OUR HISTORY

Space

AIMING FOR THE STARS WITH EUROPE'S LAUNCH VEHICLES

EUROPE ENTERS THE SPACE AGE

On November 26, 1965, France became the world's third country to launch a satellite, using the Diamant A launcher to place a spacecraft affectionately named "Asterix" (after the French comic book character) into low-Earth orbit.

Leading France into the "elite club" of space powers were three companies: Société d'étude et de réalisation d'engins balistiques SEREB (as prime contractor), Nord Aviation (responsible for the first stage) and Sud Aviation (second and third stages).

The three were later merged into Aerospatiale – one of the Airbus predecessor companies.

Diamant began its career from a launch pad called "Brigitte" at Hammaguir, Algeria, where France had established a launch site for missiles and rockets.

The Diamant A launcher's initial liftoff mass was 18 t and could carry a satellite payload of 85 kg.

The Diamant rocket series evolved with the Diamant B and Diamant B P-4 variants, both launched from the newly-established Guiana Space Centre at the overseas territory of French Guiana in South America.These versions demonstrated progressively improved payload capabilities, achieving a lift performance of up to 150 kg to a 500 km low Earth orbit.

Over the programme's duration, 12 Diamant vehicles were launched through November 1975, successfully placing 11 payloads into orbit. Amongst these was a notable dual-passenger mission, foretelling the future of the dual-payload missions that would later become a hallmark of European launch services with the Ariane programme.

DIAMANT TO ARIANE

France's successful experience with Diamant was an essential credibility factor when Europe moved to the framework of a multi-national space programme under management of the European Space Agency (ESA). The creation of ESA in 1975 was partly motivated by the failure of Europe's first multi-national launcher effort, called Europa, which faltered due to inherent technical and organisational shortcomings.

Using the expertise gained with its successful Diamant programme, France proposed in 1972 a new launcher aptly called Ariane. The name derived from the Greek mythology name of Ariadne, the daughter of Minos, who gave Theseus a ball of thread to guide him through the mazes of the labyrinth. With Ariane, France and its space industry provided the pathway for Europe to escape from the multi-national maze that had doomed the earlier Europa launcher.

France's Ariane proposal provided a precise technical definition for a new launch vehicle that ultimately became Ariane 1, which offered the payload lift capability of 1,850 kg into geostationary transfer orbit and 1,400 kg into low Earth orbit.

In addition to guaranteeing it would finance more than half of the Ariane programme, France proposed a centralised management and design / development structure that resolved challenges of the more distributed technical and managerial setup for the Europa launcher. In fact, no single authority or group was entirely responsible or in control of Europa, something France was determined to avoid with Ariane.

SUCCESS WITH CENTRALISED MANAGEMENT

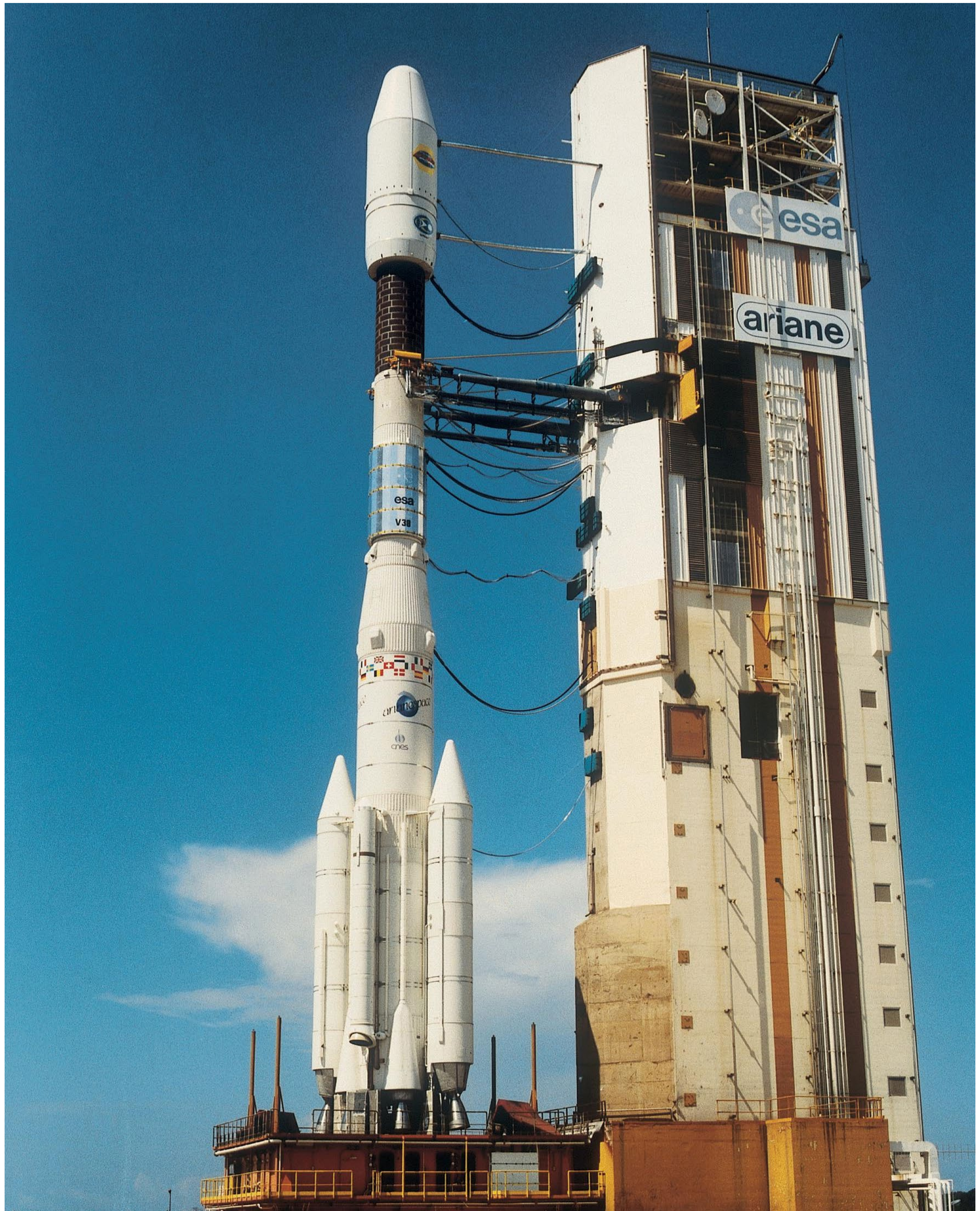
Aerospatiale took the industrial architect role for Ariane and became a key contractor along with other Airbus predecessor companies: Messerschmitt-Bölkow-Blohm (MBB), Entwicklungsring Nord (ERNO) and Dornier Flugzeugwerke in Germany; Construcciones Aeronáuticas SA (CASA) in Spain; and Matra in France.

The first Ariane 1 was launched in 1979 from the Guiana Space Centre, providing the framework for a family of vehicles that were to become a benchmark in the world's launch service industry.

To ensure its commercial viability, Europe formed an organisation to market the newly developed launcher and compete with the well-established U.S. launcher industry. As a result, Arianespace was created in 1980.

Throughout the 1980s the Ariane product line evolved with the introduction of the more powerful Ariane 2 and Ariane 3 models,culminating in the versatile Ariane 4 family.,This version featured six configurations, combining a core vehicle with varying combinations of solid and liquid boosters, enabling payload lift performance exceeding 4,000 kg into geostationary transfer orbit.

THE WORKHORSE ARIANE 4



Ariane 4 earned its reputation as the Ariane family's workhorse. With designed-in versatility, Ariane 4 proved ideal for launching communications and Earth observation satellites, as well as scientific research satellites.

Its core first stage could accommodate up to two or four strap-on boosters, or a combination thereof in "plug and play" configurations, capable of delivering satellites weighing from 2,000 kg to nearly 4,300 kg into geostationary transfer orbit, nearly three-times as much as the Ariane 3 version.

A trademark of the Ariane launcher (and in particular, Ariane 4) was the ability to carry multiple payloads on a single launch – a capability regularly used with commercial telecommunications satellites, enabling customers to share the launch costs.

The first Ariane 4 flew in June 1988 from the Guiana Space Centre in French Guiana, and was retired from service in February 2003, performing 113 successful launches and capturing 50% of the commercial satellite launch services marketplace.

MORE "MUSCLE" WITH ARIANE 5

In the 1970s, alongside the development of the foundational Ariane family of launchers, Europe began looking at more powerful launchers. These advanced launchers were designed to support the anticipated demands of the 1990s, including the deployment of heavy telecommunications satellites and the capability to orbit Europe's proposed Hermes spaceplane. Although the dream of developing Hermes (a programme led by Airbus predecessor company Aerospatiale) ended for both financial and political pressures, Europe correctly anticipated the emergence of large geostationary communications relay satellites.

Full-scale studies of the future heavy-lift launcher were authorised in January 1985 by the European Space Agency (ESA), and the development go-ahead for this new launcher – to be named Ariane 5 – came in November 1987.

One of the primary objectives for the Ariane 5 programme was to reduce overall costs while enhancing reliability. . The manufacturing time of an Ariane 5 was approximately 50,000 hours, significantly lower than the 100,000 hours required for an Ariane 4. This cost reduction was achieved, in part, by simplifying the systems and components, which also contributed to improved reliability. Unlike the Ariane 4, which utilised up to 10 solid-propellent and liquid-fuelled motors, the Ariane 5 operated with four motors, each delivering substantially higher thrust.

Aerospatiale was initially designated as the lead contractor for the Ariane 5 programme, serving as its "industrial architect". This responsibility transitioned to Airbus with the formation of the industrial group and subsequently passed to Airbus Safran Launchers. In 2017, Airbus Safran Launchers was rebrandedArianeGroup.

Ariane 5 has lived up to its promise: the heavy-lift vehicle has been launched more than 100 times from the Guiana Space Centre in French Guiana, placing telecommunications, Earth observation and climate-monitoring satellites, deep-space probes and other payload types into orbit. Its payload lift capability has evolved from the initial 6,900 kg in geostationary transfer orbit to an enhanced performance of 10,000 kg, along with a capacity of 20 t into low Earth orbit.

EYES ON THE FUTURE: ARIANE 6

Ariane 6 was conceived to address the evolving demands of the launch services marketplace, which now encompasses a diverse range of satellite sizes and lift-off masses for both commercial and institutional missions.

This next-generation successor to Ariane 5 was designed with reduced production costs and design-to-build lead times in mind, while maintaining the quality and reliability that has made Ariane 5 an industry leader.

On July 9, 2024, the first Ariane 6 rocket successfully launched, marking a significant milestone in Europe's space exploration. This inaugural mission, designated VA262, deployed multiple satellites into a circular Earth orbit and restored Europe's independent access to space. The flight demonstrated the heavy-lift capability of Ariane 6, capable of delivering both individual satellites and satellite constellations to their intended orbits.

Ariane 6 boasts a modular configuration, featuring core stages powered by lower and upper liquid propellant modules, complemented by either two or four strap-on solid rocket motors.

The A62 variant, equipped with two solid rocket motors, has an initial payload capacity of over 5,000 kg to geostationary transfer orbit and over 5,000 kg to an 800 km Sun-synchronous orbit. Ariane 6's first commercial mission of an A62 variant, designated VA263, successfully launched on March 6, 2025.

Meanwhile, the A64 variant, with four solid rocket motors, offers an initial payload capacity of 11,000 kg to geostationary transfer orbit, with potential for future growth.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EUROPEAN TELECOMMUNICATIONS
BRINGING THE WORLD TOGETHER...

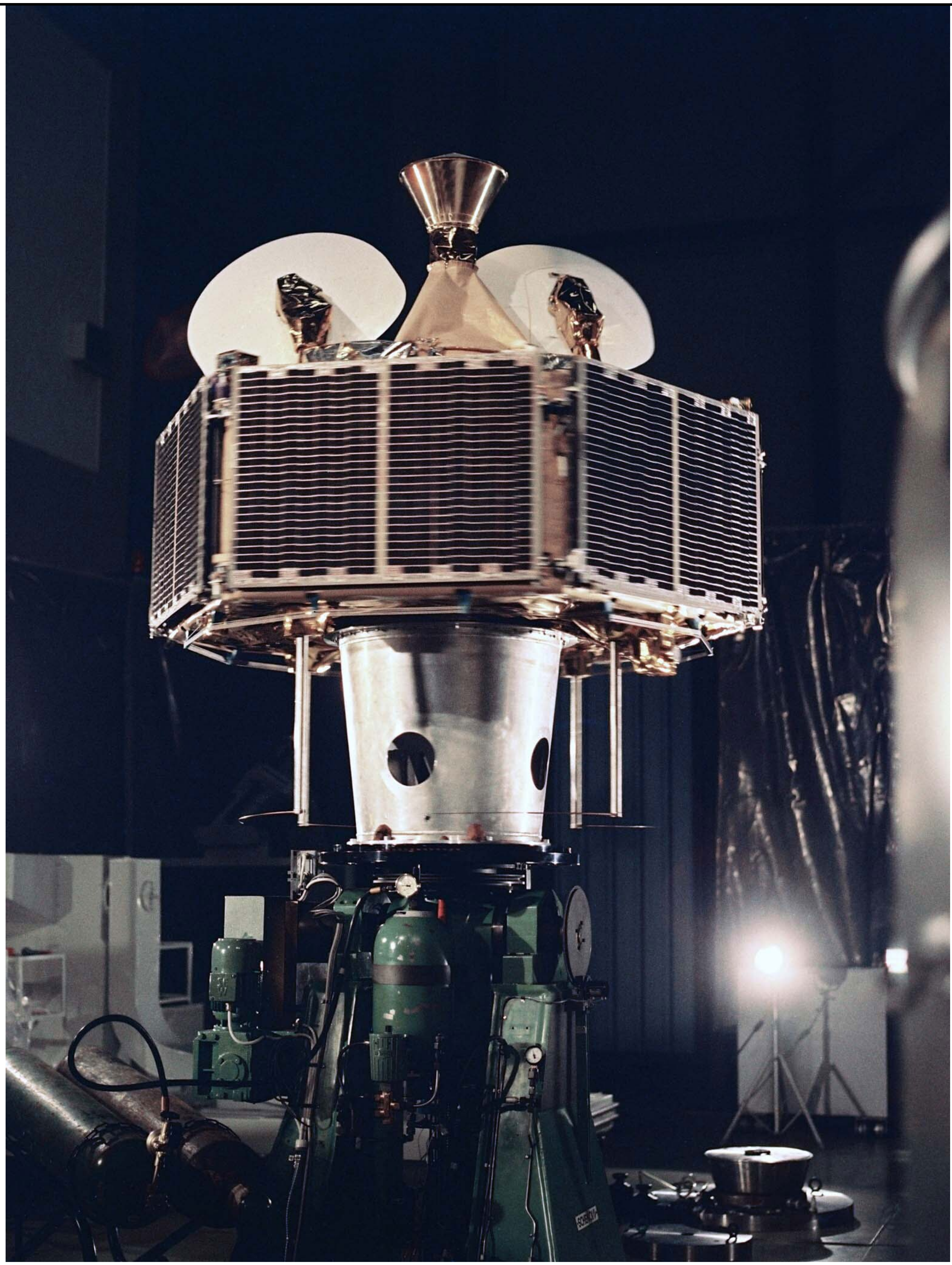
EUROPE’S FIRST TELECOM SATELLITE SYSTEM

U.S. IMPOSED RESTRICTIONS

SYMPHONIE’S ENDURING LEGACY

TELECOM, TDF, TV-SAT AND DFS

SETTING THE STANDARDS WITH EUROSTAR



EUROPE'S FIRST TELECOM SATELLITE SYSTEM

When the Symphonie satellites were launched in December 1974 and August 1975, they represented several significant milestones for the European space community. Yet, their success came with a caveat that would shape European space programme decisions for years to come.

The Symphonie project originated from a French / German cooperative agreement signed in 1963 by President Charles de Gaulle and Chancellor Konrad Adenauer. The goal was to build on the early satellite experience of both nations, including France's historic achievement with Asterix, the country's first satellite, launched in 1965 aboard the French-built Diamant A rocket. Other trailblazing spacecraft include Germany's AZUR, orbited in 1969 on an U.S. Scout-B rocket; and the Franco-German DIAL satellite, launched in 1970 by a Diamant B launcher version.

This high-level agreement set the way for the future, forming the first European communications satellite system. Symphonie-A and Symphonie-B were also the world's first three-axis stabilised communications satellites in geostationary orbit with a bipropellant propulsion system. This maeans the spacecraft is maintained in a fixed orientation: providing a stable platform for relay duties via its antennas aimed at the Earth, and the power-generating solar panels facing the Sun.

The development of Symphonie involved Airbus predecessor companies France's Aérospatiale (leader of the industrial consortium, host of the integrated project team at its Les Mureaux centre; and developer / manufacturer of structures and subsystems), and Messerschmitt-Bölkow-Blohm of Germany (attitude, orbit control and thruster systems, along with testing and integration).

Building on Symphonie's legacy, subsequent programs included France's Telecom series of national spacecrafts, which provided relay capabilities for both civilian and military users. These satellites were designed and manufactured by another Airbus predecessor company, Matra. The configuration used for Telecom satellites was derived from an earlier programme called ECS, in which Matra was a subcontractor to British Aerospace.

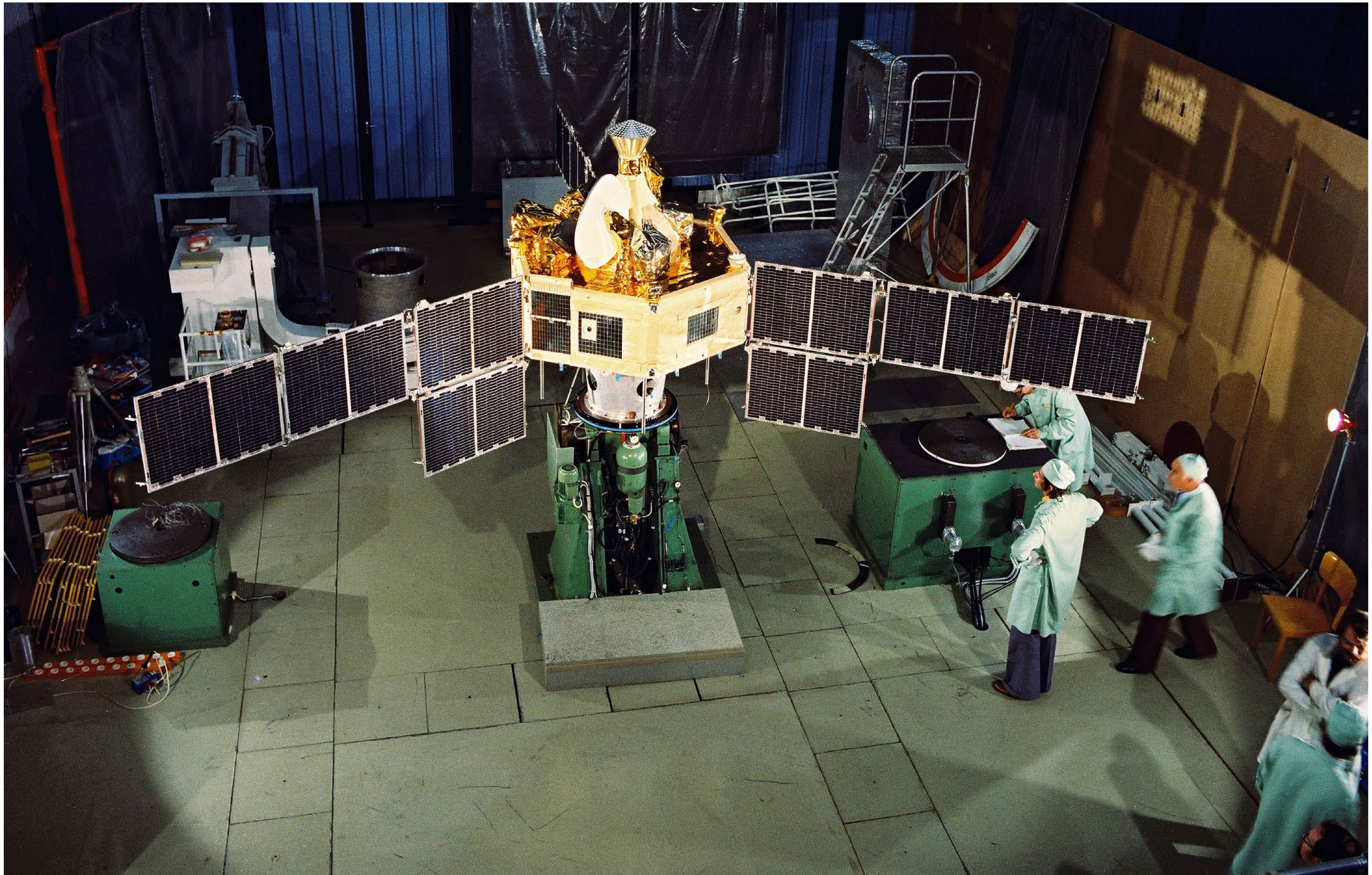
British Aerospace also produced ESA's OTS-2 experimental satellite, which was launched in 1978 using a Delta rocket. In service for more than 12 years, it was one of the first geostationary communications spacecraft outfitted with six Ku-band transponders.

U.S. IMPOSED RESTRICTIONS

The Symphonie programme arose from Europe's inability to independently orbit its pioneering spacecraft due to the failed multi-national Europa launcher programme. Following Europa's abandonment, France and Germany turned to the U.S. for launches on Thor Delta 2914 launch vehicles. However, the U.S. State Department imposed a critical restriction: Symphonie could not be used for commercial purposes.

Symphonie programme managers and government officials perceived this limitation as a protectionist measure. At the time, the U.S. aerospace industry had not yet adopted the three-axis stabilisation for its telecommunication satellites, relying instead on spin stabilisation. This method involved the entire spacecraft rotating around its vertical axis, akin to a spinning top. Spin stabilisation had notable disadvantages, including limited solar array efficiency, higher reliance on batteries and the need for complex mechanisms to despin antennas, trackers and optical instruments for precise orientation.

According to Professor Hubert Curien, a leading figure in European space policy, the Symphonie experience galvanised Europe's commitment to securing sovereign access to space. It inspired initiatives such as the creation of the Ariane launcher, eliminating dependency on foreign launch services. Symphonie also strengthened support for French and German national satellite telecommunications and TV relay programs, fostering a new era of European collaboration and technological advancement.

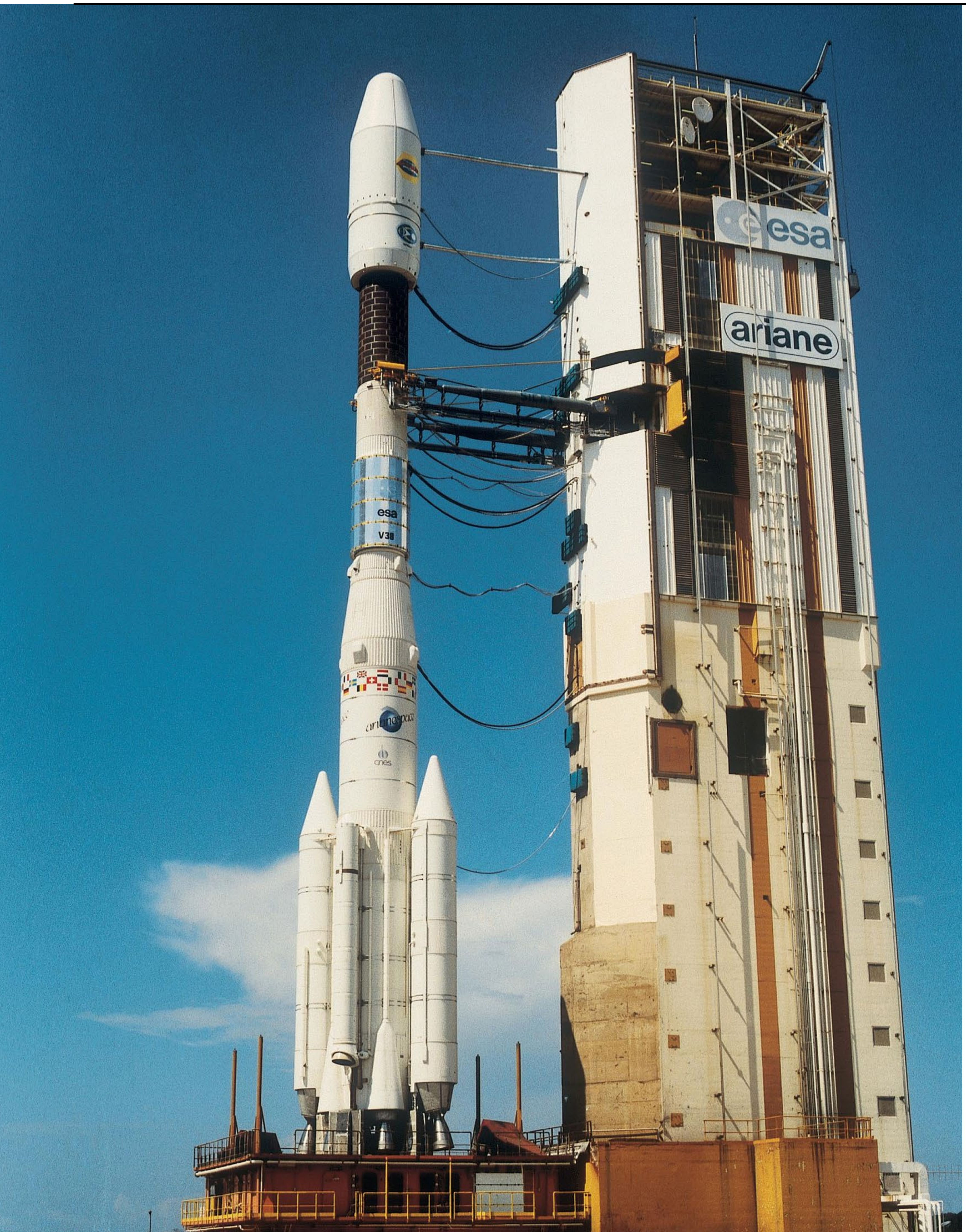


SYMPHONIE'S ENDURING LEGACY

The U.S.restrictions on Symphonie's commercial use, limiting it to experimental purposes, played a pivotal role in uniting Europe for an unprecedented space telecommunications initiative. This effort, involving 40 countries, facilitated humanitarian, cultural, educational, technical and scientific experiments using fixed, portable and mobile ground stations. France also used the Symphonie spacecraft to validate satellite-based telephony and television links between metropolitan France and its overseas departments, technologies applied in many programmes to come.

Symphonie's legacy extends well beyond the two satellites and their 10-years of reliable in-orbit service. It not only accelerated the communications sector's transition from terrestrial cable and microwave links to space-based relay, but also fostered the development of a community of skilled designers, technicians and builders. Moreover, it cultivated a global user base for European space-based telecommunication services.

Equally significant was Symphonie's role in driving industrial restructuring, merging national industries into European groupings and laying the groundwork for the creation of Airbus.



TELECOM,TDF, TV-SAT AND DFS

Among the programmes inspired by Symphonie were France's Telecom national satellites, which provided relay capacity for both civilian and military users. These satellites were designed and manufactured by Airbus predecessor company Matra.

The platform used for the Telecom satellites originated from an earlier initiative called ECS, where Matra served as a subcontractor to British Aerospace.

France and Germany collaborated on the development of direct broadcast satellite systems, producing the TDF 1 and 2 platforms for France, launched in 1988 and 1990; and TV-SAT 1 and 2 for Germany, launched in 1987 and 1989. These satellites were jointly manufactured by Airbus' predecessor companies Aérospatiale and Messerschmitt-Boelkow-Blohm.

TDF and TV-SAT were based on Aérospatiale's Spacebus platform, which evolved into a product line of satellites built for France, Germany and export customers (including the Arabsat telecommunications organisation and Sweden). Responsibility for development and production of the Spacebus series subsequently was passed to another spacecraft manufacturer.

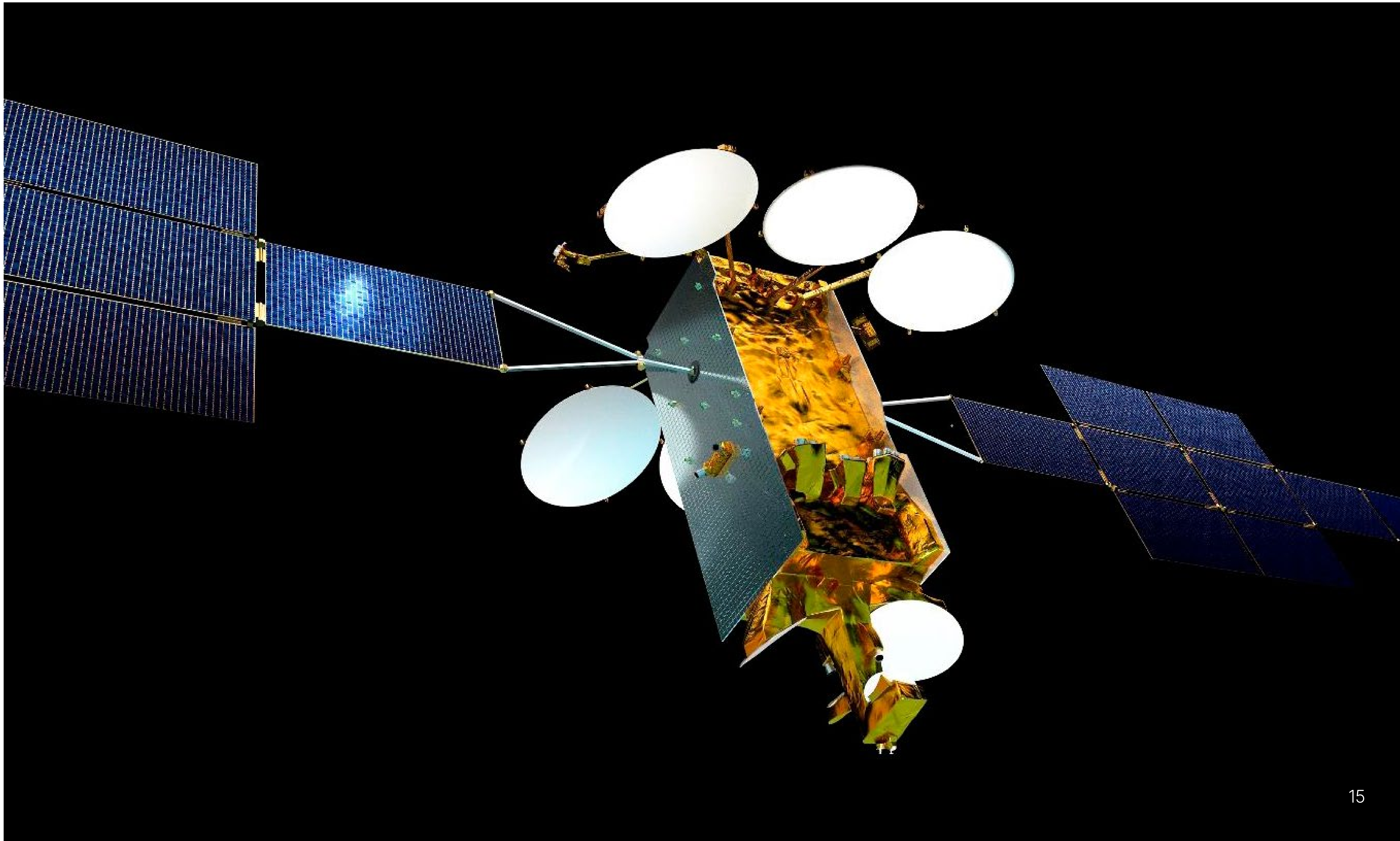
Also included in the Airbus telecommunications heritage are the German national DFS satellites developed as a national system for the German Federal Post Office. Three spacecraft were launched from 1989 through 1992, produced by a German industrial consortium that included Airbus forerunner company MBB-ERNO.

SETTING THE STANDARDS WITH EUROSTAR

A long-running satellite product line is Eurostar, jointly developed in the mid-1980s by Matra Marconi Space with British Aerospace, and now integrated within the space activities of Airbus. The Eurostar series of high-performance communications satellites is suited to a full range of communications missions, including links with fixed ground stations, mobile services, broadcast and broadband, becoming a benchmark for in-orbit reliability. Airbus has expanded Eurostar in a phased process, increasing the satellite power and propulsion capability and ability to accommodate equipment and antennas as well as on-orbit lifetime.

Included in the Eurostar series are Skynet spacecraft for the British Ministry of Defence, which helped establish Airbus' competence in secure communications relay platforms for utilisation by militaries and governments.

To date, more than 84 Eurostar satellites have been ordered, collectively achieving over 600 years of operational success in orbit. The latest iterations include the Eurostar E3000, renowned for its mission flexibility and enhanced payload capacity; and the Eurostar Neo, which delivers superior efficiency, performance and cost-effectiveness, alongside streamlined manufacturing schedules. Both platforms support traditional chemical propulsion as well as next-generation electric propulsion, enabling significant mass reduction. This results in lower launch costs for a given mission and/or the deployment of more capable satellites within the same mass constraints.



AIRBUS SPACECRAFTS OPEN THE UNIVERSE

UNDERSTANDING THE SUN WITH ULYSSES

THE FAST TRACK TO MARS

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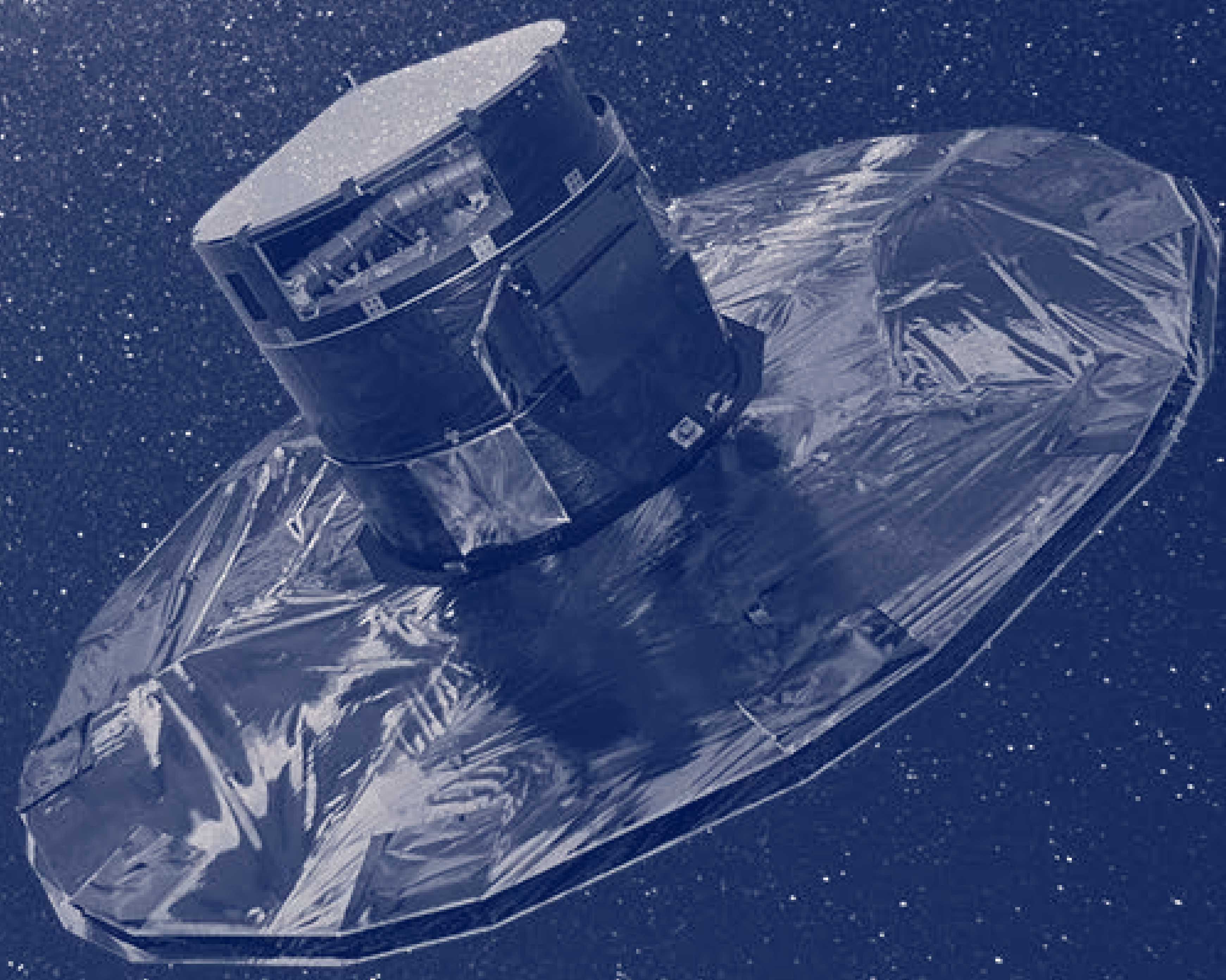
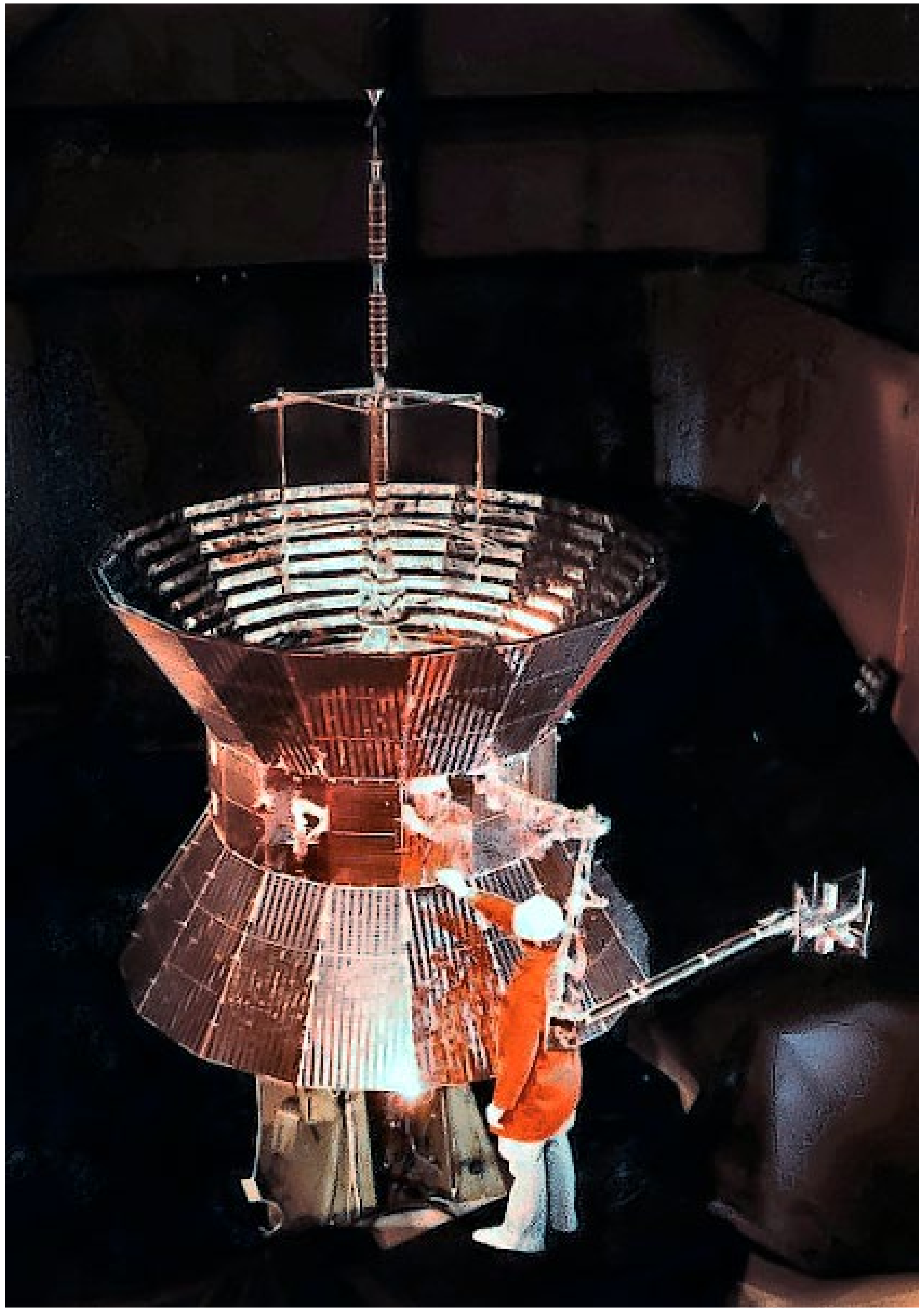




AIRBUS SPACECRAFTS OPEN THE UNIVERSE

Airbus and its predecessor companies have contributed to the exploration of space – from learning more about the Earth to revealing details about other planets, moons and comets.

With their launches in 1974 and 1976, Helios-A and Helios-B were the first space probes produced outside of the United States and the Soviet Union to leave Earth orbit. Built by Messerschmitt-Bölkow-Blohm, a German predecessor company to Airbus, they were designed to study solar processes and enabled the collection of data on comets. The 370 kg spin-stabilised Helios probes carried 10 scientific instruments and were placed in orbits around the Sun. During their trajectories, they set a maximum speed record for spacecraft of 252,792 km/hr (70,220 meters/sec).

Another early spacecraft was COS B, a scientific satellite developed by Airbus predecessors MBB and Aérospatiale to study extraterrestrial gamma radiation. It was the first satellite to go into space under the banner of the newly-created European Space Agency (ESA), with its launch in August 1975. COS B originally was targeted for launch on Europe's own Europa-2 launch vehicle, but the spin-stabilised spacecraft ultimately was launched by a U.S. Delta rocket in 1975 after the Europa launcher programme was cancelled. Initially planned for a mission duration of two years, COS-B was finally switched off in April 1982 after six years and eight months of successful operations.

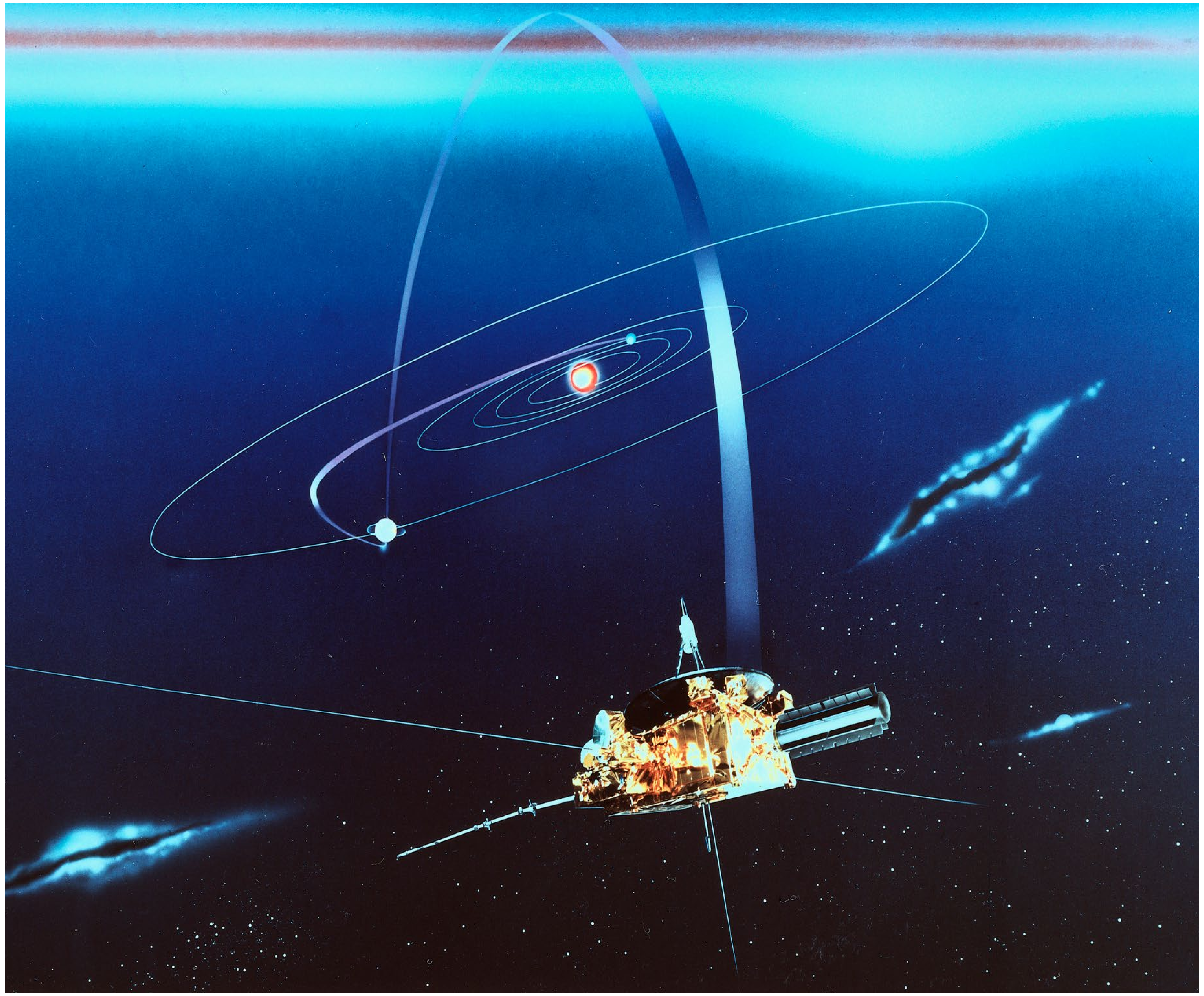
Launched in 1989, ESA's Hipparcos was a pioneering space experiment dedicated to precisely measuring the positions, parallaxes and proper motions of stars, which is more commonly called astrometry. It operated in space until 1993, and while in service pinpointed more than 100,000 stars – 200-times more accurately than ever before.

The Roentgen Satellite (ROSAT) was an X-ray observatory built by Airbus forerunner company Dornier. This Germany / U.S. / UK collaboration allowed researchers to perform an all-sky survey of X-ray sources with an imaging telescope for the first time. Launched in June 1990 on a U.S. Delta rocket, ROSAT exceeded its planned 18 month lifetime expectation in Earth orbit, detecting about 80,000 cosmic X-ray sources and another 6,000 sources in the extreme ultraviolet regime. During nearly nine years of operation, more than 4,000 scientists from 24 countries took the opportunity to commission and analyse measurements.

UNDERSTANDING THE SUN WITH ULYSSES

Dornier was the prime contractor for Ulysses, a mission of the European Space Agency and U.S. National Aeronautics and Space Administration (NASA) to study the heliosphere – the region of space influenced by the Sun and its magnetic field. With a liftoff mass of 370 kg, Ulysses was a spin-stabilised spacecraft that included an RTG (Radio-isotope Thermoelectric Generator) for electrical power during its flight into deep space.

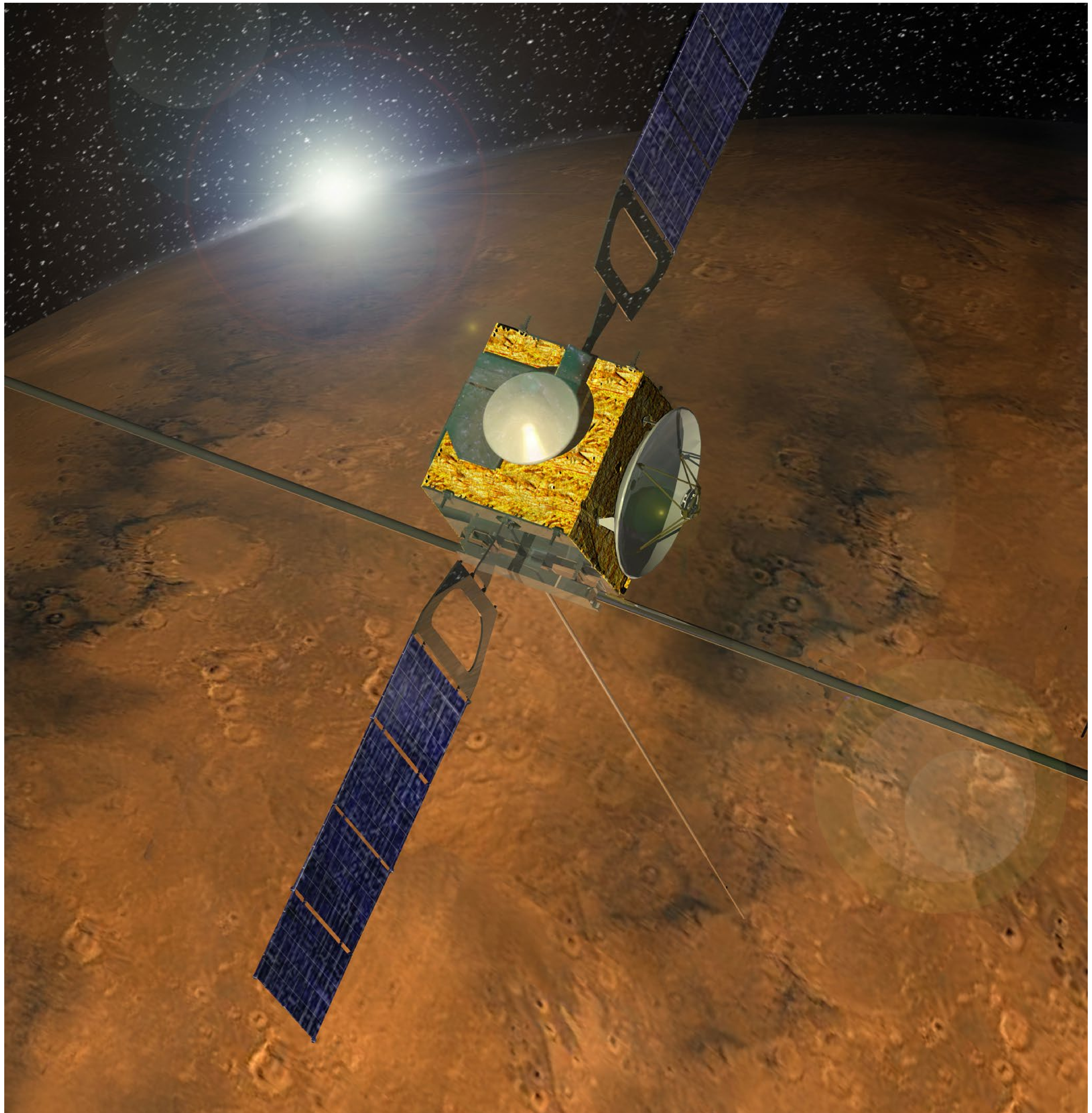
This long-duration mission had a delayed start: originally planned for launch on a Space Shuttle in May 1986, it was put on hold after the Space Shuttle Challenger accident in January of the same year. It subsequently was launched by Space Shuttle Discovery in October 1990, with Ulysses remaining in operation for nearly 19 years. Achievements included the first-ever measurements of the unexplored region of space above the Sun's poles, determination of the global properties and behaviour of solar winds, the study of energetic particles of solar and interplanetary origin, along with measurements of the magnetic field of the Sun and the heliosphere.



Exploring Saturn was the goal of an international mission called Cassini-Huygens, launched in 1997 aboard a U.S. Titan / Centaur rocket. Airbus predecessor Aérospatiale served as prime contractor for the Huygens atmospheric entry probe that landed on Saturn’s moon, Titan. Huygens was developed for the European Space Agency, and many engineering challenges had to be overcome in designing Huygens as the first probe to study a moon beyond the Earth's system.

Weighing approximately 318 kg, Huygens’ hard shell provided protection from high temperatures during the 2 hour and 27 minute descent through the Titan moon’s atmosphere after separating from the Cassini, which was in orbit around Saturn. Touching down on Titan’s surface in January 2005, Huygens made the first ever landing accomplished in the outer Solar system, as well as farthest landing from Earth ever performed by a spacecraft at the time, and the first landing on a moon other than the Earth’s own.

THE FAST TRACK TO MARS



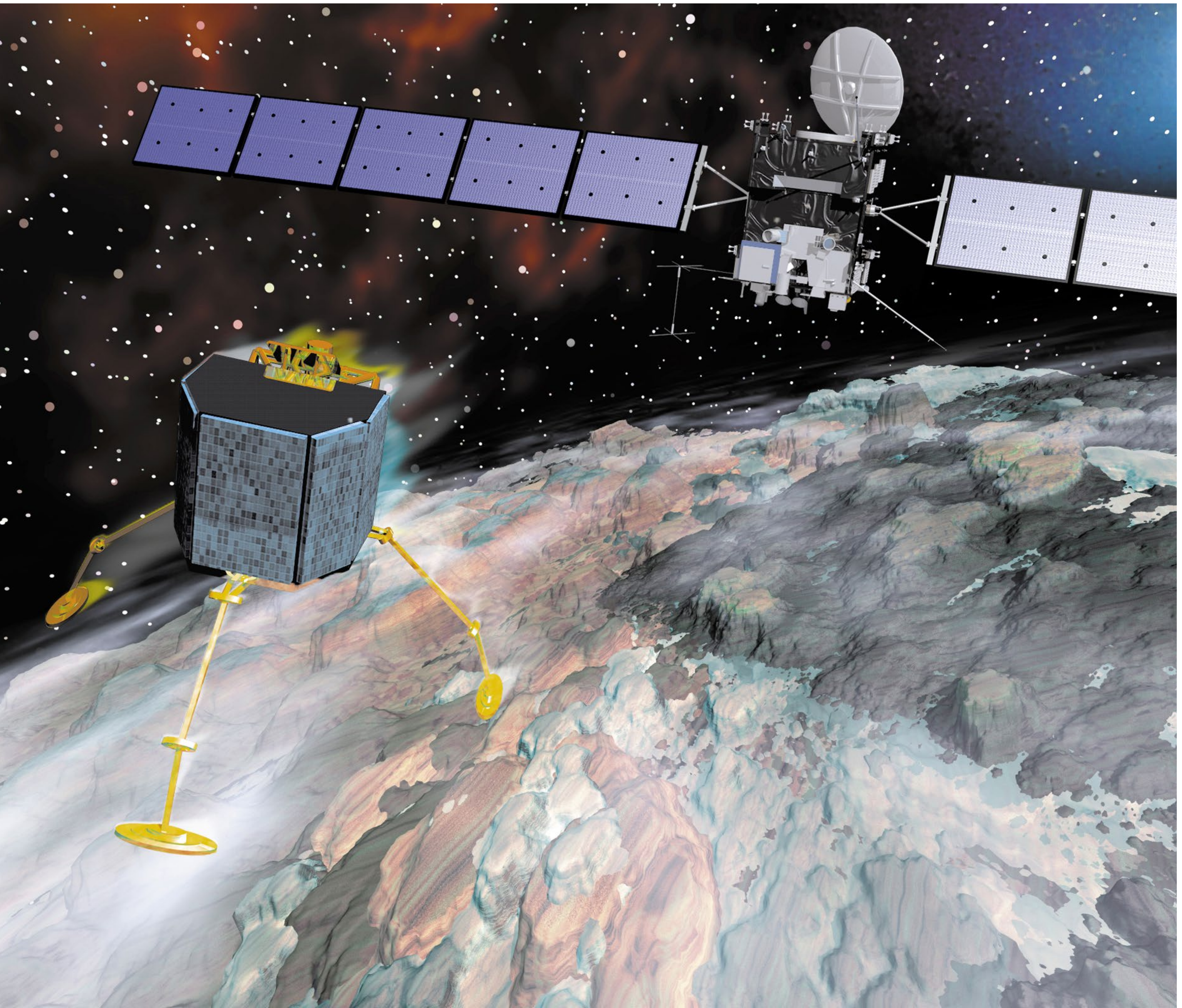
An Airbus-led team designed and built the Mars Express spacecraft, which lifted off in June 2003 from Kazakhstan's Baikonur Cosmodrome aboard a Soyuz rocket as Europe's first mission to the Red Planet. Mars Express' name refers to its rapid and streamlined development timeline and involved the European Space Agency's first visit to another planet in the Solar System.

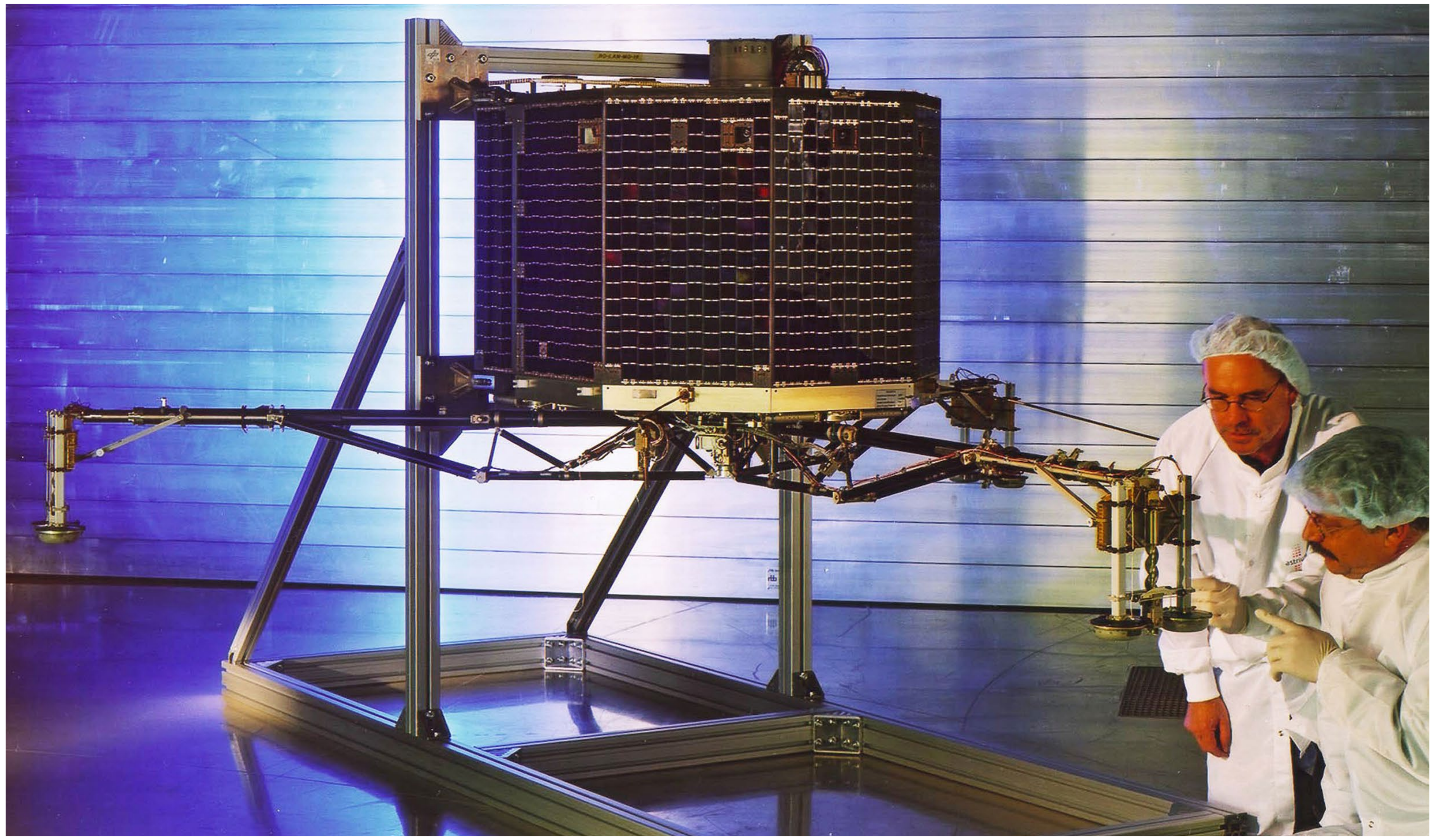
After arriving at Mars in December 2003, data from this 1,120 kg planetary orbiter helped answer fundamental questions about the geology, atmosphere, surface environment, history of water and potential for life on the planet. One of Mars Express' most significant finds came from its on-board "webcam," which captured 3D colour images of water ice and carbon dioxide ice in the planet's south polar region.

A European Space Agency mission that is helping to solve many cosmic mysteries – from neutron stars and enigmatic black holes to the formation of galaxies – was developed by Dornier as the prime contractor and is operating well beyond its initial mission duration. Called XMM-Newton, this Earth-orbiting satellite was launched aboard an Ariane 5 heavy-lift launcher from Kourou, French Guiana in December 1999 for a nominal operation of two years, with its useful mission now extended to 2026.

XMM-Newton was the most powerful X-ray telescope ever placed in orbit and set the record as the biggest scientific satellite ever developed and built in Europe. It had a launch mass of 3,800 kg, with an overall length of 10 m. The three-axis stabilised spacecraft features a very high pointing accuracy and incorporates three "mirror modules" with more than 170 wafer-thin cylindrical mirrors and a focal plane assembly carrying the science instruments. XMM-Newton is detecting more X-ray sources than any previous satellite.

A COMETARY ENCOUNTER





The Airbus-built Rosetta cometary mission for the European Space Agency can be summarised in a single word: spectacular.

Launched in 2004 aboard an Ariane 5 rocket, Rosetta embarked on a 10 year, six billion kilometre journey to reach comet 67P/ Churyumov-Gerasimenko. The spacecraft conducted extensive studies of the comet's nucleus and surrounding environment, observing gas and dust eruptions and tracking its activity during its orbit around the Sun. Rosetta also executed precision flights across the comet's night side to assess the plasma, dust, and gas interactions in this region, along with collecting dust samples.

In November 2014, Rosetta deployed the lander , achieving the first ever touchdown on a comet Although Philae operated for only 64 hours - having landed on its side in a shadowed crevice - it transmitted ground-breaking images and data from a comet, including the detection of a rich array of organic molecules, supporting the theory that comets are linked to the origins of life on Earth.

The mission concluded in September 2016, with Rosetta performing a controlled descent onto the comet's surface. Its legacy endures through a wealth of scientific data that continues to advance research and understanding of cometary science.

BILLIONS OF STAR IMAGES WITH GAIA

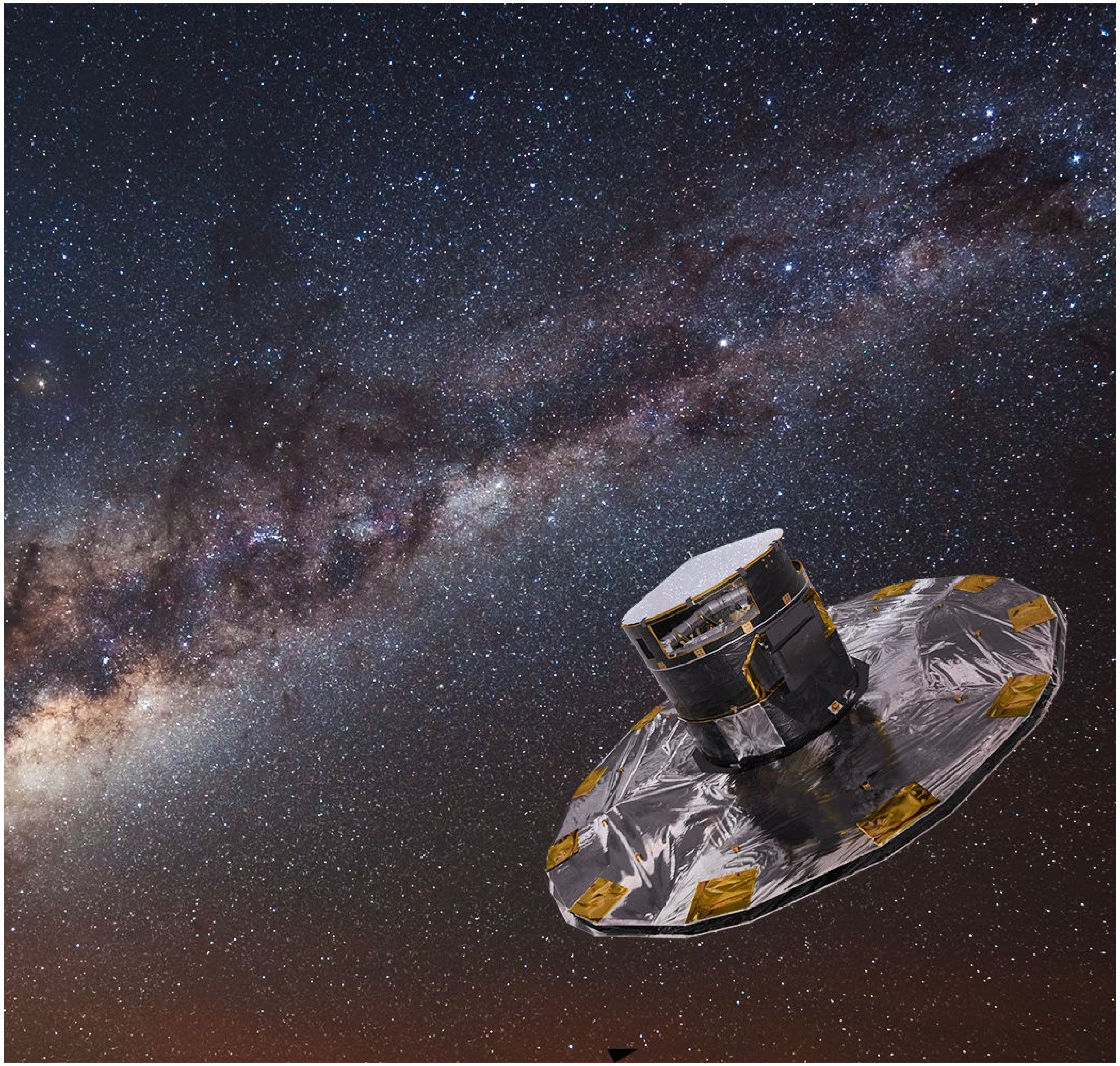
The ambitious goal of Gaia, an Airbus-designed and -built space surveyor for the European Space Agency, was to compile a 3D space catalogue of more than 1,000 Million stars, or approximately roughly 1% of the stars in the Milky Way. With its name derived from mother Earth in Greek mythology, Gaia is a cornerstone space astrometric mission for the European Space Agency. Despite some performance challenges, this spin-stabilised spacecraft has taken more than 150 Billion images, including star pictures and spectra.

Launched from French Guiana aboard a Soyuz-Fregat rocket in December 2013, Gaia's trajectory took it to the Lagrange point L2 (situated 1.5 Million km behind the Earth), where data returned by the spacecraft is helping scientists solve the mystery of stellar evolution and star formation. Gaia is also providing new insights into the origin and formation history of the Milky Way.

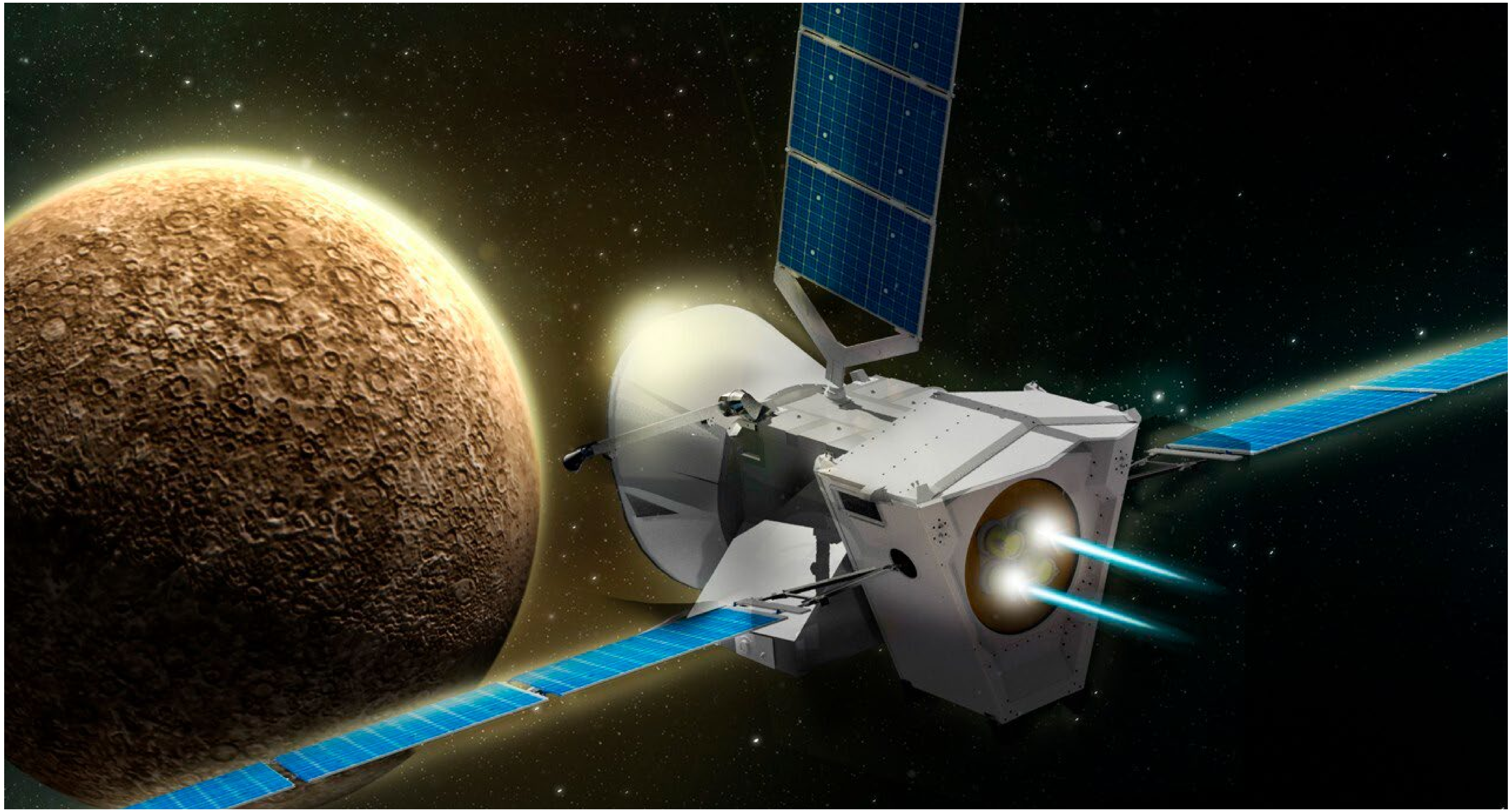
To ensure that Gaia would be able to face the rigours of space travel, Airbus created the largest instrument ever built fully in silicon carbide for this mission. Airbus used expertise gained from silicon carbide telescopes on the Herschel telescope and the Aladdin instrument for the European Space Agency's wind satellite Aeolus, as well as on three Earth observation satellites.

Another cutting-edge Airbus-designed and -built spacecraft is the LISA Pathfinder, a European Space Agency technology demonstrator mission for one of the most ambitious scientific undertakings to date: proving key elements of Einstein's theory of general relativity. With Airbus' UK space operation as prime contractor, engineers in Stevenage were responsible for designing and building the overall system and platform, effectively creating a spacecraft capable of managing its own gravitational, magnetic and thermal environment. This enabled two test masses of identical gold and platinum cubes to be put in a near-perfect gravitational free-fall and control, allowing measurements of their motion with unprecedented accuracy within a delicate instrument shielded from all disturbances except gravity.

LISA Pathfinder was launched from French Guiana ona Vega rocket in December 2015 and operated from March 2016 to June 2017 in orbit around the first Sun-Earth Lagrange point L1, a region of thermal and gravitational stability. By paving the way for future missions by flight-testing the concept of gravitational wave detection from space, the LISA Pathfinder mission was honoured with the 2017 Space Technology Award of the American Astronautical Society.



A TRIP TO PLANET MERCURY WITH JAPAN



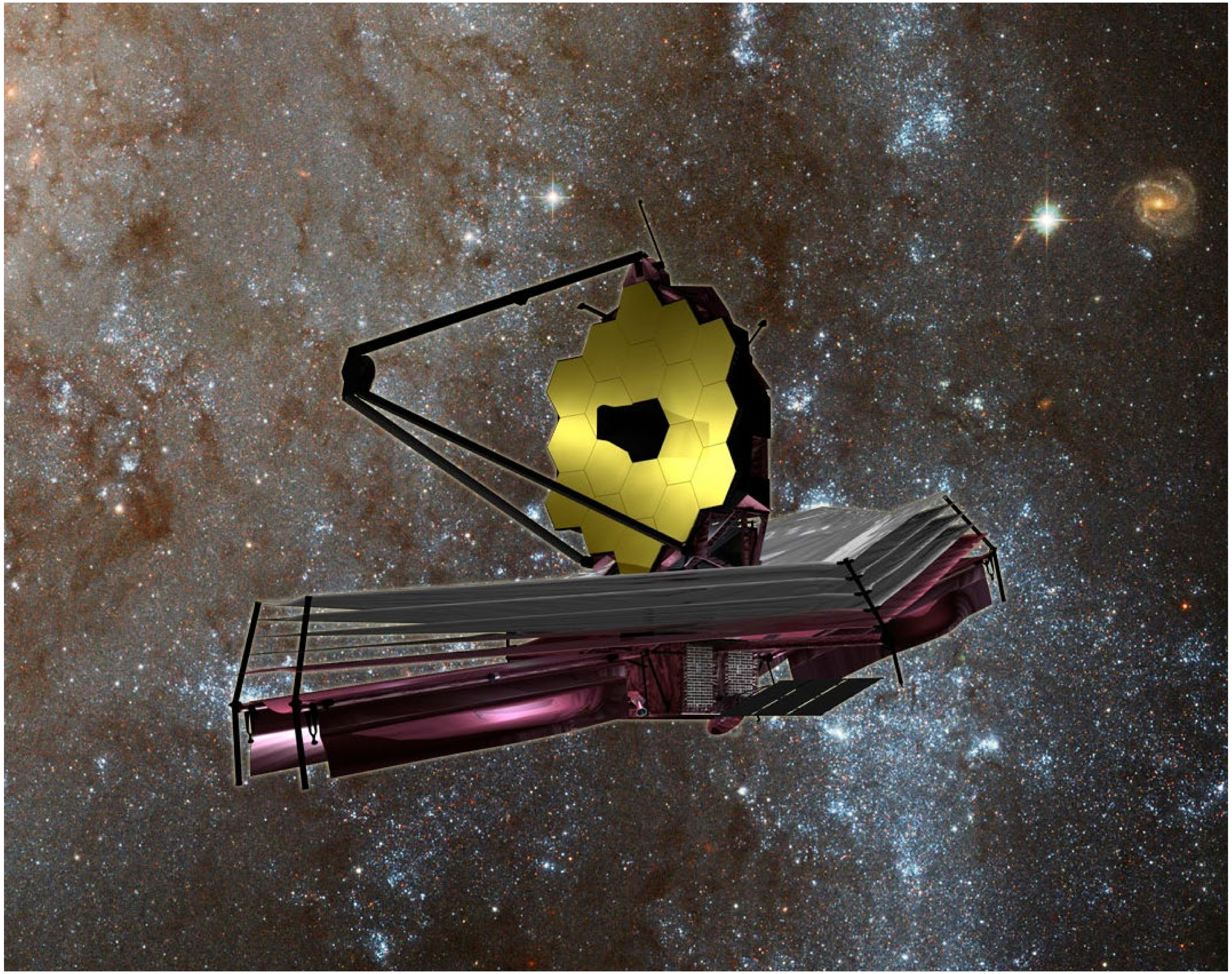
Airbus played an important industrial role in BepiColombo, a mission of the European Space Agency and the Japan Aerospace Exploration Agency (JAXA) to research Mercury, the solar system's smallest and least-explored terrestrial planet. Airbus is responsible for the system design and building of three BepiColombo spacecraft elements: the Mercury Planetary Orbiter (MPO), a three-axis stabilised spacecraft tasked to study the planet's surface and internal composition; the Mercury Transfer Module (MTM), providing solar-electric propulsion on the mission's trajectory to Mercury; and the sunshield and interface structure for the Japanese-built Mercury Magnetospheric Orbiter (MMO).

BepiColombo will provide valuable data on Mercury´s internal structure, the generation of its magnetic field, as well as its interactions with the Sun and solar winds. The mission also aims to study Mercury's surface features and chemistry, including the presence of ice in permanently-shadowed craters at the poles. These investigations are expected to significantly enhance our understanding of the Solar System's formation and the evolution of planets close to their parent stars. Launched aboard an Ariane 5 rocket from French Guiana in October 2018, the 4,081 kg spacecraft is on its 7 year journey through space. It is set to be captured by Mercurian gravity in late 2025, initiating a one-year period of scientific operations.

CHEOPS

ESA's CHEOPS (CHaracterising ExOPlanet Satellite) is the first mission dedicated to studying bright, nearby stars that already are known to host exoplanets, in order to make high-precision observations of the planet's size as it passes in front of its host star.

The satellite is based on Airbus' AstroBus platform. Launched on 18 December 2019 from Europe's Spaceport in French Guiana, the cover of the telescope was first opened in January 2020 and CHEOPS took its first light image in February 2020. In April 2020, the telescope began science operations.



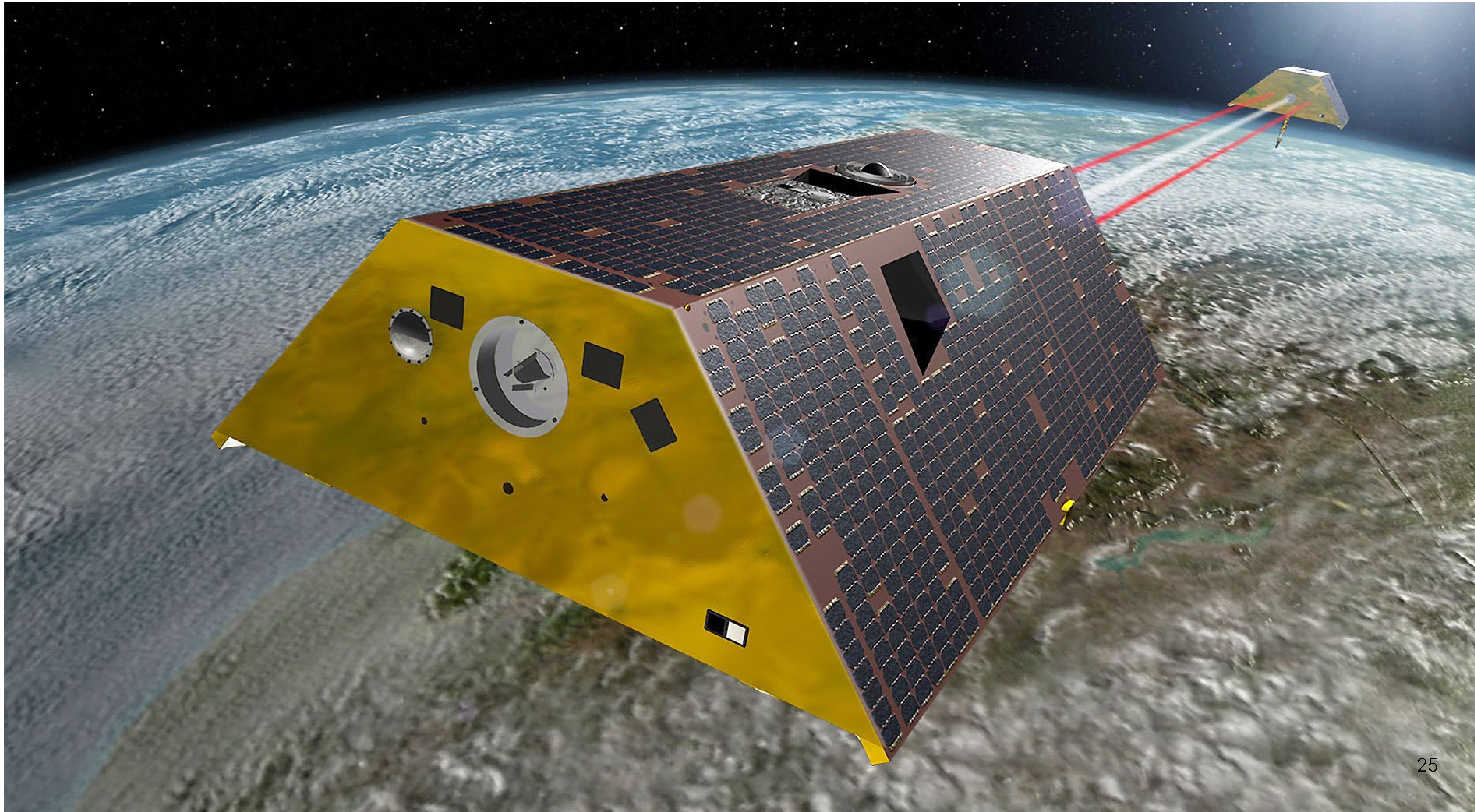
JAMES WEBB

NASA, ESA, and the Canadian Space Agency (CSA) collaborated to develop the James Webb Space Telescope, which served as the successor of the legendary Hubble Space Telescope. The James Webb Space Telescope's payload module, known as OTIS (Optical Telescope Element and Integrated Science), included two European instruments with major Airbus contributions: the near-infrared spectrograph NIRSpec (built by Airbus) and the mid-infrared instrument MIRI (built with Airbus support). James Webb was launched on 25 December 2021 and orbits the Sun 1.5 Million km away from the Earth at what is called the second Lagrange point or L2.

TRACKING EARTH'S WATER MOVEMENT WITH GRACE

Launched in 2002, GRACE (Gravity Recovery and Climate Experiment) was a joint U.S. NASA / German DLR mission with the primary objective to measure Earth's gravity field and its time variability with unprecedented accuracy. The secondary goal was to obtain approximately 150 very precise globally-distributed vertical temperature and humidity profiles of the atmosphere per day using a GPS occultation technique.

The GRACE mission ended in 2017, having lasted three-times longer than originally planned. GRACE was succeeded by the 2018 launch of GRACE-FO (GRACE Follow-On), which uses near-identical hardware.



MONITORING AND UNDERSTANDING EARTH

AIRBUS PROVIDES A NEW LOOK AT THE WORLD

FROM ERS TO METOP

COVERAGE WITH METOP-SG AND SENTINEL

PUTTING EARTH “ON THE SPOT”

EXPERTISE FOR INTERNATIONAL COOPERATION

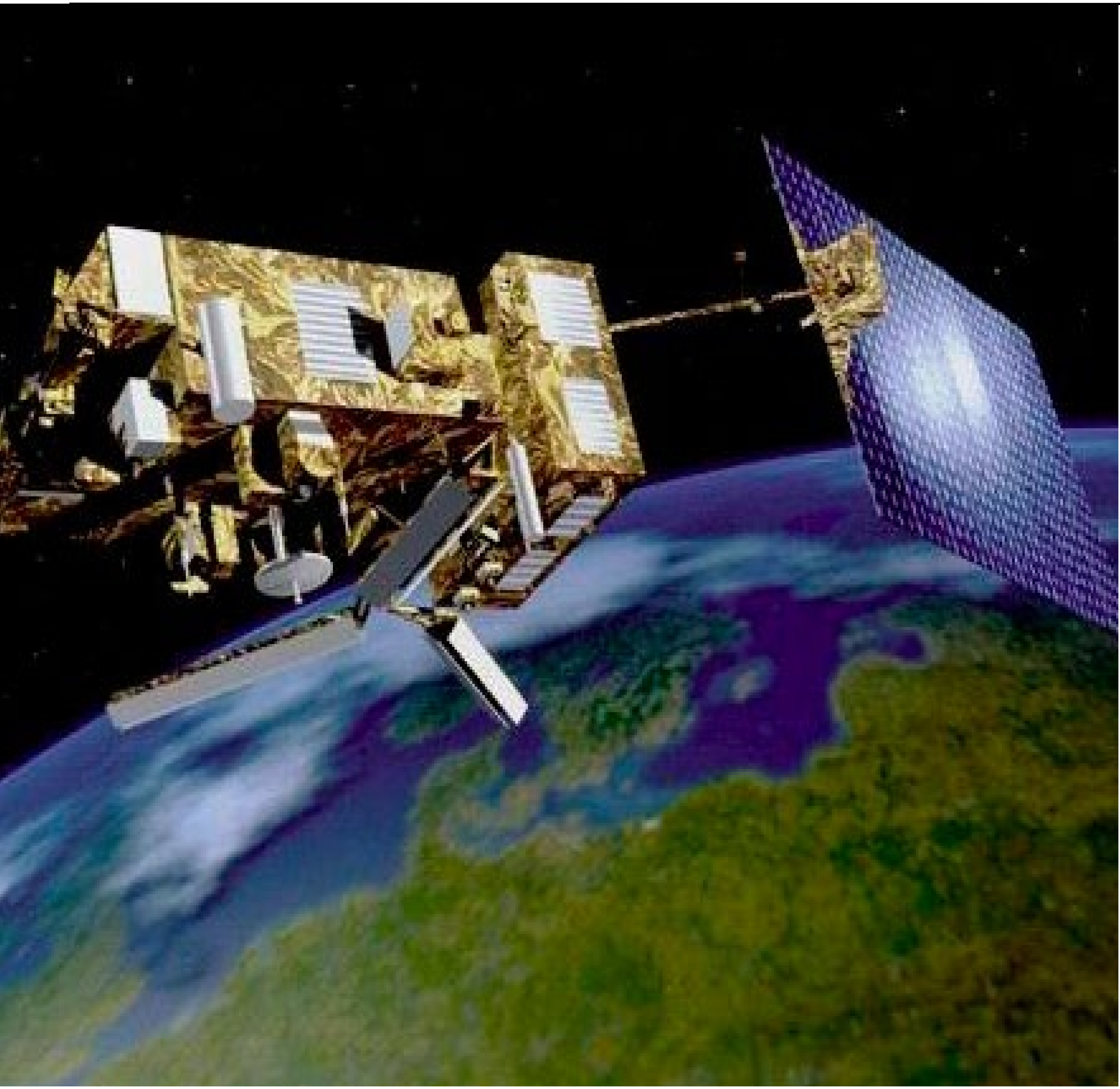
AIRBUS PROVIDES A NEW LOOK AT THE WORLD

With over 70 Earth observation satellites launched since 1986, Airbus is a supplier of choice for European institutions and customers around the world. The satellites have demonstrated an excellent level of mission success and many remain in orbit well beyond their originally scheduled engineering lifetimes.

Among the cornerstone Earth observation missions is Meteosat, the first European weather satellite and the basis for Airbus' competence in meteorological platforms. Built by an industrial consortium, the prototype Meteosat-1 was launched in November 1977 on a U.S. Delta rocket, followed by six others that were orbited by Ariane launchers between 1981 and 1997.

Meteosat's origins came from the European Space Research Organisation (today ESA), which funded studies of Meteosat applications, which introduced a global system of geostationary platforms capable of observing the atmospheric circulation and weather around the equator in near real-time. In September 1972, ESRO officially adopted the Meteosat programme and the first prototype Meteosat was launched 5 years later. To ensure the long-term continuity of Meteosat, a convention establishing the EUMETSAT organisation was agreed in 1983, creating a specialised operational agency for managing meteorological satellites and their data.

The spin-stabilised Meteosat satellites had a liftoff mass of approximately 280 kg and operated from a geostationary orbit of 36,000 km. The satellites transmitted detailed images back to Earth every 30 minutes. In addition to capturing data on cloud cover and weather fronts, their infrared imagery was used to monitor atmospheric temperatures and the distribution of water vapour. This information provided meteorologists with a comprehensive 3D global view of the planet's weather patterns.



FROM ERS TO METOP

The European Remote Sensing satellite (ERS) was the European Space Agency's first Earth-observing satellite programme in a polar orbit, developed by Airbus predecessor companies Dornier (as prime contractor) and Matra (for the satellite bus). With launches on Ariane rockets from French Guiana in July 1991 and April 1995, these three-axis-stabilised satellites were the most sophisticated Earth observation platforms spacecraft developed and launched by Europe at the time.

ERS satellites were equipped with a Synthetic Aperture Radar (SAR), a high-resolution, wide-swath imaging radar providing high-quality images of the oceans, coastal zones, polar ice and land regions in all weather conditions, both day or night. Europe’s next step was the MetOp (Meteorological Operational satellite) programme, for which Airbus was prime contractor and provided the instruments. It comprises three polar-orbiting spacecraft that circle the Earth at an altitude of 830 km and complete an orbit around the globe in 100 minutes.

As their orbits are 42-times closer to Earth than geostationary weather satellites, observation data provided by MetOp platforms are much more detailed, enabling more precise weather forecasting, better prediction of natural disasters, and enhanced measurements for issues such as climate change, the progressive melting of polar ice and the rise in sea levels. The three-axis-stabilised MetOp spacecraft, weighing in the 4,000 kg class at liftoff, were developed in a joint undertaking between the European Space Agency (ESA) and EUMETSAT, carrying 10 to 12 instruments.

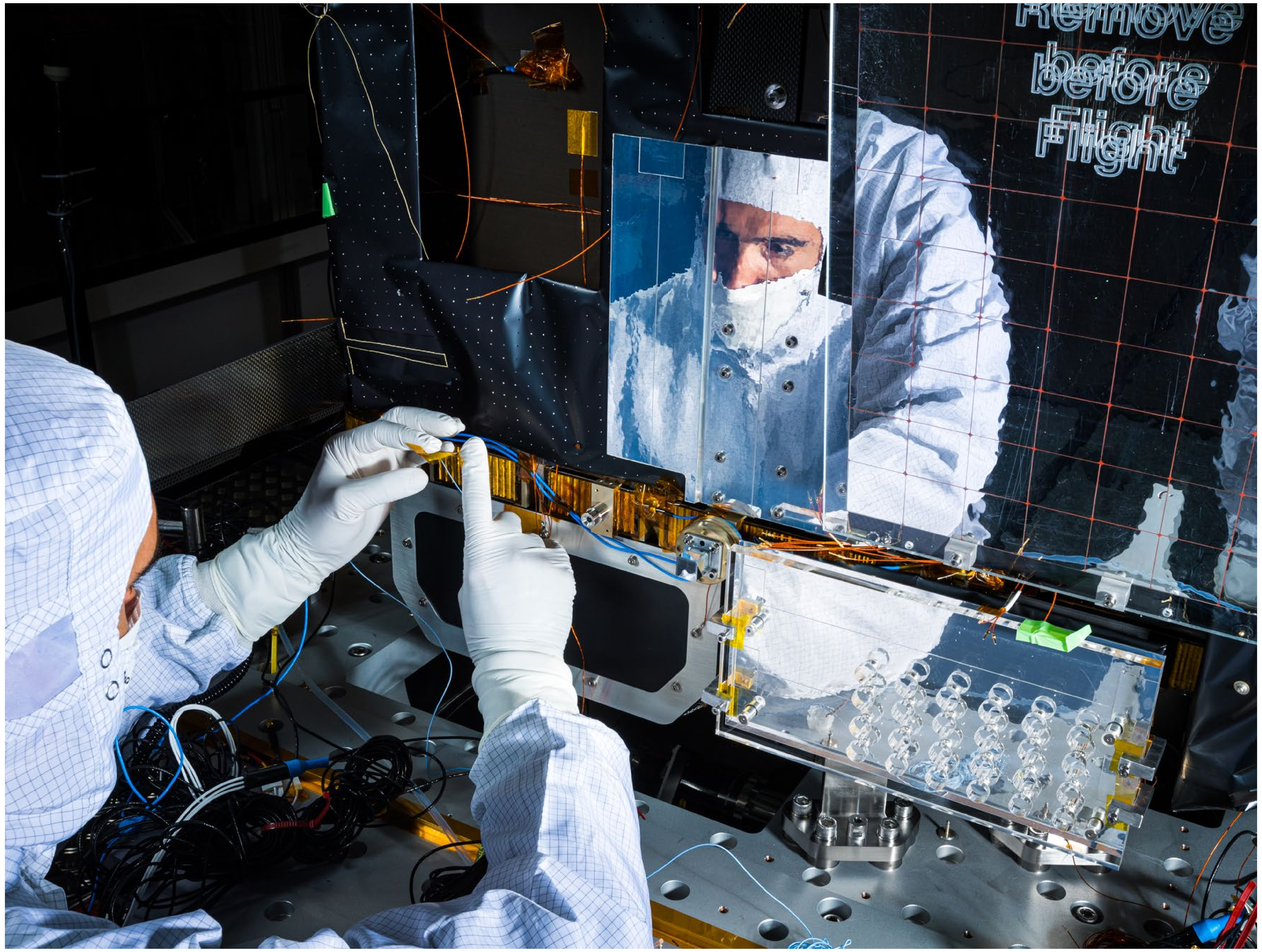
Metop-A was launched in October 2006 aboard a Soyuz rocket from the Baikonur Cosmodrome in Kazakhstan, followed by the launch of Metop-B in September 2012 also on a Soyuz rocket from Baikonur and Metop-C in November 2018 with Soyuz from French Guiana. Together, these satellites comprise the space segment of the overall EUMETSAT Polar System (EPS).

COVERAGE WITH METOP-SG AND SENTINEL

In October 2014, Airbus was selected to design and build the second-generation MetOp satellites (MetOp-SG), which consist of two satellite types: Series A and Series B, with three units in each series. To be launched from 2025, MetOp-SG programme will further improve weather forecasting and climate research. The MetOp-SG Satellite A series incorporates optical instruments and atmospheric sounders (with a liftoff mass of approximately 4,000 kg), while the Satellite B series carries microwave instruments, having an estimated liftoff mass of 3,818 kg.

Europe's most ambitious Earth observation programme to date is called Copernicus (previously known as GMES Global Monitoring for Environment and Security). Headed by the European Commission in partnership with the European Space Agency, it is designed to provide important information in six key areas: land monitoring, marine environment monitoring, disaster and crisis management, monitoring the Earth's atmosphere, climate change monitoring, and security.

Airbus is playing a key role in constructing the programme's satellites as well as their instruments.



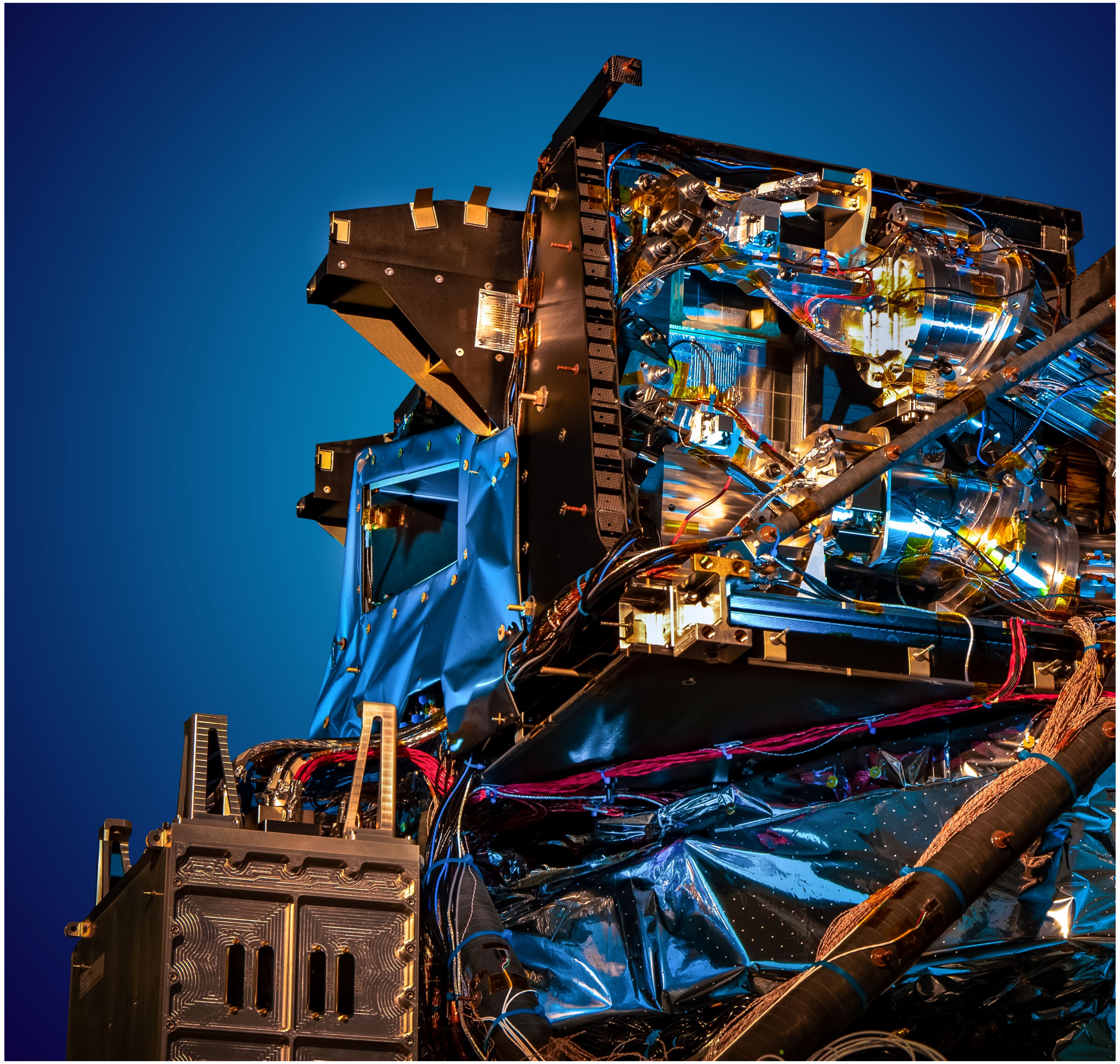
The first generation of this family of satellites is called the Sentinels and Airbus' responsibilities for the Sentinel spacecraft include:

- Developing and building the radar instrument for Sentinel-1
- Prime contractor for Sentinel-2 and supplying a spectral mode observation instrument,
- Designing and building the microwave radiometer (MWR) for Sentinel-3,
- Prime contractor for the two spectrometers on Sentinel-4,
- Designing and building the satellite and instrument for the Sentinel-5 Precursor (5P),
- Prime contractor for the Sentinel-5 imaging spectrometer, and
- Prime contractor for Jason-CS/Sentinel-6.

MONITORING AND UNDERSTANDING EARTH: Coverage with MetOp-SG and Sentinel

Accurate and timely information provided by the Copernicus programme began with the all-weather, day and night radar data from Sentinel-1A and Sentinel-1B, launched in April 2014 and April 2016, respectively. Sentinel-2A, launched in June 2015, delivers high-resolution optical images for land services, while its twin Sentinel-2B was launched in March 2017. A pair of Sentinel-3 satellites, launched in February 2016 and April 2018, provide essential data for ocean and land monitoring services., Sentinel-5 Precursor (Sentinel-5P), launched in October 2017, ensures the continuity of ozone hole monitoring and tropospheric pollution tracking. Sentinel-6A, launched in November 2020, performs high-precision measurements of ocean surface topography.

The Sentinel satellites benefit from Space Data Highway services provided by Airbus. Equipped with optical communication terminals from Airbus subsidiary TESAT GmbH, Sentinel-1 and Sentinel-2 rapidly transmit time-critical and large volumes of data to Earth monitoring centres, significantly enhancing data delivery speed and operational efficiency.



In 2020, ESA approved six additional missions to expand the capabilities of the Copernicus programme. Airbus has a key role in three of these missions. The two Airbus-built CRISTAL spacecraft will monitor sea-ice thickness and overlying snow depth using dual-frequency radar altimeter and microwave radiometer technology from Airbus. The data will support maritime operations in polar oceans and contribute to a better understanding of climate processes. CRISTAL will also support applications related to coastal and inland waters and the observation of ocean topography.

The Land Surface Temperature Monitoring (LSTM) mission will help farmers achieve sustainable agricultural production at field-scale in a world of increasing water scarcity. The two satellites will be able to identify the temperatures of individual fields and image the Earth every three days at 50 m resolution. Airbus is prime contractor for this next generation satellite, including its high spatial-temporal resolution thermal infrared sensor.

Since longer L-band signals can penetrate through many natural materials, such as vegetation, dry snow and ice, the ROSE-L mission will complement the information gathered by the Copernicus Sentinel-1 C-band radar mission, supporting forest management, precision farming, food security and ocean monitoring. The radar antenna will be the largest planar antenna ever built measuring an impressive 11 m by 3.6 m.

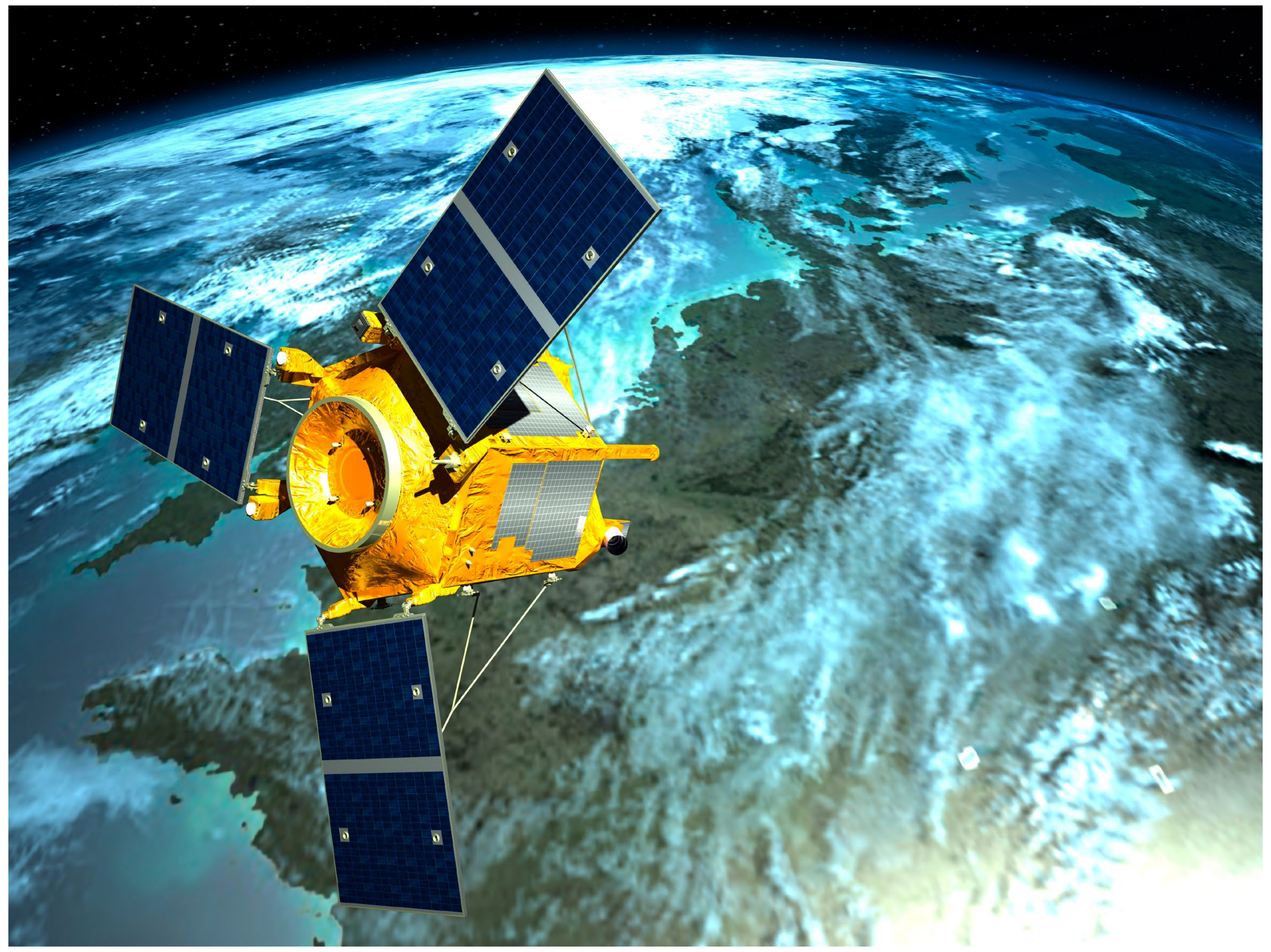
Space Data Highway

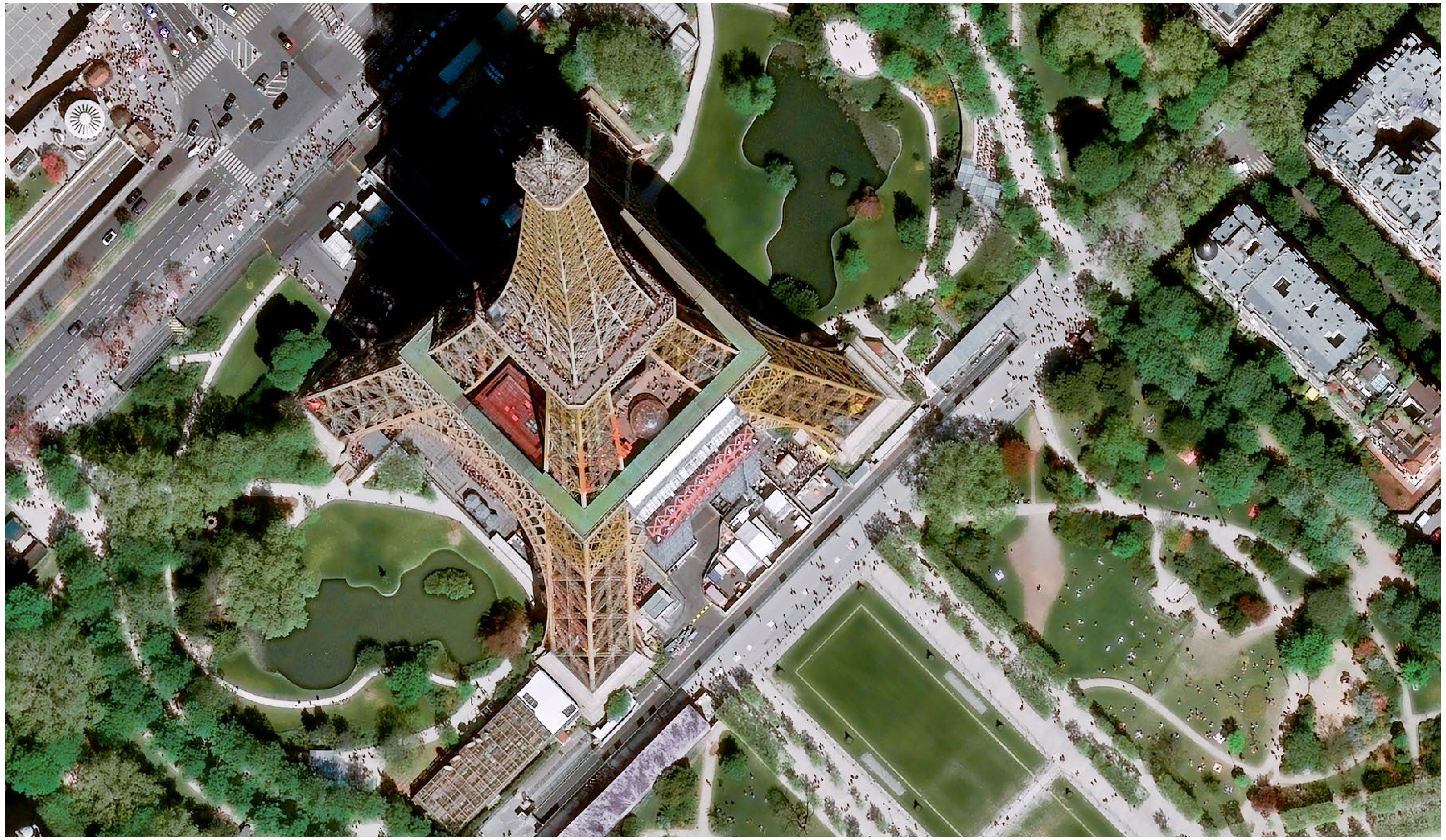
The European Data Relay System (EDRS), also known as the Space Data Highway, is a cutting-edge communication network developed through a partnership between the European Space Agency (ESA), Airbus, and Airbus subsidiary TESAT GmbH. It leverages advanced laser technology to deliver near-real-time data from low-Earth orbit (LEO) satellites to Earth. The system consists of two geostationary satellites, EDRS-A and EDRS-C (launched in 2016 and 2019 respectively), positioned at 36,000 km altitude, along with a network of European ground stations. By maintaining a continuous field of view over LEO satellites and a permanent connection to ground stations, EDRS eliminates traditional delays of up to 90 minutes caused by the need for direct line-of-sight to ground stations.

The Space Data Highway strengthens Europe's autonomy and leadership in space-based laser communication. By enhancing disaster management and emergency response capabilities, EDRS is a vital component of Europe's space infrastructure, ensuring resilience, reliability, and technological advancement.

PUTTING EARTH "ON THE SPOT"

The SPOT series of polar-orbiting satellites traces its origins to Airbus predecessor company Matra, and set new standards for commercial high-resolution optical imaging of the Earth. Over the years, the SPOT satellites incorporated enhanced features, with launches spanning from February 1986 (SPOT 1) through June 2014 (SPOT 7). The SPOT system includes a series of satellites and ground resources for satellite control and programming, image production, and distribution, all supported by Airbus. With SPOT 6 and SPOT 7, Airbus ensured mission continuity of its SPOT series. Today, users have access to a vast archive of high-resolution imagery collected over the past decade, spanning billions of km² and offering unique historical insights.





The "twin" SPOT 6 and SPOT 7 satellites incorporated technological improvements and advanced system performance, increasing reactivity and acquisition capacity, as well as simplifying data access. SPOT 6 and SPOT 7 operate in the same orbit with the very-high-resolution Pléiades 1A and Pléiades 1B spacecraft as a four-satellite constellation, providing an optimum combination of detail and broad coverage.

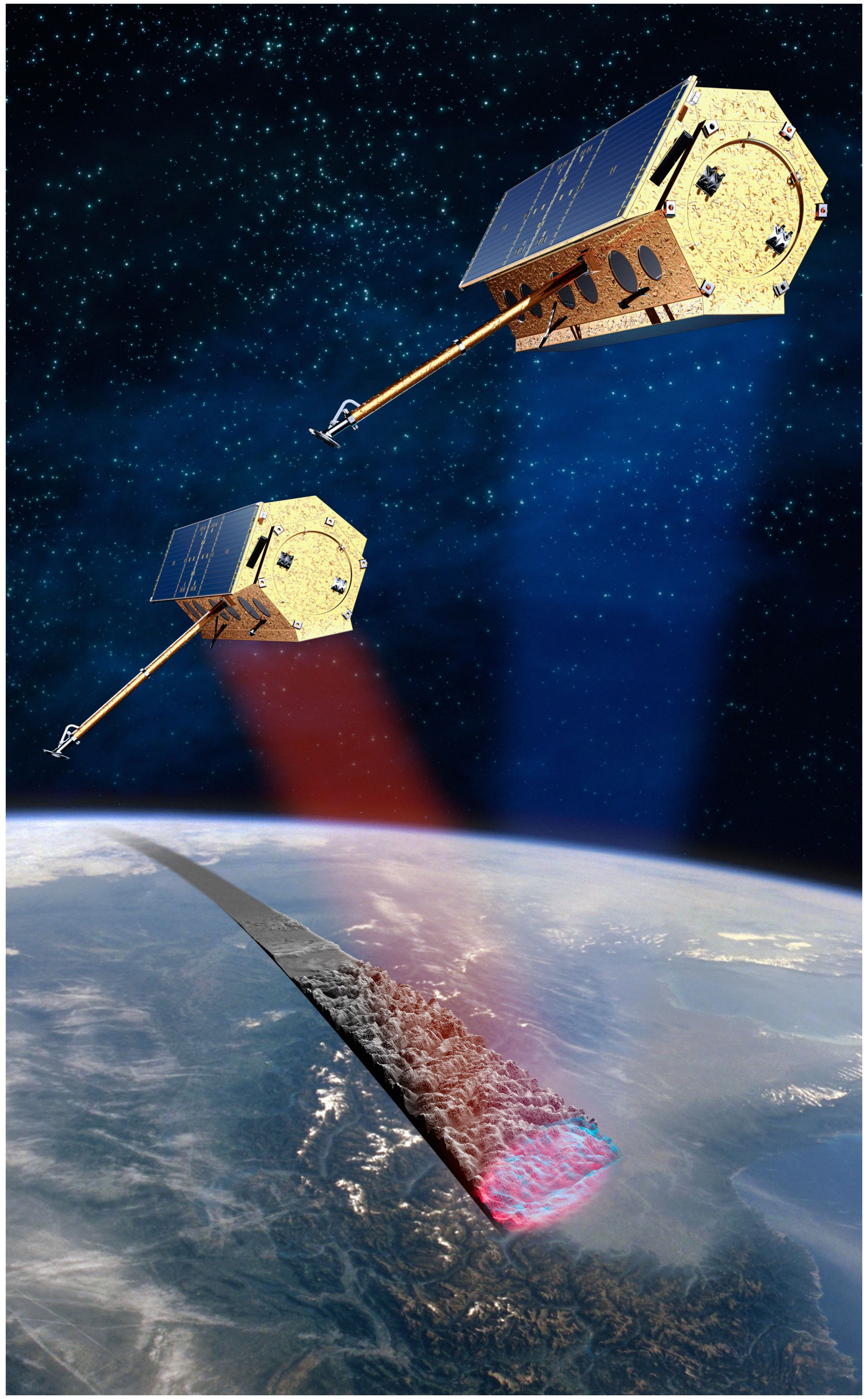
MONITORING AND UNDERSTANDING EARTH: Putting Earth "On the SPOT"

The Pléiades 1A and Pléiades 1B programme was initiated in October 2003 with the French space agency CNES as overall system prime contractor and Airbus predecessor EADS Astrium acting as the prime contractor for the space segment. This initiative resulted in the first commercially available European satellite capable of acquiring sub-meter resolution imagery. The Pléiades satellites were launched in December 2011 and December 2012 with a Soyuz rocket from French Guiana.

In September 2016, Airbus announced the creation of its own very high resolution Pléiades Neo optical satellite constellation programme. The Pléiades Neo satellites, fully funded, manufactured, owned, and operated by Airbus, represent a groundbreaking advancement in Earth observation. Designed to serve commercial, institutional, and governmental customers, this state-of-the-art optical constellation offers unparalleled capabilities. Comprising two identical 30 cm resolution satellites phased 180° apart in orbit, Pléiades Neo provides global revisit capabilities, enabling coverage of any location at least twice daily. Each satellite captures 500,000 km² of imagery daily. The first satellite was launched from French Guiana in April 2021, closely followed by the second one in August of 2021.

The Disaster Monitoring Constellation (DMC) provides rapid repeat coverage of the largest countries, regions, and even entire continents. The constellation consists of a number of remote sensing satellites constructed by Airbus subsidiary,Surrey Satellite Technology Ltd (SSTL), and operated for the Algerian, Nigerian, Turkish, British and Chinese governments by DMC International Imaging. It can acquire multispectral imagery with a resolution of 22 - 24 m and panchromatic imagery at 12 m.

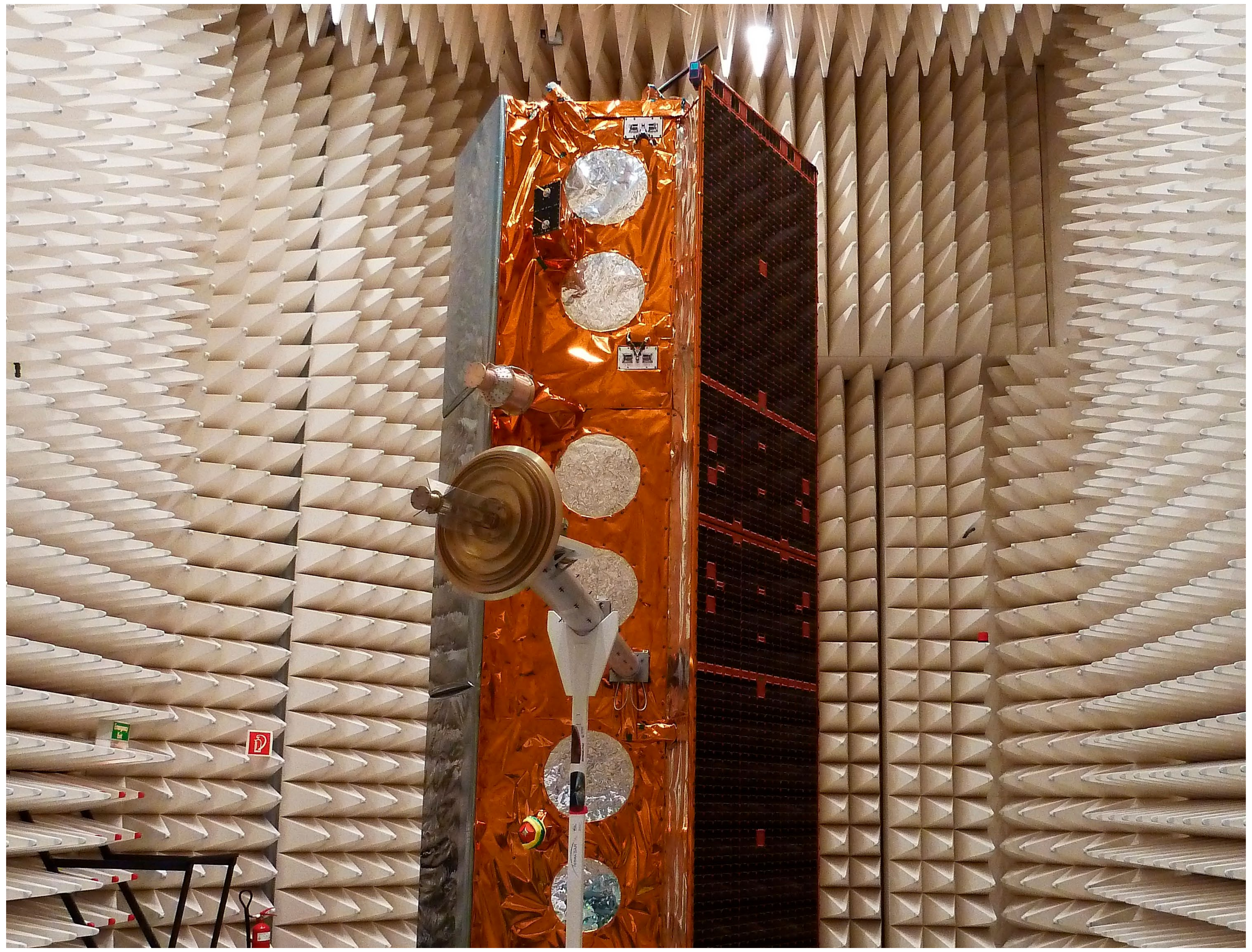
Developed and built by Airbus subsidiary, Surrey Satellite Technology Limited (SSTL), Vision-1 offers orthorectified products with resolution up to 87 cm in panchromatic mode and 3.48 m in multispectral mode as standard. These technical specifications make it particularly suited for applications in defence, security, and agriculture. Launched in September 2018 alongside NovaSAR, Vision-1 enables new opportunities for applications that combine optical and radar satellite imagery, opening the door to innovative solutions across various industries.



Revolutionising Earth Observation: Airbus Radar Earth observation legacy

Airbus in Germany has firmly established itself as a global leader in Synthetic Aperture Radar (SAR) technology, contributing to groundbreaking spaceborne missions that have revolutionised Earth observation and radar imaging. The journey began in 1994 with the Shuttle Imaging Radar (SIR-C/X-SAR) mission, a collaborative effort between NASA, the German Space Agency (DLR) and the Italian Space Agency, Agenzia Spaziale Italiana (ASI). The X-SAR radar instrument was developed and built by Airbus predecessor company Dornier / Daimler-Benz Aerospace and the Italian company Alenia Spazio (today TAS-I). This mission offered unprecedented insights into the Earth's surface and highlighted SAR's versatility and practical applications in both scientific and operational domains.

Building on this success, Germany played a crucial role in the Shuttle Radar Topography Mission (SRTM) in 2000. Utilising advanced X-band SAR, the mission produced the first near-global, high-resolution digital elevation models (DEMs). These models revolutionised cartography and supported critical applications such as flood risk assessment, urban planning, and environmental monitoring.



In June 2007, the launch of TerraSAR-X, Germany's first national radar satellite, marked a significant milestone. TerraSAR-X was developed and built under a Public-Private Partnership between the German Space Agency DLR and Airbus predecessor EADS Astrium. TerraSAR-X delivered very high-resolution imagery for diverse applications ranging from natural disaster assessment to maritime surveillance and climate change monitoring, showcasing the versatility of SAR for scientific, governmental, and commercial use.

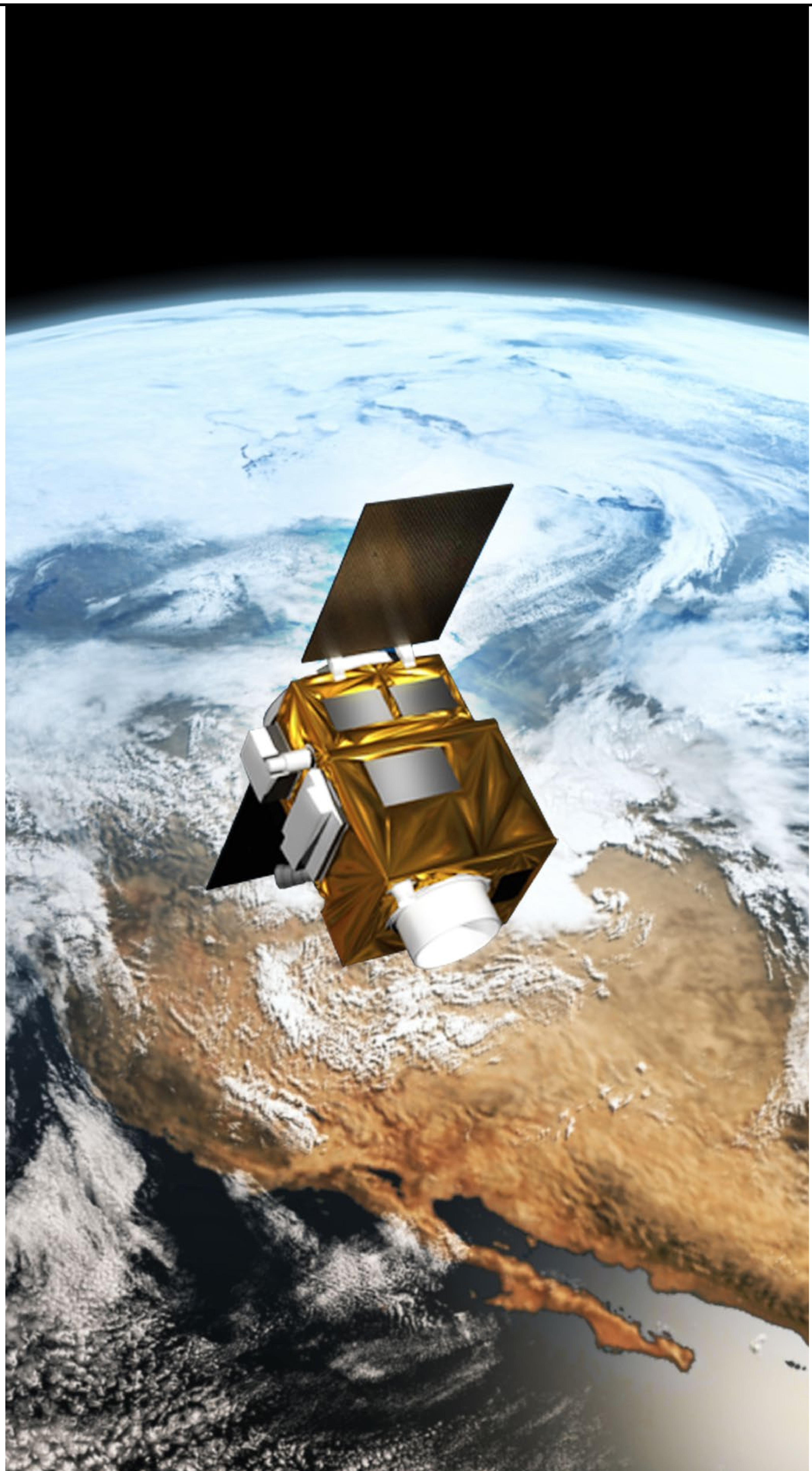
In 2010, Airbus further advanced its SAR capabilities with the launch of TanDEM-X, which operated in tandem with TerraSAR-X to form the world's first bistatic SAR satellite constellation. This innovative system produced highly accurate 3D models of the Earth's surface, creating a global Digital Elevation Model (DEM), named WorldDEM, with unparalleled precision, accuracy and coverage. The data became a cornerstone resource for industries, governments, and researchers worldwide.

MONITORING AND UNDERSTANDING EARTH: Putting Earth "On the SPOT"

The Airbus-built SARah-1 next-generation reconnaissance satellite for the German Bundeswehr was launched in 2022. As the successor system, it replaced the SAR-Lupe system and offers significantly enhanced capabilities with its active phased array antenna for fast and flexible radar imaging. Airbus led the development of the radar technology, launch, calibration, and operational readiness of the satellite, demonstrating its continued technological leadership in SAR.

In 2018, Spain's first radar satellite, PAZ, joined the Airbus SAR constellation, operating alongside TerraSAR-X and TanDEM-X. Built by Airbus in Spain, PAZ provides continuous high-resolution radar data for environmental monitoring, urban planning, crisis response, and other critical applications, while also supporting the European Union's Copernicus Earth monitoring programme.

In February 2014, Airbus secured a contract to deliver the radar antenna and electronics for South Korea's Kompsat-6 Earth observation satellite. Kompsat-6, designed to replace its predecessor from 2019 onward, featured enhanced capabilities, including various operational modes (SpotLight, StripMap, and ScanSAR), dual polarisations, and sub-meter resolution.



EXPERTISE FOR INTERNATIONAL COOPERATION

Airbus is recognised as a leading provider of Earth observation satellite expertise in Europe, making it a preferred supplier for an increasing number of international customers. A notable example is the Vietnamese VNREDSat-1 programme, awarded by Vietnam in 2010. Airbus developed a comprehensive system including an optical satellite capable of capturing images with a resolution of 2.5 m and the associated ground control, image receiving and processing stations. The objective was to create a space system enabling Vietnam to better monitor and study the effects of climate change, predict and take measures to prevent natural disasters, and to optimise the management of its natural resources.

Designed and developed by Airbus in partnership with the French CNES space agency, the 150 kg satellite was placed in a Sun-synchronous orbit in May 2013 by a Vega launcher from French Guiana.

KazEOSat -1 and KazEOSat-2 are the first Earth observation satellites for Kazakhstan. Built by Airbus, KazEOSat-1 was launched into Sun-synchronous orbit in April 2014 from French Guiana on a Vega launch vehicle for operation by Kazakhstan Gharysh Sapary, a division of Kazcosmos. Based on Airbus' AstroBus-L platform, the 830 kg high-resolution KazEOSat-1 provides a complete range of civil applications in Kazakhstan, such as monitoring natural and agricultural resources, the gathering of mapping data and providing support for rescue operations in the event of natural disasters. As a follow-on, the medium-resolution KazEOSat-2 was built by Airbus subsidiary SSTL and orbited as a 177 kg payload in June 2014 on a Dnepr launcher from Dombrowski in Russia.

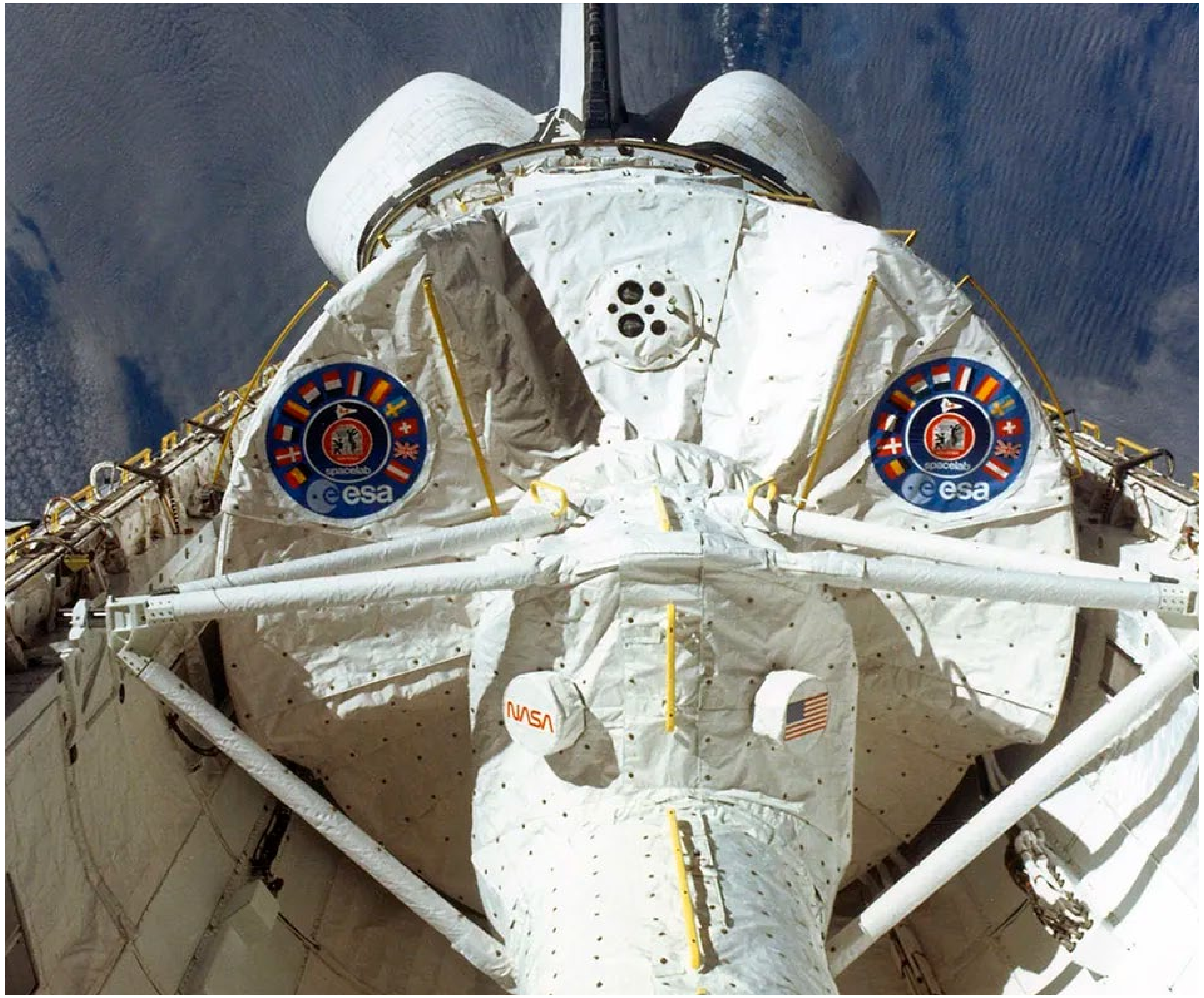
PerúSAT-1 is a 430 kg satellite built by Airbus in record-time for the Peruvian Space Agency, CONIDA. The programme's rapid pace was made possible by the creation of the "Projects Factory©," a new and highly integrated working organisation in Airbus' Space System business unit, which reduced development and construction lead times for 500 kg satellites, while optimising costs and schedule delivery, all without impacting quality. PerúSAT-1 was placed in polar orbit by a Vega rocket from French Guiana in September 2016.

TAKING HUMAN SPACEFLIGHT TO NEW HEIGHTS

50-PLUS YEARS OF EXPERTISE

Airbus has played a key role in human spaceflight, starting with the Spacelab re-usable laboratory flown on the U.S. Space Shuttle, followed by the Columbus module for the International Space Station (ISS) and the Automated Transfer Vehicle (ATV) resupply spacecraft that serviced the ISS. These projects share a common heritage, showcasing Airbus' expertise, which extends to the European Service Module (ESM) for the Orion spacecraft, NASA's next spacecraft designed for human space exploration. This extensive experience now informs Airbus' involvement in the development and building of the next-generation space stations Starlab.

With construction starting in 1974, Spacelab was built by Airbus predecessor company Vereinigte Flugtechnische Werke (VFW) / Entwicklungsring Nord (ERNO) in Bremen, Germany. It enabled astronauts to perform microgravity experiments in a "shirtsleeve" laboratory environment while the Space Shuttle was in orbit. It consisted of multiple components, including a 4.06 metre wide pressurised cylindrical module that would accommodate crew members for research work during a Space Shuttle flight, along with an unpressurised pallet and other related hardware, all securely fitted in the Space Shuttle's cargo bay.

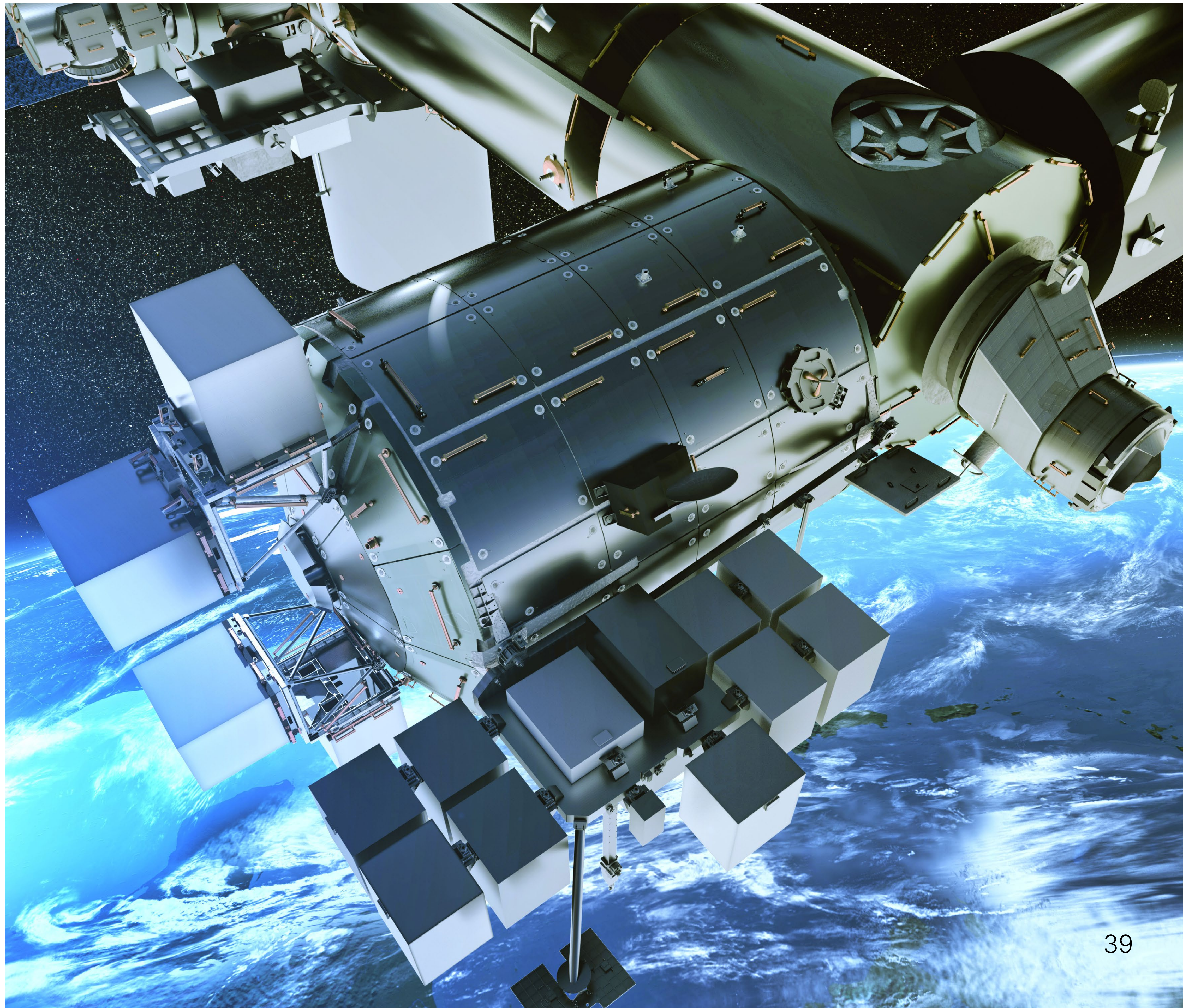


Depending on specific mission and payload requirements, these components were assembled in different configurations. The initial Spacelab laboratory module was financed by the European Space Agency (at that time ESRO) in exchange for European astronaut flight opportunities on the Space Shuttle, while a second module was purchased by NASA. Some 22 major Spacelab missions were performed on Space Shuttles launched from Florida between 1983 and 1998. Spacelab hardware was also used on several other Space Shuttle flights, with some of the pallets being flown until 2008.

The legacy of Spacelab continued with the Columbus science laboratory module, which is permanently mated to the International Space Station. Its functional equipment and software were designed by Airbus forerunner company EADS Astrium Space Transportation in Bremen, and the module was fully integrated in Bremen before being flown to the Kennedy Space Center in Florida for launch aboard Space Shuttle Atlantis in February 2008.

TAKING HUMAN SPACEFLIGHT TO NEW HEIGHTS: Columbus meets the space station

COLUMBUS MEETS THE SPACE STATION



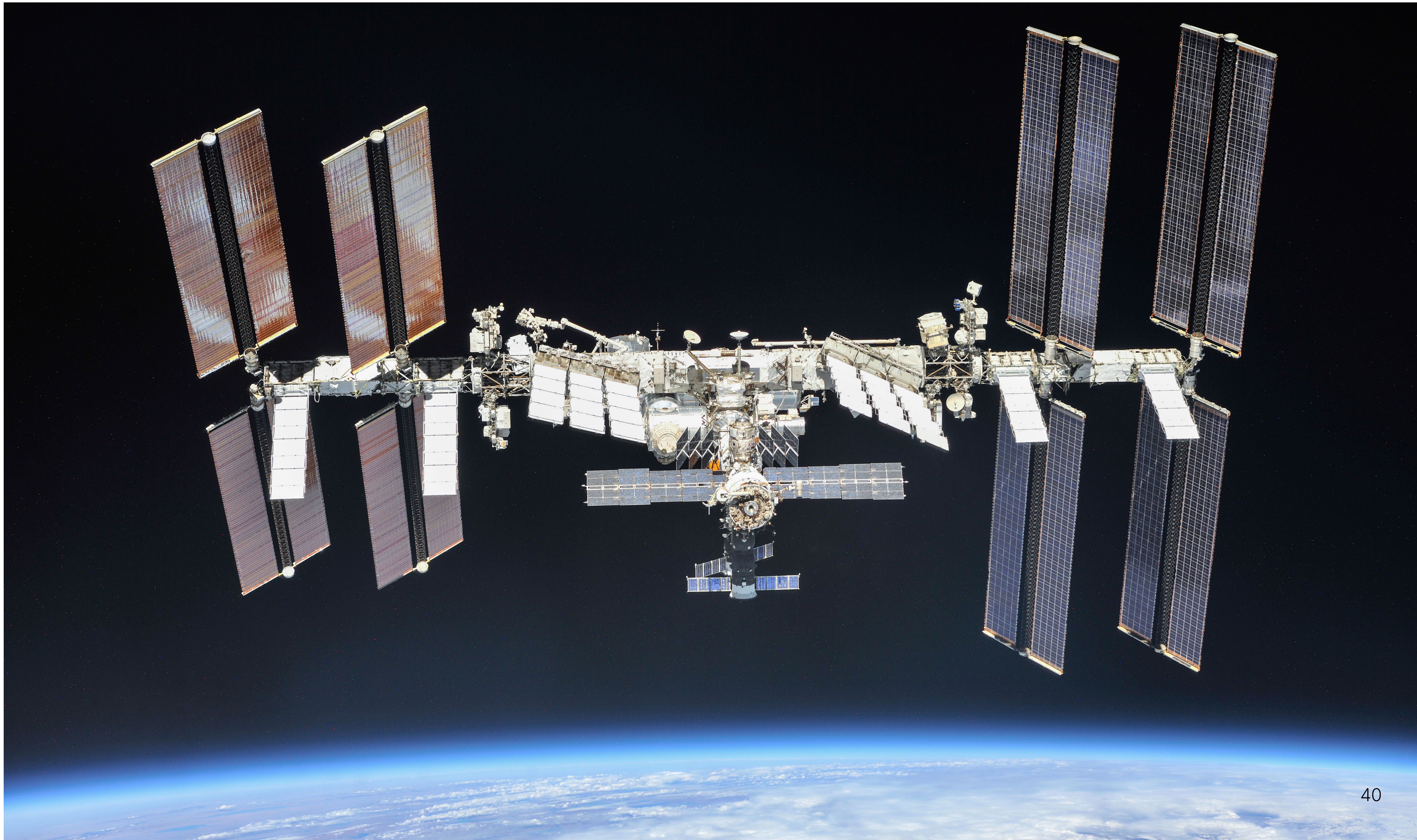
Columbus was originally part of a European Space Agency (ESA) programme designed to complement America's then-envisioned Freedom space station. Led by the prime contractor Messerschmitt-Bölkow-Blohm - Entwicklungsring Nord (MBB-ERNO), the programme envisioned the development of three elements, with the Man-Tended Free Flyer (MTFF) being the most ambitious. The MTFF was intended as an autonomous mini-station for microgravity experiments, serviced by France's Hermes spaceplane, which was under development by Airbus predecessor company Aerospatiale. It could dock periodically with the Freedom space station for maintenance and reconfiguration. The other two components included an Attached Pressurised Module (APM), designed to dock with Freedom and support in-orbit crew activities, and an unmanned Polar Platform (PPF), dedicated to remote sensing.

Due to the projection of high programme costs and other factors, the Man-Tended Free Flyer and Hermes were cancelled. The Attached Pressurised Module subsequently became the Columbus module that ultimately docked with the International Space Station in 2008. The Polar Platform (PPF) evolved into a separate programme leading to the future series of European-developed polar-orbiting spacecraft for Earth monitoring and weather forecasting.

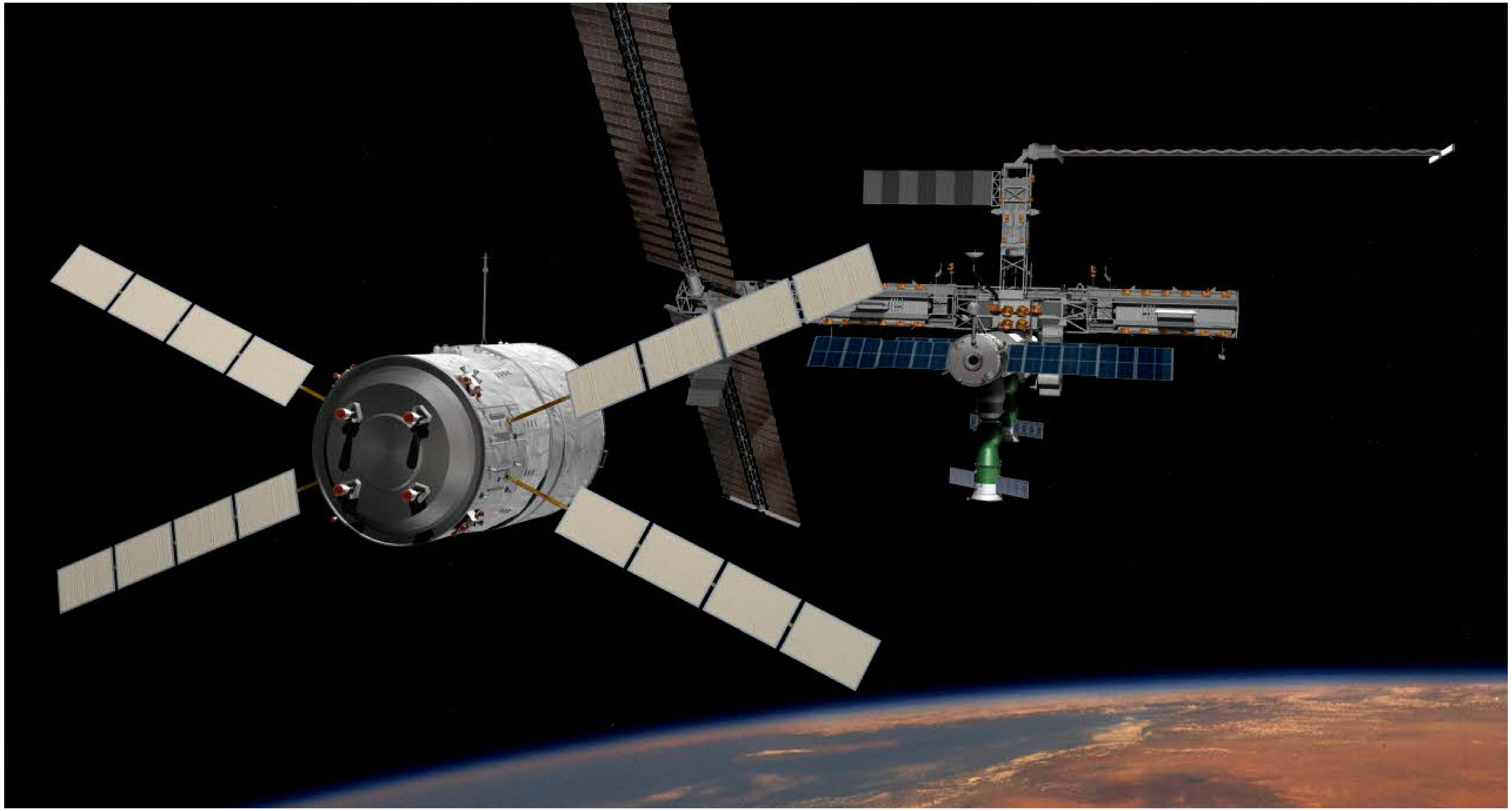
Airbus' heritage in developing, producing and equipping space-qualified modules led to another important programme known as the Automated Transfer Vehicle (ATV). ATV is a servicing spacecraft for the International Space Station used for the delivery of propellant, water, air, payload and experiment equipment. The ATV development contract was awarded in December 1998 by the European Space Agency to Airbus predecessor company Aérospatiale as principal contractor. Aérospatiale collaborated with multiple major subcontractors, including Franco-British firm Matra Marconi Space and Germany's DaimlerChrysler Aerospace (DASA), both of which subsequently became part of Airbus as part of restructuring and ownership changes.

Bartolomeo: Easy access to Low Earth orbit

The Bartolomeo External Platform, developed by Airbus, is an advanced external payload hosting system attached to the Columbus module of the International Space Station ( ). Launched in 2020, Bartolomeo offers an accessible gateway to low Earth orbit (LEO) for both commercial and scientific entities. The platform enables a wide range of activities, including scientific experiments, Earth observation, and technology demonstrations, providing an efficient and cost-effective solution for those seeking to leverage the unique environment of space. Since becoming fully operational, Bartolomeo has supported numerous scientific and commercial payloads, reinforcing Airbus's position as a leader in facilitating innovative space research.



ATV:
AN IMPORTANT STEP AHEAD



Between March 2008 and July 2014 a total of five ATVs were built by Airbus and orbited by Ariane 5 heavy-lift launchers from French Guiana for docking with the International Space Station (ISS). During this period, the ATVs delivered more than 31,500 kg of supplies to the ISS. They also served as a "tug," raising the station's orbital altitude numerous times and helping manoeuvre the station clear of potential contact with space debris. Upon completing their duties while attached to the ISS, the ATVs would often be filled with up to 6,500 kg for a controlled destructive re-entry in the atmosphere.

The ATVs reinforced the ability of Airbus and European industry to develop, build and operate complex spacecrafts and systems that support human spaceflight, including the ability to perform automatic dockings with orbital facilities such as the ISS.

As a result, Airbus was selected in 2014 as prime contractor for the development and manufacture of the European Service Module (ESM) to equip NASA's Orion spacecraft. Airbus secured a status previously unattainable due to U.S. restrictions: recognition as a full partner in NASA's ambitious Artemis space programme. Orion, the next-generation spacecraft, is designed to transport astronauts to the Moon and beyond, marking a significant milestone in international collaboration.

To the Moon and beyond

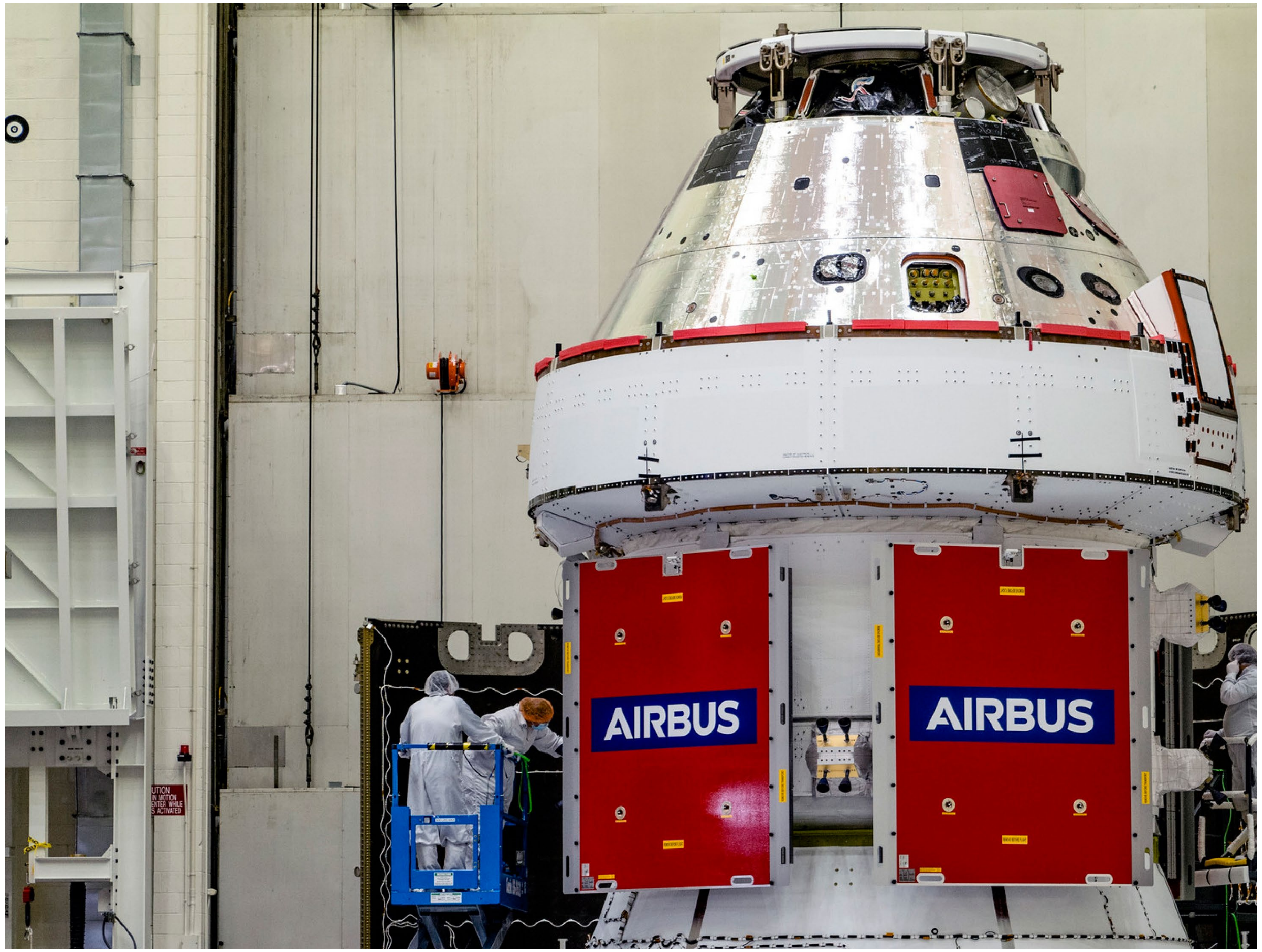
In July 2022, NASA launched the Artemis programme to return humans to the Moon, with the ambitious goal of establishing a long-term presence as a foundation for future exploration. Central to the programme is Europe's contribution through Airbus, which developed the European Service Module (ESM) for the Orion spacecraft. Airbus, under a European Space Agency (ESA) contract, has been tasked with building six ESMs.

The cylindrical ESM serves as the powerhouse for Orion, providing electricity, propulsion, thermal control, and essential life-support systems such as air and water during its missions in space. The ESM's radiators and heat exchangers will keep the astronauts and equipment at a comfortable temperature, while the module's structure forms the Orion vehicle's backbone.

The Artemis I mission, an uncrewed test flight completed in 2022, was designed to send Orion beyond the Moon, traveling over 70,000 km past the lunar surface and returning to Earth after a 26-day mission. The second ESM will support Artemis II, NASA's first crewed lunar flyby since Apollo, planned for the near future. Artemis III will carry the first woman and person of colour to the lunar surface, with subsequent missions utilising ESMs to support further lunar exploration and the construction of the Lunar Gateway station.

The execution of lunar missions is a complex and challenging task for the international community. It requires a precisely planned chain of supply and logistics missions and new ways of manufacturing and new infrastructures. Airbus is studying new concepts and developing important building blocks to set-up these new elements that will ultimately lead to the first human lunar settlement.

For a long-term stay on the Moon or a permanent station on the lunar surface, it is imperative that local resources are used to produce structures, propellants and oxygen in-situ. Airbus is able to do just that with its concepts for in-space manufacturing and developments in oxygen and metal extraction from Moondust, ROXY (Regolith to OXYgen and Metals Conversion). As they move increasingly further from Earth, the capabilities of autonomous systems and assistance systems, such as the ISS-proven CIMON, are becoming more and more important. They need to be able to solve problems largely without maintenance and relieve astronauts of routine tasks, Airbus is constantly developing new technologies and systems to achieve this aim.



StarLab: The next generation space station

By the end of this decade, as the International Space Station (ISS) reaches the conclusion of its operational life, Airbus aims to launch its successor: Starlab, a next-generation space station designed to ensure the continued human presence in low-Earth orbit and facilitate a seamless transition for microgravity science and research into the commercial space era.

To realize this vision, Airbus has partnered with U.S.-based Voyager Space and Japan's Mitsubishi Corporation to form Starlab Space LLC, an international joint venture tasked with designing, building, and operating the commercial space station. Starlab aims to serve a diverse global customer base, including space agencies, researchers, and companies of all sizes.

Central to Starlab's design is the Airbus LOOP multi-purpose orbital module, featuring interconnected decks with a central greenhouse. This innovative layout provides ample space for scientific research, exercise, and leisure activities, including unparalleled views from oversized windows.

Airbus is bringing the full breadth of its 50+ year experience in human spaceflight to this future-defining endeavour.

PRECISE POSITIONING FROM SPACE

PRECISE POSITIONING FROM SPACE

PRECISE POSITIONING FROM SPACE

Airbus has established itself as a leader in European satellite navigation, playing a pivotal role in the development and implementation of Europe's satellite-based navigation systems. Since the inception of the Galileo satellite navigation programme, Airbus has contributed extensive expertise to the European Space Agency, the European Union, and the European GNSS Agency (GSA), solidifying its position as a key partner in advancing European navigation capabilities.

PRECISE POSITIONING FROM SPACE: Precise positioning from space

Two experimental spacecraft, GIOVE-A and GIOVE-B respectively built by Airbus subsidiary, Surrey Satellite Technology Ltd (SSTL), and Airbus predecessor company, Astrium, were launched in December 2005 and April 2008 to demonstrate critical Galileo technologies in orbit. They were succeeded by four fully-representative satellites from Astrium that allowed the successful In-Orbit Validation (IOV) of the Galileo system and helped to perform the first-ever Galileo-only position fix in 2013.

Since then, the navigation payloads of all Galileo satellites in orbit as of 2019 were built by SSTL. Airbus delivered system and services support to the European Space Agency, the European GNSS Agency for the Galileo Exploitation Phase up to 2020.

From the beginning of Galileo through 2018, Airbus was prime contractor for the satellite navigation system's ground control segment, which provides the day-to-day control for all the Galileo satellites in orbit. Looking ahead, Airbus is now involved in the development of Galileo Second Generation (G2G), evaluating major evolutions for the mission and control ground segment. Additionally, Airbus is a leading provider of navigation payloads for the European Augmentation System and it also delivers payloads for the American counterpart WAAS (Wide Area Augmentation System).

Building on its position as a market leader, Airbus is advancing plans to develop EGNOS V3, the next generation of the European Satellite Based Augmentation System Galileo and the U.S. GPS satnav system. This upgraded system will deliver enhanced performance and security features tailored to civilian aviation, while also introducing innovative new services for maritime and land-based users. Airbus is spearheading the initiative in collaboration with an industrial consortium comprising 20 European companies.