CYBER & SECURITY SOLUTIONS

SPACE SOLUTIONS

LEONARDO

Space is recognized as an essential entity, globally connected beyond physical boundaries, subject to strict cyber and security requirements, and playing a strategical role for countries economic development and wellbeing. Societies, Governments, and Industries strongly rely on space-based technologies and services. Satellites and space-based systems have, among others, a crucial role in communication, navigation, scientific research, national security and Defense operations, making them attractive targets for malicious actors. Indeed, Space assets have been evolving into complex and connected digital infrastructures, becoming increasingly vulnerable to cyber-attacks and security threats.

Space systems are essential for the operation of National Critical Infrastructures, which underpin global economy, as-well-as military advantage and intelligence superiority, and if ever compromised would determine highly catastrophic consequences. In this context, it is vital to focus on cyber and security solutions for Space assets and systems, but also leverage on secure space systems to increase safety and security of infrastructures, citizens and operations on Earth.

CYBER AND SECURITY IN SPACE: UNDERSTANDING THE RISK AND EMBRACING THE CHALLENGE

Leonardo, through its Cyber and Security capabilities, assists Space sector organizations to increase security and resilience of their entire infrastructure, data and applications against emerging and evolving security threats. Leveraging a breadth of expertise across defence and civil domains, Leonardo Cyber & Security Solutions Division has developed a comprehensive ecosystem of cyber and security solutions, services and products in order to ensure effectiveness, reliability, security and control of Space operations throughout all stages.

Leonardo can support Governmental Agencies and Space Economy stakeholders at large, by providing a range of security solutions, services, and products that fulfil the needs and requirements of Space infrastructures, in a scalable and adaptable manner. These offerings effectively address diverse domains spanning from Earth Observation, Navigation, Communications to Security & Digital and Situational Awareness programmes. Leonardo's solutions are designed to accommodate different conditions, sizes, scales, and scopes, while effectively countering a wide range of threats specific to each domain.

BENEFITS

- Adherence to international NIST framework (identify, protect, detect, respond, recover) and main international standards (MITRE ATT&CK®).

- In depth understanding of major international standards for Space activities, among others: SPARTA, ECSS and ESA rules and regulations.

- System integrator approach: integration of national and international sovereign solutions with best in class technologies.

- Design and implementation of physical and logical infrastructures supporting high-classification projects.

In recent decades, Space operations have advanced significantly leading to a growing need for robust security measures to protect and safeguard valuable assets, critical infrastructures and their operations. As the programmes become more complex and diverse, the risks associated with Space-based activities increase exponentially. In this sense, the commensurate Space infrastructure (comprehensive of Space, Ground, Link and User segment) turns into a wide attack surface exposed to sophisticated hybrid and asymmetric threats.
In response to these challenges, Leonardo offers a structured portfolio to address and mitigate such risks effectively and to turn Space systems into secure and resilient structures.

Leonardo offering includes:

- cyber security professionals and certified engineers, with specific skills for the implementation of secure by design infrastructures.
- effective prediction and identification of advanced threats and highly structured intelligence process management and orchestration.
- design and implementation of physical and logical infrastructures supporting high-classification projects.
- preparatory activities for obtaining certifications and homologations needed for classified information management.
- enhancement of situational awareness capabilities in cyber operations to support decision makers in understanding and managing cyber risks.
- timely implementation of tailored detection rules and response actions through a proprietary EDR (Endpoint Protection & Response) solutions.
- local management of vulnerability data, response actions and malware analysis.
- access to multiple malware analysis tools from a single dashboard, optimizing COTS (Commercial Off-The-Shelf) usage costs.

Cyber Security & Resilience	
Professional Services	Leonardo consulting services are focused on supporting organizations in: governance management, definition of procedures, compliance with standards and regulations, penetration tests and risks management, vulnerability analysis, assets management.
Leonardo Engineering Assurance Profile for Cyber Resilience (LEAP4CR)	Methodology based on NIST and MITRE frameworks, developed to define the level of Cyber of a new or already existing product/system/service. It defines a comprehensive view of security ensuring effective security governance, while allowing the association between resilience techniques and the ability to contain a given type of attack.
Design and Build services	Services based on a proprietary approach and an established process for designing and building security management of on-prem infrastructures (SOC, CERT, IOC).

Managed Security Services	Our Security Operation Centres (SOCs) provide a flexible and comprehensive set of Managed Security Services that can be quickly tailored around an organisations' specific needs. Managed Security services offer efficient, around-the-clock perimeter and internal security with real-time monitoring, device maintenance, event correlation, and analysis of the customer's infrastructure and critical applications to ensure the cyber threat is pro-actively managed and attacks mitigated.
Cyber Information Superiority (CIS) suite	Suite composed of a combination of platforms providing threat intelligence, end point protection and malware analysis based upon Information Superiority concept applied to the cyber domain. It aims to obtain valuable and actionable information which can be used to rapidly implement targeted prevention, response and containment actions.
Cyber Situational Awareness System (CSAS)	The system is designed to keep security teams and decision-makers informed about what is happening in terms of their IT perimeter security status and support the definition and execution of course-of-action. It provides an information centralizing platform that aggregates and displays data through both high-level management views and technical-operational ones.

Despite technological advancements and the implementation of robust security measures, humans involvement in Spaces operation remains crucial and their actions can inadvertenetly contribute to the rise of vulnerabilities.

In this sense, the Space sector both relies on complex systems and extensive human interaction, making it sensitive to human error. It is therefore essential to invest in training activities that, on one side, strengthen operator's security knowledge in terms of technologies, processes and regulations, and on the other, develop the 'human factor', enhancing the ability to share context and interpret information, which is crucial to effectively manage crises arising from security attacks and incidents with largescale impacts.

Leonardo supports Space stakeholders to enhance skills and capabilities needed to recognize and deal with the new cyber-physical risks that threatening the sector through an advanced training centre, providing:

Leonardo's Integrated Control Centre is able to:

- integrated and multilateral approach to global security issues that goes beyond the concept of delivering training content on specific topics.
- dedicated training ecosystem to exchange ideas, improve skills of cyber defence teams, propose and test new approaches and collect new requirements in the field of cyber protection.
- automatic generation and setup of complex training theatres and reusable exercise scenarios.
- context-driven training paths, implemented using proprietary training platforms based on the simulation of real operational contexts.
- interoperability with remote orchestrators, scenarios and native capabilities to share cyber gaming fields and be federated with other cyber ranges services.
- immersive training experience based on skills gained by Leonardo's security teams in critical domains.

CYBER TRAINING	
Cyber & Security Academy	An innovative training centre to promote cyber security awareness increase competencies by means of a complete training portfolio delivered by expert trainers leveraging advanced platforms for hands on exercises.
Cyber Trainer	Cloud-based platform to train and keep up to date both security professionals and non-expert users managing the whole training process (training needs, formal learning, exercises, certification).
Cyber Range	Integrated environment for immersive realistic simulations of cyber-attack and defence scenarios and advanced simulation to test the cyber resilience of Space infrastructures.

Increasing the resilience of its infrastructures is critical for the Space sector, so that it can anticipate, withstand and adapt to adverse conditions, stresses, attacks or compromises. Assuming that it is impossible to completely eliminate cyber-physical risks, it is indeed necessary to ensure that operations continue even in the face of a physical, cyber or hybrid attack. To do so, it is necessary to ensure an effective monitoring of Space infrastructures, processing and analyzing multi-domain data in order to extract, in a timely manner, concise, contextualised and immediately usable information to support decision-making processes and optimally cope with the new converging risks.

In this context, Leonardo is able to leverage satellite data to elevate Situational Awareness to higher levels. With a sophisticated approach to data analytics and cutting-edge technology, we adeptly aggregate, process, and interpret data from various space-based sources, such as Earth Observation satellites and Global positioning systems. Thanks to this capacity we provide real-time insights, critical to guarantee an adquate level of information and kwoledge. The ability to translate complex data into actionable intelligence empowers decision-makers to take informed choices, optimize operations, and respond swiftly to changing circumstances, ultimately giving operators a significant support.

Leonardo's Integrated Control Centre is able to:

- integrate a large number of different sensors and subsystems to collect events and alarms both from physical and cyber domains related to the Ground Segment.
- filter and correlate alarms through intelligent rule based engine.
- geographically represent the on-field scenario thanks to an effective and flexible GUI integrated with a powerful GIS.
- automate operations and guide operators in the analysis of the situation by following standard and emergency operating procedures.
- boost on-field squad coordination through the integration of Mission Critical Communication.
- track and record all events to enhance post event analysis, investigation and debriefing.

## GLOBAL MONITORING

X-2030	A new model of control room system based on system of systems paradigm. X-2030 integrates operational procedures, decision support processes, radio communications and leverages technologies for a superior situational awareness and informed decision making. Designed to integrate existing systems, provides an innovative user interface based on virtual assistant and natural language understanding.

Cloud plays a pivotal role in Space activities, offering a range of critical advantages that are instrumental for Space exploration and research. Among primary benefits is the ability to store and process in real time vast amounts of data collected from Space missions. Space Agencies and organizations can leverage Cloud Infrastructure to efficiently store and manage satellite imagery, telemetry data, and other information, enabling scientists and engineers to access and analyze this data from anywhere on Earth. Furthermore, the scalability of Cloud services enables Space Agencies to adapt quickly to changing demands, whether it's scaling up computational power for complex simulations or managing data during peak mission phases. Overall, Cloud is instrumental in enhancing the efficiency, collaboration, and effectiveness of Space activities, ultimately contributing to advancements in Space exploration.

Thanks to our know-how in protecting National Critical Infrastructure, Leonardo ensures the confidentiality, integrity and availability of information through infrastructure protection measures, networks and archives taking into account different levels of cyber risk exposure. Additionaly, taking into consideration stringent security standards required by Space systems, cryptographic capabilities play a key role in ensuring data sovereignty through the protection and control of information stored in the Cloud. In line with these objectives, Leonardo also integrates encryption services (Key Management System) that allow you to implement encryption mechanisms external to the public cloud provider (Bring Your Own Key or Hold Your Own Key).

SECURE CLOUD & DIGITAL

Cloud migration support	Leonardo has an iterative model and a supporting tool to address assessment and feasibility activities related to cloud migration. The model addresses the activities of analysing the infrastructure, identifying specific performance, efficiency and security objectives, defining the expected and desired state of Cloud adoption, analysing current gaps and identifying and planning the interventions to be implemented.
Secure cloud management	The need to orchestrate, secure and govern hybrid, multi-cloud and edge computing cloud environments is managed through the Secure Cloud Management Platform. The platform provides overall visibility over the resources, simplifies their management and makes it easier to optimise them within the infrastructure, thus enabling constant control over performance, quality of service delivery and security. The ability to perform what-if analyses allows scenarios to be simulated to assess the impact of any changes in infrastructure capacity, the migration of loads from one environment to another, and to control costs.
Privacy management	Leonardo has a platform to implement the necessary controls to allow the anonymised and minimised extraction and use of information containing personal data, while guaranteeing privacy. The Privacy Query Platform, based on technologies such as Big Data and Artificial Intelligence, is usable in the Cloud or on premise and manages data and information stored on heterogeneous sources.
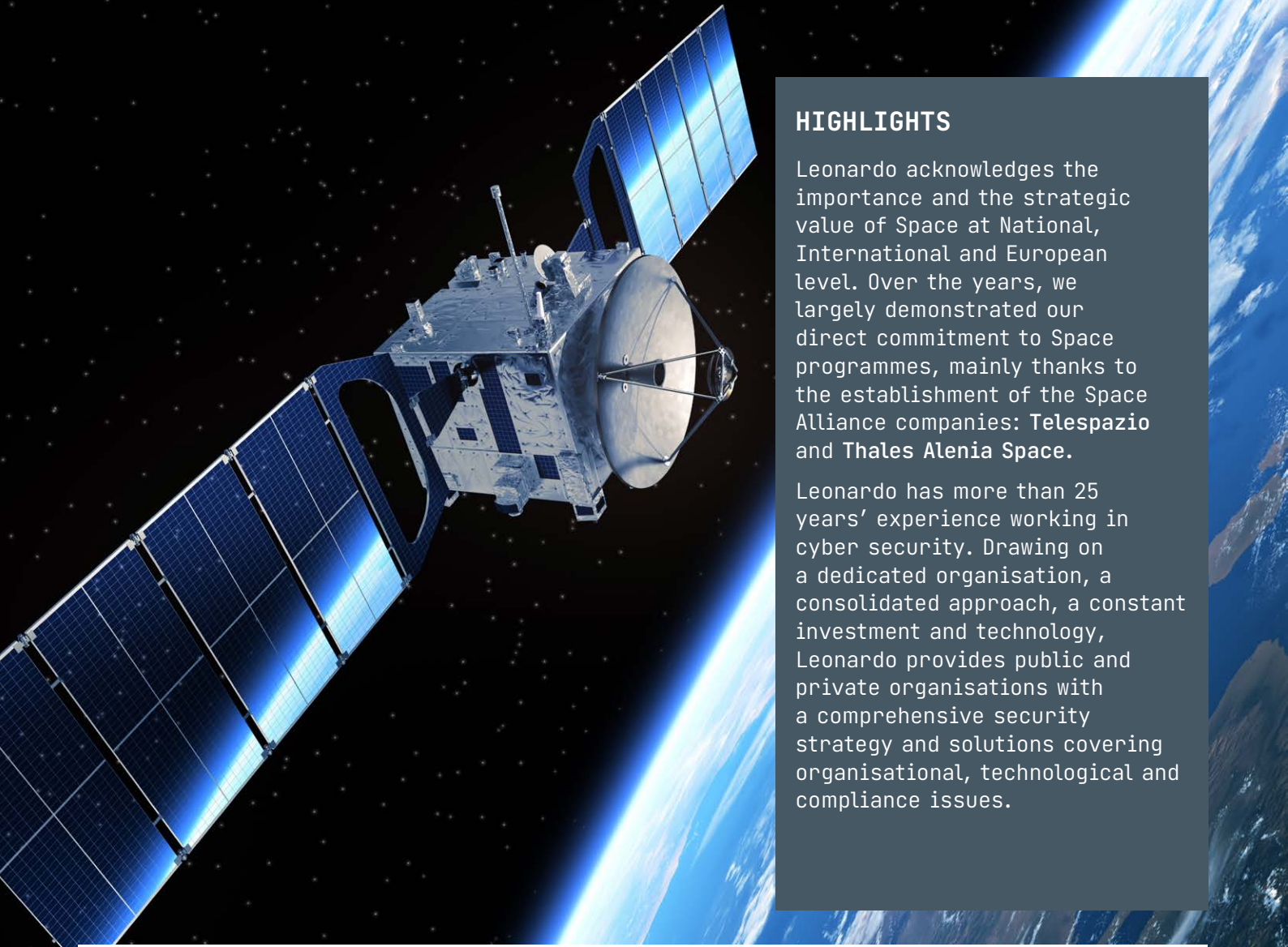
HIGHLIGHTS

Leonardo acknowledges the importance and the strategic value of Space at National, International and European level. Over the years, we largely demonstrated our direct commitment to Space programmes, mainly thanks to the establishment of the Space Alliance companies: **Telespazio** and **Thales Alenia Space.**

Leonardo has more than 25 years' experience working in cyber security. Drawing on a dedicated organisation, a consolidated approach, a constant investment and technology, Leonardo provides public and private organisations with a comprehensive security strategy and solutions covering organisational, technological and compliance issues.

ABOUT CYBER & SECURITY SOLUTIONS DIVISION

With experience in information technology, communications, automation, physical and cyber security, Leonardo Cyber & Security Solutions Division generates synergies by joining its expertise to support enterprises, agencies, public safety, security and emergency organizations. Our offer includes solutions for the security and protection of critical infrastructures, transport infrastructures, major events and stadia, cyber security, integrated networks systems and secure communications that enable reliable and efficient information management.

Secure Cloud & Digital

Global Monitoring

Mission Critical Communications

Cyber Security & Resilience

leonardo.com

LEONARDO