

# THE MONTHLY LIST

JANUARY 2018



## LIST AND CERATIZIT TEAM UP TO IMPROVE HIGH SPEED MACHINING TECHNOLOGY

The Luxembourg Institute of Science and Technology (LIST) and the Luxembourg-based company CERATIZIT have committed, between now and 2020, to developing physical vapour deposition coatings for CERATIZIT's future cutting tools dedicated to the machining trades.

On 5 December 2017, LIST and CERATIZIT signed a three-year collaboration agreement within the framework of the NANOPIMS research project, co-funded by the Luxembourg National Research Fund (FNR) together with LIST and CERATIZIT. They have committed to a mutual aim that they plan to achieve by 2020: developing new physical vapour deposition (PVD) coatings that perform at high temperatures, exceeding 850 degrees Celsius, for high speed machining technology.

Indeed, machining trades are not only seeking to optimise costs, but also to reduce environmental risks to the maximum by using as little lubricant as possible. Thus, two major trends are emerging on the cutting tools market: 'green machining' associated with the concept of reducing the amount of lubricant used (Minimum Quantity Lubrication – MQL), or near-dry machining, and an increased demand for PVD coatings that can withstand high temperatures. Consequently, during cutting activities the tools are faced with an increased surface temperature and a reduced life span.

In order to increase operating temperatures whilst preserving equivalent performance, CERATIZIT and LIST specialists will endeavour to optimise both the composition and microstructure at the nanometric level of the coatings currently deposited on the tools used by the industry. In particular, they will look at chemical composition, microstructure and adhesion, as well as the final coating's resistance to plastic deformation, and wear and tear. Whilst the analyses, mechanical tests and surface characterisation activities will be carried out in the LIST laboratories in Belvaux, the machining tests will be conducted at the CERATIZIT Group facilities. A true challenge, which could eventually lead not only to a 15-30% improvement in the life span of the cutting inserts produced by CERATIZIT, but also provide additional knowledge about improving PVD coating resistance to oxidation and wear and tear at high operating temperatures.

The collaboration between LIST and CERATIZIT is not new. It began in 2009 with developing PVD coatings. In recent years, they have begun studying new, hard, high-temperature nanocomposite coatings, as well as new key concepts and technologies for designing new hard coatings. Thus, the two partners can draw upon mutual research experience on the subject to benefit this new research project.

Learn more on [www.list.lu/project/nanopims](http://www.list.lu/project/nanopims)

Photo: from left to right: Paul Jung, CERATIZIT and Fernand Reing, LIST

# OTHER HIGHLIGHTS



## Luxembourg

### ICT-LEARNING DEVICE FOR CHILDREN BASED ON LIST TECHNOLOGY NOW ON SALE

Kniwwelino, LIST's micro-controller development platform entirely designed for children attending fundamental schools and "maisons relais" in Luxembourg, as well as its development board with its visual programming tool, is now available as a product on [electronic-shop.lu](http://electronic-shop.lu). A unique tool, Kniwwelino allows 6-year-old kids or older to connect to other controllers via a playful application and thus to internalize the very idea of Internet of Things. In the near future, the platform will be improved and extended. LIST researchers already plan to develop kits with specific extensions, such as sensors, servos or external LEDs, along with instructional material.

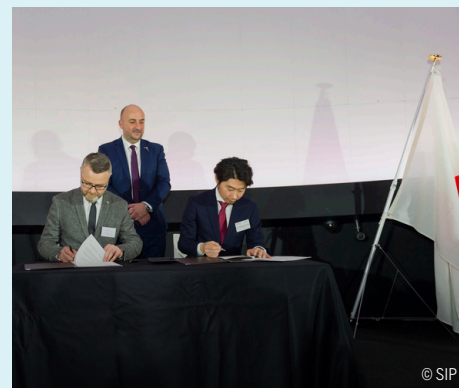
[Learn more on www.list.lu](http://www.list.lu)

## Smart Space

### LIST DEEPENS PARTNERSHIP WITH ISPACE DURING ECONOMIC MISSION TO JAPAN

On 26-30 November 2017, LIST participated in a State visit to Japan, as part of the economic delegation accompanying their Royal Highnesses the Grand Duke and his daughter, Princess Alexandra, Luxembourg's Deputy Prime Minister and Minister of the Economy, Étienne Schneider, Minister of Foreign and European Affairs, Jean Asselborn, and Pierre Gramegna, Minister of Finance. There, LIST signed a Memorandum of Understanding with the Tokyo-based space robotics company ispace Europe S.A. Both partners intend to strengthen their cooperation towards a first joint explorative mission, called "roving spectrometer", with the objective of prospecting lunar resources. A series of joint research projects will be conducted of which two are already on track.

[Learn more on www.list.lu](http://www.list.lu)



## Industry

### PAVING THE WAY FOR CLOSER TIES TO THE NATIONAL INDUSTRY

On 6 December 2017, LIST hosted the event "FEDIL meets LIST" organised by the Luxembourg multisectoral business federation, FEDIL. On this occasion, LIST introduced Luxembourg companies, such as Telindus, Ceratizit, IEE, CircuitFoil, Buderus, Delphi, Dupont and Moutarderie de Luxembourg, to its various services, activities and skills. For a few hours, thanks to presentations, a networking lunch and a visit to its laboratories and research infrastructures, LIST gave a global view of its research and innovation activities. By raising awareness of the participants to the potential of research and innovation for their future improvement, LIST paves the way for potential future cooperation. [Learn more on www.list.lu](http://www.list.lu)

## Career

### LIST SUPPORTS AN EVER-INCREASING NUMBER OF PHD STUDENTS

On 30 November, LIST held its annual PhD Day, an opportunity for the PhD students it hosts to share their experience, to learn about the support and funding available to them, and to discuss the challenges they face as well as their future career. Supporting PhD students into building the Luxembourg of tomorrow is of very high concern for LIST, which intends to offer a favourable environment to its PhD students for their thesis work. In 2017, together with the University of Luxembourg and foreign universities, LIST supervised more than 80 PhD students and among them, 12 PhD students successfully defended their theses. [Learn more on www.list.lu](http://www.list.lu)



## WHERE TOMORROW BEGINS

Located in the heart of Belval's Research & Innovation Campus, LIST can ideally connect its over 600 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 literally within arm's reach.

## CONTACT

Luxembourg Institute of  
Science and Technology

5, avenue des Hauts-Fourneaux  
L-4362 Esch-sur-Alzette

Tel.: +352 275 888 1  
[communication@list.lu](mailto:communication@list.lu)