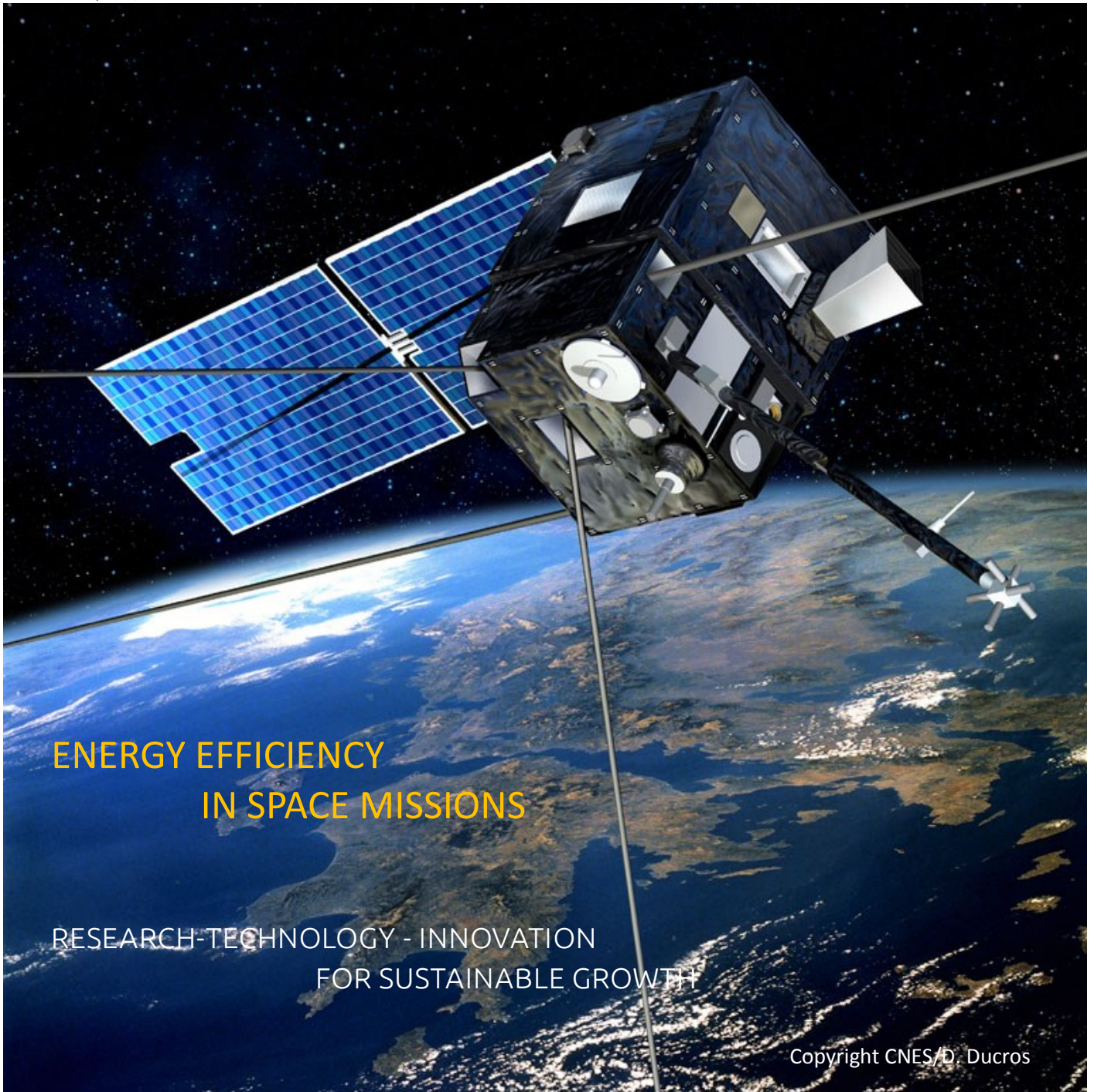


CERTH
CENTRE FOR
RESEARCH & TECHNOLOGY
HELLAS



ENERGY EFFICIENCY IN SPACE MISSIONS

RESEARCH-TECHNOLOGY - INNOVATION
FOR SUSTAINABLE GROWTH

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SPACE: BEST ENERGY STORAGE SOLUTIONS

CPERI-CERTH finds out the best energy storage solutions for space missions. A research for ESA.

ADVANCED TECHNOLOGY FOR CARDIAC REHABILITATION

An advanced technology for Cardiac Rehabilitation lying on autonomy offers to the patients guidance and feedback during the exercising sessions. ITI/CERTH plays a crucial role on the research

PIONEERING RESEARCH IN LIFE SCIENCES

INAB-CERTH stands at the forefront of research in Life Sciences and especially active in Cancer and Drug Safety

Newsletter CERTH in English

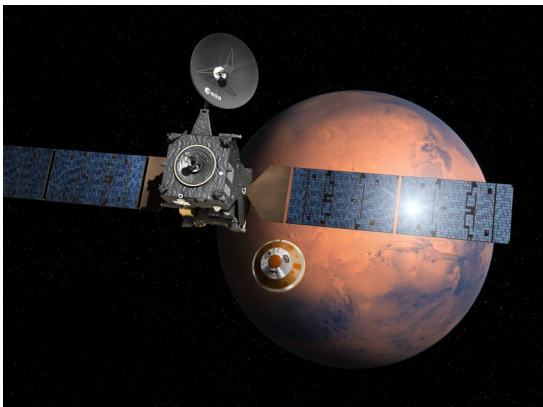
Opinions—Angelos Lappas

In this column, researchers of CERTH express their opinion regarding the research environment in Greece, make suggestions, express ideas and raise concerns about crucial research issues in the country. In this issue, Dr. Angelos Lappas, researcher at the Chemical Process and Energy Resources Institute (CPERI/CERTH), is the one that provides valuable food for thought.

Below, some of the most important points of his utterances:

- New research centers are not to feed a further competition between the existing ones but rather to support new research fields
- Greece needs more extroversion on its activity plan
- In Greece there is a lack of entrepreneurial culture. Education is the key for this to be changed.
- Strong motivation has to be given to the research to minimize the so-called brain drain
- Only through interdisciplinary research innovative ideas and products can be created

Energy efficiency in space missions



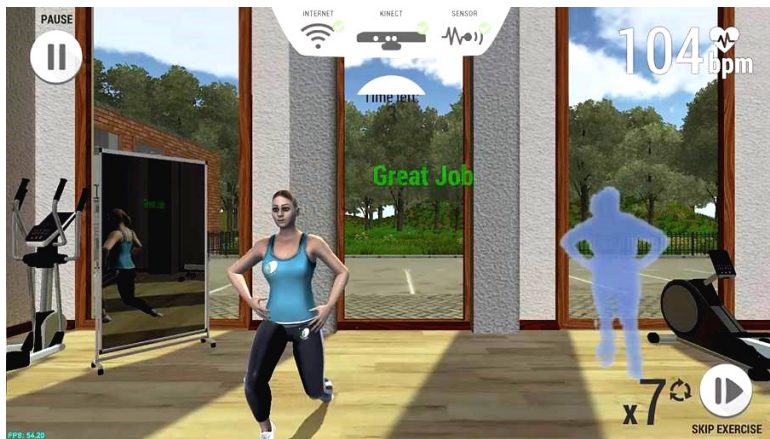
The space activities of PSDI/CPERI/CERTH date back to 2007, following the 1st Call for Ideas in the frame of the Greece's Industry Incentive Scheme after Greece became the 16th member Country of the European Space Agency. The activities of the group are connected to the development and testing of Regenerative Fuel Cells (RFCs) materials, components and systems for advanced energy storage solutions in telecommunication satellites and planetary exploration. Very recently, PSDI was involved in the development of high specific energy, low temperature (down to -40°C) Li-ion cells for space exploration. PSDI has realized or currently running 7 ESA funded projects with a total budget of 1.1 M€.

"Greece joined ESA as a new member state in March 2005. As part of the agreement the so called task force for new member states has been implemented. Amongst originally many R&D contracts CERTH has been invited to participate. Having a very successful outcome of the activity on "Feasibility of Regenerative PEM Fuel Cells (RPEMFC) for Space Applications", a continuation has been granted. Again successful, with only very few companies left in the original task force, a third slice has been started on 1 April, 2015, the total funding by now well exceeding 1 MEuro including the newly introduced industrial prime contractor ADVENT in Patras. It was justified that a continuation is not just a benefit for the Greek scientific institutes and finally for Greek innovative industry, but for ESA as well. It has been appreciated that it is a big advantage for ESA technology developments to have European products available, being independent from non-European suppliers. However, it is even more important to have partners involved in ESA R&D development projects who are not just interested in financial return, but show a high level of motivation and a clear commitment to achieve the targets even if it might exceed the initial assumptions on resources needed to achieve the requirements."



*Dr. Max Schautz
Energy storage engineer, Technical Officer at ESA-ESTEC*

A cutting-edge technology for Cardiac Rehabilitation (CR)



Today, Cardiovascular disease (CVD) is the leading cause of premature death (31% of all deaths) and disability in Europe and worldwide according to the World Health Organization (WHO). 75% of CVD deaths occur in low-income and middle-income countries while of them are due to heart

attacks and strokes.

PATHway will provide individualized rehabilitation programs that use regular, socially inclusive exercise sessions as the basis upon which to provide a personalized comprehensive lifestyle intervention program (exercise/physical activity (PA), smoking, diet, stress management, alcohol use, medication compliance) to enable patients to both better understand and deal with their own condition and to lead a healthier lifestyle in general. This will be made possible by the provision of an internet-enabled sensor-based home exercise platform that allows remote participation in CR exercise programs at any time, by a small number of patients from the comfort of their own living room.

“PATHway’s innovation lies on the autonomy, that offers to the patients in multiple levels, offering them guidance and feedback during the exercise sessions, while adapting their daily exercise program through monitoring their performance and health indicators. PATHway will further enable social interaction among multiple patients while exercising at their homes. This way PATHway targets to engage and motivate patients to adhere to their rehabilitation program”, explains the project coordinator Dr. Kieran Moran (Dublin City University).

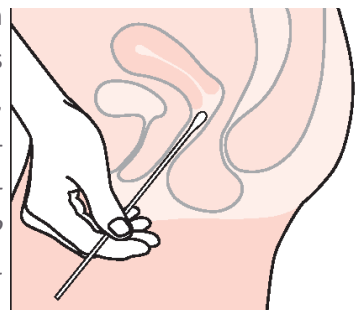
The Centre for Research and Technology Hellas plays a crucial role in the implementation of PATHway. Dr. Petros Daras, researcher at ITI/CERTH and technical coordinator of PATHway underlines the crucial role of the Centre for Research and Technology Hellas in the implementation of the project: *“Apart from the technical coordination of the project, the Information Technologies Institute of CERTH is responsible for the implementation of a system that monitors, analyses and evaluates the patient’s movements during his/her physical exercise. At the same time the Institute of Applied Biosciences of CERTH is responsible for the implementation of the data management system to support the automated individuality of the programmes’s patients”.*

Today, PATHway is in a quite mature technological level. Within July 2016 the first version of its platform with all the necessary functionalities is going to be delivered.

The Institute of Applied Biosciences at the Centre for Research and Technology Hellas (INAB/CERTH) conducts high level research in Life Sciences, including Biomedicine. In this broad research domain, INAB is especially active in Cancer and Drug Safety - Pharmacovigilance.

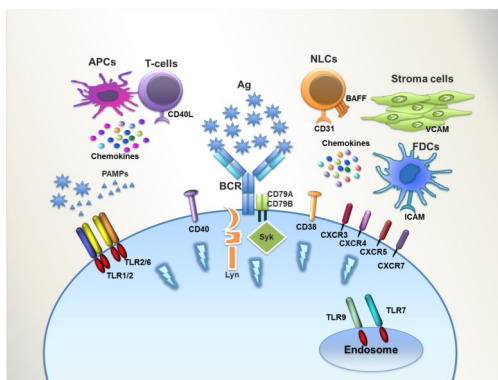
GrecoSelf: A new self-sampling method for the prevention of cervical cancer

A new screening study for the prevention of cervical cancer in women has been launched by INAB/CERTH in collaboration with Professor Theodore Agorastos from the Aristotle University of Thessaloniki (AUTH). This multicentre study, called GrecoSelf, is based on self - sampling and will screen women living in remote areas with limited or no access to specialized centers. *“If this self – sampling HPV test is proven acceptable and more effective than the existing PAP test, then it will be absolutely appropriate especially for women leaving in remote areas in Greece”*, underlines Prof. Theodore Agorastos.



Studying micro-environmental interactions in leukemia for developing more effective anti-leukemic treatments

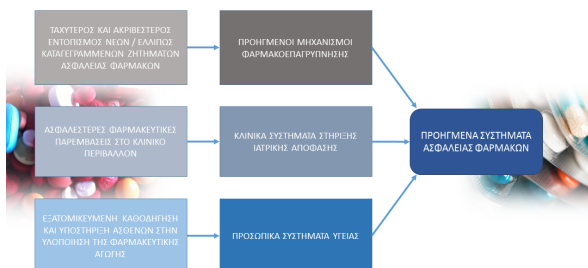
INAB/CERTH is a hub in the research of Chronic Lymphocytic Leukemia (CLL), the most common adult leukemia in the West. Research results of INAB/CERTH are used for the development of new diagnostic methods, new predictive systems and more efficient therapeutic approaches. A recent publication of INAB/CERTH provides a better understanding of the way leukemia cells communicate with their micro-environment. This analysis, published in the Journal of Immunology - May 2016, was highlighted as one of the articles expected to have a significant impact on the field of Immunology.



Advanced systems for assessing the safety of pharmaceutical products

Given the crucial role that drug safety plays in public health, effective mechanisms of constant monitoring and support of the appropriate use of these drugs are needed. Dr. Vassilis Koutkias, researcher at INAB/CERTH, is active in this particular field, mainly focusing on:

- the development of advanced systems of Pharmacovigilance
- the development of advanced systems for medical decision support
- individualized patient support



Road safety and energy efficiency in road transport



HIT participated in the Compass4D project that aimed at increasing road safety and energy efficiency in road transport through the exploitation of the potential of cooperative ITS (C-ITS) solutions to address these issues and prove their benefits and sustainability to key stakeholders. Three core services have been implemented in regard to Road Hazard Warning (RHW), Red Light Violation Warning (RLVW) and Energy Efficient Intersection Service (EEIS), and then by piloting these services during one year in real life conditions in the urban roads of 11 cities at EU, including Thessaloniki.

service (EEIS), and then by piloting these services during one year in real life conditions in the urban roads of 11 cities at EU, including Thessaloniki.

Smart farming systems for low energy

Nowadays, in the years of financial recession, there is an urgent need for a new model of agricultural production, which will secure the quality assurance of agricultural products. The contribution of the Institute for Research and Technology Thessaly (IRETHETH) of CERTH in this field is more than important as it develops the appropriate tools and services that lead to a Smart Agricultural Production. Dr. Thomas Bartzanas researcher at IRETETH points out:



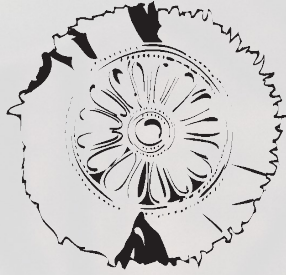
Our research team develops and evaluates systems/technologies and techniques, relative with the production process like precision farming systems for low energy/water and chemical ingredients input. We try to summarize all this knowledge in a Farm Management Information System.

We also have developed and evaluated technologies for the reduction of environmental footprint but also for the mitigation of climate change consequences.

Last, we have developed an integrated system for the traceability of the products, based on the RFID technology.

Until so far, all these systems lead to a 20% reduction of the total cost and improvement of the quality and quantity of the products with a sustainable decrease of the total environmental footprint.

Unfortunately Greece is still at a low level regarding the integration and use of ICT in the agricultural production. This has to do mainly with the lack of infrastructure in the agricultural areas, the low-educational level and the aged farmers.



ΕΚΕΤΑ

ΕΘΝΙΚΟ ΚΕΝΤΡΟ
ΕΡΕΥΝΑΣ & ΤΕΧΝΟΛΟΓΙΚΗΣ
ΑΝΑΠΤΥΞΗΣ

The Centre for Research and Technology-Hellas (CERTH) founded in 2000 is one of the leading research centres in Greece and listed among the TOP-20 E.U. institutions with the highest participation in competitive research grants.

Today CERTH includes the following five institutes with indicated major fields of research:

- **Chemical Process & Energy Resources Institute (CPERI)** Sustainable & Clean Energy, Environmental Technologies, Chemical & Biochemical Processes, Advanced Functional Materials
- **Information Technologies Institute (ITI)** Informatics, Telematics and Telecommunication Technologies
- **Hellenic Institute of Transport (HIT)** Land, Sea and Air Transportation as well as Sustainable Mobility services
- **Institute of Applied Biosciences (INAB)** Agri-biotechnology, Health Translational Research, Informatics for big bio-data
- **Institute for Research & Technology of Thessaly (IRETETH)** Agrotechnology, Mechatronics, Biomedicine and Kinesiology

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