TKI-projecten

NLR - Projectnummer: 1283206

Titel: Thermoplastich Composieten Stoelframe

Penvoerder: Dutch Thermoplastic Components BV

Partners: Dutch Thermoplastic Components BV, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Stichting CompoWorld

Roadmap: Aeronautics

Toeslagjaar: 2013 en 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Het doel van dit project is om een fabricageproces te ontwikkelen voor een thermoplastisch composieten rugframe van een vliegtuigstoel. Met thermoplastisch composiet kan een vliegtuigstoel worden gemaakt die voldoet aan de “Fire, Smoke and Toxicity”-regels en tegelijkertijd lichter is dan een vliegtuigstoel met een aluminium rugframe.
In het project zal een keuze worden gemaakt voor een aantal meest geschikte processen. Alle geselecteerde processen worden verder uitgewerkt, inclusief een analyse van de aan deze processen verbonden kosten. Een conceptueel eindige elementenmodel moet uitwijzen of de ontwerpen aan de structurele eisen voldoen.
Uiteindelijk worden er productietrials uitgevoerd met bijvoorbeeld fibre placement en persen. Deze trials moeten uitwijzen welke processen daadwerkelijk wel en niet mogelijk zijn en welke kosten en technische implicaties eraan verbonden zijn.
Met het geoptimaliseerde proces worden drie demonstrators gebouwd om het proces en het product te valideren. Het uiteindelijke product wordt structureel getest en getoetst aan de structurele eisen.
Aan het eind van dit project wordt er een productontwerp en productieproces opgeleverd waarmee de eerste stappen gezet kunnen worden richting serieproductie van het thermoplastisch stoelframe.
Door uitvoering van dit programma ontwikkelt het NLR geautomatiseerde productietechnologieën waarmee hoogwaardige thermoplasten composietonderdelen met een complexe geometrie kosteneffectief kunnen worden geproduceerd. Hiermee wordt een belangrijke stap gezet om de recurring kosten van composietproducten te verlagen, de reproduceerbaarheid te verhogen en het afvalpercentage te verminderen. Dit is van groot belang om de (inter)nationale concurrentiepositie van de Nederlandse maakindustrie te verbeteren.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 45000
Industrieel/Toegepast:	€ 135000	*Waarvan Private cash:*	€ 90000
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	*€ 0*
Totaalbegroting:	***€ 135000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284302

Titel: Crosstalk

Penvoerder: Fokker Elmo B.V.

Partners: Fokker Elmo B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2013 en 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Het onderzoek maakt deel uit van een langlopend onderzoek op het gebied van elektromagnetische overspraak in vliegtuigbekabeling. In voorgaande onderzoek is met name gekeken naar de overspraak tussen afgeschermde en niet-afgeschermde kabels. In het huidige onderzoek zal worden onderzocht wat de invloed is van het twisten van draadparen op de overspraak. Twisted pairs worden veel toegepast in vliegtuigen. Daarom is het belangrijk het electromagnetische gedrag van deze twisted pairs te bepalen zodat dit kan worden meegenomen in het EMC-ontwerp van de kabelbundel.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 35000
Industrieel/Toegepast:	€ 70000	*Waarvan Private cash:*	€ 35000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 70000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1283208

Titel: ECOMISE

Penvoerder: Deutsches Zentrum für Luft- und Raumfahrt EV

Partners: Deutsches Zentrum für Luft- und Raumfahrt EV, Dassault Systemes SA, Airborne Technology Centre BV, Faserinstitut Bremen EV, Hutchinson SA, SHORT BROTHERS PLC, LOOP TECHNOLOGY LIMITED, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, POLYWORX BV, SAMTECH SA, SYNTHESITES INNOVATIVE TECHNOLOGIES

Roadmap: Aeronautics

Toeslagjaar: 2013 en 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Binnen de huidige ontwikkeling van composieten onderdelen en productieprocessen wordt een disproportioneel hoge inspanning geleverd om optimale procesparameters te vinden om aan de vereiste kwaliteiten en toleranties van high performance lichtgewicht constructies te voldoen.

Het doel van EU-project ECOMISE is om een baanbrekend productiesysteem om de volgende generatie van thermohardende composietenfabricage en post-processing mogelijk te maken. Binnen deze nieuwe aanpak worden procestechnieken met hoge precisie ontwikkeld voor Advanced Dry Fibre Placement (AFP), infiltratie (Resin Tranfser Infusion / Resin Transfer Moulding) en uitharden, om de procesefficiëntie te maximaliseren tegen lagere kosten en minder productietijd door minder materiaalverbruik, hogere reproduceerbaarheid, minder energie, minder afval en minder nabewerking.

Innovatieve online procesbewakingssystemen, probabilistische simulatiemethoden, evenals een nieuwe methode voor in-situ structurele evaluatie van de resulterende composieteigenschappen worden in detail ontwikkeld, gevolgd door een nieuwe, op kennis gebaseerde methode voor in situ procesaanpassing met betrekking tot initiële structurele specificaties. Op deze nieuwe manier kunnen de vereiste structurele prestaties van het uiteindelijke composieten product worden gekoppeld en gegarandeerd tijdens elke productiestap, terwijl kwalificatiekwesties in het vroegste stadium kunnen worden aangekaart.

Geavanceerde karakteriserings- en testtechnieken zullen worden benut en afgestemd om de efficiëntie van het proces voor de vereiste kwaliteit van het product te evalueren, door te focussen op procesrobuustheid en doorvoersnelheid. Vervolgens wordt de verminderde ecologische voetafdruk geëvalueerd tijdens de productie en in-service.

De resulterende economische voordelen van de ECOMISE-aanpak zal worden geëvalueerd en aangetoond door pilot-implementaties voor industrieel gebruikscasussen, waarbij bijzonderheden worden beschouwd voor de productie van volumeonderdelen (automotive), grote onderdelen (luchtvaart) en dikke complexe onderdelen (marine). Hier wordt een significante impact verwacht voor het MKB en de industriële eindgebruikers en leveranciers van composieten structuren, alsook van faciliterende bedrijven die meetsystemen en software-oplossingen leveren.

In dit programma wordt een nieuwe methode ontwikkeld die tijdens geautomatiseerde composietenproductieprocessen afwijkingen detecteert en automatisch corrigeert volgens het “in één keer goed” principe. Ten opzichte van conventionele productieprocessen zal door middel van toepassing van nieuwe methoden afval, maar ook afkeur, tot een minimum worden beperkt. Dit resulteert in een significante reductie van materiaal- en energieverbruik, maar zal ook leiden tot kortere doorlooptijden en uiteindelijk resulteren in aanzienlijke kostenbesparingen. Dit is essentieel voor het vergroten van de concurrentiepositie en het verbreden van de markt voor de opkomende Nederlandse composietindustrie.

NLR stelt criteria op voor processen en meetmethoden en inventariseert, rangschikt en selecteert detectie-apparatuur. Methoden worden ontwikkeld om gedetecteerde afwijkingen terug te koppelen naar het ontwerp om vervolgens correctieve maatregelen te treffen. Het systeem wordt geïmplementeerd op NLR’s fiber placement faciliteit, waarna validatie en evaluatie van het systeem zal plaatsvinden op industriële componenten.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 132600
Industrieel/Toegepast:	€ 5366449	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 1399592
Totaalbegroting:	***€ 5366449***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1283202

Titel: SmaRTMoulding

Penvoerder: Fokker Landing Gear B.V.

Partners: Fokker Landing Gear B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Stichting CompoWorld

Roadmap: Aeronautics

Toeslagjaar: 2013 en 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

De afgelopen jaren is veel onderzoek gedaan naar verbetering en automatisering van Resin Tranfer Moulding (RTM)-processen, maar het gebruik van gereedschappen (wisselen en onderhoud van mallen) en de daarbij behorende logistiek (bij serieproductie) is tot op heden niet beschouwd. Om het produceren van producten, door middel van RTM, robuust en economisch verantwoord te maken is onderzoek nodig naar "slimme" RTM-malsystemen. In dit project wordt onderzoek gedaan naar flexibele preform mallen om daarmee het aantal mallen sterk te verminderen. Tevens wordt onderzoek gedaan naar krimpcompensatie in RTM-mallen om daarmee afkeur van producten te verminderen. Door de uitvoering van dit programma ontwikkelt het NLR nieuwe malconcepten waarmee met kleine aanpassingen verschillende producten door middel van harsinjectie kunnen worden gemaakt. Hiermee wordt een belangrijke stap gezet om de non-recurring kosten van deze categorie composietproducten te verlagen. Dit is van groot belang om de (inter)nationale concurrentiepositie van de Nederlandse maakindustrie te verbeteren.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 90000
Industrieel/Toegepast:	€ 270000	*Waarvan Private cash:*	€ 180000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 270000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1283204

Titel: AFLoNext

Penvoerder: Airbus Operations GmbH

Partners: Airbus Operations GmbH, Aernnova Engineering Solutions Iberica SA, Airbus Operations Limited, Airbus Operations SAS, Airbus Operations SL, ACQ INDUCOM, AIRCRAFT RESEARCH ASSOCIATION LIMITED, ASCO INDUSTRIES N.V., BAE Systems (Operations) Ltd, CENTRE EUROPEEN DE RECHERCHE ET DE FORMATION AVANCEE EN CALCUL SCIENTIFIQUE, CFS ENGINEERING SA, CENTRO ITALIANO RICERCHE AEROSPAZIALI SCPA, THE CITY UNIVERSITY, COEXPAIR SA, DASSAULT AVIATION SA, DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, AIRBUS DEFENCE AND SPACE GMBH, AIRBUSGROUP LIMITED, TOTALFORSVARETS FORSKNINGSINSTITUT, FOKKER AEROSTRUCTURES BV, FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V GKN Aerospace Services Limited, ISRAEL AEROSPACE INDUSTRIES LTD., IBK-INNOVATION GMBH & CO. KG, INSTITUTUL NATIONAL DE CERCETARI AEROSPATIALE ELIE CARAFOLI - I.N.C.A.S. SA, INVENT INNOVATIVE VERBUNDWERKSTOFFEREALISATION UND VERMARKTUNG NEUERTECHNOLOGIEN GMBH*, KUNGLIGA TEKNISKA HOEGSKOLAN, L - UP SAS, MESSIER-BUGATTI-DOWTY SA,

Roadmap: Aeronautics

Toeslagjaar: 2013 en 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:
In het EU-project AFLoNext wordt onderzoek uitgevoerd naar stromingsbeheering middels een fluidic jet ter plaatse van de verbinding tussen een aerodynamisch oppervlak en de romp, in transsone condities. Het NLR-onderzoek richt zich initieel op de validatie van benodigde methodieken voor deze toepassingen. Verder richt het onderzoek zich op de elektrische integratie van actuatoren en de ontwikkeling van een inzetstuk in de vleugel voor de fysieke integratie van deze actuatoren. Tevens wordt er gewerkt aan een afzuigpaneel, waarin ook elektrische anti-icing geïntegreerd wordt.
Meerwaarde voor TKI-programma is dat door gezamenlijke deelname van Nederlandse partijen op een gefocusseerde manier kennis wordt opgebouwd en kennis van andere AFLoNext-partners wordt geabsorbeerd. Deze toepasbare kennis zal in de toekomst noodzakelijk zijn bij de ontwikkeling door de Nederlandse maakindustrie van nieuwe vliegtuigonderdelen inclusief flow control functies. Nieuwe toekomstige ultra long range vliegtuigen zullen naar verwachting dergelijke componenten moeten bevatten.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 276700
Industrieel/Toegepast:	€ 36879692	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 7725625
Totaalbegroting:	***€ 36879692***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1283301

Titel: ASHLEY

Penvoerder: Thales Avionics

Partners: Thales Avionics SAS, Airbus Operations Limited, Airbus Operations SAS, Alenia Aermacchi SPA, Appl. Res. Techn. Tr. Industr. Collaborat. Nederl. BV, AIRBUS OPERATIONS GMBH, DIEHL AEROSPACE GMBH, NORD-MICRO AG & CO OHG, GMVIS SKYSOFT SA, STIFTELSEN SINTEF, ACQ INDUCOM, DASSAULT AVIATION SA, Eaton Aerospace Limited, GE AVIATION SYSTEMS LTD, STATE RESEARCH INSTITUTE OF AVIATION SYSTEMS, HS ELEKTRONIK SYSTEME GMBH, INSTITUTO DE SOLDADURA E QUALIDADE, MESSIER-BUGATTI-DOWTY SA, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Oxsensis Limited, UNIVERSITA DELLA SVIZZERA ITALIANA SAAB AKTIEBOLAG, SAGEM DEFENSE SECURITE, SYSGO AG, GTD SISTEMAS DE INFORMACION SA, SMART FIBRES LTD, TELETEL S.A. - TELECOMMUNICATIONS AND INFORMATION, TECHNISCHE UNIVERSITAET HAMBURG-HARBURG, INTERTECHNIQUE SAS,

Roadmap: Aeronautics

Toeslagjaar: 2013, 2014, 2015*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

In search for a more competitive, multiple types of aircrafts, IMA based, avionics platform solution, the European aerospace industry has recently initiated the IMA2G paradigm thanks to the EC funded SCARLETT project.
This latter successfully validated a first underlying set of IMA2G concepts (Separate Core Processing resources from I/O resources, introduce resource segments typology of electronics solutions, provide platform services layer to function supplier etc.), thus creating the expected Distributed Modular Electronics (DME) breakthrough to lay IMA2G solid rock foundations.
The goal of the work within ASHLEY is to go on carrying out research on top of the existing SCARLETT state-of-the-art in areas where innovations are likely to make the most of DME growth potential :

• Extension of DME concepts and solutions to other aircraft domains especially the open world domain, leading to the definition of DME security components.
• Common remote I/O resources typology including high integrity, time critical remote solutions.
• Multi-domains, secured Data Distribution services to streamline aircraft data distribution.
• Development of an efficient system designer oriented IMA2G Tooling Framework solution that remains compliant with IMA2G industrial and certification constraints.
• Development of a generation of digital i.e. smart sensors based on new advanced photonics technologies.

ASHLEY innovations will be supported by advanced processes, methods and tools for an efficient implementation in the future and validated thanks to the ASHLEY Large Scale aircraft representative Demonstrator.
By progressing as described above the European Industry will be in a position to offer a common secured multi-domain avionics platform solution across a worldwide range of aircraft types, at a higher level of maturity at entry into service.
NLR will work in one sub-project and will obtain knowledge on DME concepts applied to the open world domain, focusing on security, safety, data communication, use of databases, use of COTS components, and agile techniques for system development.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 195000
Industrieel/Toegepast:	€ 39834293	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 16130208
Totaalbegroting:	***€ 39834293***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1283205

Titel: E-BREAK

Penvoerder: Turbomeca SA

Partners: Turbomeca SA, ALCIMED, ALSTOM NV, AVIO SpA, Bauhaus Luftfarth E.V., INDUSTRIA DE TURBO PROPULSORES SA, MTU AERO ENGINES GMBH, ROLLS-ROYCE DEUTSCHLAND LTD & CO KG, ROLLS-ROYCE PLC, SNECMA SA, TECHSPACE AERO SA, VOLVO AERO CORPORATION AB, WYTWORNIA SPRZETU KOMUNIKACYJNEGO PZL - RZESZOW SA, AAC MICROTEC AB, CENTRO DE ESTUDIOS E INVESTIGACIONES TECNICAS, CHALMERS TEKNISKA HOEGSKOLA AB, FUNDACION CENTRO DE TECNOLOGIAS AERONAUTICAS, DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, DUTCHAERO BV, ENGINSOFT SPA INSTITUT SUPERIEUR DE L'AERONAUTIQUE ET DE L'ESPACE, KARLSRUHER INSTITUT FUER TECHNOLOGIE, UNIVERSITE DE TECHNOLOGIE DE BELFORT MONTBELIARD, OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, POLITECNICO DI MILANO, POLITECNICO DI TORINO, SULZER METCO AG, TECHNISCHE UNIVERSITAET DRESDEN,

Roadmap: Aeronautics

Toeslagjaar: 2013 en 2015*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

In het EU-project E-BREAK onderzoeken het NLR en DutchAero samen met Europese partners het slijtproces van 'abrasieven'. In een vliegtuigmotor zit tussen de draaiende turbinebladen en de motorbehuizing een kleine spleet om er voor te zorgen dat de bladen vrij kunnen draaien. Onder bepaalde omstandigheden (bijvoorbeeld een harde landing) kunnen de draaiende bladen de motorbehuizing raken. Daarbij slijt de zogenaamde 'abrasief' die op de motorbehuizing is aangebracht en worden de kostbare turbinebladen gespaard. Verandering van de kleine spleetgrootte heeft echter een relatief groot negatief effect op de efficiëntie van de motor. Het is daarom van groot belang om het slijtproces te kunnen voorspellen om verbeterde ‘abrasieven’ te kunnen ontwikkelen. Tijdens het slijtproces treden vele complexe fysische fenomenen op, zoals impact bij hoge snelheden, wrijving, hoge temperaturen en materiaalschade. In 2013 heeft het NLR een initieel rekenmodel ontwikkeld om het slijtageproces te kunnen voorspellen. Projectpartners hebben meetdata aangeleverd die zijn bestudeerd door het NLR. Deze meetdata is verkregen uit een eerste serie proeven in een testopstelling. Hierbij zijn de optredende effecten onderzocht en is een plan gemaakt hoe de fysische effecten gemodelleerd kunnen worden. De kennis die het NLR in dit project opdoet kan ingezet worden om complexe processen te modeleren.

Daarnaast werkt het NLR in E-BREAK aan de toepassing van hogetemperatuur-composieten in gasturbinedelen. Het NLR is voor het beoogde onderdeel verantwoordelijk voor het ontwikkelen van het productieproces en materiaalkarakteristiek tijdens het proces. Door toepassing van de hogetemperatuur-composieten wordt het gewicht gereduceerd maar wordt ook een functioneel beter werkend gasturbinedeel mogelijk. Het NLR kan middels dit project de Nederlandse industrie beter ondersteunen bij kennis- en fabricage/productontwikkeling van hogetemperatuur-composieten waar duidelijke groei in zit, onder andere in gasturbinedelen. Dit is van groot belang om de (inter)nationale concurrentiepositie van de Nederlandse maakindustrie te verbeteren.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 313342
Industrieel/Toegepast:	€ 29993566	*Waarvan Private cash:*	*€ 0*
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	€ 9462592
Totaalbegroting:	***€ 29993566***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284301

Titel: Thermal Analysis

Penvoerder: Fokker Elmo B.V.

Partners: Fokker Elmo B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Space

Toeslagjaar: 2013 en 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

The project Model Development leads to validated thermal model covering most relevant wiring situations with known and appropriate accuracy that is acceptable as proof in verification support. Its results are conditional to the program future state of art: automated thermal design to deliver safer wiring with a lower weight requiring less engineering effort.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 36000
Industrieel/Toegepast:	€ 72000	*Waarvan Private cash:*	€ 36000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 72000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284204

Titel: Demonstration Additive Manufacturing on an Inconel 718 gas turbine component

Penvoerder: DutchAero BV

Partners: DutchAero BV, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2014; Fase:* Afgerond

Omschrijving:

Research on the potentials of manufacturing by Selective Laser Melting of a Ni-base alloy and the product quality that can be achieved with the current state-of-the-art Selective Laser Melting technology and the corresponding material properties.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 5000
Industrieel/Toegepast:	€ 10000	*Waarvan Private cash:*	€ 5000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 10000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284206

Titel: Validation of unsteady aerodynamic CFD codes for structural dynamics qualification of civil aircraft

Penvoerder: Duits-Nederlandse Windtunnels

Partners: Duits-Nederlandse Windtunnels, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

In this private-public partnership research is done and knowledge is accumulated on aeroelastic wind tunnel model design and testing. Successful qualification of civil aircraft in the area of structural dynamics and flutter calls for validated unsteady aerodynamic CFD codes, especially in the transonic flow regime where potentially dangerous phenomena such as transonic dip can occur. Advanced aerodynamic modelling using validated CFD codes is required to ensure robust and reliable structural dynamics qualification of civil aircraft in the future. A first necessary step towards this goal is aeroelastic wind tunnel model and testing, including development of a design methodology for semi dynamically-scaled transonic wind tunnel flutter models.
An unsteady transonic wind tunnel model (based on Embraer DT geometry) will be developed and tested in DNW's high speed wind tunnel (HST). The pressure sensors and accelerometers that are installed in the wind tunnel model will generate relevant data for unsteady aerodynamic CFD codes validation.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 300000
Industrieel/Toegepast:	€ 300000	*Waarvan Private cash:*	€ 618000
Experimenteel:	€ 618000	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 918000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284207

Titel: Automatische preform aanmaak door middel van Pick-and-Place

Penvoerder: Fokker Landing Gear B.V.

Partners: Fokker Landing Gear B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Stichting CompoWorld

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Een grote kostenpost in het maken van dikke composieten onderdelen met behulp van Resin Transfer Moulding (RTM) is het handmatig maken van preforms. Om componenten zoals een drag brace van een composieten landingsgestel of balken en kokers in automotive-toepassingen betaalbaar te kunnen blijven maken is het nodig om het preformen te automatiseren. Dit kan op verschillende manieren. Een huidige state-of-the-art methode is het preformen met behulp van pick-and-place robots. Hierbij worden vlakke weefsels of prepregs vanaf een snijmachine op een nieuwe positie samengevoegd tot een vlakke preform. Voor veel onderdelen is echter een vlakke preform niet voldoende. De vlakke preforms moeten nog tot bijvoorbeeld een U-vorm worden gezet en op een uiteindelijke maat gesneden worden. Hierbij moet de kwaliteit van de weefsellagen gewaarborgd kunnen worden.
In dit project wordt onderzocht of het huidige niveau van pick-and-placen van vlakke laminaten kan worden uitgebreid met drie taken: het vormen van U-vormige preforms, het op maat maken van deze U-vormige preforms en het automatisch controleren van de afmetingen en vezelrichtingen in de preform. Tevens wordt een eenvoudig kostenmodel opgezet om het gehele automatiseringsproces te kunnen evalueren in vergelijking met de huidige handmatige preform-processen, waarbij zowel fabricagekosten als noodzakelijke investeringen zullen worden meegewogen.
Door de uitvoering van dit programma ontwikkelt het NLR “Robot Based Composite Manufacturing Technologies”. Hiermee wordt een belangrijke stap gezet om de recurring kosten van composietproducten te verlagen, de reproduceerbaarheid te verhogen en het afvalpercentage te verminderen. Dit is van groot belang om de (inter)nationale concurrentiepositie van de Nederlandse maakindustrie te verbeteren.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 36000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 180000
Experimenteel:	€ 270000	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 270000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285101

Titel: MTM Flight Trials

Penvoerder: Thales Avionics

Partners: THALES AVIONICS, LIEBHERR-AEROSPACE LINDENBERG GMBH, LIEBHERR AEROSPACE TOULOUSE SAS, LIEBHERR-ELEKTRONIC GMBH, THALES AVIONICS ELECTRICAL SYSTEMS S.A., AIRBUS SAS, AIRBUS OPERATIONS SAS, AIRBUS OPERATIONS GMBH, AIRBUS OPERATIONS LIMITED, ALENIA AERMACCHI SPA, ROLLS-ROYCE, LABINAL POWER SYSTEMS, SAFRAN ENGINEERING, MESSIER-BUGATTI-DOWTY SA, TECHSPACE AERO SA, ZODIAC AEROTECHNICS SAS, ZODIAC ECE, ZODIAC AEROSAFETY SYSTEMS, UNIVERSITY OF NOTTINGHAM, DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, EADS DEUTSCHLAND GMBH EADS UK LTD., AERONAMIC BV, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, TECHNISCHE UNIVERSITEIT DELFT, UNIVERSITY OF MALTA, CRANFIELD UNIVERSITY, SELEX ES SPA, Airbus Operations SL,

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Het “Systems for Green Operations” ITD (Integrated Technology Demonstrator) programma van CleanSky richt zich op het demonstreren van nieuwe systemen en functies aan boord van een vliegtuig, welke duidelijk milieuvriendelijk zijn en relevante economische voordelen bieden. Naast het programma-onderdeel “Management of Aircraft Energy” (MAE) worden deze voordelen verwacht van “Management of Trajectories and Missions” (MTM). Voor dit laatste programma-onderdeel is een optimalisatie- en geleidingsfunctie voor Flight Management Systems (FMS) in ontwikkeling ten behoeve van Continuous Descent Operations (CDO), gebaseerd op tijd en energie. Deze nieuwe technologie, genaamd “Multi Parameter Guidance with Time and Energy Managed Operations” (MPG-TEMO), optimaliseert een daling en nadering van een vliegtuig tot de landingsbaan, rekening houdend met meerdere parameters tegelijkertijd. De innovatie van MPG-TEMO technologie, zeker ten opzichte van huidige CDO’s, is dat deze technologie beoogt de daling en nadering zoveel mogelijk “idle-thrust” uit te voeren door middel van energiemodulatie, en tegelijkertijd te voldoen aan de door ATC opgelegde tijdsdoelstellingen. Deze milieuvriendelijke aanpak maakt het naar verwachting mogelijk de economisch voordelige CDO’s ook overdag uit te voeren zonder negatieve gevolgen voor de capaciteit van de luchthaven. Het NLR heeft samen met partners afgelopen jaren verschillende experimenten uitgevoerd om de MPG-TEMO technologie op een hoger Technology Readiness Level (TRL) te krijgen. De geplande vliegproeven in 2015 met het NLR onderzoeksvliegtuig zijn binnen het CleanSky programma hierin het sluitstuk en betreffen en nieuw project.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 169000
Industrieel/Toegepast:	€ 23183396	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 9932738
Totaalbegroting:	***€ 23183396***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285222

Titel: Predesign of the structure for the RPA-3

Penvoerder: Ampyx Power B.V.

Partners: Ampyx Power B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

With its PowerPlane® technology, Ampyx Power can bring about dramatic change in the energy sector. PowerPlanes will generate renewable power at cost levels far below fossil-fueled alternatives such as coal-fired power plants. This will allow utility companies and banks to invest in renewable power generation capacity while sustainability drivers and economic drivers point in the same direction. The remotely piloted aircraft (RPA) is one of the elements of the PowerPlane® technology. This RPA is an innovative aircraft that generates efficiently power when connected to the tether, whereas it is able to safely land when disconnected from the tether. This requires ground-breaking development of aircraft technology. The RPA is developed in a process during which prototypes of increasing scale and complexity are developed and flight-tested. This Public-Private Partnership is an essential step in the development of RPA-3, which is aimed to be the last scaled prototype before the development of the first production version. The RPA-3 is aimed to be tested in a real operational environment. In this Public-Private Partnership NLR will combine its aircraft development knowledge and experience for existing aircraft with relevant existing scientific and technological know-how to predesign the highly innovative structure for the RPA-3, as an experimental step towards the completely new RPA product. It is envisaged that the Public-Private Partnership will extend to the full development of the structure in follow-on projects. This Public-Private Partnership is a follow-up of the predesign support project. The objectives of the Public-Private Partnership are to confirm the feasibility of the structure of the RPA-3 and to develop the innovative preliminary structural design of the RPA-3. The additional value for the TKI-programme is to enable the development of a competitive Dutch airborne wind energy product, which would otherwise be impossible without the aircraft knowledge from NLR. The results of the research can be directly used to support the Dutch industry in developing RPA.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 53000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 159000
Experimenteel:	€ 212000	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 212000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284208

Titel: SFWA - Innovative Engine Demonstrator Flying Testbed

Penvoerder: AIRBUS SAS

Partners: AIRBUS SAS, AIRBUS OPERATIONS SAS, AIRBUS OPERATIONS GMBH, AIRBUS OPERATIONS LIMITED, AIRBUS OPERATIONS SL, SAAB AB, DASSAULT AVIATION SA, EADS CONSTRUCCIONES AERONAUTICAS SA, FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V, ROLLS-ROYCE PLC, AIRCELLE SA, MESSIER-DOWTY LIMITED, SNECMA SA, SAGEM DEFENSE SECURITE, THALES AVIONICS SAS, DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, RUAG SWITZERLAND LIMITED, FOKKER AEROSTRUCTURES BV, AIRBORNE TECHNOLOGY CENTER B.V., Microflown Technologies STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, FOKKER ELMO B.V., TECHNISCHE UNIVERSITEIT DELFT, UNIVERSITEIT TWENTE, INCAS-NATIONAL INSTITUTE FOR AEROSPACE RESEARCH, S.C STRAERO SA, S.C AVIOANE CRAIOVA SA, S.C ROMAERO SA,

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

To perform detailed static & dynamic aero-elastic CROR simulations and compare with ONERA-S1 wind tunnel experimental data on blade deformation and rotor aero-acoustic performance.
To participate to the post-test comparison of numerical predictions with CROR rig test experiments performed in DNW-LLF & ONERA-S1.
To develop CFD/CAA capabilities for full aircraft geometries (i.e. with deployed high lift devices and CROR) and compare the numerical (aero-acoustic) predictions with experiments performed in DNW-LLF.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 200000
Industrieel/Toegepast:	*€ 26328359*	*Waarvan Private cash:*	*€ 0*
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	€ 11292748
Totaalbegroting:	***€ 26328359***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284210

Titel: Advancement of acoustic array technologies for aeronautical wind tunnel testing

Penvoerder: Duits-Nederlandse Windtunnels

Partners: Duits-Nederlandse Windtunnels, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The research and development of modular noise and autofocus algorithms to support acoustic wind tunnel testing. To support this development a highly detailed (representing acoustic noise sources) wind tunnel model will be designed and manufactured. The wind tunnel model will be an Embraer 175E2 configuration. Embraer will provides wind tunnel test data and full scale test data to validate the algorithms.The noise measurements for this test will be carried out in a closed-test section configuration. In this case array measurements are required to obtain reliable results and therefore the noise is only measured at t wo directivity angles. Modular noise algorithms will be developed based on public noise models. These algorithms aim to reconstruct the aircraft noise directivity by ad-hoc calibration of thenoise source models based on the array measurement. Noise levels can now be expressed the EPNL, a measure based on which aircraft manufacturers can quickly assess the acoustic performance.An improvement to current beamforming software will be researched and developed. An algorithm inspired on autofocus techniques in photography is envisaged, that allows automated assessment if a noise source lies within a defined scan grid and adjustment to the right position. This will greatly enhance the depth of focus of the array, and furthermore open up the possibility to obtain source maps for a 3D volume instead of a 2D plane. Furthermore, the quality of the source maps is improved since spurious noise source due to out-of-plane source can be filtered out

---

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 566000
Industrieel/Toegepast:	*€* 566000	*Waarvan Private cash:*	*€* 1796200
Experimenteel:	*€* 1796200	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 2362200***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284212

Titel: Research on smart wind tunnel correction methods

Penvoerder: Duits-Nederlandse Windtunnels

Partners: Duits-Nederlandse Windtunnels, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Research on smart wind tunnel correction methods in order to improve the prediction accuracy of CFD based wind tunnel interference models and the associated methodology to derive wind tunnel wall/support corrections.
Wind tunnel testing is a key part of aeronautical research. However, the measurement data of any wind tunnel experiment is contaminated by the aerodynamic interference of the model mounting system and the tunnel walls. Tunnel interference is a complex subject, due to the fact that wind tunnel calibrations, tunnel wall and model support interference are closely related to each other. Therefore, wind tunnel interference continues to be a research item, particularly at high transonic Mach numbers.
The effects of wind tunnel interference to the aerodynamic characteristics of test articles can be assessed from flow solutions based on CFD technology. Computational methods like CFD have matured to a level which allows for the simulation of the transonic flow over a test article in a wind tunnel and free air environment. Combination of the two mentioned computational results provides the increments related to wind tunnel interference. The virtue of CFD methods is the ability to accurately predict increments and is therefore a valuable tool to address the aerodynamic interference of a wind tunnel. The answers provided by CFD also allow for a critical examination and improvement of existing wind tunnel correction procedures that are based on lower fidelity flow physics models, e.g. linear compressible flow. The largest benefit of CFD based wind tunnel interference appears in the high-lift and/or high transonic Mach number flow regimes, where HST-DNW clients have also their key interest.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 246000
Industrieel/Toegepast:	*€ 246000*	*Waarvan Private cash:*	*€ 890000*
Experimenteel:	*€ 890000*	*Waarvan Private inkind:*	*€ 0*
Totaalbegroting:	***€ 1136000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285102

Titel: Future Sky Safety

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, CEIIA - CENTRO PARA A EXCELENCIA EINOVACAO NA INDUSTRIA AUTOMOVEL, CENTRO ITALIANO RICERCHE AEROSPAZIALI SCPA, CSEM CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA - RECHERCHE ET DEVELOPPEMENT, INSTITUTUL NATIONAL DE CERCETARI AEROSPATIALE ELIE CARAFOLI - I.N.C.A.S. SA, INSTITUTO NACIONAL DE TECNICA AEROESPACIAL, VYZKUMNY A ZKUSEBNI LETECKY USTAV A.S., TOTALFORSVARETSFORSKNINGSINSTITUT, EUROCONTROL - EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION, CIVIL AVIATION AUTHORITY, AIRBUS SAS, AIRBUS OPERATIONS SAS, EADS - CONSTRUCCIONES AERONAUTICAS S.A., THALES AVIONICS SAS, THALES AIR SYSTEMS SAS, DEEP BLUE SRL, TECHNISCHE UNIVERSITAET MUENCHEN, DEUTSCHE LUFTHANSA AKTIENGESELLSCHAFT, SERVICE TECHNIQUE DE L'AVIATION CIVILE EMBRAER PORTUGAL ESTRUTURAS EM COMPOSITOS SA, FEDERAL STATE UNITARY ENTERPRISE THE CENTRAL AEROHYDRODYNAMIC INSTITUTE NAMED AFTER PROF. N.E. ZHUKOVSKY, ENAV SPA, BOEING RESEARCH & TECHNOLOGY EUROPE S.L.U., LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE, ALENIA AERMACCHI SPA, CRANFIELD UNIVERSITY, THE PROVOST, FELLOWS, FOUNDATION SCHOLARS & THE OTHER MEMBERS OF BOARD OF THE COLLEGE OF THE HOLY & UNDIVIDED TRINITY OF QUEEN ELIZABETH NEAR DUBLIN,

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Het project zal technologie of concepten ontwikkelen die aan boord van het vliegtuig komen en aan de vlieger guidance kunnen geven die zal leiden tot lager runway excursion risico. Er worden algoritmes en tools ontwikkeld waarmee luchtvaartmaatschappijen beter gebruik kunnen maken van de aan boord geregistreerde data en waarmee ze in staat zijn om hun risico op runway excursions te monitoren en tijdig mitigerende maatregelen te treffen. Door deelname van KLM in dit project wordt onmiddellijk een effect gesorteerd bij een operator. Tenslotte zal er onderzoek gedaan worden naar de stopping performance op contaminated runways. Dit zal nieuwe kennis opleveren over de combinatie van eigenschappen van banden en pavements die interessant zal zijn voor Possehl uit Oosterhout. Ook kan dit onderzoek de basis vormen voor nieuwe regelgeving met aanvullende eisen op het gebied van friction, drainage, en andere eigenschapen van de baan en de toplaag. Het Nederlandse Possehl is in de markt voor het leveren en aanbrengen van de bijbehorende runway en pavement technologie.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 465000
Industrieel/Toegepast:	€ 16382874	*Waarvan Private cash:*	€ 0
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	€ 501794
Totaalbegroting:	***€ 16382874***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285301

Titel: Research of an improved Fibre Optical Gyroscope

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Nedaero Fibre Optic Technology B.V.

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Er wordt kennis opgebouwd op het NLR over de key performance drivers van Fibre Optics Gyros, met als doel om dit soort systemen te kunnen innoveren en verbeteren. Hierbij moet gedacht worden aan de invloed van de lengte van de fiber en de diameter van de spoel en de invloed die die parameters hebben op nauwkeurigheid en robuustheid.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 110000
Industrieel/Toegepast:	€ 345000	*Waarvan Private cash:*	€ 110000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	€ 125000
Totaalbegroting:	***€ 345000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285209

Titel: NIPSE

Penvoerder: AIRCELLE SA

Partners: AIRCELLE SA, ARTTIC, THERMOCOAX SAS, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Compañía Española de Sistemas Aeronáuticos, BAE Systems (Operations) Limited, MEGGITT AEROSPACE LIMITED, SNECMA SA, LABINAL POWER SYSTEMS, ARCHIMEDES KENTRON KAINOTOMIAS KAIDIMIOURGIAS ARCHIMEDES CENTER FOR INNOVATION AND CREATION

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Background: Novel aero engine architectures, such as the Ultra-High Bypass Ratio (UHBR) engines having a larger diameter fan, require a further examination of the powerplant system, especially the integration of the engine systems into the powerplant itself. An engine size that requires smaller and thinner nacelles will produce less space for the engine systems installation, and provides less space for ventilation solutions and the installation of traditional heat exchangers. Project Goal: The NIPSE project aims at developing new powerplant equipment, and optimising and integrating this equipment within the engine-nacelle zones in a more time effective way, so as to deliver new technologies up to TRL4 or above that match the requirements of next generation UHBR aero engines. NIPSE will be an enabler for UHBR engine architectures, a technology that is being developed in Europe to address the aero-engine propulsion efficiency gains targeted by 2030 by the Horizon 2020 and the Strategic Research and Innovation Agenda (SRIA2) of the Advisory Council for Aviation Research and Innovation in Europe (ACARE). Utilisation: Equipment installation within today's powerplant is very complex, leading to maintenance difficulties for routine maintenance and/or replacement of equipment. The movement away from the fan compartment will further exacerbate this access issue. Any powerplant installation for future engines must provide solutions which do not reduce the current maintenance access to key equipment.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 120000
Industrieel/Toegepast:	€ 6355001	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 6355001***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285216

Titel: AGILE

Penvoerder: Deutsches Zentrum für Luft- und Raumfahrt EV

Partners: DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, AIRBUS DEFENCE AND SPACE GMBH, ALENIA AERMACCHI SPA, BOMBARDIER INC., CFS ENGINEERING SA, FEDERALNOE GOSUDARSTVENNOE UNITARNOE PREDPRIYATIE CENTRALNII INSTITUTAVIACIONOGO MOTOROSTROENIYA IMENI PI BARANOVA FOKKER AEROSTRUCTURES BV, GENWORKS BV, KE-WORKS BV, KUNGLIGA TEKNISKA HOEGSKOLAN, LINKOPINGS UNIVERSITET, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, NOESIS SOLUTIONS NV, OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, POLITECNICO DI TORINO, RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN, SAAB AKTIEBOLAG, THELSYS GMBH, FEDERAL STATE UNITARY ENTERPRISE THE CENTRAL AEROHYDRODYNAMIC INSTITUTE NAMED AFTER PROF. N.E. ZHUKOVSKY, TECHNISCHE UNIVERSITEIT DELFT, UNIVERSITA DEGLI STUDI DI NAPOLI FEDERICO II

Roadmap: Aeronautics

Toeslagjaar: onbekend?*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Background: “Competitiveness through innovation” is one out of the main challenges which shapes the current EU work programme and which is highlighted by the “Europe 2020 Flagship Initiative Innovation Union” [European Commission, “Europe 2020 Flagship Initiative Innovation Union", Brussels, 2010]. Therefore, a competitive supply chain able to rapidly introduce novel, innovative products and to reduce product development costs is a very important contribution leading to lower operational costs and a more affordable transport system for the citizen. Project Goal: The AGILE overall project objective targets the significant reduction in aircraft development costs, by enabling a more competitive supply chain able to reduce the time to market of innovative aircraft products. Utilisation: AGILE develops and quantifies innovative technologies that will result in lower lead times and costs of aircraft and its systems. AGILE focuses on the early stages of the development process, including certification constraints, targeting at least a 40% reduction in time to solve an MDO problem.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 500000
Industrieel/Toegepast:	€ 7574808	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 7574808***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285221

Titel: Model DAQ system

Penvoerder: Duits-Nederlandse Windtunnels

Partners: Duits-Nederlandse Windtunnels, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

The project “Research on High Performance Miniaturized Data Acquisition System for Windtunnel Models” leads more advanced instrumentation and miniaturized data acquisition for wind tunnel models. This enables NLR and DNW to maintain their world class “state of the art” in wind tunnel campaigns and wind tunnel models, and enables participation of the Dutch cluster in international aerospace projects and the supply chain of major OEMs.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 144000
Industrieel/Toegepast:	€ 659000	*Waarvan Private cash:*	€ 515000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 659000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285206

Titel: AEROGUST

Penvoerder: UNIVERSITY OF BRISTOL

Partners: UNIVERSITY OF BRISTOL, INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, DEUTSCHES ZENTRUM FUER LUFT- UND RAUMFAHRT EV, UNIVERSITY OF CAPETOWN, NUMERICAL MECHANICS APPLICATIONS INTERNATIONAL SA, Optimad engineering s.r.l., THE UNIVERSITY OF LIVERPOOL, AIRBUS DEFENCE AND SPACE GMBH, DASSAULT AVIATION SA, PIAGGIO AERO INDUSTRIES SPA, VALEOL SAS

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Background: Tijdens het ontwerp en van modificaties van vliegtuigen is kennis van de belastingen bepalend voor de sizing-analyse van vliegtuigconstructies. Een te conservatieve afschatting kan leiden tot een te zware, en daarbij minder competitieve, constructie. Belastinganalyses zijn voor bijvoorbeeld Fokker Aerostructures al in de proposalfase van cruciaal belang. Een onnauwkeurige schatting van de belastingen kan leiden tot een veiligheidsprobleem. Bij modificaties en retrofit-activiteiten door bijvoorbeeld Fokker Services moet dit uiteraard voorkomen worden. In veel gevallen vormen belastingen veroorzaakt door gust de kritische belastingen van een vliegtuig. AVFP is betrokken bij flutter-onderzoek van Fokker Services. NLR ondersteunt NL-industrie in de berekeningen van gust-belastingen ten behoeve van vliegtuigmodificatie en voor certificatiedoeleinden. Tot nu toe wordt in geringe mate onzekerheden in de modellen zelf meegenomen. Onzekerheden worden veroorzaakt door verschillende oorzaken, bijvoorbeeld productiefouten, onnauwkeurigheid van materiaaleigenschappen, onzekerheden in de gust-vorm, etcetera. Door het modelleren van onzekerheden in de gust-berekeningen kan het NLR de industrie beter van dienst zijn door een betere afschatting van de belastingen te geven, inclusief informatie over de gevoeligheid van de resultaten ten opzichte van de input. Project Goal: In het voorgestelde project samen met Europese partners wordt kennis opgebouwd om de huidige rekenmethode voor gust-belastingen te verbeteren in termen van de nauwkeurigheid, efficiëntie en modellering van onzekerheden. De volgende onderzoeksvragen zullen worden beantwoord: 1) Hoe nauwkeurig zijn de aannamen in de huidige modellering van gust, wat zijn de gevolgen in de berekende belastingen? 2) Hoe kan de huidige rekenmethode van gust-belastingen worden verbeterd met behulp van een geavanceerd aerodynamisch model, bijvoorbeeld CFD, waarbij de afhankelijkheid van experimentele data verminderd wordt? 3) Hoe kunnen de onzekerheden in het model worden gekwantificeerd en in analyse worden meegenomen? Utilisation: De resultaten van het onderzoek kunnen rechtstreek worden ingezet om NL-industrie beter te ondersteunen in de afschatting van vliegtuigbelastingen ten gevolge van gust- en vliegtuigbelastingen in het algemeen.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 300000
Industrieel/Toegepast:	*€ 4589986*	*Waarvan Private cash:*	*€ 0*
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	*€ 0*
Totaalbegroting:	***€ 4589986***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1283201

Titel: CANAL

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, UNIVERSITAET STUTTGART, TECHNISCHE UNIVERSITEIT DELFT, KATHOLIEKE UNIVERSITEIT LEUVEN, VYZKUMNY A ZKUSEBNI LETECKY USTAV A.S. OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, EUROPEAN AERONAUTIC DEFENCE AND SPACE COMPANY EADS FRANCE SAS, DASSAULT AVIATION SA, ISRAEL AEROSPACE INDUSTRIES LTD.

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Het doel van EU-project CANAL is om door middel van Dry Fibre Placement (DFP) nieuwe niet conventionele laminaatconfiguraties te ontwikkelen en om engineering tools te ontwikkelen om de implementatie van de technologie te garanderen in de lucht- en ruimtevaartindustie, maar ook in andere industrieën, zoals de automotive-industrie die kan profiteren van een snelle en kosteneffectieve productie van complex gevormde en high-performance composieten onderdelen.
Hoewel tot nu composietlaminaten meestal alleen uit 90, 0 en + / -45 graden lagen bestaan, heeft de ontwikkeling van Automated Fibre Placement technologie mogelijkheden geopend om af te wijken van deze beperkende stap in ontwerp en fabricage. Momenteel zijn er geen niet-conventionele laminaten bekend die in de industrie worden toegepast, maar onderzoek heeft veelbelovende resultaten laten zien bij virtuele analyse en coupontesten. Laminaten met variabele stijfheid en gebogen vezelbanen vertonen een toename in knikbelastingen, alsmede afstemming van eigenfrequenties van zowel platen als cilinders. Rechtevezellaminaten met verspreide vezelhoeken zijn veelbelovend voor een betere schadetolerantie. Een zogenaamde AP-PLY multi-directioneel weefpatroon kan schadetolerantie voor iedere stapelvolgorde verbeteren.
Terwijl het voor grote vliegtuigbouwers zoals Airbus en Boeing bijna de standaard lijkt om composieten te gebruiken en een hoge mate van geautomatiseerde productie te realiseren met bijvoorbeeld Automated Fibre Placement, zijn composieten en geautomatiseerde productieprocessen ook winstgevend voor de kleine vliegtuigindustrie en transportindustrie in het algemeen. Zowel gewicht- als kostenreductie kan worden bereikt met behulp van geautomatiseerde composietproductie zoals Automated Fibre Placement. Materiaalkostenreductie kan worden bereikt door gebruik te maken van droge vezels in plaats van duurdere prepregs, in combinatie met Liquid Composite Moulding in plaats van uitharden in een dure autoclaaf. De gewichts- en kostenreductie, samen met nieuwe niet-conventionele ontwerpmethoden en dry fibre placement en Liquid Composite Moulding, zullen de invoering van de lichtgewicht composieten structuren in de lucht- en ruimtevaartindustrie en andere transportindustrieën vergemakkelijken en versnellen.
Door de uitvoering van dit programma ontwikkelt het NLR een zeer kostenefficiënte, geautomatiseerde composietproductieproces door de combinatie van goedkopere startmaterialen, optimale laminaatopbouw en Automated Fibre Placement. Hiermee wordt een belangrijke stap gezet om de recurring kosten van composietproducten te verlagen, de reproduceerbaarheid te verhogen en afvalpercentage te verminderen. Dit is van groot belang om de (inter)nationale concurrentiepositie van de Nederlandse maakindustrie te verbeteren.
NLR is de coördinator van CANAL en hoofdverantwoordelijk voor het ontwikkelen van nieuwe niet conventionele laminaatconcepten, Automated Fibre Placement-productietesten, het produceren van testpanelen en uiteindelijk mede-ontwikkelen en produceren van de test articles (wingbox skin panel en rear spar).

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 219750
Industrieel/Toegepast:	€ 4704380	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 596851
Totaalbegroting:	***€ 4704380***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284201

Titel: BBYPASS

Penvoerder: Fokker Aerostructures B.V.

Partners: Fokker Aerostructures B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

This project aims to improve understanding of failure phenomena in mechanically fastened joints in composites. This is achieved through the design, application and evaluation of an innovative test facility for specific specimens that are representative for mechanically fastened joints in composite parts. Moreover, detailed finite element simulations of the tests are done to support in the design of a test facility, as well as in the interpretation and thorough understanding of the test results.
In this project advanced design criteria for bolted joints of composite parts are developed. These design criteria are based on experimental assessments of the failure behaviour of composite specimens that are representative for industrial applications. This is achieved through the design, development and exploitation of a dedicated test facility for variable bearing-bypass loading of composite laminates.
The application of novel design methods and more accurate design criteria is of key importance for the further reduction of design time and costs.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 112500
Industrieel/Toegepast:	€ 225000	*Waarvan Private cash:*	€ 112500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 225000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284209

Titel: Development of foldable rotorblade for PAL-V

Penvoerder: PAL-V Europe NV

Partners: PAL-V Europe NV, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Stichting CompoWorld

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Het NLR zal in dit samenwerkingsproject onderzoek doen naar, en kennis opbouwen over de robuustheid, de performance, de opvouw-ergonomie en de reproduceerbaarheid van inklapbare rotorbladen.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 90000
Industrieel/Toegepast:	€ 270000	*Waarvan Private cash:*	€ 180000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 270000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285215

Titel: Laser Coating Removal certification testing and support

Penvoerder: LCR Systems B.V.

Partners: LCR Systems B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

De kennis die NLR opbouwt en voor derden beschikbaar komt: kennis van verfsystemen en de interactie van lasers met verschillende (kleuren en types) verfsystemen, een beter begrip van de effecten op de materiaaleigenschappen van het gebruik van een state-of-the-art verf stripping systeem met een hoog vermogen laser beam. Geïnteresseerde partijen binnen Nederland zijn defensie, vliegtuiggebruikers (bijvoorbeeld KLM), maintenance bedrijven (bijvoorbeeld Specto).

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 106000
Industrieel/Toegepast:	€ 603600	*Waarvan Private cash:*	€ 360000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	€ 78600
Totaalbegroting:	***€ 603600***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286103

Titel: SESAR Remote Tower

Penvoerder: DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV

Partners: DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, LETOVE PREVADZKOVE SLUZBY SLOVENSKEJ REPUBLIKY STATNY PODNIK, VALSTYBES IMONE ORO NAVIGACIJA, AUSTRO CONTROL OSTERREICHISCHE GESELLSCHAFT FUR ZIVILLUFTFAHRT MBH, CROATIA CONTROL, CROATIAN AIR NAVIGATION SERVICES LTD, Luftfartverket, ENAV SPA, FREQUENTIS AG, HUNGAROCONTROL MAGYAR LEGIFORGALMI SZOLGALAT ZARTKORUEN MUKODO RESZVENYTARSASAG, INDRA SISTEMAS SA, SAAB AKTIEBOLAG, STIFTELSEN SINTEF, DFS Deutsche Flugsicherung GmbH, SWEDAVIA AB, LEONARDO - FINMECCANICA SPA, THALES AIR SYSTEMS SAS

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

This project is part of the SESAR 2020 Multi Annual Program for the period 2016-2019. It is part of the Industrial Research & Validation phase, developed under the SJU Private Public Partnership and addresses topic 8 C.5 “High Performing Airport Operations – Remote Tower for Multiple Airports (PJ05)” in particular. The costs for performing Air Traffic Service (ATS) particularly at low to medium traffic density airports are high and need to be reduced / limited. It is very important to maintain this service at small airports to keep rural and remote regions vivid and interesting for people to inhabit and for local industry to grow. Remote Tower Services (RTS) provide an opportunity for continued operations and integration of those airports into the global network. SESAR 1 performed trials to test the feasibility to perform ATS from a remote location. It was assumed that multiple remote tower operations from a single Controller Working Position (CWP) could increase

effectiveness as one operator (ATCO/AFISO) can provide service to more than one aerodrome. Validation in SESAR 1 was conducted within the frame of the three different Operational Improvements,

• Single Remote Tower for low density aerodromes – SDM-0201,
• Contingency solutions for aerodromes with one main RWY – SDM-0204 and
• Multiple solution for two low density aerodromes simultaneously – SDM-0205.

The idea of a Remote Tower Centre (RTC) was only partly covered in discussions, leaving many ideas

untouched. This results in a gap between the results achieved in SESAR 1 and the market demand for highly efficient RTC as well as for a potential multiple remote tower solution. This gap will be filled by PJ05 solutions to bring the multiple remote tower and remote tower center to a higher maturity level and provide a baseline for implementations. In Wave 1 the multiple solution will be further developed to maturity level V3, the “Remote Tower Center” solution will be reached V2 maturity.

PJ05 is composed of two solutions:

i. WP2 - Solution PJ.05-02 - Remotely Provided Air Traffic Service for Multiple Aerodromes

ii. WP3 - Solution PJ.05-03 - Remotely Provided Air Traffic Services from a Remote Tower Centre

with a flexible allocation of aerodromes to Remote Tower Modules.

NLR participates in both WP2 and WP3 of this project.

The main objective of PJ.05-02: “Remotely Provided Air Traffic Service for Multiple Aerodromes” is to validate that the provision of ATS for two or more aerodromes simultaneously is possible, and concurrently reveals a sufficient level of safety. To validate remote tower services for multiple airports, the work to be addressed focuses on different kinds of environment in order to determine the amount of airports to be controlled simultaneously. The different environments may be composed of:

• different level of airport complexity,
• varying controller workload and

• variable traffic mix (VFR- IFR-mix, rotor-fixed wing, special, RPAS).

Technical aspects, such as network quality of service and other resilience/redundancy related issues that are of key importance to the regulatory authorities need to be addressed. Furthermore, the information needs for maintaining situational awareness including the local actual and forecasted weather (MET) and the local actual and forecasted status of the infrastructure (AIM) will need to be addressed from various operational perspectives as well as short term planning tools. Attention will be given to the definition of information needs, liaising with PJ18 to develop potential System Wide Information Management (SWIM) enabled MET and AIM capabilities to support these needs, and to integrating this information into the remote Controller Working Position (CWP). Human Performance (HP) aspects in the working environment will be addressed on a case-by-case basis, as well as the impact of different technical solutions on operations. Training and licensing aspects will be considered to be prepared for the deployment phase.

The second SESAR Solution PJ.05-03 “Remotely Provided Air Traffic Services from a Remote Tower Centre with a flexible allocation of aerodromes to Remote Tower Modules” addresses the flexible use of the human resource ATCO/AFISO through a flexible and dynamic allocation of airports connected to different RTMs. In some environments an integration of airport approach positions connected to the RTC need to be investigated, and connections of RTCs with systems for flow management have to be considered.

Development of long term planning tools and features for a flexible planning of all aerodromes connected to remote tower services will be addressed. The solution further addresses additional automation functionalities like voice recognition, alerting and warnings for conflict, and resolution advisories. SWIM infrastructure, the need for the role of a RTC supervisor, technical aspects (e.g. network aspects, such as seamless integration of air/ground multi-sensor tracking), handling of contingency situations, and situational awareness as indicator for safety and cross border interoperability issues will be further considered by this solution. A V2 maturity is the aim for planning automation, and V3 maturity (Wave 2) is the aim for providing solutions for a “highly flexible allocation of aerodromes to RTMs”.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 336000
Industrieel/Toegepast:	*€ 13343815*	*Waarvan Private cash:*	*€ 0*
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	*€ 3644838*
Totaalbegroting:	***€ 13343815***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286101

Titel: IMCA

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, KLM

Roadmap: Aeronautics

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Exponential technologies are emerging on the market that, when placed in the context of air transport aircraft, enables new functionalities and business models with the potential to enrich the (both mental and physical) passenger well-being, improve the in-flight experience and contribute to an increase of operational efficiency for the airline and airline cabin staff.
Although most attention is naturally drawn to the individual application that creates the new business values, a thorough understanding of the underlying infrastructure building blocks, the way these technologies can be used on board transport aircraft, and understanding how these technologies would impact both passenger and cabin crew during flight operations is as important.
This project aims to evaluate the use of immersive technologies such as virtual reality and augmented reality in relation to exponential technologies within a cabin environment, to enable them to be used by passengers and cabin crew during (revenue) flight operation.
The fundamental question to be answered in this project is how suitable these immersive technologies are for:
1. Increasing well-being of passengers and cabin crew (human factors);
2. Generating ancillary revenue; and
3. Improving operational efficiency.
Focus areas within the project are formulated around:
1. Enrichment of the stay of passengers in the cabin space by influencing the field of view.
2. Coordination and cooperation between passenger and cabin crew.
3. Interaction between cabin crew members and cabin crew member with passengers.
4. How the aircraft technology eco-system for hosting exponential technologies inside an aircraft should look like (Architectural point of view)
5. Possibility to extent the aircraft technology eco-system from within the aircraft into the daily life of the passenger/crew member.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 182000
Industrieel/Toegepast:	€ 550385	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 52855,5
Totaalbegroting:	***€ 550385***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285307

Titel: FlexPCB vliegtuigbekabeling

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Fokker ELMO B.V.

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Het onderzoek maakt deel uit van technologie ontwikkeling voor nieuwe en compacte vliegtuigbekabeling. Voor de toekomst worden, naast de traditionele vliegtuigbekabeling, nieuwe concepten ontwikkeld, zoals FlexPCBs, geleidende strips op lange, flexibele prints. Bestaande richtlijnen voor installatie van bekabeling zijn niet toepasbaar op deze nieuwe concepten. De toepassing van deze nieuwe concepten vereist daarom uitbreiding van kennis over de Elektro-Magnetische Compatibiliteit (EMC) van deze nieuwe bedradingsconcepten. In het voorgestelde onderzoek worden modellen en tools ontwikkeld voor EMC analyse van FlexPCB concepten en toegepast op enkele representatieve proefstukken.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 14100
Industrieel/Toegepast:	€ 28200	*Waarvan Private cash:*	€ 14100
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 28200***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285306

Titel: Antenne integratie in rompdelen

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Fokker ELMO B.V.

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Dit voorstel betreft onderzoek naar structurele integratie van vliegtuig-antennes in Fiber Metal Laminate panels (GLARE panels) en in CFRP structuren met een RF transparante huid. Het voorstel is geschreven op verzoek van Fokker Technologies (Aero-structures and ELMO). Binnen dit onderzoek wordt de volgende activiteiten uitgevoerd:

• De ontwikkeling van een geminiaturiseerde prototype VHF communicatie-antenne die kan worden geïntegreerd in GLARE en het demonstreren van een Proof of Concept geïntegreerde antenne waarbij het NLR testen zal uitvoeren op een door FMLC gefabriceerde antenne. Hierbij wordt gestreefd een TRL5 te bereiken.

• De verdere ontwikkeling van een GPS-antenne in GLARE waarvan het NLR in 2015 een eerste Proof of Concept heeft gemaakt (TRL3). Ook hierbij wordt gestreefd TRL5 te bereiken.

• Ontwikkeling van concepten voor structurele integratie van een Ku-band SATCOM antenne array in CFRP romp panelen.

De kennis die bij dit onderzoek wordt opgebouwd omvat:

• Miniaturisatie van antennes (door materiaalkeuze of vorm)

• Integratie van antennes in metaallaminaat

• Interactie tussen structureel geïntegreerde antennes en de omgeving op en van het vliegtuig.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 70000
Industrieel/Toegepast:	€ 140000	*Waarvan Private cash:*	€ 70000
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	*€ 0*
Totaalbegroting:	***€ 140000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286305

Titel: Crosstalk 2

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Fokker ELMO B.V.

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Dit voorstel volgt de roadmap elektromagnetische compatibiliteit (EMC) van Fokker ELMO en is een vervolg op eerdere onderzoeken naar elektromagnetische (EM) overspraak in vliegtuigbekabeling. In voorgaand onderzoek zijn modellen voor overspraak tussen verschillende typen bedrading gecreëerd, zoals draadparen met of zonder EM afscherming en met of zonder twist.
Het huidige voorstel heeft als doel om bestaande modellen te kunnen combineren waardoor het mogelijk is om complete kabelbundels te simuleren. Binnen deze kabelbundels is er een grote mate van onzekerheid over bijvoorbeeld posities van draden in de bundel. Daardoor is het noodzakelijk om de simulatietools uit te breiden met statistische componenten om uitspraken te doen over boven- en ondergrenzen in overspraak binnen een bundel. Met dit voorstel wordt gestreefd om vanuit het entry level TRL 3 uiteindelijk TRL 5 te bereiken.
Binnen dit onderzoek wordt de volgende activiteiten uitgevoerd:

- Ontwikkeling van stochastische modellen om de invloed van variaties in verscheidene parameters van de transmissielijn te bepalen op overspraak
- Toepassing van de stochastische modellen in een tool om boven- en ondergrenzen van overspraak in relevante scenario's te bepalen.
- Onderzoek naar welke component van een kabel (bv. connector) in welke situaties het meest bijdraagt aan overspraakniveaus.
- Onderzoek naar mogelijke consequenties van de ontwikkelde kennis voor de ontwerpregels die Fokker ELMO hanteert voor het ontwerp van efficiënte en veilige bekabeling.
- Validatie van de nieuw ontwikkelde, statistische modellen.

De kennis die bij dit onderzoek wordt opgebouwd omvat:

- Stochastische en statistische modellen voor overspraak binnen complete kabelbundels.
- Dominantie van verschillende subsystemen van een vliegtuigkabel bij overspraak.
- Invloed van variaties in transmissielijn parameters op overspraakniveaus.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 75000
Industrieel/Toegepast:	€ 150000	*Waarvan Private cash:*	€ 75000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 150000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286215

Titel: CS2 ALFA

Penvoerder: FOKKER AEROSTRUCTURES BV

Partners: FOKKER AEROSTRUCTURES BV, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2016*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Background:

Technologie om laminaire stroming te realiseren is één van de weinige technologieën die voor een brandstofbesparing van meer dan 10% kan zorgen. In deze call vraagt Dassault Aviation om de maakbaarheid van een horizontaal staartvlak met natuurlijke laminaire stroming te demonstreren in een grondopstelling, die ook gebruikt kan worden voor een windtunneltest. Fokker Aerostructures trekt het voorstel en de bijbehorende kennisvragen voor de NLR-bijdrage zijn:

1. Hoe kan een leading edge gemaakt worden voor het horizontale staartvlak van een zakenvliegtuig met een oppervlaktekwaliteit die past bij laminaire stroming aan boven- en onderzijde van het staartvlak tot ver over de vleugeldoos?
2. Hoe kan deze leading edge verbonden worden met de vleugeldoos zodat de oppervlaktekwaliteit van de aansluiting past bij laminaire stroming tot ver over de beide zijden van de vleugeldoos?
3. Hoe kunnen de voorgaande 2 leading edge-concepten gedemonstreerd worden in een schaal 1:1 ground demonstrator voor de maak- en integratietechnologie?
4. Hoe kan de schaal 1:1 ground demonstrator van de maak- en integratietechnologie voor de constructie worden uitgebreid tot een windtunnelmodel voor het testen van de laminaire stroming in een hogesnelheidswindtunnel?

Project Goal:

Laminaire stromingstechnologie verder ontwikkelen door het ontwikkelen, ontwerpen en bouwen van een horizontaal staartvlak met natuurlijke laminaire stroming op volledige schaal als demonstrator.

Utilisation:

De resultaten van het onderzoek kunnen rechtstreek worden ingezet om NL-industrie (Fokker Aerostructures) om nieuwe producten (in het bijzonder nieuwe vliegtuigstaarten) te ontwikkelen voor hun klanten, zoals Dassault Aviation.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 213568
Industrieel/Toegepast:	€ 2342677	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 518714
Totaalbegroting:	***€ 2342677***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286203

Titel: CS2 IRON

Penvoerder: CENTRO ITALIANO RICERCHE AEROSPAZIALI SCPA

Partners: CENTRO ITALIANO RICERCHE AEROSPAZIALI SCPA, GE AVIO SRL, CENTRE DE RECHERCHE EN AERONAUTIQUE ASBL - CENAERO, General Electric Deutschland Holding GmbH, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, POLITECNICO DI TORINO, TECHNISCHE UNIVERSITEIT DELFT, UNIVERSITA DEGLI STUDI DI NAPOLI FEDERICO II, GE AVIATION SYSTEMS LTD

Roadmap: Aeronautics

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Background:

Coming years, there will be demand for new configurations of regional – and commuter aircraft due to an increase in oil price, the huge growth of air transport traffic and the increasing attention to the aircraft environmental footprint.

New configurations are rear mounted propeller aircraft and innovative silent, new propellers. The rear propeller installation can lead to a cleaner wing with possibilities to achieve laminar flow extension. In addition, the wing without engine nacelle, and free of propeller interference effects will be characterized by a more efficient high-lift system (flap) with a possible increase in aircraft maximum lift coefficient, which will positively affect ground performance.

A low noise propeller will be required to decrease environmental impact and improve community acceptance of turboprop aircraft.

NLR is involved in the development of a new, low noise propeller for the turboprop regional aircraft.

Project Goal:

The goals are:

• The feasibility study of an innovative turboprop configuration

• The development of an innovative low noise propeller for a conventional turboprop configuration.

For the low noise propeller that means the following tasks:

• Identify and analyze novel low noise propeller concepts

• Develop and compare propeller aero-acoustic analysis methods

• Test low noise propeller designs in a wind tunnel

The new propeller concepts include the whole design, from number of blades, rotational speed, non-homogeneous blade spacing and pitch distribution, diameter, blade shape, airfoil shape/thickness and additions to the blades such as proplets, riblets, serrations or liners.

Utilisation:

With participation in IRON NLR will gain more knowledge about acoustic and aerodynamic simulation techniques of propellers as well as the manufacturing of these propellers. This knowledge will be used to support Dutch industry by means of applying this knowledge to manufacture new test objects to be tested in wind tunnels.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 470000
Industrieel/Toegepast:	€ 6813615	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 536569
Totaalbegroting:	***€ 6813615***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286212

Titel: Research into alternative measurement techniques for remotely controlled surfaces

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Duits-Nederlandse Windtunnels

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Background:

Wind tunnel models typically employ remote controls that set angles of control surfaces remotely. The remote controls currently in use have a dedicated angle measurement device that measures the actual angle setting the remote control is set at. The angle measurement is sometimes not as accurate as required and needs maintenance between tests.

Project Goal:

The goal is to improve the remote control angle measurement systems currently used in wind tunnel models

Additional possibilities of angle measurement devices for remote controls are investigated and a prototype is designed and manufactured to be used in a wind tunnel test to generate valuable data to assess the performance.

Utilisation/ Bijdrage van dit onderzoek aan de Nederlandse kennisinfrastructuur:

The results of this research lead to improved measurement results, better matching the CFD results, and a more efficient wind tunnel test for the (NL and abroad) industry.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 51750
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 207000
Experimenteel:	€ 258750	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 258750***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286219

Titel: Research into Advanced Turbofan Propulsion Simulator Testing

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Duits-Nederlandse Windtunnels

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Background:

For propulsion and thrust reverser simulation, wind tunnel models may contain Turbine Propulsion Simulators (TPS) and various types of thrust reverser mechanisms. For larger aircraft sufficient thrust reversing can be obtained by reversing the angle of the engine's fan blades. This creates unsteady loads on the engine's fan blades. Also for new configuration aircraft (rather than engines mounted on the wings), unsteady loads are expected to be experienced by the fan blades.

Project Goal:

The goal is to investigate the level of expected unsteady loads on a wind tunnel model turbine propulsion simulator. Also, a study is performed into the feasibility of realising an advanced TPS fan, capable of producing reversed thrust and withstanding the expected unsteady loads.

Utilisation/ Bijdrage van dit onderzoek aan de Nederlandse kennisinfrastructuur:

The results of this research lead to starting up the capability of simulating thrust reversing by changing the fan blade angle and to the capability of using propulsion simulators in new aircraft configurations. This contributes to attracting more aircraft and aircraft engine manufacturers to The Netherlands for their development processes.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 114350
Industrieel/Toegepast:	*€ 0*	*Waarvan Private cash:*	*€ 457400*
Experimenteel:	*€ 571750*	*Waarvan Private inkind:*	*€ 0*
Totaalbegroting:	***€ 571750***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286216

Titel: CS2 ALGesMo

Penvoerder: MEGGITT (UK) LIMITED

Partners: MEGGITT (UK) LIMITED, MEGGITT SA, MEGGITT AEROSPACE LIMITED, TECHNOBIS FIBRE TECHNOLOGIES BV, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Achtergrond:

Landingsgestellen van vliegtuigen worden ontworpen volgens de safe-life filosofie waarbij de levensduur bestaat uit een vast aantal cycli met een aangenomen belasting, waarna het onderdeel wordt vervangen. De werkelijke belasting op het landingsgestel wordt op dit moment niet gemeten. Deze belasting kan worden gemeten met sensoren. Een type sensor is de rekstrook die veelvuldig wordt gebruikt voor het meten van rekken in vliegtuigconstructies. Deze is echter minder geschikt voor toepassing in landingsgestellen. Een optische sensor, de zogenaamde Fibre Bragg Gratings (FBG) waarmee onder andere de rek kan worden gemeten, is hiervoor veel geschikter vanwege onder andere het geringe gewicht, ontbreken van bekabeling, geen elektrische interferentie, en de langere stabiliteit. Het Nederlandse bedrijf Technobis maakt hardware voor het uitlezen van dergelijke sensoren en is bezig met een veelbelovende ontwikkeling van chip-based optische schakelingen die de hardware sterk doen verkleinen.

NLR ondersteunt Technobis in het ontwikkelen van toepassingen van dergelijke hardware in de vliegtuigindustrie, waarbij het monitoren van de belasting op landingsgestellen er een van is. Binnen dit project wordt nauw samengewerkt met Technobis, waarbij het NLR verantwoordelijk is voor het uitvoeren van de testen met het sensor systeem en het ontwikkelen van algoritmen voor het analyseren van de sensor data.

Project Doel:

In het voorgestelde project wordt samen met Europese partners Meggitt de mogelijkheden onderzocht van het toepassen van optische sensoren voor het monitoren van de belasting op landingsgestellen. Doel is het kunnen meten van:

1. De belastingen tijdens landing en taxiën
2. Het detecteren van harde landingen en overloads
3. Het detecteren van air-ground transition
4. Health monitoring van het landingsgestel

Utilisatie:

De resultaten van het onderzoek kunnen worden ingezet om de Nederlandse industrie, zoals Technobis en Fokker Landing Gear, beter te ondersteunen in toekomstige CBM/SHM oplossingen. Er is vanuit Fokker Landing Gear veel interesse. Hiernaast is de ontwikkelde kennis ook van toepassing voor defensie (b.v. Luchtmacht) en andere industrieën (b.v. windenergie, chemische industrie).

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 549900
Industrieel/Toegepast:	€ 3639655	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 678633
Totaalbegroting:	***€ 3639655***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286213

Titel: H2020 TurboNoiseBB

Penvoerder: DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV

Partners: DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, SNECMA SAS, ROLLS-ROYCE PLC, AIRBUS OPERATIONS SAS, GKN AEROSPACE SWEDEN AB, INDUSTRIA DE TURBO PROPULSORES S.A., TURBOMECA SA, MTU AERO ENGINES AG, OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, ECOLE CENTRALE DE LYON, UNIVERSITY OF SOUTHHAMPTON, THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE, CHALMERS TEKNISKA HOEGSKOLA AB, UNIVERSIDAD POLITECNICA DE MADRID, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Background:

In recent years, the steady increase in air traffic has increased the sensitivity and the concerns of airports neighbouring communities with respect to local environmental issues. Noise has remained one of the most significant factors of limitation for air transport growth in Europe. A significant reduction of jet noise has been achieved by the continuous increase of the bypass ratios of modern aeroengines. This has led to a new generation of ultra-high-bypass-ratio turbofans (UHBR) with lower-speed fans.

The noise signature of current UHBR engines is highly dominated by fan noise and this trend will even grow for the future UHBR engines. Indeed, the noise generated by the fan system is responsible for 50 to 65% of the aircraft noise for all certification conditions. And the broadband part of that contribution is currently estimated to about 80-90% in approach and about 40% at takeoff. So the reduction of fan broadband noise has the maximum effect on noise reduction for modern aeroengines.

Project Goal:

The overarching technical objective of this proposal is the development of concepts and enabling technologies aimed at reducing aeroengine noise at source. Advances in computational methods, which have revolutionised tone noise prediction, have yet to make an equivalent impact on broadband noise prediction, due to the difficulty in accurately predicting turbulent flow that is the source of fan broadband noise. TurboNoiseBB will address these issues enabling a major technical leap in providing the industry with low fan broadband noise concepts, based on an improved understanding of the broadband noise source mechanisms and validated broadband noise prediction methods. The plan is to raise the TRL of innovative low noise OGV (outlet guide vanes) concepts from by performing large scale fan rig tests.

NLR will develop and apply a beamforming method to assess the location and strength of the fan broadband noise sources. In addition, the broadband sound field in the inlet will be decomposed into circumferential modes and correlated to the sound radiated to the environment.

Utilisation:

Via participation in TurbonoiseBB NLR will gain more knowledge and improved measurement techniques related to the broadband noise generated by turbomachinery. This expertise will be used to assist the Dutch industry in designing quieter components for gas turbines. In addition, the improved knowledge on fan noise can be applied to optimized design of acoustic inlet absorbers, in which the Dutch industry is presently involved.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 78590
Industrieel/Toegepast:	€ 6781441	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 6781441***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286209

Titel: Smart Industry Fieldlab: ACM

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Label Breed, Kaptein Roodnat, PAL-V NV, Fokker Landing Gear, Ampyx Power, Bright Composites, VABO, Corellian BV, Omron Europe BV, TNO, Fontys, Windesheim, TECHNISCHE UNIVERSITEIT DELFT

Roadmap: Aeronautics

Toeslagjaar: 2016*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Background:

Composieten producten bestaan uit dunne laagjes basis materiaal (laagdiktes variëren tussen de 0.2 mm en 0.4 mm). Dit basis materiaal bestaat over het algemeen uit een mix van vezels (vaak koolstofvezels) en een hars. Deze laagjes worden tot op heden vooral handmatig neergelegd. Hierdoor is de productie van deze composiet producten zeer arbeidsintensief. Kostenbesparingen zijn te realiseren door:

• de handmatige lamineerprocessen zo veel mogelijk te reduceren;
• het verhogen van de reproduceerbaarheid van het fabricage proces;
• het verminderen van afvalpercentages en uitval van halfproducten tijdens het fabricageproces.

De beoogde kostenbesparingen zijn te realiseren door een verregaande invoering van automatiseringsconcepten tijdens het composieten fabricageproces via standaard robotsystemen. Door deze robotsystemen te voorzien van andere en programmeerbare “koppen” wordt de inzetbaarheid van deze systemen sterkt vergroot en kunnen kleinere series kosten efficiënter aangeboden worden. Dit zijn bij uitstek de productie aantallen waar de Nederlandse MKB kansen ziet.

Project Goal:

De doelstelling van het samenwerkingsproject Smart Industry Fieldlab: Flexible Manufacturing - Automated Composites Manufacturing is om door middel van inzet van de beschikbare kennis- en faciliteiteninfrastructuur van het NLR, om:

• private partijen in staat te stellen om in nauwe samenwerking met het NLR composieten constructies te ontwikkelen en de daarvoor benodigde geautomatiseerde fabricagetechnologieën.
• intensief samen te werken met het onderwijs om nieuwe kennis op te bouwen en bestaande kennis uit te breiden, die dan weer ingezet en overgedragen kan worden in samenwerkingsprojecten met het MKB.

In PPS-en wordt met de partners kennis opgebouwd mbt de ontwikkeling van geautomatiseerde fabricagetechnologieën (waaronder automatisch pick and place processen in combinatie met braiding) voor: zwaarbelaste composieten onderdelen gebruik makend van composieten en fabricageprocessen uit de vliegtuigbouw, composieten rotorbladen en vouwpropeller voor een gyrocopter, composiet onderstelcomponenten van vliegtuigen, en een "zweefvliegtuig" voor innovatieve opwekking van elektrische energie. Daarnaast ontwikkeling van concepten waardoor mensen beter en veiliger met machines (robots) kunnen samenwerken tijdens aanmaak van composieten onderdelen en onderzoek naar de benodigde kwaliteitscontroles op gebied van afmetingen en richtingen van vezellagen en snelle C-scan procedures voor dikwandige delen.

De partijen werken mee in de uitvoering van het project.

Utilisation:

Door de samenwerking met de partners in de verschillende werkpakketten ontwikkelt het NLR (additionele) “Automated (Robot Based) Composite Manufacturing Technologies”. Hiermee wordt een belangrijke stap gezet om de recurring kosten van composietproducten te verlagen, de reproduceerbaarheid te verhogen en het afvalpercentage te verminderen. Dit is van groot belang om de (inter)nationale concurrentiepositie van de Nederlandse maakindustrie (zowel aerospace als niet-aerospace) te verbeteren.

Kosten:			
Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 349426
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 3273400
Experimenteel:	€ 5950000	*Waarvan Private inkind:*	€ 1887610
Totaalbegroting:	***€ 5950000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286214

Titel: CS2 EcoTECH

Penvoerder: ISRAEL AEROSPACE INDUSTRIES LTD.

Partners: ISRAEL AEROSPACE INDUSTRIES LTD., INASCO - INTEGRATED AEROSPACE SCIENCES CORPORATION O.E., Altran GmbH & Co kg, AKZO NOBEL CAR RIFINISHES BV, HELLENIC AEROSPACE INDUSTRY SA, INVENT INNOVATIVE VERBUNDWERKSTOFFEREALISATION UND VERMARKTUNG NEUERTECHNOLOGIEN GMBH*, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, TECHNISCHE UNIVERSITEIT DELFT, LORTEK S COOP, AERO-MAGNESIUM LIMITED (A.C.S.), UNIVERSITY OF PATRAS, UNIVERSITAET STUTTGART

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:
Background:
Volgens de EU REACH-richtlijn mogen coatings gebaseerd op het giftige Cr-6-element niet meer toegepast worden. Voor de luchtvaartsector is hierop nog een uitzondering gemaakt. In het ecoTECH-programma zal o.a onderzoek gedaan worden naar alternatieve coatings voor toepassing op vliegtuigmaterialen. Het onderzoek naar deze coatings zal door AKZO gedaan worden waarbij het NLR kennis inbrengt voor toepassing op vliegtuigmaterialen, waarbij gelet wordt op specifieke omgevingseisen als temperatuur, luchtvochtigheid, chemicaliën en mechanische belastingen. Het NLR zal verder een testprogramma definiëren en uitvoeren.
Project Goal:
Doelstelling is een Cr-6 vervangende coating te ontwikkelen voor toepassing in een luchtvaartomgeving.
Utilisation:
De resultaten van het onderzoek kunnen rechtstreek worden ingezet om NL-industrie (maakindustrie en airliners) beter te ondersteunen in het voldoen aan de EU REACH richtlijn.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 341397
Industrieel/Toegepast:	€ 11807928	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 2335333,5
Totaalbegroting:	***€ 11807928***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286218

Titel: CS2 HECOLAG

Penvoerder: Fokker Landing Gear B.V.

Partners: FOKKER LANDING GEAR BV, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, COMPOSE SAS

Roadmap: Aeronautics

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

In deze PPS wordt onderzoek gedaan naar het geautomatiseerd aanmaken van dikwandige composieten landingsgestel delen. Hierbij wordt gekeken naar de effectiviteit van machine set ups voor automatische pick and place processen in combinatie met braiding, om uiteindelijk dikke onderdelen kosten effectief te kunnen maken. Hierbij worden ook de benodigde kwaliteitscontroles onderzocht op gebied van afmetingen en richtingen van vezellagen en snelle C-scan procedures voor dikwandige delen. Deze kennis komt ook beschikbaar voor derden. Fokker Landing Gear werkt mee in dit programma met ontwerp- en test activiteiten, materiaalkeuze en de opzet van procedures.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 346000
Industrieel/Toegepast:	€ 6757037	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 1017790
Totaalbegroting:	***€ 6757037***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285303

Titel: SMILE - Small Innovative Launcher for Europe

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, NAMMO RAUFOSS AS, DEUTSCHES ZENTRUM FUER LUFT- UND RAUMFAHRT EV, TERMA A/S, ANDOYA SPACE CENTER AS, INSTITUTUL NATIONAL DE CERCETARI AEROSPATIALE ELIE CARAFOLI - I.N.C.A.S. SA, AIRBORNE TECHNOLOGY CENTRE BV, HERON ENGINEERING MECHANICAL STRUCTURAL ANALYSIS LIMITED LIABILITY COMPANY, ISIS - Innovative Solutions In Space BV, LAYERWISE NV, Payload Aerospace,S.L, FUNDACION TECHNALIA RESEARCH & INNOVATION, BoesAdvies

Roadmap: Space

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Background

The market for small satellites is expected to increase substantially in the coming years, as shown in market analyses. The new generation ARIANE 6 and VEGA C launchers will guarantee Europe's independent access to space for the high-end market of satellites in terms of mass and size with a competitive edge in the world market of launchers. These launchers however are significantly less attractive for classes of smaller satellites. The SMILE initiative addresses reliable, affordable, quick, and frequent access to space for the emerging market of small satellites up to 50 kg. Herewith, a market niche is addressed projected to grow significantly in the coming decades presently lacking availability of a dedicated European launcher.

Objectives

The objectives of the proposed work therefore are:

• To design a concept for an innovative, cost-effective European launcher for small satellites.

• To design a Europe-based ground facility for small launchers based on the evolution of the existent sounding rocket launch site at Andøya Space Centre.

• To increase the Technology Readiness Level (TRL) of critical technologies for low-cost European launchers.

• To develop prototypes of components, demonstrating this critical technology.

• To create a roadmap defining the development plan for the small satellites launcher system from a technical, operational and economical perspective

Utilisation

These project objectives will aid Europe in providing the strategic prerequisites for independent access to space for small satellites, by designing a:

• Competitive European Launch Vehicle dedicated to small satellite launches.

This will target a niche market that is emerging and which will be addressed by other non-European countries as well. Europe has a strong academic, scientific, and commercial basis in the small satellite domain but lacks a proper launch solution for such satellites at this point. The effect is that many small satellite developers have to look outside of Europe for launching their spacecraft. This holds both in the nanosatellite field (e.g. CubeSats) and in the small microsatellite field. The latter is an emerging market where companies such as SSTL, OHB Sweden and LuxSpace are aiming at 50 kg spacecraft. By providing a launch solution for the small satellite market to Europe, the sector will be able to thrive even more than it already does being part of the space domain that has shown strong growth in the past decade.

• Europe-based Launch Facility.

A launch facility based in Europe can significantly reduce overall launch operations duration and costs through reduction in logistics effort and overall operations. Reducing operational costs in conjunction with a lower cost for the launch vehicle is essential for the future success of a small launch vehicle as the fixed cost of performing a launch campaign at the launch facility becomes a larger and larger fraction of the overall costs to launch a satellite if series production of small rockets is successful. Ease of logistics, fewer delays due to customs import

aspects and an excellent infrastructure, which is all present within Europe could allow for a more efficient launch campaign activity and thus a further lowering of launch costs.
Dutch companies, such as –but not limited to- ISIS and Airborne will benefit from such a launcher.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 150000
Industrieel/Toegepast:	€ 4543642	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 4543642***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1283209

Titel: Onderzoek naar het lange duur gedrag van glasvezelversterkt thermoplast onder verschillende omgevingscondities

Penvoerder: Airborne Oil & Gas B.V.

Partners: Airborne Oil & Gas B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Stichting CompoWorld

Roadmap: Hightech materials

Toeslagjaar: 2014*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

In dit project wordt onderzoek gedaan naar glasvezelversterkt polyetheen en polypropyleen. Deze materialen worden onder andere gebruikt voor het aanmaken van olietransportbuizen voor toepassingen in de diepzee. De materiaaleigenschappen onder deze condities zijn relatief onbekend, maar dienen wel bekend te zijn om in een vroeg stadium in het ontwerpproces de eigenschappen van buizen te voorspellen. Met name veroudering van de materialen als gevolg van langdurige belastingen in combinatie met blootstelling aan chemicaliën is onbekend.
Met de kennis die in dit project wordt opgedaan kan het ontwerpproces van de olietransportbuizen efficiënter worden uitgevoerd.
Door uitvoering van dit project bouwt het NLR kennis over materialen op, waarmee diepzee olie- en gaswinning met een grotere effectiviteit (men kan dieper boren dan met traditionele metalen pijpen) en met minder risico's voor het milieu (composieten buizen zijn minder vermoeiingsgevoelig en corroderen niet) kan worden uitgevoerd.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 90000
Industrieel/Toegepast:	€ 270000	*Waarvan Private cash:*	€ 180000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 270000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284205

Titel: High-pressure pipes by continuous pull-winding technology

Penvoerder: ACP Technology B.V.

Partners: ACP Technology B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Stichting CompoWorld

Roadmap: Hightech materials

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Common practice for high pressure pipes is to use a thermoplastic inner tube (or liner), and glass or carbon reinforcement fibres, impregnated with a thermoset resin, winded onto this thermoplastic inner tube. This effectively results in a pipe with a thermoplastic liner and a thermoset reinforcement tube. In this project research will be done on a new concept, in which a thermoset resin is used for both the liner and the reinforcement tube.
It is expected that the increased flexibility of the thermoset resin in combination with the high production quality and large design freedom, will result in a spoolable thermoset pipe that allows for application of much higher pressures. Current thermoset composite pipes have only been used in low pressure (up to 40 bars) applications and can be described as rigid pipes.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 11967
Industrieel/Toegepast:	€ 36000	*Waarvan Private cash:*	€ 24000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 36000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1284211

Titel: Additive manufactured demo product

Penvoerder: Oerlikon Eldim (NL) B.V.

Partners: Oerlikon Eldim (NL) B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Roadmap: Hightech materials

Toeslagjaar: 2014*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Onderzoek naar gasturbine component door middel van additive manufacturing.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 5000
Industrieel/Toegepast:	€ 10000	*Waarvan Private cash:*	€ 5000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 10000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285104

Titel: PASSME

Penvoerder: Technische Universiteit Delft

Partners: TECHNISCHE UNIVERSITEIT DELFT, THE UNIVERSITY OF NOTTINGHAM, OPTIMARES SPA, STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, KONINKLIJKE LUCHTVAARTMAATSCHAPPIJ NV, SCHIPHOL NEDERLAND BV, DEUTSCHES ZENTRUM FUER LUFT- UND RAUMFAHRT EV, FLUGHAFEN HAMBURG GMBH, TECHNISCHE UNIVERSITAET HAMBURG-HARBURG, ALMADESIGN CONCEITO E-ESEN VOLVIVMENTO DE DESIGN LDA, C.C.I.C.C. LIMITED, INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:
Het PASSME project richt zich het ontwikkelen van Passenger-Centric oplossingen (tot TRL6) voor passagiers, luchthavens en luchtvaartmaatschappijen. Deze oplossingen zijn industrie-gedreven en richten zich op het accommoderen van de verwachte toename van commerciële vluchten in Europa en het zogenoemde Europese Door-to-Door concept. Het doel van dit concept is een verkorting van de reistijd met ten minste 60 minuten, het verbeteren van tijdige en nauwkeurige informatievoorziening tussen alle betrokken partijen, en de reis efficiënt, naadloze, robuust te maken. Gezamenlijk bieden deze oplossing een bijdrage aan een efficiëntie en voorspelbare luchthavensysteem, en een toename van de kwaliteitsperceptie van de passagier.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 263000
Industrieel/Toegepast:	€ 4902086	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 4902086***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285214

Titel: Additive Manufactoring programma

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Fokker Technologies, Mokveld Valves B.V., SLM Solutions GmBH, Oerlikom Eldim (NL) BV, Laborelec S.C.L.R, Kusters Metaalbewerking B.V., 3D Worknet B.V., Fokker Aerostructures B.V., Fokker Services B.V.

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

In dit vierjarig programma zal het NLR samen met TNO, Nederlandse industrie en universiteiten onderzoek doen naar waardevolle toepassingen van 3D-printen. Het NLR en TNO hebben diverse workshops georganiseerd over additive manufacturing om te inventariseren welke technologische behoeften en ambities de Nederlandse industrie en universiteiten hebben. Op basis hiervan is een Metal Additive Manufacturing Roadmap opgesteld en een vierjarig programma gedefinieerd op het gebied van metal additive manufacturing. Diverse Nederlandse en buitenlandse bedrijven en onderzoeksorganisaties hebben hun interesse in het programma uitgesproken. Het zwaartepunt van het programma is onderzoek doen naar additive manufacturing van metalen componenten en de opkomende additive manufacturing-technologieën productierijp te maken voor de industrie. Het programma is onderverdeeld in 5 onderwerpen: 1) Materials, 2) Process parameters optimization, 3) Standardisation & Qualification, 4) Design Tools & Modelling en 5) Applications. De focus ligt op de metalen aluminium (bijvoorbeeld 2219, 6061, 6082 en 7075), titanium (Ti-grade 5) en nikkel super alloy (Inc 718). Er zullen drie PhD-studies uitgevoerd worden binnen dit programma.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 221785
Industrieel/Toegepast:	*€ 871070*	*Waarvan Private cash:*	*€ 590000*
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	*€ 59285*
Totaalbegroting:	***€ 871070***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285217

Titel: HiTec

Penvoerder: Fokker Aerostructures B.V.

Partners: Fokker Aerostructures B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Stichting CompoWorld

Roadmap: Hightech materials

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:
In dit samenwerkingsproject zal onderzoek gedaan worden naar, en kennis opgebouwd worden over het ontwikkelen van kostenefficiënte productietechnologieën voor het fabriceren van hogetemperatuur composieten constructiedelen. De tot op heden in composieten gebruikte epoxyharsen zijn niet bestand tegen de hoge temperaturen in bijvoorbeeld vliegtuigmotoren of motoruitlaten. Met zogenaamde Bismaleimide (BMI)-harssystemen is het mogelijk composieten constructies te vervaardigen die hoge temperatuurbelastingen kunnen verdragen. BMI is interessant voor bijvoorbeeld Fokker en Airborne voor de productie van uitlaten en de ophanging van vliegtuigmotoren, en de mogelijkheden om BMI-composietdelen van de F35 te kunnen repareren met een gelijkwaardige hogetemperatuurcomposietsysteem. BMI-harssystemen hebben echter een aantal eigenschappen die de verwerking ervan bemoeilijkt. Dergelijke hogetemperatuurharssystemen dienen op een hogere temperatuur worden uitgehard dan epoxy, wat gevolgen heeft voor de mallen, maar ook voor gereedschappen en hulpmiddelen zoals vacuümzakken, scheidingsfolies, harsinjectieslangen, etc. Deze hulpmaterialen moeten de hoge verwerkingstemperatuur maar ook corrosieve aard van BMI aankunnen.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 90000
Industrieel/Toegepast:	€ 233000	*Waarvan Private cash:*	€ 143000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 233000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1285218

Titel: Bodemplaat

Penvoerder: Corellian B.V.

Partners: Corellian B.V., STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Stichting CompoWorld

Roadmap: Hightech materials

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

In dit samenwerkingsproject zal onderzoek gedaan worden naar, en kennis opgebouwd worden over vacuüminjectie van laminaten in combinatie met reactieve thermoplasten, en toepassen van gerecyclede composieten. Met de kennis die opgebouwd wordt kan een materiaal-procescombinatie gekozen worden die afgestemd is op een lager productievolume. In het project zal een composieten bodemplaat ontwikkeld worden die onder bestaande en nieuwe auto's kan worden aangebracht . Het innovatieve ontwerp van de bodemplaat en de gewichtsreductie t.o.v. een metalen bodemplaat zal naar verwachting leiden tot significante brandstofbesparingen.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 45000
Industrieel/Toegepast:	€ 135000	*Waarvan Private cash:*	€ 90000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 135000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286201

Titel: Prediction of Fatigue

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Fokker Aerostructures B.V., Wartsila, Embraer, Airbus, Lloyd's Register EMEA

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Background: Na ruim vijftig jaar onderzoek na het introduceren van de empirische Paris vergelijking voor de vermoeiingsscheur is er nog steeds niet een fysisch model en is het nog steeds niet mogelijk om constante, maar vooral variabele amplitude vermoeiing goed te voorspellen voor verschillende belastingsspectra.
Project Goal: Het achterhalen van fundamentele relaties m.b.t. vermoeiingscheurgroei en het verkrijgen van beter fysisch inzicht door nauwkeurige scheurgroeimetingen op aluminium en staal onder verschillende omstandigheden.
Utilisation: Een verbeterd fysisch inzicht en betere scheurgroei vergelijkingen kunnen direct worden gebruikt voor betere voorspellingen van vermoeiing in de civiele en militaire luchtvaart industrie, maar ook voor andere industrieën.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 45000
Industrieel/Toegepast:	€ 826000	*Waarvan Private cash:*	€ 180000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 60000
Totaalbegroting:	***€ 826000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287101

Titel: TERRA

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, INGENIERIA Y ECONOMIA DEL TRANSPORTE S.A., LEONARDO - FINMECCANICA SPA, CENTRO DE REFERENCIA INVESTIGACION DESARROLLO E INNOVACION ATM, A.I.E., C-ASTRAL d.o.o., CHPR BV

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Doel van het project is de identificatie van technologie en gap analyse voor benodigde grond-gebaseerde technologie ter ondersteuning van een UTM (Unmanned Traffic Management) concept. “TERRA (Technological European Research for RPAS in ATM) Project addresses the research topic H2020-SESAR-2016-1 RPAS04: Ground-based technology, by focusing on the performance requirements, enabling technologies, and system architecture to support the UAS Traffic Management (UTM) concept. The project will culminate in an integrated system proof-of-concept demonstration in an RPAS simulation environment, as an initial evaluation of the operational suitability of the proposed architecture and systems. The TERRA project aims to leverage existing state-of-the-art and potential new technologies, to develop elements of a ground-based UTM architecture that will accommodate a large base of RPAS in a mixed mode (manned and unmanned) environment. In the first instance, TERRA is focused on very low level (VLL) VFR operations. However, the project also aims at potential extension to other flight domains.”

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 150000
Industrieel/Toegepast:	€ 1087000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1087000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287302

Titel: Thermal Development

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Fokker ELMO B.V.

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The derating rules in the aerospace standards for harness design are coarsely defined leaving margins for improvement e.g. weight reduction. Gauge selection in the standards is based on the maximum allowed temperature elevation with respect to environmental conditions due to the load and electrical resistance of a conductor. It is expected that thermal analysis of harness designs will lead to a relaxation/optimization of electrical systems saving harness weight up to 20%. The objective of the project Thermal Model Development 2016 is to evaluate how the modelling and correlation of the thermal behavior of wiring harnesses can be improved based on laboratory test results obtained during the Cleansky/Smart Fixed Wing Aircraft (SFWA) - Integrated Component Demonstrator (IACD) - Thermal tests. This covers relevant wiring situations with known and appropriate accuracy that shall be acceptable as proof for verification support. The results are conditional to the program future state of art and commercial application: automated thermal design to deliver safer wiring with a lower weight requiring less engineering effort.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 98000
Industrieel/Toegepast:	€ 204000	*Waarvan Private cash:*	€ 58000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 48000
Totaalbegroting:	***€ 204000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287303

Titel: INFRA Broadboard

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Airbus Defence and Space Netherlands B.V.

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

In het kader van interne research projecten wordt door ADSN (50k€) en NLR (30k€) gezamenlijk een lichtgewicht “inflatible” radiator systeem (INFRA) ontwikkeld in combinatie met een vloeistofloop voor drukopbouw en warmtetransport (TRL2-3). ADSN is hierbij verantwoordelijk voor de fabricage van de Foil Radiator (FR). NLR is verantwoordelijk voor de fabricage van de Pump Assembly (PA). De PA bestaat uit gemodificeerde commerciële beschikbare componenten zoals mini-pumps, accumulator en check-valves. Deze componenten zullen naar verwachting ook voor andere thermische koelsystemen ingezet worden. Om de werking van INFRA te demonstreren wordt er een Deployment Test bij ADSN uitgevoerd waarvoor de systeemeisen en interfaces in dit project worden afgestemd. Voor de Deployment Test is ondersteuning van NLR nodig voor integratie van de PA en test support.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 12500
Industrieel/Toegepast:	€ 92500	*Waarvan Private cash:*	€ 10000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 40000
Totaalbegroting:	***€ 92500***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287304

Titel: ACASIAS

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, FOKKER AEROSTRUCTURES BV, DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, CENTRE INTERNACIONAL DE METODES NUMERICS EN ENGINYERIA, INVENT INNOVATIVE VERBUNDWERKSTOFFEREALISATION UND VERMARKTUNG NEUERTECHNOLOGIEN GMBH*, VYZKUMNY A ZKUSEBNI LETECKY USTAV A.S., EVEKTOR, spol. s.r.o., TRACKWISE DESIGNS LIMITED, IMST GMBH, L - UP SAS, FOKKER ELMO BV

Roadmap: Aeronautics

Toeslagjaar: 2017*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:
In het voorgestelde project wordt onderzoek gedaan naar het verbeteren van aerodynamische prestaties en de integratie van nieuwe efficiënte voortstuwingssystemen (bv CROR) om het energieverbruik van toekomstige vliegtuigen te reduceren. Het NLR zal kennis opbouwen over: • Geavanceerde concepten voor aerostructures met geïntegreerde antennes, sensoren en bedrading; • Structurele integratie van antennes in vliegtuigstructuren, zoals een composieten rompwandpaneel, een Fibre Metal Laminate (FML) rompwandpaneel en een composieten winglet; • De prestaties van structureel geïntegreerde antennes in vergelijking met gewone antennes die buiten de romp uitsteken; • Reductie van brandstofgebruik en CO2-NOx-uitstoot door integratie van antennes in de vliegtuigstructuur; en • Multidisciplinaire ontwikkeling van smart aerostructures.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 503000
Industrieel/Toegepast:	€ 6690130	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 6690130***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287207

Titel: SECOPS

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Sensofusion Oy, UNIFLY, Delft Dynamics B.V.

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Het doel van het project is een innovatief geïntegreerd beveiligingsconcept te ontwikkelen zodat drones beschermd zijn tegen onwettige inmenging door derden. Tevens zal het beveiligingsconcept de integratie van geo-fencing technologie mogelijk maken, zodat drones automatisch van bijvoorbeeld vliegvelden geweerd worden. Qua systemen ligt de focus op communicatie, navigatie and surveillance systemen. Het proof of concept zal worden gedemonstreerd bij het Nederland RPAS Test Centre (NRTC).

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 222500
Industrieel/Toegepast:	€ 1135294	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1135294***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287210

Titel: STUNNING

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, FOKKER AEROSTRUCTURES BV, FOKKER ELMO BV, FOKKER TECHNOLOGIES HOLDING BV, DIEHL AIRCABIN GMBH, Diehl Comfort Modules GmbH, TECHNISCHE UNIVERSITEIT DELFT

Roadmap: Aeronautics

Toeslagjaar: 2017*; Einddatum: 2023; Fase:* Conform planning

Omschrijving:

Background: The Netherlands industry is an important supplier of fuselage parts and systems for the European aeronautics industry. The Clean Sky 2 topic manager Airbus has requested the development, manufacture and delivery of an innovative and integrative large passenger aircraft multifunctional and integrated 180° fuselage shell from thermoplastic composite material together with a passenger and a cargo floor including their main system and cabin/cargo elements. The STUNNING consortium, lead by Fokker, has submitted a successful proposal. Project Goal: The STUNNING project goal is to develop, manufacture and deliver a 180° full scale multi-functional integrated thermoplastic fuselage shell, incl. cabin and cargo floor structure and relevant main interior and system elements. A significant weight reduction resulting from this integrated approach, based on advanced thermoplastic manufacturing and assembly principles, will contribute to the environmental challenge to reduce the CO2 and NOx footprint by 5 to 8% while enhancing the effective space for passengers and cargo. Manufacturing costs and assembly times will be reduced and production rates will be increased. To achieve the overall goals, 'beyond state of the art' technologies will be developed and verified in dedicated tests up to TRL5. NLR will contribute to the demonstrator and leads the technology developments. The NLR contribution to the demonstrator consists of an innovative thermoplastic fuselage skin. The NLR contribution in technology development and maturation consists of contributions to integrated fuselage design and optimisation, thermoplastic applications and joining technologies, structural aspects of interiors, integration of systems, and simulation methods both for manufacturing/materials/processes and for virtual functional & operational testing. NLR also contributes to validation & verification of the technology developments and to the assessment of the industrial readiness. Utilisation: The developments in STUNNING will stengthen the competitiveness of the Netherlands industry as supplier of thermoplastic products. First of all this concerns integrated and multi-functional fuselage shells, including systems, and floor structures. The technology development will however also contribute to strengthen the position of the Netherlands industry in other thermoplastic aircraft parts and in aircraft systems, such as on wings and tails. Moreover, through NLR the thermoplastic technology development is also exploited towards other sectors such as automotive.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 1235000
Industrieel/Toegepast:	€ 16616830	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 2673264
Totaalbegroting:	***€ 16616830***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287205

Titel: TKI strain gauge balances

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Duits-Nederlandse Windtunnels

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Background: 6-component internal wind tunnel model balances measure the aerodynamic forces and moments induced on wind tunnel models. These balances are precision-machined instruments equipped with strain gauges at specific locations to measure the strain (i.e. deformations) induced by forces and moments on the model. The strain gauges convert strain into electrical voltage making the forces and moments measureable by external volt meters. The accuracy with which aerodynamic forces and moments can be determined with a strain gauge balance is however highly influenced by thermal effects. The phrase “thermal effects” embodies a broad number of physical temperature related effects that cause unwanted changes in the output of the strain gauges other than those caused by external loading on the wind tunnel model. Electrically these effects are perceived as zero output shift or drift and change in gauge sensitivity. Project Goal: The goal is to improve correction methods to reduce the interference on force measurements done by using a strain gauge balance, in order to obtain more accurate wind tunnel measurements. Utilisation: There is a need for more accurate balance measurements, especially in terms of drag measurement. This PPS offers a research path to evaluate the thermal effects and to assess possibilities to increase the accuracy of balance measurements either by improving on the current correction methods or by another approach that would improve the accuracy of the existing balances (e.g. active heating).

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 92500
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 370000
Experimenteel:	€ 462500	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 462500***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287206

Titel: CS2 MANTA

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, FOKKER AEROSTRUCTURES BV, Fokker Technologies Holding, ASCO Industries, Deutsches Zentrum für Luft- und Raumfahrt, Technische Universiteit Delft

Roadmap: Aeronautics

Toeslagjaar: 2016*; Einddatum: 2023; Fase:* Conform planning

Omschrijving:

Background: The movable surfaces of aircraft, e.g. slats, flaps, ailerons, spoilers and winglets, are currently utilised in a single role during the flight, i.e. the flaps are exploited for high-lift generation during the landing phase. Movables offer the promise to enhance the efficiency of transport aircraft for all phases of a flight by assigning dual roles to them. For example, the utilization of flaps can extended to the cruise segment by adapting of the aerodynamic shape of the wing to the actual flight point in order to provide cumulative benefits over the aircraft mission in terms of fuel consumption reductions. The symmetrical deployment of ailerons can be used for lift dumping in order to mitigate gust loads. In the latter case, the multi-functional role of movables is exploited with regard to load control capabilities; both manoeuvre and gust induced, and offer structural weight reductions. Project Goal: MANTA will develop and demonstrate innovative multifunctional movables that increase airframe efficiency over the complete flight envelope of business jets and large passenger aircraft as contribution to the societal challenge to reduce 3 to 5 % CO2.

MANTA follows a process that creates generic multifunctional movable concepts first, which will then be assessed separately for business jets and large passenger aircraft. The underlying technologies include adaptive use for multiple flight segments along with adaptive structures which incorporate new materials and more electric actuation systems. Subsequent down-selection together with the European aircraft manufacturers Airbus, Saab and Dassault will ensure that the most promising and feasible concepts remain. MANTA will develop and finally validate these by testing at system and structural level.

Utilisation: The Dutch aerospace knowledge centre (NLR), industry (Fokker Aerostructures) and university (TUD) have combined their expertise to develop and demonstrate innovative multifunctional movables such that future transport aircraft and business jets of European manufacturers maintain a cutting edge with regard to their non-European competitors. The Dutch Tier 1/2 supplier (Fokker) will be able to translate the industrial relevant experience into new products and strengthen its position on the global market.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 546000
Industrieel/Toegepast:	€ 8086668	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 916668
Totaalbegroting:	***€ 8086668***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287202

Titel: AIRPASS

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Israel Aerospace Industries Ltd. (IAI), Università degli Studi di Napoli Parthenope (UPTH), SAAB Aktiebolag (SAAB), Technische Universität Braunschweig (TUBS), Central Aerohydrodynamic Institute (TsAGI), Avular b.v. (AVU)

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Doel van het project is het bestuderen van de benodigde technologieën die aan boord van drones nodig zijn en eventueel nog moeten worden ontwikkeld om een Unmanned Traffic Management (UTM) concept te implementeren. Via een UTM-concept wordt een economisch effectieve en veilige integratie van drones in het luchtruim beoogd. Het betreft hierbij operaties in zogenaamde “Very Low Level” (VLL) condities en onder zichtvliegvoorschriften. Het onderzoek betreft Detect & Avoid systemen voor zowel het coöperatieve als het niet-coöperatieve verkeer, autopilot systemen en Communicatie, Navigatie en Surveillance (CNS)-systemen.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 172500
Industrieel/Toegepast:	€ 1440674	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1440674***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287201

Titel: Propeller PAL-V

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, PAL-V Europe NV

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:
Het NLR zal in dit samenwerkingsproject onderzoek doen naar, en kennis opbouwen over nieuwe technologieën voor het ontwerp en de aanmaak van inklapbare propellerbladen, daarbij rekening houdend met robuustheid mbt impact damage (bird strike), propeller efficiency, de performance, de opvouw-ergonomie, de maakbaarheid en de reproduceerbaarheid.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 78000
Industrieel/Toegepast:	€ 234000	*Waarvan Private cash:*	€ 156000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 234000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287204

Titel: Ariane VINCI Thrust Frame

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Airbus Defence and Space Netherlands B.V.

Roadmap: Space

Toeslagjaar: 2015*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

The new Ariane 6 Launcher will enter a very competitive commercial launcher market. New entrants to this market have reduced the launch price per unit mass payload by half (50%). As a consequence a key requirement for the development of the Ariane 6 is reduced recurring production costs and increased performance. In this public-private partnership project, NLR will investigate the applicability of innovative technologies which will be introduced to find solutions beyond unconventional laminates with fibre steering. Knowledge will be gained by application of “Active fibre steering” technology in combination with “Smart overlapping” technology in order to create integrated grid stiffeners between blade stringers to lower weight and increase performance, and will be applied for the development of carbon fibre reinforced composite conical structures operating under partly cryogenic conditions.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 125000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 500000
Experimenteel:	€ 625000	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 625000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1287209

Titel: EFRO Valorisatie High Tech Composieten NH

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Free-D Geometries BV, MOCS BV, Green Composites BV, Futura Composites BV, Fishflow Innovations BV, Schaap Composites BV, CPT BV, GJJ Scholte BV, 2MV composites, Rolan Robotics BV, Smit Composites BV, Theuws Polyester BV, TU Delft, Kenniscentrum WMC, Lectoraat Inholland, Dutch Terahertz Inspection Services B.V., DSM Resins, Ontwikkelingsbedrijf NH-H

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Achtergrond: In dit project staan de composietenbedrijven in NoordHolland centraal. Deze bedrijven ontwikkelen en produceren, elk in hun eigen sector, hoogwaardige composiettoepassingen met een hoog potentieel aan economische waarde en werkgelegenheid. In de wereldwijde transitie naar een duurzame samenleving is composiet in elke sector een belangrijke factor en worden conventionele materialen vervangen door composieten. De Noord Hollandse composietbedrijven zijn actief in jachtbouw, windturbines, lucht- en ruimtevaart, automotive, maritiem, bouw en infra. De concurrentiepositie wordt bedreigd door lage lonen landen maar de up-side potential wordt geboden door de groeiende vraag naar complexe composietenproducten in praktisch elke sector. Echter, door de relatieve jongheid van de composietenindustrie kampen de bedrijven met technologische en product technische obstakels om deze vraag in te vullen. Met intensieve pre-concurrentiele samenwerking tussen bedrijven onderling en intensieve samenwerking tussen bedrijven en kennisinstellingen wordt de potentie van het composieten cluster Noord Holland ontsloten en realiseert het cluster zijn innovatiecapaciteit. Doel van het project: Het doel van het project: “Valorisatie HighTech Sector Composieten NH” is het realiseren van duurzame innovatiekracht, duurzame groei en duurzame werkgelegenheid in het composietencluster Noord-Holland. Het project wordt uitgevoerd in een consortium dat op basis van open-innovatie gaat samenwerken en bestaat ut: • Een bedrijvengroep van composietbedrijven uit Noord-Holland, • Een kennisgroep van kennisinstellingen met specifieke kennis en hoogwaardige laboratoria. Gezamenlijk worden 4 deelprojecten uitgevoerd: • Deelproject 1: Onderzoek en ontwikkeling van nieuwe materialen en vezels, nieuwe composieten en nieuwe constructietechnieken; • Deelproject 2: Onderzoek en ontwikkeling van innovatieve composiet toepassingen; • Deelproject 3: Verbetering van fabricageprocessen voor composiet toepassingen; • Deelproject 4: Versterking van het cluster en borging samenwerking. Het NLR zal werkzaamheden verrichten in deelprojecten 1 en 2. Utilisatie: De resultaten van het onderzoek kunnen worden ingezet om de Noord-Hollandse composieten industrie, beter te ondersteunen in toekomstige lichtgewicht oplossingen.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 32500
Industrieel/Toegepast:	€ 5000000	*Waarvan Private cash:*	€ 2116100
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 5000000***	*Waarvan overige*	*€ 0*

TKI-projecten

NLR - Projectnummer: 1286217

Titel: Research into innovative biaxial testing procedures and rig development

Penvoerder: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM

Partners: STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM, Fokker Aerostructures B.V.

Roadmap: Aeronautics

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Background: One of the important technological innovations in modern aircraft is the increased use of composite materials. Netherlands industry, as part of the supply chain of leading aircraft manufacturers like Airbus, Boeing, Dassault and Gulfstream, are actively looking for new composite design and manufacturing technologies to ensure their place in these supply chains, both commercially and technologically. Overall, despite the large advantages that composite materials offer their adoption by the aerospace industry is still slower than anticipated, notwithstanding the widely published success stories. This is mainly due to the uncertainty and limitations in the understanding of how new composite materials behave already in the design phase. It has been recognised that limiting the evaluation of a material characteristic to uni-axial coupon tests can lead to a misrepresentation of the behaviour of a material in an aircraft structure. More realistic loading during the virtual test and the physical tests, i.e. introducing biaxial conditions, leads to a more accurate representation of the expected behaviour of the structure in-service. The use of biaxial testing represents a major step forward in understanding the properties of composite structures and establishing a way forward to the next generation of advanced structures, leaving traditional 'black aluminium' designs in the past. The present Public Private-Partnership proposal builds upon a former innovative Strategic Research Programme (SRP) project "Innovating the design of aircraft structural components made of composite materials using a new biaxial failure criterion". This successful research project delivered a very usable failure criterion. It is hampered however by the complexity of the testing procedure, especially the complex manufacturability of the coupons needed to underpin the test data for this criterion. Project Goal: This research project aims to improve the manufacturability to such an extent that providing bi-axial test data in the early stages of the design can become state-of the art and routine practice. This will be achieved through the design, application and evaluation of innovative manufacturing possibilities that are representative for various industrial applications. For cost-efficiency, existing and available test equipment and know-how will be used in the test facility where possible. The key innovations of the proposed project are the following: • Innovative testing procedures enabling early industrial adoption of the innovative bi-axial failure criterion. • Further development of a test rig for composite specimens under biaxial loading that allows routine application of bi-axial testing early in the design process Utilisation: The resulting improved testing procedures will allow early application of the much more accurate bi-axial based allowable stress constraints in the design and optimisation of composite aircraft components. This will lead to more right-first-time design, and greater potential for further component weight reduction, which could in turn lead to far wider use of composites and new opportunities for Dutch industry and the SME's in their supply chain.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 33000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 133000	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 133000***	*Waarvan overige*	*€ 0*

TKI-projecten

SRON - Projectnummer: 62242100

Titel: SPEX-PACE phase 0 (SRON deel)

Penvoerder: SRON

Partners: SRON, TNO, Airbus DS NL

Roadmap: Space

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Conform planning

Omschrijving:

Voorstudie voor een innovatief wetenschappelijk instrument om wolken en fijnstof vanuit een baan om de aarde te bestuderen.

Kosten:

Fundamenteel:	€ 170000	*Waarvan TKI-toeslag:*	€ 126000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 28000
Totaalbegroting:	***€ 170000***	*Waarvan overige*	*€ 0*

TKI-projecten

SRON - Projectnummer: 62227000

Titel: SPEX-Airborne

Penvoerder: SRON

Partners: SRON, Airbus DS NL

Roadmap: Space

Toeslagjaar: 2015 en 2016*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

Bepalen van aerosol eigenschappen met SPEX Ariborne meetgegevens.

Kosten:

Fundamenteel:	€ 208728	*Waarvan TKI-toeslag:*	€ 150000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 57528
Totaalbegroting:	***€ 208728***	*Waarvan overige*	*€ 0*

TKI-projecten

SRON - Projectnummer: 4922

Titel: MXS TKI

Penvoerder: SRON

Partners: SRON, Cosine

Roadmap: Space

Toeslagjaar: 2017*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:
Ontwikkeling high-energy prototype X-ray source.

Kosten:

Fundamenteel:	€ 124500	*Waarvan TKI-toeslag:*	€ 107000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 17500
Totaalbegroting:	***€ 124500***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-I - Projectnummer: 14HTSM05

Titel: Mitigating EUV Litho Mirror Damage (MiLiMiD)

Penvoerder: FOM

Partners: FOM, Carl Zeiss SMT GmbH

Roadmap: Semiconductor Equipment

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

The Industrial Focus Group XUV Optics has been quoted as an example for the Dutch Topsectorenbeleid. The Group now proposes a project for funding within the "TKI-toeslag" frame, using the existing know how and infrastructure for a most urgent research question.

Kosten:

Fundamenteel:	€ 585000	*Waarvan TKI-toeslag:*	€ 250000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 221000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 114000
Totaalbegroting:	***€ 585000***	*Waarvan overige*	*€ -24058*

TKI-projecten

NWO-I - Projectnummer: 13CLC07

Titel: High-speed imaging of inkjet printed droplets

Penvoerder: FOM

Partners: FOM, Océ-Technologies BV

Roadmap: Printing

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

In this proposal we outline how to spend the 2013 TKI-toeslag of kC{ 30 for the FOM program \Contact line control during wetting and deleting", CLC, nr. I20. The idea is to buy a high-resolution digital camera to allow for high-precision tracking of jette

---

Kosten:

Fundamenteel:	€ 19080	*Waarvan TKI-toeslag:*	€ 13744
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 5336
Totaalbegroting:	***€ 19080***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-I - Projectnummer: 14JSP57

Titel: Plasma processing of silicon nanocrystals at scalable throughputs for high capacity lithuim-ion battery applications

Penvoerder: FOM

Partners: FOM, Roth & Rau BV

Roadmap: Solar

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

Binnen het JSP programma programma wordt een minicall georganiseerd Innovative projects for solar solutions. Abstract: Lithium-ion batteries, which provide a high energy density over an extensive period of time are considered key to realize a wide range of ...

Kosten:

Fundamenteel:	€ 156891	*Waarvan TKI-toeslag:*	€ 55000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 25000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 45000
Totaalbegroting:	***€ 156891***	*Waarvan overige*	*€ 31891*

TKI-projecten

NWO-I - Projectnummer: 14JSP58

Titel: TKI Toeslag projecten 2013 - Mini Call JSP

Penvoerder: FOM

Partners: FOM, Adtech

Roadmap: Solar

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

The record conversion efficiency of luminescent solar concentrators has not been broken since 2008, mainly due to various loss mechanisms that prevent reaching higher efficiencies than about 5-7%. In the FOM-JSP project "Towards low-cost luminescent solar ...

Kosten:

Fundamenteel:	€ 68500	*Waarvan TKI-toeslag:*	€ 45000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 8000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 68500***	*Waarvan overige*	*€ 15500*

TKI-projecten

NWO-I - Projectnummer: 13VEC07

Titel: Predicting the fracture properties of filled rubbers

Penvoerder: FOM

Partners: FOM, SKF BV

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

Filled rubbers are widely used in the automotive industry; they not only constitute the main base material for car tires, but are also employed for many different sealing applications. The working conditions for these seals are extreme: high stresses, high ....

Kosten:

Fundamenteel:	€ 65450	*Waarvan TKI-toeslag:*	€ 46256
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 13000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 65450***	*Waarvan overige*	*€ 6194*

TKI-projecten

NWO-I - Projectnummer: 13APFF03

Titel: Investment in fast ICCD camera imaging and AFM for fundamental front growth studies of AP-PECVD deposited films

Penvoerder: FOM

Partners: FOM, FUJIFILM Manufacturing Europe BV

Roadmap: Nanotechnology

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

The AP-PECVD (Atmospheric Pressure Plasma Enhanced Chemical Vapor Deposition) process being a highly spatial and temporal non uniform discharge can yield an ultra-smooth ALD-like film growth. The origin of the smooth film is not known although it probably .....

Kosten:

Fundamenteel:	€ 168317	*Waarvan TKI-toeslag:*	€ 140000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 25000
Totaalbegroting:	***€ 168317***	*Waarvan overige*	*€ 3317*

TKI-projecten

NWO-I - Projectnummer: 13TQC07

Titel: Remote readout of Majorana fermions

Penvoerder: FOM

Partners: FOM, Microsoft International Holdings BV

Roadmap: Nanotechnology

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

Signatures of Majorana fermions have been found by tunneling spectroscopy. These measurements, however, destroy the quantum state (i.e. parity state). Here, we propose to use a remote sensor to measure the presence of Majorana Fermions without flipping the .....

Kosten:

Fundamenteel:	€ 283624	*Waarvan TKI-toeslag:*	€ 200000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 35300
Totaalbegroting:	***€ 283624***	*Waarvan overige*	*€ 48324*

TKI-projecten

NWO-I - Projectnummer: 14HTSM06

Titel: Growth of interactive Nanolayers (GRIN)

Penvoerder: FOM

Partners: FOM, Carl Zeiss SMT

Roadmap: Semiconductor Equipment

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

This project addresses thin film layer growth requirements for new types of advanced EUV optical schemes. These includes layer materials and configurations which can be adjusted or manipulated to accommodate optical adjustments in the Extreme UV wavelength range. The focus is on the basic layer growth of piezo and pyro-electric materials and a new, for the group additional, method for deposition, namely DC and RF magnetron sputtering of these materials.

Kosten:

Fundamenteel:	€ 85000	*Waarvan TKI-toeslag:*	€ 72000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 13000
Totaalbegroting:	***€ 85000***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-I - Projectnummer: 15DRDC002

Titel: Inelastic tin-particle interactions with plasma-facing material

Penvoerder: FOM

Partners: FOM, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The project aims at investigating the interaction between highly charged Sn ions and highle excited Sn atoms with clean and H-covered materials. The results will be of direct relevance for the understanding of the behavior of materials in ASML's modern EUV lithography machines, in which EUV light is generated in a SN plasma, which also emits a variety of high-energy ion, atom and cluster species.

Kosten:

Fundamenteel:	€ 388000	*Waarvan TKI-toeslag:*	€ 325000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 63000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 388000***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-I - Projectnummer: 15HTSM07

Titel: Exploring the dark electronic properties of FeS2 nanoparticle films

Penvoerder: FOM

Partners: FOM, IMRA Europe S.A.S.

Roadmap: Solar

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Conform planning

Omschrijving:

Within the framework of the HTSM project (Project: 12852, title: Surface-engineered iron and tin sulfide nanoparticles as cheap solar cell materials) we have succeeded in improving the quality of photoactive FeS2 NCs films by ligand exchange during the NC film fabrication process and additional annealing treatments. Photoconductivity measurements show a 100 times higher signal and a 10 times longer charge carrier lifetimes than films without treatment. To find the origin of this improvement more detailed electronic information regarding our FeS2 NCs films is required. Using a Hall effect measurement system the number, kind and mobility of charge carriers can be measured.

Kosten:

Fundamenteel:	€ 6000	*Waarvan TKI-toeslag:*	€ 5000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 1000
Totaalbegroting:	***€ 6000***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-I - Projectnummer: 14DRDN004

Titel: Field studies with seismic and gravity-gradient sensor networks for gravitational wave physics and oil-and-gas exploration

Penvoerder: FOM

Partners: FOM, Shell global solutions international BV, Innoseis BV

Roadmap: Advanced Instrumentation

Toeslagjaar: 2014*; Einddatum: 2015; Fase:* Conform planning

Omschrijving:

In this project we will carry out field-tests with small-scale networks (up to 200 nodes). Part of the nodes will have wireless communication based on proprietary mesh protocols to allow data quality assurance and network communication. In addition we will test nodes with ultra-sensitive low-power readout electronics and microelectromechanical (MEMS) acceleraometer. These nodes are light and compact and the absence of cabling leads to new degrees of freedom in the deployment that may be important for oil and gas exploration.

Kosten:

Fundamenteel:	€ 440000	*Waarvan TKI-toeslag:*	€ 182000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 150000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 108000
Totaalbegroting:	***€ 440000***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-I - Projectnummer: 14FEUL03

Titel: Fundamental fluid dynamics challenges of extreme ultraviolet lithography

Penvoerder: Stichting Fundamenteel Onderzoek der Materie (FOM)

Partners: Stichting Fundamenteel Onderzoek der Materie (FOM), ASML Netherlands BV

Roadmap: Semiconductor Equipment

Toeslagjaar: 2014, 2015, 2016, 2017*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Extreme Ultraviolet Lithography (EUVL) is considered to be the future technology for the production of Integrated Circuits, yet there are major fundamental and technological challenges to overcome. The objective of the project is:

- To achieve a better control of the debris formation to reduce contamination of the optical elements in the EUV machine, especially the source optics.
- To maximize the conversion efficiency from laser power to EUV by properly shaping the tin droplet.

Kosten:

Fundamenteel:	€ 350000	*Waarvan TKI-toeslag:*	€ 295000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 55000
Totaalbegroting:	***€ 350000***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-I - Projectnummer: 16DRDN013

Titel: HTSM TKI: Seismic LoRA

Penvoerder: Stichting Fundamenteel Onderzoek der Materie (FOM)

Partners: Stichting Fundamenteel Onderzoek der Materie (FOM), Innoseis

Roadmap: Advanced Instrumentation

Toeslagjaar: 2015 en 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

In the proposed project curiosity based fundamental research drives instrumentation across technology boundaries, leading to innovations that can be utilized throughout various industries. The recent detection of gravitational waves has been a ground-breaking discovery that required the development of state-of-the-art displacement sensors with low noise and low power. Gravitational wave detectors (especially next generation instruments) will prot from sensor networks for measuring seismic noise and subtraction of so-called gravity gradient noise. This project complies with the HTSM Roadmap on Advanced Instrumentation and focuses on sensor systems for determination and monitoring of location, movement and vibration. The project can be considered a continuation of the successful TKI project with reference INNO2015001 entitled "TremorNet nodes for field studies with seismic and gravity-gradient sensor networks'" that started on June 30, 2015. A 100-node sensor network was delivered to Shell on time, within specifications, and within budget. Subsequently, field tests on earthquake monitoring were carried out in Groningen in Q1 2016. In addition, seismic measurements to assess the quality of Zuid-Limburg as a candidate site to host a third-generation gravitational wave detector named Einstein Telescope were performed. Finally, these sensors were used at the Blegny Mine in Belgium. Analysis of the data is in progress.
In this project we propose R&D on long-range wireless communication with smart sensor nodes to allow data quality assurance and bi-directional network communication. Innoseis, has begun development of an improved version of Tremornet sensor nodes with ultra-sensitive low-power readout electronics and long-range communication capability. We propose to employ these nodes in a sensor network at the European Gravitational Observatory (EGO) site that houses Advanced Virgo. Network protocols with various topologies will be implemented and tested. Successful implementation will lead to improved low-frequency performance of Virgo. At the same time for Innoseis it provides a testing ground of its Tremornet 2.0 sensors.

Kosten:

Fundamenteel:	€ 271000	*Waarvan TKI-toeslag:*	€ 230000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 41000
Totaalbegroting:	***€ 271000***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-I - Projectnummer: 17DRDD002

Titel: TKI-HTSM Solid State Plasma 4C (DF16-35)

Penvoerder: Stichting Fundamenteel Onderzoek der Materie (FOM)

Partners: Stichting Fundamenteel Onderzoek der Materie (FOM), Ampleon

Roadmap: Semiconductor Equipment

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

De recente ontwikkeling van RF power transistors voor de telecom industrie heeft de introductie van dit soort componenten en op deze componenten gebaseerde hoog-vermogensvoedingen in andere applicatie-gebieden versneld1. De door Ampleon ontwikkelde halfgeleider technologie biedt nu mogelijkheden voor de succesvolle opschaling. Dit voorstel behelst een feasibility studie van de toepassing van een door Ampleon ontwikkelde hoogvermogen voeding in een chemisch conversie-proces. Op DIFFER wordt onderzoek verricht aan het zogenaamde plasmolyse proces (zie kader) een disruptieve technologie om op basis van duurzame elektriciteit en de grondstoffen water, CO2 en N2, chemie te bedrijven. Binnen DIFFER is een plasmolyse "proof-of-concept" opstelling4 ontwikkeld met een vermogen tot 1 kW gebaseerd en welke gebaseerd is op de klassieke magnetronvoeding.(TRL 2 niveau). SolidStatePlasma4C zal een door Ampleon ontwikkelde “state-of-the-art hoogvermogen voeding van orde 10 kW inzetten en testen voor toepassing in een plasmolyse proces om te komen tot de bouw en inbedrijfstelling van een TRL 3 tot 4 Prototype Development Unit (PDU). Het project zal derhalve Ampleon inzicht geven in de mogelijke geschiktheid van dit soort voedingen in de chemische industrie. Een uitdaging voor een op RF transistoren gebaseerde voedingsbronnen is om de efficiency van magnetrons te evenaren (rond de 80-90%). De belangrijkste voordelen van op RF transistoren gebaseerde voedingsbronnen t.o.v. van de nu gebruikte magnetrons zijn:

1. hogere beschikbare vermogens, modulair voor schaalbaarheid in toepassing (orde MW)
2. snelle, eenvoudige modulatie, frequentie tuning en schakelbaarheid.
3. een veel langere levensduur (>105 uur) dan voor de magnetrons (5000 uur) waardoor dit type voeding uitermate geschikt is om gebruikt te worden in de chemische industrie.

Voor Ampleon zijn de evidente voordelen dat de opschaling van het op plasma gebaseerde gasconversieproces leidt tot een grotere afzet van RF transistoren en dus tot grotere revenuen. Daarnaast zal de opschaling naar hoogvermogensvoedingen andere markten toegang verschaffen (o.a. de verwarmingsmarkt).

Kosten:

Fundamenteel:	€ 242000	*Waarvan TKI-toeslag:*	€ 174000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 68000
Totaalbegroting:	***€ 242000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/15.1036

Titel: Drone-based multi-agent system design for farming

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven

Roadmap: Smart Industry

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Achter op planning

Omschrijving:

Het landbouw productie proces van de toekomst kan beschreven worden als een multi agent systeem waarbij allerlei apparaten (agents) naast elkaar bestaan en met elkaar samenwerken. Voorbeelden van agents zijn drones en sensoren voor monitoring en inspectie en actuatoren voor irrigatie, bemesting, onkruidverdelging etc. Met gebruikmaking van de juiste kennis van bodem, gewas en klimaat, proberen we het multi-agent systeem zodanig in te richten dat voedselproductie proces ge-optimaliseerd wordt. Dit project is een eerste in een rij van gerelateerde projecten.

Kosten:

Fundamenteel:	€ 453376	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 453376***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/15.1036

Titel: co-financiering PD Eng opleiding Automotive

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, Consortium van bedrijven nog af te spreken

Roadmap: Automotive

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

De TU Eindhoven kent een aantal zogenaamde Professional Doctorate Engineering opleidingen. Dit zijn twee jarige post MSc opleidingen waarvan ruim een jaar besteed wordt aan het volgen van vakken en ongeveer een jaar voor het doen van een opdracht voor een betalende partner, meestal een bedrijf. Een van de opleidingen is gericht op Automotive toepassingen. Om de jaargang van 2016 van 11 PDENg studenten te kunnen financieren zal een deel van de TKI gelden worden ingezet.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 140000
Industrieel/Toegepast:	€ 680000	*Waarvan Private cash:*	€ 510000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 680000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/15.1036

Titel: Sensor technologies and metrology solutions for high tech Additive Manufacturing processes enabling industrial scale products

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven

Roadmap: Smart Industry

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Achter op planning

Omschrijving:

Additive manufacturing (ook wel 3D printing genoemd) is sterk in opkomst. Samen met TNO heeft de TU Eindhoven een drie-tal onderzoeksplaatsen gecreerd rondom het thema Additive Manufacturing. Het TKI project is er een van. De focus van dit project ligt op het verbeteren van de kwaliteit van het additive manufacturing productie proces als ook de kwaliteit van de geproduceerde producten. Daarvoor moeten speciale sensoren worden ontwikkeld om allerlei specifieke eigenschappen van het product te kunnen meten alsmede nieuwe methoden om tijdens het productie proces te kunnen meten.

Kosten:

Fundamenteel:	€ 453376	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 453376***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/15.1036

Titel: PATIENCE: Patient-centric ICT System featuring end2end security and Detailed Clinical Models

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven

Roadmap: HealthCare

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Nog niet gestart

Omschrijving:

Dit project bestaat uit twee onderdelen. Een gefocuseerd op patientenzorg en het andere deel op dierenwelzijn in de veehouderij. Beide projecten worden uitgevoerd door een PostDoc. De patientenzorg wordt steeds verder gepersonaliseerd en patienten willen steeds meer controle over hun eigen gezondheid. Dit verklaart ondermeer de opkomst van vele gezondheid apps. Deze trend stelt hoge eisen aan de ICT infrastructuur voor de gezondheid. Een hele belangrijke eis is dat patienten data op een veilige manier opgeslagen kunnen worden en verstuurd indien nodig. Het dierenwelzijnsproject richt zich vooral op nieuwe technieken die ingezet kunnen worden op dieren individueel te kunnen monitoren.

Kosten:

Fundamenteel:	€ 453376	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 453376***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/16.1049

Titel: Magnetic control of micro-particles and integrated micro-actuators for high precision handheld diagnostics

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, Philips Handheld Diagnostics

Roadmap: HealthCare

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Om diagnostiek van patienten te versnellen en goedkoper te maken wordt gewerkt aan micro devices die in staat zijn op basis van een druppel bloed analyses uit te voeren. Deze devices zijn gebaseerd op micro kanaaltjes. Een van de problemen die hierbij opgelost moet worden is het goed mengen van de vloeistof met droge chemische stoffen. Dit onderzoek draagt bij aan de verdere ontwikkeling van deze diagnostische devices.

Kosten:

Fundamenteel:	€ 460000	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 60000
Totaalbegroting:	***€ 460000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/16.1049

Titel: Plasma driving industrial developments on the nanoscale

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, Prodrive

Roadmap: Semiconductor Equipment

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Omdat in de semiconductors industry de afmetingen van devices steeds kleiner worden (nu een 10-tal nanometers) wordt de impact van nano-deeltjes op het fabricage proces steeds groter. Steeds kleinere deeltjes kunnen de werking van een chip verstoren. Daarom is er behoefte aan een fundamentele nieuwe methode. Dit onderzoek gaat na of te toepassing van plasma kan helpen om de impact van nanodeeltjes te minimaliseren.

Kosten:

Fundamenteel:	€ 480000	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 40000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 40000
Totaalbegroting:	***€ 480000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/16.1049

Titel: Next generation ultra-high precision power amplifiers

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, ASML, Prodrive

Roadmap: Smart Industry

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Nog niet gestart

Omschrijving:

De nieuwe generaties lithografie machines stellen zeer hoge eisen aan de vermogensversterkers die nodig zijn om de steeds kleinere details met een afmeting van minder dan een nanometer te kunnen afbeelden. Om aan deze eisen tegemoet te komen moet een hele nieuwe architectuur van deze versterkers worden ontwikkeld. Dit project beoogt hieraan een bijdrage te leveren. Deze versterkers kunnen ook in andere takken van industrie worden toegepast zoals automotive.

Kosten:

Fundamenteel:	€ 460000	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 60000
Totaalbegroting:	***€ 460000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/16.2036

Titel: Smart materials for greenhouses

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, Sabic Innovative Plastics

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

In dit project wordt onderzoek gedaan naar slimme materialen die in kassen gebruikt kunnen worden en die met name het zonlicht op optimale wijze doorlaten. De materialen passen zich aan zodat het hele seizoen the omstandigheden voor de groei van bloemen en planten opitmaal zijn. Dit project wordt uitgevoerd met een aantal partners uit de topsector Tuinbouw en Uitgangsmaterialen.

Kosten:

Fundamenteel:	€ 240000	*Waarvan TKI-toeslag:*	€ 200000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 40000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 240000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/16.2036

Titel: Smaragd-Farmtronics

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, Protonic Holland

Roadmap: Smart Industry

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Nog niet gestart

Omschrijving:

Samen met een aantal partners uit de Agri&food wereld wordt gewerkt aan een heel nieuw landbouw concept. In plaats van te werken met grote mono-culturen en grote machines wordt onderzocht of gewassen door elkaar kunnen groeien. Vanuit de plantkunde weten we dat dit veel beter is voor de opbrengst en voor de resistentie van de planten. Dit vereist echter een nieuwe methode van bewerken en oogsten, gebaseerd op kleine machines. In dit deel van het project ontwikkelen we een kleine machine met een zeer efficient aandrijf mechanisme en die zich voortbeweegt op zonne-energie.

Kosten:

Fundamenteel:	€ 428000	*Waarvan TKI-toeslag:*	€ 300000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 28000
Totaalbegroting:	***€ 428000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI-HTSM/17.0783

Titel: Building a hydraulic Z-drive for cutting robot of asparagus harvesting machine

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, Cerescon B.V.

Roadmap: Smart Industry

Toeslagjaar: 2017*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

In dit project wordt onderzoek gedaan naar een hydraulische aandrijfsysteem voor een asperge steek robot.

Kosten:

Fundamenteel:	€ 69000	*Waarvan TKI-toeslag:*	€ 37200
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 31800
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 69000***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13304

Titel: Modeling drying droplets on porous substrates

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Océ-Technologies BV

Roadmap: Printing

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

We propose the extension of a recently developed numerical simulation model for the drying and absorption of inkjet-printed droplets on porous substrates. The existing model is based on the lubrication approximation, which significantly reduces the computational effort, and is able to predict the deposition profile after drying of the solvent. The following extensions are proposed: (1) Incorporation of the effect of neighboring droplets, printed in lines or square patterns, on the evaporation velocity; (2) Incorporation of the effects of surfactants, which may gather either at the liquid-air interface or at the liquid-substrate interface; (3) Development of a model for the description of a porous substrate consisting of small spherical particles instead of parallel channels.
For the first extension, the model will be generalized from axially symmetric to three dimensions. The second extension enables the description of Marangoni flow in the model. For the third extension a multi-scale approach will be followed, in which the properties of the large-scale model will be derived from simulations at the scale of a few particles.

Kosten:

Fundamenteel:	€ 279030	*Waarvan TKI-toeslag:*	€ 601467
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 57000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 57120
Totaalbegroting:	***€ 279030***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13305

Titel: A high-end flow cell system for nanoparticle manipulation

Penvoerder: Stichting VU-VUmc

Partners: Stichting VU-VUmc NT-MDT Europe BV

Roadmap: Nanotechnology

Toeslagjaar: 2013*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Fundamental research and product development are two sides of the same coin in this newly granted project. Wouter Roos and Gijs Wuite, who are both leading an independent research group at the Vrije Universiteit Amsterdam, will study virus infection with a specially developed sample chamber. Essential for this project is the intensive collaboration with NT-MDT, an Eindhoven-based high-tech company. Project leader Roos: "I am very happy this challenging project has been granted and we are eager to start it. The Wuite lab and my lab will put in our specialist knowledge and experience in the areas of Atomic Force Microscopy (AFM), viruses and flow cells. At the same time NT-MDT will use their development skills and capacity to make a product of the sample chamber we design."

Kosten:

Fundamenteel:	€ 773606	*Waarvan TKI-toeslag:*	€ 183958
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 166666
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 102564
Totaalbegroting:	***€ 773606***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13306

Titel: Ultra-high specific activitiy 177Lu: a radioisotope generator based on the decay of long-lived 177mLu

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, I.D.B. Holland BV

Roadmap: HealthCare

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

177Lu wordt meer en meer gebruikt als therapeutisch middel in peptide-receptor radionuclide therapie (PRRT) in de behandeling van neuroendocrine tumoren. Een radionuclide-generator van waaruit een dosis 177Lu kan worden geleverd van ultrahoge specifieke activiteit zal een grote impact hebben op PRRT. Het doel van het project is zo?n generator ontwikkelen, via de scheiding van 177Lu (6.65 d halveringstijd) van haar moedernuclide (177mLu: 160.7 d halveringstijd). De basis voor deze scheiding is een de verbreking van chemische bindingen (bond rupture). Bond rupture is het chemische effect als gevolg van het verlies van een of meer ?inner-shell? elektronen. Succesvolle demonstratie van deze generator zal impact hebben op eindgebruikers via kostenreductie, verbeterde beschikbaarheid, en verminderde afhankelijkheid van de productie/demand-keten. Het resultaat zal zijn dat de beschikbaarheid van 177Lu voor ziekenhuizen en patiënten wordt gewaarborgd via de lange beschikbaarheid van 177mLu en niet meer zo sterk afhankelijk van de anders noodzakelijke dagelijkse/wekelijkse reactor-productie van 177Lu zelf.

Kosten:

Fundamenteel:	€ 522979	*Waarvan TKI-toeslag:*	€ 116774
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 104612
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 98195
Totaalbegroting:	***€ 522979***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13307

Titel: Integrated Graphene Pressure Sensors (IGPS)

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, NXP Semiconductors Netherlands BV, ANL, AMS

Roadmap: Nanotechnology

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

De ontdekking van grafeen heeft het mogelijk gemaakt om overspanningen te maken met membranen van slechts een enkel atoom dik. De extreme flexibiliteit van deze grafeen membranen maakt grote verbeteringen mogelijk in de gevoeligheid en afmetingen van druksensoren. In dit project zal aangetoond worden dat grafeen druksensoren conventionele sensoren kunnen overtreffen. Om dit doel te bereiken zullen grafeen membranen van verschillende afmetingen en geometrieën worden gefabriceerd. Hun eigenschappen zullen worden gekarakteriseerd door middel van Raman spectroscopie, interferometrie en atomaire kracht microscopie. Geavanceerde elektrische methodes, gebaseerd op capacitieve-, piezoresistieve- en veld-effecten zullen worden ontwikkeld om verplaatsingen te detecteren op de femtometer schaal. Door het combineren van extreem drukgevoelige CMOS compatibele grafeen druksensoren met zeer gevoelige elektrische positie detectie methodes zullen druksensoren worden gedemonstreerd die huidige MEMS sensoren overtreffen in gevoeligheid en miniaturisatie.

Kosten:

Fundamenteel:	€ 305092	*Waarvan TKI-toeslag:*	€ 72541
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 65500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 40700
Totaalbegroting:	***€ 305092***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13312

Titel: Nanomedicines targeting the multiple myeloma-stroma alliance

Penvoerder: UMC Utrecht

Partners: Umc Utrecht Holding BV, Excytex, Enceladus Pharmaceuticals BV, Sun Pharma Universiteit Twente

Roadmap: Nanotechnology

Toeslagjaar: 2013*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

In this project we will design nanomedicines that target tumors. The novelty lies in the fact that we do not only treat the primary tumor, as we have successfully done in the past with liposomal dexamethasone. Now, our recent insights into the important role of the pre-metastatic niche and the contribution of the tumor micro-environment to the development of metastasis and tumor resistance, allow us to deploy our nanomedicine formulations against the tumor-stroma alliance.

We will particularly focus our research on Multiple Myeloma (MM), an aggressive, debilitating cancer with a high therapeutic need that our team has become specialized in. In MM, we can formulate established and emerging drugs into nanomedicines to improve their efficacy and tolerability. In addition, we are currently identifying new microenvironment-related factors that contribute to proliferation, resistance to immune- and chemotherapy, and metastasis formation. One of these factors is Notch. Notch signaling plays a major role in building the alliance between stroma and MM. Based on Notch, we can design new experimental therapeutic approaches to disrupt the tumor ?stroma alliance with our targeted nanomedicines.

Hereto, we have developed excellent humanized animal models, which can effectively mimic the natural microenvironment of human MM enabling us to study the efficacy of our formulations at a preclinical level. Finally we are one of the leading centers in the Netherlands in terms of Phase I/IIa trials in MM, which creates the opportunity to directly translate the most promising treatment to the clinic.

Kosten:

Fundamenteel:	€ 667680	*Waarvan TKI-toeslag:*	€ 155073
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 140000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 102500
Totaalbegroting:	***€ 667680***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13314

Titel: Automated multi-modal tomography for sub-22nm IC nodes

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, IMEC BV, FEI Electron Optics BV, CWI, Universiteit Antwerpen

Roadmap: Semiconductor Equipment

Toeslagjaar: 2013*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

We want to achieve unprecedented fast and accurate imaging of interfaces and faults in 3D semi-conductor materials, especially sub-22nm IC's. To this end we will develop novel algorithms for globally-consistent element-specific tomographic reconstructions at near-atomic resolution based on multi-modal data from energy dispersive X-ray (EDX) and Scanning Transmission Electron Microscopy (STEM). Both modalities can be acquired simultaneously. We will exploit this multi-modal information in a completely new way, namely to steer all tomographic reconstructions in order to obtain one overall consistent 3D element-wise reconstruction. Improving each individual reconstruction in combination the tomograms from the electron and all X-ray channels, will deliver the ultimate tomogram by exploiting the strong aspects of every technique.

Use of priors in tomographic reconstruction reduces the number of tilts angles without loss of resolution. Dynamically adapting the resolution of projections and automatic assessment of the intermediate tomogram quality permits investigating dynamic acquisition schemes. This research will deliver near-atomic resolution of elemental and structural interfaces in tomograms with a reduced number of tilt angles and therefore enable fast, reliable fault detection for 3D IC's

---

Kosten:

Fundamenteel:	€ 763738	*Waarvan TKI-toeslag:*	€ 181840
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 164000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 101170
Totaalbegroting:	***€ 763738***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13315

Titel: SEEDCom - Smart Energy Efficient Digital Communication

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, NXP Semiconductors Netherlands BV

Roadmap: Components & Circuits

Toeslagjaar: 2013*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Problem statement; Wireless communications are growing exponentially and are moving towards fourth generation (4G) mobile services, which aim for wider signal bandwidths and MIMO techniques to handle more users at higher data rates. These rapid changing conditions demand new solutions for the basestation transmit path (TX), whose efficiency dominates the huge operating costs and related worldwide CO2 emissions of wireless networks. Scientific challenges are found in identifying the suitable all-digital signal generation, conditioning, amplification and power combining that enable truly energy-efficient, multi-band cost-effective data transmissions.
Research method; The goal of SEEDCom is: “To introduce novel, digital-oriented signal generation, up-conversion and RF amplification techniques that will yield a new paradigm of transmitter topologies pushing to new unheard-of limits of functionality, integration and power efficiency, while being modular and data-rate scalable”. Our expertise on all-digital RF upconversion and signal-processing will ensure the development of optimal driving conditions for a new class of RF switch-mode power amplifiers that utilize the latest scientific insights in outphasing operation. Fundamental bottlenecks related to switch-mode operation at RF frequencies, like low gain, poor path calibration and power hungry pre-distortion can be completely eliminated by the alldigital approach and the use of NXP’s unique high-voltage CMOS (HVCMOS) technology. The later enables to bridge the gap between the low-power digital (CMOS) domain and the high-power GaN output-stage technology. As such, these GaN devices can now be digitally controlled in an intelligent way, which, when combined with innovative ultra-compact, low-loss wideband power combining networks, can provide an un-precedent TX performance.
Expected results; SEEDCom will result in new scientific approaches to transmit and amplify RF signals, which will allow our corporate partner to engineer novel smart package-integrated digitalenhanced power amplifier modules with improved data capacity, energy efficiency, signal quality, re-configurability, form factor, reduced cost and ecological footprint. Their 100 x smaller form factor and extended functionality will allow new tower-top base stations (eliminating lossy cables and active cooling units), facilitate MIMO and multi-sector operation, as well as, smart-antenna systems, providing higher data capacity and improved link budget at much lower CO2 emissions.

Kosten:

Fundamenteel:	€ 639454	*Waarvan TKI-toeslag:*	€ 138761
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 125000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 134000
Totaalbegroting:	***€ 639454***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13316

Titel: Light Management and Interface Engineering for Highly Efficient and Ultra-Thin CIGS Solar Cells (LIMIET)

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, Philips Lighting BV, Smit Ovens BV, Solvay Holding Nederland BV, TNO Technische Universiteit Eindhoven

Roadmap: Solar

Toeslagjaar: 2013*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Copper-Indium-Gallium-Selenide (CIGS) solar panels have the highest state-of-the art efficiency of 15.7% among all thin film photovoltaic (PV) technologies, and therefore the highest potential to approach efficiencies of the mature c-Si technology (i.e. 18.2% for multi-crystalline Si). Consequently, CIGS can definitely address both technological challenges of achieving high panel efficiencies to guarantee the low non-modular and panel costs (lower than c-Si PV technology) towards a sustainable and mature market for PV manufacturers. We propose a new architecture for CIGS solar cells in which the thickness of the CIGS absorber layer is significantly reduced down to 500 nm.
This project focuses on the interface engineering and the introduction of innovative and inexpensive light trapping concepts towards the design and development of ultra-thin CIGS solar cells with higher efficiencies. In addition, thinner CIGS layers translate into reduced material and processing costs and, therefore, panel costs. This approach would also allow to tackle the limited supply of indium and gallium, which represents an issue when very large CIGS volume production is taken into consideration.
The major challenge associated with the reduction of the absorber layer thickness lies within the several optical and electrical loss mechanisms. These losses comprise a decrease in sun light absorption and an increase of charge recombination at interfaces. The losses lead to solar cells with lower performances in reference to state-of-the art modules, i.e. a reduced short-circuit current and fill factor.
In this project, selected modeling and experimental efforts will be developed and applied to ultra-thin CIGS solar cells, which tackle the optical and electrical loss mechanisms. In particular, the research efforts will address new configurations for the back contact, based on multifunctional stacks (MFS) serving the roles of back reflector and electrical passivation layer. In order to further address the insufficient light absorption in the ultra-thin CIGS cell, the conventional flat solar cell structure will be replaced by nano-structured solutions (e.g. surface texturing, metal nanoparticles/dielectric plasmonics), which potential has already been demonstrated for thin film silicon solar cells.
To realize a successful integration of these concepts into ultra-thin CIGS cells, state-of-the-art optical and electrical modeling of solar cell devices will be applied. At process level, atomic layer deposition (ALD) will be adopted to achieve the mandatory nm-scale thickness control, uniformity and 3D conformality when ultra-thin films are deposited on nano-structured/textured surfaces and interfaces.

Kosten:

Fundamenteel:	€ 508784	*Waarvan TKI-toeslag:*	€ 120827
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 125000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 52500
Totaalbegroting:	***€ 508784***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13318

Titel: Development of eco-concretes by using industrial by-products.

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Enci BV, Struyk Verwo Infra BV, ATTERO BV, Technische Universiteit Eindhoven, Van den Bosch Beton BV, Van Gansewinkel Groep BV

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

De meeste industriële reststoffen worden tegenwoordig laagwaardig ingezet of gestort. Voorbeelden hiervan zijn verbrandingsassen van huisvuilverbranding, biomassa energieopwekking en papierslibverbranding. Deze materialen bevatten vergelijkbare componenten als cement en andere betoningrediënten, wat toepassing op dit gebied indiceert. Voor de productie van cement, de duurste ingrediënt van beton, worden natuurlijke grondstoffen en energie gebruikt, waarbij CO2 vrijkomt. Door de substitutie van cement door reststoffen worden zowel milieu- als kostenvoordelen voorzien.

Er is momenteel een groot gebrek aan kennis en informatie over de betoneigenschappen wanneer deze reststoffen worden toegepast. Het eerste doel van dit project is om de eerder genoemde reststoffen fysisch en chemisch te karakteriseren, en vervolgens in te zetten in aardvochtig betonproducten. Een derde aspect is de milieuhygiënische impact van deze reststoffen, want betoningrediënten en beton moet voldoen aan vigerende milieuregels. Hiervoor dient de uitloging van milieuvervuilende stoffen te worden bestudeerd en hun interactie met cementuitharding gekwantificeerd.

Omdat de genoemde reststoffen vergelijkbare mineralen bevatten als cement en gangbare substituten, hebben ook zij bindmiddeleigenschappen. Dit puzzolaan gedrag wordt bestudeerd in detail en gekwantificeerd, opdat zij cement gedeeltelijk kunnen vervangen met behoud van betoneigenschappen. Door bepaalde karakteristieken, o.a. een hogere waterbehoefte, kunnen de bestudeerde reststoffen zelfs tot betere eigenschappen leiden. Een ander bekend effect van cementsubstituten is hun mogelijke vertraging van de cementuitharding. Ter compensatie wordt olivijn nanosilica toegevoegd, geproduceerd van reststoffen, en dit is daarom een duurzame betontoevoeging. Vanwege de fijnheid voorziet nanosilica in nuclei die de reactie versnellen. Om deze brede range van materialen toe te kunnen passen wordt een bestaand betonontwerpprogramma aangepast. Geavanceerde korrelpakking- en hydratatiemodellen worden gecombineerd met verfijnde experimentele technieken om eco-beton met gewenste eigenschappen te realiseren.

Kosten:

Fundamenteel:	€ 820194	*Waarvan TKI-toeslag:*	€ 185533
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 195000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 116500
Totaalbegroting:	***€ 820194***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13319

Titel: Graphene Wafer-scale Technology: the ultimate material goes from lab to fab.

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, Hauzer, NXP Semiconductors Netherlands BV, AMS VLSI

Roadmap: Components & Circuits

Toeslagjaar: 2013*; Einddatum: 2019; Fase:* achter op planning

Omschrijving:

De bijzondere mechanische en elektrische eigenschappen van grafeen maken grafeen een ideaal materiaal voor de elektronische industrie, in het bijzonder voor "high speed"- en sensortoepassingen. Ondanks het enorme potentieel van grafeen wordt het vandaag de dag nog niet toegepast in micro-elektronica. Dit komt omdat de vereiste groei van grafeen op wafer-schaal en de overdracht van grafeen van de ene wafer naar de andere wafer zeer moeilijk te bereiken is. Daarom gebeurt het meeste grafeen onderzoek nog steeds op micrometer kleine velletjes grafeen die met plakband van grafiet zijn afgepeld: nog een lange weg te gaan tot een industrieel proces. De TU Delft is in de unieke positie om hier verandering in aan te brengen. Binnen het FOM grafeen programma hebben wij een Chemical Vapour Deposition (CVD) proces ontwikkeld waarmee wij nu al millimeter grote grafeenkristallen groeien met de zelfde hoge elektrische kwaliteit als plakband grafeen: 200.000 cm2 /V.s. Wij hebben dit resultaat behaald door ons begrip van CVD processen en de gelieerde materiaalkunde van dunne films. Bovendien hebben we ruime ervaring opgedaan in het op wafer-schaal overdragen van lagen van diverse materialen in het programma "Silicon on anything". In het voorliggende project stellen wij voor om samen met onze industriële partners op basis van ons huidige grafeen depositieproces op koperfolie in een hete wand buisoven een proces te ontwikkelen voor grafeen deposite en overdracht op 100 mm wafers. Gas- en Hallsensoren zullen vervaardigd worden om de mogelijkheden van de ontwikkelde technologie te demonstreren. Succesvolle afronding van dit project zal de micro-elektronische- en sensor-industrie voorzien van een toepasbaar wafer-schaal grafeen depositie- en overdrachts-proces, dat het veld zal veranderen.

Kosten:

Fundamenteel:	*€ 743297*	*Waarvan TKI-toeslag:*	€ 165985
Industrieel/Toegepast:	*€ 0*	*Waarvan Private cash:*	€ 170000
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	€ 118200
Totaalbegroting:	***€ 743297***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13320

Titel: Nanometer-accurate planar actuation system (NAPAS)

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, ASML, TNO, Philips Lighting BV, Prodrive BV, SKF Engineering & Research Centre BV Technotion

Roadmap: Mechatronics / Manufacturing

Toeslagjaar: 2013*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Our society demands mobile devices with increasing computational power, storage capacities and, at the same time, decreasing energy consumption and prices. This demand has been translated into the roadmap of the semiconductor industry predicting larger wafer sizes (from 300 to 450 mm) and smaller circuit details (from 30 to 5 nm). These challenging requirements force the high-tech semicon-ductor industry to design and manufacture new production machines for lithography, inspection and dicing, to be able to support both larger wafers (larger movement ranges) and smaller details (higher accuracy). This trend leads to the ratio between range (meter) and resolution (nanometer) to unprecedented values of 1 billion.

Nanometer-accurate motion systems are nowadays realized by a combination of a micrometer-accurate long-stroke positioning system (large movement range) and a nanometer-accurate short-stroke positioning system (>1mm movement range). These dual-stage positioning systems are complex, heavy, expensive and increasingly more difficult to design for production and reliable operation. Magnetically levitated, single-stage planar motors are the single-most promising alterna-tive technology that can replace and simplify these bulky positioning systems for the one-billion-ratio challenge of the future. However, accuracy of these motors is limited by the intrinsic position-dependent electromagnetic interaction between the coil and magnet plates and deformation of the translator due to the position-dependent force and temperature distributions. Insufficient detailed knowledge of these static and dynamic interactions serves as the major bottleneck of the achieva-ble position and accuracy, preventing the single-stage planar motor technology in breaking the one-billion-ratio challenge.

The NAPAS project aims to overcome the fundamental limits of the dynamic accuracy of moving-magnet planar motors by developing a highly accurate and experimentally verified understanding of the dynamics of the position-dependent coil-magnet interactions together with the development of a control system that, by exploiting this knowledge, capable of significantly improving high-speed positioning and bordering the one-billion-ratio objective. The project focus is on improving the understanding of the dynamic multiphysical electromagnetic-mechanical-thermal behavior of moving-magnet planar motors with commutation effects, developing new design principles, exploring material choices, dynamic calibration (auto-tuning), estimation and control techniques for reducing the influence of unpredictable disturbances to support predictable and high-performance nanomotion of the new 450 mm wafers. The project envisions new and challenging research in developing better models to predict parasitic electromagnetic effects such as eddy currents and the effect of thermal and force distributions in the planar motor on wafer deformations. Based on this knowledge, new on-line calibration methods for coil-magnet plate interaction, in-line observers and measurement methods for determining the dynamic deformation of the wafer translator during movements, and new commutation and control methods for guaranteeing the specified motion requirements will be developed. The final goal is to move a plate holding permanent magnets with nanometer precision in a plane 4 times the size of the plate. Measurements and implementation will be carried out on a state-of-the-art planar motor equipped with a measurement system with sub-nanometer resolution.

Kosten:

Fundamenteel:	€ 796733	*Waarvan TKI-toeslag:*	€ 175651
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 159000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 156133
Totaalbegroting:	***€ 796733***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13322

Titel: Physics based modelling of failure in textile composites under complex stress states

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Fokker Aerostructures BV, N.L.R. Holding BV, Advanced Lightweight Engineering BV,

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The ever growing interest of high performance composite materials can partially be attributed to relatively recent developments that enable the shift from traditional laminated composites made of unidirectional plies towards composites that include complex two- and three-dimensional features, such as woven textiles. These composites offer the possibility to design relatively thick components with a complex geometry as opposed to the more traditional thin-walled structures.

The success of these materials notwithstanding, the fundamentals of their mechanical behaviour upon failure is not well understood. Existing numerical and analytical techniques often fail to predict the initiation and development of damage to complete failure, especially under compressive stress states.

This project aims at developing numerical techniques that are able to accurately predict the complex failure behaviour of woven composite materials in thick structural components under all stress states. The emphasis is put on the interaction between various failure mechanisms such as matrix cracking, fibre kinking and delamination.

Kosten:

Fundamenteel:	€ 301162	*Waarvan TKI-toeslag:*	€ 69532
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 62500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 48020
Totaalbegroting:	***€ 301162***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13323

Titel: New Materials for Extreme ultraviolet & Integrated Circuits (NMEIC)

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Carl Zeiss BV, Stichting voor Fundamenteel Onderzoek der Materie FOM, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The current and future generations of lithography operate in the extreme ultraviolet (EUV), which requires reflecting optics. The operating conditions of an EUV lithography tool present a highly reactive environment that can react with the component materials of the EUV optics, ultimately destroying them. Also particulate contaminants are created in the EUV environment, which adhere to the mask in a wafer scanner and are imaged sharply on the wafer. To prevent these effects, protective capping layers are placed on the EUV optics and a protective pellicle is placed in front of the mask, out of the depth of focus of the imaging system. Both the pellicle and the capping layers need to be chemically inert under EUV irradiation, and EUV transparent. In addition, the pellicle needs to be mechanically strong and the capping layer needs to be impermeable to maintain the reflectivity of EUV optics. At present, although a pellicle is required, there are no EUV compatible pellicle solutions that are commercially acceptable. In addition, current capping layers need further improvement before commercialization. In this proposal, the effect of EUV irradiation under EUV lithography operating conditions on novel materials such as graphene and ultra-thin membranes deposited by atomic layer deposition (ALD) will be explored. Both graphene and ALD membranes are extremely thin (~nm), and therefore will exhibit exceptional EUV optical properties. In addition, graphene is mechanically very strong and chemically inert. Therefore these materials are very promising candidates for pellicle materials and protective coatings on EUV optics. The generated knowledge will be used to come to novel solutions for the protection of EUV optics and the mask from the harsh operation conditions of an EUV lithography tool. In addition, these studies are highly relevant to developing new EUV patterning and modification processes for graphene.

Kosten:

Fundamenteel:	€ 581784	*Waarvan TKI-toeslag:*	€ 138516
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 125000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 77000
Totaalbegroting:	***€ 581784***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13324

Titel: High Voltage Actuation System for Future Generation Lithography Machines (HVAS)

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Prodrive BV, ASML

Roadmap: Mechatronics / Manufacturing

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The HVAS proposal aims at the integral research of the design of the full actuation chain: high-precision power amplifiers, cables, connectors and actuators of future generation lithography machines at a relatively high voltage level of several kilovolts. The voltage increase will enhance power to ultimately increase productivity. Currently, motion systems in lithography equipment operate at a voltage level of 600 V, after a steady increase in the past decades. Increasing the voltage to higher levels has the advantage over increasing current levels that the mass and volume of moving flexible power cables and their force and thermal disturbances can be reduced. However, such increased voltage requires a significant breakthrough in the power amplifiers, cables, connectors and actuators because several high-voltage effects will become significant:

- New power amplifier technology is required as fast switching MOSFETs can only be used up to 600 V reliably and for higher voltages only slower switching devices are available.
- New cabling and connector concepts have to be designed as EUV lithography machines operate in vacuum close to the Paschen minimum and, as a result, are very sensitive to partial discharge phenomena if supply voltages are increased.
- New actuator topologies are necessary to combine a high power density with high internal electric field strengths.

Approaching these challenges independently would preclude testing of the individual solutions with the proper boundary conditions and testing the interactions. An integral approach solves this and also allows checking robustness and system performance in terms of speed and accuracy. In order to force a breakthrough in electrical high-precision design, this project aims at future voltage levels of at least 2000 V, a more than doubling of the currently applied voltage level. The system approach will be validated by the construction of a single demonstrator.

Kosten:

Fundamenteel:	€ 779176	*Waarvan TKI-toeslag:*	€ 185709
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 170000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 100000
Totaalbegroting:	***€ 779176***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13325

Titel: THz silicon-Integrated CAMera for low-cost imaging applications (TiCAM)

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, NXP Semiconductors Netherlands BV

Roadmap: Components & Circuits

Toeslagjaar: 2013*; Einddatum: 2019; Fase:* Achter op planning

Omschrijving:

The THz region , is virtually unexplored, currently employed only by astronomers, chemists and physicists. However, it has enormous potentials for commercially viable applications, such as: imaging (security and inspection), sensing (material properties) and broadband communication. In particular THz imaging cameras are attracting the highest interest because of their intrinsic capability to see through materials and acquire high resolution images.

Commercial THz imagers have not yet been developed due to the lack of low-cost, low-power and integrated systems, capable of being portable and employing technologies with high-volume capabilities. Recent developments employing silicon technologies are showing the possibility to bridge the gap between niche (space like) and everyday applications. Nevertheless, the current research emphasis is focusing only on active imaging systems, which require bulky and expensive external sources. The use of an active source is required to bypass the lack of sensitivity that is currently perceived as intrinsic with silicon based passive imagers. To counter the trend of using external sources, TICAM proposes a multi-disciplinary, high profile research team with competences in the three key areas required to develop THz integrated systems: antennas, integrated circuit design and device modeling. By applying a multi-disciplinary research approach, efficiently employing an ultra large bandwidth, reducing the active device noise contribution and truly co-designing the system front-end, the sensitivity of passive imagers can be increased by a factor 20.

Overall TICAM will demonstrate a multi pixel passive radiometer (e.g., 1 thousand elements), operating between 0.1 THz and 1THz integrated in a silicon based technology. This will enable sub kelvin temperature imaging in less than one second, reaching the sensitivity requirement for typical security scenarios.

Kosten:

Fundamenteel:	€ 785176	*Waarvan TKI-toeslag:*	€ 182426
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 165000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 120000
Totaalbegroting:	***€ 785176***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13326

Titel: Massively Parallel Electron-Beam Imaging

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, Mapper Lithography BV Technolution BV

Roadmap: Semiconductor Equipment

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

We propose to perform a theoretical and experimental feasibility study for high throughput electron beam inspection of patterned semiconductor wafers. Presently there is no clear technology roadmap for detecting 10 nm defects, a capability that the semiconductor industry will need at the latest in 2018. From first order estimates it seems possible to create a dedicated electron microscope with 200 beams scanning in parallel on a foot print of 25x30 mm. When put in an array over a 300 mm wafer these microscopes could make an image of the pattern on the wafer at 10nm resolution within 1 hour. Although MAPPER has designed a system with 13.000 beams for lithography and the applicant has a first prototype of a full size electron microscope with 196 beams, a machine as we propose does not exist. The electron source of MAPPER?s machine is not sufficiently bright for inspection and lithography does not require signal detection. The 196 beams of the scanning microscope are not sufficient for the required throughput. Especially the separate detection of the secondary electron signals needs some careful analysis and innovative optical design. We will optimize the detection strategy based on signal to noise models of the secondary emission from defects and particles. We will develop some basic technology and expect to build a prototype of the miniature 200 beam inspection unit, including the microlens arrays and the detection of the signal at a rate of several GB/s.
The ultimate goal of this project is that Dutch industry finds a position in the manufacturing of wafer inspection tools, either as a manufacturer of such tools or as a producer of sub-systems. Several existing Dutch industries could contribute to this. For this project we have chosen to work with MAPPER Lithography BV because of their in-house technology for electron lens arrays and with Technolution BV for their knowledge in handling large amounts of data. Depending on the early results of the project, we will try to expand the cooperation into a full-fledged consortium possibly including one of the world?s 4 present suppliers of inspection machines. The extremely high throughput imaging technology developed in this project may have other applications as well.

Kosten:

Fundamenteel:	€ 556547	*Waarvan TKI-toeslag:*	€ 130041
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 140000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 60000
Totaalbegroting:	***€ 556547***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13328

Titel: WaterPrint: On-chip optical sensors for the fingerprinting of contaminants in drinking water

Penvoerder: Universiteit Twente

Partners: Universiteit Twente, TNO, NV PWN Waterleidingbedrijf Noord-Holland, Optisense, Hatenboer, Vitens NV, Vtec Glas- & Steentechniek, Waterlaboratorium Noord BV

Roadmap: Photonics

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Real-time water quality monitoring in the distribution network is becoming a subject of great interest due to the large economic and public health consequences derived from an unexpected contamination outbreak in the drinking water supply. Compact, low cost, robust, low maintenance and long lifetime sensors, functioning without the need for sample preparation, capable of firstly detecting the occurrence of a contamination event and secondly determining the origin/cause of such event are needed by waterworks both in the Netherlands and worldwide. The aim of this project is to develop waveguide-based on-chip surface enhanced Raman spectroscopy (SERS) sensors and investigate the full potential of their combination with refractive index and pH sensors for the real-time fingerprinting of contaminants in drinking water. During operation the sensing platform will first detect that a change has occurred in the water composition, "an event", followed by chemical identification of what produced the event.

Kosten:

Fundamenteel:	€ 491412	*Waarvan TKI-toeslag:*	€ 107882
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 95620
Totaalbegroting:	***€ 491412***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13329

Titel: Atlas-based Image Analysis of Inflammatory Markers on Extremity MRI for Early Identification of Rheumatoid Arthritis

Penvoerder: Leids Universitair Medisch Centrum LUMC

Partners: Leids Universitair Medisch Centrum LUMC Medis Holding BV, Percuros BV, PS/Tech, Stichting Nationaal Reumafonds, BioClinica BV

Roadmap: HealthCare

Toeslagjaar: 2013*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Rheumatoid Arthritis (RA) is a prevalent disease (1% of the population), characterized by chronic inflammation and destruction of joints, predominantly in the hands and feet. Current therapeutics can significantly reduce joint damage (~50%) and chronicity (~20%), thereby increasing quality of life and preventing high healthcare costs. This is only possible if treatment is initiated in a very early stage. Since recent studies suggest that a dedicated extremity-MRI scanner could detect inflammation before it is clinically detectable, it may become an essential tool for achieving these very early diagnoses. However, the interpretation of MRI is hampered by a lack of efficient, sensitive and specific imaging biomarkers, thereby not making full use of these powerful treatments. Reasons for this are that a) MRIs are evaluated by a visual scoring method that requires three months of training, whilst the analysis itself is also time-consuming (30 min./patient); b) image quality is limited by image inhomogeneities and because the small-bore permanent magnet requires scanning in different stations; c) sensitivity and reproducibility are inadequate because the expected subtle changes are difficult to detect by the human visual system; d) specificity is restricted since healthy subjects can also have subtle abnormalities. Goals The goal of this project is to develop and validate a computer-aided system for very early detection of RA from extremity MRI. To realize this, we will address the following major technological challenges:

a) We will investigate computer-assisted time-efficient analysis algorithms for user-friendly visualization of the MRI data, comparing to image data from healthy individuals.

b) We aim to improve image quality by inhomogeneity correction and image stitching, and by developing methods for stabilizing the hand and foot during image acquisition.

c) To increase sensitivity and reproducibility, we aim to automatically quantify imaging biomarkers (such as bone marrow edema, erosions, synovitis) that are known to be visible in more advanced RA, but may already be detectable in an earlier stage by intensity- and texture-based analysis.

d) To improve sensitivity and specificity, we aim to construct a reference image atlas to discover more subtle changes, while accounting for normal anatomical variations. This will require an articulated atlas-based approach with affine and elastic image registration. We will follow two concurrent strategies; extracting features from the intensity differences between patient and corresponding normal reference image data and subsequently applying pattern recognition; and by adaptive, semi-supervised classifiers. e) Finally, the developed methodology will be validated extensively in longitudinal studies, to determine the predictive value.

Kosten:

Fundamenteel:	€ 435546	*Waarvan TKI-toeslag:*	€ 103325
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 92500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 59750
Totaalbegroting:	***€ 435546***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13330

Titel: Fate of Forgotten Fuel

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Shell Global Solutions International BV

Roadmap: Automotive

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Achieving a 20% efficiency increase in a device as ubiquitous and as thoroughly researched as the nowadays heavy-duty Diesel engine will require innovative measures. This is the challenge that engine manufacturers are facing on the mid term. Two major pathways towards the desired efficiency improvement can be recognized: new combustion mode, and adaption of fuel properties. These two are not independent. Modification of the combustion mode, in order to avoid combustion regimes that lead to excessive soot or NOx production, is likely to pose specific demands to the fuel, demands which are not met by pump diesel fuels today. One of the aspects that has received little attention up to now is the burn-out phase: the late combustion of ?forgotten fuel?, left-overs from the main heat release in the classical diesel combustion (CDC) regime. The fraction of late-burning fuel incurs a reduction of the thermodynamic efficiency of the whole process. Little is known, however, on the details of this burn-out phase, and how it can be influenced, let alone be optimized. In this project, we intend to investigate the late stages of (surrogate) diesel fuel combustion in the unique and complementary numerical and experimental engine research facilities of the TU/e. We will use laser-diagnostic techniques to qualitatively characterize the composition of the late flame in both optically accessible Diesel engines as well as in fixed-volume spray combustion vessels for various fuels. The numerical method will be based on a state-of-the-art CFD combustion model that captures the intricate details of the detailed chemistry involved yet is efficient (FGM method). Trends observed will be compared to data on comparable full-metal engines, and the experimental results will be interpreted on the basis of detailed numerical simulations. Our goal is to provide an improved fundamental understanding of the fate of late-burning fuel, to improve engine efficiency by more economic use of the injected fuel, and to complete the last steps towards a full numerical engine combustion model.

Kosten:

Fundamenteel:	€ 973784	*Waarvan TKI-toeslag:*	€ 183742
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 170000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 300000
Totaalbegroting:	***€ 973784***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13335

Titel: GARDIAN GAstroesophageal Reflux disease DIagnosis by video Analysis for Neonates

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Prodrive B.V. ViNotion BV, Maxima Medical Centre

Roadmap: HealthCare

Toeslagjaar: 2013*; Einddatum: 2019; Fase:* achter op planning

Omschrijving:

The inability of newborns and toddlers to express themselves verbally and the lack of appropriate pain assessment tools to measure pain, impairs early recognition of discomfort and disease and may lead to a delay in the institution of adequate treatments. In this study, the focus is on preterm infants admitted at the neonatal intensive care unit (NICU) and toddlers suspected of GERD (gastro-esophageal reflux disease). It has been shown that repetitive pain exposure in preterm infants is associated with major developmental impairments occurring during childhood. Therefore early pain recognition in preterm infants is of utmost importance, so that adequate treatments can be instituted. GERD in toddlers may result in excessive crying, aspirations, feeding problems, weight loss or failure to thrive caused by pain due to oesophagitis. Misdiagnosis and absence of appropriate care may lead to growth failure, developmental delay and oesophagus stricture. Recognition of pain is essential to diagnose whether a reflux episode is causing symptoms. Ph-impedance is currently the most reliable method to diagnose reflux episodes, but as none of the other existing methods, it does not incorporate automated pain assessment to diagnose GERD (there is no golden standard for this). Adding pain recognition using video content analysis to pH-impedance is expected to greatly improve the detection of GERD in toddlers and therefore promote the chances for successful treatment. The purpose of this study is pain recognition by combining unobtrusive video observation with subsequent video analysis. The objectives are:
A: More accurate observation of pain in preterm to enable adequate and timely treatment of pain in preterm infants, resulting in a better neuro developmental outcome
B: More accurate observation of pain experience by toddlers suspected of GERD, to gain more insight when and how reflux occurs and provide typical facial expressions of the child during reflux episodes, and as a result, tailor GERD treatment to the child?s specific needs in order to improve growth and development.

Kosten:

Fundamenteel:	€ 296098	*Waarvan TKI-toeslag:*	€ 62039
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 60000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 66000
Totaalbegroting:	***€ 296098***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13336

Titel: Smart Control of OBFN-based Phased Array Systems (SCOPAS)

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, SatraX

Roadmap: Photonics

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

Photonic processing of phased array antenna (PAA) systems on an optical beam forming network (OBFN) chip has several advantages. Processing in the photonic domain reduces beam squint, can lead to small, robust, and cost effective devices. However, the accurate control of the many on-chip optical ring resonator (ORR) delay elements is difficult as the properties of these elements can vary significantly due to fabrication errors, chip inhomogeneities, and heater cross talk.

In this project we develop algorithms to control the ORR delay elements based on the measured OBFN signal. Our approach is based on modeling the thermal dynamics and coupling of the ORR in the OBFN within the new framework of decomposable distributed systems, pioneered by the applicant. A data-driven OBFN control algorithm is developed which identifies, from acquired data, the thermal coupling and local dynamics of the ORR. This model and its uncertainty is used in devising a robust control for high performance OBFN systems. With the new decomposable framework becomes possible to design the global control of an OBFN possibly consisting of thousands of ORRs with the complexity of the control design for a single ORR only. Furthermore, the new approach enables a distributed implementation of the controller on a GPU. The models and developed algorithms are implemented, tested, and validated on an OBFN test assembly from the company SATRAX.

The successful implementation of these algorithms impacts the whole development line of OBFN-based PAAs as the availability of adaptive photonic OBFNs relaxes design constraints and fabrication tolerances and creates more flexible OBFN systems that have higher performance. Consequently, the algorithms are an essential step in the development of high performance OBFN-based PAA systems to be used by end-users such as Astron, Astrium, KLM and NLR. Moreover, it keeps the SATRAX OBFN systems at the forefront of the electronic beam-steering antenna systems market.

Kosten:

Fundamenteel:	€ 547392	*Waarvan TKI-toeslag:*	€ 129985
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 118000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 73000
Totaalbegroting:	***€ 547392***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13337

Titel: Protein structures for poorly diffracting crystals

Penvoerder: Universiteit Leiden

Partners: Universiteit Leiden, CCP4

Roadmap: Nanotechnology

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

Proteins are nature's ultimate nanomachines. In order to understand their function, manipulate their properties and harness their behaviour in health and disease, we need to visualize their three dimensional atomic structure. Yet, this is not an easy task and many proteins resist structure determination: quite often, and in particular for large macromolecular complexes and membrane proteins that are of considerable medical interest, crystals are not of sufficient quality to allow structure solution using established methods. Novel algorithms are urgently required for interpreting X-ray diffraction data of proteins that only form poorly ordered crystals.
Currently, protein structure determination relies on successive approximations of the experimental data and a step-wise solution. If instead, all experimental data are combined with all relevant prior knowledge in one single step, even poor diffraction data can lead to three dimensional structures where current methods fail. Preliminary results show that our new algorithm can automatically visualize a macromolecule where expert crystallographers did not succeed with existing techniques and that we can push the limits of automatic structure solution to as low as 4.5 Angstroms. This multidisciplinary proposal will lead to new computer software that will greatly extend the applicability of a nanotechnology that allows medically and biologically relevant molecules to be viewed at atomic detail.

Kosten:

Fundamenteel:	€ 287062	*Waarvan TKI-toeslag:*	€ 66402
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 75000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 30000
Totaalbegroting:	***€ 287062***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13338

Titel: Silent sensors for stellar echo's and seismic surveys

Penvoerder: NIKHEF

Partners: NIKHEF, Shell Global Solutions International BV Stichting VU-VUmc, STMicroelectronics BV, InnoSeis BV, Universiteit Twente

Roadmap: Components & Circuits

Toeslagjaar: 2013*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

The SENSEIS project is a typical example where curiosity based fundamental research drives instrumentation across technology boundaries, leading to innovations that can be utilized throughout various industries. The detection of Gravitational Waves will be a ground-breaking discovery that requires the development of low noise, low power amplifiers and will profit from state-of-the-art seismic sensor networks for subtraction of so-called gravity gradient noise.
SENSEIS will develop ultra-sensitive readout electronics for micro- electromechanical (MEMS) accelerometers in the low 1-100 Hz frequency band. SENSEIS will build seismic sensors with superior sensitivity also to be utilized in survey networks for oil and gas exploration. The innovative integrated circuits and MEMS accelerometers will also find applications in consumer electronics and scientific instrumentation.

Kosten:

Fundamenteel:	€ 774063	*Waarvan TKI-toeslag:*	€ 183844
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 200000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 70000
Totaalbegroting:	***€ 774063***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13892

Titel: Fluorescence-on-the-Fly: A Multi-Modal 3D Scanner for Digital Pathology & Life Sciences (FluoFly)

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, Nikon, Philips

Roadmap: HealthCare

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Digital pathology is the diagnosis via microscopic examination of tissue and cells from a biopsy using digital images acquired with a whole slide scanner. Molecular pathology adds testing for specific genes and proteins important for cancer diagnosis and treatment planning. This requires extension of current scanner platforms to fluorescence imaging for a high detection sensitivity and specificity. The aim of the project is to demonstrate different fluorescence showcases for clinical as well as for the life sciences research market. We will target high-throughput scanning of a large area with many cells and automated image analysis for improving diagnostic quality and efficiency, as well as additional contrast modes such as fluorescence lifetime imaging, and new illumination and analysis modes for increasing resolution.

Kosten:

Fundamenteel:	€ 357744	*Waarvan TKI-toeslag:*	€ 104786
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 60000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 63000
Totaalbegroting:	***€ 357744***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13893

Titel: Transport along interfaces in microelectronics and LED packages (TRACES)

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Philips Lighting, NXP Semiconductors

Roadmap: Components & Circuits

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Microelectronics and light emitting diodes (LEDs) are often encapsulated in polymers to prevent the electric circuit from exposure to water and ionic contamination. These encapsulations, or i.e. packages, contain a large amount of internal interfaces, such as those between the bond wires and the polymer, and the filler particles and the polymer. Water and ions can penetrate into the packages along these internal interfaces to reach the electric circuit. The combination of water and ions at the electric circuit will provoke metallization corrosion, which is a major reliability risk. In this project sophisticated experimental techniques will be combined with dedicated simulation software in order to predict the corrosion susceptibility of microelectronics and LED packages based on both the physical and chemical properties of the packaging materials.

Kosten:

Fundamenteel:	€ 621719	*Waarvan TKI-toeslag:*	€ 194901
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 77500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 107600
Totaalbegroting:	***€ 621719***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13896

Titel: Hybrid solutions for cost-aware high-performance motion control

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, CCM, Océ Technologies, Bosch Rexroth, Assembleon, VDL ETG, ASML, Philips, Fei Company

Roadmap: Mechatronics / Manufacturing

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Motion control is a key enabling technology in a broad range of high-tech applications ranging from electron microscopes, pick-and-place machines, and copiers to wafer scanners, thereby representing an enormous value for the Dutch economy. The corresponding high-tech industries are currently faced with essential system-level tradeoffs between cost, performance and adaptability to changing/uncertain circumstances of machine usage.

This program will develop the next generation motion control technology for high-tech positioning equipment necessary for addressing this important challenge.

Groundbreaking innovations will be obtained through a novel design framework for hybrid control strategies combined with adaptive performance optimization techniques. These innovations will be transferred naturally to the high-tech industry via the broad spectrum of high-tech companies (ASML, Bosch Rexroth B.V., Philips, FEI Company, Assembléon, Océ, CCM, VDL) actively supporting and cooperating in the program.

Kosten:

Fundamenteel:	€ 873092	*Waarvan TKI-toeslag:*	€ 211467
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 180000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 219360
Totaalbegroting:	***€ 873092***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13900

Titel: Monitoring Si/Sn interaction with atomic hydrogen, transport properties and decomposition of the species formed

Penvoerder: Universiteit Twente

Partners: Universiteit Twente, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

In extreme-UV lithographic steppers, reflective optics are employed. These deteriorate over time under operating conditions as a result of surface contamination, leading to a significant decrease in output power of the system within an unacceptably short operational time. Therefore, frequent maintenance is necessary at present. In this project deposits of tin- and silicon-containing surface contaminations are studied, as well as techniques for their in-situ removal, aiming to optimize debris mitigation and cleaning strategies, thereby prolonging lifetime of the mirrors. Keywords: Bragg mirrors, ultraviolet optics, vacuum systems, degradation, lithography, surface chemistry.

Kosten:

Fundamenteel:	€ 499478	*Waarvan TKI-toeslag:*	€ 156448
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 84000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 65000
Totaalbegroting:	***€ 499478***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13901

Titel: Quantitative ultrasound imaging of the uterus for improved reproduction technology

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Ferring, Samsung

Roadmap: HealthCare

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

It is estimated that in Europe IVF (in-vitro fertilization) represents the only reproduction option for over 2.5 million couples. This number is progressively increasing due to the trend in postponing childbirth. In spite of the recent major efforts to improve IVF, the failure rate remains over 70%. Many IVF failures remain unexplained. We have strong evidence of a major involvement of uterine contractions in IVF failure. Precise interventions on contractions are possible and will boost the success rate of IVF. Unfortunately, the role of uterine contractions in IVF failure is not yet understood. For the first time, the proposed research seeks to measure and characterize the contractions of the uterus through quantitative analysis of uterine motion and strain by 4D ultrasound imaging. Successful implementation of the analysis will represent a breakthrough for understanding the activity of a nonpregnant uterus. Quantification of uterine contractions will open up a new era for IVF and for the diagnosis and treatment of many uterine dysfunctions.

Kosten:

Fundamenteel:	€ 720567	*Waarvan TKI-toeslag:*	€ 209608
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 83000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 168000
Totaalbegroting:	***€ 720567***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13903

Titel: Stable and Non-Toxic Nanocrystal Solar Cells

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, Toyota

Roadmap: Solar

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Cheap and efficient solar cells will be developed that are based on non-toxic semiconductor nanocrystal materials. The nanocrystals of interest consist of iron sulfide, or copper chalcogenides (CIGS and CZTS). These materials have a broad optical absorption spectrum with an onset in the near-infrared. The electronic passivation and stability of assemblies of these nanocrystals will be enhanced by filling-up the voids between nanocystals using atomic layer deposition. The factors influencing the efficiency of photogeneration and transport of charges will be studied with time-resolved laser spectroscopy. Particular attention will be paid to photogeneration of two or more electron-hole pairs for the absorption of a single photon. This process of carrier multiplication can significantly enhance the solar cell efficiency. In collaboration with Toyota Motor Europe we will develop solar cells and investigate their stability.

Kosten:

Fundamenteel:	€ 573948	*Waarvan TKI-toeslag:*	€ 178978
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 70000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 103000
Totaalbegroting:	***€ 573948***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13905

Titel: Embedded Power Electronics, Converters and Control

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, FEI Company, Prodrive

Roadmap: Mechatronics / Manufacturing

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

To keep the industry competitive, very high quality products have to be manufactured at staggering rates. However, state-of-the-art electronic power converters, which are an essential component in modern equipment, can be optimized exclusively for low distortion or high bandwidth, but not for both at the same time. This inherent tradeoff will be the limiting factor in tomorrow's high-tech equipment.
The EPECC proposal aims to trade slow passives for fast active components in the power converter, which increases the power stage complexity, but allows for more flexibility. The additional degrees of freedom will be leveraged through advanced real-time control, to dramatically increase the efficiency, power density, accuracy, bandwidth and dynamic range of next generation power converters. A set of tools will be developed to embed the design flows for the power stage and the associated control system into a single automated, well structured, and verifiable process.

Kosten:

Fundamenteel:	€ 506857	*Waarvan TKI-toeslag:*	€ 157443
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 65000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 89150
Totaalbegroting:	***€ 506857***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13906

Titel: Photronics: Photonic Electronic Integration at the Wafer Scale

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Effect Photonics, Oclaro, NXP, Fraunhofer, Smart Photonics, Technobis, TEConnectivity

Roadmap: Photonics

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

We address a breakthrough solution to the problem of integrating photonic and electronic functionality: we fabricate photonic ICs on top of electronic ICs to create a single photronic chip. Photronics: Photonic Electronic Integration at the Wafer Scale 3. We do this using a combination of new technology and full semiconductor wafers from industry production lines. Photronic ICs - single-chip photonic-electronic integrated circuits - will outperform discrete electronic-optical systems in terms of performance, energy-efficiency, physical size and ease of assembly. Critical performance breakthroughs are directly targeted in high-speed data networks and precision metrology, with a number of future potential applications in non-invasive healthcare, safety systems, monitoring and control. If successful, this project will further strengthen the position of the Netherlands in the Photonics landscape and help Europe to leapfrog the US and Asia in photonic-electronic integration.

Kosten:

Fundamenteel:	€ 900258	*Waarvan TKI-toeslag:*	€ 211256
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 83000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 344000
Totaalbegroting:	***€ 900258***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13911

Titel: ICDC - Intelligent Class D Control

Penvoerder: Universiteit Twente

Partners: Universiteit Twente, NXP, Teledyna Dalsa, Axign

Roadmap: Components & Circuits

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

This project is set out to digitize the control loop of switched-mode systems for use in power driving electronics. This offers opportunities to use more complex control algorithms which can improve power efficiency and reduce distortion compared to analog techniques. The results are aimed at applications like class D amplifiers and motor controllers.

Kosten:

Fundamenteel:	€ 410576	*Waarvan TKI-toeslag:*	€ 93462
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 46000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 155200
Totaalbegroting:	***€ 410576***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13912

Titel: Directional instabilities in piezoelectric inkjet printing

Penvoerder: Universiteit Twente

Partners: Universiteit Twente, Océ Technologies

Roadmap: Printing

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

In piezo acoustic ink-jet printheads, a piezo actuator induces pressure waves in an ink-filled channel, driving the droplet formation. The extraordinary accuracy requirements in modern inkjet printing for the droplet deposition on a superficial substrate layer require a thorough physical understanding of the droplet generation mechanisms and subsequent droplet formation process, which we will further extend in this project.

One striking but very cumbersome phenomenon presently limiting the deposition accuracy is the observation of droplets jetting at an angle with respect to the nozzle axis at certain driving conditions. At other driving conditions ? in terms of pulse amplitude and droplet jetting frequency - the same nozzle will eject droplets perfectly aligned with the nozzle axis. The jetting angle also depends on the pulse shape, the governing acoustics within the printhead, and on the nozzle design. The presence of such a jetting instability hinders the possibility to access jetting regimes with maximum performance ? small droplets at a high jetting frequency yielding the highest productivity per nozzle. Presently, it cannot be controlled, as the physical processes involved are not understood.

The directional jetting instability presumably is associated to processes happening inside the nozzle where optical access is on the one hand experimentally difficult and on the other hand also poses remarkable challenges to numerical investigations, as the latter commonly rely on the paradigm of assuming axial-symmetry of the problem. In this project we will employ experimental, numerical, and theoretical methods to investigate in detail the hypothesized physical effects and a prime suspect for the directional jetting instabilities. The physical phenomena that will be studied include a systematic investigation of the jet angle variation with the type, amplitude, and frequency of the pulses, the dynamics of air bubbles entrainments in the nozzle and the bubble interaction with the acoustic field with and without jetting angle variation, and the long term behavior of the meniscus position and its retraction after many refills and emitted droplets.

Kosten:

Fundamenteel:	€ 604523	*Waarvan TKI-toeslag:*	€ 189501
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 75000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 105000
Totaalbegroting:	***€ 604523***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13913

Titel: Enhanced multilayer mirror stability through heterogeneous materials

Penvoerder: Universiteit Twente

Partners: Universiteit Twente, Carl Zeiss

Roadmap: Semiconductor Equipment

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Achter op planning

Omschrijving:

Multilayer mirrors form the basic optical element for EUV lithography, as well as synchrotron and free electron laser beam lines. To maximise the optical through put of these systems, the reflectivity must be preserved for as long as possible. However, the ionizing radiation creates a plasma near the surface of the mirror, which reacts with the mirror surface, degrading it. Chemical reactions, ion implantation, and diffusion all combine to damage the mirror's surface, and create hidden damage sub-surface, which may, eventually, evolve into surface blisters. To slow or prevent these processes, we are investigating heterogeneous toplayers. We intend to use material combinations that will react with their environment, and, after reacting stabilise, preventing further degradation or diffusion. In this way, we expect to greatly extend the lifetime of EUV optics.

Kosten:

Fundamenteel:	€ 719488	*Waarvan TKI-toeslag:*	€ 225196
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 185000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 30000
Totaalbegroting:	***€ 719488***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13916

Titel: L3SPAD: A Single-Photon, Time-Resolved Image Sensor for Low-Light-Level Vision

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, NKI, Fasttree3D, Photonis

Roadmap: Photonics

Toeslagjaar: 2015*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Low-light-level (LLL) image sensors have been receiving great attention because they have various applications ranging from fluorescence microscopy to automotive sensing, from safety monitoring to 3D vision for robots. Traditionally, however, they have been used for military purposes because of its prohibitive costs. The appearance of monolithic solid-state complementary metal-oxide-semiconductor (CMOS) processes for the design and fabrication of photon counting image sensors has paved the way to enable low-cost and high-performance LLL image sensors. In this project, we'll realize a gated 1.3Mpixel photon-counting image sensor in a standard CMOS process and the sensor with high timing resolution, low noise, and high photon detection efficiency are the perfect candidate to meet all these technical and cost specifications.

Kosten:

Fundamenteel:	€ 920870	*Waarvan TKI-toeslag:*	€ 222006
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 150000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 273530
Totaalbegroting:	***€ 920870***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13917

Titel: MiniSens - 3D full body movement tracking using minimal wearable sensing

Penvoerder: Universiteit Twente

Partners: Universiteit Twente, Re-lion, Roessingh, Xsense

Roadmap: HealthCare

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Many high-potential applications of daily-life monitoring (e.g., in telemedicine, virtual reality, and serious gaming) require 3D full body motion tracking. Unconstrained body movement capture anytime/anywhere requires the sensing system to be self-contained, unobtrusive, easy to wear, cheap and low-power. To this end, the MiniSens project aims at accurately estimating 3D full body movements using a minimal on-body sensor set. We will develop and optimize suitable estimation methods for a wide range of complex body movements, applying biomechanical characteristics and personalizing the analysis. The new methods will be validated against existing lab-based 3D movement analysis system and demonstrated in two representative applications in virtual reality and telemedicine. Method development and application demonstration will be performed in close collaboration with selected user parties.

Kosten:

Fundamenteel:	€ 342884	*Waarvan TKI-toeslag:*	€ 83137
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 32500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 124140
Totaalbegroting:	***€ 342884***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13919

Titel: Towards zero defectivity - Understanding watermark defect formation in immersion lithography

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

The continued miniaturization, cost-reduction and performance increase of semiconductor devices enable progress and innovations in essentially all technology areas such as automotive, communication, healthcare, and entertainment. Prominent examples include personal computers, smart phones, and flash memory devices. All of these structures are defined by photolithography. In the past decade, the trend towards smaller feature sizes relied primarily on the introduction of immersion lithography (IL), where water is introduced between the semiconductor wafer and the projection lens. State of the art systems use 193 nm ArF lasers and achieve sub-30-nm line widths. The current industry strategy is to increase device complexity by stacking more and more layers on top of each other. This will require up to 60 lithography steps on a single wafer, which severely limits the tolerable number of defects, before the overall yield drops below profitable margins. The goal of this project is to understand the nanoscale interactions of water and photoresist in order to develop strategies for reducing immersion-specific lithography defects. This would enable the manufacturing of complex multi-layered devices and boost the market potential of IL.

Kosten:

Fundamenteel:	€ 994992	*Waarvan TKI-toeslag:*	€ 225421
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 400000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 90000
Totaalbegroting:	***€ 994992***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13921

Titel: Through Polymer Vias: Bridging the gap between 2D and 3D

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, Advanced Packaging Center, NXP, Boschman

Roadmap: Components & Circuits

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

2D integrated systems such as system in package and systems on chip products in consumer electronics have become the main drivers of the semiconductor industry in terms of volume. 3D integrated systems composed of heterogeneous devices, such as; logic, memory, analogue, RF and MEMs, are also expected to have a wide impact on applications, such as smart electronics, mobile communication and others which require miniaturized, multi-functional and energy-efficient electronics according to the ITRS roadmap. This project will focus on low-cost, large-scale, parallel fabrication of through-polymer-vertical interconnect vias (TPVs) as technology enabler for 3D system integration, offering a potential solution for high-frequency applications.

Kosten:

Fundamenteel:	€ 501744	*Waarvan TKI-toeslag:*	€ 121303
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 70000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 160000
Totaalbegroting:	***€ 501744***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13922

Titel: MUltiple-input multiple-output Silicon-based mm-wave Integrated Circuit radar (MUSIC)

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Radarxense, NXP, TNO, ASTRON

Roadmap: Components & Circuits

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Recent breakthroughs in the development of Silicon semiconductor technologies have opened the opportunity to develop integrated mm-wave radars with on-chip embedded antennas. Due to the high level of integration, new highly-flexible multi-node mm-wave radar systems can be considered for low-cost medium- to high-volume applications. Examples of such applications include autonomous driving and 3D object/people scanning. In this proposal we will investigate the integration of a complete multiple-input multiple-output (MIMO) mm-wave radar system with on-chip antennas that operates in the license-free 60 GHz band. A novel non-regular sparse array configuration is used to obtain a range resolution of approximately 2 cm at a range up to 50 m with a limited number of array nodes.

Kosten:

Fundamenteel:	€ 751580	*Waarvan TKI-toeslag:*	€ 226130
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 140000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 105000
Totaalbegroting:	***€ 751580***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13925

Titel: HearScan: Towards Data-driven Hearing Aids

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, GN Resound

Roadmap: HealthCare

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

One out of every five patients remains dissatisfied with Hearing Aid (HA) sound processing. Unfortunately, more research on upfront sound processing algorithm design will not break the 20% dissatisfaction rate, since most problems occur as a result of unforeseen and changing 'in-the-field' (in situ) conditions. These 'dissatisfaction problems' must therefore be resolved in situ, by the patient himself. The challenge in this project is to develop methods that facilitate incremental tuning of a hearing aid algorithm through problem-driven in situ interaction with a patient. In order to minimize patient burden due to uninformative experimental interactions, our approach relies on a fully probabilistic approach that supports automated inference for both signal processing execution, experiment generation, and learning (the HA 'fitting' problem). Expected results include a functional prototype in software and patentable technology for in situ personalization of hearing aids.

Kosten:

Fundamenteel:	€ 487888	*Waarvan TKI-toeslag:*	€ 149757
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 70000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 82400
Totaalbegroting:	***€ 487888***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13928

Titel: Advanced 4D Flow MRI for Hemodynamic Characterization of Congenital Heart Disease

Penvoerder: Academisch Medisch Centrum

Partners: Academisch Medisch Centrum, Life Tec Group, Pie Medical

Roadmap: HealthCare

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Diagnosis, risk stratification and treatment of congenital heart diseases (CHD) benefit from quantitative knowledge of abnormal blood flow patterns in the heart. 4D Flow magnetic resonance imaging (MRI) can measure time-resolved three-dimensional blood flow direction and velocity in the whole heart. However, current protocols provide insufficient spatial and temporal resolution to derive hemodynamic parameters. We will develop novel MRI methods that provide high spatial and temporal resolution in a clinically feasible scan time based on the latest imaging techniques. Additionally, we will develop software for quantitative analysis of advanced hemodynamic parameters. During the project our commercial partner Pie Medical Imaging will develop prototypes of novel analysis tools . MRI methods and protocols will be actively disseminated among experts in the fields during scientific conferences and a congress organized by the research group.

Kosten:

Fundamenteel:	€ 688418	*Waarvan TKI-toeslag:*	€ 213230
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 85000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 125738
Totaalbegroting:	***€ 688418***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13929

Titel: Ultra-thin layers and their stacks for next-generation electronics and energy storage devices

Penvoerder: Universiteit Twente

Partners: Universiteit Twente, ASM, Toyota

Roadmap: Components & Circuits

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Ultra-thin layers of crystalline materials containing carbon, boron and nitrogen are very promising for demonstrating fundamental physics in solid state systems and expected to enable a rich variety of electronic properties, potentially resulting in new applications. The technologies available nowadays have however clear drawbacks limiting material's industrial relevance. In this project we aim to develop controllable deposition processes of the targeted materials to eliminate the drawbacks and explore the potential applications.

Kosten:

Fundamenteel:	€ 723488	*Waarvan TKI-toeslag:*	€ 224750
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 95000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 125000
Totaalbegroting:	***€ 723488***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13930

Titel: Integrated Stabilized Laser Systems for High Resolution Strain and Position Sensing

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Smart Photonics, ASML

Roadmap: Photonics

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

In this project the photonic integration group at the Technische Universiteit Eindhoven together with ASML NV and Smart Photonics BV investigate and demonstrate a position and strain variation measurement system to monitor highly accurately the movement of components in a lithography machine. The system is based on a number and other optical components integrated on to a single semiconductor chip that is fabricated using a generic integration technology platform. The optical frequencies of a new type of tunable lasers are highly stabilised to determine the optical resonance frequency differences between a number of optical resonators which act as sensors. Temperature effects in the sensors will be separated from the mechanical effects through the use of two polarisation states that are controlled on the photonic integrated circuit.

Kosten:

Fundamenteel:	€ 601859	*Waarvan TKI-toeslag:*	€ 161361
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 88000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 152375
Totaalbegroting:	***€ 601859***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13933

Titel: Environmental concretes based on treated MSWI bottom ashes.

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, BTE, ENCI, Hess, Eerland, Kijlstra, Heros Sluiskil

Roadmap: HealthCare

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

At present Municipal Solid Waste Incineration (MSWI) bottom ash is used in low-grade applications (such as road base) or landfilled. However, this material has a similar composition to cement and other concrete constituents, suggesting its applicability in this field. So far, there is a lack of information about properties concrete incorporating bottom ash in relation to their characteristics. The objective of this project will be firstly to study the MSWI bottom ash fractions in terms of their physical and chemical properties and secondly to prepare both normal concrete (NC) and autoclaved aerated concrete (AAC) incorporating these materials. Another aspect which will be taken into account is the environmental impact of MSWI bottom ash, since both concrete constituents and final concrete products need to comply with the existing legislation.

Kosten:

Fundamenteel:	€ 775792	*Waarvan TKI-toeslag:*	€ 226314
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 130000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 138800
Totaalbegroting:	***€ 775792***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13934

Titel: Towards inline 2D surface topometry by lensless imaging

Penvoerder: Vrije Universiteit Amsterdam

Partners: Vrije Universiteit Amsterdam, ASML, Tata steel

Roadmap: Advanced Instrumentation

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Lensless imaging is a form of microscopy in which the imaging optics is effectively replaced by computer algorithms. Such an approach can have large advantages when size, cost and stability of an imaging system are important, but especially in situations where the image quality (resolution, sensitivity, etc.) is limited by conventional optics. In this project, VU University, ARCNL, Tata Steel and ASML will join forces to develop new methods for industrial optical metrology and quality inspection, based on the concept of lensless imaging. Novel tools will be developed to perform high-resolution microscopy and topometry inline during manufacturing. Such tools provide rapid feedback on surface flatness, sample structure, positioning, etc., and can lead to improved product quality and higher accuracy in manufacturing.

Kosten:

Fundamenteel:	€ 705948	*Waarvan TKI-toeslag:*	€ 221116
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 148600
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 62000
Totaalbegroting:	***€ 705948***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 13935

Titel: Imaging the Retina for Early Alzheimer Diagnosis (I-READ)

Penvoerder: Vrije Universiteit Amsterdam

Partners: Vrije Universiteit Amsterdam, Heidelberg Engineering

Roadmap: Hightech materials

Toeslagjaar: 2014*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Alzheimer's disease (AD) is by far the most important cause of dementia. The neuropathological features of AD have been intensively studied over the past decades and a number of promising treatments are currently being developed. However, an effective biomarker for early diagnosis and monitoring of the disease is still lacking. What is needed is a non-invasive, cheap and fast, patient friendly method, suitable for use in an outpatient setting. We will develop a system and method for non-invasive optical detection of amyloid beta plaques in the retina of patients with Alzheimer's disease using curcumin labeling. A proof-of-concept study involving 20 patients will be performed at the Alzheimer Center of the VU University medical center in order to evaluate its clinical potential. If successful, the new method with minimal cost and patient discomfort will have a huge impact on dementia care, health care costs and quality of life.

Kosten:

Fundamenteel:	€ 755460	*Waarvan TKI-toeslag:*	€ 225630
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 125000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 125000
Totaalbegroting:	***€ 755460***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14641

Titel: High-resolution deposition of high viscosity materials using Laser Induced Forward Transfer

Penvoerder: Universiteit Twente

Partners: Universiteit Twente, Henkel Electronic Materials Belgium, TNO Holst Centre

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

3D printing is becoming a mainstream manufacturing technology. Printing of conductive materials is however very challenging since these are generally not in the liquid phase or very viscous. Laser induced forward transfer (LIFT) is an innovative printing technique allowing for deposition of such “difficult” materials. Here, a small part of the material is temporarily melted by a laser pulse, and ejected by the thermal stresses induced by the same laser pulse. In this manner, metals, polymers, liquids, and pastes have already been printed. However, for pastes and “complex” liquids, for which the viscosity depends on the shear rate, undesired deposition of multiple droplets, off-angle ejection, and splashing are commonly observed. These phenomena are usually detrimental for the printed structure, it is unknown how to optimize the LIFT process to solve these issues. Therefore, in this project, we aim to develop a deeper understanding of LIFT by combining experimental investigations of the transfer process with advanced modeling. We aim to design controlled material/process combinations for successful printing of new materials and to demonstrate printing of conductive circuits in 3D.

Kosten:

Fundamenteel:	€ 858304	*Waarvan TKI-toeslag:*	€ 181310
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 213000
Totaalbegroting:	***€ 858304***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14648

Titel: COWBOIS

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, NXP Semiconductors

Roadmap: ICT

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

In the field of software security it is prudent to assume that the attacker has full access to the execution environment and full control over it. This is called the "white-box" model. White-box cryptography is the discipline of implementing a cryptographic algorithm in software such that it secure under this model.

Whereas the security of hardware is well studied, and it is known how to evaluate security levels, the field of white-box security is still in its infancy. The COWBOIS project aims to improve our knowledge of whitebox attacks to the point where certification of software security becomes meaningful.

Kosten:

Fundamenteel:	€ 231012	*Waarvan TKI-toeslag:*	€ 48800
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 36000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 33920
Totaalbegroting:	***€ 231012***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14651

Titel: Resonant microwave cavity EUV beam monitor

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

The proposed project aims at the development of an Extreme Ultraviolet (EUV) beam power and position monitor with superior spatial and temporal resolution. The device will be based on the interaction between plasmas induced by EUV photoionization of a low pressure background gas, and electromagnetic fields in a resonant microwave cavity. Measurement of the exact EUV beam path, stability and power is crucial for successful operation of EUV lithography tools currently being introduced in the field, but available tools lack speed and precision. This holds even more so for the next generation lithography tools where high power (tens of kW) EUV beams will be generated.

Kosten:

Fundamenteel:	€ 761056	*Waarvan TKI-toeslag:*	€ 160767
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 94000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 134000
Totaalbegroting:	***€ 761056***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14654

Titel: Protons4Vision

Penvoerder: Leids Universitair Medisch Centrum

Partners: Leids Universitair Medisch Centrum, Holland PTC BV, Varian Medical Systems

Roadmap: HealthCare

Toeslagjaar: 2015*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Uveal melanoma is the most common primary eye tumor. Proton beam therapy (PT) is capable of performing verylocal irradiation and is therefore one of the main eye-sparing treatments. In the PROTONS4vision project we willdevelop technologies that provide a more targeted and less invasive treatment. New high-resolution MRItechnologies will be developed to locate the tumor in 3D. This will facilitate more precise treatment planningstrategies that spare healthy tissues surrounding the tumor. MRI data and the new to be developed eye-trackingsystem will replace the use of tantalum clips, invasive markers that are currently used to locate the tumor in theeye. Upon project completion successful innovations will be implemented at HollandPTC, the first PT center in TheNetherlands with a dedicated eye-beam. The developed technologies together serve one purpose: maximize intraocculartumor destruction, while minimizing vision loss and painful side effects, thereby optimizing the patient'squality-of-life.

Kosten:

Fundamenteel:	€ 1163170	*Waarvan TKI-toeslag:*	€ 245711
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 200000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 211872
Totaalbegroting:	***€ 1163170***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14658

Titel: Smart integrated tips for massively parallel high-throughput atomic force microscopy

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, ASML, Bruker Nano, SwissLitho, TNO

Roadmap: Nanotechnology

Toeslagjaar: 2015*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

A novel concept for the design, construction and operation of an all-integrated Atomic Force Microscope (AFM) is proposed, that would enable massive parallelization for highthroughput nanometrology and nanomechanical sensing. It is based on an integrated nano-optoelectro-mechanical system (NOEMS) and combines electrical actuation and optical read-out of sub nm-scale mechanical displacement in a single device. The device is coupled to on-chip electrical interconnects and optical waveguides. The base unit has a footprint of the order of only 15×15 µm2, and can be fabricated using state-of-the-art chip-scale semiconductor integration technology. The massively parallel operation of the AFM tips enables optical alignment-free and very high throughput AFM microscopy, enabling large area nanometrology or high frame rate movie recordings of atomic scale (bio)processes.

Kosten:

Fundamenteel:	€ 800992	*Waarvan TKI-toeslag:*	€ 169203
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 93000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 180000
Totaalbegroting:	***€ 800992***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14660

Titel: Coherent Fourier Scatterometry for fast and sensitive detection of subwavelength structures and particles

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, TNO, ASML

Roadmap: Nanotechnology

Toeslagjaar: 2017*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

The characterization of nano-structures is essential in several major application areas such as in the semiconductor industry and in the recently developed plastic-based technologies. Far field optical inspection is very attractive for this purpose since it is noninvasive and can operate in-line with the production machines. In particular the technique called scatterometry is already being applied. But in order to keep up with the further developments of IC and rollto- roll manufacturing processes, fundamental improvements of the technique are necessary. In this project, we will investigate sample-specific optimized illumination and detection to achieve maximum sensitivity and resolution. Furthermore we will optimize the detection system to achieve the required detection speed and to reduce the influence of the noise in the system. Finally, since in many applications it is important to probe larger areas up to a few cm2 in a few minutes, we will design for this goal a parallel illumination and detection system.

Kosten:

Fundamenteel:	€ 399018	*Waarvan TKI-toeslag:*	€ 84290
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 60000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 60000
Totaalbegroting:	***€ 399018***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14663

Titel: Enabling widespread ambulatory monitoring for improved pregnancy outcome

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Philips, Maxima Medisch Centrum

Roadmap: HealthCare

Toeslagjaar: 2015*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

High-risk pregnancies are on the rise because of the progressively higher age at which women get pregnant. For such pregnancies, continuous assessment of fetal wellbeing is critical to reduce fetal mortality and morbidity rates. Unfortunately reliable continuous assessment is currently not feasible, even in clinical settings. In this project we aim at a breakthrough towards reliable continuous pregnancy monitoring in ambulatory settings, by strongly improving the unobtrusiveness and user-friendliness of the sensors, by increasing signal quality, and by exploiting supplementary information to improve diagnostic quality. Provision of reliable, continuous signals can not only improve perinatal outcome, but will also pave the way for home monitoring of high-risk pregnancies, supervised from the hospital. This will provide opportunities to high-risk pregnant mothers to remain with their family and address the problem of increasing healthcare costs for hospitalization.

Kosten:

Fundamenteel:	€ 1075029	*Waarvan TKI-toeslag:*	€ 227092
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 132000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 198432
Totaalbegroting:	***€ 1075029***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14665

Titel: MOBIUS: Additive Manufacturing of Complex Precision Flexure Mechanisms

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, ASML, Hittech group

Roadmap: Smart Industry

Toeslagjaar: 2017*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Flexure mechanisms allow motion due to deformation of slender segments. Consequently, they have no friction or backlash which makes them popular in many areas of precision engineering. Classically, they are essentially planar, composed of flat leaf springs. Recently, the advent of Additive Manufacturing has opened a new world of exotic geometries that potentially increase compactness and performance while reducing cost. However, no synthesis methods or efficient analysis tools exist for these truly spatial flexure mechanisms. The present project aims to provide these, along with a range of scientific demonstrators and industrially relevant prototypes with spatially curved flexure systems that will pair compactness with unprecedented performance.

Kosten:

Fundamenteel:	€ 585784	*Waarvan TKI-toeslag:*	€ 123742,4336
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 72524
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 103600
Totaalbegroting:	***€ 585784***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14666

Titel: Spreading and imbibition of water-based printing inks in porous media - Experiments and multiscale simulations

Penvoerder: Universiteit Twente

Partners: Universiteit Twente, Océ

Roadmap: Printing

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Inkjet printing is nowadays a standard technology in every home, but due to its capabilities concerning the deposition of various materials onto substrates other than expensive paper coated with microporous layers, there is still a great potential to be explored. Goals are to reduce printing costs and ecological damage by using water-based inks and cheap compatible substrates such as uncoated recycled and plain paper. The project will improve our understanding of the interaction of ink with the substrate by using novel experimental and modelling techniques on multiple scales.The developed tools will allow to optimize printing techniques and -products. Next to inkjet printing, the outcome of the project will have relevance for other applications involving multiphase fluid flow in porous media, enhanced oil recovery, transport in biological tissues, or food processing.

Kosten:

Fundamenteel:	€ 1087288	*Waarvan TKI-toeslag:*	€ 229681
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 166000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 170000
Totaalbegroting:	***€ 1087288***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14667

Titel: Safe interaction of automated vehicles with vulnerable road users

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, NXP, Provincie Gelderland, SWOV, 2getther, TNO

Roadmap: Automotive

Toeslagjaar: 2017*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

SafeVRU will develop sensing, intent recognition, and vehicle control strategies for theinteraction of automated vehicles with vulnerable road users (VRU) such as pedestriansand cyclists. We will enhance VRU detection and classification by fusing vision and radar.We will furthermore examine the benefit of cooperative localization for added robustnessespecially in case of visibility obstructions. Novel VRU intent recognition and pathprediction methods will be developed using kinematics, gestures, visual focus and scenecontext. Taking into account the complex interaction with multiple VRU, real time adaptivepath planning strategies will be developed to minimize risk, with vehicle motion beingintuitive and predictable for VRU. The SafeVRU technologies will be validated using realworld data, virtual reality labs and fully automated vehicles (WEpods) in the province of Gelderland.

Kosten:

Fundamenteel:	€ 1006908	*Waarvan TKI-toeslag:*	€ 212702
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 105000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 318824
Totaalbegroting:	***€ 1006908***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14669

Titel: Reconfigurable meta-instruments for sensing and inspection

Penvoerder: FOM-AMOLF

Partners: FOM-AMOLF, Bruker Nano, TNO

Roadmap: Semiconductor Equipment

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

This project aims to realize a novel type of instrumentation for high-throughput, sensitive, nanoscale-resolution sensing and inspection/imaging. The prospect of this technology is the rapid detection of nanoscale defects and contaminants on masks, wafers or any large substrate. Our concept relies on subwavelength optical field localization enabled by photonic metamaterials. In particular, we will develop metamaterials in which the optical field is reconfigurable in a fast and flexible fashion, either through nanomechanical actuation or controlling illumination conditions. Nano-optomechanical or optical reconfiguration will thus enable agile sensors and imaging systems, in which many nanoscale optical detection volumes can be scanned over a large surface and detected in a parallel fashion. We will investigate how the complex coherent interactions of the nanoscale resonators that form the metamaterial constituents, together with compressive sensing concepts, can enhance the flexibility and throughput of the technique. It simultaneously addresses the two main challenges of optical nanoscopy: speed and efficiency. We will take the first steps towards integrating these disruptive concepts in a near-field imaging instrument. Combining different expertise, ranging from metamaterials/nano-optomechanics/plasmonics (AMOLF) and antennas/metamaterials (TU/e) to optomechanics/mechatronics (TU Delft), we address the stringent photonic, mechanical, and instrumentational constraints. In particular, high resolution, high sensitivity, and large measurement bandwidth will be ensured through multi-scale optical and mechanical design of the full meta-instrument.

Kosten:

Fundamenteel:	€ 671184	*Waarvan TKI-toeslag:*	€ 141783
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 102000
Totaalbegroting:	***€ 671184***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 14671

Titel: OPTILIGHT: Mathematical Optimizations for Human Centric Lighting

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Philips

Roadmap: Lighting

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

The overall goal of this project is to make lighting control systems more centered towards the human user.
The project has four Work Packages (Fig 4). WP1 and WP 2 focus on obtaining better quantified models on human perception and experience. WP1 focusses on controlled experiments while WP2 takes a big data approach and extracts statistical models from observing users in natural environments. WP3 uses the quantified models and reliability information in formal optimizations. We plan to apply the principles of Statistical Signal Processing to Lighting Control and to account for incomplete knowledge that the system has about the users and learn from (hopefully) very sparse user interventions in the lighting conditions. WP4 addresses how to use this in self configuring, rapidly learning smart lighting control infrastructures.

Kosten:

Fundamenteel:	€ 922728	*Waarvan TKI-toeslag:*	€ 194919
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 114000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 163000
Totaalbegroting:	***€ 922728***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15319

Titel: High repetition rate thermionic electron source for accelerator-based light sources

Penvoerder: Technische Universiteit Eindhoven

Partners: TUE, ASML

Roadmap: Advanced Instrumentation

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

High brightness X-ray light sources are now making the transition from research laboratories into industry, where reliability and cost become important parameters. State-of-the-art high average current pulsed electron sources use semiconductor photocathodes that require ultra-high vacuum (<10^-11 mbar), a high power laser system and have limited cathode lifetime (few days). Alternatively, thermionic sources can operate 24/7 in much relieved vacuum conditions (10^-7 mbar) for more than 5000 hours, but the continuous beam needs to be chopped into short bunches for further acceleration.

A preliminary study funded by ASML was carried out at Eindhoven University into using multiple harmonics in RF cavities for chopping and bunching (2 patents filed). The designed system was input in the model used at Cornell University to compare the performance to a state-of-the-art photo-emission source. It was found that all requirements on bunch parameters can be met, even after further acceleration to 10 MeV.

This innovative approach will in combination with X-band accelerator technology (CERN) enable the development of compact high-brightness X-ray sources for research ranging from cultural heritage (Rijksmuseum) to metrology in semiconductor production processes and will boost the feasibility of a high power Free Electron Laser for lithography (ASML).

Kosten:

Fundamenteel:	€ 735486	*Waarvan TKI-toeslag:*	€ 155707
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 90000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 130800
Totaalbegroting:	***€ 735486***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15327

Titel: Microwell cell Selection PRinter for single cell isolation and high throughput screening of therapeutic biologicals. (McSPRinter)

Penvoerder: Universiteit Twente

Partners: UT, IBIS Technologies BV, VyCAP BV, Bioceros, Sanquin BV

Roadmap: Nanotechnology

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

There is an increasing need to find therapeutic antibody candidates in an efficient, cost-effective and high-throughput manner, which meets stringent selection criteria. Traditional methods are time consuming and significantly limited by the number of cells that can be feasibly screened. In this McSPRinter proposal an efficient high throughput cell screening and isolation method is researched and developed.The method is based on a combination of the efficient single cell seeding and isolation technology of VyCAP BV and the Surface Plasmon Imaging (SPRi) technology for sensitive molecule characterization of IBIS Technologies BV. This combination results in a label free technology that is capable of determining not only the amount of a specific molecule that is excreted by thousands of single cells, but as well the affinity/epitope of this product in an overnight process.
After the successful proof of concept, this technology is further investigated at the Univeristy of Twente, chair MCBP, in cooperation with established companies as Genmab, Epirus Biopharmaceuticals and Sanquin Research who will participate in the user committee.
The McSPRinter significantly reduces the cell screening and selection, from currently 21 days down to an overnight process, resulting in a shorter time to market and higher quality of therapeutics.

Kosten:

Fundamenteel:	€ 1075558	*Waarvan TKI-toeslag:*	€ 227972
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 180000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 142000
Totaalbegroting:	***€ 1075558***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15345

Titel: ALARM - Alarm-Limiting AlgoRithm-based Monitoring.

Penvoerder: Technische Universiteit Eindhoven

Partners: TUE, Philips, Maxima Medisch Centrum

Roadmap: HealthCare

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Preterm infants in a neonatal intensive care unit (NICU) require continuous monitoring as their lifeis at serious risk. In current patient monitoring based on vital signs, however, multiple alarms aregenerated for the same critical event, causing alarm fatigue of caregivers and stress in patient andparents. Moreover, detection of clinical deterioration with vitals crossing predefined boundaries canonly be done in hindsight, whereas an early warning of such deterioration would be much morevaluable. Finally, current monitoring involves a variety of obtrusive sensors and wiring, interferingwith the babies' well-being. This projects aims to bring patient monitoring beyond current state ofthe art by fusing the vitals and use video monitoring to reduce false alarms; employing data analyticsto detect deterioration earlier; and using video techniques for robust motion detection andunobtrusive monitoring.

Kosten:

Fundamenteel:	€ 1059192	*Waarvan TKI-toeslag:*	€ 225833
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 128703
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 184000
Totaalbegroting:	***€ 1059192***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15350

Titel: Reliability of Optical Materials in LED-based Products under Harsh Environments (REOPT)

Penvoerder: Technische Universiteit Delft

Partners: TUD, Philips

Roadmap: Lighting

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Microelectronics and light emitting diodes (LEDs) are often encapsulated in polymers to protect the embedded electric circuit from exposure to humidity, acids, UV lights and other contaminations. Water and other contaminations can penetrate into the packages, resulting in the deterioration of chemical and optical properties of the system. The absorption of UV light and other contaminations at the polymer surface provokes
oxidation and browning; with both being major reliability risks in LED industry. In this project dedicated experimental techniques will be combined with reliability models to understand and predict the browning and hydrolysis susceptibility of LED packages in harsh and outdoor environments. Based on the obtained results, both the optical and chemical properties of the packaging materials will be optimized.

Kosten:

Fundamenteel:	€ 191987	*Waarvan TKI-toeslag:*	€ 36434
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 35000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 36555
Totaalbegroting:	***€ 191987***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15352

Titel: Taking Plasma Atomic Layer Deposition to the Next Level

Penvoerder: Technische Universiteit Eindhoven

Partners: TUE, Oxford Instruments Plasma Technology, Avantes, Pegasus Chemicals, Impendans Ltd., University of Glasgow

Roadmap: Nanotechnology

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Atomic layer deposition (ALD) of thin films is a true nanotechnology and ALD involving plasma steps is becoming increasingly more common and vital for a range of applications, for example in defining and building sub-10 nm transistors. However, the associated understanding of plasma ALD has not increased accordingly and is limiting further expansion of its usage. This project investigates processes during plasma ALD and the role of reactive and energetic species such as ions, radicals and photons. Long-standing open questions will be addressed and the insights obtained are expected to result in new plasma ALD processes, a wider range of ALD materials, and novel and improved applications of ALD. Hence the research will take plasma ALD to the next level.

Kosten:

Fundamenteel:	€ 793450	*Waarvan TKI-toeslag:*	€ 144390
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 216170
Totaalbegroting:	***€ 793450***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15354

Titel: The RESOLVE project: Enabling MR guided radiothErapy of moving abdominal tumorS and Organs by development of a dense eLement receiVer array and highly undersampled, parallEl MRI.

Penvoerder: Universiteit Utrecht

Partners: UU, Philips

Roadmap: HealthCare

Toeslagjaar: 2016*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

The increased use of x-ray based image guidance in radiotherapy for cancer patients has led to improved care and reduced toxicity. However, tumors cannot be directly visualized as x-rays lack soft tissue contrast.
Magnetic resonance imaging (MRI) has the soft tissue contrast required to visualize tumors in soft tissues as well as their surrounding organs, which should be spared from radiation exposure. The potential of MRI to further improve radiotherapy has led us to pursue the integration of a radiotherapy linear accelerator with an MRI scanner, resulting in a hybrid MR-Linac (MRL) device being shortly introduced in clinic. Unfortunately, MRL treatment of mobile abdominal and thoracic tumors with high mortality (e.g. pancreatic or esophageal tumors) is not yet viable, as MRI currently lacks the quality and speed needed to resolve respiratory induced tumor and organ motion in the abdomen. In this project we will develop new and faster motion resolved MRI methods that provide the means to monitor 3D dose deposition in moving tissue or even lock the radiation beam onto the moving tumor. This unlocks the potential of MRL for radiation treatment of abdominal tumors resulting in more effective radiation treatment and lower toxicity of healthy organs-at-risk.

Kosten:

Fundamenteel:	€ 1089129	*Waarvan TKI-toeslag:*	€ 232244
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 172000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 149450
Totaalbegroting:	***€ 1089129***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15357

Titel: Freestanding advanced membranes for EUV lithography ("FRAME")

Penvoerder: Universiteit Twente

Partners: UT, ASML research

Roadmap: Semiconductor Equipment

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Photolithography at Extreme UV (13.5nm) wavelengths is likely to need a most advanced membrane technology to protect the EUV reticles. These membranes, or pellicles, should keep particles away from the reticle structures to prevent imaging of these particles onto the chip patterns. This specific purpose calls for large area (multiple cm2), highly EUV transmissive (>90%), thermally stable (few 100 C) and mechanically robust membranes placed in front of the EUV reticles. Although an impressive proof of concept has been given by ASML, the number of existential questions from the litho application is still growing.

A supportive rsearch activity is now proposed from the side of the nanotechnology base present at MESA+, including the NanoLab and the XUV Optics group. The proposed work is explorative and of a fundamental nature, and will start from know how on multilayer mirrors for the reflection of EUV light: subjects as protective capping layers, stress-controlled growth of nanoscale films, and the use optically suited materials and their chemical and physical properties are, in a first approximation, analogous to the pellicle challenge. Both XUV and MESA+ have a track record of over 25 year of relevant experience and hold world records in optics and membrane performance.

Kosten:

Fundamenteel:	€ 996208	*Waarvan TKI-toeslag:*	€ 190353
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 300000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 67000
Totaalbegroting:	***€ 996208***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15360

Titel: Advanced fully integrated on-chip optical sensors for the early diagnosis of diseases

Penvoerder: Universiteit Twente

Partners: UT, BioVolt, VTEC, PhoeniX, Technobis, MEDLON

Roadmap: Photonics

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Diabetes is a common chronic metabolic disorder. According to the World Health Organization (WHO), over 420 million people live with this condition and its prevalence steadily increases. Another 180 million people suffer from the disease without having been diagnosed. Early diagnosis of diabetes, differential diagnosis between the two types of the disease (Type I and II) and continuous monitoring is of paramount importance to both individuals, as early detection followed by proper treatment can lead to a delayed onset of the disease, and the society, reducing the economic impact of the disease.

The research carried out in this project will lead to the development of a fully integrated handheld low-cost real-time sensor platform for the simultaneous detection of several diabetes biomarkers in blood, which will bring the diagnosis and monitoring of diabetes to the doctor's office, improving the quality of life of diabetic patients.

Kosten:

Fundamenteel:	€ 350265	*Waarvan TKI-toeslag:*	€ 72601
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 42000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 68285
Totaalbegroting:	***€ 350265***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15362

Titel: High-dynamic Superconducting Linear Motor

Penvoerder: Technische Universiteit Eindhoven

Partners: TUE, ASML, Prodrive Technologies, VDL-ETG

Roadmap: Smart Industry

Toeslagjaar: 2016*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

The force and power density of linear motors and actuators are limited by the remanent magnetization of permanent magnet materials and the power dissipation in the coils. In the Highly Dynamic Superconducting Linear Motor project the application of superconducting coils in high-force linear motors (250kWpeak) is researched for highly dynamic applications such as positioning systems in semiconductor equipment. This technology can result in a significant increase of the force and power density of linear motors because larger magnetic fields and current densities will be possible. The research will focus on applications in semiconductor equipment. However, this technology could also be applied in other applications such as transport (e.g. electric driving) and power generation.

Kosten:

Fundamenteel:	€ 1158938	*Waarvan TKI-toeslag:*	€ 230620
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 135000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 261626
Totaalbegroting:	***€ 1158938***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15367

Titel: Precision photonic ICs with wafer scale nanolithography

Penvoerder: Technische Universiteit Eindhoven

Partners: TUE, Bright photonics, Effect Photonics, Smart photonics, Technobis FOS

Roadmap: Photonics

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Photonic integrated circuits power the modern internet, and are underpinning a new generation of products for precision measurement to ensure structural safety, medical imaging for tumor detection, gas-sensing and data connectivity to name just a few. A generic integration technology platform able to support multiple products accelerates product design cycles and shares development costs.
Future product generations require energy savings, enhanced precision and speed, but at a ever-lower cost-points. This project creates the precision photonic building blocks using tools from the electronics industry to enable a new generation of building blocks to control the size of optical beams, the polarization and the wavelength with unprecedented precision. Further, we create the precision features in the same photolithographic step and enable integration with a range of high-efficiency modulators and lasers. This enables the project´s industry partners to demonstrate circuits high speed for fiber optic communications and high precision sensing.

Kosten:

Fundamenteel:	€ 284583	*Waarvan TKI-toeslag:*	€ 53965,4673
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 31100
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 75101
Totaalbegroting:	***€ 284583***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15376

Titel: Transport in Rarefied Gases in Next Generation Photo-Lithography Machines

Penvoerder: Technische Universiteit Eindhoven

Partners: TUE, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

Heat and mass transport in rarefied gases are fundamental in semiconductor photo-lithography machines, notably in thermal- and contamination-control processes in next-generation EUV machines. Due to the high power that is delivered by the EUV light, excessive thermal expansion and outgassing of the wafer occur at the focal point. The thermal expansion and the dispersal of contamination are counteracted by carefully directed gas flows. However, as these flows occur in near-vacuum conditions, the gas is rarefied and exhibits marked non-equilibrium behavior. To enable the development and optimization of new thermal- and contamination-control concepts for EUV photo-lithography machines, it is therefore imperative to have a detailed understanding of transport phenomena in rarefied gases, and of the interactions of such gases with solid particles and surfaces. Contemporary understanding of these processes is however very incomplete. The objective of this research project is to develop models and simulation tools for rarefied-gas flows in EUV photo-lithography machines, including interactions of such flows with solid particles and surfaces. To account for the multiscale character of the problem, we consider an innovative combination of methods, from molecular dynamics with tailored potentials for gas/solid interactions, via kinetic methods to resolve collective behavior, to macroscopic computational fluid dynamics.

Kosten:

Fundamenteel:	€ 1026839	*Waarvan TKI-toeslag:*	€ 214211
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 165289
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 153480
Totaalbegroting:	***€ 1026839***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 15388

Titel: Integrated 3D Motion System Synthesis for High-Performance Semiconductor Equipment (IMSYS-3D)

Penvoerder: Technische Universiteit Delft

Partners: TUD, ASML, MI Partners, Additive Industries, Infinite Simulation Systems

Roadmap: Semiconductor Equipment

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Equipment in the high tech industry relies on high-performance motion systems. To meet future performance targets and time-to-market demands, effective design optimization methodologies for these systems are essential. Moreover, maturing additive manufacturing (AM) technologies are enabling highly complex components. To turn the opportunities offered by this new design freedom into performance gains for motion systems, dedicated topology optimization (TO) techniques are required.
This project will enable integrated controller and structure optimization for motion systems, using 3D topology optimization. It builds on recent achievements by members of this research team, where we developed the groundwork for the world's first fully integrated 2D controller-structure TO. Our 2D studies revealed clear advantages of an integrated, multidisciplinary design approach over the traditional sequential design process. This previous research however also revealed that the transition to 3D significantly increases complexity and requires fundamental improvements regarding specifically mode tracking and mode sensitivity analysis, and dedicated fast solution techniques. IMSYS-3D will address these challenges in order to deliver the benefits of integrated controller-structure optimization to problems of industry-relevant complexity. Two full-scale prototypes will be designed, printed and evaluated to validate the approach and to illustrate the potential of combining AM and integrated TO for high-tech applications.

Kosten:

Fundamenteel:	€ 545382	*Waarvan TKI-toeslag:*	€ 115670
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 66000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 97038
Totaalbegroting:	***€ 545382***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16169

Titel: TORNADO - Targeting Of RNA Driving Onco-immune therapy

Penvoerder: UMC Utrecht

Partners: UMCU, eTheRNA, 20MED Therapeutics

Roadmap: Smart Industry

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Immune therapy is revolutionizing cancer treatment. Presently, there is an improved understanding of the molecular pathways involved in the activation of the immune system to attack tumor cells. This in turn, now allows us to design new therapeutic strategies that exploit this knowledge. One of these strategies, with demonstrated clinical success, is based on the use of mRNAs that encode immune-stimulatory proteins. A smart cocktail of three mRNAs known as TriMix can boost the response to an antigen. The challenge is to deliver these mRNAs into the cytoplasm of the immune cells in the spleen to activate them.
In this project, we aim to design a library of self-assembling injectable nanoparticles that incorporate and protect the mRNA-payload. The self-assembling materials are based on polymers, lipids or their combination. Their molecular structure is designed to meet two seemingly incompatible demands: self-assembly, protection and high stability outside the target cell on the one hand and release and disassembly after arrival, on the other. Using microfluidic manufacture, we ensure scalability and reproducibility of the production process. By systematically investigating the relationship between nanomedicine structure and performance we aim to decipherer the critical determinants for therapeutic efficacy. Close collaboration with clinicians creates an opportunity to directly translate the most promising treatment to the clinic.

Kosten:

Fundamenteel:	€ 924548	*Waarvan TKI-toeslag:*	€ 261884
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 112000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 165060
Totaalbegroting:	***€ 924548***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16178

Titel: Next-generation focused ion beam

Penvoerder: Technische Universiteit Eindhoven

Partners: TUE, Thermo Fisher Scientific

Roadmap: Nanotechnology

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Focused Ion Beam (FIB) instruments are important tools for the semiconductor industry. Essential applications are editing circuits and repairing masks in the development phase, failure analysis during wafer processing and preparing samples for inspection using transmission electron microscopy. In this project, the properties of a next-generation, “ultracold'' rubidium-ion FIB will be experimentally assessed and optimized with the eventual aim of creating a practically useful instrument. The research will focus on beam properties, stability, reliability and user-friendliness. In addition, the interaction of rubidium ions with typical materials will be studied to assess the performance of a Rb+ FIB in real-world applications. To this end, sputter and deposition processes will be analyzed in terms of rates and various forms of damage.

Kosten:

Fundamenteel:	€ 744626	*Waarvan TKI-toeslag:*	€ 212191
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 120000
Totaalbegroting:	***€ 744626***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16184

Titel: Maxwell modeling for chip metrology target electromagnetic-scattering analysis with cross talk (MAX META-XT)

Penvoerder: Technische Universiteit Eindhoven

Partners: TUE, ASML, VSL

Roadmap: Semiconductor Equipment

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Optical metrology is a key technology needed for the high-volume production of integrated circuits. Its performance hinges on the use of fast, flexible and reliable Maxwell solvers to interpret the measurement data in terms of quantities of interest. New manufacturing techniques for integrated circuits, e.g. printing of extremely fine details and building 3D structures with high aspect ratios on a wafer, require next-generation optical metrology in combination with a fast Maxwell solver that is optimally suited to new production methods. The current project aims at the construction and demonstration of an advanced, accurate, and efficient Maxwell solver for optical metrology, including cross-talk with product structures and coupling to the metrology sensor.

Kosten:

Fundamenteel:	€ 538600	*Waarvan TKI-toeslag:*	€ 148381
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 62060
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 109680
Totaalbegroting:	***€ 538600***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16191

Titel: Stable and Adjustable Mounts for Optical Instruments (SAMOI)

Penvoerder: Technische Universiteit Delft

Partners: TUD, Nexperia-ITEC, VDL-ETH, TNO, BAAT Medical, ASML, Airbus Defence and Space

Roadmap: Smart Industry

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

High-tech manufacturing equipment typically involves high precision and high throughput. The rapidly increasing product diversity requires frequent repositioning and realignment of optical components that are part of this equipment. This tuning using adjustable optical mounts is currently a time-consuming manual process, because the motions are not decoupled. This leads to significant labor and downtime costs. Moreover, current mounts are sensitive to thermal and mechanical disturbances, and are not optimized for dynamic performance, which form limiting factors in production environments. These aspects are also crucial in aeronautics and space applications. Finally, current mounts consist of many components which challenges stability and increases cost. Monolithic design concepts are also paramount for adjustable medical implants. This project will realize cost-effective design techniques to create print-ready optimized 3D monolithic instrument mounts and other adjustable structures, realized by metal additive manufacturing (3D printing). This will enable mounts with much better performance in terms of thermal and mechanical stability, bandwidth, ease of tunability and cost.

Kosten:

Fundamenteel:	€ 667140	*Waarvan TKI-toeslag:*	€ 170651
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 85000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 160220
Totaalbegroting:	***€ 667140***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16210

Titel: MexFlex: Material Science and Synthesis of Extreme positioning flexures stages

Penvoerder: Universiteit Twente

Partners: UT, FEI Company, ASML, VDL-ETG, Settels Savenije, Demcon, 3D systems

Roadmap: Semiconductor Equipment

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Flexure mechanisms allow motion due to elastic deformation of slender segments. Classically, their application it limited to small range of motion and small loads. Recently, the advent of Additive Manufacturing has shown some complex hybrid joint topologies with improved range of motion.

However, a synthesis method, including the stiffness and load bearing capacity of mechanisms at large deflections, is currently lacking. In addition, with the accuracy of modern stages evolving to sub nanometres, the nonlinear behaviour and hysteresis of the flexure materials ultimately limits the repeatability.

This project aims to generate a synthesis method for achieving (1) flexure-based mechanisms with a combination of (2) high load and high stiffness over a large range of motion, (3) predictable hysteresis, damping and nonlinear fine positioning, with (4) acceptable fatigue resistance.

Kosten:

Fundamenteel:	€ 781496	*Waarvan TKI-toeslag:*	€ 221668
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 97000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 136440
Totaalbegroting:	***€ 781496***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16213

Titel: ECOMOLD - Efficient Co-Molding of Metal – Thermoplastic Composite Joints

Penvoerder: Universiteit Twente

Partners: UT, TPRC

Roadmap: Aeronautics

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Metallic inserts in thermoplastic composites provide an efficient way of load introduction into structural components. The moldable nature of the matrix material allows co-molding of the inserts during thermoplastic composite manufacturing, providing a cost-effective production process. Application of the co-molding technology is currently limited by the lack of proper manufacturing procedures and insert design tools. The current proposal addresses this issue by developing an insert design tool, taking into account the relevant bonding mechanisms that act on different scales, from physicochemical interactions on the nanoscale, via interlocking effects on the microscale, to residual stress development on the macroscale. The design tool will be implemented in a user-friendly application for use by industry.

Kosten:

Fundamenteel:	€ 684284	*Waarvan TKI-toeslag:*	€ 194030
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 140000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 64560
Totaalbegroting:	***€ 684284***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16219

Titel: New methods to solve macromolecular structures from limited data

Penvoerder: Universiteit Leiden

Partners: UL, CCP4

Roadmap: Nanotechnology

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Three-dimensional atomic information of proteins, nature's nanomachines, provides a wealth of information for understanding processes at a molecular level and a starting point for rational drug design. Although there are over 120 000 crystal structures available, over 98% of these structures were determined to high resolution (better than 3.5 Angstroms). Valuable information can be obtained from low-resolution structures, but obviously current methods are not suitable for lowresolution data. Here, we will develop new methods that can automatically solve structures from weak data and when current methods fail. These methods will be important for macromolecular assemblies and membrane proteins crystals that are of considerable medical interest but tend to diffract relatively poorly.

Kosten:

Fundamenteel:	€ 361969	*Waarvan TKI-toeslag:*	€ 103777
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 43388
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 62000
Totaalbegroting:	***€ 361969***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16237

Titel: Nanomaterial Networks for Artificial Intelligence in the Automotive Industry: NANO(AI)2

Penvoerder: Universiteit Twente

Partners: UT, Toyota Research Europe, Simbeyond B.V.

Roadmap: Nanotechnology

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Autonomous and computer-assisted driving are disruptively changing the automotive industry. Automatic recognition and classification of traffic events and road signs require considerable on-board intelligence and real-time decision making. Artificial intelligence is widely considered crucial for implementing this technology. The aim of this project is to develop low-power, reconfigurable devices for artificial intelligence in the automotive industry. Our systems consist of bottom-up assembled nanomaterial networks integrated with conventional top-down CMOS electronics. The project is a close collaboration between the University of Twente and all four users.

Kosten:

Fundamenteel:	€ 578210	*Waarvan TKI-toeslag:*	€ 165105
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 70000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 100000
Totaalbegroting:	***€ 578210***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16238

Titel: Nanoparticles for image guided thermo-brachytherapy

Penvoerder: Technische Universiteit Delft

Partners: TUD, Elekta

Roadmap: Healthcare

Toeslagjaar: 2017*; Einddatum: 2024; Fase:* Conform planning

Omschrijving:

Today several cancers, including breast, are more frequently diagnosed at an early stage. For those cancers, current treatment includes surgery, radiotherapy, or an association of both to ensure local control. As patients with these tumors have very good long term prognosis, it is important to minimize the long-term side effects and the treatment burden for those patients. The ideal treatment would be a minimally invasive real-time image guided intervention, without tissue removal to minimize cosmetic damages and under light sedation, such that the patients could return to their normal life the same day. This could be achieved by heating cancerous tissues to the temperatures above 50 °C (thermal ablation) generated by the alternating magnetic field, in combination with brachytherapy (BTh). Our guiding hypothesis is that nanoparticles (NPs), made of 5 nm core of radiotherapeutic 103Pd, with a 25 nm diameter middle shell of super paramagnetic iron oxide (SPIO) and an outer silica layer can efficiently and safely enable thermal-ablation (TA) and local irradiation for tumors like early stage breast cancers. The 103Pd-SPIO are then incorporated into rigid alginate seeds, which can be loaded in standard BTh needles and inserted under image guidance in a typical BTh procedure. The area is finally exposed to high power and low frequency alternating magnetic field to perform the TA, and a suited radiation dose will be delivered. MRI can be used to visualize the 103Pd-SPIO dispersion and hence to monitor the therapeutic effect. While the individual building-blocks constituting the proposed therapy are wel-described and even partially applied in clinics, the combination of heating using an image-guided BTh with unsealed radioactive sources in a NP design has never been demonstrated before for this type of cancer. The intrinsic properties of NPs, such as biocompatibility, favorable biodistribution, diffusion within the tumor volume and hence efficient distribution of the radiation dose in combination with a strong MRI signal, will enable the necessary step of tumor destruction traditionally done by surgery.

We propose to design, make and test novel radio- and thermo-active NPs to enable this worldwide first approach of image-guided thermo-brachytherapy for cancer ablation. The scope of work in this proposal implies achievement of tangible results by the application of SPIO-based NPs in an innovative way. This implies fabrication of the optimal BTh materials under careful tuning of the ferromagnetic properties of NPs required for thermo-ablation at a safe intensity and frequency of the alternating magnetic field. More fundamentally, the project will provide basic knowledge on the interaction of the clinical, biological and physological processes involved in tumorcell kill when combining TA and BTh.

Kosten:

Fundamenteel:	€ 737787	*Waarvan TKI-toeslag:*	€ 210717
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 92000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 124805
Totaalbegroting:	***€ 737787***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16247

Titel: Monolithically integrated SiC sun sensor for Space

Penvoerder: Technische Universiteit Delft

Partners: TUD, International Aviation Support, Lens R&D

Roadmap: Space

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Sun sensors, which are used to determine the satellite orientation towards the sun, are a vital part of the satellite attitude control. Current commercial available sun sensors are too large and costly to be integrated in the small satellites, e.g., nanosats. Due to the low costs of these satellites, they enable a wide range of applications which otherwise would not be possible or cost-effective. By developing a sun sensor that is fully integrated on a single substrate, the overall size of the sensor can be significantly reduced and costly extra calibration is avoided. By using SiC as material, we secure high performance and high reliability under harsh environment. In addition, the sensor will not be sensitive to reflections of the earth, as it uses the parts of the light spectrum absorbed by the atmosphere.

Kosten:

Fundamenteel:	€ 369800	*Waarvan TKI-toeslag:*	€ 105548
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 60000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 48840
Totaalbegroting:	***€ 369800***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16249

Titel: Novel immunometabolic platforms for cancer diagnostics and pharmacotherapy

Penvoerder: Universiteit Leiden

Partners: UL, Agios, SampleQ, ScieX

Roadmap: Healthcare

Toeslagjaar: 2017*; Einddatum: 2023; Fase:* Conform planning

Omschrijving:

Tumor associated macrophages (TAMs) are master modulators of tumor immunity and metabolism and have the capacity to be reprogrammed for their immunometabolic phenotypes. The dynamic nature of TAMs and their sensitivity to environmental signals such as tumor induced hypoxia results in significant heterogeneity of TAM population within a tumor and significant variations between individuals. Here, we develop in vitro technologies to probe tumor immunometabolism at the single cell resolution. The technology will allow us to characterize TAM heterogeneity and monitor their behavior upon administration of inhibitors of metabolism. This could lead to a breakthrough in cancer therapy and diagnostics; TAM frequencies have been used as a predictive measure of tumor progression and response to cancer therapy, strongly suggesting that detailed characterization of TAMs may reveal key information with significant predictive power for therapy and diagnostics.

The goal of this project is to develop an integrated technology platform to study cell-cell interactions and the role of immune metabolism in cancer. For this goal, we will use innovative analytical technologies for the metabolic analysis of a limited number of cells, down to the single cell level, using innovative 3D cell culture and mass spectrometric imaging techniques. We will focus on the optimization and application of this novel platform to study the metabolic characteristics of tumor-associated macrophages (TAMs), as their understanding is key for the development of novel macrophage-centered anticancer therapies, and can also help to predict the outcome of other anti-tumor treatment options (chemo-, radio, and immuno- therapies). We will demonstrate the potential of the envisioned platform by studying the following aspects: We will demonstrate the potential of the envisioned platform by studying the following aspects: 1) immunometabolic heterogeneity of TAMs; 2) interactions of TAMs and the tumor microenvironment 3) predictive value of single cell analysis of metabolism and immunomarkers of TAMs for cancer progression and response to therapy.

Kosten:

Fundamenteel:	€ 1252027	*Waarvan TKI-toeslag:*	€ 315043
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 330000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 143107
Totaalbegroting:	***€ 1252027***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - TTW - Projectnummer: 16251

Titel: An integrated Optical Coherence Tomography system for medial imaging at 1300nm

Penvoerder: Technische Universiteit Eindhoven

Partners: TUE, Smart Photonics, APEX Technologies, VTEC Lasers and Sensors, Bright Photonics, Lionix International Scinvivo BV

Roadmap: Photonics

Toeslagjaar: 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

In this project the Photonic Integration group at TU/e, the Biomedical Engineering and Physics group at the Academisch Medisch Centrum Amsterdam in collaboration with six industrial partners intend to achieve an integrated, Indium-phosphide semiconductor based, miniaturized system for Fourier domain optical coherence tomography (OCT) at 1300nm as well as combining 1300nm and 1550nm in a single system. This is enabled by a new design of a feedback insensitive widely tunable semiconductor laser system which allows it to be combined with the components of the interferometer and balanced detectors in a single miniaturized system. To realize this, existing photonic integration technology will be extended to the 1300nm range. Access to the 1300nm wavelength range is critical for many clinical applications of OCT, the combination of the two wavelength ranges will enable e.g. determination of water content and reduction of speckle. The device that we intend to realize will have unique capabilities to minimise computational overhead, will apply new scanning technology and will lower cost. InP based amplifiers can be more energy efficient at 1300nm compared to 1550nm and the technology and associated design library will therefore also be relevant for data communication applications.

Kosten:

Fundamenteel:	€ 971996	*Waarvan TKI-toeslag:*	€ 268004
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 127000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 182376
Totaalbegroting:	***€ 971996***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T45.5.12479

Titel: RESTMETAL - Hydrometallurgical recovery of strategic metals from End-of-Life electronic wastes

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Van Gansewinkel Groep B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Materials scarcity has become a critical issue globally. Raw materials supply security will play a more important role in all industrial sectors in the future. Primary metal production is limited by the availability of the natural resources of minerals an ....

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 77611
Industrieel/Toegepast:	€ 155222	*Waarvan Private cash:*	€ 77611
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 155222***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T81.88.14541

Titel: Monolithic facades of Ultra-lightweight concrete

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, CRH Europe Sustainable Concrete Centre B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

In the monolithic façade concept, all necessary façade functions are provided by one material, e.g. a type of lightweight concrete that combines both thermal insulating capacities with structural capacity sufficient for a specific application. Such a concept fits perfectly in the current search for sustainable building solutions.

In the previous M2i projects (MA.12265 and MA.13275), the research on the development of an ultra-lightweight concrete, i.e. for the application of monolithic façade structures, was performed. The results show that an ultra-lightweight concrete with a thermal conductivity of about 0.12 W/(m·K) and a 28-day compressive strength of about 10 N/mm2 can be achieved on laboratory level. This concrete has been made designed for a mass production by concrete plant, considering sufficient fresh open time for transportation, desired mechanical and thermal properties, sufficient durability and relatively low cost to make it market acceptable.

In this project we aim to demonstrate the performance of the material in application. The aim of the project is designing and actually constructing a simple and partly adaptable prototype building that can serve as a showcase, in order to encourage further development and market introduction of ultra-lightweight concrete applied in monolithic facades. Different types of prefabricated facades, as well as prefabricated roof floors will be tested as part of the prototype building For this, a level of adaptability will be ensured in the definition phase.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 11770
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 35310
Experimenteel:	€ 47080	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 47080***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: MT81.88.14536

Titel: Building Information Modelling (BIM)

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Staalfederatie Nederland, Tata Steel Nederland Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Building Information Modelling (BIM) krijgt een steeds belangrijkere plaats in het bouwproces. Het informatiemodel blijkt een sterk middel om de broodnodige veranderingen in de bouw te faciliteren. BIM maakt ketenintegratie mogelijk, doordat projectpartners al in een vroeg stadium van elkaar tot in detail kunnen zien, waarmee iedereen bezig is. Ontwerpbeslissingen kunnen op eenvoudige wijze via een BIM-model met elkaar worden gecommuniceerd.
Ook in de uitvoering kan BIM een belangrijke rol vervullen. De staalbouw maakt al veel gebruik van BIM, echter niet in het bestelproces. De uitwisseling van informatie is tijdens het bestelproces nog traditioneel via een materiaallijst. Doel van dit project is om het bestelproces te digitaliseren via BIM.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 5050
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 15150
Experimenteel:	€ 20200	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 20200***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: MT81.88.14537

Titel: Dutch Hall

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Staalfederatie Nederland, Tata Steel Nederland Technology B.V., Vereniging Bouwen met Staal

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Het aanbieden van een energieneutrale en duurzame hal met een stilstaande of zelfs teruglopende energiemeter. Doel van dit kennistransferproject is ondersteuning van de ontwikkeling van een nul-energie hal door energieprestatieberekeningen van de gebouwen met een industrlefunctie te vereenvoudigen. Het project sluit aan op Dutch Hall waarin, naast de stalen gevel- en constructiebranche, ook andere materialen zoals beton en composieten en de installatiesector deelnemen.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 7592
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 22775
Experimenteel:	€ 30367	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 30367***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: MT81.88.14538

Titel: Earthquake-resistant design and realisation

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Staalfederatie Nederland, Tata Steel Nederland Technology B.V., Vereniging Bouwen met Staal, HaskoningDHV Nederland B.V., Ingenieursbureau Wassenaar B.V., Zonneveld Ingenieurs B.V., Grontmij Nederland B.V., TNO Diana B.V., ABT Wassenaar Seismisch Advies B.V., Ingenieursbureau Dijkhuis B.V., W2N Engineers B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Het opstellen van concrete aanbevelingen voor aardbevingsbestendig ontwerpen en bouwen met behulp van lichte bouwmethoden. Daarbij wordt gefocust op staal, maar tevens wordt gekeken naar combinaties met andere lichtgewicht materialen zoals composieten en hout. Vervolgens wordt kennisoverdracht verzorgd van praktische wenken gericht op de (kleine) ingenieursbureaus.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 10701
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 32102
Experimenteel:	€ 42803	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 42803***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: MT81.88.14539

Titel: Environmental data structural steelwork

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Samenwerkende Nederlandse Staalbouw, Tata Steel Nederland Technology B.V., Vereniging Bouwen met Staal

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Bij de bepaling van de carbon footprint van de staalbouw zijn de staalproductie en de hergebruik- en recyclingfase de belangrijkste factoren. Daarnaast is er steeds meer vraag naar inzicht in de carbon footprint van het bouwproces. Door de globalisering van de bouw speelt het transport namelijk een steeds grotere rol. Doel is om deze milieukosten zichtbaar te maken om de aanbiedingen beter te kunnen vergelijken en oneigenlijke concurrentie te voorkomen.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 5618
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 16852
Experimenteel:	€ 22470	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 22470***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: MT81.88.14540

Titel: Interaction structure / facade

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Tata Steel Nederland Technology B.V., Staalfederatie Nederland, Vereniging Bouwen met Staal

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Door een betere constructieve interactie tussen de gevel en de hoofddraagconstructie is materiaal te besparen. Door de staalbouwbranche wordt samenwerking gezocht met andere materialen zoals de aluminium- en composietenbranche. Het project sluit aan op het VMRG-project Constructieve gevels, dat op dit moment loopt.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 7528
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 22584
Experimenteel:	€ 30112	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 30112***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T41.5.12467

Titel: Bainite formation and properties in multiphase steels

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Tata Steel Nederland Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

The primary aim of this project is to develop a physically-based approach on the microstructure scale for the formation and the microstructure/property relationship of bainite in low-alloyed multi-phase steels and to implement this into an existing throug ...

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 251970
Industrieel/Toegepast:	€ 503940	*Waarvan Private cash:*	€ 251970
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 503940***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T63.7.12480

Titel: Microscopy study of plastic deformation recovery and air passivation in stainless steeld -BESTSHAVING

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Philips Consumer Lifestyle B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

Modern trend in miniaturization of high precision metallic parts, their net-shaping and surface treatment together with avoiding expensive and energy consuming production processes, requires in-depth knowledge concerning all the complicated microstructura.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 277750
Industrieel/Toegepast:	€ 555500	*Waarvan Private cash:*	€ 277750
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 555500***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T62.3.13483

Titel: New Materials for Minimally Invasive Medical Instruments - NEMESIS

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Philips Electronics Nederland B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

More and more medical interventions are performed with minimally invasive techniques resulting in: less trauma to the patient, lower risk of infection and a faster recovery. The integration of advanced sensor and imaging functionality on the tip of instr...

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 135352
Industrieel/Toegepast:	€ 270703	*Waarvan Private cash:*	€ 135351,5
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 270703***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T21.10.12481

Titel: Repetitive loading and the interaction with surface layers of the material, leading to Rolling Contact Fatigue in camshafts

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, DAF Trucks N.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

In the current project a new approach to the predicting aspects critical to R(olling) C(ontact) F(atigue) is suggested with the ultimate goal to increase the accuracy of lifetime prediction. In the case of a well lubricated and designed camshaft assembly.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 134930
Industrieel/Toegepast:	€ 269859,6	*Waarvan Private cash:*	€ 134929,8
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 269859,6***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T91.1.12475A

Titel: The interaction between macroscopic loading modes and micro-scale mechanisms in railway switches

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, ProRail B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The general scientific aim of the integrated project can be defined as follows: obtaining an interdisciplinary understanding of damage mechanisms of switch points, and thereby creating the possibility to influence key factors in order to optimise the long ..

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 133919
Industrieel/Toegepast:	€ 347838	*Waarvan Private cash:*	€ 213919
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 347838***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T91.5.12475C

Titel: The mechanisms behind modification and control of loading conditions in the presence of a lubricating layer in railway switches

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, ProRail B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

The general scientific aim of the integrated project can be defined as follows: obtaining an interdisciplinary understanding of damage mechanisms of switch points, and thereby creating the possibility to influence key factors in order to optimise the long ...

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 133750
Industrieel/Toegepast:	€ 267500	*Waarvan Private cash:*	€ 133750
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 267500***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T22.2.13497

Titel: The influence of grain and interphase boundaries on strength and fracture toughness of AHSS steels – experimental investigation on the relation between character of individual grain boundaries and grain boundary networks and their deformation behaviour

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Tata Steel Nederland Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Tata Steel as manufacturer of steel products is continously engaged in improving processes and developing new steel products. In th eglobal world of steel it is essential to keep at thge forefront of developments to maintain a competitive edge. Key products of the steel industries in the automotive market are the advanced high strength steel (AHSS). These multiphase steels have a growing interest in the automotive market, because of their higher strenghts compared to more conventional forming steels. With these light weigth construction of Body in White (BIW) is possible, which enables a further reduction of CO2 emissiong. In case of crash also safety performance of cars willbe improved. However forming behaviour and fracture toughness is critical in automotive applications and limits their applications until now. One of thec urrent strategic developments is the development of new high strength steels with better ductility. Typical microstructures of these multiphase steel grades consits of hard 2nd phases embedded in ductile ferrite matrix. The macro mechanical properties of the steel grades depend on the micromechanical properties of the hard and soft phases, but also strongly on geometrical parameters. Still not understood is the influence of the morphology og the grain boundaries and interphases boundaries and also the spatial distribution of constituents on hardening and fracture toughness. With decreasing grain size in AHSS the role of grain boundaries for the macroscopic mechannical properties of the material is further increasing. In particular, grain boundaries play an important role in the determination of ductility, fracture strength and toughness of the material. Optimization of the grain boundaries in AHSS would therefore allow improving the mechanical behaviour of these materials. However, still little is known on the properties of indivdual boundaries with respect to slip transmission and fracture strength and the relation of these properties with the crystallographic and chemical chracter of the boundaries. Improved knowlegde on these relations is therefore important to improve the materials.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 125000
Industrieel/Toegepast:	€ 250000	*Waarvan Private cash:*	€ 125000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 250000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T22.8.13508

Titel: Mechanical property and failure prediction of resistance spot welded (RSW) advanced high strength automotive steels

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Tata Steel Nederland Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The scientific aims of the project include:

• Quantifying the relationship between weld microstructure, mechanical properties and failure resistance of AHSS spot welds;

• Revealing the deformation behavior of different microstructure zones and failure modes of AHSS spot welds under different loading conditions;

• Improving the weld failure strength by identifying RSW process parameters, alloying elements and possible post-weld treatments;

• designing novel materials guidelines for improved weldability of advanced high strength automotive steels.

Key aspect of the project is to quantify the relationship between the weld microstructure, local mechanical properties (hardness, ductility, fracture strength and toughness), failure mode and the total energy to failure of resistance spot welds in AHSS. This knowledge will lead to a new strategy for optimizing the welding process settings with respect to the specific alloying of new advanced/ultra high strength automotive steels. The scientific aims can be detailed as follows:

• microstructure engineering: effects of grain composition, orientation and distribution on the deformation and failure behavior of the welds during external loading;

• external loading and residual stress state: in-situ mechanical testing at microscale in scanning electron microscopy and quantification of residual stress state by using a combination of digital image correlation and focused ion beam milling;

• design of micromechanical descriptions: mechanical behaviour around the weld during shear and cross-tension loading. In order to identify optimized process and alloying strategies, it is necessary to understand how the metallurgical properties affect the actual mechanical performance.

The ultimate and overarching goal is the generation of the new processing maps for appropriate weld schemes and/or alloying strategies for automotive industry, based on enhanced mechanical performance of spot welds, prediction of their failure behaviour and support to automotive industry.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 168000
Industrieel/Toegepast:	€ 336000	*Waarvan Private cash:*	€ 168000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 336000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T41.5.13490

Titel: Shifting the limits for nut coke usage in the iron making blast furnaces

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Bosch Transmis+BD26:BF26sion Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2014*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Packed-bed reactors are widely used in chemical and metallurgical industries such as oil refineries, production of metallic iron and ferroalloys as well as elemental phosphorus. In the production of metallic iron (ironmaking) and ferroalloys (FeMn, FeCr, FeSi), highly complex packed-bed reactors are used at very high temperatures (up to 2000°C): the ironmaking blast furnaces, and submerged arc furnaces. Inside this type of packed-bed reactors (furnaces), the oxide ore minerals in the form of agglomerated “pellets” or sinter, are fed into the high temperature furnaces together with reducing agent, quite often the “coke” particles (either mixed or in layered structures). The high temperature and required thermal energy for heating and reactions are provided either by electric arcs (for ferroalloy production) or combustion of coke or coal (for ironmaking). The reduction reactions are multiphase in nature: gas – solid, solid – solid – gas, or liquid – solid – gas. Therefore, the reduction degree (completeness) and reaction rate (kinetics) are highly dependent on the contact and mixing of the reactants, local temperature and gas compositions, and more importantly the bed permeability and reactivity at the interface (in particular solid – solid interface). The gas permeability in the solid bed and consequently the pressure drop across the whole solid bed (porous media) will play critical roles for the total performance of the reactor.

The current proposed project will focus on the chemical and physical phenomena inside the multi-phase packed bed of ironmaking blast furnaces. Inside the slow-moving packed bed of the ironmaking blast furnace, there are two major types of solid materials: iron ore particles (pellets or sinter) and coke particles. The particle size, particle shape and reactivity or mineralogy are important parameters to determine the physical and chemical properties of the bed: the permeability or bed porosity, and reaction kinetics. Good permeability of the solid bed is important for reacting gases to travel through and to provide the reacting interface between the solid and gases. Inside the ironmaking blast furnace, the iron ore particles (pellets and sinter) are gradually reduced by the ascending reducing gas CO and H2, while the local coke particles react in-situ with CO2 or H2O to generate CO and H2 gas again to sustain the gas-solid reduction reactions. Furthermore, the contact of different sized coke particles with the ferrous materials (pellets and/or sinter) will have significant influence on the local CO/CO2 and H2/H2O gas composition and reduction kinetics. Iron oxides have different forms depending on the valence: from Fe2O3 (hematite) normally as the starting feed, to Fe3O4 (magnetite) and finally FeO (wüstite) before metallic iron is formed. The gas – solid reduction reactions occur stage-wise from high to low valence iron oxides. The major chemical reactions of the last reduction step taking place in the middle part and blast furnaces are illustrated below [3]:

$CO(g) + FeO = Fe + CO_2(g)$ (1)

$H_2(g) + FeO = Fe + H_2O(g)$ (2)

Carbon dioxide and water vapor react with coke (carbon) particles in the vicinity of the pellets and/or sinter to provide more CO and H2 reducing gases:

$CO_2(g) + C = 2\,CO(g)$ (Boudouard reaction) (3)

$H_2O(g) + C = CO + H_2(g)$ (water – gas reaction) (4)

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 173858
Industrieel/Toegepast:	€ 347715	*Waarvan Private cash:*	€ 173857,5
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 347715***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T81.7.14542

Titel: Research into the air purifying performance of a mineral coating

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Keim Nederland B.V., Sirius International B.V.

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2016; Fase:* Conform planning

Omschrijving:

1. Development of the air purifying transparent coating and evaluation of the air pollutants removal efficiency under laboratory conditions.
A home-made test set-up following the ISO standard 22197-1 will be employed for evaluating the air pollutants removal efficiency of the developed coating, as shown in Figure 1, and nitrogen monoxide (NO) will be applied as the model pollutant. As previously reported [5], the surface properties of the applied substrate including such as the porosity, surface roughness and absorption etc., and the dosage of the photocatalyst as well as the application methods greatly affect the air pollutants, therefore, as the first step, the new functional coating will be evaluated in terms of the NOx degradation efficiency. Here a special attention will also be paid to an optimal balance between the air pollutants removal efficiency and the increased cost due to the incorporation of the photocatalyst compared to the base coating, for instance, the dosage of photocatalyst, the concentration of other additives such as the stabilizer and surfactant, the modification of the recipes of the applied base coating, etc.
2. Research into the self-cleaning properties of the new functional coating.
The PCO is a surface reaction [10], which indicates that a possible coverage of the surface of the developed coating by materials such as dirt would reduce the effective exposed surface area of the photocatalyst, leading to decreased air pollutants removal efficiency. Hence, in the present project, the self-cleaning properties of the new coating, caused by the increased hydrophilic property of the developed coating, will be investigated due to the importance of the effective exposed surface of the applied coating. The self-cleaning mechanism will be studied by surface spectrometry according to the ISO standard 10678. Methylene blue, a widely used redox indicator that will be degraded in an aqueous solution when in contact with the potentially photocatalytically active surface under irradiation with suitable wavelength, will be used as a model pollutant.
3. Long term field performance investigation.
The outdoor performance investigation will cover the whole seasons in order to obtain representative data during a year. The air quality monitoring will be performed at Javastraat located in the Hague, as seen in Figures 2 and 3. Often the air quality monitoring is carried out by measuring the air pollutants concentration in the photocatalyst-coated street [11]. There are several concepts to quantify the photocatalytic reduction of air pollutants in the open atmosphere, by: i) comparative measurements before and after treatment; ii) up- and downwind measurements, iii) use of a reference test site. However, all these concepts suffer from high uncertainties caused by the meteorological variability of the atmosphere, which can easily introduce variation of trace gas concentrations (>10 %), both in time (i) and space (ii/iii), exceeding the expected PCO activity.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 24975
Industrieel/Toegepast:	€ 49950	*Waarvan Private cash:*	€ 24975
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 49950***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T61.3.15568

Titel: Design and construction of a test reactor for in-situ monitoring of plasma-enhanced sALD thin film deposition

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Solliance

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2016; Fase:* Conform planning

Omschrijving:

A project is envisaged that aims at pre-selecting, designing and (pre-)constructing microdiagnostics provisions integrated in a test bed reactor set for atmospheric-pressure spatial ALD, with a surface DBD plasma source. Ideally this involves a set of complementary, in situ, real-time diagnostics integrated of integratable on to a gas injector assembly with adjustable plasma source(s) that can be easily connected to a basic test reactor chamber.

The project fits in perfectly as highly complementary to these existing industry-driven Shared Research Programs and the recently started Materials Transition Program, run by TNO and its industrial partners, since this project has its own academic focus on understanding the fundamental plasma-related aspects to deliver new functional ALD layers with superior quality and unprecedented machine throughput. This way, the proposed project will catalyze the high-volume ALD production concept into swift implementation in any high-throughput, large-area production lines.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 25000
Industrieel/Toegepast:	€ 50000	*Waarvan Private cash:*	€ 25000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 50000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T61.7.14545

Titel: NARSIA: Novel Approach to local Residual Stress for Industrial Applications

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Bosch Transmission Technology B.V., SKF B.V., Philips Consumer Lifestyle B.V.

Roadmap: Hightech materials

Toeslagjaar: 2013, 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The overarching emphasis in this proposal lies on low and high cycle fatigue behavior of heterogeneous materials and interfaces that are used in ball bearings (SKF), in push belts (Bosch) and various appliances for domestic use (Philips CL). Local hetero-geneities like inclusions in metals play a key role in the materials performance under repeatable compression-tensile loading (fatigue).
There are different hypotheses regarding the harmfulness of heterogeneities and the effects of the local residual stress state. From a scientific viewpoint another approach with sufficient novelty is needed to elucidate the fundamentals. The project is aimed at exploring a novel approach to measure residual stress state when inhomogeneous displacement fields are present at the local micrometer scale in these heterogeneous materials. Our method is based on applying dual beam microscopy as an imaging-milling semi-destructive instrument to introduce mechanical relaxations. A Focused Ion Beam (FIB) will be used as a “knife“ to release the local strain induced by internal stresses and the accompanying relaxation in the vicinity of such cut will be mapped in the form of displacement field using the 2D Aramis Digital Image Correlation (DIC).
The key scientific goal of the project is to present a proof-of-principle of the magnitude and effect of local stress components in heterogeneous and dissimilar materials. The fatigue limit depends on the residual stress gradients, size, shape and concentration gradients of the inclusions. Residual stresses will affect the actual value of the critical size below of which a real fatigue limit will exist. Therefore the focus will be on:
• stress gradients due to multi axial loading and fatigue as a function of depth and in plane in regions of particular interest: metal surfaces, precipitates in steels, heterogeneous interfaces;
• design of a new approach to evaluate stress gradients in industrial materials including nano-crystalline or even amorphous layers.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 114846
Industrieel/Toegepast:	€ 229692	*Waarvan Private cash:*	€ 114846
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 229692***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T11.4.14523a

Titel: Forming large and accurate Double Curved Shells for GLARE Skin Panels

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Fokker Aerostructures BV

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Controling the forming process for Glare panels.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 121000
Industrieel/Toegepast:	€ 242000	*Waarvan Private cash:*	€ 121000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 242000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T11.4.14523b

Titel: Forming large and accurate Double Curved Shells for GLARE Skin Panels

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Fokker Aerostructures BV

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Controling the forming process for Glare panels.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 121000
Industrieel/Toegepast:	€ 242000	*Waarvan Private cash:*	€ 121000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 242000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T41.5.13489

Titel: Particle - gas interactions at high temperatures: fundamental study of in-flight melting and reduction (Hisarna)

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Tata Steel Nederland Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2014, 2015*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Developing the Hisarna process.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 175000
Industrieel/Toegepast:	*€* 350000	*Waarvan Private cash:*	€ 175000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 350000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16001

Titel: Investigation and demonstration of Super-hydrophobic Surfaces for contamination-free self-cleaning wafer table applications - ShySwaft

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, ASML Netherlands B.V.

Roadmap: Hightech materials

Toeslagjaar: 2014, 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

The goal of this project is to develop an understanding of methods that enable the prevention or reduction of contamination of wafer tables via surface functionalization.

WT contamination build-up can be reduced in two ways. The first one is by preventing contaminants transport to the WT surface. The second one is by modification of the WT surface in such a way that contamination will not permanently adhere to it. Surface modification can lead to super-hydrophobic surfaces, which are known to have self-cleaning properties, as shown in Figure 3.

Figure 3.a) Water droplets on different locations of a composite “super-hydrophobic” surface yielding spherical shapes [1]. b) Self-cleaning property of a piece of glass with a super-hydrophobic coating.

The most interesting assets of superhydrophobic surfaces are their resistance to inorganic and organic fouling, corrosion resistance, resistance to bacterial growth, controlled electrical properties and more [1-27]. Therefore tuning superhydrophobicity of surfaces is a potentially efficient method to prevent WT surface to get contaminated. Up to now, many methods of preparing artificial superhydrophobic surfaces have been developed [28], which can basically be sequestered into two main categories. The first category comprises realizing rough surfaces from low surface energy material and the second is modifying a rough surface with a material of low surface energy [29-33]. The aforementioned categories are feasible with both chemistry and topology modifications of the material surfaces.

The real challenges in fabricating superhydrophobic surfaces are their mechanical durability under harsh conditions and maintaining their structural integrity and robustness [34-38]. Erosion by water flow and mechanical touch could destroy the microscale rough structure which is crucial for maintaining superhydrophobicity [39-45].

To overcome these barriers there are two potential options. The first option is by keeping the same patterning techniques and modifying surface roughness. The second option is by varying the procedures and adding one chemical process to keep the surface as good as new. While technology for superhydrophobicity is at this time not mature enough for a wafer table application it is very interesting for ASML to study the opportunities which can be realized with such surfaces. Apart from the wafer stage the gained knowledge can potentially also be used in other parts of the machine where contamination and cleaning are an issue.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 157500
Industrieel/Toegepast:	€ 315000	*Waarvan Private cash:*	€ 157500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 315000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16003

Titel: Reaction Wheel Technology Consolidation (ReWTeC)

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Bradford Engineering BV

Roadmap: Hightech materials

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The long term stability of reaction wheel bearing lubrication system has been observed indirectly from a number of in-flight performance studies. However, in-depth studies to the lubricant life time and lubricant budget for high temperature and long term space mission (> 10 years) have not been performed. On top of that, the underlying mechanism of lubricant (oil) migration from the oil reservoir to the working surfaces of ball bearing during the operation re-lubrication campaign are not fully understood and quantified.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 25000
Industrieel/Toegepast:	€ 50000	*Waarvan Private cash:*	€ 25000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 50000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16005a

Titel: Advanced manufacturing of sustainable tires

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Continental Reifen Deutschland GmbH

Roadmap: Hightech materials

Toeslagjaar: 2015 en 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Circular economy in recycling materials from used tires.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 208500
Industrieel/Toegepast:	€ 350000	*Waarvan Private cash:*	€ 141500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 350000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16005b

Titel: Advanced manufacturing of sustainable tires

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Continental Reifen Deutschland GmbH

Roadmap: Hightech materials

Toeslagjaar: 2015 en 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Circular economy in recycling materials from used tires.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 208500
Industrieel/Toegepast:	€ 350000	*Waarvan Private cash:*	€ 141500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 350000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16009

Titel: Design and demonstration of flexible functional surfaces deposited by roll to roll APCVD

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, FujiFilm Manufactring Europe BV

Roadmap: Hightech materials

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

New deposition process.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 25000
Industrieel/Toegepast:	€ 50000	*Waarvan Private cash:*	€ 25000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 50000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16010

Titel: Materials behaviour under extreme particle and radiation loading: Lithography

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, ASML Netherlands B.V., Research Instruments Gmbh, NRG, Differ, Eurofusion

Roadmap: Hightech materials

Toeslagjaar: 2014, 2015, 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Materials development for extreme conditions.

Kosten:

Fundamenteel:	€ 2874500	*Waarvan TKI-toeslag:*	€ 1249500
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 350000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 100000
Totaalbegroting:	***€ 2874500***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16017

Titel: Metallic Nanoparticle Based Interconnect for 3D Heterogeneous Integration of Micro and Nano systems

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, NXP Semiconductors BV, Infineon technologies AG, BESINetherlands BV

Roadmap: Hightech materials

Toeslagjaar: 2014, 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

3D integrated structures for semi conductor industryr…

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 185000
Industrieel/Toegepast:	€ 300000	*Waarvan Private cash:*	€ 115000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 300000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16022

Titel: Large Scale Metal Additive Manufacturing

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Rotterdam Fieldlab Additive Manufacturing BV

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Develop wire based additve manufacuring for very large constructions.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 87000
Industrieel/Toegepast:	€ 200000	*Waarvan Private cash:*	€ 113000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 200000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16023

Titel: Earthquake-resistant design and realisation

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Vereniging Bouwen met Staal, Staalfederatie Nederland, Ingenieursbureau Wassenaar B.V., HaskoningDHV Nederland B.V., C.A.DOL Bouwkundig adviseur, Staalbouwkundig adviesbureau van Odenhoven

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:
Design housings to be safe even in case of eartquakes.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 12667
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 38000
Experimenteel:	€ 50667	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 50667***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16024

Titel: Light Gauge steel framing/ cold formed steel members

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Vereniging Bouwen met Staal, Tata Steel Nederland Technology B.V., Interdam projects bv, FeNB2 staalframebouw bv,, KSProfiel, Knuwer bouwadvies, Holland Staal BV, Space Solutions

Roadmap: Hightech materials

Toeslagjaar: 2013*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:
Production method for steel constructions.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 9633
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 28900
Experimenteel:	€ 38533	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 38533***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16034

Titel: Development of new sorel elements for artificial reefs

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Boskalis

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

In this feasibility study, a modified sorel cement will be investigated, that can sustain a seas water environment. First the degradation mechanism will be studied by a physical/mineralogical study of the current cements.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 12750
Industrieel/Toegepast:	€ 25500	*Waarvan Private cash:*	€ 12750
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	*€ 0*
Totaalbegroting:	***€ 25500***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16036

Titel: Thermal effects in SiGe HBTs

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, NXP Semiconductors BV

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

This project aims to a better understanding of the self-heating and response-shifting mechanisms affecting the operation of a high driving-voltage RF of SiGe heterojunction bipolar transistors (HBT). By using and optimising thermal models valuable knowledge will be gained on the material parameters allowing stable performance.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 25000
Industrieel/Toegepast:	€ 50000	*Waarvan Private cash:*	€ 25000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 50000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17001

Titel: Design and development of modelling tool for Advanced High Strength Steels (AHSS) product development and process optimisation - AHSSPro2

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Tata Steel Nederland Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

production of Advanced High Strength Steel by organsing internal oxidation in steel.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 32500
Industrieel/Toegepast:	*€* 65000	*Waarvan Private cash:*	€ 32500
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 65000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17004

Titel: ICARUS - Increased Collection of energy by Advanced solar harvesters on Roof moUnted Solar panels

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Weijland Technologies BV

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: n.t.b.; Fase:* Nog niet gestart

Omschrijving:

Select the right materials and joining techniques to be integrated in an overall PV infrastructure solution.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 32500
Industrieel/Toegepast:	*€ 65000*	*Waarvan Private cash:*	€ 32500
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	*€ 0*
Totaalbegroting:	***€ 65000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17005

Titel: Maxwell Developing the Mass Production System for a PV Tile based Energy System

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Weijland Technologies BV

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: n.t.b.; Fase:* Nog niet gestart

Omschrijving:

Determination of the right materials to connect the different parts of the system based on durability.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 32500
Industrieel/Toegepast:	*€* 65000	*Waarvan Private cash:*	€ 32500
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 65000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17008

Titel: 3D printed heat pipe array

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, VDL Enabling Technologies Group

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

3d design for heat transfer in extreme conditions.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 30000
Industrieel/Toegepast:	€ 60000	*Waarvan Private cash:*	€ 30000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 60000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17016

Titel: Assessment of Gas Fermentation Technology using Tata Steel WAGs as Feedstock

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Tata Steel Nederland Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Utilisation of waste gas enabling reduction of CO2 emissions.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 32500
Industrieel/Toegepast:	*€* 65000	*Waarvan Private cash:*	€ 32500
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 65000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17017

Titel: Design and development of a cost efficient plasma source for sterilization purposes

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, LOg10 BV

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Characterisation of an instrument for Glow discharge plasma generation for sterilisation of medical devices.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 30000
Industrieel/Toegepast:	*€* 60000	*Waarvan Private cash:*	€ 30000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 60000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17018

Titel: Determination of optical properties for manufacturing of PICs for process control

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, SMART PHOTONICS BV

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

A tight process control of the manufacturing process for Photonic Integrated Circuits is required. This project aims to identify monitoring devices.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 30000
Industrieel/Toegepast:	€ 60000	*Waarvan Private cash:*	€ 30000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 60000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17019

Titel: Digitally Enhanced New Steel Product Development (DENS)

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Tata Steel Nederland Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2015, 2016, 2017*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Bring through process modeling to a maturity for new product development.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 2600000
Industrieel/Toegepast:	€ 5427500	*Waarvan Private cash:*	€ 2827500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 5427500***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17023

Titel: Pulsed power driven rock fragmentation

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, IHC Systems BV

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Deep sea mining development.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 55000
Industrieel/Toegepast:	€ 110000	*Waarvan Private cash:*	€ 55000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 110000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T18001

Titel: Thermal management of hybrid electric CVT vehicles

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Bosch Transmission Technology B.V.

Roadmap: Hightech materials

Toeslagjaar: 2017*; Einddatum: n.t.b.; Fase:* Nog niet gestart

Omschrijving:

Develop a mulit-domain control optimisation for minimal energy consumption based on materials utilisation & design.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 82500
Industrieel/Toegepast:	€ 330000	*Waarvan Private cash:*	€ 165000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 330000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T18002

Titel: Coating of microfluidic chips for Point of Care medical diagnostic devices" (Coat&Close)

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Surfix BV

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Surface anti fouling coatings development.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 60000
Industrieel/Toegepast:	*€* 120000	*Waarvan Private cash:*	*€* 60000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 120000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T18003

Titel: Understanding the microstructural essence of Damage Evolution in Rolling contact fatigue (UNDER)

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, ProRail B.V.

Roadmap: Hightech materials

Toeslagjaar: toekomstige toeslag*; Einddatum: n.t.b.; Fase:* Nog niet gestart

Omschrijving:

Develop fundamental knowlege on damage devopment and prevention in rails.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 200000
Industrieel/Toegepast:	*€* 400000	*Waarvan Private cash:*	€ 200000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 400000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T18004

Titel: Enhancement of reliability of 3d printed fibre reinforced poymer parts via material modelling and insitu 3D X/Ray inspection technology. Reliable GF-3D (M-ERA.NET)

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, BMC

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: n.t.b.; Fase:* Nog niet gestart

Omschrijving:

Allow industrial manufacturers to make full use of the potential of composites based on understanding on the processing and mechanical performnace of composite 3D printed parts.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 110500
Industrieel/Toegepast:	€ 130000	*Waarvan Private cash:*	€ 19500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 130000***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T16045

Titel: Two-scale modelling of composite "steel-concrete-reinforced resin" interaction (INTERMOD)

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Vereniging Bouwen met Staal

Roadmap: Hightech materials

Toeslagjaar: 2017*; Einddatum: n.t.b.; Fase:* Nog niet gestart

Omschrijving:

Develop methodology to predict behavior of composite structures.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 158950
Industrieel/Toegepast:	*€* 317900	*Waarvan Private cash:*	€ 158950
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 317900***	*Waarvan overige*	*€ 0*

TKI-projecten

M2i - Projectnummer: T17010

Titel: Process monitoring and Control system for Wire Arc Additive Manufacturing (ProCoWAAM)

Penvoerder: Materials innovation institute

Partners: Materials innovation institute, Rotterdam Fieldlab Additive Manufacturing BV

Roadmap: Hightech materials

Toeslagjaar: toekomstige toeslag*; Einddatum: n.t.b.; Fase:* Nog niet gestart

Omschrijving:

Develop methodology to predict behavior of composite structures.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 191750
Industrieel/Toegepast:	€ 383500	*Waarvan Private cash:*	€ 191750
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 383500***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.01878

Titel: CARM2G 2013

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Embedded Systems

Toeslagjaar: 2013*; Einddatum: 2013; Fase:* Afgerond

Omschrijving:

The goal of the CARM program is to develop and demonstrate a multi-disciplinary and integrated design methodology that can be used by ASML to

· Predict and optimize the performance of new products;

· Specify the solution in terms of system models;

· Automatically synthesize the software code required for the real-time machine control;

· Use the system models to involve external suppliers in the development of the target embedded platform.

The main result of the project will be tooling and techniques to quickly model complex systems with a focus on real-time system performance and resource usage. It will allow System Architects to improve their rationale for high-impact architectural decisions and to specify the design unambiguously for both the ASML and supplier development teams.

These techniques are general in nature and can be applied to domains other than ASML thus appealing to many potential companies building high performance embedded systems.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 450000
Industrieel/Toegepast:	€ 965000	*Waarvan Private cash:*	€ 450000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 965000***	*Waarvan overige*	*€ 65000*

TKI-projecten

ESI - Projectnummer: 060.01885

Titel: Magenta-Basic 2013

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Embedded Systems

Toeslagjaar: 2013*; Einddatum: 2013; Fase:* Afgerond

Omschrijving:

The world-wide trends described above also occur in and have influence on ASML. The MaGenTa 2012 project aimed to expose the influences and effects in ASML context, mainly termed ‘data-related issues’ or ‘data management issues’.
We formulate our goals based on an extensive analysis performed in 2012. This analysis has shown that a system-level data-techniques are required for a number of basic system aspects related to data handling and data management. These five aspects – or 'fundamentals' – are shown in Figure 3.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 275000
Industrieel/Toegepast:	€ 550000	*Waarvan Private cash:*	€ 275000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 550000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.01898

Titel: Cardinal 2013

Penvoerder: TNO

Partners: TNO, NXP Semiconductors BV

Roadmap: Embedded Systems

Toeslagjaar: 2013*; Einddatum: 2013; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 100000
Industrieel/Toegepast:	€ 200000	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 200000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.02432

Titel: Anaconda 2013

Penvoerder: TNO

Partners: TNO, TP Vision

Roadmap: Embedded Systems

Toeslagjaar: 2013*; Einddatum: 2013; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 141443
Industrieel/Toegepast:	€ 282886	*Waarvan Private cash:*	€ 141443
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 282886***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.08771

Titel: Cardinal 2014

Penvoerder: TNO

Partners: TNO, NXP Semiconductors BV

Roadmap: Embedded Systems

Toeslagjaar: 2013, 2014*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Modeling and analysis techniques to deduce Advanced Driver Assistance System (ADAS) requirements for highly automated driving.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 100000
Industrieel/Toegepast:	€ 200000	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 200000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.08775

Titel: CARM2G 2014-2018

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Embedded Systems

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The main goal of the project is to identify new opportunities for NXP in the automotive market within the scope of Cooperative Advanced Driver Assistant
Systems and Highly Automated Driving applications.
The second goal is to acquire insights in future use cases, architectures and subsystem requirements to facilitate highly automated driving by 2020 – 2025 in cars. These insights are necessary to achieve the project main goal.
The third goal is to generate proposals for follow-ups of this project, either internally NXP or with involvement of external partners, for example with universities via the STW regulations of Dutch government. It is agreed in the start of this project that 3 STW projects will be started within the scope of ADAS and HAD.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 450000
Industrieel/Toegepast:	€ 900000	*Waarvan Private cash:*	€ 450000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 900000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.08776

Titel: Magenta 2014

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Embedded Systems

Toeslagjaar: 2014*; Einddatum: 2014; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 275000
Industrieel/Toegepast:	€ 550000	*Waarvan Private cash:*	€ 275000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 550000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.08777

Titel: Anaconda 2014

Penvoerder: TNO

Partners: TNO, TP Vision

Roadmap: Embedded Systems

Toeslagjaar: 2014*; Einddatum: 2014; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 94274
Industrieel/Toegepast:	€ 188548	*Waarvan Private cash:*	€ 94274
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 188548***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.14832

Titel: Prisma 2015

Penvoerder: TNO

Partners: TNO, Philips Lighting BV

Roadmap: Embedded Systems

Toeslagjaar: 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

The main goal of the Prisma 2015 project is the development of techniques to analyse a system's robustness and reliability and to develop concepts and architectural guidelines for robustness and
reliability. These techniques should be applicable to distributed systems-of-systems with proven appllcability for intelligent lighting systems for the office and retail market.
TNO-ESl aims at developing generic methods and tools that are applicable to large-scale distributed (control) systems. These methods and tools will be consolidated and disseminated to other domains via TNO-ESI's expertise areas. Depending on the nature and scope of the developed methods and tools, consolidation, and dissemination will be done via the Systems-in-Context expertise area or the Future-Proof Systems expertise area.
The Prisma 2015 project aims at developing methods and tools for the development of robust and reliable systems-of-systems. Robustness involves a system's capability to continue to deliver its
functionality despite the occurrence of system failures and environmental changes. One speaks of graceful degradation in case the level of functionality has decreased in response to failures. In the literature, many methods have been proposed for developing systems that are robust against system failures and environmental changes.
Typical robustness analysis techniques are testing, simulation, and model checking. Typical robustness improvements methods include redundancy and rollback recovery. Redundancy aims to
achieve robustness by duplicating components, functionality, or information. 1f a failure occurs in one component of the system, a redundant component can take over its functionality. Rollback
recovery involves returning to a well-defined state after a failure has occurred. Alternative approaches to develop robust systems are inspired by biological systems. Biological systems are
inherently robust. These approaches aim at self-organizing systems, i.e. systems that autonomously adapt/reorganize themselves in response to changes in their environment.
The Prisma 2015 project does not aim at the development of new robustness techniques. Instead, it will focus on the applicability of existing techniques in an industrial setting; Prisma will consider applicability from a technical viewpoint and a cost-effectiveness viewpoint. This means that Prisma's contribution to the state of the art is an assessment of selected robustness techniques regarding their applicability in distributed systems-of-systems.
A critical success factor is the validation of the project results. Within the scope of this project, this means that the research results are applled to industrial use cases in the product development
process. The distributed lighting systems of Philips Lighting will be used as case to evaluate the industrial applicability of robustness techniques. To perform this evaluation, the project involves an analysis of the robustness of existing lighting systems. This provides valuable insight to Philips Lighting regarding their products. The project will also define and evaluate strategies to alleviate
identified robustness issues. This will provide architectural guidelines and application concepts that Philips Lighting can apply to improve their distributed lighting systems, but are appilcable to
distributed systems from other domains as well.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 110000
Industrieel/Toegepast:	€ 220000	*Waarvan Private cash:*	€ 110000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 220000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.14837

Titel: Thema 2015

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Embedded Systems

Toeslagjaar: 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

To ensure that a high-tech system, such as the ASML wafer-scanner, can comply to the required level of reliability in a 24-7 operation, system quality improvement can be addressed on three levels. The first level addresses 'model-based testing and user profiling' as a strategy to certify the inherent quality of the product itself. The second level addresses 'product modelling and simulation' as a means to better represent and simulate the practical use of systems in a FAB. The third level addresses 'health monitoring and prognostics' as a means for the system to report or autocorrect its
behaviour in case of deterioration or violation of operational integrity.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 450000
Industrieel/Toegepast:	€ 900000	*Waarvan Private cash:*	€ 450000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 900000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.15170

Titel: CARM2G 2015

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Embedded Systems

Toeslagjaar: 2014, 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 450000
Industrieel/Toegepast:	€ 900000	*Waarvan Private cash:*	€ 450000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 900000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.19375

Titel: Thema 2016

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Embedded Systems

Toeslagjaar: 2016*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 450000
Industrieel/Toegepast:	€ 900000	*Waarvan Private cash:*	€ 450000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 900000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.19376

Titel: Prisma 2016

Penvoerder: TNO

Partners: TNO, Philips Lighting BV

Roadmap: Embedded Systems

Toeslagjaar: 2016*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 110000
Industrieel/Toegepast:	€ 220000	*Waarvan Private cash:*	€ 110000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 220000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.19503

Titel: Follow me eco twin 2015/2016

Penvoerder: TNO

Partners: TNO, NXP Semiconductors BV

Roadmap: Embedded Systems

Toeslagjaar: 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 250000
Industrieel/Toegepast:	€ 500000	*Waarvan Private cash:*	€ 125000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 125000
Totaalbegroting:	***€ 500000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.19662

Titel: Concerto 2016

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Embedded Systems

Toeslagjaar: 2016*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Specify and combine software application and platform designs enabling peformance optimization for wafer logistics.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 450000
Industrieel/Toegepast:	€ 900000	*Waarvan Private cash:*	€ 450000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 900000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.23174

Titel: Renaissance

Penvoerder: TNO

Partners: TNO, FEI Europe BV, Cornerstone

Roadmap: Embedded Systems

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Afgerond

Omschrijving:

Develop methods and tools to impove human inderstanding by analyzing domain-specific patterns in legacy code.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 650000
Industrieel/Toegepast:	€ 1300000	*Waarvan Private cash:*	€ 200000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 450000
Totaalbegroting:	***€ 1300000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.24380

Titel: Archway

Penvoerder: TNO

Partners: TNO, DAF

Roadmap: Embedded Systems

Toeslagjaar: 2016*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Methods have to be developed for defining and reasoning about reference architectures.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 146678
Industrieel/Toegepast:	€ 366678	*Waarvan Private cash:*	€ 220000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 366678***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.26159

Titel: Prognosis 2017

Penvoerder: TNO

Partners: TNO, Thales Nederland

Roadmap: Embedded Systems

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The long-term goal is to establish in industrial practice methods to develop models from a commonhigh-level description language and to generate instances suitable for a variety of uses. Once thedesign at a model level has been verified, deployable components can be generated. The methodsdeveloped and tooling used can be applied to most industrial organizations developing high-endelectromechanical products with a high software content.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 250000
Industrieel/Toegepast:	€ 500000	*Waarvan Private cash:*	€ 250000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 500000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.26161

Titel: Prisma 2017

Penvoerder: TNO

Partners: TNO, Philips Lighting BV

Roadmap: Embedded Systems

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

In general, the goal of the Prisma programme is to reduce the effort for the full product lifecycle of distributed control systems. The focus of study are model-based approaches addressing a system's entire lifecycle: specification, development, validation, installation, commissioning, upgrade, etc. By opting for a workflow-centric approach using specific domain models (represented by DSLs), supported by analysis and validation techniques based on virtual prototyping, the (inherent) complexity of the domain is addressed for each lifecycle stage.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 110000
Industrieel/Toegepast:	€ 220000	*Waarvan Private cash:*	€ 110000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 220000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.26163

Titel: Concerto 2017

Penvoerder: TNO

Partners: TNO, ASML Netherlands BV

Roadmap: Embedded Systems

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The goal of the Concerto project is to develop a model-based methodology to diagnose, predict and optimize system timing and throughput and to keep computational tasks out of the critical (throughput) path as much as possible. The main methodological concepts to be developed are shown in Figure 1. In detail the methodology will constitute:

Figure 1: main methodological concepts

• Domain-specific languages to concisely and modularly capture execution architectures, formalizing the interplay between (see also figure 1):

– applications consisting of physical tasks and computational tasks and their (dynamic) dependencies;

– platforms consisting of run-time processes and computational and physical resources;

– mappings of tasks on platforms, i.e. of computational tasks on processes, of processes on computational resources and of physical tasks on physical resources.

• Automated techniques for execution architecture reconstruction, i.e. reconstructing application tasks, dependencies, platform resources and mappings from design and run-time artefacts (such as machine traces). This is necessary to cope with the size and complexity of realistic applications and platforms. In addition it enables the timing analysis and optimization of legacy applications in combination with their newly developed model-based counterparts.

• Highly scalable automated techniques to efficiently compute system timing and throughput, resource usage and critical paths. These techniques will combine model-checking and

---

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 345000
Industrieel/Toegepast:	€ 690000	*Waarvan Private cash:*	€ 345000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 690000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.26164

Titel: TeXel 2017

Penvoerder: TNO

Partners: TNO, ASML Netherlands BV

Roadmap: Embedded Systems

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The goal of the TheXel project is to develop a model-based testing methodology (MBT) that improves the effectiveness and efficiency of the testing process, and that is applicable to high-tech
systems and systems-of-systems. In particular, the methodology:

* allows models which are powerful enough to specify system-level and systems-of-systems models, e.g., providing the combination of state-based control flow and complex-data specification, allowing specification of distribution, concurrency, and uncertainty, and enabling compositional modelling;
* provides automatic generation of test cases from abstract system models, automated test execution and test result analysis;
* supports the selection of high-coverage test suites;
* supports the use of usage profiles for test selection;
* supports test-coverage and reliability assessment;
* is supported by tools that are powerful and scalable.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 150000
Industrieel/Toegepast:	€ 300000	*Waarvan Private cash:*	€ 150000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 300000***	*Waarvan overige*	*€ 0*

TKI-projecten

ESI - Projectnummer: 060.26165

Titel: ADS5 2017

Penvoerder: TNO

Partners: TNO, ASML Netherlands BV

Roadmap: Embedded Systems

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The goal of the ADS project is to realize a methodology to diagnose root causes of existing problems and to predict upcoming issues within complex multi-stakeholder production chains. The purpose is to resolve such problems either by an intervention (service action, repairs) or by compensative actions via adaptive control.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 285000
Industrieel/Toegepast:	€ 570000	*Waarvan Private cash:*	€ 285000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 570000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: holst2014-1

Titel: Roadmap Printing Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, Samsung, Henkel, Panasonic, Roth and Rau BV, Sumitomo, Du Pont, n Tact, Orbotech, Pragmatic, Stork Prints, Heidelberg, NovaCentrix, x

Roadmap: Printing

Toeslagjaar: 2014*; Einddatum: 2014; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 377000
Industrieel/Toegepast:	€ 754000	*Waarvan Private cash:*	€ 377000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 754000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: holst2014-2

Titel: Roadmap Solar Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, DTF, Henkel, Philips, Rolic, Roth and Rau, Vitrex, Bosch Rexroth, MAS Active Trading, Heliatek, Smit Ovens Bv, Thyssen Krupp, VDL ETG

Roadmap: Solar

Toeslagjaar: 2014*; Einddatum: 2014; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 272000
Industrieel/Toegepast:	€ 544000	*Waarvan Private cash:*	€ 272000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 544000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: holst2014-3

Titel: Roadmap Lighting Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, CPT, MASActive Trading, DTF, Henkel, Mitsui, Panasonic, Philips, Rolic, Roth and Rau, Solvay, Sumitomo, Vitrex

Roadmap: Lighting

Toeslagjaar: 2014*; Einddatum: 2014; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 765000
Industrieel/Toegepast:	€ 1530000	*Waarvan Private cash:*	€ 765000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1530000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: holst2014-4

Titel: Roadmap C+C Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, CPT, MASActive Trading, DTF, Henkel, Mitsui, Panasonic, Philips, Rolic, Roth and Rau, Solvay, Sumitomo, Vitrex

Roadmap: Components & Circuits

Toeslagjaar: 2014*; Einddatum: 2014; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 3586000
Industrieel/Toegepast:	€ 7172000	*Waarvan Private cash:*	€ 3586000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 7172000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-C

Titel: Roadmap C+C Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, Henkel, Panasonic, Philips, Orbotech Ltd, Artek Electronics, AU optronics Corp, BASF, Blinksight, Braemar, Cityzen, Cloudtag Active, Bloom, Chungwa Picture Tub, Coopervision, Evonik, Global Foundires, Jansse Consulting, Konica Minolta, dpiX, Methods2 Business Maxim Int Pord, Carta Mundi, Neuropro, Omron, Hitachi Maxwell, Posterama, Renasus, Neurospire

Roadmap: Components & Circuits

Toeslagjaar: 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 3769000
Industrieel/Toegepast:	€ 7538000	*Waarvan Private cash:*	€ 3769000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 7538000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-C

Titel: Roadmap C+C Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, Barco Silex, Panasonic, Philips, Orbotech Ltd, Artek Electronics, Niko, BASF, Intrinsic, Braemar, The Sleep Company BV, Cloudtag Active, Bloom, Chungwa Picture Tub, Coopervision, Evonik, Rombit, Niko, Kempenhaege, dpiX, Methods2 Business Maxim Int Pord, Carta Mundi, Isoltechnics D&D, Given Imaging, Hitachi Maxwell, Fuji film, Renasus, Dtawyler

Roadmap: Components & Circuits

Toeslagjaar: 2016*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 4711000
Industrieel/Toegepast:	€ 9422000	*Waarvan Private cash:*	€ 4711000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 9422000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-C

Titel: Roadmap C+C Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, Analog Devices, Artek Electronics. L, Asahi Kasei Chemical, Barco Silex, Bloom, Braemar, Chunghwa, DePuy Synthes, dpiX LLC, Dr.Herberger Medical GmbH, Fujifilm, Maxim MUSIEC AFE, MDT, Microsemi, Nordic, Orange, Orbotech Ltd., PANASONIC, Philips Electronics nederland B.V., Renasas Gwo research Ulp Wireless SAMSUNG SSIC, Shin-Etsu Chemical Co., Ltd., Shinko, Sony

Roadmap: Components & Circuits

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 3131623
Industrieel/Toegepast:	€ 6263246	*Waarvan Private cash:*	€ 3131623
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 6263246***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-L

Titel: Roadmap Lighting Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, Afga-Gevaert, Henkel, Philips, Rolic, Meyer Burger BV, AU optronics Corp, Bosch Rexroth, MAS Active Trading, Duont Tejin Films, Illumix Mitusi, VDL ETG, Sumitomo Chemical Co, Solvay, Smit Ovens BV

Roadmap: Lighting

Toeslagjaar: 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 723000
Industrieel/Toegepast:	*€* 1446000	*Waarvan Private cash:*	€ 723000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 1446000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-L

Titel: Roadmap Lighting Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, AU Optronics Corpora, Bosch Rexroth BV, dpiX LLC, BMW, Aixtron, Cambridge Display Technology, Meyer Burger (Nether, Dell Products, PANASONIC, Philips Electronics Nederland BV, Rolic Technologies A, Deregallera, China Lucky, Eight, VDL Enabling Technol, NittoDenko, Nitto Deutschland, Pepsico

Roadmap: Lighting

Toeslagjaar: 2016*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 558000
Industrieel/Toegepast:	€ 1116000	*Waarvan Private cash:*	€ 558000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1116000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-L

Titel: Roadmap Lighting Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, BMW, China Lucky

Roadmap: Lighting

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 186826
Industrieel/Toegepast:	€ 373652	*Waarvan Private cash:*	€ 186826
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 373652***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-P

Titel: Roadmap Printing Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, Du Pont UK, MASActive Trading, Hereaus Noble light, Henkel, Illumix, Panasonic, Philips, Nordson-Asymtek, Stork Prints Group, Posterama, Orbotech Ltd

Roadmap: Printing

Toeslagjaar: 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 547000
Industrieel/Toegepast:	€ 1094000	*Waarvan Private cash:*	€ 547000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1094000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-P

Titel: Roadmap Printing Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, e-Sense, Du Pont (UK) Ltd., Henkel AG & Co. KGaA, Heraeus Noblelight G, Sabic Global, MAS Active Trading L, Nordson-Asymtek Inc., Orbotech Ltd., Faurecia, Philips Electronics Nederland BV, SPG Prints B.V.

Roadmap: Printing

Toeslagjaar: 2016*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 584000
Industrieel/Toegepast:	*€* 1168000	*Waarvan Private cash:*	*€* 584000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	*€* 0
Totaalbegroting:	***€ 1168000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-P

Titel: Roadmap Printing Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, Du Pont (UK) Ltd., Henkel AG & Co. KGaA, MAS Active Trading L, Nordson-Asymtek Inc., Orbotech Ltd., Sabic Global, The Sleep Company BV

Roadmap: Printing

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 394840
Industrieel/Toegepast:	€ 789680	*Waarvan Private cash:*	€ 394840
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 789680***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-S

Titel: Roadmap Solar Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, Philps Electronics, Henkel, Rolic, MAS Active Trading, Sumitomo, Heliatek, Thyssen Krupp, Agfa Gevaert, Cambriso Technologie, Meyer Burger BV, Mitsui Mining x

Roadmap: Solar

Toeslagjaar: 2015*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 281000
Industrieel/Toegepast:	€ 562000	*Waarvan Private cash:*	€ 281000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 562000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-S

Titel: Roadmap Solar Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, PANASONIC, Heliatek GmbH

Roadmap: Solar

Toeslagjaar: 2016*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 47000
Industrieel/Toegepast:	€ 94000	*Waarvan Private cash:*	€ 47000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 94000***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer: Holst-S

Titel: Roadmap Solar Holst

Penvoerder: Stichting Holst Center

Partners: Stichting Holst Center, Dyesol LTD, Heliatek GmbH, SolarTek B.V.

Roadmap: Solar

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 136711
Industrieel/Toegepast:	€ 273422	*Waarvan Private cash:*	€ 136711
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 273422***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer:

Titel: Roadmap Printing Holst

Penvoerder: TNO

Partners: TNO

Roadmap: Printing

Toeslagjaar: 2013*; Einddatum: 2013; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 566969
Industrieel/Toegepast:	€ 1133938	*Waarvan Private cash:*	€ 566969
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1133938***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer:

Titel: Roadmap Lighting Holst

Penvoerder: TNO

Partners: TNO

Roadmap: Lighting

Toeslagjaar: 2013*; Einddatum: 2013; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 755959
Industrieel/Toegepast:	€ 1511918	*Waarvan Private cash:*	€ 755959
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1511918***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer:

Titel: Roadmap Solar Holst

Penvoerder: TNO

Partners: TNO

Roadmap: Solar

Toeslagjaar: 2013*; Einddatum: 2013; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 566969
Industrieel/Toegepast:	€ 1133938	*Waarvan Private cash:*	€ 566969
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1133938***	*Waarvan overige*	*€ 0*

TKI-projecten

HOLST - Projectnummer:

Titel: Roadmap C+C Holst

Penvoerder: TNO

Partners: TNO

Roadmap: Components & Circuits

Toeslagjaar: 2013*; Einddatum: 2013; Fase:* Afgerond

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 2834846
Industrieel/Toegepast:	€ 5669692	*Waarvan Private cash:*	€ 2834846
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 5669692***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.03082

Titel: Feasibility study for CGIS bufer layer

Penvoerder: TNO

Partners: TNO, Smit Ovens

Roadmap: Solar

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

To obtain experimental process parameters for spatial ALD of thin layers of ZnOS as input for the design of pilotproduction for solar cell manufacturing.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 62868
Industrieel/Toegepast:	€ 137868	*Waarvan Private cash:*	€ 75000
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	*€ 0*
Totaalbegroting:	***€ 137868***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.05192

Titel: Particle contamination control

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2013*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The investigation of the fundamentals of nano-particle contamination control for next generation semiconductor manufacturing.

Kosten:

Fundamenteel:	€ 1224000	*Waarvan TKI-toeslag:*	€ 1034000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 190000
Totaalbegroting:	***€ 1224000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.05523

Titel: EUV Beamline

Penvoerder: TNO

Partners: TNO, Carl Zeiss

Roadmap: Semiconductor Equipment

Toeslagjaar: 2013*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Enabling technology built on contamination physics and chemistry is required to design, integrate and qualify ultra-clean systems. To achieve the required level of understanding for practical use, a comprehensive and quantitative overview of mechanisms and scaling laws is needed.

Kosten:

Fundamenteel:	€ 295000	*Waarvan TKI-toeslag:*	€ 250000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 45000
Totaalbegroting:	***€ 295000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.06493

Titel: Next gen aftertreatment

Penvoerder: TNO

Partners: TNO, DAF, Bosal

Roadmap: Automotive

Toeslagjaar: 2013*; Einddatum: 2014; Fase:* Afgerond

Omschrijving:
Het modelleren van ureaumafzetting in after treatment.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 110000
Industrieel/Toegepast:	€ 220000	*Waarvan Private cash:*	€ 10000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 100000
Totaalbegroting:	***€ 220000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.06761

Titel: Addressable light source array

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2013*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Research on a suitable illumination module for large area patterning.

Kosten:

Fundamenteel:	€ 1170000	*Waarvan TKI-toeslag:*	€ 995000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 175000
Totaalbegroting:	***€ 1170000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.07089

Titel: Freeform manufacturing for HTS

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

To investgate a computer aided design compatible with software of additive manufacturing platforms and investigate new multiphase slurries and processes for debinding and sintering.

Kosten:

Fundamenteel:	€ 1183000	*Waarvan TKI-toeslag:*	€ 1008000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 175000
Totaalbegroting:	***€ 1183000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.08274

Titel: Trustester PoC

Penvoerder: TNO

Partners: TNO, SIDN, PostNL, Verispect, Surfnet

Roadmap: ICT

Toeslagjaar: ; Einddatum: 2014; Fase: Afgerond

Omschrijving:

Met de Trust Tester wordt een generieke oplossing geboden voor validatie van persoonsattributen in een breed spectrum aan online klantprocessen om de benodigde zekerheid en vertrouwen in online zaken doen te kunnen verhogen en de privacy van de consument te kunnen waarborgen.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 130000
Industrieel/Toegepast:	€ 310000	*Waarvan Private cash:*	€ 75000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 105000
Totaalbegroting:	***€ 310000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.09057

Titel: LTE Broadcast

Penvoerder: TNO

Partners: TNO, KPN Mobile, Vodafone, NPO, Ericsson TV&Media, SBS, Samsung

Roadmap: ICT

Toeslagjaar: 2013*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Het doel van het project is beantwoording van de waag of LTE netwerken kunnen worden uitgerust met een toekomstvaste optie in termen van technologie, busienss en rechten / regelgeving, voor schalbare live content distributie via de radioweg.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 141000
Industrieel/Toegepast:	€ 322000	*Waarvan Private cash:*	€ 105000
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	€ 76000
Totaalbegroting:	***€ 322000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.09064

Titel: UVi (250-300nm) channel optics imp

Penvoerder: TNO

Partners: TNO, Airbus DS GmbH

Roadmap: Space

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

To improve accuracy for measuring trace gases such as O3, NO, HCHO and SO2 significant improvements in the UV spectral range are required with respect to spatial resolution and reduction of stray light. This requires development of new coating technology and methods to reduce stray light and improve alignment and verification, which is one of the important research and development topics of the current TKI proposal.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 1197000
Industrieel/Toegepast:	€ 2394000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 1197000
Totaalbegroting:	***€ 2394000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.09547

Titel: Darkweb

Penvoerder: TNO

Partners: TNO, ING, Rabobank, ABN-AMRO, Fox-IT

Roadmap: ICT

Toeslagjaar: 2014*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:
Onderzoek of data uit het darkweb van nut kan zijn voor de financiele sector.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 100000
Industrieel/Toegepast:	€ 200000	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 200000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.09765

Titel: QuTech Engineering 2014 deel

Penvoerder: TNO

Partners: TNO

Roadmap: Nanotechnology

Toeslagjaar: 2014*; Einddatum: 2015; Fase:* Afgerond

Omschrijving:

Towards a quantum computer based on the scientific base of TU Delft.

Kosten:

Fundamenteel:	€ 1500000	*Waarvan TKI-toeslag:*	€ 250000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1500000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.09765

Titel: QuTech Engineering 2015 deel

Penvoerder: TNO

Partners: TNO

Roadmap: Nanotechnology

Toeslagjaar: 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Towards a quantum computer based on the scientific base of TU Delft.

Kosten:

Fundamenteel:	€ 3000000	*Waarvan TKI-toeslag:*	€ 500000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 3000000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.09931

Titel: Information Value provider (SDF2.0)

Penvoerder: TNO

Partners: TNO, Friesland campina, CRV Agrifirm, Agrifirm Feed BV

Roadmap: ICT

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Smart dairy Farmingontwikkeling van een visie en IT-architectuur voor ketensamenwerking.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 700000
Industrieel/Toegepast:	€ 1200000	*Waarvan Private cash:*	€ 300000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 200000
Totaalbegroting:	***€ 1200000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.10668

Titel: Innovatieve stuwstof technieken

Penvoerder: TNO

Partners: TNO, Aerospace Propulsion Products BV

Roadmap: Space

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

In dit voorstel wordt een TKI project in een publiek private samenwerking beschreven om technische toepasbaarheid, haalbaarheid en ontwikkeling van een aantal nieuwe innovatieve productietechnologieën voor de verwerking van stuwstoffen te onderzoeken.

Kosten:

Fundamenteel:	€ 250000	*Waarvan TKI-toeslag:*	€ 212500
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 37500
Totaalbegroting:	***€ 250000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.11224

Titel: High Power Adaptive Optics

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2013, 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

In the semiconductor industry, the new generation lithography tools employ high power lasers for generation of EUV exposure light. The most promising solution directions lies in the field of Adaptive Optics (AO), where active control is introduced in the light processing system to preserve or adapt the shape of optical elements, such that optical performance is continuously guaranteed and disturbance influences are being suppressed.

Kosten:

Fundamenteel:	€ 2323000	*Waarvan TKI-toeslag:*	€ 1975000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 348000
Totaalbegroting:	***€ 2323000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.11448

Titel: Predictive Energy Management E3 Bus

Penvoerder: TNO

Partners: TNO, VDL Bus & Coach, Heavac BV

Roadmap: Automotive

Toeslagjaar: 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Development of topics towards model-based supervisory control, particularly with focus on predictive information for energy management and CO2 reduction in transport.

Kosten:

Fundamenteel:	€ 592000	*Waarvan TKI-toeslag:*	€ 610000
Industrieel/Toegepast:	€ 214000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 196000
Totaalbegroting:	***€ 806000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.11888

Titel: E-MESH fund ©

Penvoerder: TNO

Partners: TNO, Innplate B.V.

Roadmap: Solar

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Large area (> 0.5 m2) opto-electronic devices, like thin film PV modules, require electrical interconnections for current transport in and out of the devices. Transparent conductive oxides
(TCOs) are used as optically transparent and electrically conductive interconnects in the front contact window of thin film PV modules. Due to the TCO's trade-off between conductivity and
optical transmittance interconnection losses are an important factor in the large efficiency gap between laboratory champion thin film PV cells and industrial thin film modules. Model simulation
of CIGS cells have shown that application of a metal mesh on a TCO front contact can reduce these losses and increase the cell efficiency by 10% relative1. This presents a potentially viable business case for the application of metal meshes to CIGS PV modules.
However, there is no industrially feasible technology for large area application of these metal meshes on CIGS. Inkjet- and screen-printing are not able to meet the mesh dimension and
conductivity requirements. The 10% relative efficiency improvement has been shown for evaporated metal meshes on lab-scale CIGS cells, but evaporation is not a scalable technology. By electroplating a metal mesh on a TCO, a strongly reduced transparency/conductivity trade-off a has been shown.4 However, lab-scale test have shown that there are still major challenges to obtain an electroplating technology for large area application of metal meshes on CIGS modules. The chemical or thermal stability of semi-finished CIGS modules is incompatible with the process conditions of state-of-theart patterned electroplating technology. In addition only minimal changes to the current manufacturing process are allowed to facilitate adoption in industrial production.
The eMesh project partners aim to investigate new electroplating technology to minimize current restrictions on large area interconnection of optoelectronic devices, in particular thin film CIGS PV
modules. In the eMesh project. Together Innplate and TNO will develop technology to apply highly conductive electroplated metal meshes to PV module front contacts.

Kosten:

Fundamenteel:	€ 445000	*Waarvan TKI-toeslag:*	€ 375000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 70000
Totaalbegroting:	***€ 445000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.12948

Titel: NZR

Penvoerder: TNO

Partners: TNO, Liander BV, Brabant Water, Dunea NV, Evides Waterbedrijf, Oasen BV, PWN Moord Holland, Stedin Netbeheer Stichting waternet, Waterbedrijf Groningen, Waterleidingmaatschappij Drenthe, Vitens BV, Skt Geo Netherlands BV

Roadmap: ICT

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:
Omzetting van informatie naar producten die beheerders van leiding infrastructuur direct kunnen toepassen om hun asset management te optimaliseren.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 300000
Industrieel/Toegepast:	€ 600000	*Waarvan Private cash:*	€ 200000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	€ 100000
Totaalbegroting:	***€ 600000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.13068

Titel: Fundamentals of low density plasma

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

To improve optics lifetime predictive model to understand the present low-density plasma in EUV optics.

Kosten:

Fundamenteel:	€ 999685	*Waarvan TKI-toeslag:*	€ 849685
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 150000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 999685***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.13213

Titel: Autoflow

Penvoerder: TNO

Partners: TNO, Liander BV, Brabant Water, Dunea NV, Evides Waterbedrijf, Oasen BV, PWN Moord Holland, Stedin Netbeheer Stichting waternet, Waterbedrijf Groningen, Waterleidingmaatschappij Drenthe, Vitens BV, Skt Geo Netherlands BV

Roadmap: ICT

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:
Een monitoringsysteem voor ondergrondse pijpleidingen, dat op basis van remote sensing door altimetrie satellieten, een verwachting afgeeft over de faalkans van leidingen als gevolg van grondzettingen.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 250000
Industrieel/Toegepast:	€ 500000	*Waarvan Private cash:*	€ 200000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	€ 50000
Totaalbegroting:	***€ 500000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.13918

Titel: Novel calibration approach

Penvoerder: TNO

Partners: TNO, SSTL

Roadmap: Space

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:
To develop innovative novel calibration approaches to prevent in future an explosion of calibrabtion time and budget of optical space instruments.

Kosten:

Fundamenteel:	€ 734370	*Waarvan TKI-toeslag:*	€ 623870
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 110500
Totaalbegroting:	***€ 734370***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.14079

Titel: ACO24HEE

Penvoerder: TNO

Partners: TNO, DAF, Sensata Technologies BV

Roadmap: Automotive

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Focus on research for the reduction of CO2 emissions of heavy-duty powertrains for truck applications.

Kosten:

Fundamenteel:	€ 2066000	*Waarvan TKI-toeslag:*	€ 1996000
Industrieel/Toegepast:	€ 360000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 430000
Totaalbegroting:	***€ 2426000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.14192

Titel: Follow Eco Twin

Penvoerder: TNO

Partners: TNO, DAF, Ricardo

Roadmap: Automotive

Toeslagjaar: 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

This project focuses on the technology development required for truck-platooning systems including all required safety and performance measures required for this automated driving application.

Kosten:

Fundamenteel:	€ 1635000	*Waarvan TKI-toeslag:*	€ 1935000
Industrieel/Toegepast:	€ 1180000	*Waarvan Private cash:*	€ 375000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 505000
Totaalbegroting:	***€ 2815000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.14643

Titel: ICN

Penvoerder: TNO

Partners: TNO, KPN BV

Roadmap: ICT

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

Oplossen van vraagstukken rondom Information Centric networking op het gebied van name-based routing en naming.

Kosten:

Fundamenteel:	€ 400000	*Waarvan TKI-toeslag:*	€ 330000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 70000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 400000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.15640

Titel: Focafet

Penvoerder: TNO

Partners: TNO, Stichting Focafet

Roadmap: ICT

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:
Oplossingen voor (internationale) economische transacties.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 245493
Industrieel/Toegepast:	€ 486815	*Waarvan Private cash:*	€ 41322
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 200000
Totaalbegroting:	***€ 486815***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.15723

Titel: Power amplifiers

Penvoerder: TNO

Partners: TNO, UMS, Thales NL

Roadmap: Components & Circuits

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The development of a more than 100-Watt S-band amplifier in low cost package for application in future S-band sensor and communication systems. The following approaches will be investigated: A classical two-stage GaN power amplifier MMIC design; A thermally optimized two-stage GaN power amplifier MMIC design.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 500000
Industrieel/Toegepast:	€ 900000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 400000
Totaalbegroting:	***€ 900000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.15724

Titel: High Power Transmitters

Penvoerder: TNO

Partners: TNO, NXP

Roadmap: Components & Circuits

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Development of a driver amplifier in the Qubic gen 10 SiGe technology of NXP. The following research topics are defined: 1. What is the optimum amplifier topology. 2. What kind of power levels can be realized with SiGe technology.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 250000
Industrieel/Toegepast:	€ 350000	*Waarvan Private cash:*	€ 0
Experimenteel:	*€* 0	*Waarvan Private inkind:*	€ 100000
Totaalbegroting:	***€ 350000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.15923

Titel: Digitale fabriek

Penvoerder: TNO

Partners: TNO, Brainport Industries

Roadmap: ICT

Toeslagjaar: 2015*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

Het project Fieldlab Digitale fabriek: “the smart networked high tech supply chain” legt de focus op het beter samenwerken en informatie delen over bedrijfsgrenzen heen in de high tech toeleverketen. In het project wordt samengewerkt met maakbedrijven, IT-leveranciers van ondersteunende software, kennisinstellingen en adviesbureaus die werken binnen het domein ...

Kosten:

Fundamenteel:	€ 450000	*Waarvan TKI-toeslag:*	€ 405000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 45000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 450000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.16611

Titel: Tiled streaming

Penvoerder: TNO

Partners: TNO, KPN BV, Stadion Amsterdam BV, InMotio Object Tracking, Game on

Roadmap: ICT

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Begrip van de relatie tussen geavanceerde netwerkinfrastructuren.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 100000
Industrieel/Toegepast:	€ 200000	*Waarvan Private cash:*	€ 15000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 85000
Totaalbegroting:	***€ 200000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.16788

Titel: Advanced Micropropulsion

Penvoerder: TNO

Partners: TNO, Hyperion Technologies BV, ISIS BV

Roadmap: Space

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The project aims to solve the fundamental problems related to High Performance Micro-Propulsion Systems (HPMS) for miniaturized satellites, such as nanosatellites.

Kosten:

Fundamenteel:	€ 333000	*Waarvan TKI-toeslag:*	€ 283000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 50000
Totaalbegroting:	***€ 333000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.17366

Titel: Transient apps

Penvoerder: TNO

Partners: TNO, KPN BV, Emansion

Roadmap: ICT

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Challenge to present relevant apps to users.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 100000
Industrieel/Toegepast:	€ 200000	*Waarvan Private cash:*	€ 75000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 25000
Totaalbegroting:	***€ 200000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.18020

Titel: SRON PACE TKI

Penvoerder: TNO

Partners: TNO

Roadmap: Space

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The Netherlands is well-known for the definition, design and development of optical instruments for Astronomy and Earth Observation. Building on the heritage of atmosphere monitoring spectrometers like SCIAMACHY, OMI, GOME and TROPOMI, the national space industry and institutions are renowned for their vital contributions. TNO plays a crucial role in the design and manufacturing of the optical part of these spectrometers.

Since these instruments have to measure minute differences in observed spectra in order to determine the constituents of trace gases in the Earth atmosphere, the required accuracy of these instruments is extremely high. This implies that these instruments have to be calibrated at a level that is far above the standards required for spectrometers used in a more common environment.

Furthermore, the calibration should be guaranteed while the instrument is in orbit, i.e., in vacuum and harsh thermal conditions. If some part of the calibration is wrong, accuracy of the delivered instrument data will be decreased, in worst case to a degree that will render data useless. Taking into account that these instruments typically cost 100-150 million euro, launch cost not included, it is obvious that calibration campaigns of spectrometers for space are very time-consuming and costly. While required accuracy of optical space instruments increases, the calibration requirements become more and more demanding. In order to prevent an explosion of calibration time and budget, innovative, nonconventional ways of working are needed to improve efficiency, while at the same time delivering the required accuracy with a minimum of risk. This proposal tackles three issues that play a dominant role in the run time and related cost of a typical space spectrometer: i) the radiometric on-board diffuser calibration; ii) the spectral calibration; iii) concurrent calibration (optics and electronics measured independently). By using the proposed novel calibration approach on the Visible-Near Infrared-Short Wavelength Infrared (VNS) optical unit of the Multi Spectral Imager (MSI), which may be considered as a model system, we want to prove that both run time and cost can be saved, while at the same time accuracy is improved. If this approach proves to be successful, it will further strengthen the Dutch position in the field of space nstrumentation calibration.

Kosten:

Fundamenteel:	€ 62000	*Waarvan TKI-toeslag:*	€ 62000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 62000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.18600

Titel: E-ELT M1 Segment Supp Warping Harness

Penvoerder: TNO

Partners: TNO, VDL Projects BV

Roadmap: Advanced Instrumentation

Toeslagjaar: 2015*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

Research to demonstrate the compliance of the Warping Harness design for the E-ELT it is required to identify a verification approach based on direct measurement. The Support Structure must be constructed in such a way that the forces on the mirror actuation points are in the order of 40 – 80 Newton with a force variation of 0.05 % to allow the nanometer adjustments in the mirror shape.

Kosten:

Fundamenteel:	€ 842350	*Waarvan TKI-toeslag:*	€ 752350
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 90000
Totaalbegroting:	***€ 842350***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.18985

Titel: Adaptive Lighting

Penvoerder: TNO

Partners: TNO, DCD, Zumtobel, Qpark, Sense OS

Roadmap: Lighting

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Dynamic Individual Lighting (DIL) is based on the vision that lights should be turned on only when users are present, but can be off if no one is around. In addition, not the whole area needs to be lit if someone is present, only his or her direct surroundings. In other words, creating a patch of light at the user's spot: activity spot. This reduces the duration of the lights being turned (fully) on, without compromising on user performance nor on (perceived) safety and comfort. Regarding lighting outdoors, this is especially important for vulnerable road users (VRU's). Therefore, this concept is most suitable for urban areas with a mix of different types of road users (like cars, busses, bicycles and pedestrians). Indoor situations, like e.g. in offices, in which comfort and atmosphere is of importance, also benefit from this concept.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 60000
Industrieel/Toegepast:	€ 326500	*Waarvan Private cash:*	€ 25500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 91000
Totaalbegroting:	***€ 326500***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.19004

Titel: Brainwave Music

Penvoerder: TNO

Partners: TNO, Effenaar, EagleScience B.V., Nick Verstand

Roadmap: ICT

Toeslagjaar: 2017*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Nederland wordt wereldwijd gezien als koploper binnen de Dance industrie, waarin 4 miljard euro wordt verdiend via festivals en clubs. Door het enorme succes van dance events begint echter
marktverzadiging op te treden. Om de verwende bezoeker te blijven verrassen en binden, hebben organisatoren en clubs behoefte aan een nieuw soort (dance) beleving, die interacties realiseert op basis van emoties, en het publiek een essentieel onderdeel maakt van de show. Brainwave Music wil deze behoefte invullen met een technologie platform dat automatisch en continue emoties meet en doorgeeft aan een (interactieve) toepassing. Brainwave technologie heeft zich reeds bewezen in het lab door automatisch emoties te herkennen op basis van neurofysiologische sensor data bij het lezen van een boek.
In een eerste muziek experiment is tijdens Amsterdam Dance Event 2016 het Brainwave platform gebruikt om een grote ring van licht aan te sturen op basis van deze feedback uit het publiek (zie
foto rechts), maar met een eenvoudig real-time classificatie algoritme voor deze nieuwe toepassing. Nu is de tijd rijp om deze technologie uit het lab, in het veld te brengen. Dit project realiseert een proof-of-concept dat Brainwave Music in 2017 demonstreert tijdens en rondom de programmering van het poplab Effenaar en gedurende de evenementen van danceevent organisator DIT. In het verlengde van bovengenoemde ring van licht worden hiervoor vier nieuwe aansprekende concept-toepassingen op basis van het platform gebouwd, samen met kunstenaars, muzikanten en platform ontwikkelaars. TNO begeleidt de realisatie van de concepten en ontwikkelt het vereiste emotieclassificatie algoritmes. De demonstraties worden gebruikt om zowel de technische als de commerciële haalbaarheid te toetsen tijdens live (dance) events.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 135000
Industrieel/Toegepast:	*€* 270000	*Waarvan Private cash:*	*€*
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	€ 135000
Totaalbegroting:	***€ 270000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.19090

Titel: Photocurable polymers

Penvoerder: TNO

Partners: TNO, Vertex Dental, Materialize

Roadmap: Printing

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

In order to support the development of improved photopolymer systems, this project aims to gain insight into the mechanisms that currently limit the performance of the photocured materials under different use conditions and in the course of time. Therefore, characterization techniques that are most suitable to evaluate and predict product performance under relevant use conditions will be identified. It is expected that (post-)processing conditions of the AM process will affect the material properties and their influence on product performance will be investigated. Overall, the project aims to create a predictive model of the relation between processing properties and material performance.

Kosten:

Fundamenteel:	€ 177000	*Waarvan TKI-toeslag:*	€ 150000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 27000
Totaalbegroting:	***€ 177000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.19308

Titel: QuTech 2016

Penvoerder: TNO

Partners: TNO

Roadmap: Nanotechnology

Toeslagjaar: 2016*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

QuTech has the ambition to develop the first working prototype quantum computer, as well as a demonstrator quantum internet. The envisioned developments cover many TRL's, multiple disciplines, and thereby about 15 years. This will result in a different approach during the subsequent phases of the development. The first phase (2014 – 2017; Proof of Principle) will be dominated by solving the current bottlenecks to accelerate the research, and by making the transition towards the mission-based way of working. The latter includes, amongst others, a better defined goal of the project, working out the project plan, system architectural considerations, and involving third parties.

Kosten:

Fundamenteel:	€ 4375000	*Waarvan TKI-toeslag:*	€ 750000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 4375000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.19525

Titel: Assemblage cel

Penvoerder: TNO

Partners: TNO, Omron, Bronkhorst, TE Connectivity

Roadmap: Smart Industry

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

Het project zelflerende en zelfconfigurerende assemblage cel beoogt de ontwikkeling en realisatie van een zelflerende en zelfconfigurerende assemblagecel met optimale ondersteuning van en interactie met operators gericht op foutloos, flexibel en efficiënt assembleren van enkelstuks/kleine series. Een dergelijk systeem is er niet in de industrie.

Kosten:

Fundamenteel:	€ 470000	*Waarvan TKI-toeslag:*	€ 200000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 70000
Totaalbegroting:	***€ 470000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.19630

Titel: Retinal Imaging

Penvoerder: TNO

Partners: TNO, IDCP/Dinolite

Roadmap: HealthCare

Toeslagjaar: 2014*; Einddatum: 2016; Fase:* Afgerond

Omschrijving:

We will design and construct a first functional model of a small footprint non-mydriatic fundus camera. After specification of the requirements of the system, the optical design team will identify design concepts that meet the requirements including radiation safety regulations. After a trade-off analysis, the most promising concept will be optically designed in more detail, including a design tolerance analysis. Finally, a functional model will be developed and the feasibility of the concept will be evaluated on 10 healthy volunteers.

Kosten:

Fundamenteel:	€ 166100	*Waarvan TKI-toeslag:*	€ 141100
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 25000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 166100***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.19704

Titel: Parallel AFM Litho Tool

Penvoerder: TNO

Partners: TNO, Swiss Litho Ag

Roadmap: Semiconductor Equipment

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

As the semiconductor industry is approaching the 10 nm node fast, demands on nanopatterning and nanometrology technologies are becoming ever more stringent. Besides shrinking the critical dimensions even further, 3D scaling is anticipated to introduce new functionalities which make optimum use of the available space. Existing industrial metrology tools are already performing at the limit of their capabilities, lacking the reserves for upcoming smaller, 3D features.

Kosten:

Fundamenteel:	*€* 0	*Waarvan TKI-toeslag:*	€ 300000
Industrieel/Toegepast:	€ 590000	*Waarvan Private cash:*	*€* 0
Experimenteel:	*€* 0	*Waarvan Private inkind:*	€ 290000
Totaalbegroting:	***€ 590000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.20279

Titel: Digitale fabriek II

Penvoerder: TNO

Partners: TNO, MKG, Isah, KMWE, NTS, ETE Productietechniek

Roadmap: Smart Industry

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

Met het project Fieldlab Digitale Fabriek wordt binnen 3 jaar een blijvend concurrerende 'smart networked high-tech supply chain' bewerkstelligd die ook internationaal kan doorbreken door zijn efficiëntie (lagere transactiekosten) en zijn effectiviteit (minder uitval, beter produceerbare producten – 20% winst in ontwerp, productie en assemblage).

Kosten:

Fundamenteel:	€ 475000	*Waarvan TKI-toeslag:*	€ 200000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 75000
Totaalbegroting:	***€ 475000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.20520

Titel: LTR IoT in 5G

Penvoerder: TNO

Partners: TNO, KPN

Roadmap: ICT

Toeslagjaar: 2016*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

Doelstelling van het project is om innovaties op te leveren op gebied van communicatie tussen apparaten in een 5G/IoT context. Specifiek moeten deze innovaties oplossingen leveren op de gebieden van discovery, identificatie, mobiliteit en security.

Kosten:

Fundamenteel:	€ 785000	*Waarvan TKI-toeslag:*	€ 660000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 110000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 15000
Totaalbegroting:	***€ 785000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.20521

Titel: LTR Networked Virtual Reality

Penvoerder: TNO

Partners: TNO, KPN

Roadmap: ICT

Toeslagjaar: 2015*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The main objective of the research is to develop new solutions for Networked VR. These solutions will improve Networked VR by lowering delays and increasing (perceived) quality. Prototypes will be realised, showing the newly developed principles. These prototypes will be demonstrated to show that Networked VR is suitable for new applications. The prototypes will also show if and how networks need to be adapted to support Networked VR.

Kosten:

Fundamenteel:	€ 645000	*Waarvan TKI-toeslag:*	€ 545000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 645000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.21022

Titel: SDF3PF of young calves

Penvoerder: TNO

Partners: TNO, Friesland Campina, CRV Agrifirm, Agrifirm Feed BV

Roadmap: ICT

Toeslagjaar: 2015*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

The objective of this TKI proposal is: develop and establish IoT and (big) data driven applications for the support of precision feeding of young stock that is, in the context of Smart Dairy Farming (SDF), focused on a large scale, improving growth, health and welfare of young stock resulting in a better lifetime performance of dairy cows and a positive effect on the carbon- and phosphates footprint of dairy production.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 875000
Industrieel/Toegepast:	€ 1751000	*Waarvan Private cash:*	€ 651000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 225000
Totaalbegroting:	***€ 1751000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.21540

Titel: AO/DM

Penvoerder: TNO

Partners: TNO, VDL-ETG, Technolution

Roadmap: Space

Toeslagjaar: 2015*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The innovation goals are to establish a knowledge and technology basis enabling the realization of a DM for space science applications.

Kosten:

Fundamenteel:	€ 235000	*Waarvan TKI-toeslag:*	€ 200000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 35000
Totaalbegroting:	***€ 235000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.22006

Titel: Eco Twin III Econvoy

Penvoerder: TNO

Partners: TNO, DAF, NXP, Ricardo BV

Roadmap: Automotive

Toeslagjaar: 2015*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The EcoTwin III: Econvoy project has the following objectives: 1. Develop technology for robust three truck heterogeneous platooning system with an arbitrary platoon leader with a time gap of 0.3 seconds or less (or 7 m at 80 km/h) that is functionally and/or operationally safe. 2. Publicly demonstrate automated driving in a truck at Technology Readiness Level 6 (TRL).

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 2590000
Industrieel/Toegepast:	€ 3990000	*Waarvan Private cash:*	€ 565000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 835000
Totaalbegroting:	***€ 3990000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.22297

Titel: Free surface flow instabillities

Penvoerder: TNO

Partners: TNO, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: 2015*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

Improve understanding of physical phenomena in multiphase flow to develop models to be used in the development and performance enhancement in the high tech industry.

Kosten:

Fundamenteel:	€ 424000	*Waarvan TKI-toeslag:*	€ 360000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 64000
Totaalbegroting:	***€ 424000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.22438

Titel: LA AM with Ceramics

Penvoerder: TNO

Partners: TNO, Oce, ASML, Admatec, Xycarb

Roadmap: Smart Industry

Toeslagjaar: 2014*; Einddatum: 2017; Fase:* Conform planning

Omschrijving:

Advanced ceramic additive manufacturing is seen as a promising enabling manufacturing technology to address these challenges, with free-form design of lightweight parts. Advanced Ceramics exhibit superior hardness, toughness, corrosion/oxidation resistance and electromagnetic properties. The Smart Industry Fieldlab MultiM3D has been initiated to bring together companies and research organizations along the advanced manufacturing value chain to accelerate the adoption of AM technology for identified and relevant applications and use cases. This project serves as a preparation for the Smart Industry Fieldlab.

Kosten:

Fundamenteel:	€ 490000	*Waarvan TKI-toeslag:*	€ 200000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 90000
Totaalbegroting:	***€ 490000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.23361

Titel: Optical Feeder Link

Penvoerder: TNO

Partners: TNO, Airbus DS GmbH

Roadmap: Space

Toeslagjaar: 2016*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

AO-based pre-correction is seen as one of the key enabling technologies for optical ground to GEO satellite communication (i.e. a optical feeder link). However currently AO-based pre-correction is only a conceptual idea. No AO systems have been developed yet that are able to perform pre-correction for optical communication purposes. This TKI project seeks to answer the following fundamental research question: "Is Adaptive Optics a suitable technology for optical beam pre-correction to mitigate the effect of atmospheric turbulence in ground-to-GEO satellite optical links?"

Kosten:

Fundamenteel:	€ 470500	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 70500
Totaalbegroting:	***€ 470500***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.23536

Titel: S5 ADSNL

Penvoerder: TNO

Partners: TNO, Airbus NL

Roadmap: Space

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

The Earth atmosphere is changing, partly due to human influences. Over the past many decades several important treaties have been signed between many governments with the
intent to ensure global air quality in the future (e.g. the Montreal protocol on the ozone layer, the Kyoto protocol on greenhouse gases). Both for monitoring global air quality and for investigating newly arising issues, spectroscopy of the Earth atmosphere from space is essential. Over the decades much knowledge on the Earth atmosphere has been gained, and models describing the various aspects have been refined. Through this new knowledge, aspects previously considered too complex to address by observations from orbit are now becoming possible. A clear trend is visible, with the focus shifting from high in the Earth atmosphere (stratosphere, where the ozone layer is) and coarse spatial resolution of typically hundreds of km, to lower in the atmosphere (troposphere and boundary layer) and a few km resolution, towards the air that we breathe at ground level.
The shift of focus in particular from regional scale (hundreds of km) to city scale (a few km) will no doubt continue towards even smaller scales to identify individual sources of air
pollution and greenhouse gases (e.g. factories or roads).
With this shift in focus the desire to monitor globally on a daily basis remains, and even more frequent sampling in time is desired to discern the diurnal cycle of air quality. Combined, these trends require vastly improved amounts of data. This pushes the boundaries of amongst others the instruments collecting the data. Where earlier satellites could observe a single ground pixel (of a few hundred km squared), today's instruments collect the light from typically hundreds of ground pixels over a swath on the Earth of typically 2500 km wide (at ten km squared ground pixels).
Earth observation instruments are used to observe the Earth's atmosphere and to monitor air quality. By using passive spectroscopy, instruments are able to determine the composition of the atmosphere, i.e. what trace gases such as O3, NO, HCHO and SO2 are present. Successive generations earth observation instruments have improved upon the previously achieved sensitivity and spatial resolutions, and by doing so, increasing the accuracy of measurements that give insight in the distribution of polluting and climate gases within the earth's atmosphere. The next generation of earth observation instruments aim to further improve the spatial resolution of by at least a factor 6 over the whole.

Kosten:

Fundamenteel:	€ 1400000	*Waarvan TKI-toeslag:*	€ 1200000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 200000
Totaalbegroting:	***€ 1400000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.23646

Titel: Fine Steering Mirrors

Penvoerder: TNO

Partners: TNO, Focal BV

Roadmap: Space

Toeslagjaar: 2016*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

The FSM is a key technology to enable laser communications over tens of thousands kilometres between satellites. However, the current state of the art in Fine Steering Mirrors does not meet the requirements needed for this challenging application. Therefore, the major technical issue to be addressed in this TKI is formulated as: “Is it possible to overcome the classical trade-off between bandwidth and positioning range in active tilting devices using novel opto-mechatronic concepts and methods?”

Kosten:

Fundamenteel:	€ 470500	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 70500
Totaalbegroting:	***€ 470500***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.23650

Titel: LIBS for Horticulture Freshteq

Penvoerder: TNO

Partners: TNO, Hobré Instruments, Priva, Demokwekerij, Inno-Agro, Van der Knaap

Roadmap: Smart Industry

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:
In zeer veel productieprocessen speelt proces- en afvalwater een belangrijke rol zoals in de chemische, maak-, staal-, semicon- en voedingsindustrie. Productieprocessen vinden vaak nog plaats
op basis van relatief eenvoudige open loop sturing. Door het ontbreken van betrouwbare in-line procesdata is het niet goed mogelijk om modellen te verfijnen en gebruik te maken van gesloten
control loops. In-line productieprocesdata gebaseerd op sensor systemen is van belang voor het verbeteren van robuustheid, kwaliteit en efficiency van productieprocessen. Daarnaast spelen
emissies in water een steeds grotere rol, waarbij gedacht moet worden aan sporenelementen van zware metalen, stikstofhoudende en fosforhoudende componenten.
TNO heeft de laatste jaren veel kennis opgebouwd in het niet-invasief optisch meten van ionen en moleculen in vloeistoffen met Raman en Laser Induced Breakdown Spectroscopie. Dit beperkte zich tot nu toe tot heldere vloeistoffen met een beperkt aantal componenten. Proceswater betreft daarentegen in veel gevallen een complexe en troebele matrix. Tuinbouwwater is goed voorbeeld
van een dergelijke complexe matrix. De kennis die hierin wordt opgedaan kan worden gebruikt in proceswater in veel industriële toepassingen.
Nederland heeft een unieke positie in glastuinbouw en deze sector kent wereldwijde faam.
Nederland loopt voorop op het gebied van hoogwaardige productie alsook op innovatieve productiemiddelen voor de tuinbouwsector. De sector heeft de drive om steeds efficiëntere en
kwalitatievere productie te bewerkstelligen en emissies in het milieu te reduceren. Tuinbouwwater wordt gemeten middels wekelijkse monsters in een laboratorium. Het kleine aantal
datapunten en de informatiedelay stellen de tuinder niet in staat directe in te kunnen grijpen waar nodig. Het met hoge frequentie, in-line meten van het nutriëntenverbruik van planten maakt het
mogelijk om waardes direct bij te sturen en daarmee de kwaliteit van het product en de betrouwbaarheid en efficiency van de productie te vergroten en bij kleinere emissies.
Betrokken industriële partners Hobré Instruments ontwikkelt, produceert, levert en ondersteunt wereldwijd continue meetinstrumenten voor onder andere de olie- en gasindustrie, chemische industrie, voedingsmiddelenindustrie en de staalsector.
Priva levert meet en regelsystemen op het gebied van klimaat, water, energie, arbeid en productie. Het bedrijf staat bekend om haar totaaloplossingen waarin alle processen en systemen in bedrijven worden gekoppeld met als doel een betrouwbare en efficiënte productie.
In samenwerking met de industriële partners en de betrokken eindgebruikers zal in dit project de
haalbaarheid van meten in complex proceswater worden geanalyseerd.
Fit met HTSM roadmap Smart Industry
Dit TKI project past binnen de HTSM roadmap en sluit aan bij de doelstellingen van het Fieldlab Freshteq dat momenteel wordt opgericht. Freshteq streeft ondermeer naar efficiëntere, kwalitatievere en duurzamere productie en distributie.

Kosten:

Fundamenteel:	€ 149800	*Experimenteel:*	€ 0
Industrieel/Toegepast:	€ 0	***Totaalbegroting:***	***€ 149800***

Waarvan TKI-toeslag:	€ 120000	*Waarvan Private inkind:*	*€* 11800
Waarvan Private cash:	*€* 18000	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.23897

Titel: Flexible Manufacturing Robotics (SI)

Penvoerder: TNO

Partners: TNO, Van Lierop, De Cromvoirtse, Fokker Landing Gear

Roadmap: Smart Industry

Toeslagjaar: 2014*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Manufacturing industry in Western Europe faces serious challenges to stay competitive against low wages countries. Smart Industries initiatives are being developed to support and secure a healthy future for high tech manufacturing and assembly companies. [ref: Actieagenda Smart Industry]. Particularly for High Complexity, High Mix, Low Volume manufacturing and assembly there seems to be good potential, but innovations are necessary to make this happen. Manufacturing and assembly automation are often mentioned as the way to go, but to implement
this for small series in an economically feasible way, poses a great technological challenge. Zero defect but also fast switching between products in a manufacturing or assembly line is an important ambition, which is indicated as 'flexible manufacturing'.
At the logistic front-end of industrial manufacturing already a lot of automation has been achieved, for example in laser cutting of sheet metal. At De Cromvoirtse, a good example is found, where
directly from CAD model data an appropriate metal sheet is taken from stock, and placed in the laser cutting machine. Programming of the laser cutting actions is done without operator input or
intervention, and parts being cut out are automatically taken out and placed on a transport carriage. The next manufacturing step is plate bending ('kanten') where operators are involved to place metal sheets in the bending press (in Dutch 'kantbank') according to work instructions. Full automation of this manual labor is not required on the short term, but robot assistance is desired to avoid additional workers to be called for assistance when large or heavy parts have to be handled that cannot be dealt with by a single person.
At Van Lierop, robotized laser welding is available for the manufacturing of, mostly complex, frames. However, to provide the robot with the right motion trajectories to realize required welds accurately enough, it takes a lot of operator assistance. Because of timing and cost reasons, it is desired to reduce this as much as possible, or (even better) fully automate the robot assisted laser welding of such frames.
Similar challenges are found at Fokker Landing Gear, where tube parts have to be mounted and sealed to other composite parts. There is a need to automate this with a robot system to achieve
tighter tolerances than possible by hand, and avoid un-ergonomic postures for workers while applying the seam. In cutting parts from composite sheets from rolls, the obvious target is to
minimize the cutting loss by clever orientation of segments to be cut out, leaving the least of area in between. Prior knowledge of the useable areas on the composite sheet or roll has to be taken into account, adding another boundary condition to this optimization problem.
In view of the need for flexible manufacturing innovations, these three cases motivate the research
into Robot Assisted Manufacturing, which is the title of this TKI project. Challenges are dominated by the complex actions between a robot manipulator, handling of a workpiece or partial assembly, and

---

Kosten:

Fundamenteel:	€ 470000	*Waarvan TKI-toeslag:*	€ 100000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 70000
Totaalbegroting:	***€ 470000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.24700

Titel: DISAC (Cross-over)

Penvoerder: TNO

Partners: TNO, ZLTO, ZuivelNL, Eurofins Agro B.V., John Deere Fabriek Horst B.V., Yara Benelux B.V., Barenbrug Holland B.V., Anteryon B.V., Vavi, Tolsma Techniek Emmeloord, Eijkelkamp Soil & Water, VAA ICT Consultancy, BioDAC, KPN B.V., KverneLand, NAO, NEO B.V., Aerovision, Agrifirm, Diversen,

Roadmap: Smart Industry

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

De aanleiding voor dit onderzoeksprogramma is de verwachting dat data-intensieve sturing van grondgebonden teelt, bewaring en verwerking van aardappelen, granen en ruwvoeders aanzienlijk zal bijdragen aan verduurzaming van agrifood ketens, en de verwachting van ketenpartijen dat er door een gecoördineerde cross over R&D aanpak op sensoren, data analytics en IT sneller en beter beschikbaar komen voor gebruik in de landbouw.

In 2016 is er diverse malen overleg gevoerd tussen akkerbouw- en zuivelketenpartijen om nut en focus van het programma te bespreken (zie bijlage 7). Uit die overleggen zijn 3 use(r) cases geprioriteerd met voldoende financiële ondersteuning om te starten in 2016. Twee andere use cases staan 'in de wacht' tot er voldoende financiële ondersteuning is. Vanuit TUE is een generiek project voorgesteld gericht op wensen m.b.t. data-infrastructuren. De 3 uitgewerkte use cases hebben betrekking op verbetering en inzichtelijk maken van processen voor productie, opslag en verwerking van ruwvoer en aardappelen, op veilige en robuuste data communicatie tussen stand alone sensoren, data analytics software, landbouwmachines, en internet data platforms. In de use cases wordt kennis ontwikkeld om van data uit innovatieve sensoren voor het meten van bodem- en gewasdata die informatie geven over nutriënten, relevante omgevingsfactoren, inhoudsstoffen en kwaliteit, om te zetten in concrete beslissingsadviezen voor mens, koe en machine. De data dienen zoveel mogelijk real time, plaats- en object-specifiek te zijn om maatwerk in beslissingsondersteuning aan te kunnen.

Bij deze publiek private samenwerking zijn 20 bedrijven en consortia betrokken uit de agrifood sector en HTSM sector, en 4 kennisinstellingen (WR (voorheen DLO), TNO, NLR en TUE). De sensorontwikkeling is use case specifiek, de benodigde IT oplossingen zullen zo veel mogelijk generiek zijn. De kennisinstellingen leveren kennis en basisprincipes waarmee de deelnemende toeleverende bedrijven hun producten kunnen ontwikkelen en toetsen. Met deze producten (nieuwe sensoren en adviesdiensten) kunnen ze nationaal en internationaal nieuwe diensten leveren.

Dit programma draagt bij aan de volgende doelstellingen die Nederland heeft: (1) verduurzaming van landbouw-productiesystemen, (2) vermindering energieverbruik en inzet van agrochemicaliën in de land- en tuinbouw, (3) meer voedselzekerheid en –veiligheid en transparantere ketens, (4) minder milieubelasting en gezondere bodems, en (5) nieuwe business mogelijkheden. In Figuur 1 staat weergegeven welke HT2FtW High Tech onderdelen en ketentoepassingen gewerkt wordt (zwart gestippelde vierkanten, en waaruit de eerste applicaties en capabilities verwacht mogen worden.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 500000
Industrieel/Toegepast:	€ 1027200	*Waarvan Private cash:*	€ 199000
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	€ 328200
Totaalbegroting:	***€ 1027200***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.25091

Titel: E-Miracle, Atomic Layer Processing

Penvoerder: TNO

Partners: TNO, Carl Zeiss

Roadmap: Semiconductor Equipment

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

To protect EUV multilayer mirrors against degradation by and contamination from the aggressive EUVenvironment, this project aims to explore the feasibility of spatial Atomic Layer Processing for thecreation of pinhole-free ultrathin protection layers (order ~1-2 nm) primarily based on contaminatingelements, and the cleaning and redistribution of these layers, thus restoring the mirror performance.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 300000
Industrieel/Toegepast:	€ 600000	*Waarvan Private cash:*	€ 240000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 60000
Totaalbegroting:	***€ 600000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.25660

Titel: Multi Party Computation

Penvoerder: TNO

Partners: TNO, Philips Electronics Nederland B.V., Centrum Wiskunde en Informatica, University of Amsterdam

Roadmap: Security

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

In (Secure) Multi-Party Computation (MPC) a number of participants in a protocol wish to jointly evaluate a function of their respective input data, without exposing their input data to the other parties. In the Netherlands a significant academic knowledge base in the field of MPC is present, and MPC has thus reached a level of maturity that enables more practical forms of research in which industrial parties can play an important role.

However, MPC is not an off-the-shelf technology. While in theory MPC protocols exist to solve any computational problem securely, in practice this is often not feasible. Many MPC protocols come at a high cost of computational efficiency or of communication requirements. For each application domain, it is therefore a challenging research question whether feasible solutions exist, and how they can be implemented.

Two problems in the medical domain were identified for which MPC techniques can be very relevant:

1. Clinical Decision Support + Workflows: if medical data from different sources are combined, a more efficient route of patients and equipment through medical institutions can
be determined, possibly saving lives. The privacy of the patient data, however, has to be guaranteed.
2. Drug-to-drug interaction: medical institutions have the need to get a greater knowledge of possible detrimental results when different drugs are combined. At the same time, medical
details of patients taking the combination of drugs are to remain private.

The long-term goal of this research project is to enable the evaluation of challenging and powerful algorithms within these use-cases securely. It is still an open question, however, how far we can push the MPC technology towards practical applicability in these use cases.

In particular this project aims to provide solutions for these use cases by:

- designing new MPC solutions,
- gaining insight in the maximum complexity of problems that can be solved with MPC solutions,
- improving on state of the art protocols,
- building a proof-of-principle demonstrator showing the practical applicability of the solutions.

This project will function as a stepping stone in creating a crypto infrastructure or ‘crypto backbone’ in the Netherlands.

This project is a joint initiative of TNO and Centrum Wiskunde & Informatica (CWI, the national research institute for mathematics and computer science in the Netherlands). Furthermore this project will be conducted with the following partners: Philips and the Computational Science Lab of the University of Amsterdam (UvA).

The planned duration of the project is one year; the intended budget is k€ 319.

Kosten:

Fundamenteel:	€ 319000	*Waarvan TKI-toeslag:*	€ 250000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 69000
Totaalbegroting:	***€ 319000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.26012

Titel: Quantitative Molecular Retinal Imaging

Penvoerder: TNO

Partners: TNO, Het Oogziekenhuis Rotterdam, Boston Scientific

Roadmap: HealthCare

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

TNO considers retinal imaging as a promising methodology for diagnostics of more than just eye diseases. By looking into the eye and imaging the retina, we have direct visual access to both the
vascular and nervous systems. This enables improved diagnosis of not only eye diseases such as diabetic retinopathy, age-related macular degeneration and glaucoma, but also of cardiovascular,
neurodegenerative (Alzheimer, Parkinson) and potentially other systemic diseases. At TNO we are convinced that the next step in retinal imaging will be to quantify the scattering, absorption and
fluorescence properties of the retina. This will allow us to extract information about tissue structure, vascular state and biochemical composition of the retina from fundus images. Therefore, in this TKI project we will investigate the feasibility of developing a retinal imaging device capable of quantifying the optical properties of the retina.
The technology we aim to develop will yield quantitative maps of scattering (related to tissue structure), absorption (related to the absolute concentrations of absorbing molecules such as oxyand
deoxyhemoglobin, carotenoids) and fluorescence (related to the absolute concentrations of fluorescent molecules such as lipofuscin, curcumin and targeted contrast agents). The combination
of structural, functional and molecular imaging will enable early disease diagnosis, monitoring of disease progression, and longitudinal clinical treatment efficacy research.
Key aspects of the technology that will be developed include:

- Innovative concept for multi-spectral reflectance and fluorescence fundus imaging.
- Tissue-optics modeling to quantify scattering, absorption and fluorescent properties.

In this project we will investigate what accuracy can be achieved in recovering the absorption and scattering properties of the retina, using the innovative concept for illumination and imaging in the challenging environment of the eye. The geometrical restrictions imposed by the eye/pupil as well as the radiation safety regulations for eye exposure can provide fundamental limitations to the accuracy that can be achieved. Tissue optics modeling based on numerical solutions of the radiative transfer equation using Monte Carlo simulations will be used to assess the achievable accuracy of the novel illumination and imaging concept. An experimental system will be designed and developed to validate the numerical results. The experimental performance of the technology will be evaluated on an artificial eye with artificial retinas spanning a range of well-controlled optical properties relevant for retinal tissue.
The project will result in:

- An algorithm for absolute determination of optical property maps from retinal images collected with the innovative fundus camera based on tissue optics modeling.
- Numerical assessment of the accuracy and resolution of the measured retinal optical property maps.
- An optical illumination and imaging design for the quantitative retinal imaging system.
- An optical setup of the above mentioned optical design.
- An artificial eye featuring artificial retinas with relevant scattering and absorption properties.
- Experimental assessment of the accuracy and resolution of the measured optical property maps using artificial eye and retinas.

Kosten:

Fundamenteel:	€ 510000	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 95000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 15000
Totaalbegroting:	***€ 510000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.26419

Titel: QuTech 2017

Penvoerder: TNO

Partners: TNO

Roadmap: Nanotechnology

Toeslagjaar: 2017*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

QuTech has the ambition to develop the first working prototype quantum computer, as well as a demonstrator.

Kosten:

Fundamenteel:	€ 4750000	*Waarvan TKI-toeslag:*	€ 1000000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 4750000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.26490

Titel: More ALD (A)

Penvoerder: TNO

Partners: TNO, Meyer Burger (Netherlands) B.V.

Roadmap: Solar

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Smart system architecture based on multiple use of (mm gap) air bearing principles enables up to 100x faster spatial atomic layer deposition at low cost for solar, display, and battery production, and has generated great commercial interest for upscaling towards large size rigid (glass) and flexible production. Current state of the art models for the design of such systems treat gas earing/curtain flows separately from process gas and -temperature. However, this approach does not suffice to design up scaled versions that meet the technical specifications for large substrate areas, and to simultaneously enable economically viable CAPEX and OPEX. It is therefore required that process- and air bearing design are integrated into a single model.

Goal of the project is to extend and experimentally validate the existing computational design model towards high temperature and reactive process conditions.

To achieve this goal, it will be explored which reactive process parameters are relevant to the flow model, and for these relevant process parameters kinetic input data will be experimentally obtained.

The fundamental challenge is to leave the secure path of equipment design based on separate optimisation of air bearing functionality, and to include process related functionalities in order to reach the desired equipment- and process specifications at a reduced cost.

Result will be a validated model for gas bearing and reactive flow design and optimisation, for improved control and stability in upscaling of reactive process equipment. Also, specific process input parameters will be obtained for (atmospheric plasma enhanced) large area ALD of aluminium- and zinc oxide based layers on rigid (glass) substrates.

Kosten:

Fundamenteel:	€ 480000	*Waarvan TKI-toeslag:*	€ 400000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 80000
Totaalbegroting:	***€ 480000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.27350

Titel: Future High Effici Heavy-Duty Engine

Penvoerder: TNO

Partners: TNO, DAF

Roadmap: Automotive

Toeslagjaar: 2017*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

This project aims to research which (diesel-)natural gas (dual fuel) combustion concepts, in combination with optimal aftertreatment hardware developed for the use of natural gas (NG),will deliver the highest greenhouse gas (GHG) reduction, the highest use of NG and a direction for the lowest total cost of ownership (TCO) while complying with current and future heavy-dutytruck engine emission legislation and regulation for: Euro VI (NOx and CH4), USA EPA23 (NOx), and GHG-2 (CO2) including the incentive to meet the Paris Agreements for significant loweringthe CO2 emissions by 2050.This research will be conducted by performing experimental measurements, modeling, and simulation. Validation of TNO's engine and aftertreatment models will enable using them forshowing the potential of CH4 reduction of lean burn dual fuel concepts. For TNO, this is an important milestone in the research on low temperature and high efficient RCCI combustion andits required hardware and control solutions.

Kosten:

Fundamenteel:	€ 763000	*Waarvan TKI-toeslag:*	€ 798000
Industrieel/Toegepast:	€ 300000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 265000
Totaalbegroting:	***€ 1063000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.27420

Titel: ECiDA

Penvoerder: TNO

Partners: TNO, Vitens N.V., Anchormen

Roadmap: ICT

Toeslagjaar: 2017*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

The objective of this TKI proposal is to introduce applicable generic methodology for dealing with runtime changes in industrial strength fast and flexible (big) data analysis. As the Internet of Things (IoT) is stimulating both the amount and the evolution of data size and types, ICT platforms need to become more agile in analyzing different and unknown types of changing data. As society depends more and more on the outcome of (big) data analysis as a part of the whole digitalization and servitization trend, the supporting ICT platforms need to become more available. More adaptiveness to newly coming requirements, environmental changes and new models is needed.
New generic methodology for runtime changes of data sources, data analysis and parameters will provide this support for more agility and more availability, while respecting dynamic environmental requirements. The ECiDA project– an NWO proposal from RuG, CWI, TNO, Vitens and Anchormen – will provide a fundamental research and use case used in this TKI project for design and prototyping of tooling that uses runtime changes technology. This particular use case involves large scale analysis of water quality related data directed at improving predictions in real time, thus enabling a significantly better control of water quality in an environment with dynamics in water demand an differences in the water usage purpose. The data is coming from both historical as well as real-time continuous Internet of Things (IoT) sensor sources, e.g. located in water pipeline networks. This use case will not constrict the application of the developed runtime-change technology to the water distribution domain. During prototyping generic methodology will be separated from specific application in tooling. This enables other data driven analysis solutions to benefit from the application of the generic runtime-change technology for dealing with external changes, e.g. other environmental conditions, new production line in smart industry, customization of products, etc.

Kosten:

Fundamenteel:	€ 100000	*Waarvan TKI-toeslag:*	€ 140000
Industrieel/Toegepast:	€ 100000	*Waarvan Private cash:*	€ 30000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 30000
Totaalbegroting:	***€ 200000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.27518

Titel: Techruption Blockchain

Penvoerder: TNO

Partners: TNO, Campus Heerlen

Roadmap: ICT

Toeslagjaar: 2016*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

The Techruption Blockchain R&D Project forms the research component of the overall Techruption Blockchain Program1 being undertaken by the Brightlands Smart Services Campus. This project will focus on a number of key research questions which will contribute to the fundamental research concerning blockchain technology as well as responding to needs of the commercial participants in the Techruption program. The research focus will be on six key areas as follows: blockchains and business, looking at the design and validation of blockchain focussed business models; identities and access management, looking at how to provide assurances that digital identities refer to the same physical identity; smart contracts, focussing on how robust smart contracts can be built which will interact effectively with the legal system; performance and scalability, looking at how to overcome current scalability problem in view of business requirements and constraints; interoperability and standards, looking at how standards can enable interoperability between different blockchains and with existing legacy systems; blockchains and society, focussing on how blockchain technologies will fit into societal and legal constraints, and the wider economy. The research results of this project will include white papers, academic articles, code contributions to a number of open source projects and contributions to standardization. The research output is guided by and directly applied to Techruption Blockchain use cases being developed in between Techruption participants (ideation, proof-of-concept development). Research outputs are considerably amplified to the wider business and educational community via Techruption educational sessions (guest lectures, workshops). The program will also connect to blockchain startups being incubated by Brightlands Innovation Factory and beyond. Techruption will actively seek to act as a practical field lab within the future national blockchain R&D and educational infrastructure being created by BC32.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 860000
Industrieel/Toegepast:	€ 1720000	*Waarvan Private cash:*	€ 700000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 160000
Totaalbegroting:	***€ 1720000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.27669

Titel: Switchables pigments

Penvoerder: TNO

Partners: TNO, Akzo Nobel

Roadmap: Hightech materials

Toeslagjaar: 2016*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Our longer term aim is to develop a coating consisting of a thermally adaptive near infrared (NIR) pigment that self-switches (thermally) the absorption of NIR radiation of the sun. The main application is in the built environment, but other application domains are foreseen, namely cars (Tesla's), containers etc. To achieve cooling in summer and heating of the building in winter, by respectively harvesting or reflecting solar radiation depending on the surface temperature of the building. Obviously, a façade has an aesthetic function as well, and thermo-chromic switching properties in the visible spectrum (e.g. from white to black (or color)) would be unwanted. Consequently, this would hamper market acceptance and introduction of the developed product. To achieve our aim we need to develop fundamental understanding of coatings that switch only in the invisible part of the spectrum (NIR), which allows efficient thermal regulation and does not negatively impact the aesthetics. In this project it is foreseen that the proof-of-principle of thermal switching of NIR radiation in coatings will be delivered.

Kosten:

Fundamenteel:	€ 310000	*Waarvan TKI-toeslag:*	€ 250000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 30000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 30000
Totaalbegroting:	***€ 310000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.28412

Titel: Accuracy Improvement

Penvoerder: TNO

Partners: TNO, Airbus NL

Roadmap: Space

Toeslagjaar: 2017*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Earth Observation (EO) instruments are used to observe the Earth's atmosphere and to monitor airquality. These instruments use passive spectroscopy to determine the composition of theatmosphere, i.e. the concentration at which trace gases such as O3, NOx, HCHO, CO2, CH4 and SO2 arepresent. Successive generations of EO instruments have improved upon previously achievedsensitivity and spatial resolution, and by doing so, have increased the accuracy of measurements ofthe distribution of polluting and climate gases within the earth's atmosphere. The next generation ofEO instruments aims to further improve the spatial resolution by at least a factor 6 over the wholespectral range. This improvement will allow end users to identify localised individual emissionsources (such as a very large container ship) with increased accuracy.The increase in required performance of the final instrument directly translates into tightenedtolerances on the individual optical components (mirrors, gratings, lenses etc.) and on the optomechanicalstructure that supports these components. This TKI proposal seeks to push the limits ofopto-mechatronic design and technology in order to bring achievable performance inline with thechallenging specifications required for next-generation EO instruments.The specific example of the Sentinel-5 UV1 spectrometer makes a perfect first case study and proofof-principle for the new approach. No single factor limits the performance of an EO instrument,instead the influence of numerous optical, thermal and mechanical effects combine to degrade thefinal performance of the instrument below its theoretical optimum. In this TKI research projectproposal, we focus on the following effects which represent the largest hindrance to achievingoptimum performance:1. Out-of-band straylight suppression by combining optical and mechanical analysis and design2. Mitigating the effect of measurement errors on performance validation and componentalignment3. Improvement of dimensional stability of optical components during shock loads4. Optimization of system performance by coupling thermal, mechanical and optical analysisThe expected results of this TKI research project should support not only the assembly, alignmentand validation of the UV1 spectrometer but also the TSBOA telescopes of Sentinel-5. They would beinstrumental in establishing methodologies which can be exploited in future instrumentdevelopments. It is applicable to general instrument development trends where requiredperformance is beyond the current state of the art.

Kosten:

Fundamenteel:	€ 1460000	*Waarvan TKI-toeslag:*	€ 1225000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 235000
Totaalbegroting:	***€ 1460000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.28469

Titel: Beveiliging watermanagement naar een hoger peil met IoT

Penvoerder: TNO

Partners: TNO, KPN B.V., Kuipers Electronic Engineering B.V. (TMX), Applied Risk BV, Waterschap Hunze en Aa's, Waterschap Aa en Maas, Waterschap Brabantse Delta, Croon Wolter & Dros B.V.

Roadmap: Security

Toeslagjaar: 2016*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Internet of Things (IoT), letterlijk vertaald het Internet der Dingen, is een ontwikkeling waarbij een groot aantal 'dingen' via netwerken zoals het Internet verbonden zullen gaan worden. Deze
ontwikkeling creëert kansen; "IoT kan zorgen voor een toekomst waarin alles om ons heen wordt gemeten c.q. aangestuurd en wordt verwerkt tot nieuwe toepassingen die zo handig zijn dat we na verloop van tijd niet meer zonder kunnen", en bedreigingen; "de inzet van IT in het algemeen en met IoT in het bijzonder kunnen cyber security en privacy risico's ontstaan die tot schade (kosten) leiden".
TNO, de waterschappen Hunze en Aa, Brabantse Delta, en Aa en Maas, TMX, Croonwolter&dros, Applied Risk en KPN hebben daartoe dit onderzoeksproject opgesteld. Het doel van het project is om te onderzoeken en vast te stellen of de nieuwe LoRaWAN IoT netwerktechnologie geschikt is om te worden gebruikt in een nieuwe generatie watertoepassingen voor het beheren van het grondoppervlaktewater. Het lange-termijn doel is uiteindelijk de adoptie van veilige protocollen en implementaties in de kritieke infrastructuur van de waterschappen zodat SCADA en andere ICS protocollen kunnen worden afgebouwd en uitgefaseerd.
De bij het project betrokken partners bestrijken gezamenlijk de benodigde kennis en kunde, producten en diensten die benodigd zijn om een end-to-end watermanagement keten te kunnen
realiseren en beoordelen De volgende keuzes zijn gemaakt om het project de juiste richting op te kunnen sturen:

- De projectdoelstelling wordt ingekaderd tot alleen LoRaWAN omdat we niet drie nieuwe IoT netwerktechnologieën tegelijk kunnen onderzoeken en uitproberen.
- Daarnaast is gekozen om het project te richten op cyber security en specifiek in te kaderen tot alleen de end-to-end beveiliging van in-transit data in LoRaWAN.
- Tot slot is gekozen om het onderzoek uit te voeren aan de hand van zowel een lab-opstelling als een veldopstelling waarin verschillende functionele- en cyber security test scenario's
worden bedacht, ontwikkeld en uitgeprobeerd.

Gedurende 18 maanden zal door de partners gezamenlijk gewerkt worden aan het vinden van antwoorden op onderstaande hoofonderzoeksvragen;

- Voldoet LoRaWAN aan de minimale set van eisen om überhaupt te kunnen worden gebruikt in een nieuwe generatie van watertoepassingen?
- Is het mogelijk om op een reproduceerbare manier aannemelijk te maken dat LoRaWAN veilig dan wel niet veilig genoeg is om op termijn te kunnen worden geadopteerd door de
waterschappen in een nieuwe generatie van veilige watertoepassingen?

De projectresultaten bestaan uit de gedocumenteerde en gerealiseerde testopstellingen bij de HSD bij het waterschap, alsmede een eindrapportage betreffende de requirements analyse,
dreigingsanalyse, aanvalsscenario's, testresultaten en conclusies en aanbevelingen.

Kosten:

Fundamenteel:	*€ 0*	*Waarvan TKI-toeslag:*	€ 180800
Industrieel/Toegepast:	€ 361600	*Waarvan Private cash:*	€ 30000
Experimenteel:	*€ 0*	*Waarvan Private inkind:*	€ 150800
Totaalbegroting:	***€ 361600***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.29280

Titel: Assembly of PV modules

Penvoerder: TNO

Partners: TNO, Kameleon Solar B.V

Roadmap: Solar

Toeslagjaar: 2017*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

For the ubiquitous application of photovoltaics (PV), integration of PV as a functionality in a product is needed. This most likely implies the use of flexible semi-fabricates that are light weight, deformable, and compatible with existing manufacturing methods.
The goal of the project is to show the feasibility to make freeform (double curved) solar panels based on flexible CIGS solar cells in semi-fabricates made with Solliance technology.
The major results of the project are:
• the demonstration of the feasibility to make semi-fabricates and integrate these in double curved modules using Solliance technology;
• the demonstration of the feasibility of back contacting of semi-fabricates on deformable back sheet and the integration in modules;
• the feasibility of using modelling to predict optimal semi-fabricate and module architectures.
The validation is done using standard measurement and reliability testing methods.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 300000
Industrieel/Toegepast:	€ 600000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 300000
Totaalbegroting:	***€ 600000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.29402

Titel: ASML Plasma Mat Interaction

Penvoerder: TNO

Partners: TNO, ASML Netherlands BV

Roadmap: Semiconductor Equipment

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

This project will be executed between ASML and TNO and will focus on experimental research aimed at understanding EUVinduced plasma's and their interaction with optical components and construction materials as e.g. used in commercial EUVlithography tools. A major challenge here is to understand differences between EUV generated plasma and equivalent plasma generated by gas discharge in relation to physical and chemical interactionsof the plasma with all plasma-facing surfaces. The candidate gas discharges in this research, are high-frequency (HF) driven gas discharge and microwave discharge. It is anticipated that independent ion energy and ion flux tuning especially above 40 MHz is an advantage for various material studies and likely reproduces EUV-induced plasma conditions. Another major challenge is to minimize plasma-source induced contamination, to facilitate plasma-exposure testing on the timescale of weeks, months or even years. Specific behavior and properties in gases producing complex dissociation patterns with long afterglow times, various ion fluxes and energies is less described in plasma models and therefore requires advanced experimentation as fastest way to build a good comparison with the EUV-induced plasma case. Once the effects of the various plasma types are better understood, it will be possible to use alternative, better accessible and cheaper plasma generation methods to assist EUV optics development, selection and qualification of materials and coatings for inert construction materials, and ultimately an increase of lifetime of EUV-lithography equipment. This will ultimately be a major cost saver in development and operation of EUV lithography tooling.

For the experiments that are part of this research, advanced plasma diagnostic methods and experimental procedures need to be studied. A proof of concept for measurement methodology is desired as a result. This because of the complex timeand space-resolved ion fluxes generated in EUV and equivalent non-EUV plasmas that cannot be measured accurately with commercially available plasma diagnostics. Other diagnostics like improved RFEA or alternative measurement tooling such as high sensitivity mass-energy ion spectrometer, electron quadrupole plasma spectrometer (EQP) and metrology for neutral radicals have to be considered and experimentally verified. The current RFEAs diagnostics were developed more than 3 years ago and are used by Zeiss and ASML. Lessons learned from the use of the existing RFEA can be implemented in a more reliable and advanced RFEA version and compared with EQP at low ion energies 1-50 eV, time resolved mode 50-100 ns and ion fluxes of 1016-1020 ions/m2·s to suit needs of EUV-induced plasma measurements.

Kosten:

Fundamenteel:	€ 889727	*Waarvan TKI-toeslag:*	€ 756268
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 133459
Totaalbegroting:	***€ 889727***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.29531

Titel: CubeCAT

Penvoerder: TNO

Partners: TNO, Hyperion Technologies BV

Roadmap: Space

Toeslagjaar: 2016*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:

Communication of small satellites and CubeSat are currently completely relying on radio links in various frequency bands. Many small satellites launched until now are involved in technology
demonstration missions and only require a small amount of data to be transmitted to ground. This situation is rapidly changing. Recent developments show a strong increase in the use of small satellites for earth observation missions. The huge amounts of data gathered by these missions cannot be transmitted to earth in its full amount, due to the limited available bandwidth in the radio spectrum. Laser communication is considered a key enabler for future high data communications between satellites, UAV's and ground stations and it is expected that CubeSats will widely adopt laser communication once the technology has becomes commercial viable. It is the intention of the consortium to develop such a terminal.
This TKI research project proposal, in short TKI, seeks to:
- Perform industrial research regarding the feasibility of viable generic building blocks (Optics and control electronics) for a CubeSat terminal for a LEO <-> Ground product also known as
`CubeCat`.
- Perform fundamental research into the feasibility of an inter-CubeSat laser communication link and assess whether CubeSats are a good platform for Quantum Key Distribution.
To achieve these aims, developments in opto-mechatronic knowledge, new insights into technology and solutions are required to overcome the perceived fundamental challenges. The selling price for a terminal is a key consideration in making it commercially viable. To ensure a cost effective terminal can be realized a novel integrated optics/electronics concept is needed.
The insights to be gained in this TKI are essential for the possible development of the next generation of CubeSat Laser communication terminals in space, and this TKI can be seen as the first step towards that.
It is foreseen that after successful completion of this TKI, the main generic building blocks are available for a LEO <-> Ground link laser communication terminal product; as well as the feasibility of an inter-CubeSat link and QKD via a CubeSat have been assessed. If feasibility is demonstrated, then this TKI will be followed up by other projects to eventually industrialize the first commercially viable inter-CubeSat laser communication links and QKD CubeSat products.

Kosten:

Fundamenteel:	€ 990000	*Waarvan TKI-toeslag:*	€ 600000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 390000
Totaalbegroting:	***€ 990000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.29857

Titel: ES4ACC

Penvoerder: TNO

Partners: TNO, DAF

Roadmap: Automotive

Toeslagjaar: 2016*; Einddatum: 2017; Fase:* Afgerond

Omschrijving:

European objectives to reduce greenhouse gas (GHG) emissions for transport with 60% in 2050 require the automotive heavy-duty (HD) industry to act. Main focus is on CO2 emissions. Further improving powertrain efficiency will play a significant role. Optimization of the engine efficiency has a direct effect on CO2 emission. Simultaneously, by reducing fuel consumption total cost of owner ship (TCO) is reduced.

The project goal is to increase engine's brake thermal efficiency (BTE) by minimized fuelling inaccuracy, minimized pumping losses and enhanced power loop under varying operating conditions. In previous work (ACO24HEE), the potential CO2 reduction by implementation of advanced combustion control strategies has been researched and developed and consequently validated on an engine platform. These successfully developed strategies have resulted In steady state operation points in a BSFC reduction of 0,5% (weighted OP8 cycle). With individual points

up to 0,8% close to the overall target of 1%.

The reduction for real world cycle (Ardennen cycle) was 0,2% BSFC ,here it is considered that there is additional CO2 reduction and BTE increase potential in the applied cylinder pressure based control strategy by means of enhanced convergence speed of the Extremum-Seeking and enhanced fuel flow and ECU air mass flow estimation.

To that end, the following promising research is identified:

i) New Extremum Seeking control strategy.

ii) Accurate, real-time predictions of pumping losses, specific NOx emissions and fuel consumption based on in-cylinder pressure information.

This research will a.o. comprise of:

Research of Fuel flow estimation, PMEP, MAF estimation to improve ES accuracy and convergence speed.

Replacing ES algorithm with a new improved supervisory control strategy (Extremum Seeking, TKI-5).

Optimal CPB air-fuel path control strategy (TKI-4) capable of handling variable engine out NOx set point levels in terms of dynamic response.

The project will generate valuable research data on a multi-cylinder engine for the technical feasibility of concepts with the ability to significantly contribute to the CO2 reduction potential of current engine technology. For industry, this will lead to potential for improved performance of diesel engines, cylinder pressure sensors and reduced TCO. Additionally, this will lead to improved competitiveness in a market that will become increasingly challenging with respect to CO2 performance. Furthermore, the results of this research are important input to guide academic research on universities & applied research to concentrate on topics related to real world applications.

The TNO research group Powertrains is one of the leading players on emission management technology and has a longstanding track record in the automotive industry. TNO has special interest in the demonstration of advanced combustion and engine control concepts that have the potential to significantly reduce CO2 emissions. These concepts use information from new sensors, which provide cylinder individual conditions. Cylinder pressure-based control solutions have proven to reduce fuel consumption in conventional diesel and are believed to be a crucial enabler for advanced combustion concepts, which are very sensitive for operating conditions. This research is an important step towards demonstration of improved fuel flexibility.

Phase 1 of the project Advanced Combustion Control for High Efficient Engines (ACO24HEE), Optimization of Conventional Diesel, has been finalized in Q1-2017, where the control strategy using on-line optimal engine control (Extremum Seeking) is regarded as the most promising. Based on results of ACO24HEE, there is more BFSC reduction potential (refer to Figure 2) in the applied cylinder pressure based control strategy. Therefore this project is adopted in which the further BSFC reduction potential of on-line optimal engine control strategy will be

explored. This research effort is directly aimed at the investigation of a proof of principle towards the possibility of a further reduction of CO2 emissions and efficiency optimization of the current state-of-the-art engine.

Kosten:

Fundamenteel:	€ 596000	*Waarvan TKI-toeslag:*	€ 500000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 96000
Totaalbegroting:	***€ 596000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.31237

Titel: DID-IT

Penvoerder: TNO

Partners: TNO, Stroomt interactions BV, SYSQA B.V., Lost Lemon B.V.

Roadmap: ICT

Toeslagjaar: 2017*; Einddatum: 2018; Fase:* Conform planning

Omschrijving:
Het kabinet heeft als doelstelling dat burgers en bedrijven uiterlijk in 2017 hun zaken met de overheid digitaal moeten kunnen afhandelen. Vooral toegankelijkheid staat momenteel sterk op de agenda door een recente ratificatie van het VN-Verdrag Handicap en de inwerkingtreding van de EU-richtlijn Toegankelijkheid Overheidswebsites. Nederland is in Europa op dit gebied een voorloper. ICTontwikkelaars realiseren zich echter ook dat ze zich kunnen onderscheiden ten opzichte van hun concurrenten door met hun ICT-producten naast toegankelijkheid ook een excellente gebruikerservaring (user experience, UX) te bieden. Dit kan door gebruik te maken van bestaande doelgroepkennis, ontwerprichtlijnen en –voorbeelden en door eindgebruikers in het ontwikkelproces te betrekken (inclusive design).
ICT-ontwikkelaars geven echter aan onvoldoende kennis over inclusive design in huis te hebben. In dit project willen we deze kennislacune opvullen door de volgende kennisvraag te beantwoorden: “Hoe kan de voorsprong van Nederland op het gebied van toegankelijkheid worden uitgebreid met user experience (UX) en inclusive design voor diverse (kwetsbare) doelgroepen, en hoe kunnen daarmee nationaal en internationaal kansen worden gecreëerd voor het Nederlandse bedrijfsleven?”, met als deelvragen (1) Wat is zijn de fundamentele of basiskenniselementen die nodig zijn voor het realiseren van de noodzakelijke vernieuwing in samenhang tussen de verschillende typen partijen (ICTontwikkelaars,
eindgebruikers, overheden, …) met als doel user experience (UX) en inclusive design voor diverse (kwetsbare) doelgroepen structureel te verbeteren?, en (2) Welke nieuwe tooling op het
gebied van UX en inclusive design voor diverse (kwetsbare) doelgroepen dient dan te worden ontwikkeld? Op basis van die kennis en tooling (deels van het ministerie van BZK en TNO), ontwikkelen we in dit project de inzichten voor ICT-ontwikkelaars die aansluiten bij hun werkprocessen en die community-vorming ondersteunen, in co-creatie met de stakeholders binnen door henzelf aangedragen use cases en uitgetest met een value case en een bijbehorende toolkit. In samenwerking met BZK kan die toolkit beschikbaar worden gesteld via een website.

Kosten:

Fundamenteel:	€ 105000	*Waarvan TKI-toeslag:*	€ 130000
Industrieel/Toegepast:	€ 135000	*Waarvan Private cash:*	€ 25000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 30000
Totaalbegroting:	***€ 240000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.31313

Titel: Non disruptive liquid conditioning

Penvoerder: TNO

Partners: TNO, ASML Netherlands BV

Roadmap: Semiconductor Equipment

Toeslagjaar: 2016*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

The high tech industry is always looking to develop new innovative technologies in order to stretchfurther the performance of their equipment. In many of such cases their equipment performance islimited by physical phenomena in which the fundamentals are not fully understood.This project proposes to develop fundamental understanding of sloshing behavior in shallow bowls,liquid impinging jets characteristics in confined spaces and the flow interactions of a wall jet insignificant crossflow. These phenomena cannot be resolved purely analytical or theoretical, butexperimental verification and validation are needed to develop physical models (numerical and/orengineering) with predictive value.These phenomena are representative for many flow challenges in the high tech industry, such ascooling of high power (electronic) devices, immersion lithography or thermal conditioning of surfacesin the nuclear fusion demonstrator (ITER). Furthermore, ALD and 3D printing technologies maybenefit as well. Therefore, the models can be applied in a broad set of industrial application.

Kosten:

Fundamenteel:	€ 436000	*Waarvan TKI-toeslag:*	€ 370000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 66000
Totaalbegroting:	***€ 436000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.31486

Titel: ELUCIDATA

Penvoerder: TNO

Partners: TNO, VDL Enabling Transport Solutions, Heliox B.V.

Roadmap: Automotive

Toeslagjaar: 2017*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

This project aims to research novel methodologies for data-mining based Root-Cause Analysis (RCA) algorithms to identify scenarios or other risk factors leading to operational deviations or
potentials for risk reduction, utilizing scalable data-driven approaches (such as those avoiding NP (Nondeterministic polynomial)-hard/NP-complete problems).
The transition towards a social, mobile, analytics, and cloud (SMAC) industry, Internet of Thing (IoT) and Software as a Service means that many companies are evolving into both technology
and data driven organizations. Diagnosing the status or faults of modern systems remains a key challenge, where complex interactions of systems can mean that faults are the result of
combinations of factors, or as a causal series of events. In general these diagnostic approaches rely on Root-Cause Analysis (RCA) methods1. The overwhelming complexity of modern systems means that monitoring and diagnosing the states is often beyond the capabilities of human beings, which commonly use dashboarding or procedural problem solving methods (Figure 1). Figure 1: Ishikawa (Fishbone) Traditional Fault Diagnostic Tools Due to the need for handling complex interactions, higher degrees of automation are required, where there is a need for advanced algorithms which generate hypotheses of potential rootcauses more accurately.

Kosten:

Fundamenteel:	€ 800000	*Waarvan TKI-toeslag:*	€ 600000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 100000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 100000
Totaalbegroting:	***€ 800000***	*Waarvan overige*	*€ 0*

TKI-projecten

TNO - Projectnummer: 060.31507

Titel: BioRings: biological and ADA detection with ring resonators

Penvoerder: TNO

Partners: TNO, Scienion A.G., Sanquin Diagnostiek B.V.

Roadmap: HealthCare

Toeslagjaar: 2016*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

Binnen het BioRings project zullen TNO, Sanquin en Scienion, middels het beantwoorden van een tweetal kennisvragen, bepalen of een (in potentie point-of-care te gebruiken) snelle diagnostische test haalbaar is, waarmee simultaan concentraties biopharmaceuticals en anti-drug antibodies kunnen worden bepaald in een bloed monster. Met deze informatie kan dosering patiënt-specifiek worden aangepast, hetgeen kan resulteren in een effectievere behandeling en een reductie in het gebruik van dure medicijnen. Hierbij wordt gebruik gemaakt van de expertise van Sanquin op het gebied van assay-ontwikkeling voor biopharmaceuticals en de expertise van TNO op het gebied van optische biosensor ontwikkeling. Scienion zal kennis inbrengen op het gebied van oppervlaktefunctionalisatie van de sensoren.

Kosten:

Fundamenteel:	€ 280000	*Waarvan TKI-toeslag:*	€ 292000
Industrieel/Toegepast:	€ 108000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 96000
Totaalbegroting:	***€ 388000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI-HTSM/15/1045

Titel: Smart sensing for Aviation

Penvoerder: Technische Universiteit Delft

Partners: TUDelft, Fokker, Airbus, Schiphol

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Achter op planning

Omschrijving:

A cross-faculty team of researchers at TU Delft from Aerospace Engineering and Electrical Engineering are working on developing smart sensing for the aircraft and airports of the future. A new project, called Smart Sensing For Aviation, aims to improve the safety, security and efficiency over the life cycle of the aircraft and specifically when it is waiting to be boarded at an airport.

Interdisciplinary components

The project consists of three interdisciplinary components that focuses on developing a method for tracking and understanding passenger movements within airports, smart ways to use sensors in the manufacturing process in order to improve process efficiency and integrated structural health monitoring sensors to guide efficient maintenance and repair procedures. All project components are woven together by the common themes of distributed sensing and big data.

This project works closely with local aviation organisations and industry, including the Schiphol Group, Fokker, Airbus Defence and Space, and others.

The project is sponsored by the Ministry of Economic Affairs as a part of the “Topsectoren” policy. The research team has received TKI-funding from the top-sector High Tech Systems and Materials for the Smart Sensing For Aviation Project.

Kosten:

Fundamenteel:	€ 500000	*Waarvan TKI-toeslag:*	€ 630000
Industrieel/Toegepast:	€ 250000	*Waarvan Private cash:*	€ 120000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 750000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI-HTSM/17.1187

Titel: Imaging Quantum Materials

Penvoerder: Technische Universiteit Delft

Partners: TUDelft, Jeol

Roadmap: Nanotechnology

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* uitvoeringsfase er zijn nog geen uitgaven van het TKI budget

Omschrijving:

Project goal: Opening new avenues for the understanding of the functionalities of QMs by means of exploiting Electron Microscopy (EM) and related techniques to achieve their comprehensive atomic-scale characterization. This program requires following a two-pronged approach based on the unique combination of expertise in nanomaterials and EM imaging. The key challenges are:

• achieving improved control on the properties of QMs for optimised device applications by tailoring new materials combinations;
• building novel QM platforms based on an effective one-dimensional geometry;
• developing improved theoretical models for interpretation of the EM data.

A unique strength is the exploitation of recent developments in EM to achieve unprecedented spatial and energy resolution for imaging QMs. In turn, the characterization of engineered QMs will boost progress in improving EM capabilities.

Kosten:

Fundamenteel:	€ 1048000	*Waarvan TKI-toeslag:*	€ 548000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 500000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1048000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI-HTSM/17.1187

Titel: Design and Additive manufacturing of patient specific implants for endorpstetic reconstruction after periacetabular tumor rresection

Penvoerder: Technische Universiteit Delft

Partners: TUDelft, Implant Cast

Roadmap: HealthCare

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* uitvoeringsfase er zijn nog geen uitgaven van het TKI budget

Omschrijving:

Design and Additive manufacturing of patient specific implants for endoprostetic reconstruction after periacetabular tumor resection.

Kosten:

Fundamenteel:	€ 251000	*Waarvan TKI-toeslag:*	€ 131000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 120000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 251000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI-HTSM/17.1187

Titel: engineered functional material structures for advanced sensing in high-tech instruments

Penvoerder: Technische Universiteit Delft

Partners: TUDelft, Nexperia, Krohne Altometer

Roadmap: Smart Industry

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* uitvoeringsfase er zijn nog geen uitgaven van het TKI budget

Omschrijving:

Engineered functional material structures for advanced sensing in high-tech instruments.

Kosten:

Fundamenteel:	€ 943000	*Waarvan TKI-toeslag:*	€ 493000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 450000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 943000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI-HTSM/17.1187

Titel: behavorial detection of advanced network

Penvoerder: Technische Universiteit Delft

Partners: TUDelft, Thales

Roadmap: Security

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* uitvoeringsfase er zijn nog geen uitgaven van het TKI budget

Omschrijving:

Behavorial detection of advanced network.

Kosten:

Fundamenteel:	€ 400000	*Waarvan TKI-toeslag:*	€ 165000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 151000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 400000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI-HTSM/17.1187

Titel: domain specific languages for adapable digital print systems

Penvoerder: Technische Universiteit Delft

Partners: TUDelft, Océ

Roadmap: Embedded Systems

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* uitvoeringsfase er zijn nog geen uitgaven van het TKI budget

Omschrijving:

Domain specific languages for adapable digital print systems.

Kosten:

Fundamenteel:	€ 400000	*Waarvan TKI-toeslag:*	€ 159000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 145000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 400000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI-HTSM/17.1187

Titel: communication for airplane smart cabin

Penvoerder: Technische Universiteit Delft

Partners: TUDelft, Zodiac Aerospace

Roadmap: Components & Circuits

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* uitvoeringsfase er zijn nog geen uitgaven van het TKI budget

Omschrijving:
Communication for airplane smart cabin.

Kosten:

Fundamenteel:	€ 400000	*Waarvan TKI-toeslag:*	€ 66000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 60000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 400000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI-HTSM/17.1187

Titel: composite automation

Penvoerder: Technische Universiteit Delft

Partners: TUDelft, Fokker

Roadmap: Aeronautics

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* uitvoeringsfase er zijn nog geen uitgaven van het TKI budget

Omschrijving:
composite automation

Kosten:

Fundamenteel:	€ 838000	*Waarvan TKI-toeslag:*	€ 438000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 400000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 838000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI-HTSM/16.2041

Titel: Smart sensing from space

Penvoerder: Technische Universiteit Delft

Partners: TUDelft, ISIS, Hyperion Technologies, Airbus Defence&Space

Roadmap: Aeronautics

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* uitvoeringsfase er zijn nog geen uitgaven van het TKI budget

Omschrijving:

Smart sensing from space.

Kosten:

Fundamenteel:	€ 600000	*Waarvan TKI-toeslag:*	€ 560000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 40000
Totaalbegroting:	***€ 600000***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-ENW - Projectnummer: 628011001

Titel: SQIREL-GRAPHS

Penvoerder: CWI

Partners: CWI, Databricks, Neo4j Sweden AB, OBI4WAN BV, Spinque BV, WizeNoze BV, Radboud Universiteit Nijmegen

Roadmap: ICT

Toeslagjaar: 2016*; Einddatum: 2023; Fase:* Conform planning

Omschrijving:

In this project we study techniques to store, update and query evolving large graphs, such as social media messages disseminated and consumed by a network of users. On such continuously changing datas, we study the combination of structured queries formulated in a graph query language with information retrieval keyword queries where the ranking function takes into account the graph structure. Graph queries boil down to (recursive) join operations moving from vertex-set to vertex set over edge-relationships, which can be made efficient using indexing. Similarly, efficient information retrieval queries depend on inverted-lists to quickly find and rank occurrences of keywords. However, when the graph is continuously updated and changes its structure, classical indexing solutions become inefficient or must trade recency for efficiency. Other solutions for querying on evolving data (stream processing) trade-off expressiveness of the query language or ranking model such that it can be evaluated in a linear pass over the incoming data. However, some of the most valuable use-cases, such as emergency monitoring are hindered by these trade-offs. In this project, we aim to develop new graph query and update languages, integrated in scalable date and better scalable storage structures that allow for querying and ranking highly volatile graph data, by taking into account the properties of modern (and future) hardware, among which new persistent memory types very wide SIMD processing. The solutions will be prototyped in MonetDB, neo4j and Spark. The consortium consists of top academic researchers from query processing and IR, together with two use-case partners and two technology partners: Neo Technology, the company behind graph database neo4j, and Databricks, the company behind data science framework Spark. The use cases evaluate the our results in public security (via Dutch webcare market leader OBI4WAN) and in the creative-sector (social graph ranking by WizeNoze, and linking cultural heritage collections by Spinque).

Kosten:

Fundamenteel:	€ 891221	*Waarvan TKI-toeslag:*	€ 307318
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 142500
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 172500
Totaalbegroting:	***€ 891221***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-ENW - Projectnummer: 628011002

Titel: Dynamic Data Analytics through automatically Constructed Machine Learning Pipelines

Penvoerder: Universiteit Leiden

Partners: Universiteit Leiden, Honda Research Institute Europe GmbH (HRI-EU), Qualogy BV, TU Delft, TU Eindhoven

Roadmap: ICT

Toeslagjaar: 2016*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

This research aims at developing a platform for dynamic data analytics that is based on techniques for automatically constructing machine learning pipelines for the task at hand.

To demonstrate the approach, two complementary practical application tasks are selected: The early detection and treatment optimization for Parkinson's disease, and the cost- and environmentally optimized management of energy for private households with electric vehicles. The first case deals with videos and slow dynamics over time (analyzing the progression of the disease over a sequence of diagnostics), while the second one addresses numerical data with fast dynamics and the need for optimal decision making in real-time.

In both cases, the underlying big data analytics task makes it necessary for the data scientist to develop a pipeline of computational steps, such as data preprocessing, feature engineering, image processing, predictive modeling, and multiple objective optimization. This task also includes making decisions about dozens to hundreds of configurations and parameter choices for the components of the pipeline – which is impossible for humans to solve.

The project will develop algorithm configuration approaches for composing, configuring, and parameterizing such processing pipelines from scratch – thereby automatically generating the best solution method for the application task at hand. For decision making, multiple objective optimization will then use the resulting models to generate optimal decisions in each application, such as optimal energy management for households (e.g., cost vs. greenhouse emissions) and individually optimized (e.g. side effects vs. efficacy) treatment strategies for evolving motor diseases such as Parkinson's.

Kosten:

Fundamenteel:	€ 1046235	*Waarvan TKI-toeslag:*	€ 396925
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 160000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 142000
Totaalbegroting:	***€ 1046235***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-ENW - Projectnummer: 628011003

Titel: ECiDA: Evolutionary changes in Distributed Analysis

Penvoerder: Rijksuniversiteit Groningen

Partners: NRijksuniversiteit Groningen, Vitens N.V., Anchormen, CWI

Roadmap: ICT

Toeslagjaar: 2016*; Einddatum: 2023; Fase:* Conform planning

Omschrijving:

In the past years, the collection of data has increased significantly. Large scale data analysis requires a distributed server cluster where the data is divided among the available machines such that it can be processed in parallel, speeding up the analysis substantially. Distributed data processing platforms such as Spark have become a de-facto standard in the world of large-scale data processing. The data processing pipelines for such platforms are composed during design time and then submitted to the central “master” component who then distributes the code among several worker nodes. However, in many situations, the application is not static and evolve over time: the developers add new processing steps, data scientists adjust parameters of their algorithm and quality assurance discovers new bugs. Currently, an update of the pipeline looks as follows: the developers patch their code, re-submit the updated version, and finally restart the entire pipeline. However, restarting the processing pipeline safely is difficult: the intermediate state is lost and needs to be re-computed; some data needs to be reprocessed and, finally, the cost of restarting may not be trivial - especially for real-time streaming components that require 24x7 availability. In this project we investigate the possibility to support evolving data-intensive applications without the need for restarting them when the requirements change (e.g., new data sources or algorithms are available). We apply and evaluate the developed techniques against three different use cases coming from three top sectors: Water, Life sciences, and HTSM/Smart Industry.

Kosten:

Fundamenteel:	€ 766828	*Waarvan TKI-toeslag:*	€ 291642
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 110000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 110000
Totaalbegroting:	***€ 766828***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-ENW - Projectnummer: 628011004

Titel:
Techniques for the Analysis of Client-Team InteraCtionS (TACTICS)

Penvoerder: Vrije universiteit Amsterdam

Partners: Vrije universiteit Amsterdam, Stichting Lunet zorg, TU Eindhoven

Roadmap: ICT

Toeslagjaar: 2016*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

In various care and service settings (e.g. mental healthcare, youth care, social work), teams of professionals interact with clients to improve their well-being. The TACTICS project aims at the development of automated techniques to generate insights into the evolving statuses of such clients as well as the way how actions of care teams influence clients. The inputs for these algorithms are large sets of heterogeneous, operational data, such as team reports, sensor data, client records and emergency reports.

This project address various data handling and data analytics challenges. First of all, it will be necessary to align sets of heterogeneous and partially unstructured data. Secondly, the concept of a client status, which is non-protocolled, must be developed from this data. Thirdly, it must become feasible to automatically detect the characteristics and variations in team practices. Finally, the team practices need to be related to how client statuses develop over time, such that care organisations can transfer beneficial work practices from one team to the other.

To address these challenges, the scientific team will build on their expertise in the field of process mining, data analytics, information alignment, and business process improvement. A close collaboration with Lunet zorg, a Dutch care organization, will allow the team to use operational data and incorporate essential socio-medical expertise in their work.

The TACTICS techniques are expected to benefit various care organisations, which is a sector that is lagging behind with respect to the automatic exploration and utilization of operational data sources.

Kosten:

Fundamenteel:	€ 929549	*Waarvan TKI-toeslag:*	€ 336613
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 140000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 158400
Totaalbegroting:	***€ 929549***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-ENW - Projectnummer: 628011005

Titel: Geometric Algorithms for the Analysis and Visualization of Heterogeneous Spatio-temporal Data

Penvoerder: Technische Universiteit Eindhoven

Partners: Technische Universiteit Eindhoven, Here Global bv, FUGRO, NDW, Universiteit Utrecht

Roadmap: ICT

Toeslagjaar: 2016*; Einddatum: 2023; Fase:* Conform planning

Omschrijving:

Probe data from vehicles is one of various types of data that concerns traffic and traffic flow. The corresponding GPS-based trajectories allow various types of analyses, but especially the combination with other data like vehicle-based LiDAR or weather data opens up new possibilities in data correction, pattern detection, and visualization. Both the volume and the heterogeneity of the data poses challenges that can be addressed with an algorithmic approach.

More specifically, we will design visualizations of abstract data like traffic flow within the context of 3D city environments, to discover to what extent the 3D context can be exploited without obscuring the flow data. Such visualizations need modelling and geometric algorithms development, and should work in real-time. Furthermore, we will analyse speed patterns that arise in trajectory data in the context of road intersections, weather, visibility, land cover, and various other data sets. The focus is on modelling, efficient algorithms, provable properties and optimality of the output, and visualization of the patterns. Thirdly, we will develop a model for spatial and spatio-temporal data quality and use it to improve the quality of data sets by outlier detection, completion of missing data, and metadata provision, applied to probe and other traffic-related data. It is specifically the objective to improve data sets by using the heterogeneity of the collection of data sets.

Our foundational research is rooted in computational geometry and provides an algorithmic basis for traffic analysis, traffic visualization, and spatio-temporal data quality handling, with further applications to smart cities.

Kosten:

Fundamenteel:	*€* 843227	*Waarvan TKI-toeslag:*	€ 267321
Industrieel/Toegepast:	*€* 0	*Waarvan Private cash:*	€ 159000
Experimenteel:	*€* 0	*Waarvan Private inkind:*	€ 183000
Totaalbegroting:	***€ 843227***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer: 30975348+30975349

Titel: Next Generation Aquaporin Emedded Forward Osmosis Membranes

Penvoerder: Universiteit Twente

Partners: UT, Aquaporin

Roadmap: Nanotechnology

Toeslagjaar: 2015*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

The development of more selective and highly permeable water filtration membranes is seen as the next step in water purification. Many living organisms have specialised proteins that are capable of selectively transporting water through a membrane. These proteins are called aquaporins and serve as small water channels, which allow fast transport of only water molecules and retain all contaminants. The Danish company Aquaporin is world leader in the development of biomimetic membranes by using nature's technology in synthetic water purification membranes. Although first generation membranes can compete on the market by having high fluxes paired with extraordinary rejection, much potential has yet to be unlocked. The goal of the present project is the development of the next generation aquaporin embedded membranes together with Aquaporin.

Kosten:

Fundamenteel:	€ 820000	*Waarvan TKI-toeslag:*	€ 205000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 410000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 820000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer: 20916351+20916352+20916353+20925343+20916354

Titel: Robust Processing of Advanced Fiber Reinforced Composites

Penvoerder: Universiteit Twente

Partners: UT, TPRC

Roadmap: Aeronautics

Toeslagjaar: 2015*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

The program includes two research lines that are connected. The first line: Processing defects may occur during the manufacture of thermoplastic composite parts. Components with (severe) defects are generally scrapped, as the influence of defects on performance is unknown. This project aims to reduce scrap rate by developing tools and guidelines to (1) prevent the formation of defects and/or (2) predict the effect of defects. The second line: Prediction of the mechanical performance of compression molded long fiber reinforced thermoplastic parts requires understanding of the mold filling behavior and the resulting fiber orientation. This project aims to develop simulation tools and material models to predict the mold filling stage, while taking into account the strong coupling between material flow and fiber orientation.

Kosten:

Fundamenteel:	€ 1640000	*Waarvan TKI-toeslag:*	€ 540000
Industrieel/Toegepast:	€ 130000	*Waarvan Private cash:*	€ 820000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1770000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: Design and Construction of an Intelligens Mechatronic Product Fixture

Penvoerder: Universiteit Twente

Partners: UT, WINN+ Wouter Witzel

Roadmap: Smart Industry

Toeslagjaar: ; Einddatum: 2019; Fase: Nog niet gestart

Omschrijving:

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 70000
Industrieel/Toegepast:	€ 140000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 20000
Totaalbegroting:	***€ 140000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: Robotised micro Tunneling

Penvoerder: Universiteit Twente

Partners: UT, Royal IHC

Roadmap: Smart Industry

Toeslagjaar: 2014*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

One important part of the essential civil infrastructure is composed of pipes underground which are used for the distribution network of gas and water as well as the sewer system. The various pipes have a life time which varies form the type of material and external influence like chemical influence form soil and liquids and mechanical influence form vibrations and stresses from ground pressure or tree roots in certain cases. This implies that these pipes need to be substituted at a certain moment in time and therefore pipe infrastructure maintenance is of paramount importance and an economically sound way to do this of great value.

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 70000
Industrieel/Toegepast:	€ 140000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 20000
Totaalbegroting:	***€ 140000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer: 30952323

Titel: Packaging oil-based lubricants in confined, smart microcapsules: Design principles

Penvoerder: Universiteit Twente

Partners: UT, Shell

Roadmap: Hightech materials

Toeslagjaar: 2015*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

An essential function of lubricants is to bridge surfaces of solids that are in mechanical contact and are in a relative sliding motion from direct solid-solid touching. Pure water or other fluids that maintain a low viscosity at high pressures do not prevent this microscopic contact formation as low-viscosity fluids are squeezed out of the contact as a result of pressure gradients that arise from microscopic surface roughness. This is one reason why commercial lubricants are usually based on oils whose viscosity increases with pressure. We propose here to encapsulate oil-based lubricants in microcapsules with a variable wall thickness. The wall material must have a controllable burst-strength and under a predetermined pressure must burst-open to release the lubricant. The wall material must also have a lubricating action (smooth molecular profile). We anticipate that the encapsulation of oil results in an enhanced efficiency for lubrication, since the oil is released where the lubricating action is desired (in other words will not be pressed out of the contact area due to mechanical pressure)

Kosten:

Fundamenteel:	€ 0	*Waarvan TKI-toeslag:*	€ 65000
Industrieel/Toegepast:	€ 135000	*Waarvan Private cash:*	€ 0
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 20000
Totaalbegroting:	***€ 135000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: On-chip sexing of boar spermatozoa

Penvoerder: Universiteit Twente

Partners: UT, Mork BV

Roadmap: Nanotechnology

Toeslagjaar: ; Einddatum: 2020; Fase: Nog niet gestart

Omschrijving:

Kosten:

Fundamenteel:	€ 820000	*Waarvan TKI-toeslag:*	€ 205000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 410000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 820000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: Supporting the BALANcing act of Systems Engineers and System Architects

Penvoerder: Universiteit Twente

Partners: UT, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: ; Einddatum: 2020; Fase: Achter op planning

Omschrijving:

Kosten:

Fundamenteel:	€ 820000	*Waarvan TKI-toeslag:*	€ 205000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 410000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 820000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: Integrating Fibre optic and other sensor modalities into the asphalt construction process

Penvoerder: Universiteit Twente

Partners: UT, ASPARi

Roadmap: Embedded Systems

Toeslagjaar: ; Einddatum: 2020; Fase: Achter op planning

Omschrijving:

Kosten:

Fundamenteel:	€ 820000	*Waarvan TKI-toeslag:*	€ 205000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 410000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 820000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: Healthcare in a clean environment

Penvoerder: Universiteit Twente

Partners: UT, Asito

Roadmap: HealthCare

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Wanneer gebouwen ons zouden kunnen vertellen wat op welk moment waar nodig is voor schoonmaak en onderhoud, dan kunnen we de planning daar adaptief op aanpassen. Om een op de dag adaptieve planning te kunnen maken die optimaal capaciteit in kan zetten is het nodig een planning te maken die op hoofdlijnen de juiste capaciteit toewijst over weken, dagen en dagdelen. Dit schept het kader voor de in te roosteren medewerkers, rekening houdend met de globale hoeveelheid werk. Echter, evenzo is het nodig deze planning zo te organiseren dat deze op de dag kan worden aangepast aan actuele en vaak onvoorspelbare ontwikkelingen. Hierbij is het van belang dat de medewerkers flexibel kunnen worden ingezet, en dat aanpassingen van de planning en/of route real-time kunnen worden gemaakt en doorgegeven aan de medewerkers. Wiskundig onderzoek om deze vraag te adresseren past binnen planning rekening houdend met onzekerheid. De verwachte uitkomst van het onderzoek is een prototype planningsmethode voor optimale inzet van capaciteit, die opereert op verschillende besturingsniveaus.

Kosten:

Fundamenteel:	€ 820000	*Waarvan TKI-toeslag:*	€ 205000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 410000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 820000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: Frame-i

Penvoerder: Universiteit Twente

Partners: UT, ASML

Roadmap: Semiconductor Equipment

Toeslagjaar: ; Einddatum: 2020; Fase: Achter op planning

Omschrijving:

Kosten:

Fundamenteel:	€ 820000	*Waarvan TKI-toeslag:*	€ 205000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 410000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 820000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: VARSITIES

Penvoerder: Universiteit Twente

Partners: UT, NXP

Roadmap: Components & Circuits

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

In this project, we aim at fully (CMOS technology) integrated references that achieve very high accuracy at low power consumption, using maximally one production-time trim. This high accuracy includes insensitivity to processing spread, temperature variations and component degradation.

Kosten:

Fundamenteel:	€ 820000	*Waarvan TKI-toeslag:*	€ 205000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 410000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 820000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: Human Plus Machine competencies for a Resilient Rail Transport

Penvoerder: Universiteit Twente

Partners: UT, NedTrain/NS

Roadmap: Security

Toeslagjaar: 2016*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:

The overarching objective of this research is to develop a framework to integrate observation competencies of humans and machine to ultimately achieve a risk-free working environment and a risk-resilient rail transport.

Kosten:

Fundamenteel:	€ 820000	*Waarvan TKI-toeslag:*	€ 205000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 410000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 820000***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer: 20930350

Titel: Silent Approach

Penvoerder: Universiteit Twente

Partners: UT

Roadmap: Aeronautics

Toeslagjaar: 2016*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Advancing aircraft silent design by wind tunnel test uncertainty reduction.

Kosten:

Fundamenteel:	€ 1963240	*Waarvan TKI-toeslag:*	€ 750000
Industrieel/Toegepast:	€ 844295	*Waarvan Private cash:*	€ 380000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 1248312
Totaalbegroting:	***€ 2807535***	*Waarvan overige*	*€ 0*

TKI-projecten

UT - Projectnummer:

Titel: 3D oxide catodes for solid state thin film battery technology

Penvoerder: Universiteit Twente

Partners: UT

Roadmap: Nanotechnology

Toeslagjaar: ; Einddatum: 2021; Fase: Nog niet gestart

Omschrijving:

Exploration of novel synthesis routes for cathodic nanoparticles and depostion methods to achieve conformal 3D coated thin film cathodes with high performance.

Kosten:

Fundamenteel:	€ 325000	*Waarvan TKI-toeslag:*	€ 276000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 49000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 325000***	*Waarvan overige*	*€ 0*

TKI-projecten

FOM - Projectnummer: TKI1412P01

Titel: i33 - Nanophotonics for Solid State Lighting

Penvoerder: FOM

Partners: FOM, Philips Electronics Nederland 8.V.,

Roadmap: Nanotechnology

Toeslagjaar: projecttoeslag*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

This Industrial Partnership Programme between FOM Institute AMOLF and Philips Research aims at achieving fundamental knowledge required to develop efficient solid-state light sources. A key element is the control of light-matter interactions using resonant photonic and plasmonic nanostructures at optical frequencies. By enhancing these light-matter interactions it will be possible to reach the ultimate limits of efficiency, and achieve control over beam shape and emission spectrum in white-light LEDs. Three main technological challenges will be addressed in this programme: 1) Control of beam shape and direction, 2) Spectral tuning of the emission by means of inexpensive and sustainable nanostructured materials, and 3) Optimized optical absorption of phosphors used for solid-state lighting.

Kosten:

Fundamenteel:	€ 4503000	*Waarvan TKI-toeslag:*	€ 503000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 2000000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 4503000***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - Projectnummer: TKI1412P02

Titel: Merging Electronics and Micro & nano Photonics in Integrated Systems: MEMPHISII

Penvoerder: STW

Partners: STW, IBM, GENEXIS, EFFECT PHOTONICS, LIONIX, XIO PHOTONICS, WATERLAB NOORD, HYBRISCAN, BECTON DICKINSON, VTEC, ANTWERP SPACE, PHOENIX, TECHNOBIS, ASMI, FEI, SATRAX, SMART PHOTONICS, BRIGHT PHOTONICS, FRAUNHOFER HHI, VLC, EMEA

Roadmap: Photonics

Toeslagjaar: projecttoeslag*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

The photonic technology will play an increasingly important role in near future equipment and systems. Photonics is an enabling technology, based on properties of light, which in combination with micro-nano-electronics will be implemented in many applications and markets as indicated in the Dutch Top Sector policy. Photonics is one of the European Key Enabling Technologies to strengthen our economy with innovative products. To be successful in different market sectors like safety, communication, lighting, healthcare and many others, the need for standardization of basic processes is mandatory in order to accommodate efficient production capabilities. The MEMPHIS platform approach offers such a platform in which new scientific innovation will be realized using a basic building blocks philosophy in processes, design methodologies and components developed in our platform. Focus in this program is on the value chain approach where applications for various markets will be identified and translated into new products using this MEMPHIS platform approach. Apart from the technology development, also organizing the field including international companies, SME's, universities and institutes into a collaborative national eco system with "hot spots" will strengthen our competitive position.

Kosten:

Fundamenteel:	€ 7114338	*Waarvan TKI-toeslag:*	€ 472898
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 1472400
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 1094393
Totaalbegroting:	***€ 7114338***	*Waarvan overige*	*€ 0*

TKI-projecten

FOM - Projectnummer: TKI1412P03

Titel: i37 - The foundations for faster electron microscopy

Penvoerder: FOM

Partners: FOM, FEI Electron Optics B.V.

Roadmap: Nanotechnology

Toeslagjaar: projecttoeslag*; Einddatum: 2019; Fase:* Conform planning

Omschrijving:

The objective of this Industrial Partnership Programme is to make major steps in the advancement of scientific knowledge and technology in the area of electron microscopy and ion beam techno-logy. Making instrumentation faster is not just saving time for economic reasons. If the speed is increased above certain thresholds, it enables fundamentally new scientific investigations and new applications of the instruments in industry.

Kosten:

Fundamenteel:	€ 2772500	*Waarvan TKI-toeslag:*	€ 315500
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 1250000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 2772500***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI1512P01

Titel: Smart Monitoring (TKI-HTSM/15.1822)

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, Philips Electronics, Catharinaziekenhuis, Kempenhaege

Roadmap: HealthCare

Toeslagjaar: projecttoeslag*; Einddatum: 2020; Fase:* Achter op planning

Omschrijving:

Het doel van dit project is om een 'smart monitoring' innovatie-ecosysteem in de regio Eindhoven te creëren, met Philips, TU/e en twee strategische lokale semi-academische klinische partners, te weten het Catharina Ziekenhuis en Kempenhaeghe. Het wetenschappelijke doel van dit project is het sterk verbeteren van de functionaliteit, kwaliteit, intelligentie, kosten-potentieel, en de gebruiksvriendelijkheid van monitoringsystemen. Om deze ambitieuze doelstellingen te kunnen bereiken, combineert het programma de internationaal erkende expertise van de klinische partners met de leidende industriële deskundigheid van Philips Research en Philips Design, en de vooraanstaande academische expertise uit 6 verschillende TU/e faculteiten, met een bewezen track record van vruchtbare hoogwaardige interdisciplinaire samenwerking.

Kosten:

Fundamenteel:	€ 4900310	*Waarvan TKI-toeslag:*	€ 635957
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 2524838
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 60000
Totaalbegroting:	***€ 4900310***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI1512P02

Titel: High Tech Systems: towards Systems Integration (TKI-HTSM/16.0551)

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, Consortium van 11 bedrijven bestaande uit grote en kleine bedrijven

Roadmap: Smart Industry

Toeslagjaar: projecttoeslag*; Einddatum: 2021; Fase:* Achter op planning

Omschrijving:

Het strategisch doel van dit programma is het vormen van een innovatief ecosysteem in het domein van High Tech Systems. Hierbij werken industriele partners zoals ASML, OCE, VDL ETG, Philips Healthcare, Tecnotion, Marel en consortia van MKB bedrijven samen met TUe onderzoekers aan nieuwe concepten voor het ontwerpen van geavanceerde complexe systemen. De uitdagingen die worden opgepakt zijn ondermeer het drastisch vergroten van de precisie, betrouwbaarheid, snelheid en intelligentie van high tech systemen. Deze problemen worden op een multi-disciplinaire wijze aangepakt redenerend vanuit een systeem perspectief. Dit betreft een samenwerking van de faculteiten: Werktuigbouwkunde, Wiskunde & Informatica, Electrotechniek en Natuurkunde. Het programma wordt onderverdeeld in een aantal promotieprojecten waarbij fellows vanuit de industrie, een stuk kennis, kunde, coaching en programmamanagement inbrengen.

Kosten:

Fundamenteel:	€ 8420362	*Waarvan TKI-toeslag:*	€ 1549356
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 5833422
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 220000
Totaalbegroting:	***€ 8420362***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI1512P03

Titel: Fault Tolerant Quantum Computing at low T

Penvoerder: Technische Universiteit Delft

Partners: TUD, TNO, Intel

Roadmap: Nanotechnology

Toeslagjaar: projecttoeslag*; Einddatum: 2020; Fase:* Achter op planning

Omschrijving:

Het Amerikaanse elektronicabedrijf Intel en QuTech, het quantuminstituut van TU Delft en TNO, gaan intensief samenwerken. De grote uitdaging voor het ontwikkelen van quantumtechnologie, zoals een quantumcomputer, zal het komende decennia 'opschaling' zijn: het kunnen maken van complexe structuren met zeer veel quantumbits. Om de verwezenlijking van quantumcomputing een stap dichterbij te brengen, is diepgaande expertise op het gebied van gespecialiseerde elektronica vereist, in combinatie met geavanceerde natuurkundige kennis. De samenwerking betreft het onderzoek naar 'fault-tolerant quantum computing' binnen QuTech. Vandersypen doet daarbij onderzoek naar qubits op basis van de spin, een miniem magnetisch effect, van elektronen gevangen in quantum dots. DiCarlo's onderzoek richt zich op qubits op basis van supergeleidende circuits op chips. Onderzoeksleider Edoardo Charbon ontwikkelt lage-temperatuur elektronica om de qubits aan te sturen, Koen Bertels richt zich op de architectuur van de quantum computer en Ryoichi Ishihara werkt aan de verbinding tussen quantumbits en controle-elektronica. Ingenieurs van TNO richten hun expertise op de computerarchitectuur, het verbeteren en opschalen van de fabricage van qubits op nanoschaal, en de noodzakelijke verbindingen tussen qubits, chips en elektronica. Intel levert naast een financiële bijdrage ook expertise, mankracht en faciliteiten.

Kosten:

Fundamenteel:	€ 32346750	*Waarvan TKI-toeslag:*	€ 6471750
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 25875000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 32346750***	*Waarvan overige*	*€ 0*

TKI-projecten

UvA - Projectnummer: TKI1512P04

Titel: QUVA-Lab

Penvoerder: Universiteit van Amsterdam

Partners: Universiteit van Amsterdam, Qualcomm

Roadmap: ICT

Toeslagjaar: projecttoeslag*; Einddatum: 2020; Fase:* Conform planning

Omschrijving:
De Universiteit van Amsterdam (UvA) en Qualcomm Technologies, Inc. (QTI), wereldwijd leider in next-generation mobiele technologieën, starten een gezamenlijk onderzoekslab, QUVA Lab. In het lab gaat onderzoek gedaan worden naar geavanceerde machine learning-technieken voor de verwerking van sensorische data, waaronder beeldweergave op mobiele en ingebouwde systemen
Na de overname van het UvA-spin-offbedrijf Euvision door QTI september vorig jaar, hebben er gesprekken plaatsgevonden tussen de UvA en QTI over mogelijke onderzoekssamenwerking. Dit heeft geresulteerd in het gezamenlijke onderzoekslab, dat onderdeel wordt van het Instituut voor Informatica (IvI) van de UvA, op Amsterdam Science Park.
De overeenkomst is voor vijf jaar gesloten en biedt ruimte aan zo'n 15 tot 20 onderzoekers. Het directieteam van het onderzoekslab bestaat uit Arnold Smeulders, hoogleraar Intelligente Sensorische Systemen aan de UvA, Max Welling, hoogleraar Machine Learning aan de UvA, en Cees Snoek, Principal Engineer bij QTI en universitair hoofddocent aan de UvA. QTI's onlangs opgezette Amsterdamse vestiging is dichtbij het nieuwe lab, wat verdere samenwerkingsmogelijkheden zal bevorderen.

Kosten:

Fundamenteel:	€ 8902002	*Waarvan TKI-toeslag:*	€ 940500
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 3750000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 8902002***	*Waarvan overige*	*€ 0*

TKI-projecten

UvA - Projectnummer: TKI1612P01

Titel: UvA - SAP cooporation

Penvoerder: SAP SE

Partners: SAP SE, Universiteit van Amsterdam

Roadmap: ICT

Toeslagjaar: projecttoeslag*; Einddatum: 2020; Fase:* Achter op planning, project is verlengd

Omschrijving:

Veel bedrijven verhandelen tegenwoordig producten over internet via platformen zoals SAP's Ariba netwerk. Het is moeilijk te achterhalen welke categorieën producten worden verhandeld door welke bedrijven. Om hier inzicht in te krijgen gaan de Universiteit van Amsterdam en SAP een samenwerking aan om de data van deze handelsnetwerken te analyseren. Dr. Ivan Titov (Institute for Logic, Language and Computation) zal de tekst-data analyseren terwijl Prof. M. Welling (Instituut voor Informatica) de handelspatronen zal analyseren. Beide onderzoekers gebruiken geavanceerde deep learning technieken. Deze twee complementaire benaderingen worden dan uiteindelijk samengevoegd tot één krachtig model om te kunnen voorspellen wie wat wanneer verhandelt. Uit deze inzichten kunnen nieuwe services worden ontwikkeld door SAP zoals het voorspellen van tekorten in de "supply chain" en het doen van aanbevelingen voor alternatieve producten.

Kosten:

Fundamenteel:	€ 1006000	*Waarvan TKI-toeslag:*	€ 200000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 800000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 1006000***	*Waarvan overige*	*€ 0*

TKI-projecten

NWO-I - Projectnummer: TKI1612P02

Titel: i43 - Fundamental fluid dynamics challenges in inkjet printing

Penvoerder: Stichting Fundamenteel Onderzoek der Materie (FOM)

Partners: Stichting Fundamenteel Onderzoek der Materie (FOM), Universiteit Twente (UT), Technische Universiteit Eindhoven (TU/e), OCÉ Technologies BV

Roadmap: Printing

Toeslagjaar: projecttoeslag*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

The main scientific goal of the programme is to create insight into unresolved issues in the current inkjet process and to improve and extend the functionality of the inkjet printing process to meet future requirements. The functional modelling of the inkjet printing process not only concerns the numerical simulations but also the physical theory, which explains the results, and the experiments, which validate the results. The first programme line refers to the fluid dynamics of the printhead including the piezo and the wetting properties at the nozzle, on the droplet formation process and the droplet dynamics. It includes the actuation principles and performances, acoustic ink channel modelling, the meniscus dynamics, air bubble entrainment, wetting properties of the nozzle plate and its coatings, and the droplet formation process. The second programme line refers to the 'paper' side and includes the dynamics of the droplet impact, its spreading, the droplet merging, the wetting properties of the substrate, the evaporation and drying process, the ink intrusion into the paper, the ink absorption and solidification, and the effect the ink has on the substrate.
The programme combines experimental, numerical, and theoretical approaches. Beyond above formulated specific issues, the project has the objective to establish a fundamental fluid dynamics group at Océ which contributes to achieving the long-term goals of Océ.

Kosten:

Fundamenteel:	€ 6345000	*Waarvan TKI-toeslag:*	€ 705000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 2820000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 6345000***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI1612P03

Titel: Research, development and commercialization of TUD multielectron-beam-multi-probe

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft

Roadmap: Nanotechnology

Toeslagjaar: projecttoeslag*; Einddatum: 2021; Fase:* uitvoeringsfase er zijn nog geen uitgaven van het TKI budget

Omschrijving:

Inspectie van patronen in de chip industrie met parallelle elektronenbundel technologie.
Het project betreft een haalbaarheids- en ontwerp studie van een nieuwe technologie om extreem snel een hoge resolutie beeld te maken van 300 mm diameter gepatroneerde Si-plakken. In de halfgeleider industrie worden de geschreven patronen regelmatig geïnspecteerd om defecten op te sporen. Over enkele jaren moeten de inspectie machines 10 nm defecten kunnen zien. Daar is op dit moment geen technologie voor beschikbaar. Een elektronenmicroscoop kan wel het juiste type beeld maken, maar is meer dan een factor 1000 te langzaam. In dit project wordt onderzocht of een dergelijke microscoop met behulp van nano technologie een factor 1000 kleiner gemaakt kan worden, zodat er zeer veel microscopen tegelijk kunnen werken aan één enorm beeld van die chip patronen. Het uiteindelijke, miljoenen kostende, apparaat zal een typisch voorbeeld zijn van een high tech systeem met een combinatie van optiek, elektronenoptiek, vacuüm, mechatronica, computeraansturing en supersnelle dataverwerking. De industriële partner in het project levert zijn bijdrage in cashbetalingen aan de TU Delft.

Kosten:

Fundamenteel:	€ 3755705,8	*Waarvan TKI-toeslag:*	€ 447649
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 1778596
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 3755705,8***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - Projectnummer: TKI1612P04

Titel: FLOW+ Real-time flow and composition measurement

Penvoerder: Bronkhorst High-Tech BV

Partners: Bronkhorst High-Tech BV, KROHNE, Stichting Technische Wetenschappen

Roadmap: Components & Circuits

Toeslagjaar: projecttoeslag*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

FLOW+ richt op het ontwikkelen van nieuwe productie- en meettechnieken voor microsystemen en sensoren waarmee de samenstelling en eigenschappen van gassen en vloeistoffen bepaald kan worden. Het betreft enabling technology voor allerlei verschillende toepassingen in bijvoorbeeld de geneeskunde, de chemie, de voedings¬middelenindustrie en de olie- en gasindustrie. In dit programma werken wetenschappers van verschillende vakgroepen van de technische universiteiten samen met bedrijven, met name Bronkhorst High-Tech en KROHNE Altometer, om innovatieknelpunten op te lossen.
Gespecialiseerde projecten hebben een complementaire focus en vormen tezamen een pallet aan oplossingen die via een extra project tot demonstrators van microfluïdische en gassysteem sensoren gebracht worden door de nauwe publiek-private samenwerking.
Details van de projecten zijn:
- The aim is to develop a miniaturized magnetic resonance system, completed with integrated electronics for stabilization, excitation and detection. This system can be used as an online sensor to monitor and quantify the chemical composition of a liquid. It will also be possible to use it for flow measurement of multiphase systems, in the micro liter per minute range.
- In this project (PZT) piezoelectric sensors for fluid flow, and fluid parameters like density and viscosity will be researched and developed. PZT thin films will be combined with the so-called surface channel technology (SCT) that is used to realize silicon nitride tubes on a silicon chip. Adding piezoelectric actuation and detection will further enhance the possibilities offered by the technology.
- The aim of this project is to realize a compact and reliable mass flow sensor whose resolution is only limited by the random thermal motion of the vibrating sensor tube. This will be accomplished by combining an optimized sensor design with CMOS readout electronics. The final aim is a TRL6 prototype consisting of two chips: one for the vibrating sensor tube and another for the CMOS readout electronics.
- In this project, we will develop a new class of clamp-on ultrasonic flow meters that employ so-called matrix transducers, which consist of many small acoustic transmitterreceivers that can be individually controlled by custom integrated electronics to steer the path of the acoustic pulses. This will enable several new measurement techniques, including automatic alignment and self-calibration, that will greatly improve the accuracy and applicability of clamp-on flow sensors.

Kosten:

Fundamenteel:	€ 3309918	*Waarvan TKI-toeslag:*	€ 345000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 1482459
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 3309918***	*Waarvan overige*	*€ 0*

TKI-projecten

STW - Projectnummer: TKI1612P05

Titel: Partnership STW-NXP Advanced 5G Solutions

Penvoerder: Stichting Technische Wetenschappen

Partners: Stichting Technische Wetenschappen, NXP

Roadmap: Components & Circuits

Toeslagjaar: projecttoeslag*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Het Advanced 5G Solutions' Partnership Programma is een initiatief van STW en NXP voor onderzoek naar technologische doorbraken voor 5G-systemen. Het partnership richt zich op nieuwe oplossingen en doorbraken die gebaseerd zijn op geavanceerde IC- en antenne-ontwerpen, signaalverwerking en systeemonderzoek voor een breed scala aan 5G-toepassingsgebieden, maar vooral voor communicatie en automotive.

De mondiale communicatie-industrie zal in het komende decennium een enorme stap maken van 3/4G-systemen naar 5G. Deze stap wordt vooral gedreven door de vraag naar hogere capaciteiten aan dataverkeer en systemen. Deze nieuwe standaard voor draadloze communicatie, 5G, zou een hogere systeemcapaciteit moeten kennen met datasnelheden tot 10Gbps. De frequentiebanden voor 5G zijn nog niet bepaald en worden pas in 2019 gealloceerd. Om 5G haalbaar te maken zijn nieuwe technologieën nodig die vele malen kleiner en goedkoper zijn met lager energieverbruik. De Nederlandse universiteiten hebben de kennis opgebouwd om zulke technologieën te helpen ontwikkelen.

Kosten:

Fundamenteel:	€ 3096972	*Waarvan TKI-toeslag:*	€ 344108
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 1376432
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 3096972***	*Waarvan overige*	*€ 0*

TKI-projecten

UvA - Projectnummer: TKI1712P01

Titel: Bosch - UvA lab

Penvoerder: Universiteit van Amsterdam

Partners: Universiteit van Amsterdam, Bosch

Roadmap: ICT

Toeslagjaar: projecttoeslag*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Bosch and the University of Amsterdam will collaborate on the topic of deep learning. This collaboration will benefit Bosch because it will import expert knowledge and will allow Bosch to stay in tune with the latest developments in this fast developing field. To achieve this, researcher exchanges will be organized where Bosch personnel will “intern” at UvA and UvA researchers from Bosch lab will intern at Bosch. Ten PhD students / postdoctoral scholars will be fully supported by this collaboration. All researchers will reside at UvA and be employees of UvA. The deliverables of the project are top tier publications, software and demonstrators. The research topics are all highly fundamental in nature and involve various theoretical challenges in deep learning. The research results will allow Bosch to create new applications and tools to be integrated in their products and services, as well as remove roadblocks for embedding deep learning into practical applications.

Kosten:

Fundamenteel:	€ 4176316	*Waarvan TKI-toeslag:*	€ 733900
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 2923600
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 0
Totaalbegroting:	***€ 4176316***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI1712P02

Titel: Learning Physical Human-Robot Cooperation Tasks

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, Honda Research Institute Europe GmbH

Roadmap: Smart Industry

Toeslagjaar: projecttoeslag*; Einddatum: 2021; Fase:*

Omschrijving:

Human-robot interaction and collaboration is of fundamental importance for any robot leaving the safety of fences on a highly-structured factory floor: service and care scenarios, medical applications, offshore, maintenance and inspection, as well as industrial assembly. In this project, we will develop new concepts and techniques for robot learning that endow robots with the capability to physically interact and collaborate with humans. In particular, we will consider tasks related to joint handling of large objects, i.e., jointly transporting and manipulating them. This research project is structured into two main research questions. Firstly, we will investigate and devise models to predict and anticipate the human's behavior as a result of the agent's one, and vice versa. These intention models will constitute to the elements of the second research question: a planning architecture that allows creating cooperative plans for complex problems under consideration of the interaction and intentions within the cooperation. Bringing these elements together will finally allow to research different modes of interaction and to assess how they are perceived by a human co-worker.

Kosten:

Fundamenteel:	€ 993328	*Waarvan TKI-toeslag:*	€ 132000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 496000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 40000
Totaalbegroting:	***€ 993328***	*Waarvan overige*	*€ 0*

TKI-projecten

TUD - Projectnummer: TKI1712P03

Titel: Research on next generation lightweight aircraft materials

Penvoerder: Technische Universiteit Delft

Partners: Technische Universiteit Delft, Airbus

Roadmap: Aeronautics

Toeslagjaar: projecttoeslag*; Einddatum: 2021; Fase:*

Omschrijving:

Airbus kijkt voor volgende generaties vliegtuigen naar nieuwe lichtgewicht materialen. Er wordt daarvoor veel samengewerkt met bedrijven en instellingen. Twee materialen waarvoor Airbus nadrukkelijk naar de TU Delft kijkt zijn Fiber Metal Laminates en Thermoplasten. Voor thermoplastische composieten gaat het om het begrijpen van scheurgroei in thermoplastische gelaste verbindingen vergeleken met scheurgroei in het moedermateriaal. Bij FML gaat de wetenschappelijke vraag over het begrijpen en vaststellen van de limieten van gelamineerde, dun-gelaagde concepten.

Kosten:

Fundamenteel:	€ 989112	*Waarvan TKI-toeslag:*	€ 128000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 480000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 20000
Totaalbegroting:	***€ 989112***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI1712P04

Titel: Advanced piezo-electric wafer stage for next generation lithography and metrology application (TKI-HTSM/17.1429)

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, ASMl

Roadmap: Semiconductor Equipment

Toeslagjaar: projecttoeslag*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Bij moderne lithografie machines zoals die geleverd worden door ASML is de positionering van de wafer van groot belang. Hierbij worden grote eisen gesteld aan de nauwkeurigheid en wordt een reproduceerbaarheid vereist die kleiner is dan 0.1 nanometer. De positionering wordt uitgevoerd in twee trappen: eerste een grove trap met een eerste actuator en vervolgens een precisietrap met een tweede actuator. Deze tweede actuator is momenteel gebaseerd op electro-magnetische principes. In dit onderzoek willen we nagaan of deze electro-magnetische actuator in de tweede trap vervangen kan worden door een piezo-electrische actuator met nog hogere precisie. Mogelijke voordelen hiervan zijn: (i) een systeem met een veel kleinere massa en (ii) een systeem dat veel minder electro-magnetische stoorsignalen heeft naar de omgeving (het proces). Om het nieuwe concept mogelijk te maken moeten een aantal fundamentele stappen worden gezet op het gebied van materialen, regeltechniek en elektrische aansturing, mechatronica en sensoren. Dit project gaat uitgevoerd worden door 4 promovendi begeleid door hoogleraren van de TU/e en experts van ASML.

Kosten:

Fundamenteel:	€ 2088149	*Waarvan TKI-toeslag:*	€ 608000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 800000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 75240
Totaalbegroting:	***€ 2088149***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI1712P05

Titel: Smart ONE: Integral systematic approach for commercial applications based on front runner Telecom technologies (TKI-HTSM/17.1442)

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, KPN

Roadmap: ICT

Toeslagjaar: projecttoeslag*; Einddatum: 2022; Fase:* Conform planning

Omschrijving:

Door de ontwikkelingen op het gebied van ICT wordt het mogelijk dat steeds meer apparaten of devices met elkaar verbonden worden via een draadloos netwerk. Het op afstand bedienen van je thermostaat of je verlichtingssysteem in huis via je smart-phone is al enkele jaren mogelijk. De verwachting is dat in de toekomst vele miljarden devices met elkaar verbonden gaan worden via het internet. We spreken daarbij over het Internet of Things. Hierdoor worden gebouwen en steden steeds “slimmer” (smart cities). Deze ontwikkelingen stellen zeer hoge eisen aan het netwerk om de grote hoeveelheden data efficient en betrouwbaar te kunnen vervoeren. In dit project beogen we hier een bijdrage aan te leveren door onderzoek te doen aan nieuwe methoden om telecommunicatie technieken, aan methoden om de grote hoeveelheden data te kunnen analyseren en ook om de grote hoeveelheden data om te zetten in bruikbare informatie. Dit project wordt uitgevoerd door 4 promovendi verbonden aan de TU Eindhoven ondersteund door experts van KPN en hoogleraren van de TU Eindhoven.

Kosten:

Fundamenteel:	€ 2087909	*Waarvan TKI-toeslag:*	€ 608000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 800000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 75000
Totaalbegroting:	***€ 2087909***	*Waarvan overige*	*€ 0*

TKI-projecten

TUE - Projectnummer: TKI1712P06

Titel: FAST new Frontiers in Autonomous Systems Technology (TKI-HTSM/18.0010)

Penvoerder: Technische Universiteit Eindhoven

Partners: TU Eindhoven, VanderLande Industries B.V., Diversey Europe Operations B.V., Rademaker B.V., Lely Industries N.V., Exrobotics B.V.

Roadmap: Smart Industry

Toeslagjaar: projecttoeslag*; Einddatum: 2021; Fase:* Conform planning

Omschrijving:

Current robot applications rely on a closed-world assumption; meaning that everything thing in the environment of the robot is structured; or in other words engineered by programmers and mechanical engineers. Most robots are at this point still unaware of its surroundings or the tasks it needs to accomplish. In that sense, the robot has very limited amount of autonomy and only provides geometric freedom for the task at hand. This also results in closed environments (e.g. safety cages) that controls the level of variation in the surroundings of the robot; preventing humans for entering for example. In order to create higher levels of flexibility of plants, warehouses, factories; robot systems must be able to adapt to new circumstances and work in highly dynamic environments. Project FAST will introduce a higher level of autonomy for mobile systems usually referred to as AGVs; industrial project partners are active in warehousing, agriculture, oil & gas and professional cleaning. Each having the desire for non-conservative and adaptive systems that can cope with changes in its environment and deal with dynamic objects like people, vehicles, cattle and much more. The project will create a so called semantic world model; to encompass more semantic and contextual meaning to the robot; greatly increasing its robustness against variation and extending its functionality.

Kosten:

Fundamenteel:	€ 2192909	*Waarvan TKI-toeslag:*	€ 650000
Industrieel/Toegepast:	€ 0	*Waarvan Private cash:*	€ 750000
Experimenteel:	€ 0	*Waarvan Private inkind:*	€ 120000
Totaalbegroting:	***€ 2192909***	*Waarvan overige*	*€ 0*