

Technology Transfer Demonstrators 2016

ANTELOPE DIAGNOSTICS/GHENT UNIVERSITY

Highly Sensitive Lateral-flow Lab-on-chip Immunoassey for Self-Diagnostics

Antelope Diagnostics is a spin-off from the University of Ghent, which is in the incubation phase and aims at start-up around fall 2017. The team is building a rapid self-testing platform which brings diagnostics to where it is really needed: in the hands of patients. An example of a market that is targeted is self-testing for sexually transmitted infections, such as Chlamydia, Hepatitis C or HIV. Second, we are also developing an assay that assists people to assess their risk on diabetes and cardiovascular diseases and to subsequently prevent them from developing these conditions via self-monitoring and coaching.

The technology comprises of a read-out unit and a consumable. The consumable consists of a mature silicon photonics chip embedded in a microfluidic cartridge. In order to ready the consumable for the home care market, a new microfluidic cartridge has to be designed that requires no user manipulations and that can easily be mass-produced. Capillary microfluidics is a passive technology that enables this. Densely defined nanostructures can drag a drop of blood over the sensor, omitting the need for active pumping and simplifying the system. Furthermore, they are easily reproduced by lithography and injection molding. The technology to be transferred is the design and fabrication of these capillary systems.

The proposed technology transfer relies on micro-fabrication processes and surface treatments originating from the following space related projects: EDA RTP 10.8. IR Diffractive and Low Cost Optic; ESA-TRP Infrared Lithographic Manufacturing of Zeroth Order Gratings for Innovative Achromatic IR Phase Shifters; ESA Solar Orbiter (Monolithic high solar rejection EUI transmission filter development for the EUI instrument). This knowledge is mainly situated from CSL – Research department of the University of Liege as being one of the contributors of this demonstrator project. The consideration of the fabrication process at CSL as part of the space programs have been included in the design which led us to a cartridge which is laser-written from both sides. The cartridge has been fabricated and the filling experiments validate the design.

G&A ENGINEERING S.R.L.

Space for Automotive

The aim of the project is the development of a Technology Transfer Demonstrator of a new generation Event Data Recorder (Black Box) to be applied onboard different kind of vehicles (terrestrial and naval) in order to real-time monitor, record and trace all the operational events of the vehicle.

This device of the last generation include gyroscopes, accelerometers, magnetometers, RH, P and T sensors, on-board LAN, CAN bus controller…, in order to acquire, real-time, all the vehicle data by storing them into different memory banks, allowing a fine crash reconstruction.

Some of the used technologies were successfully developed and used in 2 different space missions inside 2 different experiments. The 1st experiment EST (Electronic Space Test) flew as part of the Eneide Mission with ESA astronaut Roberto Vittori in 2005 and the 2nd experiment APE (Astronaut PersonalEye) flew as part of the DaMa Mission again with ESA astronaut Roberto Vittori in 2011.



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INSTITUTE OF EXPERIMENTAL AND APPLIED PHYSICS, CZECH TECHNICAL UNIVERSITY

Earth Application of Timepix Space Radiation Monitor in Centralized Network

The project was based on the SATRAM (Space Application Timepix Radiation Monitor), which is an adaptation of the Timepix detector developed at CERN for the use in Space. During the realization of the project, the IEAP CTU has provided 5 Timepix detectors (4 with 300 μm thick silicon sensor, 1 with a 500 μm thick GaAs layer), which were tested and calibrated, the FITPix readout systems, and the software for detector control, data processing, analysis, and visualization.

The demonstrator successfully showed that a centralized area-wide network of radiation monitors based on Timepix pixel detector technology can be running properly without user interactions. The results in the form of radiation levels are stored permanently on a server, so that the history of changes in the radiation levels can be reviewed at any time. Automatic data transfer from the detectors to the server is currently not possible due to network security restrictions, but possible solutions to bypass the security are negotiated.

The demonstrator is covered by a close cooperation with local industry partners in nuclear control.

ADAMANT COMPOSITES

Made4Sports

The scope of the project was to transfer FXply Materials technology from space structures to sports equipment utilizing composite materials. The space technology demonstrated in MADE4SPORTS project is a material technology based on nanotechnology comprising two interdependent modules; the made-to-measure material development through design and the FXply technology that can help with the design. The first module is used in space as a design process developed for the need of space structural materials to be versatile and tailored. The second is a material processing technology developed for enabling these tailored targeted performances of composites used in satellite architectures. The technology is the outcome of years of combined research and development through EU projects.

C LA VIE

The Pato Bet

The Pato Bet transfer demonstrator project consist in upgrading and adapting Pato (Porous material Analysis Toolbox), initially a NASA funded project and distributed around EU/USA. The space technology has been developed to fulfil the ambitious exploration program of the space agency's there is a need for advanced fundamental models and simulation tools to guide innovative ablative material developed and enable an optimized and safe design of the thermal protection system for space vehicles.

Pato Bet will make it possible to model and simulate industrial processes in the biomass pyrolysis sector with the same level of precision as in the field of thermal protection system design for space exploration.



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ESR TECHNOLOGY

Bearing Technology for Rotating Magnetrons

The aim of the technology transfer demonstrator was to investigate the possible benefits of applying solid lubricants developed for the space industry in a terrestrial application. The target application was a rotating cathode magnetron developed by Gencoa. In particular, the aim was to improve the reliability of the bearing set-up through a change in the lubrication approach.

CSEM SA

LTMS-Diving

The project consists of the design and manufacturing of a demonstrator of a wearable multi parameter physiological monitoring system which measures body signals of divers and swimmers. The monitoring system is based on sensors which were developed by CSEM under the frame of LTMS (Long-Term Medical Survey) commissioned by ESA. The LTMS sensor technology has been modified so that they can be used under water in a diving suit. After some laboratory tests; during the demonstrator a diver has worn the sensor system during a test dive to see whether the system can be used. The demand readiness level of the LTMS-S technology was at 7.