ITA
ITALIAN TRADE AGENCY
ICE - Agenzia per la promozione all'estero e l'internazionalizzazione delle imprese italiane

asi
agenzia spaziale italiana

ITALIAN SPACE INDUSTRY

Products - Services - Applications - Technologies

CATALOGUE 2017

in collaboration with:

AIAD
ITALIAN INDUSTRIES FEDERATION FOR AEROSPACE, DEFENCE AND SECURITY

AIPAS

ASAS

Foreword

This Catalogue collects the company profiles of the enterprises operating in the Space Sector in Italy, with its products, services, applications and technologies.

The initiative was edited jointly by ASI and ICE, in collaboration with the National Industrial Associations AIAD, AIPAS and ASAS.

The data contained in this Catalogue were provided directly by the companies, under their responsibility.

This initiative complements the ASI tool D.V.

(Distretto Virtuale web 2.0 interactive portal)

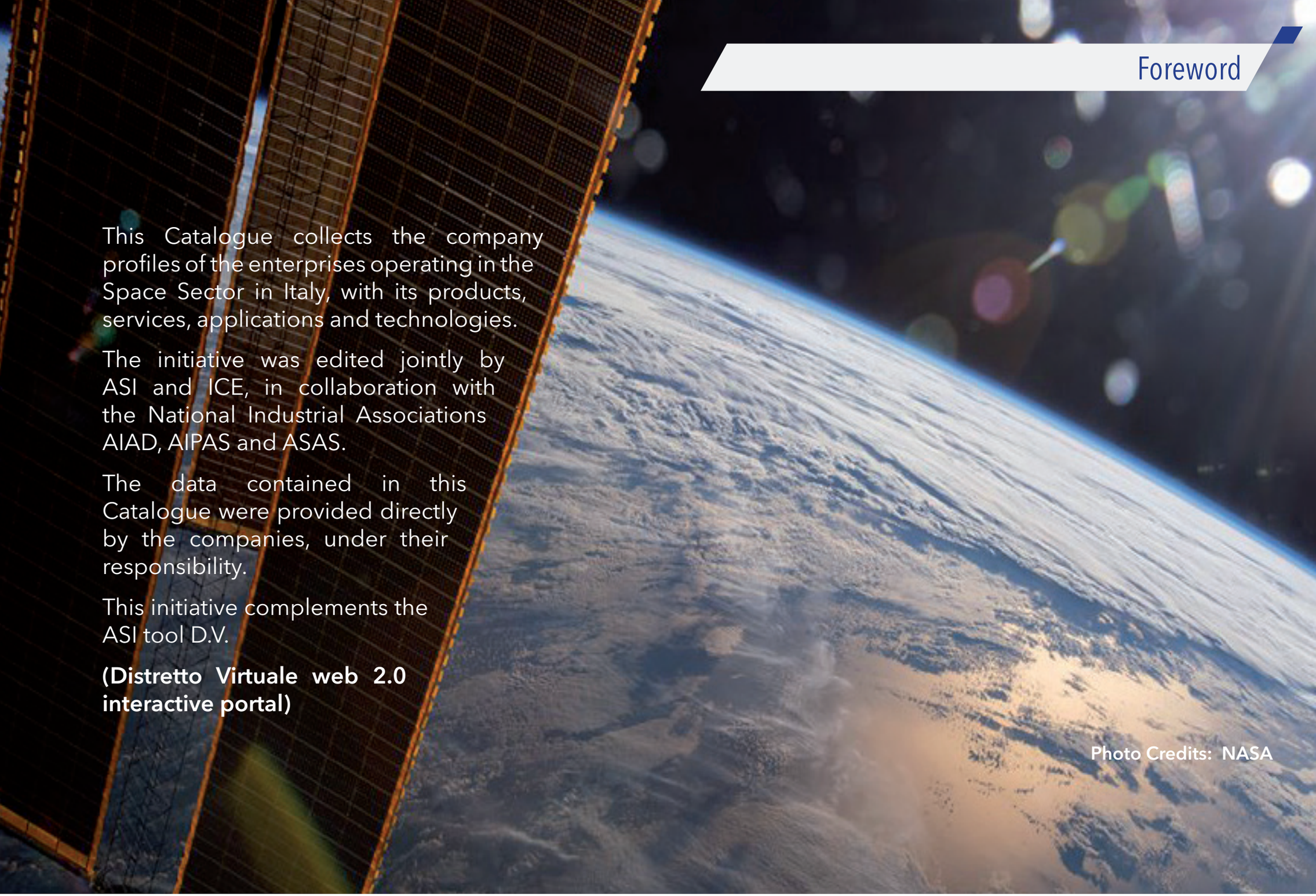

Photo Credits: NASA

Introduction

Italy's long tradition in Space, dating back to the beginning of the 20th century, has determined the development and consolidation of a well structured and competitive industrial system.

The national Space Industry includes all the application domains and space enabling technologies, with excellent and traditional capabilities at system level and in payload design and integration. At the same time there is a well structured community of Small and Medium Companies (SMEs) holding forefront capabilities at subsystem level as well as in services and applications. Overall the italian space industrial system covers the entire value chain, from the upstream (satellite infrastructures and launching systems) to the downstrean sector (services and applications).

Italian space industry is open to the world: there are cooperation initiatives and commercial relationships with a very large number of countries in all continents.

This Catalogue, issued for the first time, intends to provide on a yearly basis a general overview of the space industrial capabilities in Italy. Although it is not an exhaustive representation of the entire Space Italian industry (in particular for the SMEs), it is an extensive representation, thus enabling international stakeholders to identify potential Italian industrial partners in space activities.

Roberto Battiston
President of the
Italian Space Agency (ASI)

ASI, Agenzia Spaziale Italiana
00133 Rome (Italy)
Via del Politecnico snc
+39 0685671
www.asi.it

Photo Credits: ESA

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Aerospace is a sector of excellence of the Italian industry, with a vested interest in innovation.

The Italian Space sector is iconic amongst Italian industry, as it reflects well some of its key features, such as the ability to perform at the highest level in cutting edge technologies and quality, and to compete with major global players.

In fact, Italy has always been a player in the space industry: it was the 3rd country to ever launch a satellite, and today Italian technology and components are very often an essential part of the new satellites or space missions.

Moreover, the Italian Aerospace Industry holds third place in Europe in turnover after Germany and France, for a total of 2 billions Euros, most of which is exported.

International cooperation and integration in multinational projects is key to the success of our companies, and for this reason we carry out a large number of activities, mostly in collaboration with the Italian Space Agency (ASI).

Among the activities is this catalogue, that aims to give the reader a comprehensive vision of our companies' activities, specialization and achievements, a working tool in the process of starting a dialogue.

I trust it will give to many a clearer picture of the capacity and potential of our industry, and may open new opportunities for industrial, commercial or technical cooperation.

Michele Scannavini
President of ICE
Italian Trade Agency

ICE - Agenzia per la promozione all'estero e l'internazionalizzazione delle imprese italiane
00144 Rome (Italy) | via Liszt, 21
tecnologia.industriale@ice.it
www.ice.gov.it

Photo Credits: ESA

Introduction

AIAD, AIPAS and ASAS are very glad to participate and to contribute for the success of this National space companies catalogue.

The Italian space industry plays a leading role in the Italian economy and stands out as one of the high-tech industries able to produce innovations generating positive ripple effects in other industrial sectors.

Space is one of the few high-tech sectors in which Italy holds a global leadership position. Italy belongs to the exclusive club of spacefaring nations in the world that have a complete supply chain and a full range of expertise in the field.

Moreover, Italy is characterized by an advanced technology, a wide range of available applications (civil, military and dual-use) and a fruitful interaction between research and industry.

The Italian leadership leverages on the unique capabilities (skills and infrastructure) developed by the different actors of the sector (research institutes, universities and industry) and on a broad spectrum of enabling technologies, ranging from the manufacture of systems (satellites, launchers, inhabited infrastructure, etc.) to the operational management of space centres, to the provision of services in different areas of civil society (security, environmental monitoring, transport, telecommunications, science, critical infrastructure monitoring, etc.).

The national ranking is the result of the continuity of investments which have been a priority since many years by the Italian Government, it materialized through the policies and the programs of the Italian Space Agency (national programs, ESA programs) and the initiatives of other national organizations and institutions.

In Italy the Space sector has a significant number of both large companies and small and medium-sized enterprises (SMEs). They are represented by three different national organizations:

Photo Credits: ESA

AIAD, Italian Industries Federation for Aerospace, Defence and Security
00184 Rome (Italy) | Via Nazionale 54
aiad@aiad.it
+39 064880247
www.aiad.it

AIPAS, Association of Italian Space Companies
00186 Rome (Italy) | Via del Tempio 1
info@aipas.it
+39 066869222
www.aipas.it

ASAS, Association for Space-based ICT Technologies, Applications and Services
00187 Rome (Italy) | Via Barberini 3
asas@asaspazio.it
+39 06421401
www.asaspazio.it

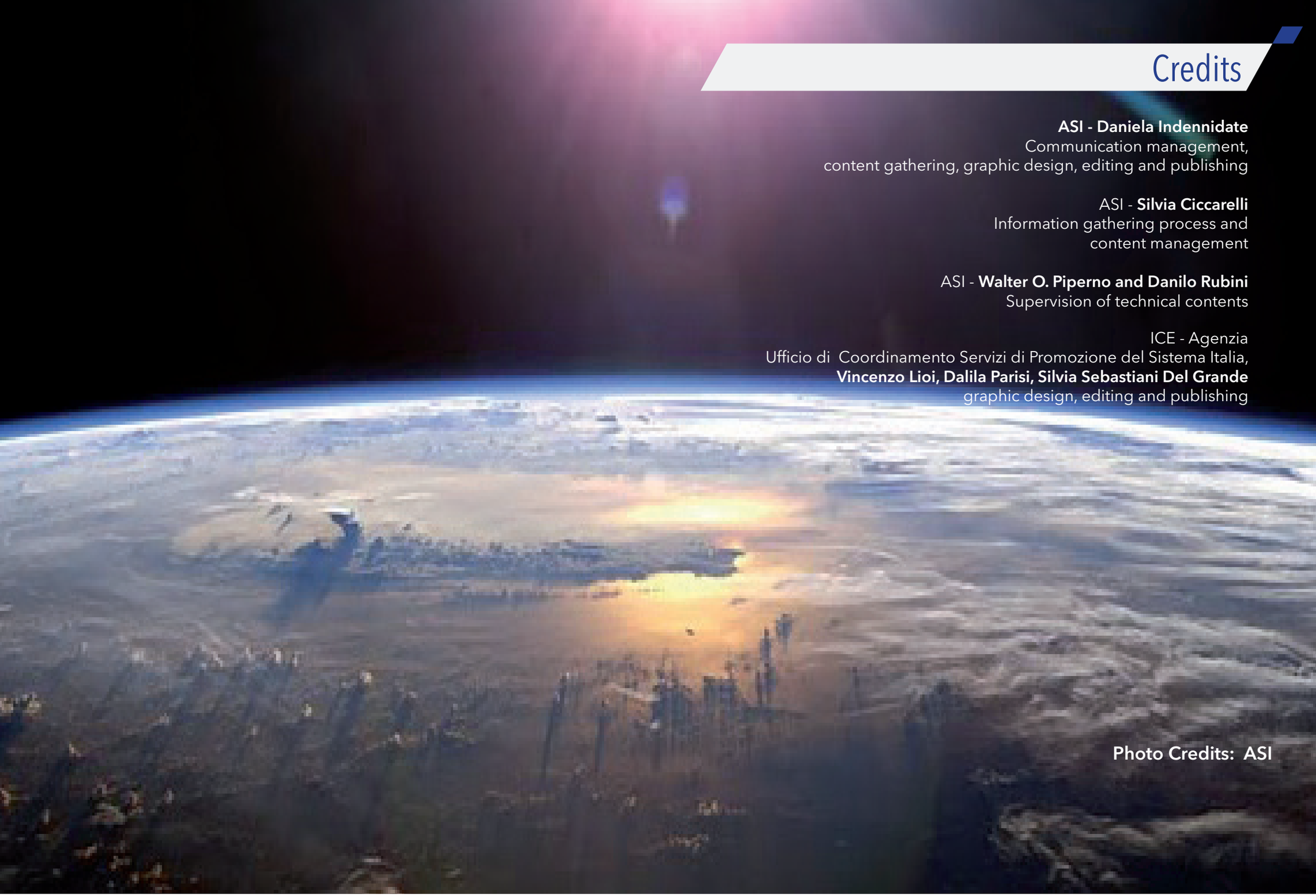
Credits

ASI - Daniela Indennidate
Communication management,
content gathering, graphic design, editing and publishing

ASI - **Silvia Ciccarelli**
Information gathering process and
content management

ASI - **Walter O. Piperno and Danilo Rubini**
Supervision of technical contents

ICE - Agenzia
Ufficio di Coordinamento Servizi di Promozione del Sistema Italia,
Vincenzo Lioi, Dalila Parisi, Silvia Sebastiani Del Grande
graphic design, editing and publishing



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Acknowledgements

We wish to thank all the italian companies that have accepted to be present in this Catalogue.

We thank also **ICE** and **AIAD**, **AIPAS** and **ASAS**, that gave their support to carry out this pilot project.

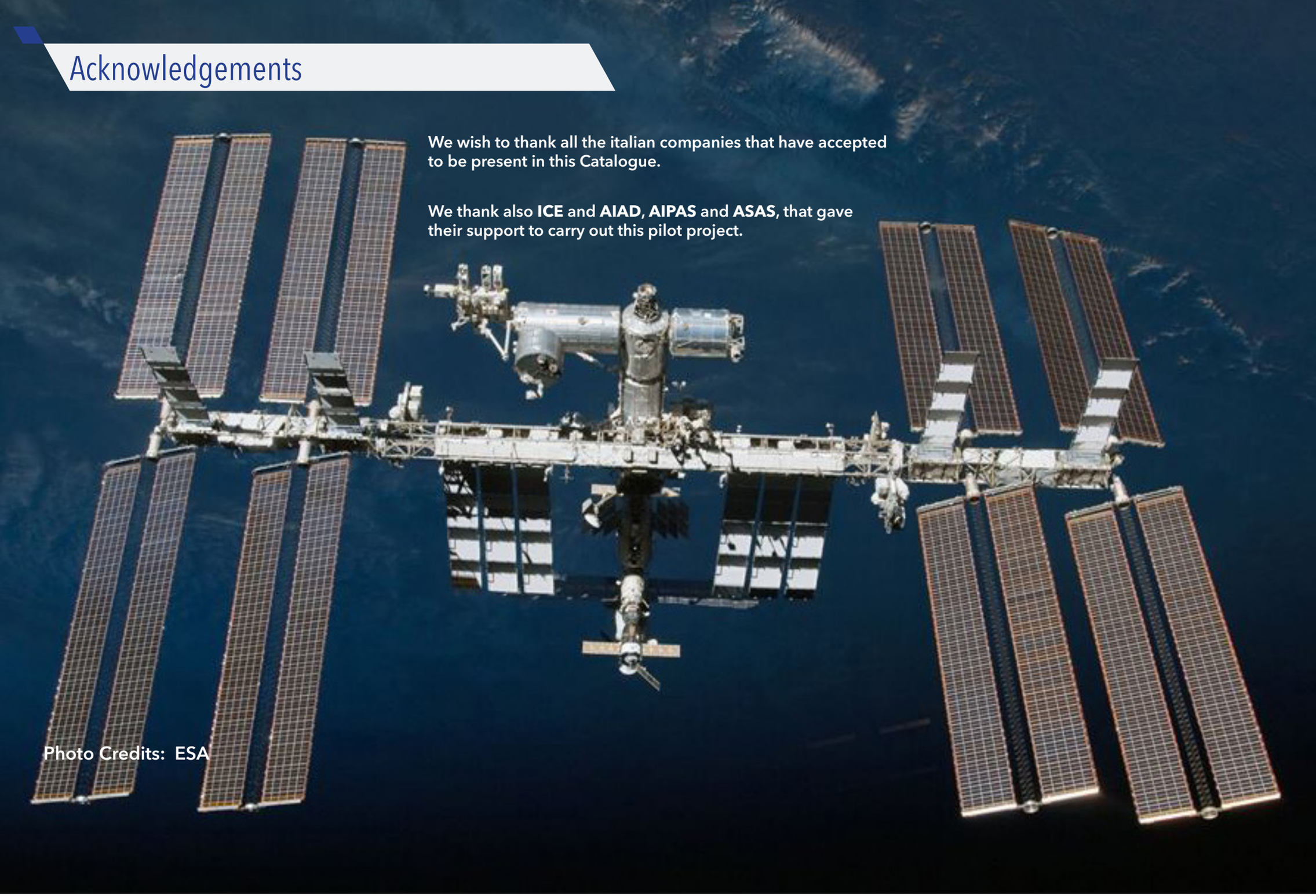

Photo Credits: ESA

Photo Credits: ESA Astronaut Samantha Cristoforetti

Contents

APPLICATION DOMAINS AND ENABLING TECHNOLOGIES

SME
LARGE COMPANY

COMPANY NAME	APPLICATION DOMAINS							ENABLING TECHNOLOGIES				SYSTEM CAPABILITY					
	EARTH OBSERVATION SYSTEM	SATELLITE NAVIGATION SYSTEMS	TELECOMMUNICATIONS SYSTEMS	SPACE	TRANSPORTATION, LAUNCH AND RE-ENTRY SYSTEMS	HUMAN EXPLORATION, SPACE STATION, CAPSULE MANNED	INTEGRATED APPLICATIONS AND SERVICES, SECURITY	OBSERVING THE UNIVERSE, SCIENCE AND ROBOTIC EXPLORATION	MATERIALS, STRUCTURES, THERMO-MECHANICAL, MECHANISM	ELECTRONICS, PHOTONICS, OPTICS, INTEGRATED SENSORS AND CRYOGENIC COMPONENTS ELECTYRO	INFORMATICS, DATA AND SIGNAL PROCESSING	TECHNOLOGIES FOR SPACE TRANSPORT	NANO-MICRO UP TO 50 KG	SMALL 50-500 KG	MEDIUM 500-2000 KG	LARGE MORE THAN 2000 KG	PAYLOAD DESIGN AND INTEGRATION	LAUNCH VEHICLE MISSION DESIGN AND INTEGRATION
ACS	■					■			■		■							
AEROSEKUR				■	■				■					■	■			
AEROSPAZIO				■						■		■		■				
AGT	■			■		■			■	■	■							
ALI	■	■	■	■		■	■		■	■	■	■	■	■			■	
ALMA SISTEMI	■	■				■			■		■			■	■		■	
ALPHA CONSULT	■	■	■			■												
ALTEC				■	■	■	■				■	■					■	
ANGELANTONI TEST TECHNOLOGIES	■	■	■	■	■		■		■	■			■	■	■	■		
ARESYS S.R.L.	■					■				■	■							
ARGOTEC					■		■		■	■	■		■				■	
AVIO				■					■	■		■						■
AVIOSPACE		■	■	■	■				■	■		■	■					
CESI	■	■	■			■			■	■								
CGS	■				■	■	■			■			■	■			■	
COMPOLAB									■	■			■				■	
DATASEL		■				■				■	■						■	
D-ORBIT				■			■			■	■	■	■	■				
DRAGONFLY									■	■								
E-GEOS	■																	
EIE									■	■							■	
ELITAL													■	■	■	■	■	
ELV				■					■	■	■	■						■
ENGINEERING	■					■						■						
ESRI ITALIA	■	■				■					■							
FLYBY	■					■					■	■					■	
GAP						■					■							
GAUSS	■		■	■			■		■	■	■	■	■				■	
GEOCART	■	■								■	■			■				

APPLICATION DOMAINS AND ENABLING TECHNOLOGIES

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LARGE COMPANY

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	EARTH OBSERVATION SYSTEMS	SATELLITE NAVIGATION SYSTEMS	TELECOMMUNICATIONS SYSTEMS	SPACE TRANSPORTATION, LAUNCH AND RE-ENTRY SYSTEMS	HUMAN EXPLORATION, SPACE STATION, CAPSULE MANNED	INTEGRATED APPLICATIONS AND SERVICES, SECURITY	OBSERVING THE UNIVERSE, SCIENCE AND ROBOTIC EXPLORATION	MATERIALS, STRUCTURES, THERMO-MECHANICAL, MECHANISM	ELECTRONICS, PHOTONICS, OPTICS, INTEGRATED SENSORS AND CRYOGENIC COMPONENTS	INFORMATICS, DATA AND SIGNAL PROCESSING	TECHNOLOGIES FOR SPACE TRANSPORT	NANO MICRO UP TO 50 KG	SMALL 50-500 KG	MEDIUM 500-2000 KG	LARGE MORE THAN 2000 KG	PAYLOAD DESIGN AND INTEGRATION	LAUNCH VEHICLE MISSION DESIGN AND INTEGRATION
GEO-K	■					■				■							
GMSPAZIO	■					■				■			■			■	
IMT	■								■			■					
INGENIARS	■	■	■	■	■	■	■		■	■							
INTECS	■	■	■														
INTELLIGENTIA						■				■							
IPTSAT	■									■							
ITAL CONSUL						■											
ITS	■	■	■			■	■		■	■						■	
ITS LAB Srl						■				■							
KAYSER					■		■	■	■	■		■	■			■	
KELL	■	■	■			■			■	■							
LAER		■						■									
LEAF SPACE SRL	■		■			■				■		■	■				
LEONARDO	■	■				■	■	■	■	■						■	
LMA	■	■	■	■	■			■			■						
MAPSAT	■					■				■			■				
MEC	■	■	■				■	■	■								
MEDIA LARIO	■		■				■	■	■							■	
MEEO Srl	■					■				■							
NADIR					■			■				■					
NAIS	■	■	■	■	■	■		■		■							
NEXT INGEGNERIA DEI SISTEMI S.p.A.	■	■	■				■			■							
OFFICINA STELLARE	■						■	■	■			■				■	
OPEN SKY			■														
PICOSATS SRL			■					■				■				■	
PLANETEK	■	■				■	■			■		■	■			■	
PROGETTI SPECIALI	■	■	■					■	■	■		■	■			■	

APPLICATION DOMAINS AND ENABLING TECHNOLOGIES

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RED CAT DEVICES									■								
SAB AEROSPACE	■			■		■		■			■						
SATE		■		■	■	■		■		■	■	■	■	■	■	■	
SIAE	■	■	■						■	■							
SICILSAT COMMUNICATION S.R.L.	■	■	■														
SIELTE	■		■			■											
SITAEL	■	■	■	■		■	■	■	■	■			■	■		■	
SOMACIS	■	■	■	■	■	■	■		■								
SPACE DYNAMICS SERVICES						■	■			■							
SPACE ENGINEERING	■	■	■	■	■	■	■		■	■						■	
SPACE EARTH	■	■				■			■	■							
SURVEY LAB	■					■											
T4i																	
TECHSEMA			■	■				■	■		■	■	■			■	
TELEMATIC SOLUTIONS				■							■						
TELESPAZIO	■	■	■	■	■	■	■			■							
TEMIS	■	■	■	■		■			■	■							
THALES ALENIA SPACE	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	
TiBERLAB						■		■	■								
TRANS TECH		■		■		■		■	■		■	■	■			■	
TSD	■	■		■	■		■		■	■		■	■			■	
TYVAK	■	■	■	■		■		■	■	■	■	■				■	
VITROCISET		■	■	■		■			■	■	■						

Photo Credits: ESA Astronaut TIM PEAKE

APPLICATION DOMAINS AND ENABLING TECHNOLOGIES

SME LARGE COMPANY COMPANY NAME	KEY WORDS
ACS	Pdgs / Processing / Eo Applications
AEROSEKUR	Inflatable, Expandable Modules, Parachute
AEROSPAZIO	Electric Propulsion, Testing, Thermal Vacuum
AGT	Technology Transfer, Expert And Semantic Systems, Internationalization
ALI	Re-Entry / Capsule/It Shield
ALMA SISTEMI	Mgse, Egse
ALPHA CONSULT	Uav, Its, Business Plan
ALTEC	
ANGELANTONI TEST TECHNOLOGIES	Space simulation, testing
ARESYS S.R.L.	Technology transfer, dissemination, education
ARGOTEC	Training, Space Food, Heat Pipe
AVIO	Propulsion, Subsystems, Technologies
AVIOSPACE	
CESI	Multijunction Solar Cells
CGS	
COMPOLAB	Materials, Structures,Thermal
DATASEL	
D-ORBIT	Commissioning, Decommissioning, Orbital Transfer
DRAGONFLY	
E-GEOS	Geo-information services, data distribution, decision support system, big data
EIE	Mgse, Ogse, Deep Space Antenna
ELITAL	Pcb / Brazings, Mgse, Egse
ELV	System Integration, Avionics
ENGINEERING	Dissemination, Ict Infrastructural Services
ESRI ITALIA	Gis, Gnss, Eo
FLYBY	Decision Support System, Eo Ground Processors, Eo Instrument Data Simulators
GAP	
GAUSS	
GEOCART	Remote Sensing, Integrated Multi-Sensor Platforms
GEO-K	Education
GMSPAZIO	Modeling & Simulation
IMT	Eee Parts Testing, Education
INGENIARS	Design Services, Spacefibre, Spacewire
INTECS	User Ground Segment, Standard, Spatial Data Infrastructure, Inspire

APPLICATION DOMAINS AND ENABLING TECHNOLOGIES

SME LARGE COMPANY COMPANY NAME	KEY WORDS
INTELLIGENTIA	Tecnology transfer, Process automation, IoT
IPTSAT	Precision Farming Agricolture, Dem-Dsm-Dtm, Change Detection, Earth Observation, Big Data
ITAL CONSUL	
ITS	Sensor Design, Gnss Applic., High Speed Computer
ITS LAB Srl	Maritime & Health Applications, Secure Hybrid Communication, Digital Transformation
KAYSER	
KELL	Space Applications, E-Health, Hw/Sw Integration
LAER	Cfrp Prototypes And Tools Production
LEAF SPACE SRL	Telecommunication, microsatellites, ground segment, tecnology transfer, dissemination, education
LEONARDO	Robotics
LMA	Machining, Quality, Competitiveness
MAPSAT	Direct Broadcast, Vhr, Near Real Time
MEC	Microwave Technology
MEDIA LARIO	Optics, Eo, Communication
MEEO Srl	Big data: remote sensing; -datacube
NADIR	Technology Transfer, Polymer Nanocomposite, Atmospheric Plasma
NAIS	Applications, Eo Mapping, System Dependability
NEXT INGEGNERIA DEI SISTEMI S.p.A.	Ground Segment, System Engineering, CalVal
OFFICINA STELLARE	Telescopes, Optical Payloads, Optical Antennas
OPEN SKY	Insternet Service Provider
PICOSATS SRL	
PLANETEK	Big Data Analytics
PROGETTI SPECIALI	Elint, Observation, Navigation
RED CAT DEVICES	Rad-Hard Components
SAB AEROSPACE	
SATE	Simulation, Control, Data Analysis
SIAE	Rf, Microwave, Design
SICILSAT COMMUNICATION S.R.L.	Antenna& RF Components design
SIELTE	
SITAEL	Electric propulsion
SOMACIS	Printed Circuit Boards
SPACE DYNAMICS SERVICES	
SPACE ENGINEERING	Flat Antennas, M2m, Flexible Payloads

APPLICATION DOMAINS AND ENABLING TECHNOLOGIES

SME LARGE COMPANY COMPANY NAME	KEY WORDS
SPACE EARTH	Space Weather, Remote Sensing, High Precision Gnss
SURVEY LAB	DInSAR, Monitoring Systems, Damage Assessment
T4i	Biomedical Devices, Hvac Systems, Aeronautic Propulsion
TECHSEMA	
TELEMATIC SOLUTIONS	Ground Segment, Ground Stations, Launch Pad Design
TELESPAZIO	
TEMIS	
THALES ALENIA SPACE	
TIBERLAB	Device And Material Modeling And Simulation
TRANS TECH	Technology Transfer, Education, Space Tourism
TSD	High Performance, Cost Effective, Technological Excellence
TYVAK	High Performance Adcs, Mission Design, Launch Integraiton Services
VITROCISET	

SMALL AND MEDIUM ENTERPRISES

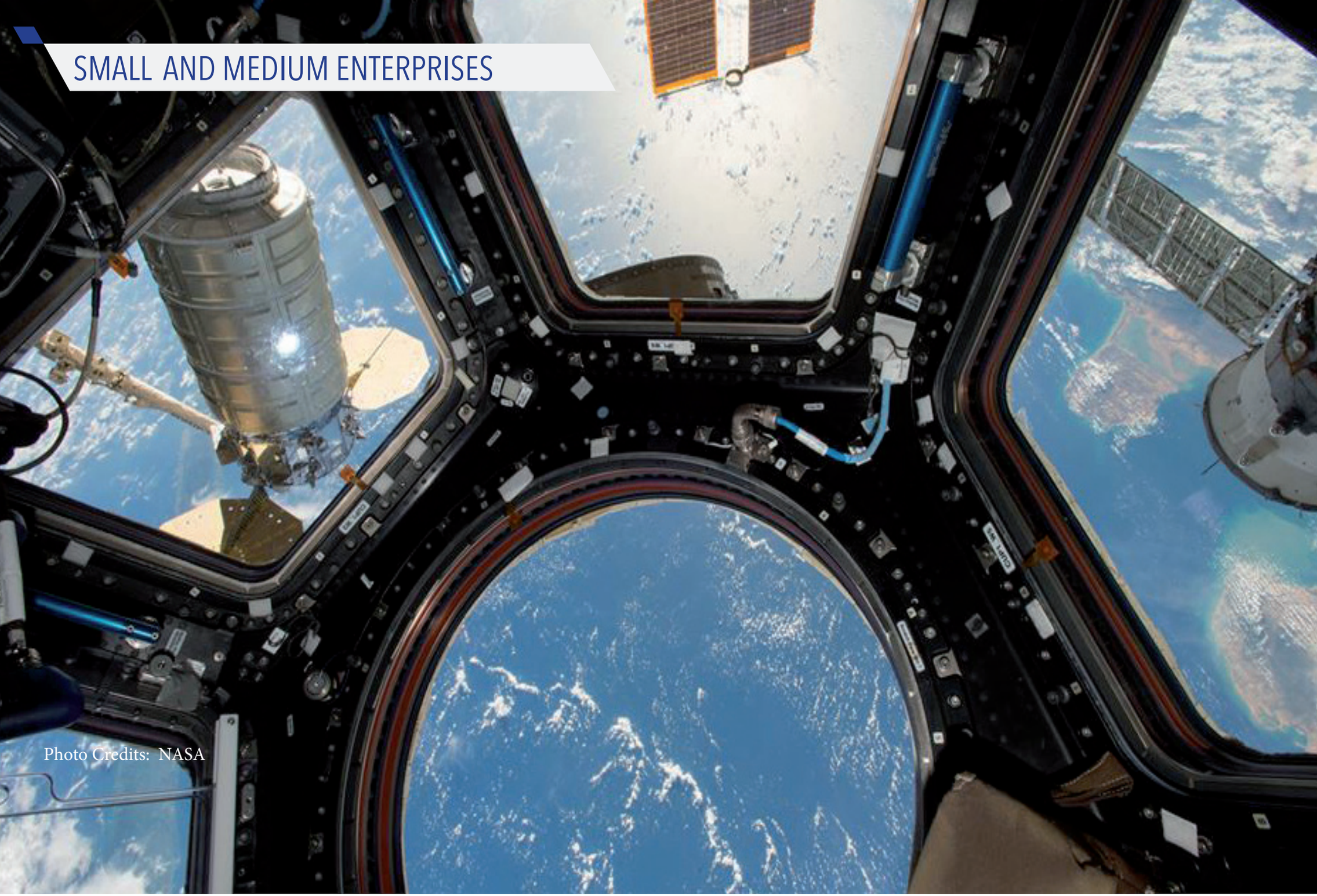


Photo Credits: NASA

ADVANCED COMPUTER SYSTEMS

SMALL AND MEDIUM ENTERPRISE

ACS is a software & system Integrator founded in 1979. To their Customers, this Italian SME can offer integrated systems, software, services and consultancy in:

- Earth Observation Satellites Payload Data Ground Segments
- Environment monitoring Applications
- Advanced & Immersive data visualization

As a «Payload Data Ground Segment» specialist, ACS develops ground stations and subsystems/components for satellite data acquisition, dissemination, processing. The 36-year long record testifies to profound knowledge of and capabilities in handling different satellite data, metadata, sensors, products, facilities interactions, associated services delivery.

Our cutting end technology solutions are serving customers in thirty countries.

Today, 70 IT specialists work on two company sites in Italy: Operational Headquarters in Rome and Research & Development center in Matera. ACS-D, our German subsidiary, provides high-end consultancy services at Eumetsat premises.

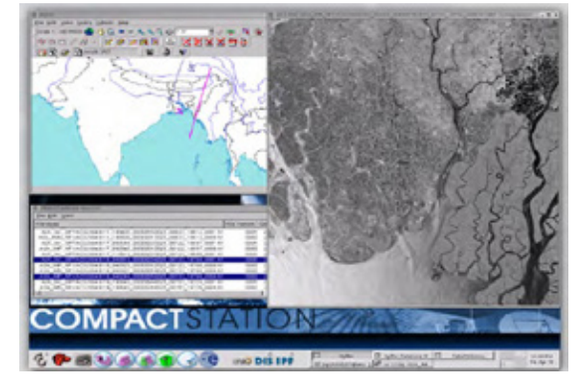
ACS is part of a large ICT group Exprivia (2200 employees, provider of SW technology and IT services in banking, medical, industrial, telecommunication and PA sectors).

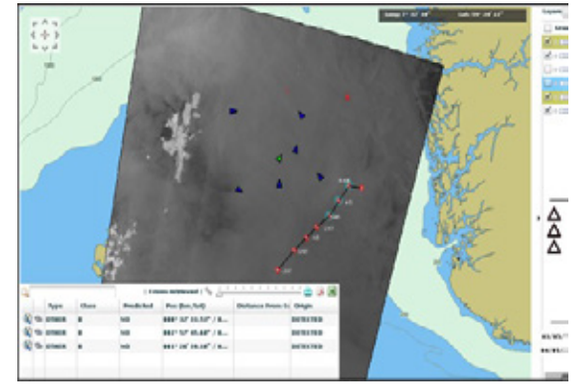
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Turnkey Ground Station is a full-featured multimission acquisition, real time ingestion, data processing, standard products generation and dissemination station. Based on ACS proprietary MDPS architecture, modular and scalable, the station is deployed on commercial medium-large or compact HW. ACS Facilities and Tools support satellite data ingestion and processing (optical & radar Processors), instruments and products quality control (QCF, CalVal), archives and catalogues (Archive& Catalo- Majority of ACS Services are OME and/or Framework contracts (ESA, ASI, EMSA) under which ACS provide engineering, maintenance and enhancements support, systems performance monitoring, consulting…

ACS applications cover a wide range of both research and commercial/ operational activities. From VR& augmented reality for 3D models and scientific data visualization as in VRES and ESA Model Dismantler to EMSA IMDatE surveillance system for maritime safety and security business. Based on a highly configurable anomalies detection engine, the system combines different maritime data types and sources to discover and notify suspicious behavior. CleanSeaNet also developed for EMSA is the SAR-based surveillance application for detection of vessels and oil slicks in European waters.

ACS is not only implementing, but developing innovative technology. From large scale industrial systems to Internet of Things, ACS have been driving forward innovation in Space, Cloud Computing and Healthcare.





CONTACT

Headquarters address:
Via della Bufalotta, 378
00139 Roma

T (+39) 06 870901
www.acsys.it
space.business@acsys.it

AEROSEKUR
SAFETYFIRST

CONTACT

Headquarter address:

Via delle Valli, 46
04011 Aprilia (LT)

T (+39) 06 920161
www.aerosekur.com
space-systems@sekur.it

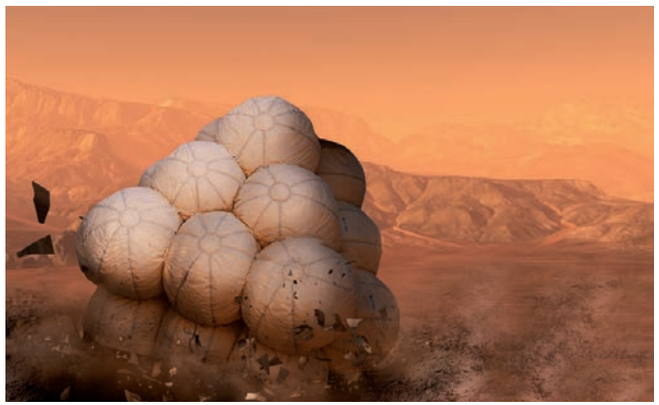
SMALL AND MEDIUM ENTERPRISE

The company's mission is to design, develop, qualify and manufacture products and supply services dedicated to ensuring the survival of defense and security forces, as well as supporting helicopter, aircraft and land vehicle operations, based on the best and consolidated mechanical technology, software, textiles and innovative materials.

The Space & Technology Division of Aero Sekur is tasked with developing new technologies and designing new products of the future; all through a skillful fusion of advanced technological capability based on company expertise, collaboration with the main national and European Research Institutes, and a good amount of creativity that has always characterized the company's innovation capabilities.

European leader in the design, development and validation of atmospheric re-entry, descent and landing systems, Aero Sekur has the most advanced technologies for the production of flexible thermal protection systems and vented airbag systems which are the only one in the world to allow soft precision landing.

Thanks to this exclusivity, Aero Sekur is a continuously evolving company, able - with innovative products, technologies and solutions – to anticipate the needs of tomorrow in multiple areas of application, putting human safety at the centre of its development, on Earth and in Space.



PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

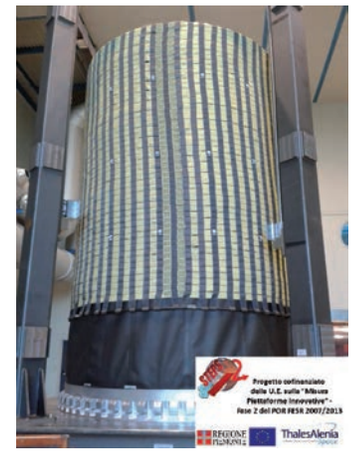
PLANETARY RE-ENTRY SYSTEMS
Lightweight inflatable thermal protection systems able to ensure payload protection by dissipating the heat generated during the hottest phase of atmospheric re-entry.

PLANETARY DESCENT SYSTEMS
Single and multi-stage, supersonic and subsonic parachute systems for the descent phase in planetary exploration missions (Mars and other planets).

PLANETARY LANDING SYSTEMS
Airbag systems for landing on any solid surface, capable to avoid payload rebound and ensure extreme precision during missions.

INFLATABLE MODULES

Thanks to the most advanced textile technologies, Aero Sekur designs and manufactures inflatable structures and mechanisms which allow considerable volume savings during the launch phase and can be used to realize habitable modules, sample returning or deorbiting missions.



CONTACT

Headquarter address:

Via Provinciale Nord, 42a
53040 Rapolano Terme (SI)

T (+39) 0577 705009
www.aerospazio.com
erospazio@aerospazio.com

SMALL AND MEDIUM ENTERPRISE

AEROSPAZIO Tecnologie is a leading SME providing testing and engineering services for Aerospace. The company is particularly active in the fields of Thermal Vacuum and Electric Space Propulsion, where provide its services to most of the European space industry.

For its mission, the company operate a test laboratory equipped with several vacuum test facilities some of which are unique in their features.

The expertise of the company include the development of electric propulsion technologies, diagnostics (plasma probes, thrust balance), vacuum systems and cryogenic equipment, data acquisition & control systems, networking & communications in harsh environments, software tools.

The company has worked in several ESA flight programmes, including the BepiColombo mission to Mercury, the Exomars mission to Mars and the Small-GEO programme.

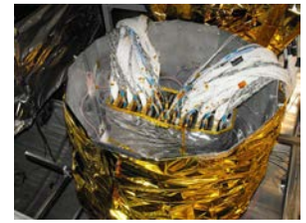
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

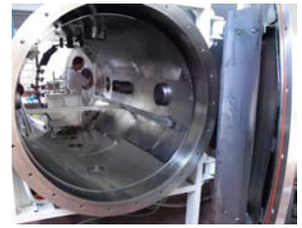
Electric Space Propulsion

- Technology development
- Development & qualification testing

Thermal – Vacuum

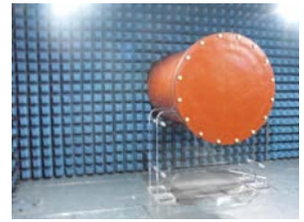
- Thermal cycling
- Thermal balance





EMI / EMC

- In-vacuum EMC testing
- Electric propulsion testing



ESD – Electro Static Discharges

- Plasma source and electron gun available
- Arcing on solar array coupons

AGT ENGINEERING

CONTACT

Headquarter address:

Via Paolo Emilio, 34
00192 Roma

T (+39) 06 45437023 www.
agtgroup.it
info@agtgroup.it

SMALL AND MEDIUM ENTERPRISE

AGT is a scientific, engineering, marketing and sales integrated organization.

Agt enhances its customers products with innovative technologies identified by its sales team, reviewed by its R&D development team, engineered by its engineering team, and repositioned in their respective markets by its marketing team: this way injecting innovation and adding value into its customers products.

In addition, Agt develops horizontal capabilities of technology transfer and consultancies, develops its own prototype products, and operates services based on Artificial Intelligence proprietary patents applications.

AGT is active in the Aerospace, Transportation, Oil and Gas, and Energy production and distribution fields.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

AGT is a company specialised in industrial and applied research, technology transfer, engineering and prototyping, as well as project management, marketing and sales of projects and systems in the areas of transportation (aerospace, terrestrial and marine), energy generation (conventional, advanced and renewable), and of the application of innovative materials and processes to the Industrial companies.

The AGT capabilities are:

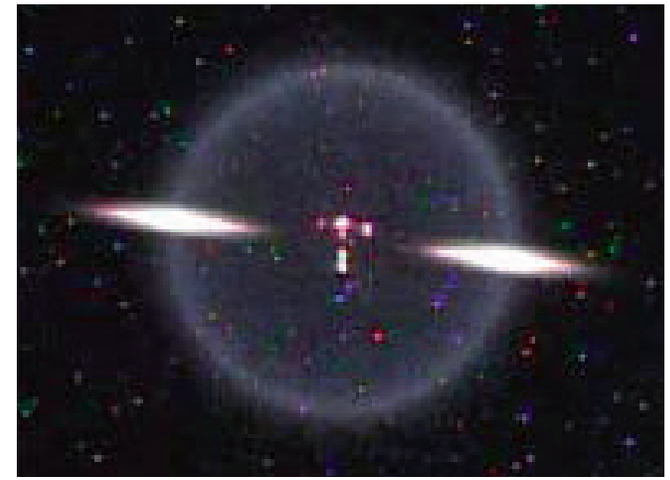
- Ideation and Research: assistance to structure research activities and research financing, when possible through European and national funds, both for customers and on self generated ideas.
- Technology Transfer: Scouting of specific technologies to design and manufacture innovative systems and components developed in existing market areas, this way reducing time and costs of the R&D. Conversely, valorisation of technologies, processes, systems or components originated by its own applied research projects to new market areas.
- Engineering and Prototyping: Transformation of the results of the research and development into operational projects, systems and products for validation and testing of an innovation.
- Production: Streaming of the prototypes developed and tested into pre-series and small batch production. Assistance in the implementation of the series production.
- Project Management: Project Management for its customers for high technology content projects.
- Marketing and Sales: Build up and management for its customers of methods for strategic marketing; turn-key sales networks structures; follow-up in the European and North American Countries; introduction and sale of high technology systems and components into the European and Italian markets.

AGT is therefore operational in the entire value chain of the innovative technologies, from ideation and research to the full commercial deployment of innovative systems and components, generating added value to its Customers through its knowledge of the detailed methods to apply innovation, and the technology transfer of innovative materials, components and processes.

A Special Project department has been recently added, to implement the potential of Artificial Intelligence systems to the Industrial applications in various areas, from the energy distribution systems to the aggregation of international clusters and companies.

AGT has been partner of the ESA (European Space Agency) to transfer to the European Industries the activities available on the ISS (International Space Station), in the areas of Life Sciences and Advanced Materials; and to the ASI (Agenzia Spaziale Italiana) and NASA to perform two experiments with the Italian Astronaut Luca Parmitano during his mission on the ISS.

AGT is also partner in an International Consortium for the development and manufacture of innovative rail structural systems; designs and manufactures special systems and parts for the F1, the transportation and the aerospace markets; runs activities of Project Management for important Multinational Groups; Acts was Technology Broker for the Association Lazio Connect inside the DTA-Filas district of the Aerospace Industries, and for Lazio Innova for the internationalization of the Aerospace cluster companies of the Lazio district.



Aerospace Laboratory for
Innovative components S.c.a r.l.

CONTACT

Headquarter address:

Via E. Gianturco, 31
80146 Napoli

T (+39) 081.6020139
www.aliscarl.it
info@aliscarl.it

SMALL AND MEDIUM ENTERPRISE

ALI Aerospace Laboratory for Innovative Components is a consortium among aerospace and ICT companies, which work in the fields of design, engineering, prototyping and manufacturing of innovative components for aerospace, ground segment for controlling remote platforms, science and technology.

Companies associated with a workforce of approximately 1,500 employees and a turnover total of € 200M€, emit virtually the entire industry in the areas of activity considered.

The team also relies on the corporation of existing centres of excellence on the Campanian territory such as: CIRA, for technological aspects, University of Naples (DIAS - Aerospace Engineering Department - and Earth Science Department) and the CNR (National Researche Centre) for scientific aspects. ALI participate in the following projects:

IRENE (Italian Re-Entry Nacelle)
The Italian and European Space Agencies (ASI and ESA) are supporting a research programme, called IRENE, carried out in Campania region (South of Italy) by a cluster of industries, research organizations and universities, to develop a low-cost re-entry capsule, able to return payloads from the ISS to Earth and/or to perform short-duration, scientific missions in Low Earth Orbit (LEO) and/or to perform Earth Observation missions.

FIT (Technological Innovation Funds)

Experimental development programme: "Technological Developments for the realization of a prototype of a deployable structure for use as a lifting body reentry capsule from space" (waiting for approvation).

MISSION (Maritime Integrated Satellite System in an InterOperable service Network)
The aim of the project is the monitoring of containers inside the ship through a satellite network.

SMS The Small Mars Satellite (SMS)
Is a proposed mission to Mars. The project is being funded by the European Space Agency and is currently reaching the conclusion of Phase 0. The prime contractor is ALI S.c.a.r.l., and the study team includes the University of Naples "Federico II" (UniNA), the Astronomical Observatory of Capodimonte (INAF-AOC) and the Space Studies Institute of Catalonia (IEEC). The objectives of the mission are technological and scientific, and consist in delivering to Mars a small lander carrying a particle dust analyser (INAF-AOC) and an aerial drone (UniNA).

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

ALI has developed a project management model based primarily on the creation of an internal team for project management and commercial activities and the involvement of the associated companies in the supply of technologies / products / services. The associated companies are divided into five main areas of expertise.

The following table shows the main areas of expertise vs the companies:

1. **Design, Mechanics and Components**
   Aermec Sud Srl - Astro Industry Srl - Advanced Tools and Moulds (ATM) Srl - Powerflex Srl – SRS Engineering Design Srl
2. **System Integrator**
   Intecs Solutions SpA - Telespazio SpA - Space Engineering SpA
3. **Electronics, SW and HW On Board**
   Euro.Soft Srl - FoxBit Srl - Techno System Dev. Srl
4. **Services and Applications**
   Fabbrica Srl - ITSLab Srl - Lead Tech Srl - Canale Otto Srl - Form & Atp Srl - Space Factory Srl
5. **Financial**
   Naos SpA

Alma Sistemi sas
consulting for space

CONTACT

Headquarter address:
Via dei Nasturzi, 4
00012 Guidonia (RM)

Operative Address:
Via Tenuta del Cavaliere,1
CAR Centro Direzionale
Building B, 1st floor
00012 Guidonia (RM)

CEO Alessio di Di Iorio
T (+39) 0774 016871
www.alma-sistemi.com adi@
alma-sistemi.com

SMALL AND MEDIUM ENTERPRISE

ALMA Sistemi sas di Di Iorio Alessio & C (www.alma-sistemi.com) is an Italian SME established in 2005 in Guidonia (Rome, Italy) providing high level engineering and management consultancy in the space and defence markets. From 2005 ALMA operates in high-value, high technology areas focusing on helping clients to exploit new technologies and management styles. Its proven expertise has been gained from performing a broad range of projects in the: Aerospace, Engineering and Research sectors.

ALMA provides services in Project and Proposal Management, Business Development, Mechanical Engineering and Analysis as well as System and Software Engineering.

The activities of ALMA are focused on industrial projects covering added value services in the space market including Project Management, business development, engineering for Mechanical and Electric Ground Support Equipment (MGSE, EGSE) for satellite and payloads, Earth Observation and Navigation Applications.

ALMA is also involved in a number of international RTD projects funded by European Space Agency, Italian Space Agency and European Union (FP7, H2020, JPI-CH).

Activities are carried out by Alessio Di Iorio, Managing Director with the support of a core team of high skilled engineers and a network of professionals engaged time by time on a project basis.

ALMA provides services in:

- Project and Proposal Management.
- Business Development;
- System Engineering;
- Mechanical Engineering and Analysis;
- Software Engineering;
- Software Product Assurance and CADM;

The areas covered by ALMA are:

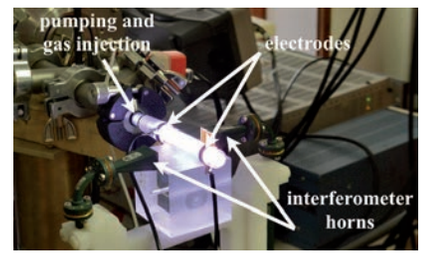
- Ground Segment Check–out equipment (MGSE, EGSE) for satellite and payloads.
- added value services in the space market including Earth Observation and Navigation Applications.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

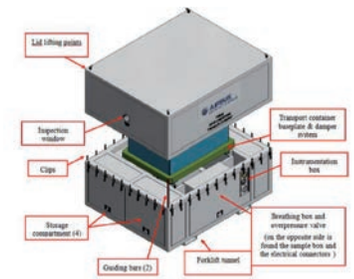
ALMA has been working for its clients in several industrial programs managed by main the Large Scale Integrators in Europe: Airbus Defence & Space, Thales Alenia Space and OHB Systems. ALMA has been involved in several ESA programmes: MTG, MetOp-2G, EnMAP, ExoMars, HSF, Galileo, Science & Telecommunication (ARTES). The following table summarize the main ongoing research projects in witch ALMA Sistemi is directly involved:

Navigation Plasma Antenna beam for aviation applications

Reference Project / Customer	Main field	Role
ITACA (FP7, customer EU) Innovative Technologies for Underwater archaeology by remote sensing. www.itaca-fp7.eu	Software Development and dissemination	Partner
APHORISM (FP7, customer EU) Innovative methods for ash plume and earthquake monitoring by remote sensing in partnership with INGV (I). www.aphorism-project.eu/	Exploitation and dissemination	Partner
CLIMA (Cultural Landscape risk Identification, Management and Assessment) www.clima-project.eu/	Software Development, Exploitation	Partner
PALADIN (SME Instrument) Commercial feasibility of an innovative phase array antenna based on plasma technologies for navigation application in the aviation sector.	Business Plan	Coordinator
STARLET (ASI) Development of an innovative concept of phased array antenna based on plasma echnologies and development of a prototype demonstrator for terrestrial navigation application.	Software development, Management & PA Support, Business Plan	Subcontractor
EVER-EST (European Virtual Environment for Research – Earth Science Themes: a solution) Generic Service Oriented-based Architecture Virtual Research Environment (VRE) tailored to the needs of the Earth Science community | www.ever-est.eu	System and Software Engineering	Partner



Plasma antenna element under test



Design of the Transport Container for MWS (NetIo-2G)

Alpha Consult

CONTACT

Headquarter address:

Via Umbria,10
20090 Segrate (MI)

Emiliano Spaltro

T (+39) 02 39810139
www.alphacons.eu
es@alphacons.eu
info@alphacons.eu

SMALL AND MEDIUM ENTERPRISE

ALPHA Consult is a European management and technology consultancy supporting businesses, regulators and European institutions.

We are recognised as one of the leading independent experts in Satellite Navigation (GNSS), Earth Observation (EO), Intelligent Transport System (ITS) and Unmanned Aerial Vehicles (UAVs), and are increasingly active across other supporting and related markets (chiefly Aerospace, Transportation, Agribusiness, Emergency response and management, and Climate Change).

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

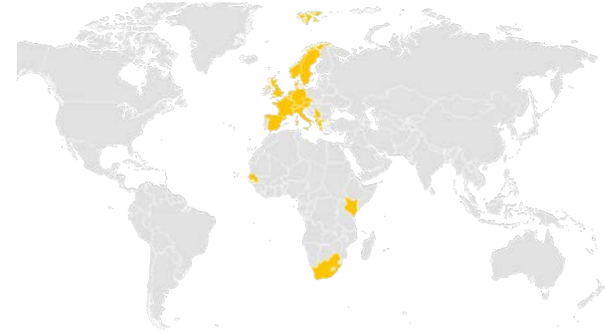
ALPHA Consult was established as a private limited company in 2009 by an experienced strategy consultant and today is an independent and wholly owned company by its working director and staff. ALPHA Consult's headquarters is Milan (Italy), with a branch office in London (UK). ALPHA Consult works with all manner of stakeholders providing high quality consultancy about all aspects of satellite navigation, earth observation, ITS, and UAVs concepts and technologies. Our core services are strategy, business case and technology advices.

Business Strategy	Corporate Finance	Co-to-Market Strategy
• Restructuring • Strategy Definition • Market Assessment • Competitive Environment Analysis • Users' Needs Evalution • Pricing and Positioning Strategy	• Business Plans • Cost-Benefit Analysis • Business Due Diligence • Company Evaluation • Financing Strategy	• Business Opportunities • Road Map Definition • Detailed Market Survey • Support to the implementation Activity
Project Management	**Dissemination**	**Technical Support**
• Stakeholders' Management • Administrative / Contractual Management • Quality Management • Risk Assessment and Risk Management	• Events and Workshops Definition and Management • Web 2.0 Social Tools / Community Management • Web-based Marketing Stragegies • Website Design and Implementation	• On-site Support • User Requirements • Independt Technical / Business Reviewers • Support to various R&D Projects

ALPHA Consult's services

Our broad staff profiles means that we can draw on the internationally-recognized expertise of senior business managers, economists, and technology specialists to create bespoke multi-disciplinary teams tailored to meet customers' needs. By combining innovative thinking with a practical approach, we are helping our customers to meet the new and emerging challenges they are facing. We provide services to large European aerospace conglomerates and research centers and we have a long track record in studies both for the European GNSS Agency, the European Commission, the European Space Agency, as well as institutional/ service provider organisations in Europe and in Africa.

ALPHA Consult's geographical reach



CONTACT

Headquarter address:

via Flumendosa, 16
20132 Milan

T (+39) 0287244800
www.aresys.it
info@aresys.it

SMALL AND MEDIUM ENTERPRISE

ARESYS, Advanced Remote Sensing Systems, is an Italian SME, spin-off of Politecnico di Milano, founded in 2003, that inherits the internationally renowned expertise of Politecnico di Milano in the field of remote sensing.

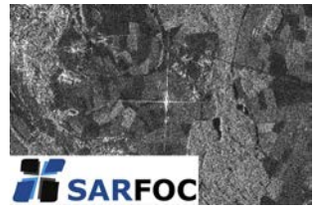
ARESYS is a strongly R&D oriented company, that exploits cutting edge technologies to deliver highly customized solutions and services to its customers.

ARESYS expertise covers the following areas:

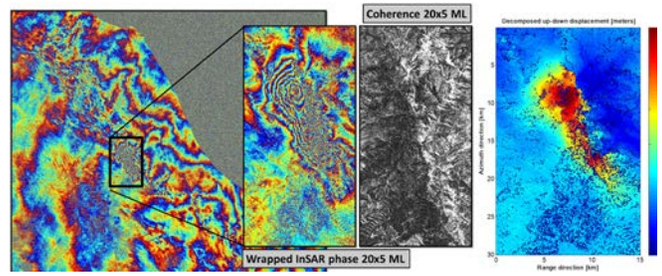
- Airborne and Spaceborne Synthetic Aperture Radars (SAR) ;
- Ground based SAR, RADARS and GPR;
- Pipeline acoustic monitoring systems;
- Seismic and geophysical prospection systems

Nowadays ARESYS can count on a group of around 45 high skilled professionals and serves customers in Europe, Asia and South America.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

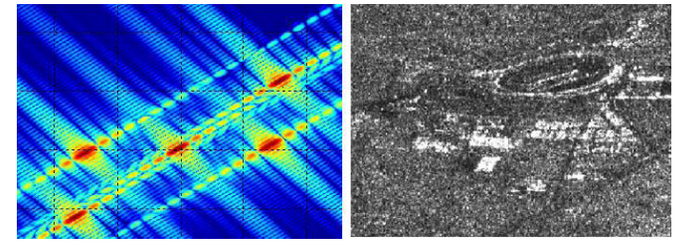


SARFOC: is a multi-sensor, versatile kernel for SAR focusing and L1 processing. It handles mono as well as bistatic SAR, ScanSAR, TopSAR, Spotlight and other modes. It is designed with emphasis on geometric accuracy, calibration and phase preserving features. SARFOC comes in two different versions: DESKTOP, a light version that can be used on a desktop PC (for academic and scientific purposes) and HPC, a highly efficient and optimized version suitable for multi-core and high-throughput processing solutions for Ground Segments and Operational Data Centers.



SARINT: provides advanced tools and components for SAR interferometry and interferometric stacking. It supports Stripmap, ScanSAR, TopSAR and Spotlight acquisition modes. SARINT is robust and mature and it is the core of operational interferometric stack processor of the Santinel-1 PDGS. SARINT can be used in combination with SARPS to perform multi-temporal interferometric processing and Persistent Scatterer analysis.

SARFOC, SARNT and SARPS can be managed through simple and easy to use web-application, FreeSAR, that allows to exploit powerful SAR data processing features without any local software installation.



SAR system end-to-end simulations: ARESYS offers a complete SAR simulation framowork, for SAR satellites and UAV/airborne systems called GSS-RT. Our solution includes a flexible SOFTWARE raw data simulator (GSS) and a Real-Time optional component (AWG-4k, developed by ARESYS Electronics) that is able to provide simulated data over a real-time IF link or over an high-rate Digital link.

Innovative SAR system design, SAR Engineering support services: ARESYS supports SAR systems manufacturers and designer world-wide offering highly specialised consultancy services. Thanks to the long experience in SAR mission design, through the participation to many national and international SAR projects, ARESYS can offer a unique support service starting from SAR system concept, to SAR operations support, SAR calibration and SAR data processing.

Besides Space activities ARESYS is also active in the following fields: Ground interferometric Radars monitoring solutions, Leak detection systems and pipeline monitoring and Seismic and Geophysics.

CONTACT

Headquarter address:

Via Cervino, 52
10155 Torino

T (+39) 011 765 05 67
www.argotec.it
info@argotec.it

SMALL AND MEDIUM ENTERPRISE

Argotec is an Italian aerospace engineering company founded in 2008 in Turin. It works in the aerospace sector and its activities are in various areas: payloads and technology, small satellites, as well as training and simulations for astronauts and ground staff. Argotec engineering activities have focused on the research and development of several technological solutions for the International Space Station. A branch of the research is dedicated to the field of passive heat transfer. Additionally, the company works to design and build mini-satellites with small size and low mass (<50 kg).

Training and simulation operations are conducted by instructors certified by NASA and ESA. Many of these activities take place at the European Astronaut Centre (EAC), based in Cologne in Germany. Moreover, the Turin headquarters has a functional Mission Control Centre, directly connected to NASA, from which Argotec engineers can provide real-time support for the operations on the International Space Station (ISS).

In recent years, Argotec has designed and constructed the "Space Food Lab", a new research facility for the study of healthy and nutritious food for astronauts. In particular, a team of chefs, food technologists, dietitians, nutritionists, and engineers developed the bonus food for ESA astronauts who have flown to the ISS.

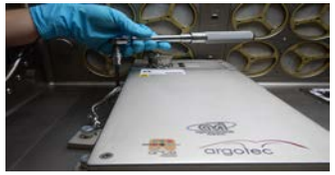
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Argotec performs research and development in several aerospace industry areas. The company is an important Italian player in various projects related to the design and the development of fluid dynamics thermal and systems for the International Space Station. These devices are not targeted at space only, but are also designed with the intention of implementing innovations and new technologies that are directly applicabl on Earth

Argotec has a long and recognized history in various aerospace industry areas, including training and mission operations for the European Space Agency (ESA) as well as other Industries or National Agencies in Europe. Its certified instructors train Astronauts at the European Astronaut Centre (EAC) in Cologne and they also instruct the ground crew (the flight controllers) regarding voice protocol, ISS operations, control centres on Earth, and flight rules.

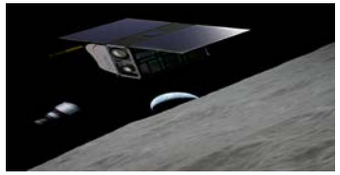
Argotec research and development also covers the Small Satellite Unit. The small satellites can be a utilized as an experimental platform in space to obtain useful scientific data or deliver commercial services. This is the case with ArgoMoon, a nanosatellite for deep space built by Argotec and with coordination provided by the Italian Space Agency. Argomoon has been selected by NASA as a payload for the forthcoming Exploration Mission 1 scheduled for the end of 2018.

Argotec developed the Space Food Lab for the study of healthy and nutritious food dedicated to Astronauts. A team of chefs, food technologists, dietitians, nutritionists, and engineers developed the bonus food menu for Astronauts in a new research area. Thanks to the ReadyToLunch brand, this expertise was applied on our planet, making space food suitable for Earth consumption.



Payloads and Tech Unit

Operation Training & Simulation Unit



Space Food

Small Satellite Unit

CONTACT

Headquarter address:

Via Giovanni Botero, 18
10122 Torino

T (+39) 011 0867 100
www.aviospace.com
contact@aviospace.com

SMALL AND MEDIUM ENTERPRISE

AVIOSPACE is a space company located in Torino. The company was formed in 2004 and its network of partnership includes various SMEs in the field of Engineering and Manufacturing, several Universities, and Professionals.

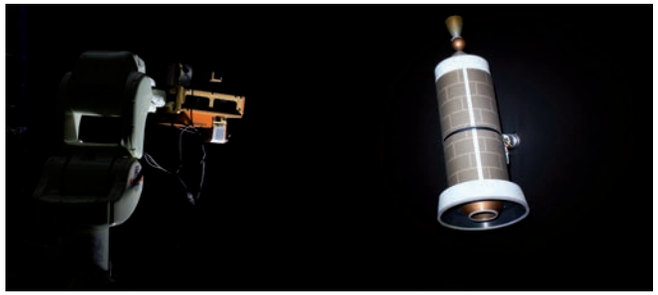
Between January 2010 and March 2016 Aviospace has been an Airbus Defence and Space company, remaining however an Italian registered company with management and personnel entirely Italian.

Company core competences:

- System Engineering, Space Transportation, Future Launchers, and Space Exploration systems
- Thermal Control, Mechanical structures, Composite materials, and nano-structured material
- Avionics and On-board Software
- Propulsion, Multi-layer thermal insulation equipment (MLI), and Multi-physical simulation
- Human Life in Space and ISS operations

AVIOSPACE can benefit of a network of collaborations with small and medium companies with robust experience in high-quality manufacturing and niche technologies.

The scenario of collaborations is permanently in evolution: agreements across Italy and Europe are already established or are in final preparation in the sector of the automatic space systems for transportation and exploration with the Italian Institute of Technology (IIT), as well as with universities and other academic organizations (e.g. INSTM, Politecnico of Torino, La Sapienza) and manufacturers.



PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Project: *Multi Purpose Crew Vehicle – European Service Module for NASA's Orion programme (MPCV-ESM)*

The activities are developed in the frame of collaboration between Aviospace and Airbus Defence and Space Bremen, it consists in a support for: Design and Manufacturing of mechanical parts of the propulsion systems and for Design and Analysis support for Primary and secondary structure interface for the Propulsion System.

Project: *Capture and De-orbiting Technologies (CADET)*

The project developed and demonstrates, by the development of ground functional breadboards, key technologies for ADR, including the capture systems and a vision base d navigation system, including target in-situ recognition and properties assessment.

Project: *e.Deorbit phase A*

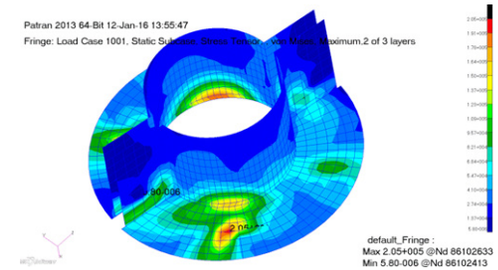
The e.Deorbit mission objective is to "Remove a single large ESA-owned Space Debris from the LEO protected zone". The role of Aviospace in the project is the design of a tethered-net capture mechanism.

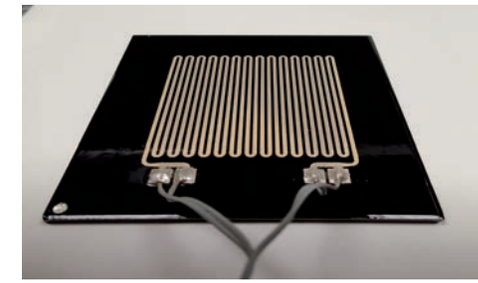
Project: *Activ-jet*

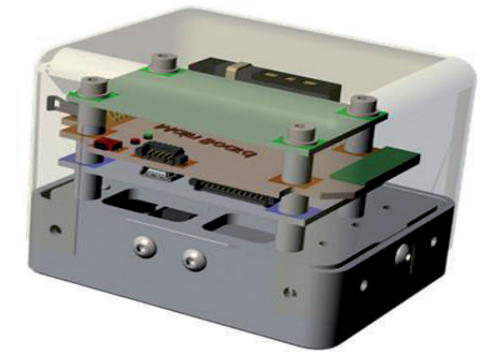
The project allowed Aviospace to develop a full process of materials functionalization by means of ink-jet printing, including: 1) Case-by-case nanoparticle-based ink design and formulation (e.g. both conductive and dielectric inks). 2) Printed pattern optimization and printing process set-up. 3) Wide range of possible substrates (e.g. ceramic, metallic, composites). 4) Post-printing thermal treatments. This technology involves the use of a stable and repeatable process, which makes use of less galvanic treatment and waste production. Moreover, mass savings and lower manufacturing costs, as well as the possibility to deal with 3D shapes, make it a competitive alternative to traditional manufacturing techniques.

Project: *Wireless Sensor Network*

This project focuses on sensing nodes development, powered by a vibration energy harvesting technologies, developed in the frame of the project. The nodes are conceived to be used on-ground, during storage, pre-launch phase, and during ascent/in orbit phases, e.g. Launcher staging, to allow communication between stages after separation. The communication system is composed by a multi-radio communication platform capable of using, in cognitive and opportunistic mode, heterogeneous wireless communication technologies for monitoring and control of complex systems for industrial and aerospace markets. The communication platform consists of multi-radio nodes able to cooperate for building up an intelligence network, that promotes the opportunistic use of wireless technologies with complementary characteristics in terms of data rate, latency, robustness to radio channel conditions, power consumption, and ability to self-organization in networks.







COMPOLAB
advanced R&D

SMALL AND MEDIUM ENTERPRISE

Compolab project was founded in 2010 aiming to provide solutions and technologies to support our clients through the conception, the design, the prototyping and the industrialization of the product and to assist them in process design and optimization.

The company business is focused on design and technical drafting, on modelling, on structural and fluid dynamic simulations, on design and realization of test machines and tests. We have developed remarkable skills in project design and in the direct distribution of highly qualified activities on projects promoted by regional, national and European bids. Our internal resources are highly specialized and qualified to guarantee an efficient and valuable quality service at competitive costs.

Our crew has progressively increased the number of its collaborators and has guaranteed a constant turnover growth.

Among our clients, besides some PMI, we count the main international players within the automotive, railway, energy, defence and aerospace sectors. Moreover we have started important collaborations both with primary Italian and international research centres and with technological parks, developing productive collaborations and mutual satisfaction.

Even if we have significantly enhanced our internal skills in order to offer highly specialized services, we have been able to produce an analysis method to approach considerably complex.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Our core business is focused on innovation, products and processes development and technical-scientific knowledge transmission for big companies and industrial organizations, as for medium and small businesses.

We offer support and consultancy through the stages of:

- conceptual design
- design
- simulation
- prototyping
- testing
- production start up
- business management

On the areas:

- Design and FEM calculation
- Design and calculation CFD
- Calculation and verification of 3D tolerances
- CAD Design and Reverse Engineering
- Electronics design
- Testing and design of testing machines
- Data correlation
- Quality
- Support to company management
- FMEA / PFMEA / DFMEA
- Courses and training

In particular for the space sector we have skills in structural and thermal calculation in materials and design, according to the ECSS standards. Eletronics design and devlopment.

The knowledge of the FEM simulations includes the process parameters and the optimization of weight.

CONTACT

Headquarter address:

Via dell'Artigianato, 53
Livorno

T (+39) 0586 422497
www.compolab.it
info@compolab.it

DATASEL S.R.L.

Headquarter address:
Via privata OTO, 45
19136 La Spezia

T (+39) 0187 599077
www.datasel.it/chisiamo.html

CONTACT

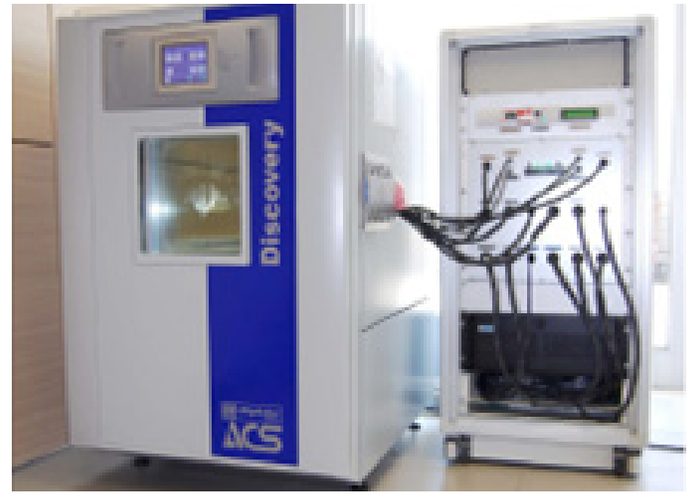
Managing Director
Sandro Pazzini
T (+39) 346 0098399
s.pazzini@datasel.it

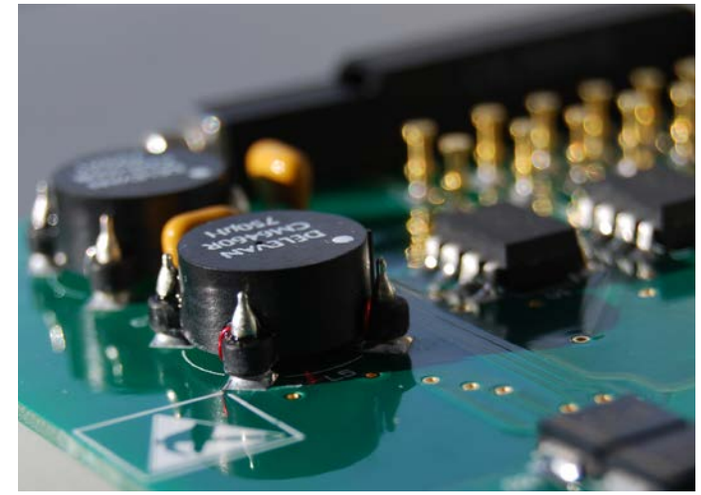
SMALL AND MEDIUM ENTERPRISE

Datasel s.r.l. is a small engineering company operating both in hardware and software capabilities to perform design, development , qualification and construction/implementation of reduced quantities of electronic equipments. Datasel especially operate in the following fields:

- Navigation device, detonation control system and special interface equipments for missiles;
- System Integration and software development of special equipments for Microsatellite;
- BMS (Battery Management Systems) for applications in electromedical robotics (e.g. exoskeleton), automotive and military applications;
- Illumination, Domotic control and Security Systems (e.g. PA/GA for Mega-yachts and Cruise Ships).

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES





CONTACT

Registered Office:
Via Giuseppe Mazzini, 2
20123 Milano

Operational Office:
Viale Risorgimento, 57
22073 Fino Mornasco (CO)
www.deorbitaldevices.com
info@deorbitaldevices.com

Renato Panesi – CCO
T (+39) 320 0244978
renato.panesi@
deorbitaldevices.com

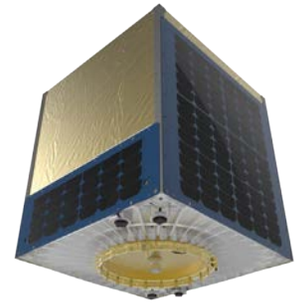
SMALL AND MEDIUM ENTERPRISE

D-Orbit is an Italian space systems company providing solutions for satellite design, development, launch, commissioning and decommissioning.

in 2011, D-Orbit currently employs approximately 35 people. The firm is based in Milan, Italy with subsidiaries in Washington, DC, and Lisbon, Portugal.

Our business model revolves around products and services that are profitable, create value for the customer, and have a proven social benefit and a positive impact on the environment. To do so, we look for ways to streamline every phase of a satellite mission with components and services that simplify spacecraft design, increase reliability, improve the use of mission resources, reduce operational costs, and extend the revenue-generating phase of a space mission.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES



InOrbit NOW is a CubeSat launch and deployment service enabled by ION CubeSat carrier, a satellite platform developed and operated by D-Orbit that is able to carry a combination of CubeSats (from 1U to 12U) inside its 48U dispenser, and release them individually into distinct orbital slots with client-required orientation, attitude, and impulse.

D-Raise is a special version of D3 conceived for the new generation satellites implementing only electric propulsion system on-board and able to speed-up their transfer maneuver from parking orbit to operational orbit. By speeding up the transfer maneuver from parking orbit to operational orbit, D-Raise allows anticipated revenues for the satellite operator and prevents deterioration of solar arrays due to a long exposure to radiations.

D-Orbit Decommissioning Device (D3) is an independent, smart propulsive device available for all satellite platforms operating in LEO, MEO, GEO, specialized in decommissioning maneuvers to remove the hosting satellite from the operational orbit in a quick, direct, and controlled way at the end of the mission or in case of major malfunction.

FENIX is a compact solid propulsion system that empowers CubeSat to perform orbit-raising maneuvers, enabling operators to extend their CubeSats' operational life.

Dragonfly

CONTACT

Headquarter address:

Piazza Guglielmo Marconi, 15
00144 Roma

T (+39) 06 9293.9404
www.dragonfly.it
Claudio.giarda@dragonfly.it

SMALL AND MEDIUM ENTERPRISE

Dragonfly is an innovative start-up (under Law 221/2012), operating in specific services for additive manufacturing, in particular for Defense and Aerospace fields.

Dragonfly offer an all-around support for additive manufacturing adoption, in terms of services and products: ranging from tailored business cases to system integration services and from products "additive" engineering design to third parties prototyping & production.

We help you to develop your product with specialized additive redesign services. We will find unconventional design solutions in lightening, assembly and fluid dynamics optimization, solving technical problems that until now were faced with only partial solutions, not entirely effective.

We quickly realize your prototype and produce and finish final parts using the most advanced technologies of laser metal powder fusion (EOS M290) with which it is possible to obtain fully dense objects with excellent metallurgical characteristics.

Dragonfly is based in Capua inside the Italian Center for Aerospace Research (CIRA), with branches in Rome and Milan.

On December 22nd, 2015,

Dragonfly established (along with other leading partners in the aerospace, engineering and research) the network of companies called NIAM (Italian Network for Additive Manufacturing).

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Light-weighting & Design Optimization for Aerospace Parts

We support our customers in the design of new parts or reviewing and optimizing products currently in production, allowing the production of components optimized both in performance that in weight, while maintaining the peculiarities of the product. It is possible to achieve an average weight reduction which range from 20% to 60%, with enhanced benefits on the final part functionality.

Direct Metal Laser Melting technologies for mechanical final parts production

Dragonfly is the Italian "solution partner" of EOS, that is the world leader supplier of AM systems, materials and software for the production of high-quality metal parts. With a building volume of 400 x 400 x 400 mm and with a wide range of metal powders, the EOS systems allows the production of metal parts for aerospace, automotive ad energy fields. Together using technology, materials and standards process parameters provided by EOS, the production process is certified for serial production of parts and components.

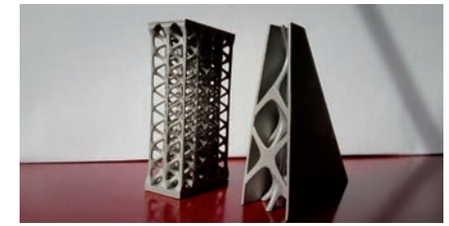
Aerosol Jet Technologies for electronics 3D printing (antennas, sensors & MEMs)

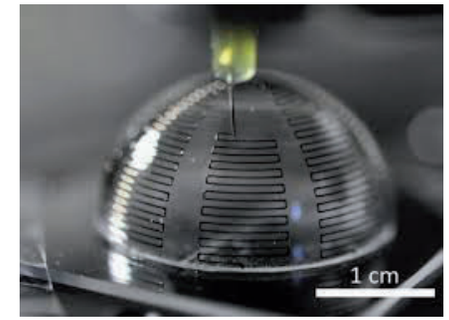
Dragonfly is the Italian partner of Optomec for all sales services and technical support for the Aerosol Jet® Printing technology, of which the American company is a global leader. The Aerosol Jet® technology delivers the unique ability to print fine-feature electronic, structural and biological patterns onto almost any substrate. The patented process utilizes aerodynamic focusing to precisely deposit conductive materials and even other kinds of materials in dimensions ranging from 10 micrometers (microns) up to centimeter scale. Typical applications are antennas, sensors, MEMs packaging on conformal surfaces; enabling "smart" parts.

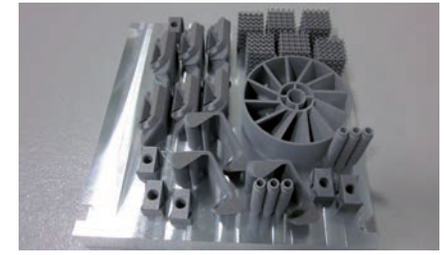
Rapid Prototyping and Rapid Manufacturing

We offer the possibility of 3D printing components with a high degree of accuracy. We are able to ensure production of prototypes as well as finished components in small series. We are able to perform conventional treatment and special finishing with nanomaterials (for a full additive production process).

Typical applications include small batches of products and spare parts in metals for high-performance engineering applications in the automotive, aerospace and plant engineering (energy) fields.







EIE SPACE TECHNOLOGIES

Headquarter address:
Via Torino, 151/A
30172 Mestre (VE)

T (+39) 041 5317906
www.eie.it

CONTACT

Mr. Gianpietro Marchiori, CEO
Mr. Massimiliano Tordi, CTO
gmarchiori@eie.it
mtordi@eie.it

SMALL AND MEDIUM ENTERPRISE

EIE GROUP has been on the market since 1989, specializing in Engineering & Design, Management & Contracts and Production & Services. It operates globally to provide engineering and turn-key solutions in areas such as Astronomy, Astrophysics, Big science, Civil Infrastructures, Large Scientific Technological Facilities as well as Space Technologies and Renewable Plants. EIE GROUP is an internationally recognized player in Astronomy, very active in Dome and Telescope engineering.

In the scope of the services provided for supporting the scientific research, EIE GROUP established EIE Space Technologies for the development of the activities in the Aerospace sector.

EIE Space Technologies is based in Mestre-Venice, headquartered at the main offices of the Group. It is devoted to the development of Optical, Thermal and Mechanical Ground Support Equipments for the Aerospace market and the design and integration of optical payloads. With more than ten years of experience with aerospace industry (Leonardo-Finmeccanica, Thales Alenia Space, ASI, ESA, MT-Mechatronics) we can provide products and solutions for the most demanding conditions.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

EIE Space Technologies is specialized in providing solutions for radiometric testing of flight optical payloads. Specific testing solutions includes illumination systems for testing and stray-light performance verifications, radiometric calibration, MTF measurement and performance validation of optical payloads.

Relevant experiences for dual use large radar antennas and radio antennas allows EIE GROUP to provide complete solutions for the Ground Segment, in particular for what concerns Deep Space Networks, including main structure and reflector design and realization as per customer requirements, buildings realization, on site erection, on sky test and acceptance.

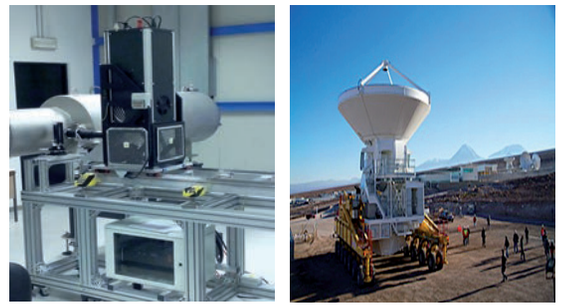
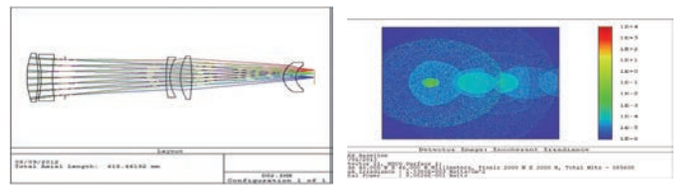
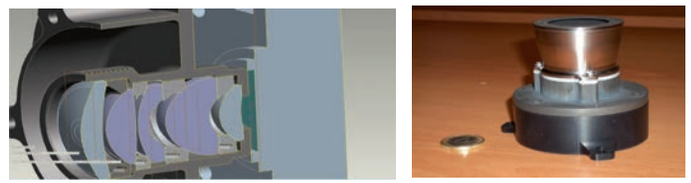
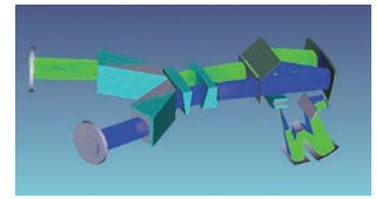
EIE Space Technologies S.r.l. provides services for the aerospace industry including mechanical design, optical design, integration and test of opto-mechanical payloads, design and realization of ground support equipments.

Services include the assessment of the optical design for EO systems and scientific payloads, stray-light analysis and prototyping of advanced system models.

A broad range of engineering services is also available to the aerospace community from the EIE GROUP team: structural analysis, CFD modeling, thermal analysis, FMECA, cable harness design, mechatronics and control system design, software design are routinely used for the realization of the most advanced astronomical facilities in the world, together with our capabilities in management of large projects in international environments.

EIE Space Technologies S.r.l. is continuously improving its portfolio of innovative optical solutions for Earth Observation and Solar System Exploration, including multi-spectral and hyperspectral imagers from UV to MWIR.

We can provide new ideas for the solution of the Customer problems and support our Customers in the development of their own ideas.

Headquarter address:

c/o Tecnopolo Abruzzo,
ss17 Ovest
Nucleo Industriale di Pile
67100 L'Aquila

T (+39) 0862 1965740
www.elital.com
info@elital.com

CONTACT

Mr. Guido Arista

T(+39) 08621965740 ext.50
guido.arista@elital.com

SMALL AND MEDIUM ENTERPRISE

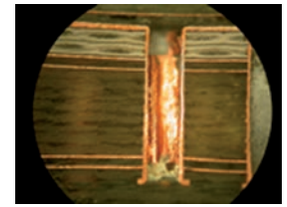
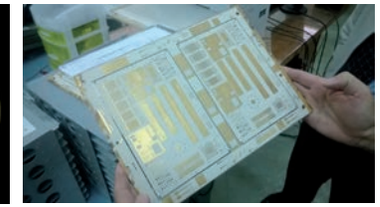
Elital (the name is Elettronica Italiana) was founded in 1986 and has rapidly expanded its capabilities in the design and manufacturing of complex and multidisciplinary systems, subsystems and complete products.

The fields where our technology is applied are mainly Space and Defense (Homeland Security included) and also Industrial application. Product and technologies are listed into www.elital.com. Some of our products:

- MGSE – OGSE
- EGSE
- Space Qualified PCB (Printed Circuit Boards)
- Space Qualified Brazings
- Transportable Satcom systems
- Mobile Satcom Systems

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

PCB Printed Circuit Boards

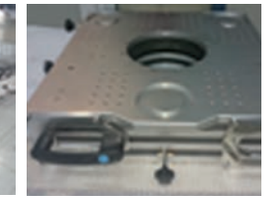



Brazed unit


MGSE







EGSE

SATCOM





esri Italia

Headquarter address:
Via Casilina, 98
00182 ROMA

Other Offices:
Strada 1, Palazzo F2
Milanofiori
20090 Assago (MILANO)

T (+39) 06 40696.1
www.esriitalia.it
info@esriitalia.it

SMALL AND MEDIUM ENTERPRISE

Esri Italia is the Italian leading company in geospatial solutions for Government and Enterprise. Esri Italia is Esri Official Distributor for the Italian market where the company operates also in networks with important Partners. The target customers are mainly in Government, Defence, Public Safety & Security, Space, Telecom & Utilities, Enterprise Companies, Universities, Research Institutions and No-Profit Associations.

Esri Italy has a strong presence in the Italian market with Enterprise solutions supporting operation and decision making of any private or public organization.

The company offers high level of expertise in various application fields with solutions based on Esri technology and the integration of ArcGIS Platform with other enterprise systems. The offering integrates Geolocation and Mapping Platforms, Spatial Analysis, GIS, Geospatial Data, Training Programs and Professional Services.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

ArcGIS is a geolocation platform to make better, smarter decision and a more efficient organization.

It works about every problem and situation has a location aspect.

People in an organization can use ArcGIS in different ways i.e.:

- Executives use the platform to keep on top of key performance indicators and analyze trends and spatial connections that influence every aspect of organization's operations.
- GIS analysts with ArcGIS can build maps using up-to-date data, perform deep analysis, and share results within or outside their organization.
- Knowledge Workers use ArcGIS for manage enterprise data in decisions and business workflows. Support decision making in their organization with tools for advanced analysis and data visualization.
- CIO & IT Professional with ArcGIS can integrate mapping and spatial analysis into business system dashboards and reporting systems without customization. Implement ArcGIS across your enterprise using your organization's policies and procedures for maintaining security and data integrity. You can deploy ArcGIS on-premises or in the cloud.

Many projects in Environment & Natural Resources, Defense, Public Safety & Security, Urban Design, Utilities & Communication include the ArcGIS Platform.

Esri Italia Solutions complementing the ArcGIS platform:

- Normalization and Geocoding – Standardize and convert an address into a geographic location allows fully understanding the spatial relationships with other information. Esri Italia supports standardization and mass geocoding of addresses and points of interest.
- Image Processing - The processing of remote sensing images provides powerful spatial analysis tools. Esri Italia offers skills and solutions for satellite images analysis, particularly in SAR (synthetic aperture radar images). The company owns a patented solution called GISAR for filtering and extracting automatically information from data. The collaboration with the European Space Agency allowed testing the solution mainly with COSMO-SkyMed and Envisat data.
- Geophysical and Structural Monitoring – This topic is very important in Italy, a country with exposure landslides, subsidence, bradyseism, volcanoes and a unique historical heritage. Maintain the territory integrity requires effective control actions. The SENDAS solution is an alternative tool to traditional monitoring systems, based on GNSS sensors single frequency. It is a technologically advanced solution for monitoring landslides, volcanoes, dams or other similar elements.

CONTACT

Headquarter address:

Via Carlo Puini, 97
int. 26/27
57128 Livorno

T (+39) 0586 505016
www.flyby.it
info@flyby.it

SMALL AND MEDIUM ENTERPRISE

Flyby is an independent Italian company, specialized in the development of Decision Support Systems (DSSs) exploiting edge technologies in the field of Remote Sensing, Signal Processing and Big Data Analytics.

The company has been founded in 2001 with the aim to develop innovative solutions exploiting data analytics. Today we are operating worldwide providing our systems and services in different scenarios and market fields.

The company is managed by the founder, Dr. Emilio Simeone (M.S. in Physics, Ph.D. in Applied Optics), and the staff is composed by experts with M.S./Ph.D. level education and skills in Computer Science, Physics, Telecommunication, Electronics, Signal Processing Engineering and Artificial Intelligence.

Flyby operates in five different business sectors (Defence, Space, Health, Maritime&Fishing, Energy) with five related Strategic Business Units (SBUs) and Controlled Corporations: FlySight, siHealth, Flyby Space, BestFish and i-EM. i-EM (Flyby 70%, Enel 30%) and BestFish (Flyby 60%, PxL 40%) are currently two joint venture founded respectively in 2012 and 2016. siHealth Ltd is a UK company founded in 2015 (100% Flyby owned).

Transversally to the five SBUs, the Research & Development Department ensures a continuous growing of the edge competences in several technological fields.

Since its foundation, the Company has been continuously involved in a wide range of R&D projects funded by the European Space Agency (ESA), the Italian Space Agency (ASI), the European Commission (EC) and by other regional agencies. These participations allowed us to bring in the market state of art technologies for our customers.

All the processes in the Company are managed according to UNI EN ISO9001:2008 quality standards. For the more demanding Military and Space projects we apply the rules and the quality requirements set down respectively by the MIL-STD-498 and by the ECSS standards.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Flyby's cutting edge competences are the development of dedicated algorithms for the processing of data, especially those coming from optical sensors, and complex systems modelling. Such capabilities stem from the multi-disciplinary background of Flyby's R&D personnel, who is active both in assimilating latest achievements from science and in collaborating with important public/private research centres, thus achieving the goal of designing and implementing innovative solutions tailored to any specific application.

Flyby's key competences are in the following fields:

- Optical Physics
- Signal Processing and Computer Vision
- Geomatics
- Embedded Systems
- Big Data Analytics
- Simulation

The main Products are:

Earth Observation Products for Costal & Maritime Environmental Assessment

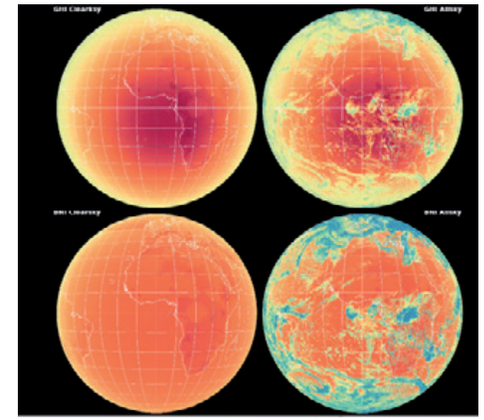
- Shallow water bathymetry map
- Turbidity maps
- Ocean colours parameters maps (e.g. chlorophyll A, suspended matters, surface temperature)
- Off-shore wind, wave and currents maps

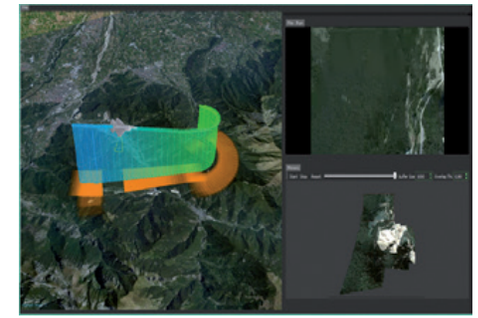
Worldwide Real-Time Earth Observation Products (15 minutes update in Africa and Europe, 30 minutes update elsewhere)

- GHI/BNI (Global Horizontal Irradiance, Beam-Direct Normal Irradiance) Maps
- UV (Ultraviolet) Radiation Maps
- High Resolution Imagery
- Flyby distributes High Resolution Satellite Imagery

OpenSIGHT

OpenSIGHT is a geo-exploitation toolbox that represents a new environment concept for the definition of Decision Support Systems. OpenSIGHT have been developed following the STANAG guidelines and rules in more than 10 years of expertise matured in interfacing SW tools for the processing of airborne data sensors and avionics information.





CONTACT

Headquarter address:

Via Amendola, 173 c/o
Physics Department
70126 Bari

T (+39) 080 5442180
www.gapsrl.eu
info@gapsrl.eu

raffaele.nutricato@gapsrl.eu
mimma.ciola@gapsrl.eu

SMALL AND MEDIUM ENTERPRISE

Geophysical Applications Processing s.r.l. is a spin-off company of Politecnico di Bari, established on February 2006, whose mission is to develop products, processes and services with technological and scientific value in the fields of satellite remote sensing, stereo vision and biomedical research, and related software/hardware technologies.All the activity is performed on the basis of competencies and pay-offs of research projects, particularly in the Remote Sensing Group of the Department of Physics of Bari, in collaboration with the Institute for high studies on Intelligent Automation Systems (ISSIA) of the National Council of Research (CNR), based in Bari, Italy.

During the last twenty years, the following scientific competences have been acquired:

- Synthetic Aperture Radar (SAR) data processing;
- Developing of a multi-temporal SAR interferometric processing chain (SPINUA © - Stable Points Identification in Non Urbanized Areas) for ground instability monitoring (subsidence, landslides, earthquakes);
- Analysis of optical data acquired by satellite platforms aimed at the inference of biophysical parameters such as water quality and chlorophyll;
- Meteorological and climate data processing; high resolution forecast services using numerical meteorological models;
- Development of signal and image processing algorithms using both interpreted and compiled programming languages (MATLAB, SCILAB, IDL, C, C++) as well as Assembly;
- Development of algorithms on parallel architectures and computational grids.

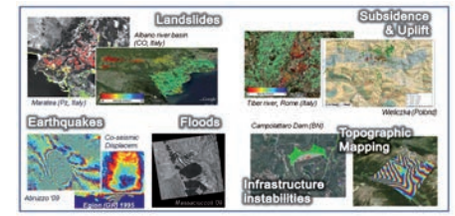
Starting from this scientific background, GAP intends to provide products and services characterised by high level of innovation and scientific / technological contents in the field of remote sensing and related hardware and software technologies:

- Production, marketing and customer service;
- Feasibility studies, designing, developing and prototyping of innovative procedures for digital signal processing (DSP) dedicated in particular of satellite remote sensed data;
- Training activities dedicated to the product users;
- Activities of research and development aimed at updating the scientific knowledge in the specific fields of interest.
- Shareholders of GAP are Politecnico di Bari, Planetek Italia srl, SITAEL SpA and seven professionals among Polythecnic professors, CNR researchers and young Physics and Engineering graduates.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

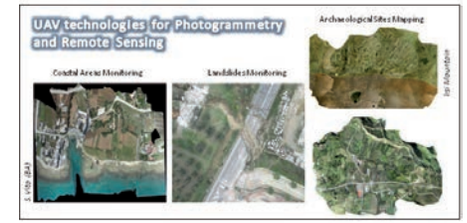
Remote sensing by satellite-borne SAR sensors

- Subsidence Maps
- Landslide Monitoring and Warning Maps
- High Resolution DSM
- Buildings and Infrastructures Stability Monitoring
- Ground Displacements Generated by Earthquakes
- Flood Maps
- Oil Spill Detection



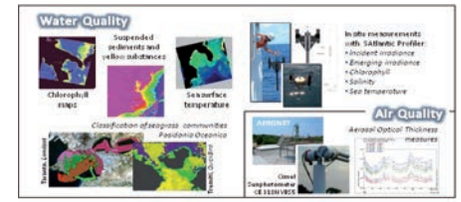
UAV technologies for Photogrammetry and Remote Sensing

- Landslides monitoring (orthophotos and 3D)
- Stability analysis of buildings, monuments, bridges, dams, infrastructures (HR videos)
- Natural hazards monitoring (HR videos)
- Inspection of wind turbines and plants (HR Photos and Videos)
- Dumps and mines (orthophotos and volumetric analysis)
- Archaeological sites (orthophotos)
- Monuments (3D reconstruction)
- Buildings and construction industry (HR orthophotos and DSM)



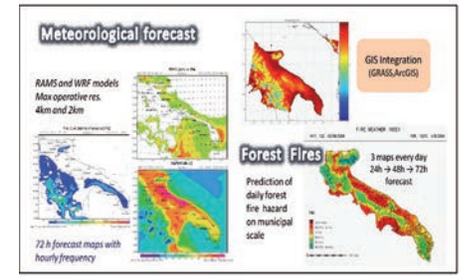
VIS/NIR Satellite Remote Sensing

- Coastal Erosion Maps
- Water Quality Products
- Dynamic Modelling of physical and biological parameters in coastal waters
- Water Leaving Reflectance
- Air Quality



Meteorological Services

- HIGH RESOLUTION METEOROLOGICAL MODELLING
- WIND REANALYSIS
- METEO-CLIMATOLOGICAL DATA PROCESSING
- CUSTOMIZED WEATHER SERVICES



Other products and services:

The long-term experience in the field of digital signal processing has enabled the transfer of GAP algorithms, developed for remote sensing, in other areas where advanced techniques are required for digital processing of data. Examples of this technological transfer are:

Stereo Vision & 3D Tracking

Biomedical Applications

Group of Astrodynamics for the Use of Space Systems

CONTACT

Headquarter address:

Via Lariana, 5
00199 Roma

T (+39) 06 97 88 14 40
www.gaussteam.com
info@gaussteam.com

SMALL AND MEDIUM ENTERPRISE

The Group of Astrodynamics for the Use of Space Systems (G.A.U.S.S. Srl) is an Italian limited liability company based in Rome, founded in 2012 as a spin-off of the Scuola di Ingegneria Aerospaziale of Sapienza University of Rome, carrying on the school's more than twenty years tradition in the field of microsatellites. Active in the space technology field, its aims are the research, the development and the implementation of aerospace projects, plus the educational aspect and the execution of related cultural initiatives.

G.A.U.S.S. Srl has gained its experience from 8 differently shaped and sized satellites' launches. The company business is mainly related to the design and the manufacturing of micro, nano, pico and femto satellites, intended as CubeSat, PocketQube and releasing platforms such as GPOD (GAUSS Picosatellites Orbital Deployer), MRFOD (Morehead Rome Femtosatellites Orbital Deployer) and TUPOD (TubeSat Picosatellites Orbital Deployer).

Since the early nineties, activities of designing, ground testing, integration, launch and ground operations have been managed by GAUSS members at the Scuola di Ingegneria Aerospaziale, where the UNISAT program started under the supervision of Professor Filippo Graziani.

In the most recent launches, UniSat was also a platform and it was able to release 4 CubeSats, thus letting G.A.U.S.S. being a small satellites launch provider. G.A.U.S.S. activities include also structural design, realization and integration of the main subsystems and payloads and all the ground segment operations. The scientific and educational mission of the company is also very important: several experiments are boarded on the microsatellites, ranging from space debris observation instruments to space biomedicine.

Since 2009, GAUSS has been performing bio-medical research in space and on 2011 it was able to conduct two bio-medical experiments on board the Space Shuttle. Since then, space biomedicine payloads research has been carried on.

Since 2000, GAUSS Srl has launched satellites with the support of "International Space Company" (ISC) Kosmotras, using the Dnepr LV.

Recently, thanks to the cooperation with "Japan Manned Space Systems" (JAMSS), GAUSS Srl is also performing launches from the "International Space Station".

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

CUBESAT, POCKETQUBE and TUBESAT Deployers

GAUSS has already launched several times into orbit the CubeSat deployer GPODs (Gauss Picosatellite Orbital Deployer). The GPOD is available for the launch of 1U, 2U and 3U CubeSats and can be customized on request. It supports the 3U+ standard with 10mm of space for deployable panels. The MRFOD (developed in cooperation with MSU), launched for the first time on 2013, is a deployer for the PocketQube satellites. The TUPOD (developed in cooperation with TetonSys) can host up to two tubesats and can be deployed from standard CubeSat deployers.

ABACUS On Board Computer

ABACUS is an OBC manufactured over a PC104 standard. It is a dual core OBC with a MSP430 microcontroller and a Spartan-3E FPGA. It includes a 9 DOF IMU and internal FLASH memory. Software libraries and examples include a bootloader with the capability to update the software once in orbit. ABACUS has an extensive successful flight heritage with more than 5 flights.

GAUSS Electrical Power Subsystem

The GAUSS EPS designed for nano and micro satellites has a capacity of 30Wh using the newest Lithium battery technology. It offers 3 regulated and protected buses (3.3V, 5V and adjustable up to 12V) with a max current of 3A and an extra non-regulated bus. It can act as a watchdog for the complete satellite and it is fully compatible with the ABACUS OBC.

GAUSS Radio UHF

The GAUSS UHF transceiver has been designed for nano and microsatellites thanks to the experience gained on orbit during several missions. It has an output power of 36dBm and speeds from 1200bps to 200kbps. As a result of its dimensions two radios can be stacked in the same PC104 for redundancy purposes. Test ground equipment and libraries for its use with the ABACUS OBC are included.

Ground Station & Software

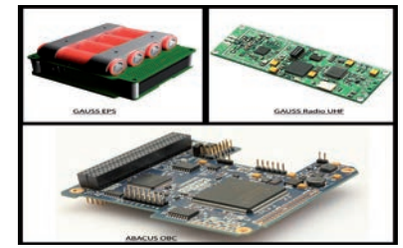
GAUSS offers support for in orbit operations through its fully automated ground station based in Rome in VHF & UHF (uplink & downlink) and S-Band (downlink). GAUSS also offers customized software to automate your ground station and support for designing and building it.

Launch Services

GAUSS provides launch services for micro, nano and pico satellites. The company offers launch opportunities in LEO orbit with a wide range of options: DNEPR launches into near SSO and other LEO orbits at heights ranging from 450 to 650km with the cooperation of ISC Kosmotras using the UniSat platform; ISS launches in cooperation with JAMSS at heights of around 400km. We are the only launch provider able to provide services in LEO orbits for any kind of picosatellites and Nanosatellites standard.

CUBESAT, POCKETQUBE and TUBESAT Deployers

Ground Station & Software



ABACUS On Board Computer
GAUSS Electrical Power Subsystem
GAUSS Radio UHF

GEOCART
sensing innovation

CONTACT

Headquarter address:
Viale del Basento, 120
85100 Potenza

T (+39) 0971 56671
www.geocart.net
geocart@geocart.net

SMALL AND MEDIUM ENTERPRISE

Geocart is an engineering company that operates in the fields of Earth Observation, Environmental Monitoring, Engineering and Information and Communication Technology by providing technical expertise and highly innovative services. The core activity is the design, production and maintenance of geographical databases.

The company provides services related to the processing of satellite images and of geographic data acquired by means of terrestrial and aerial remote sensing with the use of traditional techniques and innovative instruments (GPS, laser scanner, photogrammetric cameras and sensors operating in different spectral bands).

Moreover, Geocart designs and develops multi-sensor integrated platforms and carries out GIS and cartographic editing and offers a consolidated experience on differential SAR interferometry techniques. Regarding SAR analysis, the company has developed a software named "SLIDE" (acronym for SAR Land Interferometry Data Exploitation) that allows to measure, with very high precision, displacements of land, works and infrastructures, using the SAR data acquired by satellites.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Products

Orthophotos and Oblique Photos, Digital Cartography, Satellite Data, Thermal Imaging, Hyperspectral Imaging, DTM, DSM, 3D Models, Software and App, Web GIS.

Services

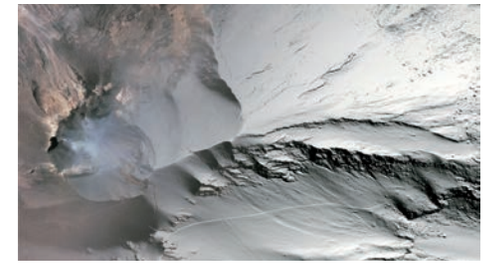
Infrastructures Inspection and Analysis, Aerial and terrestrial remote sensing, Satellite data processing, Topography, Cartography, Environmental Impact Studies, Environmental monitoring, Soil Use Classification, Characterization of forests, Corridor mapping, Urban and territorial planning, System integration, Web GIS, Software and App.

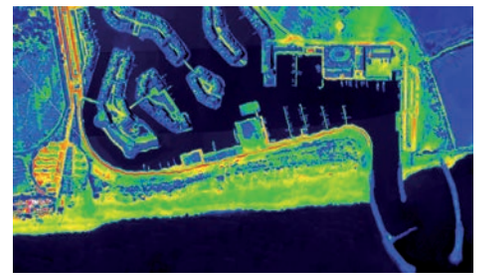
Applications

Urban and Terrain Mapping, Coastal and Protected Area Characterization, Environmental Assessment, Land Degradation Risk Management, Natural and Antropic Risk Management, Water Bodies Monitoring, City modeling, Civil Design, Analysis of structures displacement, Precision farming, Analysis of the Vegetation, ICT Solutions.

Technologies

Laser Scanner, Hyperspectral Sensors, Digital Cameras, Thermal Cameras, Gps And Topographic Tools, Multi-Sensor Integrated Platforms, Own Software.





CONTACT

Fabio Del Frate

T(+39) 06 7259 7734

www.geo-k.co

info@geo-k.co

SMALL AND MEDIUM ENTERPRISE

GEO-K was founded in April 2006 as the first spin-off company of the University of Rome "Tor Vergata". The mission of GEO-K is to conduct R&D activities and to provide consulting, services and products in the field of image processing and of microwave, optical and hyperspectral remote sensing It is the commercial vehicle through which the scientific know-how developed by the University's Earth Observation Laboratory is made available to public and private initiatives in the form of user-oriented applications. Right after its birth, GEO-K was incubated within the European Space Agency (ESA) ESRIN center, where new technology, based on artificial neural networks for the processing of satellite data, was further developed

The key-personnel of GEO-K is highly qualified and with significant experience in international activities. In fact, over the last few years GEO-K has been involved in contracts with national (Italian Space Agency) and international institutions (ESA, EUMETSAT) for the exploitation of EO data. Moreover, GEO-K is the only SME partner in the "URBANFLUXES" project, funded under the Horizon 2020 program, and aiming at estimating anthropogenic heat flux in urban areas from satellite data. The company has also acquired experience in providing educational sessions in EO, mainly addressing companies or technical groups.

GEO-K has recently set-up a drone division, with two qualified pilots driving and managing a small fleet of three drones, exploited to complement the satellite information. Often GEO-K exports its technology and know-how to other fields of engineering not strictly related to Earth Observation. In the past, consultancy has been provided for Automatic Incident Detection problems, Solar Energy Devices and Electromagnetic Pollution analysis.

URBANFLUXES

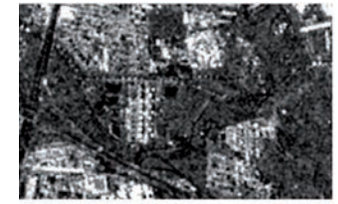
URBAN ANthropogenic heat FLUX from Earth observation Satellites

The organization of the company system in conformance with the ISO normative has led GEO-K to pass the check to receive the certification ISO 9001:2008 for "Design and development of satellite data processing components for geoinformation production". The certification has been confirmed and renewed on July, 2016.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

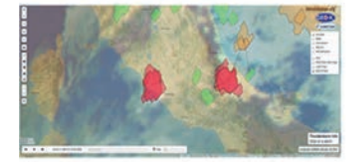
Features extraction from satellite SAR images

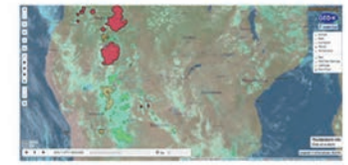
Fully automatic extraction procedures based on neural networks can be provided for extraction of objects of interest from SAR (Synthetic Aperture Radar) images. Examples of detectable objects are buildings (shown in the figure), roads, inundated ares after a flood event, oil spills and ships in the ocean.



The storm track algorithm

StormTrack is an algorithm for the detection and the tracking of thunderstorms based on the Meteosat Second Generation images. The algorithm works in near real time, because there is a delay between the satellite observation and the data availability (about 15 minutes). It can be used for weather now casting applications. The shapes represent the detected objects. The color of each object is related to its phase: Triggering (first detection), Growing, Mature and Dissipating.





Edutainment with the app "Login Earth"

Using spectacular images of our planet taken from space, Login Earth is aiming to offer a new approach to physical and political geography by way of a game. The player is asked to recognise the different places on our planet. Each exact answer given will provide interesting facts about that particular geographical are.

Headquarter address:
Via Stefano Longanesi, 14
00146 Roma

T (+39) 06 4555 2502
www.gmspazio.com
info@gmspazio.com

CONTACT

Dott. Filippo Gemma MBA
T (+39) 335 5702 339

SMALL AND MEDIUM ENTERPRISE

GMSPAZIO is a small hi-tech ICT enterprise based in Rome, made mainly of brilliant young engineers operating in the fields of Aerospace, Defense and Homeland Security to help customers managing:

- Complex Modeling & Simulation Scenarios,
- Space Surveillance & Tracking and Space Situational Awareness Systems,
- Missile Defense Network Analysis Systems,
- Satellite Remote Sensing Products and Services,
- UAVs Surveillance & Monitoring Activities,
- Offering Products, Services, Training, and Know-how transfer, to develop Integrated and Customized Information Systems, and customers' tailored ICT applications and related services.

GMSPAZIO operates in EU Countries and overseas markets delivering integrated solutions to the main actors of the aforementioned market segments, serving International and National Space Agencies, Ministries of Defense, Prime Contractors, Subcontractors, and Research Entities with state-of-the-art products and solutions used to produce high quality results saving time, money and resources.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

GSTT & GOST – Space Surveillance & tracking and Space Situational Awareness Systems

GOST has been built to assist customers analysing collision avoidance risks managing satellite mission.

GSTT is the integrated system able to allow the cooperation of several GOSTs and/or heterogeneous SSA/SST Systems devoted to Space Surveillance & Tracking, and Space Situational Awareness operations.

GMTK & GMDT – Missile Tool Kit and Missile Defense Solutions

GMTK models and simulates ICBM, MRBM, SRBM single and multiple stages, ballistic and guided missiles scenarios.

GMDT offers integrated Modeling & Simulations capabilities to model Missile Defense Network performance.

GSC2 – Maritime Real Time Monitoring and Control System

GSC2 has been created to operate maritime vessel traffic monitoring over the seven seas. It offers the customer an integrated view of the sea basins and the tracks of the ships currently navigating inside it obtained through the decoding of maritime traffic control signals.

GMST - Mission Simulation Tool

GMST has been developed to evaluate the performances of a future complex satellite constellation. It implements the following features: Ground Station download access, Access Revisit Time, Response Time, On-board Memory and Statistics.

Ingegneria Marketing Tecnologia

CONTACT

Headquarter address:
Via Carlo Bartolomeo Piazza, 30
00161 Roma

T (+39) 06 44292634
www.imtsrl.it
imtsrl@imtsrl.it

SMALL AND MEDIUM ENTERPRISE

IMT is a private SME, founded in 1991 and active in the space sector on two main types of activities:

- Systems Engineering: Design and Development of Nano/Microsatellites and relevant On-board units for space commercial, scientific and defense applications.
- Parts Engineering: Characterisation and Testing of EEE (Electrical, Electronic, ElectroMechanical) parts.

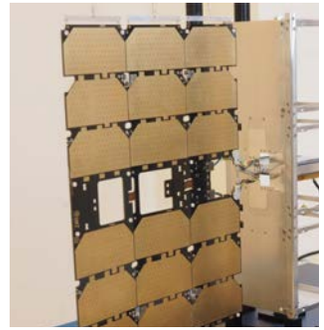
IMT srl's Quality Management System has been formally certified by Det Norske Veritas (DNV) and declared compliant with standard UNI EN ISO 9001:2008 (ISO 9001:2008). Certification number is CERT–18458–2007–AQ–ROM-SINCERT.

The certification applies to the following application fields:

Design and Development of equipment prototypes for Space and Defense. Engineering support in the field of systems and quality disciplines such as: Product Assurance, QA, Software QA, Reliability, Safety, Component characterization and tests, Materials and Processes.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

ERMES is a scientific nanosatellite, based on Cubesat 3U form factor, compatible both with PPOD and ISIPOD dispenser. The Cubesat is developed at IMT as result of a Regional program based on EU funding. The total mass is 4 Kg.

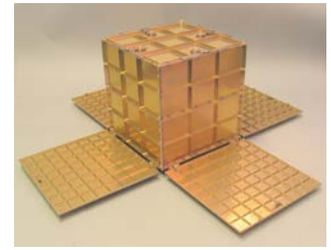


Solar Array Drive Assembly (SADA)

The SADA is composed by a solar array deployable system (6 panels) and a drive mechanism for solar pointing, compliant with 3U Cubesat Platforms.

The system is able to increase the power transfer by a peak of 5W to an average of 30W. An autonomous control system is available, both for logic and actuation. Suitable sliprings allow rotation above 360° on the rotation axis.

NADIR - NAnosatellite for DIdactics and Research



NADIR, the nanosatellite developed by IMT, has been conceived to be a low-cost and medium-high capabilities multifunctional platform. Its main features are:

Two fully separable modules

- The BUS module
- The P/L module

Main Characteristics:

- Modular configuration (each module 300x300x150 mm)
- 15 Kg Satellite BUS
- 10 Kg Custom Payload Accommodation Capability
- 100 W (EOL) available power
- Enhanced Solar Array with Motorized Deployment Mechanism
- Use of Commercial and Mil-Standard Components
- Radiation Hardening features
- 3-years minimum Design Lifetime

EEE Parts Characterisation and Testing

IMT is providing services to main Space actors for testing of eEEE parts, including Upscreening, DPA, Constructional Analysis, Failure Analysis, Environmental Testing, Radiation Testing (TID, SEE, Displacement), Xray, SEM

CONTACT

Headquarter address:

Via Ponte a Piglieri, 8
56121 Pisa

T (+39) 050 6396129
www.ingeniars.com
info@ingeniars.com

SMALL AND MEDIUM ENTERPRISE

IngeniArs S.r.l. is an Italian spin-off company of the University of Pisa, born in 2014 (registered as "Innovative Start-Up" according to the Italian law 221/2012) from the large experience of his co-founders in the area of Electronics and Computer Science Engineering advanced research. Its ambitious goal is to provide an answer to the ever increasing demand of innovation in strategic areas such as aerospace, telemedicine and automotive. The main focus is the design, development and commercialization of Electronics Systems, Informatics Systems and innovative services. This is accomplished by offering highly advanced hardware/software solutions, and by managing the complete lifecycle of electronics, microelectronics and embedded systems.

IngeniArs has a consolidated network of partners, suppliers and customers, and can offer a wide range of high quality products and services being able to cope with cutting edge technologies and at the same time answer promptly to the customer requests. The goal of IngeniArs is indeed to industrialize and put on the market the considerable results achieved by the co-founders especially in the field of aerospace, telemedicine and automotive.

As spin-off company of the University of Pisa, IngeniArs is continuously encouraging and promoting the technology transfer from the valuable outcome of the advanced research to the market.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Gigabit Serial Link Controller IP core

The Gigabit Serial Link Controller (GSLC) IP implements the digital interface for both simple and complex communication protocols based on the most used Serializer/Deserializer (SERDES) available on the market. The GSLC can be customized to be compatible with a very simple hand-shake/ flow control protocol or with a more complex communication standard including FDIR and Quality-of-Service such as SpaceFibre. The GSLC IP is suitable both for FPGA and ASIC technology depending on the application. Key features are:

- Customizable to fulfil user needs
- 6.6 Gbps link speed on the Xilinx Virtex-6 GTX transceiver
- Compatible with Microsemi RTAX2000 + WizardLink TLK2711
- Compliant with the SpaceFibre standard
- Interoperable with commercial SpaceFibre products
- Compliant with the most common SERDES units (WizardLink, RocketIO, GTX), and compliance with others on request

SpaceWire CODEC IP core

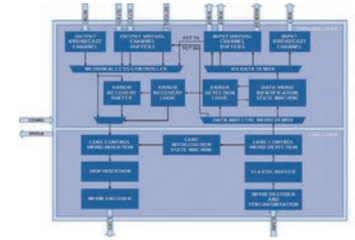
The SpaceWire CODEC IP is a complete and configurable solution for high-data rate and state-of-the-art on-board communications. SpaceWire is a bi-directional, full-duplex serial data communication link. The SpaceWire is based on LVDS physical layer, resulting in a low-power high-speed link. The SpaceWire CODEC IP is compliant with the standard ECSS-E-ST-50-12C (encoder-decoder specification). Key features are:

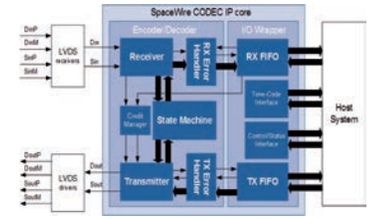
- Customizable to fulfil user needs
- 200 Mbps on Microsemi RTAX2000 FPGA
- Validated in ESA project and used in flight-hardware
- Interoperable with commercial SpaceWire products
- Fault-tolerant IP with FIFO EDAC

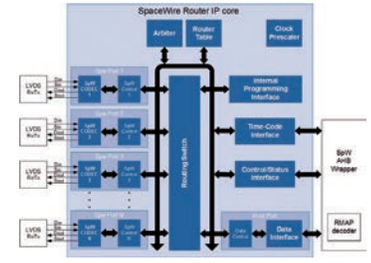
SpaceWire Router IP core

The SpaceWire Router IP core is a VHDL macrocell providing a complete routing and interfacing solution for high data-rate on-board satellite networking. It is fully compliant with the SpaceWire standard ECSS-E-ST-50-12C plus the extensions Protocol IDentifier (PID, ECSS-E-ST-50-51C) and Remote Memory Access Protocol (RMAP, ECSS-E-ST-50-52C). Key features are:

- Customizable to fulfil user needs
- 100 Mbps in Microsemi (RT)AX FPGA for 8-link router
- Validated by simulation and prototyping in ESA project
- Data host interface FIFO-based or with AMBA AHB bus
- Time-code (master or slave) and status/error interface
- Programmable via SpaceWire (RMAP) or host interface
- Synthesized on rad-tolerant FPGA and gate-array devices







INTELLIGENTIA

CONTACT

Headquarter address:

Via Del Pomerio, 7
82100 Benevento

T (+39) 0824 1774728
www.intelligentia.eu
info@intelligentia.eu

SMALL AND MEDIUM ENTERPRISE

Intelligentia was born as the result of the collaboration between Balance Systems Srl, a company operating in the manufacturing sector in the production of balancing machines and auxiliary systems process control since 40 years, and University of Sannio, an important research center in the heart of Campania region in Southern Italy.

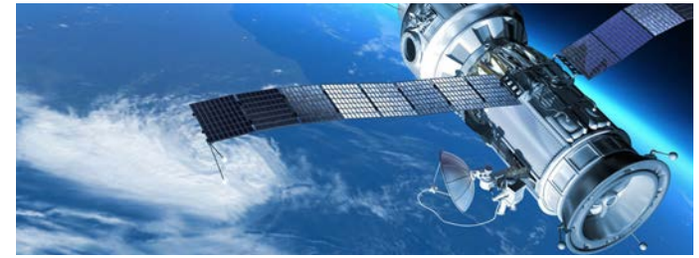
The Vision we share looks at the evolution of the technologies, that day by day are improving performance and efficiency providing new opportunities in elaborating, understanding and managing an incredible quantity of data. All of these information, properly elaborated, can be used by the Industry for improving even more their Business in terms of production efficiency, information management and new services to the customers.

Our Mission is to transfer the latest technologies and methodologies from the Academic and R&D world to the Industrial context. In order to do this Intelligentia invests in internal R&D aimed at identify new needs and in developing prototype solutions that will result in a reduction of the time-to-delivery when a new product shall be created for satisfy the requirements and expectations of our customers.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

On board software

Design and development of critical on-board Software based on RTOS for Space Qualified CPU. Verification and Validation on the complete set of activities defined by the V-Model from the Unit Testing, TS Validation, RB Validation, and Acceptance Tests of the satellite on-board software.



Ground software

Design and development of fully integrated Rich Internet Applications compatible with the most common Cloud Platforms. We adopt consolidated technologies integrated with REST/SOAP services layers to enable third Party integration. The applications rely on a technological platform named ELISA (Enterprise Light Information Systems Architecture) that enables rapid prototyping and remote updates.

Consultancy

Thanks to our background both industrial and aerospace, we can provide a wide range of expertise regarding intelligent systems and software production. We can offer our skills and competences through on-site consultancy in particular regarding the development and testing of real-time on-board software and production of advanced electronic equipment.

Industry 4.0 and IoT

Intelligentia develops and delivers fully integrated solutions for covering enabling technologies for the Industry 4.0 environment such as Big Data, IoT, Cyber-security, Cloud Computing, and Simulation. Real-time processing of live data from Industrial plants integrated with satellite downstream are used to deliver innovative services such as assets monitoring and locating, production and quality KPIs monitoring, preventive maintenance.

SMALL AND MEDIUM ENTERPRISE

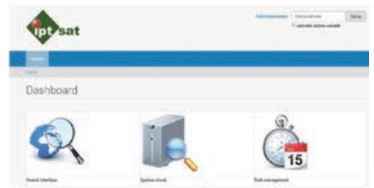
The Iptsat has long been engaged in the development of solutions for the management and monitoring of land and environment through interaction with the users community GIS (Geographic Information System) and Remote Sensing, providing high level of professionalism in all aspects relative to the use of these technologies and proposing solutions with high added value.

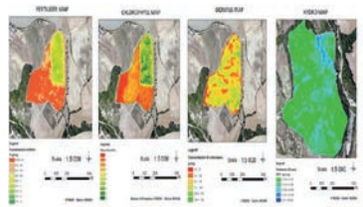
The business sector in which Iptsat in 1982 initially concentrated its energies was that of GIS Geographic Information Systems, operating in developing applications for the management of geographic resources.

Since 1996 Iptsat draws new life and economic planning from a corporate reorganization operated to meet the growing demand for remote sensing data and the need to create new GIS solutions to meet ever-changing technology.

In the following years Iptsat signs an A.A.D. Acquisition, Archiving & Distribution agreement with ImageSat International, which enables the acquisition of exclusive high-resolution panchromatic data from EROS satellites in the constellation.

In 1999 Iptsat joined the Business Network of esri Italy, dealing with the sale, assistance and development of customized software ArcGIS. With the growth of its know-how, Iptsat pays special attention to training activities, offering training courses best suited to professions and businesses, with strong skills in computerized management of land and environment.





Since April 2008 iptsat AICA is the official test center for GIS ECDL (European Computer Driving License for Geographic Information System).

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

CLOUD GIS AND CATALOGS

We offer all the commercial and open source solutions for publishing customer data through their servers either at our data center business, or through the clustering of the data, the optimization of databases and cataloging and dating of meta data according to the standards of the INSPIRE Directive.

VISTA

Web Planning tool (server side) for the download of Copernicus data with download connection rescue, ping control for new data (for long period monitoring), with easy user interface, with the possibility to make at the same time more download.

EOFARMING

EOFARMING main objective is to launch in the market an innovative Precision Farming service which targets small farms (average size between 5-30ha), addressing a clear user need, and to enter in the emerging market of commercial applications of EO downstream services in agriculture. The combined usage of GIS and remote sensing, for the development of a Webgis platform related to a geographic database; the use of an innovative algorithm derived from the 3 indexes NDVI,LAI and OSAVI developed by IPTSAT in collaboration with CRA for the production of 3 kind of maps simultaneously i.e. crop vigor maps, vegetation status maps, green leaf maps. The use of free data from Sentinel 2 and Landsat 8 as basic information in the realization of thematic maps, thus valorizing EU efforts in provision of open access data from satellites.

REMOTE SENSING

Iptsat has for years been engaged in the world of Remote Sensing

- Distributing RapidEye satellite imagery, GeoEye, IKONOS, Aster, Landsat (7.8), Pleiades.
- Carry out activities in remote sensing proximity via radio-controlled UAV drones
- By providing remote sensing data processing and classification, i.e. analysis and interpretation of the images
- Proposing solutions with high added value for the study and control of environmental resources,

agricultural, and forest vegetation

Products:

Very High Resolution Data (RapidEye - 5mt); High Resolution Data (0,5 mt - 4mt); Medium Resolution Data (10mt - 60mt)

Value Added Services:

- Correctional services and preparation of satellite images; Change Detection and historical analysis; dem – stereoscopy; ctrn e dbt; orthophotomaps; maps of vegetation indices.

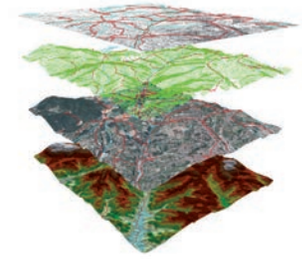
UAV Cartography:w

- Mappe No fly zones per SAPR

GIS

Iptsat has been for years engaged in the world of geographic information systems:

- Dealing with the sale and support of the ArcGIS software, thanks to its membership in the Esri Business Network of Italy. Esri is a leading global provider of GIS software.
- Land use planning, urban planning, infrastructure, public works and transport
- Environmental monitoring, study and management of natural resources
- Emergency and Safety
- Tourism, Archaeology, Cultural Heritage and Landscape
- Facility Management, Real Estate Management, Marketing
- Utilities and Telecommunications
- By creating and updating geographic databases based on geospatial information and technology
- Esri and/or open source, both for desktop environments, and Web
- Providing Geographical datasets, ready to be used in the context of systems and GIS applications



CONTACT

Headquarter address:

Via Sallustiana, 23
00187Roma

T(+39) 06 42041717
www.iptsat.com
info@iptsat.com

ItalConsul

CONTACT

Headquarter address:

Via Frangipane, 24
00184 Roma

T (+39) 06 6791818
F (+39) 06 69787432
www.italconsul.net
italconsul@italconsul.it
m.paggi@italconsul.it

SMALL AND MEDIUM ENTERPRISE

ItalConsul is an engineering services enterprise. Its Core Business is the Logistics Engineering, ie RAMS Analysis (CENELEC - Norm EN 50126) that make up the Integrated Logistics Support to Design of Systems and Equipments.

Decades of experience gained in RAMS Analysis led ItalConsul to develop its ability to Design in the fields of Mechanical, Electrical, Electronics Engineering (Machinery and Equipment), Software and Assessments. Moreover, ItalConsul extended over time its skills to simulations by software, such as Finite Element Analysis, Multi-domain and circuit simulations, too. The work-areas of ItalConsul concern Aerospace, Naval, Railway, Power Plants and manufacturing.

Then ItalConsul is engaged in Research & Development activities. Among its results it includes three patents, seventy scientific publications (also in prestigious journals) and the realization of "RelySoft", a software-tool, based on the revolutionary methodologies, which have been accepted by RIAC and often have made possible to find original solutions to very complex problems, considered sometimes even insoluble. "RelySoft" was produced internally and certificated by the University of L'Aquila.

ItalConsul employs Human Resources with longest experience, gained over decades. They work in symbiosis with young talents, supported and trained constantly to highly advanced projects. ItalConsul is also qualified in the suppliers panel of Rheinmetall, Finmeccanica, Sogin. ItalConsul uses the software tool SUITE-CARE for its Analysis of Integrated Logistic Support and makes use of advanced analysis and project tools:

- MD-NASTRAN for Finite Element Analysis applied to mechanical structures
- Ansys Maxwell for Finite Element Analysis applied to electrical and electronic systems
- Ansys SIMPLORER for Multi-domain and circuital simulation of complex electrical and electronic circuits
- Micro Cap V for the circuital simulations of electronic systems

The combined use of the above listed software tools with "RelySoft" makes possible to perform much more effective simulations of innovative products and systems to be realized. Consequently, you can much more effectively reduce the testing phase, anticipate the production and place the final product on the market. Such reduction of the "Time-To-Market" leads to save the production cost and time for at least 40% and make possible a considerable extension of the warranty times.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

RelySoft is a software tool, designed and developed by ItalConsul in order to enable manufacturers and design of civil works and infrustructures to predict through time the behavior of infrastructures, civil works and manufactured products only by means of only few data. RelySoft is divided into two areas of application:

- an application for medium and large enterprises, geared to simpler processes which can be expressed through analytical formulas;
- the other application for large enterprises of railway, aerospace, shipbuilding, power plants, in order to provide for applications running in Simulations to Finite Element.

The RelySoft tool specializes in the analysis of each physical process , described either through equations in analytical form or in matrix form (according to the Approach to Finite Element) and calculates the probability of failure or success in the analyzed process. This probability is expressed by the probability that the value of Stress does not exceed the value of Strength. Compared to the conventional "Monte Carlo Method", the advantage of RelySoft is it can get very accurate results even by arranging of a few data and making a few calculations, with great savings in terms of time, effort, and thus also costs.

RelySoft was designed in order to calculate the Reliability of the non-standard structures, or even they are not realized yet and we have no experience in operation. In these cases, we cannot use statistical data because still inexistent. The consequent advantages are:

- being able to solve analytically the troubles of the links between the characteristic variables of the probability distribution functions;
- to run extremely fast and accurate calculations;
- being able to calculate directly the expected values (average, median and mode) and uncertainties (STD) of output variables by starting from the nominal values and the uncertainties of the input;
- avoiding the knowledge of the statistical distributions of the input variables for the calculation of probabilities;
- ensuring reliable results, even in the presence of few empirical data;
- avoiding expensive experimental measures, organized on single projects, and using only the expected values and uncertainties;
- being able to work around the non-homogeneity problem of the experimental data (on which the statistics are made) and using simulation techniques with confidence;
- enhancing the use of commercial programs;
- evaluating the independence of the involved variables.

Limiting to the analysis of a simple component, we start with project data such as dimensions, tolerances, physical features of the materials, the stress to which they are subjected, the physical laws that govern the degradation processes. Then, according to the links between the process variables we pass to calculate the success probability of the process which is the basis to assess the probability of item failure.

In the design phase RelySoft can suggest and define:

- the most appropriate materials
- the most appropriate sizes
- the most appropriate tolerances

RelySoft

From the project RelySoft can obtain:

- the reliability of each items through time
- the procedures and maintenance intervals
- the average life of each items of the system
- the real cost of the life cycle and thus the lifetime of the system

With respect to a newly designed system, never utilized and consequently devoid of statistical data, we can't make any forecasts and thus establish the "correct" maintenance procedures. Infact, the forecasts and procedures can be based on data collected on old schemes. In addition, if a system is designed to be unique or almost, as a plant, the collected data will cover the components, not the product, with the further aggravating circumstance that identical components, installed in different places and with different exercise, will be part of the same statistics, although not homogeneous, cause solicited differently.

The novelty introduced by ItalConsul, is the unification of two separate Engineering worlds: realization of the product and its maintenance. The forecast of the Preventive Maintenance cycles is made by RelySoft, not on the basis of statistical surveys made during the year, but already in design phase by calculating the probability that the system will work on through time in "satisfactory manner", as observed in testing.

Information Technologies Services

Headquarter address:

Via Monte Santo, 2
00195 Roma

T (+39) 06 45504949
www.intese.com
info@intese.com

CONTACT

Ing. Cesare Dionisio

SMALL AND MEDIUM ENTERPRISE

ITS was established on 1st September 1999 and is formed by managers and entrepreneurs deriving their complementary experiences from a prolonged activity in the main aerospace Italian industries and from the mastery of the financial instruments necessary for the "start-up" of firms focusing in the high technological sectors.

Main motivation for the establishment of the Company was the awareness that a strong industrial capability in any Territorial District, regional, national or continental, can't be flourish without the availability of innovative technologies and advanced products, those are main ITS's objective. In this sense a particular attention is devoted to the relationship with Research and Final Users, carrying out industrial links which changes technologies into hi-tech products really usable.

Mission of ITS is to operate in the High Band of the Information Technology field for the markets of:

- Space
- Defense
- Energy

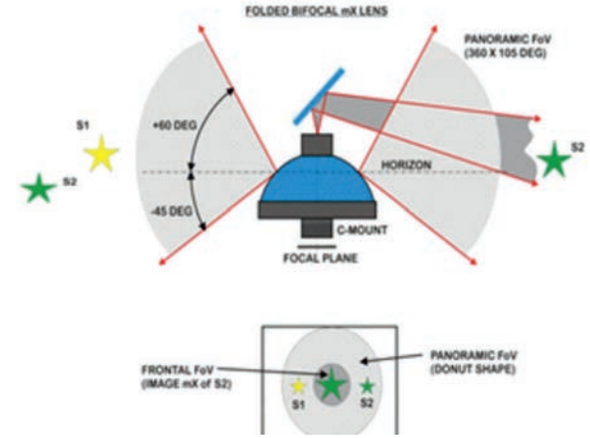
In terms of Horizontal capabilities, ITS ca provide:

- Data processing of digital images coming from several typologies of sensor (multispectral and hyperspectral electro-optics, radar, etc.) also implementing techniques of data fusion
- System Integration extending the concept of distributed information architectures (LAN and Web) also to Complex and Robust systems (C4I2) using wireless links (Link 16, Satcom UHF, GBS)
- Simulation and Modeling also of Complex Scenarios (Digital Battlefield)
- Technologies and Systems based on satellite navigation (GPS and Galileo)
- High End Computing also for on-board and distributed systems.
- RFID Application for the Italian Air Force
- TLC Satellite Space architectures
- TLC Satellite Ground Architecture
- Strategic and Professional Consultancy both to PMI and to the Research and Acquisition Government Bodies

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Super Computer in the ISS

TESEI GNSS
augmented terminal antenna configuration



POLIFEMO
(Panoramic Multifunctional Sensor for small sats)

Headquarter address:
Via Terragneta, 90
80058 Torre Annunziata (NA)

T (+39) 3920388151
www.itslab.it

CONTACT
Nazzareno Marchese
nazzareno.marchese@itslab.it

SMALL AND MEDIUM ENTERPRISE

ITSLAB is an Italian Company specialised in information system engineering, integration and development.

The quality of services and products represent the key features of its prestigious goals: high technology, staff growth and constant increase of Customers. A widespread and detailed internal system of quality control and ongoing research activities, in association with Universities and Research Institutes, allows ITSLAB to operate at forefront technical levels.

ITSLAB participates in many projects, providing innovative solutions in the field of broadband communication and localization for the following public bodies: European Space Agency **(ESA)**, Italian Space Agency ***(ASI)***, Italian Ministry of Research **(MIUR)** and Italian Ministry of Economic Development **(MISE)**.

ITSLAB R&D Competence Centre, is involved in innovation activities, mainly devoted in design, development and integration of **Software** component and Sub-systems, **Integrated Application** exploiting **Satcom** and **Navigation** space assets, **Safety and Security.** Main focus is on: Location & Business Intelligence, Service Oriented Architecture, Cloud computing, Semantic Interoperability.

Time-to-Market and Change Management are based on **Agile/Scrum** Programming paradigm. In the framework of Next Generation Network (NGN) for Future Internet, ITSLAB develops simulators and communication framework for an optimized content distribution and delivery over hybrid multi-channel networks, both public and private, for Secure Access and Data Integrity over IP, for Autonomic Maintenance, Wireless Sensor Networks, IoT.

ITSLAB development process is compliant with **ISO 9001:2008** and Software Engineering ***ECSS*** standards.

By investing in a Software Production Center in Torre Annunziata (Napoli, Italia), ITSLAB meant to realize a technological pole with international relevance.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

The **SmartBOX** is a Multichannel Communication Gateway providing automatic and manned channel switching according to a configurable policy based on a least cost routing algorithm. If installed on a mobile means of transport or relocatable sites where both terrestrial and satellite connectivity is available, the smartBOX shall help an effective, efficient and secure usage of available bandwidth. It was designed for maritime environment. Thanks to the smartBOX it shall be possible to remotely manage cyber security as a service.

AMICO is a software application platform implementing a Collaborative Health Care paradigm, focused on neuromotor and cognitive tele-rehabilitation at home. AMICO Health Station is the local component installed at home: it is based on low cost technologies for motion capture&detection and wearable sensor device. The capability to dynamically manage available communication services make it possible to benefit by the usage of Satellite ADSL services, even supporting 'bandwidth on-demand' feature.

SMILE
Satellite Multi-constellation Identification techniques for Liable Enhanced applications

SMILE Security Platform enhance trustiness of maritime service chain, making a Maritime Service Platform, such as a 'tracing and tracking' more accurate and reliable. SMILE core logic is based on a GNSS-based algorithm to be used in open-sky environment such as maritime navigation. GNSS multi-constellation raw data are received and filtered onboard of a vessel according to the SMILE algorithm, and a security challenge is issued to the SMILE Security Platform. In such a way a the vessel can be uniquely identified or not, so that it can enable the provisioning and commercialization of institutional and commercial Liability Services.

The **End-to-End Trial Management System** (E2E TMS) è software component ready to be integrated in each test-bed environment thanks to a plug-in architecture and an object-based management system. An easy-to-use visual tool allows: to create 'objects' populating a simulation environment, building AIT/AIV scenarios and executing planned test campaigns, even for multiple missions a time. Results are collected, aggregated and make available (export) for statistical purpose.

KAYSER ITALIA

CONTACT

Headquarter address:

Via di Popogna, 501
57128 Livorno

T (+39) 0586 562 100
www.kayser.it
kayser@kayser.it

SMALL AND MEDIUM ENTERPRISE

Kayser Italia is a Small Medium Enterprise (SME), a private independent aerospace system engineering company, owned by Dr. Valfredo Zolesi's family. It has been incorporated in 1986, and since 1995 it is 100% Italian property. The company is located in the countryside of Livorno, in the region of Tuscany, 20 Km south of the international airport of Pisa and 90 Km from Florence. In a modern building, the company has 5,000 sq. meters of property, organized into offices, meeting rooms, conference room, laboratories, clean room, manufacturing, inspection and integration area, and an User Support Operation center (USOC) for the support to the execution of experiments with astronauts on board the ISS.

Since the beginning up to 2015, Kayser Italia has participated to 64 space missions with 101 payloads, all of them completed with full scientific, technical, economic and programmatic success. The staff consists of 50 high-specialized engineers, with expertise in electronics, aeronautics, mechanics, thermodynamics, physics, computer science, optics and molecular biology. Their design and manufacturing capabilities, joined with a deep engineering background, have allowed the participation of the company as both prime-contractor as well as sub-contractor to many European Space Agency (ESA) and Italian Space Agency (ASI) programmes, especially in the area of life science (biology and human physiology).

The payloads developed by Kayser Italia have flown on sounding rockets, on the Russian capsules Bion, Foton, Progress, Soyuz, on the Shuttle Transportation System (STS), on SpaceX, on the Japanese HTV module, on the European ATV module, on the Chinese Shenzhou spaceship and on the International Space Station (ISS). Kayser Italia supports grants and partnership programs with universities and research institutes and is actively involved in the promotion of the integration process between large and Small Medium Enterprises working in space.

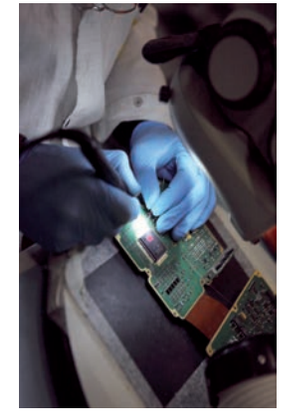
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

PRODUCTS

- Bioreactors, Experiment Containers, Incubators, etc. for biology experiments
- Bio analysers
- Instruments, devices and consumables for human research experiments
- Experiment hardware for physical and material science research
- Payloads and associated control electronics and software
- Electronic equipment (power conversion and distribution, control, data acquisition, etc.)
- Structures and deployable systems

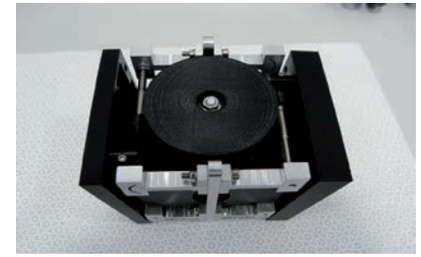
SERVICES

- Project Management
- Space system engineering
- Electrical and electronics design
- Manufacturing of electronic circuits and harness
- Structural, mechanical and thermal design and analysis
- Software design and implementation
- System Assembly, Integration and Verification (AIV)
- Product and Quality Assurance, Safety
- Support to ISS on-board astronaut operations by means of dedicated User Support Operation Centre (USOC) and certified personnel



TECHNOLOGIES

- Deployable space structures based on tensegrity technology
- Miniaturised deployable boom (Cubesat standard)
- Wired and wireless on-board sensors and actuators network



KELL
MOVING INNOVATION

Headquarter address:

Legal Office:
Via Donat Cattin, 83
52100 Arezzo

Operative Office:
Via Ennio Quirino Visconti, 8
00193 Roma

T (+39) 06 36004916
F (+39) 06 3216937
www.kell.it
info@kell.it

CONTACT

SMALL AND MEDIUM ENTERPRISE

KELL is an ICT Italian company operating for over twenty years in the Space and ICT sectors developing SW and ICT smart solutions in the following fields of application: e-health, telemedicine, e-government, Earth Observation, remote sensing, mobile applications. Our Vision "make everyday life easier with computing by making the technology easy, usable and available to everyone through continuous innovation." This objective is pursued through a process of continuous innovation that promotes the exploitation of research and its dissemination in the industry and market.

The team is formed by young researchers and technicians, with strong and focused skills on ICT solutions, informatics, software engineers, electronic engineers, physicists, engineers, electronic, oceanographers, economist who form a young, dynamic and multidisciplinary group engaged in R&D activities performed for international and national Public Bodies and private organizations.

The main technologies and skills are: a) Information Technology: web platform and mobile solutions for e-Health applications; b) Earth Observation: Kell designs and develops software systems for telemetry processing and production and processing of remote sensing images, optical and SAR, archiving and distribution of data and quality control fusion and geo-location for smart agriculture, water and land management; c) Navigation

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Satellite Telecom supports ICT / SW open source web platform, tested in healthcare organisations, to provide and manage the classical e-health services as tele-counselling, tele-consultation, tele-diagnosis, tele-emergency, screening campaigns services, electronic medical records, plus the tele-validation service, that is especially delivered to CRO and pharma companies to raise the performance of management of clinical trials.

During last years, Kell has established a leadership position in the development of telemedicine systems; enhancing technological innovations in the ICT field that can be used in the health sector to improve the efficiency and increase the quality of health processes, in all the different contexts of their "value chain" such as prevention, emergency care, maintenance of own well-being – wellness, family support, clinical and epidemiological studies. Along with some of the major Italian companies, it has developed the largest telemedicine programs especially some of them based on satellite communications for mobile telemedicine.

Some examples of applications and tools deployed are:

- KosmoMed: SW/HW integrated system for satellite tele-medicine to support high quality video-conference and medical data exchange in all kind of medical branch;
- Mobile Ambulatories (by land and sea): with advanced diagnostic equipment and satellite solutions for screening campaign, clinical investigations, etc.

Kell is certified ISO 13485:2003 for the "design and development, implementation, technical installation and assistance of SW medical platforms and systems for the tele-medicine".

Kell operates in the Earth Observation since 1997, as service provider for Public and Private organisations, developing and implementing. The use of Satellite technologies, the integration with other sources to collect data (aero-UAV, ground sensors), the use of open standards to design and perform ICT applications and solutions, are at the core of the innovation strategy of Kell. Some examples of applications and tools deployed are:

- WAGRIT: a SW tool for the land and agriculture monitoring that able the classification of vegetation
- AIRFIRE: Satellite and Hyperspectral images monitoring campaign to assess and alert in case of fire
- MIA-VITA "Mitigating and Assessing Volcanic Impacts on Terrain and human Activities", an integrated tool to assess and manage the volcanic risk for human
- ITACA (Innovation Technologies and Applications for Coastal Archaeological sites), a tool using satellite techniques, remote sensing, special algorithms from marine movements, to identify sub-marines archeological sites and support the management decisions of public authorities.

Kell is certified ISO 9001:2008 for the "design, development, implementation, technical installation of SW platforms and systems for tele-medicine, Earth Observation and navigation for telecommunications".

LAER

AERONAUTICAL MANUFACTURING

Headquarter address:

Via Caracciano 57/63
82011 Airola (BN)

T (+39) 0823 951634
www.laergroup.com
info@laergroup.com

CONTACT

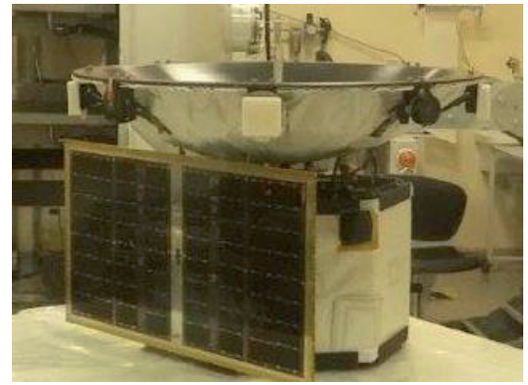
Ing. Paola Iaccarino

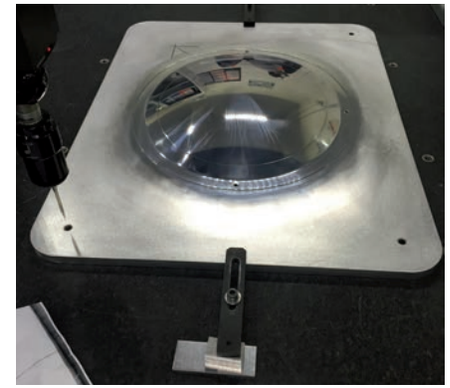
SMALL AND MEDIUM ENTERPRISE

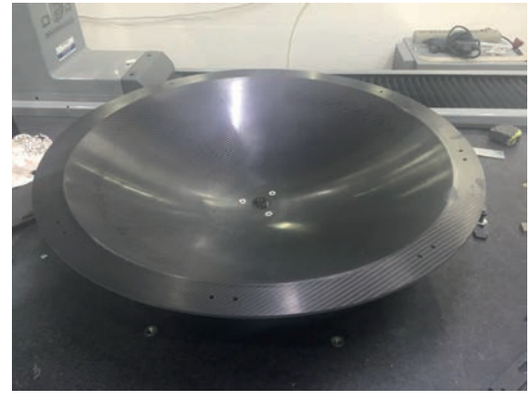
LAER is a private company, AQ-ITA-SINCERT and NADCAP qualified, operating since 1989 in aerospace field. The core business is represented by large assemblies and manufacturing of metal and reinforced composites parts.

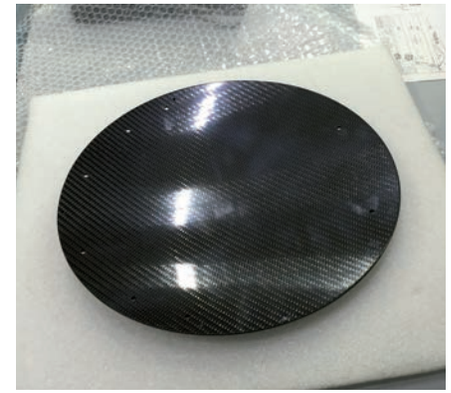
LAER is also involved in several ambitious R&D projects, assuring a continuous improvement of its products quality and technical competences.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES









LEAFSPACE

SMALL AND MEDIUM ENTERPRISE

Leaf Space mission is to simplify the access to space to microsatellites operators.

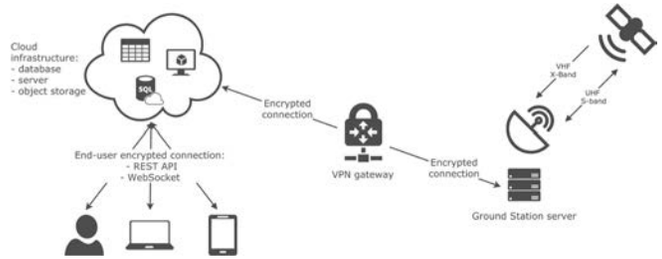
The company develops services and products to support the use of microsatellites for commercial, scientific and exploratory purposes, by tackling the unmet needs of this sector.

Leaf Space is currently focused on the development of the Leaf Line, through an innovative infrastructure-as-a-service ground stations network dedicated to microsatellites. Leaf Space solution enables the full exploitation of data coming from microsatellite, thanks to a significant cost reduction and performance increase of ground segment operations. The service is on its commercialization phase and ready for operations.

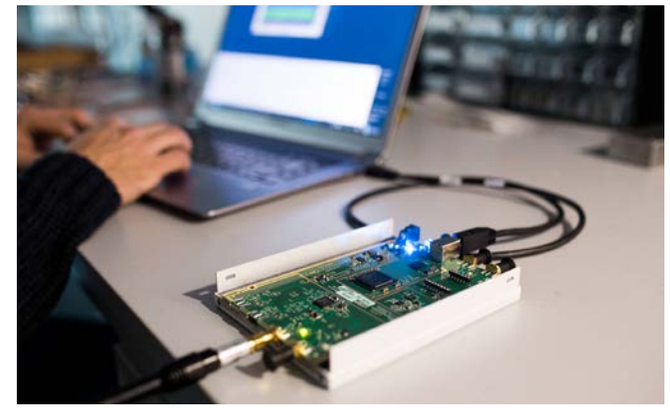
Thanks to its dynamicity, Leaf Space is able to continuously evolve and, with new innovative product and service, to always meet microsatellites needs, even for future missions.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Leaf Line is an innovative ground stations network dedicated to microsatellites, designed to fulfil all the requirements of the present and future missions of this class of satellites. The Leaf Line network currently counts 4 operative ground stations in Europe (Italy, Lithuania, Spain and Ireland). Within 2018, Leaf Space will implement 4 additional ground stations in Brazil, Canada, Australia and New Zealand. At regime, Leaf Line will count on 20 ground stations, implemented in 5 continents, fully automated and remotely controlled.



The service employs ground stations capable of operating in VHF, UHF, S-band and X-band. All the ground stations can perform payload data downlink and TT&C operations. A cloud-based software infrastructure is the backbone of the service, managing and optimizing requests from many different users.



To switch between frequencies, modulations and protocols, each antenna is equipped with a Software Defined Radio (SDR), able to grant the wider possible compatibility and flexibility.

The Leaf Line service allows up to 10-fold cost reduction to satellites operators for ground segment operations and ensures the possibility to download tens of Terabytes of data per day, with latency up to few minutes. Furthermore, the infrastructure-as-a-service philosophy allows extremely simplified operations for satellite communication.

CONTACT

Headquarter address:

Via Cavour, 2
22074 Lomazzo (CO)

T (+39) 02 36714624
www.leaf.spac
info@leaf.space

AEROSPACE TECHNOLOGY

CONTACT

Headquarter address:
Via Vercelli 6
10044 Pianezza (TO)

T (+39) 011 9672053
www.lmasrl.com
lma@lmasrl.it

SMALL AND MEDIUM ENTERPRISE

With more than 45 years of commitment into the Aerospace Market, LMA is today a leading global supplier of integrated solutions for the most important players in the Space sectors.

A whole set of in-house capabilities gives LMA the ability to provide customers with any combination of services required - from the detailed-design, build-to-print manufacturing, to the assembly - and anything in between with flexibility and efficiency, meeting the highest quality requirements.

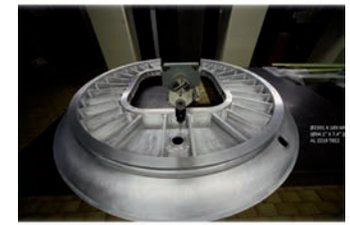
The Company excels at being a Tier 1 Integrator filling the gap between the main Customers and the traditional Subcontractors by integrating the supply base.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

INTERNATIONAL SPACE STATION
MULTI PURPOSE LOGISTIC MODULE (MPLM)
Liquid Nitrogen distributor to refuel the space station.
Manufacturing of key components, assembly and final control.

INTERNATIONAL SPACE STATION
MULTI PURPOSE LOGISTIC MODULE (MPLM)
REAR CLOSING DOOR (Aluminum).
Machining (5 Axis) and final control.

ARIANE IV
SPACE LAUNCHER BOOSTER COMPONENT (Uranus)
Machining (5 Axis) and final control.



INTERNATIONAL SPACE STATION
MULTI PURPOSE LOGISTIC MODULE (MPLM)
Front Door (Aluminum)
Front Door

mapSAT
we see the world for you

CONTACT

Headquarter address:

C.da Piano Cappelle, 129
(area MUSA)
82100 Benevento

T (+39) 0824 52422
www.mapsat.it
direzione@mapsat.it

SMALL AND MEDIUM ENTERPRISE

MapSAT is an Italian newCo, based in Milan (Italy) and established in March 2015.

The principal place of operations is located in Benevento (Campania Region - Italy) in order to meet a specific sector of the market, related to the growing demand for products and services of remote sensing for continuous monitoring of the Earth's soil and sea. These activities are aimed at protecting environment and climate, citizens security, urban planning, development of energetic and electrical infrastructure, prevention of human and natural risks and, more generally, updating and control of the elements of main interest to constantly increase the knowledge of territorial changes.

MapSAT targets both public and private clients, with the aim of creating technology platforms dynamic and flexible, able to satisfy both of these stakeholders, working on customizing the hardware and software solutions based on the same technology.

MapSAT is developing a solid platform of business based on MARSec (Mediterranean Agency for Remote Sensing and Environmental Control) previous existing know how and technologies, along with a new push to develop new Earth Observation products and services for civilian and military market. Moreover, MapSAT will spend many energies to start and strengthening its relationships with the European Space Agency, United Nations, European Agencies (Frontex, JRC, EMSA, UNOSAT, ..) governmental bodies of competence of the Mediterranean countries (North Africa and Eastern Europe) interested in services of remote sensing for their territory.

Company location in Campania Region provides the strategic coverage of an important geopolitics area: Europe, Mediterranean Sea and North Africa.

The GS is equipped with two antennas that have been provided from Sea Space Corporation (USA). The largest antenna (X band) is based on a structure of several meters in height.

Since 2004, the MARSec Ground Station has been acquiring data from Aqua and Terra NASA satellites equipped with MODIS sensor. This experience has given the opportunity of configure and adapt the systems to acquire EROS-A starting from August 2005, RadarSat-1 from 2006 and EROS-B since 2009.

The X-band Antenna System is SeaSpace TeraScan 4.4m, three axes X-Band Polar Satellite Tracking Antenna. The Antenna is connected to the Equipment Racks located in Equipment Room.

The distance is about 146 meters therefore the tracking/carrier frequency is down-converted to 720 MHz. The antenna is configured to acquire EROS-B, EROS-A, Terra and Aqua missions.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

MapSAT can provide a wide range of products and value-added services from EO satellite data acquired at the center in Benevento.

Earth Observation Midstream: Near Real Time Services

MapSAT manages a Ground Receiving Station (GRS) certified by ImageSat INTL as EPOD Station since 2009. The Exclusive Pass on Demand (EPOD) Program enables our Ground Station to autonomously task the EROS B satellite and directly receive all the acquired imagery on a selected set passes every year into MapSAT commercial footprint (EPOD footprint) established in the business agreement.

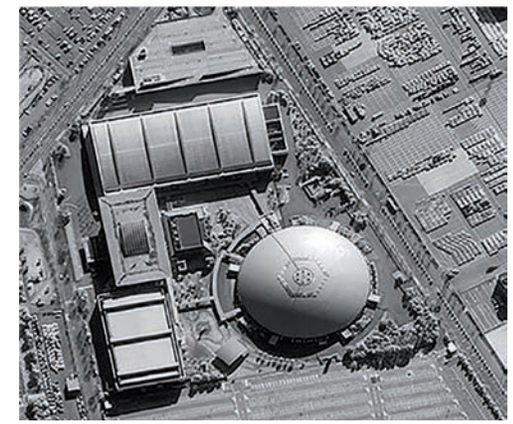
MapSAT can choose in advance and notify ImageSat of the relevant orbits for which it would like to have full control. In the selected passes, the MARSec GRS will create and transmit to the satellite the acquisition command file generated by Mission Planning System (MPS).

The satellite will acquire the images as planned and will downlink them to MapSAT Ground Station in real-time.

Thus MapSAT is able to process and transfer a set of Products to the Customer in NEAR REAL TIME (24h/36h).

Earth Observation Downstream: Value Added Product&Services

- AGRICULTURE: Agriculture Land Use Map (using VHR and HR Optical satellite), Crop Monitoring, Frauds Detection...
- FORESTRY: Forest Inventory (using VHR and HR Optical satellite), Estimate of the damage after a forest fire, Illegal use of soil...
- ENERGY & INFRASTRUCTURE: Map of electrical networks, Oil Spill Detection, Offshore Drilling Installations, Oil Drilling, Oil & Gas Infrastructure Planning and Management....
- SECURITY: Ship Tracking, Route Detection, Target Recognition, Illegal immigration Control, Illegal Traffic Control, Piracy Sea Monitoring, Borders Control, Terrorist Attacks...
- GOVERNMENT: Analysis for Disaster and Crisis-Management Support (Civil Protection), Port Development, Municipal Planning, Illegal Buildings Monitoring, Cartography update...
- ENVIRONMENT: Recognizing trends in resource depletion, Climate Changes, Efficient disaster assessment of natural disasters...
- RESEARCH&DEVELOPMENT: GSTP ESA Program, Italian Defense PNRM, EDA, CIRA, ASI ...



MICROWAVE ELECTRONICS FOR COMMUNICATIONS

CONTACT

Headquarter address:

Via San Nicolò di Villola, 1
40127 Bologna

T (+39) 051 6333403
www.mec-mmic.com
contact.mec@mec-mmic.com

Giorgio Mariani
giorgio.mariani@mec-mmic.com
Francesco Scappaviva

SMALL AND MEDIUM ENTERPRISE

MEC was founded in 2004, as spin-off of Bologna's and Ferrara's Universities, in order to offer to the Italian and European enterprises, the know-how coming from the university R&D department in the field of microwave electronic components, with a main focus on MMIC and TR Modules. The Company's expertise and core business, are based on the executive design, lay-out generation, on wafer probe test, on jig electrical & thermal characterization of MMIC.s and discrete active components.

The leading technologies based on GaAs and GaN semiconductors are used in our projects. A manpower of fifteen PhD Engineers, with solid background and expertise in MMIC design, make the strength of our Company. Further, the most advanced software tools , based on ADS , Microwave Office Sonnet EM and Ansys TAS, are always available to this design team. On the base of the excellent results achieved in strategic European projects for Space,

MEC was appointed by UMS (which is first European GaAs / GaN foundry) its official Design House. Since then, a very tight cooperation is in progress with this foundry, which allows MEC to get early access to each new technology. From its inception, MEC had the opportunity to develop, for enterprises which are leaders in satellite systems, as Thales Alenia Space, Selex , and Space Agencies as ESA , CONAE and ASI, very innovative microwave integrated modules and advanced MMICs, which allowed us to become one of the preferred European Design Centre for spatial microwave components.

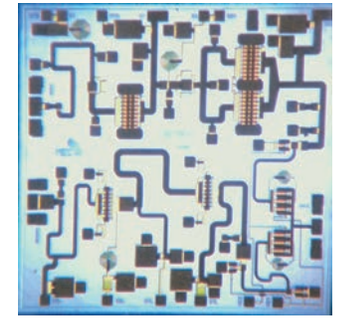
The most known European satellite programmes, to name some : Iridium, Galileo, CosmoSkymed, SIASGE, Sentinel…etc, board MMIC.s and microwave ybrids in their most critical line-ups, developed by MEC.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

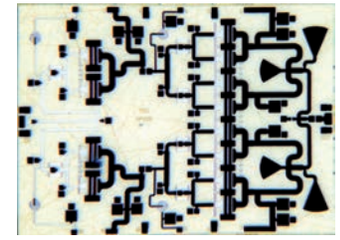
Over the twelve years since our inception, we had the opportunity to cover a large spectrum of designs, from L band thru W band, both for small signal and very high power amplifiers. The above pictures give an idea of some significant items which address the new generation of SAR Antenna for Earth Observation 1), 2), 4) and mobile Communications (Iridium) 3).

More in general, the following products, based on GaAs and GaN technologies, represent a short catalog of what a Satellite System Integrators can find as MEC's off-the shelf

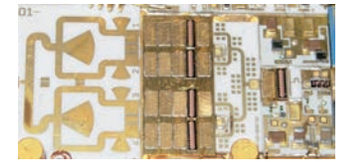
- HPA at X, Ku and Ka band for satellite and terrestrial telecommuniwcation systems.
- HPA at L and X band for Earth observation satellite.
- Down converter at V band for Telecommunication Satellite.
- VCO at C, X and Ku band.
- LNAs from 2 to 20 GHz.



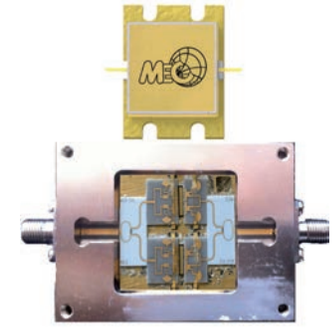
1) X-Band GaN Single Chip TR-Module



2) 27W X-band GaN HEMT HPA



3) 50W L-band, 45% PAE



4) High Power Micro-ModulesL, C, X band

Headquarter address:

Località Pascolo
23842 Bosisio Parini (LC)

T (+39) 031 867111
www.media-lario.com
info@media-lario.com

CONTACT

Mr. Giovanni Bianucci
Ms. Mara Bello

SMALL AND MEDIUM ENTERPRISE

Media Lario S.r.l. is a dynamic and innovative technology-driven company with more than two decades of experience supplying advanced optical components and optical systems.

The company works with leading industrial and agency partners including ASI, ESA, NASA, INAF, INAOE, Max-Planck Institutes, Thales Alenia Space Italia, Leonardo Finmeccanica, OHB, ASML, and others.

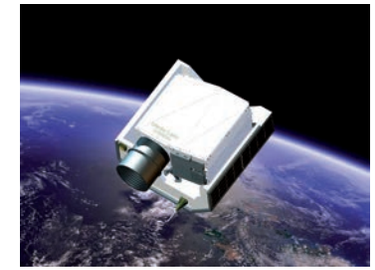
Media Lario's products are aboard space missions such as Beppo-SAX, SWIFT, XMM, eROSITA, ROSETTA, INTEGRAL, CHEOPS, and installed in terrestrial observatories such as IRAM, ALMA, LMT, MAGIC.

The company is located in Italy, within the industrial hub of Milan, an area rich with opto-mechanical expertise and experience with space programs.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Satellite Optical Systems

Media Lario designs and manufactures optical systems for Satellite Earth Observation, Space Telescopes, and Inter-Satellite Optical Communication. STREEGO is our Multispectral Earth Observation Optical Payload for small satellites with 2.75 m resolution, addressing the application needs for Agriculture, Forestry, Land Usage, Disaster Monitoring. Media Lario has a long history and experience in this area which is rapidly becoming a larger and larger portion of our business.



STREEGO
multispectral EO optical payload

X-ray Space Telescopes

Media Lario designs and manufactures optics for X-ray space telescopes using a variety of processes and technologies. Media Lario has developed its electroforming process where thin mirrors are grown in electrolytic baths and nested tightly in high-performance optical structures. Over the last 20 years, our optical mirror modules have enabled the X-ray observatories Beppo-SAX, SWIFT, XMM, and eROSITA. Today, Media Lario is developing the integration process for the ATHENA optics.

eROSITA
X-ray mirror modules
Credit to Max Plank Institutes

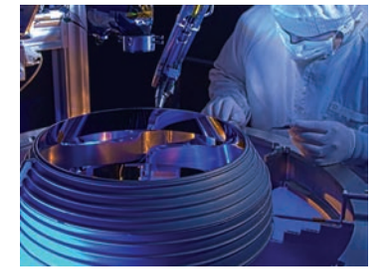
Large Terrestrial Telescopes

Media Lario manufactures Nickel and glass reflector panels for large radio and Cherenkov telescopes using a laminated structure process. These 2 m2 panels are made of thin electroformed Nickel or glass sheets bonded to an Aluminium honeycomb core, resulting in typical shape accuracy of 10 μm and 10 kg/m² weight. Media Lario has supplied more than 5,000 m² reflectors for large radio telescopes (IRAM, LMT, ALMA) and Cherenkov telescopes (MAGIC, CTA).

Large Millimeter Telescope
Credit to New York Times and INAOE

Extreme Ultraviolet Lithography (EUVL)

Media Lario designs and manufactures optical collectors for EUV Lithography. The application is advanced semiconductor fabrication at sub 10 nm transistor sizes. Our electroforming mirror technology is integrated in optical systems that are capable of collecting and focusing high power levels of EUVL light. They are uniquely shaped mirrors, with integrated cooling technology to dissipate the high power levels. Our collectors have enabled lithography systems of ASML, Nikon, and Selete.



EUVL
collector in integration

MEEO
Meteorological Environmental Earth Observation

CONTACT

Headquarter address:
Via Volano, 195/a int 2
44123 Ferrara

T (+39) 05321861501
www.meeo.it
info@meeo.it

SMALL AND MEDIUM ENTERPRISE

MEEO is a privately-held company devoted to the implementation and development of products and services based on **remote sensing**.

Founded in 2004 in Ferrara, Italy, MEEO started its activity providing products and services for atmospheric pollution monitoring, extending successively its application domain to the Earth surface mapping.

Since 2006 MEEO is a consolidated partner of the **European Space Agency** and provides its services to public and private entities. In 2011 MEEO became an associated partner of the **Climate-KIC**, investing in pathfinder and innovation projects to create new services for the climate mitigation and adaptation markets.

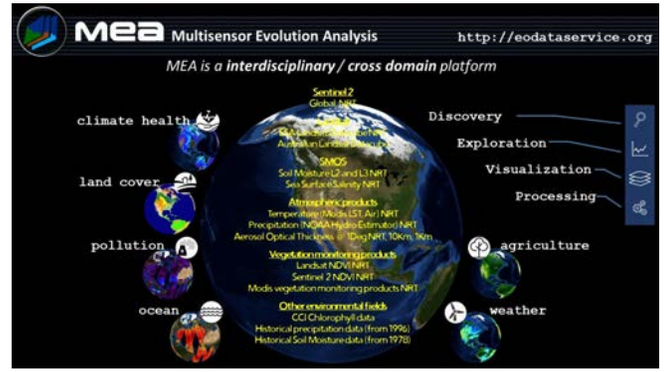
Presently MEEO is focused on the **provisioning of operational services** to end-users and customers, **facilitating geospatial data access** e and implementing exploitation platform.

Since September 2014 MEEO provides also processing services and storage capability (up to 2.5PB): the **MEEO Data Facility (MEEO-DAF)** is an infrastructure created to support the high computing demand of geospatial data and services.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

MEEO provides advanced technological solutions for geospatial data management and thematic applications mainly based on the use of remotely-sensed data. MEEO offers products and services in following domains: Multi-temporal / time series data analysis (with a proprietary technology MEA), Climate Data Services (including meteorological time series data analysis), Air quality / pollution monitoring (remote areas observation, data fusion with ground measurements / numerical models with a proprietary software PM MAPPER® implemented on MEA platform), Fires and burned areas detection and analysis (with a proprietary software SOMAFID), Solar radiation mapping and analysis (including photovoltaic plants performance estimation also for concentration panels with a proprietary service SIMS), WebGIS Applications development and implementation for private and public local administrations, Standardization of processes and data storage / transmission tools (OGC, INSPIRE).

MEA, the most recent technology developed and implemented by MEEO: it is a Multisensor Evolution Analysis platform that allows managing a large set of geospatial information.



MEA technology allows accessing, visualizing, sub-setting, combining, processing and downloading all data simultaneously and it is made of three main layers:

- GUI: that can be a web-based interface, a web-based workbooks, a GIS tool or a direct access via command line interface. EOdataservice is the innovative cross domain portal offered by MEEO that allows access and manipulation of a vast amount of environmental data.
- I/O tools: it is represented by a standardized Data Access System (DAS) in front of the data sources, that can be the EODatacube or the Virtual datacube, called also "Digital Earth" (Gore 1999). With this concept we mean a multi-resolution (multi)-dimensional representation of the planet that would make it possible to find, visualise and make sense of vast amounts of geo-referenced information on physical and social environments, allowing users to navigate through space and time, accessing historical data as well as future predictions.
- Data: called also Datacube, that can include mission-specific or thematic or other geospatial data

CONTACT

Headquarter address:

c/o Campus Scientifico
Università Cà Foscari Venezia
Via Torino,155b
30172 Mestre (VE)

T (+39) 041 2346711
T (+39) 348 3639396
www.nadir-tech.it
scatto@nadir-tech.it

SMALL AND MEDIUM ENTERPRISE

Nadir S.r.l. is a small enterprise which heads some experienced researchers that decided to focus their activities in the development of a novel atmospheric plasma technology and innovative nanocomposites polymers materials with active and smart functionalities.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Stylus Plasma Noble

The Nadir Plasma device is a jet type that works in atmospheric conditions and thus does not require vacuum systems for the plasma generation.

Thanks to the innovative own design (PCT patent n. WO / 2015/07 174) the Nadir device is able to generate efficient and cold plasma, (less than 50 ° C on the substrate) particularly suitable for surface treatment of heat sensitive materials.

Among the innovative aspects of this device the fact that the plasma is generated in a DDBD (double dielectric barrier discharge) configuration allows to avoids any contact between the electrodes and the plasma, thus eliminating the electrode erosion problem typical of arc systems, which as a side effect causes the deposition of metal microparticles on treated surfaces.

These features make the Nadir Plasma device applicable in various sectors, ranging from cultural heritage, advanced manufacturing biomedical and others.

Bioactive compound

Polymer compound with biologically activity, can be obtained adding filler with specific functionality inside of Polymer by Melt compounding Technologies. By introducing active species intercalated in lamellar fillers special properties can be reached in the final active compound such as:

- Enhanced mechanical, thermal, gas barrier properties
- Antimicrobial/antioxidant/antibiotic and other biologically activity
- Scavenger
- Dye and chromophor
- Catalytic
- UV absorber
- Photostability

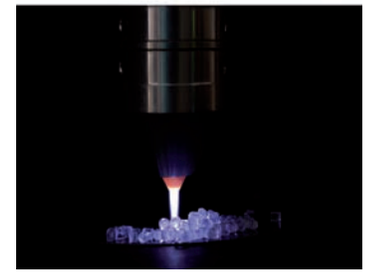
It's possible to obtain compound in wire or pellets form also like raw material for 3d printing in order to obtain 3d article with specific functionality with a tailor made approach on the base of customer request.

Service

- Atmospheric Plasma treatment
- Atmospheric Plasma equipment realization
- On demand specialty masterbatches with tailor made properties
- Melt compounding service
- Technological Scouting of Innovative high performance materials

Applications

- Plasma treated materials
- Compound for production of 3d printed article
- Plasma and Polymer Science consultation



CONTACT

Marco PASCALE

Headquarter address:
Via Andrea Noale, 345/A
00155 Roma

T (+39) 06 91139002
www.nais-solutions.it

marco.pascale@nais-solutions.it
T (+39) 335 7781148

SMALL AND MEDIUM ENTERPRISE

NEXTANT Applications & Innovative Solutions – NAIS was founded in 2005 with headquarters in Rome, with the mission to design innovative applications in the Aerospace market, based on the ICT infrastructure and satellite technologies of Navigation, Earth Observation and Telecommunication. For this purpose, NAIS continuously invests in research activities financed by equity and participating in R&D projects, co-financed by the National and International programs; in partnership with other Companies, Universities and Research Centers.

The overtime expertise in satellite assets and ICT technologies allowed NAIS to develop Innovative applications in the field of: Smart-mobility (solution for both citizens and tourists transportation support and information); Emergency (mission management and resource planning); Cultural Heritage (safeguard, fruition and prevention); Maritime (search & rescue, mission management and access to harbour and docks); Defence (air defence systems development; simulation and training system development); and Aeronautics (Air Traffic Management system 2D & 3D and flight information systems of General Aviation aircraft) and e-health (data synch & mobile devices).

Company skills is covering the following matters: GNSS, Location-based systems, Multi-link communication concept and technologies, Wireless communication, Satellite and terrestrial data communication, Satellite Earth Observation systems, ATM concepts and systems, ADS-B surveillance, Flight Information Services, HMI techniques based on Virtual and Augmented Reality technologies, Visual Modelling and Simulation, Verification and Validation task. WebGIS systems, EO mapping analysis.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Emergency service, with solutions for the management and coordination of rescue teams on missions of public emergency and assistance at events.

Air transportation solutions for ATM (air traffic management) and ATC as technology partner of ENAV in the EUROCONTROL and SESAR JU programs.

Cultural Heritage, solutions for the monitoring and protection of archaeological sites in urban and rural against: anthropogenic (human impact); meteorological (impact on the vulnerability of monuments) and geotechnical and structural (deformation of the land and structures).

Maritime with GNSS integrated solutions for controlling access to restricted areas (marine parks) by vessels (boats, fishing, etc.), in order to provide, information services, tolls and check compliance with the rules of access; planning assisted route and tracking of vessels.

Smart Mobility, a set of service for citizens and tourist mobility both pedestrian and on public and private transportation system within metropolitan areas.

Security & Defence, highly innovative simulation systems for training of personnel involved in the management of weapon systems. Demining field service support system.

Software development in the field of satellite Ground Segment system design and development relevant to: Mission management, Mission Control and Mission Planning. From 2013 NAIS was engaged to develop COSMO SkyMED 2° Gen constellation. Database and Web Portal in support of science missions such as those of Space Weather and Space Debris. Engineering and System Dependability including software with expertise in Ground System requirements and functional chains; Analysis of the Reliability, Availability, Maintainability and Safety – RAMS of subsystems than the prediction data.

Project Management in the field of Research and Innovation and technology transfer programs.

NESS (www.nais-solutions.it/products/ness) NAIS Emergency Support System, command & control services platform for emergency mission's management and on-field resources deployment. Fire Brigade, Law Enforcement, Civil Protection, State Forestry Corps and many others organizations can take advantages in the intervention readiness and decision making process as well as in the efficiency resources allocation.

VECTOR (www.vector-nais.it) solution for the "real-time monitoring system for sensitive items transportation". To monitor and control the integrity of "sensible goods" along their inter-modal transportation. Many economic sectors can take advantage from the easy to use, VECTOR © system technology applications such as: Cultural Assets, Fresh and Frozen Food, Dangerous Materials and Horses transport.

CALIPSO (www.calipso-nais.it) Innovative information service platform to Marine Protected Areas. The bundle of service in based on location services and design through ICT technologies, satellite navigation, wireless communication, mass-market terminals and GIS; addressed both to managers and end-users.

VIDEOR (www.nais-solutions.it/products/videor/) It is a solution to monitor and safeguard of natural heritage in the areas of common interest. The developed applications including vulnerability maps, are based on Earth Observation by satellite remote sensing & GIS framework. Data management by means of dedicated processing chains will aims to analyse the following anthropic and natural aspects: changes detection of land and urban areas, structural changes of buildings and infrastructures and environment pollution and micro climate changes.

D-Cube (www.nais-solutions.it/products/d3) - It is an IT framework for the development of 3D distributed interactive applications aimed at representing geo-referenced 3D worlds and capable of integrating heterogeneous surveillance data (e.g. GNSS data, radar data) coming from both operational and simulation systems.

Headquarter address:

Via Andrea Noale, 345/b
00155 Rome

T (+39) 06 22454266
www.next.it

CONTACT

Giorgio Lo Verde marco
Giorgio.loverde@next.it

SMALL AND MEDIUM ENTERPRISE

NEXT- Ingegneria dei Sistemi S.p.A. is a completely private Italian Company founded in 1999; It employs more than 200 professionals and has its legal head office located in Rome.

The Company supplies systems, services and products in the field of Information Technology in Defence, Aerospace, Transport and Telecommunications domains. - In particular, for the Space domain, NEXT S.p.A. is focused on the provision of Turk Key System and Services for Calibration and Validation, Mission Analysis and engineering, System Engineering support , Ground Segment S/S supply and engineering support, Satellite and on-board S/S AIT support and Satellite and ground operations.

Such activities are and have always been undertaken in both National as well International contexts.

Moreover, through one of its Business Unit, called SIS (Sistemi Innovazione Sviluppo), NEXT S.p.A. is actively involved in both National and European Space programmes, covering three space domains: Navigation, Earth Observation and Communication, including Dual Mission.

- NEXT S.p.A. SIS Business Unit is focusing its Growth Strategies on the pre competitive development of advanced Services and Applications based mostly on GNSS technologies, developed in R&D Projects, performed during the European Commission Research Framework Programmes, as well as in National Projects for Italian Space Agency (ASI), for the ItalianMinister of University and Research (MIUR) and for "Finanziaria Laziale per lo Sviluppo" (FILAS) a Lazio Region Funding Entity.

- Performing Technology Transfer, NEXT S.p.A. SIS Business Unit has developed innovative Satellite Based Services and Applications, for Institutions and Corporate Entities, bringing in the Real Market the results gained in Research and Development Projects, on the Space Domains;

- These strategies meet the growing interest of the market in the Emergency/Safety/Security, Remote Monitoring Info-Mobility, Tourism, and Cultural Heritage applications, supported by Location Based Services and Applications.

- Consolidated links with National and European Academic and Industrial community, together with Specialist training on the job and professional development, allowed NEXT S.p.A. to gain "Transversal" expertise to work on different mission classes.

- NEXT S.p.A.'s personnel have broad expertises on mission analysis & design, with greater emphasis on national and international on GNSS - Global Navigation Satellite Systems (GALILEO, EGNOS, GPS) and Earth Observation Activities.

- In order to exploit the opportunities offered by Invitations to Tender published by EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites) an intergovernmental organisation sited in Darmstadt (Germany) that supply weather and climate-related satellite data, images and products to National Meteorological Services, NEXT S.p.A. created a German Subsidiary named NEXT ES GmbH, sited in Darmstadt (Germany).

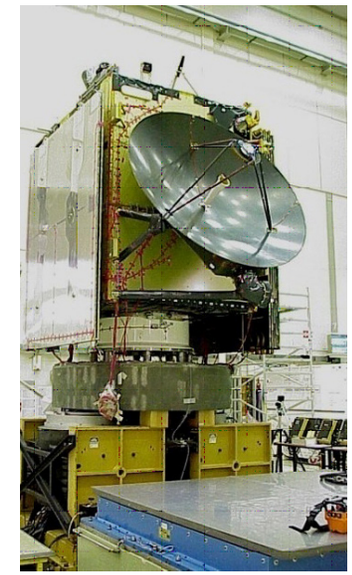
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

MIDAS (MINE & IED DETECTION AUGMENTED BY SATELLITE)

MIDAS system, exploits Earth Observation, Navigation and Communication Space assets, services and products. It aims to perform precise Survey on contaminated terrains, to detect and neutralise Land-Mines, IED (Improvised Explosoive Device) and UXO (UneXploded Ordinance).

For this System, NEXT S.p.A. developed and provides three of the most important Software components:

- The Control and Management Centre Tool, called CMT
- The Mobile CMT
- The Operational WEB Site



TURNKEY SYSTEMS & SERVICES

Many activities carried out by NEXT S.p.A. are linked to Ground Segment facilities and Satellite testing, with special focus on Earth Observation (COSMO-SKYMED I, II) and GNSS (GALILEO) contexts.

Services and activities provided and carried out by NEXT S.p.A. cover:

- Calibration and Validation
- Mission Analysis and engineering
- System Engineering support
- Ground Segment S/S supply and engineering support
- Satellite and on-board S/S AIT support

Headquarter address:
Via Andrea Noale, 345/b
00155 Rome

T (+39) 06 22454266
www.next.it

Giorgio Lo Verde marco
Giorgio.loverde@next.it

More in detail for GALILEO:

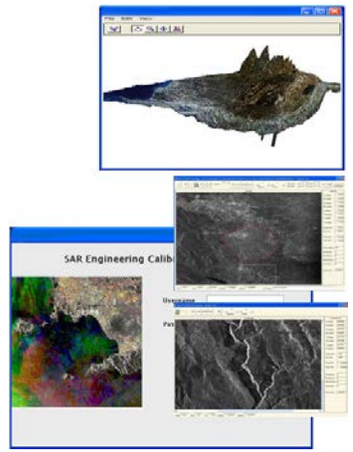
- Mission Controlling, Ground and Network Controlling,
- First level of Maintenance, SpaceCraft Engineering, (at Galileo Control Centre in Fucino, for Telespazio)
- Galileo FOC activity (in Germany with Thales Alenia Space-Italy) (in Germany with Thales Alenia Space-Italy)
- Satellite AIT (in Brema with OHB)

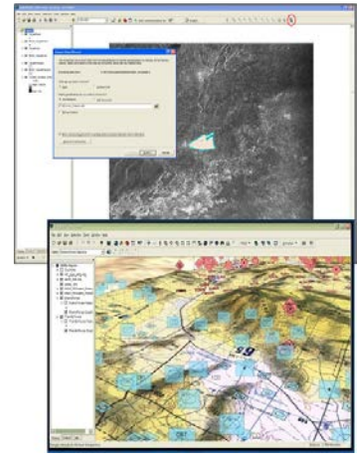
More in Detail for CSMO SKYMED:

- Ground Segment System Engineering
- End-to-End Performance Engineering
- Flight Dynamics engineering
- Mission Planning Subsystem Definition

SECF (SAR Engineering Calibration Facility).

HW / SW Infrastructure for calibration (Radiometric, Geo-location, Pointing) and Image Quality Analysis, for the instruments on board Cosmo Sky Med SAR satellites constellation. General framework capable of driving any algorithmic chain, cataloguing and store of incoming data, intermediate products and final results of the performed analysis. Compliant with safety standards at the higher level.





SFM

(MULTI SENSOR PHOTO INTERPRETATION SYSTEM)

Implementation of a Geographical Information System (GIS), including Catalogue management, presentation and archiving of information about SAR Optical images, maps and auxiliary products. Photo-interpretation to be utilized by C4I (command, control, communications, computers and intelligence)

Headquarter address:
Via della Tecnica, 87/89
36030 Sarcedo (VI)

Tel. Inter. (+39) 0445 1922219
Tel. USA (001) 323 9271020
F (+39) 0445 1922009
www.officinastellare.com

CONTACT
Gino Bucciol
Worldwide Sales Manager/R&D
info@officinastellare.com
gino.bucciol@officinastellare.com

SMALL AND MEDIUM ENTERPRISE

Officina Stellare srl is an Italy based company specialized in the design and manufacturing of optomechanical instrumentation for professional applications.

The wide range of products is including optical payloads for earth imaging satellites, Astronomical Research Observatories, Space Situational Awareness and Debris tracking solutions, Aerospace and Defence application, Astroimaging and CCD imaging cameras.

Headquarters are in Sarcedo (Italy) whit R&D, mechanical manufacturing, integration and final quality control and metrology. The Optical Design and Manufacturing Unit is based in Occhiobello (Italy) whit the design/ manufacturing of optics up to 1 meter.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Custom development and manufacturing of hi resolution, wide spectral bandwidth optical systems satellite payloads for earth imaging applications. Custom development and manufacturing of Lasercom/ Optical Antennas optical systems.

Custom development and manufacturing of up to 1 meter automated complete telescopes and optical systems for astronomy research applications.

Development and manufacturing of special optical systems for thermally critical environments and applications.

Custom development and manufacturing of remotely controlled optical systems up to 1 meter with high speed pointing and tracking platforms for space assets/mission tracking and Space Situational Awareness/Debris applications.




OPEN SKY
ADSL FIBRA SATELLITE
IL MEGLIO DI INTERNET

Headquarters address:
C.so Santi Felice e Fortunato, 105
36100 Vicenza

T (+39) 02 47931234
www.opensky.it
info@open-sky.it

CONTACT

SMALL AND MEDIUM ENTERPRISE

Connecting anybody anywhere has been our motto and goal from the very beginning. This is why in 2001 Open Sky started a partnership with Eutelsat, one of the leading satellite Internet providers worldwide, and committed to the challenge of connecting 100% of the Italian territory. Because the digital divide, lack or poor Internet terrestrial connections, was largely spread throughout Italy, an exciting technological and business opportunity lay ahead of us. Soon Open Sky increased its expertise and market share to become the Italian leading telecom operator by number of Tooway subscribers and today our network includes 2500 authorized Smart Installers and 140 dealers.

The trusting relationship and cooperation with our client companies changed our role from service provider to consultant and partner in the technological endeavours of businesses and professionals. As a result, we were able to design breakthrough B2B satellite services to meet the diverse needs of our clientele, such as the remote control of surveillance systems for monitoring, and telemetry to backup data to the live streaming.

Our other passion is the distribution of digital content to theatres via satellite. Open Sky's Cinema Division is now the Italian leader in the industry as it broadcasts more than 300 films per year, which equals about 85% of the shows broadcast via satellite. In 2015 we launched Cinema On Demand, a digital delivery through broadband connection. This service makes it possible for theatres to select and download DCP and trailers from our online catalogue.

In 2016 we started pursuing a new challenging objective. With more than 20,000 satellite installations and a large sales network, Open Sky entered the fiber and ADSL market being the only provider to offer a varied range of Internet technology options and products.

Open Sky is proud to be an established and renowned company in the industry. We believe that being a VNO (Virtual Network Operator) has been a crucial factor in our success as this enables us to research and integrate the most performing technologies and craft our own products in response to our customers' needs. Open Sky is therefore not a just dealer, but a knowledgeable technology consultant of reliable and competitive customer-oriented services. Leveraging our expertise, we strive to provide the best service by increasing performance and traffic.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

TECHNOLOGY:

Tooway is the satellite Internet service providing broadband across Europe, up to 22 Mbps download and 6 Mbps upload, which is separate from the terrestrial network. The signal transmitted from the KA-SAT satellite travels in KA band, enabling a reuse of frequencies greater than the KU band. KA band ensures lower costs because of lower rates and more affordable modems and antennas, the latter being also smaller in size (77 cm diameter).

PRODUCTS:

Satellite Internet Connection for businesses

Open Sky is the perfect consulting partner for large and small enterprises, businesses, rural areas, and professionals, providing versatile, custom-oriented services to satisfy the diverse communication and broadcasting needs of its clientele.

Satellite Internet Connection for home users

Our expertise in the satellite internet connection industry has made Open Sky an established market leader offering a wide customer oriented range of products for home users. In fact, as a VNO, Open Sky has been able to create superior subscription plans: our monthly traffic has increased while rates have decreased.

APPLICATIONS:

Video surveillance

There is a growing need for security systems. Open Sky offers a remote controlled service, where a video surveillance system is connected and monitored remotely, always and everywhere.

Backup

In case of failure of the terrestrial network, Open Sky backup solution protects uptime through redundancy of the satellite link, which is completely independent from the primary one.

M2M

Measuring performance to improve efficiency. The Telemetry service boosts management of M2M applications for companies and businesses and meets other needs with unlimited traffic at affordable rates.

SMALL AND MEDIUM ENTERPRISE

PicoSaTs view is to make space more accessible and affordable, thanks to its great mix of physics and engineering. The Trieste based company is developing a new generation of small satellites, combining an innovative structure with an advanced communication system, enabling big data rates to flow from and to space.

The company is based at the Italy's biggest technology park, Area Science Park, and has long track record both in ESA and NASA mission project management, and industrial collaboration with big Large System Integrators. Moreover, as a University spin-off, PicoSaTs has a strong attitude towards R&D and related challenges.

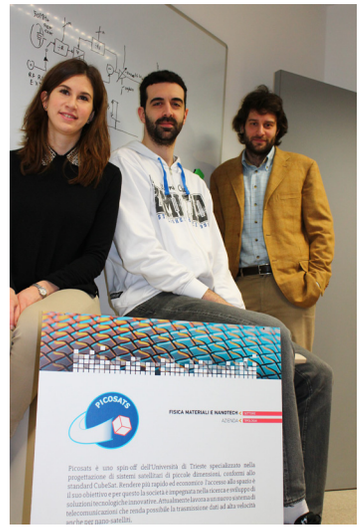
PicoSaTs portfolio diversification, consisting in advanced miniaturized communication system, innovative satellite structure, and mission analysis, aims at creating a bundle between the hardware's side, the satellite bus, and the software's side, the communication system, addressing the same potential user and customer segments.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

1. Telecommunication. A new generation of telecommunication systems for space applications dedicated to small satellites. The key technologies at the core of this system are a software defined radio and a highly directive and configurable antenna, operating at high frequencies (Ka band), and providing very high data rates. The hardware system will be associated with ad-hoc services.

2. Mechanics. PicoSaTs is carrying on an R&D program towards the hardware development of the mechanical structure of the satellite that will allow exploiting cross-selling opportunities (hardware & software). The hardware system will be associated with ad-hoc services.

3. Services. Beyond services associated to the hardware products, PicoSaTs is proposing consultant services for End to End Space Mission simulations.



CONTACT

Headquarters address:

Padriciano, 99
c/o Area Science Park
34149 Trieste

T (+39) 040 375 5445
www.picosats.eu
info@picosats.eu

planetek italia

CONTACT

Headquarter address:

Via Massaua, 12 I
70132 Bari

T (+39) 080 9644200
www.planetek.it
info@planetek.it

SMALL AND MEDIUM ENTERPRISE

Planetek Italia is an Italian SME, established in 1994, which employs 45 men and women, passionate and skilled in Geoinformatics, Space solutions, and Earth science.

We provide solutions through all phases of data life cycle from acquisition, storage, management up to analysis and sharing. Application areas: satellites missions & cosmic exploration; environmental & land monitoring, open-government & smart cities.

Main activity areas are: On board payload data processing and compression, radar and optical data processing for the ground segment, systems for the satellite attitude determination, software for EGSE, mission planning and real-time system ; Satellite, aerial and drone data processing for cartography and geo-information production; Design and development of Spatial Data Infrastructures for geospatial data archive, management and sharing; Design and development of geo-location based solutions, based on indoor & GPS/Gallileo/GNSS positioning systems.

We are dealers of Hexagon Geospatial software and data providers of satellite images.

The Planetek group consists of four companies based in Italy and Greece and is active in both national and international markets.

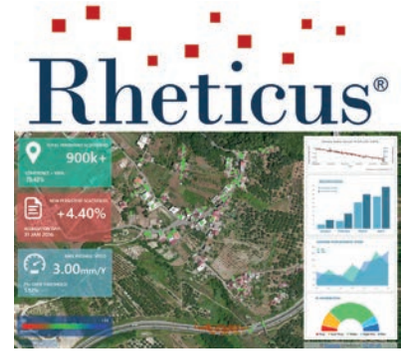
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Space missions solutions

- spacePTS: EGSE SW Front-End for Integration, Verification & Validation activities of a satellite payload.
- spacePDP: Open & modular Payload Data Processing framework, transferring satellite data processing from the Ground to the Space Segment.
- spaceOP3C: FPGA or SW solution for on-board high-performance hyperspectral data compression and cloud classification.
- spaceADM: space Attitude Determination Module

Rheticus®

Automatic cloud-based geo-information service platform for territorial and infrastructures monitoring. Active services: Displacements, Marine, Wildfires, Urban Dynamics.



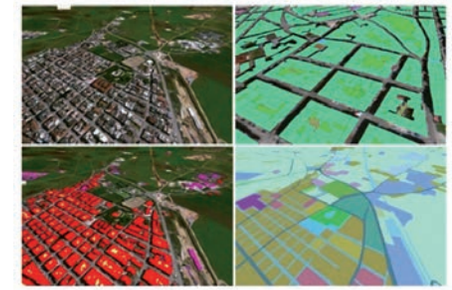
Spatial Data Infrastructures

Design and development of Spatial Data Infrastructures for geospatial data archive, management and sharing.

Preciso®

Geo-information products, derived from satellite and remote sensing data, designed to provide cognitive frameworks that meet the specific needs of application fields, such as: Urban Planning and monitoring, marine and coastal areas, emergency situations, landslides identification, infrastructures engineering, etc.

Preciso®



Progetti Speciali Italiani srl

Headquarter address:

Via Monte Santo, 2
00195 Roma

T (+39) 06 3215001
www.psi-space.eu
info@psi-space.eu

CONTACT

Ing. Armando Orlandi

SMALL AND MEDIUM ENTERPRISE

Progetti Speciali Italiani Srl (PSI)
operate mainly in the following areas:

- Aerospace
- Defence
- Homeland Security

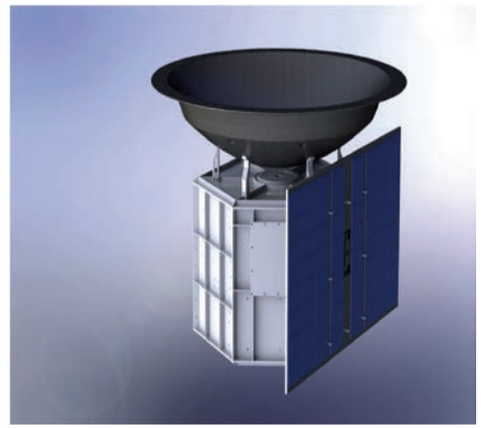
The industrial base turnover is about 20 MEuro with about 200 employee.

At the date PSI received contracts to perform the following activities for a set of National and International customers:

- Nano/Microsatellites for Dual Use application
- Small GEO TLC Satellite Phase B study
- UAV system and application
- Consultancy on the Ground Segment of Large TLC constellation
- Large Space Thermal Vacuum Simulator

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Nemosat – Electro Magnetic Scanning Microsatellite developed under IT MoD Contract

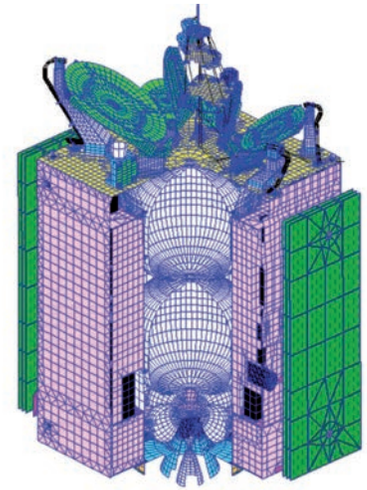


Nemosat Microsatellite

Thermal Vacuum Chamber to simulate satellite compliant with Ariane 5 ME dimension

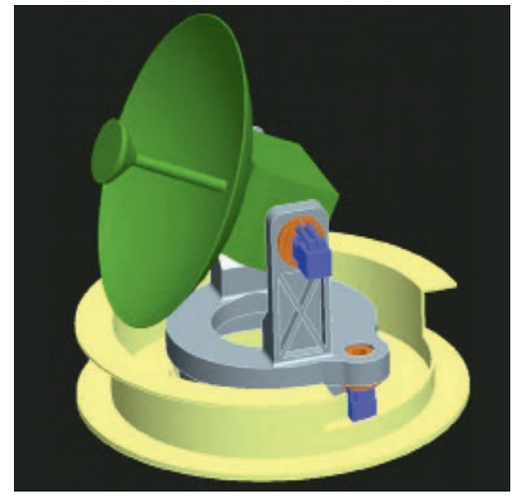
TVC Simulator

Phase B Study for a 1 Tonn Ka Geostationary TLC Satellite



Small GEO TLC Satellite

Ku/Ka antenna assembly for UAV applications developed under Italian Space Agency contract



Ku/Ka UAV Antenna

RedCat Devices

CONTACT

Headquarter address:

Via Moncucco, 22
20142 Milano

T (+39) 02 89506865
www.redcatdevices.it
c.calligaro@redcatdevices.it

SMALL AND MEDIUM ENTERPRISE

RedCat Devices (RCD) was born as a start-up company in 2006 thanks to a public funding from Milan Chamber of Commerce and Lombardia Region. RCD is a fabless semiconductor company devoted to design semiconductor memories and analog devices for aerospace and nuclear science taking the best from standard and well consolidated CMOS technologies and using radiation hardening by design (RHBD) proprietary methodologies to enhance resistance both to total ionizing dose (TID) and single event effects (SEE).

The expertise of RCD is focused on semiconductor memories and ADCs/DACs coming from its founders whose experience have been matured either in academics (University of Pavia, University of Milan) and large semiconductor companies (ST Microelectronics) and spread on technical and management issues such as design of silicon devices and technology transfer operations among large companies.

RCD is based in Milano and can count on a nine people permanent staff team including founders and consultants. Its capability spreads from project management to physical simulation and layout design of complete silicon devices for customers who can be helped on silicon process choosing too. RC works mainly on CMOS processes with different fabs like X-FAB, Tower Semiconductors and others.

RCD is organized in three units: 1) APG, Analog Product Group, 2) MPG, Memory Product Group, 3) SSG, Scientific Software Group. APG and MPG are devoted to the development of rad-hard products (ADCs, DACs, SRAM, NVMs), SSG supports APG and MPG in software maintenance and development of internal tools (rad-hard libraries, testing tools, etc...) required for all phases of chip development.

RCD design everything from scratch starting from the selected silicon foundry PDK (Process Design Kit), from I/O up to the single logic port, making leverage on almost ten years of rad-hard developments in several research projects (RiFLASH, RAMSES, CISSA, ATENA, SkyFlash, R2RAM) and customer oriented case studies. RCD is member of AIPAS association (www.aipas.it).

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

RedCat Devices Rad-Hard SRAMs

RedCat Devices volatile memories are designed specifically to be used in very aggressive environmental conditions. This means aerospace but also terrestrial environment with high temperature or under mechanical stress. RedCat Devices SRAMs take the best from CMOS selected standard CMOS processes and products are available as IPs to be included in rad-hard ASICs, as bare dice (also at wafer level) for SiP (System in Package) and as final components in ceramic or metallic package.

RedCat Devices proprietary techniques for Radiation Hardening By Design (RHBD) include different approaches:

RHBD at Architecture Level considers the device as a whole reducing the possibility of transients (SETs) and upsets (SEUs and MBUs) by placing critical blocks in order to mitigate the effects of charged particles. Every bit is physically independent from the others and thanks to its own decoding system error proliferation is avoided.

RHBD at Circuit Level is the domain where the single block or circuit such as operational amplifiers, input/output buffers, differential stages, multiplexers, NANDs, NORs are taken into account. At this level many precautions are considered such as low-gain feedback loops, Enhanced Flip-Flops or SRAM cells with Miller Capacitors.

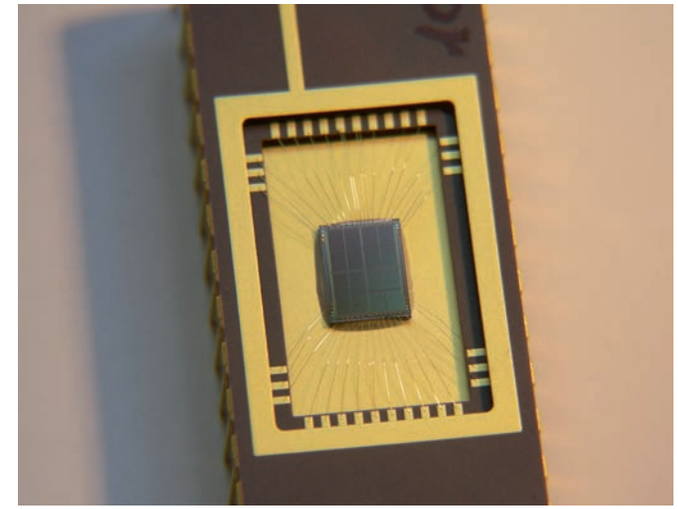
RHBD at Layout Level is the domain where strong counter measures against TID and SEL are taken into account. Extensive usage of ELT (Edgeless Transistors) and enhanced guard rings guarantee a resistance from 100 krad (Si) (M Family) up to several megarad (H Family) and a resistance against SEL up to 80 MeV/mg*cm2 proven with Xe, Ag and Au heavy ions.

RedCat Devices RC7C SRAM Family has a wide range of rad hard devices spanning from 256Kbit to 4Mbit and from very high TID resistance to basic tolerance to radiations.

"M" Family for Basic Radiation Tolerance (100 krad)

"S" Family for Space applications (300 krad)

"H" Family for High Energy Physics (25 Mrad)



SAB Aerospace

CONTACT

Headquarter address:
C.da Piano Cappelle, 8
82100 Benevento

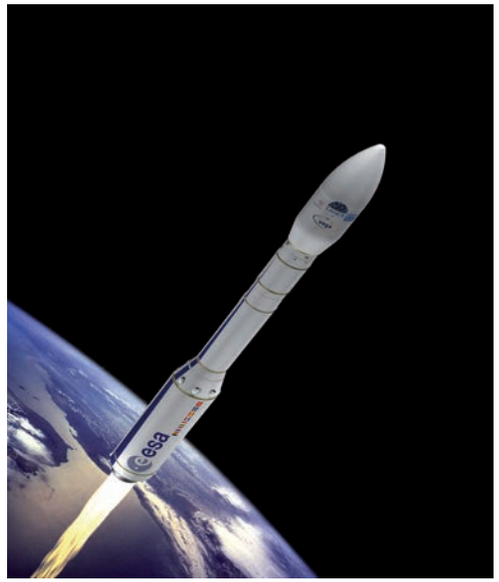
T (+39) 0824 25587
www.sabaerospace.com
info@sabaerospace.com

SMALL AND MEDIUM ENTERPRISE

S.A.B. Aerospace S.r.L. is a private and independent SME, in the space business since 2004. The company core business is focused on the development of mechanical systems and subsystems for Launchers and Satellites. The internal facilities for Manufacturing, Assembly, Integration and Testing, together with the heritage in ESA programs as responsible for small systems, make SAB in the position of being a valuable alternative to large companies in different fields of activities.

Nowadays SAB is recognized as one of the Italian player in the Launchers field, thanks to the involvement with ESA and ELV on the Small Spacecraft Mission Service project (SSMS). The other main activities carried out by SAB are related to Satellites, mainly focused on the development of mechanical subsystems of satellites platforms as well as optical payloads and equipment.

In the frame of the internationalization process, SAB has started in the Czech Republic a daughter company (S.A.B. Aerospace Sro). The company is nowadays recognized as a small system company, with competences related to electronics, mechanical, thermal, software and system integration.



PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

PRODUCTS

VEGA SSMS Dispenser:

Vega-SSMS is a modular carbon fibre dispenser developed by SAB to meet the low Earth orbit (300 km and more from Earth) launch service demands for clusters of small satellites weighing anywhere between 1 kg (Cubesat or Cubesat clusters) and 400 kg (Minisat).

VEGA Adapters: PROBA Vegetation Small Spacecraft Interface System

SPACEBATTERY: development of next generation battery packs, using lithium ion cells and an evolved Battery Management System with the possibility of telemetry and remote control.

SERVICES

MANUFACTURING

- Machined of Machined Parts (internal facility)
- Manufacturing of Composite Parts (outsourced)

ASSEMBLY/INTEGRATION

AIT activities performed by certified operator:

- Internally in clean room 100000 Class (e.g. Assembly Integration and test of Flight HW internally manufactured)
- By the customer (e.g. EDRS-C panel integration and alignment at OHB System premises)
- In Centre Spatial Guyanais (e.g. SSIS integration on VEGA for PROBA –V launch at CSG in Kourou)

TESTING

- VESTA (Vega Shock Test Apparatus): Shock Qualification Test for the Satellite embarked on VEGA launcher
- Vibration and Shock Testing (internal facility)
- TVAC Testing (outsourced)

APPLICATIONS

Conero-UAV: environmental monitoring services to the local communities and public Institutions through the Unmanned Aerial Vehicle (e.g. coast erosion, environmental pollution)

ARIANNA: platform that optimizes the tracking and management of goods within the intermodal logistics (vehicles tracking, traffic status monitoring, tracking of goods, Personal Protective Equipment RFID identification, Driver Rfid Identification, Communication interfaces towards National Telematic System).

TECHNOLOGIES

Development of **Material Technologies:**

- Advanced Ceramics: development of novel materials for TPS for re-entry vehicles and equipped with SHMS (in collaboration with CGS and CNR-ISTEC)
- Light Alloys: innovative application of magnesium alloys for aerospace systems

Development of **Processes Technologies:**

- Friction Stir Welding/Laser Welding
- Carbon Fiber Lamination
- Honeycomb Sandwich Panel with CFRP skins Manufacturing

Development of **Technologies for Separation Systems**

Development of **Aeronautical Syste:m**

- UAV (unmanned airvehicle)
- Flight Management System

Systems & Advanced Technologies Engineering S.r.l.

Headquarter address:
Santa Croce, 664/A
30135 Venezia

T (+39) 041 2757634
www.sate-italy.com
info@sate-italy.com

CONTACT
Ing. Attilio Brighenti
President
attilio.brighenti@sate-italy.com

SMALL AND MEDIUM ENTERPRISE

S.A.T.E. is an engineering company, founded in 1998 that performs services of advanced technology engineering in many different industrial fields, in particular in the offshore industry, in the gas compression and processing industry, in the automotive industry, in the marine and space industries.

S.A.T.E. specialises in the study and analysis of innovative systems, modelling and simulation, knowledge extraction and diagnostics applied to power and operating machines, plants, vehicles, space systems and special machines.

In particular, S.A.T.E. operates in the following areas of activity:

- SYSTEMS ENGINEERING, which consists in the activities of consultancy, study and design with regard to mechanical, underwater, marine and space systems for which design with a strongly interdisciplinary and inter-functional ("systems-engineering") approach is normally necessary.
- SIMULATION AND MODELLING, consisting of dynamic simulation services of systems operation and control, which is necessary to verify their design. To provide these services, S.A.T.E. uses its own proprietary advanced software products, developed in the MATLAB/SIMULINK environment.
- SOFTWARE ENGINEERING, which services are provided for applications requiring customised software products, either for simulation activities or for other purposes.
- DATA ANALYSIS AND DIAGNOSTICS, which consists in services oriented to the interpretation of data acquired from any type of physical system, such as a car or a satellite, with the purpose of characterising the normal system behaviour, identifying anomalies, detect incipient faults and identify possible causes, automatically.

SATE is a qualified supplier of ENI group (IT), GE Oil&Gas-Nuovo Pignone SpA (intl.), LINDE Engineering AG (DE), SARAS group (IT), SIAD Macchine Impianti SpA (PRAXAIR group, intl.), STATOIL Petroleum AS (N), TECHNIP Italy SpA (IT), UHDE GmbH (ThyssenKrupp, DE), WÄRTSILÄ (FN), and others in the power and oil&gas sector.

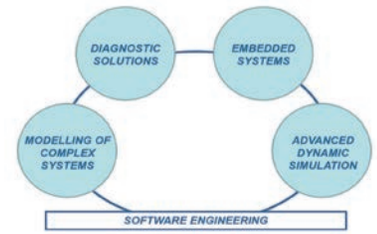
SATE is a qualified consultant and supplier of BMW GmbH (DE), FERRARI SpA (IT), GENERAL MOTORS Group (intl.), in the automotive and motorcycle sectors and of the ESA and CGS SpA in the space sector.

SATE quality system is certified according to ISO 9001-2008 standards.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

MODEL BASED DYNAMIC SIMULATION SERVICES AND PRODUCTS

In the space field, S.A.T.E. developed a model simulating the dynamics of a large telescope in its design phase, to estimate the dynamic oscillations of its parts and verify the compliance with the system specifications, considering various effects, such as wind disturbance, gravity, bearing friction, motors model (AC brushless).



In the field of industrial plants, these services include the dynamic simulation of processes and machines operation and control, such as for the refrigeration cycle compressors during design, commissioning and start up phases.

DATA ANALYSIS AND DIAGNOSTICS SERVICES AND PRODUCTS

S.A.T.E. operates in the diagnostics field since its foundation gaining experience in a variety of solutions, including both model-based and data-based approaches. In the space field, S.A.T.E. performed three projects for the European Space Agency (ESA) for the study and implementation of data mining solutions for the analysis of large data sets, the extraction of relevant knowledge from data and the automatic detection of novelties or correlations. During these projects, the techniques developed were applied to the analysis of spacecraft telemetry data, with the purpose of monitoring the health state of the spacecraft and learn from data on its behaviour, and of medical data, with the purpose of defining solutions that may enable astronauts' medical autonomy in future missions.

During one of this projects, S.A.T.E. also developed the software prototype KETTY (Knowledge ExtracTion from TelemetrY) that performs the automatic characterisation of the normal behaviour of the spacecraft, the detection of novelties, ordered by priority score, and identification of correlations among the monitored parameters. Some of the technologies developed under these projects were transferred also to other application domains, such as the automotive and the energy distribution fields.

SOFTWARE PRODUCTS

S.A.T.E. developed a variety of software products that were licenced for non-exclusive use to the customers, for the simulation or diagnostics of different types of systems. For example in the automotive filed, S.A.T.E. licenced software products for the vehicle transmission dynamics, the tyre threads performance, the vehicle air conditioning system, the heat transmission and the automatic correction of the temperature set point according to the driver effort and physiological status. The experience gained in software engineering allows S.A.T.E. deploying the software satisfying the customer requirements and tailoring it to the specific programming languages and framework selected by the customer.

S.A.T.E. is included in the network "Third party products & services", qualified by The Mathworks Inc., having produced, sold and/or used for commercial services, advanced simulation products in the following fields: compressors (COMPSYS™ , ACUSCOMP™ and ACUSYS®), gas turbines (TGSIM™), vehicle dynamics (DRIVE™), tyre-road interaction (CARPET™), mechanical suspensions (BENCH™), automotive thermal exchanges (CONDIZ™, CONDIZ4HIL™, THERBOX™), pneumatic systems (PNEUMA™), CAN signals acquisition and on-board diagnostics (CANpanion™), fuel consumption monitoring for vehicle fleets (FLEET FCM™) and data analysis by data mining techniques (KETTY™ and CLUE™).

CONTACT

Concetto Squadrito

Headquarter address:
Via Roma 19/21
95030 Pedara

T (+39) 0952933861
www.sicilsat.com
info@sicilsat.com

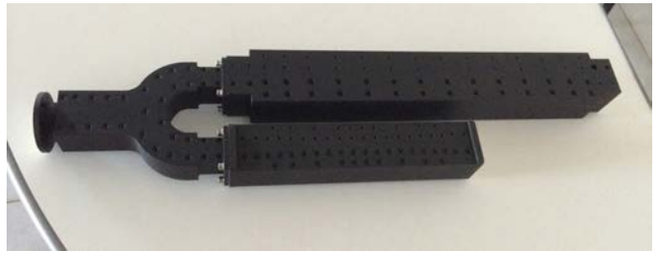
c.squadrito@sicilsat.com
T (+39) 3939964625

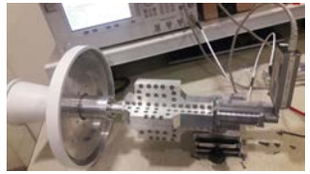
SMALL AND MEDIUM ENTERPRISE

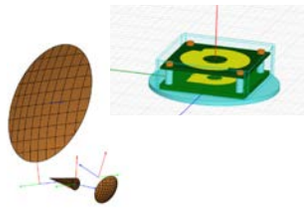
Sicilsat Communications operates in the area of satellite communication systems. The company was founded in 2010 by Concetto Squadrito which has more than thirty years of experience in the telecommunications sector. The main activities are design, manufacture, installation and testing of up-link and satellite system. Sicilsat Communications designs and manufactures fixed and mobile satellite systems, adapting them to the needs of its customers. This allows to obtain high reliability, a good standard realization, while maintaining a very competitive final price.

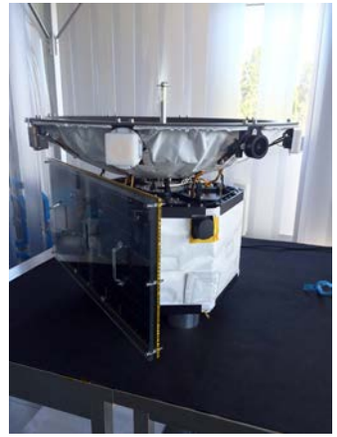
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

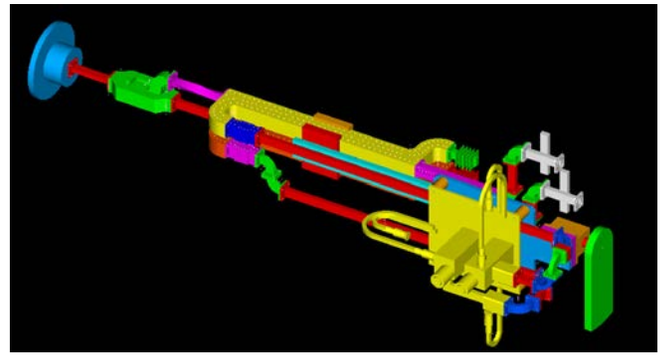
Sicilsat Communications is able to design geometry for both satellite and ground antenna, single or multi reflector. Moreover, in recent years we have specialized in the field of microstrip and planar antennas, with considerable satisfaction of our customers for space applications as cubesat and nanosatellites.

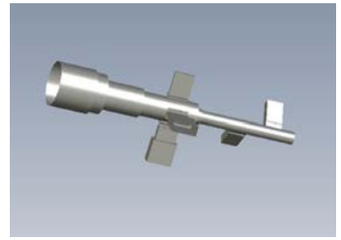


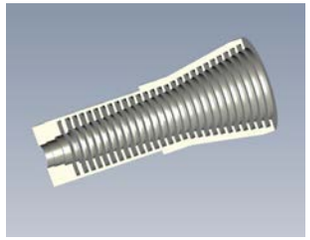












Capabilities to design and manufacture of waveguide components, corrugated horn.

SOMACIS

CONTACT

Headquarter address:

Via Jesina, 17
60022 Castelfidardo (AN)

T (+39) 071 721531
www.somacis.com
info@somacis.com

SMALL AND MEDIUM ENTERPRISE

For more than forty years, SOMACIS has been a dynamic company producing high-tech PCBs and delivering innovative solutions.

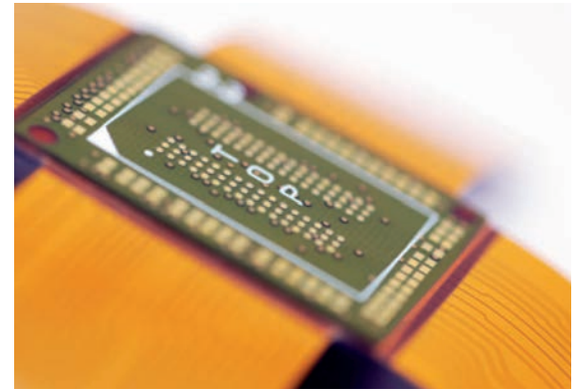
SOMACIS, headquartered in Italy, is one of the leading PCB manufacturers, with more than 800 employees and production plants in Italy, USA and China.

SOMACIS is a worldwide partner supplying HDI, rigid, rigid-flex and flex PCBs for time critical and mass production requirements.

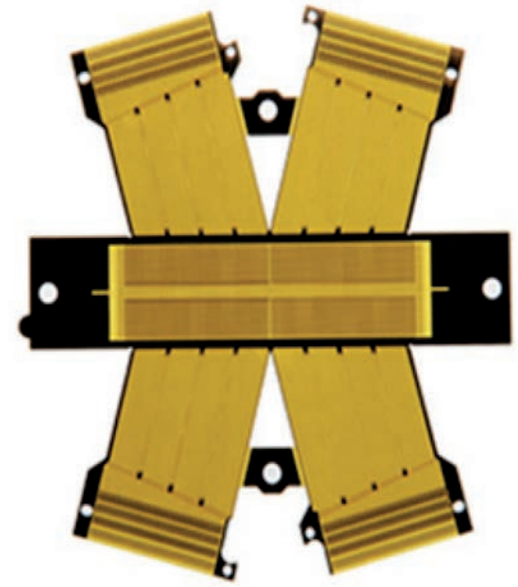
Certified ISO 9001, EN 9100, ISO 13485 and ISO 14001, SOMACIS was the first company in Europe to be accredited Nadcap since 2005.

SOMACIS is active in various sectors, such as telecom, aerospace and defence, industrial, IT, medical, automotive and transport. The aerospace, defence and security part accounts for one quarter of the total production.

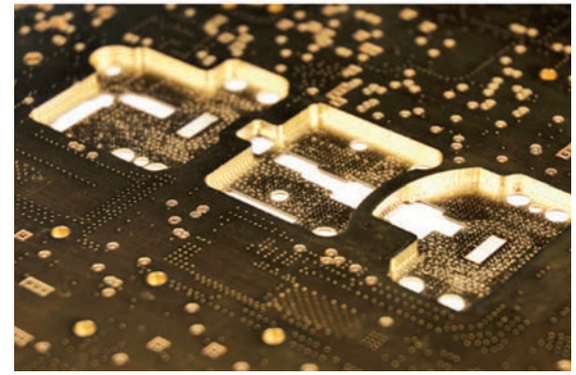
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES



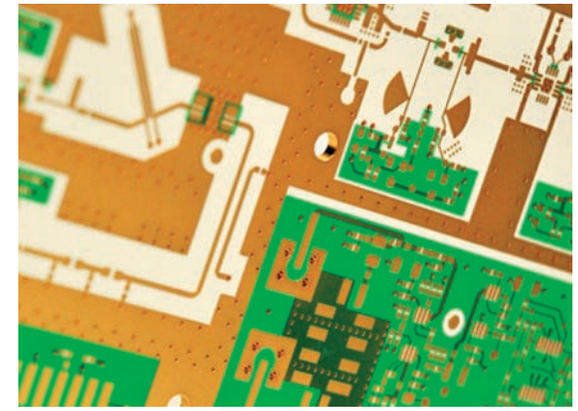
Rigid-flex PCBs



PCBs with ultra fine features



Rigid PCBs with cavities,
metal back or metal cores,
mixed materials



High-frequency PCBs with special materials

CONTACT

Mr. Fabrizio Bernardi

Headquarter address:

Navacchio
56023 Cascina (PI)

T (+39) 050 7519607
www.spacedys.com

bernardi@spacedys.com

SMALL AND MEDIUM ENTERPRISE

SpaceDyS is a company established in 2011 by a group of researchers of the Celestial Mechanics Group of the Department of Mathematics of the University of Pisa. Since September 2014 it has officially become also a Spin-Off of the University of Pisa.

The company is set up by a team of skilled researchers in the field of space dynamics, with a high level background in Mathematics, Physics, Astronomy and advanced capabilities in the areas of Flight Dynamics, Mission Design and Computer Science.

The company structure is composed of eleven associates. The senior ones have a strong experience in the space business, thanks to a long cooperation with space agencies such as ESA, ASI and NASA.

The core business of the company concerns the software development for applications of advanced orbit determination techniques to different space problems. One of the main activities is the management of the public services NEODyS and AstDyS, which provides updated information and data on all known asteroids.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Since 2011 SpaceDyS has been actively involved in different projects and studies of the Space Situational Awareness (SSA) programme of the European Space Agency (ESA). The company has signed a Service Level Agreement (SLA) directly with ESA for the provision of data and services from NEODyS and AstDyS to the ESA SSA-NEO Coordination Center (NEOCC).

SpaceDyS has also been involved in the development of advanced population orbit determination algorithms for the cataloguing of space debris in LEO, MEO, HEO and GEO orbits. Therefore, the company is also interested in the SSA activities of the Space Surveillance and Tracking (SST) segment.

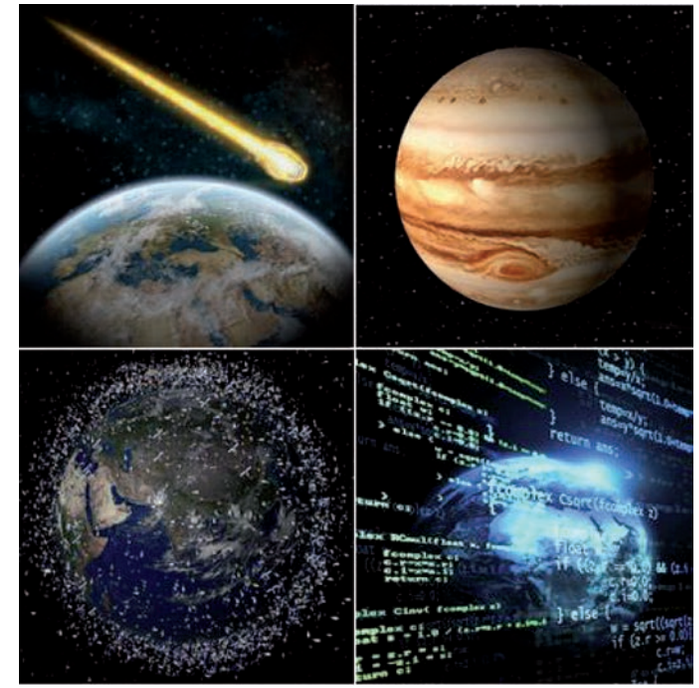
Another important field of research and study connected with both the NEO and SST segments is the new concept Fly-Eye telescope. The telescope has been conceived and designed by the Compagnia Generale per lo Spazio (CGS-OHB) and is now in the development phase.

SpaceDyS has been involved in the development of a high precision orbit determination tool for the radio science experiments of the missions BepiColombo and Juno. The radio science experiment is one of the on board experiments, which would coordinate a gravimetry, a rotation and a relativity experiment, using a very accurate range and range-rate tracking. Thanks to our data processing algorithms, most of the measurements errors can be removed, by improving of about two orders of magnitude with respect to the past technologies.

Juno has been a NASA mission launched on the 5th of August, 2011. The spacecraft will be insert in orbit around Jupiter in July 2016. Juno's goal is to understand the origin and evolution of Jupiter.

SpaceDyS has been involved in an ESA study on the strategies of disposal for spacecraft operating on Libration Point Orbits (LPO) or Highly Elliptical Orbits (HEO) at the end of their life.

The company started also the research and development of algorithms and software to the highest level of innovation to build the basic libraries of new software tools for orbit determination purposes. After the project CEOD the company continued the internal software development with its own resources, and now it has completed and tested an accurate and efficient numerical propagator, which is able to work in every dynamical environment in the Solar System.



INGV spin-off
SPACEARTH TECHNOLOGY

CONTACT

Headquarters address:
Via di Vigna Murata, 605
00143 Roma

T (+39) 06 5186 0396
www.spacearth.netinfo@
spacearth.net

SMALL AND MEDIUM ENTERPRISE

SpacEarth Technology started its activities in 2014 as spin-off of INGV (Istituto di Geofisica e Vulcanologia) to realise innovative products and services through technological transfer from the INGV research results.

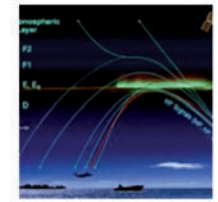
The company is composed by a team of engineers, physicists and geologists with a long involvement in research fields such as: Upper Atmosphere Physics, Space Weather, Satellite Navigation and Positioning, Remote Sensing, Data management and Elaboration, Radio propagation, Marine Monitoring and Environmental Geophysics. As spin-off of INGV we inherit a long standing experience in the use of GNSS receivers and algorithms development for the monitoring, forecasting and analysis of ionospheric disturbances and their effect on positioning. SpacEarth Technology is the owner of the Italian patent "Method for forecasting ionosphere total electron content and/or scintillation parameters" (2015) which is now being extended to International patent. The invention relates to a method of TEC (Total Electron Content) and scintillation empirical short-term forecasting (seconds to minutes), able to provide the basic quantities describing the ionospheric and signal propagation conditions, even under severe scintillation environment. The output of the proposed method is the necessary input to feed the mitigation algorithms aiming at improving the accuracy on real-time GNSS precise positioning techniques (RTK, NRTK, and PPP) under harsh ionospheric conditions. This can contribute to improve the scenario for the use of GNSS and SBAS (EGNOS) in several field of applications.

As a spin-off of INGV we also inherit a remarkable experience in the use of optical and radar remote sensing and geodetic methods for the monitoring and analysis of geological and geophysical hazards. We provide advanced scientific products, as well as consultancy services, in these subjects. We provide tailored services and information products for geomorphological, structural and lithologic investigations, using optical and radar remote sensing data, from satellite and airborne (manned and unmanned) platforms.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

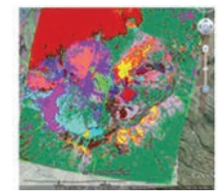
AIS ionosonde (Advanced Ionospheric Sounder) is an efficient, and simple as well, instrument capable to investigate Earth ionosphere. Designed and carried out employing the most advanced radar techniques, it allows to get an ionogram with only 250 W peak power, keeping dimensions and weight low with respect to similar instruments, and above all the reliability of the measurement due to the usage of coded pulses. Various specimens of AIS are currently working in ionospheric observatories placed in different continents.

Fii (Forecast Ionosphere Irregularities) is an innovative product to forecast ionosphere irregularities. Our invention concerns a method for forecasting ionosphere total electron content and/or scintillation parameters. We developed a method of TEC (Total Electron Content) and scintillation empirical forecasting, in particular short-term forecasting (seconds to minutes). The output of the method is necessary to feed mitigation algorithms aiming at improving accuracy on GNSS precise positioning techniques (RTK, NRTK, and PPP) under ionospheric harsh conditions. Fields of applications of GNSS precise positioning techniques, to name just a few, are precision agriculture and Civil Aviation.



Remote sensing analysis for geomorphological, structural and lithologic mapping.

We provide tailored services and information products for geomorphological, structural and lithologic investigations, using optical and radar remote sensing data, from satellite and airborne (manned and unmanned) platforms. We use radar and optical panchromatic, multispectral/hyperspectral, and thermal sensor data from various platforms to classify and isolate lithologic units and their structural and geomorphological settings and parameters.
The analysis accuracy can be improved by using spectral signatures from local geological samples, and we provide spectra measuring services for the VNIR and TIR.



Marine Monitoring: planning of data acquisition campaigns at sea: site-specific topics, choice of the right set of instruments, support for logistics for marine operations, hardware specifications etc. Surveys with our instruments and platforms: we can use our existing monitoring systems and instrumentation and our expertise for survey at sea. Custom hardware/firmware/software development: we can help you if you need small customizations of off-the-shelf hardware, as well as you plan to use a newly designed system tailored on any specific need: high depth, long-term monitoring, real-time monitoring, low power consumption, high bandwidth. We can perform data analysis and we can develop software for data management.

IONOspheric Ray Tracing (IONORT) is an applicative software tool package for calculating a three-dimensional ray tracing of high frequency (HF) radio waves in the ionospheric medium. IONORT runs under Windows operating systems. The corresponding software is coded in MATLAB for the input/output routines, while the integration algorithm is coded in FORTRAN. MATLAB graphical user interface (GUI), friendly managing the input needed to the integration algorithm and the corresponding numerical and graphical output, facilitates noticeably the numerical data input entry managed by the user and at the same time performs an useful two/three dimensional (2-D/3-D) visualization of the ray path.

Applications in the field of environmental surveys are:

- Geological-structural
- Archaeological
- Environmental

while the survey methodologies supported and tools available are:

- GPR (Ground Penetrating Radar): GSSI Sir3000 with wide spectrum of multifrequency antennas;
- Electrical tomography, resistivity and induced polarization surveys: SYSCAL Instrument;
- Magnetometry: magnetometer Geometrics optically pumped magnetometers and gradiometrici for archeology Bartington Grad 601-2;
- Electromagnetism: electromagnetic induction methods in the frequency domain (FDEM) fixed frequency (Geonics EM31) and multifrequency (Profiler EMP400 GSSI), Methods in time domain electromagnetic induction (TDEM);
- GPS (Global Positionning System): Receivers geodetic Topcon GB1000 and HiRes RTK.

Survey Lab

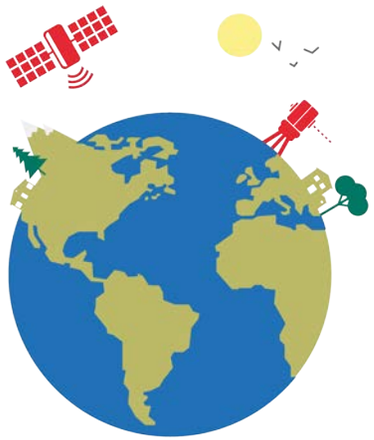
Spin off di SAPIENZA UNIVERSITÀ DI ROMA

SMALL AND MEDIUM ENTERPRISE

Survey Lab a spin-off of Sapienza University of Rome was started in 2008 by researchers of the Geodesy and Geomatic Section of the Civil, Environmental and Construction Engineering Department (DICEA).

Its main expertise is in the development of innovative approaches based on remote sensing and geomatic techniques to monitor land, structure and infrastructure.

In 2016, thanks to I.MODI, a H2020 Phase II- SME-Instrument Project, the company enforced its commercial approach with new experts and research and business partners.



MISSION

- Develop and distribute innovative geomatic monitoring systems based on advanced surveying and mapping technologies with a specific focus satellite Earth Observation data.
- Promote the use of satellite technology to increase the capability of setting up preventive mitigation actions to protect land and urban areas.

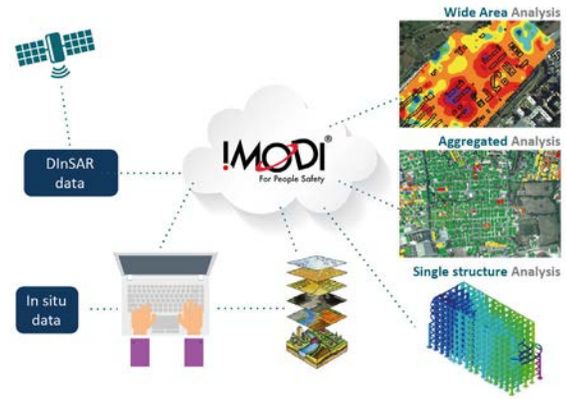
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Survey Lab provides monitoring services for built-up and natural hazard areas.

I.MODI® - AN EARTH OBSERVATION DOWNSTREAM SERVICE

I.MODI (Implemented MOnitoring system for structural DIsplacement) is a value added service that integrates Earth Observation (EO) technologies, in-situ data and ICT to monitor the stability of buildings and critical civil infrastructures. It was developed thanks to a SME-Phase 2-H2020 grant.

Monitoring urban areas and infrastructure networks is a dominant socio-economical issue for the safety of the population. Structural deterioration with aging and due to natural and man-made subsidence processes poses a threat to structural strength.



To guarantee a systematic and comprehensive monitoring service over large areas EO data can be effectively adopted by means of the Differential Interferometry SAR (DInSAR) technology. I.MODI® exploits DInSAR displacement time series by designing monitoring solutions fully assimilating ground-based data.

Through a multi-level service I.MODI performs the analysis of the displacements suffered by a structure and sets up a damage assessment investigation. A WebGIS platform is adopted to distribute results to a wide range of users and advanced technical reports for specialists.

I.MODI service aims at encouraging mitigation and prevention actions enforcing the capability of performing back analysis using data archived since early 1990ies. Customized solutions can be implemented for different end-user needs.

MAPPING AND GIS

Survey Lab uses GNSS surveying and EO data to setup georeferenced databases accessible in GIS platforms.

NATURAL HAZARDS

Multi-temporal analyses based on airborne lidar and satellite photogrammetry for controlling areas affected by natural hazards

OTHER SERVICES

- Training Courses
- Research and Development Projects
- WebGIS Platform
- App development

CONTACT

Headquarters address:

Via Eudossiana, 18
00184 Roma

T (+39) 349 8608044
www.surveylab.info
www.imodi.info
info@surveylab.info
info.imodi.info

TECHNOLOGY FOR PROPULSION AND INNOVATION

Headquarter address:
Via della Croce Rossa, 112
35131 Padova

T (+39) 049 927 1547
www.t4innovation.com
info@t4innovation.com

CONTACT
Alberto Bettella
(CEO)
a.bettella@t4innovation.com

SMALL AND MEDIUM ENTERPRISE

T4i, Technology for Propulsion and Innovation, is a spin-off of the University of Padova and classified in the Italian enterprises' register as an innovative start-up (i.e. a firm that develops, produces and sells innovative high added value products and services). It was founded in 2014 by an entrepreneur, a team of professional managers, researchers and engineers with international experience and several years of expertise in developing innovative systems. T4i's professionals come mainly from aerospace systems sector where research and development demands an effective integration of engineering, physics and computer science know-how to develop complex systems.

T4i operates in the aerospace and industrial sectors with the objective to provide an integrated service that supports the customer from the feasibility study of a new product up to the pre-industrialization.

In the aerospace sector T4i focuses its activity on the development of propulsion systems to be used in the field of autonomous aircraft, of small satellites and in the field of plasma sources.

In addition to develop systems, we design and develop test beds.

In the industrial sector we want to be innovation-partners for small medium enterprises developing products and solutions that have better performance and cost less to produce through the application of cutting edge technology to everyday products.

Our goals are to keep our clients ahead of their competitors reducing risks and time to market related to the launch of new products.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Small plasma thruster for space applications

- Problem analysis: To develop a low cost plasma thruster for low-cost satellites
- Feasibility: Development of analysis code, physics investigation, Experimental breadboard
- Prototype: Thruster engineering model, Radio frequency electronic board

Turbo-Jet Engine

- Problem analysis: develop an engine prototype with 1600 N thrust to be equipped on a new Italian military training plane
- Feasibility: starting from an existing design (80's), the motor has been reverse-engineered, improved and modernized
- Prototype: Successful demonstration at customer premises

Moisture measurements

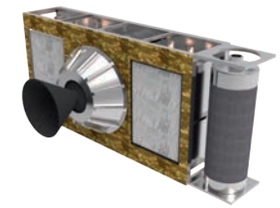
- Problem analysis: in-line measure of moisture on plastic dryer for ppm values
- Feasibility: design of a compact ready-to-use moisture meter using innovative microwave technology: reliable and accurate
- Prototype: already mounted on next generation of plastic dryer of our customer

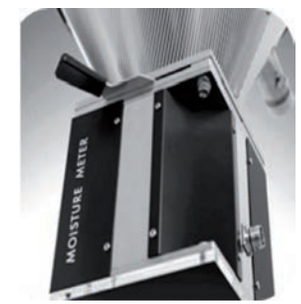
Hybrid rocket propulsion

- Problem analysis: develop a low-cost RATO (Rocket Assisted Take Off) system for UAV applications
- Feasibility: design, testing and implementation of a new kind of propulsion system: low-cost, green, ease of use and mainteinance
- Prototype: flight version tested on customer UAV

Skills

- Microwave systems, signal conditioning, online diagnostic
- Turbomachinery, combustion, roto-dynamics, CFD simulations
- Automation, optics, fluidic systems
- Mechanical engineering, fluid-dynamic, ultra-high-speed electronic system, very high temperature material, high speed valves, high pressure components, fluidic equipment
- Radio frequency technology, plasma system, high vacuum equipment, plasma diagnostic
- Rocket propulsion, launcher system engineering, internal combustion, rocket design and testing
- Testing and data analysis for aeronautics, rockets, plasmas and industrial systems





TECHSEMA
Technical services engineering & managment

SMALL AND MEDIUM ENTERPRISE

TECHSEMA srl began to operate at end 2002 analyzing the Italian Space market with particular attention to the SME' role and expectations . It is an Italian SME owned by private managers previously acting at high level in the major Italian Space and Military Industries.

The main TECHSEMA mission is to analyze and exploit the development of available satellite technologies for social and commercial applications also supporting other SME not having a similar background of marketing experience. Joining its shareholders technical & marketing experience with external professionals TECHSEMA is a in position to offer:

- Competence and assistance in the field of satellite TLC applications for social and commercial services with institutional entities and private customers.
- Technical assistance in the field of analysis and management of synthetic scenarios, virtual reality models, E.O. images treatment and photo interpretation.
- Management of marketing, communication and data dissemination plans and actions related to technological products.

Most significant TECHSEMA activities, carried out or still running :

- Collaboration with OCI (today Rheimetall) in the program "VEGA Ground"
- Participation in ESA study contracts for "Start-up initiatives" and ARTES
- An ESA/ESRIN Study Contract for analyzing, modeling and managing the technological transfer
- Responsibility of market requirements analysis, investments return analysis and contacts with Institutions in the frame of the ASI telemedicine program "TELESAL"
- Participation in the ESA feasibility contract "EASY" (Easy And Safe Yachting) conceived by TECHSEMA itself.
- Collaboration with "Tor Vergata" University of Rome for the feasibility of an incubation and formation center.
- Responsibility of development and realization of a SatComBox for a maritime commercial application in the frame of the "SIMONA" contract with ESA

CONTACT

Headquarter address:

Via Castello Tesino 46
00124 Roma

T (+39) 338 7547405
T (+39) 335 8318900

www.techsema.it
fgardini@techsema.it
mfargnoli@techsema.it

Headquarter address:
Via Donizetti, 20
20011 Corbetta (MI)

T (+39) 02 90380812
www.temissrl.com
info@temissrl.com

CONTACT
Alberto Bettella
(CEO)
a.bettella@t4innovation.com

SMALL AND MEDIUM ENTERPRISE

TEMIS was founded in 2006 as an engineering company to study and develop electronic systems and products for the F1 & Motorsport sector.

In 2008 Temis starts to transfer its know-how to space sector and it realized a telemetry system to be integrated in the Vega launcher for the acquisition of data and video acquired during the entire duration of the flight. (LARES A&H Sub system)

In the same year Temis also developed its first Satellite test equipment to simulate, control and test the on board unit before launch.

During the following years Temis has increased its expertise in the space field thanks to participation both to Institutional and Industrial Program and working together with leading space companies and European and Italian Space Agencies.

TEMIS has its headquarter located in Corbetta (close to Milan), distributed in 400 m2 of offices and about 200 m2 of laboratory for integration and test.

It counts about 20 resources, mostly highly graduated engineers deeply experienced in:

- Project Management Office (including System Engineering and Product Assurance)
- Design & Manufacturing of Test Equipment & Simulators
- Design & Manufacturing of custom Embedded Systems
- Thermo-Mechanical Analysis and Design
- Control Systems Development and Simulation (including satellite AOCS)

TEMIS is part of ART SpA, located in Passignano sul Trasimeno (PG) , a medium sized company (120 resources) particularly proficient in advanced technological solutions mostly in the automotive and defense fields

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

TEMIS is placed in the market as system provider, and it's capable to provide a turn-key solution for the customers, starting from the requirement analysis until the product realization/qualification.

Particular attention is given to quality assurance policy to design, produce and test products responding to a high quality and reliability level for professional and space applications.

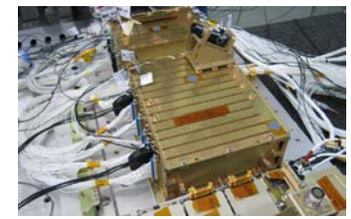
Attitude Control System (AOCS)

TEMIS supports Large systems Integrators in the design, implementation and validation of the satellite AOCS subsystem. The company can start from the system requirements and define the attitude control system specification providing also a first dimensioning and choosing sensors and actuators.

Test Systems (EGSE/SCOE)

TEMIS has been involved in some important space projects as subcontractor of OHB group. The main effort has been spent in the definition, project and realization of Electrical Ground Support Equipment's (EGSE) with a special focus on the attitude and control subsystem and Payload SCOE.

In-flight telemetry systems

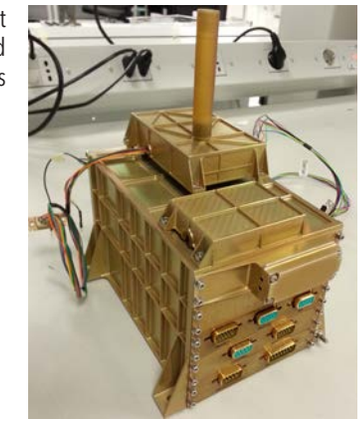


TEMIS, for the VEGA first and second qualification launch, delivered the Avionic & Harness Subsystem (A&H).

The A&H has been conceived with the purpose of assisting the Launch Vehicle in the acquisition and monitoring of key parameters inside the launcher fairing and of providing separation of the payloads (satellites) inside the launcher.

In the frame of EXOMARS project TEMIS have developed and delivered the Central Electronics Unit (CEU) Boards in charge of:

- communication I/F with CTPU fotr TM/TC,
- Power conditioning
- Payload sensors acquisition
- housekeeping signals acquisition.



CONTACT

Fabio Sacconi

Headquarter address:

Via del Politecnico,1
00133 Roma

T (+39) 06 72597781
www.tiberlab.com
info@tiberlab.com

SMALL AND MEDIUM ENTERPRISE

Tiberlab Srl is a spin-off of University of Rome "Tor Vergata". Our mission is to develop innovative software solutions aimed to the design and simulation of electronic and optoelectronic devices, focusing in particular on nanostructured devices.

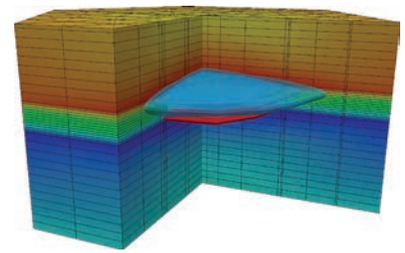
Modern nanostructure devices pose new challenges due to the wide range of length and time scale involved. We provide tools for multiscale simulation able to perform analysis and optimization at all the relevant length scales, through state of the art physical models ranging from continuous to atomistic level.

Tiberlab offers consulting services and end-user software. Our core product is TiberCAD, a software for modeling and design of innovative nanostructured devices. tiberCAD software has been and is presently used as a main simulation tool in several FP7 EU projects, for the design and the study of optoelectronic properties of quantum well and nanowire based LEDs and of advanced solar cells.

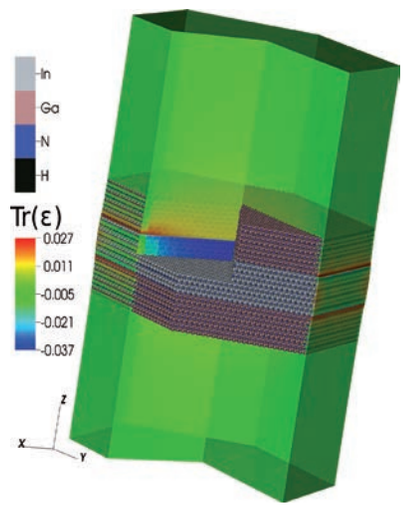
Tiberlab is presently a partner in FP7 Project Deepen, aimed to the design of an open source multiscale simulation environment for electronics and optoelectronics modeling.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Our software product TiberCAD is a multiscale CAE tool for design and simulation of electronic and optoelectronic nanostructured devices. This simulation software provides novel tools to accomplish the critical requirements imposed by the recent developments in Key Enabling Technologies such as micro-nanoelectronics, nanotechnology, photonics and advanced materials.

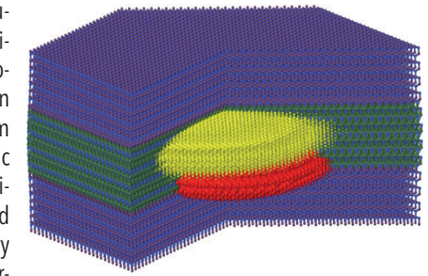


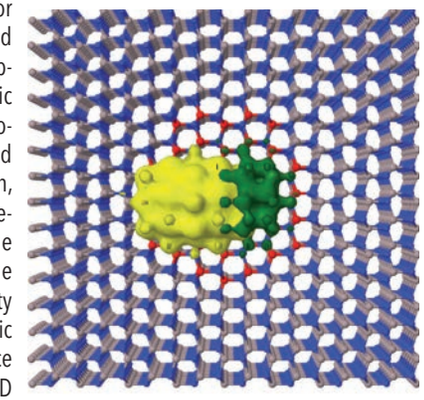
Among the applications of TiberCAD are LEDs based on quantum wells and quantum dots, nanowire FETs, III/V heterostructures, photovoltaic cells for space applications, organic solar cells (OPVs), Dye Solar Cells (DSCs), piezoelectric nanogenerators. TiberCAD is a multiscale tool, since it allows the simultaneous solution of physical models on different length scales, ranging from the continuous level of macroscopic device to the atomistic structure of the active region at the nanoscale.



The multiscale approach can be employed in several fields such as particle transport, heat dissipation and mechanical deformation. In this way, quantum and classical descriptions can be used in different regions of a device/nanostructure within the same simulation; analysis and optimization may be performed at all the relevant length scales, possibly including self-consistent coupling of different models, such as quantum, thermal and drift-diffusion ones.

TiberCAD is capable to couple the FEM-based continuous media physical models with simulation models based on quantum approaches in an atomistic framework, such as Empirical Tight-binding (ETB) and Density Functional Theory (DFT) for electronic properties and Non-equilibrium Green Function (NEGF) for quantum transport. Based on the FEM device description and crystallographic orientation, the needed atomistic structure is generated internally in TiberCAD. Then, the atomistic structure is deformed according to the strain obtained from the continuous media elasticity model or from an atomistic approach such as Valence Force Field (VFF). TiberCAD provides models to calculate particle transport and IV characteristics, including strain and piezoelectric effects in nitride materials; a fully 3D quantum model allows to calculate optoelectronic properties at operating bias. Atomistic models for strain and electronic calculations such as VFF and ETB, together with random alloy representations of the active region, allow to study realistic material nanostructures, where the fluctuation of alloy composition may affect in a critical way the properties and performances of a LED or a solar cell. Accurate models for the most important material systems for photonics and electronics applications are provided, such as GaAs/AlGaS and GaN/AlGaN/InGaN. Methods for parallelization of computationally heavy routines for atomistic calculations through Graphical Processing Units (GPU) and MPI techniques are implemented.





TRANS-TECH

TECHNOLOGY TRANSFER and ENGINEERING SERVICES

Headquarter address:

Via F.Palizzi, 107
80127 Napoli

www.trans-tech.it
info@trans-tech.it

CONTACT

Mr. Giancarlo Pagliocca
giancarlo.pagliocca@trans-tech.it
T (+39) 338 5832183
Dr. Gennaro Russo, PhD
T (+39) 329 2535926
gennaro.russo@trans-tech.it

SMALL AND MEDIUM ENTERPRISE

Trans-Tech (TRANSfer of TECHnology) is an Italian innovative start-up company born from the vision of its founders and from their 30-years experience in the aerospace sector, with the aim to transfer technologies all other industrial sectors, with specific regard to transportation.

The business model of the company is based on the synergic fusion of a robust experience of its entourage and the application of the concept of Open-Enterprise.

The targeted and efficient collaboration, properly managed, of best resources and external companies allow Trans-Tech to create competitive teams in terms of flexibility, quality of services, cost and delivery time.

Trans-Tech it is the best solution in the development of innovative projects that require comprehensive and differentiated competencies: it provides a single expert interlocutor able to intercept customer needs and translate them into an efficient and effective answer, especially in a context of international and multi-national programs and collaboration.

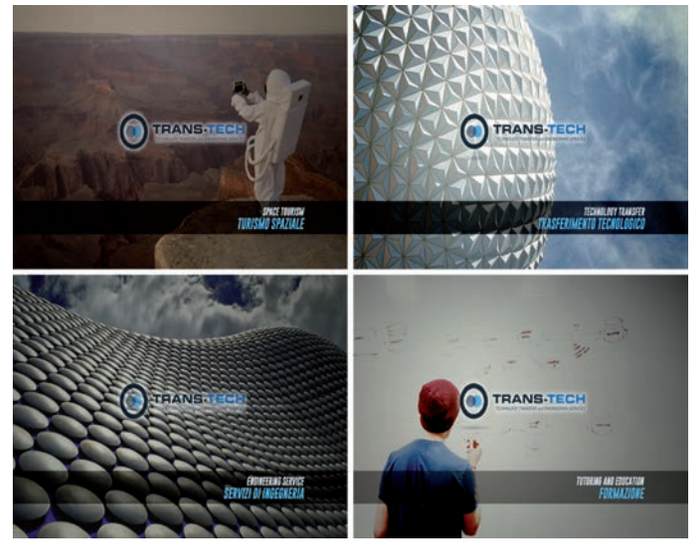
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Trans Tech srl provides services and solutions such as:

- Counseling for Technology Transfer
- Support to the Business Development
- Re-engineering of products and processes
- Management of R&D projects
- Drafting of offers, quotes, proposals for funding,

Internationalization & Patents

- Scouting of High-Tech technologies and partners
- Cross-product exploitation
- Training & Education



We provide consultancies and engineering services both for technical and management issues in the modality Work Packages and/or Time & Material.

Our services are provided to the customer according to their actual technical needs and their economic capabilities, even by adopting a win-win strategy when necessary.

The targeted industrial sectors are :

Space, Aeronautics, Defence, Railways, Automotive, Energy.

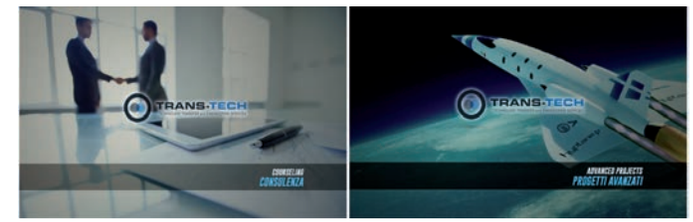
Furthermore, Trans-Tech is the conceiver, team coordinator and designer of several innovative projects, such as:

The HYPLANE is a "triple-use" jet for fast business travel, space tourism and defense. It is a new concept of hypersonic transportation system able to offer access to stratospheric and space flights as safe, convenient and commonplace as today's commercial air transportation.

The Hyplane integrates state-of-the-art aeronautics and space technologies.

The AIREL project aims at replacing the today's concept of "urban transport", able to lift off the road surface vertically and then travel horizontally.

The FLEETSMART system according to a logic of Navigation Optimization intending to provide a tool for the owner, allowing him to remotely manage the navigation of each unit of its fleet, with the ultimate objective of reduce costs of consumption fuel, reduce costs of general exercise increase safety of navigation.



Headquarter address:
Via Provinciale Pianura, 2
Zona Ind. San Martino int.23
80078 Pozzuoli (NA)

T (+39) 081 5263475
F (+39) 081 5262701
www.tsd-space.it
info@tsd-space.it

CONTACT
Francesco Monti
fmonti@tsd-space.it

SMALL AND MEDIUM ENTERPRISE

High performance and cost effective solutions for Satellites, ISS, Capsules, Rockets, USV/UAV

TSD has a relevant experience in the development of Imaging Systems, Avionics and Scientific payload and Instruments for space applications on board several platforms like Satellites, ISS, Capsule, Re-entry vehicles Sounding Rockets, Balloons and UAV.

TSD technological strategy is based on:

1. Focus on small platform and real time application
2. Look for technological excellence and for primeship in small niches
3. Technological independance
4. Build strong core competence
5. Develop proprietary solutions
6. Adopt simple and replicable architectures
7. Use of standard I/F
8. Easy of customisation

- TSD operates on the following space market segments:
- Institutional, in the frame of Agency (ESA, ASI) programs with direct contract and/or under Prime contractors in the field of Microgravity, Technological developments, Earth Observation, Exploration, Navigation
- Commercial, most in the field of Earth Observation, by providing Prime contractors with general Avionics (OBDH, GN&C, PMS, TT&C, CDMU), Digital Video systems and Optical payloads electronics
- R &D, by supporting research centers such as CIRA (Italian Center for Aerospace research), INAF, CNR insitutes and universities mostly for electronic developments in experimental/not recurrent applications
- TSD also operates in non space markets such as Aerospace and Military

Image from PRISMA TSD

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

ELECTRONICS FOR OPTICAL PAYLOADS AND VIDEO SYSTEMS

- Space Cameras
- Compression & Image Processing (visible/hyperspectral/multispectral)
- Payload Data Handling & Storage

SPACECRAFT AVIONICS

- Command and Data Handling Systems
- Processing Unit for Vision Based navigation
- On Board Computers
- Remote Terminal Units
- Power Systems

EQUIPMENT FOR SCIENTIFIC PAYLOADS & INSTRUMENTS

- Data Processing Unit
- Control and Data Management Systems
- High Accuracy Signal Conditioning and Data Acquisition
- Power Actuators Driving and Control

GROUND EQUIPMENT

- EGSE
- SCOE
- TELEMETRY/TELECOMMAND STATION

Tyvak
A Terran Orbital Corporation

CONTACT

Headquarter address:

Corso Castelfidardo, 30/A
10129 Torino

T (+39) 011 1911 6070
www.tyvak.eu
sales@tyvak.eu

SMALL AND MEDIUM ENTERPRISE

Tyvak International SRL is one of the three operating groups and the first international branch of Terran Orbital Corporation. Terran Orbital teams are leading innovators and providers of nanosatellites and microsatellite space vehicle products that target advanced state-of-the-art capabilities for government and commercial customers to support operationally and scientifically relevant missions.

Tyvak International represents the most advanced and vertical integrated offer in the market of small space vehicle products and services. The proprietary technology and know-how, based upon the continuous progress in the miniaturization of semiconductors, enable to develop, design and commercialize small satellites platforms faster and cheaper with respect respect to traditional satellites systems. This also provides considerable opportunities to exploit the space more effectively and profitably.

Founded in 2015, during its first year Tyvak has successfully started the process of technology transfer from the USA headquarters, being able to start its own R&D activities. So far, Tyvak International has executed considerable space engineering projects, from mission concepts and feasibility studies to nanosat development and integration, launch integration services and procurement of launch opportunities, for commercial and institutional customers at international level. The company has established partnerships with important stakeholders of the Aerospace Industry such as SMEs, Large System Integrators (LSI), Research centers and Universities. Tyvak International executes R&D programs with several of them focused on breakthrough technologies which will contribute in the next future to foster the company's growth.

Tyvak capabilities include mission & system design, software and hardware manufacturing, assembly, integration & verification, consulting services, launch integration & insurance services, operations support. The company's growth strategy will imply hiring new experienced staff and the acquisition of new facilities with up-to-date manufacturing and testing facilities. Seeking for advanced technology suppliers, in order to cover the whole range of products and services, Tyvak will maintain control of integration processes and will expand as needed in response to advanced space mission needs in the European framework.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

PRODUCTS The Endeavour product line is Tyvak' solution to the needs of high-performance nano- and micro-satellite missions. Tyvak designed its Endeavor platforms to provide cutting-edge capabilities with inherent design flexibility to accommodate missions requiring S/Cs from 5 to 75Kg. Endeavor platform offers: High Power, electrical PMAD, custom and high-power solar array design; Advanced Thermal management; Precision attitude knowledge and control (next generation Star Tracker and reaction wheel assembly); Advanced fault handling and autonomous FDIR; Radiation-tolerant avionics; High communication data rates; Miniature Deployable Mechanisms and Structures (high-gain X-band, S-band and UHF antennas); Configurable multi-mission components and bus; Custom mission operations design; Flawless integration with existing ground networks.

CONSULTING SERVICES Tyvak critical role in nanosats development-and-launch activities affords the ability to provide its customers with a robust portfolio of consulting services. Mission Development and Analysis: mission design, compatibility and feasibility analysis, system engineering support and industry/application market research; Spacecraft Analysis and Development at system and subsystem level, requirements development and analysis, system engineering support; Integration and Test Support including integration process and procedure development and analysis, test plan development and test services. Ground Operations plan development, Ground station support, frequency management.

LAUNCH INTEGRATION Tyvak understands the unique challenges to get a customer satellite integrated with the right launch vehicle and mission to ensure success. To get the objective Tyvak provides its customer with System Engineering Support, including integration of complex s/c subsystems, vehicle ICD, safety and Mission Assurance; Assembly and Integration: custom deployer design, fabrication and flight certification, s/c-to-deployer integration, launch vehicle integration; System Testing of s/c system performance (environmental, shock, vibration, thermal, thermal vacuum) by aerospace test standards tailoring; Launch coordination and operations including selection of international launch opportunities, regulatory processes management and satellite on-orbit operations; Launch & Satellite Insurance characterized by competitive rates and favorable payment terms, simple process and contract, financial risks reduction analysis, to cover the full cost of launch/satellite in case of unexpected launch failure.

APPLICATIONS Tyvak small satellites provide an advantage over larger, more traditional and expensive satellites due to built-in redundancy, lower cost and the ability to solve a myriad of challenges. Tyvak leadership team expertise supports Commercial, Government and Academic missions ranging from Technology Demonstration in LEO to Weather Data and Climate monitoring, Disaster Management, Advanced Telecommunication, Machine-To-Machine applications, Earth Observation and Maritime Security.

LARGE ENTERPRISES

Photo Credits: NASA Astronaut Scott Kelly

CONTACT

Headquarter address:

Corso Marche, 79
10146 Torino

T (+39) 011 7430 301
www.altecspace.it
communications@altecspace.it

LARGE ENTERPRISE

ALTEC (Aerospace Logistics Technology Engineering Company), a public-private company owned by Thales Alenia Space Italy (63,75%) and the Italian Space Agency (36,25%), is the Italian center of excellence for the provision of engineering and logistics services to support operations and utilization of the International Space Station and the development and implementation of planetary exploration missions.

ALTEC is based in Turin and has liaison offices at NASA and ESA. ALTEC services include: engineering and logistics support, astronauts training, support to in orbit experiments, processing of scientific data, development and management of the ground segment of space programs and the promotion of space culture. ALTEC collaborates on large international projects defined in the context of the programs of the Italian and European Space Agencies.

Participation in the programs developed for the International Space Station is the core business of the company and indicates the strong commitment to promote the development of technological innovation and scientific knowledge. ALTEC, working closely with NASA centers in the exchange of sensitive data, as part of the bilateral agreement ASI-NASA, takes the value of a prestigious international showcase of Italian industrial excellence. ESA'S designation of ALTEC as the Control Center for the "EXOMARS Rover" acknowledges the company's operational capabilities in the context of European research and innovation.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

ALTEC provides Engineering Services to support the exploitation of the International Space Station both at system and payload level, being able to operate in the frame of the NASA and ESA ISS networks of centers and operational teams.

ALTEC performs the complex ensemble of required engineering services thanks to the availability of the dedicated PMM (Pressurized Multi-purpose Module) Mission Support Centre, part of the NASA ISS related Ground Segment to which is connected by the ASINet infrastructure, and the Columbus Engineering Support Center, part of the ESA ISS related Ground Segment through the ESA IGS network.

The main provided services are:

- Engineering Support Services: ALTEC supports the activities of the Columbus Control Centre providing to its team a Flight Director, two station managers for the Columbus System and two other managers for DMS (Data Management System) for the on-board computer management
- Training Services: ALTEC provides training to ISS assigned crew members, ESA astronauts, other International Partners astronauts and cosmonauts, focusing on Columbus System and ESA Payloads operations. These training tasks are carried out by ALTEC instructors and are mainly performed at EAC, where the instructor team is located.

Engineering Support Services to the ISS

Considering its importance, special mention should be made of the Integrated Logistics Services for which ALTEC covers the role of "International Space Station European Logistics Center". In order to act on behalf of ESA, ALTEC is certified as Known Consignor (KC) and Authorized Economic Operator (AEO). The dedicated tasks are:

- Centralized spare warehouse
  ALTEC provides the following area and infrastructure:
- 150 cubic meters equipped with shelves and individually lockable cabinets for storage of flight and ground hardware
- Additional 150 square meters with increased ceiling height for larger items to be stocked inside their transportation boxes
- Area of Class 100.000 cleanliness condition to support any activity requiring flight h/w to be temporarily and directly exposed to the ambient environment
- Ground inventory management
- The Logistics Information System (L.I.S.) operations: this ALTEC proprietary tool enables the management of the various European warehouses in terms of control of the items quantity, locations and status
- Logistics engineering support

Headquarter address:

Corso Marche, 79
10146 Torino

T (+39) 011 7430 301
www.altecspace.it
communications@altecspace.it

- Ground logistics planning
- Launch package logistics
- Packaging Handling Storage & Transportation (PHS&T)
- Ground h/w maintenance management
- On-orbit inventory monitoring: to maintain under control the current inventory on board the Columbus laboratory. It implies to follow all the items transition from one location to another in order to allow the crew to reach a required item promptly and to plan any refurbishment activity
- Launch package preparation & cargo review execution: including the physical integration of the items into the delivery bags, ready to be launched to International Space Station

ALTEC is responsible for the design, development and operations of the ESA EXOMARS Rover Operation Control Center (ROCC). The Exomars-ROCC includes also the Science Operation Center (SOC) and the Mars Terrain Simulator (MTS).

The Mars Terrain Simulators facility supports engineering and AIV/AIT activities in performing the following tests and verifications: rover module deployment and egress from landing platforms, mobility confidence end to end test, drilling verification, sample collection and distribution to instruments payload analytical instrument operations and simulation of off-line nominal and non-nominal rover surface operations providing an easily reconfigurable Mars-like environment.

The Rover Operations are organized in line with up-to-date robotic autonomy concepts on the basis of the ASDP (ALTEC Space Data Processing) proprietary tool, a multi-purpose reusable core to set up new automatic processing pipelines and software infrastructures.

ALTEC assets are ready to support the development of highly autonomous space robotics missions in which the robot system will execute actions to attain the goal, considering Time/ Space/Resources constraints. The developed tool is a first step toward an operative system enabling computing resource management to fulfil in a dynamic way the high level mission/goals, the fault management with reconfiguration capability.

Planetary Mission Exploration

ALTEC is responsible for the design and operations of the ESA Gaia Data Processing Center (DPCT), located in Turin, part of the European ground segment dedicated to the processing of the Gaia data.

The DPCT main activity is the Astrometric Verification of the scientific data performed using dedicated software products developed under ALTEC responsibility:

- AIM (Astrometric Instrument Model): to process the Astro data telemetry in order to monitor and analyze the Astro instrument response over the mission lifetime;
- BAM/AVU (Basic Angle Monitoring) software system: to process the BAM device telemetry in order to monitor and analyze the BA behavior over time
- GSR (Global Sphere Reconstruction): the mathematical and numerical framework to verify the global astrometric results produced by AGIS.

The scientific data management and processing is performed according to up-to-date "Big Data" approaches which constitute the basis of ALTEC participation to the National Space Surveillance & Tracking initiative in the frame of the European Union dedicated program.

Sub-Orbital and Nano-Satellite Mission Control Center

In the frame of the European IXV (Intermediate eXperimental Vehicle) Mission, ALTEC has designed, developed and operated the IXV Ground Segment whose core element is the Mission Control Center located at ALTEC premises.

This asset enables the performance of the broad and complex ensemble of tasks and operations required for the controlling and commanding of Sub-orbital Vehicles. It provides infrastructures, systems, tools and applications to be used during the mission for Telemetry (TM) monitoring, storage, processing, displaying as well as detailed trajectory and splash-down/landing location support phase, offline management of Ground Stations operations, meteorological forecast data of the splash-down/landing area. During pre-launch phases the Operations Director resident at ALTEC MCC can provide support to the Mission Director resident at Launch Control Center (LCC) by reporting him on the status of subsystems, on the status of the overall Ground Segment and also on the meteorological conditions at the splash-down/landing site. During the mission execution and any spacecraft (S/C) emergency phases, the responsibility for conducting sub-orbital flight, ground segment and recovery operations lies with the Operations Director.

The available asset is ready to support operations control and data management of nano-satellite systems, a dedicated research and development effort is actually on-going to implement innovative approaches based on advanced mission planning systems.

Scientific Data Management and Processing

CONTACT

Headquarter address:

Corso Marche, 79
10146 Torino

T (+39) 011 7430 301
www.altecspace.it
communications@altecspace.it

Space Commercialization

ALTEC complete knowledge of the International Space Station processing and regulations enables the provision of specialized services to non-space customer willing to exploit the unique capabilities of the largest human out-posts in the Space.

ALTEC provides engineering and technical service support performing on behalf of customer the required ISS testing, safety, paperwork, manifesting onto the launch vehicle, astronaut services, data retrieval. ALTEC is also able to provide legal support to customer interested in promoting terrestrial products through significant utilization on-board the ISS by the astronauts.

Research & Development according to European and National Strategic guidelines

ALTEC is partner of reference within several consortiums, participated by industries and research centers, dedicated to technical research in multidisciplinary space relevant fields with possible applications also to the life on earth.

Presently the main covered topics are:

- Big Data: Implementing big data systems to manage, process, analyze, visualize and preserve space data characterized by huge volume, variety and veracity. In particular, ALTEC is interested in the definition of data exploitation platforms for users' communities using space data in their business. To complement platforms, ALTEC has several data analytics systems dedicated to extract new values from space data and be able to design best systems on the basis a complete understanding of events in past applicable missions. TECSEL2 (Temporal Characterization of the remote Sensors response to radiation damage in L2) is an example of data mining tool dedicated to characterize the response of detectors subject to strong radiation damage in L2 analyzing the Gaia focal plane data together with auxiliary and solar events data.
- Advances Space Data Processing: ASDP (ALTEC SPACE DATA PROCESSING) is a distributed data processing framework dedicated to the on-ground handling and transformation of any aircraft and spacecraft data. Its modular architecture gives it the flexibility to be easily adapted to several other domains where commonalities with ground centers could be found, even outside of aerospace domains. ASDP enables both automatic and batch processing of large dataset and the automatization of complex pipelines. It is implemented using several state-of-art IT technologies
- allowing the system to be maintainable, robust, scalable and easily extendible. On ground segment based data exploitation platform the ASDP is a brick needed to provide platform services as it is designed as a useful tool to setup PaaS cloud computing platform.
- Smart Center: implementing a "Station of Supervision and Coordination" designed as a multi-mission, multi-sensors system able to operate in a broad range of scenarios and with a multitude of data input coming from a variety of platforms (satellite, airborne, balloons, rpa, in-situ). The data exchange and notification architecture among the different systems and modules allows to support different security levels enabling "Support to Decision Systems" also in the frame of critical operations such as oil spill detection and recovery (project "Early Warning Integrated System").
- Bio- and Space-medicine: aimed to understand how to deal with the physiological changes and conditions that can occur when humans are exposed to extreme environments. ALTEC interest in the gravitational physiology and the relevant technology and methodologies to support astronauts' activities and ergonomics has evident application and offer synergies with on-earth researches dedicated to other human areas such as aviation, extreme and Paralympic sports, rehabilitation.
- Virtual and Augmented Reality: participating to important European R&D projects (in the frame of H2020 program) addressed to study and develop new applications such as augment training in situ with live expert guidance in knowledge-intensive environments where effective decision making has high impact on processes.

CONTACT

Headquarter address:

Località Cimacolle, 464
06056 Massa Martana (PG)

T (+39) 075 89551
www.att-testing.com
info@acstestchambers.it

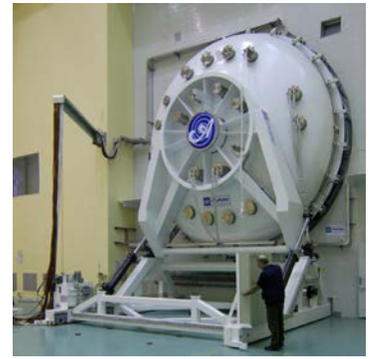
LARGE ENTERPRISE

Angelantoni Test Technologies is a company with a turnover of around 42 million euro and 200 employees. The company is part of the Angelantoni Industrie Group, operating globally since 1932, with a turnover of around 80 million euro and 400 employees, and active also in the fields of Life Sciences and Renewable Energy. Angelantoni Test Technologies is now present with its own branch companies in Germany, France, China and India, in addition to being well represented worldwide in over 50 countries.

Since 1952, Angelantoni has been producing and marketing worldwide, under the ACS brand, environmental test chambers for all types of tests on materials, components, and finished products. The ACS brand has always been associated with experience and flexibility in customized solutions, undisputed expertise and technological innovations.

The ACS brand has acquired a strong leadership position in the Aerospace sector, the most challenging environment for simulation: after the first Thermal Vacuum Chamber (TVC) in 1988, Angelantoni became one of the few leading international manufacturers at international level, and a supplier for the most important Space Research Centers testing satellites, subsystems, and components.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES



THERMAL VACUUM CHAMBERS (TVC)

Angelantoni Test Technologies has developed a wide range of Thermal Vacuum Chambers thanks to its wide experience in several techniques applied in the environmental simulation and testing.

TVC are able to artificially create the operating conditions (temperature and high vacuum) of whole satellites or equipment used on board of satellites.

- Wide range of TVC sizes, with diameters ranging from under 1m up to 10m
- High quality and vast experience in vacuum pumping systems
- High quality of black shroud paint with a solution for low outgassing at maximum temperatures (>+150°C) according to ESA standard ECSS-Q-ST-70-02C
- Special shroud design to withstand the highest heat dissipations (>5 kW/m2)
- Special attention to minimizing consumption through hardware solutions and software management of the plant
- Integrated control and monitoring system totally developed by ACS
- Special attention to and experience in redundancy aspects
- Full capability for supplying turnkey systems

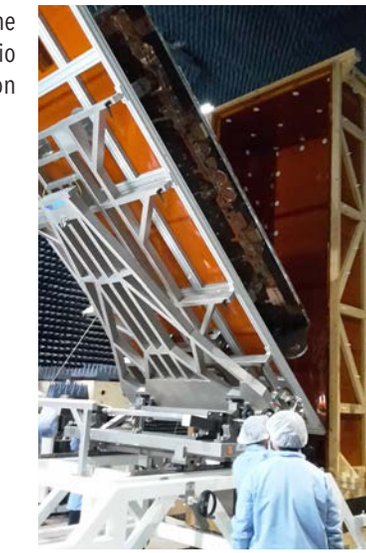
MODULAR AND CUSTOMIZED WALK-IN CHAMBERS

ACS prefabricated chambers can be supplied for temperature only or temperature/ humidity tests, and are suitable for tests on electronic modules or complete assemblies (solar panels, satellites, antennas, etc…). Where high power dissipation by the specimen is expected, i.e.testing of complete assemblies, the temperature humidity chamber incorporates the indirect system for climatic thermoregulation.

Entrance doors for technicians or materials can be supplied for any size chamber, either side hung and automatic sliding type.

TRANSPARENT THERMAL CHAMBERS

Special chambers to combine thermal tests and Radio Frequency measurements on active antennas.



ADVANCED VISION INTO ORBIT

LARGE ENTERPRISE

Avio is a leading company in space propulsion based in Colleferro, Rome, Italy. The expertise and know-how acquired in over 100 years in explosives and more than 50 in space activities allow Avio to compete with the top players in the Space Launch Systems definition and integration as well as in the segment of solid, liquid and cryogenic space propulsion .

Today, Avio plays a strategic role in the global space industry through VEGA, a light launcher of satellites in the range 1500kg - 2,000kg in LEO produced by ELV (70% Avio, 30% ASI) and Ariane 5, the biggest European launcher.

Avio has operations companies at the European Space Centre in French Guiana since 1984: Regulus (60 % Avio, 40% ASL) for solid propellant manufacturing for Ariane and Vega's first-stage engines, Europropulsion (50 % Avio, 50% ASL), in charge of booster assembly and ELV for integration of the entire Vega launcher.

CONTACT

Headquarter address:

Via Ariana Km 5,2
00034 Colleferro (RM)

www.avio.com/it
comunicazione@avio.com

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

SOLID ROCKET PROPULSION

Design, manufacturing, assembly and testing of the following Solid Rocket Motors (SRM) and their different sub-assembly (Inert Motor Case, Thermal Protections, Loaded Motor Case, Nozzle):

- **SRM P230** (In cooperation with EUP)
  Solid Rocket Motors of about 240 tons of propellant and a Maximum Thrust of about 7000 kN, used as first stage booster of Ariane 5 launcher.

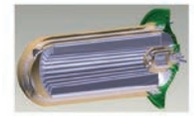
- **P80** (In cooperation with EUP)
  Solid Rocket Motor of about 88 tons of propellant and a Maximum Thrust of about 3000 kN, used as first stage of Vega launcher.

- **Z23**
  Solid Rocket Motor of about 24 tons of propellant and a Maximum Thrust of about 1100 kN, used as second stage of Vega launcher.

- **Z9**
  Solid Rocket Motor of about 10,5 tons of propellant and a Maximum Thrust of about 320 kN, used as third stage of Vega launcher.

- **P120C** (In cooperation with EUP)
  Solid Rocket Motor of about 140 tons of propellant and a Maximum Thrust of about4300 kN, to be used as first stage of Vega C launcher and booster of Ariane 6 launcher.

- **Z40**
  Solid Rocket Motor of about 36 tons of propellant and a Maximum Thrust of about 1300 kN, to be used as second stage of Vega C launcher.



- **Ariane 5 booster igniter**
  It is an Ariane 5 booster component, to be used to ignite the SRM P230 booster

- **Vega retro rocket**
  Solid Rocket Motor, derived from Ariane 4
  Separation motors, used on Vega Launcher for separation between first empty stage (P80) and second stage (Z23)

LIQUID ROCKET PROPULSION

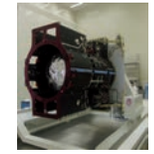
Design, manufacturing, integration and testing of Liquid Rocket Propulsive Systems and their different sub-assembly:

- AVUM Liquid Propulsion System
  Vega launcher fourth stage main propulsion system; NTO/UDMH bipropellant pressure regulated system.
- Vulcain 1 and Vulcain 2 TPO
  Liquid Oxygen Turbo Pumps for Vulcain 1 and Vulcain 2 engines used for the first core stage of Ariane 5 launcher. Products Services Applications Technologies

- Vinci TPO
  Liquid Oxygen Turbo Pump for Ariane 6 upper cryogenic stage.
- MIRA Demonstrator Liquid Rocket Engine
  LM10-MIRA expander cycle engine was aimed for the concept design of the 10 tons/ 100 kN-class thrust LM10-MIRA flight engine propelled by liquid oxygen and liquid natural gas.
  Avio designed and manufactured the injection head and the methane turbo-pump.

- Satellites chemical liquid propulsion systems Example: MON3/MMH bipropellant regulated chemical propulsion systems of the geostationary satellites Small GEO and DRS-C.

THERMAL PROTECTION



- ablative TP protection for atmosphere re-entry of IXV Space Vehicle
- ablative TP protection for atmosphere flight of Vega Launch Vehicle

CESI 1956 60 years 2016

Shaping a Better Energy Future

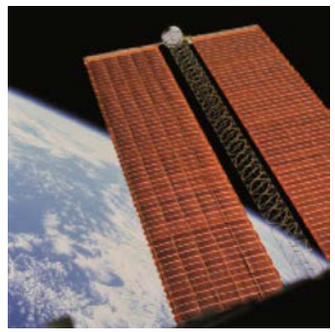
CONTACT

Headquarter address:

Via Rubattino, 54 I
20134 Milano

T (+39) 02 21251
www.cesi.it
solar@cesi.it
info@cesi.it

LARGE ENTERPRISE



CESI is a global leader in technical, consulting and engineering services to the Energy sector, with over 60 years of experience and operating in more than 40 countries with a total network of 600 employees and about 400 stable professionals worldwide. CESI is a fully independent joint-stock company with facilities in: Italy (Milan - Headquarter), Germany (Berlin (IPH) and Mannheim (FGH), United Arab Emirates (Dubai and Abu Dhabi), Brazil (Rio de Janeiro), United States (Washington DC), and with commercial representatives in almost all countries worldwide. Established in 1956 as the Italian centre of excellence for research and development in the Energy sector, CESI is today an independent and internationally recognized player operating in several areas including: Testing, Certification and Quality Assurance, Transmission and Grid Interconnection, Distribution and Smart Grids, Energy permitting, Structural and Environmental Engineering, Renewables and Solar. Another important area of business for CESI is the also development and manufacturing of advanced multi junction photovoltaic solar cells for space applications.

CESI operates through three Divisions: 1) Testing and Certification (which incorporates the two German subsidiaries IPH and FGH, and also includes the Solar Cells Facility; 2) Consulting, Solutions and Services; 3) Engineering & Environment (ISMES).

CESI has been involved since 30 years in the manufacturing of high efficiency space solar cells based on III-V compounds for civil applications. We have strongly invested for decades in developing our own proprietary technology, while being involved in the main space research and development programs at EU and international level and going through all the roadmap steps from single junction to multi junctions.

The research activities of CESI have been performed through time thanks to internal investments and to the financial support of the Italian National Space Agency (ASI) and of the European Space Agency (ESA). In the frame of the ESA European space programs CESI is well established for its expertise in the development of advanced devices and as producer of space proved solar cells.

CESI has cooperated in many significant projects for interplanetary missions (on planets such as Mercury, Mars and Jupiter). The heritage of CESI counts more than 100,000 manufactured solar cells, powering more than 60 civil satellites for over 25 different countries worldwide. Our triple junction space cells are state of the art with 30% typical efficiency and are qualified for both LEO and GEO satellites according to ESA standards ECSS E ST20-08C.

In our continuous improvement effort we are already investing with effective results into four junction cells towards space efficiencies beyond 35%. CESI owns its proprietary technology which was developed covering all the steps of the multijunction solar cell manufacturing process. Our manufacturing facilities located in Milan can provide either Bare solar cells and Solar Cell Assemblies to serve our civil space markets with the best cost versus quality mix. In 2015, CESI has doubled its own industrial production capacity of III-V solar cells to above 40,000 cells/year and increased its process automation, plus has established external partnerships for extra volumes production. CESI is particularly proud of its distinctive positioning based on our attention and capability to shape and fine tune our solar cells for the specific needs and applications of our customers.

CESI is certified according to the following standards: ISO 9001:2008, UNI EN ISO 14001:2004, BS OHSAS 18001:2007. CESI had the following accreditations confirmed over the course of 2014: UNI EN ISO / IEC 17025:2005, UNI CEI EN 45011:1999 and UNI CEI EN ISO/ IEC 17020:2005. CESI adopted the Code of Ethics and the Model of Organization, Management and Control (ex-Italian Legislative Decree 231/2001) in 2002.

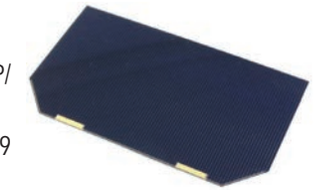
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

High efficiency multi junction space solar cells based on III-V compounds for civil applications

Triple-Junction Solar Cell for Space Application (CTJ30)

The CESI Standard space Triple Junction solar cell named CTJ30 is qualified for LEO and GEO missions have to date powered more than 60 satellites of clients from over 25 countries.

Features & Characteristics

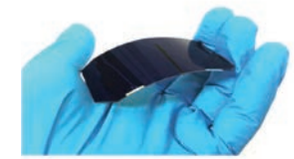


- 29.5% efficiency at AM0
- Triple Junction Solar Cells InGaP/ GaAs/Ge for Space Applications
- Very low solar cell mass (81-89 mg/cm2)
- Thickness 150 µm
- Fully qualified under ESA Standard ECSS E ST20-08C for LEO and GEO orbit
- High Radiation Resistance

Thin Triple-Junction Solar Cell for Space Applications (CTJ30-thin)

The Thin triple junction solar cell named CTJ30-Thin (80-60um thin bendable) maintains the high quality features and the electrical performances of CTJ30, while reducing of about one half the whole cell thickness. This new class of solar cells will allow the manufacturing of a new generation of lightweight solar generators.

Features & Characteristics



- 29% efficiency at AM0
- High Radiation Resistance
- Thickness 150 µm
- 50 mg/cm2 mass
- >0.7 W/gr (power-to-mass ratio)
- Qualification according to ESA Standard ECSS E ST20-08C for LEO and GEO orbit in progress

CESI 1956 60 years 2016

Shaping a Better Energy Future

CONTACT

Headquarter address:

Via Rubattino, 54 I
20134 Milano

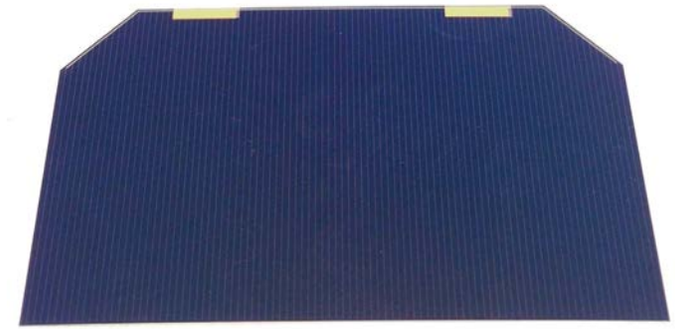
T (+39) 02 21251
www.cesi.it
solar@cesi.it
info@cesi.it

Low Cost Triple-Junction Solar Cell for Space Applications (CTJ-LC)

The Low Cost solar cell supports the achievement of costs/prices 30% lower than current commercial market levels, being especially suitable for the new mini/micro satellite macro constellation projects where the costs are key.

Features & Characteristics

- 28% efficiency at AM0
- High radiation resistance
- Standard assembly approach for solar cell interconnection and coverglassing
- Applicability of low cost concept also to thin and/or large area cells
- Higher volume production capacity
- Qualification according to ESA Standard ECSS E ST20-08C for LEO and GEO orbit, pending



Large Area Triple-Junction Solar Cell for Space Applications (CTJ-LA)

The Large Area solar cells named CTJ-LA (c.a. 70cm^2) maintains the high quality features and the electrical performances of our standard cell with typical AM0 efficiency 30%. This new class of solar cells is mainly devoted to the market of Telecom satellites and in general to the high power demanding missions powered by large area solar arrays that are requested to be increasingly lighter and cheaper and more efficient, while maintaining their high reliability.

Features & Characteristics

- 30% efficiency at AM0
- Lower manufacturing costs per cm^2 at cell level
- Lower assembly costs at solar generator level
- Space saving at solar generator level

CONTACT

Headquarter address:

Via Gallarate, 150
20151 Milano

T (+39) 02 380 48 1
www.cgspace.it
cgs@cgspace.it

LARGE ENTERPRISE

CGS S.p.A. Compagnia Generale per lo Spazio is a leading company in Italy in the field of space systems design, development and integration.

The company is a subsidiary of OHB SE, a European Space and Technology group that currently employs over 2,000 people in two Business Units: "Space Systems" and "Aerospace & Industrial Products".

CGS core business is the design, development and integration of satellites, payloads for scientific and application missions and space station facilities.

The company, founded in 1981, has headquarters in Milan.

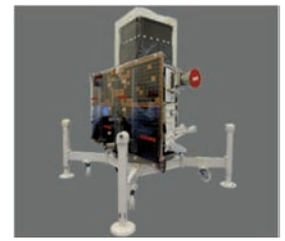
Thanks to a consolidated technical expertise, advanced technologies and highly qualified human resources, CGS acts as prime contractor at system level and as supplier of subsystems, instruments and equipment for the space segment.

Main Specializations: Satellites: turn-key systems for scientific and application missions; Scientific payloads: for experiments in microgravity conditions, deep space and planetary exploration; Commercial applications of space technologies: integrated security, telemedicine, fleet management, traffic monitoring, civil protection, surveillance; Planetary Exploration: exploration mission and system studies to precision landing systems, surface mobility vehicles and in-situ science.

Other capabilities: Mission analysis, AIT activities ACS, OBDH, TM/TC, power subsystems for satellites; Instrumentation and processors for scientific and application payloads, with application software; Instruments for microgravity experiments; Software for space systems and applications; On-board automation; Attitude control and modelling; Thermal and structural analysis, design, thermal control units; Power supply; Guidance navigation & control systems; Time & frequency distribution systems; Ground Stations; Ground support equipment with application software, ranging from check-out to test equipment; SSA ground telescopes development; On-board receiver for satellite AIS.

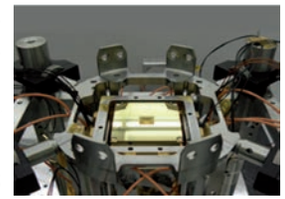
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Satellites



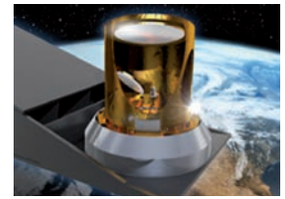
CGS has a turn-key system competencies for scientific and application missions. The company is prime contractor for various ASI missions. Its flagship programme is PRISMA, an ASI funded hyperspectral Earth observation satellite. It is also part of the Italian industrial team for the procurement of OPTSAT for the Italian Ministry of Defence. Future plans include the development of a very innovative satellite platform called VENUS based on novel electric propulsion technology and highly performing constellation of nanosatellites.

Scientific instruments



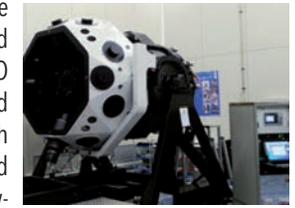
CGS is at the heart of the most high-performance technology for space-based scientific programs. It is involved in the development of payloads for fundamental physics, solar science and planetary exploration. CGS instruments are on board of basically all recent scientific missions of ASI and ESA.

Earth Observations Instruments



CGS develops electro-optical instruments for Low Earth Orbit (LEO) Satellites. The company has the capability to develop high resolution cameras for imaging. In addition, CGS is in charge of the design and development of the MicroWave Imager (MWI) for the MetOp Second Generation satellites for ESA and EUMETSAT. The instrument monitors high precipitation events worldwide.

Space Surveillance Awareness (SST and NEO Optical Sensor)

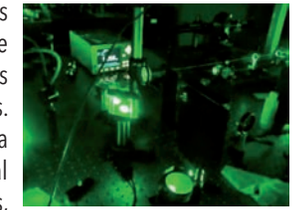


CGS is developing a highly innovative ground telescope for detecting and cataloguing space debris from LEO to GEO, as well as for observing and predicting the orbit of Near Earth Objects (NEO). The telescope is based on a proprietary technology, names Fly-Eye, which grants high accuracy in an extremely wide field of view (45 square degrees) and high astronomic resolution (1.5 arcsec).

International Space Station (ISS) and Planetary Exploration

Since many years, CGS has been involved in the design and development of elements for the ISS, including standard equipment for internal facilities and complete payloads installed externally. Among others, CGS has significantly contributed to the development of the largest space instrument for fundamental physics research (AMS-02). Other major contributions to the ISS and Columbus laboratories include the European Technology Exposure Facility (EuTEF).

Research



To consolidate and strengthen its competitive position in the space market, CGS invests dedicated efforts on research & development programs. Collaboration long-established with a network of national and international research institutes and universities, enable the spin-off of innovation, new ideas and advanced technologies for instruments and satellites. CGS main research areas are focused on electro-optical payloads sensors.

e-geos

AN ASI / TELESPAZIO COMPANY

LARGE ENTERPRISE

e-GEOS, an ASI (20%) / Telespazio (80%) company, is a leading international player in the Earth Observation and Geo-Spatial Information business.

e-GEOS is the global distributor for the COSMO-SkyMed data, the largest and most advanced Radar Satellite constellation available today and offers a unique portfolio of application services, specially thanks to the superior monitoring capabilities of COSMO-SkyMed constellation. It has acquired a leading position within European Copernicus Program.

Covering the whole value chain, from data acquisition to the generation of analytics reports, e-GEOS is working for big data analytics, based on the integration of different sources. This approach is one of the key assets of the new services and products offered by the company.

e-GEOS, provides Geo-information services such as monitoring for environmental protection, rush mapping in support to natural and man-made disaster, specialized platforms for defence and intelligence (braINT), Near Real time oil spill and vessel detection services for maritime surveillance platforms (SEonSE).e-GEOS can offer interferometric measurements for, ground subsidence and landslides analysis, thematic mapping for city management, agronomy/ precision farming, cultural heritage, Inherent Defect Insurance (IDI) and forestry.

e-GEOS runs a 24h Centre for any kind of mapping needs: from the emergency mapping, in which European Copernicus Program (EMS) represents one of the main success cases to the IMINT reports for defence and intelligence in which Copernicus SEA is the latest example.

In support to its operational applications and activities, the Matera Space Centre represents a unique and advanced premise for acquisition, archiving and processing multi-mission satellite data, including COSMO-SkyMed, ESA Sentinels, Radarsat-2 and other missions.

Commercial Ground Station Network is amplifying the COSMO-SkyMed acquisition capabilities at Matera Space Centre. It has been realized and installed by e-GEOS around the world, to grant and provide Near Real Time access and services over specific areas.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

e-GEOS is a multimission hub for satellite data both radar and optical. Thanks to its Multi-Mission Center in Matera, it is able to provide data from some of the most important and innovative satellites in the Earth Observation scenario, fulfilling also Near Real Time (NRT) needs and emergency activities.

The COSMO-SkyMed is a constellation of four radar satellites for Earth Observation, founded by the Italian Space Agency and the Italian Ministry of Defense.
COSMO-SkyMed is at the forefront of technology and uses high-resolution radar sensors to observe the Earth day and night, regardless of weather conditions. The constellation is fully operational since 2008.

Each of the four satellites is equipped with a SAR (Synthetic Aperture Radar) instrument and is capable of operating in all visibility conditions at high resolution and in real time. The overall objective is global Earth observation and relevant data exploitation for the needs of the military forces as well as for the civil (institutional, commercial) community.
Its purpose is to monitor the Earth for the sake of emergency prevention (management of environmental risks), strategy (defense and security), scientific and commercial purposes. The constellation provides data on a global scale to support a variety of applications which includes risk management, environmental protection, natural resources exploration, land management, defense and security.

e-GEOS (ASI/Telespazio Company) is the world-wide exclusive distributor of COSMO-SkyMed and operates, on behalf of ASI, the IC-UGS (Italian Civilian User Ground Segment) at the Matera Space Center. The new mission that will support the continuity of the products and services offered by the COSMO-SkyMed constellation is the already founded Cosmo Second Generation. It consists of a new constellation of two satellites aiming at improving the quality of the imaging service. This will provide the end users with enhanced capabilities in terms of higher number and quality of images (larger swath, finer spatial and radiometric resolution) with respect to the current constellation.

Geoinformation Centre
To make the customers familiar with the use of SAR imagery and, at the same time, to provide an operational tool for running geo-spatial intelligence tasks, the Geo-Information centre offers:

- The immediate access to COSMO-SkyMed constellation data (User Terminal)
- The installation of a Geo-Information Centre for the exploitation of multimission satellite imagery (both optical and SAR)
- A knowledge transfer program, including training and on-site assistance to operations

The architecture of the Geo-Information Centre encompasses the full process of EO data management and dissemination of value added and geo-information products. A workflow manager simplifies the operations by supporting the sequence of value addition steps. The Centre is modular in terms of application domains; both civilian and defence application can be managed with the necessary security levels.

Fileds of Applications

OIL AND GAS

To support Enterprises and Governments for on/off shore activities; including safety, environmental protection and resource management.

CONTACT

Headquarters address:

Via Tiburtina, 965
00156 Roma

T (+39) 06 40791
www.e-geos.it
communication@e-geos.it

e-geos

AN ASI / TELESPAZIO COMPANY

CONTACT

Headquarters address:

Via Tiburtina, 965 - 00156
Roma

T (+39) 06 40791
www.e-geos.it/
communication@e-geos.it

MARITIME SURVEILLANCE

To support Defense and Marine forces in maritime situational awareness services, for coast guards, international environmental protection organizations and defense.

RISK AND ASSET MANAGEMENT

To support Disaster management operators through immediate reports and maps based on multi-temporal data series integrated with Georeferred crowdsourcing data for a rapid situational awareness and operations.

DEFENSE AND INTELLIGENCE

To support defense and intelligence operators to exploit satellite data for: Target analysis and change monitoring, searching & planning activities, damage assessment

AGRICULTURE AND FOOD PRODUCTION

To support Governments and farmers management for the agronomic activities and food production, as well as the entire crop lifecycle.

LAND MANAGEMENT AND INFRASTRUCTURES

To support planning, management and maintenance of infrastructures for Power Supply Utilities, Assets Monitoring, Transportation and Infrastructures, Mining, Oil & Gas, and natural resources.

FORESTRY AND CLIMATE CHANGE

To support the observation and measurement of the causes and effects of climate change on natural and semi natural resources, helping to assess the corrective actions and mitigation in the context of the biosphere.

An Avio Group and ASI Company

CONTACT

Headquarter address:

Via degli Esplosivi 1
00034 Colleferro (RM)

www.elv.it/en
comunicazione@avio.com

LARGE ENTERPRISE

ELV (European Launch Vehicle) is a company established by Avio and ASI

(Italian Space Agency) in December 2000. It develops, manufactures and delivers the European launcher called Vega and its evolutions with all associated technologies. The company is responsible for every aspect of system development, from the drafting of the specifications, through production, to its integration in the launch pad.

ELV's primary tasks include managing and planning launcher design, development, qualification and production processes, by coordinating the activities of the subcontracts participating in the programme. Moreover, ELV coordinates and ensures the integration of the launcher in the lift-off facilities in Kourou (French Guiana) being involved in the final phase of the launch with own specialized team.

At present ELV is owned 70% by Avio S.p.A and 30% by ASI. Headquartered in Colleferro (Rome) where has an operational facility next to Avio main space operations site, one of the most dynamically innovative production centres in Europe, at the forefront of science and technology.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Vega current Launch Vehicle

Vega is a 4-stage Launch Vehicle. It is composed by:

- 1st stage: P80 SRM (88 tons)
- 2nd stage: Z23 SRM (24 tons)
- 3rd stage: Z9 SRM (10,5 tons)
- 4th stage: AVUM liquid stage (including Liquid Propulsion System, Roll Attitude Control System, Avionics and Flight Program Software)
- Upper Composite: Payload Adapter & Fairing for the satellite/payload accommodation.

ELV is responsible of :

- Launcher development, manufacture and deliver
- Subsystems procurement;
- Launch Vehicle integration and testing (avionics and hardware in the loop);
- Mission Design & Analyses
- Development, missionization and technical authority of the Flight Program Software for Vega guidance, navigation and control

Vega C Launch Vehicle (under development)

It is an upgrade of present launcher Vega configuration aimed to improve the launch system performance.

Vega C is a 4-stage Launch Vehicle. It is composed by:

- 1st stage: P120C SRM (140 tons)
- 2nd stage: Z40 SRM (36 tons)
- 3rd stage: Z9 SRM (10,5 tons)
- 4th stage: AVUM+ (including enhanced Liquid Propulsion System, Roll Attitude and Control System, upgraded Avionics and Flight Program Software)
- Upper Composite: Payload Adapter & Fairing (larger than the VEGA fairing) for the satellite/payload accommodation.

ELV responsibilities are the present one with an enlarged perimeter in the activities in Kourou Spaceport in French Guiana.

ENGINEERING

CONTACT

Headquarter address:

Via San Martino della Battaglia, 56
00185 Roma

T (+39) 06 402011
www.eng.it
info@eng.it

LARGE ENTERPRISE

Engineering is the leading national software and services company, with 8,100 employees and 40 branches in Italy and overseas (Belgium, Republic of Serbia, United States, Brazil and Argentina) with a consolidated revenue portfolio at the end of 2015 of 877,5 million Euro.

The company carries out IT innovation combining the potential of a full, integrated offer of Business Integration, infrastructural Outsourcing and Cloud services (provided by 3 Data Centers) Consulting, customized proprietary solutions for vertical markets – from Industry Space sector to Healthcare, Utilities, Finance and Public Administration - and technologically cross-market, such as geo-referencing and Open Source Business Intelligence solutions.

Special attention must then given to the Defense , Space & Security Division, which historically has decades of experience and technological, methodological and managerial expertise specific to the Defence & Homeland Security sector.

With 250 researchers located in 6 R&D laboratories the Engineering Group plays a leading role in ICT research, coordinating and participating to several national and international projects thanks to established open partnerships with other EU companies, universities and research centers.

The research areas that the company focuses in, in line with the European Research Agenda of Horizon 2020 are linked to the notion of smart cities conceived as ecosystems of digital services. Specifically, the research and innovation activities concentrate on the following research topics: Smart Health, Smart Government, Smart Enterprise, Smart Tourism, Smart Energy, Secure societies, Digital Science.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

DSI (Data Consolidation and Bulk Processing Service Initiative)

Engineering offers consolidated Infrastructure services providing data reception, processing, distribution, data quality control and archiving services to the mission operated by ESA and member states. A relevant reference is the ESA Project called DSI (Data Consolidation and Bulk Processing Service Initiative) for management of various activities concerning Earth Observation(EO) data and to provide a solution for ESA EO Data Users, focused in particular on activities systematically performed upon acquisition of data concerning:

- ESA missions (ERS, ENVISAT, Earth Explorers);
- ESA Third Party Missions (e.g., Landsat, etc.)
- Past, present and future missions (with future ESA missions limited to Earth Explorers).

During the project the following operations on missions have been carried out:

CORE SERVICES

- Data Collection and Data Consolidation
- Processing System Integration
- Reprocessing / Bulk processing / Format Conversion

SUPPORT SERVICE

- Data Repatriation / delivery
- Data Information and Configuration Management
- Project and Service Process management and other support services.

SIMONA

With "SIMONA" Engineering is providing an information platform for the completion and improvement of existing services in Maritime Situation Awareness, improving the skills that the Italian Coast Guard and the Italian Navy currently have, as well as providing added value services based on satellite assets in support of private subjects, such as merchant naval transport companies and insurance brokerage, insurance and assistance companies. The main functions of the SIMONA platform can be summarized in:

- Contributing to the generation of an enriched Common Operating Picture (eCOP) by integrating data coming from various sources of information (EO images, data on weather and oceanographic conditions, Local Pictures supplied by collaborative users) in adherence with the main reference standards (GRIB, VMS)
- Supporting maritime surveillance, S&R and safe navigation operations, by providing services that integrate the satellite assets, and such as to guarantee safety, integrity, precision and reliability characteristics.

During the SIMONA project a bidirectional narrowband satellite module has been developed, in order to take advantage of SIMONA services also with absence of a common traditional communication channel (WIFI, UMTS, etc.) This narrowband lighter module (named SatcomBox) is tailored for a more wide market of private leisure boat users and linked through SIMONA services to Insurance contracts. The SatcomBox includes a GPS function and, during normal navigation conditions, will support only offshore (SATCOM) navigation telecommunications from/to crafts. The use of the SatcomBox by the leisure boat users is also well seen by Italian Cost Guard because enabling continuity of communication from coastline to open sea, increasing the safety of the leisure navigation.

ENGINEERING

CONTACT

Headquarter address:

Via San Martino della Battaglia, 56
00185 Roma

T (+39) 06 402011
www.eng.it
info@eng.it

CLOUD

Engineering services are available through different technology stacks:

- CloudEng offering based on the "Microsoft Azure Pack" platform, these services allow you to build both Private Cloud and Hybrid Cloud thanks to the perfect combination between the IT services offered by the Engineering Data Centers and its Cloud platform based over Microsoft WAP technology.
- CLOE (Cloud Computing by Engineering) is the Engineering platform for the provision of Cloud services based on the Vmware technology platform (Vmware Vcloud director) according to various innovative modes: IaaS: virtual servers on demand with a wide range of standard catalogue and customized operating systems; PaaS: service development platforms with main stacks; SaaS, document, contact management and service collaboration applications, CRM and asset management applications, electronic mail systems.
- The management policy of the Information security for Cloud services is defined in harmony and within the compliance with legal regulations Italian and European (https://vetrina.cloudeng.it)

BIG DATA

Cloud Computing facilitates the commercial use of Big Data, especially for Space. The main benefits cloud computing provides are the systematic evaluation of big data, understanding the collected information and how it relates to each other as well as the near real-time analysis of the collected data. Moreover , the recent increase of free and open access initiatives to big data from space, such as the European Copernicus programme, extends the spectrum of users.

The Big Data Competency Center, which includes data analysts, data architects, data developers, data scientists, research scientists, is the specialized organizational unit that supports the Engineering Group's offer and coordinates its initiatives involving big data skills and technologies. The competencies include goal definition and solution design; big data architecture design and realization; specialized skills on technologies and development methods; data collection, open data management, advanced data analysis and visualization; presentation and communication skills, and business development support. These are integrated with in-depth knowledge of distributed computing, modern services architectures and cloud infrastructures. The main technologies include the whole set of Hadoop ecosystem components and commercial distributions, NoSQL data bases, stream processors and CEP, appliances, open data technologies.

DIGITAL SCIENCE SERVICES

From the experience of big data and cloud technologies in the context of eScience, Engineering promoted the exploitation of the open source data platform gCube (www.gcube-system.eu) in the context of business customers. The software enable the creation of Virtual Environments where Data Scientists can access all-they-need (in term of data sets, processors and algorithms, computing and storage facilities, till people know-how) in order to access, explore, use and eventually produce value from digital data of any nature. The system is proven in operation as part of the D4science eInfrastructure (www.d4science.eu) serving several research communities (i.e. Marine and Fishery, Archeological, Geothermic and Geology, Social Big Data, etc.).

MARITIME SITUATIONAL AWARENESS SYSTEMS

Engineering offers consolidated experience in the Maritime Situational Awareness domain. During the last years it had developed several systems for the:

- acquisition
- elaboration
- redistribution

of maritime traffic information, acquired from a number of heterogeneous data sources.

These systems are the result of all the experience gained during the last years, especially in implementing information systems supporting MDA/MSA.

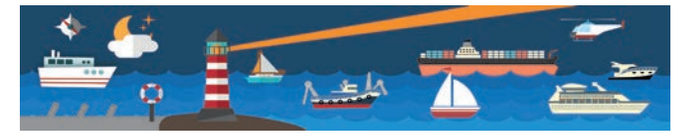
All solutions provide access to a number of different applications through a web portal.

The main functionalities provided to users are the following:

- User rights and access control management – this feature provides the functionality for creating specific profiles and associate users to them.
- Collaboration Tools - Users can exchange instant messages (IM) and start discussion threads under dedicated forums.
- Document and Workflow Management - Users can access documentation (upload/download) according to different profiles.
- Data acquisition and redistribution – the system can acquire and redistribute data according to a number of different application protocols.
- System Chart – starting from the acquired data, the system provides the ability to visualize the related RMP.
- Statistics – the system provides details on the received and redistributed data as well as the mean for delving into the details of the maritime traffic domain.
- Smart Agents and Watchdogs – these are pre-set rules according to which the system reacts with predetermined actions/alerts.

All systems deliver information exchange capabilities.
In fact they are able:

- to acquire maritime information provided by heterogeneous assets/ systems
- to elaborate and enrich the acquired information, in order to build a full near real-time maritime picture (RMP) aimed to provide the Maritime Situational Awareness
- to distribute to the participating entities the resulting maritime picture



intecs

the Brainware company

CONTACT

Headquarter address:

Via Giacomo Peroni, 130 -
00131 Roma

Maria Carla Terzi

T (+39) 06 20392850
www.intecs.it
mariacarla.terzi@intecs.it

LARGE ENTERPRISE

Intecs is an Italian private hi-tech company design, developing and integrating complex electronic systems and solutions. Intecs employs around 500 professionals. More than 80% of the Intecs'staff has a university degree, in Engineering, Computer Science or other scientific disciplines. The business area of the Company is in the Information Technology field applied to the Transport, Telecomunication, Automotive, Space and Defence Domains.

It provides big national and international organizations with consultancy services on high-tech systems, as well as prototype, product and "turn-key" software systems developments. Large emphasis is also placed on the study and experimentation of innovative technologies, aiming at maintaining its expertise updated with the state-of-the-art. To this end Intecs dedicates over 15% of its annual budget to R&D activities. Intecs experiences on the Space market cover the following areas:

- Earth Observation Infrastructures and Applications;
- Geographic Information Systems;
- Satellite Navigation Applications;
- Software Engineering and Software Quality;
- On-Board Software Systems;
- Embedded and Control Systems;
- Communications Software;
- Operating Systems and Software Architectures;
- Check-out Systems.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

User Ground Segment

User Ground Segment systems are in charge to handle, overall, the Satellite Payload Data acquires according to User Request. Accessing the UGS user can consult catalogues, requests new acquisitions or specific processing on data. Starting from these generic requests the UGS typically split them in single acquisitions and handle the complete acquisition request life cycle from the sensing up to the delivery to the user. In this context our experience in service-oriented architectures, interoperability, OGC services and Web services allow us to design and put in operation services provisioning infrastructures and spatial data infrastructures. We develop systems that includes multi-mission cross-catalogues, processing services, ordering services and sensor web services orchestrated via standard workflow and protected via standard user management and single-sign-on technologies.

We have applied our experience in several National (Cosmo Sky-Med) and international (SSE, ngEO, DREAM, HMA related projects) projects supporting big organizations (ESA, JRC, ASI and many industrial organization) in developing their solutions.

In the Earth Observation Domain, we are also specialized in Integration, Verification and Validation activities. The tasks we usually carry on aim to ensure reliability of applications and systems deployed into operations, allowing to increase MTBF of applications and to reduce the operational costs. Flexibility of the approach and clear understanding of Earth Observation scenarios support the effectiveness of the activity. We have applied our experience in many ESA User Services related projects and for the Copernicus Data Access Systems.

Onboard software

INTECS has a large experience in developing and validating onboard software for satellites and space vehicles software (e.g. Application and Basic SW for OBC, avionics, control Units, Data Handling, Mass Memory, payload subsystems SW applications, Time and Space partitioning Applications, etc). Our software engineers can support organizations in the whole flight software life cycle starting from the requirement collection, the architecture definition, the design and the development up to the validation and the final integration of mission-critical software systems. In this context we can provide services for support to system/software engineering, integration and tests engineering, integration of third party software and On-site software integration. INTECS also gained expertise in the development of the SW simulators of the on-board equipments, using both custom and SMP approach. In the last few years, INTECS supported the main European space companies for the development and integration of software subsystems in the frame of the main ESA and ASI programs:

- Galileo IOV and FOC: NSGU On-Board SW, NSGU SW Simulator
- Sentinel1: SMU Basic SW, DSHA On-Board SW, SMU Test SW
- COSMO Second Generation: SMU Basic SW, DSHA On-Board SW, SMU Test SW, SMU Simulator
- Exomars 2016: CTPU Basic SW, CTPU Test SW, CTPU Simulator
- Exomars 2020: NCMM Basic SW, NCMM Test SW
- SARAH: PDS Application SW
- SOLAR Orbiter: SSMM On-Board SW
- BepiColombo: SSMM On-Board SW

intecs

the Brainware company

CONTACT

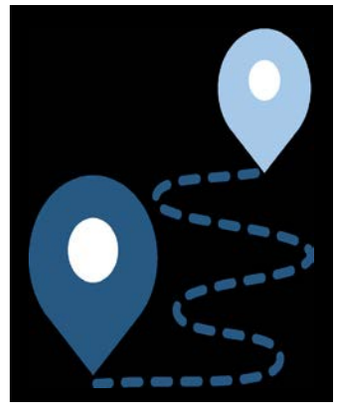
Headquarter address:

Via Giacomo Peroni, 130
00131 Roma

Maria Carla Terzi

T (+39) 06 20392850
www.intecs.it
mariacarla.terzi@intecs.it

GNSS



INTECS is active in the field of GNSS signal exploitation since 2004 looking for solutions based on SW design and high value added applications. The key technology we use in our solutions is based on Software Defined Radio (SDR) approach getting code routines as close to the antenna as possible, basically turning radio hardware problems into software problems. Such a design allows producing smaller, lighter and less expensive receivers with a high level of configurability, which was not attainable with traditional hardware receivers. The resulting solutions are more flexible and hardware independent, so that the terminals can be deeply configured via software, providing a range of solution from "fully Software Receiver" to "signal analysis stations" where the impact of hardware is extremely reduced and flexibility and evolution are drastically improved.

INTECS has been involved in several European and National Research projects in close contact with the leading technological reality as ESTEC, ASI, GSA, Thales Alenia Space, Telespazio, etc, and has collaborated with private enterprises. In 2010 INTECS has been awarded with 3rd place Lombardy prize at the EUROPEAN SATELLITE NAVIGATION COMPETITION 2010. The subjected idea is SyCerto (SYstem for CERTified pOsition); system aims to cope with the lack of certified positioning system in the field of LBS applications. (see http://www.asi.it/it/news/european-satellite-navigation-competition-le-idee-vincenti).

PRODUCTS

INTECS uses the experience gained in the Space domain also in different markets (automotive, transportation, defense) and in its products. In particular, we are the first Italian company that has integrated a satellite Broad Band link with an innovative obstacle detection system for the safety of active level crossings: EMUSER. The product is an extension based on the existing MUSER system developed by Intecs for the detection of unexpected obstacles at level crossings and for the transmission of the related alarms and diagnostics to central control stations, certified by RFI (Italian Railway Infrastructure Manager) and CENELEC SIL-4 compliant. The new product, thanks to the integration with the satellite telecommunication asset, provides increased resilience in case of natural disasters or damages to the rail infrastructure. It can be installed in areas that are uncovered by conventional communication networks.

Whereas MUSER relies on conventional communication channels, EMUSER relies on the introduction of the broadband satellite datalink that replaces (in locations where the terrestrial communication is not available) or complements (redundancy) the legacy communication link traditionally used in the railway infrastructure.

EMUSER is designed and developed relying on Intecs extensive expertise in the railway domain, deep knowledge of safety regulations/ standards and solid technological background.

Technically, the main advantages of using a satellite Broad Band link with respect to more traditional approaches (either based on conventional communication channels, or more drastically based on the substitution of level crossings with underpasses or overpasses) are:

- Increased resilience and availability of the whole system in situations where conventional communication systems are unavailable due to natural disasters (e.g. floods or earthquakes) or unforeseen damages to the rail infrastructure (e.g. derailment or copper theft);
- Possibility to install and operate the system also in areas that are uncovered or poorly covered by conventional communication networks: in such areas (for instance in the Middle East or in remote regions of Australia) wired connection with the central station may be unavailable and wireless connection may offer insufficient bandwidth for the transmission of real-time video sequences;
- Limited investment and socio-technical impact if compared to the invasive solution of building an underpass or an overpass in substitution of a level crossing.

LEONARDO
AIRBORNE & SPACE SYSTEMS

CONTACT

Headquarter address:

Piazza Monte Grappa, 4
00195 Roma

www.leonardocompany.com
airborneandspace@
leonardocompany.com

LARGE ENTERPRISE

Leonardo-Finmeccanica is a global player in the high-tech sectors and a major operator worldwide in the Aerospace, Defence and Security sectors. Finmeccanica is based in Italy, has more than 47,000 employees (latest update 11/30/2015), of whom about 37% abroad, and in 2014 recorded 14.6 billion euro in revenues and received orders in the amount of 15.6 billion.

Based on the dual application of technologies, Finmeccanica designs and creates products, systems, services and integrated solutions both for the defence sector and for public and private customers of the civil sector, both in Italy and abroad.

With the first equipment provided in the 1960s, the Airborne and Space Systems Division holds a primary position in the space market. Since then, it has designed and produced qualified instrumentation for space activities implementing optical systems, star trackers, radio frequency devices, photovoltaic assembly, distribution and power control systems and robotic devices.

At present, the products are used on-board the most important European space missions such as Rosetta, Exomars, Galileo, Copernicus, Cosmo-Skymed, METOP, MeteoSat Third Generation, within other ESA and NASA missions as well as for other international customers.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

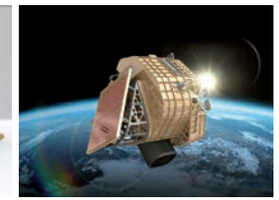
Electro-Optical Instruments

- PRISMA hyperspectral payload: Small E/O Mission (Italian Space Agency)
- Sea Land and Surface Temperature Radiometer (SLSTR): Flying on Copernicus Sentinel 3 since March 2016
- Lightning Imager (LI) for MTG missions
- Multi-viewing Multi-channel Multi-polarization Imager (3MI) for MetOp-SG mission

Domain:
Earth Observation

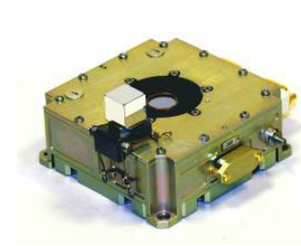
- Visible InfraRed Thermal Imaging Spectrometer (VIRTIS) flying on Venus Express and Rosetta; VIRTIS-like product has been developed for NASA DAWN
- Spectrometer and Imager for MPO Bepi Colombo SIMBIO-SYS -: three channels: High resolution and STereo Imaging, Visual and Infrared
- Jovian Infrared Auroral Mapper (JIRAM) - Camera and Spectrometer, cooperation between ASI and NASA/JPL for the Juno mission to Jupiter

Domain:
Science & Exploration


Attitude Sensors

- Autonomous Star Trackers (ASTR, AA-STR): More than 100 ASTR and AA-STR produced since 2001
  AA-STR is based on APS (CMOS) technology
  SPACESTAR as AA-STR evolution with centralized control (inside AOCS) developed for Iridium NEXT constellation
- InfraRed Earth Sensor (IRES): Since early 70s' over 500 Earth Sensors developed
  IRES-N2 for Galileo GNSS, SICRAL and other TLC missions, IRES-C for LEO satellites in development
- Smart Sun Sensor (S3): Sun Sensors suitable for LEO, MEO, GEO or Interplanetary missions (GOCE, LISA Pathfinder, SICRAL, Earthcare …)

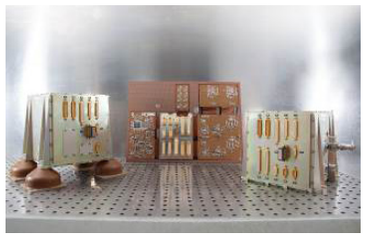

Headquarter address:

Piazza Monte Grappa, 4
00195 Roma

www.leonardocompany.com
airborneandspace@
leonardocompany.com

Power conditioning and distribution

- Electrical Power Systems & Equipment composed of standard, flight proven functional blocks, ranging from a few watt up to 6 kW
- Cosmo-Skymed, Copernicus, GAIA, ATV and other missions
- Specific Application High Voltage Power Supply, EPC for TWTA and Converters for Electric Propulsion

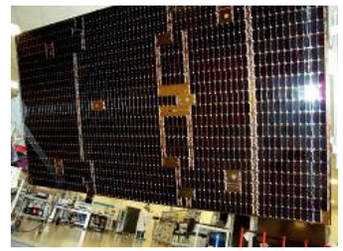


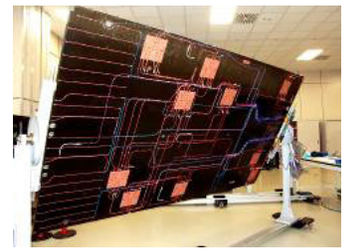
Atomic clocks

- Passive Hydrogen MASER (PHM)
  Is the master clock developed for Galileo Navigation Satellite System (more than 50 units delivered)
  The PHM is the most stable clock ever developed: frequency drift less than 10-14.
- Mini-PHM : under development in ESA program EGEP, more compact and lighter – 30% less wrt PHM - maintaining the original PHM stability

Photovoltaic Assemblies

- PhotoVoltaic Assemblies for Scientific missions (ROSETTA Orbiter and Lander, GAIA, LISA pathfinder), LEO missions (COSMO SkyMed FM1, 2, 3 & 4 ATV FM1, FM2, FM3 & FM4 Pleiades FM1 and 2), MEO/GEO missions (GIOVE A)
  Small applications based on GaAs TJ cells and welding technique (AGILE, PRISMA, PROBA, DUBAISAT)
- More than 140,000 solar cells integrated on PVA and successfully placed on orbit.
- 600 m2 clean room for PVA integration and functional testing.





Satellite Ground Segment

Complete solution, from Master/ Anchor Station to set of Terminals both for Military and Civil Applications:

- Commercial and Military GEO Earth Terminals (Fixed/ Transportable/On the Move types available up to 50 GHz) for telecom and LEO Earth Station for Earth Observation systems. Example: Ground terminals and anchoring stations for SICRAL and Athena/FIDUS
- Satellite network Management Solution providing a complete FCAPS model services
- Applicable Technologies: High Performances Feed Systems with Multiband capabilities and higher modes autotracking features, Beam Waveguide System and Large Radio Telescope System Engineering capabilities, Planar Array antenna design (X and Ka Bands fielded) with electronic scanning capabilities

Galileo PRS

- Secure satellite navigation solutions
- Galileo PRS receiver "P3RS-2": the first Galileo PRS operational receiver, unclassified when keyed

PRS
Public Regulated Service
Secure, robust and always available

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AIRBORNE & SPACE SYSTEMS

Headquarter address:

Piazza Monte Grappa, 4
00195 Roma

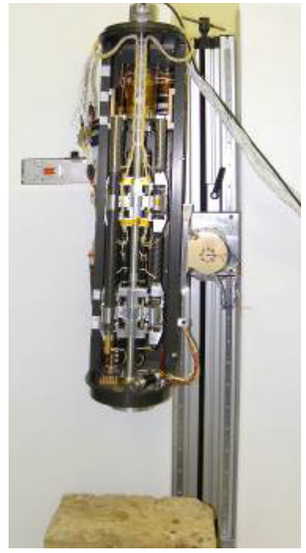
www.leonardocompany.com
airborneandspace@
leonardocompany.com

On orbit Propulsion

- Cold Gas Micropropulsion subsystem: On/Off Propulsion (small-GEO applications) Micro thruster (1-500mN) Linear control Micro-thruster (LISA Pathfinder, Microscope, Euclid) up to 2mN, Low thrust noise In-flight heritage on GAIA, LISA pathfinder and Microscope
- Micropropulsion Components: Pressure Regulation, Propellant Flow Regulation/Gauging Hollow Cathodes and Thermionic Neutralizers

Space Robotics

- Robotic arms for in-orbit servicing or planetary exploration EUROPA: 7 degrees-of-freedom manipulator qualified under ASI contract for a technological demonstration on the ISS DEXARM (Dextrous Robot System): 7 degrees-of-freedom manipulator for exploration and servicing
- Drilling & sampling systems: Rosetta SD2: drilling, sampling and sample distribution system (operated in 2014 on the comet CG 67P) ExoMars Drill system (up to 2 meters depth) with embedded spectrometer and control system to drive the Drill and the Sample Preparation and Distribution System mechanisms to be flown in 2020 on Mars Lunar driller for icy soil sampling to be flown in 2020, Bio-containment System for MARS Sample Return



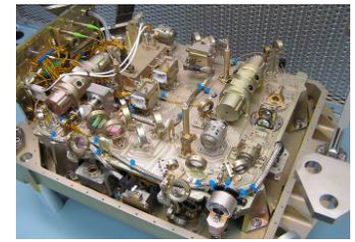
High Power amplifiers and ground terminals

- Solid State Power Amplifiers (SSPA) UHF SSPA cover the bands from 200 to 1000MHz and deliver up to 200 W of output RF power ATV, SkyNet V, Sicral 1, 1B & 2 missions

- Vacuum Tube Power Amplifiers (pulsed and CW TWT and Klystron) Vacuum Tube Amplifiers are integrated with high voltage Electronic Power Conditioning units and cover the bands from 1 to 40 GHz (EarthCare, Cloud Profiling Radar)
- Ka and EHF satellite transceivers providing high integrated solution for Vsat Terminals operating in enhanced High Frequencies 30..50GHz

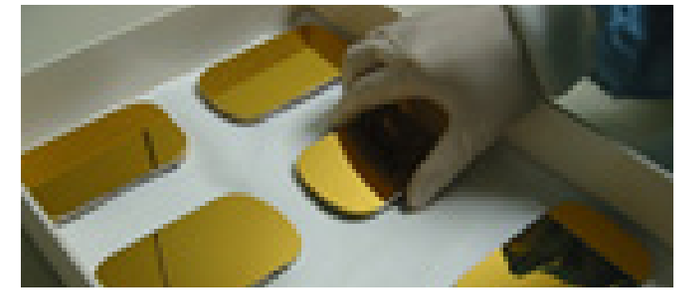
Space LASER TxA

- High Power Laser TxA for atmospheric LIDAR Will be on board ADM-Aeolus and Earth-CARE, the two ESA "Earth Explorer" missions devoted to the study of the Earth atmosphere The two mission share the Laser High Power Transmitter (TxA), which provide an optical output power of 120mJ @ 355 nm with very high frequency stability. Aladin, the Aeolus TxA, will be the most powerful laser source ever built in the UV band.



Coating vacuum technology

- Center of Excellence for Thin Film Coatings (optical and functional) for space, aeronautics, defense and industrial applications. Coating systems: n.6 EB-PVD, n. 1 new Plasma and Ion Assisted Deposition (PIAD), n.5 Sputtering, n.3 PE-CVD. Testing: Spectrophotometers and Climatic chambers. Clean room area class 1000 (class 100 in loading zones). 20k coated surfaces per year, over 70 qualified optical coatings.



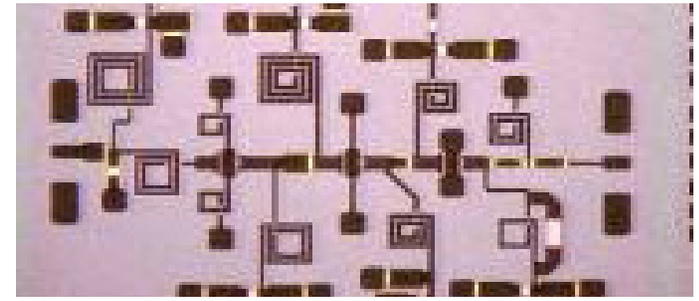
Headquarter address:

Piazza Monte Grappa, 4
00195 Roma

www.leonardocompany.com
airborneandspace@
leonardocompany.com

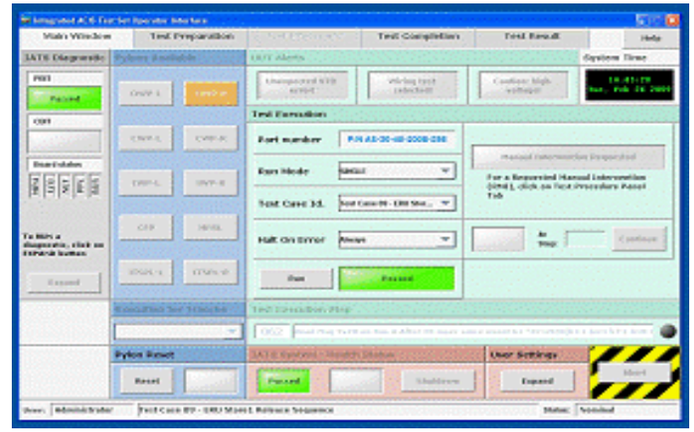
GaAs/GaN microelectronics foundry

- Development and Production of GaAs/ GaN devices (LNA, HPA, …) and T/R modules from L band to X band.
- Microelectronics Technologies for RF Sub-systems
- 700 m2 ISO 5 clean room: from wafer to packaged device processing.



Aerospace Software

- On-board s/w (OBDH for Cosmo-Skymed, SICRAL, PICS, Sentinel 1 and PRIMA; SAR payload s/w), Mission planning for remote sensing (CSK) and telecom (SICRAL, Athena-FIDUS), COAP for ISS-Columbus
- Network management/monitoring and control (SICRAL, CSK)



siae microelettronica

CONTACT

Headquarter address:

Via Michelangelo
Buonarroti, 21
20039 Cologno Monzese (MI)

T (+39) 02 37 73 251
www.siaemic.com

LARGE ENTERPRISE

SIAE MICROELETTRONICA, founded in 1952, is a leader in wireless communication technology. Present in over 25 countries it offers to national and multinational operators advanced technological solution for microwave and millimeter wave transport, services and design. In 2014 the group has founded SM OPTICS, a company driving innovation in fibre based communication, counting on a proven management and R&D team with 20+ years of experience in the optical domain as well as delivering comprehensive professional services.

SIAE MICROELETTRONICA-Technologies is a dedicated department aiming to keep technological edge from the RF design stages to the manufacturing. Its principal target is the supply of high quality components to improve performances, reliability and life expectancy to the wireless transmission products offered to the market. Secondary it offers design consultancy, co-development and services to third party entity.

The activity addressed includes RF design center for active and passive microwave components in either components and sub systems, MoDem, firmware developments, prototyping and automatic testing.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

SIAE Microelettronica-Technologies offers its capability to supply RF active components from the design to the production.

We are capable to supply RF components on multiple technologies (InGaP HBT, GaAs pHEMT, SiGe) due to our long experience in microwave and millimetre frequencies.

In particular, our experience is focus on oscillators, low noise converters, low noise amplifiers and power amplifiers.

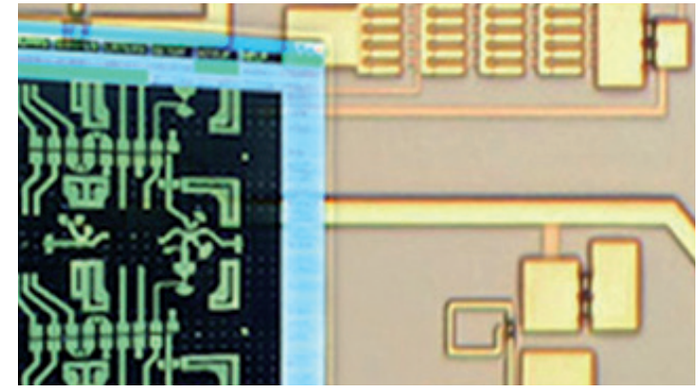
SIAE Microelettronica-Technologies offers also its capability in the design and the manufacturing of passive microwave components.

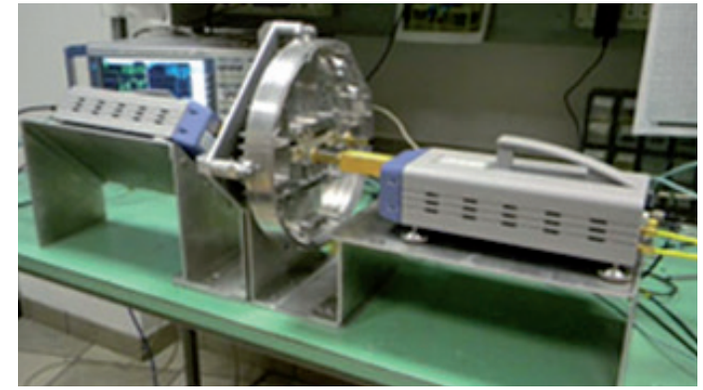
Some examples of our areas of expertise are circulators, duplexers, orthomode transcers and complete modules (i.e. front-end, RTX, LNC).

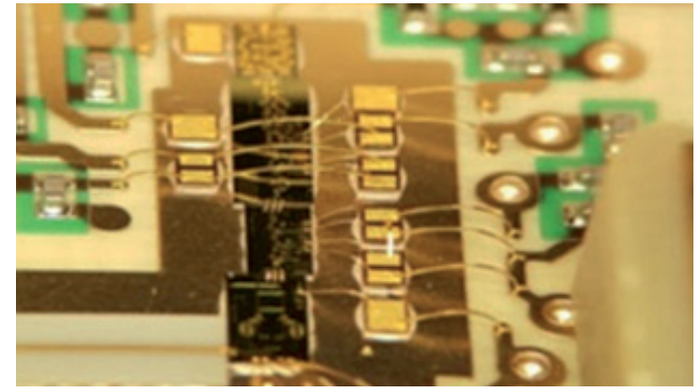
In particular, a relevant expertise is present to mitigate the mechanical vibration effects with no-tune solutions.

SIAE Microelettronica-Technologies can support on the realization of components, such as chip&wire, multi chip modules and System in Package, from the prototype to the production.

Our manufacturing center can guarantee a high quality production since we use high precision (< 10 μm alignment) and dedicated vacuum vapor phase oven.







siae microelettronica

CONTACT

Headquarter address:

Via Michelangelo
Buonarroti, 21
20039 Cologno Monzese (MI)

T (+39) 02 37 73 251
www.siaemic.com

SIAE Microelettronica-Technologies can boast of the most advanced SMT line in Europe: we use automatic visual inspection (with 3D survey on the single device), X-Rays techniques and kic on board.

The manufacturing center is equipped with a clean room for the in house production of thin film on Al2O3 and "quartz" substrates and ribbon gold bolding. We can assure a complete control during the manufacturing process in order to improve the quality in production.

The SIAE Microelettronica-Technologies laboratory is equipped with an area dedicated to test the final device for I/O signals in the base band and at RF ports. The reliability and efficiency is increased by the use of customized socket to hold on the equipment and an automatic handler.

CONTACT

Headquarter address:

Via Valle di Perna, 1
00128 Roma

Teleport address:

Via Cerza, 4 – 95027
San Gregorio di Catania (CT)

T (+39) 06 724101Web
www.sielte.it
a.caltabiano@sielte.it

LARGE ENTERPRISE

SIELTE (www.sielte.it) is a leading Company in System & Service Integration for Telecommunications Networks, Transport and Advanced Technological Systems. With a proven track record in complex realizations in civil, industrial and military sectors we provide turn-key projects ranging from Optical Telecommunication networks to Satellite Systems as well as from Renewal Energy Plants to Surveillance, Security, Supervision and Communication Systems in the Oil&Gas sector.

Sielte offers a wide portfolio of solutions and services covering the value chain from engineering to implementation, technical assistance and operations & maintenance. With her R&D and satellite systems division, Sielte offers turnkey satellite systems and components, both standard and customized, providing from the design to the installation and integration. The reference markets are Mobile telephone providers, government and public administrations, Oil & Gas companies, broadcast providers.

With 3000 people and 35 national and international operation centers, we are committed to provide reliable support to our customers and the best solutions for telecommunications and advanced technological systems.

Our teleport

Sielte teleport, located in Catania in the center of the Mediterranean sea, is a unique place as it is a natural bridge from south Europe towards Africa and Asia. The strategic location allows access to all the satellites in the GEO orbit from 42° W to 72° E and is under coverage of the most important satellite fleets.

A modern satellite platform that benefits from the DVB-S2 technology, optimising the performance of services, the teleport is fully monitored via a CCTV system and 24/7 surveillance. The system is 90% powered by solar energy, with redundant power generators and UPS. All RF antennas are fully redundant with automatic switching systems, and several equipped with up link path power control.

Sielte teleport Network Operation Center is available 24/7. An automatic system constantly monitors the activities and the status of the networks. Every request is handled in real time by our team of highly skilled engineers, allowing to guarantee the shortest possible solving time.

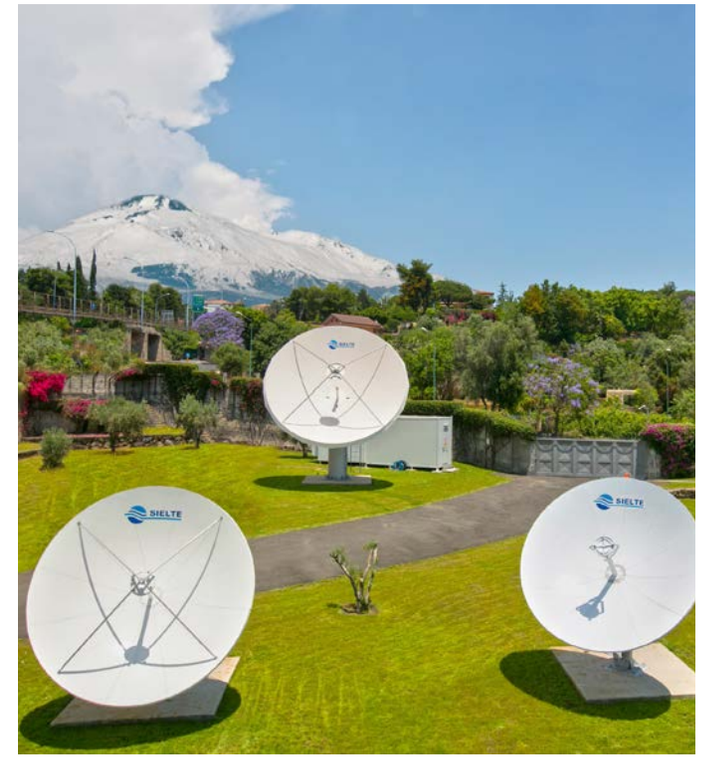
PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Our services

- C, X, Ku band uplink/downlink
- Private networks - Voice over IP
- Maritime
- Satellite backhaul
- Equipment co-location
- Disaster recovery
- Satellite broadcast
- VSAT services

Our products

- Turn key telecommunications solutions, civil and military
- Telecommunications infrastructures, terrestrial and satellite
- Satellite Antenna systems, standard and customized



SITAEL

CONTACT

Headquarter address:

Via San Sabino, 21
70042 Mola di Bari (BA)

T (+39) 080 53 21 796
www.sitael.com
info.space@sitael.com

LARGE ENTERPRISE

Nowadays the largest Italian privately-owned Company operating in the Aerospace Sector, SITAEL belongs to Angelo Investments holding, a worldwide leading Transportation and Aerospace Group.

Counting on more than 320 employees and state-of-the-art facilities, SITAEL is able to cover all the processes needed for the Design, Development and Production of Small Satellites, Advanced Electric and Chemical Propulsion Systems, Earth Observation and Science Payloads, Platform and Payload Avionics from equipment down to complex component level.

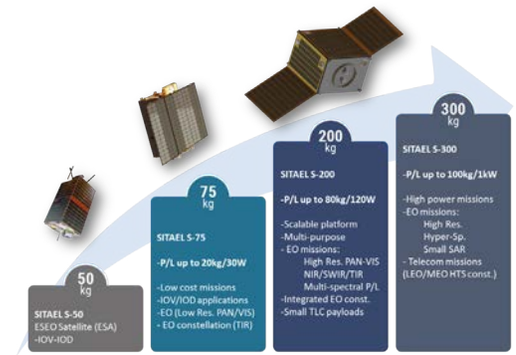
SITAEL flexibility and deep knowledge of design and development of innovative products ensures the highest quality attention to each project while optimizing costs and development times of the proposed solutions.

SITAEL is a leading contractor and preferred partner for the main space stakeholders in several international space projects, thanks to its skilled staff and more than twenty years of proven experience.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

SMALL SATELLITES

SITAEL offers a complete Small (Micro and Mini) Satellites Product Line, based on smart, modular and scalable platform solutions, able to cover a wide range of possible missions/applications in satellites-class range from 50 kg to 300 kg, mainly for LEO Earth Observation (PAN-VIS, NIR/SWIR/TIR, Multi/Hyperspectral), but also for small Telecom missions (i.e. LEO/MEO small constellations) and small SAR P/L (i.e. companion satellite for bi-static applications).



EARTH OBSERVATION SOLUTIONS

SITAEL is able to provide "Turn-Key" Earth Observation services to meet the customer's needs, taking care of the complete chain from the Mission Concept to the Small Satellites Production up to the Ground Infrastructure services.

The combination of data from Small Satellites, Institutional and Commercial Satellites, Airborne and In-situ sensors, through an innovative and efficient Data Integration Centre, provide useful services for Environmental Monitoring, Humanitarian Aid & Civil Protection, Industrial & Home activities and Security, Surveillance and Defence applications.

SITAEL

CONTACT

Headquarter address:

Via San Sabino, 21
70042 Mola di Bari (BA)

T (+39) 080 53 21 796
www.sitael.com
info.space@sitael.com

ADVANCED PROPULSION

Since the early '80s, SITAEL is involved in development of Electric Propulsion Systems based on innovative proprietary technologies.

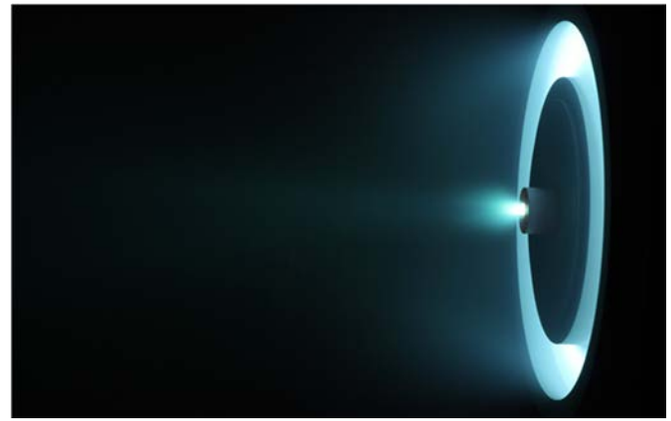
Electric Propulsion Products ranges from High and Low Power Hall Effect Thrusters to Electrothermal Thrusters, from micro-Newton Field Emission Electric Propulsions up to hundreds of kilowatt Magneto Plasma Dynamic Thrusters.

SITAEL is today one of the few companies worldwide with development and qualification capabilities of complete Electric Propulsion systems, including Thruster Units (Thruster , Hollow Cathode), Power and Processing Units (PPU), Propellant Management Assemblies and related diagnostics.

TEST SERVICES AND PRODUCTS

SITAEL is equipped with a unique set of test facilities, covering all phases of advanced propulsion technology development and qualification.

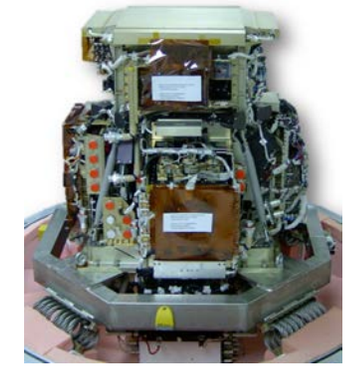
Besides the extensive test services offered, SITAEL can manufacture custom turn-key vacuum and thermal-vacuum facilities fully equipped with diagnostics, control and feeding systems.



SPACE INSTRUMENTS

The development of Innovative Payloads for Earth Observation and Science is one of the SITAEL core activities. Thanks to the unique and specialized skills of its staff, SITAEL manages sub-systems production and their payload integration. This customer confidence in company capabilities, along with the increasing role of small satellites in the space market, drove SITAEL to increase studies and activities for the development of EO payloads and new generation advanced optical sensors.

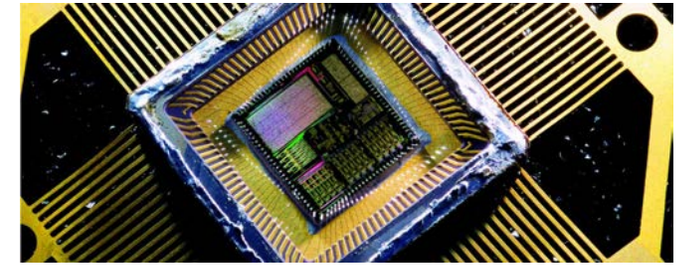
SPACE AVIONICS



SITAEL is able to offer specific electronic solutions for the most complex space systems. SITAEL designs and produces a very wide range of reliable, low noise and high efficiency space-born power supply systems, drive and control electronics equipment for propulsion, mechanisms and thermal control applications. Moreover, in order to assure the unique product quality demand of space missions, SITAEL applies the highest level system design in order to provide flight equipment and components for satellite data processing, handling, storage and communications. SITAEL heritage and gained experience in this area includes units and sub-equipments on several Earth Observation and Science missions.

SPACE MICROELECTRONICS

For more than 20 years, SITAEL Microelectronics Design Center has been pioneering radiation hardening techniques for the design of Integrated Circuits suitable for space environment. SITAEL provides complete solutions, including screening and qualification service according to ESA and NASA standards.



SPACE ENGINEERING

CONTACT

Headquarter address:

Via dei Luxardo, 22-24
00156 Roma

Violetta Orban

T (+39) 06 225951
www.space.it
info@space.it

LARGE ENTERPRISE

Space Engineering is a frontrunner Italian space company with more than 28 years of experience in space technologies, now part of the world leading Airbus Defence and Space, Space Systems. Space Engineering stands as a reliable partner for space agencies, satellite operators and leading companies in the space domain. Space Engineering has an outstanding expertise in design, engineering, simulation, prototyping, integration, testing, for Space & Ground, owning a significant number of international patents on antennas, radars, scientific software and Digital Signal Processing. Space Engineering has active projects in Europe, Israel, Russia, Turkey, United Arab Emirates, Argentina, China and others and has attained exceptional know-how and strong international reputation thanks to the participation to major programs (more than 30 programs, including Artemis, Globalstar, Meteosat, Sicral, Galileo, Cosmo SkyMed, Alphasat, Metop SG, Quantum, Saocom). Among its main customers and partners there are ESA, ASI, Italian MoD, CONAE, Yahsat, Eutelsat, Inmarsat, OHB-CGS, Finmeccanica, Siemens, Thales CS, Thales Alenia Space Italy, Telespazio.

Space Engineering employs about 110 technical staff members, the large majority of which are university-graduated engineers. The Company has ISO 9001:2008 and ISO 9100 certifications. Space Engineering QMS is updating to NATO AQAP 2110/2210 standards. "Space Test Centre" certification by ESA TEC-Q completed for Alphasat Q/V payload. Facility Security Clearance (FSC) and several engineers with Personal Security Clearance (PSC).

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

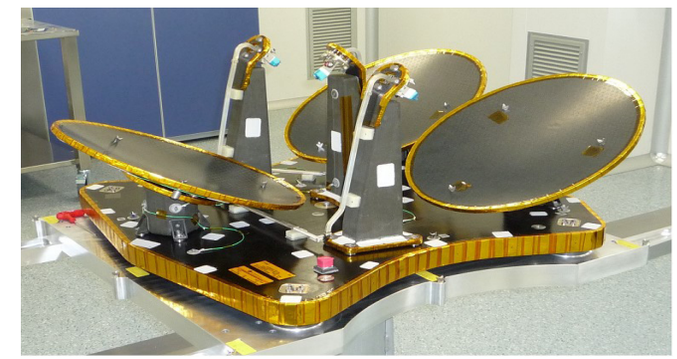
Active and Passive Onboard RF components, feeds, filters, splitters, combiners including high bands (Q/V/W).

Very low profile broadband SatCom antennas for airborne applications, including UAV and helicopters, with patented Janus automated dual-band remote control (Ku/Ka, X/Ka).

World leading supplier of Broadband SatCom terminals for trains, providing fully operational terminals in France, Turkey, Russia, Kazakhstan. Designers of the only Ka-band antenna for trains.

Designers of **flat antennas for Communication-On-The-Move** Applications.

Active and reconfigurable antenna for flexible payloads, for the new generation of High Throughput and Flexible Satellites, new tools for the operation of flexible payloads.



SPACE ENGINEERING

Headquarter address:

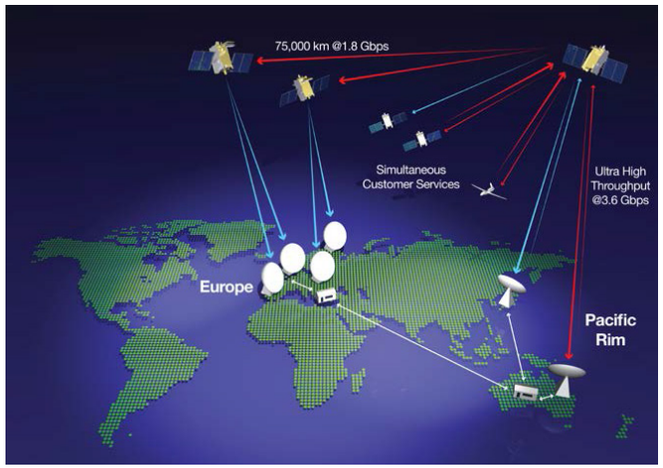
Via dei Luxardo, 22-24
00156 Roma

CONTACT

Violetta Orban

T (+39) 06 225951
www.space.it
info@space.it

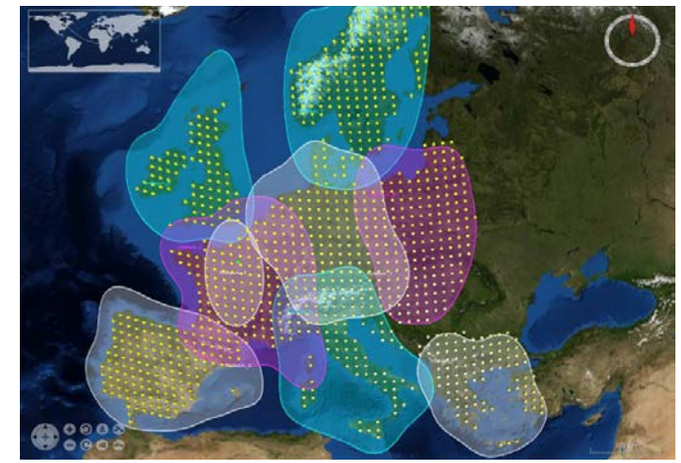
Equipment for the user and ground segment of the **EDRS SpaceDataHighway** system, solutions for LEO-GEO Inter-Satellite Links



Ground Transponders and Calibrators for SAR, Compact Active Transponder for application of interferometry to monitoring of environment and critical infrastructures

Gateway and Terminals for **Machine-to-Machine** applications of Satellite Communication using novel waveforms and protocols specifically conceived for low-data rate applications

End-to-End system performances studies and unique tools for design and simulation



Headquarter address:

Via Gallarate, 205
20151 Milano

T (+39) 02 30468151
www.telematicsolutions.it
info@telematicsolutions.it

CONTACT

Thomas PANOZZO,
Managing Director

LARGE ENTERPRISE

Telematic Solutions Srl is an Italian company, with headquarters in Milan, specialized in EPC (Engineering, Procurement and Construction) projects, maintenance and exploitation services within the space sector, specifically in the ground segment and telemetry domains.

The company has a continued and valued presence in major European space programs, and in many other projects in low current & security, fluids, TT&C at the Guyana Space Center (CSG) where the company has a permanent work force through Telematic Solutions Guyane.

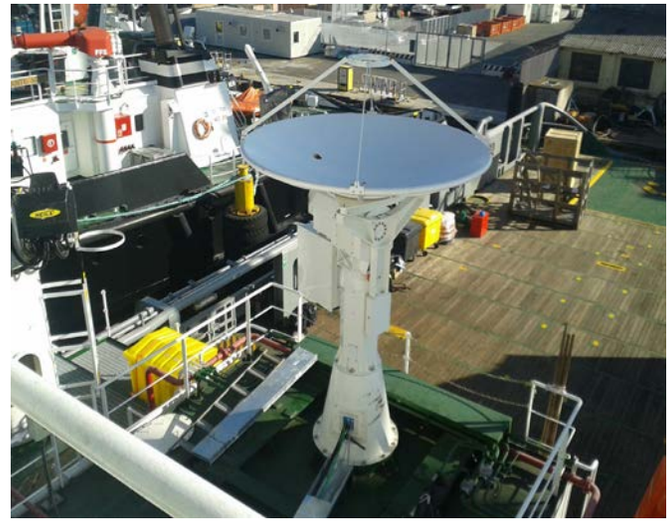
For fifteen years the main space players, such as the European Space Agency (ESA), the Italian Space Agency (ASI), the Centre National des Etudes Spatiales (CNES) have continuously renewed their trust in Telematic Solutions by awarding contracts for ambitious space projects on a European scale, such as the operation and the maintenance of VEGA fluid ground segment and the engineering, procurement, delivery and installation of telemetry stations for IXV (Intermediate eXperimental Vehicle) reentry vehicle.

The expertise and the commitment to fulfill each customers' specific needs are Telematic Solutions features upon which Customer's rely to build their space programs.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

TT&C

- Engineering, procurement and integration as well as operations of TM and Tracking Ground Stations
- Integration of ground stations for telemetry reception
- Antenna Control Unit and tracking receiver stations
- Telemetry ground stations monitoring and control
- Telemetry data recording and re-play tools.
- Telemetry post-processing tools.
- Telemetry distribution
- Development of Transportable Ground Station
- Naval Ground Station integration



VEGA and SOYUZ Launch Pads

Development, Procurement, Integration, Test and Deliver of :

- Low current systems
- Telecom systems

CSG Safety, SOYUZ and VEGA Control Room

Design of control room or operations center (OCC) equipped with all front end equipment:

- Video system, communication system, video wall
- Ergonomic studies
- Safety systems supervision
- Data handling

Launch Pad Safety Systems

- Low current systems
- Gas and toxic vapors detection
- Security systems: access and video surveillance

TELEMATIC SOLUTIONS

Headquarter address:

Via Gallarate, 205
20151 Milano

T (+39) 02 30468151
www.telematicsolutions.it
info@telematicsolutions.it

CONTACT

Thomas PANOZZO,
Managing Director

Mechanical and Fluid Systems

PROPELLANTS FILLING SKID

- Fluids ground support equipment
- Propellant disposal system
- VEGA upper stage filling system

Maintenance and exploitation of VEGA Launch Pad:

- Maintenance and exploitation of VEGA mechanical and fluid launch pad systems
- Launch campaign
- Launcher stages integration
- After launch revalidation
- Maintenance between launches

TELESPAZIO
a LEONARDO and THALES company

CONTACT

Headquarter address:

Via Tiburtina, 965
00156 Roma

T (+39) 06 40791
www.telespazio.com
telespazio.communication@
telespazio.com

LARGE ENTERPRISE

Telespazio, a joint venture between Leonardo-Finmeccanica (67%) and Thales (33%), is one of the world's leading players in satellite services. The company, with headquarters in Rome, employs approximately 2500 people. It relies on an international network of space centres and teleports and operates worldwide through many subsidiaries.

In particular, it is present: in France with Telespazio France; in Germany with Telespazio VEGA Deutschland, GAF and Spaceopal (a joint venture in which the German space agency DLR holds a 50% interest); in the United Kingdom with Telespazio VEGA United Kingdom; in Spain with Telespazio Iberica and in Romania with Rartel. Telespazio has consolidated its presence in South America with Telespazio Brasil and Telespazio Argentina. In Italy, the company is also present through e-GEOS (in which the Italian Space Agency holds a 20% interest).

Telespazio is a leading company in sectors that are becoming increasingly important for institutions, business operators and consumers, with activities ranging from the design and development of space systems to the management of launch services and in-orbit satellite control; from Earth observation services, integrated communication, satellite navigation and localisation, to scientific programmes. Telespazio relies on a wealth of experience of the highest level, stemming from technological expertise acquired over 50 years of business practice.

The Company's experience is also drawn from the management of space infrastructure, including the Fucino Space Centre, the world's largest civilian teleport, as well as from its involvement in major space programmes, including: Galileo, EGNOS, Copernicus, COSMO-SkyMed and SICRAL.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

SATCOM

With its long track record in the satellite tlc and tv sectors and thanks to a portfolio of cutting-edge products and services, Telespazio offers its clients secure, reliable and globally available solutions. The company manages communications networks capable of integrating satellite and ground-based infrastructure, responding effectively to the requirements of business and institutional markets, media and broadcasting sectors and global tlc operators. Thanks to its experience in the management of fixed and mobile platforms in Ku and Ka band, Telespazio offers dedicated services for the oil&gas, transport and navigation sectors, implementing fixed-line, mobile narrowband and broadband satellite services worldwide. The company mainly operates on the market through the Fullsat and SeaOnNet (Global Ku) products for fixed and mobile services, respectively. The company is also first tier value added reseller for Inmarsat's Global Xpress Services. Telespazio provides innovative solutions for civil defence, security and e-government applications and services. Trunking and backhauling services for telco operators are also included in its product portfolio, mainly for Latin America and supported by teleports managed by Telespazio in Brazil and Argentina. In its Fucino, Scanzano and Lario Space Centres, Telespazio hosts ground segment equipment dedicated to tlc satellite systems managed by key satellite operators.

MILSATCOM

In tactical military satellite communications Telespazio provides telecommunications services to the armed forces of NATO countries, through its involvement in the Italian defence programmes SICRAL and Athena Fidus. In non-tactical military communications the company offers telemedicine, distance learning and wideband connectivity services.

Broadband TV

Telespazio is the Italian leader and a major European player in radio and television satellite broadcasting, thanks to its facilities at the Fucino and Lario Space Centres, to the digital platforms operated there and to control of the uplinks installed at clients' premises. A network of international platforms connected to Telespazio and operated by partners worldwide, further enriches Telespazio's international range of terrestrial and satellite television services. Telespazio provides contribution to and from its teleports over managed and unmanaged networks, as well as playout services and value added services including simulcrypt, conditional access and electronic program guide services. Telespazio also maintains a technical, operational and commercial presence in France, Spain, UK, Germany and Romania.

TELESPAZIO
a LEONARDO and THALES company

Headquarter address:

Via Tiburtina, 965
00156 Roma

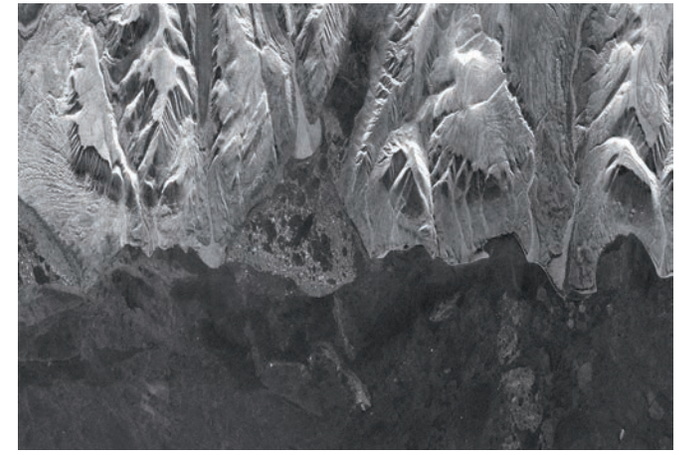
T (+39) 06 40791
www.telespazio.com
telespazio.communication@
telespazio.com

Satellite Operations

Telespazio is one of the world's leading operators for both the launch and early orbit phase and in-orbit control of satellites and satellite fleets throughout their operating life. Telespazio's highly skilled staff, with their strong and internationally recognised know-how, operate via the company's own space centres in Italy, as well as through customer infrastructures: at the Broglio Space Center in Kenya; the Kourou launch site in French Guiana; the Malargue station in Argentina; the military sites at Vigna di Valle and Pratica di Mare in Italy, and Creil and Maysons-Lafitte in France. In Italy the company can count on the "Piero Fanti" Space Centre at Fucino, Abruzzo, (in operation since 1963 with over 170 operational antennas), the Lario Space Centre in Lombardy, and the Scanzano Space Centre in Sicily. Particularly in its space centres, Telespazio provides LEOP, TT&C and IOT services, as well as in-orbit operational management. It also provides operation and maintenance services for complex terrestrial systems with LEO, MEO and GEO orbital profiles. Moreover, at the Fucino Space Center, Telespazio provides hosting services for customers' equipment such as antennas, ground systems or even overall facilities such as the Galileo Control Center or the satellite access station for the Inmarsat satellite fleet.

Satellite Systems and Applications

Telespazio is a world leader in the design and development of satellite systems and downstream applications. Based on 50 years' experience supporting the majority of European satellite missions and many others globally, Telespazio has established unparalleled capabilities in the development and integration of space, ground and user segments. These include single mission control segments, multi-mission payload data segments and on-board software, for programmes such as the Copernicus' Sentinels, EGS-CC (an innovative common infrastructure to support space systems' monitoring and control for all mission types), the ISS and the Vega launcher, and complete ground segments for scientific, tlc and Earth observation missions. Telespazio is a key innovator in the development of applications and services for the downstream user market. These include leading-edge developments in GNSS infrastructures and applications, and using simulation technology to provide advanced training solutions for military and civil aerospace organisations. Telespazio also provides expert scientific, consulting and engineering services to commercial and institutional customers. This ranges from early phase studies into potential space projects, to providing teams of highly experienced experts to support the specification, development and deployment of committed space programmes such as the ESA Space Situational Awareness programme.



Geoinformation

Telespazio is one of the major global suppliers of geospatial application solutions and services. Through its subsidiary e-GEOS, created jointly with the Italian Space Agency, through Telespazio Ibérica, GAF in Germany, as well as Telespazio France, Telespazio Brasil, Telespazio Argentina, Rartel in Romania, and Telespazio VEGA UK, Telespazio is active in all areas relating to the Earth observation market: from satellite data acquisition and processing to development and sale of software and products. It provides services to public institutions and companies for the study and monitoring of land, maritime surveillance, civil defence, the prevention and management of natural events, cartography and agricultural applications.

TELESPAZIO
a LEONARDO and THALES company

Headquarter address:

Via Tiburtina, 965
00156 Roma

T (+39) 06 40791
www.telespazio.com
telespazio.communication@
telespazio.com

Main Space Programmes Galileo

Telespazio plays a leading role in the development of the Galileo programme, with one of the Galileo Control Centres (GCC), which will manage the programme's constellation and mission, having been built at the Fucino Space Centre. A second GCC was built by DLR GfR, a German Space Agency (DLR) company, in Oberpfaffenhofen (Germany). Telespazio is heavily involved in all the phases of the Galileo's operational life span through Spaceopal (50% Telespazio, 50% DLR-GfR), which manages and coordinates services using the LEOP Operations Control Centres in Toulouse and Darmstadt. These provide constellation launch and early orbit phase services. Spaceopal uses the GCC at Fucino and Oberpfaffenhofen to provide the navigation signals and in-orbit control of the satellites. Telespazio France also plays an important role through its teams in Toulouse and Kourou: the company supports CNES and Arianespace, respectively, in management of the Launch Centre in Guiana and in the launch and early orbit operations of Galileo satellites. Telespazio VEGA Deutschland has developed the Galileo System Simulation Facility and is responsible for developing a facility to support testing and validation of the first four Galileo satellites. Currently, the company is prime contractor for both the Ground Control Segment Constellation Simulator and the Ground Mission Segment Assembly, Integration & Validation Platform.

Copernicus

Telespazio is one of the major industrial partners of the Copernicus programme. The company is involved in the space component ground segment development and operations. Through its subsidiaries e-GEOS, GAF and Telespazio VEGA UK, it operates in the fields of emergency management, land and sea safety management, land resource management, and the monitoring of climate change. It also provides Earth observation data related to the Copernicus Contributing Missions COSMO-SkyMed and IRS. In particular, the e-GEOS Matera Space Centre is one of the three stations in the Copernicus Core Ground Segment and receives the radar and optical data acquired by satellite missions Sentinel-1 and Sentinel-2. ESA is developing six families of Sentinel satellite missions specifically designed for the operational needs of the Copernicus programme. Telespazio participates in the creation, maintenance and evolution of the Payload Data Ground Segment for Sentinel-1 and Sentinel-3, the Mission Control System of Sentinel-1, Sentinel-2, Sentinel-3 and Sentinel-5P and the infrastructure for access to the EO products of the Copernicus missions. In the field of operations, Telespazio's staff supports ESOC during Sentinel satellite pre and post launch phases, and is responsible for CSCDA/CDS operations as well as Sentinel-1 and Sentinel-2 data acquisition via its Matera Space Centre (through e-GEOS). Telespazio is also responsible for managing operations in the Sentinel-3 ground segment.

COSMO-SkyMed

COSMO-SkyMed is one of the most innovative Earth observation programmes and is funded by ASI, the Italian MoD and the Italian Ministry of Education, Universities and Scientific Research. The system involves a constellation of four dual use satellites equipped with radar sensors that can operate under any weather or visibility conditions. Telespazio built the entire ground segment. The Fucino Space Centre houses the constellation control centre, and managed the post-launch satellite acquisition phases and subsequent in orbit injection. Today the Centre carries out command and control activities and scheduling of image acquisition requests. The programme will move forward in the near future with the development of two improved performance second generation satellites.

SICRAL

SICRAL is Italy's satellite system for military communications. The programme is divided into three phases: the first began in 2001 with the launch of SICRAL 1; the second in 2009 with the launch of SICRAL 1B and third, in cooperation with France, started from April 2015 with the launch of SICRAL 2. For all the SICRAL missions, Telespazio managed the phases of design, construction, integration and ground segment testing at the Defence Control Centre at Vigna di Valle (Rome) and in the Fucino Space Centre (back-up centre). Telespazio also managed the LEOP and IOT phases. For SICRAL 1B and SICRAL 2, Telespazio also provided the launch services. For SICRAL 2, Telespazio is also responsible for the interconnection system between the Italian and French mission centres. Telespazio was one of the investors for construction of SICRAL 1B and SICRAL 2, thus consolidating its role as military telecommunications satellite operator. The company has part of the transmission capacity of SICRAL 1B and SICRAL 2, and provides communications services to the armed forces of NATO member states.

CONTACT

Headquarter address:

Via Saccomuro, 24
00131 Roma

Tel: (+39) 06 41511
www.thalesaleniaspace.com

CommunicationDept.
DSP-I@thalesaleniaspace.com

LARGE ENTERPRISE

Thales Alenia Space is a joint venture between Thales (67%) and Leonardo-Finmeccanica (33%). For more than 40 years now, Thales Alenia Space has designed, integrated, tested, operated and delivered innovative space systems. Our cutting-edge products and services meet the needs of commercial and government customers from around the world, spanning the space, defense, science and security markets. Thales Alenia Space's satellites and payloads are recognized worldwide as benchmarks in delivering communications and navigation services, monitoring our environment and the oceans, better understanding climate change and supporting scientific research. Today, Thales Alenia Space is one of the main suppliers to the International Space Station, and a pivotal player in systems to explore our Universe. Along with Telespazio, Thales Alenia Space forms the Space Alliance, which offers a complete range of solutions and services. Because of our unrivaled expertise in dual (civil-military) missions, constellations, flexible payloads, altimetry, meteorology and high-resolution radar and optical observation, Thales Alenia Space is the natural partner to countries that want to expand their space program.

Thales Alenia Space Italia S.p.A. is the italian component of Thales Alenia Space. The company is based on more than 40 years of experience gained building over two hundred satellites for

- Telecommunications (Intelsat, Hot Bird, Arabsat, Olympus, Italsat, Artemis, Globalstar, O3b, Iridium-NEXT, Athena-Fidus, SICRAL)
- Navigation (Giove B, Galileo), science and exploration (Hipaorcos, Beppo Sax, Cassini- Huygens, Rosetta, Integral, Mars Express and Venus Express)
- Science and Exploration (Hipaorcos, Beppo Sax, Cassini- Huygens, Rosetta, Integral, Mars Express and Venus Express)
- Remote sensing (ERS 1 and 2, Envisat, Metop, COSMO-SkyMed, Sentinel)

Without forgetting the significant contribution to the development of orbiting infrastructures (the International Space Station and the logistics modules). Thales Alenia Space is responsible for over half of its pressurized volume, and played a major role on the ATV (Automated Transfer Vehicle) cargo vessels for ESA and on NASA's Cygnus program, which will also bring supplies to the ISS. The company collaborates with the leading international space industries on the programs of the most prestigious agencies, such as NASA, the European Space Agency and the Italian Space Agency. Thales Alenia Space Italia has around 2,200 employees and has plants in Rome, Turin, L'Aquila and Milan.

Thales Alenia Space en route for the Red Planet

ExoMars is a 50/50 joint program between ESA and the Russian space agency, Roscosmos. Thales Alenia Space is prime contractor for the two missions in this program, set for launch in 2016 and 2020. For the 2016 mission, Thales Alenia Space is in charge of designing the reentry module and designing and integrating the orbital module. On the 2020 mission, the joint venture is in charge of developing the navigation and guidance system for the orbital and descent modules, as well as designing the Martian rover and building the analysis lab carried by the rover. This lab features a perforator, capable of drilling two meters deep into the Martian soil and removing samples. The first mission was successfully launched in March 2016.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

ATHENA-FIDUS

The ATHENA-FIDUS programme (Access on THeatres and European Nations for Allied forces - French Italian Dual Use Satellite) is a French-Italian telecommunications system based on a geostationary satellite for dual use broadband communications services. The satellite was launched on 6 February 2014, from the Guiana Space Centre in Kourou, French Guyana, with an Ariane 5 launcher. With the ATHENA-FIDUS launch, more than a decade after the end of the Italsat F2 mission, Italy once again has its own satellite telecommunication system in Ka Band, dedicated to institutional and governmental services. Thales Alenia Space, prime contractor for the program, is responsible for the development, construction, testing and putting into orbit of the satellite. The company is also responsible for the development, construction and testing of the satellite control center, designed on a Spacebus 4000B2 platform.Thales Alenia Space is the industrial partner of the first European cooperation, French-Italian, regarding a dual-use civil/military communications space programme, which includes the Sicral 2 and Athena-Fidus satellites. In addition, Thales Alenia Space is responsible for the DGA (Direction générale de l'armement) of the support services and maintenance of the Syracuse 3A, Syracuse 3B and Athena-Fidus satellites, as well as the French portion of the Sicral 2 satellite.

Headquarter address:

Via Saccomuro, 24
00131 Roma

Tel: (+39) 06 41511
www.thalesaleniaspace.com

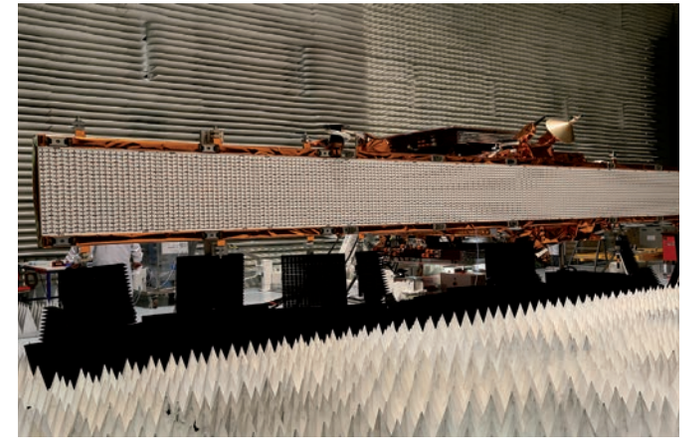
CommunicationDept.
DSP-I@thalesaleniaspace.com

BEPICOLOMBO

BepiColombo is the very first European mission dedicated to the exploration of Mercury, a project resulting from the collaboration between Europe (European Space Agency - ESA) and Japan (Japanese Space Agency - JAXA). The launch is expected in 2018 and the probes will reach Mercury after a seven-year journey through the solar system, also taking advantage of the gravitational pull of the Earth and Venus. Thales Alenia Space Italia is part of the Core Team, led by Airbus Defence & Space, and coordinates an industrial group of 35 European companies within its work package. In particular, it is responsible for the telecommunication, thermal control, electric power distribution systems, for the integration and tests of the complete satellite as well as the support for the launch campaign. The company also directly develops the X- and Ka-band transponder, the onboard computer, the mass memory and the high-gain antenna.

COSMO-SkyMed

COSMO-SkyMed is one of the most innovative Earth observation programmes and is funded by ASI, the Italian Ministry of Defence and the Italian Ministry of Education, Universities and Scientific Research. The COSMO-SkyMed system involves a constellation of four satellites equipped with radar sensors that can operate under any weather or visibility conditions and with a very high revisit frequency. Thales Alenia Space Italia is the prime contractor company, responsible for the entire system, including the space and ground segments. The Second Generation (CSG) of COSMO-SkyMed envisages the continuity of the dual purpose (civilian and mi litary) Earth Observation services, provided today by the first generation COSMO-SkyMed (CSK) satellites. The development of CSG represents an authentic generational leap in terms of technology, performance and operational life of the system, providing new application possibilities, with particular reference to risk management and damage assessment with regard to natural and anthropic disasters.



Copernicus- Sentinel

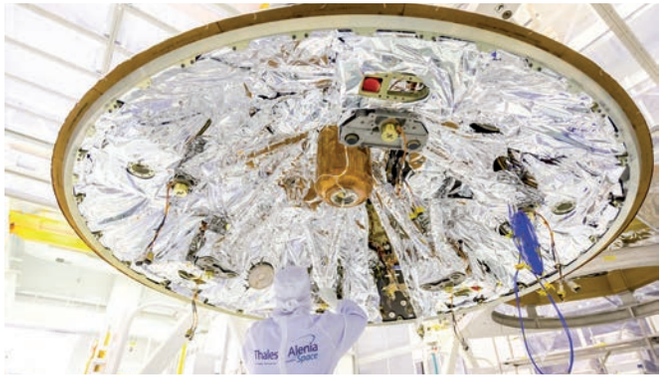
Copernicus is the programme for the establishment of a European capacity for Earth Observation, coordinated and managed by the European Commission. Copernicus programme provides accurate, timely and easily accessible information that enables the monitoring of the earth, marine and atmospheric environments, understanding and mitigating the effects of climate change and ensuring civil security. ESA is developing six families of Sentinel satellite missions specifically designed for the operational needs of the Copernicus programme. The Sentinels provide high-resolution radar and optical images of our planet. Thales Alenia Space has a very important role in this programme. As prime contractor, Thales Alenia Space is responsible for the constellations of the Sentinel-1 and Sentinel-3 missions.

Headquarter address:

Via Saccomuro, 24
00131 Roma

Tel: (+39) 06 41511
www.thalesaleniaspace.com

CommunicationDept.
DSP-I@thalesaleniaspace.com



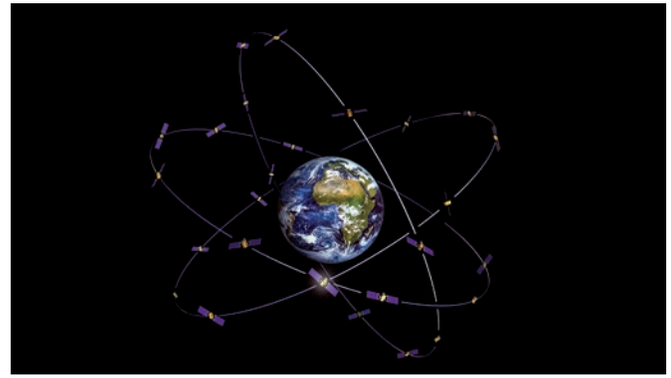
ExoMars

ExoMars is a is a joint endeavor between the European Space Agency (ESA) and the Russian Space Agency (Roscosmos), with the Italian Space Agency (ASI) playing a strong role as major contributor. ExoMars is developed by a European industrial consortium led by Thales Alenia Space Italia – Prime Contractor for both missions - and involving almost 134 space companies from ESA State members.

2016 Mission comprises two main parts:

- Trace Gas Orbiter (TGO), which is making the "journey" to Mars, with arrival in October, will orbit the planet, observing his atmosphere and surface, also investigating the planet's surface and subsurface, to help pave the way for the 2020 mission.
- Entry, Descent and Landing Demonstrator (EDM), designed to measure wind speed, humidity, atmospheric pressure, ground temperature, atmospheric transparency, electrical fields and more.

2020 Mission will deploy a large Russian Descent Module, carrying an ESA Rover. It includes a cruise module, descent module and a landing platform hosting the rover, fitted with a robust drill, capable of piercing the Martian soil to a depth of two meters. The samples it recovers will be analyzed for any traces of life.



Galileo

The Galileo programme is one of the greatest and most ambitious European projects born from the collaboration of the European Union with the European Space Agency (ESA) to create a global navigation satellite system for a highly accurate, and reliable global positioning service which is interoperable with the U.S. GPS and Russian GLONASS systems. Thanks to Galileo, Europe will have its own independent satellite navigation system capable of satisfying a wide range of business sectors, including transport (by air, rail, road and sea), telecommunications (geo-location services), and those requiring high security standards. Italy has had a major role since the very beginning of the Galileo programme, first of all, through the Italian Space Agency (ASI), and secondly, through the involvement of the Italian industry.

Thales Alenia Space has been a major partner of the Galileo program since its very inception: as responsible for Galileo System Support Contract, the Company provides industrial system support to ESA regarding system engineering, performance, integration and validation. Therefore Thales Alenia Space is prime contractor for the development of the Galileo Mission Segment and the Galileo Security Facility that will control the overall satellite navigation system. The Company provides also some key elements as the signal generation units and the antennas for the first 22 satellites of the FOC (Full Operational Capability) phase. In addition Thales Alenia Space has developed in the site of Rome the assembly, integration and test of 4 IOV (In Orbit Validation) satellites.

The International Space Station (ISS)

The International Space Station (ISS) is one of the largest and most ambitious space projects created, 40 years after the initial explorations on the Moon. ISS is an orbital base for research and for discovery of new knowledge, capabilities and opportunities in Space. The ISS is being built and assembled as a joint project between the United States, Russia, Canada, Japan and the 11 European Space Agency member countries.

Thales Alenia Space Italia and, in particular, its plant in Turin, gave an essential contribution to the ISS's development, building several modules of the "orbiting home". The three MPLMs (Multi-Purpose Logistic Modules), are among the symbol projects. Other crowning achievements of Thales Alenia Space Italia's activities for the space station are the Columbus European laboratory for microgravity research; the ATV (Automated Transfer Vehicle) modules, automatic logistics systems with maximum refueling and materials loads for astronauts up to 7,300 kilograms; NODES 2 and 3, elements that connect the pressurized modules of the "orbiting home" together, and the CUPOLA, a special observatory to allow the astronauts on board the station to operate the remote robotic arm during the module assembly operations.

Thales Alenia Space also makes the Pressurized Cargo Modules (PCM) for the Cygnus resupply vessel, and is prime contractor for ESA's IXV and Expert reentry demonstrators.

VITROCISET

CONTACT

Headquarter address:

Via Tiburtina, 1020
Roma

T (+39) 06 88201
www.vitrociset.com
spazio@vitrociset.it

LARGE ENTERPRISE

More than fifty years of experience in logistics to support operations in mission critical areas such as Defence, Space and Air Traffic Control, expertise in integrating complex systems and ICT, the organization over the area coordinated by a modern Service Center in Rome, the substantial investments in Research & Development, make Vitrociset the ideal technology partner for companies and Public Administrations. The areas of intervention of Vitrociset range from systems for the Defense to those for Air Traffic Control, from Satellite Technologies to Telecommunications, from Transportation to Infomobility, from systems for Information Communication & Multimedia Technology to those for the Environment.

Vitrociset's activity in Space business area dates back to 1982 with the awarding of a turnkey contract for the ESA Redu tracking station. The gradual and constant expansion of its offer to the key players of the sector (ASI, CNES, Arianespace, MOD and Satellite Operators) has required the diversification of its products and services, such as the design and development of mission-critical systems.

PRODUCTS | SERVICES | APPLICATIONS | TECHNOLOGIES

Ground Facilities & Support Equipments

Vitrociset has experience and technological capability in the design and development of complex systems for the Ground Segment. One example is the VEGA launcher. The company has been the prime contractor for the Ground Segment, successfully supporting the first VEGA launches.The value-solutions also include the provision of equipment or subsystems for the main companies on the market. Vitrociset is able to provide its solutions directly to end Customers, but it is also able to support other System Integrators in the design and manufacture of components and subsystems. Our experience in GSEs, combined with the ability to design, test, and maintain products, allows us to offer the most efficient and complete solutions for space and aerospace products.

Exploitation Services

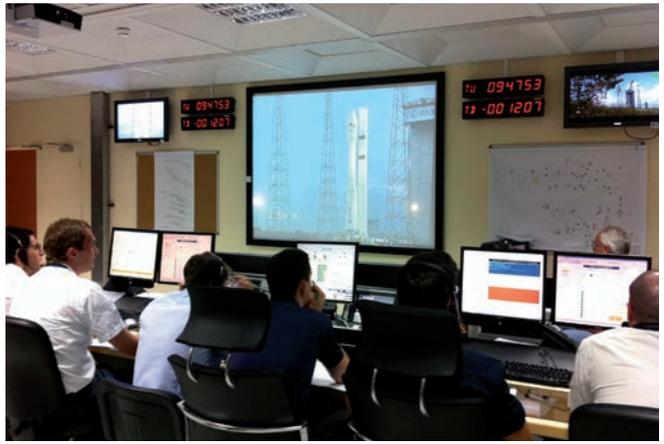
The company's key skills include Ground Operations and the construction of infrastructure and systems for the Ground Segment. Since the mid-1980s, specialist Vitrociset staff have developed and performed ESA-ESOC validation for procedures to apply to spacecraft and the Ground Segment.For 25 years Vitrociset has supported CNES in the use of the Ground Facilities in Kourou, and now the Company is responsible for the "Localisation, Weather and Remote neutralisation" infrastructure for ARIANESPACE and ARIANE 5, performing the role of "Authorité de Conception" for the VEGA launch operation.

Moreover, leading an Italian Industrial Consortium, Vitrociset was awarded an ASI contract for the Operational Exploitation of the Broglio Space Centre in Malindi, Kenya.

Headquarter address:

Via Tiburtina, 1020
Roma

T (+39) 06 88201
www.vitrociset.com
spazio@vitrociset.it

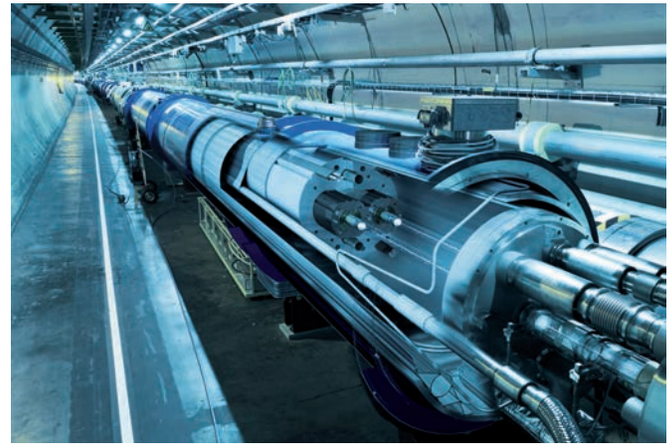


Ground Data Systems

Vitrociset designs, implements and maintains checkout software and operating systems for the Ground Segment of Space Programmes. The Company's involvement includes Mission Control Systems (Vitrociset participated in the development of original SCOS 2000), Mission Automation and Planning Systems, Central Check-out systems and Database Engineering. In this context, Vitrociset works with sector agencies (ESA, CNES, ASI), with large system integrators (TAS, Airbus Defence and Space) and the most important commercial players (EUTELSAT, INMARSAT).

Added Value Applications & Services

Vitrociset is very active in the identification, development and promotion of applications and services with high added value using technologies in the Space sector, in support of major market players (end-users).The Company provides advanced platforms for positioning applications in critical areas (e.g. monitoring of dangerous goods), for telecommunications in support of air traffic management (voice Board-Ground-Board and data transmission using satellite data-links) and for the integration of satellite positioning and link services for real-time monitoring of multimodal transportation.



Large Experimental Facilities

Based on its consolidated experience in several domains and in special in the space market, since 2012 Vitrociset is providing its services and products for Large Experimental Facilities. In this context, Vitrociset is currently supporting ITER Control Division and Diagnostic Division for the design, development and commissioning of high specialized and safe critical systems.

Moreover, Vitrociset supports I&C development for Fusion For Energy and it has recently accomplished the supply of command and control systems for a linear accelerator, built at University of Calabria, for the Italian Interuniversity Consortium for the Physical Sciences of Matter.

Alphabetical list of Companies

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