Collaboration

Collaboration:	Partners:	Project description:
RunnerAssist 	RRD Sensorun Trimm Xsens	RunnerAssist is a project is funded by European Union within the European fund for regional development (EFRO). RunnerAssist was launched in 2017 and has a duration of 3 years with a total budget of 2.4M euro of which 960K euro funding is provided by the EU. The project aims at developing a wearable measurement system to monitor running technique and to provide feedback to the runner during and after the activity with the goal to increase performance and reduce injuries. Compared to other available systems, RunnerAssist distinguishes itself through the personal approach by extracting and providing feedback based on individual runner data and personalized parameters. The consortium consists of Roessingh Research and Development BV, Sensorun BV, Trimm BV, and Xsens BV, supported by Demcon Advanced Mechatronics.Project website: www.runnerassist.com
AnDy	Istituto Italiano di Tecnologia Institut national de recherche en informatique et en automatique Institut Jožef Stefan Deutsches Zentrum für Luft- und Raumfahrt Xsens IMK automotive GmbH Otto Bock HealthCare GmbH AnyBody Technology	AnDy (Advancing Anticipatory Behaviors in Dyadic Human-Robot Collaboration) is a project funded by the European Union within the Horizon 2020 Research and Innovation Programme. AnDY was launched in January 2017 with a duration of 4 years with a total funding volume of 3.9 M Euro. Recent technological progress in robot physical interaction permitted robots to actively and safely share with humans a common workspace. Leveraging these technologies, AnDy aims at strengthening the European leadership in the robotic market by endowing robots with the ability to control physical collaboration through intentional interaction. AnDy will innovate the way of measuring human whole-body motions developing a wearable force and motion tracking technology (AnDy suit), and proposing technologies to learn cognitive models of human behavior in collaborative tasks (Andy model) and to help humans through predictive physical collaboration (AnDy control).Project website: https://andy-project.eu/
AWESCO	University of Freiburg Ampyx Power B.V. Xsens Technologies B.V. EPFL ETH Zurich TU Delft Technical University of Munich University of Limerick Enerkite KU Leuven Chalmers	AWESCO (Airborne Wind Energy System Modelling, Control and Optimisation) is a Marie Skłodowska-Curie Initial Training Network funded by the European Union within the Horizon 2020 Framework Programme and by the Swiss federal government. The network connects twelve European academic and industrial partners who have joined forces to collaboratively train young researchers in the area of airborne wind energy. AWESCO was launched in January 2015 with a duration of 4 years with a total funding volume of 3.4 M Euro. The research programme addresses the present key challenges of airborne wind energy technologies with the aim of supporting the commercialisation in Europe.Project website: http://www.awesco.eu/
KNEEMO	Glasgow Caledonian University Westfalische Wilhelm-Universitat Munster Paracelsus	KNEEMO is the Initial Training Network (ITN) for knee osteoarthritis research funded through the European Commission's Framework 7 Programme. It includes 15 research fellows employed at 8 different host institutions.The research theme of the KNEEMO ITN is "towards targeted and tailored

KNEEMO	VUmc Aalborg University Peacocks University of Southern Denmark	interventions for knee osteoarthritis", and focuses on identifying the right patients for the right treatment at the right time. Research areas include anatomy, musculoskeletal modelling, prevention and early identification of patients, epidemiology, biomechanical mechanisms, and intervention studies. Knee Osteoarthritis (KOA) is the most common chronic musculoskeletal disorder, currently affecting over 8 million people within the EU, for which currently no cure is available. Adverse biomechanics, affected through some of the major health issues of our time (ageing, obesity, sedentary lifestyle) lie at the heart of the disease.Project website: www.kneemo.eu
TRAX TRAX	University of Twente University of Sheffield Thales Linköping University Ericsson Fraunhofer FKIE Rinicorn	TRAX is an International Training Network (ITN) research project sponsored by the EU under the Marie Curie actions in the 7th Framework Program. TRAX concentrates on Tracking in Complex Sensor Systems, focusing on complexities due to large volumes of data, complex object dynamics and measurement models, as well as large scale systems. The project starts October 1st 2013 and will run 4 years. Project website: www.trax.utwente.nl
BALANCE BALANCE	University of Twente Tecnalia Technische Universität Darmstadt EH (Eidgenössische Technische Hochschule Zürich) Imperial College London CEA List	The BALANCE project is a project dedicated to Balance Augmentation in Locomotion, through Anticipative, Natural and Cooperative control of Exoskeletons. Xsens is participating in the FP7 funded project BALANCE with a number of interesting topics, including balance monitoring, focussing on CoP.The goal of BALANCE is to design and create a robotic exoskeleton to improve the balance performance of humans while standing and walking. This is particularly important when balance is difficult for example for people with neurological injury or in certain working conidtions for healthy people.The exoskeleton will support the user rather than take over the control when this is not needed. Supported tasks are functional standing and walking, in a clinical, real all-day life or work environment.For more information about the BALANCE project, visit the project website: http://www.balance-fp7.eu/
Interaction INTERACTION	University of Twente Roessingh Research and Development University of Pisa Smartex, Pisa UZH, University of Zurich	Continuous daily-life monitoring of the functional activities of stroke survivors in their physical interaction with the environment is essential for optimal guidance of rehabilitation therapy by medical professionals and coaching of the patient. Such performance information cannot be obtained with present monitoring systems. It is the objective of the INTERACTION project to develop and validate an unobtrusive and modular system for monitoring daily life activities and for training of upper and lower extremity motor function in stroke subjects. The system will be unobtrusively integrated in clothing (e-textile), include fabric-based and distributed inertial sensing, and provide telemonitoring and adaptive on-body feedback capabilities. Telesupervision facilities will enable a clinical expert at a distance to evaluate performance effectively, coach the patient and influence training. Monitoring will be based on ambulatory sensing of muscle activation (EMG), interaction forces and body movements. The physical interaction with the environment during reaching and grasping will be assessed by relating interaction forces and movements. This provides information about power exchange between the human body and the environment, dynamics of the environment and task performance. Balancing the body will be assessed from ground reaction forces and relative foot placements. EMG provides information about neural control of movements, including abnormal synergies and spasticity. The assessment is made context aware by task identification and estimation of the dynamics of the environment from the sensed quantities. The system will first be validated in a lab setting, comparing the system against current

		clinical measures. It will subsequently be demonstrated during the actual daily life of stroke survivors. More about INTERACTION
SmartBot	Axum Engineering BV DLV Plant Imotec INCAS³ Irmato Strautmann	SmartBot is a cross-border collaboration between 24 different partners from Germany and the Netherlands. The aim is to develop multi sensor robot platforms for maritime, agricultural and industry applications. Xsens will participate in two of the three sub projects. The subproject Roboship is about an autonomous intelligent robot for the inspection and repair of ballast water tanks of ships. The sub project Sinbot a pilot environment for intelligent use of industrial robotics in a production environment. The first application will be focused on the production of composite material for the transport sector.
MC Impulse	University of Twente Lancaster University Linköping University Fraunhofer Institute KFIE Thales Saab Group Rinicom	As part of Xsens' participation in the EU funded Marie Curie program named MC Impulse, Xsens is investigating sensor fusion for nonlinear tracking problems and ultrawideband RF positioning in particular.The MC Impulse network is a collaboration with the academic partners University of Twente, Lancaster University, Linköping University, Fraunhofer Institute KFIE and the industrial partners Thales, Saab AB, Rinicom and Xsens. The aim is to provide training to PhD students and postdoctoral fellows in the field of nonlinear sensor data processing and sensor networks. More about MC Impulse
FUSION	Roessingh Research and Development University of Twente TU Delft Groot Klimmendaal Sint Maartenskliniek	The FUSION project is a follow up of the successful project FreeMotion. A consortium of Dutch research institutes and companies, including Xsens have teamed up to develop a fast, instant manner of monitoring motion, using inertial sensor technology, with the added potential of real-time feedback. The goal of the research is to facilitate users with no prior knowledge of specialised hardware and software programming, such as physiotherapists, rehabilitation doctors etc. More about Fusion
muFly	Autonomous Systems Lab of ETH Zurich University of Freiburg (Albert-Ludwigs-Universität Freiburg) Cedrat & Cedrat Technologies CSEM (Centre Suisse d'Electronique et de Microtechnique SA) Berlin University of Technology	Autonomous micro flying robots combine a large variety of technological challenges and are therefore an excellent showcase for leading edge micro/nano technologies and their integration with information technology towards a fully operational intelligent micro-system. Therefore, the muFly project proposes the development and implementation of the first fully autonomous micro helicopter comparable in size and weight to a small bird. The key challenges of the project include innovative concepts for power sources, sensors, actuators, navigation and helicopter design and their integration into a very compact system. The envisaged fully autonomous micro-helicopter will weight less than 30g and measure only 10cm in diameter. MuFly is a STREP project under the Sixth Framework Programme of the European Commission.
Freemotion	Roessingh Research and Development (RRD) BMTI Twente University Faculty of Movement Sciences, Free University of Amsterdam Biorobotics Laboratory, Delft Technical University Department of rehabilitation of Free University Medical Center, Amsterdam Re-lion Noldus Information Technologies TNO Industries	FreeMotion is conducted by a consortium of Dutch research institutes and companies, in wich Xsens also participates. Currently optimal decision making around motor disorders and performance can only be made applying accurate and complete motion analysis methods. These elaborate laboratory based methods are only available in a few elite institutes.FreeMotion focusses on the development of ambulatory methods using only body worn sensors for motion analysis in order to provide a larger part of the healthcare, ergonomic and sports professionals with similarly optimal decision making tools. More about Freemotion

Matris	Fraunhofer Institute for Computer Graphics BBC R&D Christian-Albrechts-University Kiel University of Linkoping	Xsens teams up in a strong European consortium to develop a unique, markerless, solution for real-time 6DOF tracking for augmented and mixed reality applications. Per Slycke (CTO) of Xsens: "The MATRIS project aims to develop a unique, easy-to-use and robust technology for accurate 6DOF tracking of cameras in augmented and mixed reality applications. In technical terms, the system will track position, orientation, and focal length of a camera in real-time, using the camera images together with unobtrusive 6DOF inertial motion sensors mounted on the camera. This approach mimics the way a human orients himself, using the vestibular organ (in the ears) -which is essentially an inertial measurement unit, and the eyes- essentially comparable to a camera. The great thing about this approach is that the tracking system will not require any special infrastructure, or markers, to be installed."J. Chandaria, G. Thomas, B. Bartczak, K. Koeser, R. Koch, M. Becker, G. Bleser, D. Stricker, C. Wohlleber, M. Felsberg, F. Gustafsson, J. D. Hol, T. B. Sch on, J. Skoglund, P. J. Slycke, and S. Smeitz. *Real-time camera tracking in the MATRIS project* SMPTE Motion Imaging Journal, 116(7-8):266-271, Aug. 2007a. Link to paper
TUBA	European technology for business limited The salisbury health care national health service trust Roessingh research and development b.v. University college cork - national university of ireland	Xsens participated on this project, which was funded under the European Union 5th Framework Programme. The project developed a device to help patients with a problem known as drop foot. The device consists of a medical implant for stimulation of the peroneal nerve and a stimulator that strapped to the lower leg. Instead of using manual switches or footswitches for control of the stimulator, data of inertial sensors are used. A software algorithm accurately detects the gait phase and ensures that the implant stimulation is triggered at the correct time instance.There are currently around 1.4 M stroke patients living with drop foot in Europe and the USA. In addition, the 3 different Microsystems to be developed can be used in a variety of other medical applications, e.g. other implantable systems and in monitoring human movement to help prevent back injury. This project introduces new Microsystems into the market place, thus helping to reduce the material resources required. In addition, it will improve the health and quality of life for people suffering from walking disabilities.
Impulse	Finetech-Medical Ltd Roessingh Research and Development	The purpose of this project is to investigate the safety and effective of an Implanted Dropped Foot Stimulator. This medical device is a 2 channel implanted neuromuscular stimulator intended for the correction of dropped foot following stroke.The nerve that controls the lifting of the foot in walking is called the common peroneal nerve. At a point, just below the knee, this nerve splits into two branches, the deep branch and the superficial branch. The deep branch goes to the muscles that lift (dorsiflex) and turn inward (inversion) the foot while the superficial branch supplies the muscles that turn the foot outwards (eversion). In normal walking, a combination of these movements is required. Therefore an electrode is surgically inserted in both nerves enabling the movements to be controlled separately. This causes nerve impulses to travel down the nerve to the muscle in the same way as naturally occurring nerve impulses. Stimulation begins when the foot is lifted and ends when the heel is returned to the ground. Sensation from the electrical stimulation should be very slight and it is expected that users will quickly become accustomed to it. Once healing has occurred the operation site scars should be negligible. It may be possible to palpate the implant under the skin but it is not expected to be noticeable to the eye.

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