THE MONTHLY LIST

FEBRUARY 2019

LIST AND ISPACE EUROPE WORKING TOWARDS LUNAR WATER MISSION

The Luxembourg Institute of Science and Technology (LIST) and ispace Europe recently began initial research work to develop compact mobile mass spectrometry technology by September 2020, making it possible to prospect for lunar resources.

In 2017, LIST and ispace Europe – a Japanese lunar exploration company whose European headquarters are in Luxembourg – formed a strategic partnership with the aim of developing a first mission to prospect for resources on the Moon and, in particular, to detect and analyse water. A year later, initial research work began to develop an instrument capable of detecting water in situ at a lunar pole and to perform an initial mapping of the water distribution in a polar region.

October 2018 saw the launch of the dedicated FOCAL1DS - "Space Deployable 1-Dimensional Focal Plane Detector for Magnetic Sector Mass Spectrometer" research project, funded by the Luxembourg National Research Fund (FNR), which will run for two years. With FOCAL1DS, LIST researchers specializing in Advanced Instrumentation for Ion Nano-Analytics (AINA) will adapt their high-performance compact mass spectrometry technology for space applications so that it can be coupled with small and lightweight rovers used by ispace Europe to explore the surface of the Moon. Once equipped with a compact instrument, specifically designed to measure certain elements and molecules, such as hydrogen, oxygen and water, ispace's lunar rovers will be able to fully perform their mission: to analyse and map the water resources potentially present on the lunar surface. By September 2020, the detection technology required by the mobile spectrometer instrument will be made available to ispace Europe so that it can then test it as a whole in the relevant space environments.

This partnership between LIST and ispace Europe forms an integral part of Luxembourg's ambitious spaceresource.lu initiative implemented by the Luxembourg Government in 2016. It is not the first of its type for either partner. LIST already collaborates in this respect with Kleos Space S.à.r.l to build robotic antennas in space, and ispace Europe works with the University of Luxembourg to develop surface navigation solutions making it possible to map water deposits on the Moon.

Photo from left to right: Kyle Acierno (ispace Europe) and Fernand Reinig (LIST)

Learn more at www.list.lu/project/focal1ds

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OTHER HIGHLIGHTS

Business

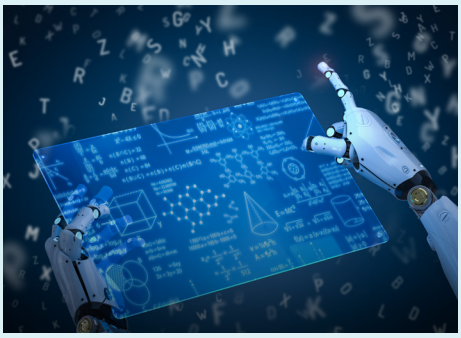
GOODYEAR-LIST: FIRST TANGIBLE RESULTS AFTER 18 MONTHS OF PARTNERSHIP

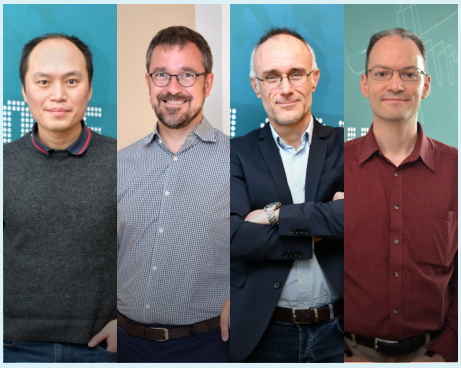
On 16 January 2019, LIST and Goodyear met up for a working seminar concerning the latest progress in their long-term partnership to develop the next generation of tyres. The past 18 months were reviewed and thanks to new materials and new tools developed, the results are highly promising. Those concrete innovations now need to be implemented into everyday production so that future solutions can be developed. Such success would not have been possible without, among other things, the significant investment of the teams at LIST and Goodyear. The 26 PhDs and post-docs recruited are networking at international conferences around the world to present the work resulting from the partnership and the research teams will next meet in June 2019. **Learn more at www.list.lu**

Luxembourg

LIST SUPPORTS THE CREATION OF ARTIFICIAL INTELLIGENCE LAB IN LUXEMBOURG

On 30 January 2019, Luxembourg's research community, of which LIST is a part alongside the University of Luxembourg, the Luxembourg Government and the world leader in computing solutions for Artificial Intelligence (AI) systems NVIDIA, announced the creation of a joint AI laboratory in Luxembourg. A first in Europe, this collaboration is a milestone towards solving society's most important challenges using AI and high-performance computing by working together. A real added value for LIST activities in AI, LIST researchers will gain better access to cutting-edge NVIDIA hardware and software. Broadly speaking, the opportunities provided by the lab will directly benefit LIST applications in industry 4.0, finance, regulation, the environment and autonomous vehicles. **Learn more at www.list.lu**





Scientific excellence

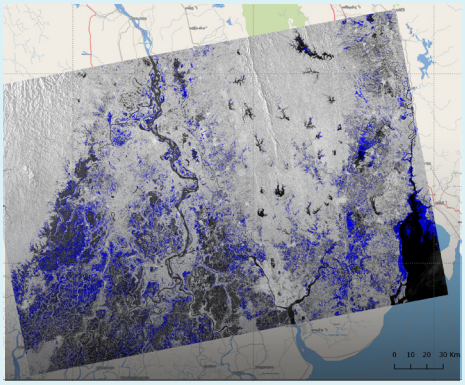
WAVE OF NEW RECRUITMENTS STRENGTHEN LIST RESEARCH DOMAINS

Dr Phuong Nguyen who served as an assistant professor at the Dutch Eindhoven University of Technology leads the "Sustainable Energy Systems" research group. Dr Arno Biwer, a R&D Engineer within the former CRP Henri Tudor's Resource Centre for Environmental Technologies department leads the recently created "Environmental Policies" research group. Dr Emanuele Barborini, previously responsible for coordinating R&D activities and managing technology transfer projects at an Italian company specializing in bio- and nanotechnology, leads the "Transparent Electronics and Optically Tuneable Nanocomposites" research group. Finally Daniel Schmidt, a Lead Research and Technology Associate at LIST since 2017 with a focus on composite materials, leads the "Green Polymers" research group. **Learn more at www.list.lu**

Technologies

INTERNATIONAL PAPER DISCUSSES "HASARD", LIST'S AUTOMATIC FLOOD-MAPPING TOOL FOR DISASTER RELIEF EFFORTS ON A GLOBAL SCALE

On 9 January 2019, the online scientific journal *Remote Sensing* published an article written by LIST researchers and their Italian counterparts from the CIMA Research Foundation and the Sapienza University of Rome. Entitled "Sentinel-1 InSAR Coherence to Detect Floodwater in Urban Areas: Houston and Hurricane Harvey as a Test Case", the article focuses on the method behind the HASARD® tool - developed by LIST and available through the Grid Processing on Demand Platform of the European Space Agency - which allows the high-spatial-resolution mapping of flooded areas. It centers on the automatic flood-mapping algorithm whose main advantage is to allow the detection of flood-hit areas not only on bare ground, but also in urban environments. **Learn more at www.list.lu**



WHERE TOMORROW BEGINS

Located at the heart of Belval's Research & Innovation Campus, LIST can easily connect its 600-plus specialists in materials, environment and IT, including its many PhD students, through a broad range of joint research projects, programmes and partnerships with virtually all of Luxembourg's other major research players. At Belval, the University of Luxembourg, LIH, LISER, Technoport, Luxinnovation and the Luxembourg National Research Fund are all within arm's reach.

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