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Mitglieder News

LIST & GRADEL ANNOUNCE JOINT LUXEMBOURG LAB

LIST & GRADEL ANNOUNCE JOINT LUXEMBOURG LAB PRODUCING ULTRA-LIGHTWEIGHT STRUCTURES FOR MAJOR PLAYERS IN SPACE SECTOR

The Luxembourg Institute of Science and Technology (LIST) is thrilled to announce a new partnership venture with established Luxembourg company Gradel to research and produce ultra-lightweight structures for the aeronautics and space industry. Parts will be produced for three European giants in satellite construction; Thales Alenia Space (France), Airbus Defence and Space (France), and OHB (Germany).

*LIST will be the home of a joint laboratory at the institute's new premises in Hautcharage to research and develop the ground-breaking Gradel's technology known as "xFK in 3D".

What is this special ultra-lightweight structure, and what makes it special and unique to Luxembourg research?

In the domain of space and satellites, weight is expensive. The heavier a product for transport into space is, the more it costs. In fact, the current estimate is costs of around €5,000-10,000 per kilogram, meaning that any weight loss is beneficial financially for companies sending satellites into space.

That's where LIST and Gradel comes in, aiming to produce very tough, yet ultra-lightweight structures using continuous carbon-fibre-reinforced-polymers (CFRP) in a filament winding process creating ultralight 3D structures.

The carbon fibre is coated with a polymer that solidifies the entire object rendering it extremely solid and resilient. Impregnated carbon fibres are wound to form an optimised 3D-mesh design that gives the part its special mechanical properties.

There will be two projects being carried out at the LIST-GRADEL labs:

One project known as "xFKin3D", the name of the process technology, consists

of making parts by hand with the filament weaving manually. It will target the demonstration space-use standards of structural parts produced by the xFKin3D technology.

The second project to be known as "Robotised xFKin3D" will be the challenge of producing the same parts as the first project, but with the use of a new robotic arm recently installed at LIST, making it a fully automated manufacturing process, assuring excellent repeatability, to the same strength and quality, but on a larger scale.

While the first project is seen as more artisanal, the second robotised projects will be on an industrial scale for highly renowned end customers.

The end products are for aerospace, but what exactly?

The components produced are destined for use in all that is antenna support, bracket for equipment in satellites. Currently many of these parts are metallic and therefore relatively heavy. The aim is to move away from metal parts, and with this new technology by LIST and Gradel produced in Luxembourg, a reduction of up to 75% in weight can be achieved, saving companies considerable costs.

It has already been confirmed that the final clients for parts produced at LIST premises, will be initially for Airbus, Thales and OHB – three major European players in the space industry.

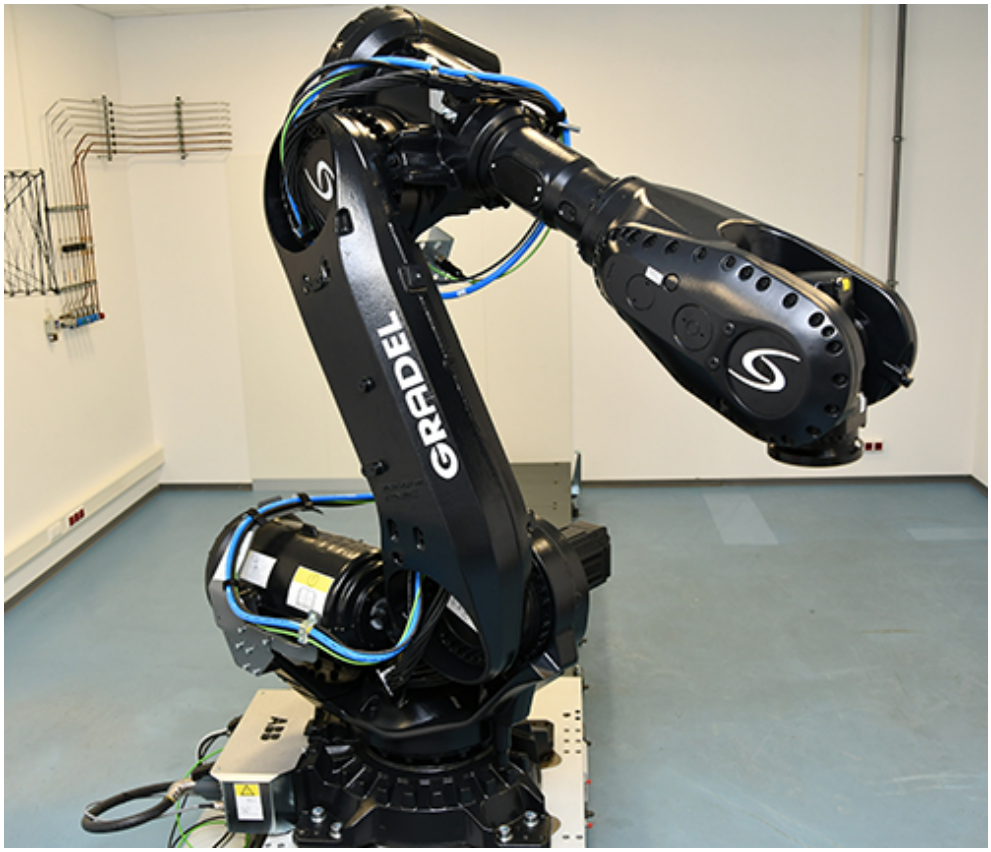
When it comes to commercialising parts produced in the LIST labs, it is Gradel who will take on this task with an already proven track record in producing products for the space industry.

LIST will contribute its expertise in the formation of the materials and play a major role at the start and of the process and development, researching and determining such things as the correct conditions, speed, printing, pressure, temperature etc, needed to obtain parts of strong and good quality. "Setting up joint laboratory and development program to support innovative Luxembourg company is at the very heart of our LIST mission " said Dr Damien Lenoble, director of the Materials Research and Technology – MRT Department of LIST adding that "advanced research towards ultra-light-weighting with sustainable materials and processes is one our CORE research area in MRT, acknowledging that targeting leading-edge requirements of the space industry together with GRADEL will pave the way for timely energy-efficient terrestrial applications that go from wind turbines to ultra-light transport vehicles"

Regarding the new collaboration with LIST, GRADEL's Managing Director, Claude Maack stated, "GRADEL began working with Ultra Lightweight structures in the space sector in 2018 by signing an exclusivity contract with AMC GmbH which developed xFK in 3D first in the Automotive sector. Now with LIST we have a strong partner with deep knowledge in material and process of composite structures allowing us further qualification for Space applications. Supported by LSA, this innovative process technology will enable GRADEL to continue its success story in Space sector and beyond with a full automated manufacturing process".

Light-weighting is a popular topic in today's world, and becoming more and more important in many areas of production, notably in the automotive and aeronautic world. The heavier a car is, the more it consumes. If you manage to halve the weight of a vehicle, you halve the energy necessary to move it. This technology is currently being applied to space technologies, in the future it could equally be as beneficial for aircraft and automobile industries.

Both projects are supported by the Luxembourg National Space Programme LuxIMPULSE, which aims at providing funding to help companies established in Luxembourg to bring innovative ideas to market. The programme is managed by the Luxembourg Space Agency (LSA) together with the European Space Agency (ESA).



**Definition of a joint lab: Researchers and engineers from LIST and Gradel working as a team in the same lab space. In LIST's Materials, Research and Technology (MRT) department, there is already a joint-lab partnership (3D-Oxide) but each joint-lab has its own specificities. In Gradel's case, a team of engineers as well as several pieces of equipment (i.e. the robotic arm) from Gradel will be located in LIST's premises. The major advantage is collective intelligence with expertise and testing equipment next door to the manufacturing process. The benefit is efficient and fast development for guaranteeing a shorter time to market.*