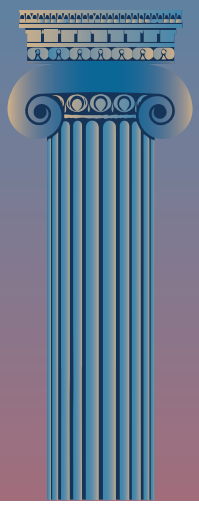
GLOBAL BUSINESS REPORTS

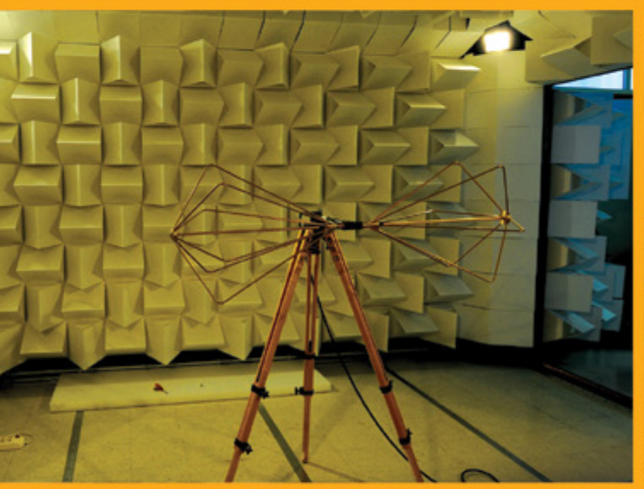
INDUSTRY EXPLORATIONS

ITALY AEROSPACE

2016

Civil aviation - Defense - Aerospace - Regional clusters
SMEs - Knowledge exchange - Innovation - Internationalization





Dear Reader,

The Italian Aerospace Industry is an example of resilience throughout these volatile times. Each of the six main regions within the aerospace sector have displayed strength, a drive towards continuous innovation and a push to further develop the industry in the country. Though many wish to see this country unite under a single aerospace flag, it seems that competition and rivalry amongst regions and clusters also fuels the wheels of this moving vessel.

Many companies have seen the current political instability in Europe as something that could bring detriment to the aerospace industry, especially given UK-American connections, yet others believe that this may be an opportunity to make the country more of a hub for international players, especially in the Lombardy region. New Earth observation technologies are constantly being developed and innovated to improve the country's emergency response, as well as to address the migrant crisis in North Africa and the Middle East.

New decommissioning solutions are being created in the country in order to address the thousands of new satellites forecast to be launched into orbit in upcoming years. Some also have plans to lead the market in terms of satellite production. A new race for space has arisen and Italy aims to be riding the wave of it.

Though most companies agree that the way forward is through internationalization, strong investments are also being made in order to place Italy at the forefront of the aerospace industry. With R&D developments and unparalleled technologies being created in CIRA, as well as the creation of a UAV testing site in Grottaglie Airport, the country is not slowing down despite Leonardo's decision to outsource some of their manufacturing activities. SMEs are certainly facing difficulty, which means that the race to staying alive will be fiercer than ever in upcoming years.

GBR has had the pleasure of learning more about the Italian aerospace industry over the course of several months. We invite you to learn more about the entrepreneurial spirit of the country, as well as understand the larger companies at play, which have been running the show from the origins of the sector. We would also like to thank the hundreds of companies who participated in order to create this report. This would not be possible without your support. We trust you will enjoy our findings.

Alice Pascoletti
Elisa Iannacone
Catherine Howe
Harriet Bailey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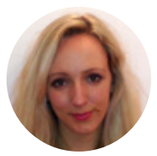
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Italy

- International Boundary
- Regional Boundary
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Italy Aerospace 2016
Industry Explorations
Global Business Reports

This research has been conducted by Alice Pascoletti, Elisa Iannacone, Catherine Howe and Harriet Bailey

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INTRODUCTION TO ITALY'S AEROSPACE INDUSTRY

"The Italian aerospace industry is currently the fourth largest in Europe and the seventh largest in the world. Our domestic industry has focused its skills on specific technological areas where there is significant international demand, which has served to enhance the capabilities of both large companies and SMEs."

- Guido Crosetto,
President, Italian Industries Federation for Aerospace, Defense and Security (AIAD)

Image courtesy of Leonardo

The Path to International Success

Aerospace players increasingly look abroad

Long considered a European powerhouse for innovation and design, it follows that Italy should be well respected on the global stage in an industry that holds these proficiencies as a necessity above all else. With a turnover of over €15 billion across the Aerospace and Defense & Security sectors, Italy's aerospace industry accounts for 75% of that at €11 billion, making it the seventh largest in the world and fourth largest in Europe. It may only account for 0.05% of the GDP, but with a workforce of 48,000 people and a network of over 600 small and medium enterprises (SMEs) as well as large key players, the industry is considered to be of great strategic importance to all regions in the coming years.

With a long history in mechanical engineering alongside innovation and research supported by the many institutions and universities, Italy's aerospace industry demonstrates vast capabilities. Among the large players and SME network we can find competences across the entire aeronautics value chain and in every aspect of space activity, from components and services to data collection and handling. Italy was the third country in the world to launch a satellite with the San Marco 1 mission in 1964 and, today, is one of the largest contributors to many European Space Agency (ESA) projects, playing a key role in both the International Space Station (ISS) and the ExoMars project.

Italy is home to several large multinationals, which include Leonardo (formerly Finmeccanica), Thales Alenia Space, Avio Aero and UTC Aerospace Systems. With 2015 revenue figures at €13 billion and 47,000 employees across 15 countries, Leonardo is organized in seven divisions: Helicopters, s, Aerostructures, Airborne & Space Systems, Land & Naval Defense Electronics, Defense Systems, and Security & Information Systems. The Military & Defense sector accounts for 65% of Leonardo's business, and the field of civil aviation accounts for the remaining 35%.

Under Leonardo's new strategy, effective since January 1st 2016, heralded by the

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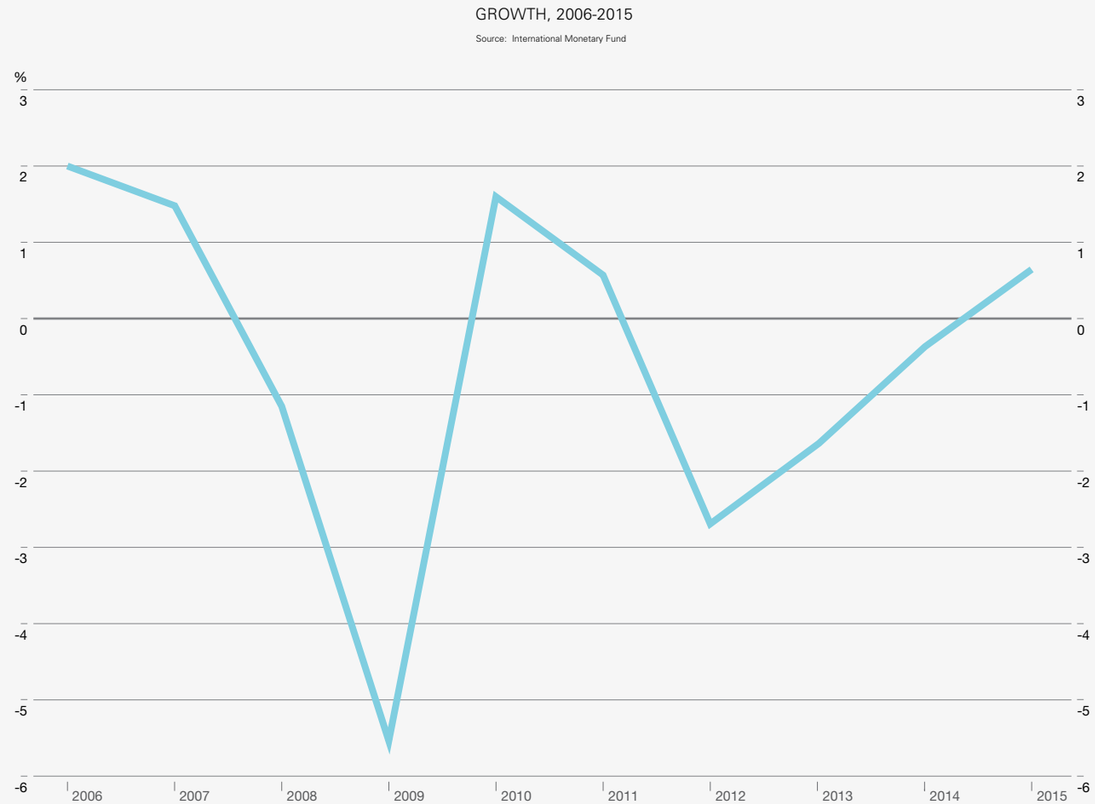

1.82
TRILLION USD
GDP

16.7%
Total investment (% of GDP)

11.9%
Unemployment rate

ITALY AT A GLANCE
Sources: CIA World Factbook / IMF

Population: 61,855,120 (July 2015 est.)
Land Area: 301,340 sq km
Official Language: Italian
Capital: Rome
Chief of State: President Sergio Mattarella (since 3 February 2015)
Head of Government: Prime Minister Matteo Renzi (since 22 February 2014)
GDP: $1.82 trillion (2015 est.)
Growth Rate: 0.8% (2015 est.)
GDP per Capita (PPP): $35,708 (2015 est.)
GDP Composition by Sector: 2.2% agriculture, 23.6% industry, 74.2% services (2015 est.)
Exports: $454.6 billion (2015 est.): engineering products, textiles and clothing, production machinery, motor vehicles, transport equipment, chemicals; foodstuffs, beverages, and tobacco; minerals, nonferrous metals
Imports: $389.2 billion (2015 est.): engineering products, chemicals, transport equipment, energy products, minerals and nonferrous metals, textiles and clothing; food, beverages, tobacco

35,708 USD
GDP per capita (PPP)

2.1%
Current account balance (% of GDP)

0.1%
inflation

◂ 8

change in name from Finmeccanica, the company has converged the operations of its fully-owned subsidiaries AgustaWestland, Alenia Aermacchi, Selex ES, OTO Melara and WASS to promote cohesion and efficiency within the business. DRS Technologies is the remaining U.S. subsidiary, and the remaining joint ventures are MBDA (with BAE Systems and Airbus Group), Telespazio and Thales Alenia Space (both with Thales) and ATR (with Airbus Group).

An unusual aspect of the Italian aerospace industry is its characterization by a network of SMEs, many of which compete for contracts with Leonardo as the leading national OEM. One of the key elements of Leonardo's new strategy is the cap on the overall business that a supplier may conduct with the company at a maximum of 75%, with the aim of encouraging competition between companies. "A fully or mostly dependent supplier would have no stimulus to develop or take in new practices and the company would therefore have no opportunity to grow or diversify their activities," explained Mauro Moretti, CEO and general manager of Leonardo. "If, on the other hand, our suppliers are competing in international markets," Moretti continued, "we know that their products and services are of high quality and offered at an appropriate price. This assists our growth and, in turn, we are able to provide them with more business. The objective, therefore, is to support sustainable growth for companies across the supply chain."

At a sub-national level, Italy has 11 main aerospace districts, of which the six key regions are Lombardy, Lazio, Piedmont, Campania, Apulia and Umbria. Each region lends itself to particular capabilities according to its history and the presence of major players within particular fields. Piedmont and Lombardy have particularly extensive capabilities, although Lombardy is best known for helicopters due to the presence of AgustaWestland (now merged into Leonardo's helicopter division). The region also boasts the capacity to produce an aircraft from inception to delivery. At 15,000 and 15,800 employees respectively, these two regions represent the largest workforce by region dedicated to the aerospace industry.

Lazio has a particularly strong space segment, while Apulia and Campania are more focused on aerostructures. At a national level however, and even within some regions, the capabilities are extensive and cover the entire value chain. "Italy is one of the richest countries in Europe when it comes to aerospace," claimed Filippo Ugolini, president of AGT Engineering. "The country more or less covers all areas of aerospace technologies available, with mechanical, industrial and electronic capabilities across space and aircraft. When taking these 640 smaller companies and their combined capabilities into account, it is clear to see that the opportunities are wide in many areas."

The rate of growth of each region correlates to the cohesion of its infrastructure and institutional support received. "The Italian government provides a lot of support to the southern regions of Italy, such as Campania, Apulia and Lazio, giving them the chance to grow quickly using government support and funds," explained Guglielmo Pisapia, CEO of S.I.M.E. "The northern parts of Italy," he continued, "have more traditional companies that were started earlier and have a slower growth rate, yet are more robust and resilient as a result. Going south, there are bigger companies that have grown faster with good personnel from universities and an injection of capital, however they have a shorter history and heritage."

Decrease in support through publicly funded activities, such as government-funded programs within the defense sector, is cited by many companies as a key challenge and driver for internationalization to identify new opportunities. "Aerospace is a public sector entity. There is no way to have a private sector market at the moment so in a way the future is of a stable nature, because it is difficult to grow without competition," explained Marco Casucci, managing director of Intecs Solutions.

It is clear that the national and regional governments have recently been paying more attention to the aerospace sector and its growth. "We receive less funding than other countries, but it seems that change is on the horizon in the ways in which the government and ministries are seeking to manage and support the SME network," commented Antonio Alunni, president of Fucine Umbre, an Umbria-based company specialized in forging, complete parts and treatment processes. "We need greater cohesion between the public and private sectors. Italy is a very competitive region and a very powerful market, with companies that compete worldwide, and a very strong supply chain." Alunni added: "There are, however, issues that need to be solved, and the government is needed to support the industry through programs and R&D funding."

Historical cultural competitiveness amongst regions and between northern and southern Italy are also matters that many companies are trying to address. A want for a national Italian aerospace consortium is present, but the steps to create it are incredibly nebulous given the vast amount of regional consortiums.

A push for collaborating amongst companies is also emerging. "I have always noticed that Italy had an *industrial bonsai mentality*", said Alfonso Centuori, President of the Apulian Aerospace Consortium. "Some Italian aerospace entrepreneurs try to make their own company the strongest in the world, covering all industrial processes, from composites to metal sheets, machined parts, assembly, engineering, design and painting. But when this bonsai company sits before a Tier-1 company and they request 1 million man-hours of labor per year, these kind of SMEs can only offer fractions of it," adds Centuori, who calls learning to collaborate a "Darwinian industrial evolution" that is indispensable for the future development of the region and the country.

There is a national control for regions to have a strong specialty: it is called the Italian meta-district of aerospace. Lombardy and Piedmont specialize in space, military aircraft and helicopters; Campania and Apulia are focused on civil aircraft and the manufacturing of the different airframes; the North takes care of final assembly lines (where they deliver the aircraft to the customers), the satellites and warfare; Lazio is more into radar, armaments, cyberware and other types of military products. They all have a strength and respect each other's operations.

Agreeing that there has been a historical lack of support from the national government, Sergio Chiamparino, president of Regione Piemonte, cited the establishment of a national governing unit as a means to organize the industry and align common objectives. "We were recently able to define a multiregional program as part of the national strategic plan for the space economy, which is supposed to be co-financed by both the state and regional governments, as well as the private sector."

Italy is a strong player within the aerospace sector, with extensive capabilities across its leading companies and SMEs. With increased support from the government and continued development across the different players, the country will continue to grow in prominence and further cement its position at the forefront of the international aerospace community.

Image: Finmeccanica

Global Business Reports

EDITORIAL

Guido Crosetto

President
ITALIAN INDUSTRIES FEDERATION FOR AEROSPACE, DEFENSE AND SECURITY (AIAD)

Why was AIAD established and what role does it play in the promotion of the aerospace industry in Italy?
In 1947, the Federation of Aircraft Manufacturers (AIA) was formed by the major players of the time to unite the country's aviation industry. The objective was to represent, promote and protect its interests within the General Confederation of Italian Industry (Confindustria) and various national and international organisations. We are now known as the Italian Industries Federation for Aerospace, Defense and Security, AIAD, and have more than 100 member companies employing 50,000 personnel nationwide. The industry generated more than €15 billion for the Italian economy in 2014, with aerospace accounting for 75% of that total.
The federation has grown over the past 70 years and is increasingly a stable reference point for the aerospace industry in front of governmental agencies and institutions. It is considered a forum for sector-specific economic and industrial issues and policies. Within our research and technological innovation activities, AIAD coordinates the activities of three platforms: ACARE Italy for Aeronautics; SERIT for security; and SPIN-IT for space.

How do you try to open expert markets for Italian manufacturers?
AIAD maintains close links with similar associations abroad, enabling us to take advantage of the experience and knowledge available worldwide. We also conduct significant activities in support of the internationalization process alongside the Secretariat General of Defense and the Italian Space Agency (ASI), as well as with the Italian Trade Promotion Agency (ICE) through representation at major international events and business conventions. AIAD aims to promote possible collaborations between Italian companies and their foreign counterparts, and match international demand with Italian supply. Furthermore, we also offer international delegations the opportunity to tour aerospace regions of interest, where we present various investment opportunities and potential scientific and commercial projects.
In Europe, our activities have been focused on fostering collaboration with other countries and developing research and innovation projects for Horizon 2020. Worldwide, we have been focusing on North and South America, South-East Asia and some of the countries in the Arabian Peninsula.

What is the scope of Italy's aerospace and defense sector?
Maintaining an adequate technological and industrial base is a key element for safeguarding Italian interests internationally. In terms of defense, Italian companies satisfy the demands of the armed forces, enabling Italy to remain a key player in this sector and to increase its role at an international level. Defense is indeed one of the few areas of strategic importance where Italy plays a leading global role, comprising advanced technologies and a highly skilled workforce, among other benefits.
Although defense represents only 1% of our GDP, it contributes on average a surplus of up to €5 billion (8 to 10%) to our trade balance.

Could you tell us more about the importance of the aerospace industry to particular provinces in Italy?
Italy has 11 aerospace districts, with Campania, Lazio, Lombardy, Piedmont and Apulia being the five most important. The remainder are located in Basilicata, Emilia Romagna, Liguria, Sardinia, Tuscany and Umbria. Although Varese in Lombardy has earned the nickname "the winged province" due to the presence of important companies in the history of the Italian Air Force, I do not believe it is possible to determine one leading aerospace district. AIAD is also a collaborator with the National Technology Cluster for Aerospace (CTNA) which coordinates activities across the country.
The Piedmont aerospace district is one of the most important districts because it covers the entire spectrum of aerospace activities. The region combines research and production, as evidenced by the continuous growth rate of 6.7% in production volume. Piedmont also benefits from three leading universities and research centers, five leading multinationals and more than 400 small to medium-sized companies, employing more than 10,000 people and generating revenues of €1.8 billion.

What are the future opportunities for the Italian aerospace industry?
The Italian aerospace industry is currently the fourth largest in Europe and the seventh largest in the world. Our domestic industry has focused its skills on specific technological areas where there is significant international demand, which has served to enhance the capabilities of both large companies and SMEs. Leonardo-Finmeccanica represents 80% of the Italian industry within the sector, positioning it among the top European players. Italian companies now have real potential to consolidate their technological expertise and become leading companies on an international level.

Supporting Innovation and Knowledge Exchange

The importance of Italian universities and research institutions

Universities and research institutions play a very active role in the overall development and innovation of Italian industry. From skilled vocational training and niche specialized engineering programs to independent and collaborative research projects, Italian universities are a key component of the industrial sector.
Well integrated into the surrounding industry, many universities conduct applied research in conjunction with companies and participate in programs at a national and European level. It is no coincidence that the director of Sapienza University's Center for Aerospace Research, Marcello Onofri, is also the president of Technological National Cluster for Aerospace (CTNA). CTNA is the key organization unifying all different actors within the aerospace sector, from the various regions, large companies and SMEs, to academic institutions and other entities.
Because of the close relationship with local enterprises, it follows that the activities of each university and research institute will reflect the local capabilities and specialize in these specific areas accordingly. "In the Lazio region there is a concentration of all the needed technologies and capabilities for many space activities. We have industries and research centers working on launchers and satellites with both optical and radar technologies, making Lazio a key region for innovation and the development of the Italian space sector," outlined Onofri, further identifying Campania's Italian Aerospace Center for Research (CIRA) as demonstrating particular excellence in high-speed flow and re-entry vehicle applications.
Major investments have been made in CIRA. The facilities now have an Icing Wind Tunnel as well as a Plasma wind tunnel. They have the capacity to test for extreme temperatures and are also focusing a strong part of their R&D work to developing composite materials. The Center was supported by NASA engineers in order to develop the competences they have now. This has allowed them to possess leading technologies that attract both national and international customers.
"Equally, most of the industrial activity for the International Space Station (ISS) is performed in Piedmont, which has become the hub for these activities. Lombardy is the key focus area for aeronautics, although there are also satellite and earth observation activities," he continued.
CNR, the National Research Council, is another research institution operating at a national level, with the opportunity to organize its divisions according to the areas of excellence of particular regions. "From region to region, the local industry emphasis and therefore our own capabilities differ," said Romolo Marcelli, senior researcher at IMM, a division of CNR.
A move to invest in the aerospace field can be clearly seen across the regions. In Apulia specifically, regional authorities have taken a keen interest on further developing the industry. Innovation and industrial initiatives are being encouraged. "In the Basilicata Region, geographically very close to Bari in Apulia, the Italian Space Agency has its Space Geodesy Center where Earth observation data from all active EO satellites is received and archived. In relation with this activity, an agreement between the Italian Space Agency and the Apulia Region has been signed for the creation of a national Center for Space Data Fusion," mentioned Luciano Guerriero, CEO, GAP and Professore Emerito, Politecnico di Bari.
Following reorganization in 2001, IMM collected seven units across Italy. The headquarters are based in Catania, and further units are situated in Agrate Brianza (MI), Bologna, Rome, Naples and Lecce, with a second unit in Catania. "In Lecce, for example, the excellent relationship between the institute and the local aerospace industry has resulted in a specialization along these lines, such as in technologies with high fre-

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Stefania Giannini

Minister
MINISTRY OF EDUCATION, UNIVERSITY AND RESEARCH

What initiatives does the Ministry of Education support to contribute to educational programs and graduate training in the country?
More than 8,000 students are enrolled in aerospace programs in Italy and universities offer high quality courses that pave the way for the necessary internationalization of the industry. Over the last few years, we have increased our university funding, believing that our country needs a smart and knowledge-based growth in order to compete at the best standards with our partners and secure sustainable benefits to our citizens. Further funds have been allocated to support departments dedicated to R&D. The National Research Program (2015-2020) has identified the aerospace sector as a priority area for applied and transnational research. We intend to fully support and consolidate our quality level, favoring a better impact on production and technology and leading the way in terms of innovation.

The Ministry of Education also supports the research institutions. Could you outline the funding model for research and the key institutions in Italy?
Italy holds a strong international technical and scientific position, thanks to public research institutions, such as the Italian Space Agency (ASI), the National Research Council (CNR) and the National Institute for Astrophysics (INAF). We provide them with more financial and human resources and simplify the regulatory framework as much as possible. Our support to the Italian Space Agency has grown and we are the third largest contributor to the European Space Agency. Other relevant funds come from Horizon 2020.
In the seventh Framework Program, Italy obtained relevant funds (19% of the total). 24% of this percentage is to be attributed to industrial participation (61% large enterprises and 39% SMEs). At the same time Italy has a unique portfolio of strategic partnerships with all the relevant space agencies around the word, such as NASA, Roscosmos and the China National Space Administration, which allows our scientists and industries to be well positioned in the global space competition.

What are the current target areas for space and aerospace research and developent in Italy?
The use of spatial data for terrestrial applications constitutes a cultural turning point for addressing global challenges such as climate change, environment, health, energy, transportation, migration and Earth protection. They pose an extraordinary opportunity to increase quality of life and protect our planet, to explore the universe and increase our knowledge. The last ESA report on Space Economy reminds us that the Earth Observation (EO) services market is creating new opportunities, such as the emergence of big data and the digital revolution. This is the new Space Gold Rush which could represent a relevant volume of economic activity.

The Ministry of Education cooperates in scientific research internationally. Could you provide an example of a research program in which Italy has played a leading role?
Regardless of its final outcome, the ExoMars Mission has been a clear example of our potential. We participated in this mission for Mars exploration with a leading role (35% of the total budget), both at a scientific and a technological level. Four principal investigators were Italian, three of whom were women. This experience teaches us that success can arrive both after first achievements and failed attempts. We are looking forward to a new initiative, "Open Universe", proposed during the 59th session of the COPUOS. We want to build and strengthen the capacity in the use of open source space science data and technology through international cooperation.

What are the key focus areas for the Ministry of Education over the next three to five years?
During the first International Space Forum, which took place in Trento in October, we stressed the need to financially support the development and the harmonization of Space Curricula at local, regional and international levels, paying the greatest attention to developing countries. Large challenges require strong alliances and this international commitment confirms the central role of universities and their attitude to shape global communities of knowledge. We should take advantage of this openness, by supporting the inception, preparation and exploitation of space and research activities regardless of their geographical location.

"The last ESA report on Space Economy reminds us that the Earth Observation (EO) services market is creating new opportunities, such as the emergence of big data and the digital revolution. This is the new Space Gold Rush which could represent a relevant volume of economic activity."

"Our students have the opportunity to work with prominent aerospace companies and contribute to their research projects. [...] Within these collaborative relationships, students work on real projects and challenges otherwise handled by qualified engineers within the companies. Students gain practical experience and provide solutions to complex challenges with wider applications. This arrangement is also beneficial to the companies in furthering research capabilities, using the resources offered by the university."

- Marco Gilli, Rector, Politecnico di Torino

"The Sapienza University provides major support to international aerospace programs, and the roots of Italy's space activities can be traced back here. [...] We cover a large number of activities, ranging from education and research in space to practical collaborations. When I go to the launch sites, I often find some of my former students at a high level of responsibility for many programs."

- Marcello Onofri, Director, CRAS-Center for Aerospace Research, Sapienza University of Rome

"As well as our teaching resources offered to students, we also conduct applied research and therefore collaborate with many companies in the surrounding regions. We have many contracts for projects both in association with ESA and the European community, and on regional and national programs."

- Ernesto Limiti, Professor, University of Rome Tor Vergata, EE Department

IMPORTANT UNIVERSITIES AND RESEARCH CENTERS FOR THE AEROSPACE INDUSTRY

1. CTNA
2. CIRA
3. IMM (part of CNR)
4. Italian Space Agency - Space Geodesy Center
5. Politecnico di Bari
6. CRAS at Sapienza University of Rome
7. Politecnico di Torino
8. Institute of Italian Technology (IIT)
9. University of Rome Tor Vergata
10. Politecnico di Milano
11. Institute for Applied Remote Sensing (EURAC)
12. University of Naples Federico II
13. University of Studi Del Sannio
14. University of Napoli Parthenope
15. University of Salerno
16. European Centre for Space Law
17. University of Bologna
18. University of Pisa

Image: IDS

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quency applications. In Apulia, Lazio and Campania, for example, space is particularly prominent, and this is reflected in IMM's activities in the corresponding units," indicated Marcelli.

Many of the universities offer specialized programs and have highly respected engineering departments offering excellent training to students. The specializations of the regional universities also tend to reflect the areas of excellence of the wider region. The Sapienza University of Rome, for instance, houses CRAS, an inter-departmental center for aerospace research. The Politecnico di Torino is particularly well regarded for engineering, and its Department of Mechanical and Aerospace Engineering is one of 11 departments that support 5,000 engineering students per year. "Our aerospace program is one of the most popular among students, and we welcome about 300 first year students annually onto this course. Many of our graduates have become very prominent within leading companies, both in Piedmont and throughout the country," remarked Marco Gilli, rector and professor of electrical engineering at the university. "More than 90% of our engineering students find a job within a year of graduation; however, the figure is slightly higher in aerospace engineering because the field is more technologically advanced."

The universities are very well respected within the wider industry, and often cited as a key advantage by companies in their respective regions, providing access to a skilled and well-trained graduate pool. Many of the universities have a history of collaboration with leading companies, of which there are generally a substantial concentration nearby. The University of Rome Tor Vergata, for instance, has built strong relationships that benefit both students and companies. "We are lucky to have a long history of collaboration with companies in the aerospace and defense sector, particularly because of our proximity to a large concentration of them. In the Via Tiburtina area close by, for example, we have Leonardo–Finmeccanica, Thales Alenia Space, Elettronica, Rheinmetall, and several others," noted Ernesto Limiti, professor of the department of electronic engineering. "We face very few challenges in terms of work opportunities for graduates, who naturally become enrolled in these companies. The university as a whole offers 21,000 internships and traineeships in Italy and abroad, and 88% of masters graduates find work within one year of graduation," Limiti added.

Many companies offer internships to students, and several others offer joint masters programs at the university, often employing graduates on their completion of the course. The Politecnico di Torino offers joint courses designed with Thales Alenia Space, for example.

Contributions to technological development

The relationship between private enterprises and universities is beneficial for both parties; students often have the opportunity to learn in a practical environment or apply their research to real challenges, and companies gain access to innovative research and skilled workers within a specialized field.

Collaborating with universities for R&D purposes is an opportunity very much valued by aerospace companies. IDS, a company specializing in electromagnetic applications and signals with 80% of its business conducted internationally, collaborates with several Italian universities in order to uphold its position as a forerunner of innovation and cutting-edge technology. "We have offices near universities in Naples, Catanzaro and La Spezia in order to be close to different research centers," highlighted Giovanni Bardelli, IDS' CEO. "Cooperating with universities is crucial for R&D and finding new, effective solutions, especially in a niche market like ours. Having a lot of offices near universities and research centers around the world helps us to continuously modify and adapt our programs to our customers' needs."

The universities and research institutions are particularly involved in large-scale projects, such as those funded by the Italian Space Agency (ASI) and European Space Agency (ESA). These projects require collaboration between different entities to realize a full set of services, from research to manufacture and testing. "By collaborating and complementing the capabilities of other institutions, we increase our critical mass as a region and forge an easier route to internationalization," stated Marcelli. "The relationship is also mutually beneficial, providing feedback on design for us, and simultaneously contributing to the professional growth of students."

Italy's universities and research institutions offer numerous advantages to companies operating across various regions, supporting training, knowledge sharing, research and innovation. As the capabilities and skills of these institutions become more widely recognized, the potential for them to become more involved in large-scale projects will grow. —

LEONARDO

HEADQUARTERS LOCATION
ROME

company size

47,156
EMPLOYEES

revenue (2015)

12.9
BILLION EUROS

key aerospace customers

65%
MILITARY

35%
CIVIL

key products and services

CIVIL AND MILITARY HELICOPTERS AND AIRCRAFT, AEROSTRUCTURES, UNMANNED SYSTEMS, DEFENSE AND SECURITY ELECTRONICS (AVIONICS, LAND AND NAVAL RADARS, MILITARY AND SECURE COMMUNICATIONS, AIR TRAFFIC CONTROL AND MANAGEMENT, ICT AND SECURITY); TORPEDOS, NAVAL GUNS, MISSILE SYSTEMS, SATELLITE MANUFACTURING AND SATELLITE SERVICES

company type

OEM System Integrator
AND COMPONENTS FOR FIXED WING AND ROTARY WING AIRCRAFT, ELECTRONICS SYSTEMS, SPACE SYSTEMS

key industries

100%
AEROSPACE & DEFENSE

NOTE: Data and activities are referred to Leonardo Group – in 2015 Transportation activities are no more consolidated. From 2014 the Group DATA no longer include the contribution given by the JVs (Telespazio, Thales Alenia Space (Space activities) MBDA (Missile systems), ATR (regional aircraft)

Mauro Moretti

CEO and General Manager

There have been many changes to the company since you became CEO in 2014. Could you provide us with an overview of these developments and the company's new vision?
Focusing on the key capabilities of the business, we have aimed to promote cohesion and efficiency in our operations. The first step taken was a restructuring of the company and reorganization around the aerospace, defense and security activities. Moving away from the holding structure of the business, our second step was to arrive at a new business model, with just one integrated and consolidated company, rather than a network of independent companies operating in different sectors.
This new operating model is based around four major business sectors, organized across seven operational divisions. These divisions are now coherent and consistent in terms of technology, capabilities and customers, and each has a specific focus. They are also supported centrally at a corporate level, sharing processes across functions such as marketing, strategy, communications, legal and HR. The provision of a single interface helps us to implement best practices and streamline operations. This, of course, benefits the customer and also gives us a single voice, allowing us to leverage our position as a large corporation when building relationships with customers, partners and other companies. The change from Finmeccanica to Leonardo communicates our shift in focus and business culture. Taken from Leonardo Da Vinci, the name to us exemplifies the roots of disruptive innovation. We consider ourselves proponents of similar qualities, and the name epitomizes our new vision.

How do you balance the commercial interest of your investors with the strategic interests of the government?
Just over 30% of Leonardo's shares are held by the Ministry of Economy and Finance, and 50% by institutional investors. There is however no conflict between the interests of the Italian Government and the interests of the institutional investors as decisions are made by the corporate governance system in place in Leonardo and aimed at creating value for shareholders. Additionally, as exemplified by the order for the Eurofighter Typhoon aircraft from Kuwait, the Italian Government is fully supportive of our business. As a matter of fact, the contract with Kuwait was signed following a specific G to G between the Italian Government and the Government of Kuwait.

What is the motivation behind the cap on the business your suppliers can conduct with the company?
The idea behind restricting the percentage of overall output that companies may supply to Leonardo at 70%–75% is to encourage competition within the market. A large company like Leonardo can be a huge support to the growth of a country's industry if it has a balanced and healthy relationship with its suppliers. If SMEs work for just one customer, it is not beneficial for either party. A fully or mostly dependent supplier would have no stimulus to develop or take in new practices and the company would therefore have no opportunity to grow or diversify their activities. If, on the other hand, our suppliers are competing in international markets, we know that their products and services are of high quality and offered at an appropriate price. This assists our growth and, in turn, we are able to provide them with more business. The objective, therefore, is to support sustainable growth for companies across the supply chain.

“

A large company like Leonardo can be a huge support to the growth of a country's industry if it has a balanced and healthy relationship with its suppliers. If SMEs work for just one customer, it is not beneficial for either party.

”

Where are you focusing your R&D investment, and what are your plans for future growth?
We invest a significant amount in R&D, approximately 11% of our revenues (more than €1.4 billion in 2015), and we receive a large amount of national funding. Most of our projects are based on cooperation and collaboration with research centers and universities. Our approach is to identify, acquire and rapidly and effectively consolidate cutting-edge technologies across the division's businesses, and apply these to the needs and requirements of the market.
We believe that a key area of focus for the aerospace and defense sector going forward will be unmanned systems, and an increase in their autonomy and performance. We are also investing further in the helicopter domain, developing the next generation civil tilt rotor, which seeks to answer growing demand for substantially higher speed, range and comfort, and capable of generating an additional rotorcraft market, both commercial and governmental. Within aeronautics, trainers are another leading product family for Leonardo, and we aim to grow our market presence. Another focus area will be the security and defense electronics sector, with key investments in the radar domain, including the development of AESA (Active Electronically Scanned Array) radars and in the four fixed-face Multi-Functional Radar (X and C band). We will also continue to leverage our unique experience and services acquired through the Space Alliance and national and international government institutions to develop our space capabilities.

As an Italian company looking to internationalize, what are Leonardo's key objectives over the next four years?
Italy has strong capabilities across aerospace and defense. We will see a continued and increasing pesence at the leading edge of innovation. Investment in R&D and innovation will be key to staying ahead and providing unique solutions and products that will meet customer requirements. As a player in the Italian aerospace and defense industry, we will continue to offer our capabilities, investment, heritage and expertise. One of the main aims of Leonardo's new vision is to grow internationally. We want to improve our international operations and offer a complete and integrated service.
We will also continue to focus more narrowly on those areas in which we could become world leaders. We plan to achieve this through investments and growth, and consolidating our presence in those areas where we want to be stronger and increase our volumes.

CETMA

HEADQUARTERS LOCATION
Brindisi

company size
90
EMPLOYEES

company type
R&D,
INDUSTRIAL ENGINEERING

key aerospace customers
95%
COMMERCIAL AVIATION

key industries
25%
AEROSPACE

25%
TRANSPORTATION

50%
OTHER SECTORS

key products and services
COMPOSITES
DESIGN AND ANALYSIS
PROCESSES AND FORMING
TESTING AND CERTIFICATION

Luigi Barone

CEO

Could you describe the goals that you had when the company started?
CETMA was born out of ANEA as a research and a technological organization. The aim was to promote innovation in the south of Italy, for which a technical structure was created, including an office for research and a development lab. We built up a team of people who were experienced in research management. We have two main activities, the first is to carry out research, and in doing so create knowledge, however we are also a technological center because the knowledge and skills created by the research are transferred to our customers.

What is CETMA's geographical scope?
In terms of research and development we are able to give services to customers across Italy. We have researchers operating in many fields but most of our work is focused on the aerospace industry. Our operations are concentrated in our site in Apulia. We work with composite materials in the aeronautical sector, but our knowledge in this segment is transferrable. Indeed, we plan on opening a new site in northern Italy.

How is virtual reality (VR) translating into new developments for CETMA?
We have been working with virtual reality for 10 to 15 years. We have developed software to interact with virtual reality and have created design software in order to use VR as a kind of computer aided design (CAD). We have also developed an application for augmented reality. The more realistic the system is, the better it becomes for maintenance training, but the main usage of VR in this field lies in manufacturing. Augmented reality is a technology that merges the real environment with informative virtual reality.

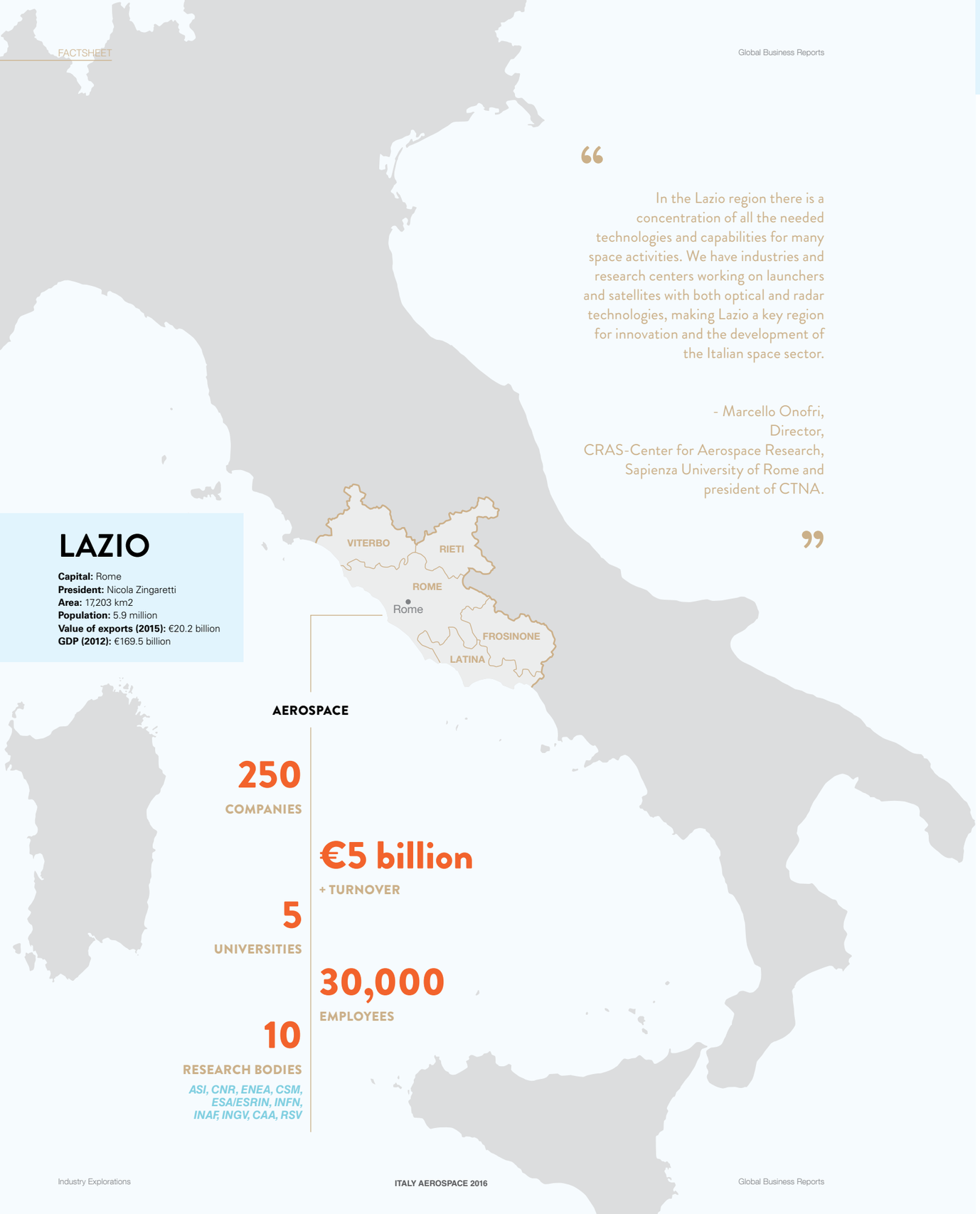
Where would you like to see CETMA in three years time?
We are evolving from being a research center to becoming a technological provider. We are thinking to invest in providing not only knowledge but also devices for our customers. For example we are now owners of an important European patent concerning the welding of thermoplastic composite materials. It is important to remember that we are a non-profit enterprise and that all the profit generated is used to finance our research activities according to the non-profit structure.

Image courtesy of Leonardo

Uniting the Front

Spotlight on the key aerospace districts

Italy has 11 aerospace districts, with Campania, Lazio, Lombardy, Piedmont, Apulia and Umbria widely deemed the six most important. The remainder are Basilicata, Emilia Romagna, Liguria, Sardinia and Tuscany. With differing competences and areas of excellence, it is impossible to select one district as the leader across all fields. “Although Varese in Lombardy has earned the nickname ‘the winged province’ due to the presence of important companies in the history of the Italian Air Force, I do not believe it is possible to determine one leading aerospace district,” underlined Guido Crosetto, president of the Federation of Italian Companies for Aerospace, Defense and Security (AIAD).
Though there is vast competition amongst the six regions, they all have different specialties. Campania and Apulia have a strong manufacturing segment, where composite materials are being developed and there is a focus on civil aircraft. Lazio leans further towards the military and defense products. Whereas Lombardy and Piedmont are considered the wealthier regions and both have strengths in space, helicopters and military aircraft.
According to Ernesto Limiti, Professor at the University of Rome Tor Vergata’s electronic engineering department, Lazio, and specifically Rome, has the largest concentration of aerospace and defense companies, closely followed by Piedmont. Limiti attributes Piedmont’s prominence in part to the presence of Thales Alenia Space, and also to the Politecnico di Torino and Institute of Italian Technology (IIT). “Italy has a long history in the aerospace sector; we are probably the pioneers of space within Europe. We have a number of prominent medium to large-sized companies at the forefront of innovation and, additionally, all the surrounding SMEs that work for them and are very important for the national industry. There is a good network of specific competences that are not readily available elsewhere,” Limiti asserted.
It is the responsibility of the Italian Cluster for Aerospace Technology (CTNA) to coordinate the activities across the 11 districts at a national level across private enterprises and public institutions. “Because of the specific nature of the aerospace industry, the activities are typically very technologically advanced, and it is thus essential to connect research institutions and enterprises to pool knowledge and integrate capabilities,” explained CTNA’s president, Marcello Onofri. “We create a production chain from the design and research stages through to manufacturing, incorporating universities, research centers and SMEs, for example. At the moment, all cluster activities are government-driven, but there is no doubt that we will begin to operate commercially", added Onofri.



LAZIO

Capital: Rome
President: Nicola Zingaretti
Area: 17,203 km2
Population: 5.9 million
Value of exports (2015): €20.2 billion
GDP (2012): €169.5 billion

AEROSPACE

250
COMPANIES

€5 billion
+ TURNOVER

5
UNIVERSITIES

30,000
EMPLOYEES

10
RESEARCH BODIES
ASI, CNR, ENEA, CSM, ESA/ESRIN, INFN, INAF, INGV, CAA, RSV

> In the Lazio region there is a concentration of all the needed technologies and capabilities for many space activities. We have industries and research centers working on launchers and satellites with both optical and radar technologies, making Lazio a key region for innovation and the development of the Italian space sector.
>
> - Marcello Onofri, Director, CRAS-Center for Aerospace Research, Sapienza University of Rome and president of CTNA.

Valerio Caroselli

President
LAZIO CONNECT ASSOCIATION
General Manager
IPTSAT

> The space sector and in particular remote sensing will be our key focus for the future. With the growth of constellations such as Copernicus, it is necessary to transform the increasing amount of raw data into useful and accessible information. We will also focus on the agricultural sector, which is growing rapidly.

IPTSAT was established in 1987. Could you provide us with a brief history of the company?
IPTSAT's original operations were in the field of Geographic Information Systems (GIS) to help the government monitor and control changes affecting urban centers and the environment. Remote sensing technology at this time was in its very early stages with NASA only just beginning to deploy its first tracking and data relay satellites. A short while later, we began to support public institutions, the government and the military in better understanding territories through our earth observation technologies. To do this, we put most of our energy into transforming raw data into usable information, which continues to be the underlying characteristic of our company today. Today we are able to use satellites to observe vast territories and analyze a wide array of factors and areas including the level of air, water and land pollution, chlorophyll synthesis of trees in forests, and even illegal activities such as unlawful building construction.

Could you give us some insight into your customer relationships?
About 50% of our business comes from public tenders, with European, national government and public administration entities making up our largest customer base. We also have contracts with research centers, accounting for 10% to 15% of our business, usually requesting satellite data and maps or contracting us to help them understand data and transform it into simple, digestible information. The remaining to 35% to 40% of our customers is in the private sector.

What is the purpose of the project to map fly zones for UAVs?
Two years ago we began mapping 'no-fly zones' in Italy, specifically for Unmanned Aerial Vehicles (UAVs). Although not as popular in Italy as in the USA or France, UAVs are nonetheless a growing market. Their use is heavily regulated due to concerns over public safety, and they are not permitted to fly over particular areas, such as the Colosseum in Rome, for example. Often unaware of these regulations, citizens are regularly subjected to fines. For this reason, we decided to turn the complicated rules into easily graspable and accessible information. We were able to transform static information into an interactive platform through which you can select your location and find out about local regulations for flying drones, without having to download and scour huge files. Within five months we had received 500 website subscriptions and, two years later, we have more than 2,000 subscribers. We currently receive on average 40 new subscriptions every month.

How important is the international market to your business?
Currently only 5% to 6% percent of our total revenue derives from our customers outside Italy. We began selling our services across Europe two years ago thanks to an agricultural project under the framework of Horizon 2020, a European Union instrument dedicated to innovation in SMEs. For a small company like ours composed of ten people, it is extremely challenging to compete with other companies in Europe, particularly German and French companies. Collaborating with both national and international associations like the Institute for Applied Remote Sensing (EURAC), European Association of Remote Sensing Companies (EARSC) and Lazio Connect is crucial for us in terms of visibility, reference and support in our work.
We are particularly happy to work with Lazio Connect, for which I am the acting President, which connects us with 42 other members from universities, research centers, and SMEs of the Lazio region. In Italy, all regions have different capabilities and use diverse models to define a cluster. By utilizing our extensive network, we are able to identify the relevant expertise within the cluster and relay the information back to the customer. By helping each other we create a win-win situation for everyone involved.

How do you plan to utilize these opportunities to support IPTSAT's growth?
The space sector and in particular remote sensing will be our key focus for the future. With the growth of constellations such as Copernicus, it is necessary to transform the increasing amount of raw data into useful and accessible information. We will also focus on the agricultural sector, which is growing rapidly. As a result of dramatic population growth, it is essential to find ways to maximize production using the same amount of space. Our technologies and solutions can support these goals and, furthermore, reduce the use of pesticides and water.

LOMBARDY

Capital: Milan
President: Roberto Maroni
Area: 24,000 km2
GDP: €296 billion euro
(represents 20% of national GDP)
Population: 10 million
GDP per capita: 33,500.00 EUR (2008)
Value of exports (2015): €111.2 billion
GDP (2012): €331.4 billion

AEROSPACE

220
COMPANIES
OF WHICH 194 SMES

15,800
EMPLOYEES

€4.5 billion
TURNOVER

€1.9 billion
VALUE OF EXPORTS

Angelo Vallerani

President
LOMBARDY AEROSPACE CLUSTER

Could you describe your vision for the Lombardy Cluster?
The Lombardy Aerospace Cluster is an integrated system of companies, which span from large system integrators to family owned ones, universities, R&D centers and institutions, in a well-developed triple-helix model. Lombardy contains the complete expertise of aircraft system integrators with both fixed and rotary wings, satellites and scientific payloads. In the territory there is a full supply chain, able to deliver the finished product thanks to the presence of avionics, equipment and components producers. This represents a peculiarity among Italian regions, as well as in the European framework. Varese is known as the Italian "province with wings", because Alenia Aermacchi and AgustaWestland, now Aircraft and Helicopter Divisions of Leonardo, were born here.
The goal is to continuously support companies' growth through the development of a strong regional network. As the President of the cluster, I do not act as the CEO of a single company that makes independent decisions. I chair the cluster board to coordinate how we can better support each other. I try to make all players cooperate and communicate to enhance their competitiveness, especially if they are small and micro companies.

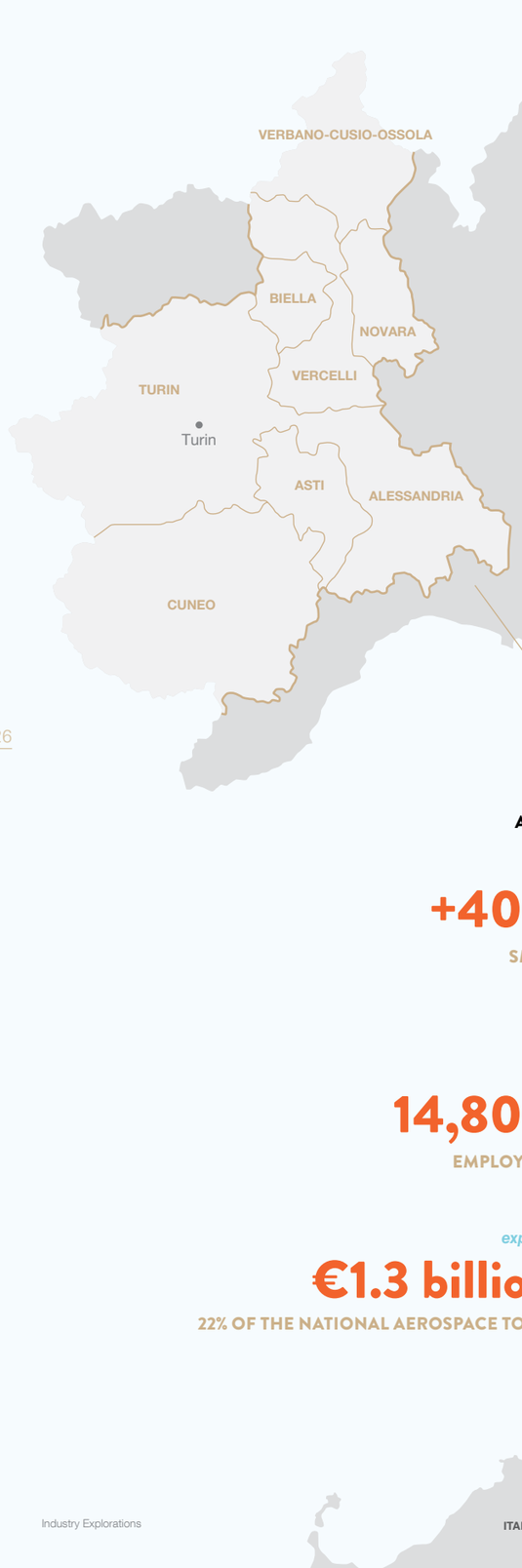
Which have you set as your main goals?
The Cluster's main goal is to support and expand aerospace industry excellence in Lombardy through the creation of a network based on the active collaboration between large, small and medium companies, knowledge systems and institutions. In this way, small companies are informed of aerospace trends, while larger companies are surrounded by an excellent local productive system. To give an example, in 2013 the cluster launched a project named "Certifications", where large companies gave support in mapping a common path for SMEs for certification achievement. The cluster involves universities and research centers as well, which helps us gain a better understanding of new developments.

Are there ways in which the Cluster can help companies gain global visibility?
We live in a global market and indeed many small and medium companies are looking to expand outside of Italy. Large players already have channels to access customers. The cluster helps small companies to collaborate with larger players to gain international visibility. We aim to take SMEs on a path of internationalization by participating in international shows, events and by creating a stable network with other clusters and European companies.

With decisions such as Leonardo's opting to move a part of their operations to Poland and the need to go global, is this a good time to invest in the Italian aerospace market?
Competitive conditions and market changes are strictly linked. For example, if we look at helicopters, oil price has dropped triggering an immediate effect: the overall worldwide reduction of helicopter orders. This negatively affects Leonardo helicopters but also all the other providers in the cluster. Companies operating in the aerospace business should therefore not only look at the Italian market, since this is only a small niche, they need to go international. In Italy there should also be more involvement at the governmental level. In France or Germany, large companies selling planes or helicopters abroad have support from their government. I would ask the government for support in making Italian products as appealing as other countries do for their products.

There is strong rivalry between Italian regions, is this a cultural reaction or a response to the current political framework?
Italy is a very young country and it was put together by many different regions: one country for 20 regions. I do not want to speak about rivalry, but rather about fair competition which is unavoidably in our DNA. There are regions with a long productive history, limited national resources and European Commission funding availability. We hope that in the future, a strong local attention will be developed with a local policy able to open new opportunities for our companies, too.

There is currently a lot of political instability at the international level. What is the future for the aerospace industry given all of these changes?
Brexit is still in a phase where details are being explored. How it will affect the aerospace industry is yet to be determined, but I see this as a potential opportunity for Italy. There have been talks of relocating various companies and agencies from the UK to Italy, given they are now outside of the EU boundary. Europe is a strong customer for our business, but there are also opportunities for new players in the Middle East and Africa. We need to be able to react to change and adapt to the current uncertainty.



PIEDMONT

Capital: Turin
President: Sergio Chiamparino
Area: 25,000 km2
Population: 4.4 million
Value of exports (2015): €45.8 billion
GDP (2012): €124.9 billion

AEROSPACE

+400
SMES

€3.9 billion
+ TURNOVER

14,800
EMPLOYEES

key players

ALENIA AERMACCHI, AVIO AERO, SELEX ES, THALES ALENIA SPACE, MICROTECNICA ACTUATION SYSTEMS, INTECS, MECAER AVIATION GROUP, AND AVIOSPACE

KEY ASSOCIATIONS: TORINO PIEMONTE AEROSPACE (TPA)

exports

€1.3 billion
22% OF THE NATIONAL AEROSPACE TOTAL

Global Business Reports

Global Business Reports

"Firstly, Piedmont boasts a complete aerospace supply chain compared with the other Italian aerospace clusters, with a stronger segment specialization. Secondly, the presence of five prime companies together with a further 300 SMEs, constitutes a substantial supplier base. The area therefore represents a unique opportunity for foreign companies looking for both suppliers and partners for industrial cooperation. Finally, the presence of a strong academic and research network provides companies with skilled engineers and professionals with a strong background in R&D activities."

- Vincenzo Ilotte, President,
Turin Chamber of Commerce

"We believe that to compete in a global market, as an SME, which make up the large majority of our enterprises, innovation has to be at the forefront of a company's offering. This comes alongside ensuring high quality products and cooperating with other companies to be able to offer a diversified and complete solution to international clients. We need to make the world more aware that Piedmont is home to an aerospace cluster that covers the entire supply chain."

- Sergio Chiamparino, President,
Piedmont Region

"Our aerospace sector is recognized as one of the most important in Italy, where the development and application of new technology plays a key role, both in terms of an improvement in design capability, as well as the potential it offers for the realization and design of high-tech products. Moreover, in Piedmont there is a long history and extensive experience and exchange between the aerospace and automotive sectors, with an evident and important cross-fertilization among them."

- Diana Giorgini, Aerospace Manager, Piemonte Agency,
Torino Piemonte Aerospace (TPA)

Global Business Reports

Global Business Reports

"Since the Aerospace District was launched, Piedmont Region has invested €50 million of European structural funds which, with the addition of private funding, have made over €100 million available for research and development. This measure has enabled Piedmont to excel in five key technological areas: UAVs for civil applications, eco-compatible aero engines, space exploration technologies, space debris management and new generation electromechanical actuators."

- Thomas De Alessandri, President,
Finpiemonte

"The significant technical contribution by the Piedmont region to the development of the space sector is highlighted by the participation of our Piedmont plant in the main scientific international missions such as Mars Express, Venus Express, Rosetta, GOCE, Bepi Colombo, Euclid and ExoMars."

- Donato Amoroso, CEO,
Thales Alenia Space.

"Piedmont's aerospace SME supply chain is both well-regarded and highly competitive, thanks to the support coming from local bodies and institutions. It is characterized by a large number of SMEs that, through innovation, can serve as a lever for further development. The main advantage of the SME population in Piedmont is their proximity to the big industry; this promises consistent opportunity to develop new products while helping secure responsive customer demand."

- Vincenzo Ilotte, President,
Turin Chamber of Commerce

CAMPANIA

Capital: Naples
President: Vincenzo De Luca
Area: 13.590 km²
Population: 5.8 million
Value of exports (2015): €9.7 billion
GDP (2012): €95.5 billion

"I was born in the Campania region and have experienced its aerospace history my whole life. There are numerous aerospace companies that have worked in this region for many years and we have strong relations with them. The region is united, and there are many skilled people. Certainly, as everywhere in Italy, there is great competition for the market, but whenever any technical problem arises, I can go to my neighbor for assistance."

- Giovanni Abete,
CEO and General Manager,
A. Abete

AEROSPACE

We chose Campania to start with our R&D activities because the region is very solid within the Earth Observation segment of the market. Campania holds many companies participating in the Aerospace District, DAC, as well as research centers devoted to aerospace, like the CIRA in Capua. There is also a critical mass of companies that use satellites to provide products and services.

- Roberto Tartaglia Porcini,
CEO and General Manager,
MapSat Telerivelamento
Euromediterraneo

170
COMPANIES
9 large companies, the rest are SMEs

10,000
EMPLOYEES

The Italian Aerospace Research Center (CIRA)

With world-leading unique test facilities, the Italian Aerospace Research Center (CIRA) was created in 1984 to further develop Italy's company competitiveness, know-how and innovation. The company is funded through both private and public entities, with the support of the local government, various aerospace companies, research bodies and space industries. Located on 160 hectares of land near Capua, in the Campania region, CIRA is involved in international R&D projects, training, as well as housing cutting-edge technologies, some of which were developed in collaboration with the U.S.

One of the most important facilities at CIRA is the Icing Wind Tunnel (IWT), which was created under PRORA in the early 90s, given that the Italian industry had a strong demand for this service. The IWT is a closed-loop circuit, in which the environmental conditions encountered by helicopters, aircraft and even Formula 1 racing cars can be found. Different from a standard aerodynamic wind tunnel, the IWT is capable of re-creating the subzero water droplets that aircraft encounter during take-off.

Antonio Auletta, researcher at CIRA and test engineer at the Icing Wind Tunnel explains that water solidifying in negative temperatures is possible with the presence of pollution, given that dust and pollution particles become the crystallization nucleus for ice to build. This means that when an aircraft takes off and goes through clouds, it encounters liquid droplets in clouds that are living at temperatures ranging from -30 to -40 degrees Celsius. "At very high altitudes we do not have such high levels of pollution. This means that when an aircraft crosses clouds, the aircraft itself is seen as a huge pollution particle. The water particles freeze instantaneously at impact, this can cause the leading-edge of the wing to dramatically change shape randomly, affecting performance, as well as altering the aircraft's weight."

The ability to test for approximately 90% of all cloud conditions is indispensable to ensuring the safety and evaluating aircraft performance. There are however very rare clouds with Supercooled Large Droplets (SLD) that are characterized by droplets whose diameter can reach 1mm of diameter. "We are developing new spray nozzles to simulate these kinds of droplets," added Auletta. The IWT is now used by entities ranging from NATO to Lockheed Martin.

The Plasma Wind Tunnel (PWT) is another of CIRA's leading facilities, and the largest in the world of its kind. "The air that exits from the nozzles goes into a diffuser, which is used to re-create the environment for the re-entry of a space vehicle into the Earth's atmosphere," described Federico De Filippis, senior researcher at CIRA. "We can represent the state of 20,000 km per hour or 6 km per second at our facilities, with two nozzles of 1 meter and 2 meters in diameter. The latter is double the size than the nozzle at NASA, which also has a wind tunnel." The PWT requires approximately the same amount of energy to operate as the city of Pisa would during one evening.

CIRA's third most important facility is the Aerospace Structures Impact Lab (LISA), which is a crash test facility that explores ways in which occupants and payloads can survive in case of impact. The company is currently running various R&D projects on composite materials, innovating ways to increase resistance to develop products for the industry.

Image: Tecnam

APULIA

Capital: Bari
President: Michele Emiliano
Area: 19,340 km²
Population: 4.1 million
Value of exports (2015): €8.2 billion
GDP (2012): €70.3 billion

AEROSPACE

32
SMES

5,198
EMPLOYEES

key companies

LEONARDO, AVIO AERO, GSE INDUSTRIA AERONAUTICA, SALVER, SITAEL

> In Apulia, the regional authorities are supporting the development of this sector with attention, encouraging the settlements of new industrial initiatives. A Space Industrial district has been created and is very active.
>
> - Luciano Guerriero, CEO, GAP and Professore Emerito, Politecnico di Bari

> Apulia is in the south of Italy, we are not in the center of the world. We know that many people do not know where we are located and who we are. The target is to enter the global market and attract international investors. We also want our airports to connect to international hubs in order to attract more tourism.
>
> - Giuseppe Acierno, President of Aeroporto di Puglia, Distretto Tecnologico Aerospaziale Scarl and Distretto Produttivo Aerospaziale Pugliese

Giuseppe Acierno

President
DISTRETTO TECNOLOGICO AEROSPAZIALE (DTA) AND DISTRETTO PRODUTTIVO AEROSPAZIALE PUGLIESE (DAP)
President
AEROPORTI DI PUGLIA

Could you please provide a brief overview of your operations?
Aeroporti di Apulia is the first Italian network made up of four airports owned by the same company. A few months ago the birth of the second network was created in Tuscany, by Pisa and Florence. The largest of the group in terms of activity are Bari and Brindisi, both devoted to commercial aviation. The whole network has now seen over 6 million passengers move through it. Foggia is not operating at full capacity given current expansions. Grottaglie was renewed in the past few years due to the cooperation between Finmeccanica and Boeing for the production of the 787 Dreamliner.

Grottaglie is now a pivotal part of your operations, given its unmanned aerial vehicle (UAV) developments. What are your goals for this airport?
Grottaglie became an airport that would support the industrial aerospace activities in Apulia, starting with Leonardo and the 787. It opened its doors to other SME suppliers to contribute to the production of the fuselage alongside Leonardo. When I became the sole director of the network in 2013, I decided to focus on building infrastructure. Grottaglie is now the only airport in Italy recognized by ENAC with a dedicated area for UAV testing. Italy aims to be a leader in this market, following the U.S. and Israel.

Can we expect a shift towards the increased usage of UAVs in the aerospace industry?
UAVs are the future of the aerospace industry. The European Commission has also spoken of a new era for aerospace, which underlines the future importance of UAV technologies. This is not an opportunity for traditional aircraft industries, but rather for space industries that integrate aeronautical and space technologies. UAVs will move following satellite signals. Apulian companies will have the opportunity to create parts and components for the aircraft, as well as develop new technologies for the payload, the capture of information and data fusion, acquisition and interpretation.

What is your vision for the future of Aeroporti di Puglia?
Apulia is in southern Italy, we are not in the center of the world. The target is to enter the global market and attract international investors. We also want our airports to connect to international hubs to attract more tourism. By 2030 we will most likely face a 50% increase of the global passenger traffic. This will be doubled in 2050, where the ideal target is to have a 4-hour door to door trip anywhere within Europe. The crisis in North Africa and the Middle East has led to a strong increase of international tourism in the continent. In 2015, Apulia saw a 23% increase of international traffic. We believe 2016 will outgrow this.

As president of DTA and DAP, could you explain their roles within Apulia's aerospace industry?
In 2004 we observed that SMEs needed to change, innovate, start R&D projects and think more globally. We then created the Technological District Consortium [DTA] with GE, Leonardo, Salver, GSE, Sitael and Planetek. The consortium is recognized by the Ministry of Research and aims to increase the Apulian aerospace industry's competitiveness. We created the DTA for research purposes, with 10 new faculties to teach aerospace, labs and technical schools. More than €200 million have been invested so far. DAP, on the other hand is made-up by companies, universities, associations such as Confindustria, trade unions and research centers. It is an association that gives public authorities support to define the policies that will promote the sector. Working in the new era for aerospace, as the European Commission stated, is paramount to the Apulia region.

UMBRIA

Capital: Perugia
President: Catiuscia Marini
Area: 8,456 km²
Population: 891,000
Value of exports (2015): €3.6 billion
GDP (2012): €21.2 billion

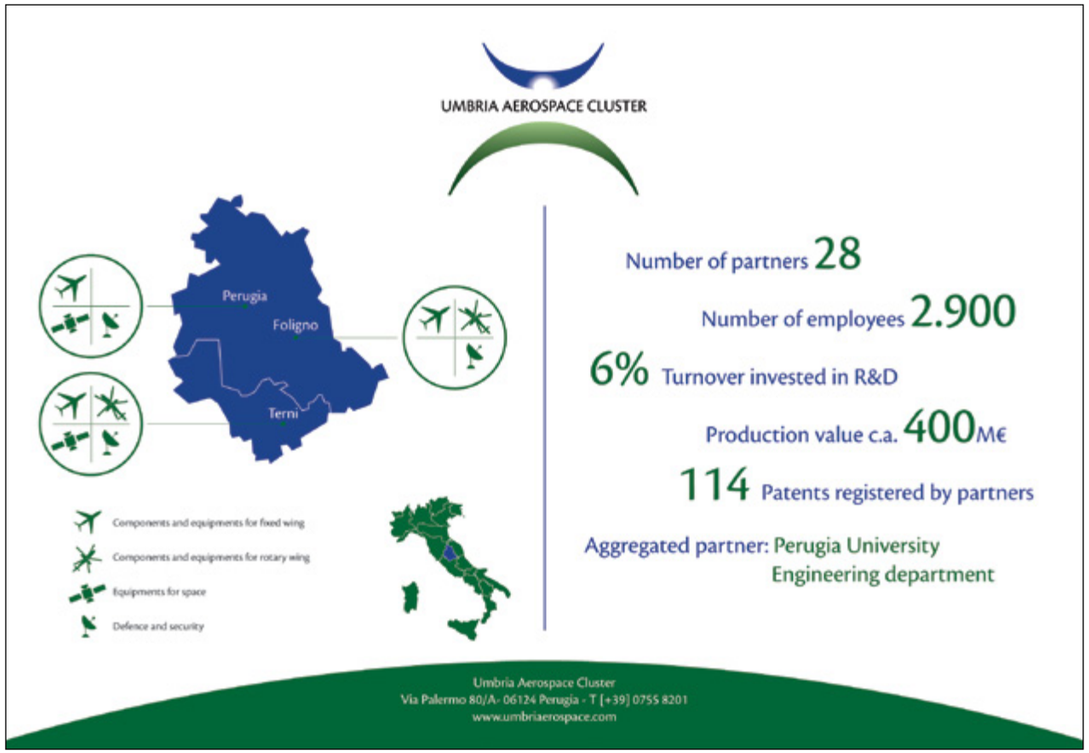
UMBRIA AEROSPACE CLUSTER

28
MEMBERS
3 LARGE COMPANIES
5 MEDIUM-SIZED
19 SMALL
The University of Perugia is an associated member.

The UAC combined turnover amounts to €400 million (2015)
(56% domestic market,
33% European Union market,
11% out of EU)

2,900
EMPLOYEES

More than 10% of workforce and 6% of turnover dedicated to R&D.



Antonio Alunni

President
UMBRIA AEROSPACE CLUSTER
President
FUCINE UMBRE

> We are one of the smallest clusters in Italy, simply because we have a smaller number of companies. Out of 29 companies, 26 are SMEs and the remainder, OMA, Umbra Cuscinetti and Angelantoni, are classified as large companies. Yet customers that visit us feel there is a strong network.

Could you summarize Fucine Umbre's main developments since its establishment?
The company was founded by my grandfather and my father in 1967 in Terni, and has a long tradition in forging and transforming metallic materials. In the 1970s, my father had the idea to specialize the company in small and medium batches instead of large-scale production, and identified aerospace and defense as the key market to pursue. When I joined the company in 1996 I further pushed the specialization in aeronautics, increasing the portfolio share from 30% to more than 90%. The remaining business falls in the defense and industrial markets with applications very close to the needs of the aerospace industry.
We offer a range of products and services to the market, targeting OEMs, in three main areas. The first area is forging, which comprises the core of our business and will remain one of our strongest capabilities. The second is to be a Tier-1 company, providing complete parts, ready to be used in the assembly line. The third is the services we offer our customers, including a complete range of in-house processes.

Who are your main clients?
Italy is our main market, and we work across the entire industry serving all OEMs, including Leonardo's divisions, which account for about 30% of our business. Over the last decade we have worked to improve our international presence, and we are proud to also supply the main OEMs in the international market, such as Parker Aerospace, Liebherr and Safran. Currently about 70% of our business is within the national market, and we are aiming to bring the split to 50-50, with the goal to increase our international operations to 70% within the next ten years. The market in the Far East has great potential, for example, particularly for defense applications.

What makes Fucine Umbre the partner of choice?
We are competitive in many areas (price, quality, availability, competence and time) which make our services appealing to many potential customers. We have had a very strong investment plan over the last decade that has allowed us to cover all areas of the process. Beginning with the raw materials, we are able to make complete parts with in-house capabilities including forging, machining, NDI, heat treatment, sheening, painting and bonding. We do not have to contend with a long and complicated supply chain, and can be more confident in managing the quality of our products. Our flexibility is also a great strength.

How does the Umbria Aerospace Cluster support the region?
Umbria is a wonderful place to be in for many reasons. The quality of work is connected to the quality of life, and the region is well placed geographically. As a suburb of the capital, we are connected to the international market. We are one of the smallest clusters in Italy, simply because we have a smaller number of companies. Out of 29 companies, 26 are SMEs and the remainder, OMA, Umbra Cuscinetti and Angelantoni, are classified as large companies. Yet customers that visit us feel there is a strong network. Bringing investment to the region is not easy, but we are trying to demonstrate the benefits of our network and promote our companies in this way.

What are some of the key challenges and barriers in the market?
Italy is a very competitive region and a very powerful market, with companies that compete worldwide, and a very strong supply chain. There are, however, issues that need to be solved. The government is needed to support the industry through programs and R&D funding. We receive less funding than other countries, but it seems that change is on the horizon as the government and ministries are seeking to give support to the SME network.
There is a lack of OEMs, and we need more medium to large-sized companies and OEMs to drive investment and challenges. Italy is very competitive in terms of cost, and OEMs entering the market would find a high level of competence and skills. The government needs to make the region more attractive for investment.

Many Bricks Build a Wall

The capabilities of the SME network

The apparent asymmetry and fragmented structure of the Italian aerospace industry is a peculiarity when compared to other national markets, which have seen a greater amount of consolidation and therefore are home to fewer niche companies. "Compared to other countries, Italian companies are more accustomed to relying on private capabilities and investment, and the country system has allowed the industry to develop in this way," explained Mauro Margherita, managing director at Angelantoni Test Technologies. "Italian companies, normally small and medium in size, have therefore tended to pursue niche capabilities that have not been developed by larger companies, giving us the chance to advance in these particular fields," he added.

The majority of SMEs are aiming to enter the international market or grow their presence outside of Italy. "The sector is undergoing a reorganization to be able to compete on the international stage. We have seen this most recently with the various companies under the Finmeccanica umbrella forming one single company: Leonardo," noted Teoresi Group's CEO Mario Brossa. This reorganization is a means to approach the international market with more force. Demonstrating their intent, Leonardo has recently secured several overseas contracts to increase visibility internationally, including its largest order ever for Eurofighter Typhoon aircraft for Kuwait valued at €7.95 billion.

Whilst some companies see Leonardo as a useful platform for international visibility, others feel pressure to look for opportunity elsewhere. Andrea Clerici, marketing and sales manager at Prestel Avio, described potentially damaging trends for big players to reduce their supplier portfolio to streamline operations. "As global markets become increasingly important for them, we will become less important for our traditional customers," he commented.

Other companies feel that there are limited opportunities within the national market due to a lack of government-funded programs and OEMs. "The main challenge in Italy is the national market's restricted growth, which makes it difficult for companies to expand. It is therefore essential to explore opportunities in international markets," said Paolo Solferino, CEO of Vitrociset.

Among the plethora of small companies with niche expertise and an ability to adapt to market needs, some have already established themselves as international leaders because of their unique capabilities. Space in particular is an increasingly global market, so it follows that players within this sector would operate internationally through contracts with the Italian Space Agency (ASI) and the European Space Agency (ESA). "In the aerospace sector it is necessary for us to operate at least on a European level," commented Luca Macaccioli, CTO of RF Microtech, an Umbria-based technology start-up specializing in antennas and phased arrays, microwave filters and passive components and micro-electro mechanical systems, among others. "The activities of ASI are strictly connected to the activities of ESA. By working with ASI we are therefore also operating within the wider European framework."

However, many SMEs struggle to compete internationally as they are unable to take on larger contracts or unable to provide an integrated set of services such is often required by the customer. "In general, it is quite difficult gaining big contracts –not because of a lack of skill, but because of a lack of dimension," explained TPS Aerospace Engineering CEO, Alessandro Rosso. "France and Germany are more structured in terms of networking and thus companies can reach higher capacity." Customers often want an integrated supplier base, which is easier to obtain from a large company with extensive capabilities, rather than SMEs with more niche specializations.

Despite the apparent fragmentation of the industry, many organizations and clusters have been established to support the SME network by connecting the capabilities and services of smaller companies in order to be more competitive on both a national and an international scale. "The only way to lead in the aerospace market" argued Luca Pigato, CEO of Mepit, "is to possess characteristics that a big company has, such as versatility, flexibility and a competitive price. We organize our factory in a way that it can handle different requests from customers, from the type of material and number of parts to the time to market."

Image: Leonardo

Organization at a regional level

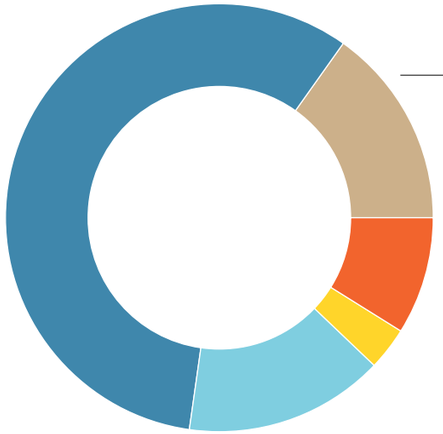
There are several organizations that function at a regional level, such as Torino Piemonte Aerospace (TPA), Lazio Innova and Lazio Connect, Distretto Aerospaziale Lombardo, Campania Aerospace and Umbria Aerospace. These organizations seek to promote the capabilities of their respective regions and to support companies in their growth and internationalization.

Supporting the aggregation model as a means to supply the international market, Diana Giorgini, aerospace manager at TPA, commented: "The aggregation of five to six companies, with a good capacity and high level of technology, can lead to a successful cluster working on integrated projects, as it is not about providing components but rather a complete system. In this way, the competitiveness of the group of suppliers increases more than that of an individual company on its own, in terms of dimensions and resources."

By creating a network of companies, SMEs are able take on larger contracts and increase their international visibility by presenting a more complete set of capabilities. This enables smaller companies to compete alongside the larger players on both a national and international scale, offering a set of specialized capabilities pooled together.

ITALY'S AEROSPACE INDUSTRY
GBR 2016 SURVEY (I)

Respondents active in the following segments (more than one answer possible):
Civil aviation: 49%
Space: 39%
Military: 21%
Other: 18%

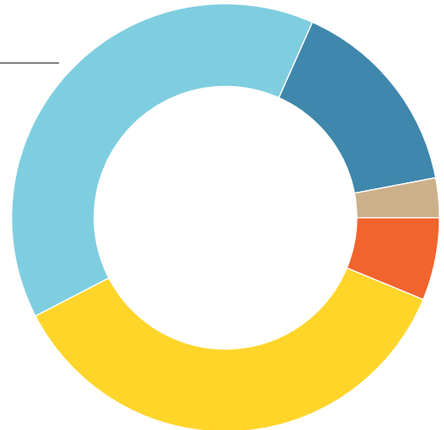


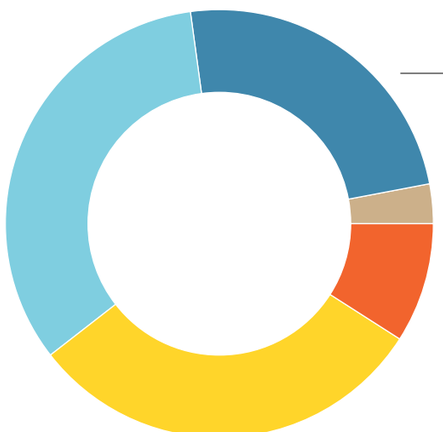
The industry's SME network has extensive capabilities and the potential to tackle large contracts through collaborations.

Strongly disagree	9.1%
Disagree	2.9%
Neither agree nor disagree	15.2%
Agree	57.6%
Strongly Agree	15.2%

Companies within the aerospace industry are well supported by the regional and national governments.

Strongly disagree	6%
Disagree	226.4%
Neither agree nor disagree	39.4%
Agree	15.2%
Strongly Agree	3%

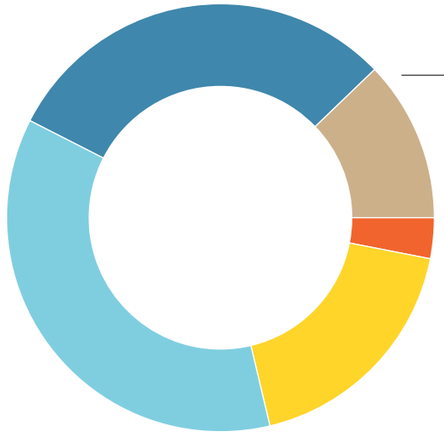




Leonardo's new strategy is beneficial to the Italian aerospace industry.

Strongly disagree	9.1%
Disagree	30.3%
Neither agree nor disagree	33.3%
Agree	24.2%
Strongly Agree	3.1%

See more results from the survey on page 134

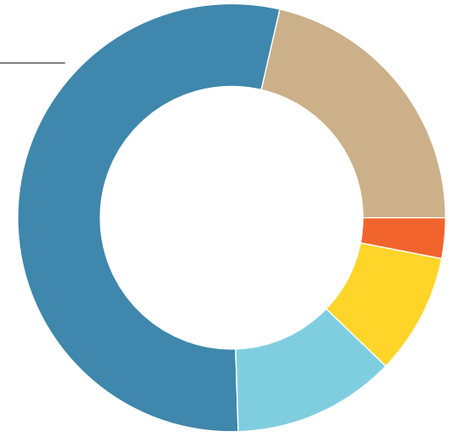


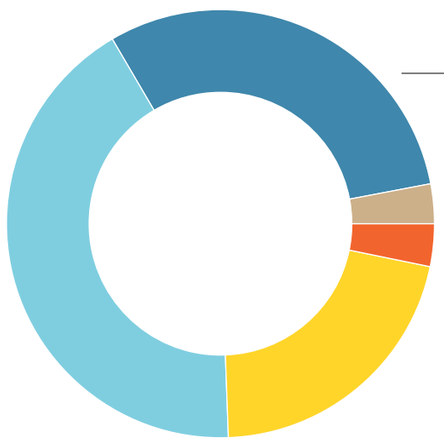
The Italian aerospace industry is very well regarded internationally.

Strongly disagree	3%
Disagree	18.2%
Neither agree nor disagree	36.4%
Agree	30.3%
Strongly Agree	12.1%

Associations and clusters are of great importance to SMEs, which would otherwise struggle to win big contracts.

Strongly disagree	6.1%
Disagree	9.1%
Neither agree nor disagree	12.1%
Agree	54.5%
Strongly Agree	21.2%





The industry will maintain levels of competitiveness in line with other countries over the next three years.

Strongly disagree	3.1%
Disagree	21.2%
Neither agree nor disagree	42.4%
Agree	30.3%
Strongly Agree	3.1%

SPACE
CAPABILITIES

"Every member state's space industry has its own characteristics. As ESA's third biggest contributor, Italy has a strong space industry including leading industrial prime contractors, such as Avio and Thales Alenia Space and is thus active both in space transportation and in satellites."

- Jan Wörner,
Director General,
European Space Agency (ESA)

Image courtesy of SITAEL

Through Space and Time

Upholding a long-standing tradition

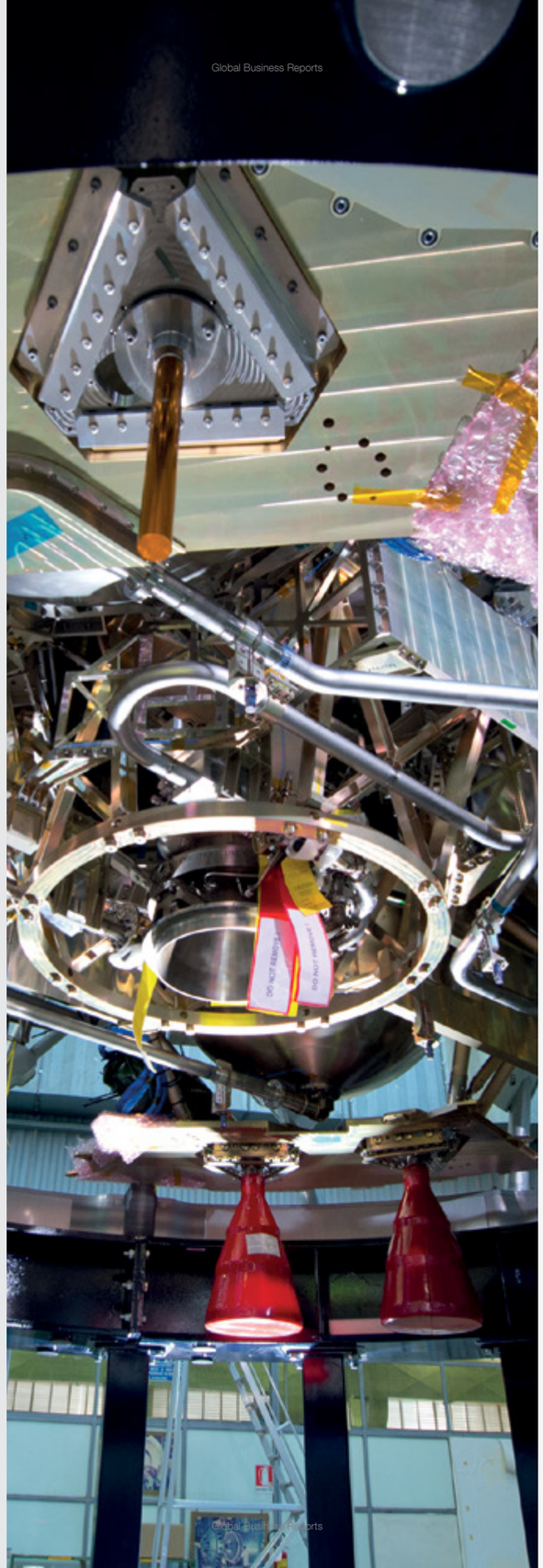
Italy has long been present on the space sector's global stage, achieving international recognition and visibility as the third country in the world to launch and operate a satellite in orbit. From the 1964 launch of San Marco 1, Italy has been at the forefront of space exploration and research for over half a century. Recognized today as the seventh largest space economy in the world, Italy is a huge contributor to international programs both in terms of funding and participation.

The third largest contributor to the European Space Agency (ESA), and a key contributor to space exploration programs including the International Space Station (ISS), ExoMars, LISA Pathfinder and the Vega Launcher, Italy is also at the forefront of Earth observation with the COSMO-SkyMed constellation. "Italy has always participated in EU research programs, demonstrating its leadership of some major projects," noted Roberto Battiston, president of the Italian Space Agency (ASI). "The Italian participation in Horizon 2020 has seen financial returns between 13.5% and 14%; results above the national average and above the percentage of Italian contribution to the program."

Several companies have also gained international recognition individually for their technological expertise. Thales Alenia Space, a joint venture between France's Thales and Italy-based Leonardo, built 50% of the residential modules and laboratories for the ISS, for example. Altec, a joint venture between Thales Alenia Space and ASI, is also responsible for supporting all operations, maintenance and logistics of the ISS through a control center located in Turin.

Furthermore, Italy is also a key player in the ExoMars program. The program's objective is to search for past or present life on Mars, with the first mission launched in March 2016 including an Entry, Descent and Landing Demonstrator Module (EDM), and the second, including a rover, with a launch date of 2020. Aside from being the greatest contributor financially among the 14 ESA member states involved, followed by the United Kingdom, Germany and France, Italian companies are also responsible for more than one third of the activity. Altec, for example, is

40►



ASI MISSIONS AND PROJECTS

SPACE HABITABILITY

① ② ③

Third country to send an **International Space Station (ISS)** element into orbit

MEDICINE AND BIOTECHNOLOGY

Transferring knowledge to **biomedical applications** on Earth

SATELLITE NAVIGATION

Galileo and other projects

OBSERVATION OF THE EARTH

Environmental monitoring and security

HIGH ENERGY ASTROPHYSICS

Studying the most **violent phaenomena** in the Universe

COSMOLOGY AND FUNDAMENTAL PHYSICS

Studying the **evolution of the Universe**

SOLAR SYSTEM EXPLORATION

Venus, Mars, Jupiter, comets **and beyond**

TELECOMMUNICATIONS

New technologies and applications

SPACE TRANSPORTATION

Developing new **European launchers**

Image: Sitael

> Italy has always participated in EU research programs, demonstrating its leadership of some major projects. The Italian participation in Horizon 2020 has seen financial returns between 13.5% and 14%, results above the national average and above the percentage of Italian contribution to the program.
>
> - Roberto Battiston, President, Agenzia Spaziale Italiana (ASI)

responsible for the technology behind the Mars rover and the operation of the Rover Operations Control Center (ROCC).

The most substantial financial contributions to space activities come through the Italian Space Agency and European Space Agency, with some further investment from private entities and other ministries, such as the Ministry of Defense. However, although there is a large amount of investment into space programs, a substantial amount of these funds is focused internationally rather than on national development. "Despite large amounts of spending historically within the European space community, we lost control of our major space company at the height of the European ideology that united all nations around a common interest," related Armando Orlandi, president of Progetti Speziali Italiani (PSI). "Taking into account the ASI budget, the defense budget, mandatory contribution to the European Commission, regional investment and research expenditures, the expenditure for space in Italy is about €1 billion per year, and needs to be properly focused to support Italian companies," he emphasized.

Because of the large scale of many programs, much of the funding also tends to be focused on the large players. "The industry has also been blocked by the fact that scientific missions, such as ExoMars and the International Space Station, have always been the key focus for industrial policy, accounting for 80% of total investment," commented Sabino Titomanlio, head of business development at Space Engineering, part of Airbus Italy. "This means that money is always funneled into the same companies that are able to operate on a large enough scale with a particular set of capabilities, which has not helped the Italian industry to develop an advanced product portfolio at a national level.

Regional specialization and niche capabilities of SMEs

Although many companies carry out space activities across Italy, Lazio is the epicenter of these operations, accounting for around half of the industry's turnover, which was around €1.6 billion in 2014. In the same year, exports from the sector made up 70% of this turnover, more than half of which was to other European countries and ESA.

Whilst the multinational companies and those operating on a large scale within the international market are the key contributors to national and European programs, SMEs also play a very important role in the technological development of niche space applications. Commenting on the Italian industry in comparison to other regions, Vincenzo Giorgio, CEO of Altec, stated: "In Italy, the industry has more or less all the capability: access to space, telecommunications capability and Earth observation systems. You will find all the building blocks of space activity in Italy, both in the wider industry as well as in the SMEs, which is a good mix. Very good and very skilled SMEs are able to invest in specific technologies, which is impossible for the larger players, as well as having good connections with universities and research centers. Italy's space footprint is, so far, very successful."

Space is an increasingly global industry, often giving SMEs immediate access to the international market, and companies worldwide have recognized the potential for highly innovative systems developed with a great deal of flexibility concerning customer requirements. However, some SMEs struggle with the size and unreliability of the ESA and ASI funded contracts. For this reason, organizations such as PSI seek to integrate their services with other companies in the region to increase their range of capabilities and the scope of projects that they are able to approach. "This integrated service, from concept and development to manufacture and delivery to the end user, allowed us to gain independence from the existing system of consolidated players," explained Orlandi of PSI. "SMEs in particular suffer from an unpredictable pattern of contracts and are unable to handle large projects, so they cannot maintain their highly-skilled workforce if they are not able to deliver new projects continuously," he added.

SMEs' competitive edge

Some SMEs have managed to shine because of their niche specialized capabilities and ability to present made-to-measure solutions, which make them a partner of choice. "As a small company, we have a very fast reaction time and great flexibility, and are able to offer tailor-made solutions in very specific niche areas," explained Filippo Gemma, general manager at GMSpazio.

A recent project carried out by GMSpazio is their J2KGTOD project for Altec, demonstrating the recognition given to a small company of only eight people by such a large and technologically advanced enterprise. "We developed a small tool to convert the coordinates of a sensor mounted on top of the International Space Station from the original reference system, the AMS magnetic spectrometer. Using many different technologies and our own expertise, we managed to build a precise and reliable system within the 20-day deadline," said Gemma.

Italian companies also have an excellent reputation in terms of technical expertise, quality and cost competitiveness. Giorgio Lo Verde, space business unit manager at Next Ingegneria dei Sistemi, sees the perception of the Italian industry as a key advantage when entering the European market. "Despite the European market being very competitive, we believe we have an advantage due to our Italian engineers, who have a good reputation abroad. In Darmstadt there are more than 1,000 consultants within the aerospace field, and around 30% of them are Italian."

Larger corporations in the country often rely on the strength of SMEs in order to maintain their level of operations. As Alfonso Centuori, President of the Apulian Aerospace Consortium describes, "the industrial backbone of Italy is made up of SMEs, especially within the manufacturing sector. The efficiency of an SME is much higher than that of a large enterprise. They lubricate the wheels of large companies. Big corporations cannot succeed in any market without a solid supply chain."

Manufacturing SMEs are currently facing challenges due to decreasing orders, especially in terms of helicopters given the lowering of oil prices. "That's where and why the Consortium can help, creating momentum and trying to intercept bigger bids, also internationally, impossible to reach for the single SMEs," Centuori added.

Italy's network of large players and SMEs with specialized capabilities forms the perfect basis for a leading space industry, offering vast experience, technical expertise and advanced solutions. The challenges surrounding space activities require constant research and innovation to be overcome, something well understood and supported by Italy's space industry. ▬

Roberto Battiston

President
ITALIAN SPACE AGENCY (ASI)

Could you explain the reasons behind the founding of the Italian Space Agency (ASI) in 1988 and how the organization has developed since then?
From the end of the 1970s, the space sector became increasingly important, and participation in international space programs began to be viewed as a necessity. A systematic approach was required with regard to resources and strategy to be applied to research and participation in international programs. The ultimate solution to the challenge of rallying our national space industry came from a proposal by the National Research Council (CNR) to construct a new independent system to coordinate Italy's space activities and, in 1988, ASI was officially established.
ASI has since aided Italy's prominence in the technological, scientific and industrial sectors, both through specific national initiatives and through participation in joint international programs with ESA, NASA and other space agencies such as Roscosmos, JAXA and ISA. In 2014, Italy took another important step in establishing the Cabinet for Space Coordination Activities, under the Prime Minister's Office. The aim of the Cabinet is to define and coordinate the Italian space strategy and policy with the participation of different ministries involved in space activities and the contribution of representatives from all the Italian space stakeholders, such as the Italian Space Agency, industry, academia, local authorities and administrations. In this framework, it is very important to have high levels of specialization in the various aerospace clusters across Italy.

In what areas is ASI leading the field in terms of European and global space research and activities?
Two thirds of ASI's funding is focused on three key areas: Universe Observation, Launchers and Earth Observation. Regarding observation of the universe, ASI has placed scientific satellites into orbit, and participates in the most prominent ESA and NASA missions, especially dedicated to the exploration of the solar system, the observation of stars and galaxies and the high energy astrophysics. Our participation in these missions has allowed us to reach levels of excellence in many fields of space research. Italy is ranked sixth in the world for the number of scientific publications in the field of space, with 5.74% of total publications, after the United States, China, Germany, France, and Great Britain.
Within ESA's scientific programs, the Italian space industry is a major contributor to several missions currently in their preparation stages. Among these are the Solar Orbiter for the study of the sun, EUCLID for energy and dark matter research and PLATO to search for extrasolar planets. Other projects in which we participate include JUICE, dedicated to the study of Jupiter's moons, Ganymede, Callisto and Europa; CHEOPS, dedicated to finding exoplanetary transits; and the LISA Pathfinder for the study of gravitational waves. Italy also contributed greatly to the success of the network of European launchers such as Ariane and, as national leaders, to the development and realization of the Vega launcher. We are also at the forefront of Earth observation, with global leadership in X-band SAR systems, due to our constellation of COSMO-SkyMed satellites.
The technological capabilities and attained knowledge allow us to possess all the skills necessary to independently access space, and place our country among the few able to develop and construct a space launcher. It is a very important area in which we will continue to invest and conduct research.

ASI is the third largest contributor country to the European Space Agency and also works with the European Union. Could you tell us more about these relationships and the shared activities you conduct?
Italy has always participated in EU research programs, demonstrating its leadership of some major projects. The Italian participation in Horizon 2020 has seen financial returns between 13.5% and 14%, results above the national average and above the percentage of Italian contribution to the program. The European Union's role in space is expected to continue to grow both in terms of programs and financing.

ASI has also been working with NASA, for example on modules and components for the International Space Station (ISS). How has this work developed and how does it improve the reputation of Italian manufacturing and innovation around the world?
Italy has a privileged and diverse partnership with the United States, with a strong tradition of bilateral relations with NASA, and many cooperative programs, particularly in the scientific field. As well as the ISS project, in which Italy, among other European countries, is a privileged partner, there are many other scientific missions led by NASA in which ASI has participated. These include CASSINI, MARSIS, JUNO and AMS-2, to name a few. In September 2015 we signed an agreement authorizing NASA for the use of the COSMO-SkyMed images in exchange for ASI's use of the Alaska Satellite Facility to grant seven post doctorate bursaries to the United States. In addition to Italy's elevation within the space sector through these joint scientific missions, this collaboration has supported Italy's space industry in terms of both human capital and technological gain.

What are your main aims for the future of ASI and its relationships with international space organizations, as well as the role of Italy as a leader in the aerospace sector?
Our vision can be explained through four strategic objectives: the promotion of services and applications for the new space economy, the development and use of infrastructure for the new space economy, the support of scientific and cultural progress, and the growth of the country's international prestige. We plan to cement and further Italy's role and position in the global space industry through the continued participation in missions and space programs, which are important vehicles to provide a platform to build an equitable and sustainable social and economic development.

Jan Wörner

Director General
EUROPEAN SPACE AGENCY

Could you give a brief history of ESA and the reasons for its establishment in 1975?
In the early 1950s the Western European nations decided to set up two different agencies that would deal with space activities: one specifically concerned with developing a launch system, ELDO (European Launch Development Organization), and the other a precursor to the European Space Agency, ESRO (European Space Research Organization). The latter was established in 1964. Soon after, the founding member states realized it would be better to have one single European Space Agency. ESA, in its current form, was founded with the signature of the ESA Convention in 1975, when ESRO was merged with ELDO.

In what ways does ESA support the European space community?
ESA's programs are designed to discover more about Earth, its immediate space environment, our Solar System and the Universe, as well as to develop satellite-based technologies and services and to promote European industries. Within the guiding vision of a strengthened European identity, ESA's activities aim to ensure European autonomy in accessing and using space and to maximize the integration of space into European society and economy. Moreover, ESA fosters the European space sector by supporting research and innovation and entrepreneurship for growth and jobs. Education and knowledge are also high in our agenda.
ESA's policy respects the principle of 'fair return' where the share of a country in terms of contracts received must as much as possible match the contribution paid to the Agency by that member state.

How is ESA's budget allocated between mandatory and optional funding?
ESA's mandatory activities (scientific programs and the general budget) are funded by financial contribution from all the agency's member states. In addition, each member state decides in which optional program they wish to participate and the amount they wish to contribute. Approximately 15% of ESA's budget is allocated for mandatory programs and the rest is for optional programs.

What part does ESRIN play in ESA's wider operations?
ESRIN is ESA's Centre for Earth Observation. The impact of their work goes far beyond Europe as ESRIN supplies satellite data to organizations and research institutions around the world. This data is used to provide services to so called European critical infrastructure, such as banking and finance, water and wastewater systems, transportation, and food and agriculture, making these secure and profitable. Another product of ESRIN are information systems, which play a vital role for the functioning of the whole Agency.

How does Italy's space industry compare to that of other jurisdictions?
Every member state's space industry has its own characteristics. As ESA's third biggest contributor, Italy has a strong space industry including leading industrial prime contractors, such as Avio and Thales Alenia Space and is thus active both in space transportation and in satellites.
Collaboration extends from that at the decision making level with ASI (the Italian Space Agency) to collaboration in research through institutions like CIRA as well as Italy's numerous and renowned universities.

How do you see Italy's space industry developing?
As with all of its member states, ESA strives to strengthen the position of the European space sector in the global market. Italy is very important in this respect. One of ESA's core goals is to foster a globally competitive European space sector and to maximize the integration of space within the wider society and economy.

What are ESA's key objectives over the next three to five years?
Space 4.0 (the fourth era of space activities) and United Space in Europe are the guiding visions of ESA for the 2016 Council at Ministerial Level. European spirit, identity and cohesion are the underlying conditions for Europe to achieve the best outcome for its nations and citizens and to make Europe successful in space, and the European space sector successful in Europe and worldwide. This can only be achieved through concerted efforts aimed at maximizing the integration of space into European society and economy, and also through strong science and technology foundations.

Sergio Marchisio

Chairman
EUROPEAN CENTRE FOR SPACE LAW (ECSL)

There is much debate regarding where outer space actually begins. Does international space law have a global agreement about this?
From the legal point of view, there is no clear delimitation of outer space. This is an issue that remounts to the time of the Soviet Union and the Cold War. We understand it as the line where you pass from navigation into propulsion, to go into orbit. There are two main theories about the limits of outer space: the functional theory, where one can identify when an object is in outer space according to the function that it has; and the space delimitation theory. The Soviet Union claimed that the Karman line, lying at 100 km, was the delimitation. This was never agreed upon internationally because the possibility of developing a technologically advanced means of transportation that can travel this grey zone, between airspace and outer space, is there. This would turn the craft into an air object and a space object both at once. Certain national legislations will have their own rules on this matter. For instance, Australian space law says the passage is at 100 km.

Discussions around suborbital flights are increasing. Could you please describe the legal implications for companies moving into this market segment?
Space tourism brings new challenges and frontiers for the development of space activities. Mainly private companies are envisaging projects with suborbital flights, not to be confused with parabolic flights, which are already sold. Suborbital flights reach the limits of airspace, entering outer space for 5-10 minutes and then re-entering the territory of the same state. New trends of space activity, such as commercial, cargo or tourist flights, aim to reach different states and will rely on the jurisdiction of each state.

What environmental laws are being developed to address the issue of space debris?
Article IX of the Outer Space Treaty prohibits harmful interference and planetary contamination. But space debris is a different issue that poses both problems from civil uses and security. In 2007, UN organs, the COPUOS and the General Assembly, adopted guidelines for the mitigation of space debris. These are non-legally binding international instruments but are supposed to be implemented by States and space operators.
The removal of space debris is very costly and challenging, and this causes problems of a legal nature. Removing objects in space requires the authorization of the owner. In 2007, China destroyed one of its own defunct satellites with another satellite in space to test their A-SAT technology, leaving 2,600 pieces of long-lived debris. They did not follow transparency procedures and denied this act. A-SAT experiments are a form of weapon, and are at the core of several international negotiations.

Could you describe the current structure of space law and who is financing most projects?
International space law is developing quickly, and national legislations are evolving. Some of the rules in the five UN treaties adopted during the 60s and 70s should be implemented at a national level. The most important example is article VI of the Outer Space Treaty, the core of the space law legislation at an international level. It was a compromise between the USA and the Soviet Union to have private as well as public activities in space, only under the direct authorization and continuous supervision of the state. Each state is responsible for its national activity in space, whether it is carried out by government agencies or private entities.
There is also public and private space law. Launching a satellite implies a long chain of legal acts that should be agreed upon by the client that asks for the launch, the operator and the launching provider. Within the umbrella of international law there are also private contracts such as insurance contracts. Then there are banks and financial institutions that provide financial resources for the projects. Thus private and public law are intertwined.

Serafino D'Angelantonio & Sabino Titomanlio

SD'A

ST

SD'A: President and CEO
and Italy Programs Director
ST: Head of Business Development and
Commercial Operations
SPACE ENGINEERING

What have been the main changes since the acquisition by Airbus?
SD'A: Airbus Group has three divisions: Airbus Commercial, Airbus Helicopters, and Airbus Defense and Space (Airbus DS). Space Engineering falls into the Space Systems business line of Airbus DS. Today, Space Engineering is 100% owned by Airbus DS and is currently the industrial footprint for space systems in Italy.
Founded in 1989 as an R&D and engineering company, Space Engineering's portfolio and revenue breakdown have completely changed since the acquisition. The traditional business as an outsourcer of major Italian primes for R&D and engineering has been significantly reduced and the company has focused on the development of products with recurring market potential. R&D and engineering have been reduced from 80% to 30%, and product revenue has increased to 30% - 35%, with the remaining revenue from programs. We do still cooperate with Leonardo companies such as TAS-I, Telespazio and Leonardo itself, as well as with other main Italian players, mainly for institutional and defense programs. Today our national activities stand at less than 40% of our overall operations and we would like to increase our national presence along with enhanced cooperation with the Leonardo Group.

What are your areas of focus?
SD'A: Space Engineering is working on its new strategy, focusing on a few products within the space and ground segments. In space we are specializing in active antennas, QV-band components and onboard RF modems for the new Globenet high-speed European data relay system. Connected to this, we are developing the tools for the operation of the new flexible payload, using software that enables the modification of a payload whilst a satellite is in operation. An example of such activities is Quantum, the first in class of a new generation of broadcast satellites of Eutelsat.
With regards to the ground segment, our flagship products are the calibration systems and transponders for SAR satellites and the satellite communication antennas for trains and airborne and land applications. We are a world leader in SatCom for trains and are entering the airborne market, particularly for mission control and ISR applications. We are specializing in dual-frequency and triple-frequency antennas, able to remotely switch between bands while the vehicle is in operation. Furthermore, we are pioneering the new frontier of machine-to-machine communications via SatCom, where we are undisputed leaders in the design and implementation of new protocols and waveforms for message-based communication over satellite.

What are some of the particular characteristics of the Italian market?
ST: Italy has traditionally been committed to scientific missions such as ExoMars and the ISS, also putting strong emphasis on launchers and earth observation. More recently, satellite communication technologies have enabled new applications such as the Internet Of Things or data relay systems for institutional and security applications like Globenet. Many of these applications are regaining further interest in light of possible deployment with LEO infrastructures based on small satellites, in which Italy wants to play a key role. Within this scenario, we intend to make the most of our relationship with Airbus DS.

What are your next objectives?
ST: Space Engineering is a key actor in the Italian space industry. Our key differentiator is the enormous know-how gained thanks to the successful participation in several programs over the last 27 years. We now want to improve our capability to deliver onboard products and progress from manufacturing and delivery of components to the delivery of subsystems. We would like to be recognized as a system provider for every kind of satellite. We want to bring disruptive innovation to the SatCom technologies sector: active antennas, flexible payloads, flat antennas, M2M solutions. We also intend to increase our revenue in the Earth observation market. We foresee good potential in some niches such as Inter-Satellite link transceivers and antennas as well as innovative antennas for data downlink.

Vincenzo Giorgio

CEO
ALTEC
Vice President Institutional Marketing and Sales
THALES ALENIA SPACE

What are some of the main services that ALTEC can provide, and could you tell us more about some of the main programs on which ALTEC works?
ALTEC has three main focus areas: exploration, scientific activity and the concept of the new space economy, which is beginning to become a reality. In terms of exploration, we are very much aligned with our stakeholders, the Italian Space Agency and Thales Alenia Space (TAS-I). TAS-I deals with low orbit explorations and the International Space Station (ISS), for which they have manufactured more than half of the pressurized volume, while ALTEC's main focus is on operation management. We have all the engineering competencies to maintain infrastructure, analyze possible outcomes, and take care of logistics, including making changes and replacing equipment, as well as helping astronauts in their experiments in space. We also have activities that deal with medicine and biology at the ISS. We collaborate with a team of scientists to help them better understand the behavior of the human body in space and all the challenges the astronauts may undergo as a result of physiological stress.

How does ALTEC support the ISS project, and what is the relationship between ALTEC and the other organizations involved?
Within the framework, there are many European, and particularly Italian, partners, and we support all of the operations, maintenance and logistics. There is a control center here in Turin that is permanently connected to the space station and we are connected with the Johnson Space Center in Houston. We analyze and preempt what they need and then work to support these needs. With this experience, we also conduct crew training. We provide most of the instructors for the European Astronauts Center (EAC) at the ESA center, and we teach the astronauts what they have to do and when.

Could you tell us more about the Mars project, and the nature of ALTEC's involvement?
Europe is approaching a Mars exploration program – ExoMars – which consists of two missions. The first mission was launched in March 2016 with a landing date of October 19th 2016. Italy is the key player in this Mars exploration mission, responsible for more than one third of the activity. Within Italy, Thales Alenia Space is leading the program, being the prime contractor.
The second mission is a rover, which will land on Mars at a later date to search, for the first time ever, for present or past life. The operation center and scientists will be based at ALTEC in Turin. Because of the communication delay, we have to rely on a somewhat autonomous system, as we cannot control the vehicle in real time. Our solution is that the rover will move between two points without human control, avoiding obstacles, until it reaches the new point. We will then drill down two meters below ground level to take samples to look for past or present life. Anything closer to the surface would have been killed by Mars' cosmic radiation (due to its lack of magnetic field). These samples will be processed and analyzed by the rover and the results will be transmitted via the orbiting satellite from the first mission. From here, at ALTEC we will analyze the transmitted data and make it readable to the scientists.

How does the development of the Italian space industry, which is the seventh largest in the world, compare to other jurisdictions worldwide?
Italy was the third country to go to space. In Italy, the industry has more or less all the capability: access to space, telecommunications capability and Earth observation systems. You will find all the building blocks of space activity in Italy, both in the wider industry as well as in the SMEs, which is a good mix. Very good and very skilled SMEs are able to invest in specific technologies, which is impossible for the larger players, as well as having good connections with universities and research centers. Italy's space footprint is, so far, very successful.

ALTEC has been around for 15 years. What can we expect for the company in the next five years and how will this align with advances in the global space sector?
One of our areas of focus will be the new space economy. Space tourism will gain a lot of attraction within the next decade – we should see the starting point by 2030 at the very latest. At ALTEC, we are considering the system that will support this venture, including establishing a spaceport, the vehicles, and the future of this enterprise. As well as discussing this with Italian partners, we recently received a contract from a Far East government to study the possibility of creating a spaceport together. Our approach is to always think ahead and plan for the next step. Now we are sending a rover to Mars, but the next idea is to send people to Mars, so we are investigating what that would entail in terms of air, water and food.

Fabio Massimo Grimaldi

President
ALTEC

Could you explain the reasons behind the founding of ALTEC in 2001 and its development over the last decade and a half, from providing support to the ISS, ESA and NASA, to also supporting private companies?
ALTEC was founded during a time of crisis for the aerospace industry, in which even Alenia Aermacchi experienced temporary lay-offs. It was a challenging period in which the Piedmont region had great foresight and strove to take advantage of opportunities at both a national and international level. The solution was to form a consortium called ICARUS, obtaining community funds and encouraging industry leader Alenia to work with Piedmont institutions such as the Chamber of Commerce and the regional government. ICARUS is a limited responsibility consortium, with public entities owning a 51% stake, while Alenia holds the remainder. This consortium and the accompanying funding made it possible to build the Multi-Functional Space Center (CMFS). When the center was built, ICARUS formed ALTEC, which included ICARUS, Alenia and the Italian Space Agency (ASI) as shareholders. The aim was to take over this strategically important sector. Despite the difficulties of those years, a great deal of effort went into increasing ALTEC's capabilities and taking advantage of the regional competencies regarding pressurized modules. Subsequently, the aerospace station project was born.

How has ALTEC's funding model been affected by Leonardo's ownership of Thales Alenia Space?
The shareholder structure has shifted slightly over the years and ALTEC remains a joint venture between both public and private sectors. Today, ICARUS has pulled out and the two shareholders, Thales (60% of shares) and ASI (40% of shares) have taken over control of ALTEC. We do not interact directly with Finmeccanica as Finmeccanica only plays a part in the French joint-venture with Thales.
We work as a large enterprise because we are controlled by a very large company, Thales Alenia, and ASI, which is a government agency. ALTEC employs 80 people, and is regarded as a large firm. As a large company, we do not receive direct funding from initiatives such as Horizon 2020, or from ASI because it is now our shareholder. We do however benefit greatly from Thales, as they will contract us as an engineering and research company for important contracts such as ExoMars.

Could you describe ALTEC's range of capabilities and services?
As a company, we began with skills and expertise related to pressurized modules and logistics. This has enabled us to become a 'center of excellence' at a European, as well as an Italian, level for engineering and logistics services in support of the ISS. Around 50% of ISS residential modules and laboratories were built here in Turin by Thales Alenia Space, while the rest were built in Japan. We are also engaged in logistics activities, such as the PMM and Columbus modules, which are used by ESA. Our facilities have two control rooms, which are permanently connected to NASA and ESA.
We also carry out astronaut training and biomedical experiments. Astronauts in orbit recently underwent an experiment related to neck vessels, to understand what happens in a weightless environment. We also carry out data processing, for example in the GAIA project, which involves satellite tracking, and we process all the mapping data.

ALTEC is located in Turin. How important is the region of Piedmont within the country's aerospace industry?
The Italian aerospace industry's turnover is about €6.5 billion and employs around 32,000 personnel throughout Italy; Piedmont accounts for about €3.5 billion of this turnover and 17,000 employees. These figures clearly show that Piedmont's aerospace industry is a leading sector in Italy. Within Europe, Italy's space economy ranks third.
The industry is highly developed because of its capabilities. We are at the center of engineering and science, but there is also a whole network supported by Politecnico di Torino and other research centers. The Politecnico trains its students in specialized skills which are fundamental to aerospace companies, and that is a key reason for ALTEC's initial establishment in Turin. Our employees and colleagues are engineers and physicists who come mainly from Politecnico di Torino or Politecnico di Milano. There are also many SMEs in Piedmont that are well established and have good technical knowledge.

What can we expect from the aerospace sector over the next three to five years?
In the last four years, €50 million has been allocated in FESR funds, with an overall investment of €100 million. Piedmont is very strong as an aerospace cluster, and we are working on many projects on drones and land mapping in partnership with the region. I believe that our aerospace district expresses an excellence within the Italian aerospace industry in terms of SMEs, research centers and ALTEC.

Global Business Reports

Space Economy

Reducing costs and increasing returns

Although the main goal of space exploration has historically been to meet strategic and political goals, in today's economic climate it is becoming increasingly important for governments to justify space exploration in terms of social and economic return. This means decreasing mission costs, increasing efficiency and mission life, and pursuing research and experiments with the potential to improve aspects of life on earth.

Whilst the market demands high quality products, cost efficiency is becoming increasingly important, and many companies are trying to reduce variables such as development cost and time-to-market. Since the cost of payloads correlates directly to their weight, lighter materials and more compact and efficient systems are a key area of focus.

End users are looking to their suppliers to reduce weight, cost and delivery time at every step of the process. Sabelt was contracted in 2011 by Thales Alenia Space, for example, to develop a lighter retaining system for cargo for their commercial aircraft. "We drew on the technology from the reduced weight webbing we had recently developed for Ferrari; the company needed a lighter harness for Formula One and, using a fabric called zylon, we were able to decrease the total mass from 60 grams to 38 grams," explained Diego Cagna, special applications & OE special projects manager, Sabelt. "We were then able to use this in the webbing structure for sending supplies to the ISS. After checking the compatibility of this material with space systems, we eventually engineered a 46 kilogram (kg) system, compared to the previous structure's 101 kg. Thales told us that for every one kilogram weight saving, the space project would save $50,000 as they could send up more cargo at a time."

Following the success of the project, Sabelt will now be involved in a program for nine modules from 2016 to 2019 and will also contribute to the STEPS 2 program in partnership with Thales.

At the other end of the value chain, Angelantoni Test Technologies are currently developing a new type of space simulator to reduce the consumption of liquid nitrogen by 50% during tests. This simulates a space environment to test the behavior of electronics and mechanical components. "This technology is entirely unique and is a contributing factor to our recognition as leaders in the field," said Mauro Margherita, managing director at Angelantoni Test Technologies. "Within the aerospace field, it is often necessary to provide the customer with a very good technical solution in the smallest possible delivery time. We have therefore developed standardized modules for the smaller space simulators, permitting us to deliver in five to six months," added Margherita, further emphasizing the importance of cost and time efficiency.

Another trend is the use of commercial off-the-shelf (COTS) or 'spin-in' components, utilizing commercial technologies in space applications. "A great deal of money is invested in the commercial sectors, and there is a lot of scope for transferring technology into the fields of space and defense. This makes us much more competitive in terms of cost and time to market," acknowledged Armando Orlandi, president of Progetti Speciali Italiani. Using COTS components eliminates the development cost and time for particular components and technologies. A component used in the telecommunications market, for example, would only have to be pre-screened, reducing cost and time-to-market, benefitting the lifecycle of the project. This would also reduce any system decay prior to the launch, further increasing the life of the mission in space.

Downsizing: rising trends for nanosatellites

Alongside the trends towards cost reduction is an increasing interest in nanosatellites. 2018 will see the launch of the OneWeb constellation of some 648 satellites, with the purpose of providing affordable internet access across the planet. Smaller satellites require more efficient technologies and downsized systems to maintain their functionality.

Recently selected by the ESA to build a satellite, Italian company Argotec's ArgoMoon satellite has now been chosen by NASA as one of 13 satellites to take part in their Exploration Mission 1 trans-lunar orbit mission. The Italian-manufactured nanosatellite is also the only satellite within the program to represent Europe. "We had a very small timeframe, with only two years to complete a project that would typically take up to five years," related David Avino, managing director of Argotec. "The mission itself is a challenge, as it will be the first to launch with small satellites. We therefore have to appropriate the same systems and subsystems of a larger, full-sized satellite into a smaller structure."

On the growing trend towards smaller satellites, Avino added: "The future will see an increase in missions involving nanosatellites, with a similar trajectory to mobile phones, becoming increasingly compact while retaining full functionality and added features."

With a plan to vertically integrate their service offering with optical, radar, aerial, drone and terrestrial viewing technologies, Earth-observation company MapSAT also plans to move towards nano-and microsatellite data collection. "Nano and microsatellites are the future," mentioned Roberto Tartaglia Porcini, CEO and general manager for MapSAt. "In the past, we had to transmit information to be received on Earth and then processed. With nano and micro-satellites, we can place two satellites in space: one to acquire information, the other to process it. By the time we receive the data, it is already interpreted and the second satellite sends a feed directly to a computer via the Internet," he concluded.

ESA has also recently contracted the University of Rome Tor Vergata to substitute four active antenna components with a single chip for another project, making the system much more compact, but retaining the same function and capabilities.

SpazioFuturo, an innovative start-up established in 2015 dealing mainly with aeronautical meteorological services and satellite products for meteorological data transmission, is currently working on a project to use jets as launchers for nanosatellites. "As satellites and their payloads become smaller and smaller, it follows to make the launch itself more cost and time

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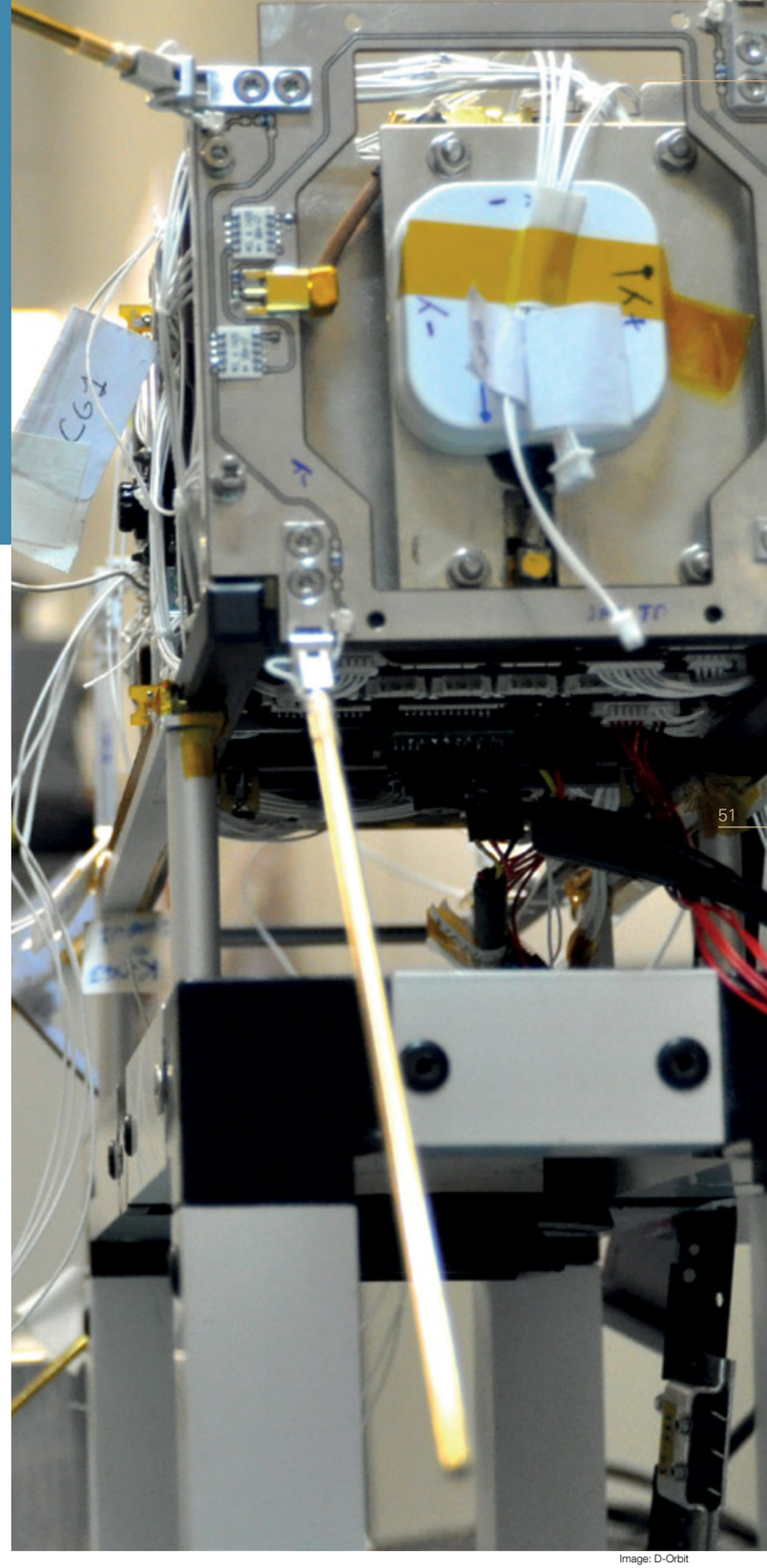

Image: D-Orbit

SITAEL

Nicola Zaccheo

CEO

HEADQUARTERS LOCATION
Mola di Bari

company size
>300
EMPLOYEES

key industries
70%
SPACE

key industries
30%
INDUSTRIAL ELECTRONICS SYSTEMS, INTERNET OF THINGS

key products and services
SMALL SATELLITE PLATFORMS & SUBSYSTEMS
EARTH OBSERVATION SERVICES & IOT APPLICATIONS
ELECTRIC PROPULSION
CHEMICAL PROPULSION
ADAPTER AND SEPARATION SYSTEMS
SMALL PAYLOADS
SCIENTIFIC INSTRUMENTS
POWER, DRIVE & CONTROL AVIONICS
DATA HANDLING & COMMUNICATION SYSTEMS
MICROELECTRONICS

SITAEL has been operating for over 20 years now. Could you provide a brief background of the company?
SITAEL is the result of the merger of five main companies. Our involvement in space missions started about 16 years ago, while our propulsion activities are around 30 years old. We have four main areas of expertise: we operate in the field of space systems (mainly new generation of small satellites), advanced propulsion (mainly electric propulsion), avionics for platforms and payloads, and downstream (innovative services and applications). We currently have over 350 people operating in aerospace, making us the largest Italian privately-owned space company. We are currently in discussions with new stakeholders and are focusing our activities in the development of integrated solutions by using data from several sources, i.e. new and existing satellites, airborne and in-situ sensors.

Is electric propulsion the future for all satellites?
In my opinion, all innovative future satellites will have electric propulsion onboard. In particular, referring to low power electric propulsion systems, we believe our products are currently the best in the world, both in terms of performance and technological maturity level. Those thrusters are very attractive for constellations of small satellites. SITAEL is now developing small satellites (from 50 to 300 kilograms) all equipped with low power electric propulsion. This would be an evolution because these satellites could operate in very Low Earth Orbit with long mission lifetime (even several years) whereas other satellites would just fall in a few weeks. Operating in very Low Earth Orbit allows us to obtain very high observation performances, comparable to bigger satellites, with huge costs savings. Furthermore, electric propulsion is also utilized to change the satellite orbit when needed and to de-orbit the satellite at the end of its life. We are also working with high power electric thrusters. High power electric propulsion has several applications, such as transferring large telecom satellites in Geo Stationary Orbit from Low Earth Orbit (thus saving a lot of money in launch activities) or moving spacecraft in deep space exploration.

Why are smaller satellites essential for the future?
Due to the technological evolution, satellite sizes will continue to decrease. In the future, I believe the maximum size for large satellites will be one or two metric tons (mt) instead of several mt. Less weight means a lot of cost savings at launch and less problems managing their operations. A crucial role in the future will be played by a constellation of different small satellites, each with different payloads on board, in order to provide diverse services (for instance in Earth monitoring or telecommunications) with the same constellation. It will also be very interesting to integrate data from a series of satellites in several different orbits.

SITAEL has been involved in several scientific missions. What are your future plans in this area?
SITAEL is involved in important scientific missions, not only for ESA but also for other important Space Agencies such as NASA and JAXA. We develop systems for detectors and scientific payloads utilized in space scientific missions. Actually, SITAEL space activities were born thanks to international experiments for astroparticle physics research (PAMELA, AMS, INTEGRAL, GAIA, etc.) We are the only Italian company involved in "Curiosity," the NASA Mars rover, for which we developed the weather monitoring station.

With all of the space debris that we have in the atmosphere, what does the future of satellites look like?
For all satellites launched today, we must guarantee that they will still be orbiting in at least 25 years. We are thinking about reducing that standard to something like 15 to 20 years. Before these regulations, there was nothing. It is illegal at the moment to remove space debris that belongs to another country. We are trying to come up with international regulations to address this issue. Space debris is a real issue. As an example, Sentinel 1 was hit recently by space debris, so there is now a big crack in the solar panel.

What is your vision for SITAEL for the next years?
We are very ambitious. Five years ago, we had 30 people, and now we have 350. In five years, we will have over 1,000 people working for us. We want to be one of the main players in the small satellite market with a focus on satellite applications. At the end of the day, we want to produce not only hardware but also to deliver services and applications to our customers. We would like to bring satellite data to everyone, to daily life. This would be a Copernican revolution, providing end users with the most integrated solution. We have now the technological means for that, new concepts in data processing, data management (big data) and new innovative infrastructure. We are strongly investing on this concept; we have an Internet of Things division working on those topics. The final goal will be to utilise satellite data with smart devices, as new "apps" for your smartphones.

Global Business Reports

IDS INGEGNERIA DEI SISTEMI

HEADQUARTERS
LOCATION
Pisa

company size

500
EMPLOYEES

segment

SYSTEMS ENGINEERING

key aerospace customers

MILITARY, SPACE, AERONAUTICAL MANUFACTURING, LAW ENFORCEMENT AGENCIES

key products and services

EMI/EMC RISK ANALYSIS AND REDUCTION STEALTH ENGINEERING FLIGHT CONTROL SYSTEMS AND AVIONICS SOFTWARE TACTICAL UAVS SATELLITE COMMUNICATION TERMINALS

Giovanni Bardelli

President and CEO

Could you provide us with a brief history of IDS and the main milestones up to the present day?
IDS Ingegneria Dei Sistemi was founded in 1980 by my father and employs around 500 people worldwide. We began within our basic area of expertise, electromagnetic applications and signals, initially focusing on the naval and aeronautical sectors, and then also space. Another electromagnetic application we worked on was radar cross-section technology. IDS is now one of the leaders in these applications worldwide, with systems used internationally in the United Kingdom, the U.S., Turkey and South Korea. Within the space sector, we have worked on many projects and developed different software for the European Space Agency (ESA) and the Italian Space Agency (ASI). Our business in the space sector is related less to satellite applications and more to satellite signals, particularly in navigation. In order to identify the best route for take off and landing, it is important to understand how the route can affect the quality of the onboard signal. For this application, we are one of the leading companies worldwide.
The Italian market represents only 20% of our turnover, and we are currently exploring opportunities in new markets. For instance, we are working on improving satellite communication on yachts. We are currently developing some new satellite products for aircraft, which today have a large satellite constellation. Recently we have also started some communications projects in South Korea and in Italy.

Within aerospace and aeronautics you work in both the civil and the defense market. What are the key differences in the demands you receive?
The military sector is more demanding. There is a need for immediate information in real time on particular areas via satellite, so information needs to be gathered and interpreted quickly. The software we use is developed in-house, but we also have colleagues working with the Italian Ministry of Defense to support the military staff in the interpretation of the received data and its distribution in other parts of the world, where Italian military forces are active.

For a technology company such as IDS, innovation is extremely important. Could you expand on your relationship with the surrounding universities and research centers?
We have offices near universities in Naples, Catanzaro and La Spezia in order to be close to different research centers. We also collaborate with several Italian universities in the regions of Friuli, Apulia, Calabria and Abruzzo, and have established similar relationships in Australia, particularly in the research of agricultural applications, a great deal of which are financed by the Australian government. Cooperating with universities around the world is crucial for R&D and finding new, effective solutions, especially in niche markets like ours, and helps us to continuously modify and adapt our programs to our customers' needs.

IDS invests 20% of its revenue in R&D and there are 11 internal research facilities. What are your current projects and areas of focus?
Our first laboratory focused on basic electromagnetic knowledge, and others now produce antennas for satellite applications or interpret the signals for earth observation. We develop various different radars, in particular for the defense market. For example, we have developed anti-mortar and anti-sniper radars, and even radars monitoring volcanic activity. We also produced about 200 radars for use at railway crossings, to ensure no cars or objects are on the tracks.
IDS is currently also involved in developing an unmanned 18-meter boat for environmental monitoring of the Tuscan archipelago. It is our first application created for environmental purposes. Another project is a system that connects satellite information to unmanned aircraft, which is particularly useful in the observation of vineyards. Unmanned and robotics technology are currently in an early phase, but they will have a big role in the market in the near future. Another important area for us is cyber security, and we are looking for companies that can support us in developing these technologies.

IDS is coming to its 40th anniversary, in 2020. What are the key objectives to reach by this point?
With input from our managers in Australia, Canada and Brazil, we have established a five-year program to increase acquisitions and support market growth. IDS currently has four internal divisions, five subsidiaries around the world, and works with six other companies in joint ventures. Our goal is to grow by 25% to 30% per year, following growth of around 20% per year for the last two decades.
I would like to invest more in the Far East, because there is great opportunity and demand for technology. We recently opened an office in Indonesia, a country in which advanced communication systems are crucial. They also have important industries in shipbuilding, aeronautics and space, and plan to have their own satellite communication system by 2019. Other interesting countries are Thailand, Singapore and the Philippines.

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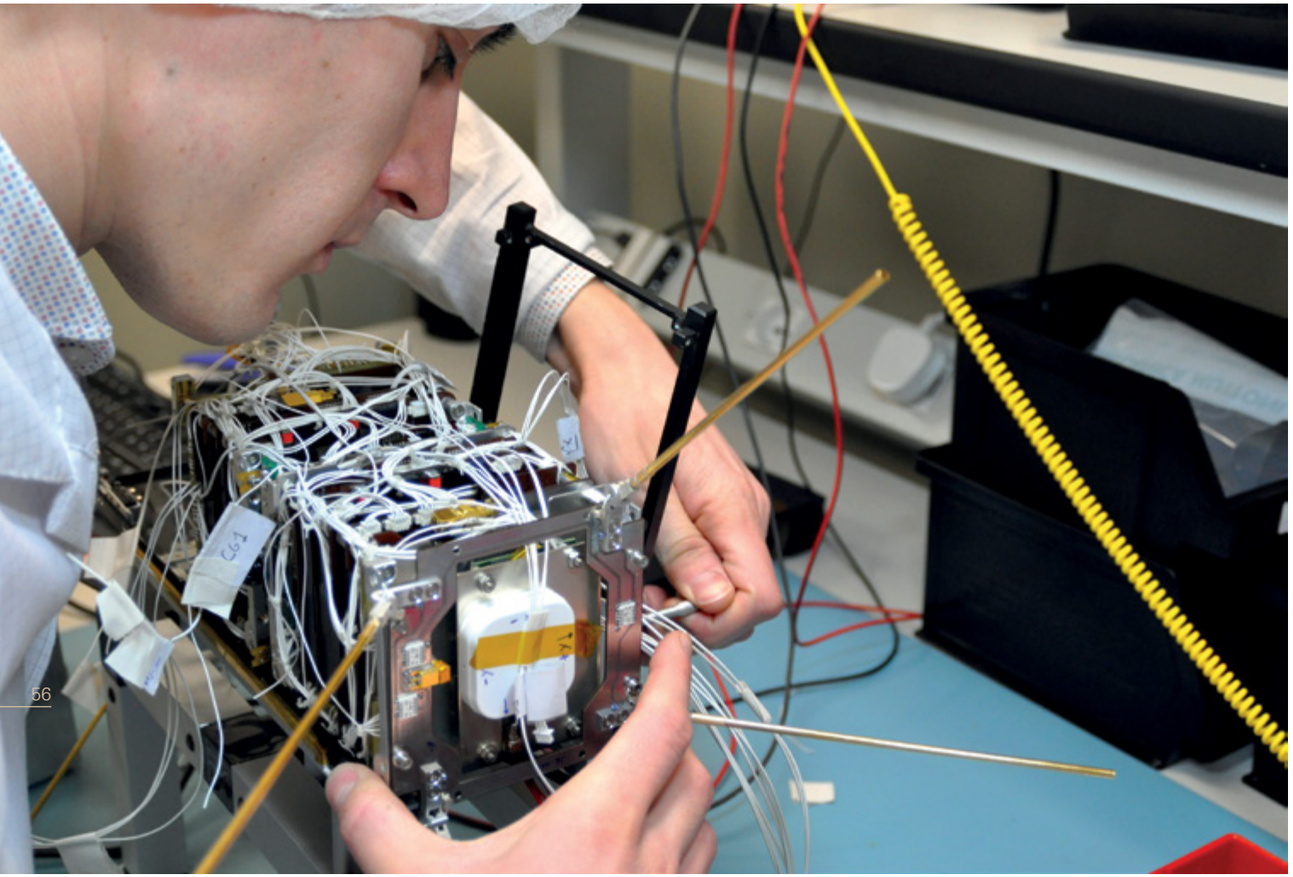
Image: D-Orbit



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efficient," explained Andrea Lorenzoni, SpazioFuturo's sole director.

Increasing mission life

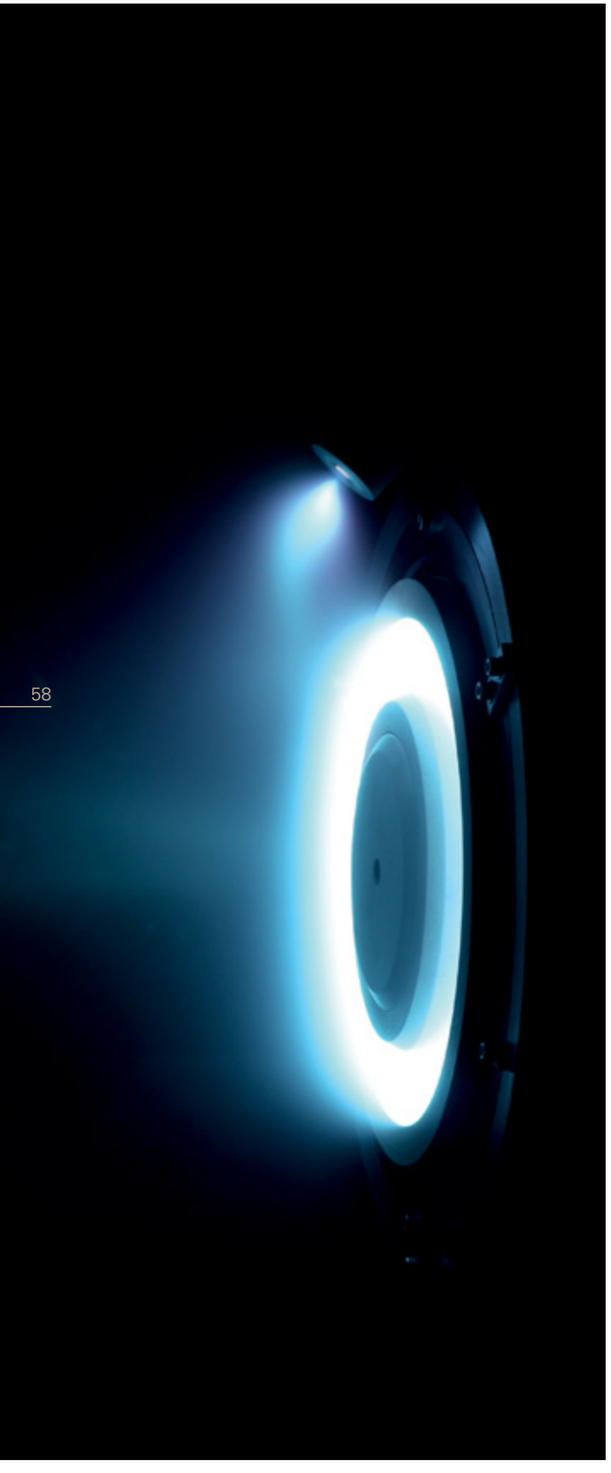
With each mission costing hundreds of millions of euros, either in space exploration, Earth observation or telecommunications, it is hugely important to increase satellite life or mission time wherever possible to achieve the greatest value. "A satellite costs from about $500 to $700 million, making the average cost daily about $150,000. With commercial satellites generating about $180,000 per day, each additional day of operation generates an additional $30,000 dollars," outlined Filippo Gemma, general manager at GMSpazio.
The company developed a system four years ago for the Ministry of Defense dedicated to collision avoidance when maneuvering a satellite through the roughly 20,000 satellites orbiting the earth. Highlighting fuel limitations as a key challenge, as well as the importance of extending operational life, Gemma continued: "Our GOST system can measure the position of a satellite in orbit with an error margin of only 50 meters at 36,000 kilometers. Our system is able to support operational control centers, giving the operators the possibility to decide whether to maneuver or not." GMSpazio now has two systems in operation in Italy and is currently in discussion with other countries to deploy the system internationally.
Technologies to enable the prolongation of space exploration missions are also a key area of focus. With reference to additive manufacturing, Marco Marigliano, global account manager – space business development at Altran Italia, commented: "We have seen, for example, that the future of space exploration is largely based on the capability to produce objects on board, even if far from traditional resources on the Earth." The development of smaller, more cost-efficient satellites will represent a significant increase in production and launches in upcoming years. "We expect the number of launches to increase exponentially in the future because the market is changing," highlighted Renato Panesi, chief commercial officer and founder, D-Orbit.
The growing number of factors that companies are required to take into account when preparing for space missions are key drivers for innovation and new solutions. There is an emphasis not just on development, but also on reassessing current technologies and processes, and on how the result may be achieved more efficiently.

Signals from Above

Earth observation and remote sensing

Italy is a leader in Earth observation and remote sensing with the particular advantage of the COSMO Sky-Med constellation. Operational since 2010, COSMO Sky-Med is composed of four satellites with global coverage, equipped with synthetic aperture radar (SAR) sensors, able to operate both day and night under all weather conditions. Massimo Claudio Comparini, general manager for e-GEOS, explained that "it takes more than 180 images over the Earth each day [...] Radar imaging is more challenging for speedy interpretations but has a vast and still unrevealed added value."
Though radar imaging requires a more in-depth level of know-how in order to read the collected data, it can also provide a greater level of support for clients. In the case of the recent Italian Earthquake, e-Geos was able to provide emergency relief data that combined optical and radar images. "The growth of geo-information is inevitable when you understand the scope of its operations, from providing security to large infrastructure such as pipelines, railways and roads, to the management of critical environmental events," said Comparini. e-GEOS, a joint venture between ASI and Telespazio, is the sole distributor of COSMO-SkyMed data. Italy is also home to ESRIN, the ESA Center for Earth Observation, which manages the world's largest database of environmental data for both Europe and Africa.
Planetek Italia is the global reseller for Digital Global Data, "which is one of the highest resolution commercial Earth observation missions in existence," said Giovanni Sylos Labini, CEO, Planetek Italia. The company was able to supply data within 24 hours of the Italian Earthquake. Giovanni is interested in making this information available to everyone: "We believe that free and open data is the best school for innovation". Sylos explained how they use hyper-spectral imaging to gather images based on the way in which light reflects off different targets.
Many Italian companies are also involved in the joint European Commission and ESA Earth observation program, Copernicus. The program is primarily concerned with the monitoring of different regions and environments, with services that fall into six main categories: land management, the marine environment, atmosphere, emergency response, security and climate change. ESA is developing a new group of satellites called Sentinels for the operational needs of the program, which are numbered from one to six. Serco, for example, is involved in data utilization and also ground segment operations for Sentinel-1 and Sentinel-3.
Certain companies, such as MapSAT, have ties to the Israeli EROS B satellite, which covers Europe, North Africa and part of the Middle East. Roberto Tartaglia Polcini, CEO of MapSAT, explained how this relationship emerged from his personal connection to ImageSat International (ISI), an Israeli commercial provider of very high-resolution panchromatic Earth observation imagery, which is obtained through Earth Remote Ob-

Image: Sitael



servation Satellites (EROS). MapSAT is then able to artificially colorize the images through a pan-sharpening methodology. “The coverage is a non-linear circle due to political reasons and potential obstructions that block the coverage. We work for civil and military entities and in various R&D projects to provide images and value added products and services in critical areas in the Mediterranean Sea and other parts of the world,” said Tartaglia Polcini.

Speedy response times are paramount in order to assist clients in cases of emergency, like natural disasters. MapSAT is capable of delivering interpreted data within 24 to 36 hours. The ability to combine optical and radar technologies allows companies to provide greater precision within their data. In the case of the Northern Africa and Middle-East crisis, technologies are being developed to determine when boats are departing in the Mediterranean. Through a series of algorithms, the most likely route the boat will take is narrowed in. Through Earth-imaging technologies, even the number of people, genders and overall situation can be assessed. This whole process would happen in time to alert coast guards.

There are many applications for the data acquired from Earth observation and many social benefits to be pursued, such as land monitoring and management. “Today we are able to use satellites to observe vast territories and analyze a wide array of factors and areas including the level of air, water and land pollution, chlorophyll synthesis of trees in forests, and even illegal activities such as unlawful building construction,” commented Valerio Caroselli, general manager at IPTSAT. Citing the necessity for sustainable growth within the agricultural sector, Caroselli said: “As a result of dramatic population growth, it is essential to find ways to maximize production using the same amount of space. Our technologies and solutions can support these goals and, furthermore, reduce the use of pesticides and water.” Meanwhile, Renato Panesi, chief commercial officer at D-Orbit, added that “Earth observation technologies have proved to be of paramount importance to monitor on a global scale the climatic phenomena and the anthropic and natural changes in the environment."

The industry is evolving at a rapid pace, with new constellations emerging that are being formed of nano and micro satellites. The need for lower costs and lower weight has forced companies to look at smaller satellites which will have a shorter life-span. “I think the maximum size for big satellites will be one or two metric tons (mt) instead of several mt. Less weight means a lot of cost saving in launching them and less problems in managing their operations,” said Nicola Zaccheo, CEO, SITAEL. Luciano Guerreiro, general manager of GAP and professor at the Politecnico di Bari explained that “the advantage of nano and micro satellites

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Marco Casucci

Managing Director
INTECS SOLUTIONS

Could you provide a brief overview of Intecs Solutions' operations and software support?

Intecs launched in 1974 to work within aerospace and defense using real time embedded systems. Currently Intecs delivers real time safety components, systems and subsystems. Our premises are mainly located in Italy but we have some operations in France and Germany. We have a company in L’Aquila, which is the former Siemens lab for transmission equipment, so we are able to provide both hardware and software solutions. Ten years ago we started offering new products, mainly for railways, in risk mitigation and a system for homeland security based on radio technology. At the moment the product line gains 20% in terms of turnover for the company. Railways represent about 30% of our operations, aerospace and defense are split 20-20%, and the remaining 30% would be automotive systems.

At the moment we are still attempting to sell our product line outside of Italy. We have sold hundreds of system to detect on railways in Italy, we are now looking abroad. The system is made to work with satellite connection as well.

Intecs is developing Air Traffic Control (ATC) and Vessel Traffic Systems (VTS). What are the safety challenges you face within this realm?

ATC is extremely challenging from a safety point of view but in our experience it is not as difficult as operating with railways. Both systems use a GPS and for aerospace there is a requirement that states that malfunctions must be reported six seconds from the point when the satellite fails. In the case of railways, we must be informed as soon as a satellite fails, there is absolutely no leeway, so the level of complexity there is greater.

Why is it important to continue developing security and defense technologies?

Intecs provides support for a mega-system used for rockets. We have other domains related to acoustic detection where beam-forming technology is used to hear things which are very far away. We also make use of artificial intelligence (AI) in a neural network to detect whether what we hear is a helicopter, a jet, a drone or gunfire, for example. This technology can be used to detect objects or sounds around barracks, or borders. We saw a strong development within the civil domain as well because cities have cameras everywhere. We also supply defense products that work with the electromagnetic spectrum. The information received is further analyzed to determine whether it needs to be investigated.

Where do you see the aerospace and defense segments of the company in the next years?

Aerospace is a public sector entity. There is no way to have a private sector market at the moment so the future is of a stable nature, because it is difficult to grow without competition. The main challenge is that Italy’s debt is so large that it leaves little room for investment. The demand for defense is not increasing despite the qualms of online security, but in the future this, together with immigration issues, will become more important. Intecs Solutions is not large enough to deal directly with the government at the moment, but we work with other companies such as the MBDA, Thales Alenia, Aero-spazio, OHB, the European Space Agency, the Italian Space Agency, AgustaWestland, Leonardo Finmeccanica and Electronica.

Massimo Claudio Comparini

CEO
E-GEOS

With the recent earthquake that hit central Italy in August 2016, the importance of geo-information was placed in the spotlight. How did e-GEOS assist Italy during this incident?
e-GEOS works as a data operator that has a treaty with the Italian Space Agency and a partnership with Telespazio. The main purpose of our space center in Matera is to operate the COSMO-SkyMed constellation and deliver data to users. We also provide geo-information solutions and products.
During the earthquake, we supported the European Commission and the UN with post-event information data. We used all the space assets from the Copernicus Program: optical satellite, radar satellite and the creation of detailed maps providing first level damage assessments, infrastructure checks, and directions for rescue teams. We produced more than 60 maps and interpreted the level of damage in the Matera Center, in the shortest time possible.
By combining data operations with value added products, we bring a unique expertise to the industry. The growth of geo-information is inevitable when you understand the scope of its applications, from providing security to large infrastructure such as pipelines, railways and roads, to the management of critical environmental events.

e-GEOS is the exclusive worldwide distributor of the COSMO-SkyMed. Could you describe this product?
The COSMO-SkyMed is one of the main assets of the constitution of the company. The Italian Space Agency made an open call because they wanted a channel to commercialize data. At the time Telespazio group responded to this call, since they have all the geo-informational business.
The COSMO-SkyMed constellation has four identical satellites in orbit with global coverage. It takes more than 180 images over the Earth each day and can operate under all weather conditions. Optical images need daylight and clear skies to observe the Earth and are really clear and easily accessible. RADAR images provide much more technical data, but can take readings under any type of weather condition or lighting. This means that readings can be taken through clouds and seen during the night, but need experts to be interpreted.

Given the vast range of data e-GEOS can offer, who are your main clients?
Our main clients at the moment are large enterprises for whom we monitor infrastructure for oil and gas industries. Local and national government institutions are also clients. We assist them mainly for agriculture, and support the cadastre activities, terrain and assets monitoring. Global institutions are also our final clients, like the European Commission and the United Nations, whom we support as we did during the recent earthquake. We also monitor World Bank activities in developing countries, for instance, as well as controlled mining and energy. We will certainly see an acceleration of geo-information service demands within the commercial sector in the coming years.

What is the future of geo-technology?
Today, geo-information is used in quite a limited way. Radar imaging is more challenging for speedy interpretations but has a vast and still unrevealed added value. The ability to get readings, day or night, under all weather conditions, is a huge asset. We are increasingly seeing more requests for the usage of radar technologies.
The industry landscape is changing rapidly. Part of these changes stem from what we call the 'new space': these are new constellations where we have a high number of small satellites. Our technology does not only deal with special resolution but also with temporary resolution. We will certainly see an increase in commercial geo-technology activities in the future, but institutional customers are perhaps the most important for the data and applications market at the moment, holding 50 to 60% of the market.
There is a transition from optical technology to radar, and a tendency to see a valuable combination when using them together. Radar technology is more challenging, and requires deep scientific know-how. However, as we proved during the earthquake, radar technologies provide an additional level of information that is indispensable for damage assessment and rescue teams. —

> "Today, geo-information is used in quite a limited way. Radar imaging is more challenging for speedy interpretations but has a vast and still unrevealed added value. The ability to get readings, day or night, under all weather conditions, is a huge asset. We are increasingly seeing more requests for the usage of radar technologies."

Armando Orlandi

President
PROGETTI SPECIALI ITALIANI

HEADQUARTERS LOCATION
ROME

key products and services
MICRO AND NANOSATELLITES

key industries
AEROSPACE (SPACE, DEFENSE AND COMMERCIAL AVIATION)

Progetti Speciali Italiani was established in 2006. What were the reasons for its foundation?
Progetti Speciali Italiani (PSI) was created to address several challenges faced by small and medium enterprises (SMEs). Due to a tendency in the space industry to shy away from using highly innovative systems developed by smaller companies, we decided to set up our own system process covering the entire value chain. This integrated service, from concept and development to manufacture and delivery to the end user, allowed us to gain independence from the existing system of consolidated players.
We formed the group based on an existing company working in aeronautical construction, power electronics, information technology and ground satellite applications, adding the special capability to conceive, develop and manufacture spatial projects. Our aim is to develop activities and products for the final client, instead of working for other companies, as is usual with SMEs. Our customers today are the Ministry of Defence, ASI and ESA, plus foreign governments. Currently, we have a 50:50 split between international and national, and our company is funded 100% by the customer.

What are the advantages of the services you offer?
We offer an integrated service and have several existing companies within our network with different capabilities as well as a workforce of highly experienced scientists. SMEs in particular suffer from an unpredictable pattern of contracts and are unable to handle large projects, so they cannot maintain their highly-skilled workforce if they are not able to deliver new projects continuously. We do not suffer in the same way because we supply the end customer directly. Another factor we have implemented is the 'spin-in' trend, taking advantage of a new trend to utilize commercial technology in space applications. A great deal of money is invested in the commercial sectors, and there is a lot of scope for transferring technology into the fields of space and defence. This makes us much more competitive in terms of cost and time to market.

How does the Italian industry compare to other European regions?
In Italy, despite large amounts of spending historically within the European space community, we lost control of our major space company at the height of the European ideology that united all nations around a common interest. Unfortunately however this didn't happen as some countries maintained strategic control of their companies despite the heavy contribution of Italian expenditure.
Taking into account the Italian Space Agency (ASI) budget, the defence budget, mandatory contribution to the European Commission, regional investment and research expenditures, the expenditure for space in Italy is about €1 billion per year, and needs to be properly focused to support Italian companies which control fall under Italian investors and shareholders.

The Italian aerospace industry is built on a structure of SMEs. How supportive is Italy of the SME network?
Across Europe there is a novel and a strong push towards SMEs, an attitude that is visible in the European Commission and ESA, for example. New products and applications are often conceived and developed within SMEs wanting to work for themselves using their own ideas and technologies.
However, although Italy has the largest number of SMEs in the world per capita, the country has not made as much of a push to promote SMEs and their development as in other European Countries. To change this situation PSI is promoting together with other Italian SME the implementation in Italy and in Europe of a directive similar to what already existing in USA under the Small Business Act where it is mandatory for the Government Entities to deliver about 24% of their annual budget to SME under direct contract, I mean without accounting the subcontract coming eventually by the Big Enterprise.

What are your key areas of focus over the next few years?
We would like to establish ourselves as one of the worldwide references for Nano and Microsatellites. We support the notion that Italian government expenditure should be focused within Italy, but Italian companies must also operate internationally. Our target regions are emerging markets such as Latin America, Gulf countries, and Eastern Europe, particularly the former Soviet Union. I continue to trust in Italy due to the region's two unique characteristics: the entrepreneurial attitude, and an excellent education system. —

Renato Panesi

Chief Commercial Officer and Founder
D-ORBIT

How can D-Orbit help reduce space debris?
The original idea for D-Orbit was to develop and sell smart propulsive devices to be applied to satellites before launch, which are able to bring them back to Earth at the end of their mission or place them in a dedicated cemetery orbit in case of a major failure. When a satellite completes its mission, it basically becomes a piece of junk. It must be removed to avoid potential collisions with other operational satellites as well as to make room for new satellites. If this problem is not addressed, there will be danger in the future for satellites falling on Earth, without being able to predict where or when. It could be a disaster.
The problem of orbital debris can be addressed through two different approaches. The first one is called debris mitigation: when a new satellite ends its mission, it has to be de-orbited. If the orbit is close to Earth, the de-orbiting maneuver brings the satellite back. If the orbit is far from Earth, the de-orbiting maneuver pushes the satellite further away. The next step will be the debris remediation: acting on already existing debris to get rid of them.

How many satellites need to be de-orbited at the moment?
Humans sent their first object to space in 1957. Since then, about 6,000 satellites have been launched. Among them, more than 5,000 are space debris and less than 1,000 are still operational. We expect the number of launches to increase exponentially in the future. Up until now, the most valuable satellites are geostationary ones, objects of 3-5 metric tons of weight with an operational life of 15-20 years and an average value of $200 million each. Of course this market is not over, but many companies, especially U.S.-based ones, will soon operate satellite constellations made of new generation satellites, designed for a shorter operational life of 4-5 years. This means more satellites in orbit with a shorter operational life: we are talking about constellations of up to thousands of satellites.

What are the immediate risks if we do not address de-orbiting quickly?
Let us assume that, within a single constellation of a few hundred satellites, ten of them have a major failure which makes them uncontrollable. They would become a serious danger for other satellites within the same constellation. The problem is truly urgent, these constellations need orbital clearance maneuvers to get rid of failed satellites. This is where we can be of help. That said, if we consider that many constellations are coming, we realize that space will soon become too crowded. The risk of collision will increase.

Which are the major challenges to decommission a satellite?
For us they are not technical, as we have a strong solution and know how the system works. Solid propulsion is the best way to decommission a satellite technically and financially. The main challenge is to convince the customer to adopt our technology: we must show that our device works. To do so, we are launching our first satellite in Q1 2017, called D-Sat. It is a three-unit cubesat, but it contains components and electronic boards qualified against most severe ESA and NASA regulations. Most components are approved for human flight. It will be the first satellite in history to be removed in an active and controlled way through a dedicated device.

How much does it cost to retrieve a satellite from space?
There is not a unique response to this because it depends on the dimension of the satellite and the operational orbit. For closer orbits of 400 to 600 km of altitude and small satellites, the devices are smaller. As an example, for the LEO orbit mega constellations, we designed a dedicated device that is very light and cheap. Depending on how many satellites are in the constellation, the dimension (volume and mass) and the operational orbit, it could cost less than €100,000 up to a few million.

What are the advantages and challenges of using electric propulsion?
Full electric propulsion is becoming the new trend, especially for geostationary satellites, which orbit at 36,000 km of altitude. They have the advantage of being very reliable and precise and are very effective in altitude control or station keeping maneuvers. Of course they are not efficient for maneuvers which imply significant orbital transfer. Due to the provided low thrust, the transfer takes a long time. I think the efficiencies will continue to improve, the motors will become lighter, smarter and more reliable.

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for Earth observation is that one can focus on a specific and limited area that requires frequent observation. It is much cheaper to test on nano and micro satellites. This is a true revolution going on these days."
'New Space' technologies raise concerns regarding possible collisions and an increase to the already half a million tracked pieces of space debris. The original idea for Lombardy-based company, D-Orbit, was to develop and sell smart propulsive devices to be applied to satellites before launch, which are able to bring them back to Earth or in a dedicated cemetery orbit in case of a major failure or at the end of their mission, according to Panesi.
"The first object sent to space by humans was in 1957. Since then up to today, about 6,000 satellites have been launched. Among them, more than 5,000 are space debris and less than 1,000 are still operational. We expect the number of launches to increase exponentially in the future because the market is changing," he added. With thousands of satellites being launched into space in the upcoming years, decommissioning is becoming more important. It is now illegal for a satellite to be launched without having a strategy for the end of its life. Rules and regulations are becoming stricter in order to avoid future problems.
The future outlook for Earth observation technologies is for companies to vertically integrate the way in which they collect data. A combination of radar, optical, very high and low orbit Earth-observation, as well as aerial technologies, UAVs and terrain sensors is essential in order to supply the most in-depth data for clients. "Unfortunately, the potential of technologies for Earth observation are not yet fully understood by the government and public, because they are outside of the traditional way to go about things. Slowly but surely, we will become indispensable in the security and defense segments, by being able to see where nothing else can," concluded Tartaglia Polcini of MapSAT.

> "A satellite costs from about $500 to $700 million, making the average cost daily about $150,000. With commercial satellites generating about $180,000 per day, each additional day of operation generates an additional $30,000 dollars.
>
> - Filippo Gemma, General Manager, GMSpazio."

Managing data

A key challenge within satellite communication is the interpretation and analysis of data into accessible information. This is essential to apply the collected data in a useful manner. Companies such as Esri Italy, a spin-off of the Earth observation division within Telespazio, can be considered as a link between the space segment and the application user. Using technologies such as Global Navigation Satellite Systems (GNSS), GIS and remote sensing in synergy, Esri Italy enriches data to provide specific services and platforms.
To exemplify the potential benefits across a wide range of applications, Mario Milanese, CEO of Modelway, cites the importance of big data usage for increased passenger safety and reduction of emissions within the aerospace and automotive sectors. "We believe that our capability to use experimental data and gain higher-level information from it can be used for airplane control, monitoring and management," he added.
GMSpazio is another company providing remote sensing services across many applications, also covering a particularly new segment: Unmanned Aerial Vehicles (UAVs). Working with Microdrones, a German company producing three types of drones, GMSpazio operates the collection and application of data across requirements in areas of monitoring, surveillance and control.

Outlining search and rescue, monitoring power lines and monitoring bridges as just a handful of possible applications, Filippo Gemma, GMSpazio's general manager, said: "We are able to georeference the images, merging GPS technology, steradian geometry and trigonometry to extract the real position of the aircraft. This process can be completed in three seconds, a huge reduction on the amount of time needed to fulfill the process manually."
Italy has extensive capabilities in collecting, translating, analyzing and applying Earth observation and remote sensing data. As data quality and associated technology increases, these companies will continue to support benefits across the many possible applications.

Roberto Tartaglia Polcini

CEO
MAPSAT

> Our plan for the future is to extend MapSAT's technologies to nano-satellite and micro-satellite data. This way, MapSAT will be vertically integrated, having optical, radar, aerial, drone and terrestrial viewing technologies.

MapSAT was formed last year. What is the company's growth strategy?
We based our first industrial activities in Benevento because MapSAT has made an offer to acquire the assets of MARSec (Mediterranean Agency for Remote Sensing and Environmental Control) as the first step of our business plan. We also aim to open a tech lab in Rome next year and extend our offices into Lombardia. We chose Campania to start our R&D activities because the region is very solid within the Earth observation segment of the market. Campania holds many companies participating in the Aerospace District, DAC, and research centers devoted to aerospace, like the CIRA (Italian Aerospace Research Center) in Capua. There is also a critical mass of companies that use satellites to provide products and services.
Our plan for the future is to extend MapSAT's technologies to nano-satellite and micro-satellite data. We are currently securing a partnership with a microsatellite industry leader, as well as holding partnerships with Genegis Group, which is a network of Italian enterprises focused on aerial and terrestrial sensors. This way, MapSAT will be vertically integrated, having optical, radar, aerial, drone and terrestrial viewing technologies.

What is the future for nano and micro-satellite technologies?
Nano and micro-satellites are the future, not only because they are more affordable, but because the technology is different to the traditional earth observing satellite. In the past the image had to transmit information to be received on Earth and then be processed. With the nano and micro-satellites we can place two satellites: one to acquire information, the other to process it in space.

How did MapSAT establish a relationship with Israel's EROS B Satellite?
I had special relations with ImageSat International (ISI), the Israeli company that is the commercial provider of high-resolution, satellite earth-imagery collected by its Earth Remote Observation Satellites (EROS). MapSAT's footprint of the EROS B satellite covers Europe, North Africa and a part of the Middle East. The coverage is a non-linear circle due to political reasons. We work for civil and military entities and in various R&D projects to provide images and value added products and services in critical areas in the Mediterranean Sea and other parts of the world.
The optical data we receive from EROS B is in panchromatic mode and very high resolution (70 cm), but MapSAT is specialized in the pan-sharpening technique, which is artificially colorizing the images.

Could you highlight a few of MapSAT's key partnerships?
In addition to the strategic relationships with ISI, MapSAT has other partners in Midstream and Upstream EO market, such as BlackBridge (owned by PlanetLab). It is a company that provides data from a constellation of satellites (RapidEye) in multi-spectral, medium resolution. This is paramount in order to monitor the environment. We also signed with RBC Signals earlier this year to participate in their network of ground stations.

What is the importance of Earth-observation imaging for security and defense?
The future of Earth-observation is to use an integrated chain of technology for data collection. We have the EROS B, which is a very high resolution optical satellite in low orbit. MapSAT also collects information from aerial technologies, UAVs and terrain sensors. We integrate all of this information to offer smart sustainable and permanent solutions to our clients. It is strategic to concentrate our attention not only on data-collection. Unfortunately, the potential of technologies for Earth-observation are not yet fully understood by the government and public, because they are outside of the traditional way to go about things. Slowly but surely, we will become indispensable in security and defense segments, by being able to see where nothing else can.

Could you provide a few highlights from MapSAT's OSIRIS project?
OSIRIS is a very important project for MapSAT. The service analyses historical and updated data in the Mediterranean Sea. We begin with SAR data which looks at a large area and then narrow in with optical imaging. For example, we can first acquire radar data – i.e. in the morning - with the Cosmo Sky-Med in Northern Africa to observe whether there are any illegal boats in the Mediterranean. The research algorithms can determine a boat's velocity, direction and dimension. We can understand roughly how many people are in travel and know whether they are in difficulty or not, to supply this information to the Coast Guard and other control agencies.

Roberto Ricci & Fabio Menichetti

RR: CEO
FM: Business Development Manager
SISTEMATICA

RR

Sistematica was established in 1996. Could you summarize the history of the company over the last two decades?
RR: Coming from a background in Telespazio, I founded Sistematica in 1996 with an initial focus on industrial automation and space. From the beginning, we were involved in infomobility, conducting business with the Italian Processing Archiving Facility (I-PAF), for example. Although concerned with the Italian market, this was a European program. We were also involved in the Shuttle Radar Topography Mission, an international research effort, which can be considered a precursor of COSMO-SkyMed. It involved a radar mounted on a shuttle with two sensors: one provided by Italy, and the other by the USA The shuttle was active for 30 orbits of the Earth, with the objective of acquiring data to create a three-dimensional map of the world.
We also worked on a precursor of GPS, but without the use of a cellular network. Using our acquired experience at Telespazio, my partner and I transferred our knowledge to work on further projects with ViaSat and with OctoTelematics, one of the big infomobility players in Europe. We have since created the space business line and worked for five or six years on the Galileo project, for example. Today, 30% of Sistematica's revenue comes from the infomobility sector and space and aeronautics account for 20%. The entirety of our space and aeronautics business is conducted with Leonardo.

What are your key capabilities within the space and aeronautics realm?
FM: We realized a subsystem of the COSMO-SkyMed constellation to elaborate acquired data and generate the image for the final customer. We were requested to create the same infrastructure for Thales Alenia Space in the Korean program KOMPSAT-5, where we realized not only the production infrastructure and some processes, but also the calibration systems for the sensors on the satellite.
RR: Sistematica is not present in the international market, although we sometimes work on international projects as subcontractors for Italian companies. In my opinion it is impossible for a small company in the space sector to work within the international environment. The opportunities within the national market are limited, and a small company does not have the visibility to attract the attention of foreign governments. Furthermore, we have worked and collaborated with Leonardo for 20 years, and I am concerned that if we approach the customer directly we will not only be unsuccessful in acquiring the contract, but also risk losing Leonardo as a customer.
FM: We have tried collaborating with other companies, but we do not find the associations beneficial. We do not need to participate in the clusters, however we operate within the START consortium, which is not a regional cluster but a group of ten companies, in which we are participating on a bid for EUMETSAT along with Thales Alenia Space.

What are some of the limitations of working on institutional contracts?
RR: Many of the programs in which we participate are supported by the Italian Space Agency (ASI) and the Italian Ministry of Defense. If we work with the Ministry of Defense, for example, we are tied to that one customer, and we are unable to profit further from our solutions. For example, we have created a much more accurate map than Google using radar data, but the MOD does not allow us to use this system commercially. In other applications, such as land management, agriculture or natural disasters, we could see a huge commercial return.

What are your key goals for growth within the space sector?
RR: Within the space sector we do not have the possibility for commercial return outside of the Leonardo group. We develop solutions as and when Leonardo receive contracts and require us to supply subsystems. We plan to focus on the Galileo program and the second-generation COSMO-SkyMed constellation. We are also in the process of acquiring a contract on a new subsystem as part of an ESA project within Horizon 2020. However, our key area of focus will be in the expansion of our energy management sector, in which we plan to invest a great deal.

Roberto Aceti

Managing Director
OHB ITALIA

within the European context. Our main customers are the Italian Space Agency, the European Space Agency and the Italian MOD. We also cooperate with research institutes like the CNR, the National Astrophysics Institute and the National Institute for Nuclear Physics.

What future trends in space technology can we expect to see in the near future?
To look ahead, one must look back. When space started in the 1960s, it was led by an elite engineering group which required huge public funding that only the USA and the USSR could afford; this space race fueled the development of the industry. We still have giants like Airbus and Thales but also smaller, high technology companies. I see the signs of a revolution in which the space industry will undergo further mutation through a radical change in the manufacturing approach which, in turn, will induce a drop of costs. We also have to think in terms of public benefits: the new services and the related data that can be made available by the new generation of satellites.

Is there a greater need to send more satellites into space?
There are many objects in space but they also need to be better exploited. Currently this does not happen, mostly because the funding mechanisms are not based on solid business ground. I believe that space will continue to progress but it will no longer be paid only with taxpayers money but by motivated entrepreneurs with long term sustainability plans.
Nowadays, most satellites are still manufactured as unique objects; I would like to introduce a new concept of production facilities for satellites, which will change the manufacturing process drastically with time and cost benefits. In two years, we should be in full production. The factory would aim to produce fifty small satellites a year.

Is OHB Italia participating in space removal projects?
We are not directly involved in any removal project, but we are pursuing research and development opportunities addressing the various technology needs. In the meantime, we are focusing on debris observation from the ground, for which we are developing a high performance telescope.

Could you speak of the origins of the company and the relationship between OHB Italia and OHB SE?
Manfred Fuchs, an entrepreneur of Italian origins who already ran an SME in Germany called OHB System, acquired Carlo Gavazzi Space in Italy. Mr. Fuchs' vision enabled Carlo Gavazzi Space, now OHB Italia, to become a designer and integrator capable of making its own small satellites and scientific payloads. OHB System has now evolved into a large European group, being the third Large System Integrator for ESA. OHB Italia however, while belonging to the group, remains strongly independent in terms of strategy, management and operations.

Could you highlight your areas of operation in Italy?
OHB Italia has the ability to realize end-to-end satellite missions from design to procurement, integration, fabrication, qualification, launch and management of operations. Our second main area of activities is the development of sensors and scientific instruments.
We are based in Italy, while we operate

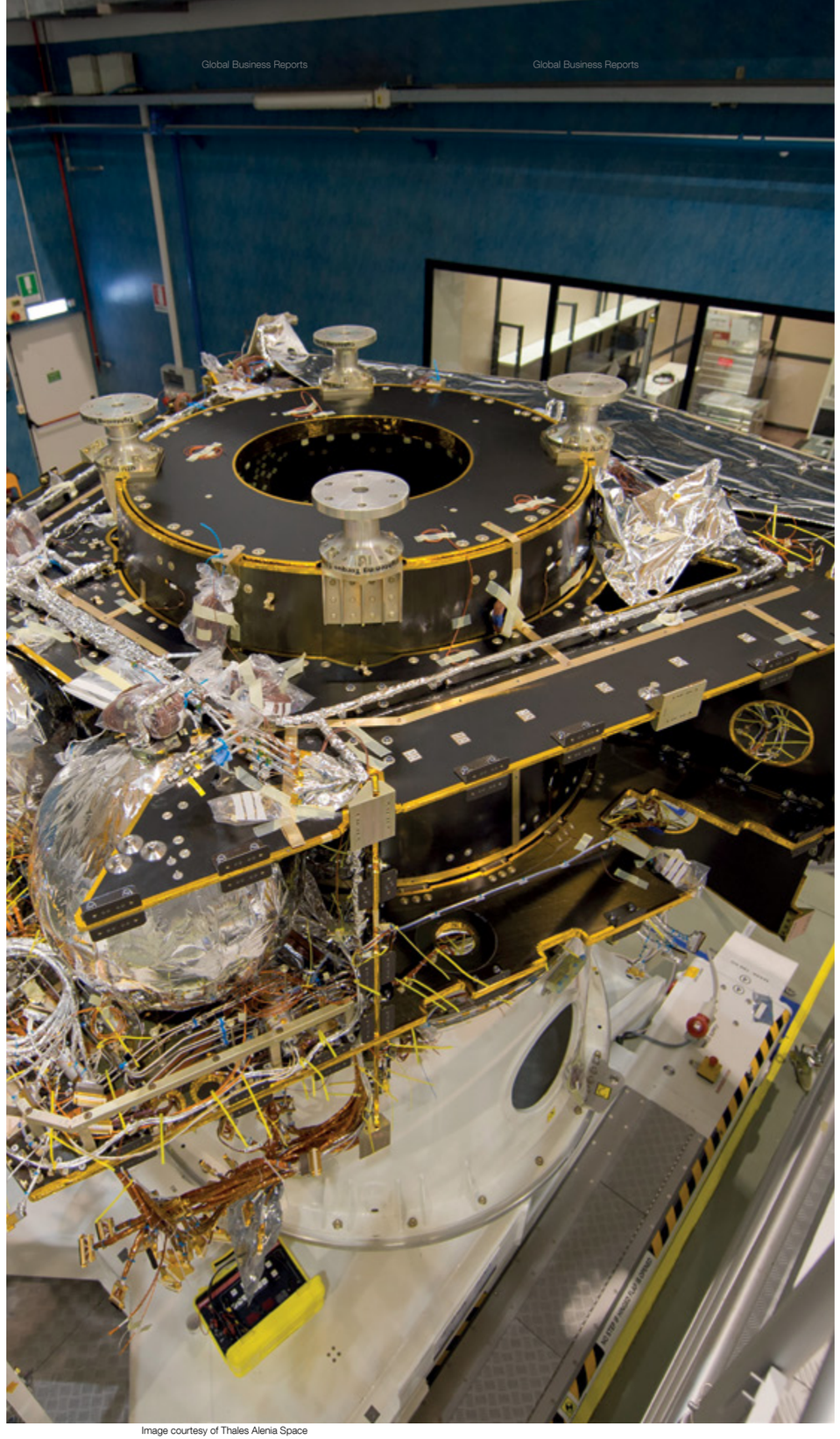


Image courtesy of Thales Alenia Space

Silvio Rossignoli

President
AERO SEKUR

Aero Sekur won a project by the MOD to develop UAVs. Could you describe your goals in this segment?
Aero Sekur is not a traditional aeronautical company given that our primary focus is working with fabrics. We are developing our own UAV created out of flexible materials. The only other kind of aircraft one can make using flexible fabrics are airships. Aero Sekur is looking to develop a new generation of high-altitude airships. We are collaborating with Thales in France on a project called Stratobus and are also developing our own stratospheric airship, the LTA (Lighter Than Air).
We rely on tough, ruggedized aircraft that can be made with parafoil. The advantage of using parafoil is that it is crash-proof. Aero Sekur believes we must also go back to using hydrogen given that helium costs a fortune. On the other hand you must also have new generation solar cells, if you want endurance at that altitude.

How does self-funding impact your operations?
Self-funding the development process is a real problem. Aero Sekur is trying to involve the national defense authorities at least for what concerns defense R&D. There are goals to better support SMEs in terms of international activity and the development of new technologies.

Italy seems to be outsourcing services much more than in previous years. Do you see this trend increasing?
Outsourcing services in Italy is a back and forth trend. There is still a strong interest in keeping the maintenance sector local. The Italian Navy is working with the Ministry of Defense for ship decommissioning, for example. Decommissioning is a very interesting part of the market, we want to be involved in that.

Could you speak of the distinct capabilities of Italian regions?
We have five facilities in Italy, two in Aprilia, one in Liguria, one in Piedmont and one in Campania, plus one in the USA in Pensacola, Florida. Here in Lazio we are taking advantage of the Fiumicino airport. We work on civilian aircraft slides and rafts that come off aircraft in Fiumicino. Our operations in Caselle (Piedmont) are largely due to the presence of Thales Alenia Space and to the Torino Politecnico, and the segment which we are most interested in, which is exploration and humans in space. Aero Sekur makes NBCR filtration and conditioning systems, NBCR protection devices and endeavors for agriculture in space, so we found other colleagues in Liguria who were working on the same there. We lastly chose Campania because it is a prime location for manufacturing. We are presently looking towards Apulia and Calabria given that we are interested in accessing a small airport.

Aero Sekur has a strong interest in agrospace. Where does this stem from?
I believe we can grow better food if we grow Martian food. Agrospace needs very specialized infrastructure to deliver products: that is where Aero Sekur comes into the equation, with its light-weight innovative inflatable structures for cultivation and the advanced filtration and environment regulation systems that create and maintain an Earth-like environment.

Image courtesy of Avio

Innovation

New ideas are essential for sustainability

Many companies are focusing on reducing cost and time to market, as well as efficiency of processes in space, with an overarching interest in prolonging mission life and increasing sustainability.

Additive manufacturing

Additive manufacturing, also known more widely as 3D printing, is a key technology both in terms of manufacturing structures and producing objects on board a spacecraft. Companies such as BeamIT, whose core focus is in the biomedical area, are transferring technology to the aerospace field with the aim of supplying OEMs with components with improved properties, a quicker delivery time, and lower costs. "The OEMs have so far found that there are many improvements to be made within structures by using components that maintain the same mechanical properties, but sometimes at half the weight," professed Maurizio Romeo, R&D manager, citing weight as one of the most important challenges alongside lead times for launches. "Additive manufacturing also makes it possible to use only one single component without the need for assembly, greatly reducing aspects of the process."

However, because there is no standard for additive manufacturing, OEMs continue to manufacture their own components. "Within aerospace specifically, we have been discussing opportunities with aerospace companies such as Thales and Leonardo for some months. While it is still too early to commence full-scale production, we are beginning to redesign components, focusing in particular on trends for nanosatellites," said Romeo.

Another application for additive manufacturing is for on-board production of objects, giving astronauts the possibility to manufacture objects even if far removed from the traditional resources available on Earth. A recent Italian Space Agency (ASI) project tested a portable 3D printer on board the International Space Station (ISS). "The mission, with the key objective of realizing a 3D printer to test in microgravity conditions, has been extremely successful. Since its return to earth, the printed object is being subjected to various tests by the Italian Institute for Technology (IIT) to verify the impact of microgravity on 3D printing," recounted Marco Marigliano, global account manager – space business development at Altran Italia. Altran acted as the prime contractor for the project in collaboration with Thales Alenia Space.

Sustainability and reusable launchers

Space pollution and sustainability challenges associated with emissions from space missions and launchers are a key driver for new programs. One of the greatest areas of waste associated with a launch is the launcher itself, and many companies, such as Thales Alenia Space, Airbus and Avio, are developing technologies and systems to support the possibility of reusable launchers.

Romeo of BeamIT cited additive manufacturing as presenting another possible solution by reducing material and therefore scrap waste. "We are currently involved in discussions concerning the best solution; whether to aim to significantly reduce the production cost of the launcher, or to create a new recyclable launcher that can be recovered and reused," he explained.

Social benefits and Earth applications

The potential to draw on space research and technologies for Earth applications and socioeconomic benefits is a growing area of interest and also an important justification for space missions. Some companies are applying knowledge attained through space activities to capitalize on the commercial market. Argotec, for example, has taken its expertise in space food and applied the knowledge for use in the consumer market. "Whilst there are no preservatives in our products, they have an extremely long shelf life and support the daily nutrition and calorie intake for humans. These features are essential to astronauts, but they also appeal to the wider commercial consumer market. Many people may not have time to prepare dishes, or may require balanced nutrition plans," related David Avino, managing director, Argotec.

Similarly, experiments carried out in space can be extremely effective in testing materials and finding efficient solutions for Earth applications. AGT Engineering recently coordinated a project in two parts; firstly, to study combustion in space in relation to biofuels, and secondly, to develop a method to capture particles by thermophoresis. "Biomasses, from which biofuels are derived, use CO2 to combust, and produce CO2 when they burn, operating in a zero cycle," said Filippo Ugolini, AGT Engineering's president. "There is growing demand for biomasses and their use in aircraft, and our experiments on the International Space Station (ISS) test the changes in the surface of the droplets when combustion occurs. Because there is no gravity, the droplets remain completely spherical, which removes the variable of the changing dynamics and surface properties that would occur under a gravitational force," he explained, adding that the result would be to determine the optimum composition of the droplet to obtain the best performance with the least pollution.

The second part of the project involves the capture of particles of only a few nanometers in breadth between a hot and a cold plate, where the cold plate attracts the tiny particles. The instrument itself is designed and owned by DTM Technologies, and processes air by thermophoresis. Although the experiment was used to test the behavior of the instrument on microdust on board the ISS with the potential application of improving the health of astronauts, there is also the possible transferrable application to filter bacteria in hospital wards on Earth. This could reduce infection and general spread of bacteria in particular environments.

With a strong foundation in advanced technology, Italian companies are well placed to develop new solutions and carry out innovative experiments, increasing their visibility internationally. Existing expertise and the potential to transfer solutions from other industries gives SMEs a competitive edge in developing cutting-edge technologies to support demand trends and requirements.

> "The OEMs have found that there are many improvements to be made within structures by using components that maintain the same mechanical properties, but sometimes at half the weight. Additive manufacturing also makes it possible to use only one single component without the need for assembly, greatly reducing aspects of the process."
>
> - Maurizio Romeo, R&D Manager, BeamIT

Antonio Caraviello, Alessandro Castaldo & Pierluigi Cirillo


AnC

AnC: CEO
AIC: Business Development Manager
PC: Program Manager
SÒPHIA HIGH TECH

Sòphia High Tech launched as a spinoff of the University of Naples Federico II in 2013. What is the company's core business?
AnC: The name 'Sòphia' stems from 'philos-sophia', which means knowledge. We consider ourselves a reactive company that is very fast at designing and producing products using in-depth expert knowledge. We are a company leader in materials testing fixtures. The second business unit of Sòphia concerns the design (from mechanical, kinematics, robotics and structural simulation) and manufacturing of structures and processes. We have a strong focus on innovation in all the industries we work in, which range from the railway and automotive sectors to the nuclear, energy, aviation, defense and space segments. All of the managers in the company are PhD graduates with specialties that cover the whole value chain of industrial processes.
AIC: The company is structured with four main divisions: mechanical testing of materials, the creation of industrial automation, R&D processes, and additive manufacturing, which focuses on optimizing structures and production of direct metal laser sintering (DMLS).

What is the importance of Sòphia High Tech's R&D processes?
AnC: R&D developments are paramount for Sòphia High Tech. We are constantly asked to execute customized tests for clients. We have a close cooperation with universities and research institutions and industries. R&D is key in order to remain a competitive and innovative player in the rapidly-evolving market.
PC: We have developed a new device for linear friction welding (LFW), and we are the only company in the country that can offer it. Our team is made up of a diverse array of competencies for new products and processes. We have also been working on a new powder mixer alongside Avio, the CNR and DICMaPI, which is used in cold spray and DMLS. The aim is to cure surfaces, adding a layer of material to improve resistance. This is important to improve performance under critical conditions. We have received funding from the Ministry of Economic Development to continue R&D on the product. We are also focused on the creation of a new alloy.

Is Sòphia High Tech looking for more partnerships to continue growing in the market?
AnC: We have various partnerships with companies such as MekEuro Engineering, DAC, UniCredit and Hexagon Metrology. Long-term strategic partnerships are indispensable for Sòphia High Tech because they are the key to growth. We possess in-depth knowledge of materials' traits and how they will perform in diverse circumstances. Our team is solid, we work with clients such as Leonardo, A.Abete, Dema and Avio, which require the highest standards of operations. We are ready to continue facing the challenges of the industry. Having looked at various international markets to continue expanding and growing, Sòphia High Tech will continue establishing partnerships to strengthen as a player in the aerospace market.

There is a strong industry focus on renewable energy and sustainability. In what ways is Sòphia High Tech developing new technologies for this market segment?
AnC: The materials landscape is constantly evolving, and the industry is looking for new solutions for their products. Sòphia High Tech has a green vision, where we focus on environmentally friendly materials with low impact on the environment. We have strengthened our knowledge within bio-composites and have successfully produced a slow-burning insulation material reinforcement and high thermo-acoustic performance. The Ministry of Economic Development has taken notice of this and we will receive financing to continue developing a sandwich panel for the civil segment. We believe in the Industry 4.0 approach, where we can optimize production and reduce waste.
AIC: There is indeed a stronger push for energy efficiency that stems from sustainable sources. We need to stray away from fossil fuels in the future. We have a focus on the development of hybrid engine solutions using the latest available fuel cells for the transport industry. We believe we have the expertise to lead in the development of high-tech solutions for this market segment and encourage customers and potential customers to reach out.

Federico Valente

CEO
ITACAE

Could you provide us with a brief history of the development of ITACAe since the company's inception three years ago?
Having worked in the automotive sector for the past two decades, in 2013 I founded ITACAe in the hope of monetizing my competences and applying my capabilities in other complementary areas, such as the aerospace industry. We began by providing CAD, CAE, Six-Sigma & LEAN engineering services for the analysis and optimization of manufacturing processes and structural performance of components, with a high focus on quality. We also work on the development of software, particularly in the area of additive manufacturing, and have two specific tools in development related to design.
Currently, our direct clients are all based in Italy and Switzerland, although we also work indirectly with some companies as sub-suppliers or contractors in other European countries. The opportunity to attend international fairs is important to us, as we want to expand our global footprint. Italy is an attractive country for European companies because of our varied competences, especially here in Turin; the concentration of the aerospace industry here is larger than anywhere else in Italy.

Could you tell us more about ITACAe's operations and any particular projects the company is working on at present?
The breakdown of ITACAe is 70% automotive, 20% aerospace and 10% other sectors. In the aerospace sector, we have several direct customers in Italy, such as Aviospace. We are working on a project financed by the European Space Agency to develop special methodologies to simulate the explosion of electronic devices. We also worked as a sub-supplier with Thales Alenia Space for the development of components for the ExoMars mission and the STEPS project. We also have some international customers, in collaboration with our partner EnginSoft. We are currently working with one of these companies on a project related to the development and optimization of launcher parts.

What advantages does TPA membership bring to companies such as ITACAe, and how do the company's software offerings fit into the working groups of which ITACAe is a part?
Italy is particularly well known for its SMEs, so we need to aggregate in order to form a big force and tender for credible offers from the international market. Many SMEs, with a variety of competences, feel the need for such an opportunity presented by TPA and therefore the decision to join is an easy one. TPA membership offers benefits such as opportunities to enter the market and to learn about different technological advancements in the industry from fellow companies. We also wanted to show our customers a possible workflow involving our engineering phase for manufacturing the end product, compared with what exists in the market at the moment. Within the working group in which we are active, there are several competences for different parts; some companies can produce parts using additive manufacturing technologies and process operations. Our presence is related to the design and engineering activities in the overall workflow.

As a relatively new company, what are your plans for your first five years in operation and beyond?
We have a business plan until 2018, which focuses on the development of two business lines that are not being exploited at the moment because they are not ready for the market. This covers smart system integration and software development. We are investing in software development for innovative technologies, such as additive manufacturing, and ITACAe is represented on the board of the Italian Association of Additive Manufacturing. Located in Milan, it is one of the most important bodies for additive manufacturing and ITACAe participates in promotional activities on important industry topics, such as certification, material design and software.

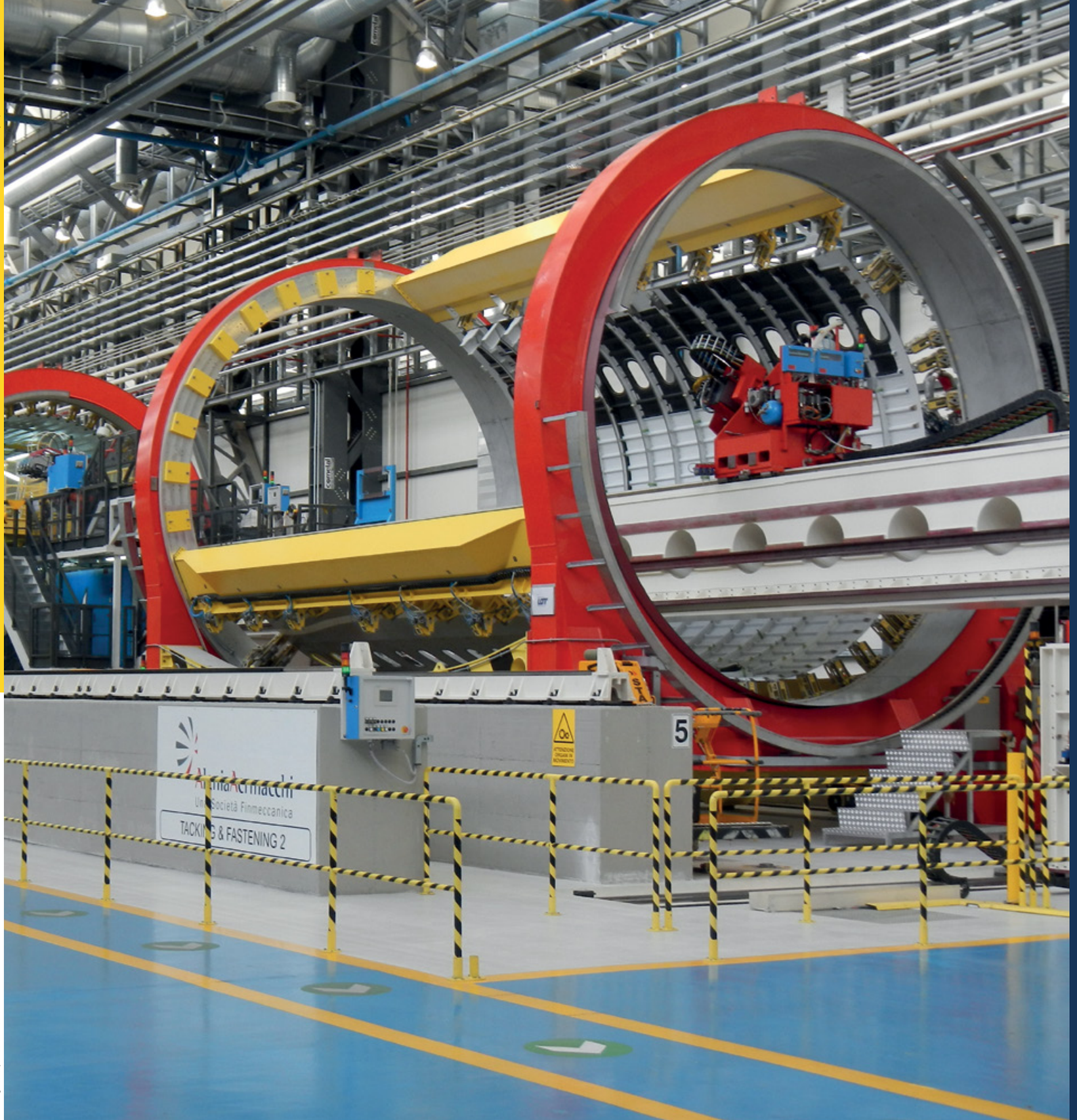


Image courtesy of Biselli and Cariu

CIVIL AVIATION

"The commercial airplane industry is constantly increasing: almost 40,000 new airplanes will be needed in the next 20 years. Asia is going to be the largest aerospace region in the world outpacing the United States and Europe."

- Antonio De Palmas,
President,
Boeing Italia

Image: Umbra Cuscinetti

Spreading Wings

—

Introduction to Italy's civil aviation sector

Italy has a long tradition in the aeronautical field, blossoming out of the broad range of competencies transferred from other industries, across design and technological innovation to manufacturing capabilities. Although Italy's SME-based network is unusual in the aeronautics sector, the structure has allowed for the growth of companies with very specialized offerings across the entire value chain.

Different regions are specialized according to the legacy of the area and the presence of larger key players. Apulia and Campania are focused on aero-structures, for example, while Lombardy is particularly well known for helicopters due to the presence of AgustaWestland, now absorbed under the Leonardo umbrella. With 35% of the company's business falling within the civil and commercial realm, Leonardo is the key player in the sector, covering capabilities from design through to manufacture for both rotary and fixed-wing aircraft.

Piedmont alone covers the entire value chain, with prime companies including Avio Aero, Leonardo, UTC and Avio SpA.

"Piedmont boasts a complete aerospace supply chain compared with the other Italian aerospace clusters, with a stronger segment specialization," explained Vincenzo Ilotte, president of the Turin Chamber of Commerce. "The main advantage of the SME population in Piedmont is their proximity to the big industry; this promises consistent opportunity to develop new products while helping secure responsive customer demand. Furthermore, by playing an active role in developing new products, these companies will be more competitive on an international level," Ilotte added.

While they may not have the scope to bring an entire aircraft to market individually, Italy's SMEs provide a rich supplier base and are technologically advanced and innovative.

Drawing on a legacy

Many companies have been able to draw on their experience in other sectors, transferring knowledge from the automotive industry in particular. This has resulted in some interesting solutions. For example, when Tubiflex were approached by a European helicopter manufacturer with a challenge caused by the use of a titanium system, they applied their knowledge of the automotive industry to create a solution. The titanium system made it difficult to fit the piping to the body of the aircraft, sometimes resulting in breakages, so Tubiflex turned to steel. "Our more flexible solution not only avoids breakages but is also more compact, which decreases the overall weight, and reduces fitting time from one shift to less than two hours," said Dario Piola, general manager at Tubiflex.

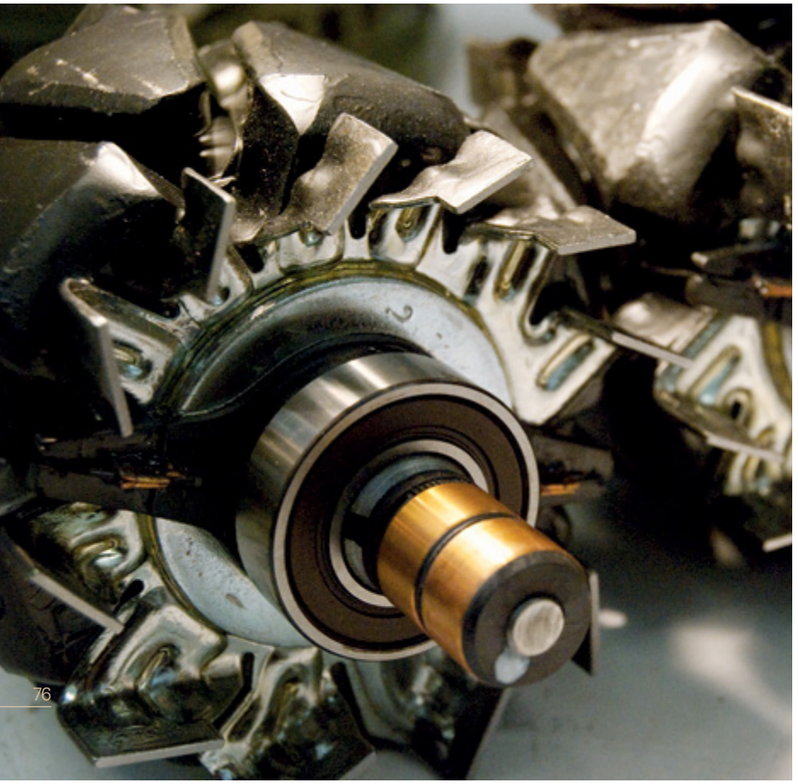
As well as materials, there is also crossover between technologies in the systems themselves. "An example is the present trend in airplane on-board actuation to move from hydraulic technology to electro-mechanical or electro-hydrostatic technologies," stated Ilario Gerlero, project manager at Modelway. "In order to answer this need, Modelway has designed and developed software able to control an electromechanical system for actuation in the automotive space which we are now applying to the aerospace sector."

Overcoming challenges

Due to their smaller size and market presence, SMEs face strong competition and challenges that larger companies overcome more easily. Often there is also demand from leading end users to produce in large volumes, putting pressure on smaller companies that do not have the facilities and manpower to do so. "Production rates for aircraft are increasing, putting a strain on manufacturers and their suppliers," stated Stefano Serra, CEO of Teseo, a company specialized in EMC testing equipment and acquired in 2012 by Clemessy, part of Eiffage Group. "Production of the Airbus A320neo, for example, is driving demand for aeronautic component suppliers at levels similar to demand seen in the automotive industry," added Serra.

The speed at which the aviation industry is evolving, and the obstacles that national SMEs are facing, are forcing them to look abroad for business opportunities. Many believe that their capacity to survive will depend on whether they are able to enter the European and international markets or not. Roberto Cacciarelli, CEO of Skystar

Image: ASE



Services, reminisces about how "in 1992 Alitalia had the biggest business jet fleet with 164 aircraft including Cessna and Gulfstreams, but now there are only about 40 to 50 of them. The aviation market has changed, the industry has changed."

Market giants such as Boeing have chosen to work in Italy however, given the country's specialized capabilities. "Italy is a source of technology for us. The Italian aerospace industry is very advanced, especially in niche capabilities," said Antonio De Palmas, president of Boeing Italia. Although the company has a strong relationship with Leonardo in the country, it also acknowledges the clear geopolitical shifts taking place at a global level. "Asia, China, Indonesia, India, the Middle East and South America are experiencing economic growth and the emergence of a strengthened middle class. This does not mean that Europe and North America are becoming less important but rather that the focus is shifting," he added.

Historically, there has not been a great deal of government focus and support for SMEs. For this reason, companies have had to find their niche within the market in order to stand out among their competitors. SMEs within the Italian market compete for a handful of customers, and therefore many see greater opportunity abroad for establishing new partnerships. "There is a lack of OEMs, and we need more medium to large-sized companies and OEMs to drive investment and challenges," asserted Antonio Alunni, President of Fucine Umbre. "Italy is very competitive in terms of cost, and OEMs entering the market would find a high level of competence and skills. The government needs to make the region more attractive for investment by establishing a set of advantages and considering these factors for the region's strategic growth," he added.

Navigating the Italian system can also cause delays and pose challenges for industry players. "Sometimes Italy is not a very business friendly environment in terms of bureaucracy, the tax and legal system and uncertainty," said De Palmas of Boeing Italia.

Because the market is so highly competitive, it is necessary for companies to tick all the boxes in terms of certification, quality, cost effectiveness and delivery time to win contracts before being able to build trust within the market.

In many cases, this means offering made-to-measure solutions and a more integrated service. "The challenge for a company such as Alfa Meccanica is to become increasingly vertically integrated, because big customers are showing interest in this from suppliers," explained David Fusta, in charge of new business development at Alfa Meccanica. "We not only aim to provide our customers with a finished product, but also a finished system and subsystem, which poses an extra challenge. For this, we need additional capabilities to assemble systems in addition to the components we already manufacture," he said.

QFP, an Umbria-based company specializing in 3D measurement and mechanical and aerospace engineering, is a prime example of a company that has specialized in a niche area in order to excel and establish a competitive advantage. QFP specializes in door design for cargo and passenger planes and, despite employing only 30 staff, is a key supplier for Airbus and recently also Korean Airlines, having worked on programs including A380, A330, A320, A350 and B737.

"In the field of mechanism design we are one of the few companies in the world able to do this type of work," said Alberto Zuccari, engineering manager at QFP. "Although it is difficult to gain the trust of large customers, the quality of our work has increased our business through positive feedback and referrals. Our business with Korean Airlines, for example, came from a referral from Airbus." QFP has also patented recently a new concept for a latching and locking system for pressurized aerospace doors, and is the only SME connected directly with the Airbus server.

Whilst there may be some restrictions in contract size for Italian SMEs, the niche specializations of many companies make them the partner of choice for specific applications in which they have learnt to excel. The possibility to establish partnerships and integrate services within the SME network is a key solution to facilitate winning larger contracts, whilst maintaining the core specialization and flexibility of the individual companies.

Vito Riggio

President
ITALIAN CIVIL AVIATION AUTHORITY (ENAC)

> Italy and Europe have one of the best performances worldwide in terms of safety. Yet there are key areas of attention on the operations field, including maintenance. Operational fatigue, crew management and the efficiency and airworthiness of aircraft by operators, especially in helicopter operations, are part of ENAC's oversight program.

Could you explain the reasons behind the founding of the Italian Civil Aviation Authority (ENAC) in 1997 and how the organization has developed since then?

Until 1997, the aviation field was regulated by two main organizations: the Italian Aircraft Register (RAI), in charge of airworthiness matters, and the General Directorate of Civil Aviation (DGAC), in charge of operations, licensing and airports. The legal status of the two organizations was different, as the first was an agency and the second was part of the Ministry of Transport. Methods of regulation for both organizations were different and there was an ever-present risk of grey areas and overlap. This created big challenges for the market, Europe and personnel, which led to the government's decision to create a unique aviation authority in charge of all aviation-related matters. Subsequent developments have been either in terms of allocation of new responsibilities, such as airspace and passenger rights, or new organizational models. The number of managerial positions has been reduced by 40% following the initial merger of RAI and DGAC, in order to have a more efficient workflow and the effective management of allocated tasks and duties.

One of ENAC's major roles is in monitoring and enforcing air transport regulation. What is the regulatory environment like for the aerospace industry in Italy, particularly in terms of manufacturing and distribution?

Today, all regulatory functions related to manufacturing, maintenance, operations, licensing, air navigation services and airports are exercised by the European Commission and EASA. ENAC participates in regulation development within the European framework and, when rules are adopted, ENAC applies and enforces them. Today, as far as production is concerned, ENAC is mostly active in enforcing Part 21, related to aeronautical products.

In terms of air transport safety, what are some of the key areas of focus for ENAC?

Italy, along with the rest of Europe, has one of the best performances worldwide in terms of safety. Notwithstanding this, there are key areas of attention on the operations field, including maintenance. Operational fatigue, crew management and the efficiency and airworthiness of aircraft by operators, especially in helicopter operations, are part of ENAC's oversight program. The same attention is afforded to other fields, such as maintaining the qualification level of mechanics and engineers, the management of parts, and working procedures.

ENAC is also a representative body for the civil aviation industry in Italy. Could you explain how ENAC fulfils this role and the relationships it has with similar bodies within Europe?

The way in which ENAC performs its duties is made up of different approaches to complement its oversight functions. We participate in frequent meetings with industry representatives to address specific issues based on open working relationships, structured meetings with sector associations covering general issues, and promotion of proactive management of perceived or existing problems. These meetings also benchmark ENAC with other European aerospace authorities.

Safeguarding the environment is increasingly becoming an area of focus for the aerospace industry. What role does ENAC play in promoting the adoption of alternative energies and implementing sustainable practices?

For many years, ENAC has taken a leading role in promoting best practices in the aviation field. It is the sole public body in Italy to have signed a protocol to safeguard the environment and implemented a program to promote a better environmental approach with the Prime Minister and the Ministry of Environment. ENAC has recently published guidelines for the production of energy from renewable sources, in particular photovoltaic cells. ENAC has also financed and made available a study of best practices to be used at airports for designing sustainable infrastructures and systems. Finally, in the service contract between ENAC and airport operators, we make available economic benefits for those airports which work on reducing their environmental impact.

Looking to the future, what are your main aims for ENAC as it approaches its 20th anniversary and beyond?

Our goals are for a better integration in the European regulatory framework and improved cooperation with the aviation industry, in all respects.

Antonio de Palmas

President
BOEING ITALIA

> We have invested €5.6 billion in Italy and this is primarily due to the 787 program, but also the partnership with Avio GE on the engines. Between Alenia, Avio and Leonardo, we have the Italian industry connected to the three major programs (the 787, 737 MAX and 777X) that will define commercial aviation for the next 20 years.

Boeing Italy turned 65 at Farnborough this year. Could you mention a few highlights of this long history?
Aviation began just a few years before Boeing emerged. Our predecessors achieved things that were viewed as impossible and we have no doubt that the second century has to be framed in the same way. The two highlights would be when the Italian industry was involved in the manufacturing of the McDonnell Douglas aircraft in the 1970s because that was a change in quality for aircraft manufacturing. It was also a recognition of our strong partner in Italy, Alitalia, which was one of the largest operators of the McDonnell Douglas aircraft, especially the MD-80. The other would be the 787 Dreamliner, which we started in 2004. The role of the Italian industry, alongside Leonardo, manufacturing composites in a new state of the art facility in the south of Italy is an indication of how this partnership has been growing. The facility in Grottaglie is the second largest industrial facility in Southern Italy, only second to the Fiat plant in Melfi.

What is the importance of the humanitarian projects Boeing undertakes?
Almost 70% of our revenue stems from outside the United States, and that is growing. The commercial airplane industry is constantly increasing: almost 40,000 new airplanes will be needed in the next 20 years. Asia is going to be the largest aerospace region in the world outpacing the United States and Europe. As part of this global reach we have a philosophy of getting close to the communities we work with. We sell products that help bring relief efforts; a very recent example is the Chinook helicopter which is a unique way of aiding disaster efforts. We used them in the recent earthquake in central Italy, and to fight a fire in Rome. We are also teaching environmental education and building environmental awareness in primary and secondary schools.

What is the importance of the Italian market for Boeing?
Italy is a source of technology for us: the Italian aerospace industry is very advanced, especially in niche capabilities. Umbra Cuscinetti have improved their technologies to a point where they have become a world leader in aerospace. Alitalia has been a great customer for Boeing and Italy has always been an open market for us in terms of defense products, namely the Chinook but also the KC-767 tanker which has the most advanced air-to-air refueling capability worldwide."
On the commercial side, new large customers reflect geopolitical shifts. Asia, China, Indonesia, India, the Middle East and South America are experiencing economic growth and the emergence of a strengthened middle class. This does not mean that Europe and North America are becoming less important but rather that the focus is shifting. We have a strong partnership with Leonardo and they are distributing the Chinook aircraft to the Italian army under a license with us.

What are the largest advantages and disadvantages of operating within the Italian market?
Sometimes Italy is not a very business friendly environment in terms of bureaucracy, tax and legal systems and uncertainty. In terms of aerospace however, there are small pockets of capabilities here. Take Piedmont, there are people who can do literally everything there. Our partner Avio, who have been acquired by GE and are now in the engines of our three major aviation products, the 787, 737 MAX and 777X, play a large role in terms of volume and economy.

Where do you see the most growth for Boeing in the upcoming years?
Last year 3.5 billion people flew, which represents half the global population. This growth will be accompanied by volatility and we need to work with that. We are probably the most important non-Italian aerospace entity: we have invested €5.6 billion in Italy and this is primarily due to the 787 program, but also the partnership with Avio GE on the engines. Between Alenia, Avio and Leonardo, we have the Italian industry connected to the three major programs (the 787, 737 MAX and 777X) that will define commercial aviation for the next 20 years. With 150 people working in Italy for Boeing, we are supporting 13,000 jobs. We see growth in the defense market and in the service business of defense, especially in integrated logistics and the tanker. We also see a lot of positive growth for Alitalia together with Rome airport with the expansion of the intercontinental network. —

Antonio Baldaccini

CEO and President
UMBRA CUSCINETTI

> Umbra Cuscinetti wants to lead the aerospace industry by showcasing a future where there is an integration between robots and humans. Through the use of artificial intelligence (AI), we want to create a better workplace and reduce costs for our customers.

Can you talk about your relationship with Umbra Group and what Umbra Cuscinetti's main focus is?
Umbra is becoming a large brand composed of five companies that operate in Italy, Germany and the United States. We have four manufacturing sites and work together on projects. Umbra Cuscinetti is specialized in the manufacture of ballscrews, ball bearings and actuators. We are the largest company in the Umbra Group and represent 75% of its business. Umbra Group has around 1,000 employees in total, of which Umbra Cuscinetti has around 700.

Umbra Cuscinetti has focused on developing robotic integration. Could you describe the direction you want to take within this segment?
Umbra is planning on integrating components around the ballscrew, which is the main part that we manufacture. We are going to witness a strong evolution in terms of mechanical and electrical parts in the upcoming years. Umbra Cuscinetti wants to lead the aerospace industry by showcasing a future where there is an integration between robots and humans. Through the use of artificial intelligence (AI), we want to create a better workplace and reduce costs for our customers. This is not only a way to produce and assemble parts with increasing speed, but also a strategy to inform the world that Italy, through innovation, is not an expensive place to do business.

Could you speak of the company's collaboration with Boeing and Airbus, and where you see these relationships going in the future?
Boeing was really the launch pad for Umbra Cuscinetti when we started regular operations together in 1987. Boeing searched the world to find the best manufacturers of ballscrews, without regard to where the company was located. We gained know-how from our French partners, managerial skills from our German partners and marketing and communication skills from our American partners; so we are blending all of this together and coming up with our own way of doing things. We discovered Umbra Cuscinetti's priority was social responsibility, which is a key reason why Boeing works with us. We are not just a partner on the business side, but also within community development.
We have a reputation as a problem solving company within the aerospace industry. In 1993, when the industry was looking for ballscrews that did not require any maintenance over the life of the aircraft, Umbra created an alloy to serve that purpose. Since we started our partnership with Boeing, Umbra Cuscinetti has accepted large challenges.
Umbra has been working indirectly with Airbus, given that their purchasing strategy is not the same as Boeing's. Boeing purchases everything from large systems to single components directly from suppliers. Instead Airbus wants to work with up to 10 companies and then manage the supply chain. We are more than an assembly company and have software and electronic capabilities that allow mechanical components to move with electrical systems. We recently started to get involved with rotary wing applications.

What do you find in the Umbria region that cannot be found elsewhere?
In Umbria you will find people with a long-term vision within the aerospace industry. People remain loyal to their company and, as a result, there is a very low turnover, which builds stronger ties between employers and employees.

Do you have any final message for the international aerospace industry readership?
I would advise readers to have a global outlook and be open to how other people see the world. Partnering means sacrifice. If there is no sacrifice it is not partnering, it is contracting. Partnering means investing part of your life and part of your budget.
An enduring part of our values revolves around social responsibility. We need to generate profit but that profit needs to be redistributed not only among the shareholders, but also with the community where we operate. —

Going Global

The growing international presence of Italy's SME network

> The biggest challenge for a small company trying to gain funds from Europe is that the company needs to be part of a European program, involving companies and research institutes from other countries. [...] Many small companies would benefit from centralized support on legal and accounting issues, internationalization and collaboration opportunities.
>
> - Maurizio Cheli, Founder, DigiSky

At a national level, the Italian industry is very much focused on internationalization, increasing presence overseas and also encouraging investment, and aerospace is considered a strategically important sector to raise Italy's competitive profile.

Italy's most prominent player in aerospace, Leonardo, is already a leading company in Europe, and aims to become a world leader by growing its international presence. The reputation of companies such as Leonardo have certainly helped to elevate the national industry and opened doors into the international market. "In terms of the industry, the growth of Leonardo-Finmeccanica is positive for us because its companies are operational both in Italy and abroad, which will be advantageous for Italian suppliers like us as it will enable us to increase our international visibility," commented Dario Piola, Tubiflex's general manager.

Because of Leonardo's dominance of the market, any changes it adopts are immediately felt throughout the industry, and whilst the increased visibility of its Italian suppliers can certainly be considered positive, there are some concerns that Leonardo's growth may not benefit national companies proportionately. Stefano Asteggiano, CEO of Prestel Avio, a company specializing in the engineering, manufacturing and testing of wire harnesses, sees the new strategy as restrictive. 'The new structure of Leonardo-Finmeccanica is not beneficial to many traditional domestic suppliers; its engagement of local suppliers is not increasing in line with its growth," he said.

Due to high levels of competition within the Italian market, as well as a desire to achieve faster growth than the national market allows, many companies already conduct a substantial portion of their business internationally. Even small companies, helped by niche specializations and advanced solutions, often compete at a European level and also further afield.

Despite being a small company relatively new to the aeronautics market, I.R.I.' s ultra-light helicopters are in demand all around the world, due to their innovative design and solutions to address practical considerations. Following a partnership with Czech turbine supplier PBS, the ultra-light helicopters are able to operate with greater power than those previously available. At only 300kg (90kg lighter than equivalent aircraft) the ultra-light is suitable for landing and take-off in restricted areas, needing only 150 horsepower to fly at up to 200 km per hour. "We have had many requests for the ultra-light helicopters around the world, and we were recently contacted by an African government agency because our machine meets their needs and regional preferences," stated Carmelo Grillo, sole administrator of I.R.I. "Our helicopters offer a relatively low cost solution, with low operation rates, resistance to high temperatures, and the ability to land and take off over very short distances."

Many companies around the world seek the specialized systems offered by Italian companies, particularly where their own national companies might not have developed in specific areas to the same degree. Developing markets are identified as some of the biggest areas of opportunity for SMEs, as are countries with rapidly developing markets and a strategic focus on technological development. "It is much easier for us to find jobs in the Far East, for example, because it is a niche market and, with only 45 people, this suits the size of our company," expressed Massimo Paoletti, chairman and general manager of UAS, which has recently developed five systems for the Indonesian aerospace company PTDI's N219 civil aircraft. "We have found that there are many more opportunities in countries such as Indonesia, South Korea and Singapore, because the markets are developing very fast."

Integrating services

There are, however, clear challenges faced by SMEs in the aerospace industry. Their size and often more restricted or niche product applications prohibit larger contracts for bigger players or international companies, whose requirements they are unable to meet. "In general, it is quite difficult gaining big contracts, not because of a lack of skill, but because of a lack of dimension," commented Matteo Vazzola, technical director at TPS Aerospace Engineering.

Furthermore, the aerospace sector requires more made-to-measure solutions than other industries, making a wider range of capabilities advantageous. To solve this challenge, there are a number of associations and clusters at a regional and sub-regional level, which seek to unite companies with a range of capabilities to provide an integrated service. All of Italy's key regions have a representative association dealing with the promotion of the SME network within the aerospace industry. A key proponent and supporter of the SME network is Torino Piemonte Agency (TPA), an internationalization project set up in 2007 by the Turin Chamber of Commerce. The key objective was to support the local SMEs in internationalization. "We have a network of suppliers and companies that are ready to conduct business with international players and work collaboratively to provide a strong competence and integrated systems," said Diana Giorgini, aerospace manager, TPA.

Citing Piedmont's strong network of universities and research centers that also support the industry, Giorgini continued: "Piedmont provides a system of relationships characterized by history, experience and knowledge. We are managers of supply chains, and this aspect is very important to international companies."

Italy's aerospace clusters

Many companies have also become members of clusters, some with the support of regional associations, to be able to take on projects of a larger scope. "Our difficulty is in presenting our company to new customers and to communicate our capacity and characteristics accurately," outlined Davide Fusta, new business development at Alfa Meccanica. Alfa Meccanica is a member of Altair Consortium, and also of Torino Piemonte Aerospace (TPA) at a regional level. Formed of nine companies with different competences, Altair Consortium's capabilities extend across design, machining, composite materials, nondestructive testing (NDT), thermal and surface treatments and maintenance, to name a few. "We believe that Altair Consortium will enable us to present our capacity effectively and provide us with the opportunity to approach big players as a cluster; together our turnover and capacity is significantly higher."

Primavis, a manufacturer of internal combustion engines, has recently presented the first ever parallel hybrid aircraft in collaboration with other member companies of TPA. The aircraft functions similarly to cars such as the Toyota Prius and is flexible in terms of power consumption. "They are able to fly in normal mode, with just the

87►

MECAER AVIATION GROUP

HEADQUARTERS
LOCATION
Borgomanero

company size

537
EMPLOYEES

segment

SYSTEMS, EQUIPMENT, SERVICES

key aerospace customers

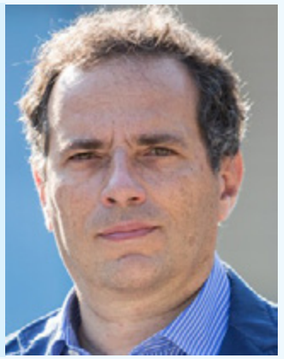
HELICOPTERS, TRAINERS, COMMERCIAL AND EXECUTIVE AVIATION, UAVS

key products and services

ACTUATION & LANDING SYSTEMS
CABIN COMFORT SYSTEMS
STYLE DESIGN
AIRCRAFT MISSION CUSTOMIZATION
AIRCRAFT COMPLETION, REFURBISHMENT & MRO

Armando Andreassi

Head of Division,
Actuation and Landing Systems



Could you provide us with an overview of how the company has evolved over the last two decades?
The company was founded in 1995, from a spin-off of the AgustaWestland plant in Borgomanero, and started with the supply of mechanical parts to the company. Since then, Mecaer invested to develop its design capability in order to sell its own products to the market. Over the years, the company experienced huge revenue growth by the acquisition of plants, as well as both customer and product diversification. We now work as centers of excellence for actuation and flight control systems (Borgomanero plant), as well as landing gears (Borgomanero and Laval) and completion and A/C services (Monteprandone, Philadelphia and Rome). This is mainly for all major OEMs in the helicopter segment.
Although Mecaer is a medium-sized company, we offer products and services typical of a much larger company. We are flexible and provide competitive pricing due to having a particularly efficient supply chain. Cross selling is a key point for us, as we are able to apply our services across various fields, from flight control to interiors. We are leaders in our sector and our niche and supply our clients with the complete solution from design and production to testing, delivery and service support.

As well as Italy, Mecaer has offices in the USA and Canada. How big of a role do North America and Europe play to your overall operations?
The Italian market constitutes around 60% of our total revenue, and we are making progress in the international market by acquiring customers and consolidating our contracts and experience. Five years ago, we started customer diversification and, with the contracts already acquired, together with our ongoing initiatives, we will have, in the next few years, a well-balanced portfolio. This is key to sustaining our future growth. Today in Italy, we carry out production and assembly mainly for local clients, but our supply chain is international. Our presence in the North American market is important to us because it gives us proximity to the end user.

Could you elaborate on a recent case study of Mecaer's work, from prototype to finished product?
Typically, the customer issues a proposal and we tend to integrate with them in order to enhance communication and ascertain which products and solutions are appropriate. Customer relationships are very important in achieving the end goal and performing well. We have an in-house design team and our own laboratories to develop the products, and we also receive support from universities and research centers. We make development phase prototypes in a multi-functional organization, driven by a program manager focused on engineering; then, a new program manager is appointed to lead the production phase and the specific client relationship. The requested skill is focused on manufacturing and supply chain. This dedicated client relationship continues for the lifespan of the product, which is typically 25-30 years. We repair and maintain our products too and have our own service centers.

Mecaer spends around €10 million on R&D annually, while 20% of your employees are dedicated to innovation. Could you tell us about some of the new technologies and solutions you are currently working on?
In 2015, we developed electronic actuation solutions and we are focused on electromechanical actuation with linear solutions. We are also conducting research on some of our current contract programs in order to improve performance. Our Italian laboratory can perform tests for landing gear systems. Staying on the cutting edge of innovation is advantageous for our position in the market as we need to provide new solutions for different applications in order to fulfill our customer needs. Although some research stems from our customers asking for specific solutions, we are very adept at understanding upcoming market trends and where we need to address our research in order to support our clients.

You have to work to the regulatory requirements of EASA, the U.S. FAA and Transport Canada. How similar are these regulations and are there any aspects that are particularly challenging?
Normally, there are agreements between governmental authorities; the FAA, for example, will request an Italian agency to conduct its audits because many of the standards are international. We guarantee compliance with all international regulations and manage the differences between that and national regulations. Our presence in Canada and the United States is an advantage, because it allows us to share different experience and know-how. What we are finding most challenging at present are the REACH regulations on chemicals. We have to be compliant with these rules regarding chemical products and authorization, and consider ourselves experts in this field. Not all companies are focused on this aspect, which may work to our advantage eventually.

What are the advantages of being an Italian company, but operating globally?
Italy has a long tradition in the aeronautical field. This region has, on the one hand, the universities and research centers, and on the other, the experience that is required. Piedmont also contains the specific skills for this industry, including design, safety and documentation.

Mecaer has just celebrated its 20th anniversary. What is your future vision for the company by the end of the decade?
We have to sustain our growth by continuing to diversify our products and customers and to increase our presence in the fixed-wing segment. Today, our main activity in this sector is the provision of landing gear. Our interest in this segment focuses on business jets and regional aircraft. We already have the know-how but we need to invest in equipment, our supply chain, and in human resources.

Global Business Reports

BISIACH & CARRU

company size

81
EMPLOYEES

revenue (2015)

23,41
MILLION EUROS

company type

systems and equipment

key products and services

- SPECIAL AUTOMATIC SYSTEMS FOR DRILLING AND RIVETING OPERATIONS (+ measuring operations, sealant automatic application)

- SPECIAL AUTOMATIC SYSTEMS FOR WELDING, ASSEMBLY (spot welding, welding electrodes, laser, plasma etc.) AND HANDLING APPLICATIONS

- SPECIAL AUTOMATIC SYSTEMS FOR MILLING MACHINING - SPECIAL FIXTURES FOR ELEMENTS' REFERENCE AND CLAMPING

key industries

60%
RAILWAY

40%
AEROSPACE

key aerospace customers

80%
COMMERCIAL AVIATION

20%
MILITARY

HEADQUARTERS LOCATION
Venaria Reale (TURIN) ITALY

Bruno Bisiach

CEO

Could you provide us with a brief history of the development of Bisiach & Carrù since its founding in 1955, including any key milestones along the way?
The company was founded by my father and Mr. Carrù, who were two friends working together on chemical and electrical experiments. We were very lucky to be in Turin, which was and remains one of Italy's largest manufacturing areas for cars, clothes, leather goods and other industries. Bisiach & Carrù began to work for the car manufacturer Lancia, making simple welding equipment. We were successful in creating an automatic production line of electro-domestic appliances such as water heaters and boilers for the world's largest manufacturer of heaters. This collaboration continued with washing machines and white goods, and around 99% of the white goods manufactured in Europe used our machines, including Miele, Electrolux-Zanussi, and Bosch. We then moved onto car manufacturing and patented our first welding robot called Jolly80. We now sell this welding equipment to all car manufacturing companies in Italy; this includes Ferrari, Lamborghini, Lancia and Autobianchi, among others.

From your origins as a manufacturer of automatized systems for the automotive and white goods industries, how did Bisiach & Carrù enter the aerospace market?
When the market became too competitive, Bisiach & Carrù decided to move into other sectors. We invented our own machine and patented this invention: the Tauro system. This invention is very important for our company today because it gave us the opportunity to continue with our welding expertise and enter the field of milling and riveting operations with a completely different philosophy of work.

The Tauro Gantry system was initially used on lorries and military vehicles. This was designed to allow the movement, assembly and welding of parts in one system, rather than in multiple stations as was traditionally the case. Our robot can perform multiple actions at once, making the system very efficient and enabling us to have a rapid turnaround time. Once we had proved the system worked quickly and efficiently, we had the possibility to work in a number of sectors. Bisiach & Carrù then began to work on railway cars and, from here, it was not difficult to expand the system for use on aircraft, as they are similar in terms of production volumes and size, even if these two areas require a completely different approach in terms of technology. The Tauro system adapts to the different kind of requirements for both areas. These two areas are now the company's key areas of focus.
Our solution is completely different from others within the global aerospace industry because of the unique technologies used in the Tauro Gantry system. Our first aerospace contract was with Alenia in 2001 to manufacture parts of the Boeing fleet. In 2006, Boeing invited us to Seattle for a conference regarding the new 787 airplanes. From 100 proposals, we reached the final three who were chosen to provide different aspects of the manufacturing process. Other activity in the sector includes working with Airbus on the A380, manufacturing the wings for the Eurofighter Typhoon and working with Moreggia on a commercial aircraft sub-assembly.

Could you tell us more about the higher standards to which you are expected to adhere in order to supply robotized systems to the military and defense sectors?
When we manufacture a part for the military, we have to be very wary of protecting intellectual property and classified information. We try to close the area where we work to ensure it is as separate as possible from external companies. Bisiach & Carrù is also licensed by the Italian government to work on parts for military purposes. We have the ISO 9100 and 9001 certifications, which is important for us and for our customers.

How do the regional and national governments support the aerospace industry in Italy and are there any areas for improvement?
We do not feel that the Italian government is supportive of our work. We are conducting niche, specialized activities that are not serving the mass market. We also feel that, while the automotive industry in Italy receives a lot of support from the national government, this is not true of the aerospace industry. However, the European community is supportive of our efforts to develop new technology. In addition, the regional government supports innovation and receives funding from the European Union to support these types of projects. The fact that either European or Italian legislation is able to support and finance our application for patents, of which we now have more than 200, is very beneficial to us.

What are some of the new technologies which Bisiach & Carrù is working on in terms of the aerospace industry?
Because manufacturing aircraft is a complex task, 80% of production in the industry is still carried out by hand. Although riveting covers a broad area of activities, we are doing this in a different way so that 90% of tasks can be automatized. Our main focus is therefore transforming an industry which carries out the majority of its work manually, into an industry which is fully automatized. The Tauro Gantry system is so accurate that we can produce prototypes of parts; this is crucial because airplanes are currently manufactured to the exact standards the initial prototype was manufactured. If we can persuade the large aircraft manufacturers to automatize from the very beginning, we will see a complete transformation of manufacturing in this industry.
This will also draw the focus of aircraft manufacturing back to Europe; at the moment, we facing competition from Asia for labor costs. Once the process is automatized, the region will no longer have a competitive advantage and the focus will be on reliability and quality, which we can provide.

Carlos Maidagan

General Manager
FIDIA

> For many years, we have been working with partners and research institutes on projects that are important for us because our competitors are very big and overpower us in terms of volumes. Fidia needs to stay at the cutting edge of technology to maintain its position in the market.

From its founding in 1974, could you explain the evolution of Fidia?
Fidia started its business producing numerical controls with integrated digital functions. At that time, this was a revolution in the automotive industry. By the 1980s, we were one of the most advanced numerical control manufacturers in the word, and were specialized in complex shapes digitizing and five-axes continuous machining. At the beginning of the 1990s, we designed and developed a new concept of high-speed milling machines, which became very appealing to the aeronautic sector. Currently, we are one of the few machine builders who fully develop numerical controls, milling heads and accessories. In 2015 the aerospace sector represented 51% of our €63 million turnover, and Fidia has 340 employees worldwide.
Fidia has grown inorganically over the years.

Are you looking to make new purchases?
Fidia has grown by creating a network of fully owned subsidiaries all over the world, in Germany, USA, China, Spain, France, Russia and Brazil, although our production is concentrated in Italy. Fidia acquired three companies in Italy: Simav, Sitra, and Meccanica Cortini. This year we are also completing the construction of a new, €7-million production plant. In China, we own 51% of a joint venture with SMTCL, where we produce machines for the local market. Around 90% of our sales are completed abroad, with our main markets being Asia and the United States; Italy represents the remaining 10% of our turnover.

Could you tell us more about the various products and services you provide to your aerospace clients?
In producing numerical controls (CNC), we have developed suitable and specific software for high-speed machining and continuous five-axis milling, which are commonly used by the aerospace industry. The Fidia numerical control is believed to be the most powerful control on the market. When we began to manufacture our own range of five-axis milling machines, we leveraged our existing controls and implemented them on the machines to suit specific aerospace needs. We have also developed a range of bi-rotary milling heads for each application and material, blending aluminum and titanium with carbon fiber and honeycomb.

What is the importance of R&D to Fidia?
For many years, we have been working with partners and research institutes on projects financed by both the European community and the Italian authorities. Such projects require two or three partners and are important for us because our competitors are very big and overpower us in terms of volumes. Fidia needs to stay at the cutting edge of technology to maintain its position in the market. We design and develop numerical controls, machines and special software, and can only survive with strong R&D and innovation.

Where would you say the Italian aerospace industry is particularly strong?
The new technologies in aerospace will take time to become standardized, as the nature of the aerospace industry is very conservative. Traditionally, France and Germany have had a greater reach in terms of the aerospace industry, and are more expansive in terms of geographic penetration compared with Italy; this is in part due to Airbus being a European consortium. Italy is making an effort to ramp up its military programs and the potential for the growth of our aerospace industry is even greater than for our neighbors. In five to ten years' time, we will see vast changes in the aerospace sector due to large investments in machinery and technology. Currently, for us, the most sought-after export market is China, as this is the country which buys the most sophisticated machines.

Looking ahead, what is your future vision for Fidia by the end of the decade?
We plan to maintain our leading role in China. In the United States we have just moved locations, growing our subsidiary by 20%. This has put us in a more advantageous position in terms of providing services to local customers. Europe is always a question mark due to the continuous political changes in the continent. The aerospace industry is dependent on politics because most of the flagship airlines, such as British Airways, Alitalia, Lufthansa and Air France, collectively decide where to buy aircraft.

internal combustion engine; in pure electric mode, utilizing just the electric motor; and in boost mode, adding the power of the electric motor to the power of the internal combustion engine," Primavis' CEO Luca Morfino explained. "Additionally, it is possible to recharge the batteries during the flight utilizing the electric motor as a generator."
Further projects include STEP, coordinated by Thales Alenia Space to provide collaborative opportunities for SMEs in the Piedmont region, and clusters such as AENCOM. "The aim of this cluster is to reduce costs and time by managing all the steps of the manufacturing process within the eleven member companies, and delivering the final piece to the client. This is the revolutionary supplier approach that we are showcasing both nationally and internationally," detailed Fabrizio Barcaro, general manager at LMB, an AENCOM and TPA member company.
By joining clusters and creating networks with companies with varying capabilities, SMEs work as part of a larger unit, allowing access to larger contracts both nationally and internationally. Companies are also able to increase their visibility by providing a more integrated service on a larger scale.

Global market outlook

The international aerospace industry is directly impacted by global market trends, such as the lowering of oil prices, as well as political instability and war. Though the outlook of the industry remains uncertain, Boeing Italia's president Antonio De Palmas remains confident that these challenges are short-term. "In the long term, we have seen this industry as able to overcome crises. Last year 3.5 billion people flew, which represents half the global population. Flying was viewed as a luxury in the 50s through the 70s. This growth will be accompanied by volatility and we need to work with that."
Given the large investments required to survive within the aviation sector, the SME bracket is certainly facing hardships and this instability has made them question what the future holds for their operations. Internationalization is happening at a rapid pace, with companies like Leonardo outsourcing work to Poland and large Italian companies being partially owned by other international players. "The major company in Italy is Alitalia, which is no longer an Italian company because 49% of it belongs to Etihad. Meridiana, which is the second carrier in Italy, is now 49%-owned by Qatar Airways. If we talk about commercial airlines, Air Dolomiti is part of the Lufthansa group, and Neos is an Italian charter company, but it has less than 10 aircraft," said Roberto Cacciarelli, CEO, Skystar Services.
Though continental Europe and the USA are primary targets for companies looking to grow abroad, many are turning to Asia given the increased demand of aircraft forecast for the next years. "The commercial airplane industry is constantly increasing, almost 40,000 new airplanes will be needed in the next 20 years, largely in Asia. It is going to be the largest aerospace region in the world outpacing the United States and Europe," said De Palmas of Boeing.
TXT Group, which focuses on avionic software, is looking to consolidate in Europe and North America, but have also "established a strategic partnership in China, seeing the Asia-Pacific market as an interesting opportunity for mid-longer term upside growth," said Marco Guida, CEO, TXT Group.
Though most agree that the way forward is abroad, others believe that national competencies should be improved on to become leaders in an international platform. "Italy should try to feed the national market again. We are able to renovate ourselves in order to be ready for future challenges," said Cacciarelli of Skystar Services. He believes it to be a mistake that Italy has allowed such vast airport access to international airlines such as EasyJet and Vueling, rather than fueling the local industry. "To make about 50 airports available for Ryanair is something that would not happen in any other country. France would do that for Air France, not for international companies," he added.
Though there is some polarization in terms of whether Italy should carry on with international growth or focus more on developing national capabilities, the internationalization race is impossible to stop. Long-haul aircraft providers will benefit from the expansion of the intercontinental network in Rome's airport and increased demand for civil aircraft in Asia will also force companies to look East.

TECNO TESSILE ADLER

HEADQUARTERS
LOCATION
Rivoli

company size

885
EMPLOYEES

segment

COMPOSITES AND AERONAUTICS

key industries

64% AUTOMOTIVE, 36% AEROSPACE

key products and services

COMPOSITE AND INTERIOR PARTS
MACHINED AND ASSEMBLED PARTS

Paolo Scudieri

President

With a strong international presence, TTA is combining automotive and aircraft technologies for greater efficiency. Could you describe TTA's work with composites?
TTA is part of a broader group that operates in 22 countries and has 62 plants. Our strategic mission is to combine the automotive and aerospace industries in a single 43,000 square meter plant based in Airola (we currently operate in both Airola and Turin). In Airola, we produce composites both for the automotive sector (high performance vehicles for big companies) and for the aerospace sector. With 60 years of experience, we wanted to combine and merge the most competitive, modern and top-notch modes of production in the automotive sector with the use of composites and light materials specific to the aerospace sector. This combo is the breeding ground for new technologies, new modes of production and assembly, the so-called lean production. We have a philosophy of positive joint collaboration between the two sectors.

Could you describe your work on aircraft interiors and precision mechanics and highlight a few clients?
We focus on both interiors and precision mechanics. In terms of interiors, we produce the whole range of products, for both helicopters and aircraft. We only use modern infotainment technologies for helicopters, given that they are very demanding. Both interiors and precision mechanics are of paramount importance when it comes to building comfortable and technologically advanced helicopters. In precision mechanics, we produce door systems for ATR and stowage for Boeing involving light materials such as titanium and aluminium.

Is TTA looking for further international growth? Which markets are you considering entering?
TTA is always looking for opportunities to grow and expand into other markets. Our current targets are the USA and Canada. When it comes to helicopters, our largest client is AgustaWestland, the helicopter division of Leonardo. We envision a strategy of future partnerships for growth. Our main focus areas for this are the countries in the Gulf region. Asia has great potential, but obviously the more consolidated markets are the USA and Brazil, which are also very important both for executives and private helicopters.

There has been a decrease in helicopter production within Leonardo. How has TTA been impacted by this?
The decline was real but it has not really impacted the group. We have a very diversified line of production, so we are able to counterbalance the negative variations of programming of our various clients. Certainly these fluctuations, which are tied to the economic development of some countries, affect our company. For example, Brazil caused a decrease on the demand for helicopters. A large company needs to balance out market variations and, even in times of recession, to offer products that can give its clients a competitive edge. This is achievable through a strong collaboration between clients and suppliers. Depending on the economic phase a country is in, the companies operating in that territory may ask for a richer or more humble design from us, but we always try to maintain the efficiency of our products at the forefront.

> "We are working on an aircraft which is a hybrid between a plane and a helicopter. This in-between product combines the benefits and comforts of these two means of transportation. It is going to take off vertically and visually it is going to be similar to a Chinook."

What is your vision for the company specifically in aeronautics for the next three to five years?
Our objective is to make our products more comfortable for the final clients. We are working on the creation of an aircraft which is a hybrid between a plane and a helicopter. This in-between product combines the benefits and comforts of these two means of transportation. This innovative product is already in the making and it is something that TTA is helping to develop. It is going to take off vertically and visually it is going to be similar to a Chinook.
Innovation is a key factor for our group. We invest 3 to 5% of our turnover into research and development because we believe our products, therefore our clients' products, have to be constantly improving. We also invest in new modes of transportation. The number of passengers will increase in the upcoming years and because of this, the demand for innovation in the aerospace sector will grow. Globalization and extreme mobility are going to be the major factors and drive for innovation.

Elisa Martinotti & Emilio Acmet


EM


EA

EM: Military and Helicopters and Italy Programs Director
EA: Business Development Manager
UTC AEROSPACE SYSTEMS

UTC Aerospace Systems was formed in 2012, after the merger of Goodrich and Hamilton Sundstrand. Could you provide us with a brief history of the company and its current structure and capabilities?
EM: UTC Aerospace Systems is a business unit within UTC, and the product of many mergers and acquisitions. UTC itself was formed in 1975, following efforts to diversify the portfolio of United Aircraft Corporation. This comprised Pratt & Whitney and Sikorsky and covered several areas, including aviation. We acquired lift manufacturer OTIS in 1976 and Carrier in 1979. In 1999, UTC purchased Sundstrand Corporation, merging the company with Hamilton Standard to form Hamilton Sundstrand, which focused on aerospace. Goodrich Aerospace was then merged with Hamilton Sundstrand in 2012 to form UTC Aerospace Systems (UTAS). UTC now has four main business units: OTIS; United Technology Climate, Controls & Security, which involves building and industrial systems; Pratt & Whitney; and UTAS. We sold our fifth business unit, Sikorsky, in 2015.
Within UTAS we have a further eight main business units: Actuation and Propeller Systems (APS), focused on primary and secondary actuation; Aerostructures, primarily nacelle systems; Engine and Environmental Control Systems; Electric Systems; Sensors and Integrated Systems; ISR and Space Systems; Landing Systems; and Interiors. Every unit has a president and a unique corporate structure.

Can you explain the importance of your national and international operations to the company's overall corporate strategy?
EM: In terms of revenue, Italy represents about 10% of overall sales for APS, which amounted to €155 million in 2015. Additionally, around one third of military and helicopter operations are carried out within the APS unit. Within Italy, our main customers are linked to the Leonardo-Finmeccanica Group, and we also supply other parts of the wider business; our Aerostructures business unit is one of our main customers, for example. Our clients are mostly domestic because of our location, but we still ship our products across the world, to clients including Bombardier and Airbus, for example. We also have customers in Brazil, the United States, Japan and South Korea.
EA: The Asian market is important to us. Whilst Asia has greatly increased competition across many sectors, the manufacturing capabilities of Asian companies within the aerospace industry are still insufficient by comparison, and Europe and the United States will continue to supply this market for some time. Manufacturers such as Mitsubishi Aircraft Corporation and Korean Aerospace Industries have sufficient funds but currently lack expertise.

How is innovation within the aerospace industry linked to efforts to make air travel more sustainable?
EA: Innovation and progress are becoming more rapid. This is partly due to an increasing emphasis on sustainability, with much of the latest innovation driven by the Clean Sky and Clean Sky 2 initiatives, which facilitate the acceleration of R&D through additional funding.
EM: For example, the success of the brand new Pratt & Whitney engine for the Airbus A320neo lies in its reduction of fuel consumption by 16%, emissions by 50% and noise by 75%. Aircraft manufacturers need more efficient engines that cause less pollution, so this becomes a key point of focus for their suppliers.

As an international company based in Europe, could you tell us more about the unique situation in Italy compared to other jurisdictions worldwide with a strong aerospace industry?
EM: Italy is definitely an SME-based economy, which is quite unique for actuation, because outside Italy, companies have been quicker to consolidate. Italy has also long been a prominent player in the automotive and mechanical industries, which facilitates an easier transition between sectors (in this case from automotive to aerospace) than in other regions worldwide. The only difference between the supply chains for the sectors is the certification; the expertise and technical understanding is exactly the same. Additionally, we have the advantage of the Politecnico di Torino, which fosters skilled labor with specific expertise and competencies. We are also seeing a great deal of collaboration between the Politecnico and the industry in R&D projects.

As UTAS approaches its fifth birthday in 2017, what can we expect from the company in the future?
EM: We have several R&D programs that we are pursuing with our customers. UTC as a whole is very focused on R&D and invested around $4 billion into these efforts last year, partly funded by the company and partly by customers.
As part of a larger group, we share a collaborative vision for growth, which will no doubt align with the consistent growth of commercial aircraft and rotorcraft. Military applications will still be a key focus area, but the outlook is less certain, so we are likely to see most growth within commercial areas.

Carmelo Cosentino

President and Chairman
ASE

Could you provide a brief overview of ASE?
Born in 1937, ASE originated from Magneti Marelli Group. After WWII the company dealt with electrical power generation, conversion and distribution systems for aerospace and military platforms. Today the company has around 130 employees but we also use subcontractors for our engineering activities. Our competitors are much larger than us but this does not mean that we have less expertise within the sector. Among our customers we have Leonardo Helicopters and Leonardo Aircraft in Italy. Internationally we have important activities with Safran, Boeing, Honeywell and we have good business in India and in Israel. We are currently targeting the USA and Asia Pacific because they are the largest markets for our business.

Could you highlight one of the new technologies that ASE is developing?
Three months ago we started working with Leonardo Aircraft to develop the majority of the electrical system in the new medium class trainer M-345. There are only few companies worldwide who are producing similar devices. We also have been awarded helicopters for the AW609 Tiltrotor program by Leonardo. It is a new transport frontier which merges the advantages of a helicopter in take-off and landing, yet the speed of an aircraft. The challenge for this product is to convince the civil market that it is economically cost effective. Other than Leonardo Helicopters, another large player is Airbus Helicopters, which is developing a new innovative platform in the context of the CleanSky2 Program and we are working for a new and advanced electrical generator with them.

ASE has focused on UAV development. How did ASE participate in the nEUROn program?
The nEUROn program is a technological demonstrator of unmanned combat aircraft. It is managed by Dassault Aviation, Leonardo Aircraft and other European partners. ASE has been chosen to develop the primary electrical distribution. We are also involved on two MALE (Medium Altitude Long Endurance) programs with our main UAV customer, the Israeli Aerospace Industry (IAI). It is an extremely complex sector due to the particular specifications issued by the customers, but also an exciting challenge.

Could you speak about the importance of the Lombardy cluster?
According to the latest figures, 39% of Italian aerospace exports come from the Lombardy region. The strength of the Lombardy aerospace segment is due to the presence of a giant like Leonardo and the large presence of SMEs. The Varese area, where Aermacchi was born in 1913, is called "the wing's province" due to the presence of a lot of lakes used by aircraft during the 1920s and 30s. The variety of manufacturers in Lombardy covers all specializations on equipment, and this is a peculiarity given that other Italian regions specialize in certain areas only.

How do you see the costs associated with environmentally-friendly products?
There is a clear trend towards 'the more electrical aircraft'. The further we go, the more electrical power we use. The 'more electrical aircraft' will enjoy fewer emissions, less noise and more reliability. I think that every time we produce a new technology it means a higher cost; the cost however decreases eventually and becomes more affordable.

Would you like to add a final message to our readers?
Italy has the best combination of culture, quality of life and technology, so I am very optimistic. Italy offers many opportunities, I think Brexit might be an opportunity for Lombardy because once the UK leaves, the EU-related stakeholder will leave London. They are going to look for a better place to continue in Europe and I think Italy is the best place to invest with a long term vision, because we have a wide range of small and medium enterprises and a wealth of knowledge.

Silvio Marioni

Managing Director
TEKSPAN (SOGIMI GROUP)

HEADQUARTERS LOCATION
TURIN

company size
61 EMPLOYEES

company type
PLASTIC AND FOAM MATERIAL CONVERSION

key industries
AVIATION
20% COMMERCIAL
40% EXECUTIVE
40% MILITARY

key products and services
CUSTOMIZED SHAPES OF FOAM AND PLASTIC MATERIAL (GASKETS, VIBRATION DUMPERS, FILLERS, NOISE AND THERMAL INSULATION)

Tekspan is a member of the Sogimi Group, which was founded in 1979. Could you explain how Tekspan came into being and when it entered the aerospace sector?
The Sogimi Group was founded in 1951 in Milan as a distributor for auxiliary materials. During the 1970s, the company began to expand across all the major Italian cities, arriving in Turin in 1979 with Tekspan. The company has two main businesses: the first division includes plastic sheet conversion and distribution for industrial applications, building construction, and communication; the second division is focused on highly technical foams and expanded rubbers used in the building, packaging and industrial segments, including the aerospace business. Clients usually experience problems with vibrations and sealing between the plastic elements of the interior and the green primary structure of the aircraft. They also need to present a more comfortable environment inside the fuselage; our foam is a solution as it works as a filler, improving the cabin experience and contributing to a reduction in weight, which leads to cost savings. We provide mixed compound foams to both the domestic and international markets, as well as laminated and 3D shaped foams to make customized, finished parts for a wide variety of applications. We began our aerospace activities in 2009 with a collaboration with Thales, and this heralded the start of heavy investment in the sector. Together, we found materials, constructed prototypes and have so far supplied nine Cygnus cargo module flights to date.

How important is the aerospace industry to your overall operations and could you tell us more about your customer base in this sector?
Currently, we are aiming for aerospace to constitute 10% of our turnover and, in two years, we hope to be able to double this figure. We obtained the UNI EN 9100 certification three years ago and have now decided to dedicate one piece of machinery exclusively to this sector. We will be using this machine to make pieces of a very specific dimension. Tekspan started working with Thales because of the company's capabilities in converting material into complex shapes; even NASA found this impressive. This led to us establishing a relationship with companies such as Piaggio Aerospace, and our finished foams are also flying on some of AgustaWestland's helicopters.

As a member of TPA, what are some of the benefits of membership and how are you involved with the technical cluster LISA?
We are the sole company within this cluster that has manufacturing capabilities, as the others are involved in design and engineering. We are trying to incorporate new technologies to increase our capabilities for the new projects we are undertaking. The new products that we can fabricate are the best available in the world market. LISA is an ongoing and interesting project that has the potential to combine Italian design with Italian capability to manage small, medium and high production volumes. As far as TPA itself is concerned, it presents companies such as Tekspan with the opportunity to meet with the big players, and to work as a cluster so as to have greater competencies and capabilities available to us and our clients.

Where would you say the Italian aerospace industry is particularly strong and what can we expect from this sector in the future?
Our industry is smaller than that in other European countries, however we are flexible and quick with our work, which lends us our competitive advantage. The capabilities within Italy are growing every year with the formation of clusters and a system of companies that is able to serve a market. Germany and France are different economies with different histories; France has Airbus and a huge network of aerospace players in the Toulouse area, while Germany is the most powerful economy in Europe and therefore has the capabilities to produce large volumes. However, when it comes to niche applications, Italy demonstrates interesting capabilities.

Tekspan will celebrate its 40th anniversary in 2019. What is your future vision for the company by this milestone?
We hope to grow within foam distribution and distribution of plastic sheets and are investing in our solutions in the aerospace business. The company aims to increase its distribution capabilities both organically and via acquisitions. The goal for Tekspan is to be able to present our clients with more options, so we will work towards increasing our product portfolio and are investing in machinery to achieve this. We are also going to add human resources and personnel once our turnover reaches a certain milestone. Currently, we have an engineering department that is able to collaborate with our customers on the development of a wide range of projects in the aerospace segment, with a further 20 people available to augment these numbers.

R&D: Rethinking Old Paradigms

Overcoming challenges and pioneering innovative solutions

Many Italian companies, both large and small, display a huge emphasis on research and innovation, drawing on a long heritage of technological expertise and a strong relationship with surrounding research institutions and universities. Antonio Caraviello, CEO of Sòphia High Tech, said: "We have a close cooperation with universities and research institutions and industries. R&D is key in order to remain a competitive and innovative player in the market."
Commenting on Italy's reputation on a global scale, Riccardo Procacci, president and CEO of Avio Aero, commented: "In the technology field, Italy offers excellent and highly competitive minds. Italy is the best choice in terms of costs, competences and capacity to accommodate workloads."
Avio Aero was acquired by General Electric (GE) in 2013, and the two companies have recently invested €200 million in R&D and business growth in Italy in Piedmont, Apulia and Campania. "This investment involves the geographical areas in which Avio Aero counts its centers of excellence for tests, cases and frames and MRO activities (Brindisi) and for turbomachinery and CRO activities (Pomigliano d'Arco – Naples)," said Procacci. "Continuous and ongoing investment in the improvement of production processes and R&D, and an established network of relationships with leading universities, such as Politecnico di Torino, are crucial for us."
Although the aerospace industry is traditionally relatively conservative, companies are looking to develop new technologies and solutions to remain competitive. With 30 years of experience operating across many sectors, Teoresi Group focuses on engineering technology, and collaborates with research institutions such as the National Council of Research and universities in Turin, Rome and Naples. CEO Mario Brossa explained: "Companies spend many years on the development of new products and systems before placing that innovation into an aeroplane because of the very high quality and safety standards that need to be assured. In comparison, the automotive industry is much quicker at implementing new technologies, particularly when these are able to cut costs and reduce time-to-market."
Aerospace companies are becoming much more sensitive to these factors in both the commercial and military realm to stay ahead of competition within the market. "Previously, modelling was not so common in the aerospace industry; now, however, the possibility to design and test using virtual modeling is one of the key areas of interest," added Brossa.
"There is a trend for using light materials, so we are trying to work towards the optimization of metallic parts by shifting towards composites. We are also working on Computational Fluid Dynamics (CFD) and structural safety with a CAE approach. AMET is using similar technology in the automotive sector, so there is an interesting overlap between the two industries," said Paolo Cavallo, technical director of AMET.

Image: Tubiflex

The Italian Aerospace Research Center (CIRA) has focused on developing new technologies and materials for the industry, and Marotta has been working on an aircraft capable of surpassing Mach 7 speed alongside CIRA. This project, named USV, should be released in 2019, at which point it would take five years to be in production. The creation of two of these aircraft is on its way. “Current aircraft fly slightly under Mach 1. [...] The security measures for the project are absolutely extreme. The speed is like nothing that has occurred ever before, and therefore the project is being monitored internationally. There are people in Russia following the trajectory and it is also being monitored via radar by Brazil, China and Europe,” stated Lino Grosso, CEO of Marotta.

A key area of development in both the civil and military fields are unmanned aerial vehicles (UAVs). Primavis have applied their light aircraft configuration to UAVs, boosting take-off to deal more easily with the heavy payloads, and also enabling take-off on shorter or high altitude runways.

Also, Aero Sekur is a company with a strong focus on using innovative materials: “We are developing our own UAV created out of flexible materials and are currently crowdfunding to develop it further,", said Silvio Rossignoli, CEO of Aero Sekur. "We rely on tough, ruggedized aircraft that can be made with parafoil. The advantage of using parafoil is that it is crash-proof. Aero Sekur believes we must also go back to using hydrogen given that helium costs a fortune. On the other hand you must also have new generation solar cells, if you want endurance at that altitude,” Rossignoli added.

Drone technologies are considered to be a part of the future. Through innovative designs and R&D, new products are emerg-

> “Companies spend many years on the development of new products and systems before placing that innovation into an aeroplane because of the very high quality and safety standards that need to be assured. In comparison, the automotive industry is much quicker at implementing new technologies.
>
> - Mario Brossa, CEO, Teoresi Group

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Andrea Romiti

Key Cluster Leader
AENCOM
CEO
APR

Could you tell us more about the background of this organization, how it came into being and the advantages to members?

The Aero Engine Components Cluster (AENCOM) comprises 11 entrepreneurs and their companies, working together collaboratively to promote their competencies as a collective service. As a combined group, we have 1,000 employees at our disposal, with a turnover and capability compared to that of a medium-sized company. To flourish within the international aerospace market, it was essential to progress from our status as a series of small companies, and add manpower, capabilities and expertise. This is the key motivation behind AENCOM; instead of each company slowly growing and developing over the years, we have been able to join forces and complement each other’s capabilities, to provide an integrated service for our customers. The initiative grew out of the activities of the Torino Piemonte Aerospace project.

Within the Cluster Network Agreement (CNA), we periodically elect a cluster leader, and for this first period it has been my company, APR. We have the flexibility to select the necessary resources among our member companies to fit the task at hand. There is one individual point of contact for the customer, which is the cluster leader. We manage the process and integrate member company capabilities to propose a quote and oversee the process with full transparency. Although it is a challenge to foster trust within a new initiative, we have been focusing on the promotion of the capabilities of AENCOM and, by extension, seeking to demonstrate to the international market that Italy has all the heritage, expertise and capabilities to supply the wider industry.

What are the key benefits you can offer to your customers by providing a fully integrated and collaborative service?

We consider ourselves to be an organization with similar capabilities to medium and large-sized companies, but with the accompanying competitiveness, approach and flexibility of small companies. These characteristics are very much appreciated by our customers. We already have all of the engineering, designing and manufacturing capabilities necessary to provide aerospace solutions across the military sphere, civil markets and space channels, including research and system activities. The aim of AENCOM is for individual, independent units, which already work effectively within the regional market, to work together to propose a full solution to the wider industry.

Although there may be an element of competition between some companies, the key is to recognize there is greater opportunity in working together for the same customers and providing full support, rather than competing for that project. Out of our 1,000 employees, we have more than 150 designers and engineers, as three of our member companies are involved in design. We can therefore support our customers from the design stages and throughout the manufacturing process. We are fully convinced that ‘United we stand’, and we are also sure of the second half of the claim, ‘Divided we fall’. Overall, none of the companies within AENCOM would have been capable of achieving what we have without this integrated approach.

What is the extent of AENCOM’s capabilities, and could you provide us with an example of a recent case study?

We have a large range of manufacturing capabilities, from metal machining, manufacturing, welding, heat treatment, special processes, composites and metal fabrication. We have also been approached by many other companies interested in adding their own capabilities to our organization. A few weeks after the 11 companies signed this contract, Avio Aero and GE Aviation included AENCOM in an international bid for a low-pressure turbine for the Sustainable and Green Engine initiative (SAGE) within the Clean Sky project, which included other European partners such as Snecma. AENCOM won the bid and it was an excellent opportunity to showcase Italian companies and our capacity to deliver fully integrated solutions. This also eased the responsibility of Avio Aero in having to handle the project, risk and contract management responsibilities.

How do you see this organization evolving over the next three to five years?

Our key goal is to secure more business with international customers, achieve greater visibility, and further raise our profile within the global aerospace industry. We are also currently evaluating a further five companies to complete our cluster, in order to have full capabilities in the aero-engine segment.

Image: Secondo Mona

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ing that will eventually become indispensable for surveillance, military and defense as well as verticalized Earth monitoring.
Another challenge that Primavis have addressed is the high consumption of currents due to the electronic systems on board that require bigger and heavier alternators. “Our electric motor solves this problem by providing both propulsion and alternator capabilities,” said CEO Luca Morfino. “This solution will also enable UAVs to fly solely on an electric motor in a target zone, leaving neither a thermal nor a noise signature; by eliminating these two traces, they can fly lower, improving their mission in the process.”

Achieving sustainability

A major driver for innovation and increased efficiency are the new sustainability initiatives in place, such as Clean Sky and Clean Sky 2. As well as influencing a great deal of the development taking place, the sustainability drive is a valuable source of funding, allowing many companies to accelerate development of particular technologies and systems.

The Italian Civil Aviation Authority (ENAC) is a particular proponent of sustainability and environmental protection. “For many years, ENAC has taken a leading role in promoting best practices in the aviation field. It is the sole public body in Italy to have signed a protocol to safeguard the environment and implemented a program to promote a better environmental approach with the Prime Minister and the Ministry of Environment,” commented Vito Riggio, president of ENAC.
Because of increased regulations pertaining to emissions in particular, end-users are increasingly looking to suppliers to optimize aerodynamic behavior to reduce energy consumption and improve engine efficiency. Discussing these trends, Elisa Martinotti, military and helicopters and Italy programs director at UTC Aerospace Systems, noted: “The success of the brand new Pratt & Whitney engine for the Airbus A320neo lies in its reduction of fuel consumption by 16%, emissions by 50% and noise by 75%. Aircraft manufacturers need more efficient engines that cause less pollution, so this becomes a key point of focus for their suppliers.”
A number of requirements, previously marginalized, are coming into play, in many cases acting as drivers for innovation and R&D. Factors such as cost, efficiency and sustainability are of increasing importance to end users, particularly where regulations are applied. Suppliers are therefore challenged to adapt to these needs.
New solutions are being developed within the materials industry to develop more low-impact, yet cost-efficient products. “Sòphia High Tech has a green vision, where we focus on environmentally friendly materials with low impact on the environment. We have strengthened our knowledge within bio-composites and have successfully produced a slow-burning insulation material reinforcement and high thermo-acoustic performance,” explained Caraviello of Sòphia High Tech. The need for developing sustainable technologies, from decommissioning satellites to agrospace, has never been more indispensable than it is today. With potentially thousands of new satellite launches taking place in the next years, and an exponential increase of civil aircraft flights, turning to ways of protecting the environment and optimizing processes is paramount.

Dario Piola

General Manager
TUBIFLEX

Tubiflex has been around since 1951. Could you provide us with a brief overview of its evolution and when it began activities in the aerospace industry?
The company was initially active in the industrial and automotive segments due to our location in Turin. The company’s first sporadic dealings with the aerospace market began in the late 1970s. These experiences helped to forge Tubiflex’s approach to the market and our focus on quality. From 2008 onwards, the company really began to focus on the aerospace industry, coinciding with our EN 9100 certification and our membership of TPA. The segment now accounts for around 18% of our turnover, marginally behind automotive which is our largest area at 20%. Tubiflex as a whole sees an annual turnover of around €22 million, with up to 600 recurring customers in 35 different countries.

How have you developed your expertise in the area since then and how has this affected your product offering?
Tubiflex offers a wide array of products for the conveyance of fluid, as well as stainless steel flexible hoses and assemblies, composite hoses, bellows, expansion joints and PTFE convoluted hoses and assemblies based on proprietary manufacturing technologies. We have been able to use our experience in a large number of applications and across all our business lines to offer our customers a range of new, innovative products. We are now a key producer of components such as drain conduits, bleed lines, ECS, fuel conveyance pipes, ventilation conduits and for special applications in rocket launchers.

You have just been acquired by Interpump Group. How will this affect the company going forward?
Tubiflex was acquired by Interpump in early May 2016. Interpump is the undisputed leader in its market and Tubiflex will add a completely different type of product to the Group’s products portfolio. We have forecasted an improvement in our revenues and synergies in general, as Interpump is engaged in many different markets.

Could you tell us more about the company’s customer base and why Tubiflex is their partner of choice?
Tubiflex clients are spread all over the world. Because the aerospace market requires more made-to-measure solutions and intensive team work in its development than other industries, the main concentration of our engineering efforts are devoted to clients in Italy and France. Our original four customers have increased to 13, and we expect to gain a further two clients in the near future, raising our aerospace revenues from 3.5% of overall turnover to our current 18% figure.

Could you provide us with an example case study in which Tubiflex has used cross-fertilization of technologies in the aerospace sector?
We produce flexible conduits for one of Europe’s largest helicopter manufacturers. With the titanium system the client was using, it was difficult to fit the piping to the body of the aircraft and fitters had to force the final connection, which occasionally resulted in breakages. Tubiflex came up with a solution using stainless steel which, although heavier than titanium, allows for the creation of easily bendable corrugations. This is common in the automobile industry but had not made the leap to the aerospace industry, so we patented this design. Our more flexible solution not only avoids breakages but is also more compact, which decreases the overall weight, and reduces fitting time from one shift to less than two hours. By responding to client needs we have been able to create a line of innovative new products to supply to new customers.

What are your expectations for both the future of the aerospace industry and the future of Tubiflex under new ownership?
In terms of the industry, the growth of Leonardo-Finmeccanica is positive for us because their companies are operational both in Italy and abroad, which will be advantageous for Italian suppliers such as Tubiflex as it will enable us to increase our international visibility.
At present the forecast for Tubiflex is based on pre-acquisition figures and therefore there are many aspects still to be defined. However, our growth trend has been very positive; our current achievements are exceeding our expectations and we plan to expand our geographic reach. With the support of TPA and our own contacts, we will be able to reach out to new customers; being part of Interpump will increase the pace of this process.

Claudia Mona

Vice President and CFO
SECONDO MONA

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HEADQUARTERS LOCATION
Somma Lombardo (VA)

company size

270
EMPLOYEES

key industries

100%
AEROSPACE

55%
MILITARY AVIATION

45%
CIVIL AVIATION

key products and services

FUEL SYSTEMS
ENGINE EQUIPMENT
ELECTROMECHANICAL AND
HYDRAULIC ACTUATORS
LANDING GEAR EQUIPMENT

Secondo Mona started operations in the aerospace industry over a century ago. Could you provide a few historical highlights?

The company was founded by Mr. Secondo Mona in 1903 for the sale and repair of bikes and motorcycles. He then joined an emerging community of pioneers in the area and started doing repair activities on the first aeroengines. In 1923 he obtained a quality certification on aircraft fuel systems, which means we have been an OEM since this time. We started international collaborations in the 1920s and 30s, when the aerospace industry was taking flights to the Americas.

Our strongest focus on the aerospace industry came after WWII with the first programs on the American aircraft that remained in Europe after the war. We continued growing and were a part of the first international programs like Tornado, Eurofighter, EH101 and NH90. We now operate with North America, India, Turkey, and directly supply new aerospace nations, such as China, Korea and Indonesia. In the last 15 years we leveraged our supply chain and moved from an equipment manufacturer to a systems manufacturer.

Which are the most recent supply chain trends that you have noticed in the market?

The aerospace industry has become much more turbulent. Changes are very rapid, development and production times have shortened, margins have lowered. We have to work in a completely flexible fashion. Secondo Mona is a large SME, employing 270 people, with a turnover of €45 million. Our dimension allows us to invest in new developments but also to be quick and relatively flexible to react to market changes, which is indispensable at this point in time. We can supply any kind of market segment, from large civil aircraft to regional and business jets, from fighter aircraft to trainers and transport aircraft, civil and military rotorcrafts, and also new developments on UAVs and tiltrotors.

What competences has Secondo Mona focused on developing to maintain its position?

Secondo Mona has the complexities of a large company and the dimensions of an SME. If one market segment has an arrest, we are never hit too hard given that we have a diverse client base. Our core business is fuel systems and subsystems, but we also supply engine equipments, which is rare. There are very limited competences on this field. In the last five years we decided to invest in new in-house competences in electronics to offer a more complete package of the fuel system. We are now moving towards developing software know-how for fuel management units and started managing fuel tanks suppliers. We are specialized in high precision mechanics. We then have competences in electromechanics and hydraulics that we developed in the 80s for niche applications.

Over the last 10 years we developed a new line of business with the supply of equipment and subassemblies for landing gear OEM manufacturers, which has become quite significant and is a rather complex and challenging work. We have developed competences in the industrialization of their design of uplocks and doorlocks, on drag and side brace lock links and on pitch trim actuators, all on main landing gears. This production has allowed us to increase our volume of sales in the civil market especially on new platforms like the 787 Dreamliner and the A350-900 and A350-1000, but also on Bombardier business jets.

Will Secondo Mona continue growing internationally?

We now have a focus on the Asian market, which offers several new aerospace platforms and interesting volumes and is closer geographically than South America, which we have entered only limitedly. Our new customers are now in countries like Turkey, China, Korea, Indonesia and India, which we entered already 20 years ago. Japan is not yet a target mainly because they are too far and too greatly linked to the US. Our main competitors in fuel systems, but sometimes they are also partners, are three or four other players in the world, which are big groups in Europe and the USA We will continue to occupy our niche in the market by remaining an innovative, competitive and reliable partner for our global customers.

Components and Manufacturing

Aerospace components are subject to a strict set of parameters and requirements. Strength, weight, reliability and cost-efficiency are just a few variables on which customers place a large emphasis.

From metal parts to composites, the Italian industry supplies OEMs internationally, and many companies are able to provide a fully flexible service. Aerotech, for example, is a company involved in the study, production and management of steel, aluminium and titanium components for all sizes of aircraft within the aerospace industry, and provides a turnkey solution from manufacturing equipment to the final assembly. Despite being an SME established only in 2012, Aerotech's customers include Boeing, ATR and Airbus.

Another company in this segment is HTF. "Our idea is that customers are not just looking for parts, but for someone to solve a problem," said Patricio Vander Elst, the company's sales director. HTF's specialty products include inlet lip skins for engines, stretched panels, exhaust parts, firewalls, and parts that are formed, welded and assembled. As an SME, HTF also has the opportunity to specialize within a particular area, with the possibility to partner with other companies to extend capabilities when necessary.

"Rather than moving away from our core competencies and developing expertise in additional technologies, it is more beneficial for us to have a strong partner, as that will help us provide clients with a complete solution. These partnerships are a win-win proposition for both companies, and we have had approaches from other businesses in need of our capabilities," Vander Elst added. The company also bought a precision mechanical machining company in 2012 to increase capabilities and facilitate full solutions for metallic products for clients.

While able to produce complex and high performing parts, producing at large volumes is a challenge for some SMEs. Tecno Meccanica, a small Umbria-based high-tech company founded in 1995, produces complex components within the aeronautics and industrial field. Within aeronautics, Umbra Cuscinetti accounts for 70% of services, and institutions account for the remaining 30%. "Since we are always running at full capacity, operating 24 hours a day, we have limited clients as we are unable to take on new business," stated Gianluca Magrini, Tecno Meccanica's founder.

Italy's SMEs have developed specialized processes and capabilities to make themselves the partners of choice to many companies with a huge supplier pool to choose from. Any insufficiency in the scope of services provided is alleviated through partnerships and cluster groups, which allow companies to continue to specialize and maintain their flexibility without foregoing larger contracts.

Gianfranco Carbonato, Luca Bianchini & Chiara Roncolini

GC: Executive Chairman
LB: Business Development Manager
CR: Investor Relations, Legal Affairs
PRIMA INDUSTRIE

GC

Prima Industrie was founded in 1977. Could you provide us with a brief overview of the company's evolution since that time and explain the importance of the aerospace sector to the business?
LB: Prima Industrie is comprised of two divisions: Prima Power, which produces machines, and Prima Electric, which produces electronics and laser technology both for our group and the wider market and accounts for only 10% of the company's consolidated turnover. Prima started as an engineering company developing dedicated software solutions for customers. The founder, who remains president and CEO, previously worked at the DEA Group and combined his experience of measuring machines with lasers in order to create the first 3D laser machine in the world for automotive applications. Our growth has been focused on lasers and sheet metal machining, and working on 3D parts, which are mostly prototypes for the automotive sector. Prototyping was, and still is, a very important application for our 3D laser.
In terms of the company's focus on the aerospace industry, around 5% of our global operations are within this sector. We are a very diversified company, so the risk of a crisis in any one sector impacting our overall business is greatly reduced. Within 3D laser applications, which accounts for 20% of overall activity, the impact of the aerospace industry on our business is much clearer: it makes up around 30% of the total, with the automotive sector accounting for the remainder.

Prima Industrie has made many acquisitions over the years. How have these contributed to shaping and growing the business?
LB: In 2001, Prima acquired Laserdyne, a company that was experienced in and dedicated to 3D laser drilling for aerospace components. Although our 3D lasers were already in use at GKN in the United States, as well as in other aerospace companies using laser technology, the Laserdyne acquisition provided us with specialized know-how in the aerospace sector. We then proceeded to develop our 3D laser machines and focused on enabling a higher global efficiency of engines.
CR: In 2008 we acquired the Finnish company Finn-Power, which was the same size as Prima Industrie at the time of acquisition. Although our revenues dropped by 40% in 2009, following the global economic crisis, we then integrated the two companies into Prima Power, the machinery division of Prima Industrie Group. As a result of this new branding, in 2015 the company saw a return to pre-crisis level figures in 2015, with a growth of around 10-15% across the business. Our goal now is to continue investment and growth.

Who are some of your main clients in the sector and what are some of the key solutions you can provide them with?
LB: All OEMs that deal with engine components are customers of our technology. Our partners include GE, Safran, Doncasters, Honeywell, United Technologies, Airbus and many others. We manufacture two types of 3D laser machines, Rapido and Optimo, which are used by many automotive and aerospace companies. The Optimo is the largest machine that we manufacture, and we produce all the components in-house at our Turin site, from the entire cast to the fuselage. This is quite unique, as our competitors tend to outsource numeric controls and laser sources. The Laserdyne 795 is another system developed and produced by Prima Power Laserdyne and is mostly dedicated to aerospace customers. It is the most accurate and flexible system for producing engine parts. Its sensing capabilities distinguish the machine from others in the market and there are more than 400 installations worldwide.

You opened a new manufacturing plant in China last year. We have heard from smaller companies about the threat from China in terms of providing a lower cost solution to clients. Have you embraced this by establishing a base in the country?
GC: We have been operating in China since the 1980s, but we began to escalate our efforts in the 1990s through local agents. Because of the requirement to have a local partner in order to enter the Chinese market, we began our presence in the country through joint ventures (JVs). We initially had a few machines, manufactured either in Italy or the United States. Later, Prima Industrie established a commercial office in Beijing called Prima Power China. Over time, our Chinese business has grown, and the market has evolved considerably. There have been increasing trends for mid-range products, whereas previously, many Chinese products operated in the segment of low manufacturing costs, low prices, but low performance.
Since the associated costs of importing machines made them too expensive for the mid-range market, we began to explore the possibility of manufacturing these products in China. We learned that despite our JVs being successful, they could not be the basis of our future growth because we lacked autonomy of control within the 50:50 structure. We therefore abandoned our JV partnerships and invested in a brand new JV where we had 70% control. In order to compete, it is essential to promote unique qualities and selling points. The market is, however, so large that it is not yet oversaturated, and we have benefitted from having a very well-known brand. In China, two countries are perceived to have a very strong brand - Italy is one, with the other being Germany, particularly for mechanical engineering. Japan is also strong, but its relationship with China is not as good.

Prima Industrie invests 6.5% of its turnover in R&D. Could you tell us more about your initiatives in this area and your work with universities and research institutes?
LB: We have many partnerships with universities, especially Politecnico di Torino, where we also have a laboratory. One of our new projects is on additive manufacturing and is financed with European funds. We are also working on 3D printing for metals, for which the primary application is in aerospace. Although other players are already producing parts using additive manufacturing, our focus is to produce larger parts at a faster rate.
CR: Another project of ours is the Diode Fab. Using our laser machines, we have been able to develop a fiber laser source to replace the CO2 laser. The fiber laser is a very complex technology that combines diodes and optic fibers to produce a laser beam. At this stage, we are still buying diodes from suppliers, but we intend to manufacture our own diodes, ensuring we can manufacture all the key components.

The company has also established a new masters program in industrial automation with Politecnico di Torino and Comau. How important is it for companies and universities to work together to ensure the next generation of qualified people for the industry?
LB: This program allows students to divide their time between studying at Politecnico di Torino and practical work at Prima, and to then move to Prima full time on completion of the course. We also cooperate with high schools in Turin, welcoming around 30 students every year. The most promising candidates are subsequently offered jobs with Prima Industrie.

You celebrate your 40th anniversary in 2017. What can we expect for Prima Industrie by this milestone and beyond?
GC: Our target is to grow our top line. Our global presence is substantial, with employees across 25 countries and sales to 80 countries worldwide. We would like to further improve this reach to regions such as South-East Asia. We also aim to double our revenue in the Chinese market over the next few years.
LB: Our target for 2016 is €400 million and we hope to arrive at this target before our anniversary. We are always following the needs of the market and trying to anticipate its requirements. Laser technology is not new in the aerospace industry, but we are continuously making our machines more efficient and effective, and continuing to reduce our footprint. The aerospace market is quite slow compared to others, but we are beginning to see companies such as General Electric ramp up their production of engines, which is driving a high number of orders. However, the outlook and cycle are much longer, so we are now experiencing trends that were forecast three or four years ago. An introduction of new engines also brings an introduction of new technologies, and we have so far managed to anticipate these changes in order to grow with the aerospace industry.

Global Business Reports

Global Business Reports

TXT GROUP

HEADQUARTERS
LOCATION
Milan

company size

700
EMPLOYEES

segment

SOFTWARE PRODUCTS AND SERVICES

key aerospace customers

60% AIRCRAFT OEMS, 20% TIER-1 SUPPLIERS & MROS, 20% AIRLINES

key products and services

ON BOARD SOFTWARE FLIGHT SIMULATORS
PRELIMINARY DESIGN AND PRODUCT CONFIGURATION
DIGITAL MANUFACTURING
TRAINING AND FLIGHT OPERATIONS

Marco Guida

CEO

Could you provide an overview of the Group's operations within the aerospace segment?
Aerospace represents approximately 50% of the TXT Group's total turnover of €70 million. TXT has worked in aerospace for over 30 years, with a primary focus on avionic software and on the software components of flight simulators. Target customers have historically been aircraft and helicopter OEMs and their ecosystem of Tier-1 suppliers. Our capabilities span from modeling and simulation to software and system design, software development, system integration, testing, validation and certification of the systems. We are also active in the development of technology-supported, immersive training systems: we target pilots, in the early stages of their training, as well other actors across the product lifecycle, such as aircraft maintenance staff, teams working in manufacturing and assembly shop floors, and others. Digital manufacturing solutions and flight operations support systems (such as ground stations, flight planning systems, electronic flight bag applications, etc) complete our solution offering.

TXT has an internationalization strategy and has recently completed the acquisition of a Germany-based company. Could you describe the rationale behind this decision?
Historically, we have run our business with a primary focus on the Italian market, even if following our customers, all global players, we soon started delivering and supporting our solutions across 30 countries worldwide. A few years ago, building on an outstanding record of successful delivery and on our solid foundations of people knowledge and proprietary methods, tools and software components, we started looking at new markets, notably in Europe. Our organic efforts have been rapidly successful, winning several new international customers, mainly in the areas of avionic and flight simulation software, and setting-up local teams in UK, the Netherlands, Germany and Switzerland.
Building upon these early successes, we decided to accelerate the organic efforts with targeted acquisitions, both to expand our offering of solutions in other niches across the industry value chain and product life-cycle, and to gain more rapid access to a larger base of global customers. As part of this strategy, we acquired an international company based in Berlin, earlier this year: PACE Aerospace Engineering and Information Technology GmbH. PACE offers to aircraft OEMs and Tier-1 suppliers worldwide proprietary software products and consultancy services in aircraft pre-design (providing a modeling environment to develop and evaluate technological alternatives before entering the detailed design phases), and customer engineering (providing tools to support the customization of a given aircraft platform for a specific airline customer). They also target airlines with software supporting fleet and route economic analysis and planning and with electronic flight bags applications for in-flight fuel optimization. PACE's global customer base, their complementary offering of software products and expertise, and the access to a new segment of the aerospace and aviation value chain (i.e. airlines) perfectly match with our strategy of accelerating international growth through targeted acquisitions.

Is TXT Group looking to grow outside of Europe?
Our target market consists of global companies, and to serve them properly we must be global as well. While consolidating ourselves in Europe, we already started working with clients in North America, which we consider strategic to sustain our ambitious growth targets. Additionally, we have a partnership with China, seeing the Asia-Pacific market as an interesting opportunity for mid-longer term upside growth. We currently operate from two main hubs, Milan and Berlin, and through other nine local teams across Italy, Germany, UK, the Netherlands, France, Switzerland and, last but not least, Seattle (U.S.)

What trends have you noticed in the past few years within the Italian aerospace sector?
Over the past few years, the Italian aerospace industry has been consolidating; the integration of a number of Finmeccanica companies as divisions of the new Leonardo entity are an example of that. Many groups across Europe, e.g. Airbus, have followed the same path. The aerospace industry is forced to continue investing in R&D and new product development, to meet a widening spectrum of operational requirements, stricter safety and environmental regulations, and leverage on technology advances to be more competitive and differentiate. Italy, with its global leaders in some segments of the industry (such as Leonardo Helicopters), is fully aligned with this approach.
TXT is extremely well positioned to ride this wave: we combine the mastery of the most innovative technologies with a deep understanding of our customers' challenges and key processes, offering experience and software products that span across the industry value chain and the entire product life-cycle.

Do you have a final message from TXT Group to our international readership?

We have learned in the past 30 years that staying at the forefront of technology innovation and working side by side with the leaders are the key ingredients to be a market leader. We are lucky to have among our customers leaders from all segments of the industry value chain: fixed and rotary wings OEMs (such as Leonardo, Airbus, Boeing, Embraer, Pilatus), Tier-1 suppliers (such as Safran, GE Aviation, Rolls Royce, UTC), airlines and lessors (such as Lufthansa, Delta, Etihad, AerCap). Our commitment is to continue along our international growth path, to become better and more global every day, and to be positioned as the partner of choice for our current and future customers worldwide.

Michele Frisoli

CEO
MANTA GROUP

HEADQUARTERS LOCATION
Foggia (FG)

revenue (2015)
7
MILLION EUROS

company type
COMPONENTS, ASSYS AND SUBASSYS

key products and services
BOEING 767 RUDDER, IB AND OB ELEVATORS, IB AILERONS; PRODUCTION, AW139 RADOMES, AW109 PILOT AND PASSENGER DOORS, AW119 LINERS, AW169 AND AW189 LINERS AND COMPOSITES PERSONALIZATIONS, MITSUBISHI FUSO ENGINE PROTECTION SYSTEM.

other programs
ATR 42/72 AND 777

> Historically the Italian aerospace industry has been developed by one big player with a supply chain comprised of many SMEs. This has made it harder for Italian companies to diversify, at least within the same industry, and has forced them to look outside the national boundaries.

What is your vision for Manta Group as the new CEO of the company?
We created Manta Group from two companies: SCS was founded by my father in 1986 and TMC was acquired in 1996. SCS focused on industrial maintenance, assembly and trimming, while TMC specialized in composite materials production and painting. Both companies worked on fixed and rotor wing and diversified into the automotive industry in 2008. As Manta Group, we offer a verticalized process in the aerostructures field that extends from product inception, including R&D, design, structural analysis and prototyping, to product industrialization and production.

Could you highlight a few of your service offerings and clients?
Manta Group is strongly focused on the production of composites as well as the assembly of assys and sub-assys. Our work on composites includes both laminate and sandwich panels. We are equipped with 550 square-meter clean rooms and we have advanced machines for composites fabrication. Our products range from radomes, pilots and passenger doors, liners, fillers, strips, ribs and panels. The main programs we produce composites parts for are AW109, AW119, AW139, AW169 and AW189; NH90 in the rotor wing industry; and Boeing 787, 767, KC-46 Tanker, ATR 42 and ATR 72 in the fixed wing industry. With respect to assembly we work on structural and non structural assys. We assemble a wide range of parts, from radomes, pilot and passenger doors of helicopters to elevators, ailerons and rudder of wide bodies programs. Today, Manta Group is the only company in the world that assembles mobile parts for the Boeing 767 and KC-46 programs, such as inboard ailerons, inboard and outboard elevators and the rudder.

Could you tell us more about your anti-corrosion paint techniques?
Manta Group offers specialized painting in both aerospace and automotive. We designed and built an *ad hoc* automated painting system for engines to serve one of our main clients that produces engines in Italy and ships them to Japan. Their engines spend 60 days in transit and are subjected to corrosion due to humidity and external agents that they are exposed to during the trip. We treat them with a special paint that prevents the creation of rust.

What are the goals for Manta Group in the upcoming years?
Going global is the only way to be competitive. Our ultimate ambition is to become a manufacturing 4.0 company in both of our business areas: automotive and aerospace. We aim to increase our client portfolio, with each client representing no more than 10% of our revenue. As a family business we want to be part of Manta Group's transition to the next generation. We value our tradition and embrace our roots, but the question I always ask myself is: "What will my kids think of this company 20 years from now?"

What are the prospects for the Italian aerospace Industry?
Historically the Italian aerospace industry has been developed by one big player with a supply chain comprised of many SMEs. This has made it harder for Italian companies to diversify, at least within the same industry, and has forced them to look outside the national boundaries. This passage requires a mindset change, and that is not easy, especially for small businesses. Overall, I see an industry that will restructure itself with less competitors but with stronger capabilities. The future is abroad and we need to be a part of it.

Jacopo Recchia

CEO
AVIOREC SRL

How has the company evolved over the past 10 years?
Aviorec is a family-owned company that specializes in the production of structural parts in composite materials. Over the years, through collaborations with major players in the Italian aerospace industry and thanks to private investment, the company has grown in terms of specialization, skilled workforce and technological equipment, and we have integrated vertically. Nowadays we produce more complex aircraft parts such as rotor blades. Since its conception in 2006 the company's workforce has increased to 90 employees today.

What are your key markets?
Although we also operate within the automotive sector, we primarily serve aerospace customers, with flagship products and services spanning industrial engineering, manufacturing of structural assemblies and components made of composite material. Civil aviation is our core focus and makes up 90% of our aerospace portfolio, and the remaining 10% serves other sectors. Until now, our main focus has been the national market, although we also have customers in other European countries and also in the United States. We have the capabilities to supply customers worldwide.

As a relatively new and family-owned company, what are some of your key challenges to overcome?
Our biggest challenge is to produce complex parts through innovative processes, allowing us to offer higher quality at a lower price. That is what makes us stand out among our competitors. The strength of the business stems from the passion and vision of the Recchia family, who have supported the growth and development of the company through their own private investment.
We are proud of our capabilities in offering a complete solution to the client, from the design stages through to manufacturing and testing. When a customer approaches us to manufacture a composite component, we begin by studying how to create it, and take care of all the subsequent stages, streamlining the process for the client. We continuously invest in resources and collaborate with engineers, and have our own R&D center with five engineers who cooperate with the main Italian universities.

How are 'made in Italy' products perceived internationally?
The Italian brand has an excellent reputation and is very well perceived worldwide. The aerospace products are appreciated both for their quality and the reliability and financial stability of the manufacturing companies. Companies such as Leonardo have helped to elevate the national industry in the eyes of international players.

What are your key internationalization strategies and plans for growth over the next few years?
We are very proactive when it comes to approaching new international customers, and our reputation is certainly growing. Within three years we aspire to be the supplier of choice to all key international aircraft manufacturers worldwide. In particular, we plan to focus on Canada, France and the United States. We also plan to open a plant in Poland, which is strategically located and financially favorable for our operations. The move will hopefully open up opportunities in the Eastern European market. Through the collaboration with a client, we are involved in the production of the a nacelle made completely of composite material. Its main features are the reduction of CO2, NOx and noise, and it will hold the engines of the future airliners.

Giorgio Bignelli

CEO
DELTA-TI IMPIANTI

Delta-Ti Impianti is a family owned company. Could you tell us how it has evolved over the last 90 years to become the company it is today?
My grandfather, a former pilot, inspired the birth of Delta-Ti back in 1925. It was my father who then established Delta-Ti in 1975, building on the solid background in thermo-technic engineering built by my grandfather. We are an EPC company specialized in the design of big cooling systems, water treatment, process plants, air-conditioning systems, fire protection systems, and combined cycle power plants.
Our clients, who are mostly large private companies and state-owned enterprises, value both our technological identity and our expertise in the sector. They identify Delta-Ti as a partner in their technological development. Delta-Ti designs and builds turnkey technological installations and is divided into six divisions, including technological plants and energy and infrastructure.

Could you tell us about the main areas of activity with which Delta-Ti is involved, specifically those related to the aerospace industry?
In terms of aerospace, we started working in this area approximately 20 years ago with a U.S.-based consortium. Our expertise in this industry is divided into two sectors: the first covers energy production, including air conditioning systems; heating and thermal energy; fire-extinguishing installations to test aircraft for fuel-recharging processes; and water and sanitary systems. The second sector focuses on specific installations such as processes for turbine manufacturing, as well as all the mechanical installations in support of the production of mechanical parts. Our systems also support aircraft wing production and specific extraction systems. The specific range of our activity includes: clean rooms, anechoic chambers, and cooling and fire protection systems. We like to think of Delta-Ti as tailors, creating very specific and customised installations for the aerospace sector.

Could you provide us with a case study of a particular project you have carried out for an aerospace company?
We built the Sky Light Simulator, which produces artificial sunlight in order to test light refraction in on-board flight cockpit and instrumentation. To my knowledge, there are four of these in the world: two in the United States and Italy, and a further two owned by the Israeli Air Force and the RAF in the UK. The simulator contains an artificial sun rotating around a sphere, which is nine meters in diameter. The nose cone of the aircraft is placed inside the sphere and tests are conducted. Because of the need to produce a very bright light, millions of bulbs are used. These produce a great amount of heat and humidity, so Delta-Ti was contracted to provide a conditioning system for this experimental environment.
Another example is the anechoic chambers, in which simulated electromagnetic currents are discharged to check the levels of interference the plane can withstand. We designed and built integrated cooling systems according to customers' global standards, which enabled the tests to be carried out in strict thermal conditions.

Around 10% of the company's operations are for companies based outside of Italy. Could you tell us more about your internationalisation strategy?
Approximately 10 years ago, Delta-Ti decided to pursue an internationalisation strategy. This was made possible thanks to our knowledge of foreign markets. We established a subsidiary in France, but remain open to other markets such as North America. Today, Delta-Ti works with various research centers worldwide, including CERN in Geneva and with ITER Organisation, which focuses on nuclear fusion energy. Delta-Ti produces the cooling systems for SPIDER and MITICA experiments, and we are collaborating with technology partners from the United States and Europe.

Delta-Ti offers its clients tailor-made solutions. What, in your opinion, are the main reasons clients choose Delta-Ti?
Delta-Ti is a big company but with the flexibility of a small company. We can rely on efficient technology and a solid background in a number of industries. We innovate with national and international universities and research centers and are a stable partner. Clients also value our financial reliability.

Looking ahead, what can we expect for the company to the end of the decade?
Delta-Ti is investing in international expansion. Our work with ITER Organisation and our other partners has greatly increased our network. International clients are drawn to us because of these contacts and our ability to provide engineering services for projects of all sizes. We are also competitive on price and have reduced expenses compared to our larger competitors.
The aerospace market is showing important growth and we plan to enter this market aggressively. We will transfer our extensive knowledge across technological sectors to become a reliable partner both for prime companies and their strategic suppliers. Our aim is to consolidate our reputation and gain new customers.

Peppino Villella

Managing Director
OVS VILLELLA

OVS Villella has worked on aeronautical welding since 1975. Could you mention the range of activities that you offer clients in the sector and provide a few highlights from the past year?
OVS Villella specializes on manufacturing aerospace structures, sheet metal, welding, piping, machining, nondestructive inspection (NDI) and surface treatments. We take care of machining, welding, inspection and treatment processes. Our workflow encompasses a complete design to build process. We can accompany our clients from raw material to design and construction, which takes place in-house. We have more than 100 employees and a main factory for production which encompasses 2,600 square meters, a laboratory and a surface treatment center of 500 square meters. We have additional land near the main factory area where OVS Villella has a capacity to continue growing and expanding its service offering and operations. Along the past decades, we have gained customer trust, which means we can now work with leaders in the market.

OVS Villella received new Nadcap accreditations and approvals this year. Could you explain the need for these and which other accreditations you currently hold?
Obtaining Nadcap certifications in the current atmosphere is indispensable to company's operations. OVS Villella is certified by Nadcap for welding (according to AC7110/5), and nondestructive testing: (liquid penetrant AC7114/1, magnetic particle AC7114/2, X-ray AC7114/4). We are also certified by the Italian Civil Aviation Authority (ENAC), as well as various companies such as AgustaWestland, Selex, Sonaca, Avio, Boeing, GE, Alenia Aermacchi, among others. OVS Villella operates under a strict mission for quality assurance and this is why our quality management system is certified under UNI EN ISO 9001:2008 and UNI EN 9100:2009.
Our operations regarding surface treatments, tooling production and welding of structures all fall under these, as well as several others. OVS Villella had one of the first laboratories to be qualified by ENAC. We are now one of the most complex companies offering a complete range of services for companies needing metal parts processing.

Which kinds of metals do you work with and what is the impact that the emergence of composite materials has on your operations?
OVS Villella works with various kinds of metals including sheet metal, steel, titanium, copper and nickel alloy. Despite the increased demand for composite materials, OVS Villella has found that the metal's reliability will not leave the market. Our high level of professionalism makes clients continue to rely on us for their needs. We have therefore not experienced a significant fluctuation on our operations.

Could you highlight a few of your clients and what your international growth targets are in the future?
We work with Boeing and various aircraft defense clients. We are currently only operating in Italy but have customers in Europe and the US. Today, 20% of our turnover stems from exports. We intend to grow to become a 50%-export, 50%-local market revenue model company. The company has grown strongly for the past four to five years. We maintained a turnover of €10.5 million in 2014 and €11 million in 2015. Our focus is to grow this year and increase our turnover in the short term. Our projected revenue for 2016 is €12 million. In the last two to three years we worked with a prototype program that will be released in order to ramp up our growth as well. The outlook for the future is good and we are glad to be based in Sesto Callende, where the aeronautical industry activities began in the 1950s.

Fabio De Felice & Giuliano Di Paola

FDF: CEO
GDP: Deputy CTO
PROTOM GROUP

What developments is Protom Group undergoing?
GDP: Protom Group's advanced engineering unit, which is mainly focused on aerospace, makes us vastly different from other companies because we can look at the entire conceptual phase of the product. We accompany clients from the original idea all the way through to the industrialization stages. It is not commonplace to find so many competences within a single company: we may only complete individual pieces for the aircraft, but we can always see the whole. We are currently working on immersive reality computer technologies which can be used for training people, assembling cockpits for pilots, and overall at any stage of the manufacturing process. Our aim is to cross-sell products throughout the different departments.

FDF: Protom Group has the know-how and professionalism to, for example, design an entire wing rather than just the pieces. We would start from the initial concept of the wing, the main structure, the analysis and then end with the industrialization.

How important is the aerospace industry for Protom Group?
FDF: The aerospace industry is Protom Group's largest department, typically representing over 50% of the business. We are actively looking to grow internationally in this area. We are currently working throughout Italy in Milan, Turin, Genoa, Brindisi and Naples, and internationally in Toulouse, Brazil and London.
GDP: We also do engine models for our automotive division, where we verify the characterization of the engine, for FIAT and other car companies, to ensure that the right standards are maintained. The company is quite diverse: we also have a railway division and an engineering division. Protom Group also ensures we are involved in training, consulting and computing.

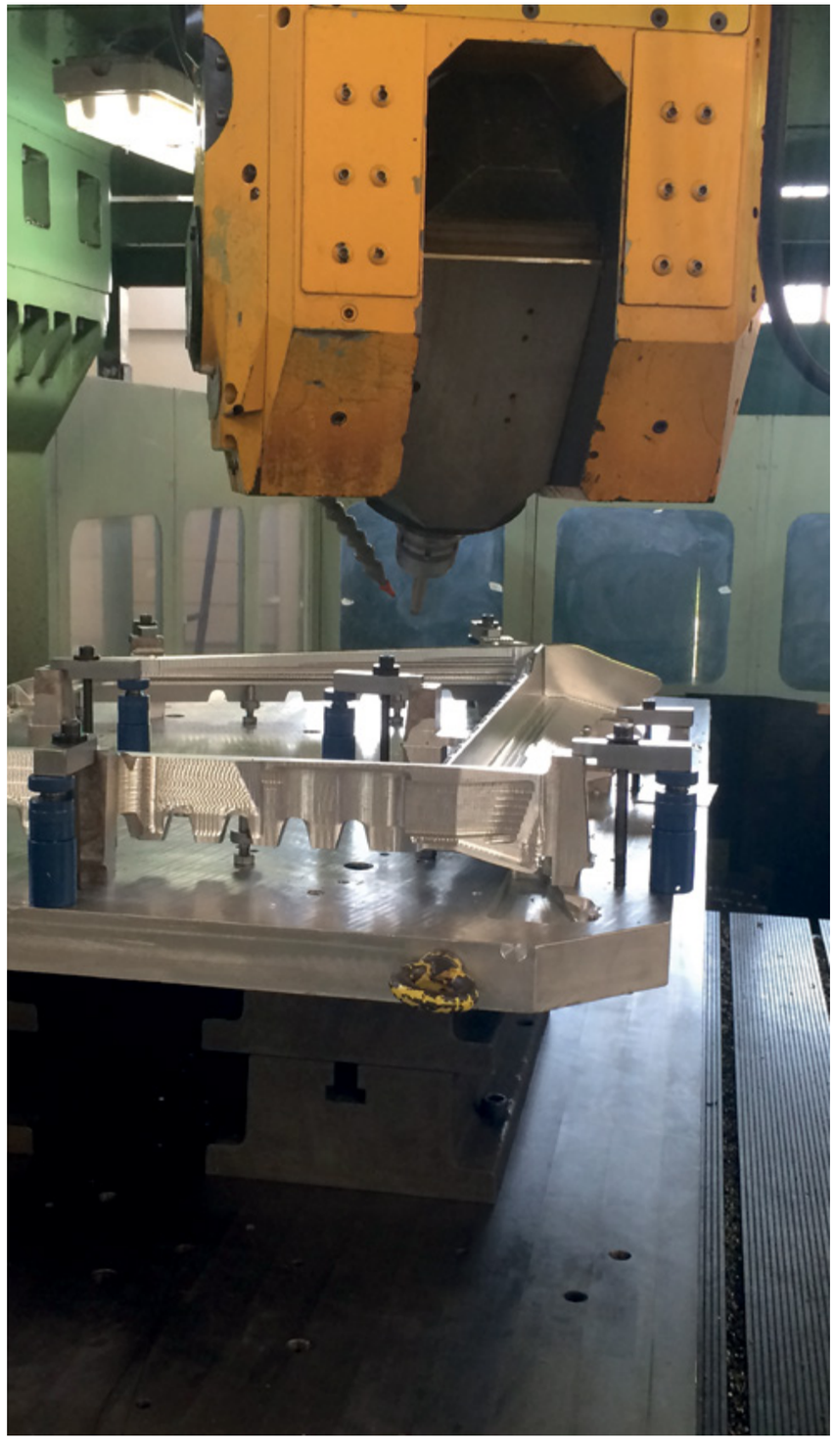
Could you provide a few highlights from your operations with Airbus?
FDF: The intent is to design, develop and manufacture electromagnetic actuators for the next Airbus helicopter. We are the managers and the coordinators for this project. We are working with LAER and with GKN Aerospace, which is a company based in the United Kingdom; we are trying to build up ice protection systems with them.

Protom has experienced growth at a time when many other SMEs are struggling. What is your strategy for success?
FDF: Protom Group's strategy is to increase our product range and to export these capabilities through the large industry players. For this, we need two things: the first is talent and the second is to have our products break into the market by cross-selling them from our different departments. We currently do not hold manufacturing capabilities, so our plan is to partner with a manufacturing company with great engineering capabilities, such as LAER, to approach large companies, such as Boeing and Airbus.
One way in which we our company is different from others is that we place a great emphasis in R&D. We are currently working with Clean Sky 2, which is the largest aerospace research project ever launched by the European Research Center and has a €1.8 billion budget. We have won six projects with them and intend to continue growing.

Where would you like to see the company in 2-3 years time?
FDF: I believe that true change stems from the manager's direction. I still have not reached my full potential in this capacity. We as a group have the right characteristics to work on project management, we are able to work on difficult and complex problems. I think it is impossible to grow beyond where we are now without going abroad and seeking new international partners.

Do you have a final message to the aerospace investment community?
FDF: The power of the Campania region relies on our people's lateral thinking and ability to adapt and solve problems: abilities that all engineers need to possess. We are beginning to launch a business school to teach these skills and help train the industry of the future. I believe in the people of this region.

Image: Aerotech



Mechanical parts, actuation and engines

The performance of every aircraft and its reliability are of utmost importance, and higher efficiency and cost reduction are increasingly sought after. There are many building blocks to an aircraft, which must all maintain high functionality. Many companies are pursuing alternative systems to support aircraft while reducing variables such as weight, time-to-market, and engine consumption.
Primavis, a start-up established in 2011, is currently developing a combustion engine to address some common challenges and demands. "The engine is based on the two-stroke principle, but in a split cycle configuration. One chamber is dedicated to combustion, while the other is dedicated to air intake, sending the air to the combustion chamber," explained CEO Luca Morfino.
"A split-cycle architecture is not as polluting as a normal 2-stroke architecture with the carter pump and the engine is much cleaner, removing the usual disadvantages of a two-stroke engine. The patent allows us to supercharge the two-stroke, split-cycle motor and achieve higher power and lower consumption than normal," Morfino added.
Following three years of development and encouraging results from the test bench, the product is nearly ready to begin industrial production.

Matteo Bertolotti

CEO
ING. BERTOLOTTI

Could you provide us with a brief history of the development of Ing. Bertoloti from its founding in 1949, including any recent key milestones?
The company was established by my grandfather and his siblings and shares strong links to Italy's mechanical industry. Originally, the company worked on construction, before my father refocused activities on the industrial sector and the manufacturing of mechanical elements for specialist machine tools and automation. We have been working in the aerospace sector for the last 15 years, specifically on the mechanical construction of avionics and electronics. This now constitutes our core business and accounts for more than half of our turnover. The most important product we manufacture is the console structure, and our products are typically made of metal sheeting, aluminum and composites.

You also manufacture products for use in the military. Could you tell us more about the standards to which you are expected to adhere in order to serve this market?
A significant portion of our business comes from military contracts, but we are not required to have specific certifications in this area because our direct clients are not military bodies. In the aeronautical space, all Leonardo suppliers are required to work to the company's specific standards, which are in line with those of the Italian government. This certification needs to be renewed every three years.

What is the importance of being more of a partner than a vendor to your customers and how can you implement tailored solutions to suit customers' individual needs?
Ing. Bertolotti uses several different technologies to produce parts. Many of these technologies are specific to machining avionics and we have certifications for these processes and operations. Without this, and our huge background of experience, clients would not choose to work with us. Thus, our history sets us apart as know-how is very instrumental. We strive to create a partnership relationship with our clients rather than a vendor-client relationship; however not all our clients are receptive to this and price often becomes the most important factor.

You are a member of TPA. What advantages does membership bring to SMEs such as Ing. Bertolotti?
We joined TPA recently, although we have been working with Leonardo-Finmeccanica for more than 10 years. Our reasoning behind joining TPA was to maintain and extend links with local aerospace companies in the Piedmont region and we would like to join consortiums and work with other companies in the future. Aerospace is very different from other industrial sectors, and therefore a company that is already working within the sector must have some know-how that other companies do not possess. It is important to connect with other companies in the industrial cluster to share knowledge.

Your products are used in 13 different countries. How much of a role does international business play to your overall operations?
We are not well established internationally as yet. We have definitely gained more exposure to international opportunities since joining TPA. Although for many years we had sufficient business from the regional market, which kept us at full working capacity, we now believe it is crucial to look at international markets because it can help us increase our business. Currently, we have occasional collaborations with international customers, and Ing. Bertoloti is looking for customers within Europe in not only the aerospace industry, but other areas as well.

What can we expect from both the Italian aerospace industry and from Ing. Bertoloti in the coming years?
The market is changing rapidly, as Leonardo has made several changes in recent years and is going to continue making waves in the market. In terms of business, aerospace is one of the more important industries in Italy and I hope this continues to be the case in the coming years. Looking to the future, I hope that Italy becomes a focal point for European aerospace. For Ing. Bertoloti, our first target is to establish an international presence. While we are not aiming to become a large player in the market, we hope to enter diverse markets in Europe in a consolidated manner. We hope to continue growing in this sector and increasing our know-how and technological skills.

Riccardo Girelli

CEO
LABORMET DUE

Could you provide us with a brief history of the development of Labormet Due since the company's inception in 2012?
Labormet Due is the second incarnation of a company for whom my business partner and I previously worked. This laid the groundwork for our current activities, as it meant we had a familiarity with the market and its needs, and we continue to provide instruments and services to some of those same clients. Our customers primarily include the FCA Group, Finmeccanica and Magneti Marelli, and these companies require our instruments for their local plants and laboratories. However, by diversifying our business into the provision of services we avoid some of the market fluctuations that come with procurement. Quality control, using computed tomography (CT) technology, is a new frontier for Labormet Due. The aerospace industry constitutes approximately 10% of our business, with the majority of our work focusing on the automotive industry and a few other areas. This changes on an annual basis as it depends on the demand facing different industries and the individual companies within them.

Why did you decide to distribute certain brands and which ones are the most popular with your customers?
Our customers are aware of the market and the rules that apply. Each company has technical requirements listed on data sheets, requiring certain tools. Products are codified by these types of requests. Our clients will often approach us in order to avoid issues with corresponding products. We analyze samples and we are able to solve their problems. If a company is innovative, it will usually want to verify that its change in process is accurate and consistent with the physical characteristics of using our instruments.

Could you tell us more about the CT scan service you can provide to clients?
Our tomographic services are provided by GE Measurement and Control's Phoenix CT system. We are the only company in Italy which provides this service, which enables our clients to review the porosity of their products and search for any internal defects, a task which would otherwise be extremely difficult. This system costs around €600,000 and, combined with the skill needed to manipulate the machine, it is of greater benefit for our clients for us to provide this service. We provide interested companies with a trial run, after which they are able to see the benefits of collaborating with Labormet Due.

Could you tell us about the benefits of being a member of TPA and the project you are working on with other TPA member companies?
The synergy between partners creates the opportunity to produce something of a higher quality using a more effective method. Because of the CT scan service we can now provide, we have been invited to join a working group with TPA and some of its member companies. The project involves part replication using additive manufacturing and therefore our services are required at every step to ensure no faults are in place in the products to be cloned.

Where would you say the Italian aerospace industry is especially strong and what can we expect from this sector in the future?
I believe the reorganization of Finmeccanica can positively contribute to Italy's aeronautic sector, providing a new impetus. For Labormet Due, it will positively affect our sales and the implementation of projects in the area of controls. On a technical level, additive manufacturing will provide the sector with new opportunities and enable project optimization, which will also boost the sector.

Looking ahead, what can we expect for Labormet Due in the medium term?
We have opportunities to increase our staffing levels and, coupled with this, another CT scan machine. The market requirement for product analysis is there and we are able to fulfill this need. We have also begun to provide our CT scan services in southern Italy, with a plant that focuses specifically on additive manufacturing. We will also look to increase the number of tools and instruments we provide and to expand our client list.

Massimo Paoletti & Gianpiero Scrascia


MP


GS

MP: Chairman
GS: General Manager
UAS

What have been the main milestones for UAS since its foundation two years ago?
MP: UAS was only founded in 2014. Gianpiero had previously established his own company, Umbria Electronic Systems, and I had founded Umbria Aerospace Technologies in 2012. We decided to merge the companies and form UAS, to provide integrated hydraulic electromechanical and electronic systems. Our defining capability is to provide 'plug-and-play' actuation systems to customers with electromechanical (EMA) applications and hydraulic and mechanical actuation systems. The systems have applications in braking, steering, and surface actuation; anything that can be actuated on an aircraft. Beginning with only one customer in 2012 based in the Far East, we soon gained another client in the same area, and about 60% of our business is international.

What are the key driving factors behind your international focus?
MP: We have found that there are many more opportunities for us in the Far East region, because the markets are developing very fast and we capture several programs thanks to our flexibility and capability to provide a fast response and continuous support. For example, we have recently developed five systems for the Indonesian aerospace company PTDI's N219 civil aircraft.
GS: We are not involved with China however, because the company is still too small to enter a market requiring such high volumes, and which is already looking for large corporations as suppliers. We would also like to work with large companies in Europe, but it is not easy, we are unable to provide the large support they require. This will be a challenge over the coming years.

What are your distinctive advantages?
MP: Although we are a small company with only 47 people, more than 60% are engineers, and we have all the capabilities to develop mechanical, electromechanical, electronics and software at this facility. We self-fund the development of our systems completely, and work closely with our customers to integrate our solutions into their programs.
GS: We are very flexible, and are able to provide continuous support and innovative, cost-effective solutions. For example, in designing a hydraulic system for a new civil aircraft, we sourced off-the-shelf components from around the world, conducting the initial market research and procuring the parts. This meant no additional certification costs, saving a great deal of money and time. In another instance, we convinced and supported a customer in selecting an innovative electrical actuated braking system solution over a traditional hydraulic actuated one. The full system developed by UAS is now flying in the aircraft's certification phase.

What are the prospects for UAS?
MP: We started with only seven people and a turnover of €500,000, and by the end of last year we had more than tripled our business. With more than 40 employees, our projection for 2016 turnover is about €2 million, and we are expecting to increase to €11 million by 2020 with a workforce of 65, following commencement of production. We are expecting to see a lot of growth from UAVs, which use only electromechanical actuation since they are not so large and do not require a great deal of power. We hope to enter new markets such as the United States, Russia, India and Turkey, but at this moment, the East and Far East markets still represent the regions of strongest opportunity for us.

Alberto Marchini

Founder
MARC INGEGNO

Marc Ingegno was founded in 1992. Could you tell us about how the company has evolved over the last two decades?
When I was building my own aircraft, I decided to produce the wheels and brakes myself, as they were very expensive otherwise. From there, I started to produce some small parts, leading on to the construction of wheels and brakes for ultralight aircraft. The company now employs 12 people, on a site of around 800 square meters. I also built a landing strip and, along with two hangars, we can now facilitate aircraft maintenance and testing of our ultralights. I have invested in CNC machinery, such as 5-axis and CAD-CAM equipment, for the company and broadened our scope in the aeronautical field, supplying parts for helicopters.
At the moment, our direct clients are primarily in Europe, but we also sell to Australia and the United States. The company also sells wheels, brake systems and landing gear to other aircraft manufacturers, which themselves sell the planes overseas. We would like to increase our direct sales into the United States and find a local dealer. Within Europe, around 60% of our clients are Italian companies, while the remainder come from across Europe.

Could you tell us about the range of products you manufacture for the aerospace industry?
We build a wide range of complex machined components, according to customer requests. This includes for customers such as Vulcanair, for whom we have built complete actuators for the landing gear and special hydraulic valves. We have also built around 200 landing gears for Tecnam's P2006. Aside from this, we are able to develop new products such as the complete retractable landing gear for AgustaWestland's Project Zero, while we have designed and built wheels, braking systems and complete landing systems for the Alenia SKY-Y drone. We are in the process of presenting our newly designed offerings to the aerospace industry; our products are universal and can be applied to many different types of aircraft with minimal modifications. In fact, our products are designed to be customized.

A fairly new product for Marc Ingegno is the Parrot ultralight plane. Why did you decide to move into manufacturing your own planes?
I own a small Kitfox 2 plane, built from a U.S. construction kit, and use it to fly around the Italian Alps. Because it is difficult to land on an incline, I began to design a plane fit for this purpose. In the initial stages of the design I applied my knowledge of building components for helicopters and produced a model that is completely different to other ultralight constructions. This plane utilizes the best materials, the best manufacturing techniques and new solutions to provide the required qualities. Its structure has the same degree of safety as a helicopter structure. Its main feature is the possibility to land everywhere, including on short strips and unprepared runways, in valleys and mountainous regions.
We recently presented the plane in Germany, and are aiming to obtain the necessary certifications by the end of 2016, which will enable us to sell this product on the European market. Although we are able to sell the product in Italy already, either as a fully built plane or as a kit plane, there is a great deal of interest from abroad.

Marc Ingegno offers full traceability and serialization of its products. How important is this service and what are the benefits?
The aerospace industry has a production system in place that we have adopted for each product and component we use, as well as for the aircraft itself. This means we have strict control of the product configuration and the entire production cycle from the raw materials to the finished product. This allows us to have constant high quality standards, as well as increased ease in providing spare parts or customizing specific parts for our clients.

Marc Ingegno will reach its 25th anniversary in 2017. What are your goals by this milestone?
I hope to bring the Parrot plane to market, and we also plan to organize a school for pilots. We plan to continue growing the main part of the business, which consists of landing gear, shock absorbers and components for the aeronautical and aerospace industries, to uphold our key business relationships, and to continue to supply innovative and high quality products.

Design and Interiors

Image: Geven

Italian companies have an excellent reputation when it comes to design and luxury products. There are many resources available to provide high quality, tailor-made products alongside more cost-efficient alternatives.

Many companies draw on experience in other industries, particularly automotive, to improve on the products readily available in the aerospace market. Pininfarina became a famous design house soon after its establishment in 1930 due to collaborations with companies including Ferrari, Maserati, Alfa Romeo and BMW, and later moved into the aerospace sphere. "We leverage our experience in the various other sectors in which we work to design aerodynamic exteriors and interiors, using our capabilities in industrial design to bring a holistic approach to the final product," said Francesco Lovo, vice president of operations at Pininfarina Extra.

The 'Made in Italy' brand is well perceived and highly regarded, giving Italian companies a competitive advantage in terms of reputation. "Italy has many small companies with experience in bespoke markets," stated Lucio Iacobucci, President at Iacobucci HF Aerospace. "When we began producing seats, for example, we were completely new to the market. Customers were attracted to our product because it appealed to them to have a product designed and tailor made in Italy," he added. Iacobucci HF Aerospace has also recently been selected to produce 52 first class seats for the Four Season's own jet, which transports customers between their hotels.

Alongside an element of luxury, there are many practical considerations to be taken into account, and requirements often vary. Companies such as Tecno Tessile Adler (TTA) partner with Italian universities and public research institutions to cater solutions to the client's specific requests. "TTA's new approach is to provide tailor-made interior products for both helicopters and airplanes. It is important for a client to be able to obtain all the necessary products from a single supplier, starting from sun-proof products to seats and decoration," commented Nicola Gullino, managing director. TTA is also working on recycling fabrics and carbon fiber, and operates six R&D centers.

Italian companies are living up to their reputation as suppliers of high quality products that are also practical and well designed. SMEs are able to use this established reputation as a lever to operate within the international market, and to become the partner of choice for many companies seeking the associated advantages of the 'Made in Italy' brand.

Alberto Veneruso

Managing Director
GEVEN

company size
400
EMPLOYEES

key industries
100%
AEROSPACE

revenue
$$88.501
MILLION

What has been Geven's evolution in the seat manufacturing segment?

Geven started in 1984 producing seats for the marine and railway industry segments, even if the main objective of Getulio Veneruso, my father and CEO, was to enter the aviation industry, which is incredibly challenging.

Initially, our strategy involved simple products. We started with retrofit programs and once we gained some experience, Airbus trusted Geven by allowing it to enter their A320 catalogue with the Piuma model, a very simple fixed backrest economy class seat. Thanks to our performances in terms of on-time delivery and quality, we have been allowed to enter also their A330 and A380 catalogue, with more complex products, like Premium Economy and Business Class, with full IFE. We are currently entering the A350 catalogue too, which was our final target with Airbus.

What are the company's growth targets?

In 2005 we invested into a new 40,000 square meter manufacturing plant, which is much larger than our previous location in San Sebastiano. In 2014, we acquired another two buildings which, combined, provide 40,000 additional square meters, and we are now planning to open a fourth plant of 50,000 square meters in the years to come. In 2009, we were awarded a contract with ATR for the supply of Economy and Premium Economy seats for the ATR 42 and 72 aircraft: as of today, we have delivered in excess of 460 ship-sets. The contract was on a non-exclusive basis, but so far 100% of the airlines have selected the Geven seats for their aircraft. Currently, we are developing the new generation of seats which will replace the previous ones by 2018. With regard to Boeing, we are confident that we will be supplying seats for linefit installation on new Boeing aircraft sooner or later.

Geven has created a new company called SkyTecno. What is the objective of this?

SkyTecno is a mechanical company that works exclusively for Geven. Today, 80% of our manufacturing needs are covered in-house, while we outsource the remaining 20%. This allows us to be more competitive in terms of cost and flexibility. Geven's quality also had an incredible improvement given the machines that were created for our specific needs. Today, we have a 0% scrap rate of the parts that come from SkyTecno.

With thousands of new planes needed in Asia in the future, does Geven have a strategy for the continent?

Geven supplies more than 250 airlines around the world and we are currently working to increase our presence in Asia and the U.S. In Asia we have agents and we are opening a new distribution center in Singapore to accelerate delivery times for spare parts and offer better support. Singapore is a strategic location and we have a good partner there. In the U.S. we have a distribution center in California that serves our customers in South America, and we are planning to open two commercial offices in Seattle and Miami to increase our sales in North America.

What is the outlook for Geven in the medium term?

Our core business is the Economy Class. Geven focuses on airlines' demands and specifically in minimizing weight and increasing comfort. Essenza, our new product for single aisle application, allow for the installation at a pitch of 27 inches. Generally the pitch is around 29 to 30 inches in high-density configurations. This product has already a launch customer that signed a long-term contract of $75 million. For the twin aisle market we are completing the development of another product named Elemento that will guarantee low weight and excellent levels of comfort for long range platforms. The next step will be the development of a new Business Class for long-range applications.

Lucio Iacobucci

President
IACOBUCCI HF AEROSPACE

HEADQUARTERS LOCATION
Fementino (Frosinone)

company size
200
EMPLOYEES

segment
AIRCRAFT INTERIORS FOR COMMERCIAL, VIP AND MILITARY AIRCRAFT

key products and services
GALLEY INSERTS
ON-BOARD APPLIANCES
MEAL AND BEVERAGE TROLLEYS
SEATS

How has Iacobucci HF Aerospace developed since its establishment in 1972?
My father founded the company focusing on improving the simple heavy steel meal and beverage trolleys of the 1960s. For the first time, my father constructed trolleys using a modular system, a concept that is still used today. His first customer was Lufthansa, and he became a world leader in this product line over the following ten years. When I became the sole shareholder in 2007 I increased investments through a private equity minority ownership of the company. As a result, the company's revenue grew from €1 million to €30 million in ten years. We are a truly international company, and I would say 99.8% of our business is outside Italy, split across 350 customers worldwide.

In what ways has the company's portfolio been diversified over the years?
Since I joined the business in the early 1990s, we have introduced additional products, and each product line contains many models. Within the espresso machine line, for example, we make 27 different models for different airplanes. Several companies had previously tried to install regular espresso machines on aircraft, but faced difficulties in passing the many safety regulatory tests, or simply fitting the machine into the space available. We later developed coffee machines, trash compactors, and also introduced our seats product line, closing a deal in 2010 with BMW Designworks for a new VIP seat. Today, the historical trolley units occupy only a small part of our business. Our portfolio is now split between commercial aviation at about 80% and VIP aviation for the remaining 20%.

What are the advantages of operating in Italy for Iacobucci HF?
There are definite advantages to manufacturing in Italy, particularly when it comes to the resources available to supply VIP programs. VIP aviation customers in particular want tailor-made products of outstanding quality, and Italy has a strong tradition in both aeronautical engineering for the structure and in design for the aesthetic appeal. We source our upholstery, detailed components and rich materials from small companies and we stand out because we customize our products to our customers' requirements at the highest quality. The Italian brand is also perceived very well in the aviation area. When we began producing seats, for example, we were completely new to the market. Customers were attracted to have a product designed and tailor made in Italy. Iacobucci HF Aerospace was recently selected for the production of 52 first class seats for the Four Season's own jet. The plane transports customers between hotels, it is a unique luxury experience.

How are you adapting to the changing industry environment?
The market is challenging and is driven by large airlines in need of suppliers like us to develop brand new equipment with increasingly higher performance, lower weight and cost. Whilst aircraft manufacturers are becoming more demanding, they also prefer to deal with fewer providers capable of supplying a broader range of products. It is therefore important to keep diversifying.
We must continue to invest in R&D to anticipate market trends. The company's goal is to continue to invest in our cabin product lines, offering more products, inserts and seats. It is no longer feasible to be a one-product company in particular. We will focus on broadening our scope from VIP cabins to prime cabins.

Giovanni Abete

General Manager and CEO
A. ABETE

Which is A. Abete's core business, and what are your growth plans?
A. Abete's primary trait is that we have multiple technologies to work, produce and assemble metallic parts, and to deliver them with a free-pass system which is a way of delivering parts without a customer quality control system. We have over 100 employees and are investing in new technologies, automation and information technology. We are also investing in opportunities in America. Our target is to grow by 20% within three years. We earned €9 million in 2012, doubled to €18 million in 2013 and €22.3 million in 2014. In 2015 we had lower sales levels because customers placed high pressure on prices, yet we produced more parts.

Can you elaborate on the ways that A. Abete participates in Horizon 2020 and Industry 4.0?
A. Abete won a Clean Sky Program award to develop a special pump for lubrication systems, with a group of companies and universities. We now have 56 months to realize this pump and its mechanical component, assembly, and electronic management. We created an R&D facility three years ago and are receiving support through PON (National Operations Program), which is funded by the Ministry of Economy. A. Abete is also creating a sound machine with a special sensor that operates via physical data and not just mechanical data. We are studying the physical parameters, such as vibration and absorption of electrical motors. Our aim is to use this data and upload it onto the cloud.

A. Abete reinvests 75% of its revenue into machinery. How is this business model sustainable?
We know that our company needs to grow, so it is better to invest in growth during this period than remaining stagnant. The international market evolves rapidly and we need to keep up with the times. At the moment our principal market outside of Italy is the USA, while we also work in Poland, the Czech Republic and Israel. I think that the next market for us is Europe. Asia needs suppliers but they have an offset program in which at least one part of the aircraft has to be produced in-country.

Have the American election and Brexit impacted the aerospace industry?
Given the issue of unemployment, Obama had a program to bring back $100 billion to the USA because they know that manufacturing activities for the last 20 years have mainly taken place abroad. I think that Brexit certainly will have an impact on Europe. The UK has a good relationship with the American aircraft industry, which would point them in the opposite direction from Italy. The Airbus consortium was originally made up of Germany, the UK, Spain and France, and now the UK is no longer involved. I think that was the first step in their unchaining from the EU. I do not believe that Italy is currently a solid aerospace market because Leonardo's restructuring process will lead to a reduction in sales from its suppliers.

Could you highlight A. Abete's international operations?
We have limited production in Poland, for Avio Aero parts, which were formerly produced in Turin. We also have operations in the Czech Republic, where we are involved in the A-321 for Leonardo, and the company is involved with Alenia.

Testing and Safety

Due to the nature of the industry, safety within the aeronautics segment is absolutely essential. "If a flying object is unsafe, there is no way of salvaging the situation, and passenger safety is of the utmost importance," asserted Mohamed Eid, executive vice president at Blue Engineering, a company with a dedicated department for reliability analysis in aerospace as well as other industry sectors.

All aircraft components and mechanisms undergo a series of tests at several stages of the aircraft's construction. AMET, an engineering company established in 1999, uses a virtual simulation test to support the design and development of new products for performance testing across areas including fuel economy, safety and comfort. "The tests that we perform are done virtually in order to decrease the number of physical tests that must be carried out to provide a certain performance," explained CEO Andrea Argondizza.

"In terms of aerospace, safety is unsurprisingly a top priority. We have the capability to perform analytical testing during the development of new aircraft," Argondizza added. Another safety factor on which AMET focuses are bird strikes and reducing their impact on small aircraft. "In the past, this was done by physical testing, key problems being lengthy processes and high costs," stated Paolo Cavallo, AMET's technical director, citing the benefits of virtual simulation. "We can control variables and conduct a much wider range of tests without hindering the dynamic performance of the aircraft," he added.

As well as overall vehicle safety, there are many developments outside the vehicle itself to increase pilot and passenger safety through infrastructure support. "There are significant investments in the security domain to ensure that infrastructure such as power generation, airport or telecommunication services can survive in case of problems," said Alberto Pasquini, R&D director at Deep Blue, a company focused primarily on human factor and safety studies and preventative measures. Pasquini continued: "All these systems are becoming increasingly interconnected, and it is necessary to ensure these methods are increasingly reliable and robust."

Similarly seeking to increase safety using additional on-the-ground support and systems is Lazio-based company Biofly. Through their E.L.I.S.A. project, which involves illuminating landing strips at small airports with solar-powered LED light systems, Biofly enhances the security and safety of pilots and also the airport staff. The lights function without cables and can be controlled remotely, turning on automatically when a plane enters a specified area. There are currently installations at locations including Venice Lido, Reggio Calabria, Viterbo, Aeroporto de Bresso and San Camillo heliport. Biofly has also created a 3D 'tunnel in the sky' vision system to simplify the pilot's landing path, making the airport approach much easier. They plan to integrate drones into the system to increase its autonomy and streamline maintenance.

Image: Bytest

Oliva Gennaro

CEO
BYTEST (TÜV SÜD)

Bytest has been part of TÜV SÜD since it was acquired in 2012. Could you tell us more about the evolution of Bytest as a testing company in the aeronautical sphere?

TÜV SÜD is a Germany-based inspection, certification and testing company for various industries. At the start of the decade, the company identified a gap in the market in the non-destructive testing (NDT) space. NDT is a service usually provided to companies in the aerospace, automotive, and oil and gas industries, which aligns with TÜV SÜD's areas of expertise. Bytest was acquired alongside three other companies in South Africa, North America and Korea, and is now TÜV SÜD's global competence center for NDT in the aerospace sector. Within this, 90% of our activity is in the civil aviation segment, while the remainder is in military and defense.

We have seen an average of €12 million in sales per year since 2012, with a peak in 2014 of €15 million due to the strength of the oil and gas industry. Bytest's senior management team has also changed during the last four years, which has enabled the company to grow. Our main competitors today are the prime manufacturers and their supply chain, as they cover the NDT part of the manufacturing circle themselves. This, however, risks a conflict of interest and, to cover peaks in manufacturing, these companies are outsourcing this testing.

Could you tell us more about the various testing services Bytest offers and any added-value services you can provide your clients?

The services that we offer can be split into destructive testing (DT) and NDT. We cover the two main areas of NDT: the infrastructure of both metals and composites, and engine parts. We carry out ultrasonic testing, radiographic testing and dye penetrant testing, among other tests. We also have laboratory facilities in which we conduct DT, failure analysis and reverse engineering services. Furthermore, Bytest has a training department for both our employees and our clients. One of the best sales tools we possess is the technical expertise demonstrated by our personnel; we focus on keeping that knowledge at a high level.

Because we often test very large products for our aerospace clients, we have started to establish on-site Bytest testing facilities. We call this new business model an embedded unit, as we set up our operations within a client's manufacturing plant. This has significant advantages for both Bytest and our clients, such as improved turnaround times and no danger of samples breaking during transport. We are investing in these sites, which are staffed by Bytest personnel and are legal subsidiaries, rather than our main locations at Volpiano and Benevento.

What is the regulatory environment like for the aeronautical sphere and could you explain the process of certification?

We have to follow all the standards and regulations applied by Accredia, the Italian testing and accreditation body, as well as NADCAP, the North American accreditation body for aerospace. Bytest has recently applied to ENAC to become accredited to carry out NDT aircraft in operation, which is in addition to our normal testing on new aircraft parts. We also work on an international basis for civil and military aircraft, and for this segment we also require client certification. To be eligible to work for a large multinational we need to be certified by Accredia in the first place; we then need to pass additional qualifications for the specific company before we can begin work on their behalf, so it is quite a lengthy process.

Looking ahead, what is your strategy for Bytest's growth up to the end of the decade?

Bytest is investing in new ventures. We believe that our embedded units are a key focus for the future of the company, as they allow us to be present where the client has a need. We have already been awarded a €20 million/10-year contract from Rolls-Royce Engines in Italy and we are confident that this kind of trend in aerospace investment will continue. Moreover, all of the programs in the sector are quite long-term, so there is no reason to expect a slow-down in business for the next decade. Piedmont remains one our key areas for growth, with 40% of our aerospace turnover coming from the region, and we have a plan to increase sales in 2016 by 15% on 2015 figures.

Carlo Spezzapria

CEO
RTM BREDA

Could you describe the way in which the aerospace industry impacted RTM Breda's activities?
RTM Breda is a testing laboratory that was founded in 1917 in Milan, with a long-standing tradition of testing and metallurgy. Since 2006 it is part of Forgital Group, which in the last 10 years has invested substantial capital in the aerospace sector.
The laboratory has two sites in northern Italy and employs more than 100 people. We have a customer base both within Italy and internationally. We are one of the largest laboratories in Italy thanks to the growth in the aerospace industry, which today represents 20% of our business. We forecast that it will increase to 40% by 2020. We have invested to obtain several approvals and we are looking outside of Italy for international growth.

Could you outline the key services you offer across your aviation segment?
We carry out testing on materials following approvals and we have an engineering consultancy department performing finite element analysis and engineering services. Technical competence is only a starting point. Third party accreditation and customer approvals are strategic for this kind of business. Holding more than 50 Nadcap approved tests is a solid base for us, but we have also achieved approvals from GE Aviation, Snecma (Safran Group), Pratt&Whitney and Rolls Royce. It has taken several years to reach this target, along with investments in machinery and staff training. Approvals are the way to reach customers; I would say it is the best form of marketing.
In the last two years, we managed a global Creep PTP (Proficiency Testing Program) for GE; results were used by them in order to approve the laboratories worldwide. It was a sort of gold medal for us.

What are the advantages of being a member of the Lombardy Aerospace Cluster?
The Lombardy Cluster has allowed RTM Breda to be known as a test facility. However I feel that there should be a next step forward: an Italian Cluster. There is too much of a regional mentality in Italy, slowing down possible growth. I am trying to develop customers outside Italy and I think that we all should work to give a stronger image of Italian aerospace companies.

What trends do you see in the international market?
Eastern Europe is investing a lot in the aerospace field, and we have good opportunities in countries such as Poland, the Czech Republic and Turkey, where some of the primes have production activities. The aerospace industry is very strong in both the UK and France but it is difficult to gain entrance. In the United States, you will see that there is a large amount of testing laboratories but at the same time, there is a huge demand for testing from the aerospace industry. There are good opportunities there.

How are you looking to grow in the next years?
We had a €11 million turnover in 2015 and the company is running well. We aim to achieve €15 million in three to four years, mostly through testing in the aerospace field but also with our materials and engineering services. We would like to grow organically, together with the outsourcing of services, the possibility of developing a laboratory within the customer's organization.

Do you have a final message for our readership?
RTM Breda has accepted the challenge of being a reference in materials science, from testing stages to engineering solutions. Aerospace applications are the market where we want to be. A European laboratory has to face and overcome the competition of strong US organizations. We are working and investing many resources to be the Italian player in the aerospace market.

> We are currently developing a new type of space simulator with the aim of reducing the consumption of liquid nitrogen by 50%. This technology is unique, and a contributing factor to our recognition as leaders in the field. We also have the possibility to supply smaller space simulators of one to three cubic meters, and up to 500 cubic meters.

Mauro Margherita

Managing Director
ANGELANTONI TEST TECHNOLOGIES

Could you give us a brief background of ATT and how it fits into the wider group's operations?
ATT, better known under its brand name ACS, has been operating since 1952 in the field of engineering and manufacturing climatic chambers for environmental testing. Our equipment tests the behavior of electronics and mechanical components. Within aerospace, our key focus is to create testing environments with the same parameters that a satellite would experience in space, simulating a vacuum and thermal radiation. Aerospace is a niche market within the testing field: it accounts for 10% of the Environmental Testing market share, compared to 30-35% for automotive. As a leader in testing for aerospace applications, our turnover is comparatively very large, with aerospace and defense representing about 30% of our business. ACS is the biggest business inside Angelantoni Industrie Group, which also operates in the areas of life science and renewable energy.

How important is the international market for ATT?
In Italy, ACS already has a market share over 60%, so our future growth depends on expansion abroad. We are very strong in many markets internationally, such as Poland, Turkey, Spain, China and India, and we have seen recent growth in Germany also. We will open our fourth subsidiary in France this year. Our other subsidiaries are located in Germany, China and India.

Where are you currently focusing your R&D investments?
We are currently developing a new type of space simulator with the aim of reducing the consumption of liquid nitrogen by 50%. This technology is unique, and a contributing factor to our recognition as leaders in the field. We also have the possibility to supply smaller space simulators of one to three cubic meters, and up to 500 cubic meters. Within the aerospace field, it is often necessary to provide the customer with a very good technical solution in the smallest possible delivery time. We have developed standardized modules for the smaller space simulators, permitting us to deliver in five to six months.

What are your key strategies over the next years?
This is a niche market with too many players. We will therefore pursue the necessary mergers and acquisitions to enter complex markets and take on ambitious projects. Our primary target is to consolidate our presence in markets such as China, India and Russia, as well as some remaining EU countries, and to then expand in countries such as the USA We therefore plan to invest in our sales and service organizations, but we are also aware of the need to set up at least two other facilities in the United States and Asia with manufacturing capabilities, to better follow these markets and support local customers with the necessary customization. We are evaluating some potential acquisitions but do not preclude the possibility of cooperation agreements with other private entities and potentially also competitors.

Image courtesy of Apulian Aerospace consortium

DEFENSE AND SECURITY

"We believe that a key area of focus for the aerospace and defense sector going forward will be unmanned systems, and an increase in their autonomy and performance. We are also investing further in the helicopter domain, developing the next generation civil tilt rotor, which seeks to answer growing demand for substantially higher speed, range and comfort, and capable of generating an additional rotorcraft market, both commercial and governmental."

- Mauro Moretti,
CEO and General Manager,
Leonardo

Breaking Ranks

Opportunities within a captive market

Italy's defense spending ranks 11th worldwide and fourth for NATO countries, and the industry is a key area of national strategic focus. "Defense is one of the few areas of strategic importance where Italy plays a leading global role, comprising advanced technologies and a highly skilled workforce, among other benefits," commented Guido Crosetto, president of AIAD. "Although defense represents only 1% of our GDP, it contributes on average a surplus of up to €5 billion (8 to 10%) to our trade balance."

Leonardo is the ninth largest defense contractor in the world and accounts for a large share of the Italian defense market. CEO Mauro Moretti's outlook for the industry is bullish. "Italy has strong capabilities across aerospace and defense. We will see a continued and increasing presence at the leading edge of innovation. As a player in the Italian aerospace and defense industry, we will continue to offer our capabilities, investment, heritage and expertise," he stated.

However, the new strategy and consolidation of outsourced services could potentially limit the market size for national suppliers, unless a particular specialized set of services is required. "Leonardo will cease business with contractors providing services easily done in-house, but will still need to rely on the specific knowledge of experienced companies such as Next for more complicated and structured turn-key software projects and tasks," maintained Antonio Bucci, CEO of Next Ingegneria dei Sistemi, a key software supplier for Leonardo.

The recent lack of national programs has created a problem for many companies that are accustomed to seeing high return from the defense sector. "Military applications will still be a key focus area, but the outlook is less certain, so we are likely to see most growth within commercial areas," commented Elisa Martinotti, military and helicopters and Italy programs director at UTC Aerospace Systems.

Many companies see the market as captive and restricted, with fewer opportunities due to decreased government spending and a lack of long-term programs. Filippo Giacinti, director at Eles, commented: "In the past, there have been several long-lasting programs, such as the EFA program, which has been active for almost 26 years. In the 1990s, it made sense to take part in such projects because we were able to stabilize our business model with a good cushion to mitigate any downturn in the sector. However, with no big business now on the horizon, the sector is no longer attractive."

"Many companies have contributed a great deal to European programs such as the Eurofighter, but volumes have been steadily

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"Many companies have contributed a great deal to European programs such as the Eurofigther, but volumes have been steadily decreasing, making growth and even survival challenging as we are all competing for the same captured markets. We are currently analyzing several options, and are particularly focused on South America, the farther reaches of Europe and South Korea."

Frank Spina,
Deputy Managing Director,
Northrop Grumman Italia

"Unfortunately, the potential of technologies for Earth-observation are not yet fully understood by the government and public, because they are outside of the traditional way to go about things. Slowly but surely, we will become indispensable in the security and defense segments, by being able to see where nothing else can."

- Roberto Tartaglia Polcini,
CEO,
MapSAT

"Italy has always been an open market for us in terms of defense products, namely the Chinook but also the KC-767 tanker. [...] We [also] see growth in the service business of defense, especially in integrated logistics and the tanker."

- Antonio de Palmas,
President,
Boeing Italia

"The main challenge in Italy is the national market's restricted growth, which makes it difficult for companies to expand. Although there are not many new programs in defense, [...] the industry will see a big boost from large projects such as the F35 and Joint Strike Fighter (JSF) programs, because we have the full set of capabilities in Italy to build aircraft and maintain them."

- Paolo Solferino,
CEO,
Vitrociset

"The military sector is more demanding. There is a need for immediate information in real time on particular areas via satellite, so information needs to be gathered and interpreted quickly. The software we use is developed in-house, but we also have colleagues working with the Italian Ministry of Defense to support the military staff in the interpretation of the received data and its distribution in other parts of the world, where Italian military forces are active."

- Giovanni Bardelli,
President and CEO,
IDS Ingegneria Dei Sistemi

"Self-funding the development process is a real problem. Aero Sekur is trying to involve the national defense authorities at least for what concerns defense R&D. There are goals to better support SMEs in terms of international activity and the development of new technologies."

- Silvio Rossignoli,
President,
Aero Sekur

"Aerospace is a public sector entity. There is no way to have a private sector market at the moment so the future is of stable nature. The main challenge is that Italy's debt is so large that it leaves little room for investment. The demand for defense is not increasing despite the qualms of online security, but in the future this, together with immigration issues, will become more important."

- Marco Casucci,
CEO,
Intecs Solutions

Image: Aerotech

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decreasing so that growth and even survival are challenging as we are all competing for the same markets," explained Isabella Gruppi, business development director at Northrop Grumman Italia. "The Eurofighter model, in which the customer would cover all development costs, is no longer applicable. Companies worldwide must approach the customer with a solution, not just a product or project proposal, and in most cases the development has to be self-funded. This results in lower margins alongside tough competition," she added. Self-funding the development phase is impossible for many, which makes the market much harder to navigate for smaller companies.

For these reasons, Northrop Grumman Italia, as well as other companies, will enlarge their portfolio and seek to enter new markets. "We plan to keep consolidating our position in the military sector, but also want to expand into dual-use and consumer applications," confirmed Frank Spina, deputy managing director. "We are currently analyzing several options, and are particularly focused on South America and the farther reaches of Europe. South Korea is also of particular interest, because there are a number of programs under development, particularly in UAVs and fighter helicopters," added Gruppi.

Other companies maintain a positive outlook. "The industry will see a big boost from large projects such as the F35 and Joint Strike Fighter (JSF) programs, because we have the full set of capabilities in Italy to build aircraft and maintain them," said Paolo Solferino, CEO of Vitrociset. Antonio De Palmas, President of Boeing Italy, agrees that the future should bring a positive outcome for the company. "We see growth in the defense market and have capabilities that the Italian MOD require. We also see growth in the service business of defense, integrated logistics and the tanker especially."

Having invested €5.6 billion in the country, Boeing has established a solid relationship with Alitalia and has a strong presence in the country's defense segment. De Palmas explained that "Italy has always been an open market for us in terms of defense products, namely the Chinook but also the KC-767 tanker which has the most advanced air-to-air refueling capability worldwide."

Lack of certainty in the defense market has driven many companies to diversify their portfolios or place increasing emphasis on other sectors for revenue generation. "The demand for defense is not increasing despite the qualms of online security but in the future this, together with what is happening with immigration, will become more important," said Nicola Zaccheo, CEO of SITAEL. Given that the military and defense segment requires much higher levels of customization and complying with strict safety regulations means that production levels are much lower than civil aviation. Companies that base their core business on the segment have faced many challenges. However, those with niche capabilities and a resulting competitive advantage continue to perform well and experience high demand for their technologies and services. —

Frank Spina

Deputy Managing Director
NORTHROP GRUMMAN ITALIA

> "We have to be increasingly wary of consumer companies trying to upgrade into a higher-margin market. Because the Italian government is no longer a big customer to national companies, we are always in competition with foreign countries in the wider market. It is therefore extremely important to be competitive in cost and performance."

How has Northrop Grumman Italia developed in relation to the wider corporation?

Northrop Grumman Italia has a long history in integrated navigation systems. The company's heritage dates back to Litton Italia's establishment in 1961 for the sale of F104 aircraft to the Italian government as part of an offset agreement. In 2001, Litton Italia was acquired by Northrop Grumman Corporation and became Lital, and then Northrop Grumman Italia in 2007. The company size has changed over the years with a reduction in workforce numbers from about 1,500 to 200 over the space of 50 years.

The fourth largest defense company worldwide, Northrop Grumman Corporation's mission systems sector alone has a turnover of $12 billion, about the same as the whole of Leonardo. We fall within this division and account for roughly €60 million to €70 million of the division's turnover. Although we have a relatively small turnover we probably have within our division the highest operating margin.

How important are the national and international markets to your operations?

Up until now the Italian market has been accountable for at least 70% of our turnover, but we are hoping that the national market will account for less than 50% of our turnover within five years. Unfortunately the wider corporation was not aware of the vast capabilities of the Italian industry and has so far not taken advantage of the opportunities available. We hope to elevate our international presence.

Many companies have contributed a great deal to European programs such as the Eurofigther, but volumes have been steadily decreasing, making growth and even survival challenging as we are all competing for the same captured markets. We are currently analyzing several options, and are particularly focused on South America and the farther reaches of Europe. South Korea is also of particular interest, because there are a number of programs under development, particularly in UAVs and fighter helicopters. Whilst competition is tough, Korean companies are keen to work with European companies.

How are new developments in the Italian aerospace industry impacting Northrop Grumman Italia's strategy?

European companies are having to change their business models and targets in line with changing supplier-customer relationships. The Eurofighter model in which the customer would cover all development costs is no longer applicable. Companies worldwide must approach the customer with a solution, not just a product or project proposal, and in most cases the development has to be self-funded. This results in lower margins alongside tough competition. Northrop Grumman Italia's new strategy therefore focuses on product development and enlargement of our portfolio, and also targeting new markets, leveraging on the marketing network and platform of Northrop Grumman Corporation.

In the defense industry we have to be increasingly wary of consumer companies, such as Samsung and Garmin, trying to upgrade into a higher-margin market. Because the Italian government is no longer a big customer to national companies, we are always in competition with foreign countries in the wider market. It is therefore extremely important to be competitive in terms of cost as well as performance. From 2014 to 2015 we renewed our strategic portfolio and examined our costs, looking at effectiveness and efficiency. We are also developing adjacent products, transferring technology to different applications, covering lower price ranges to extend our market reach.

Where are you focusing your R&D efforts?

We are always in tune with what the market is looking for, and also have new ideas to propose. We are hoping to change our funding model and work with the government and other funding bodies, rather than self-funding every project. We have understood that we need to cater to a wider range of customers, balancing price and accuracy in accordance with applications, where some may not require the same amount of precision and would prefer to pay a lower price. We also provide ITA-free products, making them easier for our customers and end users to export worldwide.

What are the company's key objectives over the next years?

The company has a long heritage and has always been a leader in navigation systems. We are aiming to achieve a higher level of technological mastery and a larger product range, as well as a larger presence in worldwide markets. We plan to keep consolidating our position in the military sector, but also want to expand into dual-use and consumer applications. —

Alfonso Centuori

CEO
APULIAN AEROSPACE CONSORTIUM

> The efficiency of an SME is much higher than that of a large enterprise. They lubricate the wheels of large companies. Big corporations cannot succeed in any market without a solid supply chain. Perhaps the size of the Italian average SMEs is about a quarter of the German ones, but Italy is one of the top 10 manufacturing nations in the world.

Could you provide a brief background of the Apulian Aerospace Consortium?
I have always noticed that Italy had an 'industrial bonsai mentality'. Some Italian aerospace entrepreneurs try to make their own company the strongest in the world, covering all industrial processes, from composites to metal sheets, machined parts, assembly, engineering, design and painting. But when this bonsai company sits before a Tier-1 company and they request 1 million man-hours of labor per year, these kind of SMEs can only offer fractions of it. Therefore to me it was Darwinian industrial evolution to learn to collaborate.
There are currently five companies that make up the Consortium in Italy, plus Verne Group in France, which is owned 100% by the Consortium. In the near future, Verne Group will be our name worldwide, because it is more international and less focused on a single territory. Every partner in the group is a manufacturer and owns a process: composites, machining parts, engineering, surface treatments, among others. In this way, all members can focus on their core businesses and investments, getting the sum of all the processes and being able to answer to 1 million man-hour requests. Altogether we are a €35 million consortium. We are the first Italian consortium to be EN 9100:2009 certified for manufacturing and not only for marketing and commercial services.

How were companies selected in order to become members of the Consortium and can more companies join in the future?
It took five years to determine which players could join the Consortium. The companies were selected after getting to know how they work and their strengths and weaknesses. The selection process screened people who were humble, team-players and were willing to sacrifice a part of their freedom for the common good. The Consortium, through Verne Group, is looking to enter also Germany and Poland. The statute of the company was designed to accept other partners, including financial ones, both nationally and internationally.

What do you think the outlook is for SMEs in Italy?
The industrial backbone of Italy is made up of SMEs, especially within the manufacturing sector. The efficiency of an SME is much higher than that of a large enterprise. They lubricate the wheels of large companies. Big corporations cannot succeed in any market without a solid supply chain. Perhaps the size of the Italian average SMEs is about a quarter of the German ones, but Italy is one of the top 10 manufacturing nations in the world. All SMEs in our region are facing challenges given the actual aerospace market's scenario of low orders, especially in the helicopters area. That's where and why the Consortium can help.

Which are the strengths that the Apulian region has to offer to the aerospace industry?
Every Italian region is specialized on some specific key technologies. Apulia has a long history within the aerospace industry, which dates back to when the first air stripes emerged and the aeronautical world was born with wings made in textile and wood. The first Royal Airmail in Italy appeared in 1923, with a service covering Brindisi to Cyprus, Athens and Istanbul. During WWII many hydroplanes were serviced in the Brindisi shipyard, which is the third largest military navy base in Italy. Fiat Avio started to make aircraft and built a presence in the country. Campania, Lazio, Lombardy, Piedmont and Apulia are the main regions in Italy where the market started.

What is your vision for Apulian Aerospace Consortium in the next 3-5 years?
The Consortium has the capacity to compete within the international marketplace and it is the only way forward for SMEs. This is an evolutive step, but culturally it is difficult. We are currently 420 people working in seven plants. The Abu Dhabi location is quite small at the moment. We have an autoclave for composite parts and the ability to do servicing, creating tools and parts. The local government wants us to grow there and we are leaning about the market in order to do so. It will not be long before we saturate the national market and will then continue investing in other countries.

Paolo Solferino

CEO
VITROCISET

Vitrociset formed in 1992. Could you give us a brief history of the company and its key developments?
The company has a long tradition in aerospace dating back 40 years, beginning with Ciset, which was merged with Vitroselenia in 1992. With an initial focus in logistics support for Italian traffic control in association with INAF, the company has evolved greatly over the years. We have transformed Vitrociset from a service company to one focused on turnkey systems with the capabilities to realize entire infrastructures, from design to testing and maintenance.
We operate in three key markets: defense and security, space and transport. Our largest focus area is defense and security, which accounts for about half our revenue, followed by space operations, in which we are involved in ground support. Last year we were selected by the European Space Agency (ESA) as a 'Best Company' based on our quality of service and excellent delivery.

What are the key challenges of operating in the Italian market?
The main challenge in Italy is the national market's restricted growth, which makes it difficult for companies to expand. It is therefore essential to explore opportunities in international markets. We are nevertheless very close to the Italian government in our defense operations, and find great support in terms of negotiations and entering new markets. Although there are not many new programs in defense, we hope that we will begin to see more growth in the space sector. The industry will see a big boost from large projects such as the F35 and Joint Strike Fighter (JSF) programs, because we have the full set of capabilities in Italy to build aircraft and maintain them.

What are your growth strategies and areas of focus for the next three to five years?
Within aerospace we are currently working on a specific project on drones, with financial support provided by the Italian government. Another important area for us is cyber security, and we have begun work on a cyber security project for ESA, in partnership with another company.
Concerning defense and space, our main focus will be on international markets, as we see many opportunities in Eastern Europe and the Far East, for example. Currently international markets account for only 40% of our business, but we are hoping to increase this percentage. We plan to make large investments into Turkey, for example, because we have found that there is strong motivation from the government to develop capabilities, and there are a number of investment opportunities.

Innovation in Defense

Continuous innovation and development are extremely important within the defense sector to ensure that the national industry remains competitive on a global scale. Although there is a great deal of cross-fertilization from other sectors, there are many specific requirements and demands, as well as additional certification, that make product and system development particularly challenging.

"There is a need for immediate information in real-time on particular areas via satellite," commented Giovanni Bardelli, President and CEO of IDS. IDS places a large emphasis on product development and innovation, investing €60 million in R&D in 2015 and distributing 50% of employees across 11 R&D laboratories. Operating within the defense sector, it is also important to work closely with the customer to develop solutions that are easily implemented within other systems or by military personnel. "The software we use is created in-house, but we also have colleagues working in the Ministry of Defense to support the military staff in the interpretation of the received data and its distribution in other parts of the world such as Afghanistan, Syria and Libya," said Bardelli.

Funding within the defense market can be a challenge, particularly for SMEs, since the scope to make the product or technology commercially available is in many cases not an option. Smaller companies in particular therefore rely on institutional funding from the development stages, and are otherwise unable to self-fund the entire process. Giacomo Russo, CEO of Sentech, an eight-person company specialized in communication and defense systems, explained: "The main challenge for small companies such as ours is related to the availability of resources, financial reach and scope of specific knowledge available. Competing with the larger companies is no easy task, and we must focus on how to allocate and channel our limited resources correctly by making sure we prioritize the right tasks." Sentech self-funds 50% of research, and the remaining 50% is financed by the Italian Ministry of Defense. The company's main areas of expertise are direction-finding technologies and designing, calibrating and producing antennas and receivers.

UAVs for military applications

A particular growing trend to increase mission efficiency and avoid dangerous situations is the application of UAVs to military tasks. Autonomous systems are in growing demand to tackle situations that are dangerous or complicated for humans to deal with.

Within a military or other high-pressure environment, accuracy, efficiency and speed are of the utmost importance. Eurolink Systems, a company specializing in embedded and robotic solutions, has recently developed a tethered drone for the Italian army, attached to a power supply via a cable up to 25 meters in length. Data is continuously exchanged through the cable, and the operator is located safely within the vehicle whilst the drone flies above, relaying a visual of the surrounding environment. If the cord is severed, the drone is still able to fly for four minutes with automatic landing capabilities, and no critical information will remain on the system.

There are many challenges surrounding UAV systems, such as factors impacting propulsion, take off, flight time, accuracy and noise. Systems must therefore be efficient and adapted to their particular application. Primavis, a company focused on developing internal combustion engines for hybrid and conventional vehicles, has sought to overcome some of these issues. "[UAVs] carry heavy payloads and have a broad wingspan, so it is helpful to have a boost take off. Our hybrid system also enables the UAV to take off on shorter runways or to take off in high altitude runways," highlighted CEO Luca Morfino.

Another challenge Primavis addresses is the higher consumption of currents compared to airplanes due to the electronic systems and boards, and the need to mount bigger and heavier alternators. "Our electric motor solves this problem by providing both propulsion and alternator capabilities. This solution will also enable UAVs to fly solely on an electric motor in a target zone, leaving neither a thermal nor a noise signature; by eliminating these two traces, they can fly lower, improving their mission in the process," stated Morfino.

Developing new UAV technologies is a challenge given that there are many rules and regulations limiting the ability for companies to test new products. In an attempt to place Italy at the forefront of the UAV movement, following the USA and Israel, Giuseppe Acierno, President of the Apulian Airport has focused on developing a regional airport for UAV testing. "Grottaglie is now the only airport in Italy recognized by ENAC as the only airport with a dedicated area for UAV testing." His aim is also to further develop the competences of the region so that "Apulian companies will have the opportunity to create parts and components for the aircraft, as well as develop new technologies for the payload, the capture of information and data fusion, acquisition and interpretation."

Now that systems have achieved a certain level of efficiency and autonomy, a new development is the attempt to facilitate autonomous capabilities between UAVs to enable the machines to work together on joint missions. "With the possibility of deploying a fleet of heterogeneous drones immediately, a key application would be in disaster recovery and civil protection," commented Pietro Lapiana, CEO of Eurolink Systems, which has recently been involved in two projects to create a 'system of systems' in the command and control for an unmanned fleet of heterogeneous drones, with only one control center.

The key drivers for innovation are increased operating efficiency and safety, and reduction in resources required for development. Whilst the market may be very competitive for SMEs, there are many opportunities for companies with specialized expertise and innovative solutions.

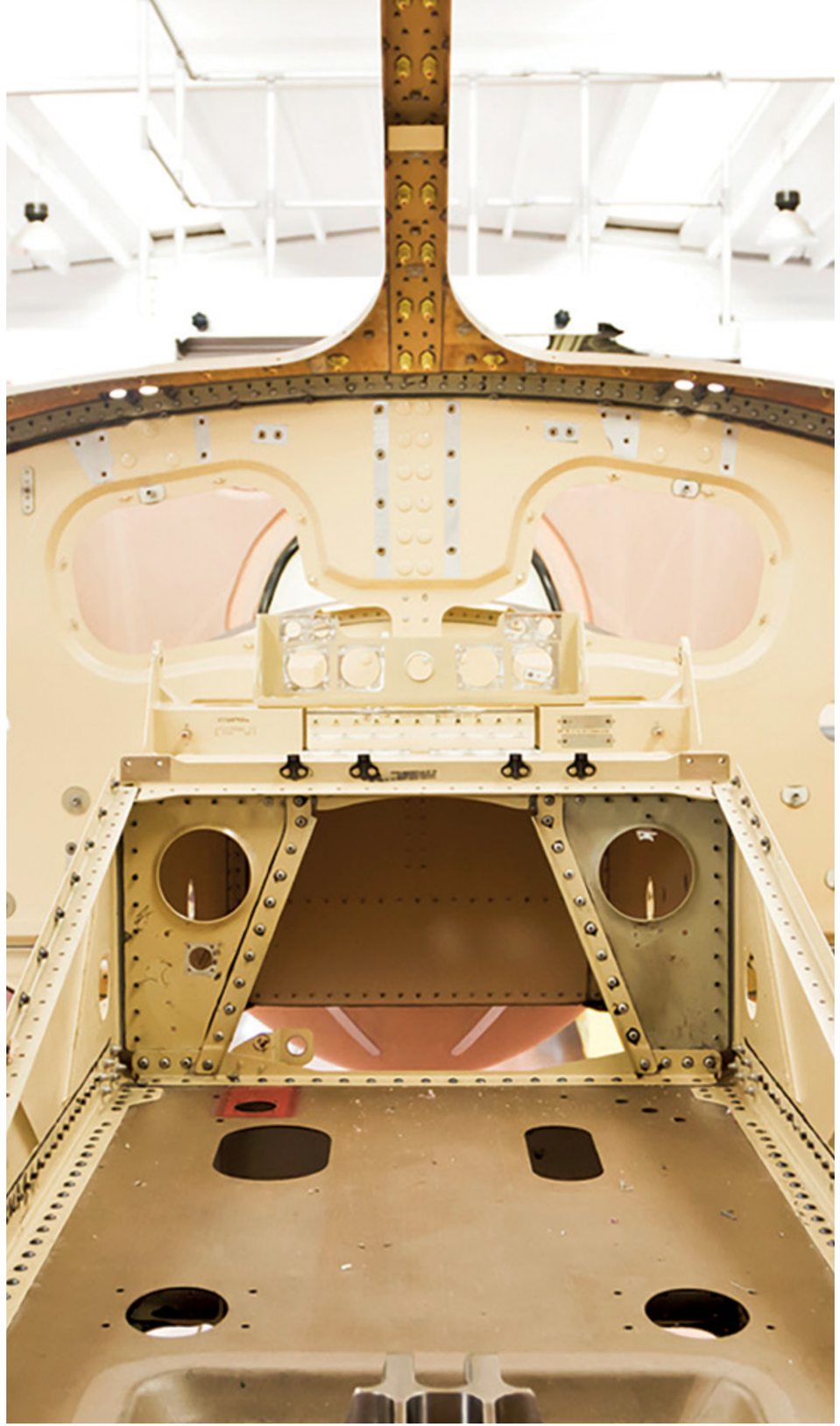

Image: Apulian Aerospace consortium

EDITORIAL

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>
> - Giacomo Russo, CEO, Sentech

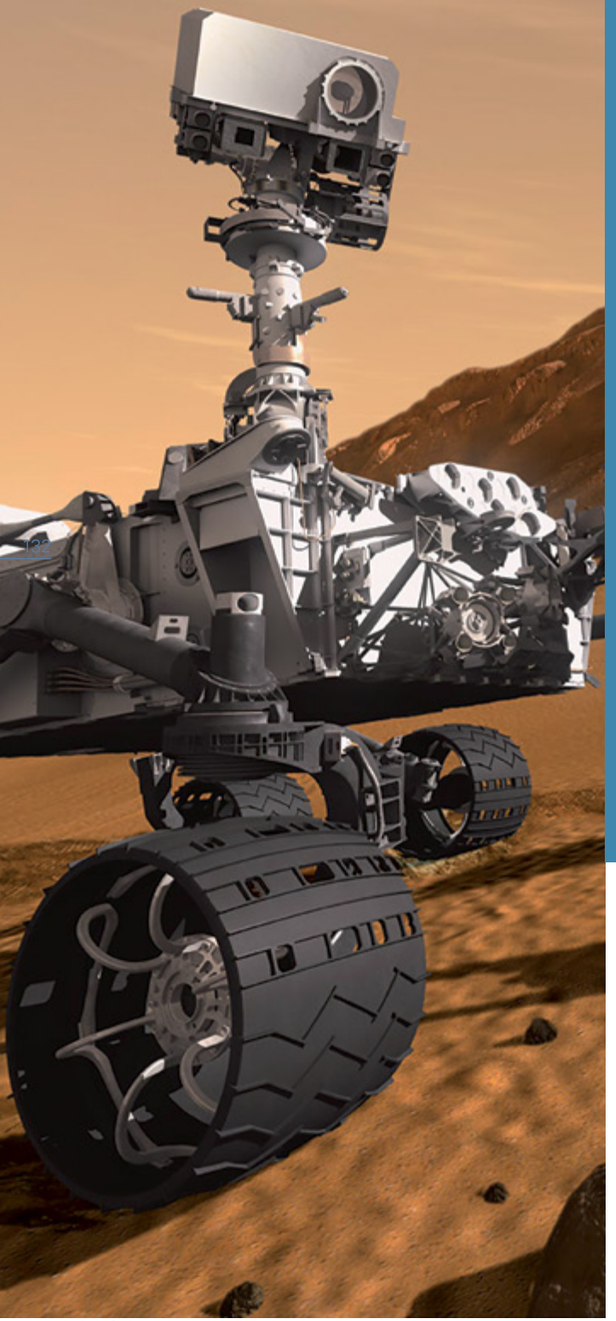


Image: Sitael

The Fourth Industrial Revolution: **Robotics and drones, reality and future**

*By **Pietro Lapiana**, CEO, Eurolink Systems Italy*

For a number of years now, technology has had a shocking effect on our everyday lives, creating a global community with its own rules and regulations, which in many aspects are new and different. The computing power available to any of our smartphones today is greater than that on board the Mars rovers and the Lunar probes. This information should spark a reflection: apps are everywhere but also affect society in terms of the way we communicate. Phone calls, for example, are increasingly replaced by instant messaging; a single spoken discussion is replaced by multiple, concurrent ones.

Similarly robots, which took the first steps in the industrial environment, are being employed in fields we never believed possible, even just 10 years ago. A robot cleaning our house or mowing our lawn is familiarizing the concept of a "robotic friend", similarly to the way in which appliances affected our parents' and grandparents' lives in the 1960s.

Global Business Reports

EXPERT OPINION

First created to support military operations at sea, over ground and in air, "drones" are today also known as "unmanned vehicles", and widely employed in hundreds of possible variations in military and civil applications. The philosophy behind the use of drones is to replace humans with unmanned systems in all "Dangerous, Dull and Dirty" operations.

Today, mini-unmanned systems (of less than 10 kg for aerial models and less than 20 kg for ground models) are successfully employed in precision agriculture, surveillance, building maintenance, wind and photovoltaic survey, artistic and architectural heritage protection, aerial filming and many other applications.

There has been an explosion in the supply of unmanned systems in the last three years, since they seemingly offer a smarter way to satisfy usual needs. There is therefore a huge potential market to be addressed as fast as regulations can be put in place to cover the possible applications.

Without diverging too far, take into consideration self-driving cars, which are gradually gaining ground in car pooling and car sharing. One year ago, during the Italy Expo 2015 ArteQ conference, I had a "vision", picturing an Uber-like app organizing self-driving cars for transportation within the city. Indeed, alongside autonomous driving features, infotainment is also evolving to meet the needs of the driver, who is increasingly becoming more of a passenger. There is great potential in reducing the number of circulating vehicles while increasing safety for passengers. Just in July 2016 Uber and Volvo planned to release 100 Volvo Xc90 hybrids to test the Uber+ autonomous vehicle in Pennsylvania over the next few months. It may seem risky, but how often do we doubt the safety of autopilots on planes and subway trains anymore? As soon as regulation is able to catch up with technology, we may welcome unmanned boats for long trans-oceanic freight navigation. Whilst our children need a driving license and a car to get around, our grandchildren may not need a car at all, nor our great grandchildren after them.

Our company, Eurolink Systems, was established in 1993 and is an ISO9001:2008 and T.U.L.P.S qualified Company. Since its foundation, Eurolink Systems has been focused on the design and manufacture of mission-critical electronics systems. We pioneered remotely controlled systems in 2009 when nobody had considered employing unmanned systems in Italy, with the exception of military applications. In 2011 we had the honor of using one of our drone systems for the live aerial HD broadcasting of the 197th Anniversary of the foundation of the Italian Carabinieri Corps.

Since then we have developed many platforms, both ground and aerial, including a cabled aerial platform with the flexibility of a Vertical Take Off and Landing (VTOL) system and the endurance capability of fixed-wing aircraft. Other platforms we developed include a small-sized tilt rotor-aircraft developed for a "Lazio Innova" program, and a robot swarm experiment for cooperating systems.

Our robot swarm experiment demonstrated the feasibility of a robotic swarm able to autonomously develop a strategy to accomplish a mission, sharing information and reacting to potential challenges such as one or more unit failures. This is a step towards a system acting autonomously on behalf of a human without risking the rescuers' own safety. We can further apply these systems in disaster recovery operations, in the presence of chemical or radioactive leaks, for example, safeguarding nature and human life alike during the operation. The command system in our swarm demonstration was also portable, allowing the possibility for any human personnel to remain at a safe distance while the reconnaissance swarm gathers information. Specific applications include civil protection programs and interventions.

Eurolink Systems is currently working on a program presented at this year's DronItaly, developing the Lazio government's "Territorial Security and Surveillance System" (S3T). This is an IoT-based platform that allows a network of heterogeneous unmanned sensors and robots to monitor pollution through data acquisition, analysis and dissemination.

The system will facilitate the prediction of pollution impact on coasts and coastal cities, gathering and analyzing wind, tidal information and sources of pollution. The system will simultaneously provide the regional and national environmental Agencies (ARPA and ISPRA) with the information needed to manage and control the effects of pollution, enabling them to put targeted countermeasures in place.

The next challenge we are facing is the "algorithm ecosystem" concerning all the sensors, actuators and processing power available now and over the next few years. The core challenge will be data fusion and harmonization from different sensors and to different actuators, and the "rules" or algorithms that will process the required work in real-time. Systems based on auto-learning and neural architectures will improve dramatically to drive this revolution, also influencing smart or digital cities where cars, robots and humans will share a common ecosystem.

Global Business Reports

ITALY AEROSPACE 2016

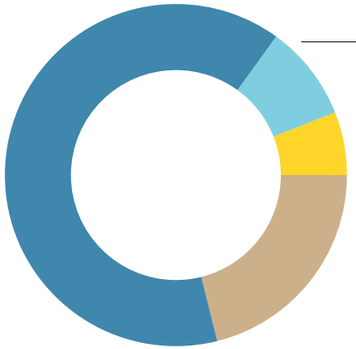
Industry Explorations

SURVEY AND COMPANY DIRECTORY

Image.

ITALY'S AEROSPACE INDUSTRY
GBR 2016 SURVEY (II)

Respondents active in the following segments
(more than one answer possible):
Civil aviation: 49%
Space: 39%
Military: 21%
Other: 18%

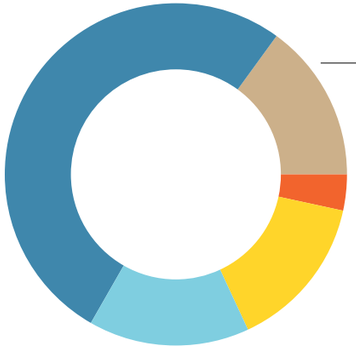


The main sector in which you operate has a positive outlook.

Strongly disagree	0%
Disagree	6.1%
Neither agree nor disagree	9.1%
Agree	63.6%
Strongly Agree	21.2%

Does your company serve only the national market?

Yes	18.2%
No	81.8%

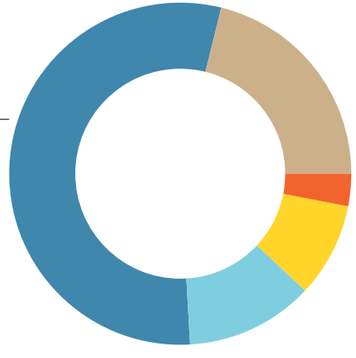


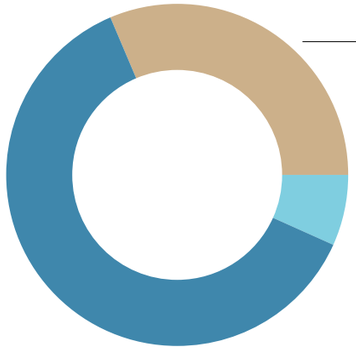
One of the key benefits of operating in Italy is the access to skilled labor and research capabilities provided by universities.

Strongly disagree	2.9%
Disagree	15.2%
Neither agree nor disagree	15.2%
Agree	51.5%
Strongly Agree	15.2%

Associations and clusters are of great importance to SMEs, which would otherwise struggle to win big contracts.

Strongly disagree	3.1%
Disagree	9.1%
Neither agree nor disagree	12.1%
Agree	54.5%
Strongly Agree	21.2%



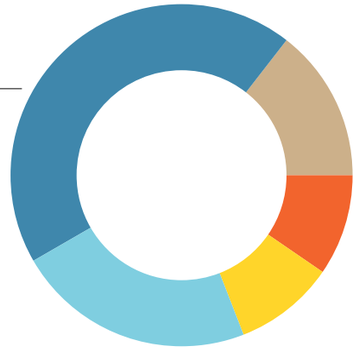


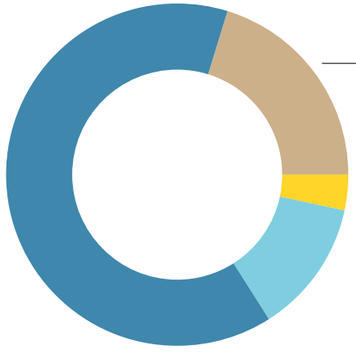
Your company is a member of a cluster or association with the aim of building connections.

Strongly disagree	0%
Disagree	0%
Neither agree nor disagree	6.2%
Agree	62.5%
Strongly Agree	31.3%

Your business has benefitted directly from membership within an association or cluster.

Strongly disagree	6.1%
Disagree	12.1%
Neither agree nor disagree	24.2%
Agree	45.5%
Strongly Agree	12.1%



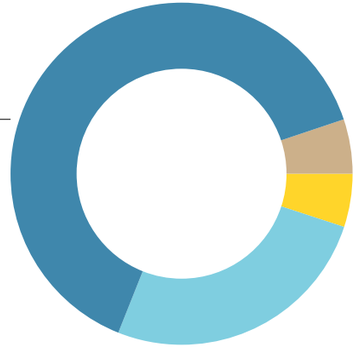


Attracting investment to the sector's development is challenging for the aerospace industry in Italy.

Strongly disagree	0%
Disagree	3.3%
Neither agree nor disagree	12.1%
Agree	63.5%
Strongly Agree	21.1%

Operating costs represent a challenge for the aerospace industry in Italy.

Strongly disagree	0%
Disagree	6.1%
Neither agree nor disagree	24.2%
Agree	63.6%
Strongly Agree	6.1%



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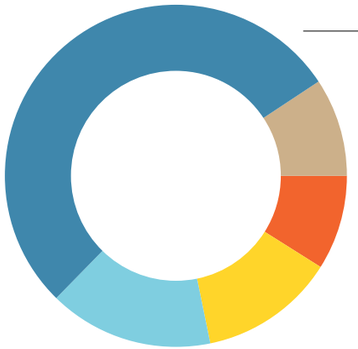
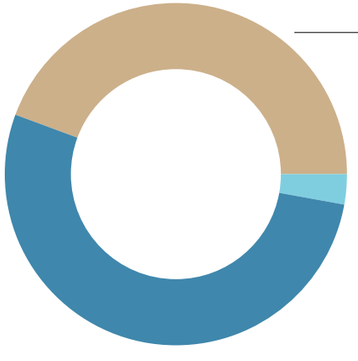


There are limited resources available to support R&D efforts and innovation.

Strongly disagree	9.4%
Disagree	12.5%
Neither agree nor disagree	15.6%
Agree	53.1%
Strongly Agree	9.4%

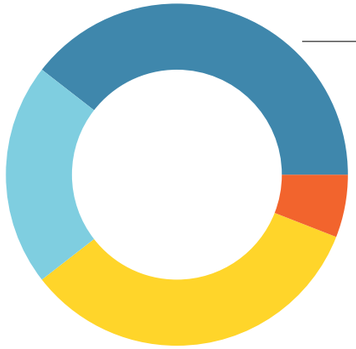
The regulatory framework and certification are a challenge for the aerospace industry in Italy.

Strongly disagree	0%
Disagree	12.1%
Neither agree nor disagree	30.3%
Agree	51.5%
Strongly Agree	6.1%



Italian government authorities could do more to support the aerospace industry.

Strongly disagree	0%
Disagree	0%
Neither agree nor disagree	3%
Agree	51.5%
Strongly Agree	45.5%

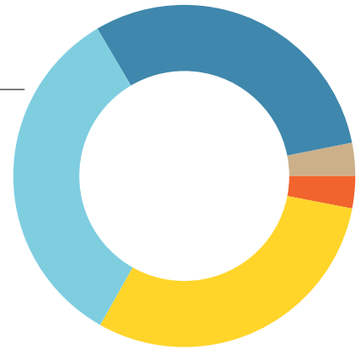


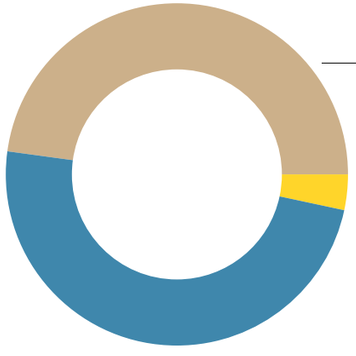
Your company will find it difficult to be competitive on an international scale.

Strongly disagree	6.1%
Disagree	33.3%
Neither agree nor disagree	21.2%
Agree	39.4%
Strongly Agree	0%

The outlook for the Italian industry is positive in terms of growth and opportunity

Strongly disagree	3%
Disagree	30.3%
Neither agree nor disagree	33.3%
Agree	30.3%
Strongly Agree	3%



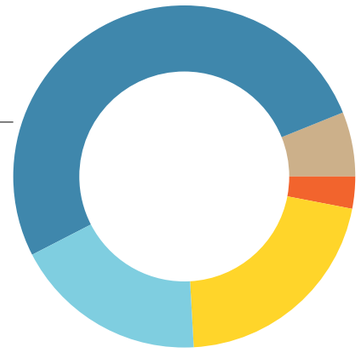


Winning international contracts and establishing relationship with international customers are of key importance within your growth strategy.

Strongly disagree	0%
Disagree	3%
Neither agree nor disagree	0%
Agree	48.5%
Strongly Agree	48.5%

The Italian industry has a strong heritage and continues to hold a strong international position.

Strongly disagree	3%
Disagree	21.2%
Neither agree nor disagree	28.3%
Agree	51.5%
Strongly Agree	6.1%



Global Business Reports

TABLE OF CAPABILITIES

COMPANIES	KEY CAPABILITIES													
Company	Components and standard parts	Industrial engineering and engineering services	Systems and software	Subassemblies and structures	Machinery and equipment	Actuation and landing gear	Treatment and processing	Navigation systems and equipment	Communication systems and equipment	Design, interiors and exteriors	Testing and Maintenance	Mapping and Remote sensing	Aerospace Services	
Aerosekur	X		X										X	
AGT		X	X							X				
Alfa Meccanica	X			X										
All Data	X		X	X	X			X			X			
Altec			X						X				X	
Altran		X												
Amet		X	X								X			
APR	X	X		X										
Argotec	X		X	X									X	
ASE	X				X						X		X	
ATT											X			
Avio	X	X	X	X			X	X			X			
Avio Aero	X	X	X	x			X	X			X	X		
Aviorec	X	X		X	X		X				X			
Beam-it	X	X												
Biofly			X					X						
Bisiach & Carru					X									
Blue Engineering	X	X	X	X	X	X				X	X			
Bytest	X	X		X	X	X	X	X		X	X			
CETMA		X	X		X		X							
Deep Blue								X					X	
Delta-Ti		X					X							
Digisky		X	X					X	X			X		
Eles			x	x							x			
EnginSoft		X												
Eurolink Systems	X	X	X	X								X		
Fidia		X	X	X	X									
Fucine Umbre	X			X	X	X	X							
Future Design		X								X				
Geven										X				
GMSpazio			X					X	X			X		
HTF	X	X		X			X							
Iacobucci HF Aerospace	X	X	X	X	X		X			X	X			
Ing. Bertolotti					X									
Iptsat			X				X				X	X		
Itacae	X	X	X							X				

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ITALY AEROSPACE 2016

Industry Explorations

Global Business Reports

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Labormet Due		X									X		
Leonardo		X	X	X			X	X	X		X	X	
LMB	X	X		X	X	X	X						
Manta Group		X		X			X						
Marc Ingegno	X			X	X	X							
Mecaer	X	X	X	X	X	X	X			X	X		X
Mepit	X	X					X				X		
Modelway			X									X	
Next Ingegneria dei Sistemi			X					X			X		X
Northrop Grumman	X	X	X	X				X			X	X	
OMI	X	X	X	X	X		X			X	X		
OVS Villella	X			X			X				X		X
Pininfarina Extra		X								X	X		
Prestel Avio		X		X							X		
Prima Industrie					X								
Primavis		X	X										
Progetti Speciali Italiani	X	X	X	X			X				X		
QFP		X			X					X			X
RF Microtech		X		X				X	Y				X
SABELT	X			X						X	X		
Secondo Mona				X	X	X							
Sentech			X					X					
Serco SpA		X	X				X	X	X		X	X	X
SIME	X	X	X	x		X	x						
Sitael	X	X	X	X	X		X		X		X	X	X
Space Engineering	X		X					X	X		X		
SpazioFuturo			X						X				
Tekspan	X				X		X			X			
Teoresi		X	X										
Teseo			X		X	X			X		X	X	
TPS	X	X	X	X	X			X	X	X	X	X	X
TTA										X			
TTN							X						
Tubiflex	X			X									
TXT Solutions			X										
UAS			X			X							
UTC/ Microtecnica Actuation	X	X	X	X	X	X	X				X		
Systems		X	X				X	X	X		X		X
Vitrociset													

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A. ABETE
Zona Industriale Nola/Marigliano
80035 Nola (NA)
(39) 081 8210821/2
abete.net

AENCOM
(39) 0121525110
aencom.it

AEREA
Via Carlo Cattaneo, 24
22078 Turate (CO)
(39) 02334831
aerea.it

AERLAND SAS DI FINI MARCELLA & C.
Via Filippo Beltrami 21
21018 Sesto Calende (VA)
(39) 0331922108
aerland.it

AERMECCANICA
Via Monte Grappa 2
21015 Lonate Pozzolo (VA)
(39) 0331301750
aermeccanica.it

AEROPORTI DI PUGLIA
Employees: 336
Segment: airport management authority
Karol Wojtyla Airport
70128 BARI
(39) 080 5800232

AERO SEKUR
Via Valli,
Aprilia, 04011 (LT)
(39) 069282846
aerosekur.com

AERO SEKUR
Via Bianco Di Barbania 16,
Caselle Torinese, 10072 (TO)
(39) 01119887714
aero-sekur.com

AEROSPACE MATERIALS MANAGEMENT (AMM)
Via Fratelli Bandiera 13,
Trezzo sull'Adda (MI)
(39) 0292092747
ammitaly.it

AEROSVILUPPI
Via Piemonte 8,
21015 Lonate Pozzolo (VA)
(39) 0331661715
aerosviluppi.it

AEROTECH
Corso Novara 29,
Venaria Reale (TO)
(39) 011 19662900
aerotechsrl.com

AGT ENGINEERING
Via Paolo Emilio 34
00192 Roma
(39) 0645437023
agtgroup.it

ALFA MECCANICA
Employees: 47
Segment: Mechanical components and subassemblies
Key industries: 98% Aerospace
Key products and services:
PROPULSION AND ENGINE COMPONENTS
AEROSTRUCTURES SUBASSEMBLIES AND SUBCOMPONENTS
COMPONENTS FOR SPACE APPLICATIONS
JIGS & FIXTURES DESIGN AND MANUFACTURING
Via Cossolo 9
Villastellone 10029 (TO)
(39) 017253199
alfameccanicasrl.it

ALFA.VI COLLAMATI
Via Cappuccini 11
21013 Gallarate (VA)
(39) 0331701820
alfavi-engineering.it

ALL DATA
Via Volontari del Sangue 11
20092 Cinisello Balsamo (MI)
(39) 0266015566
alldata.it

ALTAIR CONSORTIUM
Corso Indipendenza 7,
Casale Monferrato, 15033 (AL)
(39) 0142453958
altairconsortium.com

ALTEC
Corso Marche 79
10146 (TO)
(39) 0117430301
altecspace.it

ALTRAN ITALIA
Via Tiburtina 1232
00131 Roma
(39) 0645224200
altran.it

AEROSPACE MANUFACTURING COMPANY (AMCo)
Via E.Bartolomei
06034 Foligno (PG)
(39) 0742321168
amcosrl.com

AMET
Employees: 40
Segment: Product engineering and testing
Via Livorno 60
10144 (TO)
(39) 0119007807
amet.it

ANGELANTONI TEST TECHNOLOGIES (ATT)
Employees: 200
Segment: Environmental testing
Key aerospace customers: 40% space, 30% defense, 30% commercial
Key products and services:
ENVIRONMENTAL TEST CHAMBERS
THERMAL VACCUM CHAMBERS
CALORIMETERS
CLIMATIC WIND TUNNELS
Località Cimacolle, 464
06056 Massa Martana (PG)
(39) 07589551
angelantonitesttechnologies.com

ANGELO GIANAZZA
Via Enzo Pagani, 138
Legnano (MI)
(39) 0331426311
gianazzahitech.com

APR
Via R. Incerti, 10
Pinerolo (TO)
(39) 0121377515
apr.it

AQM
Via Edison 18
25050 Provaglio d'Iseo (BS)
(39) 0309291711
aqm.it

ARGO DI T.M. FUMAGALLI
Via Monte Pordoi 5
20021 Baranzate (MI)
(39) 023561625
argotmf.com

ARGOTEC
Via Cervino, 52
10155 (TO)
(39) 0117650567
argotec.it

ASE
Employees: 130
Segment: OEM, testing and maintenance
Key aerospace customers: Military / commercial
Key products and services:
ELECTRICAL POWER GENERATION, MANAGEMENT AND DISTRIBUTION
CONVERSION AND SYSTEM INTEGRATION
Corso Vittorio Emanuele II 30
20122 Milano (MI)
(39) 0331402216
ase-spa.com

ASSIREVA
Via Manzoni 31
20861 Brugherio (MB)
(39) 029522119
assireva.it

AVIMATIC
S.S. Paullese Km 30,230
26010 Bagnolo Cremasco (CR)
(39) 0373649457
avimatic.com

AVIO
Via Latina
00034 Colleferro (RM)
(39) 0697285111
avio.com

AVIO AERO
Via I Maggio 99
10040 Rivalta di Torino (TO)
(39) 0110082111
avioaero.com

AVIOCHEM
Via Artigianale 29/A
25010 Montirone (BS)
(39) 0302170211
aviochem.it

AVIOMEC
Via Rossini 6
21020 Mornago (VA)
(39) 0331903534

AVIOMETAL
Via Sempione 15
21010 Arsago Seprio (VA)
(39) 0331279411
aviometal.com

AVIOREC
Employees: 90
Segment: Composite components manufacturing
Key aerospace customers: 90% civil, 10% military
Key products and services:
FUSELAGE PARTS
ROTOR BLADE PARTS
FIXED WINGS
Loc. Paduni
03012 Anagni (FR)
(39) 0775772219
aviorec.com

AVIOTEC
C.so Vigevano, 46
10155 Torino
(39) 0110437091
aviotec.it

AVIOTECNICA
Via Incasale 5
21018 Sesto Calende (VA)
(39) 0331924174
aviotecnicasrl.it

BeamIT
Strada Prinzera, 17
43045 Fornovo di Taro (PR), Emilia-Romagna
(39) 0525401281
BeamIT.eu

BIMAL TESTING MACHINES
Via Alberto Monni, 18-14
Ponte Valleceppi, 06078, Perugia (PG)
(39) 075592171
bimal.com

BIOFLY
Via Pontina Vecchia Km 34
00040 Ardea (RM)
(39) 0691968133
biofly.it

BISIACH & CARRU
Corso Piemonte 36
10078 Venaria Reale (TO)
(39) 0114075111
bisiachcarru.it

BLU ELECTRONIC
Via Lavoratori Autobianchi 1
20033 Desio (MB)
(39) 03621791455
bluelectronic.it

BLUE GROUP ENGINEERING & DESIGN
Via Albenga 98
10098 Rivoli (TO)
(39) 0119504211
blue-group.it

BOEING
Piazza Sallustio 24
00187 Roma
(39) 0645217787
boeingitaly.it

BRUFANI MARIO
Via dei Platani 34/36
06083, Bastia Umbria (PG)
(39) 0758003795
brufaniofficine.com

BYTEST (TÜV SÜD)
Employees: 145
Segment: Testing
Key aerospace customers: Commercial manufacturers, Space, Military
Key products and services:
NON-DESTRUCTIVE TESTING
DESTRUCTIVE TESTING AND FAILURE ANALYSIS
TESTING SYSTEMS ENGINEERING
TRAINING AND EXAMINATION CENTER
WELDING PROCESSES AND PROCEDURES
Via Montalenghe 8
10010 Scarmagno (TO)
(39) 011037221
tuv.it

CETMA
S.S.7 Km.706+030
72100 Brindisi
cetma.it
(39) 0831 449 111

COMP. GENERALE PER LO SPAZIO (CGS)
Via Gallarate 150
20151 Milano (MI)
(39) 02380481
cgspace.it

CNR IMM
Via del Fosso del Cavaliere 100
00133 Roma
(39) 0649934533
imm.cnr.it

CO.ME.AR
Viale della Tecnica, Zona Industriale
06038 Spello (PG)
(39) 0742301884
comear-it.com

COMUTENSILI
Via R. Bernardo 6
10092 Borgaretto (TO)
(39) 011 3589123
comutensili.com

CONSTRUZIONI MECCANICHE CASTELLANI
Via dell'Artigianato, 5
06031, Bevagna (PG)
(39) 0742 361655

CP GRINDING
Via Europa Unita 12-14
24069 Trescore Balneario (BG)
(39) 035940042
cpgrinding.eu

CENTRO RICERCA AEROSPAZIALE SAPIENZA (CRAS)
Via Eudossiana 18
00184 Roma
(39) 0644585882
uniroma1.it

D-ORBIT
c/o Comonext, Via Cavour, 2
Lomazzo (CO)
(39) 0236714010
deorbitaldevices.com

DELTA-TI IMPIANTI
Employees: 250
Segment: thermo-technical systems
Key products and services:
COOLING SYSTEMS
PIPE LINES
AIR CONDITIONING SYSTEMS
FIRE PROTECTION SYSTEMS
DISTRICT HEATING SYSTEMS
Via Albenga 92
Rivoli (TO)
(39) 0119591663
delta-ti.it

DIGISKY
Corso Re Umberto 65
10128 (TO)
digisky.it

E-GEOS
Via Tiburtina, 965
00156, Roma
(39)00640791
e-geos.it

E-LEVEL COMMUNICATION
Piazza Liberazione 25
20013 Magenta (MI)
(39) 0297280169
e-levelcom.com

EICAS AUTOMAZIONE
Via Vincenzo Vela 27
10128 (TO)
(39) 0115623798
eicas.it

ELEMASTER SPA TECNOLOGIE ELETTRONICHE
Via Garcia Lorca 29
23871 Lomagna (LC)
(39) 039999121
elemaster.it

ELES
Via Sicilia
06059 Ponterio (PG)
(39) 07589800250
eles.com

ELETTRONICA ASTER
Via Longoni 108
20030 Barlassina (MI)
(39) 0276000757
elaster.it

ELETTRONICA BRIANTEA SISTEMI
Via Dante 18
20055 Renate (MB)
(39) 0362915908
elettronicabriantea.it

ELIGIO RE FRASCHINI
Via XX Settembre 85
20025 Legnano (MI)
(39) 033142721
refraschini.it

ENAC - ITALIAN CIVIL AVIATION AUTHORITY
Viale Castro Pretorio 118
00185 Roma
(39) 06445961
enac.gov.it

ESRI ITALIA
Via Casilini 98
00182 Roma
(39) 06406961
esriitalia.it

EUROLINK SYSTEMS
Employees: 20
Key aerospace customers: Military 50%, Robotics 50%
Key products and services:
EMBEDDED MISSION CRITICAL SOLUTIONS
UNMANNED ROBOTICS
Via Piedicavallo 51 2/b
00166 Roma
(39) 066191401
eurolinksystems.com

EXCOGITA
Z.I. via Renare, 12
06031 Bevagna (TR)
(39) 0742362134
excogita.eu

FEDERAZIONE AZIENDE ITALIANE PER L'AEROSPAZIO, LA DIFESA E LA SICUREZZA (AIAD)
Via Nazionale 54
00184 Roma
(39) 064880247
aiad.it

FIDIA
Employees: 350
Key aerospace customers: 70% commercial, 20% space, 10% military
Key products and services:
HIGH SPEED 5 AXES MILLING MACHINES
C.so Lombardia 11
San Mauro Torinese 10099 (TO)
(39) 0112227111
fidia.it

FINPIEMONTE
Galleria San Federico 54
10121 (TO)
(39) 0115717711
finpiemonte.it

FLAME SPRAY
Via Pola 23
20124 Milano
(39) 6957216
flamespray.org

FOMAP
Via Stradetta 24
06081 Petrignano D'Assisi (PG)
(39) 0758038640
fomap.it

FONDERIA MASPERO
Via Ercolano 2
20900 Monza
(39) 039204521
maspero.it

FORIND AVIO ELETTRONICA
Via Copernico 6
20060 Milano
(39) 0295343080
forind.it

FRONTLINE
Via Treves 548
21029 Vergiate (VA)
(39) 0331920565
frontline.it

FUCINE UMBRE
Via del Sersimone 22
05100 Terni (TR)
(39) 0744300002
fucineumbre.com

FUTURE DESIGN
20, Via Delle Industrie
33070 Polcenigo (PN)
(39) 0434749674

GALVANICA CEDRATESE
Viale Danimarca 16
21013 Gallarate (VA)
(39) 0331794411
galvanicacedratese.it

GAROFOLI
Str. Di Pantano 15/13
05100 Terni (TR)
(39) 0744803511
garofoli.it

GB BARBERI
Via Rosselli 30
21018 Sesto Calende (VA)
(39) 0331923418
gbarberi.com

GEMELLI
Via A. Manzoni 39
20010 Canegrate (MI)
(39) 0331402943
gemelli-aerocom.com

GEVEN
Employees: 400
Key services: 100% aerospace
Via Boscofangone, 80035 Zona Industriale
Nola Marigliano,
Nola NA
(39) 081 312 1301
geven.com

GFM
Via Natta 5
24030 Mapello (BG)
(39) 0354995401
gfmspa.com

GM SPAZIO
Via Stefano Longanesi 14
00146 Roma
(39) 0645433891
gmspazio.net

HIGH TECHNOLOGY CENTER (HTC)
Via G.Giuliani - Z.I, Paciana
06034 Foligno (PG)
(39) 0742326911
htcenter.it

HTF
10156, Str. del Francese 153
Area Produttiva Rostia (TO)
(39) 0112765910
htf-aero.com

IACOBUCCI HF AEROSPACE
Strada SC ASI 1/S 16-18
03013 Ferentino (FR)
(39) 775392528
iacobucci.aero

ICB
Via Zini 2
21049 Tradate (VA)
(39) 0331 811431
icbsrl.it

IDS – INGEGNERIA DEI SISTEMI
Employees: 500
Segment: Systems engineering
Key aerospace customers: Military, space, aeronautical manufacturing, law enforcement agencies
Key products and services:
EMI/EMC RISK ANALYSIS AND REDUCTION
STEALTH ENGINEERING
FLIGHT CONTROL SYSTEMS AND AVIONICS SOFTWARE
TACTICAL UAVs
SATELLITE COMMUNICATION TERMINALS
Via Enrica Calabresi, 24
56121 Pisa
(39) 050 31241
idscorporation.com

ING. BERTOLOTTI & C.
Employees: 9
Segment: Manufacturing and welding
Key aerospace customers: 50% military - 30% electronic for defense - 20% navy
Key products and services:
MECHANICAL ELEMENTS FOR AVIONIC AND ELECTRONIC DEVICES
Corso Cuneo 47
10078 Venaria Reale (TO)
(39) 0114240788
ing-bertolotti.com

INGERSOL
Via Marsala 1
25122 Brescia (BS)
(39) 030 890 1579
iebs.it

INTECS
Via Archimede 10
20129 Milano
(39) 02 55194765
intecs.it

ISTITUTO ITALIANO TECNOLOGIA (IIT)
Corso Trento 21
10129 (TO)
(39) 0110904705
shr.iit.it

ITACAe
Employees: 9
Segment: Engineering & quality services and software / Components in metal additive manufacturing
Key aerospace customers: 90% space, 10% aviation
Key products and services:
CAD-CAE
LEAN-SIX SIGMA METHODOLOGY AND SOFTWARE DEVELOPMENT
ENGINEERING SOFTWARE
DESIGN AND PRODUCTION FOR METAL ADDITIVE MANUFACTURING
Via Calosso, 3
14100 Asti
(39) 0116612126
itacae.com

ITALIAN ROTORS INDUSTRIES (I.R.I.)
Via delle Valli 44C
04011 Aprilia (LT)
(39) 69271758
irihelicopters.it

ITALIAN SPACE AGENCY (ASI)
Via del Politecnico
00133 Roma
(39) 0685671
asi.it

ITALIANA PONTI RADIO
Via Cà Bassa 67
21100 Varese (VA)
(39) 0332331417
ipreurope.com

JOINTEK
Via Generale Dalla Chiesa 1
21019 Somma Lombardo (VA)
(39) 0331250336
jointek.it

KRILL
Via Casale 5
20144 (MI)
(39) 0289075413
krill.eu

LABORMET DUE
Employees: 6
Segment: Testing
Key aerospace customers: 50% Space, 50% Commercial aviation
Key products and services:
CT SCAN SERVICES
MICROSCOPE
HARDNESS TESTER
TENSILE CHECK MACHINE
CLIMATIC CHAMBERS
Corso Orbassano 402
10137 (TO)
(39) 011740905
labormetdue.it

LAMIFLEX
Via Ernesto De Angeli 51
24028 Ponte Nossa (BG)
(39) 035700011
lamiflex.it

LAZIO CONNECT
c/o IPTSAT srl Via Sallustiana, 23
00187 Roma
(39) 0660516781
lazioconnect.it

LAZIO INNOVA
Via Marco Aurelio 26/a
00184 Roma
(39) 0660516781
lazioinnova.it

LEONARDO
Piazza Monte Grappa 4
00195 Roma
(39) 06324731
leonardocompany.com

LINKRA - DIV. MICROTECH
Via Guido Rossa, 20/22
Cornate D'Adda (MB)
(39) 03691001
linkra.it

LMA
Via Vercelli 6
10044 Pianezza (TO)
(39) 0119672053
lmasrl.com

LMB
Via Asti 6
Pianezza 10044 (TO)
(39) 0119672557
lmbsrl.it

LOGIC SISTEMI AVIONICI
Via Galileo Galilei 5
20060 Cassina de' Pecchi (MI)
(39) 02959061
logic-spa.com

LOMBARDIA AEROSPACE CLUSTER
c/o Unione degli Industriali della Provincia di Varese
Piazza Monte Grappa 5
21100 Varese
(39) 0332 251000
aerospacelombardia.it

MAKO SHARK
Viale Montecuccoli 16
Dolzago (LC)
(39) 0341451392
mako-shark.com

MANTA GROUP
Zona ASI Località Incoronata
71121 Foggia (FG)
Tel. +39 0881 666149 (int. 201)
Fax. +39 0881 666135

MAPSAT
Piazza 5 Giornate, 1
20129 Milan
(39) 0824 52422
mapsat.it

MARC INGEGNO
Employees: 12
Segment: Components
Key aerospace customers: 60% commercial aviation - 30% ultra-light aircraft manufacturers
Key products and services:
LANDING GEARS
SHOCK ABSORBERS
BRAKING SYSTEMS
MACHINED COMPONENTS
CERTIFIED WELDING
Reg. Pomarolo, 13019 Varallo (VC)
(39) 016353060
marc-ingegno.it

MECAER AVIATION GROUP
Employees: 537
Segment: Systems, equipment, services
Key aerospace customers: Helicopters, trainers, commercial and executive aviation, UAVs
Key products and services:
ACTUATION & LANDING SYSTEMS
CABIN COMFORT SYSTEMS
STYLE DESIGN
AIRCRAFT MISSION CUSTOMIZATION
AIRCRAFT COMPLETION, REFURBISHMENT & MRO
Via Arona 46, 28021 Borgomanero (NO)
(39) 0322837946
mecaer.com

MECOM
Prima traversa di Via Navello
06038, Spello (PG)
(39) 0742 302194
mecom-it.com

MEM
Via Carducci 221
20099 Sesto S.Giovanni (MI)
(39) 022189521
memsrl.it

MEPIT
Via Grazia Deledda 4
10036 Settimo Torinese (TO)
(39) 0118982240
mepit.com

MERLETTI AEROSPACE
Via Carducci 8
21010 Arsago Seprio (VA)
(39) 0331769577
meccanicamerletti.it

MODELWAY
Employees: 4
Segment: Software engineering
Key aerospace customers: 100% commercial aviation
Key products and services:

VIRTUAL SENSORS
MATHEMATICAL MODELS
AUTOMATIC CONTROLS
Via Livorno 60
10144 (TO)
(39) 0112258261
modelway.it

MPG INSTRUMENTS
Via P. Mascagni 42
20030 Senago (MI)
(39) 064071603
mpginstruments.com

N.C.M.
Via A. Vinci - Zona Ind.le
Paciana, 06034 Foligno (PG)
(39) 0742 630311
ncmonline.it

NAYAK
Località Pian di Porto, Voc. Bodoglie
148/p/3
06059 TODI (PG)
(39) 0758989408
nayak.aero

NEXT INGEGNERIA DEI SISTEMI
Via Andrea Noale 345/b
00155 Roma
(39) 0622454219
next.it

NORTHROP GRUMMAN ITALIA
Employees: 198
Segment: Design and manufacturing
Key aerospace customers: 100% Military
Key products and services:
INERTIAL NAVIGATION SYSTEMS
ATTITUDE HEADING REFERENCE SYSTEMS
GUIDANCE & NAVIGATION SOLUTIONS
STABILIZATION
Via Pontina km. 27/800
0071 Pomezia, Roma
(39) 06911921
northropgrumman.it

O.M.C. OFFICINE MECCANICHE COLOMBO
Via Giuseppe Verdi, 65
21020 Mornago (VA)
(39) 0331 901045
omc-colombo.it

O.V.S. VILLELLA
Employees: 130
Segment: Components manufacturing
Key aerospace customers: 60% commercial, 35% military, 5% space
Key products and services:
WELDING
MACHINING
PIPING
SHEET METAL
NDI & CHEMICAL PROCESS
Via Dello Sport 26/28
21018 Sesto Calende (VA)
(39) 0331 922380
ovsvillella.it

OFFICINA MALNATI
Via Po - zona industriale Villafranca
21043 Castiglione Olona (VA)
(39) 0331824865
officinamalnati.com

OFFICINE MECCANICHE AERONAUTICHE
Via Cagliari, 20
06034 Foligno (PG)
(39) 0742 34751
omafoligno.it

OFFICINE MECCANICHE MERENDONI
Via della Tecnica, 7 - Z.I.
06038 Spello (PG)
(39) 0742652749
officinemerendoni.com

OMSC MECCANICHE D'ANGERA
Via Napoli 40
21021 Angera (VA)
(39) 0331931735
omsc.it

OPTEC
Via Mantegna 34
20015 Parabiago (MI)
(39) 03311021815
optec.eu

P.T.A. PROGETTAZIONI TECNICHE AERONAUTICHE
Via Marsala 34
21013 Gallarate (VA)
(39) 0331268038

PANTECNICA
Via Magenta 77/14a
20017 Rho (MI)
(39) 0293261020
pantecnica.it

PARIANI
Via Aspesi 1
21010 San Macario di Samarate (VA)
(39) 0331236014
pariani.com

PATTONAIR
Via XXII Marzo 19
21013 Gallarate (VA)
(39) 0331792658
pattonair.com

PININFARINA EXTRA
Via Nazionale 30
10020 Cambiano (TO)
(39) 0119438111
pininfarina.it

PLYFORM COMPOSITES
Via Mirabella
Provincia di Novara (NO)
(39) 0321950111
plyform.it

POLITECNICO DI TORINO
Corso Duca degli Abruzzi 24
10129 (TO)
(39) 0110906111
polito.it

PRESTEL AVIO
Loc. Batasiolo 85/A
12064 La Morra (CN)
(39) 0173500302
prestelavio.it

PRIMA INDUSTRIE
Employees: 1,600
Segment: System manufacturer
Key industries: 5% aerospace, 16% industrial machinery, 17% automotive, 22% building and housing equipment, 11% electrical & vending equipment, 29% subcontractors and miscellanea.
Key products and services:
2D AND 3D LASER SYSTEMS
PUNCHING & COMBI MACHINES
PRESS BRAKES

PANEL BENDERS
FMS
Via Antonelli 32
10093 Collegno (TO)
(39) 01141031
primaindustrie.com

PRIMAVIS
Via E. de Sonnaz 19
10121 (TO)
primavis.eu

PROGEM
Via Monteu Roero 12/16
10022 Carmagnola (TO)
(39) 011971496
progem.eu

PROGESA
Via Romolo Gessi 37
25135 Brescia (BS)
(39) 030224600
progesa.it

PROGETTI SPECIALI ITALIANI
Via Monte Santo 2
00195 Roma
(39) 063215001
psi-space.eu

PROTOM GROUP
Employees: 120
Segment: structural design, system design, consulting
Key products and services:
TRAINING
CONSULTING
ICT
ADVANCED ENGINEERING
Via Vic. S. Maria del Pianto, Centro Polifunzionale - Edificio 6
80143 Napoli, Italia
(39) 0743220401
protomgroup.com

QFP
Via Gullotti 31, Madonna di Lugo
06049 Spoleto (PG)
(39) 0743220401
qfp-service.it

RAMAL
Via Calabria, 7, 06019
Umbertide (PG)
(39) 0759415802
ramal.com

RAMPINI CARLO
Via dell'Industria, 11
06065 Passignano Sul Trasimeno (PG)
(39) 075829891
rampini.it

RF MICROTECH
Via Mascagni 11
06132 (PG)
(39) 0755271436
rfmicrotech.com

RHEINMETALL ITALIA
Via Affile 102
00131 Roma
(39) 641230493
rheinmetall.it

ROBBY MOTO ENGINEERING
Via Giulio Galluzzi, 14
26041 Casalmaggiore (CR)
(39) 037541728
robbymotoeng.com

ROLLWASCH ITALIANA
Via S. Carlo 21
20847 Albiate (MB)
(39) 0362 930334
rollwasch.it

RTM BREDA
Via Po, 84
20032 Cormano (MI)
(39) 0445318511
rtmbreda.it

SOCIETA INDUSTRIA MECCANICA (S.I.M.E.)
Via Arona 83
Borgomanero (NO)
(39) 0322 81625
simeccanica.it

SABELT
Via Guido Rossa 8/10/12
10024 Moncalieri (TO)
(39) 0116477911
sabelt.com

SECONDO MONA
Via Carlo Del Prete 1
21019 Somma Lombardo (VA)
Tel. +39-0331-756111
secondomona.com

SELT
Via delle Industrie 13/22
20020 Arese (MI)
(39) 0293582446
selt-sistemi.com

SENTECH
Via di Quarto Peperino 35
00188 (RM)
(39) 3243646663
sentech.it

SERCO
Via Sciadonna 24/26
00044 Frascati (RM)
(39) 0698354400
serco.eu

SERMS
Via Pentima, 4
05100, Terni (TR)
(39) 0744492913
sermsrl.com

SIA AEROSPACE
Largo Quinto Alpini 12
20145 (MI)
(39) 02239929930
sia-aerospace.com

SISTEMI DINAMICI
Largo Buffoni 5
21013 Gallarate (VA)
(39) 0331775260 / (39) 3456805949
sistemidinamici.com

SISTEMATICA
Employees: 49
Segment: Software
Key products and services:
SOLUTIONS FOR AEROSPACE
TELECOMMUNICATIONS

MOBILITY AND GEOLOCATION
PLANT MONITORING & CONTROL
SOLUTIONS FOR PUBLIC & HEALTH SERVICE
SOLUTIONS FOR COMPANY ICT
Via D. Bramante, 43 05100, Terni (TR)
(39) 074461221
gruppositematica.it

SITAEL
Via San Sabino, 21 (Zona Industriale)
70042 Mola di Bari (BA) Italy
(39) 080 5321796
sitael.com

SKYROBOTIC
Strada dello Stabilimento 1
05055 Nami (TR)
(39) 0744758137
skyrobotic.com

SKYTECHNOLOGY
Via Francesco Gonin 55
20147 Milano (MI)
(39) 02370511
skytechnology.it

SOLIANI EMC
Via Varesina 122
22100 Como (CO)
(39) 0315001112
solianiemc.com

SÒPHIA HIGH TECH
Zona Industriale Caserta Sud
81025 Marcianise CE, Italia
(39) 0823 150 4748
sophiahightech.com

SPACE ENGINEERING
Employees: 111
Segment: Equipment, components, engineering, simulation
Key aerospace customers: 65% space, 35% institutional/defense
Key products and services:
ONBOARD ANTENNAS AND RF COMPONENTS
PAYLOAD ENGINEERING
AIRBORNE AND TRAIN SATCOM TERMINALS
SATELLITE GROUND MODEMS AND GATEWAYS
SYSTEM ENGINEERING AND PERFORMANCE SIMULATION
Via dei Berio 91
00155 Roma
(39) 06225951
space.it

SPAZIO FUTURO
Viale Pasteur 45
00144 Roma
spaziofuturo.eu

T.P.S.
Via Torino, 14
21013 Gallarate (VA)
(39) 0331797010
tipiesse.com

T.S.M.
Via Roma 51
21029 Vergiate (VA)
(39) 0331964486
tsmsrl.com

TCM SYSTEMS
Via F. Borromeo 4
20017 Rho (MI)
(39) 0289708001
tcmsystems.it

TECHNOSPRINGS ITALIA
Via Giacomo Puccini 4/8
21010 Besnate (VA)
(39) 0331273222
technosprings.com

TECNO TESSILE ADLER
Employees: 685
Segment: composites and aeronautics
Key industries: 64% automotive, 36% aerospace
Key products and services:
COMPOSITE AND INTERIOR PARTS
MACHINED AND ASSEMBLED PARTS
Via Bruno Buozzi 6
10098 Rivoli (TO)
(39) 0119559711
tta-adler.it

TECNOLOGIE INDUSTRIALI & AERONAUTICHE
Viale Toscana 11
20053 Cologno Monzese (MI)
(39) 0227302550
tiaeronautiche.com

TECNOMECCANICA
Via Beato Leopoldo snc
06042, Campello (PG)
(39) 0743220854
tecnomeccanica.info

TEKSPAN
Strada Alberassa 75
10026 Santena (TO)
(39) 0115503166
tekspan.it

TELEMATIC SOLUTIONS
Via Gallarate 205
20151 Milano
(39) 0230468151
telematicsolutions.it

TEMA DI COSTA CUNATI & C.
Via Briante 124
21019 Somma Lombardo (VA)
(39) 0331256312
tema-avio.it

TEORESI
Via Perugia 24
10152 (TO)
(39) 0112408000
teoresigroup.com

TESEO
Corso A. Fleming 27
10040 Druento (TO)
(39) 0119941935
en.teseo.clemessy.com

THALES ALENIA SPACE ITALIA
Via E. Mattei 1
20064 Gorgonzola (MI)
(39) 02957061
thalesgroup.com

TORINO CHAMBER OF COMMERCE
Via San Francesco da Paola 24
10123 (TO)
(39) 0115716363
to.camcom.it

TORINO PIEMONTE AEROSPACE (TPA)
Corso Regio Parco 27
10152 (TO)
(39) 0116700698
torinopiemonteaerospace.com

TPS AEROSPACE ENGINEERING
Via Olanda 5
21013 Gallarate (VA)
(39) 0331797010
tps-aerospace.it

TUBIFLEX
Employees: 160
Segment: components
Key industries: aerospace, automotive, industrial applications, shipyards
Key products and services:
FLEXIBLE ASSEMBLIES IN STAINLESS STEEL AND COMPOSITE
BELLOWS
EXPANSION JOINTS
THIN WALL METAL BENT TUBES
Strada Torino 25/27
10043 Orbassano (TO)
(39) 0119033201
tubiflex.com

TXT
Employees: 700
Segment: software products and services
Key aerospace customers: 60% aircraft OEMs, 20% Tier-1 suppliers & MROs, 20% airlines
Key products and services:
ON BOARD SOFTWARE
FLIGHT SIMULATORS
PRELIMINARY DESIGN AND PRODUCT CONFIGURATION
DIGITAL MANUFACTURING
TRAINING AND FLIGHT OPERATIONS
Via Frigia 27
20126 Milano (MI)
(39) 02257711
txtgroup.com

UMBRA CUSCINETTI
Via Valter Baldaccini 1
06034 Foligno (PG)
(39) 07423481
umbragroup.com

UMBRIA AEROSPACE CLUSTER
Via Palermo 80/A-
06124 Perugia
T [+39] 0755 8201
umbriaerospace.com

UMBRIA AEROSPACE SYSTEMS (UAS)
Employees: 45
Segment: Actuation systems and components
Key aerospace customers: 65% commercial aviation, 35% military
Key products and services:
INTEGRATED ACTUATION SYSTEMS
ELECTRONICS AND SOFTWARE
HYDRAULIC ACTUATION
ELECTRO-MECHANICAL ACTUATION
Via del Bufaloro,
06089 Torgiano (PG)
(39) 0758745519
uas-group.com

UNIVERSITÀ DI ROMA TOR VERGATA
Via del Politecnico 1
00133 Roma
(39) 0672597351
uniroma2.it

UNIVERSITÀ DEGLI STUDI DI PERUGIA
Viale Zefferino Faina, 4
06123 Perugia
(39) 0755851
unipg.it

UTC AEROSPACE SYSTEMS
Piazza Arturo Graf 147
10126 (TO)
(39) 01169321
utcaerospacesystems.com

VITROCISET
Employees: 1,000
Segment: Development, integration & testing, maintenance & operations, mission and safe critical systems
Key industries: 30% aerospace, 50% defense, 15% homeland security
Key products and services:
ENGINEERING & OPERATIONS SUPPORT
INTEGRATED LOGISTICS SERVICES (GALILEO)
GROUND SEGMENT (LAUNCHERS & SATELLITES)
GROUND SUPPORT EQUIPMENT
COMMAND & CONTROL SYSTEMS
Via Tiburtina 1020
00156 Roma
(39) 068823193
vitrociset.it

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AIAD
aiad.it

ASI
asi.it

Lombardia Aerospace Cluster
aerospacelombardia.it

Regione Piemonte and Torino Piemonte Aerospace
torinopiemonteaerospace.com

Umbria Aerospace Cluster
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