
STARION
Pushing the boundaries
of **innovation**
stariongroup.eu

Cover (satellite): ©ESA-P. Carril

Introduction

Starion provides engineering expertise and solutions for space, defence and other critical infrastructures across Europe, pushing the boundaries of innovation. Our teams work on world-leading space projects that deliver pioneering missions that provide us with the information and technologies we use today.

Innovation from experience

Starion's heritage lies in space consultancy and space engineering services and solutions. We offer over three decades of expertise in professional engineering services, developing and operating systems and solutions tailored to our clients' needs. Our teams work across the complete space mission life cycle, from spacecraft design, mission operations and data collection to decommissioning at the end of a satellite's life, and data archiving and utilisation. By combining space and system engineering with established and emerging technologies, such as artificial intelligence (AI) and quantum, we produce innovative solutions that make a fundamental difference for our clients and for society.

Our experts

Starion's employees are located across Europe, close to our clients' offices, enabling us to be responsive and agile. Our engineers and researchers are among the most trusted and respected in the industry, helping to build space-based solutions that address major challenges on Earth such as civil security, climate change and deforestation.

Our promise

Now, in our fourth decade of serving the needs of the space sector and other critical infrastructure organisations, Starion continues to provide exemplary service, ensuring our customers benefit from the utmost professionalism, coupled with unwavering commitment to the highest ethical standards.

Our capabilities

Our innovative, cutting-edge approach in system development and engineering services, and our reputation as a trusted partner, are why we are repeatedly chosen to lead and collaborate in projects and programmes that push boundaries and make a difference to both public and commercial organisations.

Our customers rely on our experienced staff to help design, build and maintain their satellites, provide flight dynamics, mission control and operations at satellite operations centres and ground stations, and deliver secure infrastructures to protect satellite data.

Over the years we have built an end-to-end capability and understanding of space systems and services, with many disciplines being transferred across programmes and projects to offer tried and tested services. Across our client base, we also provide service expertise in data and digital engineering, space domain awareness, data archiving, digital twin development, AI and quantum key distribution.

Ground segment and mission operations

Our experts provide mission operations and ground system engineering services for all space missions, including Earth observation (EO), communications, scientific, navigation and space exploration. We specialise in supporting both New Space and established space organisations to set up their operations infrastructure and to introduce new ground segment technologies to their environment.

Starion's engineers prepare and operate complete mission ground segment activities, including the design, implementation, test and operation of satellite ground systems to ensure maximum automation and efficiency for single satellites or constellations. Our Astral modular product suite provides key ground segment capabilities, including mission control and automation, mission planning, operations preparation, data processing and dissemination and data archiving. Customers can utilise the whole product suite or any part thereof.

Our services can be deployed on customers' servers or in a public or private cloud and integrated with a range of ground station providers. Starion is also working with new technologies in ground segment activities, including AI, model-based system engineering (MBSE) and digital twins.

Digital engineering

Starion offers a 'one-stop shop' partnership for digital engineering, data analytics, AI, ground segment solutions and security services. We enable customers to realise innovative new products, services and solutions more quickly, more accurately and at a lower cost.

We utilise state-of-the-art design approaches, such as MBSE and concurrent design methodologies, to rapidly deliver space, defence and critical infrastructure systems in a robust and efficient manner. For system engineering projects, we use models instead of documents to enable digital continuity – an approach that is relevant to any sector. Our experts support our clients at every stage, from idea to implementation.

Concurrent design has been used for space projects for over 20 years. It significantly reduces both the cost and duration of the early design phases of a complex project, and minimises overall risk, and is also ideal for feasibility studies.

Our concurrent design methodologies are supported by our market-leading CDP4-COMET software.

Our CDP4-COMET tool is being used by the European Space Agency (ESA) and the Dutch Ministry of Defence in their concurrent design facilities (CDFs), and by other space agencies and critical infrastructures. It has also been used in the design of factories, unmanned aerial vehicles (UAVs) and maritime vessels such as luxury yachts and naval ships.

Application service delivery

Application service delivery (ASD) has emerged as a vital asset in the space domain. The distinctive challenges of providing uninterrupted application services have stimulated advances in software development and communication technologies. ASD facilitates real-time communication with spacecraft, aids onboard data processing and enables adaptive systems for autonomous decision-making. By empowering space missions with self-reliant applications, ASD contributes to mission success and amplifies the capacity for scientific exploration in distant realms.

Starion provides design, implementation, test and operation of satellite services for EO, positioning, navigation and timing (PNT) and advanced telecommunications including 5G/6G and quantum encryption technologies. We also work with clients to develop and demonstrate their products and services in operational environments, such as the International Use Cases for Operational Quantum Key Distribution Applications and Services (INT-UQKD) project for ESA, and pooling and sharing projects.

Security for space

Starion is a pioneer in the field of cybersecurity for space assets, working closely with ESA and other national agencies to offer security by design across the entire mission operations value chain. In support of the integrity of European missions, we work closely with ESA to help model the future space security landscape and develop best practices for European space safety.

Starion has been contributing to ESA's security programme since 2018 in order to enhance Europe's role as a global space leader. Starion is part of the industrial team helping ESA to establish a new Cyber Safety and Security Operations Centre (CSOC) and a Security Cyber Centre of Excellence (SCCoE). These centres are being established to heighten the Agency's cyber resilience and protect all ESA systems from malicious interference.

The Italian Space Agency (ASI) has awarded Starion the contract to design, develop and implement its innovative Cyber Security Operations Center to protect the Agency's space and digital infrastructure.

Space domain awareness

Space domain awareness (SDA) facilitates up-to-date knowledge of activities and events, natural and human-made, occurring in the near-Earth environment. Starion is working with governments, businesses and agencies across Europe to understand threats from space, including space weather, space debris and near-Earth objects (NEO), to improve their resilience to these threats.

Starion offers a comprehensive portfolio of SDA services that build on our renowned competences in the areas of data management and preservation systems, AI and machine learning, data fusion, operational ground segment, cybersecurity and system engineering. Our clients have come to rely on our SDA services for their business needs, from identifying and exploring SDA-related risks to designing, implementing and operating mitigation measures that increase resilience for public and private organisations.

Starion is working closely with Astroscale, the first commercial organisation to pioneer orbital space debris removal, and with ESA on several projects, including leading development of a new ESA Space Weather Payload Data Centre and support for ESA's NEO Coordination Centre in Italy. In 2024, we delivered the 'Space Weather Innovation, Measurement, Modelling and Risk' (SWIMMR) report in the UK.

Earth observation and downstream services

There is a wealth of data available from EO satellites that is providing us with the knowledge and answers to questions humankind needs to ensure the future of life on Earth. EO satellites are enabling us to look at our planet in more detail, measuring and monitoring our planet in multiple ways, from sea salinity and air pollution to the impact of deforestation.

Starion experts across Europe work on some of the most advanced EO and downstream programmes, from helping to design satellites and their instruments through to exploiting EO data. Our innovative approach, combined with the latest in software engineering, AI and machine learning, helps us achieve optimum results for our clients.

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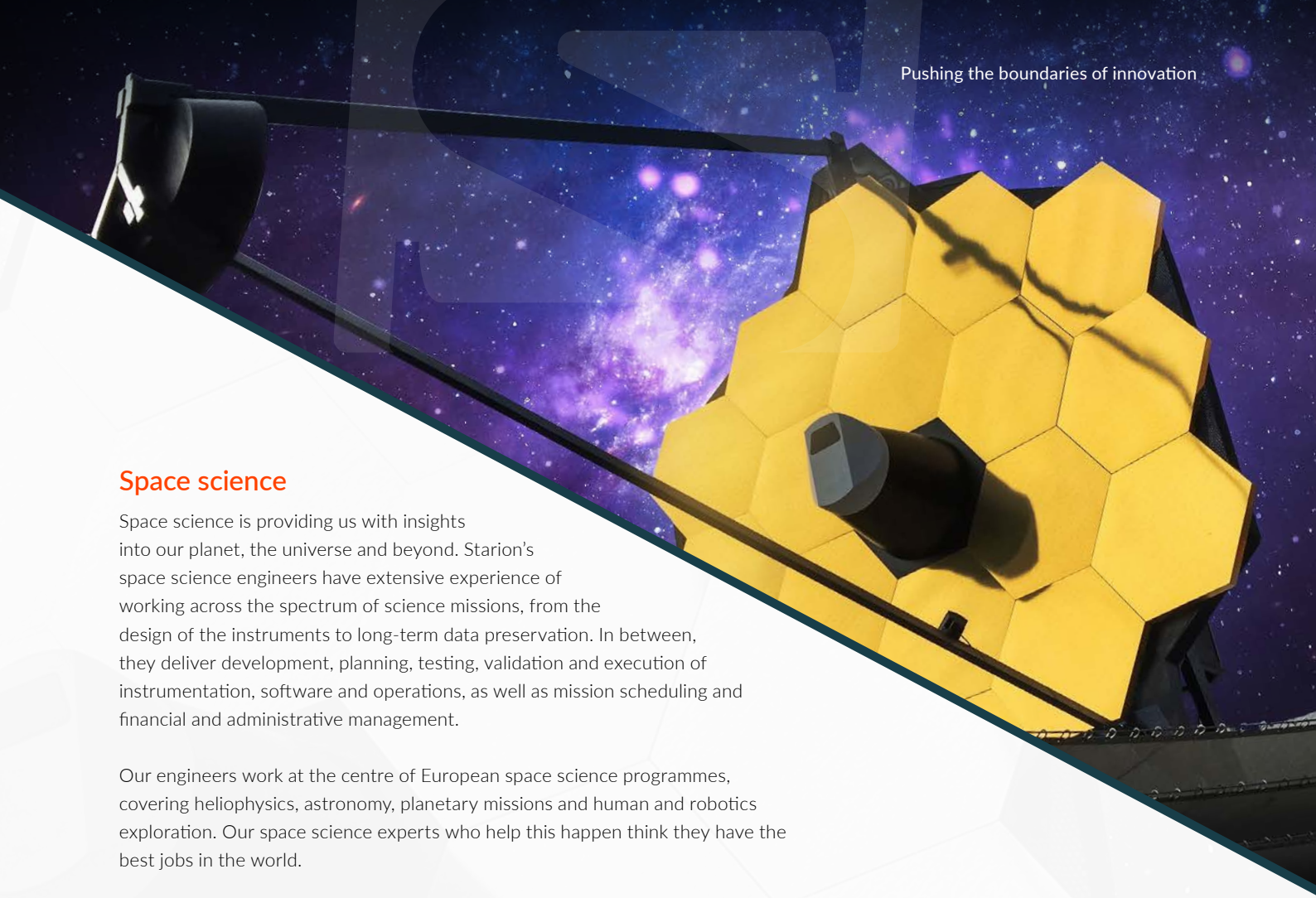
Our project portfolio includes:

- SAFEPLACE, designed to support civil protection and emergency response organisations by providing near real-time, actionable information during crises: this is being developed under ESA's Civil Security from Space (CSS) programme
- Destination Earth, providing support to ESA and EUMETSAT for the DestinE initiative that is creating a digital twin of the Earth
- Copernicus Data Space Ecosystem (CDSE), which provides a full archive of instantly available up-to-date EO data
- Object Recognition and Classification from Satellite (ORCS) using AI for the Rapid Action for Citizens with EO (RACE) project, originally developed during the COVID-19 pandemic.



Space science

Space science is providing us with insights into our planet, the universe and beyond. Starion's space science engineers have extensive experience of working across the spectrum of science missions, from the design of the instruments to long-term data preservation. In between, they deliver development, planning, testing, validation and execution of instrumentation, software and operations, as well as mission scheduling and financial and administrative management.

Our engineers work at the centre of European space science programmes, covering heliophysics, astronomy, planetary missions and human and robotics exploration. Our space science experts who help this happen think they have the best jobs in the world.

Among the many missions they have supported – and still support – are:

- James Webb and Hubble Space Telescopes, Euclid, Gaia and XMM-Newton – studying our galaxy and the universe beyond
- Solar Orbiter – observing the Sun, our nearest star
- Juice and BepiColombo – getting up close to planets in our solar system
- Rosetta – the first spacecraft to place a lander on a comet.

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