

ANNUAL REPORT 2022



Agenzia
Spaziale
Italiana

GROWTH



GIORGIO SACCOCCIA

PRESIDENT OF ASI

ASI is growing: this is the main highlight of the Italian Space Agency in 2022. It is an expansion that is being observed in various areas and has been made possible thanks to a number of factors.

New programs, significant scientific achievements, and remarkable accomplishments, such as participating with instruments and payloads in groundbreaking missions by NASA and ESA, including Artemis I and DART, have featured the last twelve months, consolidating a strategy: the strengthening of the Agency's role on a global scale and improving the competitiveness of the Italian Space System.

The year 2022 ended with a growing budget.

The data on Italy's contribution at the ESA Ministerial Conference in November of last year also reflect the image of a country that, thanks to the Agency's efforts, remains the third-largest contributor for the next three years, after France and closely behind Germany, and becomes the largest contributor to optional programs.

New and challenging agreements signed with other agencies - primarily the one with NASA aimed at the development of multipurpose lunar modules - once again affirm the role of the Agency in the global context, by acknowledging its peculiar scientific and design skills. They also represent the best evidence to

its intense space diplomacy, carried out in all continents and with major international organizations.

This complex set of activities requires the Agency to grow and enrich itself with competencies increasingly aligned with the challenges of the future: for the third consecutive year, in 2022, ASI has experienced a robust injection of new recruits into the structure, which contribute to strengthening the organization's strategic and operational capabilities.

Representing, coordinating, and supporting a complete and competitive network of businesses and activities in the space sector, capable of positioning Italy at the forefront of research and development programs: this is the ambition that ASI has pursued with increasing commitment throughout 2022.

An Agency with huger human and financial resources, engaged in growing and diversified activities, is able to meet this ambition and better contribute to the implementation of cutting-edge national space policies.

ITALIAN SPACE AGENCY



The Italian Space Agency (ASI) was established in 1988 with the mission to promote, develop, and disseminate scientific and technological research applied to the space and aerospace fields.

LEGAL NATURE AND GOVERNANCE

The Italian Space Agency, founded in 1988, is a national research institution responsible for coordinating and managing funding related to all Italian space activities, at both the national and international level. It prepares and implements Italian space policy based on the directives of the Prime Minister (or His/her delegate) and the Interministerial Committee for space and aerospace research policies (COMINT).

MANAGEMENT BOARD IN 2022

GIORGIO SACCOCCIA, PRESIDENT

GIUSEPPE BASINI

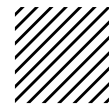
MAURIZIO CHELI

DUILIO FARINA

FABRIZIO GIULIANINI

LUISA RICCARDI

ELDA TURCO BULGHERINI



ASI IN THE GLOBAL CONTEXT

ASI is currently among the top six space agencies in the world, a distinction that reflects Italy's prestigious role in the European and global space sector. Italy is the third country to independently have launched a satellite and the third largest contributor to the European Space Agency (ESA), after France and closely following Germany. Italy is also among the early signatories of the Artemis Accords for NASA's new lunar program. Through its own Agency, Italy operates in all areas of space applications. With a strong diplomatic capacity, ASI has strategic collaborations with all major space agencies.

Through these collaborations and continuous cooperation with the scientific community and Italian industries, the Agency has achieved significant successes in the fields of cosmology, human and robotic exploration, space propulsion, telecommunications, satellite navigation, and Earth Observation. One of the most remarkable results of these collaborations is the International Space Station, where Italian astronauts operate, and whose habitat modules were built for over 40% by the national industry.



SPACE SCIENCES



EARTH OBSERVATION



HUMAN FLIGHT



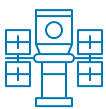
LAUNCHERS



EXPLORATION



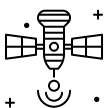
NAVIGATION



OPERATIONS



TELECOMMUNICATIONS



TECHNOLOGIES

ASI INVESTEES

To fulfill its statutory purposes, the Italian Space Agency holds minority stakes in three companies in the sector: ALTEC S.p.A., SpaceLab, and e-GEOS S.p.A. ASI is also a co-founding partner of a participatory foundation, the “E. Amaldi Foundation.”



ALTEC

It specializes in the international supply of engineering and logistics services in support of operations and utilization of the International Space Station, other orbiting infrastructures, and space exploration missions.

SpaceLab

It is engaged in research and development activities for new technologies and testing infrastructures in the space transportation sector. It originated from ELV S.p.A.

e-GEOS

It was established for the development of commercial applications and services in the Earth Observation sector. It is also responsible for managing the utilization activities of the COSMO-SkyMed satellite constellation.

Fondazione E. Amaldi

It was founded in 2017 by the Italian Space Agency and the Hypatia Research Consortium. It works to promote and support scientific research aimed at technology transfer, with a non-profit purpose. It also carries out advisory and scouting activities for the “Primo Space” Venture Capital Fund.



ASI KEY FIGURES

4

Locations

ASI operates in 4 locations. Its headquarters is in Rome, and it has three more operational centers in Basilicata, Sardinia, and Kenya.

393

Staff members

ASI consists of 393 individuals, including 365 permanent employees, 13 temporary employees, 11 research fellows or scholarship recipients, and 4 seconded from other public administrations.

8

Directorates

ASI new organization is structured into 8 management Directorates and a Strategic Area to better operate in all space sectors and respond to the new space governance.

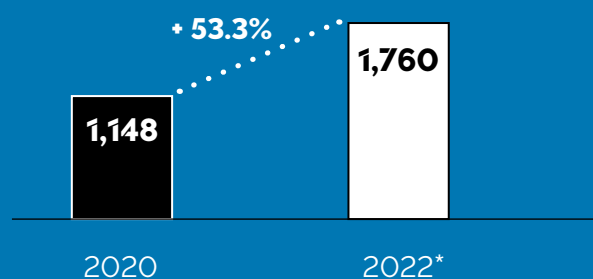
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Investees

ASI has minority shareholdings in ALTEC S.p.A., SpaceLab (formerly ELV S.p.A.), and e-GEOS S.p.A. It is also a founding partner of the "E. Amaldi Foundation."

ASI's Growth

Evolution of the budget (in million euros)



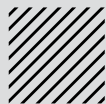
*Forecast

Evolution of human resources



AMONG THE MAIN TOPICS OF 2022

BACK TO THE MOON



The humankind return to the Moon speaks also Italian. In 2022, ASI and the Italian space system played a significant role in the launch of NASA's Artemis I mission, providing relevant technological and design inputs to the Orion spacecraft and the European Service Module, launched aboard the powerful SLS launcher's inaugural journey. Onboard the mission, which took place over 26 days between November and December 2022, marking the start of the new race to the Moon, the nanosatellite ArgoMoon from the Italian Space Agency also travelled, shooting some captivating images of the Earth and its natural satellite. Furthermore, in June, ASI and NASA signed in Rome an agreement for the development of multi-purpose lunar modules. In the coming months, the ESA astronaut who will be part of the crew returning to the Moon will be designated, with both Italians, Luca Parmitano and Samantha Cristoforetti, being among the candidates.



THE PNRR FOR SPACE

The National Recovery and Resilience Plan (PNRR) marked more than one point in favor of Italian space activities in 2022. The recipient of 880 million euros, ASI proceeded to sign contracts with the Italian industry in a few months, with the aim of enhancing Earth Observation systems for monitoring the territory and outer space, and strengthening national competencies in the Space Economy.

In particular, ASI initiated the procedures for the development of infrastructures and services for Earth Observation, smart factories for the production of small satellites, projects related to the strategic sector of In-Orbit Economy and the development of innovative satellite

technologies. Additional resources from the PNRR, along with significant research and design capabilities of ASI, are managed by ESA with the support of the Italian Space Agency for the realization of IRIDE, one of the most significant European satellite programs for Earth Observation. It will consist of a "constellation of constellations" comprising sub-constellations of low-orbit satellites, ground operational infrastructure, and services for the Italian Public Administration, and will adopt different optics and frequency ranges.

MINIATURIZATION: A WON CHALLENGE

Reduced mass, high standardization, intensive use of commercial components, lower costs, and faster development times for nanosatellites, along with more frequent and less expensive launch opportunities. The challenge of miniaturization has been accepted and won by ASI as well, with the launch of ALCOR, an innovative and ongoing program dedicated to nanosatellites. Its goal is to help the Italian space community achieve European and international leadership. Over a few months, ASI has already supported about twenty missions covering all major application domains in the space sector.

In line with the miniaturization mantra, in recent years ASI has also worked on the Platino program, a versatile platform capable of accommodating different instruments for various purposes. Additionally, two ASI nanosatellites participated in two historic NASA missions during the year. In August, LiciaCube documented the impact with which the DART probe modified the trajectory of the Dymorphos asteroid, and in November ArgoMoon took part in the Artemis I mission.



THE NEW ITALIAN PROTAGONISM AT THE ESA MINISTERIAL COUNCIL 2022

On November 22nd and 23rd, the European space community gathered at the Ministerial Conference 2022 in Paris, allocating 16.9 billion euros to ESA for the next three years - a 16.6% increase compared to the previous triennium. Italy invested 3.083 billion euros, being the largest contributor to optional programs.

Many positive outcomes were achieved during the negotiations, especially in the areas of Earth Observation, human and robotic exploration, and space transportation. Here are the main highlights: the Mars exploration program, ExoMars, led by Italy, will be

resumed, enabling Europe to land on Mars; the initiation of the new Moonlight program was signed, aimed at developing a lunar telecommunications and navigation system with associated services as a new European contribution to NASA's Artemis program; the foundations for an important Italian contribution to future reusable European launchers were laid; and the Future EO program was signed in the Earth Observation sector, preparing for upcoming missions and developing new European technological observation tools.

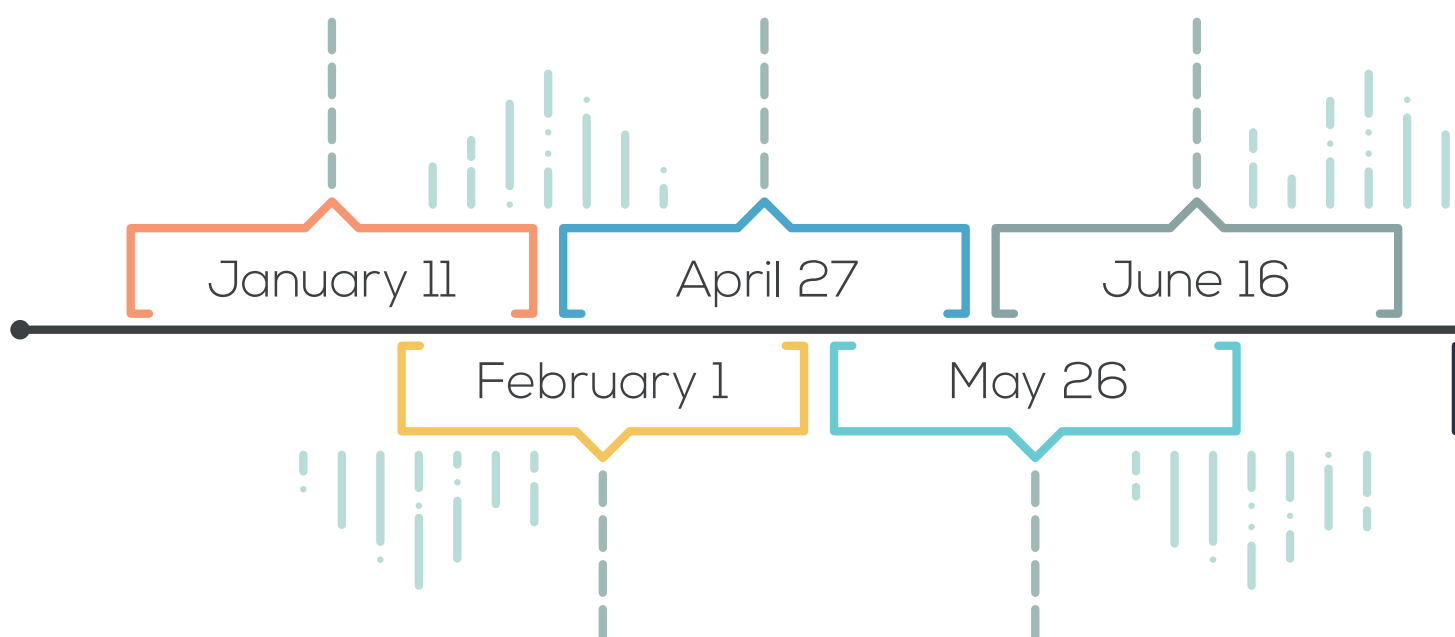
A YEAR OF SUCCESSES



IXPE, the first space observatory for studying X-ray polarization, born from the collaboration between NASA and ASI, directs its telescopes towards Cassiopea A.

Italian astronaut Samantha Cristoforetti returns to the ISS with the **Minerva** mission, spending 170 days onboard. She becomes the first European woman to conduct a spacewalk and to become the station commander.

ASI and NASA sign an agreement for a preliminary study dedicated to the design of future lunar modules proposed by ASI for the **Artemis** program.



The second satellite of the second-generation **COSMO-SkyMed** is launched into orbit.

Alcor, ASI's program dedicated to nanosatellites, is presented.





NASA's DART probe impacts the Dymorphos asteroid and alters its trajectory. ASI's **LiciaCube** documents the event.

The **2022 ESA Ministerial Conference** allocates 16.9 billion euros for the next three years. Italy, as the largest contributor to optional programs, invests 3.083 billion euros.



The new ESA launcher, **Vega-C**, co-developed in Italy, successfully completes its inaugural flight. ASI's payload, **LAES-2**, is released during the mission.

The first mission of NASA's new lunar program, **Artemis I**, takes off. ASI's **ArgoMoon** cubesat and Italian technology are aboard the European Service Module.

The **MTG-1** satellite mission is launched, the first European lightning hunter with significant Italian technology onboard.

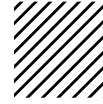




DIRECTORATE GENERAL

A SPACE BETWEEN HEALTH AND SAFETY

The Directorate General of ASI, and therefore the Director-General, has the primary responsibility of implementing and managing the resolutions of the Management Board and the President's provisions. In particular, the Director-General is responsible for directing, coordinating, and controlling the overall organizational structure.



For the exercise of his responsibilities, the Director-General relies on the organizational structure consisting of eight Directorates:



**PROGRAMS
DIRECTORATE**

**SCIENCE AND
RESEARCH
DIRECTORATE**

**INTERNATIONAL
AFFAIRS
DIRECTORATE**

**INSTITUTIONAL
COMMUNICATION
DIRECTORATE**

**SECURITY
DIRECTORATE**

**HUMAN
RESOURCES
DIRECTORATE**

**LOGISTICS
AND DIGITAL
TRANSFORMATION
DIRECTORATE**

**ADMINISTRATION
AND FINANCE
DIRECTORATE**

THE DIRECTORATE GENERAL ALSO RELIES ON DIRECT REPORTING FROM

Management Office Coordination Area (CMO)

Quality Unit

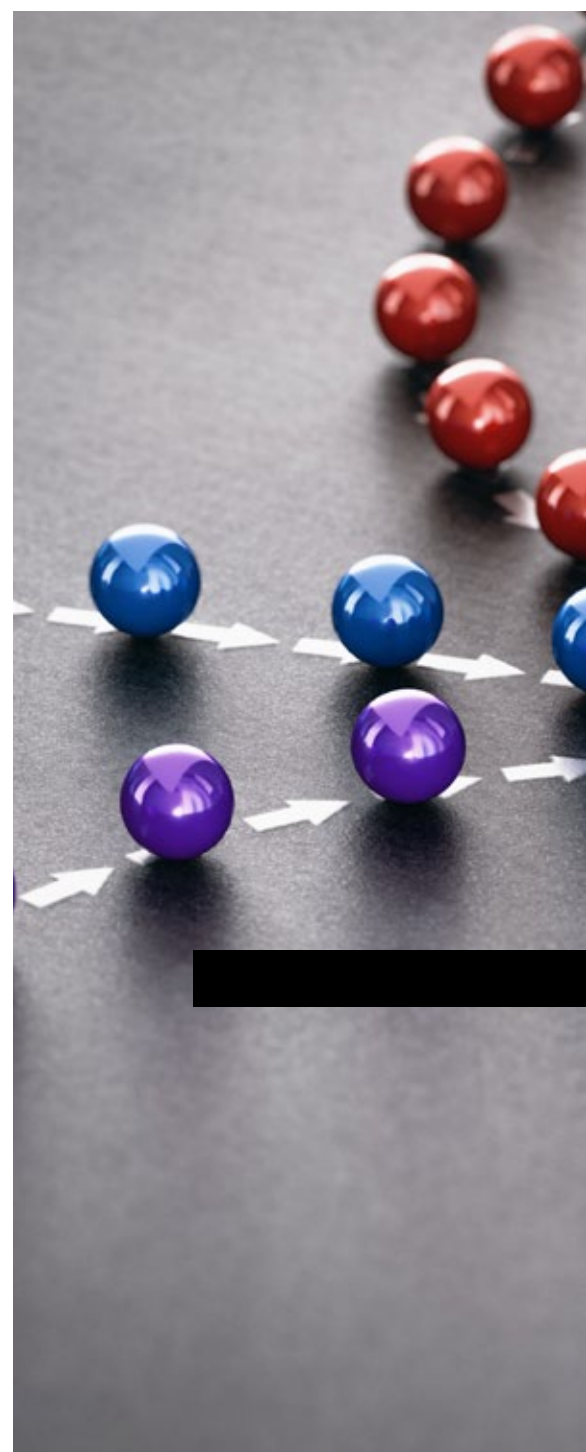
Head of Prevention and Protection Service Unit (RSPP) and Workplace Safety Unit

Offices and direct collaboration structures (Privacy and DPO Office, Management Office for ecological transition and environmental balance)

COORDINATION OF MANAGEMENT OFFICE (CMO)

The coordination area of the management office (CMO) is structured in the organizational unit “Management Control” and in the unit “Risk and Opportunity Management and Technical Structure of the OIV.” The CMO intervenes in the internal control system of the organization with the aim of ensuring the quality and reliability of processes and information to support top-level decision-making. Its action focuses on the development, improvement, and strengthening of first-level internal controls (direct verifications to ensure the correct execution of operations), second-level controls (staff controls entrusted to ad hoc structures, such as management control, risk management for the definition of methodologies, risk analysis, etc.), and third-level controls (verifications and actions to assess and improve the adequacy of systems, processes, and procedures, including first and second-level internal controls).

Within the organizational unit of management control, efforts have been made to optimize the use of systems, periodic reporting, technical and financial accountability, and the multi-year planning for 2021-2026. Coordination has been optimized for the preparation of the first integrated plan of activities and organization of ASI and other performance management cycle requirements for 2022, in compliance with relevant regulations, such as those related to social accountability (issuing reports for the years 2021-2022 in 2023).





In particular, in 2022, activities related to dematerialization and digital reengineering of processes have been of paramount importance. These activities represent an essential phase to consolidate and activate the organizational model and the internal control framework, also in order to improve the sustainability, consolidation, and further development of the new work from home mode. For example, by providing support to organizational structures in the management and monitoring phase of performance objectives (handled by the Management Control Unit), it allows personnel to operate efficiently regardless of logistical aspects.

Within the Risk and Opportunity Management Unit (URM), particular importance and priority were given to the implementation of the “Space To Knowledge Management in ASI” project in 2022. The project aims to detect, share, preserve, and enhance the knowledge accumulated over the years in specific areas that characterize the Italian Space Agency. A further purpose is to facilitate the integration of new hires and enable them to contribute with their expertise to the achievement of the agency’s institutional mission.

The project, which has now become a fully operational process of the organization, has the strategic objective of capitalizing on the knowledge that distinguishes the agency from other public administrations (from a strategic, diplomatic, scientific, and technological point of view) because it is the result of individual and collective experience and the ongoing execution of the agency’s characteristic processes. An innovative element of the project is represented by the use of behavioral sciences to increase the effectiveness of knowledge detection and sharing processes.

PROCESS OF KNOWLEDGE MANAGEMENT IN ASI

**Knowledge
Identification
and organization**

**Socialization
and knowledge
transfer**

**Enhancement
and preservation**

The General Management, through the UO URM, has promoted the establishment and consolidation of the Internal Audit function and risk analysis and management activities to integrate them with the management of the organization's performance cycle. This is done to support and improve the quality of top-level decision-making processes. Since 2021, ASI has developed an annual audit and risk management plan.

The audit plan is supplemented throughout the year by any assurance and internal consulting activities (facilitation activities), based on the needs identified by the top management of the organization and the Independent Performance Evaluation Body.

The risk plan aims to: a) consolidate the Risk culture as stakeholders in the management of corporate and project risks, b) strengthen a comprehensive approach to Risk management at the organizational level, c) create risk/opportunity scenarios through periodic reports to support the decision-making process and identify initiatives and opportunities that significantly impact the organization's performance objectives.

The Quality Organizational Unit also operates within the General Management. Achieving quality in the Space sector, as the full and substantial ability to meet the needs of stakeholders in a broad sense, is a strategic objective to be pursued primarily through:

- Optimizing processes/resources/products/services in the value chain based on continuous study, research, technological development, and the application of established best practices.
- Adequating management and control of all programmatic and technical activities related to the production of goods/services.

The primary purpose of Product Assurance/Quality Assurance (PA/QA) in institutional space projects is to ensure that the space product achieves the defined mission objectives in a safe, reliable, available, and sustainable manner until its final utilization.

In accordance with industry standards such as ECSS, ESCC, UNI, ISO, in which ASI actively participates in their development and maintenance, the domain is structured around the following priority actions:

Establish PA/QA requirements and ensure their flow-down and implementation by the supply chain and/or participation.

Ensure that all PA/QA disciplines are organized, planned, and covered by counterparts in accordance with contract or agreement requirements and program planning.

Ensure that all outputs of PA activities and disciplines are complete and consistent with applicable plans throughout the project.

Contribute to on-site and remote verification activities for all supply items (primarily through audits, surveys, boards, analysis, and evaluation of data packages).

Participate in acceptance, delivery, and operational deployment activities for contractual products/supplies.



Space Quality plays a much more significant role than in the past and must also demonstrate the ability to be agile and adaptive to keep pace with the emerging ambitions of new missions and the rapid evolution of the New Space Economy, contributing to the growth of the national and international industry.

In 2022, the Quality Unit contributed to its mission through concrete activities such as on-site verification and inspection at public/private organizations involved in ASI participation programs. Assistance during the acceptance, shipping, launch, and commissioning phases of COSMO-SkyMed Second Generation FM2, LiciaCube, LARES 2 satellites at launch sites and mission control centers, operational development of the ASIF infrastructure that provides individual users with test facilities for space applications, and organization and contribution to relevant workshops are just some of the significant stages of the ongoing commitment to Space Quality.

Within the scope of the Directorate General, the work carried out by the RSPP (Head of Prevention and Protection Service Unit) is also included, demonstrating the continuous attention paid to the safety and well-being of ASI staff. In 2022, ASI invited secondary schools to participate in the educational project “A Space between Health and Safety 2022”, to promote a new culture of health and safety through space thematics.



PROGRAMS DIRECTORATE

The Programs Directorate of the Italian Space Agency covers a wide range of space domains, including the well-established fields of Telecommunications, Earth Observation, Navigation, Robotic Space Exploration, and Space Access, as well as newer and cross-cutting areas such as Space Surveillance (SST/SSA), Suborbital Flight, In-Orbit Servicing, Nanosatellites, Technologies, and Engineering.

Each domain, through its operations and tools, contributes, albeit with varying degrees of significance, to support the space growth of our country, which represents an irreplaceable resource capable of contributing to multiple strategic, political, and socio-economic objectives.

This primacy is to be considered both in terms of technological maturity, the quantity and quality of operational infrastructures built, and the widespread adoption of applications and services derived from them. The international recognition achieved encompasses the industrial, academic, and research sectors, enabling the establishment of partnerships and collaborations on cutting-edge international programs and providing strategic services to institutions and citizens for the Italian economic and sustainable development.

Thanks to significant investments, the Italian industrial sector has achieved a high level of independence and competitiveness. Its diverse and extensive expertise has led to the development of multiple space assets with numerous implications benefiting various fields of application.

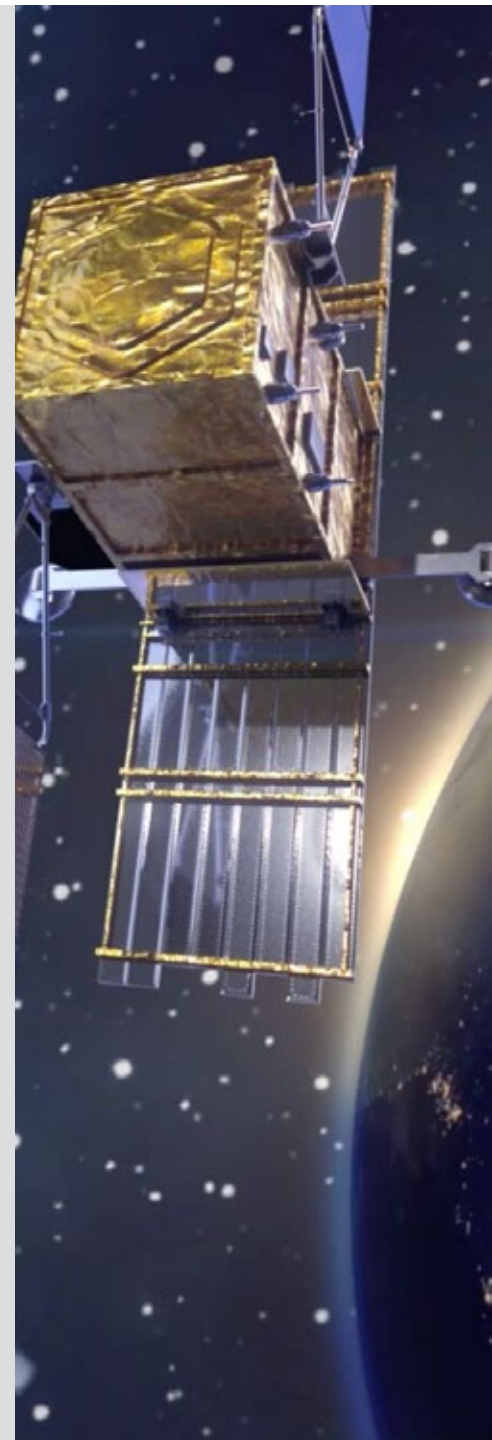
EARTH OBSERVATION AND APPLICATIONS



COSMO-SKYMED 2 LAUNCH

The second satellite of the COSMO-SkyMed second-generation constellation (CSG), promoted by the Italian Space Agency in partnership with the Ministry of Defense, was launched from Cape Canaveral Space Force Station - Space Launch Complex 40 - on January 31, 2022, at 23:11:45 UTC, aboard the Falcon 9 launch vehicle. The launch was a complete success and represented another important step in ensuring the continuity and consolidation of an extraordinary infrastructure, an Italian technological excellence recognized worldwide, capable of providing the most sophisticated monitoring and observation services of our planet.

The primary objective of CSG is to provide dual-use services, both civilian and military, for Earth Observation through a wide portfolio of products obtained in the various operational modes of the Synthetic Aperture Radar (SAR) sensor, ranging from narrow field and ultra-fine resolution to wide field coverage. The second generation of the COSMO-SkyMed system, thanks to significant investments by ASI and the Italian Ministry of Defense, features new functionalities, improved performance, and greater flexibility of use, enabling innovative services and applications for the economic and social growth of our country. In particular, the high quality of images and the high spatial and temporal resolution are powerful tools for monitoring ground movement and observing strategic infrastructure such as dams, bridges, or buildings. The data provided by the constellation are also a fundamental resource for the protection of the marine environment and its security. In this program, the Italian industry plays a leading role, with Leonardo and its joint ventures Thales Alenia Space and Telespazio, along with a significant number of small and medium-sized enterprises. In the following months, the Launch and Early Operation Phase (LEOP), In-Orbit Testing (IOT), and operational qualification activities will successfully be completed, fully enabling the integration of the second CSG satellite into the constellation and enhancing its overall capabilities.



PLATINO / MAIA AND SBG MISSION



The management of water resources, monitoring the effects of climate change and atmospheric pollution are some of the new challenges in Earth Observation for ASI. In this regard, the Italian Space Agency and NASA signed two collaboration agreements in 2022 for the implementation of the SBG-TIR and MAIA missions.

The SBG-TIR mission will be a fundamental component of NASA's Earth System Observatory and an important precursor to the European Copernicus LSTM mission. Its application objectives are related to water resource management for agriculture, monitoring coastal areas and inland water bodies, especially regarding the detection of anthropogenic spills and algal formations, mapping surface soil parameters such as organic matter estimation and mineral presence, biodiversity conservation, and managing dynamic events such as fires and volcanic eruptions.

The cooperation between ASI and NASA entails Italian responsibility for the system, satellite, and related operations, as well as the VNIR (Visible and Near InfraRed) instrument, while NASA will be responsible for the TIR (Thermal InfraRed) instrument and data exchange infrastructure. The activities of the Ground Segment will be shared between the parties. The other prestigious collaboration concerns the MAIA mission, using the PLATINO platform.

Numerous studies in the medical field highlight the link between particulate matter and health damage. However, as stated in a recent report by the European Commission, studies on the long-term and short-term exposure to air pollution are still insufficient.

The mission aims to measure aerosol extinction in 14 spectral bands and evaluate the relationship between different types of particulate matter and human health. The measurements taken by the satellite will be processed together with sensor data at selected sites and chemical transport models to characterize the sizes, compositions, and concentrations of particles in specific urban areas, including sites in the United States and Italy.

The collaboration involves Italian responsibility for the satellite and related operations, while NASA will provide the instrument and be responsible for the generation of products. The launch is scheduled for 2024.

I4DP - IMPLEMENTATION OF THE I4DP INITIATIVE'S FIRST CYCLE AND MULTI-MISSION DATA EXPLOITATION



Innovation for Downstream Preparation (I4DP) promotes the demonstration development (for use cases) of value-added services based on the use of TLC, NAV satellite systems, and EO data, also synergistically combined and integrated with non-space services, contributing to downstream growth. I4DP has been disseminated in national and international contexts through workshops and conferences (e.g., ETE, IAC, LPS, SPIE). Following user-driven approaches and through the periodic publication of thematic tenders/calls, I4DP targets three categories of users: institutional (PA), commercial (MARKET), and scientific (SCIENCE).

I4DP_PA: The evaluation and selection phase of proposals received in response to the first Call on the topic “Effects of Climate Change and Extreme Events” has been completed, with the publication of the ranking list and positive evaluation of 4 proposals.

I4DP_MARKET: The evaluation and selection phase of proposals received in response to the first Call, which was divided into two thematic areas, “Management and Monitoring of Infrastructure Stability and/or Critical Infrastructure, also regarding landscape preservation” and “Precision Farming,” has been completed, with the approval of the ranking list and positive evaluation of 7 proposals.

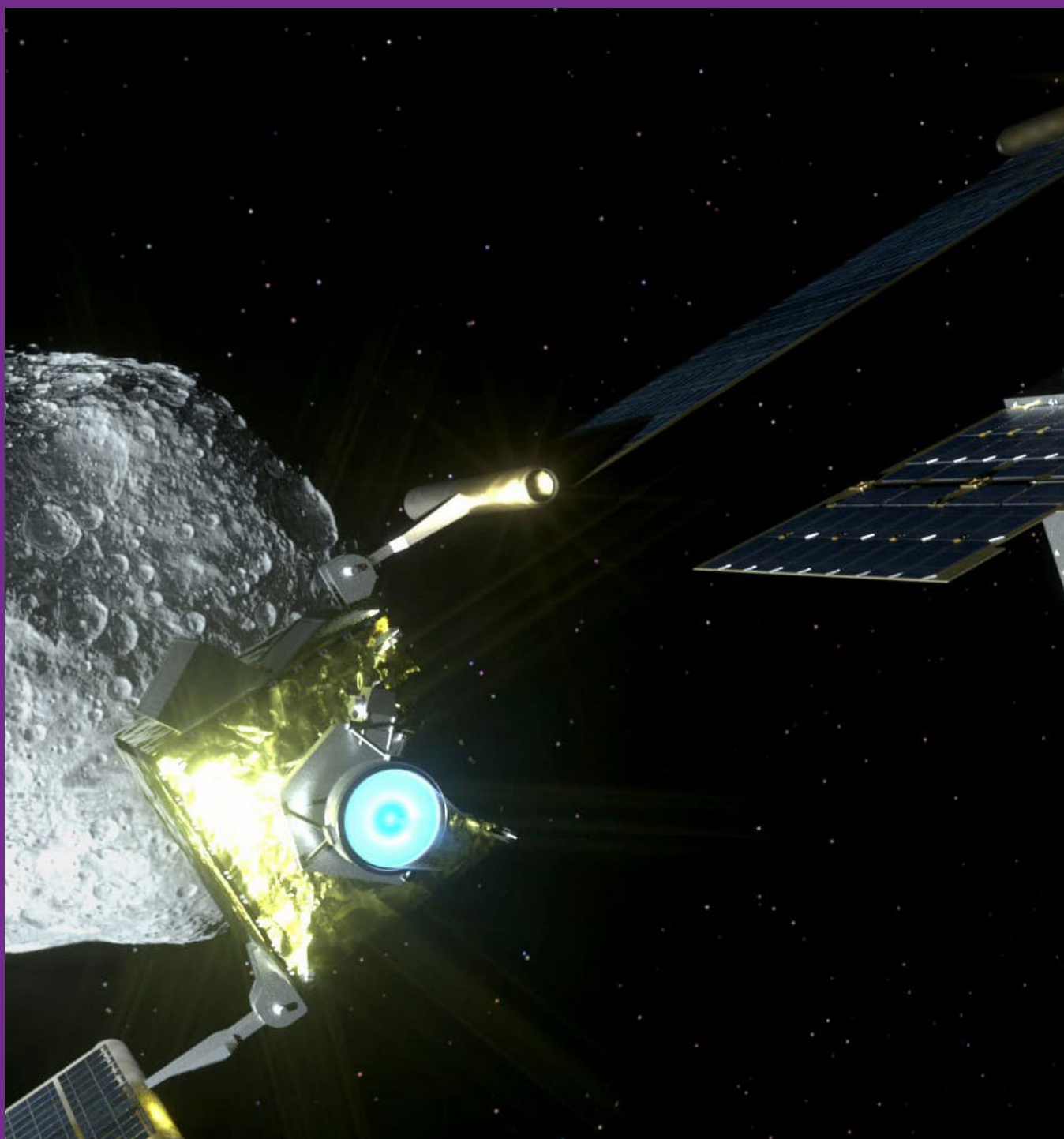
I4DP_SCIENCE: The evaluation and selection phase of proposals received in response to the first Call on the topic “Sustainable Cities” has been completed, with the publication of the ranking list and positive evaluation of 7 proposals. The implementation agreements EcoNet and LCZ-ODC have been initiated. The second Call for Ideas, “Agriculture and Sustainable Use of Water Resources,” has been published.



Multi-Mission Data Exploitation promotes the exploitation of national EO missions (COSMO-SkyMed, PRISMA), European missions (Sentinel), and bilateral collaboration missions (SAOCOM). The contracts and projects related to the SAR/Multifrequency Call, PRISMA Science, Open Call, Development of prototype hyperspectral products, TEBAKA, and STOPP are preparatory to the development of applications for the synergistic use of satellite data integrated with in-situ information.



SPACE EXPLORATION AND SMALL MISSIONS



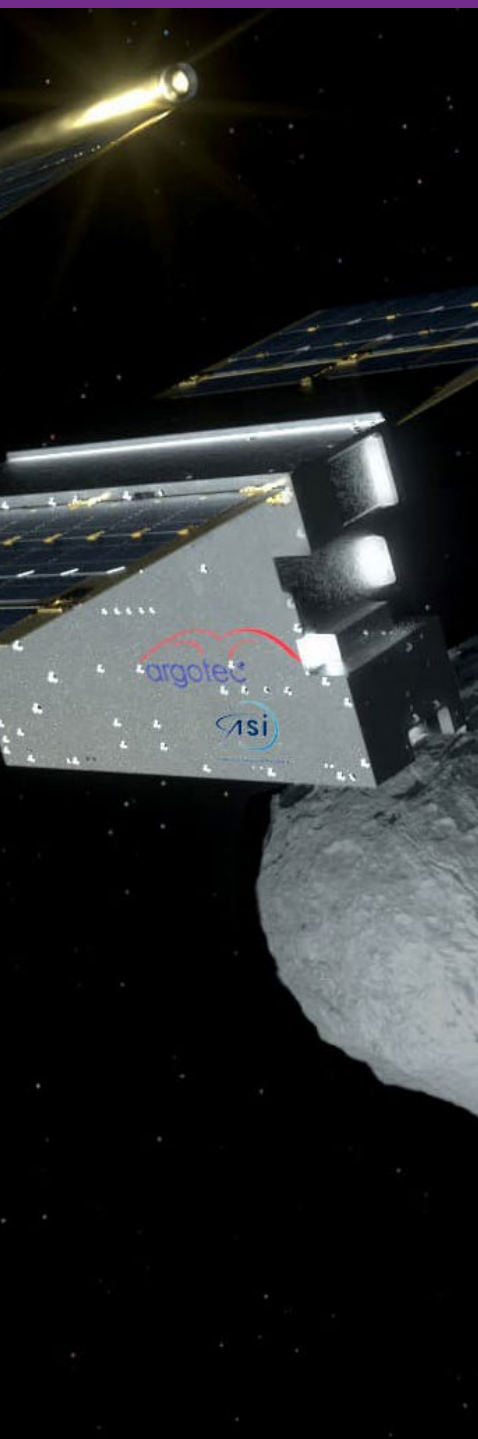


LICIACUBE, ARGOMOON, AND LARES 2

LICIACube, the Light Italian Cubesat for Imaging of Asteroids, is a 6U nanosatellite that took part in NASA's DART mission. It was the first international initiative of Planetary Defense aimed at testing the ability of humanity to deflect the orbit of a potentially threatening asteroid. Promoted, funded, and managed by the Italian Space Agency, LICIACube was developed and operated by Argotec with the contribution of national research institutions including the University of Bologna and Politecnico di Milano, coordinated by INAF. Launched in November 2021 along with DART, the nanosatellite was released on September 11, 2022, near the double asteroid Didymos. A couple of weeks later, it documented the impact of DART on the secondary asteroid Dimorphos with valuable images, confirming the effectiveness of DART's deflection and producing significant scientific results. It is the first Italian satellite in deep space beyond Earth's orbit and the third interplanetary cubesat globally, after JPL's MarCOs.

ArgoMoon is also a 6U nanosatellite, deployed in orbit during NASA's Artemis 1 mission on November 16. During its mission, it performed orbital maneuvers near the Moon and acquired images of the Earth and our natural satellite, validating important technologies for small satellites.

LARES2 was launched on the inaugural flight of the ESA VegaC launcher on July 13, from the CSG in Kourou, French Guiana. It is the second satellite in the series, ten years after the first LARES was placed in orbit by the first Vega launcher. LARES2 was developed to improve the measurement accuracy of phenomena related to fundamental physics and space geodesy. The release system of LARES2, as the first passenger of the new European launcher, hosted sensors and a video camera for monitoring environmental conditions during the launch.



LUGRE

DELIVERY OF FLIGHT MODEL PAYLOAD FOR NASA/ASI LUNAR MISSION

Within the LuGRE project (Lunar GNSS Receiver Experiment), resulting from a specific agreement with NASA and within the broader framework of the ARTEMIS Accords, of which Italy is also a signatory, the development of the flight model (FM) of the payload has been completed. The payload consists of a dual-frequency GNSS (Global Navigation Satellite System) receiver capable of using both GPS and Galileo signals. In addition to the receiver specialized for lunar missions, a directional planar antenna, a filter, a received signal amplifier, and the related wiring were provided. The LuGRE payload, developed by Qascom Srl under an ASI contract, was delivered to NASA in October 2022 to proceed with subsequent integration and testing phases on FireFly's Blue Ghost lander (contracted by NASA for the CLPS 19D mission). Previous tests were conducted using an Engineering Qualification Model to verify compliance with the expected requirements, complete developments, and finalize the FM model. The delivered FM model has been developed and optimized to acquire, track, and process GPS and Galileo signals during the Earth-Moon journey, in the cislunar environment and on the lunar surface. This significant milestone was achieved thanks to close collaboration between the NASA and ASI teams, who jointly managed the development and testing of the LuGRE payload. The project sets the stage for future lunar exploration missions, where positioning, navigation, and time synchronization capabilities will be crucial for achieving relevant scientific and applied results.

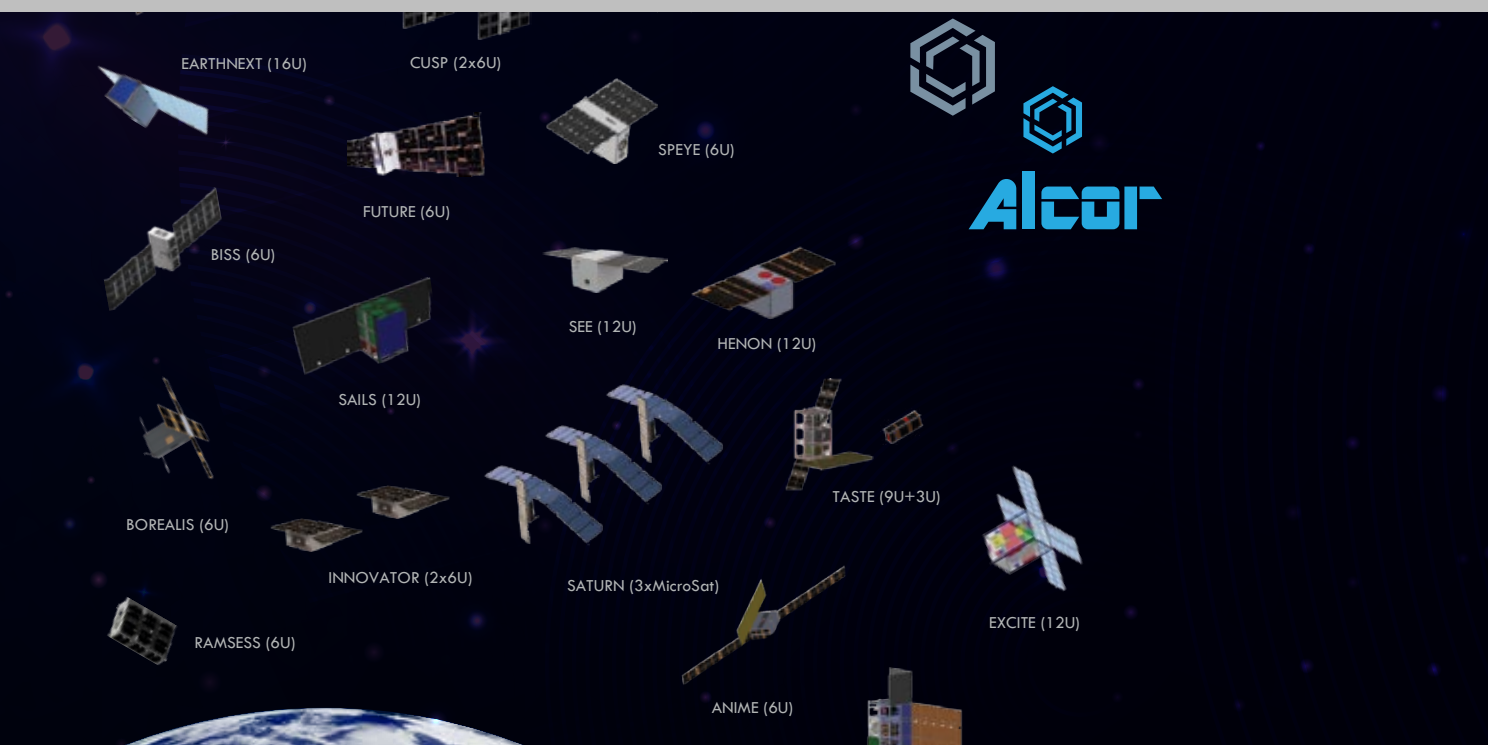


ALCOR

On May 26, 2022, the Italian Space Agency launched the ALCOR program aimed at bringing the Italian space community into a leadership position at both the European and international levels in the field of nanosatellites. ALCOR represents a kind of technological incubator to provide the opportunity for those with new ideas or those seeking new services to develop at least the first prototype and then advance their own business with a strong “customer-oriented” approach, autonomously identifying potential users among a wide variety of actors, including institutions such as Defense and Civil Protection. The focus on this class of satellites, which represents a strong driving force for the development of the new space economy, has significantly increased over the years, based on a series of factors that, working in synergy, have made their realization, launch, and operations increasingly feasible and cost-effective.

The twenty missions of the ALCOR program cover all the main application domains of the space sector, such as Earth Observation, telecommunications, in-orbit servicing, space

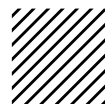
sustainability, astrophysics, and universe exploration. At the same time, they respond to all the major emerging trends in the nano-satellite sector, including the use of constellations with increasingly high-performing cooperation capabilities among individual satellites, the use of miniaturized propulsion systems, increased available power and data transmission capacity to the ground, the use of artificial intelligence for onboard data processing, the deployment of active and passive deorbiting systems, the development of new high-tech solutions for foldable antennas, and a growing interest in the use of nanosatellites in exploration missions. In 2022, a total of 11 missions were contracted, including 9 domestical and 2 supported by the ESA's GSTP-FLY program. The majority of these missions have already completed the feasibility study phase and are consolidating the preliminary design phase. Negotiations for the remaining 9 missions have commenced and will be concluded within 2023. The achieved results are extremely promising, and the first launches are expected to take place starting from 2024.





ACTIVITIES UNDER THE NATIONAL RECOVERY AND RESILIENCE PLAN (PNRR)

In May 2022, an agreement was signed between the Italian Department of Digital Transformation and the Italian Space Agency to finance some projects to be carried out within the framework of the PNRR. These projects are complementary and additional to the activities already initiated by the Italian Space Agency, with the aim of enhancing satellite communication and Earth Observation systems for territorial and outer space monitoring, as well as strengthening national competencies in the space economy and space access assets.



SPECIFICALLY, THE INITIATED PROJECTS ARE:

SatCom aimed at developing innovative satellite technologies with dual purpose, for the implementation of secure telecommunications networks, particularly targeted for use during crisis situations, institutional applications, and emergency management. The Italian Space Agency, considering the envisaged dual use, has signed an agreement with the Italian Ministry of Defense, which assumes the role of Contracting Authority.

Earth Observation - Matera Laboratory aimed at enhancing the “Giuseppe Colombo” Space Center at the ASI operational base in Matera and leveraging ground segment assets, as well as implementing the MapItaly project for the development of a digital twin of the country.

Space Factory 4.0 dedicated to the design and construction of intelligent factories for the production, assembly, and testing of small satellites, with the aim of increasing production volumes and meeting the growing demand for large infrastructures (mega-constellations), ensuring their deployment in relatively short times. This need can be met by introducing the principles underlying the concept of Industry 4.0 in the space domain, equipping satellite assembly and testing facilities with digitalized technologies and automated processes as much as possible.

In-Orbit Economy: comprises two projects. The first is **In-Orbit Servicing** organized in In-Orbit Demonstration missions for the management and reconfiguration of space assets and future maintenance of constellations and other orbital infrastructures, including the development of an orbital propulsion system for interoperability services in orbit. The second project is connected to space traffic management and the enhancement of national SST capabilities, including the establishment of a network of three wide-field telescopes for observing space debris, called “Flyeye” (a patent owned by OHB Italia and INAF). An additional fourth telescope will be funded using national resources.

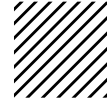
Throughout the year, the Agency has made great efforts to meet the European deadline set for March 2023 by initiating the 13 procedures for awarding the contracts necessary for the realization of all these activities. Already in 2022, the SatCom and FlyEye projects have commenced their development activities.



SCIENCE AND RESEARCH DIRECTORATE

THE ASI'S GAZE TOWARDS THE FUTURE

The evolutionary path of the human species has always had as its main objective the acquisition of knowledge and the overcoming of the physical limitations imposed by life on our planet. This has driven humanity to direct its efforts towards understanding the physical mechanisms that govern life on Earth and to question what lies beyond our own planet. Understanding the Universe is a challenge that requires constant advancements to unveil the intimate connections between the most extreme and distant environments of the Cosmos and the fundamental mechanisms of the laws of nature. Access to space, the development of new technologies, and the identification of new scientific approaches have historically allowed the opening of observational windows that have been the starting point for the exploration of uncharted horizons. To this day, these approaches represent fundamental tools to overcome the frontiers of knowledge and the consequent exploration of phenomena and observations that would otherwise be inaccessible, providing unique and complementary information to research conducted in ground laboratories for the understanding of the mechanisms underlying the laws of nature and the Universe.



In the last sixty years, scientific research in the field of space, supported by increasingly advanced technology, has been directed towards both the exploration of our galactic neighborhood, such as the Moon and the solar system, and the understanding of complex issues such as the study of the primordial Universe, high-energy physics (black holes, neutron stars, etc.), gravitational waves, and the search for Earth-like planets in other star systems.

The progress of space research has highlighted the need to bring together different and complementary scientific and technological knowledge, such as those in astrophysics, biology, engineering, and fundamental physics. This connection between different disciplines and research methodologies guarantees the enhancement of the sector-specific skills of the Italian scientific community on the international stage. The optimization of this interdisciplinary approach involves the development of interconnections between the scientific community, the academic world, and the industrial sector, and it is the objective of the development and coordination activities carried out by ASI Science and Research Directorate (DSR), in order to strengthen and maintain Italy's international position in future scientific challenges.

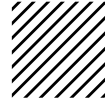
To this end, one of the tools used by DSR is the preparation of thematic roadmaps, which have a dual purpose: to identify the main areas of interest in the sector based on their relevance in the international context, evaluating the state of the art and the possible expected progress in the near future; to highlight any gaps in the most relevant scientific topics in the sector and the necessary diagnostics to bridge these gaps.

In this perspective, in 2022, an action was launched to enhance and coordinate national scientific communities through the establishment of initiatives such as congresses, workshops, and working groups that led to the definition of thematic roadmaps on space weather and heliophysics, astrobiology and life sciences.

Furthermore, the management of numerous funds, including those obtained through competitive calls, in 2022 allowed for the expansion of the community engaging with the Agency and supported the development of new technologies aimed at fostering the growth of the national space economy. This synergistic activity also involves the cultural investment carried out by DSR in high-level training activities. Through support for the development of technical and professional skills of university students and young researchers, the aim is to ensure a continuous supply of human resources for the national and international space sector. A virtuous example of such coordination with the national community is represented by the successful utilization of the European infrastructure HEMERA (Horizon 2020), dedicated to launch payloads on stratospheric balloon flights for innovative research and technologies. In this context, in 2022, Italian teams were among the major beneficiaries of this opportunity at the European level, demonstrating the high quality of the proposed research. The national coordination action, which enhances acquired heritage and promotes innovative ideas, allows ASI to support and facilitate Italian participation in major international missions and programs (with ESA, NASA, JAXA, etc.) in the field of Solar System exploration and the study of the Universe.



During 2022, the results obtained from missions dedicated to the study of the Sun, its magnetic field, the space radiation environment, and the planets of the Solar System led to significant scientific progress. The Italian contribution to joint missions with other agencies was fundamental, as in the ESA-JAXA BepiColombo mission equipped with the SERENA instrument, which for the first time observed new phenomena related to the dynamics of the magnetosphere of Mercury, the closest planet to the Sun. Also, of great relevance in its first year in space, are the scientific results of the ESA Solar Orbiter mission, dedicated to observing our star, which, thanks to data collected by the Italian coronagraph METIS, studied the structure of the solar corona to understand the phenomena governing the heliosphere and space weather.



In the context of collaborations with NASA, even in the field of deep space observation, 2022 witnessed the successful launch of the IXPE mission. Fifty years after the OSO-8 measurements, the mission is enabling the observation of dozens of celestial sources for the first time, thanks to three telescopes able to scrutinize the magnetic field structure and distribution of matter in the vicinity of black holes and neutron stars, which are crucial in the high-energy emission processes of complex astrophysical systems. In terms of programs aimed at protecting our planet and preserving its ecosystems, the NASA DART mission saw Italy at the forefront in documenting, through its LICIACube cubesat, the first-ever attempt to deflect the orbit of a celestial body.

In the context of international collaboration, a crucial role has undoubtedly been played by the International Space Station (ISS), which, due to its characteristics such as the presence of a constant microgravity condition and increased radiation exposure, represents a true laboratory of excellence for the study and de-

velopment of countermeasures against the effects of the space environment on human health. In this context, 2022 was a highly significant year for research in the field of human exploration, culminating in the Italian MINERVA mission. On October 14th, astronaut Samantha Cristoforetti returned to Earth from the ISS after conducting six Italian experiments on the space station, two of which are still on board. The experiments primarily aimed to study the effects, as well as potential responses, of some physiological systems and cellular mechanisms that are most impacted by the space environment, such as body composition (NutrISS experiment), the auditory apparatus (Acoustic Diagnostics experiment), the reproductive apparatus (OVO. SPACE experiment), and particularly oxidative stress (PROME.TEO experiment). Other studies focused on analyzing the effects of space stay on the chemical, physical, sensory, and nutritional characteristics of extra-virgin olive oil (EVOOS experiment) and monitoring cosmic radiation on the ISS (LIDAL experiment).



The ultimate goal of space missions is the advancement of knowledge, manifested through the development of innovative instrumentation and technologies, as well as scientific research based on new observations. ASI has therefore established research infrastructures such as the Sardina Deep Space Antenna (SDSA) and the Space Science Data Center (SSDC), which operate synergistically with each other and with the national and international community, covering the entire life cycle of scientific data.

SDSA was established in 2017 to provide navigation and communication services for interplanetary and lunar robotic and human exploration missions and support ambitious scientific experiments. It is currently used for “distinctive” activities rather than routine operations, and its capabilities will be expanded in the coming years to create a station characterized by versatility and high performance, in full compliance with international standards. On the other hand, SSDC, established in 2000, is responsible for valorizing the data collected by missions and scientific programs supported by the Agency, promoting their use through the development of tools and software technologies that simplify access, analysis, and scientific exploitation of the data, and fostering the fusion of diverse observations to build a comprehensive view. Among the numerous activities carried out in 2022, SSDC served as the Scientific Operations Center for LICIACube, developed the portal for the third data release of the Gaia mis-

sion, and supported the IXPE mission. The utilization of SSDC has also proven to be an enabling element for the NEOROCKS project, designed to provide a rapid response to an asteroid alert by involving a network of European telescopes and software systems to characterize both the dynamic and physical aspects of an object within a few days of its discovery.

Additionally, the activities of the Directorate at the Matera Space Center, which for over thirty years has been implementing synergy between observations from the ground and space through participation in the worldwide International Laser Ranging Service - ILRS and studies on free-space quantum telecommunications, are noteworthy. In this context, the Einstein Telescope Infrastructure Consortium - ETIC project, planned within the National Recovery and Resilience Plan (PNRR) and initiated at the end of 2022, stands out. It involves the construction of a next-generation ground-based observatory for gravitational waves and offers synergy with the LISA space mission.

Looking to the future, 2022 witnessed significant milestones in the integration and system testing phases for the JUICE and EUCLID missions, as well as the realization of the first telescope for PLATO. Their launches are scheduled for the coming years, with objectives including the study of Jupiter's moons, dark matter and dark energy, and exoplanets.



ASI-SSDC

The Space Science Data Center (SSDC) is a Research Infrastructure of the Agency that aims to enhance the data collected from missions and scientific programs supported by the Agency. ASI SSDC adopts internationally recognized standards to ensure interoperability with other national and international data centers, following the FAIR (Findable, Accessible, Interoperable, Reusable) principles of Open Science. ASI-SSDC, which is also internationally highly esteemed, serves as the focal point for the Agency's activities in the scientific exploitation of data, supporting over 25 programs and missions in the field of solar system exploration.

SDSA

The Sardinia Deep Space Antenna, located at the Sardinia Radio Telescope (SRT) in San Basilio (Cagliari) and managed by the National Institute of Astrophysics (INAF), aims to provide navigation and communication services for Deep Space and Near-Earth missions, robotic and human exploration, as well as to support ambitious scientific experiments under the responsibility of ASI.

The SDSA will also be used for joint research activities with INAF, universities, and the scientific community, offering multiple opportunities for collaboration at the national and international level.

The SDSA is an essential component of the Space National Recovery and Resilience Plan assigned to the Agency in 2022 and will enhance its current capabilities to provide services for orbiting probes or fixed installations (sites and experiments on celestial bodies, etc.) in connection with NASA's Deep Space Network and the European Space Agency's ESTRACK network, and in collaboration with mission centers or networks of further space agencies.

The enhanced SDSA will primarily provide navigation and communication services for significant and challenging mission events, support experimentation in the field of telecommunications, particularly for Human Exploration, and offer new research opportunities to the Italian space scientific community in the areas of radio science, astrophysics, planetology, and fundamental physics through data collection, measurements, experimentation, and participation in various space missions. Research activities related to space telecommunications and the scientific content of missions will increasingly involve ASI and will also be supported by the Sardinia Deep Space Antenna Research Center.

The SDSA Research Center, located in Selargius (Cagliari), will be completed in 2023. The SDSA and the Research Center will operate together to establish a strategically significant research and scientific-technological development hub at the international level, involving the industrial and academic sectors.





INTERNATIONAL AFFAIRS DIRECTORATE

INDUSTRIAL SECTOR, ESA, AND INTERNATIONAL RELATIONS

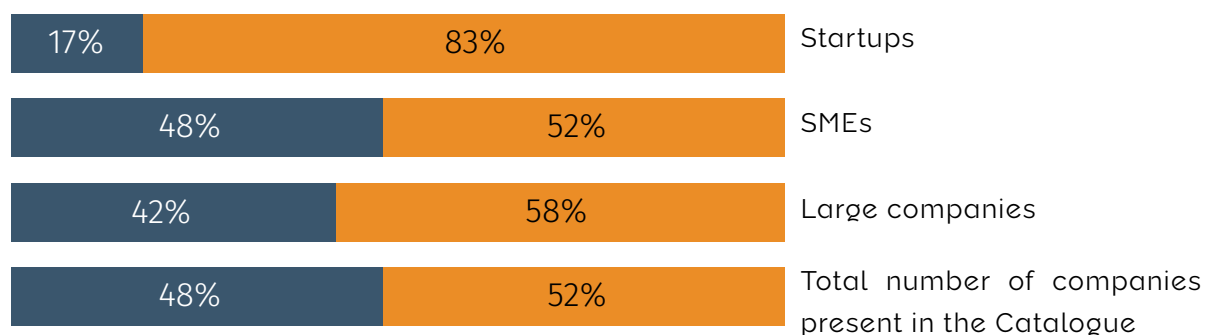
Italy is one of the few countries worldwide that, thanks to investments made in recent decades, has developed an autonomous and complete space sector, ranging from the manufacturing of space systems, ground infrastructures, launch and orbit insertion systems, to the creation of value-added services and applications that utilize space data and technologies. This enables institutions, businesses, and citizens to access and leverage space.

TYPES OF ACTIVITY IN THE VALUE CHAIN

The graph represents the distribution in the two segments, Upstream and Downstream, of the companies present in the Catalogue of the Italian Space Industry 2021-2022, out of a total of 159.

● Downstream

● Upstream



The national space sector is also represented by three industry associations: AIAD (Italian Association for Aerospace, Defense, and Security), AIPAS (Association of Companies for Space Activities), and ASAS (Association for Services, Applications, and ICT Technologies for Space), as well as 10 technological districts located in Italian regions. In addition, ASI actively collaborates with a thick network of universities, departments, and research centers.



TECHNOLOGICAL CLUSTERS IN ITALY



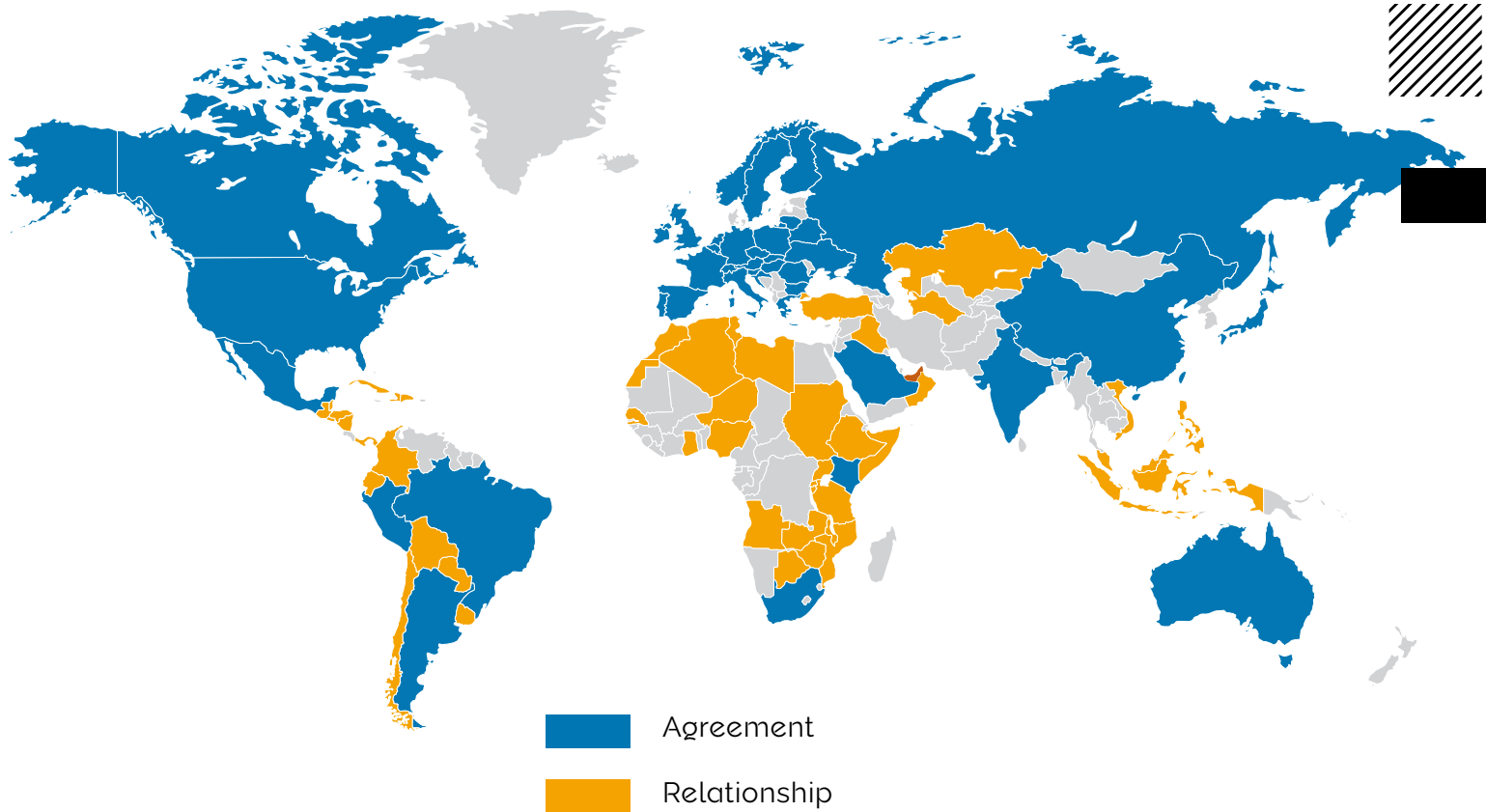
INTERNATIONAL RELATIONS AND SPACE DIPLOMACY

Most of Italian space activities are carried out within international collaborations with longstanding partners such as ESA and NASA, as well as numerous emerging or developing partners across six continents. This highlights that space is increasingly an instrument not only for scientific and technological progress but also for foreign policy and diplomacy.

The International Affairs Directorate manages the international relations of the Agency and, through scenario studies and analyses and regular consultations with competent authorities, particularly with the Ministry of Foreign Affairs and International Cooperation (MAECI), represents the Agency in appropriate national and international forums, starting with ESA, the European Union, and the United Nations, thus contributing to the mission of ASI.



AGREEMENTS AND RELATIONS



RELATIONS WITH THE EUROPEAN UNION

In the EU context, Italy remains a crucial actor in the implementation of European programs and contributes through the development and provision of satellites, payloads, applications, services, and enabling technologies. At the institutional level, Italy is directly involved in all EU space activities of a political, strategic, and technical nature, participating in the Space Advisory Group, committees of various components of the EU space program (Horizontal, Galileo & EGNOS, Copernicus, GovaSatcom, and SSA), the Horizon Europe research program, and technical working groups. In this context, the establishment of the European Union Agency for the Space Program (EUSPA) in 2022, alongside ESA, with competence at various levels for all the aforementioned programs, is noteworthy.



RELATIONS WITH ESA

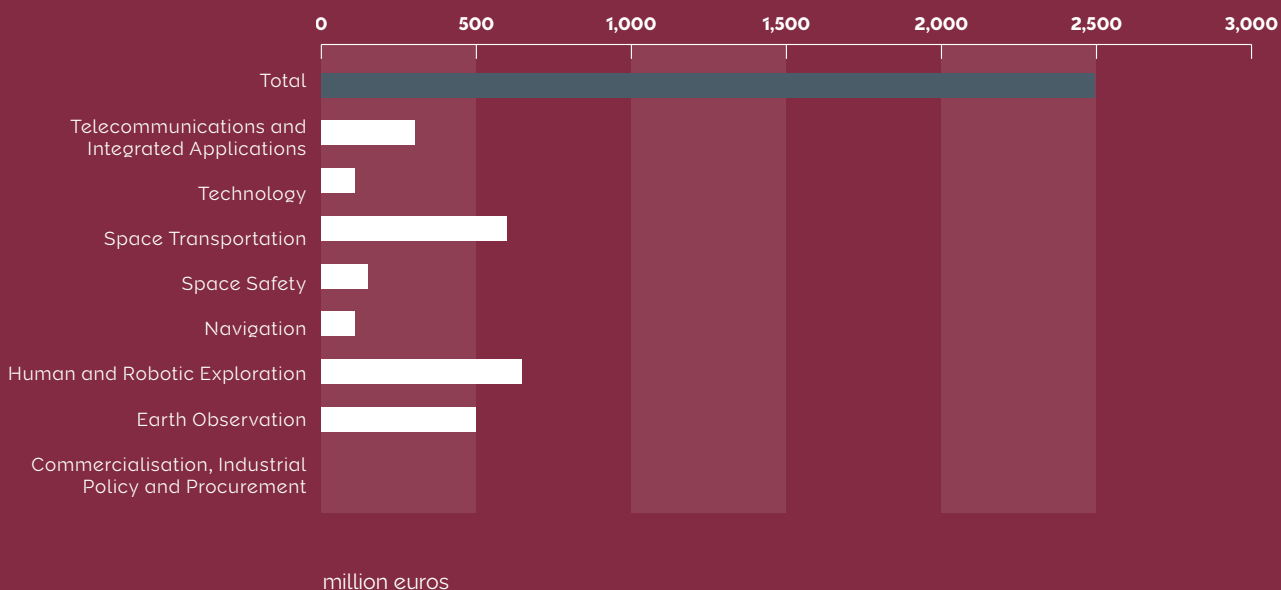
Italy is one of the founding countries of the European Space Agency (ESA) and, through ASI, actively contributes and participates in all ESA activities. In the latest ESA Ministerial Council (CM22) held in Paris in November 2022, Italy confirmed its position as the third largest contributing country, following Germany and France, with a total investment of approximately 2.8 billion euros for the period 2023-2025, thus renewing its commitment to the Mandatory Program, including the Scientific Program, infrastructure costs, and general activities, as well as Optional Programs. In the case of Optional Programs, Italy became the leading contributing country for the first time, allocating a total of 2.5 billion euros. Italy has increased its commitment in the fields of Exploration (Mars and cis-lunar orbit), Telecommunications (ARTES program), Launchers (Vega, Space Rider), and maintains a primary role in Earth Observation and Space Safety.



ITALIAN SUBSCRIPTION TO CM22



OPTIONAL PROGRAMS





LUIGI BROGLIO SPACE CENTER MALINDI

The Luigi Broglio Space Center (BSC) in Malindi, Kenya, is a joint space co-operation program between Italy and Kenya. Since 1964 the existence of the BSC in Kenya has been governed by an intergovernmental agreement between Italy and Kenya for cooperation in space activities. The agreement was renewed for the first time in 1995 for a duration of 15 years. The new intergovernmental agreement signed on October 24, 2016, for a duration of 15 years, came into effect on December 16, 2020.

It provides for the conclusion of five implementing agreements (Education and Training, Access to Earth Observation and Scientific Data, Establishment of the Regional Earth Observation Center, Assistance in establishing the Kenyan Space Agency, and Telemedicine).



HISTORICAL NOTES

26.04.1967

Launch of the San Marco 2 satellite from BSC

San Marco 1 was launched on 5.12.1964 from Wallops Island in Virginia.

12.12.1970

LAUNCH OF THE UHURU SATELLITE

24.04.1971

LAUNCH OF THE SAN MARCO 3 SATELLITE

18.02.1974

LAUNCH OF THE SAN MARCO 4 SATELLITE

25.03.1988

Launch of the San Marco D/L satellite

Last launch from BSC

1995

Italy-Kenya Intergovernmental Agreement for BSC

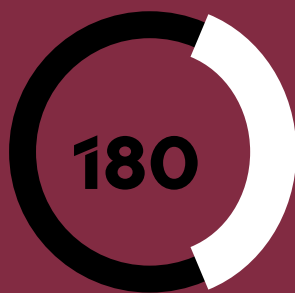
2004

Transfer of BSC management from Sapienza to ASI

2016

New Italy-Kenya Intergovernmental Agreement for BSC

BSC IN NUMBERS



LOCAL WORKERS

3



SUPPORT TO
SPACEX LAUNCHES

3



SUPPORT TO
ARIANE LAUNCHES

20

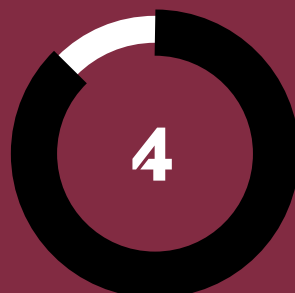


SUPPORT
TO CONAE

8,760



ACQUISITION OF
PASSAGES OF
AGILE, NUSTAR,
SWIFT, AND IXPE
SATELLITES

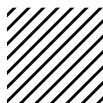


ACTIVE CONTRACTS
WITH SPACE AGENCIES

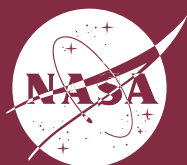
2



ITALIAN INDUSTRIES
AT BSC: GRADED AND
TELESPAZIO



COLLABORATIONS



ACTIVITIES AT BSC

OPERATIONAL SUPPORT

Routine services for AGILE/ASI, Swift, NuStar, and IXPE NASA missions. Support for the upcoming COSI mission by NASA.

SCIENTIFIC AND TECHNOLOGICAL ACTIVITIES

RESEARCH ACTIVITIES

TRAINING ACTIVITIES

A hand is shown reaching out from the bottom left towards the center of the frame. The background is a deep space scene filled with stars and nebulae. A digital, glitch-like effect with horizontal lines and a rainbow color gradient (purple, blue, green) is overlaid on the hand and the background, suggesting a technological or digital theme.

INSTITUTIONAL COMMUNICATION DIRECTORATE

Space-related topics are increasingly capturing the attention of institutions, the scientific and industrial community, the world of finance, and citizens.

They are beginning to be perceived as current issues rather than just future ones, even by a wider and non-specialized audience.

This is why the institutional communication of the Italian Space Agency plays an increasingly important role in promoting a vision of economic and social development based on research, technology, and innovation in the space sector. ASI is a leader in cutting-edge research, space programs, international cooperation for space, and owns outstanding technological expertise. For this reason, ASI proposes itself as a producer of high-quality contents suitable for the dissemination of space-related topics and activities. From this perspective as well, 2022 was a year of great commitment, during which ASI's institutional communication faced the challenge of resuming "live" communication with stakehold-

ers and citizens, re-discovering an intensity and a variety of channels and tools that had been necessarily compressed in the previous two years due to the pandemic.

The Agency has developed its communication and outreach activities designed for its main reference targets: national and international institutions and actors in space, the business sector, research, education and training, citizens, and the media. In order to reach these stakeholders, the Agency has used a diverse mix of tools and channels to specifically engage them. Particular attention has been given to young people, for whom outreach activities have also been carried out with the aim of bringing them closer to STEM subjects.

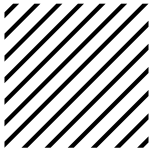


EVENTS: ASI'S IMAGE IN ITALY AND THE WORLD

The major themes of space exploration and Earth Observation have been at the center of a number of international events (6) and national events (14) in which ASI participated with exhibitions and scientific dissemination activities and space diplomacy. ASI showcased the Italian Space System at major international aerospace shows such as the Farnborough International Airshow in London and the 73rd edition of the International Astronautical Congress in Paris. At national events such as the Earth Technology Expo in Florence, the Rome Science Festival, and the New Space Economy, ASI highlighted some of its institutional activities through booths, exhibitions, and conferences.

In 2022, ASI reopened its Rome headquarters to the general public. There were numerous visits by citizens, families, and young people for the Open House event, the European Night of Research, and events organized on the occasion of the 2nd National Space Day.

The exhibitions organized by ASI or to which ASI contributed in Italy and abroad also enjoyed great success. On the occasion of the 2nd National Space Day, the Agency created “Exploring Moon to Mars,” exhibited in Rome, focusing on the exploration of the Moon and Mars. Earth Observation was the focus of “Looking Beyond,” an exhibition of satellite images (captured by the COSMO-SkyMed constellation) by MAECI, ASI, and Telespazio/e-GEOS, hosted in 50 countries at Italian diplomatic and consular offices. The “Space4OurPlanet” exhibition, with the contribution of ASI, toured Italy and then arrived at the United Nations in New York. The “Mediterranea” exhibition, which also featured satellite images, was originally produced in 2019 and was re-edited for a tour of countries in the Mediterranean region.



International Events



National Events



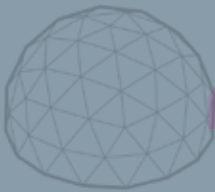
Public-facing in-house events



Event visitors



Exhibitions



Exhibition visitors

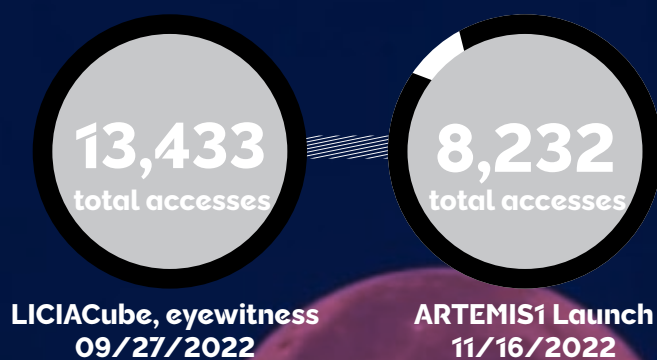
+ 1 travelling exhibition
in 50 embassies





MAJOR LAUNCH CAMPAIGNS

Main ASI tv livestreams:



Two exceptional occasions to speak about Italy's space activities and scientific and technological research of the Agency were provided by two globally significant events. Both were livestreamed by the Agency. The first occasion was the impact of the American DART spacecraft on the asteroid Dimorphos to change its course, with ASI's LiciaCube cubesat as a privileged photoreport. The second event marked the recent history of space exploration: the launch of the Artemis mission.

83 press releases
+ **8** press conferences

Press releases and press conferences

5,621

Articles published in newspapers, online websites, and new media

990

Reports on radio and TV

ENGAGING WITH THE MEDIA

Communicating ASI and its activities to the press in Italy and around the world: in 2022 media relations statistics highlight a significant effort, rewarded with over 5,600 articles in print and online media and almost 1,000 mentions on radio and TV. The Press Office turned to new interlocutors by involving not only traditional actors such as news agencies, radio, TV, and print media, but also new stakeholders: influencers, bloggers, and digital editors in the field.

MULTICHANNEL COMMUNICATION

The web and social media have allowed direct communication with various stakeholders of the Agency: Italian and international institutions, industry, research, citizens, and young people. The institutional website asi.it and the online magazine globalscience.it together received over 1.8 million page views.

In 2022, four issues of the quarterly magazine Spazio 2050 were published, distributed on-site and at events, sent by free subscription, and available online. Each issue featured an in-depth exploration of a current space-related topic, with articles and interviews with experts and stakeholders of the Agency.

The number of followers of ASI on social networks continues to grow. ASI is present on Facebook, Twitter, YouTube, LinkedIn, and Instagram, and it has experienced significant growth in subscribers, especially on the latter two networks, thanks to tailored language and messages for the specific audience: professional and institutional on LinkedIn, and more generalist and young on Instagram.

1,196,126

Views of articles on the online magazine [Globalscience.it](http://globalscience.it)

593,811

Views of pages on the institutional website asi.it

201,490

Web TV users

Total social media followers

365,712

Including:



Twitter

172,312



Facebook

77,086



Instagram

68,187



Linkedin

48,127

EDITORIAL PROJECTS

Comics continue to be a successful tool for disseminating space-related topics. The collaboration with leading Italian publishers, such as Giunti (Disney brand) and Bonelli, which receive scientific contents from ASI, successfully continues. Comics have been distributed in newsstands and industry events.

COMICS CREATED

Topolino

n. 8 pages and
n. 8 editorials

Topolino print run:

138,000
copies

Nathan Never
Mission Asteroids

Print run:

5,000
copies



CAPTURING THE STUDENTS' INTEREST

Although in 2022, due to pandemic-related reasons, student visits to the Rome headquarters were suspended, the education and outreach activities carried out by the Agency still involved the education and training system, also within the ESA's ESERO program, in which ASI participates for Italy. Education initiatives focused on space-related topics, including workshops for teachers and students, laboratories, and activities held during exhibitions and festivals, in collaboration with universities, research institutions, and science museums, have maintained a high level of interest in STEM subjects, with the aim of encouraging young people to pursue studies and careers in the scientific field.

ESERO PROJECT PARTICIPANTS - STUDENTS

— | 4,820

ESERO PROJECT PARTICIPANTS - TEACHERS

— | 2,772





SECURITY DIRECTORATE

Space, always considered one of the global commons, has been receiving increasing attention in recent years due to the growth of activities, their rapid change, and their enormous influence on the global economy, which currently depends directly or indirectly on the services provided by space systems.

The most significant factor is the exponential growth of private entities engaging in various space activities.

This phenomenon has led to an inevitable and increasing level of competition, with a consequent risk of accidents, including unintentional ones, but perceived as irresponsible behavior by other stakeholders, with inevitable implications for the relationships between the countries involved. This is especially true for so-called civil assets.

In terms of security, particular consideration should be given to the perception of space as an enabling factor for diverse applications in strategically relevant sectors, from human and social aspects to economic and environmental ones, as well as its connection to more traditional defense-related aspects.

In this perspective, states engaged in space activities that do not make efforts to raise awareness of the risks associated with them, also through their own internal regulations (e.g., national space laws), may be considered unaware of their role.

Indeed, in recent years, the intensification of industrial competition, cybersecurity threats, the presence of emerging countries, and the growing involvement of private investors, coupled with the difficulty of international organizations in regulating space use, necessitate increased awareness and particular attention to new potential risks. This is crucial not only to recognize harmless behaviors but also potentially hostile ones.



The development of an analysis capability regarding the context in which strategic space systems are realized and operate is a national requirement but involves all public and private entities to predict and prevent potential risk scenarios and mitigate their effects.

It is also essential for the state to develop a more widespread awareness of the implications that can arise from space activities taking place under its jurisdiction. Adherence to key international treaties on space entails its responsibility within the international community.

In this direction, ASI, already in 2012 through a resolution of its Management Board, established the ASI Security Committee, whose activities are aimed at:

“...analyzing the strategic security issues related to the development, implementation, and use of national, supranational, and international space systems.”

Subsequently, the “National Security Strategy for Space,” as a projection of the broader “National Security Strategy” derived from the “Government Guidelines on Space and Aerospace,” and in line with the systemic vision of national security strategy, called for synergistic action to be developed through collaboration between different administrations and with the support of industry, academia, research, and the private sector. This aims to enhance collective security and the country’s resilience, which cannot be separated from the dual sense of “security from space and of space.” The Agency, within its area of competence, also addresses its actions to strengthen and protect national space infrastructure, both public and private, and their resilience against threats, intentional or unintentional, to orbiting and terrestrial assets. It ensures the proper management of security within the scope of its mission and the initiatives undertaken in both programmatic and enabling sectors.





Within this framework, the ASI Security Directorate also carried out liaison activities with relevant state administrations in 2022, to identify any potential implications related to national security within the Agency's activities. In this regard, it established an internal permanent working group to achieve greater efficiency on this front.

International forums dedicated to security for space activities within the European Union, the European Space Agency, and those established through bilateral collaborations with other countries' space organizations were also attended.

The adoption of security measures appropriate to the level of criticality detected through context analysis has been verified in relation to institutional projects aimed at achieving excellence in the scientific, applied, and technological sectors concerning the institutional objectives of ASI, in support and coordination with other Agency Directorates.

Activities to ensure the security of Agency infrastructures both in Italy (Rome, Matera, Cagliari) and abroad (BSC in Kenya), particularly in the field of cybersecurity, have also continued.

Special attention has been given to promoting and disseminating the culture of security, including in-depth analysis of tools and methodologies for protecting the national system and strategic national industry. These efforts have been addressed to both internal staff and companies affiliated with the Agency, using webinars and in-person training sessions. These activities may also extend to other strategically significant industrial entities.





HUMAN RESOURCES DIRECTORATE

PUTTING PEOPLE FIRST

The Human Resources Directorate, in collaboration with the Agency's top management, oversees personnel policies and ensures their implementation in line with the organization's vision, values, and culture. It contributes to the development of an adequate corporate welfare system, manages personnel administration and reporting to the Directorate General, coordinates the implementation of planning and recruitment processes, evaluation, development, and enhancement of skills through appropriate training programs. It collaborates in identifying objectives, indicators, and targets within the Performance Measurement and Evaluation System for its respective areas of responsibility, and supports department managers in evaluating employees, ensuring the maintenance of individual employee files. Furthermore, it ensures compliance with current laws and contracts in handling disciplinary proceedings, prepares all documents related to labor relations management (guidelines, agreement protocols, certification procedures under Art. 40bis Legislative Decree 165/2001, etc.), collaborates with the Internal Communication Function, and supports the Legal Affairs Unit in labor-related litigation. Lastly, it manages processes related to social security activities required by current regulations, handles relationships with social security institutions, verifies and maintains contribution records for personnel, facilitates the redemption and consolidation of employees' insurance periods, as well as the assessment of retirement eligibility requirements and the preparation of relevant retirement-related files and the necessary procedures for the settlement of end-of-service benefits.



WORK LOCATIONS



**HEADQUARTERS IN
ROME**



**MATERA
SPACE CENTER**



**MALINDI
SPACE CENTER**



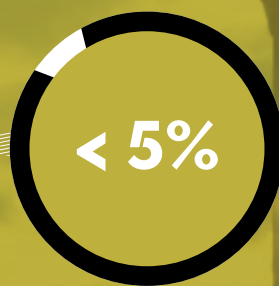
**SAN BASILIO
(CAGLIARI)
SPACE CENTER**



IN NUMBERS



**HUMAN RESOURCES
(TOTAL NUMBER OF
EMPLOYEES)**



**INCIDENCE OF HUMAN
RESOURCE COST WITH
RESPECT TO THE OVER-
ALL BUDGET**

**365
Employees**

**Permanent
employees
(Gender Balance:
182 women
and 183 men)**

**13
contracts**

**Temporary
contracts
(Opportunity,
no job insecurity)**

**11
Positions**

**Research grants
and scholarships
(Internal training
offers)**

Following the changes introduced by Law No. 7 of January 11, 2018 (the so-called “Space Law”), the Agency was granted greater autonomy in preparing the Triennial Activity Plan (PTA) and determining personnel requirements.

In light of new priorities arising from the implementation of the National Recovery and Resilience Plan, the Convention signed by ASI with the Department for Digital Transformation (DTD), and support initiatives for high-tech sectors to enhance Italian competitiveness in the Space Economy, in line with the provisions of the Strategic Vision Document for Space (DVSS) 2020-2029, the Agency is growing steadily to reach an organizational size of 600 staff members in the long term. As of December 31, 2020, the Agency had 277 employees, which increased to only 287 by December 31, 2021. However, by December 31, 2022, the number of employees had risen to 365, with the aim of recruiting an additional 85 individuals in 2023. Meanwhile, the share of human resources costs in the overall budget remains limited to approximately 5%.

GROWING IN CONSISTENCY WITH ROLE AND ACTIVITIES

Success for the Agency entails not only completing this significant growth to meet the challenges entrusted to ASI by the new governance, but also making a substantial investment in the development of existing human resources.

This involves applying motivational tools - in a meritocratic, selective, and incentivizing manner - provided by the application of legal provisions and contractual institutions aimed at eliminating job insecurity (a goal already achieved by the end of 2022), and developing careers and training. It also offers challenging opportunities for individuals to take on responsibilities in projects, programs, and positions outlined by the new organizational structure.

STATISTICS AS OF 12/31/2022

49.5

Average age of staff (years)

53

Average age of managers (years)

17.78%

Current personnel growth rate (difference over a year)

80.50%

Employees with a university degree

100%

Managers with a university degree

32

Training hours (average per employee)

€ 159,485.00

Training costs (in euros)

2.96%

Absenteeism rate

0%

Rate of premature resignations

0%

Rate of transfer requests to other entities

61,535.97

Average gross annual salary received by employees (in euros)

92.27%

Permanent staff as a percentage of total employees

49.60%

Women as a percentage of total staff

44.23%

Women in management positions/organizational units/offices

95.78%

Female permanent staff as a percentage of total female staff



IT, LOGISTICS, AND DIGITAL TRANSITION DIRECTORATE

The Directorate is responsible for the Digital Transition as referred to in Article 17 of the Digital Administration Code. It defines, in collaboration with the relevant structure of the Security Directorate, the security policy of the Information System and promotes the dissemination of security culture and practices throughout the information systems. It ensures the continuous availability of information, acts as the reference point for the information system security policy regarding internal and external stakeholders, defines and implements policies for the security of the digital preservation system and governs its management. It interprets and applies, in collaboration with the Privacy and DPO Office, the protective measures and controls for the protection of personal data to ensure compliance with the GDPR. It implements regulations for the security and availability of data, systems, and infrastructures under its responsibility, ensuring the continuous availability of information. It guides the

evolution of IT resources supporting organizational processes, aligning internal infrastructures with organizational objectives. It manages ASI's information assets by classifying them in the company's asset classification. It anticipates the evolution of the ICT market and ASI's needs and provides specialized design support on relevant topics within research programs and projects. It manages the maintenance services of the real estate assets, facilities, and infrastructural and application services in use. It defines and implements continuous training and development of the Directorate's and ASI's personnel, in close coordination with the Human Resources Directorate. It identifies the contents of internal and external communication related to the Directorate's areas of expertise to be transmitted to the Communication Directorate. It ensures compliance with the performance management cycle and the current Performance Measurement and Evaluation System to the extent of its responsibility. It contributes to the development of ASI's strategic plan within the Directorate's scope. It maintains relationships with governmental entities for the development and coordination of national digital development (AgID, Department of Digital Transformation, ACN, etc.). It collaborates with UNI and UNINFO for the development of standards, representing ASI in the national public body. It promotes and coordinates strategic digitalization projects in collaboration between ASI and other national and international institutions, organizations, and agencies, participating in relevant committees and boards. It collaborates with universities and research institutes for the adoption of new technologies, also using prototypes in laboratory testing of solutions. It participates in the review boards of international journals to increase knowledge about new technologies.



TRIENNIAL PLAN FOR IT

In order to operationally support the digital transition of public services to citizens and businesses, adopting transparent and open relationship models with civil society, ASI participates in the implementation of the Triennial Plan for IT in the Public Administration, currently available in the 2022-2024 edition. The Plan includes numerous actions over the three-year period on vertical themes such as services, data, platforms, and infrastructures, as well as cross-cutting areas of interoperability and information security, involving various Directorates and organizational Units of the Agency. The Triennial Plan, in continuity with the previous edition, consolidates the focus on implementing the planned actions and monitoring the expected results, increasingly becoming an operational guide.

The update introduces some new elements, including the provision of objectives and expected results related to the implementation of the National Recovery and Resilience Plan (PNRR), to which the Triennial Plan is connected through specific projects, such as the Single Digital Gateway (SDG) and the National Digital Data Platform (PDND). By aligning its objectives, results, and actions with the PNRR, the plan serves as a tool to support central and local administrations in achieving the milestones and objectives set by the PNRR.

The structure of this plan, which is an essential tool to promote the digital transformation of the country, particularly in the public administration, is accompanied by a corresponding plan for internal evolution in the areas of computerization and digitization.



ASI's evolution plan considers the strong push for “agile work” solutions that emerged in 2020 and has already initiated a series of adaptation interventions:

Upgrading of the IT infrastructure, including both central hardware components and peripheral equipment, as well as diversified access to cloud resources.

Enhancement of software tools, with a stronger focus on adopting collaborative work solutions.

Improvement of user support tools, dedicated to assistance, training, and information, to facilitate and foster remote access to workstations.

Revision and presentation of the services provided documentation.

The issue of information security is of absolute relevance and plays a fundamental role in the evolution of ASI's information systems. The importance of ASI in the national landscape highlights even more the need to equip the agency with the necessary capabilities to prevent, detect, and counteract cyber threats through the development of both technical and organizational initiatives.

To achieve these results, ASI is undertaking the necessary activities to:

Increase cyber threat awareness within the organization;

Develop and enhance prevention, monitoring, and incident response capabilities.



Lastly, starting from January 1, 2022, with the entry into force of the “AgID Guidelines for the Creation, Management, and Conservation of Digital Documents,” Italian public administrations are required to review and adapt the entire life cycle of produced documentation to comply with the dematerialization paradigm, ensuring its conservation exclusively in digital mode. The project aims to increase the organization's knowledge and enhance its skills, also highlighting the wealth of information within ASI for external users, ensuring relevance, accuracy, and reliability. The goal is to create a learning organization through management systems and processes for handling, archiving, and evaluating key information and knowledge (both explicit and implicit), safeguarding the resilience and flexibility of the organization and ensuring easy access and exchange of relevant information and open data with all stakeholders in an easily understandable manner.



KEY RESULTS AND INDICATORS

DIGITAL SKILLS (DIGITAL LITERACY)

The increase in computer resources has resulted in improved work efficiency and contributed to achievement of the set goals, by optimizing instrumental resources (effectiveness) in a perspective of reduced management of work time (efficiency).

During the recent pandemic, it also allowed for the normal continuation of activities entirely remotely (remote work). The improvement of digital skills relies on adequate basic and specialized training using the Public Function platform, which, through guided self-assessment, provides access to online courses on various digital topics, with particular attention to those relevant to interactions with citizens and users. In 2022, the platform was used by over 60% of qualified personnel, and in 2023, its use is planned to be extended to all employees.

DIGITALIZATION OF PROCESSES

In recent years, ASI has developed an integrated platform that enables the use of standard formats, accessibility from any device or location through cloud architecture, complete dematerialization, and real-time monitoring. In 2022, all procedural processes were carried out on this platform, resulting in an average time savings of 20%.

DEMATERIALIZATION

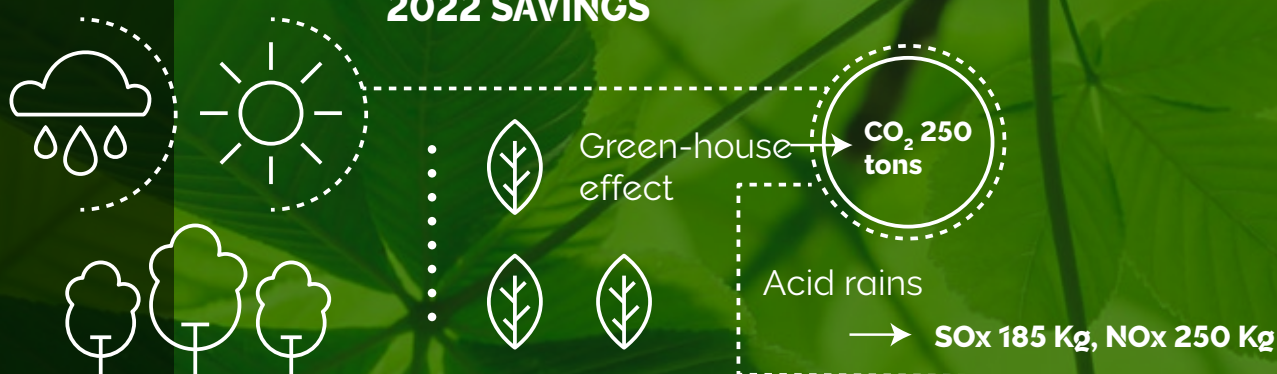
The elimination/reduction of paper (paperless) brings the benefit of eliminating/compressing costs related to copying, printing, shipping, storage, disposal, and searching. In 2022, the per capita paper consumption showed a 22% reduction compared to 2019, equivalent to 232 trees.

The dematerialization of the historical paper archive, combined with the current management of native digital documentation, will simplify searches and facilitate the sharing of ASI's document heritage with external stakeholders, along with the enhancement of the Agency's scientific library.

ENERGY EFFICIENCY AND SAVINGS

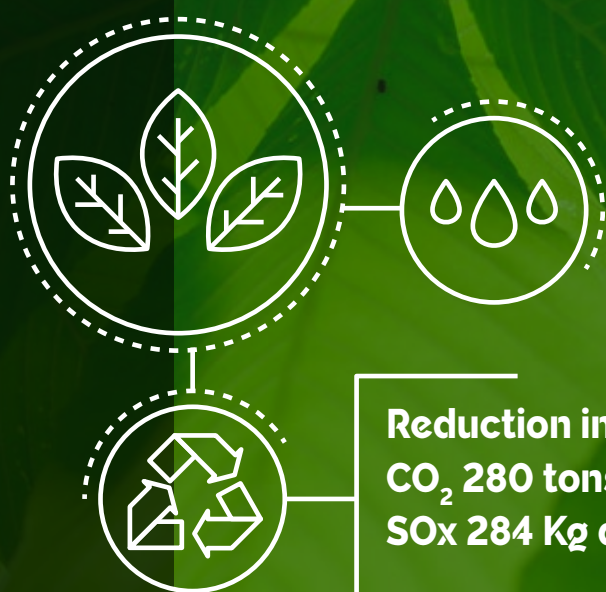
In 2022, an important energy efficiency project was launched through structural investments (installation of photovoltaic and thermal panels, renovation of systems, insulation of buildings, installation of window films, replacement of lamps, and relay installation, etc.) with positive environmental impact.

2022 SAVINGS



2023 PROJECTION

Energy efficiency - refrigerator - photovoltaic - LED - relays.



ADMINISTRATION AND FINANCE DIRECTORATE

The Administration and Finance Directorate (DAF) verifies and ensures the regularity and legitimacy of administrative acts and active and passive contracts, ensuring their compliance with the current regulatory provisions and internal regulations.

DAF oversees preparatory activities related to the Agency's budgets, receiving preparatory documents from controlled and participating entities, developing and proposing the triennial and annual budgets and the operating budget.

DAF also ensures the accurate and timely preparation of reports, budget revisions, and financial statements, accompanied by variance analysis reports, and collaborates in achieving the overall objectives in line with the guidelines provided by the President, in agreement with the other Directorates of the Agency.

In this perspective, it proposes initiatives aimed at streamlining administrative services, qualifying expenses, simplifying procedures and internal regulations, coordinating the relevant organizational Units, and promoting the synergistic use of instrumental and human resources while maintaining and enhancing motivation and professionalism.

Ultimately, the Directorate oversees and ensures functional management and development processes related to the contracting and the procurement of goods and services, thus ensuring the pursuit of the Agency's institutional objectives and reinforcing its role as a driver of the national space sector.

COST CERTIFICATION

In order to acquire specific goods and services with a strong technological connotation, ASI adopts specific forms of procurement that ensure consistency and transparency in procedures aimed at ensuring price adequacy. In this context, it is necessary to preliminarily assess the cost structure (audit) of the potential ASI supplier through a detailed analysis (determination of the company's hourly cost), and subsequently determine the price of the goods and/or services to be procured (consistency).

The activity of auditing and certifying hourly costs received further impetus following the collaboration agreement between ESA and ASI aimed at ensuring common rules to provide the required visibility on the main proposals received by ESA from national industries. To this end, a group of experts has been created, which meets regularly to harmonize certification processes and procedures at the European level.

ADMINISTRATIVE STRUCTURE, CONTRACTUAL ACTIVITY AND ACCOUNTING MANAGEMENT OF ASI

The implementation of ASI's scientific and technological space programs is realized through negotiation activities, with the signing of:

**AGREEMENTS WITH
OTHER PUBLIC
ADMINISTRATIONS**

**CONTRACTS FOR
RESEARCH AND
DEVELOPMENT SERVICES**

**FINANCING
CONTRACTS
(STATE AID)**

INITIATED SELECTIVE PROCEDURES FOR OVER €750 MILLION, INCLUDING:

no. 12

Open calls for approximately € 370 million

no. 52

Requests for Proposal for approximately
€ 380 million

no. 2

Open Calls and Calls for Ideas for approximately
€ 3 million

SIGNED CONTRACTS:

no. 12

Industrial contracts for approximately € 340 million;

no. 22

Financing contracts for approximately € 5 million;

no. 53 Agreements with Public Administrations for programs of common interest worth approximately €70 million, of which approximately €50 million at the expense of ASI, in addition to the ASI/Defense Agreement for the implementation of the National Recovery and Resilience Plan worth approximately €320 million at the expense of ASI.

2022

FOR THE FUNCTIONING OF THE AGENCY, THE FOLLOWING HAVE BEEN ISSUED:

no. 304 for approximately **€ 8 million**
Supply orders (including VAT)

of which **164** through the **CONSIP** e-procurement platform, with a total amount of over **€ 5.5 million**.

These contracts mainly relate to operational support to the Agency's institutional activities.

Income reversals: **2,262** for a total of **€ 978,948,168.18**

Payment orders: **4,972** for a total of **€ 947,740,635.23**

Payment timeliness indicator

(average invoice settlement time): **-12.5 days**

making it one of the most prompt Public Administrations in terms of payments

Research contract expenses: **€ 44,240,956.73**

Industrial contract expenses: **€ 198,949,181.36**

Provisional data
for the 2022
final balance
(in euro)

Final
forecast

Verifications
Commitments

Collections
Payments

Incomes	1,760,661,359.84	1,550,106,733.08	978,948,168.18
Expenses	1,360,022,378.68	996,594,625.72	947,740,635.23

STATISTICS OF COST ANALYSIS

56
 congruous proposals for negotiated/competitive procedures/
 thematic tenders for a total amount of approximately

€225 million

5

Joint ASI/ESA audits
for the certification of
industrial parameters

23

Negotiation Tables for
Agreements with other
Public Administrations



HEADQUARTERS

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00133 Rome, Italy
Tel: +39 06 8567.1

OPERATIONAL CENTERS

Matera Space Center “Giuseppe Colombo”

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Fax: +39 0835 339005

Sardinia Deep Space Antenna

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