



MINISTÈRE DES ARMÉES

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Successful initial tests of the KERAUNOS optical communications satellite

- **A stable laser link was established in summer of 2024, constituting a world first in high-speed optical satellite communications between a nano-satellite in low orbit and a commercial optical ground station.**
- **The experiment was initiated at the end of 2023 by the French Defence Innovation Agency**
- **The French Defence Innovation Agency provided €5.5 million in funding for the project, which is being carried out by Cailabs and Unseenlabs.**

This experiment is the result of a collaboration between the French Defence Innovation Agency, part of the French armament directorate and two French New Space companies Unseenlabs and Cailabs. Together they succeeded in establishing a stable laser link over several minutes, demonstrating the tracking of the nanosatellite in low orbit by the optical ground station and the establishment of a closed-loop laser link.

The optical link offers advantages over traditional radio links, including greater speed, enhanced discretion, and independence from radio spectrum coordination regulations. However, it can sometimes be disrupted by atmosphere turbulence, which KERAUNOS is tasked with mitigating to ensure optimal transmission quality.

KERAUNOS combines the expertise of Rennes-based companies Unseenlabs and Cailabs:

- Cailabs' technology and photonics expertise have enabled the development of a ground receiver that circumvents these constraints while being sufficiently reliable and robust to be offered commercially.
- The modern and agile architecture of Unseenlabs' nanosatellites enables the integration of the laser payload within the short timeframes demanded by the New Space pace. This laser can be used to transmit data to the Cailabs ground station.

This success makes it possible to use space-based laser communications on mobile, land-based, naval and airborne platforms. This system could be integrated into the Ministry of Defence's future satellite systems. The KERAUNOS project contributes to the objectives of the 2024-2030 Military Programming Law, which aims to strengthen France's presence and capabilities in space.

Patrick Aufort, Director of the French Defence Innovation Agency: *"I am delighted with the success of this first optical communications test with the KERAUNOS satellite, the first demonstrator initiated by the French Innovation Agency in the space sector. Our aim is to achieve the same level of success with our future projects, drawing on the creativity and ingenuity of companies from France's burgeoning New Space ecosystem."*

Jean-Michel Parlier, Head of Space Innovation at the French Defence Innovation Agency: *"The KERAUNOS experiment is a success story that forms part of the "Optical Communication" technology roadmap of the French Defence Innovation Agency's "New Space" priority theme, launched in 2021. This success is the result of the investment and exceptional know-how of Unseenlabs and Cailabs."*

Jean-François Morizur, CEO and co-founder of Cailabs: *"The success of this optical communication test completes the validation of Cailabs' range of optical ground stations. It supports Cailabs' proposal to our customers to provide a proven industrial ground station solution. This success also confirms the ability of New Space companies like Cailabs to quickly and efficiently develop ambitious systems for the armed forces."*

Jonathan Galic, CTO and co-founder of Unseenlabs: *"This success reflects Unseenlabs' ability to quickly deliver a complex, fully functional system into orbit. Combining the performance of Unseenlabs' system and satellite architectures with Cailabs' optical innovations paves the way for faster and safer communications."*



About Unseenlabs

Unseenlabs is the world's leading provider of radio frequency (RF) data and solutions for maritime surveillance. Its unique proprietary technology can geolocate and characterise any vessel at sea, at anytime, anywhere in the world and in any weather condition. Unseenlabs provides its customers with high value-added data and solutions to combat illegal activities at sea. Unseenlabs' solutions are a world reference in this field.

About Cailabs

Cailabs is a global deeptech company with offices in France and the United States. Founded in 2013, it designs and manufactures innovative optical solutions for space, defence, energy and other key industries. Thanks to a unique beam shaping technology, Cailabs guarantees reliable, high-performance laser connections for free-space communications, suitable for even the most extreme conditions. In the field of industrial laser processes, Cailabs' solutions enable greater precision, simplifying complex processes.

