Twente Innovation Route
Innovation Projects 2007-2013

The Power of Working Together on Innovation
The challenge is to convert knowledge into jobs and income

The Twente Innovation Route was established in 2007 as part of a 10-year investment project designed to strengthen the economic structure in the region of Twente, East Netherlands. A bit over half, €50 million, was specifically earmarked for innovation. What has this investment delivered, now that we’re halfway there? What does the future look like? Two men who know what a strong economy can mean for their region look both back at what’s been accomplished, and forward to what they can expect. “There have been remarkable results.”

According to Theo Rietkerk (the Province of Overijssel’s representative on Economy, Energy and Innovation) and Peter den Oudsten (Chairman of the Executive Board for the Region of Twente and Mayor of Enschede) there have been remarkable projects over the past 6 years.

Rietkerk sums it up, “TPRC, OICAM, Texperium, XUV Optics, AMMON, CMI and MESA+/HTF are all examples of projects that have laid a strong foundation for what we call the ‘innovation infrastructure’ of High Tech Systems & Materials. N-GAP and TeleFLEX have delivered tangible business results. Up and coming companies showing much promise are Nirion, with its lab-on-a-chip technology, and DAISY, that develops modular mini-radar.”

Den Oudsten adds, “Inkjet, with its digital printing concept, is another success story and a great example of how our manufacturing industry is in constant renewal. And let’s not forget the High Tech Factory that’s giving a boost to helping high tech spin-offs and SMEs in Twente to grow. Another example is the arrival of the R&D activities of Apollo Vredestein in Twente. This certainly wouldn’t have happened without the available knowledge and exceptional business climate in this region.”

Successes for the Twente Innovation Route

The Twente Innovation Route, which has resulted in a cooperative relationship between companies, institutes of higher learning, and the government, has been responsible for the successful delivery of 58 projects and many partial projects. The program focuses on five clusters: food, health, High Tech Systems & Materials, safety and construction and was until recently managed by the Twente Innovation Platform (IPT), which has now joined forces with Kennispark.

The Twente Innovation Route was established in 2007 as part of a 10-year investment project designed to strengthen the economic structure in the region of Twente, East Netherlands. A bit over half, €50 million, was specifically earmarked for innovation. What has this investment delivered, now that we’re halfway there? What does the future look like? Two men who know what a strong economy can mean for their region look both back at what’s been accomplished, and forward to what they can expect. “There have been remarkable results.”

According to Theo Rietkerk (the Province of Overijssel’s representative on Economy, Energy and Innovation) and Peter den Oudsten (Chairman of the Executive Board for the Region of Twente and Mayor of Enschede) there have been remarkable projects over the past 6 years.

Rietkerk sums it up, “TPRC, OICAM, Texperium, XUV Optics, AMMON, CMI and MESA+/HTF are all examples of projects that have laid a strong foundation for what we call the ‘innovation infrastructure’ of High Tech Systems & Materials. N-GAP and TeleFLEX have delivered tangible business results. Up and coming companies showing much promise are Nirion, with its lab-on-a-chip technology, and DAISY, that develops modular mini-radar.”

Den Oudsten adds, “Inkjet, with its digital printing concept, is another success story and a great example of how our manufacturing industry is in constant renewal. And let’s not forget the High Tech Factory that’s giving a boost to helping high tech spin-offs and SMEs in Twente to grow. Another example is the arrival of the R&D activities of Apollo Vredestein in Twente. This certainly wouldn’t have happened without the available knowledge and exceptional business climate in this region.”

Successes for the Twente Innovation Route

The Twente Innovation Route, which has resulted in a cooperative relationship between companies, institutes of higher learning, and the government, has been responsible for the successful delivery of 58 projects and many partial projects. The program focuses on five clusters: food, health, High Tech Systems & Materials, safety and construction and was until recently managed by the Twente Innovation Platform (IPT), which has now joined forces with Kennispark.

“An interview with Peter den Oudsten and Theo Rietkerk

The Innovation Route has been an important driver for closer cooperation.”

Den Oudsten adds, “Inkjet, with its digital printing concept, is another success story and a great example of how our manufacturing industry is in constant renewal. And let’s not forget the High Tech Factory that’s giving a boost to helping high tech spin-offs and SMEs in Twente to grow. Another example is the arrival of the R&D activities of Apollo Vredestein in Twente. This certainly wouldn’t have happened without the available knowledge and exceptional business climate in this region.”

Successes for the Twente Innovation Route

The Twente Innovation Route, which has resulted in a cooperative relationship between companies, institutes of higher learning, and the government, has been responsible for the successful delivery of 58 projects and many partial projects. The program focuses on five clusters: food, health, High Tech Systems & Materials, safety and construction and was until recently managed by the Twente Innovation Platform (IPT), which has now joined forces with Kennispark.
What has the Twente Innovation Route accomplished for Twente and Overijssel since 2007? What is its strength?

Don Oudsten: “From the start, the Innovation Route has been an important driver for a closer cooperation between business owners, institutes of higher education and research, and regional governments. Innovation in Twente in the future is inconceivable without this sort of cooperation. The Innovation Route has also established a firm foundation for Twente as a region that has top technology and knowledge resources.”

Rietkerk: “Actually, the Dutch government is a bit jealous of us, how these various interests work together in Twente. The Twente Innovation Platform has played an important role in strengthening what the government is now calling the ‘Top Sector High Tech Systems & Materials.’ The IPT was functioning some years ago, during previous administrations, as a model for the national innovation initiatives. In all, there has been €275 million invested in the Twente Innovation Route. The result is a huge number of new innovations and nearly 3,700 jobs. These are remarkable results.”

I'm hoping that many startups that we've seen bubbling up grow into strong and thriving enterprises.”

Are there also weaknesses in this story? What's been learned?

Don Oudsten: “One development is seeing that, especially since 2012, the business community has played a more prominent role and the government has taken more of a back seat. The economic crisis has forced the government to slim down and to use available resources smarter. One way to do this is through a revolving financing system, through loans.”

Simple risk financing

In the new innovation policy, a Strategy Board determines the course and develops together with the business community and knowledge institutes an innovation agenda: a simpler and more effective organization model. Relying on subsidies just isn’t possible anymore. The Innovation Fund Overijssel, which began in May 2013, works with interest bearing loans and participatory financing.

The provincial government provides €42 million of the funds. The Region Twente organization supplies another €15 million, an amount that is expressly reserved for business cases from Twente. The Participation Agency Oost NV manages the loans and participations.

Why does this work? What improvements were seen as a result of the new innovation funding and the merger between the IPT and Kennispark Twente?

Rietkerk: “The merger strengthens the cooperation and gives clearer oversight to the process. A good example of this is the ‘Portal to innovation,’ which is a single desk where business owners can bring their questions. In addition we have high expectations for the innovation funds, which came about through roundtable discussions with the business owners. They gave the clear message that they needed financing for their business cases.”

Don Oudsten: “The effect of the merger has been a mutual joining of forces rather than fragmentation. We have a strong platform in Kennispark Twente where the various strands of innovation come together. This makes a powerful formula, together with the Twente method of cooperation between the business community, knowledge and research institutes and the government.”

Now we are focused on delivering custom results in exchange for loans and participatory financing.

What does the future look like with the new, simplified organizational model and the starting of the Innovation Fund Overijssel?

Don Oudsten: “While we don’t extend subsidies anymore, we continue to invest in the knowledge economy in Twente through the Innovation Fund. This is more important than ever, given our current economic crisis. We need to continue preparing for the anti-crisis, the period afterwards. But the initiative is now where it belongs: with the business community.”

Rietkerk: “There is much knowledge. The reigning challenge in the near future is how to convert this knowledge into a return on investment. Especially returns that manifest themselves in new jobs. This is very important in the current economic climate. And, as far as that goes, we’ve got every confidence in Kennispark. We have now achieved just over half of our goal of creating 10,000 new jobs before 2025. I’m hoping that many startups that we’ve seen bubbling up grow into strong and thriving enterprises.”

“We have a strong platform in Kennispark Twente where the various strands of innovation come together.”

called ‘innovatiesprong’ in 2012, and the merger between Kennispark and the IPT, we now have a far more efficient organization. Another learning experience has been the method of financing. The public contribution to the project was mostly in the form of subsidies. Now we are focused on delivering custom results in exchange for loans and participatory financing. It helps that we now evaluate potential projects by zeroing in on the likeliest returns from their business case. In other words: the chances for return on investment.”

“The effect of the merger has been a mutual joining of forces rather than fragmentation. We have a strong platform in Kennispark Twente where the various strands of innovation come together. This makes a powerful formula, together with the Twente method of cooperation between the business community, knowledge and research institutes and the government.”

“The merger strengthens the cooperation and gives clearer oversight to the process. A good example of this is the ‘Portal to innovation,’ which is a single desk where business owners can bring their questions. In addition we have high expectations for the innovation funds, which came about through roundtable discussions with the business owners. They gave the clear message that they needed financing for their business cases.”
Innovation as economic driver

You have in your hand a presentation of projects that, together, represent the results of the Twente Innovation Route. Results to be proud of! The projects show what we can do in Twente, where our ambitions lie, and where the opportunities are. We can rightly state that Twente is a region where innovation and entrepreneurship is highly prized. Also, it is a region that does its best to promote cooperation between the business community, the government and institutes of higher research and education.

The projects have contributed to the innovative dynamic that exists in the region, and give proof to the maxim that more can be achieved by working together. Especially in a time where economic circumstances are rapidly changing, global powers are shifting, and financing or subsidies may not be as routine as they once were, cooperation and open innovation are essential. We are more than ever convinced that innovation will determine the economic climate in Twente’s future.

The foundation of innovation projects

The projects profiled in this document prove an important foundation for innovation projects, one that can be built on. It also reflects the effort that has gone into designing the policy process these last years, the “innovatiesprong” (Leap of Innovation). In that process, the government, knowledge institutes and companies worked together to design the contours for innovation policy for the coming years. On the basis of experience with these projects and looking at the current economic climate, the choice was made to create an environment where speed to market for regional innovations took top priority. Therefore, it was chosen to set up the innovation funding so that risk capital could also be financed in order to make the ambitions of business owners a reality.

In addition, active efforts are being made to involve companies in the regional ecosystem. Open innovation, learning from each other and cooperation are important elements for Kennispark Twente, which focusses on acquisition, commercialization of knowledge and industrial innovation.

The roadmap that has resulted from these efforts, where regional strengths have been mapped, will be a useful instrument on which to base better choices. Our goal remains: to position Twente as Europe’s authoritative technology region where developed knowledge is effectively converted to economic and societal return on investment.

This overview shows you the innovation projects for the Twente Innovation Route. More than 90 examples that show that Twente is the very model of an innovative entrepreneurial region.

We wish you pleasurable reading.

Pieter Dillingh
Director Kennispark Twente
Table of contents

An interview with Peter den Oudsten and Theo Reitsma

Subprojects I2I ................................................................................................................................................................................................................................... 33

Bundling knowledge brings micro- and nanotechnology more rapidly to market ............................................................... 32

I2I: Innovation 2 Industrialisation:

Subprojects High Tech Factory: Opportunities for entrepreneurs in micro- and nanotechnology ........................................................ 27

Force Reflecting Operating Instruments (FROI): An interview with Director Gerard Huiberts of the WWIN Group 26

Food cluster innovation platform: Working towards a sustainable food industry in Twente 23

Fieldlab for client centered care: Advanced techniques improve healthcare for the elderly and chronically sick 22

Food cluster innovation platform: Working towards a sustainable food industry in Twente 23

3D-weave: 3D-weaves make new material constructions possible 10

Ammonia Breath Analyzer, hydrogen Peroxide Breath Analyzer:

From drawing blood to analyzing breath properties 11

Bundling knowledge brings micro- and nanotechnology more rapidly to market 32

BioMark: Better follow up for accreditation for distance athletes 15

Business Cluster Semiconductors East Netherlands: A boost for the semiconductor industry 16

Business Cluster Semiconductors East Netherlands: A boost for the semiconductor industry 16

Center for Medical Imaging Twente: Finding diseases early through medical imaging 17

An interview with Director Dennis Schipper from Demcon 18

Connect: Working to bring more international knowledge workers to East Netherlands 19

Daisy: Sensor technology for mass application 20

Daisy: Sensor technology for mass application 20

DigiCasting: Working to bring more international knowledge workers to East Netherlands 19

Digital coating with inkjet as a regional opportunity 21

Fieldlab for client centered care: Advanced techniques improve healthcare for the elderly and chronically sick 22

Fieldlab for client centered care: Advanced techniques improve healthcare for the elderly and chronically sick 22

High Tech Factory: Opportunities for entrepreneurs in micro- and nanotechnology 27

An interview with Director Gerard Huiberts of the WWIN Group 26

High Tech Factory: Opportunities for entrepreneurs in micro- and nanotechnology 27

Subprojects High Tech Factory 28

DT innovation/industrialisation: Bundling knowledge brings micro- and nanotechnology more rapidly to market 32

Subprojects High Tech Factory 28

An interview with Victor Paasheis, manager Research & Technology at Thales 58

An interview with Peter den Oudsten and Theo Reitsma 01

3D-weave: 3D-weaves make new material constructions possible 10

An interview with Peter den Oudsten and Theo Reitsma 01

3D-weave: 3D-weaves make new material constructions possible 10

 Arthur: New detection method for metastasized breast cancer 12

Biobased Economy & Technology East Netherlands:

East Netherlands: Leader in Bio-based paints and yams 13

Bio-energy Park Twente: A nursery for green energy and ingredients 14

BioMark: Better follow up for accreditation for distance athletes 15

Business Cluster Semiconductors East Netherlands: A boost for the semiconductor industry 16

Center for Medical Imaging Twente: Finding diseases early through medical imaging 17

An interview with Director Dennis Schipper from Demcon 18

Connect: Working to bring more international knowledge workers to East Netherlands 19

Daisy: Sensor technology for mass application 20

DigiCasting: Working to bring more international knowledge workers to East Netherlands 19

Digital coating with inkjet as a regional opportunity 21

Fieldlab for client centered care: Advanced techniques improve healthcare for the elderly and chronically sick 22

Fieldlab for client centered care: Advanced techniques improve healthcare for the elderly and chronically sick 22

High Tech Factory: Opportunities for entrepreneurs in micro- and nanotechnology 27

An interview with Director Gerard Huiberts of the WWIN Group 26

High Tech Factory: Opportunities for entrepreneurs in micro- and nanotechnology 27

Subprojects High Tech Factory 28

DT innovation/industrialisation: Bundling knowledge brings micro- and nanotechnology more rapidly to market 32

Subprojects High Tech Factory 28

An interview with Martin Oslo-Vogelius, Chairman of OICAM 42

Lopes - Lower Extremity Powered Extremities: Quicker recovery with a rehabilitation robot 43

MainMep: Smart cooperation on innovations in manufacturing 44

Subprojects Main Mep 45

An interview with Jan Mox, Director P&O at the factory Apollo Zeedijk 50

MAX-ISO ADD-ON: An ISO container tank for transport that’s light and durable 51

Masters of the Future in Twente: The meeting place for entrepreneurs and investors 52

MEMBler: Waterstabilisability treated with the Anisoreactive Membrane Bionator (AnMBR) 53

MIC: Active care for the elderly and chronically sick 54

Multistool: A multifunctional agricultural machine that solves soil compaction 55

Myopro: The future: a better, intuitive controllable arm-hand prosthesis 56

N-Gap: High-tech production platform hits gap in mobile consumer electronic market 57

An interview with Victor Paasheis, manager Research & Technology at Thales 58

NetworkDAM: Crossborder networking in manufacturing 59

New Business by Enhanced Skin Comfort: The future: more skin sensitive materials 60

NirionPlusAndalirion: New minilab gives possibilities for independent, home-care patients 61

OICAM: The future is with open innovation and advanced materials 62

Profesio: A new line of bone substitutes 63

Pioneering: Leader in modern construction techniques and processes 64

RMCenter Twente: Rapid manufacturing: production method of the future? 65

An interview with Petra Snijder, Director Global Technology Alliances and Strategy at Boeing 66
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robot arm: A precise robot arm for Transcranial Magnetic Stimulation</td>
<td>67</td>
</tr>
<tr>
<td>Safe Tires &amp; Save Energy: An energy efficient car tire from rubber and nanosand</td>
<td>68</td>
</tr>
<tr>
<td>Senior: Staying self-sufficient longer through wireless sensors</td>
<td>69</td>
</tr>
<tr>
<td>SOFIE: A new smart bicycle helps elderly remain active</td>
<td>70</td>
</tr>
<tr>
<td>Quiet Safe Road Traffic: A connection between road surface, noise and safety</td>
<td>71</td>
</tr>
<tr>
<td>Surflect: Nano-components are becoming more advanced and smaller</td>
<td>72</td>
</tr>
<tr>
<td>TECUSE: With one information network to help emergency service providers perform their best</td>
<td>73</td>
</tr>
<tr>
<td>An interview with Hubert de Haas, Director STODT</td>
<td>74</td>
</tr>
<tr>
<td>Teleflex: New discovery makes complex procedures intuitive and more efficient</td>
<td>75</td>
</tr>
<tr>
<td>Open Innovation Center Texperium: discarded textile gets a high-value second chance</td>
<td>76</td>
</tr>
<tr>
<td>TPAC:Thermoplastic composites: the material of the future?</td>
<td>77</td>
</tr>
<tr>
<td>T-Xchange: A toolbox for Serious Gaming</td>
<td>78</td>
</tr>
<tr>
<td>U-Needle: New silicon microneedle makes injections pain free</td>
<td>79</td>
</tr>
<tr>
<td>Vacuum microwave drying of membranes: Towards a shorter drying time for membranes</td>
<td>80</td>
</tr>
<tr>
<td>Ventureslab: Business accelerator for high-tech companies that want to grow</td>
<td>81</td>
</tr>
<tr>
<td>An interview with Peter Bos, Founder and Chairman of Texperium</td>
<td>82</td>
</tr>
<tr>
<td>Veterinary Diagnostic @ point of animal care: New minilab results in a healthier cow</td>
<td>83</td>
</tr>
<tr>
<td>VipBrainNetworks: Towards better diagnostic and treatment for oxygen deficiency in the brain</td>
<td>84</td>
</tr>
<tr>
<td>Liquid separator: Waste is more cheaply separated with plastic</td>
<td>85</td>
</tr>
<tr>
<td>XUVOptics: New nano-group develops advanced multilayer mirrors</td>
<td>86</td>
</tr>
<tr>
<td>Self-cleaning packaging: A self-cleaning package for food</td>
<td>87</td>
</tr>
<tr>
<td>List of the Innovation Route Business Community</td>
<td>88</td>
</tr>
</tbody>
</table>
Thermoplastic composites are a relatively new, advanced material based on textile technology: very light but at the same time very strong and with a great deal of tensile strength. It can also be easily formed under pressure and heat. Thermoplastic composites are being increasingly used in aircraft manufacturing and they appear to be on the verge of a breakthrough in the automotive industry.

Artificial grass and geotextiles are other forms of textile technology. Changing market conditions are leading producers of textiles to use materials with new properties in their more advanced products. These properties can be formed through material finishing processes. Innovative production techniques can also lead to the realization of functionalities that were never before possible. Thanks to new weaving technology, for example, new materials can be designed and produced three-dimensionally.

Three-dimensional weaving is a breakthrough for artificial grass systems. Sport technology of the various components in an artificial grass system can be integrally produced in one batch process. If the production process uses only one of the basic ingredients, the artificial grass patch can be fully recyclable.

Four concrete prototypes bring new, interesting applications to bear. To demonstrate this, this project is being run through four concrete prototypes: a new generation of artificial grass sport fields; a 3D woven artificial grass sound barrier that can not only absorb sound but also trap fine particles; advanced filters for filtering water and other fluids; and a bulletproof material that's made from a composite that is woven in 3D. The first three-dimensionally woven products are being tested and evaluated in pilot projects. In a number of professional soccer stadiums, such as Heracles Almelo and PEC Zwolle, woven and completely recyclable artificial grass surfaces are already being used. Over time, these new, innovative technologies can be applied in the production of sport systems, road- and waterways, utilities buildings, armor plating and in water purification.

Exhaled breath contains biomarkers, which are particles in very low concentrations that may signal disease. With the advent of new, innovative sensor technology biomarkers are becoming intensely interesting. Breath analysis is more pleasant for patients than drawing blood. It also saves health costs as breath analysis can be performed and analyzed at the general practitioner's office.

Ammonia and hydrogen peroxide in this project, various devices for breath analysis have been developed and launched into the market. One example is a device to detect ammonia, which is an indicator of liver and kidney problems, among others. The Helicobacter Pylori bacteria, which causes stomach ulcers, can also be detected using this method. The method is also being tested to detect muscle acidification, which leads to injuries among athletes. Another device measures hydrogen peroxide in the breath, which is a biomarker for chronic obstructive lung disease (COPD). Sensor has proven promising results for detecting early onset of an increasing number of diseases.

First tests because breath analysis is relatively new, project research is now focused on testing and proof trials. Various medical centers have already conducted a number of tests using the ammonia analysis devices.

Project: Ammonia breath analyzer, hydrogen peroxide breath analyzer

From drawing blood to analyzing breath properties

"Breath analysis is more pleasant for patients than drawing blood."

"Breath analysis brings new, interesting applications to bear. To demonstrate this, this project is being run through four concrete prototypes: a new generation of artificial grass sport fields; a 3D woven artificial grass sound barrier that can not only absorb sound but also trap fine particles; advanced filters for filtering water and other fluids; and a bulletproof material that's made from a composite that is woven in 3D."
In the Netherlands, breast cancer occurs with relatively high frequency, affecting some 13,000 women every year. In doing follow up research to detect possible spreading of breast cancer cells, a ‘sentinel node biopsy’ is used. This involves injecting radioactive particles to detect spreading of the cancer to the armpit lymph nodes. This method has a number of drawbacks.

Detection using nanoparticles
Project Arthur uses cryo-magnetic detection and is can be a favorable alternative to the sentinel node biopsy. This method, which is still being developed, uses magnetic nanoparticles in a super-sensitive magnetic detection system. The advantage of nanoparticles over radioactive material is that it has an indefinite shelf life and has no health risks for either the patient or the technician. The research is currently focused on a step-wise integration of clinical ex-vivo evaluation and building a business model. In 2015 it will be clear if the technology is viable and if it can be brought to market.

There is a blooming renaissance in natural paints, brushes, pigments and yarns. In East Netherlands a total of fifteen companies and institutes are developing them. This bundling of resources means that from the middle of 2014, not only will there be new, innovative product concepts, but also a strong lead in the market and an amassing of knowledge in bio-based technology.

‘Bio-based’ is a collective term for making products from natural ingredients. Some of these products are biodegradable and there is much focus on their influence on humans and the environment.

The sustainable bio-based paints and pigments industry has been gaining more attention and is concentrated in East Netherlands, using flax and biopolymers as ingredients in a variety of products. The project is focused on:

- Natural paints: based on linseed oil, but without the disadvantage of its long drying time;
- Natural brushes: made from bio-polymers;
- Toys: using bio-based pigments and packaging;
- Geotubes: using biobased biodegradable yarns that compost themselves.

### Project: Arthur

**Partners:** University of Twente (MIRA), Panton, Kryoz Technologies, DKMS, Medisch Spectrum Twente, UMC St. Radboud (Radiology)

- **Private R&D investments:** €853,891
- **Public R&D investments:** €2,207,816
- **Elicited additional private investments:** €541,922
- **Number of supported SMEs:** 3
- **Approximate number created jobs:** 25

### Project: BETON – Biobased Economy & Technology East Netherlands

There is a blooming renaissance in natural paints, brushes, pigments and yarns. In East Netherlands a total of fifteen companies and institutes are developing them. This bundling of resources means that from the middle of 2014, not only will there be new, innovative product concepts, but also a strong lead in the market and an amassing of knowledge in bio-based technology.

**Partners:** Gebr. van der Geest, TenCate, Van Dam’s Kwastenfabriek, Kees Rolsma Lijnolieverven, SES Creative, De WoonCity; University of Twente, Saxion University of Applied Science, Radboud University Nijmegen, Wageningen University and Research Centrum, TwinX Innovatie
The Bio-energy Park helps to bring technologies for energy and green ingredients a step closer to the future. It offers “plug and play” facilities for pilot projects with a focus on converting biomass and trash to energy and green materials for reuse. At the park developers work in test centers using new technologies. Technology that is being used in this way can be proof of practice and can be rapidly scaled for commercial applications.

The park will also include various test centers, as well as a center for sustainability. This center will give information regarding new energy technology and will offer park participants a common area. The Saxion University of Applied Sciences and the University of Twente are researching the possibility of establishing an Open Innovation and Knowledge Center Biomass with accompanying research facilities.

A location near the Twence Energy and Recycling Center is intended for this new center. Together with city officials various required zoning changes are being looked at for this area. Once the necessary permits are in place the search will continue for partners for providing risk capital.

Distance athletes can suffer from a sudden acid buildup in their muscles. The results of acidification are cramps, pain, fatigue and failing performance. Lactate in the blood is an important indicator of acidification in muscles. Currently, the amount of lactate in the blood can only be measured post-event, by the drawing of blood.

Seven cooperative companies and knowledge institutes are working together on developing technology to measure the level of acidification in distance athletes muscles during the event. They’ve developed new sensors to continuously measure the concentration of lactate in the bodily fluids of the distance athletes. This will make it possible to design tailored training sessions and will eventually result in better performance.

Medical applications
The project will first be focused on developing the technology for application in sport. The method must be made both affordable and portable. Following this, the project partners see opportunities for medical applications such as in intensive care and during complicated childbirth. The technology can, for example, be used to monitor whether vital organs are getting enough oxygen.

"Technology for new energy and green materials are on the verge of a breakthrough."

Test centers and sustainability center
The park will also include various test centers, as well as a center for sustainability. This center will give information regarding new energy technology and will offer park participants a common area.

A location near the Twence Energy and Recycling Center is intended for this new center. Together with city officials various required zoning changes are being looked at for this area. Once the necessary permits are in place the search will continue for partners for providing risk capital.

Sensor technology
Seven cooperative companies and knowledge institutes are working together on developing technology to measure the level of acidification in distance athletes muscles during the event.

They've developed new sensors to continuously measure the concentration of lactate in the bodily fluids of the distance athletes. This will make it possible to design tailored training sessions and will eventually result in better performance.

Medical applications
The project will first be focused on developing the technology for application in sport. The method must be made both affordable and portable. Following this, the project partners see opportunities for medical applications such as in intensive care and during complicated childbirth. The technology can, for example, be used to monitor whether vital organs are getting enough oxygen.

"A success in measuring lactate will open the possibility for other biomarkers."
The Netherlands is a leader in the development of semiconductors, micro-electromechanical systems (MEMS), integrated circuits (ICs) and sensors. These form the basis of modern electronics. East Netherlands plays a prominent role in this industry as it has organisations such as MESA+ and High Tech Factory in Enschede, NXP Semiconductors in Nijmegen and roughly 80 small and medium-sized companies located here.

The Business Cluster Semiconductors (BCS) has given a boost to the companies in the semiconductor industry. The cluster helps to establish innovative projects together with companies and knowledge institutes. This magnifies the potential for innovation in the region. Around 60 companies are members of the network.

International partners and customers
Members of the network have undertaken a number of initiatives for developing collective Competence Centers (Shared EDA and Production Services Netherlands). The efforts of BCS have also resulted in at least one new company: Advanced Packaging Center. Members of BCS have also worked together on new areas of application and have approached international partners and potential customers. Examples of these are Innovation2Industrialisation for Advanced Micro- & Nanosystems (page 32) and the SME partner search for the project DAISY (page 20) which is being conducted by Thales.

The Center for Medical Imaging Twente (CMI Twente) has developed new medical imaging technology by using existing technology, such as PET, MRI and ultrasound, or a combination thereof. These technologies can look and photograph inside the body to help find diseases at its earliest stages. This improves the quality of life and reduces healthcare costs. In addition, it enables medical imaging to play a role in facilitating difficult surgeries.

CMI Twente is focused primarily on researching cancer symptoms, especially long, breast and prostate cancers, as well as heart and arterial diseases and neuromuscular conditions. It is foreseen that over the longer term the center will work with hospitals to treat patients directly.

Research and education
CMI Twente is currently setting up a high-tech location in The Gallery in Enschede, which is literally located on the border of science and business. This location is also home to researchers from the University of Twente, Siemens and from the academic research hospitals in Nijmegen and Groningen. Students from the Technical Medicine education program are also present and play an important bridging role between healthcare and technology.

Regional developments
A network of many small- and medium-sized companies, medical specialists and researchers have been created around this open innovation cluster. These parties are all busy with issues around future developments in medical imaging. It is important that the cooperation with these different parties be emphasized in order to help to accelerate innovation and to make the technology available to patients.

Project: Business Cluster Semiconductors East Netherlands

A boost for the semiconductor industry

Project: Center for Medical Imaging Twente

Finding diseases early through medical imaging

"Research should deliver patentable technology that regional companies can bring to market."

Partners: Siemens Nederland, University of Twente – MIRA institute for biomedical technology and technical medicine, University of Groningen, Universitair Medisch Centrum Groningen, UMC St. Radboud

Partners: Point-One, Health Valley, University of Twente, Cost NV and around 60 companies are member of the network

Private R&D investments € 1.556.000
Public R&D investments € 5.995.500
Elicited additional private investments € 1.631.124
Number of supported SMEs 20
Approximate number created jobs 184

www.vimeo.com/35941048
www.cmi-nen.nl
Martijn Kuit
m.kuit@utwente.nl
#cmi
An interview with Director Dennis Schipper from Demcon, a high-end technology supplier

“International innovation? Look for connections at the large companies”

"Demcon is growing and we're increasingly looking for international opportunities. A technology supplier can't afford to only focus on the Dutch market. EU projects have been a great help for us. We've participated in various European projects, such as a large subsidy project with Philips for surgical procedures using robots. Through this project we came in contact with universities and companies from across Europe. This broadens your insight, sharpens your vision towards the future, and can eventually lead to new business opportunities. International projects are a clear part of our growth strategy."

"Teasing your limits"

"I strongly recommend connecting with a large company that has the resources to establish a consortium from the ground up and to be able to properly help these companies get a leg up in the beginning phases. They don't yet have a track record, no product and insufficient cash flow. Kennispark has typically helped these companies get a leg up through networking, helping them establish a viable business case, and subsidies.

"We need to keep the public-private financing possibilities, as companies often need them for rapid growth."
Making high-value sensor technology possible for mass application - this is what the consortium under the leadership of Thales Netherlands is doing. The DAISY project develops radar modules that can be used in various sectors and for many purposes.

**Sensors for everyone**

The new applications will be, as examples, used for coast and harbor monitoring and security and for securing infrastructure. There are also medical applications possible, such as automatic measuring of the behavior of people and animals. In the agricultural and food sectors sensor technology can be used to measure rainfall for hydrology, water management or in growing crops more effectively.

The project brings East Netherlands in a unique position of knowledge and over the longer term can deliver an estimated hundred jobs. The technology is developed as much as possible with the cooperation of potential end-users.

| Private R&D investments | € 2,428,213 |
| Public R&D investments | € 2,423,261 |
| Elicited additional private investments | € 853,192 |
| Number of supported SMEs | 8 |
| Approximate number created jobs | 121 |

**Technical textiles become much smarter with inkjet technology**

Active self-cleaning canvas, sensors on firemen’s protective suits, solar cells on window shades, sheets that can deliver medicine, battle uniforms with integrated electronics: inkjet technology can help develop new properties for technical textiles. This makes technical textiles “smart textiles.”

**Radically new coating concept**

TenCate works with partners for applications for breakthrough technology in printing and coating textile materials. This technology brings new concepts where the properties of materials can be changed. An industrial prototype machine is ready for use and is now located in Nijverdal. Through testing and experience the first industrial production machine, which can be used to produce textile with active coatings, will be operational by the end of 2013.

**Smart textiles are the fabrics of the future.**
Advanced techniques improve healthcare for the elderly and chronically sick

An intuitive lift that you can ride, a towel for treatment and cleaning, a medical diagnosis chip. These are the healthcare innovations that have been brought more rapidly into the market thanks to FieldLab for Client Centered Care.

FieldLab works on accelerated market entry for new healthcare products and services for the elderly and chronically sick. The patients’ needs are the central focus. Advanced machines and technology can help people to be more self-sufficient and for longer, and help caregivers to be more effective and goal-oriented in giving care.

A leap into the market

Many healthcare innovations never make it to market. Most commonly, either the insurance and financing constructions aren’t adequate or too complex, or the innovations don’t conform to common practice in the market. The cooperative structure of FieldLab brings exactly the right innovations to the market that can make that leap to success. In the experimental lab of the partner these innovations are tested and brought to maturity. Fieldlab has brought new insights to introducing innovations in healthcare in Twente. This knowledge is now being spread throughout East Netherlands.

Quick scans

Water is one of the most important ingredients and additives in the food industry. In the food cluster companies have researched together how to find efficiencies in their water usage. Each company analyzed their own quick scans and realized savings with the results.

“WaterProof”

These experiences have lead to the development of “WaterProof” (in Dutch ‘proef’ means ‘test’), an instrument that gives companies a practical way to gain insight into their water usage, costs and potential savings. The WaterProof has been made available to other food companies as well. The food cluster has shared its project knowledge results with the regional branch association Innofood, where approximately 80 companies from food and beverage industry are members. In the meantime, members of the food cluster are now functioning as advisory board within the industry association Innofood.

Project: FieldLab for Client Centered Care

Partners: Medisch Spectrum Twente, Ziekenhuis Groep Twente, Livio, Carintreggeland, Roessingh Research and Development, Saxion University of Applied Science, University of Twente, Novay, TÜV Rheinland Nederland BV, Indes BV, Medimate BV, Farol Telemedicine Consultancy, NieuweWeme Groep, EastBridge BV, JOYinCARE, Axis Media-ontwerpers, city of Enschede, Kennispark Twente, Kempenpark Twente, Croat NZ, Health Valley

Private R&D investments € 170,000
Public R&D investments € 245,000
Elicited additional private investments € 87,170
Number of supported SMEs 12
Approximate number created jobs 28

Project: Food cluster innovation platform

Working towards a sustainable food industry in Twente

The Twente Innovation Platform had for a number of years a food cluster as focus area. Companies from the food and beverage industry worked together towards sustainable innovations. Focus areas were water, energy, packaging and human resource management.

“The food cluster works together to make cleaner water and energy usage.”

Quick scans

Water is one of the most important ingredients and additives in the food industry. In the food cluster companies have researched together how to find efficiencies in their water usage. Each company analyzed their own quick scans and realized savings with the results.

“WaterProof”

These experiences have lead to the development of “WaterProof” (in Dutch ‘proef’ means ‘test’), an instrument that gives companies a practical way to gain insight into their water usage, costs and potential savings. The WaterProof has been made available to other food companies as well. The food cluster has shared its project knowledge results with the regional branch association Innofood, where approximately 80 companies from food and beverage industry are members. In the meantime, members of the food cluster are now functioning as advisory board within the industry association Innofood.

Project: Food Cluster Innovation Platform

Partners: Koninklijke Grolsch, Zuivelhoeve, Bolletje, Johme, Huissel-Versproducten, Zwaneberg

Private R&D investments € 60,000
Public R&D investments € 20,000
Elicited additional private investments € 17,280
Number of supported SMEs 60
Approximate number created jobs 42

www.vimeo.com/33594283
www.fieldlab.eu
secretariaat@fieldlab.eu
@fieldlab
Through minimally invasive surgery (MIS) doctors use long, thin instruments through the stomach lining while they watch on the monitor how the patient’s body is reacting. A disadvantage of the current MIS instruments is that the surgeon cannot feel through them what he’s doing with the tissues. There’s no feedback over, for example, how much pressure needs to be applied to cut through tissue.

An instrument that feels

In Force Reflecting Operating Instruments (FROI) five partners are working on the development of a pre-prototype of an MIS instrument that can also feel and give feedback to the surgeon. The new instrument gives the surgeon detailed information over the tissue that he/she is holding on to. This allows the surgeon to apply only enough force that’s necessary and prevents damage to otherwise healthy tissue.

International market opportunities

Using FROI is expected to change MIC practices for the better. If doctors are better able to feel what they’re doing, it will allow them to work with more precision. In addition, new MIS procedures may now be possible where “tissue feeling” was essential, and where operating with current technology is too risky for the patient. MIS is becoming rapidly more complex for doctors and surgeons to learn to control. This trend leads the project partners to conclude that there are many market opportunities for FROI. A prototype is expected by the end of 2014.

Physiotherapists currently have no trustworthy, routinely available tool in which they can precisely measure what the effects of treatment is on the coordination abilities of the patient. In this project, there has been developed a practical method of 3D monitoring and feedback that converts a tablet into an essential basic tool for every physiotherapist.

Movement sensors

A patient is fitted with a number of belts with wireless movement sensors. An accompanying computer and advanced software allow the movements of the patient to be converted into precise and useful visualizations and measurements of position, coordination patterns and stress. In this manner weaknesses that can lead to possible injury are visible. This allows the therapist to work preventative instead of reactive. The new system will be made appropriate for large-scale use in rehabilitation and physical therapy, ergonomics and sport. Earlier versions of this method have been successfully used in the gaming and film industry, where natural movements have been converted into animated figures.
An interview with Director Gerard Huiberts of the WWINN Group - The Innovators in Micro Manufacturing:

"Innovations in high-tech systems are very close to the market":

"In the high-tech world we are constantly pushing the envelope. Components are becoming smaller, faster and more precise. We are always having to produce more complex components in ever greater numbers. The high-tech world is one of constant challenge."

"Innovations occur, and must occur, faster because they’re based on demand from the market."

"Innovations in our sector occur very close to the market. In the medical world, for example, often it's the innovation that happens first, and then they look for a market for it. We call this "push innovation." In the high-tech sector we’re working more with "pull innovation," where the market is the one that drives the demand. This means that innovations occur, and must occur, faster because they’re based on demand from the market, strategically future-oriented and worldwide."

Success criterion: being complementary

"N-Gap (see page 57) was a challenging project but also a great experience. The reasons for its success? One: all the cooperative partners had a common interest. This is very important. The second is that we had the knowledge and technology, but also that all the organizations were very complementary and had a good understanding of each other's markets.

And, of course, open communication, without a fear of losing control on our technological knowledge, is also very important in this kind of venture. I advise all companies that are running a similar project only to do so with partners that you already know. This way you run less of a risk of a wrong assumption or disappointment."

The project drives the speed

"We either develop these projects ourselves, but by working with the Twente Innovation Platform (now Kennispark) and the government - it helps to build speed. And this is certainly important with high-tech systems: the sooner something is in the market, the better. N-Gap is a commercial success, but we’ve already moved on to the next generation platform."

"Kennispark has an important role for us as network partner. For example, they facilitate the possibility for us to see how other companies work. I’d like to say this to any entrepreneur out there: work well with others and use the entire world as your playground. And make sure you know in which direction you’re headed, both technically and strategically, know what the demand from the market will be in the coming years, and base your innovation strategy on that."

High Tech Factory is a production facility with cleanrooms, laboratories and offices where companies in micro- and nanotechnology can produce their products in high volumes.

The number of companies in micro- and nanotechnology is growing. They have a pressing need for dedicated facilities in which they can bring their products to the market in large scale, but purchasing these machines for themselves is nearly impossible.

High Tech Factory, just a stone’s throw away from the reputable nanotechnology institutes NanoLab and MESA+ at the University of Twente, offers companies access to these facilities and also offers them financing for machines, with lease funding through the High Tech Fund.

In 2008 there were 21 partners who began with 10 projects to build knowledge about the devices associated with their production processes. These projects were successfully completed. The first part of the renewed production facilities was operational at the end of 2010; the second in 2012. The production facility itself was officially opened on 16 May 2013.

Project: High Tech Factory

Opportunities for entrepreneurs in micro- and nanotechnology

"Expensive machines were a bottleneck in the production of microsystems products."

"A disposable chip that costs a maximum of a few Euros isn’t out of reach."

Expensive machines were a bottleneck in the production of microsystem products.

A disposable chip that costs a maximum of a few Euros isn’t out of reach.

Partners: Bronkhorst high-tech, Demcon, EnablingMI, Encapson, IMS, LioniX, Micronit, Nanomi, Ostendum R&D, PhoeniX Software, SmartTip, SolMates, SmartTip, U-Needle, UT International Ventures, University of Twente BPE-group, University of Twente MESA+, University of Twente TST-group, University of Twente WA-group

Private R&D investments € 3,925,771
Public R&D investments € 16,046,620
Elicited additional private investments € 19,972,391
Number of supported SMEs 17
Approximate number created jobs 184

"Only do a project with partners that you already know. This way you run less of a risk of a wrong assumption or disappointment."
A production platform for lab-on-a-chip

Lab-on-a-chip products make it possible to bring the lab to the people, instead of the people to the lab. In this project new knowledge and skills were gained in how to create a production platform for lab-on-a-chip-based products. The research has been completed. There has also been work invested in the further improvement of the chip and its manufacture. In addition, a new cooperative venture has been started in the area of inspection.

A production line for the disposable lab-on-a-chip

Research has being done in the industrial assembly of spray nozzles and their feasibility for application in Medspray’s patented assembly method. This method is used for packaging for other micro-nanochips than their own spray nozzles. The result of the research was a redesign of the spray nozzle without a customary layer of glass. The detection carrier also received its own redesign: instead of the chip carrier and detection carrier being combined, they are now located in two separate work stations. This project delivered two patents.

Detection of microorganisms with Young Interferentie Chip

This project was designed to develop an inexpensive Young Interferentie chip. The development of this chip and its pre-coating mechanism offers valuable input in the development of a disposable chip. The disposable chip should have a cost price of maximum a few Euros. Ostendum is expected to begin production soon in the High Tech Factory.

Spray nozzle assembly

Research has being done in the industrial assembly of spray nozzles and their feasibility for application in Medspray’s patented assembly method. This method is used for packaging for other micro-nanochips than their own spray nozzles. The result of the research was a redesign of the spray nozzle without a customary layer of glass. The detection carrier also received its own redesign: instead of the chip carrier and detection carrier being combined, they are now located in two separate work stations. This project delivered two patents.

Process installation micro- and nanospheres for life sciences

The results of this project are a process installation design for the manufacture of injectable biodegradable microparticles for long term drug delivery. An additional result is a new process technology for the production of microparticles, for chip spray drying.
The goal of this project was to design a generically available spray coating technology with accompanying procedures and software tools that can be used to develop devices with advanced 3D functionality in microsystem technology. The experiment has concluded successfully, statistically relevant information has been collected and the process database software has been optimized. The technology is available in the MESA+ Nanolab.

At Bronkhorst, the market leader in mass flow meters and flow controllers, there was a request for a high-resolution mass flowmeter. This project concerned itself with the possibility for manufacture and commercialization of a MEMS-based micro coriolis production line. The research has delivered, in addition to a working demonstration system, various patents and publications.

The goal is a prototype installation where the feasibility of a mass volume assembly line for fiber chip coupling could be investigated. It should also have been focused on the specific requirements of the application of TriPleX. This is a very broadly applicable planar waveguide technology that has been developed and patented by Lionix.

The technology is intended for the market in mass volumes, such as broadband internet. The project has delivered guidelines and design principles.

Project leader: Bronkhorst, www.bronkhorst.nl

Project leader: Demcon, www.demcon.nl

Project leader: IMS, www.ims-nl.com

The ten subprojects of High Tech Factory

Process development spray coating for MST applications

Study into a universal probe tester

Medisol - Solutions for medical coatings

Research into the manufacture of a micro coriolis flow sensor

Fiber chip coupling assembly

The project has delivered guidelines and design principles.

Project leader: SmartTip, www.smarttip.nl

Project leader: SolMateS, www.solmates.nl

Project leader: MESA+, www.utwente.nl/mesaplus

Project leader: Demcon, www.demcon.nl

Project leader: IMS, www.ims-nl.com

The ten subprojects of High Tech Factory

Process development spray coating for MST applications

Study into a universal probe tester

Medisol - Solutions for medical coatings

Research into the manufacture of a micro coriolis flow sensor

Fiber chip coupling assembly

The ten subprojects of High Tech Factory

Process development spray coating for MST applications

Study into a universal probe tester

Medisol - Solutions for medical coatings

Research into the manufacture of a micro coriolis flow sensor

Fiber chip coupling assembly

The project has delivered guidelines and design principles.

Project leader: SmartTip, www.smarttip.nl

Project leader: SolMateS, www.solmates.nl

Project leader: MESA+, www.utwente.nl/mesaplus

Project leader: Demcon, www.demcon.nl

Project leader: IMS, www.ims-nl.com
I2I, which exists out six R&D subprojects and one cluster development subproject, supports small and medium businesses in the micro- and nanotechnology to bring their technology and prototypes more rapidly to market. The project bundles the knowledge, skills and competencies of the companies associated with the cluster, develops open research and production infrastructure for micro and nanosystems and promotes worldwide the collective knowledge of the cluster.

Open industrial infrastructure
Semiconductors, microelectronic mechanical systems (MEMS), integrated circuits (ICs) form the basis of modern electronics. Many young technology companies in this sector have a need for shared development and production facilities. I2I works together with specific facilities for micro and nano companies who offer these facilities, such as the High Tech Factory in Enschede, the MESA+ Institute at the University of Twente, and the NovioTech Campus in Nijmegen.

Project: I2I: Innovation2Industrialisation for Advanced Micro- and Nanosystems
Project partners: Business Cluster Semiconductors Netherlands, Medspray, Micronit Microfluidics, NovioMEMS, Tf2 devices, SenzAir, UMC St. Radboud, Boschman Technologies, APC, U-Needle, Solmates, Solutions On Silicon, University of Twente, Mecon engineering, A.L.S.I., Radboud University Nijmegen, MASER Engineering

Private R&D investments € 6.891.218
Public R&D investments € 4.987.181
Elicited additional private investments € 11.878.399
Number of supported SMEs 181
Approximate number created jobs 96

MEMS  micro and nanotechnology
High-tech systems
semiconductors

Open industrial infrastructure
Semiconductors, microelectronic mechanical systems (MEMS), integrated circuits (ICs) form the basis of modern electronics. Many young technology companies in this sector have a need for shared development and production facilities. I2I works together with specific facilities for micro and nano companies who offer these facilities, such as the High Tech Factory in Enschede, the MESA+ Institute at the University of Twente, and the NovioTech Campus in Nijmegen.

"Small and medium-sized companies can bring their prototypes and applications more quickly to market."

"The knowledge of regional micro and nano companies is being promoted worldwide."

Project partners: Business Cluster Semiconductors Netherlands, Medspray, Micronit Microfluidics, NovioMEMS, Tf2 devices, SenzAir, UMC St. Radboud, Boschman Technologies, APC, U-Needle, Solmates, Solutions On Silicon, University of Twente, Mecon engineering, A.L.S.I., Radboud University Nijmegen, MASER Engineering

Public R&D investments € 4.987.181
Number of supported SMEs 181
Approximate number created jobs 96

Early detection of diseases
Breath analysis is being used increasingly to detect disease at a very early stage. With this device, patients can receive help more frequently by their family doctor and don’t have to visit the hospital. SenzAir is now producing small numbers of the Breath Analyzer. Ramping up production has been paused in anticipation of the development of a new MEMS chip foundry in Nijmegen.

Project partners: Medspray, Boschman Technologies and APC

A mini-lab at home
With mini-labs people can monitor their own health more easily. This can eliminate medical interventions and lower health costs. The use of mini-labs is growing, but need to continue to be made more user friendly and reliable. This is an enormous challenge. This project is expected to deliver a prototype by 2014.

Project partners: Micront Microfluidics, Boschman, APC

The Medical Breath Analyzer is a project to develop a technology to perform a rapid and inexpensive breath analysis. Gas Chromatography (GC) technology makes it possible to have far smaller and simpler instruments to measure gas compositions in exhaled breath than is now being used. And in a shorter time; instead of 30 minutes, less than one minute. The project partners are researching which particles indicate which symptoms.

In this project partners are working together to develop a home test for thyroid disorders. The home test, that measures blood values which can indicate thyroid disorders, must be as user friendly and reliable as the commonly used pregnancy of diabetes home tests.

A drug inhaler with a new nebulization technique
Medspray has developed together with Boschman and APC an advanced nebulization technique for drug inhalers. Micro and nano-technology spray nozzles with holes smaller than ± 2 micrometer (one-thousandth of a millimeter) are used in micro-inhalers and are filled with a physiological solution. At the end of 2014, an inhaler that was developed by Medspray will be brought for commercial clinical trials. These are the requirements for registration in order to bring this product to market.

Project partners: Medspray, Boschman Technologies and APC

A new technique for rapid and inexpensive breath analysis
The Medical Breath Analyzer is a project to develop a technology to perform a rapid and inexpensive breath analysis. Gas Chromatography (GC) technology makes it possible to have far smaller and simpler instruments to measure gas compositions in exhaled breath than is now being used. And in a shorter time; instead of 30 minutes, less than one minute. The project partners are researching which particles indicate which symptoms.

In this project partners are working together to develop a home test for thyroid disorders. The home test, that measures blood values which can indicate thyroid disorders, must be as user friendly and reliable as the commonly used pregnancy or diabetes home tests.

A mini-lab at home
With mini-labs people can monitor their own health more easily. This can eliminate medical interventions and lower health costs. The use of mini-labs is growing, but need to continue to be made more user friendly and reliable. This is an enormous challenge. This project is expected to deliver a prototype by 2014.

Project partners: Micront Microfluidics, Boschman, APC

A new technique for rapid and inexpensive breath analysis
The Medical Breath Analyzer is a project to develop a technology to perform a rapid and inexpensive breath analysis. Gas Chromatography (GC) technology makes it possible to have far smaller and simpler instruments to measure gas compositions in exhaled breath than is now being used. And in a shorter time; instead of 30 minutes, less than one minute. The project partners are researching which particles indicate which symptoms.

In this project partners are working together to develop a home test for thyroid disorders. The home test, that measures blood values which can indicate thyroid disorders, must be as user friendly and reliable as the commonly used pregnancy or diabetes home tests.

A mini-lab at home
With mini-labs people can monitor their own health more easily. This can eliminate medical interventions and lower health costs. The use of mini-labs is growing, but need to continue to be made more user friendly and reliable. This is an enormous challenge. This project is expected to deliver a prototype by 2014.

Project partners: Micront Microfluidics, Boschman, APC

A new technique for rapid and inexpensive breath analysis
The Medical Breath Analyzer is a project to develop a technology to perform a rapid and inexpensive breath analysis. Gas Chromatography (GC) technology makes it possible to have far smaller and simpler instruments to measure gas compositions in exhaled breath than is now being used. And in a shorter time; instead of 30 minutes, less than one minute. The project partners are researching which particles indicate which symptoms.

In this project partners are working together to develop a home test for thyroid disorders. The home test, that measures blood values which can indicate thyroid disorders, must be as user friendly and reliable as the commonly used pregnancy or diabetes home tests.

A mini-lab at home
With mini-labs people can monitor their own health more easily. This can eliminate medical interventions and lower health costs. The use of mini-labs is growing, but need to continue to be made more user friendly and reliable. This is an enormous challenge. This project is expected to deliver a prototype by 2014.
A microneedle for minilabs

In this project a microneedle is being developed, a so-called body fluid sampler, which can barely be felt by the patient when blood or bodily fluids are being extracted. The microneedle system, made as a handy pen form and intended for lab-on-a-chip applications, can draw bodily fluids painlessly, as well as to store and analyze these fluids.

Product for one-time use

The microneedle design builds on the patented needle technology of U-Needle. Boschman and APC are developing a simple assembly method for the microneedle, and try to keep the price for this foreseen disposable product low.

A demonstration model should be ready by the end of 2014.

An ultrasound that can be made on the sport field

A broken leg on the sport field? In the future, sport medics can perform an ultrasound on the bench. An ultrasound of a fetus? The family doctor can perform one using a handheld, battery operated unit.

User friendly

Microelectromechanical systems (MEMS) are very small electrical mechanical systems, as the name implies. They help to miniaturize electronics. The company NovioMEMS uses new technology from SolMateS to make ultrasound imaging, otherwise known as echography, smaller and more user friendly. The technology also gives the possibility of using new ultrasound applications such as liposuction and wireless communication.

High efficiency thin-film solar cells

A thin-film solar cell that converts at least 26% of sunlight into electricity and is inexpensive to produce would be an enormous breakthrough for solar energy.

New separation technology

At the Radboud university a super-light, inexpensive and high-efficiency thin-film solar cell has been developed. The new separation technology makes it possible to get a thin-film solar cell out of an expensive semiconductor disk (a wafer) where it’s produced. The solar cell has been transferred to plastic and metal foil and in this way the expensive semiconductor wafer can be reused. This drastically reduces the costs of producing thin-film wafers.

Large scale application

This project is intended to be executed in a consortium construction in East-Netherlands until the technology has been further developed and the thin-film solar cells can be produced. Production facilities will most likely take place at the NoviTech campus in Nijmegen. The goal is to convert 17 million thin-film solar cell technology by 2020.

Large scale application

This project is intended to be executed in a consortium construction in East-Netherlands until the technology has been further developed and the thin-film solar cells can be produced. Production facilities will most likely take place at the NoviTech campus in Nijmegen. The goal is to convert 17 million thin-film solar cell technology by 2020.

Project partners: U-Needle, Boschman, APC

Project partners: Tf2 devices, NovioMEMS, Radboud University Nijmegen, Solutions on Silicon, Mecon Engineering and ALSI.

Project partners: NovioMEMS, SolMateS, Solutions-on-Silicon, University of Twente.

Project partners: NovioMEMS, SolMateS, Solutions-on-Silicon, University of Twente.

Business Cluster Semiconductors stimulates knowledge and experience development and management and aims to build an open and accessible development and Production infrastructure for the development and production of advanced (silicon based) micro and nano electronics in the Netherlands.

Within the subproject Cluster Development and Open Infrastructure are the following sub-activities:

1. Cluster development for companies and knowledge institutions, where the core competencies of new innovations for micro and nanosystems will be developed and produced.
2. Open Industrial Innovation Infrastructure, where the necessary facilities to make available micro and nanoelectronics are made available.
3. “Technologies Meet Applications,” where a cooperative possibility between companies in technology and application oriented companies are explored and stimulated.
4. International promotion, where the entire network of micro and nano companies are promoted internationally as a collective whole.

A thin-film solar cell that converts at least 26% of sunlight into electricity and is inexpensive to produce would be an enormous breakthrough for solar energy.

Project name: Thin-Film Lift-Off Technology

Project name: Ultrasound Imaging MEMS Technology

Project name: Ultrasonic Imaging MEMS Technology

Project name: Cluster Development and Open Infrastructure

Strengthening micro and nano companies in the region

Project name: Medical Body Fluid Sampler

Project name: Medical Body Fluid Sampler

A microneedle for minilabs

In this project a microneedle is being developed, a so-called body fluid sampler, which can barely be felt by the patient when blood or bodily fluids are being extracted. The microneedle system, made as a handy pen form and intended for lab-on-a-chip applications, can draw bodily fluids painlessly, as well as to store and analyze these fluids.

Product for one-time use

The microneedle design builds on the patented needle technology of U-Needle. Boschman and APC are developing a simple assembly method for the microneedle, and try to keep the price for this foreseen disposable product low. A demonstration model should be ready by the end of 2014.

Partners: NovioMEMS, SolMateS, Solutions-on-Silicon, University of Twente.
Some IT and software systems are of such strategic interest that their failure could severely disrupt society. Technical systems for energy networks, production systems for oil and gas, or radar systems (so-called time-critical systems) are examples of systems that must be correctly functioning no matter what.

**Longer lifespan**

The six partners of the project INAETICS are working together on innovative improvements in this architecture. Their focus is, among others, an improved quality of both systems and platforms, lower energy use, and using cloud-based technologies in order to distribute computing power workloads.

In addition, time critical systems need to be more reliable and better able to withstand cyber attacks.

**Physical and cybersecurity**

INAETICS focuses on new applications for both physical and cybersecurity in the energy sector. The energy sector has a great deal of interest in the project, according to market research. The project is expected to run until the end of 2015 and is expected to deliver 29 full time jobs in East Netherlands.

Infrared technology that can prevent the road from freezing over. This is what the project partners from this project are working on. This innovative system warms the roadway asphalt from inside, so that the temperature never falls below the freezing point. Roadways using this technology last 25% longer and using salt on the roadway is no longer needed.

Cracks
Ice and snow damage roadways by breaking them open and leaving moisture behind. This moisture in turn freezes which leads to large cracks in the binding material (bitumen) in the asphalt, which then in turn leads to large holes in the roadway. By using new technology to prevent freezing, the roadway can be spared from necessary maintenance.

**Safe and sustainable**

Cars that don’t lose their grip on the roadway will of course avoid accidents, with their resulting damage, both personal and material. Traffic flows more smoothly through an absence of icy surfaces and accidents, which then reduces fuel consumption and CO2 emissions. And finally, the traffic jams that lead to economic losses are also in the past.

The new technology has proven more energy efficient than other electrical systems and has many advantages for example where warm water is pumped through pipes.

**Airport runways**

This technology is also possible for airport runways, bicycle paths and railway platforms. It is expected that this development would deliver about 22 full time jobs by 2016. A possible "control tower" in East Netherlands would monitor the infrared systems. Tire Road Consortium group is working together on this project.

---

**Working towards a more robust IT architecture**

**“Failure of IT architecture can severely disrupt society.”**

**This project makes IT systems more resistant to cyber attacks.”**

**Project: INAETICS**

Project partners: Thales Netherlands, University of Twente, SecurityMatters, OpenSplice, Alliander, Luminis

Private R&D investments € 2.064.230
Public R&D investments € 2.038.843
Elicited additional private investments € 620.357
Number of supported SMEs 3
Approximate number created jobs 29

---

**Project: Infrared Roadway Heating**

**Safely and sustainably travel the road with heated asphalt**

Infrared technology that can prevent the road from freezing over. This is what the project partners from this project are working on. This innovative system warms the roadway asphalt from inside, so that the temperature never falls below the freezing point. Roadways using this technology last 25% longer and using salt on the roadway is no longer needed.

**Cracks**
Ice and snow damage roadways by breaking them open and leaving moisture behind. This moisture in turn freezes which leads to large cracks in the binding material (bitumen) in the asphalt, which then in turn leads to large holes in the roadway. By using new technology to prevent freezing, the roadway can be spared from necessary maintenance.

**Airport runways**

This technology is also possible for airport runways, bicycle paths and railway platforms. It is expected that this development would deliver about 22 full time jobs by 2016. A possible "control tower" in East Netherlands would monitor the infrared systems. Tire Road Consortium group is working together on this project.

Project partners: GFSC Consultants and Engineers, Grontmij Nederland, Reef Intra, TenCate Geosynthetics and Advanced Heating Technologies Netherlands, in cooperation with the University of Twente
Product Innovation through innovative materials

Product innovation often begins with the use of innovative materials. Materials form the basic building blocks of any product. Unfortunately, materials innovations often never leave the laboratories at universities and research institutes. The knowledge never reaches the market.

"Companies can innovate and improve their products with innovative materials."

New materials properties
The Innovative Materials Platform Twente (IMPT) brings to attention innovative materials with often unknown properties. The ambition is to inform small and medium sized companies about the potential of these new materials. Simply knowing about the materials is vitally important in working them into innovative products. The platform has published a list with information about 75 innovative materials.

Design cases
Of the list of 75 materials, 10 have been selected as interesting for a larger group of companies. Materials such as thermoplastic biocomposites, piezo materials, lightweight concrete, insulation materials based on air gel and 3D MID techniques. Demand driven research has led to an assembling of useful information about these materials.

"The IMPT supports small-business owners with knowledge about materials."

in addition, materials-themed congresses have been organized in order to distribute this material. IMPT encourages developers and small-business owners to include the materials in their design cases. It is expected that IMPT will by the end of 2013 have profiled some 10 - 20 material-market combinations and have a number of design cases launched. In the meantime around 75 small-business owners are working together in various constructions in the IMPT, from exchanging knowledge to developing new products together.

Risk capital for innovative companies
The Innovation Fund East Netherlands has helped innovative small-business owners with financing the startup or first development phases of their companies. Innovative startups and first-stage growth companies often find it difficult to raise necessary capital because of the risks that bringing innovation to the market entails.

"The Innovation Fund East Netherlands finances innovative business owners that otherwise would have difficulty raising capital."

Agrofood, Life Sciences, High-tech
The Innovation Fund East Netherlands has helped companies to raise risk capital and in so doing has stimulated innovation and economic growth. The fund is intended for companies in Overijssel and Gelderland that are active in the Agrofood, Life Sciences and High-tech. The fund has been extremely successful and at the moment has been depleted. Over a number of years the first returns on these investments are expected to come in.

Co-financing
This fund extends risk capital under market conditions and requires co-financing from other investors. The financing totaled 1.5 million in the first year to a maximum of € 2.5 million. The Participation Agency East Netherlands (PPM Oost) managed the fund, and the capital itself was supplied by the Dutch government. This fund has been such a success story that it has been a model for similar funds by provincial governments and regional organizations.

Project: IMPT - Innovative Materials Platform Twente

Partners: Saxion University Research Centre for Design & Technology, Industrial Design Centre, BiomimicryNL and the regional business community

Private R&D investments € 918.480
Public R&D investments € 910.480
Number of supported SMEs 75
Approximate number created jobs 18

Project: Innovation Fund East Netherlands

Partners: Participation Agency East Netherlands (regional venture capital company that is part of East Netherlands Development Agency)

Private R&D investments € 0
Public R&D investments € 13.600.000
Number of supported SMEs 35
Approximate number created jobs 147
Renewer of technical education in Twente

A renewer in technical education. This is the mission of the Integral Practice Center (IPC). The IPC uses the newest technologies and machinery in metal, mechatronics, and electrotechniques in educating lower and middle-level vocational students. This center has the ambition to become the predominant center for technical education in Twente.

Small production series

This educational renewer was established in 2009 and has domain over 5,000 square meters of space in the former foundry of Stork in Hengelo. In the meantime, the center is a beehive of training activity. Employees improve their marketable skills at the IPC for use in the job market. Small and medium-sized companies improve their experience with new manufacturing techniques and can have their products produced in small series.

Innovative cooperation

The IPC stimulates innovations in the manufacturing industry in Twente. Businesses come into contact with each other and the way has been clear for new cooperative ventures. The IPC offers a basis for the planned Center for Innovative Craftsmanship in High-tech Systems & Materials.
After a cerebral hemorrhage, many people are partially disabled. The disabled portions of the body can recover, but it requires much effort and time, from the patient as well as a physiotherapist. The robot walks with you

A rehabilitation robot can help people towards a quicker recovery. Lopes is a rehabilitation robot that supports walking movements. A patient steps into the robot as if they’re an extra pair of legs and Lopes walks together with them. Even though the patient does the work of walking, the robot assists when necessary. Rehabilitation is much more effective because the patient is supported very precisely, and is gradually encouraged to continue on their own.

"Lopes, the rehabilitation robot, accelerates recovery following partial paralysis."

Workplaces

The first robot, which was created as a research prototype by the MIRA Institute at the University of Twente, has been tested in various clinical trials. Based on these results various technical companies have developed a new prototype that performs better in a real world rehabilitation setting. After this new prototype has been tested it will go into production. This will result in between 20 and 50 full time jobs for the Twente region.

Project: Lopes - Lower Extremity Powered ExoSkeleton

Quickier recovery with a rehabilitation robot

After a cerebral hemorrhage, many people are partially disabled. The disabled portions of the body can recover, but it requires much effort and time, from the patient as well as a physiotherapist. A rehabilitation robot can help people towards a quicker recovery. Lopes is a rehabilitation robot that supports walking movements. A patient steps into the robot as if they’re an extra pair of legs and Lopes walks together with them. Even though the patient does the work of walking, the robot assists when necessary. Rehabilitation is much more effective because the patient is supported very precisely, and is gradually encouraged to continue on their own.

"Lopes, the rehabilitation robot, accelerates recovery following partial paralysis."

The robot walks with you

A rehabilitation robot can help people towards a quicker recovery. Lopes is a rehabilitation robot that supports walking movements. A patient steps into the robot as if they’re an extra pair of legs and Lopes walks together with them. Even though the patient does the work of walking, the robot assists when necessary. Rehabilitation is much more effective because the patient is supported very precisely, and is gradually encouraged to continue on their own.

Client-oriented innovations

"Then you are talking more about client-oriented innovations than those driven by technology, in which the technology plays a clear role as enabler. The trends in the new economy are healthcare, a graying population and sustainability. Products that match these trends clearly need to be developed together. You interview people as to what their latent questions are. Then you build an ecosystem together, so that together you can answer the question. This, in turn, drives your business.”

"The trends in the new economy are healthcare, a graying population and sustainability."

"You’ve got to innovate around projects in ecosystems"

"It used to be that innovating companies operated in isolation. A textile company such as TenCate, for example, would make new patterns that would be shaped differently each year and this was used for the exact same market groups. In the new economy, you see increasingly that companies work together to come up with intelligent solutions they can offer the end customer. Imagine, for example, that you are looking for intelligent turnout gear; a firefighter’s protective suit. TenCate, in Almelo, can make the fabric, but you also need someone to make the sensors, someone else for the data processing and still someone else to make the suit wearable. This is an ecosystem of innovation. Interacting together at the junction of new economy solutions with the end customer in mind.”

"Innovating in ecosystems stimulates universities to more focused research.”

Focus on concrete results

"Ecosystems exist in the open innovation centers. Here you find people and businesses together. That is the way to do it nowadays. In addition, in 2010 we established the Advanced Materials Manufacturing East Netherlands (AMMON) consortium with several business owners. This group focuses on concrete results. We work on new product-market combinations primarily on the basis of existing technologies. Medium-large multinational are the leaders in this group, mostly because of their distribution channels and access to capital. We match SME’s to appropriate projects, aided by Kennispark Twente in finding the right matches. This group continues to grow and we see over the longer term a strong industrial infrastructure coming out of it.”

Blueprint for ecosystems

"AMMON can be a blueprint for building an ecosystem in manufacturing and having it lead to quick innovation wins. In this way you also stimulate active university research by creating knowledge commercialization. The German industry works with this principle on a far larger scale than we do here. Every German university has a number of commercial enterprises that works on bringing the knowledge to market. In this way, an entrepreneur has easy and quick access to knowledge.”

"Ecosystems exist in the open innovation centers. Here you find people and businesses together. That is the way to do it nowadays. In addition, in 2010 we established the Advanced Materials Manufacturing East Netherlands (AMMON) consortium with several business owners. This group focuses on concrete results. We work on new product-market combinations primarily on the basis of existing technologies. Medium-large multinational are the leaders in this group, mostly because of their distribution channels and access to capital. We match SME’s to appropriate projects, aided by Kennispark Twente in finding the right matches. This group continues to grow and we see over the longer term a strong industrial infrastructure coming out of it.”

"AMMON can be a blueprint for building an ecosystem in manufacturing and having it lead to quick innovation wins. In this way you also stimulate active university research by creating knowledge commercialization. The German industry works with this principle on a far larger scale than we do here. Every German university has a number of commercial enterprises that works on bringing the knowledge to market. In this way, an entrepreneur has easy and quick access to knowledge.”

"Ecosystems exist in the open innovation centers. Here you find people and businesses together. That is the way to do it nowadays. In addition, in 2010 we established the Advanced Materials Manufacturing East Netherlands (AMMON) consortium with several business owners. This group focuses on concrete results. We work on new product-market combinations primarily on the basis of existing technologies. Medium-large multinational are the leaders in this group, mostly because of their distribution channels and access to capital. We match SME’s to appropriate projects, aided by Kennispark Twente in finding the right matches. This group continues to grow and we see over the longer term a strong industrial infrastructure coming out of it.”

"AMMON can be a blueprint for building an ecosystem in manufacturing and having it lead to quick innovation wins. In this way you also stimulate active university research by creating knowledge commercialization. The German industry works with this principle on a far larger scale than we do here. Every German university has a number of commercial enterprises that works on bringing the knowledge to market. In this way, an entrepreneur has easy and quick access to knowledge.”

"Ecosystems exist in the open innovation centers. Here you find people and businesses together. That is the way to do it nowadays. In addition, in 2010 we established the Advanced Materials Manufacturing East Netherlands (AMMON) consortium with several business owners. This group focuses on concrete results. We work on new product-market combinations primarily on the basis of existing technologies. Medium-large multinational are the leaders in this group, mostly because of their distribution channels and access to capital. We match SME’s to appropriate projects, aided by Kennispark Twente in finding the right matches. This group continues to grow and we see over the longer term a strong industrial infrastructure coming out of it.”

"AMMON can be a blueprint for building an ecosystem in manufacturing and having it lead to quick innovation wins. In this way you also stimulate active university research by creating knowledge commercialization. The German industry works with this principle on a far larger scale than we do here. Every German university has a number of commercial enterprises that works on bringing the knowledge to market. In this way, an entrepreneur has easy and quick access to knowledge.”

"Ecosystems exist in the open innovation centers. Here you find people and businesses together. That is the way to do it nowadays. In addition, in 2010 we established the Advanced Materials Manufacturing East Netherlands (AMMON) consortium with several business owners. This group focuses on concrete results. We work on new product-market combinations primarily on the basis of existing technologies. Medium-large multinational are the leaders in this group, mostly because of their distribution channels and access to capital. We match SME’s to appropriate projects, aided by Kennispark Twente in finding the right matches. This group continues to grow and we see over the longer term a strong industrial infrastructure coming out of it.”

"AMMON can be a blueprint for building an ecosystem in manufacturing and having it lead to quick innovation wins. In this way you also stimulate active university research by creating knowledge commercialization. The German industry works with this principle on a far larger scale than we do here. Every German university has a number of commercial enterprises that works on bringing the knowledge to market. In this way, an entrepreneur has easy and quick access to knowledge.”
Smart cooperation on innovations in manufacturing

A fully automatic meat slicing machine, a new coating technique for lenses, halal chicken and fish specialities - these are examples of new, innovative products that have come from the treasure chest that's the manufacturing industry in Twente.

Niche markets

Because of high costs, many manufacturing companies not only leave innovations on the table, but also new market opportunities. One answer to this problem is through a bundling of the resources of each others' specialities. In Main MEP, companies have worked together in a smart and multidisciplinary way on concrete product and process innovations. Professionally guided, these companies worked in internationalization, increasing added value and innovations in products and markets. Cooperation and strengthening of job opportunities are top of the list.

Partners: STODT, see Business cases MAIN MEP

"A new mobile system that warns railway workers of impending danger."

www.vimeo.com/28758587
www.main-network.nl
Joost Kuijper
j.kuijper@stodt.nl
#mainmep

A fully automatic meat slicing machine

The Quality Slice: a fully automatic meat slicing machine, developed for supermarkets. The consumer gets the chance to choose what meat they want, how many slices and the thickness of the slices.

A prototype of the Quality Slice is now being designed.

Plastic and ceramic lenses have many adaptations for industrial optical systems. The partners of this project have developed a unique coating technique that protects plastic or ceramic lenses using any desired coating at low cost. Various coatings are now being tested.

A prototype of the Quality Slice is now being designed.

A unique coating technique for lenses

A production line for static coolers

Statiq Cooling and Tebrutech are working together on a complete product line for the production of unique cooling unit interiors. These are cooling systems that only allow 15% of the energy to escape as in normal air conditioners. These machines are expected to be soon in production.

Private R&D investments € 5.648.000
Public R&D investments € 7.249.966
Civic and other private investments € 2.282.940
Number of supported SMEs 45
Approximate number created jobs 114

www.vimeo.com/21742309
www.vimeo.com/2263319
www.vimeo.com/21384771

Partners: TCPM-Oost, De Koninck, Braakhuis
Partners: Sumipro submicron lathing, SolMateS, Dineo
Partners: Statiq Cooling, Tebrutech
The Optical Precision Scanner

Innovative road salt spreaders

Production installations for small series

Custom software for flexible production

A widely implementable pump

for small series

Small series manufacturing and declining follow-up orders lead many companies to suffer high conversion costs and extra work. This project has been successfully completed.

Machining is an industrial design technique that is used in many companies. By using a drill, cutter, chisel or plane material is worked until it assumes the desired shape or thickness. In this project new flexible automated production installations are developed for small-series production from 5 to 500 pieces. The technical development is finished. A demonstration production cell is now being made.

Not only small, but also large machine and installation parts need to be made with high precision. The company Boessenkool makes large parts for, among others, dredging vessels and compressors. The company wants to be able to make parts that are more than two meters long to a specification of as exact as 5 micrometers (5 thousandth of a millimeter). A demonstrator model has been prepared.

A new, innovative design for road salt spreaders and a production design that prevents waste. This project has been successfully completed.

A new vision system for the maritime industry

Goal: development of new vision systems for the maritime industry. Focus in this project is the improvement of vision while manning the bridge on ships and work platforms.

This improved the working conditions, ergonomics and safety. The technical prototype is ready. Currently the cost price is being reduced, among other improvements.

www.vimeo.com/24770434

www.vimeo.com/50295816

www.vimeo.com/23584527

www.vimeo.com/25763944

www.vimeo.com/20684527

New vision system for the maritime industry

Business Cases MAIN MEP

Partners: Boessenkool, Sumipro

Partners: Auto-Cell, CMT

Partners: CNC-Netlink, Visioneq Innovations

Partners: Petrol, Engineering Medium, Aebi Schmidt (Nido Universal Machines)

Partners: Breidel Hose Pumps, Stevens Idé

Partners: Theunissen Tech. Trading, Stevens Idé Partners

Partners: Modulen & Engineering Medium, Aebi Schmidt (Nido Universal Machines)
A newly automated spraying process

Business Cases MAIN MEP

An alarm system for railway workers

Uniform designs

Xigo: a handheld terminal for outpatient caregivers

A new machine for styrene filtering

Halal chicken and fish specialties

In this project the process of cleaning and lacquering two component surfaces of centrifuge products so that the installation is economical, labor non-intensive, environmentally friendly and innovative.

It deals with the entire process after machining, therefore cleaning, degreasing, drying, lacquering all the way to packaging. The design and prototypes are ready. The next step in the innovation process is to find a suitable production installation.

Many accidents occur because railway workers aren’t aware of an oncoming train. Within the project Train Alarm System (TAS) a mobile and wireless system has been developed where railway workers are personally warned of impending danger. A prototype is being tested. Certification for the Dutch market is now being pursued.

Machine factory Almi and the design bureau People Creating Value have developed together a block cutter with more added value. With the aid of uniform design rules the production process can be automated, which reduces the cost price. Various prototypes are being manufactured and tested.

The developing of a handheld terminal that has been designed for outpatient caregivers in healthcare, including back and front office software. The module as well as the communication and control system are ready and are now being submitted to long term testing at two different test locations.

The solvent styrene is used in polyester processing. It’s necessary for the process, but it can be harmful for those working with it. There has been a new machine developed that cleans the air where styrene is being used. The styrene is trapped in a filter trap and the clean air is cycled back into the factory without any heat dissipation. The installation is now being subjected to rigorous testing.

The solvent styrene is used in polyester processing. It’s necessary for the process, but it can be harmful for those working with it. There has been a new machine developed that cleans the air where styrene is being used. The styrene is trapped in a filter trap and the clean air is cycled back into the factory without any heat dissipation. The installation is now being subjected to rigorous testing.

KPH Chicken Specialties has developed a varied chicken and fish specialty that conforms to Halal regulations. Decon Food Equipment delivers the equipment. There has also been a corresponding production method developed: a mixing machine that keeps the structure of the product in shape. The chicken and fish are processed into deep frozen bars. They are cut into slices for the meal, and the product is then prepared for market.

Partners Aeronamic, Emotech

Partners: Holland Railway Safety, Hortec

Partners: People Creating Value, Almi Machinefabriek

Partners: Mic-O-Data, 2-GO Mobile

Partners: Propede Products, Euro Plastics Holding, Plasticon the Netherlands, Sygan

Partners: KPH Chicken Specialties, Decon Food Equipment
"Continuing education delivers better business results"

"We invest heavily in education, training and development at Apollo Vredestein. For years we’ve been working with our new personnel policy where the central focus is on talent development. In practice this means around half of our 1,500 employees in Enschede follow a course or training every year. That in itself says something."

"Better trained people leads to better business results."

Own vocational training school for operators

"We’ve got a flat organization with lots of personal responsibility on the workfloor. Not only talent development, but also very important are educational factors that can improve the way we work together and the way we communicate."

"Around half of our 1,500 employees in Enschede follow a training course every year."

Forcing cultures

"Recently the Apollo Group, which has owned Vredestein since 2009, decided to locate their R&D center for car tires here in Enschede. For the entire group, based on the knowledge and experience in Twente. There are R&D specialists from the parent company, located in India and Africa, working here at the Technical Center Enschede. It’s really a trick to bring 100 people from different cultures all together and forge together an innovation group that delivers value. We also perform project research that is subsidized through facilities managed by Kennispark Twente and we work intensively with universities.

"R&D is a strategic investment that leads to ever further growth in job opportunities."

Radiating effects of R&D

"The new R&D Center has a clear radiating effect towards other businesses in the region, especially small and medium businesses. R&D is a strategic investment that leads to ever further growth in job opportunities. And this impact takes place all over Twente. But this means that each and every company must themselves continue to invest in R&D, to be competitive in the near and in products. Only companies that differentiate themselves in this way can continue to grow over the long term."

"Thermoplastic composites have been called the material of the future."

Material of the future

Thermoplastic composites, using fiber reinforced plastics, have been called the material of the future. The material is very light, sturdy, durable and can be produced using far lower energy costs than aluminum or metal. The companies that are working together in this project expect to complete their materials research by the end of 2014. They then move to the next phase of the project with the most appropriate material for a pressure vessel container.

Automated production

The new tank container needs to be able to be used over the entire world, and the costs need to be roughly equivalent as those currently used. This same consortium has experience with these materials and transport sector, having earlier developed a lightweight composite loading bed for dump trucks. These loading beds, the container tank and a third product developed by the consortium, composite truck wheels, are all expected to begin production by 2015. The location for production will be in an automated factory built in the province of Overijssel.

Project: MAX-ISO ADD-ON
An ISO container tank for transport that’s light and durable

Many different liquids are transported using container tanks, over road, rail and water. The tanks now being used are mostly made of steel, which adds to the weight of transport. The MAX-ISO ADD-ON project is constructing 20-foot tanks not from steel, but with thermoplastic composites. This is expected not only to result in tanks that are lighter, but also larger than those currently used. Those new material tanks will have a tare weight that is at least 1.5 tons lighter than those from steel, and have a net carry capacity that is 15% larger (24 m³ to 30 m³).

Thermoplastic composites have been called the material of the future.

The new tank container needs to be able to be used over the entire world.

"Thermoplastic composites have been called the material of the future."

Material of the future

Thermoplastic composites, using fiber reinforced plastics, have been called the material of the future. The material is very light, sturdy, durable and can be produced using far lower energy costs than aluminum or metal. The companies that are working together in this project expect to complete their materials research by the end of 2014. They then move to the next phase of the project with the most appropriate material for a pressure vessel container.

"R&D is a strategic investment that leads to ever further growth in job opportunities."

Radiating effects of R&D

"The new R&D Center has a clear radiating effect towards other businesses in the region, especially small and medium businesses. R&D is a strategic investment that leads to ever further growth in job opportunities. And this impact takes place all over Twente. But this means that each and every company must themselves continue to invest in R&D, to be competitive in the near and in products. Only companies that differentiate themselves in this way can continue to grow over the long term."

"Thermoplastic composites have been called the material of the future."

Material of the future

Thermoplastic composites, using fiber reinforced plastics, have been called the material of the future. The material is very light, sturdy, durable and can be produced using far lower energy costs than aluminum or metal. The companies that are working together in this project expect to complete their materials research by the end of 2014. They then move to the next phase of the project with the most appropriate material for a pressure vessel container.

Automated production

The new tank container needs to be able to be used over the entire world, and the costs need to be roughly equivalent as those currently used. This same consortium has experience with these materials and transport sector, having earlier developed a lightweight composite loading bed for dump trucks. These loading beds, the container tank and a third product developed by the consortium, composite truck wheels, are all expected to begin production by 2015. The location for production will be in an automated factory built in the province of Overijssel.

Project: MAX-ISO ADD-ON
An ISO container tank for transport that’s light and durable

Many different liquids are transported using container tanks, over road, rail and water. The tanks now being used are mostly made of steel, which adds to the weight of transport. The MAX-ISO ADD-ON project is constructing 20-foot tanks not from steel, but with thermoplastic composites. This is expected not only to result in tanks that are lighter, but also larger than those currently used. Those new material tanks will have a tare weight that is at least 1.5 tons lighter than those from steel, and have a net carry capacity that is 15% larger (24 m³ to 30 m³).
Masters of the Future in Twente is the number one meeting place where entrepreneurs and investors can come together. Innovative startups and first-phase growth companies can all vie to obtain risk capital by presenting their business cases to potential investors.

Pioneers in the market
Masters of the Future gives information sessions, workshops and makes sure the business proposals get to the right investors. The network is especially intended for young, innovative startups, first-phase growth companies and pioneers in the market, that in addition to capital investment can also benefit from the knowledge and skills of a venture capitalist. Informal investors go a long way to improving the business environment for young companies.

Masters of the Future in Twente in 2014, four years after its founding, an expanding network with active investors that is expected by then to have seen the business plans of some 320 companies.

Anaerobic decomposition (decomposition without oxygen) of organic materials in wastewater is, together with membrane filtering, an interesting sustainable purifying concept especially for the food industry. Local purifying and reuse of wastewater can be made both technically and economically feasible.

Membrane bioreactor
Using a membrane with anaerobic wastewater treatment can improve the conversion of organic material into biogas. In addition to higher biogas yields, the water is far cleaner, which makes it more suitable for reuse. In cases where the treated water is discharged as sewage, cleaner water means lower discharge costs. This project has led to the first commercial breakthrough by a food company in the Netherlands. The project partners have developed and tested in the market an innovative, compact and future-oriented purifying concept for relatively small or concentrated organic wastewater streams.

Less water and gas consumption
The developed AnMBR not only produces biogas, but also makes wastewater reuse possible, which means companies can save significant costs by conserving water and gas consumption. The new technology has enormous market potential and can deliver dozens of new jobs for the region.

Wastewater sustainably treated with the Anaerobic Membrane Bioreactor (AnMBR)
An aerobic decomposition decomposes without oxygen of organic materials in wastewater is, together with membrane filtering, an interesting sustainable purifying concept especially for the food industry. Local purifying and reuse of wastewater can be made both technically and economically feasible.

Membrane bioreactor
Using a membrane with anaerobic wastewater treatment can improve the conversion of organic material into biogas. In addition to higher biogas yields, the water is far cleaner, which makes it more suitable for reuse. In cases where the treated water is discharged as sewage, cleaner water means lower discharge costs. This project has led to the first commercial breakthrough by a food company in the Netherlands. The project partners have developed and tested in the market an innovative, compact and future-oriented purifying concept for relatively small or concentrated organic wastewater streams.

Less water and gas consumption
The developed AnMBR not only produces biogas, but also makes wastewater reuse possible, which means companies can save significant costs by conserving water and gas consumption. The new technology has enormous market potential and can deliver dozens of new jobs for the region.

Private R&D investments
Public R&D investments
Elicited additional private investments
Number of supported SMEs
Approximate number created jobs

Partners: Kennispark Twente, Oost NV, intermediate organizations, innovative startups and first-phase growth companies in the region of Twente

Private R&D investments
Public R&D investments
Elicited additional private investments
Number of supported SMEs
Approximate number created jobs
A graying population means an increase in the number of chronic diseases and associated healthcare costs. MIAS focuses on the results of this ageing population. The German-Dutch project builds on a crossborder innovation platform in the area of medical technology and stimulates cooperation between small and medium-sized businesses and research institutions.

**Quality of life**
Medical technology can improve the quality of life for the chronically ill and allows the ageing to retain their independence and their place in society longer. Technical aids can support these people in their daily activities or allow them to rehabilitate on their own. These technologies can also help lower the costs of healthcare.

MIAS focuses mostly on new, advanced products and services. There have already been a number of technical appliances that have been delivered, such as the lifter and a wheelchair that supports the patient with an electric motor. These developments bring to the region cooperation, knowledge gains, high-value job opportunities and contact with the German market.

A multifunctional agricultural machine that solves soil compaction

Worldwide, arable land is shutting down. The soil closes shut, which leads to a killing off of organic activity and seals off the surface from water. Agricultural machines now in use are inadequate in the battle against soil compaction.

**Electric tractor**
The machine company Boessenkool, Wissels Technique and Van Ham Organization & Consulting have developed together a new agricultural machine that can be used for many functions and is effective against soil compaction. The Multitooltrac is an electrically operated tool carrier that contains various modules. It can operate as a riding tractor, a surveying machine as well as a sustainable electric tractor.

**Sustainable and economical**
Diesel fuel is no longer subsidized by many governments, which means farmers are confronted with increasing fuel costs. An electric tractor is not only more environmentally friendly than diesel, it can also lower operating costs. This project, which is expected to run to the middle of 2014, the three companies are also working together with the University of Wageningen.

### Project: MIAS - Medical Technology Innovations for an Ageing Society

**Partners:** Fachhochschule Münster, Indes, Roessingh Research and Development (RRD), Innotronic, Use-Lab, Handicare, JoyinCare, University of Twente, Demcon, Tic Medizintechnik, Oost NV, TIMP

| Private R&D investments | € 2.178.219 |
| Public R&D investments | € 5.482.513 |
| Elicited additional private investments | € 1.355.950 |
| Number of supported SMEs | 8 |
| Approximate number created jobs | 63 |

### Project: Multitooltrac

**Partners:** Machine company Boessenkool, Wissels Technique and Van Ham Organization and Consulting

| Private R&D investments | € 463.940 |
| Public R&D investments | € 463.940 |
| Elicited additional private investments | € 163.234 |
| Number of supported SMEs | 3 |
| Approximate number created jobs | 8 |

Links:
- www.vimeo.com/34608826
- www.mias-info.eu
- Remco Hoogendijk: remco.hoogendijk@oostnv.nl
- #mias

Links:
- www.facebook.com/MultiToolTrac
- Eelco M. Osse: eelco@boessenkool.com
- #Multitooltrac

Links:
- Partners: Fachhochschule Münster, Indes, Roessingh Research and Development (RRD), Innosmart, Use-Lab, Handicare, JoyinCare, University of Twente, Demcon, Tic Medizintechnik, Oost NV, TIMP

Links:
- Partners: Machine company Boessenkool, Wissels Technique and Van Ham Organization and Consulting
The loss of a hand or part of an arm through amputation can be a shocking occurrence. If only because of all the various functions a person’s hand performs, such as fine motor skills, touch and non-verbal communication. In the Netherlands, this happens to approximately 60 people every year.

Many prosthetics in use
An arm-hand prosthetic needs to be able to replace these functions, but the current mechanical and myoelectrical prosthetics are quite limited. (A myoelectric prosthesis is an electrically controlled prosthesis that uses electrodes mounted within the socket to receive electrical signals from the muscle contraction.) Mostly the user can only open and close their hand. Intuitive control or feedback is absent. It is estimated that some 70% of fitted prosthetics stay unused.

Making more movements
In the MyoPro project an arm-hand prosthetic has been developed where the patient can control the movements in an intuitive and natural manner. The user receives feedback from the prosthetic.

Components for mobile consumer electronics are becoming increasingly smaller. Chips, speakers, microphones, cameras – the miniaturization continues and market demand continues to rise.

Unique modular construction
The current generation of microsystems needs to be produced with very exact standards. Using rapid and flexible machines, as the mobile consumer electronics market has an ever shorter shelf life.

Four companies in Twente, together with the University of Twente, have developed a production platform with a unique, modular construction. This high-tech machine, the ProfiAsPro, produces a large variety of products rapidly, accurately and flexibly.

A gap in the market. It is expected that the ProfiAsPro will find a huge market in Asia and especially China. Also in this machine’s future are the possible production of microproducts for the medical market.

By working together, the four companies have been able to make a huge leap in technology and have unlocked a new market. This is expected to lead to new orders and a growth in job opportunities.
“Large and small companies can strengthen each other”

“What’s project DAISY? It’s technology to place radar on a chip. It’s very new – never been developed. We’re trying to integrate the technology largely on one single chip, where we can build radars from many different sizes. Thales is doing this in cooperation with NXP, and in consortium with a number of small and medium-sized businesses that have specific knowledge that Thales doesn’t have in-house.”

Best of both worlds

“Smaller companies are looking more often than we are at various application fields, where their technology can be used widely. Thales develops very specific applications. What’s great is the combination of their broad and our focused view. And smaller companies have the flexibility to adapt their portfolios quickly to trends in the market. This gives them great added value. When smaller companies work together with a large company like Thales, the result is not only a lot of new applications, but also volume. The small companies have more knowledge, applications and end-applications that are either different than ours or entirely unknown by us. In this way we strengthen each other, and by working together you get the best of both worlds.”

Radar for weather monitoring

“There can be unexpected combinations from the network of Kennispark Twente. It’s out of this network that the DAISY project found a small company that specializes in water management. A partner that Thales wouldn’t otherwise have considered. But we’ve found that there is interest from meteorologists for radar systems that can monitor local rainfall patterns. This partner is focusing on an application of our chip that can work in monitoring weather.”

High risk

“The idea that large companies have enough funds for large projects is only partially true. Working with new, breakthrough technology comes with a large measure of risk. And, as they say, you can only spend your Euro once. This means that setting up a consortium with others isn’t necessarily the most logical step. Public co-financing mechanisms are, therefore, very important. It’s unfortunate that this is becoming less frequent - it’s not good for regional innovation stimulus.”

Project: Network GMA (Crossborder Machine and Apparatus Construction)

Crossborder networking in manufacturing

The Network GMA promotes cooperation between Dutch and German companies in manufacturing. The network organized trade missions to industrial regions in Europe and presents itself at international trade shows. Industrial small and medium-sized businesses find new contacts here, as well as exchanging knowledge and experience.

Marketing opportunities in Germany

Market innovations, process renewal and knowledge transfer are the goal, focused on the transport, food, environmental, energy and plastic technology markets. The German market is, by comparison, large and offers many marketing opportunities for Dutch entrepreneurs. The new contacts that the network has forged has led to various innovations, successful market introductions and an improvement in production processes by both Dutch and German partner companies.

New curricula

The Handwerkskammer (Skilled Labor Bureau) Münster and STODT have invested in new production technology and training curricula in the area of robotic welding, plate metalworking, and machining.

Partners: Handwerkskammer Münster, Handwerkskammer Osnabrück, Syntens, United Manufacturing Industry East Netherlands (Verenigde Maakindustrie Oost), STODT Toekomsttechniek

Private R&D investments € 2.235.061
Public R&D investments € 5.448.475
Elicited additional private investments € 1.377.686
Number of supported SMEs 35
Approximate number created jobs 58
The skin is the largest human organ. One and a half to two square meters of surface area covers the body, protecting it against damaging effects, regulates its temperature and has feeling. Despite this, there is relatively little insight into how products and materials interact with the skin.

Laser technology

A new method of detecting damage to the skin, developed by the University Medical Center St. Radboud, may change all this. The new imaging technology makes it possible, using laser light from outside, to look at the skin in closer detail than ever before. The technology removes the need for skin biopsy and can facilitate research into how the skin reacts in contact with various substances.

Skin sensitive products

New Business by Enhanced Skin Comfort is working with the new imaging technique to develop applications. The initial product will be focusing, among others, on artificial grass fields and sport floors to see if falls can be less damaging, shaving apparatuses to see if they can be more skin sensitive, artificial skin and new measuring apparatus and test techniques. In the meantime they’ve laid artificial grass fields where biomedical research can be performed.

Patients with high blood pressure, chronic kidney failure, heart and arterial disease can soon monitor all of the symptoms at home using a mini-lab. The mini-lab, as small as a pack of sugar, uses the lab-on-a-chip technology from the MESA+ Institute at the University of Twente. One drop of blood or urine is all it takes for the patient to measure for themselves their medical condition. This saves time visiting the doctor or laboratories and makes it possible to get an instant diagnosis.

A combination chip

The Medimate company works together with partners to create a multi-labchip that measures the values of sodium, potassium and creatinine in the blood or urine. In the meantime the labchip can measure sodium in the urine and this is now being tested in the market. The research looks into the possibility of having a combination of measuring all of the above-named substances in one go. This will make it possible for a patient, using one single measurement at home, to get a clear picture of their health.

The future: more skin sensitive materials

New minilab gives possibilities for independent, home-care patients

Patients with high blood pressure, chronic kidney failure, heart and arterial disease can soon monitor all of the symptoms at home using a mini-lab. The mini-lab, as small as a pack of sugar, uses the lab-on-a-chip technology from the MESA+ Institute at the University of Twente. One drop of blood or urine is all it takes for the patient to measure for themselves their medical condition. This saves time visiting the doctor or laboratories and makes it possible to get an instant diagnosis.

"The mini-lab saves the patient time in visiting the doctor and laboratory."

"Natrium, potassium and creatinine can be measured in the blood with the new chip."
Combine artificial grass technology with water filter technology and you’ve got a new field for water management. This particular bundling of core competencies can be applied worldwide at sport areas and landscaping. GreenSource is not only knowledgeable in the area of water scarcity and water pollution, but also helping regions that suffer from a temporary water surfeit or flooding through rain. The new water purifier has been developed through open innovation between TenCate, Wavin and Pentair X-Flow. This is OICAM’s first demonstration project.

"Artificial grass as a basis for sustainable water filtration and water buffering."

In OICAM at Nijverdal a number of companies and knowledge institutes work together on industrial research. They work together to build demonstrators and test prototypes in preparation for industrial production. In the Open Innovation Center the focus is on high-value materials and material technologies. Advanced materials play an important role by providing technological innovations, and add to the search for economically viable applications.

Other innovations that are being looked at within OICAM are new applications for biopolymers, recycling and composite materials.

"Bone is cultivated in a bioreactor from stem cells taken from cartilage."

The future is with open innovation and advanced materials. A new line of bone substitutes.

Project: Perfectors

A new line of bone substitutes

Every year some 100,000 Europeans undergo replacement surgery for their loose fitting artificial hips. This hip replacement surgery works to secure artificial hips to living bone tissue in the upper thigh. During such an operation, it is often observed that living bone has retracted from the old artificial hip. Increasingly bone from donors has been used to help the defective hip recover. But bone from donors is increasingly hard to come by and frequently leads to infections.

"Bone from a jar"

The partners in the Perfectors project have developed a new generation of bone replacement. They inject antibiotics into fragmented and demineralized bone to improve its condition. The growth substance BMP is then injected to help it grow. Lastly, the three partners work on a revolutionary new bone substitute, DCM. DCM is cultivated in a bioreactor from stem cells taken from cartilage. The new bone substitute is being tested in clinical studies with patients who are undergoing hip revision operations.

Project: OICAM - Open Innovation Center Advanced Materials

"Artificial grass as a basis for sustainable water filtration and water buffering."

Demonstrators and prototypes

In OICAM at Nijverdal a number of companies and knowledge institutes work together on industrial research. They work together to build demonstrators and test prototypes in preparation for industrial production. In the Open Innovation Center the focus is on high-value materials and material technologies. Advanced materials play an important role by providing technological innovations, and add to the search for economically viable applications.

Other innovations that are being looked at within OICAM are new applications for biopolymers, recycling and composite materials.

"Bone is cultivated in a bioreactor from stem cells taken from cartilage."

The future is with open innovation and advanced materials. A new line of bone substitutes.
The Pioneering Foundation is working on developments and applications for new technologies and processes in construction. This includes climate neutral renovations, smarter laying of roadways and further development of flexible building concepts. The goal is to help construction in Twente to become a market leader in innovation and innovative entrepreneurship.

Companies, contractors and institutions have been working since 2009 on:

- Strengthening of high-tech systems and materials (HTSM) in the construction industry. Through research, further development and preparation for production of new materials and advanced applications, Pioneering increases the image of high-tech in construction. This occurs, among other ways, through experimental, sustainable and flexible buildings that are now being developed.
- Strengthening of sustainability in construction by developing optimized production processes, converting existing buildings and homes to be more sustainable, and promoting and developing climate neutral building. Innovative processes are especially useful in the converting and reuse of existing buildings.
- Stimulating and implementing innovative processes such as Building Information Modeling, Systems Engineering and Result-oriented Real Estate Maintenance. There is opportunity especially here for the innovative contractor or business.
- Lifelong building through flexible concepts for healthcare facilities and office buildings.

In Pioneering there are currently more than 130 partners working together on concrete innovations. More than 70 people are active in 9 workgroups. A network of 200 people from the entire construction value chain as well as knowledge institutes such as Saxion, University of Twente and the ROC in Twente meet regularly together. Especially in these times the interactions have delivered much inspiration and innovation.

Rapid manufacturing is seen as the production method of the future. It is a collective term for techniques where products are built layer upon layer. A digital design, for example through a 3D printer, is taken shape directly as product. The advantages are fast production in small series and custom designed.

"After a simple scan rapid manufacturing can make an exact copy of a bone."

The Rapid Manufacturing Center (RMCenter) Twente aims to bring this new technology to the manufacturing industry in Twente. RMCenter is working on a business network and offers a podium for innovations, as well as launching projects that experiment with rapid manufacturing.

Partners: Verenigde Maakindustrie Oost (VMO), VentureLab Twente, 3d ModelFactory, 3D Worknet, University of Twente, Saxion University of Applied Sciences, STODT Toekomsttechniek

Project: Pioneering, Innovative entrepreneurship in construction

Leader in modern construction techniques and processes

In Pioneering there are currently more than 130 partners working together on concrete innovations. More than 70 people are active in 9 workgroups. A network of 200 people from the entire construction value chain as well as knowledge institutes such as Saxion, University of Twente and the ROC in Twente meet regularly together. Especially in these times the interactions have delivered much inspiration and innovation.

In Pioneering there are currently more than 130 partners working together on concrete innovations. More than 70 people are active in 9 workgroups. A network of 200 people from the entire construction value chain as well as knowledge institutes such as Saxion, University of Twente and the ROC in Twente meet regularly together. Especially in these times the interactions have delivered much inspiration and innovation.

Partners: Saxion University of Applied Science, University of Twente, ROC.

You can see a complete list of participating organizations on page 94.

Private R&D investments € 13.274.893
Public R&D investments € 8.969.417
Elicited additional private investments € 3.937.243
Number of supported SMEs 110
Approximate number created jobs 221

www.vimeo.com/23243228
www.pioneering.nl
info@pioneering.nl
@StPioneering

Project: RMCenter Twente

Rapid manufacturing: production method of the future?

Rapid manufacturing is seen as the production method of the future. It is a collective term for techniques where products are built layer upon layer. A digital design, for example through a 3D printer, is taken shape directly as product. The advantages are fast production in small series and custom designed.

Experimenting

The Rapid Manufacturing Center (RMCenter) Twente aims to bring this new technology to the manufacturing industry in Twente. RMCenter is working on a business network and offers a podium for innovations, as well as launching projects that experiment with rapid manufacturing.

Partners: Verenigde Maakindustrie Oost (VMO), VentureLab Twente, 3d ModelFactory, 3D Worknet, University of Twente, Saxion University of Applied Sciences, STODT Toekomsttechniek

Private R&D investments € 340.000
Public R&D investments € 155.000
Elicited additional private investments € 106.920
Number of supported SMEs 12
Approximate number created jobs 63

www.vimeo.com/32969828
www.rmcenter.nl
info@rmcenter.nl
#rmcenter

64
65
An interview with Pia Snijder, Director Global Technology Alliances and Strategy at Boeing, the founder of ThermoPlastic composite Research Center (TPRC).

"A physical location is essential: that brings energy"

"Collaboration is in Boeing’s blood. We have over 25,000 partners spread over the entire world. In 2004 we developed an open innovation model for technical collaboration. This one center has now grown to sixteen in total. Each company that has their own technology focus can participate in the research center. The centers are physical locations located as closely as possible to the value chain. A physical location means that there is face-to-face contact between the people. Face-to-face is essential, as it leads to an energetic environment and accelerates innovations. You need passionate drivers and trust is essential."

"Another hallmark of our collaboration is we treat intellectual property in an exceptional way: all research results are shared and the participants have a sort of membership which gives them a free license for use. Also at TPRC all research results are shared and there is a model for cooperating with competitors."

Thermoplastic composites: niche market

In TPRC’s beginning, it was difficult to find researchers. Thermoplastic composites is really a niche market. It’s much better now, because of the reputation we’ve built. There are now ten members, most from aircraft manufacturing, and we’re getting lots of international attention. To be able to predict the properties of thermoplastic composites in production processes is very new and this is exactly the field that TPRC research has been focusing on.

Support from local partners is essential

"With startups such as TPRC it takes awhile to see return on your investment. This means that everything is dependent on government and semi-public partners. Not only for financial support, but also to help you navigate the jungle of rules and regulations. As a globally operating company you’re not always familiar with the local or regional climate, and a local partner is essential. The Twente Innovation Platform has lobbied hard for us and the East Netherlands Development Agency (Oost NV) has also done a lot of work. We’ve received excellent support. You’ve really got to take the long view doing research and public partners and financing who are there for the long haul are crucial."

Patients with ADHD, depression or epilepsy are sometimes helped with a therapy that stimulates the brain with a magnetic pulse. Immediately above the head a short, very strong magnetic field is generated that gives the brain a painless jolt. This technique is called Transcranial Magnetic Stimulation (TMS).

Robot is more exacting

In this project a robot arm has been developed for application with TMS. A robot arm makes it possible to aim precisely at the area of the brain necessary for treatment of the magnetic pulse. In this way, it is thought that the treatment will be more precise and, therefore, more effective. Additionally, the robot reduces necessary preparation time and, together with accompanying software, can pinpoint the exact parts of the brain to be treated.

"Patients with ADHD, depression or epilepsy can benefit from brain stimulation with a magnetic pulse."

Project: Robot arm - A precise robot arm for Transcranial Magnetic Stimulation

Partners: ANT-Neuro b.v., University of Twente

Robot arm is a new weapon in the battle against depression and ADHD

http://youtube.com/user/antneuro
www.ant-neuro.com
Frank Zanow
info@ant-neuro.com
#robotarm

Private R&D investments € 1.107.642
Public R&D investments € 885.996
Elicited additional private investments € 352.874
Number of supported SMEs 1
Approximate number created jobs 16

67
66
Developing an energy efficient car tire using innovative materials - this is the central idea with the project "Safe Tires, Save Energy". Tire quality plays an important role in the fuel efficiency of a car. The most important aspect is the bond between the tire and the roadway: it provides for grip, but at the same time gives rolling resistance, which costs much energy. Globally, rolling resistance from tires accounts for 4% of the total CO2 emissions.

Energy label for tires
Every new tire sold in the EU since November 2012 must have an energy label. This label not only states the energy efficiency of the tire, but also its slip resistance and its resulting noise level. The European regulation has given a new impulse to research into energy efficient tires.

Silica
In this project scientists are researching how, among other things, soot can be replaced with silica in the composition of the material for the tire. Soot is added to the mixture of synthetic and natural rubber for stiffness. By adding silica (nanosand), it is possible to reduce the rolling resistance by 30% while having no effect whatsoever on the tire's grip on the road. The research is focused on the binding qualities between rubber and silica, and whether an even lower rolling resistance can be achieved with an even higher grip rating. The hope for result is an innovative, energy efficient and safe tire.

"The rolling resistance in tires makes cares safe, but it also uses much energy."

"Staying healthy requires that you continue to be active. Small movement sensors help to gain quick insight into someone’s physical needs to remain healthy."

Supporting physical exercise
In the project, small and wireless sensors have been developed that people can easily place on their body. The entire system must be flexible, easily self-operable, simple and intuitive. In addition to sensors for patient safety, the partners are also working on sensors to support physical exercise and to measure how much activity a person has, which is also an indicator of physical condition.

The Senior project is now in the research phase on using this technology for physical activities with a number of patients who have had an artificial hip or knee replacement. Insight into their activity patterns following the operation will be compared with the help of a physiotherapist in order to design the therapy as closely as possible to the needs of the patient. The Senior system has also been used to measure movements of somewhat fragile elderly as well as office workers.

Project: Safe Tires, Save Energy

An energy efficient car tire from rubber and nanosand

Project: Senior

Staying self-sufficient longer through wireless sensors

The project partners in the Senior project develop sensors and communication technology that is designed to improve the safety of the elderly and chronically ill when they are at home. Wireless sensors can easily monitor the daily habits of the patients. When a variance has been sensed, for example if someone has not risen from bed or has fallen, the system will sound an alarm. Less able people are therefore able to remain self-sufficient longer and require less institutionalized care.

The Senior project is now in the research phase on using this technology for physical activities with a number of patients who have had an artificial hip or knee replacement. Insight into their activity patterns following the operation will be compared with the help of a physiotherapist in order to design the therapy as closely as possible to the needs of the patient. The Senior system has also been used to measure movements of somewhat fragile elderly as well as office workers.

Project: Safe Tires, Save Energy

An energy efficient car tire from rubber and nanosand

Project: Senior

Staying self-sufficient longer through wireless sensors

The project partners in the Senior project develop sensors and communication technology that is designed to improve the safety of the elderly and chronically ill when they are at home. Wireless sensors can easily monitor the daily habits of the patients. When a variance has been sensed, for example if someone has not risen from bed or has fallen, the system will sound an alarm. Less able people are therefore able to remain self-sufficient longer and require less institutionalized care.

The Senior project is now in the research phase on using this technology for physical activities with a number of patients who have had an artificial hip or knee replacement. Insight into their activity patterns following the operation will be compared with the help of a physiotherapist in order to design the therapy as closely as possible to the needs of the patient. The Senior system has also been used to measure movements of somewhat fragile elderly as well as office workers.

Project: Safe Tires, Save Energy

An energy efficient car tire from rubber and nanosand

Project: Senior

Staying self-sufficient longer through wireless sensors

The project partners in the Senior project develop sensors and communication technology that is designed to improve the safety of the elderly and chronically ill when they are at home. Wireless sensors can easily monitor the daily habits of the patients. When a variance has been sensed, for example if someone has not risen from bed or has fallen, the system will sound an alarm. Less able people are therefore able to remain self-sufficient longer and require less institutionalized care.

The Senior project is now in the research phase on using this technology for physical activities with a number of patients who have had an artificial hip or knee replacement. Insight into their activity patterns following the operation will be compared with the help of a physiotherapist in order to design the therapy as closely as possible to the needs of the patient. The Senior system has also been used to measure movements of somewhat fragile elderly as well as office workers.
A new smart bicycle helps elderly remain active

Bicycling is healthy for both the body and mind. The rise in the number of electrically-assisted bicycles has caused the number of cycling seniors to rise dramatically. Despite this, a large number of elderly between the ages of 75 and 80 feel that they should stop with bicycling. The likelihood of an accident with the bicycle rises enormously after the age of 75 and the consequences of such an accident can be dramatic.

Bike with built-in intelligence

The SOFIE project (the Dutch abbreviation for Slimme Ondersteunende Fiets - smart supported bicycle) is intended to produce the next generation electric bicycle. It’s designed to support the elderly to keep their balance and to help them cope with feelings of insecurity. The project is working on developing supportive aids, while at the same time keeping the vehicle a “real” bike. A balance assistance aid is being built into the bike to help those with hearing or sight difficulties, or with diminished reaction time or balance, to remain mobile and to continue to get the exercise they need. SOFIE is closing the gap between an electric bike and a motorized wheelchair or three-wheeler.

Silent together

Quieter and safer tires and roadway contribute to the quality of living and a reduction in the number of accidents. The amount of noise together with wear and tear depends very much on what happens when the tire and roadway have contact with each other. Therefore the project looks at improving the contact between the two elements in looking for an improvement. A prototype is now being designed. Both tire and roadway together are being examined for improvements in noise level and safety.

Project: SOFIE - Smart supporting bicycle

Project: Quiet Safe Road Traffic

The project “Quiet Safe Road Traffic” (in Dutch Stil Veilig Wegverkeer) is working on how to reduce tire noise while increasing safety. What is unique about this project is the cooperative connection between university, tire manufacturer and road construction company, and the research concerns itself with exactly that juncture of tire and road.

“Quiet and safe tires and roadway increase the quality of living.”

Partners: Faculty Design Production and Management, University of Twente, Indes, Roessingh Research & Development, Private R&D investments € 1.315.722
Public R&D investments € 1.285.558
Elicited additional private investments € 460.427
Number of supported SMEs 5
Approximate number created jobs 21

Partners: Apollo Vredestein, University of Twente (Tire-Road Consortium), Reef Infra, Iris Vision Measurement & Inspection, province of Gelderland

Private R&D investments € 1.847.203
Public R&D investments € 2.086.088
Elicited additional private investments € 708.000
Number of supported SMEs 1
Approximate number created jobs 47
Nanotechnology is a strongly growing branch of business. Materials with revolutionary materials can be made from the miniscule nano (a billionth of a meter). Nano opens the way for, as examples, searching for DNA variances, drug research, or making still smaller chips for electronics.

Building the nano-surface
In this project nano-surfaces are being examined. Bottom-up by way of chemical modification technology that builds nanostructures through chemical reactions. The University of Wageningen has developed the technology and has applied for a patent. The project partners are bringing the technology further and will be launching the products in the market.

Smaller but with more functions
The bottom-up approach of building nano-surfaces is still being developed, but the future looks good. With new methods various functions on the surfaces can be performed which will lead to further miniaturization. The new technology has enormous growth potential.

The results of the research are very promising. In the meantime a new company has been established, SurfiX BV from Wageningen, that will look to commercialize the results of the research.

With one information network to help emergency service providers perform their best

Police, ambulance, fire and other emergency service personnel need the right information in order to be able to perform their best, quickly and effectively. From the moment the alarm has sounded in the control room all the way to the place of emergency. TEC4SE (pronounced: “tech force”) has developed a new system to link that information and make the cooperation between service providers easier and more effective.

Plug-in applications
The basis of the system is an open standard IT platform, one network, where applications can be “plugged in” from system to system. Such as information from closed circuit cameras, social media such as Twitter and Facebook, license registration, facial recognition, traffic information, etc. The control room receives all the information from various sources directly on their monitors. At the same time the service personnel in the field get the same information via their smartphones or tablets - exactly the relevant information so that they can do their job quickly and effectively.

Market opportunities
The current organization and infrastructure in the emergency service domain is quite complex. Because the new exchange platform is standardized and open, there are opportunities for small and medium-sized companies to create applications for this market. In the project there is currently a pilot being built. The IT platform will be available for customs officials, military police, city and various road and water traffic officials. The number of jobs created by this initiative is expected to be around 150 full time.

Project: SurfiX
Partners: LioniX BV, University of Wageningen, SmartTip, Microdish

Private R&D investments € 793.391
Public R&D investments € 820.180
Elicited additional private investments € 285.602
Number of supported SMEs 3
Approximate number created jobs 13

Project: TEC4SE
Partners: Safety Region Twente, Thales, Saxion University of Applied Science, University of Twente, Pino&Partners, Bluemark, NMC

Private R&D investments € 1.800.000
Public R&D investments € 1.800.000
Elicited additional private investments € 637.200
Number of supported SMEs 5
Approximate number created jobs 89
Innovations also qualify as added value. Usually when people say "innovation" they think of some brilliant new idea, but innovations can occur in many ways. A production company, for example, can focus on a particular operation and by applying smart ideas can become the best in its field. You can also think about broadening your focus in a production environment, where instead of only producing parts, you're working together in building modules. In this way you make the first steps in the transition from jobber to systems provider and that's your entry into the value chain. If your production company is working with the end customer's product development, you've got a better perspective on what's possible.

From jobber to systems provider

"If a company wants to continue to exist in five years it needs to continue to deliver product and process innovations. Innovation can occur in many ways. A production company, for example, can focus on a particular operation and by applying smart ideas become the best in its field. You can also think about broadening your focus in a production environment, where instead of only producing parts, you're working together in building modules. In this way you make the first steps in the transition from jobber to systems provider and that's your entry into the value chain. If your production company is working with the end customer's product development, you've got a better perspective on what's possible."
The Open Innovation Center Texperium focuses on sustainable reuse of textile. Discarded or overstocked textile is very poorly utilized at this moment. Roughly 80% is burned or simply thrown away in the garbage. Traditional recycling is limited to discarded retail clothing and is often of low material value; fibers, for example, are sometimes used in insulation material.

Texperium works on high-value reuse of waste textile, as well as post-consumer textile, uniforms and technical textile. It’s not recycling, but upcycling. The innovation center in Haaksbergen made a running start with this initiative by transforming 90,000 kg of old KLM uniforms into bathroom slippers, suitcase belts and laptop bags. It’s estimated that this initiative saved 4,700 tons of CO2 alone.

Texperium is now working with KLM on an application for retrieving fibers from aircraft carpeting and, together with Verosol, the sunscreen and blinds company, to reuse pattern scraps. They are also working on the development of yarns using reclaimed fibers. Texperium is becoming known by many companies and institutes. It is expected that their open innovation center will be self-sufficient by 2015.

Thermoplastic composites, which are made from fiber-reinforced plastics, are much lighter than existing materials, and are especially useful in products where weight is an essential property. Thermoplastic composites can be applied in, among others, aircraft, cars, wind turbines, and have potentially short production time, are recyclable and offer high resistance to chemicals. The material of the future!

The open innovation center TPRC, located at Kennispark Twente, accelerates through research the development of thermoplastic composites for various markets. There are an increasing number of large European companies that are making themselves known at the TPRC. The center sees itself in the future as the leading authority when it comes to thermoplastic composites.

Not recycling but upcycling
Texperium works on high-value reuse of waste textile, as well as post-consumer textile, uniforms and technical textile. It’s not recycling, but upcycling.

"Materials are becoming more scarce. This makes high-value textile recycling a very promising venture."

"Composites make aircraft and other vehicles lighter, which saves fuel and electricity."

Thermoplastic composites:
the material of the future?

"Discarded textile gets a high-value second chance"

Project: Open Innovation Center Texperium

Discarded textile gets a high-value second chance

"Materials are becoming more scarce. This makes high-value textile recycling a very promising venture."

Not recycling but upcycling
Texperium works on high-value reuse of waste textile, as well as post-consumer textile, uniforms and technical textile. It’s not recycling, but upcycling.

"Materials are becoming more scarce. This makes high-value textile recycling a very promising venture."

"Composites make aircraft and other vehicles lighter, which saves fuel and electricity."

Thermoplastic composites:
the material of the future?

"Discarded textile gets a high-value second chance"

Project: Open Innovation Center Texperium

Discarded textile gets a high-value second chance

"Materials are becoming more scarce. This makes high-value textile recycling a very promising venture."

Not recycling but upcycling
Texperium works on high-value reuse of waste textile, as well as post-consumer textile, uniforms and technical textile. It’s not recycling, but upcycling.

"Materials are becoming more scarce. This makes high-value textile recycling a very promising venture."

"Composites make aircraft and other vehicles lighter, which saves fuel and electricity."

Thermoplastic composites:
the material of the future?
T-Xchange has successfully completed its Ecosystem Development project. The project was an important link for the further development by the knowledge institute in the professionalizing of Serious Gaming. The project laid a theoretical basis for Serious Gaming, designed a number of games, and initiated a model-driven game development approach.

Serious Games and gaming have a future

T-Xchange has become an important figure in the area of Serious Gaming. It has participated in a number of international research projects and has profiled itself as a knowledge institute in the area of Serious Gaming. In 2013 the partners in T-Xchange, Thales Netherlands BV and the University of Twente, extended the contract with T-Xchange for an additional five years.

Examples of projects:
• Braintrain: a neurofeedback game to train patients
• Eerogame: a game to generate innovative concepts for the aviation industry
• TOKO: the Dutch abbreviation for Training Environment for multidisciplinary Chain Activity (innovation for societal safety)
• Virtual safety academy: serious games for multidisciplinary cooperation
• Gasolution: a game the youth in gas technology
• Burgemeestersgame (“Mayor’s game”): a training game for mayors to help them to make better decisions under time pressure in crisis situations
• Showcase Safe Netherlands: stakeholders explore the safety effects in the international zone in the Hague
• GO4IT: participating in this game gives more insight into the awareness of the need for a good military-civilian cooperation (winner Innovation Proze, Ministry of Defense)

Creative thinking

Serious gaming promotes creative thinking and can therefore be an effective innovation accelerator. The gaming system is expected to continue to succeed in the market, with an increasingly important role for T-Xchange as a knowledge center.
Membrane technology can be applied in many production processes. The separation filters, that selectively allow particles to pass through, are used in the purifying of drinking water for use in the production of cheese, beer and other commercially produced drinks.

"Vacuum microwave drying can drastically shorten the production time of fragile membranes."

Towards a shorter drying time for membranes

Membrane technology can be applied in many production processes. The separation filters, that selectively allow particles to pass through, are used in the purifying of drinking water for use in the production of cheese, beer and other commercially produced drinks.

"Vacuum microwave drying can drastically shorten the production time of fragile membranes."

Long drying time

The production of advanced polymer empty fiber membranes is time intensive. This is due to the long drying time of these fragile products. In the project, it’s being looked at if the drying time can be shortened through the use of microwave technology. Vacuum microwaves can shorten the drying time between 30 and 70%. This makes a far more efficient production possible.

Agro materials

In this project knowledge is being gained in the application of processing of agro materials. Another possibility is the accelerated inline continuous drying process in the textile industry. Vacuum microwave drying is being used for but a part of the production at this moment.

VentureLab Twente had helped between 2009 and 2013 a number of starting and established high-tech entrepreneurs and companies with growth ambitions. The support program included a year-long personal guidance program from a business coach, access to relevant experts and networks, and a high-value training offer as well as inclusive office space. The knowledge, skills and facilities were organized as such so that high-tech companies could make a growth start. 230 entrepreneurs out of roughly 180 companies improved their entrepreneurial competencies through this program. This resulted in job opportunities of roughly 2000.

Growth ambitions

VentureLab International is the follow up to VentureLab Twente, which was the driver behind the concept. In the Netherlands there is a franchise of this concept being discussed with the University of Groningen, the city of Apeldoorn and the province of North-Holland. There is also a cooperation with Russia.

European Enterprise Promotion Award

In June 2013 VentureLab won the Dutch preliminary round of the European Enterprise Promotion Award. The jury evaluated the impact level on the basis of grading and was very impressed with the concrete results that the program had realized.

Project: Vacuum microwave drying of membranes

Partners: Pentair X-Flow, University of Wageningen

Project: VentureLab International

Business accelerator for high-tech companies that want to grow

venturesLab Twente had helped between 2009 and 2013 a number of starting and established high-tech entrepreneurs and companies with growth ambitions. The support program included a year-long personal guidance program from a business coach, access to relevant experts and networks, and a high-value training offer as well as inclusive office space. The knowledge, skills and facilities were organized as such so that high-tech companies could make a growth start. 230 entrepreneurs out of roughly 180 companies improved their entrepreneurial competencies through this program. This resulted in job opportunities of roughly 2000.

Growth ambitions

VentureLab International is the follow up to VentureLab Twente, which was the driver behind the concept. In the Netherlands there is a franchise of this concept being discussed with the University of Groningen, the city of Apeldoorn and the province of North-Holland. There is also a cooperation with Russia.

European Enterprise Promotion Award

In June 2013 VentureLab won the Dutch preliminary round of the European Enterprise Promotion Award. The jury evaluated the impact level on the basis of grading and was very impressed with the concrete results that the program had realized.

Partners: University of Twente - NIKOS, Saxion University of Applied Science - SCS, 35 coaches, 75 business panel members, 35 teachers/trainers from the University of Twente or the business community, networks of finance, business branches, government and scientists and many cooperative relationships
An interview with Peter Bos, Founder and Chairman of Texperium, open innovation center for textile recycling

“Working with the entire chain brings quick returns with low costs”

“Texperium works with the entire supply chain. Innovation for us is product development combined with market implementation. High-value textile recycling requires new technology and demands high quality requirements. We bring sorters, reworkers and potential producers together to form new production chains. By involving the entire chain you’ve got the various complementary companies next to each other, so that everyone can benefit from each other’s particular area of knowledge. The results are optimum and you get rapid returns.”

Controllable costs

“Products are frequently produced in many steps, but in the end you need feedback from the market. This means that the chain must include partners who are involved with bringing the product to market. For smaller companies, a chain approach is advantageous as it keeps your costs under control. If everyone focuses on the benefits of their respective expertise, and you’ve got clear agreements with each other, then you’ve kept your costs to a minimum and the project can proceed rapidly. Texperium wants to see projects that are at least break even and have a clear start and finish.”

Knowledge partners

“We have our own knowledge, but also many knowledgeable partners. Texperium has a large network of partners, friends and other people who are supporting us from companies and education institutes. We regularly find new partners through Kennispark Twente. A subsidy from the province of Overijssel and Twente Region helped us get our start in 2010, and our requirement is that every project becomes self-sustaining at a certain point. We expect to be completely self-sufficient by 2015.”

“My advice is to bring business generators and marketing partners to innovation projects in a very early stage.”

New minilab results in a healthier cow

Calcium shortages are rather common for cows and lead to many diseases and reduced milk production. Blue4Green together with the veterinary practices De Graafschap has developed a new technique where the calcium shortages can be measured quickly and accurately.

One single drop of blood

The apparatus, a mobile handheld laboratory, needs only a single drop of blood and it will deliver test results by way of innovative lab-on-a-chip technology within but a few minutes. An accompanying lab book analyzes the information and it’s saved in a database. The cow can then be handled immediately.

The lab comes to the cow

The lab-on-a-chip technology brings the laboratory to the milk production location, giving an early signal to mineral shortages and preventing many sicknesses. Cows live longer and more healthy, and it’s estimated that milk farmers can save roughly €15,000 per year. Blue4Green expected that the innovative method of veterinary diagnostic can be distributed worldwide.

Project: Veterinary Diagnostic © point of animal care

www.blue4green.com
Daan Sistermans, Erik Staijen
daan.sistermans@blue4green.com
@blue4green

Private R&D investments + € 1.017.521
Public R&D investments + € 1.093.263
Elicited additional private investments + € 373.609
Number of supported SMEs 7
Approximate number created jobs 17

Partners: Blue4Green, Medimate, veterinary practices De Graafschap, venboer milkt farms, Veterinary service DGDIN BV, Wageningen University, University of Twente - BIOS

veterinary diagnostic
lab-on-a-chip
animal health
Oxygen deficiency in the brain is the most important cause of the approximately 40,000 strokes per year in the Netherlands. Approximately 25% of the deaths associated with heart and arterial disease occur on account of brain hemorrhaging.

Better diagnosis
An oxygen deficiency is known as "ischemia", which literally means "blood emptiness". This project is looking at the possibility for developing a measuring system to give more insight into the role of oxygen in the functioning of the brain. In this way a diagnosis of oxygen shortage can be made more accurately. The threat of brain damage through ischemia can be discovered earlier and possibly be prevented. In addition, this system can also lead to better therapy and rehabilitation.

Waste is more cheaply separated with plastic
The use of modern materials such as plastic to separate liquids can open new markets. This project looks at a new type of fluid separator developed where plastic and various types of steel are used.

Half the costs
The new machine separates waste such as oil, drugs and chemicals. By using plastic instead of steel or nickel, as is now being used, these fluid separators are half as expensive and can be delivered much quicker.

Prototype
In this project a working and tested prototype will be delivered. Marketing this product is expected to deliver eight full time jobs and €5 million per year.
The XUV Optics Focus Group has developed an optical system with the aid of nanotechnology. This research group has worked, among others, with multilayer mirrors to manipulate extreme-ultraviolet light and light x-radiation. Multilayer mirrors are used in space telescopes and for production of chips with a faster processor and more memory capacity. They make the new generation of microchips possible.

"Multilayer mirrors make the new generation of microchips possible."

Expansion MESA+

The group belongs to the top of nanotechnology and until recently was part of the department of the FOM-Institute in Nieuwegein. In 2012, partly due to an investment of €20 million, the group made the move to MESA+ Institute for Nanotechnology at the University of Twente in Enschede. The move to the new laboratory with state-of-the-art thin-film apparatus will be taking place throughout 2013 and 2014.

Nano-applications

Unique about XUV Optics is that the research group couples fundamental research on specific, concrete questions and needs of the business community. In this way, the researchers stimulate the application of nanotechnology for the business world.

"Multilayer mirrors make the new generation of microchips possible.”

Project: XUV Optics

New nano-group develops advanced multilayer mirrors

Project: Self-cleaning packaging

A self-cleaning package for food

Whenever has taken food out of a plastic package always seems to have to deal with plastic scraping. Part of the food stays stuck to the plastic. In the project “Self-cleaning packaging” a plastic packaging is being developed that doesn’t allow food particles to stay behind.

"With self-cleaning packaging less food is lost and the plastic is easier to recycle.”

Oil repellent

With a new laser technique it’s seen that a fine structure in plastic material can be made that repels oil and water. Oil repellent plastic has not yet existed. The result is a super-repellent material, where food rolls right off. The “self-cleaning packaging” makes recycling plastics much easier and therefore reduces waste.

Extensive testing

The new technology is not yet ready for the market. The innovative plastic first needs to be tested in practice, among others at Huuskes fresh food products.

Project: Self-cleaning packaging

New nano-group develops advanced multilayer mirrors

Project: Self-cleaning packaging

A self-cleaning package for food

Whenever has taken food out of a plastic package always seems to have to deal with plastic scraping. Part of the food stays stuck to the plastic. In the project “Self-cleaning packaging” a plastic packaging is being developed that doesn’t allow food particles to stay behind.

"With self-cleaning packaging less food is lost and the plastic is easier to recycle.”

Oil repellent

With a new laser technique it’s seen that a fine structure in plastic material can be made that repels oil and water. Oil repellent plastic has not yet existed. The result is a super-repellent material, where food rolls right off. The “self-cleaning packaging” makes recycling plastics much easier and therefore reduces waste.

Extensive testing

The new technology is not yet ready for the market. The innovative plastic first needs to be tested in practice, among others at Huuskes fresh food products.
<table>
<thead>
<tr>
<th>Project</th>
<th>Business community</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIAIS</td>
<td>Assistive Devices</td>
<td>Beton</td>
</tr>
<tr>
<td>BETON Gebr. Van der Geest Schilder- en</td>
<td>Nijmegen</td>
<td></td>
</tr>
<tr>
<td>Bio-energie</td>
<td>Biomarque Nijkerk</td>
<td></td>
</tr>
<tr>
<td>Use-Lab GmbH Steinfurt</td>
<td>Gronau, Epe</td>
<td></td>
</tr>
<tr>
<td>Innotronic, elektronische systemen</td>
<td>Enschede</td>
<td></td>
</tr>
<tr>
<td>TIC</td>
<td>Oost NV Enschede</td>
<td></td>
</tr>
<tr>
<td>Indes Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIC Medizintechnik Dorsten</td>
<td>Enschede</td>
<td></td>
</tr>
<tr>
<td>Demcon advanced mechatronics</td>
<td>Enschede</td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JoyinCare Assen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UMC St. Radboud, Radiologie Nijmegen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medisch Spectrum Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DKMS Arnhem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kryoz Technologies Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panton Deventer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TwinX Innovatie Utrecht</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saxion Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wageningen University and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TenCate Nijverdal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vastgoedonderhoud Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twence BV Hengelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stichting Bio-energiepark Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unitron Hengelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surfix Wageningen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LioniX Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td>Business community</td>
<td>City</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------</td>
<td>------</td>
</tr>
<tr>
<td>GMA Netwerk</td>
<td>Project Business community City</td>
<td>University of Twente Enschede</td>
</tr>
<tr>
<td>N-GAP World Wide Innovations Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin Comfort Enhanced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business by schermers heupbe generatie Nieuwe Nirion Medimate Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verenigde Maakindustrie Oost Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syntens Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handelswerkskammer Osnabruck Osnabruck</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STODT Hengelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informatie Techvereniging Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TwinX Utrecht</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instituut voor sport &amp; leisure Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GreenGran Ede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Wageningen Wageningen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Wageningen Wageningen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skibrand Wageningen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Nijmegen Ede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Nijmegen Ede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emicade Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pol. Kombuis Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harde Klimaat Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leo Klimaat Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graaf &amp; Burger Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lions Klimaat Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mans Klimaat Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landmark Projecten Hengelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boll Dakgroep b.v. Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance &amp; Result Deventer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aqua + Sprinklersystemen b.v. Goor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Almelose Woningstichting Beter en Zonen B.V. Goor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aannemersbedrijf Kormelink Rietmolen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catau Advies Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damsté Advocaten Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croon TBI Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite Technology Centre Hengelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cogas Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ClimaRad B.V. Oldenzaal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brusche Elektrotechniek Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwradius Training &amp; Advies bv Zoetermeer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwfonds Ontwikkeling BV Hoevelaken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boll Dakgroep b.v. Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance &amp; Result Deventer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aannemersbedrijf Kormelink Rietmolen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catau Advies Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damsté Advocaten Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croon TBI Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite Technology Centre Hengelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cogas Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ClimaRad B.V. Oldenzaal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brusche Elektrotechniek Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwradius Training &amp; Advies bv Zoetermeer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwfonds Ontwikkeling BV Hoevelaken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boll Dakgroep b.v. Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance &amp; Result Deventer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aannemersbedrijf Kormelink Rietmolen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catau Advies Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damsté Advocaten Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croon TBI Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite Technology Centre Hengelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cogas Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ClimaRad B.V. Oldenzaal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brusche Elektrotechniek Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwradius Training &amp; Advices bv Zoetermeer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwfonds Ontwikkeling BV Hoevelaken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boll Dakgroep b.v. Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance &amp; Result Deventer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aannemersbedrijf Kormelink Rietmolen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catau Advies Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damsté Advocaten Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croon TBI Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite Technology Centre Hengelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cogas Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ClimaRad B.V. Oldenzaal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brusche Elektrotechniek Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwradius Training &amp; Advices bv Zoetermeer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwfonds Ontwikkeling BV Hoevelaken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boll Dakgroep b.v. Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance &amp; Result Deventer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aannemersbedrijf Kormelink Rietmolen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catau Advies Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damsté Advocaten Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croon TBI Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite Technology Centre Hengelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cogas Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ClimaRad B.V. Oldenzaal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brusche Elektrotechniek Almelo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwradius Training &amp; Advices bv Zoetermeer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouwfonds Ontwikkeling BV Hoevelaken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boll Dakgroep b.v. Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance &amp; Result Deventer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aannemersbedrijf Kormelink Rietmolen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catau Advies Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damsté Advocaten Enschede</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croon TBI Enschede</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
These projects are supported, among others, by:

- construction
- high tech systems & materials
- health technology
- nano technology
- manufacturing industry lab-on-a-chip-technology
- smart textiles
- open innovation

Economic results

Proving the effects of public and private investments in innovation is a complex subject. Economic growth is dependent on many factors and the effect of these factors is often not seen until years later. In addition to readily observable regional developments, we estimated the economic potential of the supported innovation projects using a method developed by the European Commission. This method is based on scientific research and is used to make a reasonably accurate estimate of the economic effect of a particular project. The economic effect of the projects in this publication using this method show that through an investment volume of €275 million a total of 3,722 jobs have been created. This does not include potential indirect economic benefits, such as job opportunities created with suppliers or service providers. The investments necessary for market introduction of the innovations are expected to be even higher. An exact estimate is difficult to make because there are no standard models or references available. Additionally, economic effects are dependent on investments in production resources, sales and supply chain agreements - choices that each individual company has to make.

Kennispark Twente

There’s far more to say about innovation in and around Twente. Would you like to know more? Contact us at kennispark.Twente. Or you can meet us at one of our innovation and entrepreneurship events, which you can find here: www.kennispark.nl

Pieter Dilligh, p.dilligh@kennispark.nl
Kiki Haasewinkel, k.haasewinkel@kennispark.nl
www.kennispark.nl
The Kennispark Twente Foundation is an initiative of the city of Enschede, province of Overijssel, Twente Region, Saxion University of Applied Sciences and University of Twente.