Press release of May 11, 2021

Three impressive antennas for the Kinéis nanosatellites

The results of the recent Kinéis® antenna tests at CNES confirm not only the excellent radiofrequency performance of the 25 nanosatellites in the future constellation but also the innovative capabilities of the teams from Kinéis, CNES, Cobham, Comat, Thales Alenia Space, and HEMERIA working on them. Fitting three deployable antennas on the same side of a satellite smaller than a sheet of writing paper requires overcoming both mechanical and RF challenges. The very good results are a further confirmation of French know-how in NewSpace and space-based Internet of Things (IoT). The Kinéis antennas are now aimed confidently at their launch date in 2023!

The accelerated pace of development and miniaturization dictated by NewSpace on the satellite industry provides an ideal playing field for innovation. Antennas are a key issue, as they must be compact for the launch, reliable during deployment, and offer high performance. Mere appendages in the past, they are now longer than the satellite buses themselves. The numerous tests were conducted at the CNES compact antenna test range, which has provided unmatched measurement conditions in Europe for nearly 30 years. They confirmed the expected performance and validated technical options.

Michel Sarthou, Kinéis CTO ©Kinéis-Nuuk-photographies

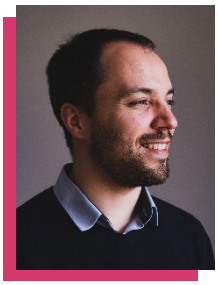
"At Kinéis, we have chosen to develop a two-way IoT based on an improved version of the Argos system. Connected objects on the ground not only transmit data but also receive commands transmitted by users via the satellite, all with minimal energy consumption. Our main antenna on board the satellites uses a full-duplex solution, which means it is capable of picking up very weak 150 mW signals sent from the ground some 2,500 km (1550 mi) below while simultaneously transmitting to the terminals in the same UHF band with a power of 1 W," explains Kinéis CTO Michel Sarthou. The same antenna also receives the satellite control commands, thus eliminating the need for extra onboard equipment. It is retracted to a quarter of its length during the launch phase, then its four helical wires automatically deploy a few minutes after the satellite has been jettisoned. This novel mechanism was developed specifically for Kinéis following research by CNES and Comat. The deployment sequence is particularly critical as it is only activated once and must therefore be perfectly reliable. Once deployed, the antenna's performance is comparable to that of bigger, more conventional antennas.

In addition to the main antenna, satellites in the Kinéis constellation carry a S-band antenna developed by Cobham to relay data down to ground stations. Placing these two antennas on a satellite not much bigger than a shoebox without causing interference in full-duplex mode is a major technical challenge. The solution devised to solve this problem—placing one on top of the other—is quite original. This innovative configuration has been successfully validated by the tests carried out.

Alongside their main IoT mission, some of the nanosatellites provide an Automated Identification System (AIS) signal collection service dedicated to maritime traffic observation via a third antenna developed by Thales Alenia Space and operating in VHF. This antenna benefits from innovative beamforming technology that improves signal detection, allowing more vessels to be tracked.

The three antennas were tested in optimal conditions thanks to the CNES facilities, the satellite platform model developed in record time by HEMERIA, and the teams' expertise. The very satisfactory results of these tests validate compliance with the demanding requirements of satellite IoT.

Innovation is also very important for connected objects used for the environment, agriculture, maritime activities, transport and logistics. They may weigh just a few grams and be self-sufficient in energy needs for several years. They are already free from the constraints of white areas and roaming agreements because of the Argos system operated by Kinéis on eight satellites in orbit, and from 2023 onwards, they will benefit from enhanced performance due to the future constellation's 25 satellites. The combination of NewSpace and the IoT has a bright future!



Rémi Fragnier, an antenna engineer at CNES, testifies to the French space agency's unfailing support for Kinéis. "Measuring satellite antenna performance is a crucial step that allows CNES to contribute its expertise to a development it has been assisting for several years. Kinéis has dared to innovate, and the success of these tests validates the original architecture chosen. With the support of our Mechanisms and Antennas Departments in particular, Cobham and Comat have successfully met the technological challenge of developing an antenna that offers the same performance as Argos antennas while being much smaller due to its unique deployment system."

Rémi Fragnier, CNES Antenna Engineer ©CNES

Jean-Marc Billaud, Cobham VP for Business Development, Sales & Marketing: "The test results for this deployable antenna are a decisive step toward launching the constellation's 25 nanosatellites in 2023. This success rewards a truly innovative, 100% French design and technology breakthrough. It helps consolidate sovereign competence in this area."

Jean-Marc Billaud, Cobham VP for Business Development, Sales & Marketing ©Cobham

Ludovic Daudois, Comat CEO: "Our strategic cooperation with Kinéis enables us to launch products such as the deployable antenna while confirming our position as a benchmark OEM in the NewSpace sector. Comat is delighted to actively participate in the constellation's development in a spirit of mutual trust."

Ludovic Daudois, Comat CEO ©Comat

"The Kinéis program has just passed a major step forward," said Benoit Broudy, Vice President for Navigation at Thales Alenia Space in France. "The antennas for this program have passed their radio-frequency tests, including the AIS antennas to automatically identify ships, developed by Thales Alenia Space. The engineering models were mounted on a mockup of the HEMERIA platform and this whole assembly was tested using means from French space agency CNES. Thales Alenia Space is very pleased with progress on Kinéis, the first French nanosatellite constellation dedicated to the Internet of Things. We are responsible for building the payloads, with Syrlinks as the main partner, and in charge of the mission center. Our company is once again demonstrating innovation and capitalizing on its unique expertise regarding constellations to address new markets for high revisit earth observation, space environment monitoring and space debris detection, as well as the IoT, with Kinéis as a flagship program."

Benoit Broudy, Director of Navigation activities at Thales Alenia Space, France ©Thales Alenia Space

Laurent Javanaud, Head of the smallsat business line at HEMERIA: "These first full-scale tests are the result of months of work by various teams spread across France. The Kinéis mission's performance and reliability requirements drive us to push back the limits of the state of the art through innovative solutions in order to obtain an ultra high-performance but also elegant product, an illustration of French technological know-how. Other stakeholders are already showing interest in this approach, which combines performance and a short lead time. These small French satellites are unique on the market, and we are all very proud of the work we have done since Kinéis entrusted us with its production."

Laurent Javanaud, Head of the smallsat business line at HEMERIA ©HEMERIA

About...

Kinéis

Created in 2018, Kinéis is a satellite operator and global connectivity provider. It benefits from a legacy of 40 years of expertise in the Argos system—founded by the French space agency, CNES, and historically operated by CLS (Collecte Localisation Satellites)—to develop reliable technology that provides easy access to useful satellite data. To make life easier for both professionals and private individuals, and to encourage them to use its products and services, Kinéis locates and connects objects wherever they are on the planet. To that end, it harnesses all of its technological innovation capabilities to forge links between NewSpace and the IoT.
In 2020, Kinéis raised capital of €100 million (CLS 32%, CNES 26%, Bpifrance 20%, Ifremer, Thales, HEMERIA, CELAD, BNP Paribas Développement, ETHICS Group, MJKD, Consuls Développement, Invest Marel, and more) and generated revenue of €7 million (à 40% increase on 2019). Kinéis joined the French Tech Next40 in 2021.

CNES

CNES is the French space agency, a public body responsible for conceiving and directing France's space policy within Europe. It designs and orbits satellites and invents tomorrow's space systems while fostering the emergence of new services of use in daily life. Founded in 1961, CNES is the instigator of major space projects, launch vehicles and satellites. As such, the agency is industry's natural contact for pushing back today's boundaries through innovation. CNES employs some 2,400 or so men and women with a passion for space and its endless scope for innovative applications. They work in five strategic areas: the Ariane launcher, science, observation, telecommunications, and defense. CNES is a driving force behind technological innovation, economic development and French industrial policy. The agency initiates numerous scientific partnerships and is part of many joint international projects. France is one of the main contributors to the European Space Agency (ESA), where it is represented by CNES.

Cobham

Every mission matters to us.
Cobham Aerospace Communication is a world leader in each of its various business lines—audio and radio management, antennas, satcom, lights, and clocks. Its solutions are at the leading edge of technological development. In the fields of commercial aerospace, defense, and security, Cobham's innovative and high-performance products are small and lightweight to facilitate integration and help our customers' assets perform to their maximum potential, save costs, and fly greener.
For further information, please visit: www.cobhamaerospacecommunications.com

Comat

Comat, a Toulouse-based company with 100 employees, is a strategic OEM for the space sector, with a particular focus on exploration, telecom, and smallsat markets. For the past 45 years, Comat has been proposing innovative equipment for satellites and a range of products for smallsats, including reaction wheels, a plasma jet pack, a deployment system and various deployable structures.

Thales Alenia Space

Drawing on over 40 years of experience and a unique combination of skills, expertise, and cultures, Thales Alenia Space designs and delivers innovative solutions for telecoms, navigation, Earth observation, environmental management, exploration, science, and orbital infrastructures. Public institutions, governments and private industry alike count on Thales Alenia Space to design, develop and deliver satellite-based systems that provide anytime, anywhere connections and positioning, monitor our planet, and enhance management of the resources of both Earth and our Solar System. Thales Alenia Space sees space as a new horizon for humankind, helping to build a better, more sustainable life on Earth. A joint venture between Thales (67%) and Leonardo (33%), Thales Alenia Space also teams up with Telespazio to form the parent companies' Space Alliance, which offers a complete range of solutions, including services. Thales Alenia Space posted consolidated revenues of approximately 1.85 billion euros in 2020 and has around 7,700 employees in ten countries. www.thalesaleniaspace.com

HEMERIA

HEMERIA is a leading space industry player. HEMERIA designs and develops world-class space-based products for the commercial, defense, and security applications of its business and scientific customers. HEMERIA develops high-performance nanosatellites to give non-technical professionals fast, competitive and effective access to space. HEMERIA is also one of the top three European suppliers of panels, thermal protection and interconnection systems for larger satellites.

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