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INDUSTRY EXPLORATIONS

ITALY AEROSPACE

Piedmont

2016

Aerospace - Defence - Civil Aviation - Clusters - Space Exploration
Manufacturing - Technology - Research and Development - Collaboration


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Dear Reader,

In regions across Italy can be found academics, scientists, designers, engineers of every hue, and manufacturers whose combined competence can not only build satellites and space rovers, but also transport them to space. Boeing, NASA, Airbus and many other industry giants regularly look to Italian groups for solutions. Italian companies are also at the forefront of civil aviation on its quest for fuel efficiency and the Clean Sky program, while also designing and producing a formidable range of military aircraft and their associated systems.

In December 1964, Italy became the third country in the world, after the Soviet Union and the United States, to launch a satellite into space; the Italian-made San Marco 1. In February 2012, the first launch of the Italian-developed VEGA space launcher for Arianespace took place in Guiana. Today, Leonardo-Finmeccanica maintains and supports its COSMO-SkyMed satellite constellation, which is the most advanced and highest resolution full radar satellite constellation system capable of overcoming any atmospheric conditions. The company has full service capabilities to manage satellites from their launch to overall operations, including data transfer, image processing and data analysis. The same company also provided the rover for the ExoMars mission. Italian companies are currently producing carbon composite segments as well as other components for the Airbus A350.

Italy's aerospace industry is the third most prominent in Western Europe after France and Germany and the seventh largest in the world. With the exception of Leonardo-Finmeccanica, which controls a vast share of the market, the Italian aerospace industry is characterized by a plethora of small- to medium-sized companies, spread around the country in distinct clusters. This year, GBR is visiting each of these, and speaking with the leaders of a wide array of companies in an effort to produce the most extensive report on the industry, from space launchers to training aircraft components, in order to detail the complete characteristics and capabilities of the industry nationwide.

We have begun our research in the Piedmont region in the North-West of the country, whose capital, Turin, has long been famed as a hub for the automotive industry, consistently designing and producing vehicles from the most performant to the most practical. This experience of excelling in the development and production of cars that have consistently been popular in all world markets has engendered the skills and competences that have allowed the Piedmont region to develop as Italy's largest aeronautical hub. Piedmont is host to around 400 companies, mostly small- to medium-sized, that together form a complete supply chain and which are defined by their propensity for cooperation, not only with each other, but in a triple helix with institutions both governmental and academic. Together they represent almost half of the overall turnover of the aeronautical industry in Italy and can be found collaborating in projects all over the world.

GBR is publishing this report on Piedmont as a pre-release of our forthcoming study of the entire Italian aerospace sector, which will be published in November and distributed at Aeromart Toulouse 2016, and throughout 2017 at major aerospace events, including Le Bourget in Paris and Aerospace & Defence Meetings in Turin. The final book will cover the entire Italian aerospace industry across operations in Space, Civil Aviation, and Defense and Security, with particular focus on specialized capabilities in key regions including Lazio, Lombardy, Campania, Piedmont and Puglia, to name a few.

We would like to take this opportunity to thank all of those who have contributed to our research and hope that our readers will enjoy its fruits.

Alice Pascoletti
Harriet Bailey
Catherine Howe

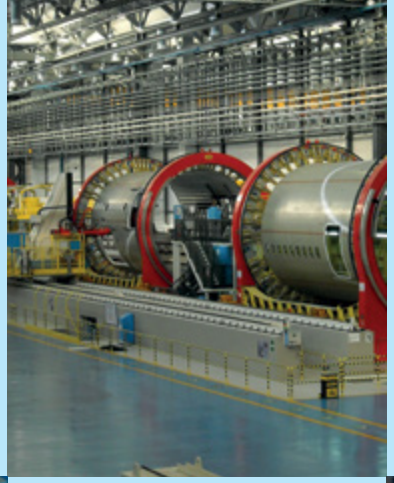

AP


HB


CH

Exclusive Interviews

Leading industry, government and academic figures from Piedmont and Italy's aerospace sector discuss market trends, technologies, opportunities as well as collaborative efforts in the cluster.

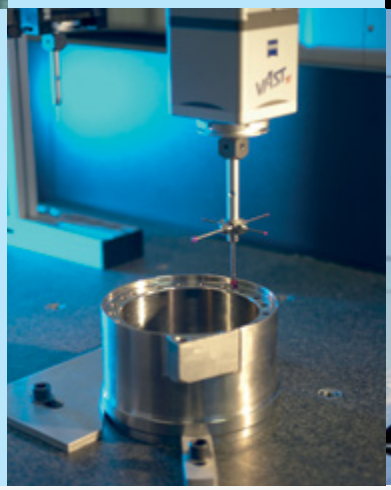


Directory

GBR and TPA provide a contact directory of major players that together make up Piedmont's aerospace cluster.

Editorial Analysis

Global Business Reports' journalists provide unique insights into all aspects of the aerospace value chain by working on the ground and meeting face to face with industry leaders.



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Industry Explorations
Global Business Reports

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

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Italy
International Boundary
Piedmont
National Capital
0 50 100 Kilometers
0 50 100 Miles
Bern
SWITZERLAND
AUSTRIA
HUNGARY
SLOVENIA
Ljubljana
Zagreb
SERBIA
CROATIA
BOSNIA AND HERZEGOVINA
Sarajevo
MONTENEGRO
Podgorica
Bolzano
Trento
Trieste
Venice
Gulf of Venice
Aosta
Novara
Vercelli
Milan
Turin
Asti
Alessandria
Cuneo
Genoa
Bologna
MONACO
Ligurian Sea
Florence
SAN MARINO
Ancona
Perugia
Adriatic Sea
Corsica (FR.)
VATICAN CITY
Rome
Campobasso
Bari
Brindisi
Naples
Salerno
Strait of Otranto
Tyrrhenian Sea
Golfo di Taranto
Mediterranean Sea
Catanzaro
Ionian Sea
Palermo
Strait of Sicily
MALTA
Valletta
44°
40°
36°
8°
12°
16°

Image: Finmeccanica

Italy & Piedmont

"Piedmont boasts a complete aerospace supply chain compared with the other Italian aerospace clusters, with a stronger segment specialization,"

- Vincenzo Ilotte,
President of the Turin Chamber of Commerce

Italy's Aerospace Industry

Introduction to Piedmont

By Harriet Bailey

ITALY AT A GLANCE

Source: CIA World Factbook

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 (PPP): $2.171 trillion (2015 est.)
Growth Rate: 0.8% (2015 est.)
GDP per Capita: $35,700 (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

Italy today is known for a number of its key industries: it is home to numerous fashion empires, its cuisine is beloved the world over, and its car brands cater both to those on a budget and with cash to splash. The country also excels in a number of other, less overt, areas however; the Italian aerospace industry is currently the fourth largest in Europe and the seventh largest in the world, covering not only commercial aviation, but the defence and space sectors as well.

Italy's aerospace industry is dominated by Leonardo-Finmeccanica, which has incorporated the activities of companies such as AgustaWestland, Alenia Aermacchi and Selex ES among others, as well as being the parent of other industry giants such as Telespazio and Thales Alenia Space. According to Guido Crosetto, president of the Italian Industry Association of Aerospace, Defence and Security (AIAD), it now represents 80% of the market and is one of Europe's leading players.

Unlike Puglia or Campania, which are focused on aero-structures, or Lazio, which has a strong space segment, or Lombardy, known for helicopters because of AgustaWestland's presence in the Varese province, the north-western region of Piedmont covers the entire supply chain. It is also Italy's largest aerospace cluster, with more than 15,000 employees working for 400 different companies, accounting for more than half of the industry's €6.6 billion annual turnover. This is hardly surprising considering that the industrial area surrounding its capital, Turin, is home to a range of leading players in the space and aero-structure segments. "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 presence of five prime companies - Thales Alenia Space, Avio Aero, Leonardo, UTC and Avio Spa – together with a further 300 small- and medium-sized enterprises, constitute a substantial supplier base."

The regional government in Piedmont, Regione Piemonte, has spent the last decade actively supporting the aerospace industry in Piedmont through two key initiatives: the Piedmont Aerospace District, established in 2005, and the Torino Piemonte Aerospace (TPA) in 2007. The former is a platform for R&D and collaboration activities, while the TPA project focuses on the promotion of Piedmont's 400 aerospace companies to an international audience. "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," elaborated president of Regione Piemonte, Sergio Chiamparino. "We need to make the world more aware that Piedmont is home to an aerospace cluster that covers the entire supply chain."

This specific focus on the aerospace industry, despite Turin being known as an automotive hub, is unique in Italy. The various organizations in the region, from the Chambers of Commerce to the regional government, have been able to establish effective working partnerships for the benefit of the industry, rather than hampering it by layers of bureaucracy. "Cooperation, between institutions, public and private players, research entities and companies, is our strength. This is not currently the norm in Italy and particularly not in the world of R&D," emphasised Chiamparino. "The main difference is not in how much money we dedicate to the aerospace industry, but the methods we adopt."

Piedmont's academic institutions are some of the best, not only in the world for research activities pertaining to the aerospace industry, and they work with local enterprises to provide an integrated solution for foreign companies and investors. "The presence of a strong academic and research network – led by Politecnico di Torino – is the driving force behind this flourishing industrial centre, providing companies with skilled engineers and professionals with a strong background in R&D activities," outlined Ilotte.

Politecnico di Torino is Italy's oldest engineering university and, according to the Academic Ranking of World Universities (ARWU) in Engineering/Technology and Computer Science, came first in Italy and eighth in Europe in 2013. As well as being a hunting ground for technically qualified personnel for the region's businesses, the university facilitates the creation of new aerospace companies through its own Innovative Enterprise Incubator (I3P), which was ranked fifth in Europe and 15th in the world by the University Business Indicator (UBI) Index.

Demonstrating Piedmont's commitment to the space sector, the Italian Institute of Technology's (IIT) Center for Space Human Robotics (CSHR) is located within striking distance of Politecnico di Torino, with whom it shares facilities and researchers, such as Paolo Fino, the director of the applied science & technology department at the university and senior scientist for aerospace at CSHR. He explained why CSHR is based in Turin: "This is no accident as the Piedmont region is the headquarters of the Italian space industry. Because we have the big players here, SMEs working in the industry and supplying those companies will also base themselves here. These large corporations can lead the way in terms of areas of interest, which spur on the smaller companies, as well as universities and research centers such as ourselves, to put resources into these areas of focus and support development," he continued.

Collaboration is key

As a result of the region's determined self-promotion, motivation to be at the cutting edge of new technologies in the sector and the high levels of investment from both the public sector and companies themselves, local company Avio Aero was acquired by U.S.-based GE in 2013 for €3.3 billion. Its expertise in additive manufacturing, more commonly known as 3D printing, and in solving problems from weight reduction to quicker turnaround times was a deciding factor. GE cited the fact Avio Aero had invested approximately €400 million into the aviation side of its business between 2010 and 2012 - €100 million of which was dedicated to research and development activities – as indicative of its commitment to the industry.

Shortly after the purchase, Avio Aero announced the opening of a new €20 million additive manufacturing plant in Piedmont. This provided the company with a dedicated facility, having previously worked in collaboration with Politecnico di Torino, CSHR and various local players on building up its expertise in this sector. "In the aeronautics industry, being able to count on a new technology means having believed in and invested for years in a research and development process," stated CEO Riccardo Procacci at the time. "The plant is the result of the commitment and passion of our technical staff and engineers, as well as the close working relationship we cultivate with universities, research centres and the industrial fabric of small- and medium-sized enterprises throughout Italy."

The former national minister for economic development, Flavio Zanonato, also highlighted the importance of combining knowledge and expertise across the public and private sector. "[The plant] has come about due to major spending on research, but first and foremost through the adoption of an effective model of collaboration between private industry, universities and institutions," he commented. "Only by combining innovation and research can we look to the future with greater optimism and leave the difficulties of the crisis behind us."

One of the small, yet highly focused, companies to work with Avio Aero on additive manufacturing is APR. Initially a typical family-owned company, which can count on almost a century of experience in Piedmontese industry, it has now developed a more corporate structure and gained new international clients, including Pratt & Whitney. CEO Andrea Romiti believes strongly in the advantages of being a Turin-based company: "Turin is a melting pot of technology, supported by a huge amount of experience and history in high-precision mechanics. Together with Montreal, Turin is probably one of the only two regions in the world capable of making a complete aircraft."

Piedmont's prowess in developing its industries is a good example for other regions in Italy. Pursuing an aggressive strategy of internationalization, as well as understanding the value of finding the next technological advance, means it is well on the way to being the leading light in not just the country's automotive industry, but its aerospace sector too.

Mauro Moretti

CEO and General Manager
LEONARDO

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, defence 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 defence. We will see a continued and increasing presence 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 defence 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. —

Roberto Battiston

President
AGENZIA SPAZIALE ITALIANA (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.

Vito Riggio

President
ITALIAN CIVIL AVIATION AUTHORITY

> 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.

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 taking 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.

Sergio Chiamparino

President
REGIONE PIEMONTE

Could you provide us with a brief overview of the main activities carried out by Regione Piemonte in terms of the aerospace sector?
Our first activity was to establish the Piedmont Aerospace District in 2005, creating and launching an aerospace platform for R&D and, two years later, to look at the internationalization scenario though TPA. 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.

How does Regione Piemonte work with the various organizations involved in promoting the aerospace industry in Piedmont?
Once the strategic planning has taken place, one of the many players involved may end up leading the initiative on behalf of the other organizations. For example, the Turin Chamber of Commerce initially led and financed the TPA project, but this has now passed to the Regione. We always share the responsibility and planning for such projects and ensure our member companies feel supported; this is particularly relevant for the SMEs, which require greater assistance than the bigger companies.

Regione Piemonte is also a key supporter of R&D projects in the region. Could you explain the funding process for these projects and highlight some you are currently financing, such as STEPS or GREAT2020?
Since 2008, we created a technology platform, or virtual network, in which R&D projects could be imagined and developed. The main aim of this aerospace district initiative is to encourage large firms, SMEs, start-ups and spin-offs to work together with each other and with research institutes on R&D and innovation. These projects are established according to the suggestions of stakeholders in the aerospace sector. Regione Piemonte launches a call for proposals and then leads the selection process, supported by in-house agencies and experts. We can then direct our policy-making to be supportive of these innovations in order to address future market demand.
The STEPS project, promoted by Regione Piemonte, involved Thales Alenia Space working together with more than 20 SMEs, as well as all the main academic and research institutes in the region for the development of new systems for both human and unmanned space missions. This was mainly focused on new concepts for living modules for space stations, landing systems, energy storage, new materials with enhanced thermal performances, robot guiding applications, and so on. GREAT2020 is a similar partnership under the coordination of GE Avio for the development of a "green" aircraft engine. Companies are working together on new combustion technologies, new turbine components, lightweight and safe structures and innovative and sustainable manufacturing technologies.

How would you compare Regione Piemonte and its efforts to promote the aerospace industry to its counterparts across the country, and how can the various regional governments in Italy provide mutual support to one another?
The main difference is not in how much money we dedicate to the aerospace industry, but the methods we adopt. Cooperation, between institutions, public and private players, research entities and companies, is our strength. This is not currently the norm in Italy, and particularly not in the world of R&D. As far as the aerospace sector is concerned, the establishment of different regional clusters, which then make up the Italian Aerospace Technology Cluster, is a best practice we should follow. This is the reason we encourage participation in, and the support of, our Aerospace District.

Although regional government support for the aerospace industry is high, how much support does the sector gain from the national government and how do these levels of government work together?
While I agree there has not been so much support from the national government in the past, the recent establishment of a national governing unit, in which both national and regional levels are involved, has helped us all to share 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. Piedmont played a key role in drawing up this multiregional program, because we believe these two levels of government need to increase their cooperation. In early 2016 we signed an agreement with Puglia and Campania, as well as the Ministry of Economic Development and GE Avio; this is an example of a new method for future collaboration.

Tommaso De Alessandri

President
AEROSPACE DISTRICT OF PIEDMONT

Could you provide us with a brief background to the organization and why it was established in 2005?
The Piedmont Aerospace District was founded to coordinate the institutions, the industrial network and the research world engaged in the aerospace sector throughout the region. More specifically, the district had a key role in the identification of technological priorities for an effective use of European Structural funds. 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.
The Piedmont District was one of the founders (with Lombardy, Lazio, Campania and Puglia) of the Italian Aerospace Technology Cluster (CTNA), which federates Italy's leading aerospace hubs and accounts for over 80% of the country's industrial output, employees, leading companies and network of state universities and research structures. CTNA's aim is to contribute to the definition of a national strategy for the aerospace industry, in order to exploit Italy's industrial and scientific assets in key international development programs, as for example those set up by Horizon 2020 and the European Space Agency.

Why do companies choose to become members of the aerospace district and what benefits can the district offer them?
The first advantage is certainly the fact that being part of a wider organization expands the reach of these companies. It also links companies based in Piedmont with other regions in Italy as well as internationally. This has enabled SMEs to grow and develop their own relationships with OEMs, rather than working solely with the big players. Formerly, those companies would have their own exclusive suppliers, but this is changing. It is now essential to promote your own name in the market rather than relying on the bigger companies, which acted as middlemen. As an example, Pratt & Whitney recently contracted Mepit and APR, both SMEs based in Piedmont, to work on the engine for the Lockheed Martin F35. Membership of the district also enables SMEs to participate in research and development projects. Individually, these companies would not have the capabilities to be involved in Europe-backed projects. Together, they can combine knowledge and be part of a more complex and complete solution. Our committee provides the meeting place for SMEs, larger players and research centers to unite on various regional, national and international projects and provide them with the best chance of gaining funding.

There has been talk of implementing a national strategy. How has this developed and what can we expect the outcome to look like?
Since 2014, both the national Government and the Italian Space Agency (ASI) have expressed a strong interest in drawing up and implementing a common strategy for the identification of shared objectives and investment priorities, involving all regional territories. This is in order to strengthen complementarities and synergies in public spending, especially as far as European structural funds are concerned. In the following months this orientation will be translated into concrete acts. One of the first positive results in the perspective of cooperation between regions is represented by the agreement signed at the beginning of 2016 with Avio Aero. With this agreement, signed with the Ministry of Economic Development and the three regions (Piedmont, Campania and Puglia), Avio Aero has committed to realize an investment plan of €200 million. Around €40 million will be invested in Piedmont, with the aim of developing innovative technologies for green propulsion.

In your opinion, what is the outlook for the aerospace industry to the end of the decade?
It is generally very good, for a number of reasons. Firstly, air transportation is a growing area as increasing numbers of people access air travel. Secondly, big aerospace companies are undergoing reorganizations; national airlines such as Alitalia have integrated into bigger units and their aircraft need updating. We are therefore expecting growth for two reasons: an increase in market demand and a need for modernisation.
As far as military aircraft are concerned, we are still seeing the use of fighter aircraft despite the debate on whether they should or should not be used and they have in fact become the main source of attack and defence in military operations. Radar on the Eurofighter Typhoons – previously believed to be obsolete – has been changed, providing scope for usage beyond 2020. We are still waiting for unmanned fighter aircraft to replace such systems and R&D processes are underway to make new technologies more reliable.
The third area of focus is the space and technology industry. One of the great challenges in this area will be space exploration, with missions to the Moon and Mars. In this field our regional industry has a preeminent position at both the Italian and European level. Thales Alenia Space is the prime contractor of the ExoMars programme, arising from an International cooperation strategy between the European Space Agency (ESA) and the Russian Space Agency (Roscosmos), with strong support from ASI.

Could you provide us with a brief introduction to the Turin Chamber of Commerce and its activities, particularly in relation to the aerospace sector in the region?

The Turin Chamber of Commerce is a public institution, whose mission is to foster the growth of the local economy and enhance it through effective and targeted initiatives. The Chamber plays the role of spokesman for the more than 225,000 companies based in the area.

This area has had a long tradition of manufacturing industries that, over the years, shaped the automotive, aerospace, ICT, environment and energy, biotechnology, infrastructure, logistics, healthcare and nanotechnology sectors. One of the most important tasks is to provide information to companies interested in entering foreign markets and promote them all over the world.

How does the Chamber of Commerce benefit its member companies and what is your strategy to foster the growth of the aerospace sector in Turin?

Piedmont, and more specifically the area surrounding Turin, is an important pole in the national aerospace industry. In 2007, the Turin Chamber of Commerce decided to set up a new internalization project called Torino Piemonte Aerospace that has, since the beginning, offered international buyers a preferential channel to meet and develop business with a selection of the region's top class aerospace and defence enterprises.

The companies selected by Torino Piemonte Aerospace respond to strict parameters of evaluation: technical know-how, innovative products and processes, quality, programme development, global coverage, human resources potential and team work. The resulting group represents all fields of production: aircraft manufacturing, components & mechanics, plants & machineries, systems & subsystems, special metalworking, defence vehicles and systems, components of electrical systems for aircrafts and satellites, test and control equipment, engineering, prototyping, software creation and consultancy.

Today, the project is co-financed by Regione Piedmont and the local Chamber of Commerce system, and run by Ceipiemonte.

One of the main events integral to the project is the biannual Aerospace & Defence Meeting. The first event was hosted in Turin in 2008, and was attended by some 300 companies coming from Italy, Europe and other countries strongly committed to the aerospace industry, such as the USA, Russia and China.

In 2015, the fifth Aerospace & Defence Meeting was held; around 500 companies and 1,000 participants (suppliers, buyers and professional visitors) attended, generating more than 6,000 B2B meetings.

With regards to the city of Turin and the surrounding Piedmont region, what makes this an ideal location for aerospace companies to base themselves?

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 - Thales Alenia Space, Avio Aero, Leonardo, UTC and Avio Spa – together with a further 300 small- and medium-sized enterprises, constitute 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 – led by Politecnico di Torino – is the driving force behind this flourishing industrial centre, providing companies with skilled engineers and professionals with a strong background in R&D activities.

What is the importance of internationalization and foreign trade to Turin's aerospace sector and overall economic health, and how can you promote further foreign investment?

Many companies can be placed in more than one sub-sector, with civil aeronautics & defence and civil aeronautics & aerospace being just two. Product quality, project design capabilities and flexibility are their main competitive factors and are indispensable requirements as members of the Torino Piemonte Aerospace. Almost 86% of the member companies invest in R&D, while 61% own national and international quality certificates. 80% of the selection already exports. Particular attention should be paid to technological innovation: at least one company out of three has its own internal laboratory and it is quite common to rely on external laboratories to carry out testing. A third of the companies in the cluster also participate in international programmes and projects, and collaborate with Italian and foreign research centres; this is first and foremost Politecnico di Torino, which plays a key role in both training the next generation of engineers, and in research and testing. Competitiveness in the international markets is closely connected to quality; most companies have the capability to meet the requirements of their partners, who have to comply with product and process certification standards and specific trademarks.

Looking to the end of the decade, what can we expect for Turin's aerospace segment in the future?

Opportunities for aerospace SMEs exist not only in increasing knowledge production and corporate skills development, but also in fostering innovation as a means to sustainability by overcoming the boundaries between the scientific community and business. The scientific community could be of increasing strategic importance to the aerospace SME community. We can face future challenges by enhancing our role in making aggregation between SMEs easier and promoting joint activities between key players and the scientific community.

Vincenzo Ilotte

President
TURIN CHAMBER OF COMMERCE

Diana Giorgini

Aerospace Manager, Piemonte Agency
TORINO PIEMONTE AEROSPACE (TPA)

Piemonte Agency is the first Italian agency dedicated to internationalization and territorial development. Could you please give us a brief background to the agency and its key areas of focus?

We have more than 40 years of experience, which means owning a heritage concerning the deep knowledge of local companies, their capacity and capabilities. We can thus provide a complete range of free services to foreign companies searching for suppliers and partners in a variety of sectors, but we are also a reference point for those wishing to locate in the area or requiring training in international trade and commercial strategies.

We facilitate the matchmaking among our companies and foreign counterparts through specific activities to ease mutual understanding and knowledge, including workshops, B2B meetings, visits to companies' facilities in Piedmont and missions abroad. We also organize the presence of territorial SMEs at relevant international events.

What is the strategic importance of Piedmont's aerospace industry to the region's economy?

These numbers highlight how crucial the Piedmont aerospace basin is in the region's economy. 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. The flexibility and high competences of Piedmontese companies are renowned worldwide and the tight cooperation of these two sectors has facilitated the industrial development of this region and promoted technological improvement, thus serving as a propellant to develop highly qualified, local supply chains with a cross-section of information and applications.

What makes Piedmont appealing for investors, and what is TPA's strategy to support the growth of the aerospace industry?

We are in a strategic region for business, offering a system of relationships characterized by history, experience and innovation. We have a chain of suppliers and companies that are ready to conduct business with international players willing to locate here and work collaboratively to provide strong integrated systems. The strong network of universities and research centers, which provide technology and knowledge as well as facilities and human resources for research and development, is another element of which we can take advantage. The academic institutions often work with the companies.

In this scenario, TPA provides customized support to foreign companies that come to Piedmont seeking innovation in a consolidated supply chain. Our assistance is focused and completely free of charge. We make an assessment of a buyers' needs and technical requirements and provide them with top-class skills and unique manufacturing know-how, as well as capable suppliers that can deliver on-time high-quality parts; products at competitive prices; technologically qualified and competitive supply chains sharing commercial objectives; target clients and strategies; and create technical working groups where local enterprises and foreign companies work together to develop projects aligned to the expectations of the international players. Over the last few years we have observed a positive trend of foreign investments and have received many expressions of interest from China and Europe, as well as elsewhere in Italy.

How can TPA be used as a model for other clusters to develop and how does Piedmont compare to them in terms of the supply chain?

TPA manages more than 100 member companies and the main characteristic of our management is that we represent the complete aerospace supply chain, based on the aggregation model. We provide groups of companies working together with a kit of important operational tools, including legal agreements and business plans, among other instruments to ensure efficient aggregation. Within Italy there is no similar management of supply chain for SMEs: TPA is unique and we have gained consensus and appreciation both from Italian as well as foreign aerospace clusters that look to us as a model.

How successful have the Piemonte Agency and TPA been in supporting the internationalization process of local companies and what is the vision for TPA for the next three to five years?

Aerospace is still a growing sector in the world, especially in emerging markets. The key factor of TPA's success in promoting and sustaining the aerospace companies abroad goes back to the decision made several years ago to work on the selection of its members. This included working with companies to identify areas for developing projects based on aggregation to face customers' needs.

To face the increasing global challenge in the coming years, SMEs dealing with the aerospace sector will have to seriously consider the aggregation model to supply internationally. The aggregation of five to six companies, with a good capacity and a 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. Furthermore, large companies are trying to simplify and consolidate their supply chain, looking for systems suppliers and, with our aggregation work, we are trying to follow this trend to be aligned with the companies' expectations. It goes without saying that investing in innovation is another aspect of growth in the aerospace sector, as new solutions and new products are strategic for the advancement of the industry.

United we stand: **the TPA project and aerospace clusters**

By Harriet Bailey

Image: Finmeccanica

Only a decade ago, Piedmont's aerospace SMEs were islands; although conscious of the major players in the industry, it was common for small- and medium-sized companies to be unaware of the competitor – or potential business partner - on the next street. However, the Piemonte Agency for Investments, Export and Tourism, established in 2007 by the local chamber of commerce and backed by the regional government, changed all that when it embarked on the Torino Piemonte Aerospace (TPA) project.

The first Italian agency dedicated to internationalism and territorial development, it is a key proponent and supporter of the SME network in the region. The key objective was to support local SMEs in expanding their business horizons in foreign markets and to gain international customers for homegrown manufacturing. "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 aerospace manager for TPA, Diana Giorgini.

In a region with a diverse range of companies offering a wide array of capabilities and expertise, TPA seeks to connect these companies in meaningful working groups so as to enable knowledge transfer and to stimulate interest in large international players looking for a more complete range of services and solutions. "The future of the aerospace sector will be the aggregation of small- to medium-sized companies, as these companies cannot work alone to supply internationally," continued Giorgini. "Aggregating five to six companies with a good capacity and a high level of technology can lead to a successful cluster working on an integrated project, as it is not about providing components but rather a system."

For Piedmont's SMEs themselves, the opportunity presented by TPA was exactly what they had been looking for. ITACAe, an engineering and software development start-up founded in 2013, may be a relative newcomer to the project, but is an advocate of its benefits. "Many SMEs, with a variety of competences, feel the need for such an opportunity as presented by TPA and therefore the decision to join is an easy one," confirmed Federico Valente. "As a member, it offers benefits such as opportunities to enter the market and to learn about different technological advancements in the industry from fellow companies."

According to Giorgini, the fact that TPA selects specific companies for membership, identifying those that can meaningfully contribute to the cluster, is a key factor of its success. The project develops

individual relationships with each company and assists them with training and advice as they grow. "The companies selected by Torino Piemonte Aerospace respond to strict parameters of evaluation: technical know-how, innovative products and processes, quality, programme development, global coverage, human resources potential and team work. The resulting group represents all fields of production," explained Vincenzo Ilotte, president of Turin's Chamber of Commerce.

In order to facilitate the internationalisation of its member companies, TPA established an event, which would see foreign players, interested in establishing partnerships, come to its members. Just one year after the project was founded, the first Aerospace & Defence Meeting was held in Turin in 2008. "It was attended by some 300 companies coming from Italy, Europe and other countries strongly committed to the aerospace industry, such as the USA, Russia and China," continued Ilotte. "This event is the only international business convention for the aerospace and defence industry in Italy and represents a unique opportunity for companies to optimize the search for new suppliers and solutions."

The 2015 iteration was the fifth meeting, hosting 500 companies and 1,000 participants, generating more than 6,000 B2B meetings. Now a bi-annual event, alternate years are hosted by the city of Toulouse, 700 kilometers away in neighbouring France, at its Aeromart event.

Mass effect

Having established a number of working groups at the start of the project, these have now formalized into three main clusters: AENCOM, focused on aero-engine components from design to production; Altair Consortium, a group of nine companies across Italy which has gained international recognition; and the LISA cluster, a group of companies related to design within the sector. However, other working groups persist, such as the additive manufacturing-focused group of which ITACAe is a member: "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 design and engineering activities in the overall workflow," explained Valente. "We 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."

The Aero Engine Components Cluster (AENCOM) is made up of 11 member companies, with a combined network of 1,000 employees, including more than 120 designers and engineers. AENCOM aims to support customers from the design stages throughout the manufacturing process, drawing on available resources within the cluster to provide a tailor-made, flexible approach. "As a combined group, our turnover and capability is similar 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," said Andrea Romiti, current cluster president and CEO of member company APR.

By joining forces with other similarly sized companies, the cluster is far more likely to be awarded broad-scope contracts that that would otherwise be inaccessible to individual SMEs, while retaining the advantages inherent in being a smaller player. "We consider ourselves to be an organization with similar capabilities to medium- to big- companies, but with the accompanying competitiveness and the approach and flexibility of small companies," he continued. "None of the companies within AENCOM would have been capable of achieving what we have without this integrated approach."

To illustrate the cluster's new-found status, it was recently part of a winning bid, together with Avio Aero, for building a low-pressure turbine for the Sustainable & Green Energy (SAGE) initiative within the Clean Sky program. "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," said Romiti.

Although Altair Consortium is older than AENCOM, having been founded in 2010, member companies have changed over the years; today, eight of the nine companies are based in Italy, with the newest member having joined thanks to TPA's internationalisation efforts in the UK. Member companies have expertise across the value chain, from engineering and manufacturing to maintenance and repair services; this includes Alfa Meccanica, an engine component manufacturer located outside of Turin. "The aim of both Altair and TPA is to approach big customers that need complete solutions like us," said sales manager Maurizio Burdese. "Because companies such as Rolls Royce are looking to consolidate and reduce the number of suppliers on their books, it makes even more sense for us to combine forces."

TPS Aerospace Engineering, a company focused on integrated logistics and engineering support, agrees that clusters are necessary to be eligible for the bigger contracts. The company is a member of the Leading Italian Design in Aerospace (LISA) consortium, established by Turin-based Future Design. "We have seen through TPA that this threshold can be reached when Italian companies come together, of which LISA is an example," said technical director Matteo Vazzola. "Through LISA, we have been able to get in contact with some of the prime aerospace companies such as Lufthansa and we often find potential clients sitting next to us during TPA cluster meetings."

LISA is focused on the provision of safety- and performance-enhancing aesthetics, particularly in the interiors of VIP jets. Tekspan joined the cluster to provide manufacturing capabilities to the design and engineering companies which make up the rest of the cluster: "LISA is an on-going and interesting project that has the potential to combine Italian design with Italian capability to manage small, medium and high production volumes," explained managing director Silvio Marioni.

The key challenge for these clusters, and others, will be their international promotion efforts and the cultivation of their image. An unfamiliar concept to many, it may take time for the clusters to gain the trust of international clients over individual companies. Fabrizio Barcaro, CEO of AENCOM member company, LMB, has identified this challenge: "Because the cluster approach is completely different to typical supplier-customer relationships, it is important that the market understands the strategy, which will mean increasing our visibility and profile." —

MG

Marco Gilli & Paolo Maggiore

MG: Rector
PM: Associate Professor
POLITECNICO DI TORINO

Politecnico di Torino has a legacy that dates back 150 years. Could you provide us with a brief overview of the institution's key activities and recent developments?

The Politecnico has 11 departments, one of which is the Department of Mechanical and Aerospace Engineering. Our tradition in aerospace engineering dates back many years, and is a field for which the institution is very well respected. We have seen increasing interest among students to study in the wider field of manufacturing. Half a century ago, we accepted around 1,000 students into their first year of engineering, and we now have 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 every year onto this course. Many of our graduates have become very prominent within leading companies, both in Piedmont and throughout the country. We also have various research operations with many industries and companies in different areas, at both a regional and national level.

Many companies consider Politecnico di Torino to be a major asset to the region. What is your relationship with surrounding companies?

PM: We have a mutually beneficial relationship with surrounding companies and industry bodies. We collaborate extensively within the fields of research, technology transfer and training with companies such as Thales Alenia Space, Avio Aero, Leonardo and UTC, as well as a large network of SMEs. We have an established management committee, involving company representatives and members of the university, who work together to support educational programs and research.

MG: Our students have the opportunity to work with prominent aerospace companies and contribute to their research projects. We also design programs and courses with specific companies to increase the training and education opportunities for students. Within these collaborative relationships, students work on real projects and challenges otherwise handled by qualified engineers within the companies. Students thereby 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.

Aside from supporting their practical training with industry partnerships, how else does the Politecnico support its students?

MG: We have made an effort to create an interdisciplinary environment to better train students, looking at the entire lifecycle of the aerospace product, from design to manufacture and verification. It is important for students to receive an education across several fields to integrate and apply this knowledge. We also offer joint courses designed with input from key companies such as Thales Alenia Space. 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. Furthermore, within the joint courses, almost 100% of students will receive an offer of employment from that particular company.

PM: We also have a very strong international program, which offers students a lot of mobility. Approximately 30% of students spend either one or two years abroad, and will receive a double degree. One of our students, for example, completed a master's degree with Thales Alenia Space and a second program with Avio Aero, followed by a joint program between Politecnico di Torino and MIT Boston, where she is currently enrolled in a post doctorate program. This is an excellent example of a student who has benefitted from the opportunities facilitated by the university.

What is the strength of the aerospace industry in Italy, and how can Politecnico di Torino continue to support its growth?

MG: The aerospace industry is particularly strong in Italy. Even during the global economic crisis, we were still able to promote innovation within manufacturing industries. The field of additive manufacturing is one example, and there are plenty of others. International space projects see strong support, and often leadership, from Italian companies and institutions such as ASI. In the National Research Plan recently approved by our Ministry of Education, the aerospace industry is acknowledged as one of the important strategic fields for the development of the country. One of the key roles of the university is to attract talented students to the region and support them in their training.

What are some of Politecnico di Torino's key objectives over the next three to five years?

We plan to invest more in human resources, increasing our number of researchers and attracting some leading professors. One of our key objectives is to offer a more interdisciplinary education, as well as more practical skills. We hope to provide broader skills and understanding with the continuing support of well-established companies, and to strengthen our partnerships.

Paolo Fino

Senior Scientist for Aerospace
ISTITUTO ITALIANO DI TECNOLOGIA (IIT)

The Italian Institute of Technology was founded in 1993. What was the reason behind this and how has the Institute developed over the last two decades?
IIT was founded by scientific director Roberto Cincolani and now has 2,500 employees, 1,200 of whom are based at the headquarters in Genoa. Initial research was focused on high-interest topics, such as human robotics, cognitive science, nano materials and graphene. As a public/private foundation, we received special funding from both the government and private companies to build up the various centers of excellence. IIT enrols both senior scientists and upcoming scientists to bolster its research activities. In Turin we are focused on space human robotics and aerospace.

Could you tell us more about IIT's Center of Space Human Robotics and why it is located in Turin?
This is no accident as the Piemonte region is the headquarters of the Italian space industry. Companies such as Thales Alenia Space and Alenia Aermacchi (now part of Finmeccanica), Avio Aero (now part of General Electric) and Altran Italy are based here. Because we have the big players here, SMEs working in the industry and supplying those companies will also base themselves here. These large corporations can lead the way in terms of areas of interest, which spur on the smaller companies, as well as universities and research centers such as ourselves, to put resources into these areas of focus and support development. Piemonte Region is a platform for the aerospace industry, having already supplied two rounds of funding to space programs led by those large companies. This leads to a great environment for research and innovation.

What are some of the key research projects on which the Center is working?
Since 2009, we have received in the region of €5 million in funding both for regional aerospace projects and from contracts with the large companies. This is large-scale research focused on electron beam melting (EBM) and material used directly in EBM applications and we therefore have various machines that are able to support these projects. We are also working on small-scale research; for example, we are supporting Altran in the production of small machines able to conduct additive manufacturing in space. Machines which the Center worked on were tested in the International Space Station in early 2016. We are currently waiting for the components that were produced during this testing in order to evaluate the mechanical and structural properties of the material and to give feedback on the process of additive manufacturing in space. This is the frontier of research into additive manufacturing and similar research was conducted by NASA in late 2015.

How has the focus of the Center changed from 2009 to today?
We began with three main lines: one on additive manufacturing and structural materials, one focused on energy and the final one on sensors. In 2015, the Center was evaluated by an external board and the results showed that the additive manufacturing line was far more important than the other two. One of the advantages of working in a research center rather than a university is that we can change our focus and hire the right people to lead research. The outcome of the evaluation resulted in a restructuring of the Center, the hiring of a new coordinator and the implementation of a new five-year plan. The new policy is to have four lines of research: advanced materials, additive manufacturing, synthetic and systems biology, and reactors and processes.

How do both regional and national governments support the aerospace industry in Italy and are there any areas for improvement?
The Center is well supported by Piemonte Region. In 2009 and 2012, the Region provided around €30 million in funding for projects based on the needs of both Thales and Avio Aero. A third round of funding, using money from European Union's Horizon program, will be awarded in summer 2016. We requested around €12 million and, with a 60% funding rate, we hope to receive around €8 million in regional funding. This will consolidate the environment for additive manufacturing.
While we have been fairly successful with regional funding, we have faced difficulties with national funding. Although we began projects with the Italian clusters in 2014, we have not received any money for these projects.
In terms of European funding, we recently had some problems due to our close work with Avio Aero and the fact that the U.S.-based General Electric acquired the company. Once the merger was complete and the rules of engagement between the European Committee and General Electric were defined, we have won some funding for large projects. Avio Aero is now able to play a full role as the driver of aerospace research in Italy.

What is the Center's strategy for the future and where do you hope to be in two years' time?
We are aiming to build up our knowledge base and capabilities to be able to produce the entire spectrum of additive manufacturing technology. We will use a further €3 million in funding to buy an EBM machine and, by 2018, we hope to have systems in place to atomise powders and produce alloys ourselves.
Our work with Avio Aero means we are moving to a structure which, on the one hand, will be publicly funded and devoted to research and, on the other, will focus on transferring our technologies to the business world. Avio Aero wants to install laboratories for the development of an engine component inside the Center.

Image: Avio

Space

"The importance of being at the forefront of technological advancement has been well understood in Piedmont and the national and regional governments have invested millions of Euros into the aerospace industry. There is great value in these investments, as they move through the supply chain and remain in the economy."

- Vincenzo Giorgio,
CEO,
Altec

Italy's space industry: **searching for solutions**

By Harriet Bailey

Although the majority of Italians may be unaware, those in the know are very proud of the San Marco project. Italy was the third country in the world to launch and operate a satellite in orbit, heralding the start of what has now been more than half a decade of space activity in the country. 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 the European Space Agency (ESA). Italy is the third largest contributor to ESA after France and Germany.

However, as the seventh largest space economy in the world, countries outside of the European Union (EU) are also taking notice. In January 2016, Italian Space Agency (ASI) president Roberto Battiston signed a framework cooperation agreement with the United Arab Emirates (UAE) Space Agency. ASI will assist in the development of the country's space activity, as it plans to become the first Arab country to reach Mars with a satellite, in time for the 50th anniversary of the UAE's independence in 2022.

Individual companies are also gaining recognition for their expertise on an international level. Thales Alenia Space – a joint venture between France's Thales and Italy-based Leonardo – built 50% of the residential modules and laboratories for the International Space Station (ISS) at its Turin location; the remainder were built by a Japanese company. The company has also taken the lead in space exploration: "Thales Alenia Space is prime contractor on the ExoMars program, arising from an international cooperation strategy between ESA and the Russian Space Agency (Roscosmos), with strong support from ASI," said Tommaso De Alessandri, president of the Piedmont Aerospace District.

The ExoMars program aims to study the environment, atmosphere and soil on Mars, and the first of two missions was launched in March 2016. While the UK, France and Germany are supporting the project, "Italy is the key player in this Mars exploration mission, responsible for more than one third of the activity," explained Altec CEO Vincenzo Giorgio.

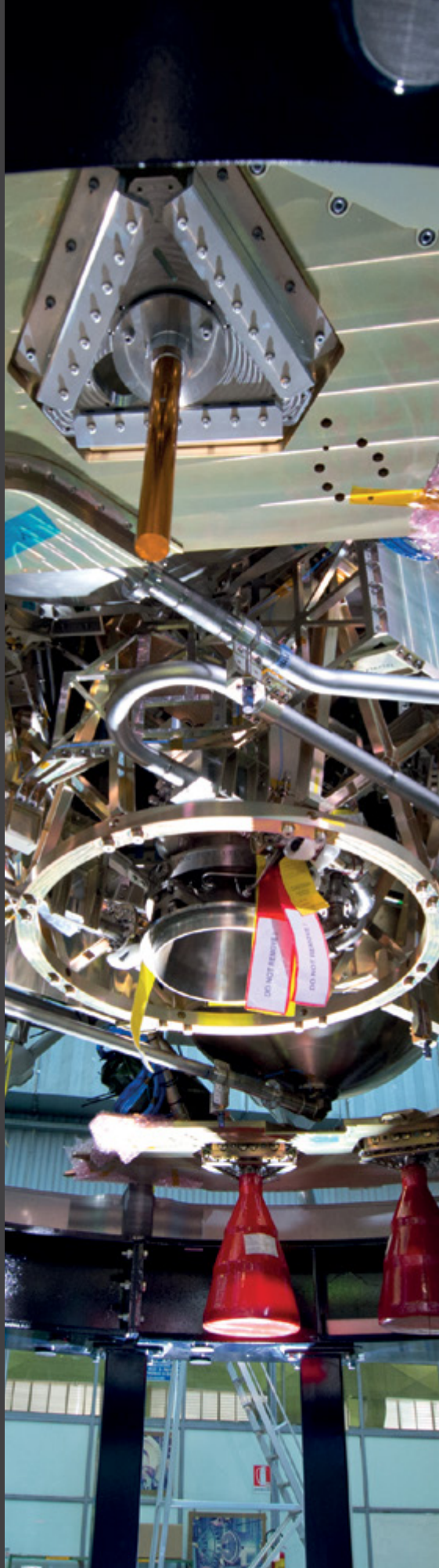


Image: Gas y Petróleo del Neuquén S.A. (GyP)

Thales Alenia Space designed both the reentry and orbital modules and is developing the navigation and guidance systems for the orbital and descent modules for the next mission in 2020. In addition, the company is designing the next Mars rover. Altec, a joint venture formed by Thales Alenia Space and ASI, is the Italian center of excellence for engineering services to the ISS and other space infrastructure. In terms of the ExoMars mission, Altec is responsible for the design, manufacturing and operation of the Rover Operations Control Center (ROCC). "The operation center and scientists will be based here [at our headquarters] in Turin," continued Giorgio.

The rover will drill two meters below the surface. "Samples will be processed and analyzed by the rover, and the results will be transmitted via the orbiting satellite that is currently on its way to Mars as part of the first mission. From here at ALTEC we will analyse the transmitted data and make it readable to the scientists."

Strong support

With such a strong reputation behind it and the need to remain at the forefront of innovation in the segment, the space industry at least appears to be supported by domestic funding bodies and national, as well as regional, governments. Giorgio continued: "The importance of being at the forefront of technological advancement has been well understood in Piedmont and the national and regional governments have invested millions of Euros into the aerospace industry. There is great value in these investments, as they move through the supply chain and remain in the economy."

As well as providing funding for R&D, Piedmont's regional government has also come up with various projects to promote collaboration in the space segment. The STEPS project, focused on developing new systems for manned and unmanned space missions, saw project leader Thales Alenia Space working with not only academic and research institutions, but also more than 20 small- and medium-sized companies. "This was mainly focused on new concepts for living modules for space stations, landing systems, energy storage, new materials with enhanced thermal performances, robot guiding applications, and so on," outlined regional government president Sergio Chiamparino.

Working on new living module concepts is Aerosekur, a Rome-headquartered company with a space division located near Turin's airport. According to the division's technical head, Massimo Conte, current technologies based on aluminium are too heavy and rigid and a different solution is necessary. "Inflatable technology is an area we began researching in 2005; this covers such aspects as habitable spaces for astronauts both in orbit – as on the International Space Station (ISS) – and on planetary surfaces," clarified Andrea Messidoro, R&D Project & Systems Engineer at Aerosekur. "We are working with Thales Alenia Space on flexible materials that can be packed and therefore launched into space at a far lower cost, as many more items can be sent on one journey.

> "Samples will be processed and analyzed by the rover, and the results will be transmitted via the orbiting satellite that is currently on its way to Mars as part of the first mission. From here at ALTEC we will analyse the transmitted data and make it readable to the scientists.
>
> - Vincenzo Giorgio, CEO, Altec

Staying a step ahead

In order to send inflatable or metallic reentry or descent modules into space, the industry is reliant on launchers. The Piedmont region has this covered in the shape of Avio. Formerly part of the aerospace conglomerate Avio Aero, the segment dedicated to space was left out of GE Aviation's purchase of the aeronautical side of the business in 2013. Avio cut its teeth on the Ariane launcher, a heavy launcher for satellite communications whose maiden flight took place two decades ago. Although production is small, with up to eight launches per year, it is a very lengthy project, which has been extended by a further 20 years. "The lifespan of this launcher is very long – much longer than a car or an airplane. We therefore still have to produce components over the course of the launcher's lifespan," explained turbomachine unit head Christophe Dumaz. "When a company takes on a project of this scope, we have to be certain that all the companies involved will have the capability to work on it over that lifespan."

While Ariane has the capacity to launch satellites up to 15 tonnes in weight and into a high earth orbit, the satellite market has changed, with the majority of earth observation satellites weighing less than 1,500 kilograms (kg) and requiring a lower orbit. "It was therefore decided we needed to create a smaller launcher more suited to this market. Although the number of big satellites is still important, the number of small satellites weighing around 100 kg for internet and communication is increasing rapidly," continued Dumaz.

The new solution is the Vega launcher, a four-stage rocket with three solid boosters, and Avio is the prime contractor for ESA. The launcher's maiden flight took place relatively recently in 2012. However, despite the Vega launcher being smaller and requiring less fuel, the fact remains that each module can only be used once. "There are many ideas today about whether it is possible to build a reusable launcher," said Dumaz, "and we are looking into the technologies and systems required to do this."

With Avio looking into this possibility, Aerosekur is looking at how its inflatable modules can be adapted for cultivating crops on the surface of Mars, while Altec will endeavour to become a key player in the space tourism industry, which it believes will begin in earnest from 2030 onwards. As regional president Chiamparino envisages, one thing is certain: "space exploration will remain as the sphere in which the scientific and technological research fields will combine to address their most compelling challenges." —

Giovanni Soccodato

Executive Vice President Strategy, Markets and Business Development
LEONARDO-FINMECCANICA

> Piedmont has been involved in the Aeronautics sector since the early 1900s, and Leonardo is the major component of the regional Aerospace cluster.

Your capabilities across different areas of aerospace are extensive. Which of your operations are concentred in Piedmont?
Aerospace is one of the main economic drivers of Piedmont, where Leonardo has around 4,000 people, plus those working in our joint venture Thales Alenia Space Italia (Thales 67% - Leonardo-Finmeccanica 33%). Leonardo Aircraft division has offices and systems laboratories in Piedmont, dedicated to defence systems design, aircraft engineering end production integration and qualification. Main activities include assembly and final integration of military, fighter and transport aircraft such as the Eurofighter Typhoon and the C-27J. In Cameri (near Novara), the Italian Air Force Base hosts a production site entirely dedicated to the F-35 programme.
The centre, currently the only programme's production site outside the U.S., is equipped with a Final Assembly and Check Out (FACO) line. Leonardo Aircraft Division is responsible, as the second source for the programme's production, for producing F-35 wings (more precisely the full wings).
The Airborne and Space Systems division develops the NATO AGS (Alliance Ground Surveillance) programme in Turin, used by the Alliance countries as land and maritime security system and involving sensors, unmanned vehicles and radar and ground segments. The ATOS (Airborne Tactical Observation & Surveillance) system is also developed in Turin, used by Coast Guards and other Police forces in many different operations such as search and rescue, boarder control, the illegal traffic of people and goods.
The Thales Alenia Space plant in Turin, with more than 50,000 sqm of laboratories, clean rooms and production areas, is a perfect model of integration in the industrial and social pattern of the region. Products are also tested at the facility, in rooms simulating the environmental conditions to which they are going to be exposed in deep space.

How does Piedmont compare to the other Italian clusters in terms of capabilities?
Piedmont has been involved in the Aeronautics sector since the early 1900s, and Leonardo is the major component of the regional Aerospace cluster. For example Leonardo established here some of its state of the art facilities, including research laboratories, clean rooms, and one of the biggest anechoic chambers in Europe, the Sky Light simulator.
Turin is also the main research and development centre for unmanned systems technology, where Leonardo is playing a leading role collaborating with local institutions, such as the SMAT research project, which aims to define, design and develop an Advanced Environmental Monitoring System based on innovative unmanned air systems, coordinated by a ground-based control station.
In Piedmont, the Thales Alenia Space Italia's facility has increased its role in orbital infrastructure, becoming a main contributor to the International Space Station (ISS), with more than 50% of the modules developed there, making the region a centre of excellence, recognised throughout the world. The facility is involved in the production of the Pressurized Cargo Module (PCM) for Cygnus automated cargo spacecraft. The company is also prime contractor through ESA for the IXV (Intermediate eXperimental Vehicle) and Expert experimental suborbital re-entry vehicles and participates in the new NASA's space capsule Orion.

"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" explains Donato Amoroso, Thales Alenia Space Italia's CEO.

Christophe Dumaz

Head of Turbomachine Unit
AVIO

Avio was founded in 1912 and, in 1962, the company moved into the aerospace industry. Could you tell us more about the company's development and how it has become one of Italy's leading players in the space sector?
At the beginning, Avio had three main divisions: aeronautic components manufacturing, space components, and maintenance. The aeronautics division was acquired by General Electric in 2013. As far as our space activity is concerned, we started developing small separation boosters for the Ariane 1 European launcher, as well as small satellite activities and, over the years, we have increased our scope in this area. We began working on small components before manufacturing the Vega launcher itself. Its maiden flight took place in 2012, when we were awarded a contract with ESA. We are trying to expand our business as much as possible and become a much more global company.

Avio has two locations in Italy. Could you tell us about what activities take place at each location?
Avio's headquarters is located in Colleferro, just outside Rome, with around 800 employees. The core business is solid propulsion, which covers areas such as boosters and complete system activities surrounding the launchers. We are the prime contractor for the small Vega launcher, a four stage rocket with three solid boosters, which is the core of our activity. Manufacturing has also expanded to cover associated software. This has been quite an important development for the company.
In Turin, our main activity is developing components for liquid propulsion and manufacturing components for space engines, which are sold to Snecma. We have kept a small nucleus of people here, although the majority of Avio's Turin-based workforce have become part of Avio Aero.
We also have two other, small locations: in France we conduct euro-propulsion, while French Guiana is our integration site. After production is carried out in Rome or Turin, parts and personnel are sent to French Guiana to conduct integration and launch testing.

How has the division of Avio, following the acquisition of Avio Aero by General Electric in 2013, affected the company?
The space division remained an independent company. We went from being part of a large company, with 5,000 people in Turin alone, to a much smaller company and our competitors, such as Airbus, are much bigger. However, Avio has a flat organisational structure and we rely on our capabilities. We are small, flexible and can work on several projects at once. This sort of flexibility is not often possible in bigger companies.

Could you tell us about your work on the Ariane space launcher program and why it was necessary to create a new program?
The Vega launcher is completely different to Ariane, which is a heavy launcher for satellite communications. Vega is a small launcher for sending small satellites, primarily for earth observation, into a completely different orbit. Small satellites can be anywhere up to 1,500 kilograms (kgs) in weight, meaning we do not need to use Ariane, which can launch satellites up to 10 times heavier. It was therefore decided we needed to create a smaller launcher more suited to this market. Although the number of big satellites is still important, the number of small satellites weighing around 100 kgs for internet and communication is increasing rapidly.

Avio spends 18% of its turnover on research and development. Could you tell us more about some of the new technologies you are developing?
In Colleferro, Avio is working on filament winding. A rope of carbon is used to make our boosters and then an envelope which generates carbon is filled with the propellant. Another technology, of which we have developed the first prototype in Europe, is additive manufacturing. Our new components for liquid propulsion would be made with this technology.

Avio is committed to sustainable operations and protecting the environment from human impact. Could you tell us in what ways this can be achieved?
We are involved in a program called "Greening the Propulsion", the purpose of which is to make propulsion as green as possible by focusing on the propellant itself. We are also working on using different liquid propellants such as methane.

Having already achieved more than a century in operations and working on some of the largest projects in the space sector, where can Avio proceed from here?
There are many ideas today about whether it is possible to build a reusable launcher and we are looking into the technologies and systems required to do this. I also believe Avio will continue to expand its field of activities and enhance our position in the complete supply chain, in order to be better integrated from sub-components to the final product. We have been working on this for the last 20 years, which has brought us to a much more stable position.

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 and has a landing date of 19 October 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 that is currently on its way to Mars as part of 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.

Many players are involved in the funding of ALTEC, including ASI, Thales Alenia Space and the ICARUS Consortium. Could you explain more about ALTEC's funding model and how this has 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.

What are some of the main services ALTEC can provide, and could you tell us more about some of the main programs on which ALTEC works?

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.

Massimo Conte & Andrea Messidoro

MC: Technical Head of
Space & Technology Division
AM: R&D, Project & Systems Engineer
AEROSEKUR

MC

Could you provide us with an overview of Aerosekur's three business lines – airborne, defence and space and technology - and any recent key milestones?

AM: Of Aerosekur's three divisions, airborne and defence are based at the company's headquarters, near Rome. These two divisions account for the majority of the company's turnover as well. Space and technology, based in Caselle near Turin, is the most innovative of the three divisions. We focus on future products for the space sector and are the main research and development part of the company. We are more innovative and creative, and are more aggressive in contacting potential clients. Aerosekur entered the space market at the beginning of the century, capitalising on our technologies and capabilities in the airborne and defence markets. We looked into various areas in which flexible technologies would be key, such as descent and deceleration solutions for Mars missions.

MC: Aerosekur's main focus is safety, from our inflatable floating systems for helicopters to the UAVs we are developing for monitoring. The space avionics market is hugely competitive in Italy. Aerosekur, however, has established itself in a niche market in which there are fewer competitors, as the market is smaller.

How are Aerosekur's flexible materials relevant to the aerospace industry's current areas of focus?

AM: Inflatable technology is an area we began researching in 2005; this covers such aspects as habitable spaces for astronauts both in orbit – as on the International Space Station (ISS) – and on planetary surfaces. Current technologies are based on aluminium, which is comparatively heavy and is unable to be made more compact and save on volumes. We are working with Thales Alenia Space on flexible materials that can be packed and can therefore be launched into space at a far lower cost, as many more items can be sent on one journey.

You work with national and European research institutes. Could you tell us about these partnerships and how they benefit Aerosekur?

AM: We have worked with 90 partners during the last three years, comprising both research institutes and other companies in the sector. Research institutes are definitely key partners for our projects. Usually they are really specialized and when you need a clear expertise in a project of technology development or new product, they are the ones you have to contact. In Italy we work with CNR, the National Research Center, and with several departments of the top universities as Politecnico di Torino, Milano and La Sapienza in Rome.

What specific challenges does Aerosekur face in terms of being awarded contracts by the European Space Agency?

MC: When trying to win an ESA-sponsored project, one of the main challenges is the political constraints in terms of geographic returns. Each nation contributes money to ESA and the body that controls which companies will be awarded contracts for a certain part of an aerospace program. Although having the best technologies and the best proposal plays a role in this decision, the economic impact on the country also plays a significant factor. The fact that each country is awarded contracts based on how much financing it contributed to ESA necessarily means that the technical skills are sometimes overlooked for economic reasons.

How do the regional and national governments support the aerospace industry in Italy?

AM: Piedmont is one of the greatest aerospace regions in Italy. Support from Regione Piemonte has been quite high in recent years. For example, we have been part of the STEPS II project, led by Thales Alenia Space, which has been funded by the European Commission and the regional government. This project has around 60 Piedmontese companies developing critical technologies for space exploration.

What is Aerosekur's strategy for the future and what are some of the areas of interest for the company's space segment?

MC: Aerosekur needs to survive in this sector. In the past, the sector possessed much more economic capability than it does nowadays; many of the traditional financing sources have been stopped. Or, for example, money was spent on a Mars preparatory program study and then the program was cancelled when there was no more money available.

Our strategy now is to analyse possible market opportunities relative to our experience. One of these is creating inflatable modules for cultivating vegetables on Mars, which is particularly difficult as Mars has no atmosphere or water. This is a particularly interesting area because this will affect how we grow food on earth in the future, as the amount of land available today is not sufficient for the growing human population.

Another area of interest is UAVs. We have been awarded a €1.5 million contract from the Ministry of Defence, although this has been temporarily halted and we have been waiting for the second phase to begin for the last year. At present, UAVs have pilots on the ground; they need to be fully autonomous and capable of carrying out a complete mission independently of a human pilot.

David Avino

Managing Director
ARGOTEC

Argotec is well established in the aerospace field, offering engineering expertise as well as specialist products. Could you give a brief overview of the company since 2008?

Argotec began by providing support and training to astronauts, flight control personnel and personnel supporting on-board activities on international flights. Building on the strong engineering tradition in Turin, we set up a research laboratory for thermal control activities, which, in 2016, provided experimental data to the International Space Station (ISS). In 2010, we expanded our services and devoted our attention to researching spaceflights and small satellites. We cover several areas, including services, training, and research, with a further interest in exploiting space research for Earth applications and nanosatellites. Around 90% of our clients are international, including the European Space Agency (ESA), Lufthansa and even NASA as the end client.

In 2011, we began our fourth key area of expertise and opened a new laboratory for space food. Our aim was to provide space food for astronauts in a completely new way, in conjunction with nutritionists, dieticians and food specialists. Within three years, recognizing that there were similarities between space requirements and everyday preferences on Earth, we manufactured a series of products that are valuable across the board. 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. Whilst these features are essential for astronauts, they also appeal to the wider commercial consumer market. Many people may not have time to prepare dishes, or may require balanced nutrition plans. We have initiated a new marketing campaign for Earth applications of our product.

It has recently been announced that the ArgoMoon nanosatellite will represent Europe in the forthcoming NASA Exploration Mission. What are the logistics involved in this project, and what will the ArgoMoon's role in this mission be?

We were selected by ESA to build a satellite, and NASA selected the ArgoMoon satellite for their Exploration Mission 1 as one of 13 satellites, and the only European satellite, on board this trans-lunar orbit mission. We had a very small timeframe, with only two years to complete a project that would typically take up to five years. 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.

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. Working on these nanosatellites is a great motivator for our young engineers, who deal directly with NASA, and more than compensate for any potential experience gap with their motivation and enthusiasm.

As an Italian company, what is your view on the broader aerospace industry, and how strongly is Italy perceived as a global competitor?

Trust is hugely important in this industry and is usually built over time. There are many Italians working for companies globally that have created a positive reputation for Italian companies worldwide. At Argotec, our work ethic and emphasis on quality is also greatly appreciated by our partners. As a new company working for NASA on the ISSpresso project, for example, we had to gain their trust, and had to be thoroughly examined before being approved. The second time we worked with NASA, we experienced an entirely new attitude, because our previous work had been very successful and we had proven ourselves as reliable and valuable partners. The Italian mentality is to solve issues quickly and with creativity and innovation, thus we have been able to build successful relations with our clients. This reputation and perception is certainly growing globally.

How have you seen the Italian aerospace industry develop in the last five years and what can we expect for Argotec in the future?

In the last few years, the space business has been changing rapidly due to the changes in the U.S. market. Italian and European companies are based on older models and have not yet adapted their business models in the same way. Companies such as SpaceX, however, have grown much faster as a result of investment from different regions.

For Argotec, we aim to grow the company in the coming years, primarily focusing on nanosatellites, systems applications and low-earth orbits, alongside wider space exploration with transferrable applications that are also beneficial to humans on Earth.

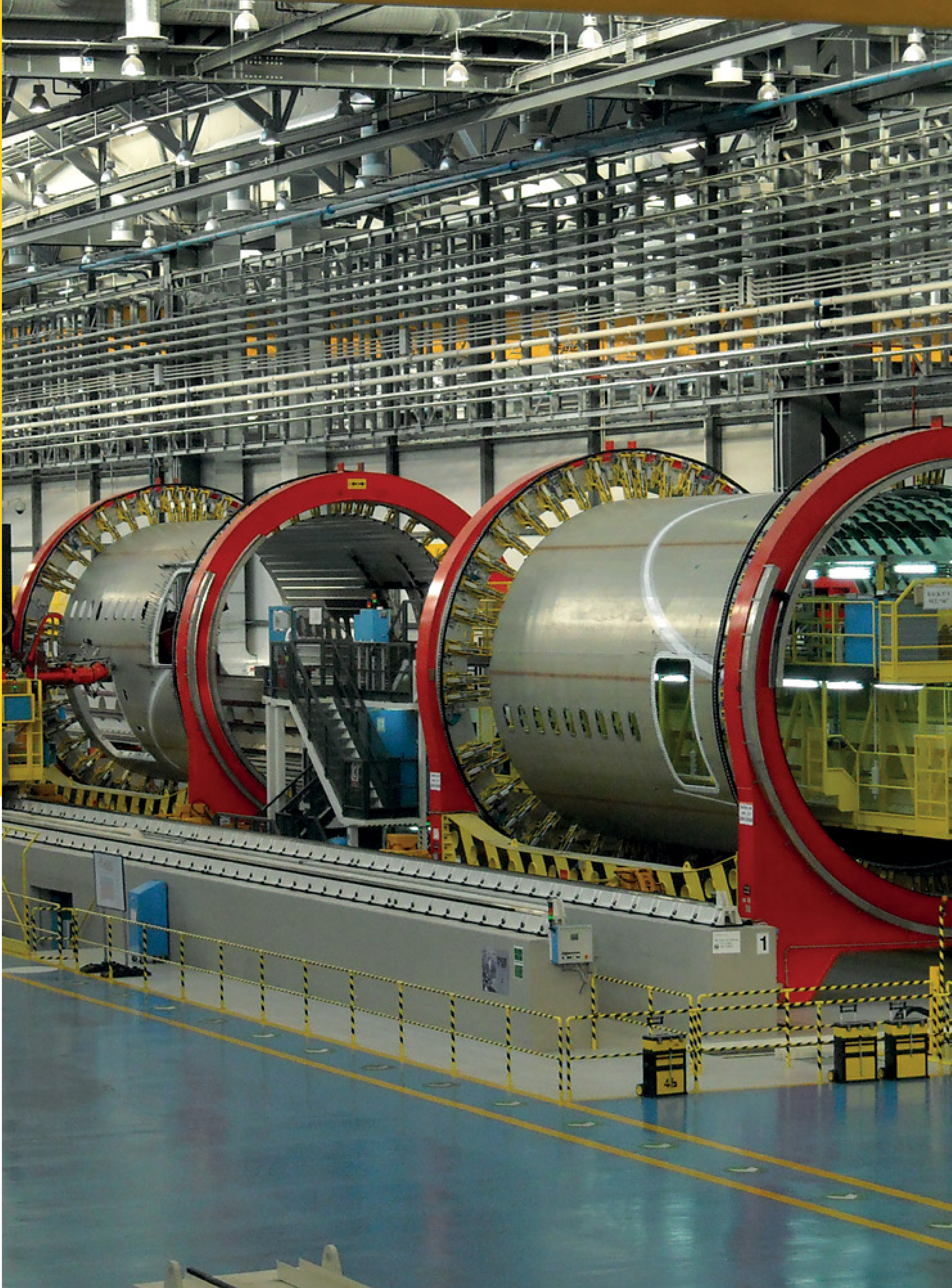


Image: Bisiach & Carrù

Innovation

"In the technology field, Italy offers excellent and highly competitive minds. 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."

- Riccardo Procacci,
CEO,
Avio Aero

Innovation: creating the sustainable aerospace sector of the future

By Harriet Bailey

An area which receives support across regional, national and industrial lines is the challenge of implementing increasingly sustainable solutions within the growing air transportation market. This issue has been the catalyst for positive action in creating a common strategy for investment in innovation and, at the start of 2016, was translated into a concrete agreement between a number of stakeholders. "With this agreement, signed with the Ministry of Economic Development and the three regions (Piedmont, Campania and Puglia), Avio Aero has committed to realize an investment plan of €200 million. Around €40 million will be invested in Piedmont, with the aim of developing innovative technologies for green propulsion," explained Sergio Chiamparino, president of Regione Piemonte.

The plan is also backed by GE Aviation, parent company of Avio Aero, which aims to invest heavily in R&D in the country to make good on its investment. According to Avio Aero, Italy is the best choice for this type of research because it offers a low-cost manufacturing base with high-capacity plants. "In the technology field, Italy offers excellent and highly competitive minds," claimed CEO Riccardo 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. These aims align with GE's goal in Italy: to grow the country."

Politecnico di Torino is the jewel in the crown of Piedmont's R&D capabilities and, according to Vincenzo Ilotte, president of Turin's Chamber of Commerce, one third of the companies in the region collaborate with Italian and foreign research centers: "It is first and foremost Politecnico di Torino, which plays a key role in both training the next generation of engineers and in research and testing."

Furthermore, one third of companies also have their own laboratory capabilities and around 85% invest in R&D. Having close and ready access to innovation centers and working on various new technologies means Piedmont's aerospace SMEs have a strong advantage on the world stage. "By playing an active role in developing new products, these companies will be more competitive on an international level," he continued.

As one of the five prime companies in Italy, Avio Aero is playing a key role in promoting new technologies. It is a founding member and partner of the public-private Clean Sky program, launched in 2008 by the European Commission and industry leaders. Covering six platforms – fixed-wing aircraft, regional aircraft, rotorcraft, engines, systems and eco-design – its mission is to develop cutting-edge technologies to significantly increase the environmental performance of air transportation, reducing fuel consumption and noise pollution. Pininfarina Extra, well known for its design partnership with Ferrari, is also active in aerodynamic design for other industries. "In the aerospace sector we are involved in the Clean Sky research program for the testing of new high-efficiency aircraft engine concepts in our wind tunnel. Noise suppression and fuel consumption are two areas of focus for sustainability in the aerospace industry, and concentrating on energy efficiency in the sector drives research and an increase in industry know-how," said vice president of operations, Francesco Lovo.

Funded by the regional government, the research program GREAT2020 aimed to test a potential reduction in carbon dioxide emissions using new engine technologies and was carried out in collaboration with Avio Aero and Politecnico di Torino. "The companies involved worked together on new combustion technologies, new turbine components, lightweight and safe structures and innovative and sustainable manufacturing technologies," said president Chiamparino.

Another prime player also working on new engine technologies is UTC Aerospace Systems (UTAS), formerly Turin-based Microtecnica. Supported by U.S.-based UTC, the company has several active R&D programs and, as a corporation, spent $4 billion on research into new technologies in 2015. UTAS works with a variety of companies in pursuit of this goal, including sister business Pratt & Whitney. "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%," explained Elisa Martinotti, military and helicopter and Italy program director. "Aircraft manufacturers need more efficient engines that cause less pollution, so this becomes a key point of focus for their suppliers."

New materials

As a design company, Pininfarina Extra takes into account not only aesthetics, but also the materials used. With weight and sustainability challenges being relevant in a number of markets the company serves, it has been able to use its existing expertise in this area in the aerospace sector as well. "We generally promote the use of sustainable materials in our projects, and this is something we hope to implement in the aerospace field as well," confirmed Lovo.

"As an example, materials developers are now evaluating the use of bio-derived resins and fibres to realise eco-sustainable composite materials for aerospace applications."

Safety belt manufacturer Sabelt initially designed and manufactured safety belts for the automotive industry, before moving into the aerospace sector in 2011. Sabelt developed a reputation for lightweight, simple to use webbing and safety belts and was contracted by Thales Alenia Space to develop a lighter cargo retaining system than the traditional polyester-based system. "This created a weight problem as there was not enough room for the cargo itself. 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 and OE special projects manager.

Having proven itself in the commercial sphere, Sabelt was able to cross-fertilize its technology once more. Thales subsequently contracted the company for space projects, using the same lightweight webbing structure for sending supplies to the ISS. "After checking the compatibility of this material with space systems, we eventually engineered a 46 kg system, compared to the previous structure's 101 kg – a saving of more than 50 kg," elaborated Cagna. "Thales told us that every for every 1 kg weight saving, the space project would save $50,000 as they could send up more cargo at a time."

As well as using standard materials, composites are coming into their own as both a weight reduction tactic and as a method of achieving sustainability goals. Additive manufacturing – also known as 3D printing – is a new area of interest, enabling companies to manufacture certain parts to order; this is particularly useful in the repair process and leads to less part wastage. "For APR, additive manufacturing is the future," commented R&D and business innovation manager Leonardo Napoli. "We are focusing on the redesign of parts rather than the production of parts for additive manufacturing. We re-engineer and re-design technologies in an attempt to reduce material wastage and to better utilize the machine."

APR works with Avio Aero and Politecnico di Torino, among others, to come up with new materials and solutions for additive manufacturing; this has the added benefit of ensuring Avio Aero is always aware of the latest technologies in the market – a distinct competitive advantage. CEO Andrea Romiti is so convinced of the capabilities within the region that he has decided to embrace collaboration within the additive manufacturing space, even establishing his own internal school to assist other companies with their R&D efforts in the Piedmont region. "The Manufacturing Technology Academy (MTA) is the point of contact between projects by students of secondary schools and universities. It is also where we conduct open research with university students and our own scholars," explained Romiti. "We partner with companies that have the printer but perhaps lack additive manufacturing expertise and knowledge of the market. It is important for the smallest companies to examine innovation opportunities and to invest in research." —

Riccardo Procacci

President & CEO
AVIO AERO

After more than a century of operations in the sector, Avio Aero was acquired by General Electric (GE) in 2013. Could you provide us with a brief overview of the company's evolution after the purchase and explain the reasons behind GE's interest?

Being part of GE, Avio Aero has access to an unprecedented amount of resources in research and development. When we approach the customer or supplier, we are no longer a $2 billion company, as we now have the power of the $24 billion GE Aviation business behind us. This has transformed the way we run the company.

GE Aviation's operations are unprecedented, in terms of the number of engines it is developing or starting to develop; these include Leap, GE9X, Passport and other projects in the military and commercial arenas. As part of GE, we can plug ourselves into these programs better than we would have as a vendor or a supplier. For example on the GE9X, Avio Aero plays a major role in the engineering development of this engine and in producing components, partly through the use of additive manufacturing. Avio Aero's main responsibility lies in designing and manufacturing the gearbox, as well as the entire low-pressure turbine module, including its assembly. The main reason behind GE's interest is that Avio Aero strengthens GE's global supply chain capabilities, as its engine production rates continue to rise to meet growing customer demand.

The company has three major plants in Italy as well as production sites in Poland. What is the importance of your domestic operations to your overall corporate strategy and how has increased internationalization changed the face of the company?

Our domestic operations are essential for Avio Aero. The company employs more than 4,000 personnel in Italy at three locations: our Rivalta di Torino headquarters, which is also our largest production facility; at Brindisi, historically dedicated to the assembly and maintenance of aircraft engines; and in Pomigliano d'Arco near Naples, which plays a key role in the production of components dedicated to the defense industry. We also have a manufacturing plant and an innovative cold-flow test center in Poland. Avio has always operated on a global stage, working with key players in the global aviation industry. This is even more possible today thanks to GE's international network, providing logistical synergies and increasingly challenging opportunities.

Avio Aero is a key player in additive manufacturing solutions. Could you tell us more about your work on this technology to make advances in this area?

The additive layer manufacturing (ALM) process behind our blades is our specialty and, since our acquisition by GE Aviation, it has been the focus of a steady drive by both parent and subsidiary to bring ALM technologies to commercial fruition.

Both parties are, conveniently, far down the development path in complementary versions of ALM; while GE has been developing a relatively low-temperature process called laser sintering – attractive for giving a fine surface finish direct from the printer, and producing fuel nozzles and high-pressure blades for CFM Leap engines – Avio Aero has been working on higher-temperature electron beam melting (EBM), ideally suited to making parts out of hard metals such as titanium.

While these examples of printed components are just the first of many still to come, we remain in the early stages of the development of ALM and need to consider where this technology will take us in the future.

As a Piedmontese company with an international owner and outlook, what makes the region and Italy in general an attractive prospect for the aerospace industry, compared with other jurisdictions worldwide?

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. Recently, for example, GE and Avio Aero invested €200 million in R&D and business growth in Italy. This investment involves not only Piedmont, but also Puglia and Campania as 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). 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. These aims align with GE's goal in Italy: business expansion and sustaining Italy's growth.

What can we expect to see from Avio Aero in 2018, after the first five years with GE?

By 2020, GE aims to be one of the ten most important players in the software market and Avio Aero, as part of the group, is at the forefront of supporting this change in the company's business model. In this context, our advanced manufacturing and, more specifically, additive manufacturing capabilities play a key role.

Elisa Martinotti & Emilio Acmet

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

EM

EA

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.

Armando Andreassi

Head of Division, Actuation and Landing Systems
MECAER AVIATION GROUP

> 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.

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 of these regulations 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.

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 (JV).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. —

Bruno Bisiach

CEO
BISIACH & CARRÙ

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 defence 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.

> "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."

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.

Image: FIDIA

Internationalisation of **SMEs**

"France has Airbus and a huge net-work 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."

- Silvio Marioni,
Managing Director,
Tekspan

Internationalisation: the road to success for Italy's SMEs

By Harriet Bailey

The global air transport industry is expected to see its fifth consecutive year of improving profits in 2016. According to the International Air Transport Association (IATA), airlines will generate $39.4 billion in profits, up from $35.3 billion in 2015 – an increase of almost 12%. Total turnover for the industry is forecast to reach $709 billion, with a net profit margin of 5.6%. Despite being hit by the economic crisis at the end of the last decade, aeronautical companies seized the impetus to make significant changes to their operations, improving synergies and creating new value streams.

IATA outlined low oil prices and increased passenger demand as the two key contributing factors to the airline industry's five-year upswing. Although oil prices have plummeted by more than 50% in the space of two years, this has only translated to a drop of just over 10% in terms of fuel prices, now representing 19.7% of the industry's expenses. Passenger demand continues to rise, though the forecast rate of 6.2% for 2016 is less than the 7.4% growth recorded a year previously.

Rising demand is a boon for the aeronautical industry in general as it requires an increase in capacity, while aging aircraft are being replaced with newer, more fuel efficient models. Of the 1,900 new aircraft to be delivered to airlines this year, half are intended to bolster current fleets while the other 50% will be more modern replacements. Consulting company Teoresi, based in Turin and with offices in Switzerland and the United States, suggests airlines are recognising the need to implement new technologies in order to more quickly reap the benefits. "In comparison [with the aeronautical industry], the automotive industry is much quicker at implementing new technologies, particularly when these are able to cut costs and reduce time-to-market. These issues are now becoming more crucial to commercial aerospace companies, as well as the military," said Mario Brossa, CEO of the Teoresi Group.

Competition across Western Europe for these contracts is fierce, and Italian companies face particular challenges in gaining international recognition. Larger players often will not work with a company until it has achieved a certain annual turnover, a pre-requisite which SMEs often struggle to achieve. "In general, it is quite difficult gaining big contracts - not because of a lack of skill, but because of a lack of dimension," explained Matteo Vazzola, technical director at technical services provider TPS Aerospace Engineering. "France and Germany are more structured in terms of networking and thus companies can reach higher capacity."

The fact that small- and medium-sized companies persist in Italy, each providing their own specific services, is increasingly becoming of little use to larger players that are slimming down their supplier portfolios and looking to partner with those companies that can provide a one-stop shop for all their needs. As new business development manager Davide Fusta of mechanical components manufacturer Alfa Meccanica explained: "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. We not only aim to provide our customers with a finished product, but also a finished system and subsystem. For this, we need additional capabilities to assemble systems in addition to the components we already manufacture."

However, being an SME does have its own advantages, which are often lost as companies expand. Smaller companies benefit from less bureaucracy and more flexibility and can often offer their clients more tailored solutions than is found in more structured markets. "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. 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," commented Silvio Marioni, managing director of Turin-based technical foams supplier Tekspan. "However, when it comes to niche applications, Italy demonstrates interesting capabilities."

Piedmont's prowess

Piedmontese companies in particular, which were often initially founded to service automotive companies such as Fiat and Alfa Romeo, have been able to transfer this wealth of expertise to the needs of the aerospace industry, in a process called cross-fertilization.

Bisiach & Carrù began life in 1955, making simple welding equipment for car manufacturer Lancia. Work in the automo-

tive sector moved onto trucks and military vehicles, using its knowledge and experience to create the Tauro Gantry system of assembly. "Bisiach & Carrù then began to work on railway cars and, from there, 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," explained CEO Bruno Bisiach.

More than half a century after it was founded, Bisiach & Carrù gained its first contract from the aerospace industry using technology that had initially been developed for other industries. The aerospace sector is now one of the company's two most important industries. Bisiach continued: "In 2006, Boeing invited us to Seattle for a conference regarding the new 787 airplanes. From 100 proposals, we reached the final three that 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."

Blue Engineering also began life as an engineering company for the automotive industry, before expanding into other industries to spread its risk. Around 30% of its workforce works on aerospace projects, though its employees are able to use their engineering expertise in a number of fields to improve existing product applications. "The company is organized such that the center of competence, which is 10% of the company, has expert knowledge in specific segments. Around 20% of our employees have flexible design knowledge to meet market needs, while the remaining 70% are high-level engineers who are able to work on components across all sectors," explained executive vice president Mohamed Eid.

After less than a decade in business, Blue Engineering's reputation for quality engineering in the Turin region by the beginning of the century enabled it to focus on a strategy of internationalization. "To illustrate this point, in 1998, 90% of our income came from Italian customers and 10% came from outside the country; a decade later these two figures had completely switched places," continued Eid. "Currently, we are working on some important projects in Russia, France, Turkey, Romania, Egypt, China and the United States. We have new contracts under discussion with a further 10 countries."

This is also the operating model adopted by numerical control manufacturer Fidia, which sees only 10% of its turnover stem from Italian business. It has established itself in various countries in Europe, North and South America and China in order to focus on the entire supply chain from manufacturing to distribution and after-sales care. "Fidia has grown by creating a network of fully owned subsidiaries all over the world, although our production is concentrated in Italy," said general manager Carlos Maidagan. "Italy has a high reputation for quality and innovative solutions in machinery design and production, and our competition from outside of Italy comes mainly from Germany and Japan."

Highlighting the advances made by Italian SMEs in terms of cutting-edge technology are APR and Mepit, two companies based in the vicinity of Turin, which have recently been awarded contracts with Pratt & Whitney to work on the Lockheed Martin F35 fighter jet engine. Operated by the founding family for almost 50 years, component manufacturer Mepit signed a $7 million 10 year supplier deal. "From my perspective, we are seeing increasing interest from foreign companies. We are currently in talks with potential customers such as Bombardier and Liebherr Aerospace," said CEO Luca Pigato. "The only way to lead in the aerospace market is to possess characteristics that a big company has, such as versatility, flexibility and a competitive price."

Bytest, a Piedmontese testing company, has seen dramatic growth over the last four years since it was acquired by Germany-based inspection, certification and testing company TÜV SÜD in 2012. Although Piedmont has a strong aerospace segment, accounting for 40% of the company's turnover, looking to international markets is crucial in ensuring solid long-term planning for companies of all sizes. "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," commented CEO Gennaro Oliva. —

Silvio Marioni

Managing Director
TEKSPAN – A SOGIMI GROUP COMPANY

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, when we began 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.

Carlos Maidagan

General Manager
FIDIA

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. 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 that fully develop numerical controls, milling heads and accessories, which puts us in a better competitive position as we can provide our customers with a global and complex solution. In 2015, the aerospace sector represented 51% of our €63 million turnover, and Fidia has 340 employees worldwide.

Fidia has made a number of acquisitions over its history. Could you explain how these have affected the company and whether Fidia is looking to make any new purchases?
Fidia has grown by creating a network of fully owned subsidiaries all over the world; in Germany, the United States, 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 and bigger production plant, into which we have invested more than €7 million. In China, we own 51% of a joint venture with SMTCL, where we produce machines for the local market only. 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. Italy has a high reputation for quality and innovative solutions in machinery design and production, and our competition from outside of Italy comes mainly from Germany and Japan.

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. 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-rotating milling heads for each application and material, blending aluminum and titanium with carbon fiber and honeycomb.

Fidia has a dedicated R&D center in Italy, staffed by 50 researchers. Could you explain to us the importance of R&D to Fidia and your work with various research centers and universities?
For many years, we have been working with partners and in cooperation with 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.

How do the regional and national governments support the aerospace industry in Italy and are there any areas for improvement?
We have gained support from such institutions over the years; however, we invest in innovation from our own resources. Although we have seen a decrease in support from the European community for publicly funded activities in the aerospace sector, we have not cut any of our research programs because of this.

Where would you say the Italian aerospace industry is particularly strong and what sort of new technologies can we expect from this sector in the future?
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 and 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.

Andrea Romiti & Leonardo Napoli

AR: CEO
LN: R&D and
Business Innovation Development
APR

Could you provide us with a brief history of the company, including any recent major milestones?
AR: APR was founded by my father and me, building on his history in the aerospace industry. I initially worked as a project manager of an SME with clients including Pratt & Whitney, before I focused on my personal dream of being an entrepreneur. This led to the founding of APR in 1998. We entered the industry to provide aerospace and aerostructure customers with functional prototypes, but the company's focus has expanded since then. Approximately 70 people work for the company today, and our team is comprised of engineers, specialists and managers. We have made the transition from a family-owned business to an externally managed company in order to facilitate APR's second phase of growth. We serve the markets of aero-engines and aero-structures, creating critical rotating components, such as centrifugal impellers, bladed disks and integrally bladed rotors. We conduct production of sub-assembly for aero-engine components, using alloys, aluminum and titanium. We also service the Boeing 787 program as a supplier by using our complex components from the aero-engine field for aero-structures. The power generation business constituted 50% of our business five years ago, however new programs in aeroengine and aerostructure shifted our focus to these lines of business.

Could you explain more about APR's international operations and tell us about your various international clients?
AR: Around 50% of our clients are international, coming from both Europe and North America. As well as clients such as GE Aviation, GKN Aerospace Engine Systems and Avio Aero, formerly known as Fiat Avio, we recently signed a contract with Pratt & Whitney, based in Connecticut. Our work on the Boeing 787, via Leonardo, represents a good portion of our Italian business.
LN: Our last project was focused on using additive manufacturing in the repair process, in order to lower the scrap rate, leading to a reduced wastage of parts. We opened another European-funded project for the creation of a new material based on titanium and nanoparticles centered on ceramics for additive manufacturing. For APR, additive manufacturing is the future. We work with Politecnico di Torino, which conducts lifecycle analysis of engine components. The benefit of research groups is that we are always at the cutting edge of technological development and are aware of the latest technologies in the market.

Additive manufacturing is a major topic in aerospace and it seems Italy is leading the way in this area. Could you tell us more about the insights you are seeing in this area?
LN: We are focusing on the redesign of parts rather than the production of parts for additive manufacturing. We re-engineer and re-design technologies in an attempt to reduce material wastage and to better utilize the machine.
AR: We partner with companies that have the printer but perhaps lack additive manufacturing expertise and knowledge of the market. We created an internal school in one of our plants called the Manufacturing Technology Academy (MTA), which is the point of contact between projects by students of secondary schools and universities. It is also where we conduct open research with university students and our own scholars. We seek engineers who are focused less on design and more on manufacturing and technology. We want to help companies structure their approach towards R&D in the Piedmont region. It is important for the smallest companies to examine innovation opportunities and to invest in research.

Why would you say being based in Turin, and Italy in general, is beneficial for APR?
AR: The opportunity to merge heritage and experience does not exist outside of Turin, because the city was one of the capitals of the automotive industry. The creation of many software companies, as well as the aerospace industry, was concentrated here. In general, Turin has had an industrial approach to manufacturing. Aerospace is a global factory so, for a small company such as APR, it is better to consolidate our position here and then further expand.

Looking ahead, what is your future vision for APR by the end of the decade?
AR: Our aim is to consolidate our presence with the major contracts we have now, and to diversify our portfolio to other global markets. We are using an open approach in welcoming new customers and investing in research within certain fields such as additive manufacturing, in order to increase our added value offerings to our customers.

Andrea Romiti

Key Cluster Leader
AENCOM

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.

Mohamed Eid & Danilo Lazzeri

ME: Executive Vice President
DL: CEO
BLUE ENGINEERING

ME

DL

Please provide us with a brief overview of the company over the last two decades and the importance of the aerospace industry to Blue Engineering?

ME: Blue began in 1993, with a focus on engineering and virtual simulations in the automotive industry. This included any component required to create virtual simulations for automotive correction analysis regarding noise and safety, which only represents 2% of the value of any component. We then became a design company before finally becoming a system integrator company, using our expertise in engineering to find better applications. Today, Blue works in the aerospace, automotive, railway, marine and ICT fields.

Around 30% of our employees work in the aerospace sector. In 1993, Turin's automotive industry experienced a crisis. Our mission now is to operate across several sectors as there will never be a crisis across all the areas that we are involved in at once. The company is organized such that the center of competence, which is 10% of the company, has expert knowledge in specific segments. Around 20% of our employees have flexible design knowledge to meet market needs, while the remaining 70% are high-level engineers who are able to work on components across all sectors.

As well as your three facilities in Italy, you also have operations in Jordan, France and Turkey. Please tell us more about the importance of your international operations to your overall strategy?

ME: By the turn of the millennium, Blue Engineering was easily able to service the companies in the vicinity of Turin. This led to us strengthening other aspects of our business, as I knew this situation would not last forever. We therefore decided to increase our international operations over the next half a decade. The Turin Chamber of Commerce helped us immensely in this task in terms of understanding markets and meeting the large players. To illustrate this point, in 1998, 90% of our income came from Italian customers and 10% came from outside the country; a decade later these two figures had completely switched places. Furthermore, our internationalization has also led to a threefold increase in our turnover and more staff.

Currently, we are working on some important projects in Russia, France, Turkey, Romania, Egypt, China and the United States. We have new contracts under discussion for a further 10 countries. Of Blue's 230 employees and collaborators, around 40 are based abroad. With increasing globalization, it is closed-minded to create boundaries for the company's expansion.

In what sort of applications are your products and services used and who are some of Blue Engineering's clients?

ME: We conduct activities within the aerospace and aeronautics sectors. For aeronautics, we are working on projects for unmanned aerial vehicles (UAVs) and helicopter parts among others. The UAVs are used for controlling agricultural areas; for example, when applying agrochemicals, the UAV collects imagery of plant growth, enabling farmers to make informed decisions. We also work with Alenia Aerospace, where UAVs are used for border control and civil protection in case of fires. Within the aerospace sector, we are involved in all aerospace activities. One of these is Clean Sky, which is a project to remove space debris. We are also developers for the European Space Agency, producing, servicing and improving software to monitor satellites.

What sort of challenges do SMEs in the aerospace sector face and could you elaborate on them?

ME: We always have to think about two things: efficiency of structures in order to get them into the air, and safety. If a flying object is unsafe, there is no way of salvaging the situation, and passenger safety is of the utmost importance. At Blue we have a special department for reliability analysis and have been able to use the technologies developed for the aerospace industry in other sectors, such as automotive and railways, as well.

Where would you like to see Blue Engineering by its 25th anniversary in 2018?

ME: Our vision is to manage companies that manufacture products; this could be either in Piedmont or somewhere internationally. This will enable us to collaborate with companies and make us a complete system integrator, sharing knowledge and production capabilities. We call this a virtual factory, because if we do not want to work with a company on a project, we will have the freedom to switch partners depending on the task.

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.

Matteo Bertolotti

CEO
ING. BERTOLOTTI

Could you provide us with a brief history of the development of Ing. Bertolloti 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. Bertolloti 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. Bertolloti 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. Bertolloti, 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.

Lorenzo Carrera

CEO
AEROTECH

Aerotech was founded in 2012 and has already managed to achieve more than €1 million in revenues by 2015. What are some of the main services Aerotech can provide its clients?

Aerotech's main activities involve the study, production, reverse engineering, management and production of titanium, steel, and aluminum components, and machining of structural components up to 4500 millimeters for the aerospace industry. The main processes in-house are CAD-CAM, waterjet cutting, 3-5 axis machining, surface polishing, Tig and Mig welding, mechanical assembly, special gluing, riveting, and dimensional testing with both 3D measuring arms and traditional instruments.

Other services we offer include the construction of moulds for laminating composite materials, sheet metal forming and vacuum equipment for trimming. The parts manufactured by Aerotech are intended for use in both civil and military aviation, although only 20% of our products are tailored for military usage, for example, in the Eurofighter Typhoon. A small percentage of our production is also aimed at the space sector. Aerotech focuses on the machining of structural parts, such as fuselage components made from aluminium or titanium, for Boeing, ATR and Airbus.

What sets Aerotech apart from its competitors and why do large multinationals choose to use your services?

Clients choose Aerotech because of the ratings we have attained and our capability to supply both direct clients and larger players. We have the potential and the technical knowledge to develop the required product and have created a pool of certified companies that provide us with external professional support. This enables us to handle client needs from the design to the delivery of finished parts. As an SME, we are also able to be more flexible than larger suppliers and, due to the size of their operations, we also provide a much more cost-effective solution in many cases. We are able to provide a complete turnkey solution, in rapid turnaround times, with regulatory compliance for all our processes.

You are a member of Torino Piemonte Aerospace. What advantages does membership bring to SMEs such as Aerotech?

Our first advantage is having a broader view of local companies also working in the aerospace sector and we benefit from having a more general view of the capabilities within the region. By forming working clusters through TPA, we are able to present ourselves to international clients with a complete solution. Being a member of TPA needs to become more commonplace as the ability to form working clusters is a great advantage. It makes it clearer to our clients that there is the possibility to develop products with a group of enterprises and satisfy their entire list of requirements.

Do you face any particular challenges within the Italian aerospace market and could you elaborate on these?

The Italian market has a fundamental problem of the limited technological development and therefore the high costs of production. This could be resolved by a reduction in bureaucracy, an increase in our global competitiveness, and more efficient internal cost management. In my opinion, Leonardo should better identify the capabilities of Italian SMEs, which could bring about more efficiency and maintain the high standards of production for which Italy is known. Nowadays, almost all projects are channelled through Leonardo. The company needs to be more aware of the consortiums of small business, which together are able to offer increased efficiency in terms of time and costs. This is why consortium and cluster opportunities are extremely important for Italian SMEs, as it will allow us to gain some market share and open up our own direct channels to international companies.

Aerotech celebrates its fifth anniversary in 2017. What is your future vision for the company to the end of the decade?

Our target is to increase the capacity of our supply chain. We would like to gain ISO 14,000 and 18,000 certifications on occupational safety and the environment, which will be beneficial for our dealings with the international market. In parallel, we would also like to gain qualifications for heat treatments and sealants, and non-destructive testing.

Our broader vision relates to making Aerotech more attractive to new customers. In spring 2016, we carried out our first work on behalf of CERN, which should enable us to present our production capacity and market resources to the wider market. Aerotech's aim is to reach the end user of a product and be able to satisfy the needs of the final customer via our work with a consortium by 2018.

Teresa Alasia, Davide Fusta & Maurizio Burdese

TA: CEO
DF: New Business Development
MB: Sales Manager
ALFA MECCANICA

Could you tell us more about how the company has evolved, particularly since 2008, when you moved to this facility and began to expand the business?
TA: Alfa Meccanica was founded in 1975 and was located near the big players in the industry, growing alongside its customers such as GE Avio Aero and Leonardo. We began with five employees manufacturing small components, investing in new machines and technologies as we could. Our first site move was in 1993 as our high production volumes, increased number of employees and growing numbers of contracts meant we lacked space for operations. In 2008, as we needed to install new, larger machines to cope with growing demand, we moved to our current location. We now have almost 50 employees, 30 of whom work in production and the remainder in services, sales, administration and engineering. Our primary goal is growth and many of our business lines are of interest to the wider European market. Although around 95% of our current clients are domestic, we have started looking at expanding our international reach. This has involved participating in international events, and we have joined TPA and Altair Consortium as we believe this will be beneficial to our growth.

Alfa Meccanica's main focus is high precision machining. Could you tell us more about the products and services you provide and how you can tailor these to individual client needs?
DF: We have four business lines and our primary role is as manufacturer of mechanical components. Our core business covers engine components and comprises 60% of our revenue; our second line comprises the structural parts of aircrafts, in particular wings and their subcomponents, and this covers up to one quarter of the business. Alfa Meccanica's third line of business, and something which we are attempting to develop further, is the niche market of space applications. The fourth line, which brings together aspects of the previous three, is the design and manufacture of fixtures for aerospace products. The company would like to break out of its current specialization of high precision machining by adding value to the mechanical part. We are now investing in plants in order to meet our customers' needs and provide parts undergoing non-destructive, in-house testing, in order to reduce the overall time needed to manufacture and test products.

What specific challenges do companies such as Alfa Meccanica face when working across the aircraft, helicopter, space and defense sectors?
DF: We are required to align customer needs with safety and regulatory standards. 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. 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.

Could you tell us more about the advantages of TPA membership and your role within it?
MB: Our commercial strength alone is not substantial enough to face the big players. Being integrated in TPA opened some doors that we did not have access to before through various international meetings and mission visits. The aim of both Altair and TPA is to approach big customers that need complete solutions like us. We share strong working relationships with the other companies in both Altair and the working groups within TPA and perform to a high standard. Because companies such as Rolls Royce are looking to consolidate and reduce the number of suppliers on their books, it makes even more sense for us to combine forces.

Where do you hope to see Alfa Meccanica by 2020?
MB: We would like to expand our plant and personnel numbers and integrate new equipment and machines. We are stable in the Italian market and hope to diversify our customer base by building our business abroad. In the next five years, our goal is to see more equilibrium between our four business lines: around one third in engine components, one third in space applications and the remainder focused on serving the international market. We also hope to build our capabilities in developing systems, in addition to manufacturing components for the Italian and international markets; we have 40 years of experience in components and in the future would like to venture into complex parts and systems. Working in partnership with other companies is vital to this vision.

Oliva Gennaro

CEO
BYTEST

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 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.

Nicola Gullino

Managing Director
TECNO TESSILE ADLER

Adler Group was founded in 1956. Could you give us a brief history of the group and where Tecno Tessile Adler fits into this?

Adler Group is a €1.6 billion group mainly involved in the automotive industry. The company was founded in 1956 by Achille Scudieri, whose family still owns the group. Adler Group re-cently acquired HP Pelzer Holding, one of the group's main competitors in the automotive sector, enabling us to become the second largest group worldwide specializing in sound-proofing. Today, the group comprises 68 plants across the world and supplies nearly all the automotive OEMs in Europe, Asia and the NAFTA regions.

Adler Group is a vertically integrated and innovative company, which possesses technical leadership in the industry and the capabilities to manufacture tailor-made products. Tecno Tessile Adler (TTA), one of its subdivisions founded just four years ago, mainly operates in composites and aeronautics. In 2010, Adler Plastic merged with Ilmas, a renowned aero-nautics company. We perform different roles on the manufacturing side and act as both cli-ents and suppliers. Our supply chain is global, which is sometimes essential in ensuring a high-quality product.

How has Adler Group's prominent position in the automotive sector helped to promote the aerospace business?

There are many synergies between the automotive and aerospace industries, and it was a strategic decision to move into aeronautics. The crucial difference between automotive and aeronautics is that the former is spread across the world, while the latter is concentrated in certain regions with strong clusters linked to major clients. The Italian regions have a strong aerospace tradition and a comprehensive supply chain. Last year, we signed a contract with AgustaWestland, a renowned helicopter design and manufacturing company, to create a VIP version of the AW169 interior. It was a revolutionary decision for a helicopter producer (AgustaWestland) to abandon its supply chain and numerous small suppliers, and select just one company to provide the full spectrum of services, starting from design.

TTA's 2015 €80 million revenue was split between aerospace and automotive, with aero-space accounting for between €25 – 30 million of the total. Ideally, we would like to even out the total volume of business between these sectors. I believe our performance in aero-space is quite promising, and we see a lot of potential there. Although the pace of business is much slower than in automotive, the supply chain is traditionally linked to key clients. We have been proactive in entering a difficult-to-access market. We have secured some com-pletely new clients, and our progress over the last year and a half has been encouraging. The first helicopter interior we did last year, for an Emir of a Middle-Eastern country, was very challenging as it was a completely new experience for us. The result, however, surpassed our expectations.

You opened your new plant in 2013. Could you tell us more about your facilities here and the advantages of being located in Piedmont?

We have two plants located here in Rivoli. One of these focuses on galvanic treatment, which is not so common in Italy. We also have a plant in Campania, where we bring to-gether all our composites (carbon fiber) production and assembly parts, as well as most of our interiors for helicopters. Additionally, we have an independent base at Agusta-Westland's plant in the Province of Varese to mount our interiors. The plant in Campania employs 600 people, and we have a further 15 employees at AgustaWestland's plant in Cascina Costa and 100 more here in Piedmont.

On a group level, we partner with Italian Universities, including Politecnico of Turin, and public research institutions on several projects in aerospace, including recycling fabrics and carbon fiber. As TTA, we also benefit from the group's six R&D centers and the large amount of investment into R&D. 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.

What are your goals for the future and how are you planning to achieve them?

The interiors business that we are developing springs from our expertise in the automotive industry. We would like to develop this business unit and reach out to new international cli-ents, as well as maximize our reach globally.

Stefano Serra

CEO
TESEO

Teseo was established in 1978 and became a major player in EMC testing equipment. Could you provide us with a brief history of the company and its development?

Teseo was established by four engineers and initially focused on key technologies in electronics, radiofrequency and fiber optics. We entered the EMC environment when it was in its very early stages, and were well placed to develop the technology and lucky to work with some pioneers in the field. From that point on, our EMC instrumentation has been one of the top ranges of products used in EMC testing. Since the early 1990s, we have applied manufacturing principles to our products and have become a top tier supplier in test benches and test instrumentation for R&D, manufacturing and ground support equipment. In 2012, the company was acquired by Clemessy SA, part of Eiffage Group, to add technical expertise within this sector and establish the Group's presence in Italy.

Teseo supplies full test benches. What are the benefits of this service to your customers?

Test benches now account for more than one third of our business. We have the capability to provide test benches that can be used throughout the entire manufacturing process on a single platform, from the R&D phase to the maintenance stage. Recently, in collaboration with Clemessy, we delivered an extremely advanced integration rig for IspanoSuiza's 'more electric aircraft' and the challenging solid rocket booster test stand (BEAP) for ESA.

We also tend to design core technology platforms for the manufacturing line and then migrate them into ground support equipment for flawless maintenance operations. This particular approach enables every aircraft to be tested with the same coherent platform. A key example is the services we provide to the Eurofighter Typhoon's combat avionics; our involvement included end-of-line testing, integration rig, and aircraft grand support equipment. Because this equipment requires preventative maintenance and calibration to determine the simulation equipment's error margins, we also perform calibration tests through our accredited laboratory. We use this facility for both the instrumentation we produce and for third party equipment.

How have market requirements and the needs of your customers developed over the last 30 years?

The industry has certainly evolved, particularly in terms of the consolidation in the aeronautic business over the last 25 years. Because of this, we have had to change our approach to the customer. The industry is no longer supported by substantial investment plans from the different defense ministries, and cost is more of a challenge. The off-the-shelf technology platforms and virtual instrumentation we have developed in-house give us a strong competitive advantage, and our innovative approach has contributed to our selection as National Instruments Platinum partner; we are the only Italian accredited entity able to perform calibration on their own instruments.

In terms of technology, the industry is increasingly moving away from mechanics and hydraulics to mechatronics. This is creating great opportunities for companies such as ours, because traditional suppliers of testing systems for hydraulic equipment don't have the skills and capabilities to adapt to new trends.

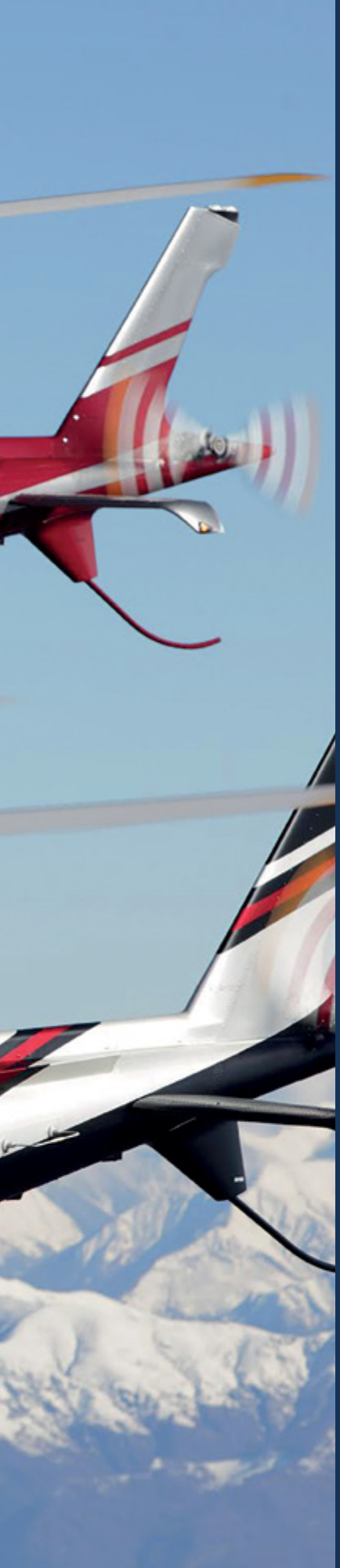
How have you adapted to the changing market conditions, and what sets you apart from your competitors?

From a technology perspective, we can offer our customers a flexible and complete service, for which most of our competitors lack the capabilities. Our mechatronic test bench, for example, comprises many building blocks that can be combined and integrated to support specific requirements. These systems apply not just to one product, but a family of products, with every test bench serving roughly 15 to 20 different actuators. The flexibility in the manufacturing line is phenomenal. Equally, this approach allows customers the flexibility to build on their current capabilities.

2018 will mark Teseo's 40th anniversary. What are your plans for the future, and what areas do you see as most instrumental to your strategic growth?

The strategy is always to preempt and meet the needs of the industry, and a key challenge is to become increasingly capable in serving multinational customers. Production rates for aircraft are increasing, putting a strain on manufacturers and their suppliers. Production of the Airbus A320neo, for example, is driving demand for aeronautic component suppliers at levels similar to demand seen in the automotive industry. We have, however, invested over the last six years to meet these challenges, building core technology platforms that today fast track our test bench delivery and dramatically reduce risks and costs for our customer. Nonetheless, we will continue to invest in R&D, which usually ranges from 8-10% of our annual revenue, and innovate and deliver customized solutions.

Image: Finmeccanica



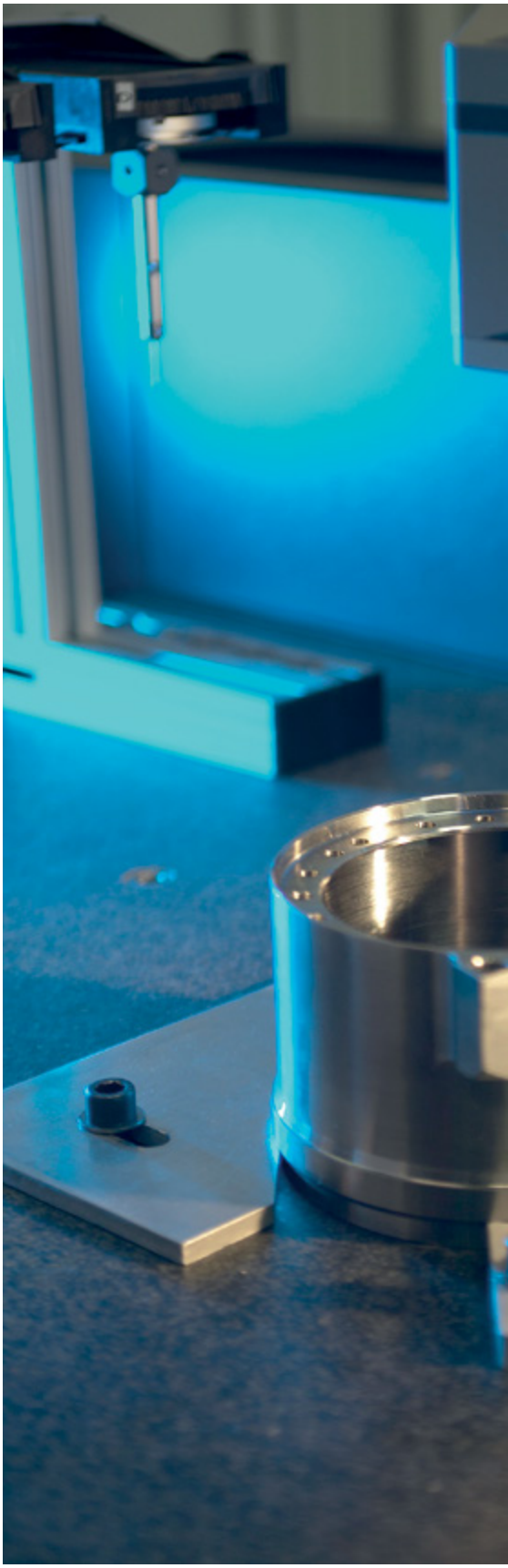
Industry Structure

"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,"

- Dario Piola,
General Manager,
Tubiflex

Stick to the big guns or strike out on your own? The choice faced by Italian SMEs

By Harriet Bailey



Leonardo the leader

Italian SMEs up and down the country invariably work, directly or indirectly, for Leonardo. Known as Finmeccanica until the start of 2016, the company underwent a re-branding at the same time as integrating a host of its subsidiaries, from helicopter specialist AgustaWestland to aeronautical company Alenia Aermacchi, into the new entity. The ninth-largest defence contractor in the world, Leonardo has divided its operations into seven divisions, ranging from aerostructures to defence electronics.

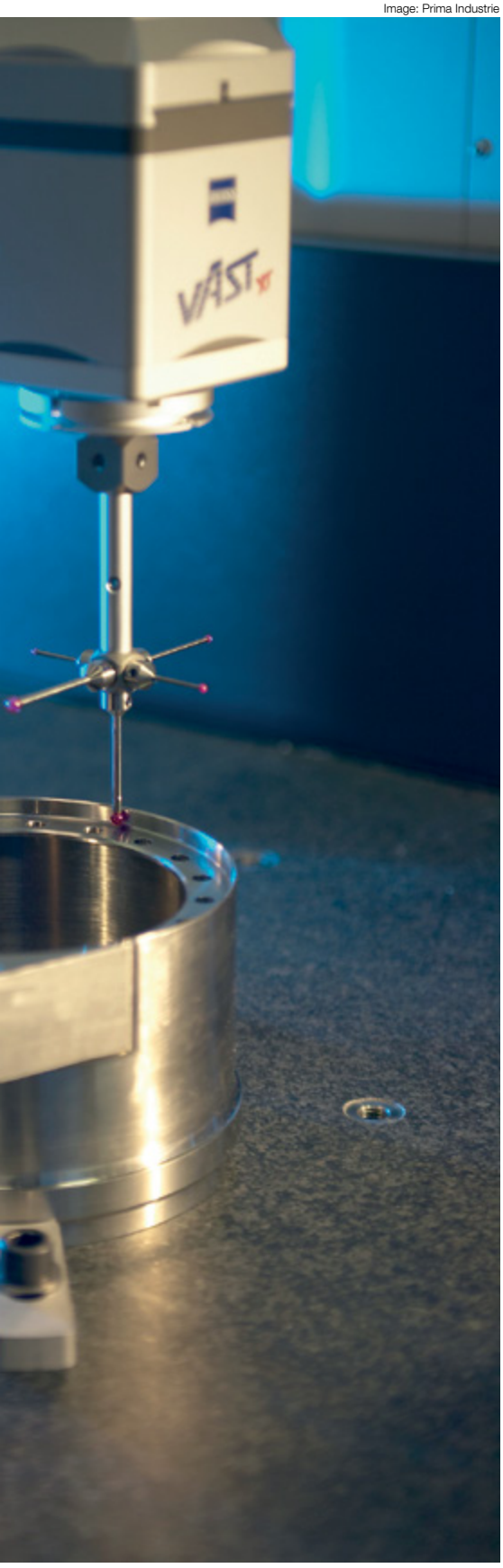
The impact of this reorganization can be felt across the Italian aerospace industry; from the government, which owns more than 30% of the company's shares and is the largest stakeholder, to SMEs, which may now fear for their contracts as the company looks for synergies in its supplier base. One such company is Prestel Avio, the Italian leader in wire harnesses for the aerospace industry. "We are mainly focused on the domestic market, as almost 90% of our business is with Leonardo-Finmeccanica. This is a weakness for us, as we are dependent on their decisions and sales in the market," said CEO Stefano Asteggiano. "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."

The company is working on an internationalisation strategy, and joined Altair Consortium to have access to a wider market of end users alongside other member companies. Being in a consortium should also mitigate the effects of any supplier changes as a result of Leonardo's structural reorganisation. "Most of the companies within Altair are already suppliers of Leonardo-Finmeccanica; this suggests the company should see synergies in terms of directly interfacing with the consortium rather than each company individually. However," explained marketing and sales manager Andrea Clerici, "the company has so far not chosen to do this, as it is accustomed to handling its relationships with us separately."

This view is shared by components manufacturer Aerotech. CEO Lorenzo Carrera also sees opportunities to gain market share by being part of a consortium, with the increase in total size and revenue opening up direct channels to international companies, by-passing Leonardo. "Nowadays, almost all projects are channelled through Leonardo. The company needs to be more aware of the consortiums of small business, which, together, are able to offer increased efficiency in terms of time and costs," said Carrera.

Sheet metal manufacturer HTF is reliant on Leonardo for around 65% of its business, but would like to grow the 35% of its turnover attributable to overseas exports. However, Finmeccanica's relationship with its suppliers created a certain way of operating in Italy, which may now need addressing. "For many years, Leonardo has been against partnerships amongst small and medium companies as they can manage us better as separate entities. The more

Image: Prima Industrie



we grow and create partnerships, the larger the scope for us to make things more challenging for Leonardo in terms of bargaining power," explained sales director Patricio Vander Elst. "They [are now beginning to] feel uncomfortable if more than 60% of our turnover comes from Leonardo, but we are dependent on them and have been for many years."

Nevertheless, some companies herald Leonardo's re-structuring as beneficial for, not only their business, but the growth of the entire industry. Labormet Due, a company focused on quality control of aeronautical parts, has high hopes for the future: "I believe the reorganization of Finmeccanica can positively contribute to Italy's aeronautic sector, providing a new impetus," said CEO Riccardo Girelli. "For Labormet Due, it will positively affect our tools sales and the implementation of projects in the area of control."

With Leonardo's re-branding and consolidation of a number of foreign subsidiaries under one umbrella, current suppliers may also be able to gain international exposure as suppliers to a wider audience. Hose and tube manufacturer Tubiflex, recently acquired by Interpump Group, hopes to expand its aeronautical segment; at 18% of overall revenues, it is marginally behind the company's automotive segment, on 20%. "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," commented general manager Dario Piola.

Finding their niche

Nevertheless, there are a host of SMEs in Italy which are unaffected by the internal workings of Leonardo. These companies typically focus on niche areas of the aerospace industry, whose specialized activities do not serve the mass market. Primavis, for example, is working on a number of engine solutions which are cleaner, smaller and lighter than those currently on the market. Working on a two-stroke principle but in a split-cycle configuration means pollution levels are lower than normal. Once the trial phase is completed and industrial production is reached, CEO Luca Morfino is confident it will have many uses: "There is a high demand for range extender solutions, which is a system based on combustion engines and electric motors with which currents can be generated."

Although currently envisaged for use in electric cars to provide a back-up should the charge run out, he also confirms this can be used as an auxiliary power unit in small aircraft. The company has already presented the first ever parallel hybrid aircraft in collaboration with other local SMEs. "It functions similarly to cars such as the Toyota Prius. They are able to fly in normal mode, with just the 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. Additionally, it is possible to recharge the batteries during the flight utilizing the electric motor as a generator," explained Morfino.

Working with Primavis on this hybrid solution is Digisky, an avionics equipment firm founded by former ASI astronaut Maurizio Cheli. The company is working on a number of new technologies, typically involving adapting products found in military aviation to the commercial sphere. This includes the smart glasses product, Eye-4Flight, and Digisky's flagship technology SmartBay. "This is a gyro-stabilized interface allowing for 'plug-and-play' of various sensors for aerial missions on already existing aircraft. It has three payload slots, allowing for different recording tools and sensors to operate at the same time, weighing up to 40 kilograms overall," outlined Cheli. "The system is connected to the hangar by Wi-Fi, allowing for upload and download of information between the two docks."

The system is currently in the certification process and it is hoped will provide a more readily-accessible solution to, for example, farmers looking to monitor crop growth. With Cheli's background as chief test pilot for the Eurofighter Typhoon, Digisky is also creating its own light aircraft for personal use. "The flying characteristics of our plane are closer to those found in a military trainer. It is at the top end of performance in its class at a considerably lower price," he commented. "This plane will also enable us to conduct further testing of Eye4Flight, as well as some of our other products and solutions."

Also designing his own plane is Alberto Marchini, founder of small parts manufacturer Marc Ingegno in northern Piedmont. This stems from his own experience as a light aircraft enthusiast and the difficulties of landing on unprepared strips in the Italian Alps near his home. Far from working through bigger companies to gain access to the market, Marc Ingegno is leveraging its innovative design to generate interest: "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," said Marchini. "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."

New planes, however, require new technologies to ensure the safety of pilots and passengers. Engineering company Amet, which was one of the first two companies to be part of the Innovative Enterprises Incubator at Politecnico di Torino, focuses on niche projects in this field using virtual simulation. "At present we are focusing heavily on reducing the impact of bird strike on military aircraft. In the past, this was done by physical testing with live birds and real aircraft – key problems being lengthy processes and high costs," said technical director Paolo Cavallo. "We are now conducting similar tests using virtual simulation. We can control variables and conduct a much wider range of tests without hindering the dynamic performance of the aircraft."

Delta-Ti is also working on simulator projects to ensure a plane's safety. The EPC company works on thermo-technic solutions in the aerospace sector, testing the endurance of various plane parts. It worked on a conditioning system for the Sky Light Simulator, of which there are only four worldwide, to test light refraction in onboard instrumentation. Millions of bulbs are used to create a brilliant light, which also produces heat and humidity, impacting on the testing. "Another example is the anechoic chambers," added CEO Giorgio Bignelli, "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."

In order to test for any internal defects on parts that might affect the structural integrity of a plane, a completely new type of testing has been developed. GE Aviation has developed the Measurement and Control Phoenix computed tomography (CT) system, and the only company which currently operates this machine in Italy is quality control company Labormet Due. "This service 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 great benefit for our clients for us to provide this service," said CEO Riccardo Girelli.

The wealth of information that can be gleaned from various modelling and control testing could prove useless if it were not for the systematic approach adopted by Modelway. The company has designed data-driven software solutions to try to make sense of virtual testing methods and allow for continuous innovation and improvement based upon the outcomes. As CEO Mario Milanese explained, this is not a very well-developed area at present, particularly in the aerospace industry, and the company is working on its own proprietary technology for the "Big Data"-focused world of the future. "This need for data and the capability to glean useful information from it is not only useful for the world of technology, but is becoming increasingly useful from automotive and aerospace perspectives," elaborated Milanese. "For example, increased passenger safety and reducing emissions are two of the drivers requiring big data usage. 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."

The upheaval in the Italian aerospace industry at present, as a result of the re-structuring of some of the biggest companies in the market into one integrated corporation, presents an opportunity for many companies to broaden their customer base and develop new solutions and collaborations that could benefit both themselves and the wider industry. The resilience and inventiveness of Italy's aerospace companies should certainly steer them through choppy waters to a new reality.

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.

Maurizio Cheli, Paolo Pari & Carlo Caiaffa

MC: Founder
PP: President and CEO
DIGISKY
CC: President
ALWAYS ITALY

MC

As a former astronaut and test pilot for the Eurofighter Typhoon, could you explain why you entered the sports aviation space with Digisky in 2007?

MC: Digisky was borne out of a passion for light aircraft and sports aviation. It was clear that there was room to bring the solutions usually applied to commercial or military aviation to the sports aviation arena, with the due differences in scale. The added advantages of this approach would be that certification is not required in the sports aviation field, meaning there is the scope to innovate without the burden of bureaucracy. We have been able to experiment with different solutions before spending time and effort on certifying the right method. Furthermore, working on new technologies in sports aviation means we can solve problems much more rapidly than in the commercial space; this is the equivalent of fast prototyping in manufacturing.

Could you tell us about some of the key products and solutions you are designing and what makes them innovative in this field?

PP: Our flagship product is SmartBay, which is a gyro-stabilized interface allowing for 'plug-and-play' of various sensors for aerial missions on already existing aircraft. It has three payload slots, allowing for different recording tools and sensors to operate at the same time, weighing up to 40 kilograms overall. The system is connected to the hangar by Wi-Fi, allowing for upload and download of information between the two docks. As well as coming up with new technologies, innovation also focuses on adapting equipment from other areas to the requirements of aviation. This can be seen in our smart glasses product, Eye4Flight; as well as applying expertise from different industries to the aerospace field, we are also adapting a new technology to the needs of the industry.

Digisky is also working on designing its own light aircraft for personal use. What sets it apart from other aircraft of its kind?

MC: The flying characteristics of our plane are very different and, because of the width of the cabin and the performance of the engine, are closer to those found in a military trainer. It is at the top end of performance in its class at a considerably lower price. We are working on this project with my other company, CFM, and Primavis. This plane will also enable us to conduct further testing of Eye4Flight, as well as some of our other products and solutions.

What is the regulatory environment like for small companies such as Digisky and how are you able to navigate the various organizations involved?

MC: It's a heavy burden. We have therefore enlisted specialised companies to help us with gaining certification for SmartBay and our other solutions. We still need to develop the expertise required to handle the bureaucracy found in this type of regulation. From our perspective, small companies do not have the necessary structures to support a regulatory environment that seems to be aimed at larger companies with dedicated departments. Furthermore, although many of the regulations are now at the European rather than the Italian level, this is sometimes more efficient than Italian bureaucracy.

Considering research and development is so important to Digisky, how does the company receive funding from national and international bodies?

MC: As with the regulatory framework, applying for and receiving funding is both difficult and burdensome, as the process is very bureaucratic. The main sources of funding are Regione Piemonte and European projects. 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. For us to manage this type of program is almost impossible, and therefore our only option is to join a program managed by a bigger company. We try to join programs in which the areas of focus align with our expertise and areas of interest, and develop a small piece of the puzzle.

How supportive are the regional and national governments to small- and medium-sized companies looking for funding in the aerospace sector?

MC: We believe there is room for improvement. Many small companies would benefit from centralised support on legal and accounting issues, internationalisation and collaboration opportunities. Increasingly, large companies are willing to work with small players because they understand there can be a lot of inertia in their own companies; while they have the financial backing and international standing to bring in other partners, they lack both agility and ability. Companies such as Digisky have the technologies they require.

What can we expect for the future of both the Italian aviation industry in general, and Digisky in particular?

CC: We are at a crossroads in our growth, and the first milestone is to find an equity partner. We are currently too small, in terms of equity, to be considered for a large research project. However, one of those projects could change the shape of our company. We are currently in the process of receiving governmental endorsement for our solutions to be used as an emergency management system, for example.

While the regional government's spending on the aerospace industry over the past decade is impressive, the logic which has been used so far is that 80% of this funding must go to large organisations and the remaining 20% should be allocated to small companies such as ourselves. This creates a problem as the Italian aerospace industry is predominantly made up of SMEs and therefore a select few companies at the top are receiving the bulk of the available funding.

Digisky is a unique example of a company which has created a commercial company using results from publically funded projects; with more funding allocated to small companies, Digisky's model could be replicated. Our feeling is that smaller companies will achieve greater results with a minimal amount of funding, while large amounts of money pumped into the prime companies generate less dramatic outcomes.

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. As a TPA member, it 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.

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 twenty 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 centres 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 centres 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.

Alberto Marchini

Founder
MARC INGEGNO

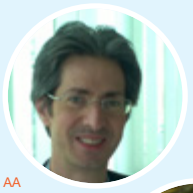
Marc Ingegno was founded in 1992. Could you tell us about how the company has evolved over the last two decades?
When I was building my own aircraft, I decided to produce the wheels and brakes myself, as they were very expensive otherwise. From there, I started to produce some small parts, leading on 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, while 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.


AA


PC


VR

Andrea Argondizza, Paolo Cavallo & Vittorio Roccavilla

AA: CEO
PC: Technical Director
VR: Sales Director
AMET

You founded the company in 1999. Could you tell us more about the development of the company since its founding?

AA: AMET is an engineering company that was established in 1999 as a spin-off from the mechatronics laboratory of Politecnico di Torino. As well as using the skills and competences we developed there, we are aiming to bring the company into the industrial environment together with the technological applications and tools we have since developed. AMET's skills include mechanics, electronics, automatic controls, computer science, and the overall integration of these domains. We were one of the first two companies to be a part of the Innovative Enterprises Incubator of the university and, during the first three years, we received assistance from the incubator in setting up the company, establishing a management and organization structure and improving our technical and commercial skills.

We have 40 full time employees, most of whom are based in our Turin office, as well as two other offices in Italy to support our customers in different regions. AMET also has a subsidiary in Slovakia, where we share a good relationship with a local technical university. We also have a commercial office in Detroit, United States, which enables us to increase our visibility with customers in North America.

How important is the aerospace industry to your overall operations and what proportion of your market is based in Italy?

VR: AMET offers products and services to the transportation industries in general; this term includes the automotive, aerospace and railway sectors. The share attributed to aerospace fluctuates, with the maximum being approximately 15%. It is part of our strategy to grow this share and diversify into other industries as the automotive sector is currently the largest contributor to our revenue stream. Although the largest share of our revenue comes from Italy, it varies on an annual basis. Europe, North America, Asia and South America have previously contributed up to 35% of our turnover. Therefore, growing internationally is an important part of our strategy.

Could you provide us with an overview of the technical services you provide to your clients and any projects you are currently working on?

AA: Around half of our revenues come from our virtual simulation business line, which gives us the capability to support the design and development of new products for performance testing, covering areas such as 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 in order to provide a certain performance. In terms of aerospace, safety is unsurprisingly a top priority. We have the capability to perform analytical testing during the development of new aircraft.

A second area is automatic controls for embedded systems, where the focus is more on the design, development and testing of electronic controllers, including avionics and any kind of automatic control system on board. We are supplying some test benches for real-time simulation, for example in the area of space launchers. Our clients use our HIL testing equipment to verify and validate avionics and electronic controllers. Our third business line is consulting, in which we focus on data management for both aircraft and vehicles. We have developed some methodologies and software tools to manage and analyze weight performance during new projects.

PC: AMET is very focused on niche projects utilizing different methodologies from other fields. A classic example is bird strike, which is very dangerous to both the aircraft and passengers. At present we are focusing heavily on reducing the impact of bird strike on small aircraft. In the past, this was done by physical testing – key problems being lengthy processes and high costs. We are now conducting similar tests using virtual simulation. When looking at the bird impact against the canopy for example, we are trying to see if the pilot and co-pilot will survive. We can control variables and conduct a much wider range of tests without hindering the dynamic performance of the aircraft.

How can the aerospace industry implement more sustainable operations and are we seeing a shift towards alternative materials?

PC: 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 fluidodynamics simulation (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.

Could you tell us more about some of the research and development projects on which AMET is currently working?

PC: We are very active in our research and innovation activities based on our experience with Politecnico di Torino. We believe our key asset is to be on the cutting edge of new technologies and methodologies. We participate in a number of partially funded projects at a regional, national and European level. Within some of these initiatives, we are working on space exploration projects on the Moon and on Mars that have been partially developed and prototyped in Turin by both companies and research organizations. We have developed a network of embedded controllers of the Mars Rover demonstrator. AMET is also leveraging its skills in modeling complex robotics systems to realize test equipment to control the structural integrity of composite parts.

What is your future vision for AMET by its 20th anniversary in 2019?

VR: Our aim is to continue to grow as a specialized engineering company, increasing our customer scope and the markets in which we are present. A large proportion of our revenue comes from services, and we are trying to grow the products that come from our experience and development of methodologies, which will also enable us to have a better balance between products and service provision. Our efforts are targeted to increase our revenues in markets such as railway and aerospace.

Mario Milanese & Ilario Gerlero


MM


IG

MM: CEO
IG: Engineering Project Manager
MODELWAY

You founded Modelway in 2004 as a spin-off of the Politecnico di Torino. Could you tell us about how the company has developed since then and any recent major milestones?

MM: I founded Modelway to transfer to the industrial world the innovative methods of modeling, virtual sensing and control developed by my research group at Politecnico over a period of 20 years. We have made several successful applications in the automotive, aerospace and biomedical industries. Our focus is on the modeling and control of complex systems because, in these areas, there is a need for continuous improvement in performance, safety and quality control. We have also been working on patent applications for our proprietary software and technology in order to be able to face challenging problems in these industries. Because we are located in Turin, the hub of Italy's automotive industry, our main area of application up to now has been the automotive sector. Our key idea was to solve complex problems in this field and, having carried out more than a decade of work, we hope we have managed to achieve this goal.

How do you provide tailored solutions to your clients' needs and why do clients choose Modelway as their partner?

IG: We try to offer solutions to challenging problems that our competitors cannot. During our experience with Politecnico di Torino, we adopted a systematic approach for modeling and control. This is a data-driven approach for the development of virtual sensing and control solutions that is currently not well developed in the aerospace field. Nevertheless, we are sensing a growing interest from Italian aerospace companies as well as large multinationals.

Could you tell us more about some of the innovations Modelway is coming up with and also what we can expect to see in terms of new technologies in the sector in future?

MM: Within flight control and engine control, for example, standards are becoming more stringent for improving performance and reducing emissions. Such requirements are gaining importance and are the catalyst for increasing research and development activity within the aerospace industry. We are able to show, using our applications, that we have been able to develop technology with better proven results than standard methods by reducing the time needed to design the control. This is a key advancement because the time required for designing a new application to adhere to new regulations is an increasing problem.

IG: 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. We have developed self-tuning control (STC®) technology, a trademark owned by Modelway. This technology allows rapid control development for electromechanical actuators from experimental data. So, if a customer approaches us with a prototype, we can acquire data from experimental tests and, 10 weeks later, we can develop a control to be tested.

You are a member of Torino Piemonte Aerospace. What advantages does membership of this organization bring to Modelway?

MM: We have been a TPA member company for four years. They help small companies through the promotion of our work through various initiatives on an international scale. This is an important door for SMEs such as Modelway to reach big players with complementary capabilities that we do not possess. TPA tries as far as possible to match the innovative technologies of the small players with larger players in the industry and, from our perspective, this has been successful so far. In particular, thanks to an overseas mission organized by TPA, we are now negotiating two important new contracts.

Having recently celebrated a decade in operation, what is your vision for Modelway in the next five years?

IG: Our goal is to grow significantly outside of Italy. The future holds opportunities for Modelway, and we hope to offer more than engineering services by providing products with embedded solutions for control. Thus, we hope to provide more than just software to our clients. We are planning to develop a chip for on-board computers that are able to implement innovative solutions in an efficient and simple manner. This will allow us to grow significantly and enhance our opportunities to work with large companies.

MM: We are also seeing a huge movement in IT and data-driven solutions – so-called "Big Data". This need for data and the capability to glean useful information from it is not only useful for the world of technology, but is becoming increasingly useful from automotive and aerospace perspectives. For example, increased passenger safety and reducing emissions are two of the drivers requiring big data usage. 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.

Marco Pirovano & Andrea Magistrelli

MP: Technology Director
AM: Head of Technical Division
T.T.N.

T.T.N. was established almost 40 years ago. Could you give us a brief background of the company and its key developments?
MP: The company was established in 1978 with a focus on heat treatment processes. Since then, we have continuously improved and increased the capacity of our nitriding plants, which at the time of their construction were the largest in Europe in terms of overall size. Nitriding is a treatment that seeks to minimize wearing and corrosion. Over time, we diversified into other heat treatment processes, primarily carburizing, until we were able to offer the market a full range of heat treatment processes. Our capabilities now extend across surface and core heat treatment.
We have also invested in the geographic expansion of the business, in order to place ourselves closer to the customer, which is important in our business. Of our six plants, five are in Italy and one is in Spain. Four of the six mainly serve the same purpose, and two are becoming more vertically integrated, in order to offer the customer the most complete solution. Our Frioli plant, for example, forges parts and, starting with the raw material in the steel mill, molds it into a finished product. Our other activity is the machine shop.

Your processes are applicable across many sectors. How important are aerospace customers to your business?
AM: Heat treatment is important for any metallic part, so we work for energy, automotive, mechanical, heavy engineering, and aerospace and defense customers. In terms of the specifications and precision of the plants required, aerospace and defense is borne from the energy and automotive fields. Although it is only a small focus area for the global group, at about 3% to 5% of business, it is nonetheless important to us, especially in terms of elevating ourselves on a global platform.

You operate primarily in the automotive field. What are the key differences in requirements for your customers in the aerospace and automotive sectors?
MP: The key differences are not between the two systems, but the capacity of the company to produce the parts internally and cater to the different certification requirements. For aerospace customers, T.T.N. has a facility that is approved by NADCAP. We also have another company in Veneto that is ISO TS-approved, the equivalent standard from the automotive industry. The automotive business is much more characterized by extensive paperwork, but NADCAP is more severe in terms of process. The audit takes place on the job from beginning to end, so you have to treat the process with extreme care.
AM: Aerospace deals with larger parts, but a smaller number of them. In automotive, however, you have a very large number of components within each order, so they are very focused on traceability, and you have to be sure to avoid mixing and losing information about the parts. In terms of aerospace, we are dealing with fewer components. Because each component is costly, you have to be more careful with how you treat it, particularly in terms of the type of instrumentation and quality standards used.

It must be important to remain at the forefront of innovation and maintain a strong corporate strategy. Where are you focusing your R&D efforts?
MP: We are focusing on expanding our capabilities to provide a more integrated solution to our customers, and a more flexible service. We are moving in the direction of jumping straight to the final customer – Rolls Royce, Snecma, and so on. We hope to supply full components, such as turbine shafts, to the end customer, starting with the raw material and taking care of the process all the way through to certification.
The possibility to offer a complete part offers us a competitive edge and a unique advantage. In terms of heat treatment processes, NADCAP provides an additional advantage that sets us apart from our competitors. Our expertise is very broad and spans across different fields and can be applied to aerospace.

What are some of the company's key objectives over the next three to five years?
MP: One of our priorities is to provide services directly to the end customer. Currently, large players such as aircraft manufacturers are conducting heat treatment within their own facilities, partly because they believe the treatment is too sensitive to outsource. However, the mood is changing, creating opportunity for the company, and also the challenge of meeting this potential demand. As the final treatment, occurring just before installation, it is the final fingerprint on the component, and therefore has to be perfect. For this, we have to be closer to these customers, to be prepared for when their strategy changes. We also need to build the customer's confidence, which takes time, and this will be a priority for us.

"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. Working on these nanosatellites is a great motivator for our young engineers, who deal directly with NASA, and more than compensate for any potential experience gap with their motivation and enthusiasm."

- David Avino,
Managing Director,
Argotec

"The domestic market is the most relevant for the aerospace sector, and we see involvement from both the large players and the state. The sector is undergoing a reorganisation 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. We can expect to see more evidence of this trend in the coming years."

- Mario Brossa,
CEO,
Teoresi Group

"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. 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."

- Vito Riggio,
President,
Italian Civil Aviation Authority (ENAC)

"Production rates for aircraft are increasing. Production of the Airbus A320neo, for example, is driving demand for aeronautic component suppliers at levels similar to demand seen in the automotive industry. In terms of technology, the industry is increasingly moving away from mechanics and hydraulics to mechatronics."

- Stefano Serra,
CEO,
Teseo

"In China, two countries are perceived to have a very strong brand - Italy is one, with the other being Germany, particularly for mechanical engineering. There have been increasing trends for mid-range products, where previously many Chinese products operated in the segment of low manufacturing costs, low prices, but low performance."

- Gianfranco Carbonato,
Executive Chairman,
Prima Industrie

"The aerospace market is ruled by a complex set of regulations that covers everything from design to operational requirements. The next aim of the European Aviation Safety Agency is to develop common certification specifications, along with the United States and other countries, and ultimately advance this into global safety standards."

- Matteo Vazzola,
Technical Director,
TPS Aerospace Engineering

"Piedmont and Lombardy are the two main regions for aerospace in Italy, growing around Thales Alenia Space in Turin and AgustaWestland in Vergiate. These major companies have given these regions an opportunity to grow in the aerospace market. The Italian government provides a lot of support to the southern regions of Italy, giving them a chance to grow quickly using government support and funds. The northern parts of Italy have more traditional companies that were started earlier and have a slower growth rate, yet are more robust and resilient as a result."

-Guglielmo Pisapia,
CEO,
S.I.ME

"Generally, research programs involve improving the quality of current projects by using virtual and computer simulations. New materials and new technology can facilitate this process and add value in terms of new methods for testing. The cross-correlation between the different fields makes it possible for us to apply capabilities across the sectors. Aerospace suppliers tend to work more cohesively and collaboratively than in the automotive sector, therefore, it is easier to work with other companies towards a common goal."

- Piero Carcerano,
CEO,
Future Design

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		Research and Development	Quality approvals	Customer approvals	Adhesives and coatings	Air system and equipment	Aircraft structures	Armaments and related equipment	Autoflight systems and equipment	Avionics	Communications systems and equipment	Composites	Control systems and equipment	Design and analysis	Electrical panels	Electrical/electronic components	Electrical power systems and equipment	Engines systems and equipment	Fuel and fuel systems	Ground systems and equipment	Hydraulic systems and equipment	Interior equipment furnishings	Landing gear systems and equipment	Maintenance, Repair and Overhaul	Navigation systems and equipment	Processes and forming	Propellers and rotors	Raw material supplies	Safety and rescue systems and equipment	Services	Space systems and equipment	Standard parts	Testing and certification	Machinery, Tools, Test Equipment	Training	Transparencies	Miscellaneous
3D NEW TECHNOLOGIES	www.3d-nt.com	✓					✓											✓								✓		✓								
A.L.A.	www.alalogistic.com		✓	✓	✓	✓	✓			✓				✓		✓	✓	✓		✓	✓		✓				✓	✓		✓	✓	✓		✓			✓
A.T.L.A.	www.atla.eu		✓				✓																								✓					
A.T.O.M	www.atomsrl.it			✓		✓				✓			✓					✓		✓	✓		✓				✓		✓		✓					
AA MODELLERIA	www.aamodelleria.com	✓	✓									✓													✓											
ADV MECH	www.advmech.it	✓	✓				✓												✓		✓		✓				✓				✓					
AERO SEKUR	www.aerosekur.it	✓	✓	✓	✓	✓	✓		✓		✓			✓		✓			✓			✓		✓					✓	✓	✓	✓		✓		✓	
AEROTECH	ww.aerotechsrl.com		✓	✓		✓	✓													✓												✓				✓
AERROBOTIX	www.aerrobotix.com	✓				✓								✓																		✓				
AIZOON COSULTING	www.aizoongroup.it	✓				✓		✓	✓	✓	✓		✓	✓		✓				✓					✓					✓	✓		✓	✓	✓	✓
ALFA MECCANICA	www.alfameccanicasrl.it	✓	✓	✓			✓					✓						✓					✓				✓				✓			✓		
ALLINOX COMPONENTS	www.allinoxcomponents.it		✓	✓			✓																				✓								
ALTAIR CONSORTIUM	www.altairconsortium.com	✓	✓				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓
AMET	www.amet.it	✓				✓				✓		✓	✓	✓																		✓	✓			
APR	www.apr.it	✓				✓	✓					✓															✓									
ARES	www.ares-srl.com	✓	✓											✓						✓				✓						✓		✓		✓		✓
ASTI AIRCRAFT SERVICES	www.astiair.com		✓	✓			✓																					✓		✓	✓					
AVIOSPACE	www.aviospace.com	✓	✓											✓						✓										✓						
AVIOTEC	www.aviotec.it									✓					✓					✓										✓						
B.E. DESIGN	www.be-engineering.it	✓																			✓			✓				✓		✓		✓			
BART	www.bartbrocce.it		✓	✓	✓									✓									✓					✓			✓	✓			
BISIACH & CARRU	www.bisiachcarru.it	✓	✓	✓				✓				✓		✓									✓							✓	✓	✓	✓	✓		
BLUE ENGINEERING	www.blue-group.it	✓	✓			✓	✓	✓				✓		✓	✓	✓	✓		✓			✓	✓			✓		✓		✓		✓	✓	✓		✓
BYLOGIX	www.bylogix.it	✓											✓		✓						✓										✓	✓			
BYTEST	www.bytest.it	✓	✓	✓			✓	✓	✓				✓					✓				✓				✓	✓		✓	✓	✓	✓	✓		✓	
CAB ELECTRA	www.cabelectrasrl.com	✓	✓	✓															✓			✓	✓						✓	✓		✓			
CAPETTI ELETTRONICA	www.capetti.it	✓	✓	✓							✓			✓	✓	✓			✓									✓				✓	✓			✓
CARBONTEAM	www.carbonteam.it	✓			✓		✓			✓								✓			✓														
COMAU	www.comau.com	✓	✓																											✓		✓	✓	✓		
COMUTENSILI	www.comutensili.it	✓	✓	✓											✓			✓																		
CRIOTEC IMPIANTI	www.criotec.com	✓	✓	✓			✓													✓										✓		✓				
DELTA-TI IMPIANTI	www.delta-ti.com	✓	✓			✓										✓				✓				✓					✓							✓
DIGISKY	www.digisky.it	✓		✓					✓	✓					✓		✓							✓				✓								
DOFWARE	www.software.com	✓	✓		✓	✓				✓			✓	✓	✓		✓	✓		✓						✓			✓	✓		✓	✓	✓		
EICAS AUTOMAZIONE	www.eicas.it	✓											✓											✓					✓	✓						
ELLENA	www.ellenaspa.com	✓	✓	✓														✓	✓		✓		✓			✓	✓			✓		✓				
EMAGINE	www.emagine.it	✓	✓																				✓					✓					✓		
EMMECI DI PORPORINO ROSANNA E LAURA	www.emmecisnc.com	✓	✓		✓																														✓
ERRE TI	www.erreticompositi.com	✓			✓		✓					✓		✓								✓							✓						✓
EURIX	www.eurixgroupc.com	✓									✓		✓																✓	✓	✓		✓		✓
EUROFORK	www.eurofork.it	✓																																	✓
FERMEC	www.fermec.biz		✓																						✓										
FIDIA	www.fidia.it	✓	✓	✓																												✓			
FRESAL	www.fresal.com	✓					✓																		✓							✓			
FUTURE DESIGN	www.carcerano.it	✓	✓											✓							✓								✓						
GATTA	www.gattasrl.com		✓																											✓					✓
HTF	www.htf-aero.com	✓	✓	✓			✓	✓										✓	✓	✓			✓		✓					✓		✓			
I.DE.A INSTITUTE	www.ideainstitute.it	✓	✓			✓	✓	✓				✓		✓	✓						✓	✓			✓					✓		✓	✓			✓
ILLOGIC	www.illogic.us													✓																✓						
IMEX.A	www.imexa.it	✓				✓	✓			✓		✓		✓	✓	✓														✓	✓			✓		✓
ING. BERTOLOTTI & C.	www.ing-bertolotti.com		✓	✓						✓			✓		✓										✓						✓		✓		
INGERSOL ENGINEERS BUSINESS SOLUTIONS	www.iebs.it																													✓					✓
ISTITUTO ITALIANO DI TECNOLOGIA (IIT)	www.it.it	✓		✓							✓	✓			✓																✓				✓
ITACAE	www.itacae.com	✓											✓	✓																✓				✓		✓
ITALPROGETTI	www.italprogetti-trino.it		✓																											✓			✓		
KITE GROUP	www.kitegroup.eu	✓					✓			✓		✓	✓	✓				✓		✓			✓	✓		✓					✓		✓			✓
ITALIA DESIGN TORINO	www.carcerano.it	✓	✓											✓								✓								✓						
L.M.B.	www.lmbsrl.it	✓					✓																✓		✓						✓	✓		✓		
LABORMET DUE	www.labormetdue.it	✓	✓										✓	✓																		✓	✓	✓		✓
LANGENSEE	www.langensee,it		✓	✓						✓	✓		✓		✓	✓		✓						✓												✓
LASERGATE	www.laasergate.it						✓								✓							✓			✓											
LAZZERO TECNOLOGIE	www.lazzero.com	✓																				✓			✓						✓	✓	✓		✓
LCA BALLAURI	www.lcaballauri.com	✓	✓	✓										✓	✓							✓		✓	✓					✓	✓	✓	✓	✓	✓	✓
LOGIKA	www.logikasas.com	✓												✓																	✓					
LMA	www.lmasrl.com	✓	✓	✓			✓	✓										✓	✓	✓			✓		✓						✓		✓			

		Research and Development	Quality approvals	Customer approvals	Adhesives and coatings	Air system and equipment	Aircraft structures	Armaments and related equipment	Autoflight systems and equipment	Avionics	Communications systems and equipment	Composites	Control systems and equipment	Design and analysis	Electrical panels Electrical/electronic components	Electrical power systems and equipment	Engines systems and equipment	Fuel and fuel systems	Ground systems and equipment	Hydraulic systems and equipment	Interior equipment furnishings	Landing gear systems and equipment	Maintenance, Repair and Overhaul	Navigation systems and equipment	Processes and forming	Propellers and rotors	Raw material supplies	Safety and rescue systems and equipment	Services	Space systems and equipment	Standard parts	Testing and certification	Machinery, Tools. Test Equipment	Training	Transparencies	Miscellaneous
LUGLI AMEDEO OFF. MECC. DI PRECISIONE	www.meccanicalugli.com							✓		✓								✓	✓	✓			✓					✓		✓	✓				
MANCIN	www.mancinsrl.it	✓	✓	✓				✓										✓	✓	✓			✓							✓					
MARC-INGEGNO DI MARCHINI ALBERTO & C.	www.marc-ingegno.it		✓	✓			✓						✓				✓	✓				✓								✓					✓
MATRIX MECHATRONICS	www.matrixto.it	✓	✓	✓		✓													✓		✓													✓
MEC	www.mecsrl.net																											✓						✓
MECAER AVIATION GROUP	www.mecaer.com	✓	✓	✓	✓	✓						✓	✓	✓						✓	✓	✓	✓	✓				✓	✓		✓	✓	✓	✓	
MECCANICA BPR	www.meccanicabpr.it	✓	✓		✓			✓	✓				✓	✓			✓	✓		✓		✓								✓					
MEPIT	www.mepit.com	✓	✓	✓													✓													✓					
METROLOGIA	www.metrologiaspa.com	✓																					✓					✓			✓		✓		
MITO SRL	www.mitosrl.com	✓				✓		✓	✓	✓	✓		✓	✓					✓					✓				✓			✓				
MIZAR	www.mizarcn.it		✓	✓													✓															✓			
MODELWAY	www.modelway.it	✓																																	
MOLLE INDUSTRIALI CONTE	www.molleindustrialiconte.it	✓	✓	✓	✓																														✓
MORELLO	www.morellospa.com	✓	✓	✓			✓										✓																		
NIMBUS	www.nimbus.aero	✓					✓			✓			✓																						✓
NU.TE.CO.	www.nuteco.it	✓					✓					✓									✓											✓			
OLIVERO	www.oliveroimpianti.it	✓													✓					✓															
OMA AIR AVIATION FURNITURE	www.omaair.it				✓		✓																	✓								✓		✓	
PININFARINA EXTRA	www.pininfarina.com	✓												✓							✓														
PLYFORM COMPOSITES	www.plyform.it	✓	✓	✓			✓					✓									✓			✓								✓			
PRATI	www.pratiaero.com	✓	✓	✓													✓	✓		✓		✓									✓			
PRESTEL AVIO	www.prestelavio.it		✓	✓							✓		✓		✓	✓	✓		✓			✓		✓										
PRIMA ELECTRO	www.primaelectro.com	✓								✓			✓															✓							
PRIMA INDUSTRIE	www.primaindustrie.com	✓	✓			✓											✓													✓					
PRIMAVIS	www.primavis.eu	✓														✓	✓				✓														
PROGEM	www.progem.eu		✓	✓			✓			✓			✓							✓									✓		✓				✓
RENISHAW	www.renishaw.it	✓																						✓				✓			✓	✓	✓		
RESINFLEX	www.resinflex.com																				✓														
RISATTI INSTRUMENTS	www.risatti.it		✓												✓															✓					
ROSFER	www.rosfer.it	✓	✓	✓													✓							✓						✓	✓			
ROTOMORS	www.rotomors.com	✓															✓					✓	✓		✓					✓				✓
S.P.I.	www.spi-tech.it	✓	✓				✓			✓				✓			✓		✓	✓		✓						✓			✓				
S.R.S. ENGINEERING DESIGN	www.srsed.it	✓					✓					✓	✓	✓								✓			✓				✓						
SABELT	www.sabelt.com	✓	✓	✓		✓															✓						✓		✓	✓				
SESIA FUCINE	www.sesiafucine.it		✓	✓																				✓		✓				✓			✓	✓
SFC COMPOSITI	www.sfccompositi.it	✓	✓		✓		✓					✓																	✓	✓		✓		✓
SHOW.IT	www.show.it		✓																									✓				✓		
SISTEMI AVANZATI ELETTRONICI (SISAV)	www.rugged.sisav.it							✓		✓	✓				✓	✓			✓					✓			✓		✓	✓	✓		✓	
SOCIETÀ INDUSTRIA MECCANICA S.I.ME.	www.simeccanica.it		✓	✓			✓	✓		✓			✓				✓	✓		✓		✓	✓			✓				✓				
SOFT-IN	www.soft-in.com	✓									✓		✓		✓	✓			✓					✓							✓				✓
SYNAREA CONSULTANTS	www.synarea.com	✓								✓				✓									✓						✓			✓			✓
T.T.N.	www.ttnspa.it	✓	✓	✓																								✓						
TECNO PROGRAM SERVICE	www.tps-srl.net	✓	✓	✓			✓	✓		✓			✓	✓			✓		✓	✓		✓		✓					✓	✓					
TECNOSTEEL	www.tecnosteel.com	✓	✓																											✓				
TEKSPAN	www.tekspan.it		✓	✓	✓							✓									✓		✓								✓			✓
TEORESI	www.teoresigroup.com	✓				✓			✓	✓	✓		✓	✓	✓	✓								✓					✓		✓	✓			
TESEO	www.teseo.net	✓				✓		✓		✓	✓		✓		✓	✓	✓	✓	✓	✓		✓	✓	✓					✓	✓		✓	✓			✓
TORINO DESIGN	www.torino-design.com	✓	✓			✓	✓	✓				✓		✓							✓				✓				✓			✓			✓
TPS AEROSPACE ENGINEERING	www.tps-aerospace.it	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓		✓		✓	✓				✓	✓	✓	✓	✓		✓	✓
TTA - TECNO TESSILE ADLER	www.adlergroup.it	✓	✓	✓								✓		✓							✓				✓										
TUBIFLEX	www.tubiflex.com	✓	✓	✓		✓				✓					✓		✓	✓		✓					✓						✓				✓
TURIN TECH	www.turintech.it	✓												✓	✓						✓														✓
VASTALLA	www.vastalla.com	✓								✓	✓																	✓	✓						✓
WPWEB	www.wpweb.com	✓							✓																			✓							✓
FIVE INTERNATIONAL LEADING PLAYERS COMBINE THEIR FORCES WITH THE PROJECT																																		
LEONARDO - AIRCRAFT DIVISION	www.leonardocompany.com	✓	✓	✓	✓		✓	✓	✓	✓	✓				✓		✓	✓	✓		✓		✓		✓	✓		✓		✓		✓		✓	
LEONARDO - DEFENCE SYSTEM DIVISION	www.leonardocompany.com	✓	✓	✓			✓	✓	✓	✓	✓																						✓		
AVIO AERO	www.aviaoaero.com	✓	✓	✓								✓		✓			✓						✓		✓	✓					✓			
AVIO SPA	www.avio.com	✓	✓	✓								✓		✓			✓						✓							✓				
UNITED TECHNOLOGIES CORPORATION	www.utc.com	✓	✓	✓		✓				✓			✓			✓	✓			✓			✓			✓								

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Via R. Incerti, 10, Pinerolo TO
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www.altairconsortium.com

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www.amet.it

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ASI
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http://www.asi.it

AVIO
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http://avio.com/

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Bytest
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http://www.tuv.it/it-en/about-tuev-sued/
subsidiaries/bytest-laboratories

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(Piemonte Agency for Investments, Export and Tourism)
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Comutensili SpA
Via R. Bernardo, 6 - 10092 Borgaretto (TO)
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www.comutensili.com

Delta-Ti Impianti Spa
Via Albenga, 92, Rivoli TO
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www.delta-ti.it/

DigiSky
Corso Re Umberto, 65 – 10128 Torino (TO)
http://www.digisky.it/

This list contains those companies interviewed during the course of research for this publication and as such represents only a limited selection of the companies operating in the aerospace industry of Piemonte. It should not be considered a comprehensive guide. GBR holds an exclusive and extensive database for Piemonte and the wider region. For further information on database access packages, please contact info@gbreports.com or call +44 20 7812 4511.

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www.enac.gov.it

ESA Esrin
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