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Open innovation in the space sector takes smart materials to new heights

ArianeWorks at a glance

ArianeWorks is the innovation platform created in 2019 by CNES and ArianeGroup, for the purpose of accelerating the implementation of the roadmap for the reuse of future European launchers and, in particular, the demonstrator Themis with a reusable first stage.
This Themis project must validate low-cost solutions that also contribute to the energy transition of the space industry, helping to make it fully sustainable, for example with bio-based fuels, infrastructure rehabilitation and clean transport.
ArianeWorks has taken on a significant dimension through partnerships with the European Space Agency (ESA), manufacturers and laboratories, SMEs and start-up.
As the space sector opens up to new stakeholders, ArianeWorks must be able to conduct optimal analysis of the technological innovations in order to make the right choices under tight deadlines.

"With some fifteen employees, ArianeWorks remains in direct contact with the scientific teams and the general management of both ArianeGroup and CNES. Their agile project management methods and rapid decision-making create working environment that SMEs and start-up are familiar with." says Charlotte Bakouche, Head of Partnerships and Business Development at ArianeWorks.
"While looking for new potential to assist the Themis project, we had the idea of tapping into technological innovation from outside the space sector and for applications we would not initially have thought of. We now have some twenty innovations that have already been studied in the form of proofs of concept. These include the one from OliKrom, which was conducted as part of a broader partnership between ArianeWorks and the Nouvelle Aquitaine Regional Council."

André-Hubert Roussel, ArianeGroup CEO (on the right), visiting OliKrom's premises in July 2020

Future reusable launcher

"The reuse of launchers will be operational for the next generation of Ariane launchers. The current demonstration phase involves a wide range of tests, including tanks and engines. The agile approach allows us to break away from the traditional space development framework by conducting more tests and moving quickly towards tangible results. The demonstrator will be completed in 2025, which will pave the way for manufacturing opportunities." says Charlotte Bakouche.

Open innovation

From a technical perspective, Philippe Briant of ArianeGroup's Research and Technology Department says, "My mission is to spot future technologies and establish collaboration with SMEs and start-up. We work best in collective settings and open innovation with deep tech stakeholders can set us apart from our competitors."
ArianeGroup has been looking into OliKrom technologies since 2018, leading to two proofs of concept for the composite mould release and also the preventive detection of corrosion. This third project is being conducted by ArianeWorks and focuses on plastic deformation.

Plastic deformation

"A key component of the reuse economy is the ability to quickly revalidate one stage in order to start the next. The goal is to reduce maintenance, ensuring it as inexpensive as possible, in order to make this the most relevant economic model. It is especially important to verify the full integrity of the tanks, which explains the focus on finding a comprehensive detection method. The solution of a colour change that would reveal a deformation in the plastic has therefore been studied for this project and the initial proof of concept is positive.
Making the structure functional and smart is one of the focus areas for this research in order to improve performance. OliKrom solutions can meet these requirements."

Technical expertise and agility

"The added value of the OliKrom team is above all their high level of technical expertise, founded on significant experience. This is a key factor since space launchers are above all complex systems for which complete control is paramount for reliability and safety reasons.
A second asset is their agility approach, based on an incremental process that makes it possible to test solutions quickly.
Finally, on a more personal note, I appreciate the humility of their staff and the openness of our exchanges." says Philippe Briant.

Smart materials

Smart materials are sensitive, adaptive and scalable.
They offer features that enable them to function as a sensor, actuator or even a processor. They are therefore able to spontaneously alter their physical properties, such as their color for example, in response to natural or induced excitation, whether it be internal or external.

OliKrom's ecosystem

OliKrom SMART COLORS

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