

Technology Transfer Demonstrators

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RAL Space

Laser Isotope Ratiometer for Diagnostics of Food Authenticity

The basis of the technology was originally developed for tuneable laser absorption spectrometers for potential European planetary missions. The demonstrator project will develop new analytical instrumentation which allows for the rapid, on-site stable isotopic chemical analysis of chemical markers that provide an indication of food adulteration. The project aims, through the integration of state-of-the-art chromatography technology with a laser based isotope ratiometer system, to develop instrumentation which will innovative the way that stable isotope analysis is carried out, potentially increasing the range of applications stable isotope analysis can be applied to and the number of industries using this technique.

Cedrat Technologies S.A.

Development of an Amplified Piezoelectric Actuator Based Servo Piezo Tool for Precise Machining

Cedrat Technologies S.A. developed the Amplified Piezoelectic Actuator (APA) technology under technical specifications coming from the French Space Agency (CNES). The APA technology allows to amplify the stroke of piezoelectric ceramic bars from tens of microns to hundred of microns while providing the resulting piezo actuator with robustness, reliability and dynamic capabilities in a compact size. In the machining industry many processes like drilling, cutting, milling, etc. Require more and more accuracy from the tool action in order to increase the surface finishing quality. Piston machining is one of these processes where the cutting tool has to precisely rectify over few hundreds of microns the piston oval shape. Through the demonstrator development Cedrat Technologies S.A. aims at providing European manufacturers with a compact, dynamic and precise APA based servo piezo tool solution for oval piston machining at a lower cost of ownership than previous existing technologies.

IKinema Ltd.

Adaptation of Spacecraft Control Algorithms to Improve the Computer Animation Process

The Control Systems Group at the Surrey Space Centre at the University of Surrey has considerable expertise in the development and successful deployment of control systems to accurately maintain the position and attitude during manoeuvring and orbit maintenance of spacecrafts within projects on behalf of ESA and NASA. IKinema Ltd. was spun out of the University of Surrey to adapt and commercially exploit these algorithms for non-space use and developed tools that enable computer game and movie animators to work much faster and animate characters in real time rather than having to rely on stored animation sequences. The demonstrator project aims at a market for simple-to-use, low cost, pay-as-you-go, web based animation service for the casual user who will be able to enhance their ‘profile’ on web based platforms such as Facebook, Second Life, etc. by animating their own bespoke avatar. The commercial potential for this market is considerably high.

cosine B.V.

Portable Miniaturised Multi-Species Radiation Detector

Almost every space mission has radiation monitors on board, both to protect the spacecraft and to serve as scientific instruments. ESA has, together with cosine B.V., developed and tested the next generation miniaturized radiation detector, called the Multifunctional Particle Spectrometer (MPS). Currently available commercial radiation detectors are tuned to one type of radiation and their function is limited to counting the overall radiation rate or measure the general dose. cosine's approach being able to detect, with one small hand-held unit, various type of radiation (and thus being able to discern between various substances) combined with directional information opens a wealth of applications. The main markets are in the fields of national security (e.g. airport safety, bomb detection, baggage screening), defence (e.g. mine detection), geology, mining, personal safety in nuclear facilities and post-disaster environmental analysis.

Lightweight Structures B.V.

Embedded Fibre Bragg Grating (FBG) Optical Sensor System for Structural Integrity of Civil Engineering Structures

Within ESA developments have been focused on the application of so-called Fibre Bragg Grating (FBG) sensors for structure and payload monitoring the propulsion system. Currently the first operational spaceflight demonstrations are underway, e.g. the fibre optic sensor system that flies on PROBA-2. The demonstrator project aims at the monitoring of stresses by application of FBG sensors within the actual reinforcing system offering the opportunity to have real-time knowledge about the performance of the reinforcement system The project will demonstrate the feasibility of fully embedded FBG sensors in test specimens that are representative of the current reinforcing techniques of steel bridges in the Netherlands. Such bridges are suffering from fatigue damages due to increasing traffic loads and traffic intensity.

STAM S.r.l.

FLEXCOMP – Development of a FLExible Mould for Manufacturing of COMPosite Material Components for Automotive and Aeronautic Fields

In 2006 the NASA Engineering and Safety Center investigated the feasibility of a composite crew module for the Crew Exploration Vehicle, within the Constellation program. During this research, a special discrete tool was developed, to manufacture components made of composite material. This system is basically a mould that can be re-shaped. The key technology development of STAM S.r.l. consists in using flexible reconfigurable mould that reduces drastically the cost and time of components manufacturing. The targeted market of the FLEXCOMP system is the composite components manufacturing, mainly for the automotive and aeronautic fields.

FormTech GmbH

ProTherm – High Performance Thermal Protection Shields of Thin Corrosion Resistant Steel Sheets

Thermal protection (TP) is critical from both the design and the material point of you. FormTech GmbH is involved in the design and build of titanium-alloy sandwich panels, which can easily be replaced, even in orbit. FormTech GmbH is involved in the design and build of titanium-alloy sandwich systems which were successfully tested in laboratory environments and which shall be also tested in space in a few months. The basic process is superplastic forming, which is a gas pressure production method. The terrestrial application refers to heat shields around the exhaust system in car engines. They get more and more importance with increasing exhaust gas temperature and the reduction of distance gaps between the hot section and the surrounding structure. Metallic TP-shields can provide significant advantages for such applications.

Micromega Dynamics S.A.

Piezoelectric Active Holder Demonstrator

In the frame of several GSTP programs, Micromega Dynamics S.A. has developed various active vibration control technologies relying on smart devices such as piezoelectric, voice-coil actuators and active mass dampers. Regarding the non-space applications, Micromega Dynamics S.A. is involved in the vibration control of machine tools. The solutions proposed are based on active mass dampers that are used to reduce chatter in large milling machines and machined parts. The proposed demonstrator will consist in a representative tool holder for machine tool, equipped with active damping devices based on the piezoelectric technology. The demonstrator will be used to verify how much structural damping can be achieved and to evaluate its effect on the tool dynamics.

CSEM S.A.

MPS – Multi-Parameter Physiological Monitoring System

The ESA LTMS (long-term monitoring survey) program addressed the development of a multi-parameter physiological monitoring system. The sensor system includes the determination of ECG, respiration, pulse oximetry, core body temperature and non-invasive blood pressure. The space based terrestrial monitoring system addresses the sports market. Additionally, the system can also be used for the healthcare market such as telemedicine, ICU or for the validation of drugs. Electrode sensors have been obtained to that simultaneously measure many physiological parameters by means of a very compact system, more comfortable and easier to wear than any other. The application shall be also running on a smart phone with Android.

Omnidea Aerospace Technology and Energy Systems

Pipelines Remote Monitoring Technologies

Gas pipelines are vital assets for Europe's energy management and their strategic importance demands that natural or man-caused operational disruptions be avoided. Currently monitoring of gas pipelines is performed with invasive equipment, but the demand for non-invasive solutions exists. These systems will be capable of interfacing with already installed equipment but will introduce a breakthrough in sensor and data transmission technologies. A solutions for portable, low cost pipeline flow monitoring.