



Dutch Robotics Inventory

An Overview by RoboNED

**Composed by: Ir. D.J.B.A. Kranenburg - de Lange
January 2011**

RoboNED Steering Board and Organisation

Chairman:	Prof. Dr. Ir. Stefano Stramigioli (UT),
Academic representative :	Prof. Dr. Ir. Maarten Steinbuch (3TU),
Large industry representative:	Dr. Ir. Barry Goeree (Philips Consumer Lifestyle),
SME representative:	Dr. Ir. Dennis Schipper (Demcon),
New trends exploration representative:	Ir. Hans van der Veen (STT),
Platform manager:	Ir. Ditske Kranenburg (RoboNED),
Supporting platform manager:	Dr. Ir. Heico Sandee (RoboNED).

Contact Information

Name:	Ir. Ditske Kranenburg
E-Mail:	d.j.b.a.kranenburg@utwente.nl
Telephone Number:	+31 (0)53 489 2778
Website:	www.roboned.nl

Content

1. Introduction.....	4
2. Consumer Services and Applications	5
2.1. Entertainment	5
2.2. Education and Training.....	9
2.3. Household	19
3. Health	23
3.1. Care	23
3.2. Cure	46
3.3. Therapeutical.....	56
4. Industrial.....	65
4.1. Material Handling.....	65
4.2. Manufacturing.....	71
5. Professional Services and Applications	74
5.1. Maintenance and Inspection.....	74
5.2. Agro&Food	80
5.3. Safety, Security and Defense.....	88
5.4. Infrastructure	90
6. Others	91
7. Indexing	94
7.1. Project names Alphabetical.....	94
7.2. Primary Application Fields.....	97
7.3. Secondary Application Fields.....	100
7.4. Technologies.....	102

1. Introduction

This Dutch Robotics Inventory is made by RoboNED, to get an overview of the Robotic activities that are currently going on in the Netherlands.

All contacts of RoboNED received an invitation to provide input for the inventory. Around 400 invitations have been send. RoboNED got 113 reactions on this invitation, resulting in an overview of 94 different projects. We would like to thank everybody who participated in the inventory and contributed to this overview of robotic activities in the Netherlands.

The projects are organized in this report in the cluster structure of RoboNED, shown in Figure 1.

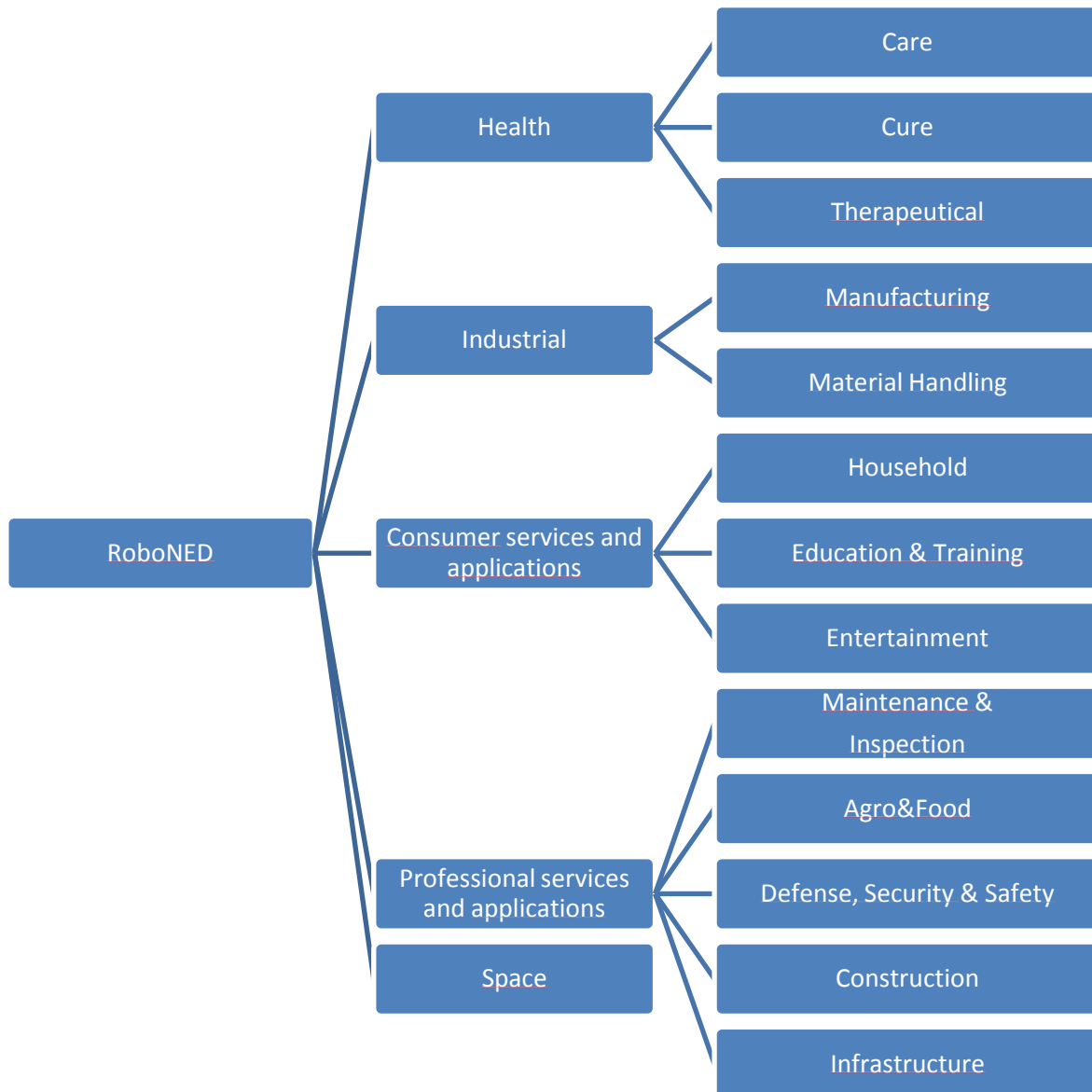


Figure 1: Cluster structure of RoboNED

At the end of the report, four different indexes are given. The first index is to be able to search on project name, the second to search on primary application field, the third to search on secondary application field and the last to search on the technology developed or used in the project.

The projects, RoboNED is allowed to publish, will be presented in the 'RoboNED database'. You can find this 'RoboNED Database' on www.robodb.org.

2. Consumer Services and Applications

2.1. Entertainment

TeamDARE

Description	TeamDARE is a small team of enthusiastic engineering specialists that share a common hobby: building robots! The team originates from an internship at the TU/e back in 2001, while participating at Eurobot. Since then, teamDARE has been building robots and participated at competitions such as Robot Wars in 2002, Eurobot in 2005 and 2006, and The Artemis Orchestra Competition in 2008 and 2009. Currently TeamDARE is extending its band --consisting of a guitar playing robot and a drum playing robot-- with a pan flute playing robot.
Primary Application Field	Entertainment
Secondary Application Field	
Technology	Control
Other Technology	Vision
Budget	
Participants	TeamDARE
Start	2008
End	NA
Website	www.teamdare.nl

Contact Details

Surname	Sandee
First name	Heico
Company	TeamDARE
Postal Code and City	5655 GA, Eindhoven
Email	info@teamdare.nl
Phone	
Company Website	www.teamdare.nl
Publication	Yes

Dutch Robotics

Description	Research groups at the three universities of technology in the Netherlands, have agreed to join efforts in creating humanoid robots, cooperating in the Dutch Robotics initiative. The Dutch Robotics project is part of a long term vision shared by the three Dutch universities and the Dutch industry for the development of a new generation of robots.
Primary Application Field	Entertainment
Secondary Application Field	Education and Training
Technology	Control
Other Technology	
Budget	
Participants	3TU (TU Eindhoven, TU Delft, UTwente), Philips
Start	2008
End	NA
Website	www.dutchrobotics.net

Contact Details

Surname	Kostic
First name	Dragan
Company	TU Eindhoven
Postal Code and City	5600 MB, Eindhoven
Email	d.kostic@tue.nl
Phone	
Company Website	www.tue.nl
Publication	Yes

TechUnited

Description TechUnited is part of the RoboCup project. RoboCup is an international research and education initiative. It is an attempt to foster artificial intelligence (AI) and intelligent robotics research by providing a standard problem where wide range of technologies can be integrated and examined. For this purpose, RoboCup chose to use soccer as a primary domain. In a highly dynamic environment as soccer multiple fast-moving robots require various technologies. The technology that comes forth from this project are a benefit for society.

Primary Application Field Entertainment
Secondary Application Field Education and Training
Technology Vision
Other Technology world modeling
Budget
Participants TU Eindhoven
Start 2006
End NA
Website www.techunited.nl

Contact Details

Surname Sandee
First name Heico
Company TU Eindhoven
Postal Code and City 5600 MB, Eindhoven
Email j.h.sandee@tue.nl
Phone +31 40 2475423
Company Website www.tue.nl
Publication Yes

Dutch Robot Association

Description : The Dutch Robot Association aims to promote robot competitions in the Netherlands. Part of this effort is the RoboCup Dutch Committee, which aims to promote the RoboCup initiative in the Netherlands.

Primary Application Field : Entertainment

Secondary Application Field : Education and Training

Technology : Other Technology

Other Technology : Artificial Intelligence

Budget :

Participants :

Start :

End :

Website : www.robocup.nl

Contact Details

Surname : Visser

First name : Arnoud

Company : University of Amsterdam

Postal Code and City : 1098 XH Amsterdam

Email : A.Visser@uva.nl

Phone : +31 20 5257532

Company Website : www.science.uva.nl/~arnoud

Publication : Yes

2.2.Education and Training

Art of Robotics

Description	This project aims for a strong interaction between youth, education and companies (small and large, young and strong) in the development, integration and use of robotics. Also Artists are involved to stimulate a creative view on applications and solutions. Several project activities are developed and practiced. The number of activities with different characters is still growing. Some of the current activities: - Robotics Puppeteers (video on http://www.youtube.com/watch?v=UNLXg9ldYR0) incorporated in a learning company at Deltion College Zwolle - development of installation Dancing with Robots (industrial robot activated by Wii-controller, thus creating a highly interactive installation). - playing with Robots, where consumer electronics are used to explore the application of sensor technology, movement control etc.
Primary Application Field	Education and Training
Secondary Application Field	Entertainment
Technology	Human-Machine Interface
Other Technology	application development
Budget	low investments with high output, still expanding
Participants	numerous
Start	1-8-2010
End	31-12-2012
Website	

Contact Details

Surname	Van der Burg
First name	Ruud
Company	Stichting The Art of Robotics
Postal Code and City	8001 BK Zwolle
Email	ruud.van.der.burg@wxs.nl
Phone	06-53140618
Company Website	
Publication	Yes

RGBd, ToF !

Description : As a Flemish research institute we will participate in the Dutch fair 'Vision & Robotics 2011'. We will show the applications of Time of Flight (ToF) cameras in combination with the RGB-image information. The intention of the Tetra-project is to contribute to the collaboration between Flanders and the Netherlands in the field of vision technology and in this way support the industry and SME's.

Primary Application Field : Education and Training

Secondary Application Field : Material Handling

Technology : Vision

Other Technology : Automatic Guided Vehicles

Budget : € 175.000

Participants : Flemish Companies + IWT

Start : September 2010

End : September 2012

Website :

Contact Details

Surname : Luc

First name : Mertens

Company : Karel de Grote-Hogeschool

Postal Code and City : 2660 Hoboken (Antwerpen)

Email : luc.mertens@kdg.be

Phone : 00 32 3 613 17 62

Company Website : <http://project.iwt-kdg.be>

Publication : Yes

Out of the box

Description : To realize a match of a Vision Smartcam with a Mitsubishi (or motoman) robot to pick objects out of a box. The objects are not oriented in the box. Place: Lab flexible Production Automation Hogeschool Zuyd, University of applied Science, Heerlen, The Netherlands.

Primary Application Field : Education and Training

Secondary Application Field : Material Handling

Technology : Vision

Other Technology : Robotics

Budget :

Participants : Students

Start : 01-09-2010

End : None

Website : www.hszuyd.nl

Summer course 'Caring robots'

Description : This two weeks course explores the possibilities that emerge in the field of robots applied to care and it shows how researchers from very different disciplines collaborate. The focus of the first week will be on acquiring insight in recent developments. Workshops will be given (partly using remote lecturing facilities) by specialists from different universities and even different parts of the world. The focus of the second week will be on developing robots and doing user studies in multidisciplinary teams.

Primary Application Field : Education and Training

Secondary Application Field : Care

Technology : Other Technology

Other Technology : Social robots, rehab. robotics, screen agents

Budget :

Participants : Summer school Almere, Windesheim Flevoland and universities from several countries

Start : July 4th 2011

End : July 17th 2011

Website : <http://www.summerschoolalmere.nl/>

Contact Details

Surname : Heerink

First name : Marcel

Company : Windesheim Flevoland

Postal Code and City : 1314 CH Almere

Email : m.heerink@windesheimflevoland.nl

Phone : 06-42917442

Company Website : windesheimflevoland.nl

Publication : Yes

Minor 'Working with Robots'

Description : We'll offer a half year program on applied robotics. Students will not only learn about the newest developments, but also work on developing robots and studying their interaction with the users in multidisciplinary teams.

Primary Application Field : Education and Training

Secondary Application Field :

Technology : Other Technology

Other Technology : n/a

Budget : n/a

Participants :

Start : September 1st 2011

End : (ongoing)

Website :

Contact Details

Surname : Heerink

First name : Marcel

Company : Windesheim Flevoland

Postal Code and City : 1314 CH Almere

Email : m.heerink@windesheimflevoland.nl

Phone : 06-42917442

Company Website : windesheimflevoland.nl

Publication : Yes

RoboDidactics / RoboCup Junior

Description	: RoboDidactics deals with the development of a contentious learning plan on robotics for students age 9 to 19. There are three different levels for 'primary school' and 'Secondary school'. The 'VWO-module' is certified by SLO. This learning plan is used in more than 35 schools through the Netherlands. At this moment an English version is being developed. RoboDidactics organizes courses and workshops for teachers and students. RoboCup Junior organizes the yearly RoboCup Junior contests and supports the teams who wants to join the RoboCup Junior World Championships.
Primary Application Field	: Education and Training
Secondary Application Field	: Entertainment
Technology	: No Specific Technology
Other Technology	: Stimulation to help children understand robotics
Budget	: 30000
Participants	: VU, NEMO, Mondo Digitale (Rome)
Start	: 2006
End	: 2012
Website	: www.robocupjunior.nl

Contact Details

Surname	: van Lith
First name	: Peter
Company	: RoboCup Junior
Postal Code and City	: 1441RW
Email	: peter@robocupjunior.nl
Phone	: 0653485718
Company Website	: www.robocupjunior.nl
Publication	: Yes

Robot Techniek Lab Flevoland

Description : The aim of the 'Robot Techniek Lab Flevoland' is to improve the connection between 'M- and HBO' and the need of companies. Companies are asking for employers with knowledge and skills on the fields of automation and robotics in different application fields. Within this project several companies are working together from the metal-editing (welding and cutting), machine-, (food)process- and packing industry, logistics, rehabilitation, healthcare and entertainment industry.

Primary Application Field : Education and Training

Secondary Application Field :

Technology : Learning

Other Technology :

Budget : 1.800.000,-

Participants : ROC Flevoland, HBO-Windesheim, ROC Friese Poort , Technocentrum Flevoland en 20 bedrijven.

Start : 01 jan 2011

End : 31 dec 2013

Website : under construction

Contact Details

Surname : Wieffer

First name : Geert

Company : Technocentrum Flevoland

Postal Code and City : Almere

Email : geert@wieffer.nl

Phone : +316 4460 4490

Company Website : www.tc-flevoland.nl

Publication : Yes

TUlip

Description : A 3TU-wide project on developing a 1.2 m humanoid robot intended to play soccer in the international Robocup competition

Primary Application Field : Education and Training

Secondary Application Field :

Technology : Control

Other Technology :

Budget :

Participants : UTwente, TUDelft, TUEindhoven, Philips

Start :

End :

Website : www.dutchrobotics.net

Robotics in an educational environment

Description : Adapting the curriculum of the technical computer science department of the InHolland University for the applied sciences.

Primary Application Field : Education and Training

Secondary Application Field :

Technology : No Specific Technology

Other Technology :

Budget : unspecified

Participants :

Start : jan 2010

End : unspecified

Website :

Contact Details

Surname : Boode

First name : Ton

Company : Hogeschool InHolland

Postal Code and City : 1800 AK Alkmaar

Email : ton.boode@inholland.nl

Phone : 0631006734

Company Website : www.inholland.nl

Publication : Yes

Handling

Description : The use of industrial Robots in a flexible production environment. Three robot placed in our labs for exercises and for research. We try to make a connection with Vision Technology.

Primary Application Field : Education and Training

Secondary Application Field : Material Handling

Technology : Vision

Other Technology : Interfacing

Budget :

Participants : Mechanical Engineering & Elektr. Engineering

Start : Pending

End : Pending

Website : None

20-sim 4C

Description : 20-sim 4C is a software package that will help you to deploy C-code on embedded targets to control robotic machines. 20-sim 4C imports code from modeling software like 20-sim and Scilab and deploys code on hardware like x86 and Arm based computer boards.

Primary Application Field : Education and Training

Secondary Application Field : Manufacturing

Technology : Control

Other Technology : Software Tools

Budget : 400k

Participants : Controllab Products

Start : 01-01-2008

End : 01-01-2012

Website : www.20sim4C.com

Contact Details

Surname : Kleijn

First name : Christian

Company : Controllab Products B.V.

Postal Code and City : 7521PA Enschede

Email : christian.kleijn@controllab.nl

Phone : 053-4836434

Company Website : www.controllab.nl

Publication : Yes

Robotics in Education

Description : Research on: 1. Learning by designing and building a robot; 2. Learning by assembling by making use of a robot; 3. Learning by acquiring new (cognitive) skills by making use of a robot; 4. Learning how to deal with robots in the society.

Primary Application Field : Education and Training

Secondary Application Field :

Technology :

Other Technology :

Budget :

Participants :

Start :

End :

Website : www.kennisnet.nl

Contact Details

Surname : Severin

First name : Edward

Company : Kennisnet

Postal Code and City : 2700 AT Zoetermeer

Email : e.severin@kennisnet.nl

Phone : (079) 329 67 22

Company Website : www.kennisnet.nl

Publication : Yes

2.3. Household

Robot Vacuum Cleaning

Description : Robot Vacuum Cleaner development for consumer market.
Primary Application Field : Household
Secondary Application Field :
Technology : Navigation
Other Technology : Cleaning, Human-machine interaction
Budget :
Participants :
Start :
End :
Website :

Contact Details

Surname : Goeree
First name : Barry
Company : Philips Consumer Lifestyle
Postal Code and City : 9206AD Drachten
Email : barry.goeree@philips.com
Phone :
Company Website : www.philips.com
Publication : Yes

Rising Sun

Description : RoboCup@Home team of the University of Groningen using Nao and Pioneer robots.

Primary Application Field : Household

Secondary Application Field : Care

Technology : Other Technology

Other Technology : all technologies, this is a complete system

Budget : unknown

Participants : 50+ students + staff

Start : 10-2010

End : unknown

Website : www.ai.rug.nl/crl

Contact Details

Surname : van der Zant

First name : Tijn

Company : RUG

Postal Code and City : 9747AG

Email : tijn@ieee.org

Phone :

Company Website :

Publication : Yes

RoboCup@Home

Description	: The RoboCup@Home league aims to develop service and assistive robot technology with high relevance for future personal domestic applications. It is the largest international annual competition for autonomous service robots and is part of the RoboCup initiative. A set of benchmark tests is used to evaluate the robots' abilities and performance in a realistic non-standardized home environment setting. Focus lies on the following domains but is not limited to: Human-Robot-Interaction and Cooperation, Navigation and Mapping in dynamic environments, Computer Vision and Object Recognition under natural light conditions, Object Manipulation, Adaptive Behaviors, Behavior Integration, Ambient Intelligence, Standardization and System Integration. It is colocated with the RoboCup symposium.
Primary Application Field	: Household
Secondary Application Field	: Care
Technology	: Other Technology
Other Technology	: All of the above
Budget	: unknown
Participants	: 40+ research groups, >250 participants
Start	: 2006
End	: unknown
Website	: www.robocupathome.org

Contact Details

Surname	: van der Zant
First name	: Tijn
Company	: RUG
Postal Code and City	: 9747AG
Email	: tijn@ieee.org
Phone	:
Company Website	:
Publication	: Yes

P-forty-F

Description : This project intensifies and extends the cooperation between leading researchers from the University of Twente and Philips and will establish an inspiring innovation environment addressing how to prepare for the future in robotics technology, energy and DFX. The robotics part will address 3 issues: 1.intelligent navigation, 2. safe robotics operation and 3. human perception of robotic devices

Primary Application Field : Household

Secondary Application Field :

Technology : Navigation

Other Technology : Safe HW and algorithms and perfection

Budget :

Participants : Philips Consumer and LifeStyle

Start :

End :

Website :

Contact Details

Surname : Stramigioli

First name : Stefano

Company : University of Twente

Postal Code and City : 7500AE Enschede

Email : S.Stramigioli@utwente.nl

Phone : +31532782794

Company Website : www.utwente.nl

Publication : Yes

3. Health

3.1.Care

R3-COP

Description : The project aims at the creation of a cross-domain platform of methods and tools for the analysis, development and validation of resilient and usable real world autonomous systems being able of reasoning, learning and co-operation in different application domains such as e.g. surveillance (in-door, land, air, sea) and rescue, agriculture (field and greenhouse), people care, home environments, transport in-door and out-door. Research tasks include resilient co-operation models and protocols, robust computer navigation and vision algorithms, semantic reasoning methods, methods and tools for efficient testing and validating dependable adaptive autonomous systems with learning and reasoning abilities. The expected outcome is an industry grade computing environment and platform for resilient autonomous systems targeting various application domains.

Primary Application Field : Care

Secondary Application Field : Household

Technology : No Specific Technology

Other Technology :

Budget : 18.3 M€

Participants : Philips Consumer Lifestyle, Philips Applied Technologies, Technical University Eindhoven, Demcon and international participants.

Start : March 1, 2010

End : February 31, 2013

Website :

Contact Details

Surname : Sandee

First name : Heico

Company : TU Eindhoven

Postal Code and City : 5600 MB, Eindhoven

Email : j.h.sandee@tue.nl

Phone : +31 40 2475423

Company Website : www.tue.nl

Publication : Yes

RoboEarth

Description	: The RoboEarth-project exploits a new approach towards endowing robots with advanced perception and action capabilities, thus enabling robots to carrying out useful tasks autonomously in circumstances that were not planned for explicitly at design time. The core of the innovation proposed by the consortium involves the development of a world-wide web-style database: RoboEarth. RoboEarth will allow robots to share any reusable knowledge independent from their hardware and configuration. As a result of the proposed project, major innovations are expected in the fields of: • 3D sensing (object recognition and localization), • control strategies (linking perception and action), and • learning.
Primary Application Field	: Care
Secondary Application Field	: Household
Technology	: Cognitive systems
Other Technology	:
Budget	:
Participants	: TU Eindhoven, TU München, U Stuttgart, U de Zaragoza, Philips Applied Technologies, ETH Zurich
Start	: December 1, 2009
End	: November 30, 2013
Website	: www.roboearth.org

Contact Details

Surname	: Sandee
First name	: Heico
Company	: TU Eindhoven
Postal Code and City	: 5600 MB, Eindhoven
Email	: j.h.sandee@tue.nl
Phone	: +31 40 2475423
Company Website	: www.tue.nl
Publication	: Yes

Fast and robust two-legged robots

Description : Based on the concept of passive dynamic walking, we research how to design and control robots with an efficient and natural walking motion. This will lead to new insights in human locomotion, as well as design ideas for prostheses, rehabilitation devices, and future service robots.

Primary Application Field : Care

Secondary Application Field :

Technology : Control

Other Technology : mechanical design

Budget : 800.000

Participants : TU Delft

Start : nov 2006

End : juni 2012

Website : www.dbl.tudelft.nl

Contact Details

Surname : Wisse

First name : Martijn

Company : TU Delft

Postal Code and City : 2628CD Delft

Email : m.wisse@tudelft.nl

Phone : 015-2786834

Company Website : www.dbl.tudelft.nl

Publication : Yes

x-arm: human-friendly support aid for health care

Description : The goal of the X-arm project is the development of an advanced support aid for lifting and manipulating patient's positions. The unique selling point of the support aid is the intuitive control the user will have over it. The movement of the user is amplified, without diminishing the contact the user has with his or her environment (for instance a patient). An exoskeleton could be a very good aid to the care worker. There are two technical challenges to achieve a lifting aid as described above: (1) the measurement and control systems, especially haptic feedback and (2) the high forces, powers and energy-need that result in the bulky and intolerant exoskeletons currently being developed. Technical drivers of the project are the development of (mechanical) structural and energy-capacitive components that will lead to efficient and light structures as contributing aspects on the realization of a safe and ergonomic functional demonstrator. The x-arm project is cooperation between InteSpring B.V., the Netherlands and The Delft University of Technology. The TU Delft has a lot of background knowledge about measurement and control systems. InteSpring has knowledge and experience regarding mechanical movement technologies and spring systems.

Primary Application Field : Care
Secondary Application Field :
Technology : Other Technology
Other Technology :
Budget :
Participants : InteSpring BV, TUDelft
Start : October 2010
End : June 2013
Website :

Contact Details

Surname : Rosenberg
First name : Emile
Company : InteSpring BV
Postal Code and City : 2629 JD Delft
Email : emile@intespring.nl
Phone : +31(0)15 2577008
Company Website : www.intespring.nl
Publication : Yes

Myopro

Description	: Myoelectric prostheses often stay unused by their owners. Currently available hands can only open and close and as a result patients perform most activities with their intact hand. Furthermore, the control is not intuitive and the user only perceives visual feedback. The main goals of the project are threefold: * Improve the control of a myoelectric arm-prosthesis by increasing the number of degrees of freedom using multichannel surface electromyography * Develop a natural and intuitive feedback mechanism * Develop a virtual reality training program to enable aimed early-phase rehabilitation.
Primary Application Field	: Care
Secondary Application Field	: Cure
Technology	: Control
Other Technology	: Haptics, Biomedical Signal Processing, Robotics
Budget	:
Participants	:
Start	:
End	:
Website	:

Assessing acceptance of assistive social robots by aging adults

Description : We developed, applied and validated a technology acceptance methodology for assistive social robots. In the future we will apply this methodology to newly developed robots.

Primary Application Field : Care

Secondary Application Field :

Technology : No Specific Technology

Other Technology : n/a

Budget : n/a

Participants : aging adults

Start : august 1st 2005

End : undefined

Website :

Contact Details

Surname : Heerink

First name : Marcel

Company : Instituut voor Information Engineering

Postal Code and City : 1314 CH Almere

Email : m.heerink@windesheimflevoland.nl

Phone : 06-42917442

Company Website : www.ije.nl

Publication : Yes

Photonic sensing

Description : Sensing technology based on fibers and/or integrated chip technology. Multiple parameters with one central interrogator: temperature, pressure, velocity, acceleration, relative humidity and selected chemical substances, EMI insensitive sensor head. Technology developed for medical and other applications, but can be applied in robotics as well.

Primary Application Field : Care

Secondary Application Field : Household

Technology : Other Technology

Other Technology : optical properties of material

Budget :

Participants :

Start :

End :

Website :

Contact Details

Surname : Enderink

First name : Jan

Company : TNO

Postal Code and City : 5612AP Eindhoven

Email : jan.enderink@tno.nl

Phone : 0654975705

Company Website : www.TNO.nl

Publication : Yes

MobiServ

Description : The objective of the MOBISERV project is to develop and use up-to-date technology in a coordinated, intelligent and easy to use way to support independent living of older persons as long as possible in their home or various degrees of institutionalization. The support will be delivered in interior (at home) daily living situations. The implementation will be based on the user acceptance of the technology and understanding of user interaction that truly addresses user needs. MOBISERV will develop a support-concept and prove that it satisfies the objective. The concept is a personal intelligent platform consisting of various middleware and devices plus a primary set of functionalities. The MOBISERV platform will consist of the following:

- a physical robotic unit (PRU) which is an intelligent autonomous robot containing processing power, data storage capability, various sensors (including an adjustable camera), a machine learning/experience gathering/adaptation unit, a TFT touch screen of adjustable height and a speech synthesis and recognition interface,
- an optical recognition unit (ORU),
- wearable health supporting unit (WHSU) which will implement various functionalities such as monitoring of vital parameters etc, and
- a Smart Home Automation and communication unit (SHACU). The physical elements are a robotic platform equipped with cameras and wireless communication devices, smart home automation and intelligent textiles embedding sensors.

Primary Application Field : Care
Secondary Application Field : Therapeutical
Technology : Vision
Other Technology : integration with smart home technology
Budget : 3,6 million euro
Participants : 9 participants from 7 European countries
Start : 1 Dec. 2009
End : 30 Nov. 2012
Website : www.mobiserv.eu

Contact Details

Surname : van Berlo
First name : Ad
Company : Smart Homes
Postal Code and City : 5521 AC
Email : a.vberlo@smart-homes.nl
Phone : 0497-514984
Company Website : www.smart-homes.nl
Publication : Yes

CompanionAble

Description : CompanionAble will provide the synergy of Robotics and Ambient Intelligence technologies and their semantic integration to provide for a care-giver's assistive environment. This will support the cognitive stimulation and therapy management of the care-recipient. This is mediated by a robotic companion (mobile facilitation) working collaboratively with a smart home environment (stationary facilitation). The distinguishing advantages of the CompanionAble Framework Architecture arise from the objective of graceful, scalable and cost-effective integration. Thus CompanionAble addresses the issues of social inclusion and homecare of persons suffering from chronic cognitive disabilities prevalent among the increasing European older population. A participative and inclusive co-design and scenario validation approach will drive the RTD efforts in CompanionAble; involving care recipients and their close carers as well as the wider stakeholders. This is to ensure end-to-end systemic viability, flexibility, modularity and affordability as well as a focus on overall care support governance and integration with quality of experience issues such as dignity-privacy-security preserving responsibilities fully considered. The collaboration of leading gerontologists, specialist elderly care institutions, industrial and academic RTD partners, including a strong cognitive robotics and smart-house capability makes for an excellent confluence of expertise for this innovative project.

Primary Application Field : Care
Secondary Application Field : Therapeutical
Technology : Navigation
Other Technology : integration with smart home technology
Budget : 15 million euro
Participants : 17 participants from various European countries
Start : 1 Jan. 2008
End : 31 dec. 2011
Website : www.companionable.net

Contact Details

Surname : van Berlo
First name : Ad
Company : Smart Homes
Postal Code and City : 5521 AC Eersel
Email : a.vberlo@smart-homes.nl
Phone : 0497-514984
Company Website : www.smart-homes.nl
Publication : Yes

MindWalker

Description : Design of powered exoskeleton (wearable robots) for Spinal Cord Injured patients in order to allow them to walk.

Primary Application Field : Care

Secondary Application Field : Therapeutical

Technology : Human-Machine Interface

Other Technology : powered exoskeleton

Budget : EU

Participants : TU Delft, UTwente, EU partners

Start : January 2010

End : December 2012

Website : <https://mindwalker-project.eu/>

Contact Details

Surname : van der Helm

First name : Frans C.T.

Company : Delft University of Technology

Postal Code and City : 2628CD Delft

Email : F.C.T.vanderHelm@TUDelft.nl

Phone : 015-2785616

Company Website : www.bmeche.tudelft.nl

Publication : Yes

EVRYON

Description : Neuromuscular modeling for powered exoskeleton for lower extremities, for elderly and other patients with weak musculature.

Primary Application Field : Care

Secondary Application Field : Therapeutical

Technology : Human-Machine Interface

Other Technology : powered exoskeleton

Budget : EU

Participants : Delft, Twente, EU partners

Start : January 2009

End : December 2011

Website : <http://evryon.eu/dyne/>

Contact Details

Surname : van der Helm

First name : Frans C.T.

Company : Delft University of Technology

Postal Code and City : 2628CD Delft

Email : F.C.T.vanderHelm@TUDelft.nl

Phone : 015-2785616

Company Website : www.bmeche.tudelft.nl

Publication : Yes

Vision in Mechatronics and Robotics

Description	: At the moment 2D-vision is often applied in industry to flexible automate all kind of production processes. In this project 'Field-Programmable Gate Arrays (FPGA's)' are being used to be able to parallel implement the edition and analysis of images. In this case the additional edition of images is not only possible with the PC, but also with an embedded controller. This can be applied in simple vision tasks like following objects and building 3D-images. The three involved 'lectoraten' have their own application of the link between 3D-vision and low power systems combined with embedded control systems. Avans applies it to gripper technology. Hogeschool Utrecht uses it to improve the accuracy and velocity with which small components are being placed. Fontys uses this technique to expand the possibilities of robot platforms with 3D vision to object detection and place recognition.
Primary Application Field	: Care
Secondary Application Field	: Manufacturing
Technology	: Vision
Other Technology	: FPGA
Budget	: 650000
Participants	: Research institutes: Avans Breda, Jos Gunsing · Fontys Hogescholen, Henk Kiela · Hogeschool Utrecht, Erik Puik · Hogeschool Leeuwarden, Jaap vd Loosdracht · Universiteit Delft /Eindhoven, Pieter Jonker. Companies: Aris, Assembleon, Alten-PTS, Beltech, CCM, Core-vision, CSi Industries, Datavision, DVC, Festo, Hupico, Jentjes, LAN Handling Systems/Robotics, Lely, LTW, MA3 Solutions, Marantz, NTS Optel, NTS Development Support, OTB Solar, Tegema, VDL Steelweld Branchevereniging Fedra, Aandrijven en Automatiseren, Vision Werkgroep
Start	: 01-02-11
End	: 31-01-13

Contact Details

Surname	: Jos
First name	: Gunsing
Company	: Avans Hogeschool (project chair)
Postal Code and City	: 4800RA Breda
Email	: jtg.gunsing@avans.nl
Phone	: 0031651994190
Company Website	: www.avans.nl
Publication	: Yes

KSERA

Description	: The KSERA project (Knowledgeable Service Robot for Aging) will serve several related purposes for elderly persons in general and those with pulmonary disease in particular. Specifically KSERA provides (1) a robotic assistant to follow and monitor the health and behavior of a senior, (2) useful communication (video, internet) services including needed alerts to caregivers and emergency personnel, and (3) a robot integrated with smart household technology to monitor the environment and advise the senior or caregivers of anomalous or dangerous situations. KSERA aims at an adaptive technical aid that will provide needed and useful services in a pleasant, easy-to-use format via a robot that also acts as a companion and assistant. The problems to be addressed by the research and field trials include: (1) robot mobile behavior, i.e. machine navigation and following a target person through a variable and cluttered environment, (2) ubiquitous monitoring of physiological and behavioral data through direct measurements and interaction with household sensors, and (3) human-robot interaction including new developments in shared environmental processing, affective technology, and adaptable multimodal interfaces.
Primary Application Field	: Care
Secondary Application Field	: Household
Technology	: Cognitive systems
Other Technology	: Navigation, Human-Robot Interaction
Participants	: Eindhoven University of Technology (TU/e), Istituto Superiore Mario Boella (ISMB), Maccabi Healthcare Services (Maccabi), CEIT RALTEC gemeinnuetzige GmbH (CEIT RALTEC), Vienna University of Technology (TUW), Consoft sistemi S.p.A. (Consoft), Universität Hamburg (UH)
Start	: 1-2-2010
End	: 31-1-2013
Website	: www.ksera-project.eu

Contact Details

Surname	: Cuijpers
First name	: Raymond
Company	: Eindhoven University of Technology
Postal Code and City	: P.O. Box 513, 5600 MB Eindhoven
Email	: coordinator_ksera@tue.nl
Phone	: +31 40 247 2911
Company Website	: www.ieis.tue.nl
Publication	: Yes

Motion Controlled Arm Support, McArm

Description : The McArm project further builds on two smaller projects the ran in 2006 and 2007. At that time the proof of concept of a motion steered and controlled dynamic arm support (exoskeleton) was realized, which was revolutionary at that time. Now in a range of smaller projects (a.o. with Maastricht University performing kinematics studies) this work is continued. Its goals is to develop a wheelchair born dynamic arm support that adds force to the arm of a handicapped user over several (4 - 7) joints. In this concept the user is still using his/her own muscle force and the system adds additional force to this but not more than strictly needed - the 'Use it or, loose it' principle. In this concept the arm scale for the human underarm is measuring the forces applied and the user is direct in the control loop. In addition to sensors and actuators balancing mechanisms are used. The arm support should be small, light and very easy to use during the demanding circumstances of daily life. In 2011 work may be continued in one or more bigger projects and with other partners.

Primary Application Field : Care
Secondary Application Field : Therapeutical
Technology : Human-Machine Interface
Other Technology : Haptics
Budget :
Participants : Focal, M2Control, Maastricht University
Start : 01-01-2010
End : Not defined
Website : www.focalmeditech.nl

Contact Details

Surname : van der Pijl
First name : Dick
Company : Focal Meditech BV
Postal Code and City : 5026SP Tilburg
Email : d.vander.pijl@focalmeditech.nl
Phone : 0031654356064
Company Website : www.focalmeditech.nl
Publication : Yes

Development of robotarm Jaco

Description : In a close cooperation with Kinova Rehab of Montreal, Canada Focal Meditech is working on the further development of robotarm Jaco. Jaco is a state-of-the-art seven degree of freedom personal robot for handicapped persons, a so- called manipulator. It came to the market in 2010 and is a lightweight robot (4,5 kg.) constructed in carbonfiber. It has an innovative motorsetting as well hand/fingers and limited volume. Focal further developed its user interfaces, control software and worked on wheelchair integration and safety rules. At the same time Kinova works on further product improvements. It is now available with a number of options but developmental work is expected to go on in 2011 also depending on the actual demand of handicapped users. First Jaco's are now in the field and help their users with their activities of daily life.

Primary Application Field : Care

Secondary Application Field : Household

Technology : Human-Machine Interface

Other Technology : Control

Budget :

Participants : Kinova, Focal

Start : 01-02-2010

End : 31-12-2011

Website : www.focalmeditech.nl

Contact Details

Surname : van der Pijl

First name : Dick

Company : Focal Meditech BV

Postal Code and City : 5026SP Tilburg

Email : d.vander.pijl@focalmeditech.nl

Phone : 0031654356064

Company Website : www.focalmeditech.nl

Publication : Yes

Bobbie

Description : This project will result in new methods to design a robot system, using standardized architectures, which can safely work in a care situation. As a proof of these methods, a specific realization in the form of a safely working prototype will be shown as an end result.

Primary Application Field : Care

Secondary Application Field : Household

Technology : Navigation

Other Technology :

Budget :

Participants : Demcon, TU Eindhoven, TU Delft, UTwente, Fontys, Lacquey, NTS, Optec

Start : October 1, 2009

End : October 1, 2012

Website :

Contact Details

Surname : Sandee

First name : Heico

Company : TU Eindhoven

Postal Code and City : 5600 MB, Eindhoven

Email : j.h.sandee@tue.nl

Phone : +31 40 2475423

Company Website : www.tue.nl

Publication : Yes

Teleoperated Service Robot (Rose)

Description : The development and the related research of a teleoperated service robot for household tasks in a care environment.

Primary Application Field : Care

Secondary Application Field : Household

Technology : Vision

Other Technology : navigation, haptics

Budget : 3 mio Euro

Participants : Inroads, Sioux, NTS, Tegema, Wingz, van Berlo, Exact Dynamics, Zuidzorg, TUE, Fontys Hogescholen

Start : second prototype is under testing

End : december 31, 2011

Website : www.robot-rose.nl

Contact Details

Surname : Zeegers

First name : Henk

Company : Inroads

Postal Code and City : 5612 AJ Eindhoven

Email : zeegers@inroads.nl

Phone : +31408519070

Company Website : www.inroads.nl

Publication : Yes

Socio-Cognitive Robotics

Description : The project aims to develop a cognitive architecture for social robots. The project consists of several sub-projects related to developing a cognitive robot control architecture, task learning, and human-robot interaction. The Nao robot platform is used as the primary platform to evaluate the project's deliverables.

Primary Application Field : Care

Secondary Application Field : Household

Technology : Cognitive systems

Other Technology :

Budget :

Participants : TU Delft, TNO

Start :

End :

Website : <http://mmi.tudelft.nl/SocioCognitiveRobotics/>

Contact Details

Surname : Hindriks

First name : Koen

Company : Delft University of Technology

Postal Code and City : 2628CD Delft

Email : k.v.hindriks@tudelft.nl

Phone :

Company Website : www.tudelft.nl

Publication : Yes

Paro interventions

Description : Paro was developed for application in dementia care. How this application is to be implemented is however not clear. In close collaboration with care providers interventions are determined and elaborated. Following, effect of these interventions is being investigated and required training for care personel is under development.

Primary Application Field : Care

Secondary Application Field : Therapeutical

Technology : Other Technology

Other Technology : Pet seal robot PARO

Budget :

Participants : Bemelmans, Gelderblom, Jonker, de Witte

Start :

End :

Website : www.technologyincare.nl

Contact Details

Surname : Gelderblom

First name : Gert Jan

Company : Hogeschool Zuyd

Postal Code and City : 6400AN Heerlen

Email : g.j.gelderblom@hszuyd.nl

Phone : +31454002658

Company Website : www.technologyincare.nl

Publication : Yes

ALIZ-e

Description : The goal of aliz-e is to develop novel methods for developing and testing interactive, mobile robots which will be able to socially interact with human users over extended periods of time, i.e. a possibly non-continuous succession of interactions which can refer back to, and build forth on, previous experiences. The target group in this project are children with diabetes.

Primary Application Field : Care

Secondary Application Field : Education and Training

Technology : Cognitive systems

Other Technology :

Budget : 10,603,617€

Participants : University of Plymouth, DFKI, VUB, TNO, IMPC, University of Hertfordshire, Hospitale San Raffaele, CNR/ISTC, Gostai

Start : March 2010

End : August 2014

Website : www.aliz-e.org

Contact Details

Surname : Looije

First name : Rosemarijn

Company : TNO

Postal Code and City : 3769ZG Soesterberg

Email : rosemarijn.looije@tno.nl

Phone :

Company Website :

Publication : Yes

Arm Shoulder MAS

Description : Development, production and sales of several robotic devices for the rehabilitation market, one device will concentrate on the Arm-Shoulder rehabilitation for stroke survivors.

Primary Application Field : Care

Secondary Application Field : Manufacturing

Technology : Haptics

Other Technology :

Budget : 150.000,=

Participants : UTwente, Hankamp Rehab, Saebo Inc

Start : 01-01-2011

End : 31-12-2012

Website : to be developed

Contact Details

Surname : Tonis

First name : Frederik

Company : Hankamp rehab

Postal Code and City : 7544 RG

Email : F.Tonis@Hankamp.nl

Phone : 06-22493652

Company Website : www.hankamp.nl

Publication : Yes

BRICS

Description	: BRICS will work together with academic and industrial providers of robotic components – both hardware and software – to identify and document best practices in the development of complex robotics systems, to refactor existing components in order to achieve a much higher level of reusability and robustness, and to support the robot development process with a well-structured tool chain and a repository of reusable, configurable code.
Primary Application Field	: Care
Secondary Application Field	: Household
Technology	: Other Technology
Other Technology	: Robot development process
Budget	:
Participants	: KUKA Roboter GmbH; GPS Gesellschaft für Produktionssysteme mbH; Bonn-Rhein-Sieg Univ. of Applied Sciences; Katholieke Universiteit Leuven; Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.; University of Twente; Università degli Studi di Bergamo; BlueBotics SA
Start	: 2009
End	: 2013
Website	: www.best-of-robotics.org

Contact Details

Surname	: Broenink
First name	: Jan
Company	: University of Twente
Postal Code and City	: 7500 AE Enschede
Email	: J.F.Broenink@utwente.nl
Phone	: +31 53 489 2793
Company Website	: www.ce.utwente.nl
Publication	: Yes

IMDI.nl

Description : Innovative Medical Devices Initiative Netherlands aims to contribute to cost reduction in healthcare and to stimulate the business activities in the medical technology sector in the Netherlands by investing in Research Centers of Excellence.

Primary Application Field : Care

Secondary Application Field : Cure

Technology : Human-Machine Interface

Other Technology : imaging, home care, minimally invasive surgery

Budget : 80 million per year

Participants : eight Centers of Research Excellence

Start : 2011

End : 2020

Website : www.imdi.nl

Contact Details

Surname : Van Ark

First name : Gerrit

Company : NWO en ZonMw

Postal Code and City : 2509 AE The Hague

Email : ark@zonmw.nl

Phone : +31 70 349.5109

Company Website : www.zonmw.nl

Publication : Yes

3.2.Cure

Remote Robotics

Description	: This project concerns design of robotic systems for applications in unstructured environments, with particular focus on medical applications. Being exposed to X-rays on a daily basis can be harmful for health care workers. Developing a remote-controlled robot that could take the X-rays is one way to reduce human exposure. The robot will be designed for use in hospitals (curative medicine) and in homecare (care-based services). With a few alterations, the robot will be able to perform multiple tasks. Marketing the robots as cheaply as possible will be key. In about seven years, the first affordable robot is expected to roll off the assembly line.
Primary Application Field	: Cure
Secondary Application Field	: Care
Technology	: Control
Other Technology	: Haptics
Budget	: 550K
Participants	: TU/e, TUDelft, UTwente, CCM, Frencken, KMWE, Philips Medical Systems, TNO Industrie.
Start	: January 1, 2008
End	: December 31, 2013
Website	:

Contact Details

Surname	: Kostic
First name	: Dragan
Company	: TU Eindhoven
Postal Code and City	: 5600 MB, Eindhoven
Email	: d.kostic@tue.nl
Phone	: 040-2478332
Company Website	: http://w3.wtb.tue.nl/nl
Publication	: Yes

Eye RHAS

Description : Eye RHAS develops demonstration models of haptic master-slave robots for vitreoretinal eye surgery. These models can be used in minimal invasive eye surgery and on the long term in orthopedics oncology, podiatry (surgery in children), neurosurgery and virtual training for (micro)surgery.

Primary Application Field : Cure

Secondary Application Field :

Technology : Haptics

Other Technology :

Budget : 942k

Participants : AMC, TNO Industrie en Techniek, TU Eindhoven

Start : March 2006

End : September 2011

Website :

Contact Details

Surname : Oderwald

First name : Michiel

Company : TNO

Postal Code and City : Eindhoven

Email : michiel.oderwald@tno.nl

Phone : +31(0) 888 666 36

Company Website : www.tno.nl

Publication : Yes

PITON

Description : The PITON project, Percutaneous Instruments Tele-Operated Needles, will result in robotic instruments for percutaneous interventions (i.e. through small incisions in the skin). Miniature steerable needles and catheters will be developed that can be navigated around organs or through vessels.

Primary Application Field : Cure

Secondary Application Field :

Technology : Other Technology

Other Technology : Fine mechanics and remote control

Budget :

Participants : DEAM, Technobis, Delft University of Technology, Technical University Eindhoven, TNO Science and Industry, Hemolab

Start : October, 2009

End : October, 2012

Website : http://www.deamcorporation.com/innovations/mri_guided_interventions.php

Contact Details

Surname :

First name :

Company : Deam Corporation

Postal Code and City : 1098 XH Amsterdam

Email : info@deamcorporation.com

Phone : +31 20 7173810

Company Website : www.deamcorporation.com

Publication : Yes

SOFIE

Description : A Minimally Invasive Surgical (MIS) master-slave system with motorized force-feedback is being developed to overcome inconveniences that accompany performing conventional MIS through 1 cm incisions: an uncomfortable body posture; limited force-feedback; and unnatural eye-hand coordination.

Primary Application Field : Cure

Secondary Application Field :

Technology : Haptics

Other Technology :

Budget :

Participants : TU Eindhoven

Start : 2006

End : NA

Website :

Contact Details

Surname : Bedem, van

First name : Linda

Company : TU Eindhoven

Postal Code and City : 5600 MB, Eindhoven

Email : l.j.m.v.d.bedem@tue.nl

Phone : +31 40 2474789

Company Website : www.tue.nl

Publication : Yes

Robotic Needle Steering

Description : Needle insertion is commonly used for medical diagnosis and drug delivery. Rigid needles often miss their targets, which may result in patient trauma. This project aims to use robotically steered flexible needles to accurately reach challenging locations within the body.

Primary Application Field : Cure

Secondary Application Field : Therapeutical

Technology : Control

Other Technology : Navigation, Robotics, Vision

Budget : 250000

Participants : University of Twente, Radboud University Nijmegen Medical Center, XiiVent Medical, Demcom, Siemens

Start : 1 January, 2011

End : 31 December, 2014

Website :

TeleFlex

Description : Surgical robotic systems are revolutionizing healthcare and medical services. Laparoscopy is becoming more invasive while conventional surgery is becoming less invasive. This has led to the emergence of the NOTES (Natural Orifice Transluminal Endoscopic Surgery) and SILS (Single Incision Laparoscopic Surgery) procedures, in which use of flexible instruments is essential. A robotic control of these instruments inside the body is both challenging and critical for achieving good surgical outcomes. The TeleFLEX project is one of the initiatives of University of Twente to design, and develop a state-of-the-art surgical robotic system for endo-/transluminal endoscopic surgery, and carry out research on the enabling technologies. The master-slave concept, which is the norm in robotic surgery today and in robotic technology itself, can solve many of the technical challenges encountered in conventional flexible endoscopic surgery. The master side contains a master input device (e.g. a haptic device or a manipulator) with a controller and other visual display devices. The slave side includes an endoscope/ endoscopic platform, which provides access channels for the flexible surgical instruments and other accessories required for the particular intervention, controller and drive system.

Primary Application Field : Cure
Secondary Application Field : Care
Technology : Control
Other Technology : Robotics, Vision, Design
Budget :
Participants :
Start :
End :
Website :

ReflexLeg: Intelligent and energy-efficient actuation and natural bidirectional control interfacing for transfemoral prostheses

Description : Although the most important function of a prosthesis for leg amputees is the support of body weight, there is a need to put more ‘intelligence’ in the device in order to perform a larger variety of tasks more efficiently, like stair ascend and descend, walking with different speeds and on different surfaces, including slopes, ambulation in complex and variable environments like buildings. For this purpose, modern prostheses are equipped with artificial controllers that alter the dynamic properties of the knee mechanism, depending on external loads as measured with different sensors. Yet, currently no prostheses exist that are integrated in the reflexive neural motor control of the body and that mimic a number of essential biomechanical principles of the body, like energy-storing actuation that allows energy transfer between knee and ankle joints. It is the objective of the current project to investigate these principles, specifically: 1. Adjustable and energy-efficient passive actuation that allows energy transfer between knee and ankle joints and that can be modulated by control inputs from the body. 2. Reflexive control, integrated with the physiological motor control of the body. The approach to be investigated in the current project consists of a controllable spring (or combination of springs) combined with a reflexive control interface. The controllable spring connects and actuates the prosthetic knee and ankle joints. The reflexive control interface consists of ElectroMyoGraphic (EMG) control and electro- or vibrotactile feedback. The EMG electrodes will sense the activation of muscles in the stump and the tactile feedback will be applied on the skin of the stump. In addition to this solution, the haptic characteristics of the physical interface between upper leg and prosthesis will be investigated and optimized for maximum integration with the remaining reflexive control.

Primary Application Field : Cure
Secondary Application Field : Care
Technology : Other Technology
Other Technology : mechanics
Budget : 684008
Participants : 3
Start : May 2008
End : April 2012
Website :

Robotics for flexible endoscope steering

Description : We develop a robotic system for flexible endoscope steering, and for manipulation of flexible surgical instruments.

Primary Application Field : Cure

Secondary Application Field :

Technology : Human-Machine Interface

Other Technology :

Budget : 3.9 million euro

Participants : UTwente, Demcon, Storz, Olympus, various hospitals

Start : 2009

End : 2012

Website :

Contact Details

Surname : Broeders

First name : Ivo

Company : MeanderMC Amersfoort

Postal Code and City : 3818 es amersfoort

Email : iamj.broeders@meandermc.nl

Phone : 0615091342

Company Website :

Publication : Yes

NeuroSIPE

Description : Development of Diagnostic Robots for system identification and parameter estimation for patients with neurological disorders. Various projects: ROBIN: Ankle and walking Torticollis: Head-Neck Movement Diagnostic System: MRI compatible robots QDisc: Low-back pain

Primary Application Field : Cure

Secondary Application Field : Care

Technology : Human-Machine Interface

Other Technology : Insight in neuromuscular control

Budget : STW programmasubsidie

Participants : Delft, Twente, LUMC, VU, VUmc, AMC, ErasmusMC

Start : Januari 2010

End : December 2015

Website : www.neurosipe.nl

Contact Details

Surname : van der Helm

First name : Frans C.T.

Company : Delft University of Technology

Postal Code and City : 2628CD Delft

Email : F.C.T.vanderHelm@TUDelft.nl

Phone : 015-2785616

Company Website : www.bmeche.tudelft.nl

Publication : Yes

MIRIAM

Description	: Minimally Invasive Robotics in An MRI Environment (MIRIAM): In this project we aim to develop a magnetic resonance (MR) compatible robotic system for interventions in the prostate. These interventions include minimally invasive diagnostic and therapeutic procedures (e.g. local irradiation, high intensity focused ultrasound, cryotherapy, photodynamic therapy). The project involves the design and development of both hardware and software components to improve targeting accuracy during the procedure.
Primary Application Field	: Cure
Secondary Application Field	: Care
Technology	: Control
Other Technology	: Robotics, Vision, Navigation
Budget	: 1.9 Million Euros
Participants	: University of Twente, Radboud University Nijmegen Medical Center, XiiVent Medical, Demcom, Siemens
Start	: 1 July, 2010
End	: 30 June, 2015
Website	:

3.3. Therapeutical

Dynamics of Stable Bipedal Locomotion

Description	In this PhD project a fundamental research is conducted around modeling and system identification of bipedal humanoid robots, as well as analysis of balance and stability of bipedal locomotion.
Primary Application Field	Therapeutical
Secondary Application Field	Education and Training
Technology	Control
Other Technology	Algorithms for assessment of balance of a biped and stability of bipedal walking.
Budget	300K
Participants	TU/e, Section Dynamics and Control, Dpt. Mechanical Eng.
Start	15 November 2009
End	15 November 2013
Website	www.humanoid.tue.nl

Contact

Details

Surname	Kostic
First name	Dragan
Company	TU Eindhoven
Postal Code and City	5600 MB, Eindhoven
Email	d.kostic@tue.nl
Phone	040-2478332
Company Website	http://w3.wtb.tue.nl/nl
Publication	Yes

IROMEC short term evaluation

Description	: Iromec is a play supporting robot for children with disabilities. It is developed in the European IROMEC project. Currently post project evaluations are carried out to determine the effect of the play robot on play behavior and development. In collaboration with the special school at Adelante a short term evaluation is carried out.
Primary Application Field	: Therapeutical
Secondary Application Field	: Education and Training
Technology	: Other Technology
Other Technology	: IROMEC
Budget	:
Participants	: Bernd, Gelderblom, de Witte
Start	:
End	:
Website	: www.technologyincare.nl

Contact

Details

Surname	: Gelderblom
First name	: Gert Jan
Company	: Hogeschool Zuyd
Postal Code and City	: 6400 AN Heerlen
Email	: g.j.gelderblom@hszuyd.nl
Phone	: +31454002658
Company Website	: www.technologyincare.nl
Publication	: Yes

MIAS ATD

Description : After stroke, many people have to cope with impaired arm and hand function. Relearning of lost functions is preferably done with high intensity, in a task oriented way, with an active contribution of the patient in a motivating environment. Within the MIAS ATD project a new Active Therapeutic Device is developed to train arm and hand function. The ATD will combine robotics to support the arm and multichannel electrical stimulation to support hand opening during training.

Primary Application Field : Therapeutical

Secondary Application Field : Care

Technology : Control

Other Technology : Electrical stimulation

Budget : 2.5 mln

Participants : Roessingh Research & Development, University of Twente, Demcon, tic Medizintechnik, UseLab

Start : 01-01-2009

End : 31-12-2012

Website : <http://www.mias-info.eu/nl/de-activiteiten/active-therapeutic-devices/>

Contact

Details

Surname : Krabben

First name : Thijs

Company : Roessingh Research & Development

Postal Code and City : 7522 AH Enschede

Email : t.krabben@rrd.nl

Phone :

Company Website : www.rrd.nl

Publication : Yes

WikiTherapist

Description	: WikiTherapist facilitates therapists in developing technology-based therapy programs on non conventional platforms like robots and tangible user interfaces. The subject of research is combining end-user programming and learning by demonstration for easy creation of behaviors on a robotic platform that can be used for therapy of autistic children. Within the project interactive scenarios between the robot and the autistic children are developed with the help of therapists and psychologists from Dr. LeoKannerhuis and ARC Cambridge. A humanoid robot NAO is used as working platform which is enhanced with GPU based robot command language that enables real-time processes to run in parallel. This language is supplied by the company TiViPE. The goal of the project is to create a web based community of therapists and robot practitioners who co-create robot behaviors and scenarios with different complexity. The expected result is an easy to control by non-specialists robotic environment which is equipped with library of behaviors and scenarios that are found useful for behavioral training of people with autism. The tools can be used also in general context.
Primary Application Field	: Therapeutical
Secondary Application Field	: Training
Technology	: Learning, Cognitive systems
Other Technology	: human-machine interfaces, robots, vision
Budget	: 1 000 000 euro
Participants	: Eindhoven University of Technology (Designed Intelligence and User Systems Interaction Group of the Department of Industrial Design and Section Dynamics and Control of the Department of Mechanical Engineering and), Philips Applied Technologies, TiViPE BV, Serious Toys, St. Maartenskliniek, Adelante, ACR Cambridge, Dr. Leo Kannerhuis.
Start	: Nov 2009
End	: Sep 2013
Website	: http://www.wikitherapist.nl

Contact Details

Surname	: Barakova
First name	: Emilia
Company	: TU Eindhoven
Postal Code and City	: 5612 AZ Eindhoven
Email	: e.i.barakova@tue.nl
Phone	: 06-41626209
Company Website	: http://www.idemployee.id.tue.nl/e.i.barakova/
Publication	: Yes

Lopes

Description : Development of a robotic gait trainer for stroke rehabilitation
Primary Application Field : Therapeutical
Secondary Application Field : Care
Technology : Haptics
Other Technology : Control, human machine interface
Budget : 3.5M
Participants : Moog, UT, Demcon, RRD, sintMaartenskliniek
Start : 2009
End : 2013
Website :

Contact Details

Surname : Meuleman
First name : Jos
Company : Moog
Postal Code and City : 2153PJ
Email : jmeuleman@moog.com
Phone :
Company Website :
Publication : Yes

VirtuRob

Description	: In the Virturob project knowledge of virtual reality and robotics is obtained. This knowledge is used for the realization of a technological system for training of the disturbed arm and hand function of patients with a neurological disease, such as cerebrovascular accident (CVA), spinal cord injury (SCI) or traumatic brain injury (TBI). This technological knowledge makes use of the state of the art insights on motor control, motor (re) learning and neurological recovery. The objective of the project is to acquire and make available technological knowledge of Virtual Reality and Robotics in a form that can be used for the development of a VirtuRob combination for the training of the impaired arm and hand function of people with neurological disorders. In more detail the project gathers information about the effect of different feedback conditions during motor learning of the arm; and the influence of cognitive dual tasks during the performance of a motor task. Also a robotic device is build for the training of the impaired arm for stroke survivors. This project is funded by Provincie Overijssel, Provincie Gelderland and Ministry of Economic Affairs.
Primary Application Field	: Therapeutical
Secondary Application Field	: Care
Technology	: Learning
Other Technology	:
Budget	:
Participants	: Three knowledge institutes are participating in the project, Roessingh Research and Development (RRD) in Enschede, University of Twente (UT) in Enschede, and the Radboud University Nijmegen Medical Centre (RUN MC). Two commercial companies are participating, BAAT medical engineering in Hengelo and Re-lion BV in Enschede. BAAT medical provides and developes the robotic systems. Re-Lion designs Virtual Environments for usage in rehabilitation therapy.
Start	: 1-11-2007
End	: 1-11-2011
Website	: www.activerehabilitation.eu

WiiTM-habilitation of Upper Extremity Function in Children with Cerebral Palsy

Description : The primary objective of this explorative study is to evaluate the training effect on the upper extremity function of the most affected arm in unilateral activity, in children with Cerebral Palsy using the WiiTM computer, which is a Virtual Reality intervention. The secondary objective is to evaluate the training effect on execution of bilateral activity in daily life perceived by the caregivers. Another secondary objective is to evaluate the user satisfaction and usability of WiiTM computer training for the user and the health professional.

Primary Application Field : Therapeutical

Secondary Application Field : Care

Technology : Other Technology

Other Technology : Wii computer

Budget :

Participants : Rehabilitation Center The Roessingh, Roessingh Research and Development

Start : 1 September 2010

End : 1 September 2011

Website : -

Contact Details

Surname : Anke

First name : Kottink

Company : Roessingh Research and Development

Postal Code and City : 7522 AH Enschede

Email : a.kottink@rrd.nl

Phone : 053-4875733

Company Website : www.rrd.nl

Publication : Yes

Added value of VR

Description	: To stimulate restoration of arm function after stroke, intensive and task-specific training is essential. To implement this, the application of virtual reality (VR) in rehabilitation is promising. Integration of stimuli and feedback in a rehabilitation game, taking principles of motor relearning into account, allows high motivation for patients during training. Additionally, VR can automate and intensify treatment, since patients can practice more independently, without the need for one-to-one supervision. Previous research of this group showed that arm training using a specifically developed game for rehabilitation (FurballHunt), combined with arm support, can improve reaching. However, this pilot study did not discern between the effect of arm support and the added value of training with a rehabilitation game. The objective of this project is to obtain first insight into the effect of a stimulus rich context, specifically developed for rehabilitation (rehab game), with a less rich context (conventional exercises) during reach training for restoration of arm function in chronic stroke patients. This project is funded by 'Wetenschappelijk College Fysiotherapie' (WCF) of the 'Koninklijk Nederlands Genootschap voor Fysiotherapie' (KNGF). The project runs within the research cluster Restoration of Human Function and is led by Dr. A.I.R. Kottink-Hutten and Dr. G.B. Prange.
Primary Application Field	: Therapeutical
Secondary Application Field	: Care
Technology	: Other Technology
Other Technology	: Virtual Environment
Budget	: €40.000,-
Participants	: Roessingh Research & Development (Enschede), Revalidatiecentrum het Roessingh (Enschede).
Start	: 1 January 2010
End	: 30 June 2011
Website	: www.rrd.nl/projects/VR_KNGF.html

Contact Details

Surname	: Prange
First name	: Gerdienke
Company	: Roessingh Research & Development
Postal Code and City	: 7522 AH Enschede
Email	: g.prange@rrd.nl
Phone	: +31-53 4875759
Company Website	: www.rrd.nl
Publication	: Yes

ROBAR - ROBot-supported Arm Rehabilitation in the early phase after stroke

Description	: After a stroke, many patients suffer from impaired motor function of the arm. Optimal recovery of arm function is important to perform activities of daily life independently. To stimulate restoration of arm function after stroke intensive and task-specific training is essential. For this, application of robotic systems in rehabilitation is promising. More specifically, active movements can be facilitated by the use of arm support, as shown by previous research by our group. One of the biggest advantages of arm support using a robot is currently the possibility to 'automate' therapy (a therapist can treat multiple patients simultaneously), so that productivity of health care can increase and cost can be reduced. In the past years, RRD has developed a device that can support the arm in a smart way (the Freebal), together with the University of Twente and Baat Medical. This concept was further developed by the Swiss company Hocoma into ArmeoBoom, in which arm support is combined with rehab games. This system will be implemented in 7 rehabilitation centers throughout the Netherlands in the scope of the ROBAR project. This is possible due to a grant from 'Innovatieprogramma van Revalidatie Nederland'.
Primary Application Field	: Therapeutical
Secondary Application Field	: Care
Other Technology	: Arm support
Budget	: €300.000,-
Participants	: Roessingh Research & Development (Enschede), Universiteit Twente (Enschede), Revalidatiecentrum Het Roessingh (Enschede), Sint Maartenskliniek (Nijmegen), De Hoogstraat (Utrecht), Beatrixoord (Haren), Groot Klimmendaal (Arnhem), Rijndam (Rotterdam) en Reade (Amsterdam), Snoek-advies (Enschede)
Start	: 1 June 2010
End	: 31 May 2012
Website	: http://robar.rrdweb.nl

Contact Details

Surname	: Prange
First name	: Gerdienke
Company	: Roessingh Research & Development
Postal Code and City	: 7522 AH Enschede
Email	: g.prange@rrd.nl
Phone	: +31-53 1875759
Company Website	: www.rrd.nl
Publication	: Yes

4. Industrial

4.1. Material Handling

ESI Falcon: underactuated grasping

Description	: Self adaptive grippers out of a single piece of material for use in unstructured environments (this is a subproject of the ESI Falcon project). Adaptation to differently sized and shaped objects, and even decision making capability between different kinds of grasps is built in mechanically (i.e. without sensors or control, just pull-to-grasp) in a single piece (allowing use in deep see, vacuum, surgery, etc.).
Primary Application Field	: Material Handling
Secondary Application Field	: Agro and Food
Technology	: Other Technology
Other Technology	: Mechanisms
Budget	: 377 kE (total project 4.2 mln)
Participants	: ESI, TU/e, TUDelft, UTwente, Demcon
Start	: Nov 1, 2006
End	: Apr 1 2011
Website	: http://compliantmechanisms.3me.tudelft.nl/mw/index.php/Underactuated_grasping

Contact Details

Surname	: Herder
First name	: Just
Company	: TU Delft
Postal Code and City	: 2628CD Delft
Email	: j.l.herder@tudelft.nl
Phone	: +31 15 2784713
Company Website	: tudelft.nl
Publication	: Yes

Frog AGV Systems

Description : Frog AGV Systems develops and markets automatic guided vehicle systems as complete turnkey projects, but also supplies the core navigation and control technology for system integrators.

Primary Application Field : Material Handling

Secondary Application Field : Entertainment

Technology : Navigation

Other Technology : Sensors, controls, fleet control

Budget : 10.000.000 per year

Participants : Frog AGV Systems

Start :

End :

Website : www.frog.nl

Contact Details

Surname : Segeren

First name : Patrick

Company : Frog AGV Systems

Postal Code and City : 3435 AP

Email : patrick@frog.nl

Phone : 030-242 8562

Company Website : www.frog.nl

Publication : Yes

Robots that learn to move naturally

Description : The goal of this project is to create robot arms that have the design and the skills to perform their repetitive tasks in a natural dynamic manner. This will make them more lightweight, more efficient, and safer than current industrial robot arms, allowing application outside the traditional factory environment into the domains of food handling and safe human-robot collaboration.

Primary Application Field : Material Handling

Secondary Application Field : Agro and Food

Technology : Learning

Other Technology : Control, mechanical design

Budget : 800.000

Participants : TU Delft

Start : may 2011

End : may 2016

Website : www.dbl.tudelft.nl

Contact Details

Surname : Wisse

First name : Martijn

Company : TU Delft

Postal Code and City : 2628CD Delft

Email : m.wisse@tudelft.nl

Phone : 015-2786834

Company Website : www.dbl.tudelft.nl

Publication : Yes

SAC Nederland

Description : SAC Nederland developed a robot system performing the supervision and assembly of plastic components of the interior of a car.

Primary Application Field : Material Handling

Secondary Application Field : Manufacturing

Technology : Vision

Other Technology :

Budget :

Participants :

Start :

End :

Website :

Contact Details

Surname : Weling

First name : Paul

Company : SAC Nederland / VCC

Postal Code and City : 6422 NJ Maastricht

Email : pw@sac-nederland.nl

Phone : 046 750 3400

Company Website : www.sac-nederland.nl

Publication : Yes

Robot Ehrbecker Schiefelbusch

Description : Pick an place robot for distribution
Primary Application Field : Material Handling
Secondary Application Field : Education and Training
Technology : Vision
Other Technology : PLC
Budget :
Participants :
Start : October
End : December
Website : www.eselektro.nl

Contact Details

Surname : van Roon
First name : Henk
Company : Ehrbecker Schiefelbusch BV
Postal Code and City : 4941 VR Raamsdonksveer
Email : h.vanroon@eselektro.nl
Phone : 076-5782860
Company Website : www.eselektro.nl/at
Publication : Yes

Sharing Control: feeling is believing

Description	: Manual control tasks – like driving - are prone to human errors, which may cause accidents. The conventional solution is to either fully automate a task or to support the human with alerting systems. Both approaches have inherent limitations, widely described in literature. The solution of the future lies in shared control, where an intelligent system assists the human with guiding forces. Control should smoothly shift between human and machine, fully optimizing human-machine interaction. The goal of this project is to develop the fundamental knowledge needed to optimize shared control for different users and tasks. Neuromuscular experiments and models will form the basis for the design of prototype systems for vehicular control tasks, which will be evaluated in available motion-based simulators. The optimized guidance forces will keep the human in full control, even when visually distracted; and allow fast neuromuscular responses (200 ms.). The proposed shared control aims to be a breakthrough in how we think about manual control, and the methodology will apply to a variety of areas (tele-operation robotics, exoskeletons, space robotics, wheel chair control).
Primary Application Field	: Material Handling
Secondary Application Field	: Maintenance and Inspection
Technology	: Haptics
Other Technology	: Human-Machine Interface
Budget	: 250,000 euro
Participants	: David Abbink
Start	: January 1st 2010
End	: October 1st 2013
Website	: http://www.3me.tudelft.nl/live/pagina.jsp?id=7e245d36-3a6f-420d-9721-f1f03e02578e&lang=en

Contact Details

Surname	: Abbink
First name	: David
Company	: Delft University of Technology
Postal Code and City	: 2628 CD Delft
Email	: d.a.abbink@tudelft.nl
Phone	:
Company Website	: www.bmeche.tudelft.nl/
Publication	: Yes

4.2. Manufacturing

Computation of partial closure grasps

Description : We consider the efficient computation of grasps that prevent motions in a given set of directions. The study includes a thorough investigation of the problem's solution space as well as the design of geometric grasp synthesis algorithms with provable performance guarantees. We also take into account quality measures for such grasps.

Primary Application Field : Manufacturing

Secondary Application Field : Entertainment

Technology : Other Technology

Other Technology : Algorithms

Budget :

Participants : Heinrich Kruger, MSc, and dr.ir. Frank van der Stappen

Start : April 1, 2009

End : March 31, 2013

Website :

Contact Details

Surname : van der Stappen

First name : Frank

Company : Utrecht University

Postal Code and City : PO Box 80089, 3508 TB Utrecht

Email : frankst@cs.uu.nl

Phone : 0302535093

Company Website :

Publication : Yes

Clet project

Description : Quality control of robotic laser welded seams through spectroscopic techniques Laser welding process is a technique widely used in industry. The interesting properties of the welded seams obtained and the possibility of automating the robotwelding process has contributed to its diffusion among several kinds of industries.

Primary Application Field : Manufacturing

Secondary Application Field : Construction

Technology : Control

Other Technology :

Budget :

Participants : Flexweld Netherlands, University of Twente the Netherlands, Cartif Spain, Precitec Germany, LIT Italie, Palacky University Tjehie,

Start : december 2008

End : april 2011

Website : www.flexweld.nl <http://clet.cartif.com.es/>

Contact Details

Surname : Hofmeijer

First name : Ard

Company : Flexweld BV

Postal Code and City : 7442 CW Nijverdal

Email : ardhofmeijer@flexweld.nl

Phone : 0031 (0) 548 544955

Company Website : www.flexweld.nl

Publication : Yes

Amron

Description : More often in industrial projects robots are used. Also small and medium enterprises are discovering the advantages. Amron offers them good and feasible solutions. Fanuc, Kawasaki, Mitsubishi and Kuka Robots are programmed in collaboration with these suppliers by Amron.

Examples of projects are:

2004, Dieptreppers loading at Orfa Visser

2006, KLM Catering fold- and handling line

2007, Pick en place robot television furniture's

2010, Automation of the assembling of an injection molding machine

2010, Automation of the placement of plugs.

Primary Application Field : Manufacturing

Secondary Application Field : Material Handling

Technology : Other Technology

Other Technology :

Budget :

Participants :

Start :

End :

Website : www.amron.nl

Contact Details

Surname : Drijfhout

First name : Theo

Company : Amron Projecten bv

Postal Code and City : 8071 CS Nunspeet

Email : t.drijfhout@amron.nl

Phone : 0341-474560

Company Website : www.amron.nl

Publication : Yes

5. Professional Services and Applications

5.1. Maintenance and Inspection

Zebro

Description	: Zebro is a power and computational autonomous robot inspired by RHex. It is bio-inspired, designed to be very agile and robust. Zebro is designed for experimental validation of machine learning algorithms.
Primary Application Field	: Maintenance and Inspection
Secondary Application Field	: Household
Technology	: Control
Other Technology	: Machine Learning
Budget	: 50000 euro
Participants	: Delft Center for Systems and Control
Start	: July 2009
End	: July 2012
Website	: http://www.dcsc.tudelft.nl/~glopes/zebro.html

Contact Details

Surname	: Lopes
First name	: Gabriel
Company	: Delft University of Technology
Postal Code and City	: 2628CD, Delft
Email	: G.A.DelgadoLopes@tudelft.nl
Phone	: +31 15 27 85489
Company Website	: http://www.dcsc.tudelft.nl/
Publication	: Yes

Pirate

Description : Demonstration of a robotic platform able to navigate autonomously through small diameter mains of the gas distribution system.

Primary Application Field : Maintenance and Inspection

Secondary Application Field : Infrastructure

Technology : Navigation

Other Technology : Sensor (pipe or material quality), Control, Mechatronic Design

Budget :

Participants : Kiwa, UTwente, Aliander, Enexis, Cogas, Endinet, Demcon

Start : 1-1-2010

End : 1-1-2012

Website : www.inspectierobot.nl

Contact Details

Surname : Pulles

First name : Kees

Company : Kiwa

Postal Code and City : 7327 AC Apeldoorn

Email : kees.pulles@kiwa.nl

Phone : +31 555 393 626

Company Website : kiwagastechnology.nl

Publication : Yes

AIROBOTS: Innovative aerial service robots for remote inspections by contact

Description	: The goal of the AIRobots project is to develop a new generation of aerial service robots capable to support human beings in all those activities which require the ability to interact actively and safely with environments not constrained on ground but, indeed, freely in air. The step forward with respect to the "classical" field of aerial robotics is to realize aerial vehicles able to accomplish a large variety of applications, such as inspection of buildings and large infrastructures, sample picking, aerial remote manipulation, etc. The starting point is an aerial platform whose aeromechanical configuration allows the vehicle to interact with the environment in a non-destructive way and to hover close to operating points. Rotary-wing aerial vehicles with shrouded propellers represent the basic airframes which will be then equipped with appropriate robotic end-effectors and sensors in order to transform the aerial platform into an aerial service robot, a system able to fly and to achieve robotic tasks. Advanced automatic control algorithms will be conceived to govern the aerial platform which will be remotely supervised by the operator with the use of haptic devices. Particular emphasis will be given to develop advanced human-in-the-loop and autonomous navigation control strategies relying upon a cooperative and adaptive interaction between the on-board automatic control and the remote operator. Force and visual feedback strategies will be investigated in order to transform the aerial platform in a "flying hand" suitable for aerial manipulation.
Primary Application Field	: Maintenance and Inspection
Secondary Application Field	:
Technology	: Control
Other Technology	: telemanipulation
Budget	: 2616000
Participants	: 5
Start	: 1 February 2010
End	: 31 January 2013
Website	: http://www.airobots.eu/

Virtual Slave

Description : Development of a Virtual Reality simulation environment including real-time dynamics

Primary Application Field : Maintenance and Inspection

Secondary Application Field :

Technology : Haptics

Other Technology : Man Machine Interface

Budget : 267000

Participants : Heemskerk Innovative Technology, Tree-C, Dutch Space

Start : May 2009

End : December 2010

Website : www.heemskerk-innovative.nl

Contact Details

Surname : Heemskerk

First name : Cock

Company : Heemskerk innovative

Postal Code and City : 2172 HZ Sassenheim

Email : c.heemskerk@heemskerk-innovative.nl

Phone : +31651340966

Company Website : www.heemskerk-innovative.nl

Publication : Yes

Dexter

Description : Development of a next generation haptic master arm

Primary Application Field : Maintenance and Inspection

Secondary Application :
Field

Technology : Haptics

Other Technology : mechatronics

Budget : 267000

Participants : Heemskerk Innovative Technology, Oxford Technologies BV

Start : March 2010

End : December 2010

Website : www.heemskerk-innovative.nl

Remote Handling for ITER

Description : In the nuclear fusion reactor ITER (which is standing in the south of France) several components will be exposed to heavy loads. Maintenance of these components will take place in the Hot Cell. We are preparing the maintenance of (a few of) these components. The components will be made compatible with the process and the process will be simulated in detail.

Primary Application Field : Maintenance and Inspection

Secondary Application Field :

Technology : Haptics

Other Technology : Virtual reality, Physics engine, ITER components

Budget :

Participants : FOM, TreeC, HIT, TNO, NRG, TU/E, Dutch Space

Start :

End :

Website :

Robotic Commercial Cleaning

Description : Development of a commercial robotic cleaning machine. Application: wet cleaning of floors in Hospitals, schools, industries, retail

Primary Application Field : Maintenance and Inspection

Secondary Application Field : Infrastructure

Technology : Navigation

Other Technology :

Budget : 5.000.000€

Participants : t.b.d.

Start : march 2011

End : introduction 2013

Website : n.a.

Contact Details

Surname : Appelo

First name : Arnout

Company : Appelo Mgt. Consultancy

Postal Code and City : 3761XB 2 Soest

Email : arnout.appelo@planet.nl

Phone : +31 6 5335 6665

Company Website : n.a.

Publication : Yes

ROSE: Energy-efficient design and control of mobile robotic sensor networks.

Description : Networks have great potential to be applied to infrastructure security, environment and habitat monitoring, industrial sensing, traffic control, and so on. One of the challenges is that the performance of such a robotic network is constrained by the limited available energy supply (usually provided by the batteries carried by each robotic sensor). It is therefore important to consider energy scavenging techniques in the design of the systems. The aim of the overall research project ROSE is to develop new energy-efficient design methodologies and control strategies for robotic sensor networks.

Primary Application Field : Maintenance and Inspection

Secondary Application Field : Manufacturing

Technology : Control

Other Technology : Energy Scavenging

Budget : 790.000 euro

Participants : SRON, IJkdijk, TNO-ICT, Controllab, Demcon

Start : October 2009

End : October 2013

Website :

Contact Details

Surname : Stramigioli

First name : Stefano

Company : Universiteit Twente

Postal Code and City : 7522 NH Enschede

Email : s.stramigioli@utwente.nl

Phone : +31 (53) 4892794/4892606

Company Website : <http://www.ce.utwente.nl/>

Publication : Yes

5.2. Agro&Food

Tomation

Description : Automatic cutting of leaves from the tomato plant in a greenhouse by an autonomous robot. The robot has 7 degrees of freedom. The computer vision is using stereo vision to determine the cutting points of the leaves.

Primary Application Field : Agro and Food

Secondary Application Field :

Technology : Vision

Other Technology : robotics

Budget : -

Participants : Priva, S[&]T Vision, Kneppers BV

Start : october 2007

End : 2012

Website : www.priva.nl

Contact Details

Surname : Ten Kate

First name : Ton

Company : Priva B.V.

Postal Code and City : 2678 LC DE LIER

Email : ton.ten.kate@priva.nl

Phone : +31174522829

Company Website : www.priva.nl

Publication : Yes

RobertPack

Description : RobertPack is an innovative system integrator of robot systems. Examples of robot systems we developed are handling robots, pick and place robots, robot caseloaders, robot palletizing machines, robot depalletizing machines. These robot systems are used in the food and non food industry.

Primary Application Field : Agro and Food

Secondary Application Field : Material Handling

Technology : Vision

Other Technology : Line tracking

Budget :

Participants :

Start :

End :

Website : www.robertpack.nl

Contact Details

Surname : Franken

First name : Dirk

Company : Robertpack

Postal Code and City : 8013NC Zwolle

Email : d.franken@robertpack.nl

Phone : 038 4652089

Company Website : www.robertpack.nl

Publication : Yes

Fieldrobot Venlo

Description	: The main goal of this project is to develop a field robot capable of navigating autonomous through a field while eradicating weeds. Fontys Venlo is a participating party of the international field robot contest organized by the Wageningen University. In 2012 the field robot event will be organized in Venlo.
Primary Application Field	: Agro and Food
Secondary Application Field	: Education and Training
Technology	: Control
Other Technology	: Vision, Actuators, Navigation
Budget	: 10000
Participants	: Fontys Venlo, National Instruments
Start	: 2006
End	: Continuous
Website	: -

CROPS

Description : CROPS will develop scientific know-how for a highly configurable, modular and clever carrier platform that includes modular parallel manipulators and “intelligent tools” (sensors, algorithms, sprayers, grippers) that can be easily installed onto the carrier and are capable of adapting to new tasks and conditions. Several technological demonstrators will be developed for high value crops like greenhouse vegetables, fruits in orchards, and grapes for premium wines. The CROPS robotic platform will be capable of site-specific spraying (targets spray only towards foliage and selective targets) and selective harvesting of fruit (detects the fruit, determines its ripeness, moves towards the fruit, grasps it and softly detaches it). Another objective of CROPS is to develop techniques for reliable detection and classification of obstacles and other objects to enable successful autonomous navigation and operation in plantations and forests. The agricultural and forestry applications share many research areas, primarily regarding sensing and learning capabilities.

Primary Application Field : Agro and Food
 Secondary Application Field :
 Technology : Learning
 Other Technology : vision
 Budget : 10.000.000 Euro
 Participants : 14
 Start : Oct. 1st, 2010
 End : Sept. 30, 2010
 Website : www.crops-robots.eu

Contact Details

Surname : Bontsema
 First name : Jan
 Company : WUR Greenhouse Horticulture
 Postal Code and City : 6708 AP Wageningen
 Email : jan.bontsema@wur.nl;
 Phone : +31 317 486390
 Company Website : www.glastuinbouw.wur.nl
 Publication : Yes

Palletiser family & Casepacker series

Description : Palletiser family : - Palletiser for egg trays at farms - Depalletiser for egg trays at egg grading & packing stations - Palletiser for egg cases.
Casepacker series : - Casepacker for egg cartons & trays - Display loader for egg cartons - Combination of Casepacker & Display loader

Primary Application Field : Agro and Food

Secondary Application Field :

Technology : Control

Other Technology : Human Machine Interface

Budget :

Participants :

Start : 01-12-2009

End : 30-09-2011

Website : www.moba.nl

Contact Details

Surname : Schreuder

First name : Rien

Company : MOBA b.v.

Postal Code and City : 3771 VE Barneveld

Email : rien.schreuder@moba.nl

Phone : +31 342 455 638

Company Website : www.moba.nl

Publication : Yes

Ruud - robot to detect and control broad-leaved weed in grassland

Description : Broad-leaved dock (*Rumex obtusifolius*) is a bothersome grassland weed. Organic dairy farmers in particular have trouble dealing with this weed. Dairy farmers who would like to switch to organic farming are often hesitant to do so because they fear that broad-leaved dock will get out of control once they can no longer use pesticides. Farmers' study group "Biologisch West-Utrecht" has been looking for an effective method to control docks. Manual removal is the most effective method, but this method is physically demanding and time-consuming. In recent years, new technologies have become available to control weeds, notably vision-based detection, mechanical destruction of the weed by means of a chopper, and autonomous vehicles. The study group, Wageningen UR, Bioconnect, LaMi and Samsom-Wilnis vof collaborate in a project to combine these technologies. This will result in an affordable, practical robot to control broad-leaved dock.

Primary Application Field : Agro and Food
Secondary Application Field :
Technology : Vision
Other Technology :
Budget : 200,000 euro
Participants : WUR, famer study groups
Start : 2006
End : 2010
Website : www.ruud.wur.nl

Contact Details

Surname : Van Evert
First name : Frits K.
Company : WUR
Postal Code and City : 6700 AP Wageningen
Email : frits.vanevert@wur.nl
Phone : +31 317 480573
Company Website : www.pri.wur.nl
Publication : Yes

CVR

Description : Harvesting robot
Primary Application Field : Agro and Food
Secondary Application Field : Material Handling
Technology : Vision
Other Technology :
Budget :
Participants : Johan van Namen
Start : 2010
End : 2011
Website :

Contact Details

Surname : Reuvers
First name : John
Company : Methore
Postal Code and City : 5331DJ
Email : john.reuvers@methore.nl
Phone : 0418785053
Company Website : www.methore.nl
Publication : Yes

Snack Packer

Description : The recognition and sorting of snacks by vision and the packaging of these snacks by a robot.

Primary Application Field : Agro and Food

Secondary Application Field :

Technology : Vision

Other Technology : Multi Picker Robot

Budget :

Participants :

Start :

End :

Website :

Contact Details

Surname : Weling

First name : Paul

Company : SAC Nederland / Budé

Postal Code and City : 6222 NJ Maastricht

Email : pw@sac-nederland.nl

Phone : 043 750 34 00

Company Website : www.sac-nederland.nl

Publication : Yes

5.3.Safety, Security and Defense

NIFTi

Description	: NIFTi investigates cognitive architectures which can meaningfully sense, act and cooperate with humans in real-life environments. When it comes to making cognitive architectures "cooperative," research has primarily focused on autonomy, and high-level communication. Little or no attention has been given to making the cognitive architecture adapt to the human in understanding the environment, planning and acting, communicating. NIFTi picks up on this: NIFTi puts the human factor into cognitive architectures. With as application area the Urban Search and Rescue domain.
Primary Application Field	: Safety, Security and Defense
Secondary Application Field	: Maintenance and Inspection
Technology	: Cognitive systems
Other Technology	:
Budget	: 8,498,600 €
Participants	: DFKI, TNO, Fraunhofer, BlueBotics, ETHZ, CTU (Prague), Sapienza university Roma
Start	: January 2010
End	: December 2013
Website	: www.nifti.eu

Contact Details

Surname	: Looije
First name	: Rosemarijn
Company	: TNO
Postal Code and City	: 3769ZG Soesterberg
Email	: rosemarijn.looije@tno.nl
Phone	:
Company Website	:
Publication	: Yes

VIATORS: Variable Impedance ACTuation systems embodying advanced interaction behaviORS

Description : Most of today's robots have rigid structures and actuators which require complex software control algorithms and sophisticated sensor systems in order to behave adaptable, compliant, and safe in contact with unknown environments or with humans. Moreover, in terms of energy efficiency, peak force and speed, these robots are still considerably weaker than their biological archetypes. An alternative design approach is to build actuators with physically adjustable compliance and damping, which are able to store and release mechanical energy, react softly when touching the environment, and provide an intrinsic degree of safety, just like muscles do. VIATORS addresses the development and use of safe, energy-efficient, and highly dynamic variable-impedance actuation systems which will permit the embodiment of natural characteristics, found in biological systems, into a new generation of mechatronic systems. Target outcome of the project is that of obtaining the intended physical interaction and motion behaviours of the robotic system intrinsically by its physical structures to the maximum extent possible. This will not only save computational and communication costs for controlling the robot motion; it will also allow us to match the task requirements in a natural and highly dynamic way as it can be observed in biology and to provide a powerful, human-like physical interface which can be accessed by higher (cognitive) intelligence levels without having to care for basic motion generation principles. This advance in technology will pave the way towards new application fields, such as industrial co-workers, household robots, advanced prostheses and rehabilitation devices, and autonomous robots for exploration of space and hostile environments. Therefore, results of this project will deeply impact applications where successful task completion requires people and robots to collaborate directly in a shared workspace or robots to move autonomously and as efficiently as humans.

Primary Application Field : Safety, Security and Defense

Secondary Application Field :

Technology : Other Technology

Other Technology : Actuators

Budget : 3350000

Participants : 6

Start : 1 February 2009

End : 31 January 2012

Website : <http://www.viactors.eu/>

5.4. Infrastructure

Mobile platform 8DOF

Description	: Feasibility and concept development of 8DOF mobile platform technology and architecture for rough and industrial environments. Connectivity with Click&Run concept, to hook the platform with ROS driven applications like arms, vision, navigation
Primary Application Field	: Infrastructure
Secondary Application Field	: Agro and Food
Technology	: Control
Other Technology	: Embedded, low cost components
Budget	: 50000
Participants	: Opteq R&D BV
Start	: 1 Aug 2010
End	: exp 31 dec 2011
Website	: www.probotics.eu

Contact Details

Surname	: Henk
First name	: Kiela
Company	: Opteq R&D BV
Postal Code and City	: 5443 BD Haps
Email	: hkiela@opteq.nl
Phone	: 0644 732 469
Company Website	: www.opteq.nl
Publication	: Yes

6. Others

DESTECS

Description	: Design Support and Tooling for Embedded Control Software, using co-simulation between 20sim and VDM++ models. Fault modeling / injection is done to enhance the dependability of the resulting embedded software. The tools are open source, and eclipse based.
Primary Application Field	:
Secondary Application Field	:
Technology	: Other Technology
Other Technology	: Design Methodology and tools
Budget	: 3.8 M (800k for UT)
Participants	: UT-EWI-CE, Uni Newcastle (UK), Engineering College Aarhus (DK), CHESS BV (NL), Controllab Products BV (NL), Neopost Technologies (NL), Verhaert New Products and Services NV (B)
Start	: 01-01-2010
End	: 31-12-2012
Website	: www.destecs.org

Contact Details

Surname	: Broenink
First name	: Jan
Company	: University of Twente
Postal Code and City	: 7500 AE Enschede
Email	: J.F.Broenink@utwente.nl
Phone	: +31 53 489 2793
Company Website	: www.ce.utwente.nl
Publication	: Yes

LESIR (Legal, Ethical and Social Issues in Robotics)

Description : This research project on social robotics investigates the legal, ethical and social consequences of the advent of robotics in various domains, including healthcare, the home environment, traffic, and war. It researches the social, legal, interactional and ethical implications of the integration of robots in these various everyday environments, in order to contribute to the development of socially acceptable or, better yet, socially viable robotics.

Primary Application Field :
 Secondary Application Field :
 Technology : No Specific Technology
 Other Technology :
 Budget :
 Participants : dr. Bibi van den Berg (TILT), prof.dr. Ronald Leenes (TILT)
 Start : 01-08-2010
 End : -
 Website : www.bibivandenberg.nl

Contact Details

Surname : van den Berg
 First name : Bibi
 Company : Tilburg Institute for Law, Technology and Society (TILT)
 Postal Code and City : 5000 LE Tilburg
 Email : bibi.vandenberg@uvt.nl
 Phone : +31134664001
 Company Website : <http://www.tilburguniversity.edu/research/institutes-and-research-groups/tilt/>
 Publication : Yes

ViewCorrect

Description : This project, executed together with the ICS/ES EE group at TU/E, deals with setting up methods and prototype tools for a multiple-view approach in mechatronic system design. Via multiple views, verification and showing cross-view design-change influences will be achieved using co-simulation as vehicle. With this approach, we aim to relax the tension between several dependability issues (like reliability and robustness), while keeping design time (and thus design costs) under control. First methodological ideas and tool prototypes are tried out.

Primary Application Field :

Secondary Application Field :

Technology : Other Technology

Other Technology : Design Methodology and tools

Budget : 500 k

Participants : UT-EWI-CE and TU/e-EE-ICS/ES

Start : 01-06-2005

End : 31-12-2010

Website : www.ce.utwente.nl/viewcorrect

Contact Details

Surname : Broenink

First name : Jan

Company : University of Twente

Postal Code and City : 7500 AE Enschede

Email : J.F.Broenink@utwente.nl

Phone : +31 53 489 2793

Company Website : www.ce.utwente.nl

Publication : Yes

7. Indexing

7.1. Project names Alphabetical

Project Name	Page Number
20-sim 4C	17
Added value of VR	63
AIROBOTS	76
ALIZ-e	42
Amron	73
Arm Shoulder MAS	43
Art of Robotics	9
Assessing acceptance of assistive social robots by aging adults	28
Bobbie	38
BRICS	44
Clet project	72
CompanionAble	31
Computation of partial closure grasps	71
CROPS	83
CVR	86
DESTECS	91
Development of robotarm Jaco	37
Dexter	77
Dutch Robot Association	8
Dutch Robotics	6
Dynamics of Stable Bipedal Locomotion	56
EVERYON	33
Eye RHAS	47
Falcon	65
Fast and robust two-legged robots	25
Fieldrobot Venlo	82
Frog AGV Systems	66
Handling	19
IMDI.nl	45
IROMEC	57
KSERA	35
LESIR	92
Lopes	60
MIAS ATD	58
MindWalker	32
Minor 'Working with Robots'	13
MIRIAM	55
Mobile platform 8DOF	90
MobiServ	30
Motion Controlled Arm Support, McArm	36
Myopro	27

NeuroSIPE	54
NIFTi	88
Out of the box	11
Palletiser family & Casepacker series	84
Paro interventions	41
P-fortyF	22
Photonic sensing	29
Pirate	75
PITON	48
R3-COP	23
ReflexLeg	52
Remote Handling voor ITER	78
Remote Robotics	46
RGBd, ToF !	10
Rising sun	20
ROBAR	64
RobertPack	81
RoboCup Junior	14
Robocup@home	21
RoboDidactics	14
RoboEarth	24
Robot Ehrbecker Schiefelbusch	69
Robot Techniek Lab Flevoland	15
Robot Vacuum Cleaning	19
Robotic Commercial Cleaning	78
Robotic Needle Steering	50
Robotics for flexibele endoscope steering	53
Robotics in an educational environment	17
Robotics in Education	18
Robots that learn to move naturally	67
Rose: Robotic sensor networks	79
Ruud	85
SAC Nederland	68
Sharing Control: feeling is believing	70
Snack Packer	87
Socio-Cognitive Robotics	40
SOFIE	49
Summer course 'Caring robots'	12
TeamDARE	5
TechUnited	7
TeleFlex	51
Teleoperated Service Robot (Rose)	39
Tomation	80
TUlip	16
VIATORS	89

ViewCorrect	93
Virtual Slave	77
VirtuRob	61
Vision in Mechatronics and Robotics	34
WiiTM-habilitation of Upper Extremity Function	62
WikiTherapist	59
x-arm	26
Zebro	74

7.2.Primary Application Fields

Primary application field	Project Name	Page Number	
Agro and Food	CROPS	83	
	CVR	86	
	Fieldrobot Venlo	82	
	Palletiser family & Casepacker series	84	
	RobertPack	81	
	Ruud	85	
	Snack Packer	87	
	Tomation	80	
	Care	ALIZ-e	42
		Arm Shoulder MAS	43
		Assessing acceptance of assistive social robots	28
		Bobbie	38
		BRICS	44
		CompanionAble	31
Development of robotarm Jaco		37	
EVRYON		33	
Fast and robust two-legged robots		25	
IMDI.nl		45	
KSERA		35	
MindWalker		32	
MobiServ		30	
Motion Controlled Arm Support, McArm		36	
Myopro		27	
Paro interventions		41	
Photonic sensing		29	
R3-COP		23	
RoboEarth		24	
Socio-Cognitive Robotics		40	
Teleoperated Service Robot (Rose)	39		
Vision in Mechatronics and Robotics	34		
Cure	x-arm	26	
	Eye RHAS	47	
	MIRIAM	55	
	NeuroSIPE	54	
	PITON	48	
	ReflexLeg	52	
	Remote Robotics	46	
	Robotic Needle Steering	50	
	Robotics for flexible endoscope steering	53	
	SOFIE	49	
TeleFlex	51		
Education and Training	20-sim 4C	17	
	Art of Robotics	9	

	Handling	19
	Minor 'Working with Robots'	13
	Out of the box	11
	RGBd, ToF !	10
	RoboCup Junior	14
	RoboDidactics	14
	Robot Techniek Lab Flevoland	15
	Robotics in an educational environment	17
	Robotics in Education	18
	Summer course 'Caring robots'	12
	TUlip	16
Entertainment	Dutch Robot Association	8
	Dutch Robotics	6
	TeamDARE	5
	TechUnited	7
Household	P-fortyF	22
	Rising sun	20
	Robocup@home	21
	Robot Vacuum Cleaning	19
Infrastructure	Mobile platform 8DOF	90
Maintenance and Inspection	AIROBOTS	76
	Dexter	77
	Pirate	75
	Remote Handling voor ITER	78
	Robotic Commercial Cleaning	78
	Rose: Robotic sensor networks	79
	Virtual Slave	77
	Zebro	74
Manufacturing	Amron	73
	Clet project	72
	Computation of partial closure grasps	71
Material Handling	Falcon	65
	Frog AGV Systems	66
	Robot Ehrbecker Schiefelbusch	69
	Robots that learn to move naturally	67
	SAC Nederland	68
	Sharing Control: feeling is believing	70
Other	DESTACS	91
	LESIR	92
	ViewCorrect	93
Safety, Security and Defense	NIFTi	88
	VIATORS	89
Therapeutical	Added value of VR	63
	Dynamics of Stable Bipedal Locomotion	56
	IROMECS	57

Lopes	60
MIAS ATD	58
ROBAR	64

7.3.Secondary Application Fields

Secondary application field	Project Name	Page Number	
Agro and Food	Mobile platform 8DOF	90	
	Falcon	65	
	Robots that learn to move naturally	67	
Care	MIRIAM	55	
	NeuroSIPE	54	
	ReflexLeg	52	
	Remote Robotics	46	
	TeleFlex	51	
	Summer course 'Caring robots'	12	
	Rising sun	20	
	Robocup@home	21	
	Added value of VR	63	
	Lopes	60	
	MIAS ATD	58	
	ROBAR	64	
	VirtuRob	61	
	WiiTM-habilitation of Upper Extremity Function	62	
Construction	Clet project	72	
Cure	IMDI.nl	45	
	Myopro	27	
	WikiTherapist	59	
Education and Training	Fieldrobot Venlo	82	
	ALIZ-e	42	
	Dutch Robot Association	8	
	Dutch Robotics	6	
	TechUnited	7	
	Robot Ehrbecker Schiefelbusch	69	
	Dynamics of Stable Bipedal Locomotion	56	
	IROMECE	57	
	Entertainment	Art of Robotics	9
		RoboCup Junior	14
RoboDidactics		14	
Computation of partial closure grasps		71	
Frog AGV Systems		66	
Household	Assessing acceptance of assistive social robots	28	
	Bobbie	38	
	BRICS	44	
	Development of robotarm Jaco	37	
	KSERA	35	
	R3-COP	23	
	RoboEarth	24	
	Socio-Cognitive Robotics	40	
	Teleoperated Service Robot (Rose)	39	

	Zebro	74
	LESIR	92
Infrastructure	Pirate	75
	Robotic Commercial Cleaning	78
Maintenance and Inspection	Sharing Control: feeling is believing	70
	NIFTi	88
Manufacturing	Arm Shoulder MAS	43
	Vision in Mechatronics and Robotics	34
	20-sim 4C	17
	Rose: Robotic sensor networks	79
	SAC Nederland	68
Material Handling	CVR	86
	RobertPack	81
	Handling	19
	Out of the box	11
	RGBd, ToF !	10
	Amron	73
Therapeutical	CompanionAble	31
	EVERYON	33
	MindWalker	32
	MobiServ	30
	Motion Controlled Arm Support, McArm	36
	Paro interventions	41
	Robotic Needle Steering	50

7.4. Technologies

Technology	Project name	Page Number
Actuators	VIATORS	89
	Fieldrobot Venlo	82
Algorithms	Dynamics of Stable Bipedal Locomotion	56
	Computation of partial closure grasps	71
	P-fortyF	22
Artificial Intelligence	Dutch Robot Association	8
	Cognitive systems	
ALIZ-e		42
	KSERA	35
RoboEarth		24
	Socio-Cognitive Robotics	40
NIFTi		88
	Mobile platform 8DOF	90
MIRIAM		55
	Remote Robotics	46
TeleFlex		51
	MIAS ATD	58
Clet project		72
	Myopro	27
Fieldrobot Venlo		82
	Dutch Robotics	6
Zebro		74
	20-sim 4C	17
Rose: Robotic sensor networks		79
	Robotic Needle Steering	50
Palletiser family & Casepacker series		84
	Fast and robust two-legged robots	25
TULip		16
	TeamDARE	5
AIROBOTS		76
	Lopes	60
Development of robotarm Jaco		37
	Robots that learn to move naturally	67
Pirate		75
	Frog AGV Systems	66
PITON		48
	Design methodology and tools	
DESTACS		91
	ViewCorrect	93
BRICS		44
	Mobile platform 8DOF	90
Lopes		60
	Sharing Control: feeling is believing	70
Arm Shoulder MAS		43
	Eye RHAS	47

	SOFIE	49
	Dexter	77
	Remote Handling voor ITER	78
	Virtual Slave	77
	Remote Robotics	46
	Myopro	27
	Motion Controlled Arm Support, McArm	36
	Teleoperated Service Robot (Rose)	39
Human machine interface	Lopes	60
	Robot Vacuum Cleaning	19
	NeuroSIPE	54
	IMDI.nl	45
	Art of Robotics	9
	Development of robotarm Jaco	37
	EVRYON	33
	MindWalker	32
	Motion Controlled Arm Support, McArm	36
	Robotics for flexibele endoscope steering	53
	Palletiser family & Casepacker series	84
	Sharing Control: feeling is believing	70
	WikiTherapist	59
	KSERA	35
	Virtual Slave	77
	Handling	19
Learning	Robots that learn to move naturally	67
	VirtuRob	61
	WikiTherapist	59
	CROPS	83
	Robot Techniek Lab Flevoland	15
	Zebro	74
Mechanical Design	Fast and robust two-legged robots	25
	Robots that learn to move naturally	67
	ReflexLeg	52
	Falcon	65
	Remote Handling voor ITER	78
	PITON	48
	TeleFlex	51
Mechatronic Design	Pirate	75
	Dexter	77
	MIRIAM	55
	TeleFlex	51
	Out of the box	11
	Tomation	80
	Robotic Needle Steering	50
	Myopro	27

Navigation	Frog AGV Systems	66
	Bobbie	38
	Pirate	75
	Robotic Commercial Cleaning	78
	CompanionAble	31
	P-fortyF	22
	Robot Vacuum Cleaning	19
	KSERA	35
	Robotic Needle Steering	50
	Teleoperated Service Robot (Rose)	39
	Fieldrobot Venlo	82
	MIRIAM	55
Neuromuscular control	NeuroSIPE	54
Powered Exoskeleton	EVRYON	33
	MindWalker	32
Sensors	Frog AGV Systems	66
	Pirate	75
Telemanipulation	AIROBOTS	76
	PITON	48
Virtual Reality	Added value of VR	63
	Remote Handling voor ITER	78
Vision	CROPS	83
	CVR	86
	Fieldrobot Venlo	82
	Handling	19
	MIRIAM	55
	MobiServ	30
	Out of the box	11
	RGBd, ToF !	10
	RobertPack	81
	Robot Ehrbecker Schiefelbusch	69
	Robotic Needle Steering	50
	Ruud	85
	SAC Nederland	68
	Snack Packer	87
	TeamDARE	5
	TechUnited	7
	TeleFlex	51
	Teleoperated Service Robot (Rose)	39
	Tomation	80
	Vision in Mechatronics and Robotics	34