

# AIR

ITP Aero magazine

## ITP Aero

PARTNERSHIPS, TECHNOLOGY AND LEADERSHIP





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# Carlos Alzola

## General Manager, ITP Aero

Dear Reader,

In this issue of AIR magazine, the first of 2018, I must refer to the recent change in ownership structure and to the renewal of the company's brand. ITP Aero is the new brand that encompasses all the company's subsidiaries and business units, and on which we will continue to build our successful track record.

This new edition of the magazine reflects our status as "corporate entity" within the Rolls-Royce Group, which guarantees a degree of organisational autonomy that allows us to fulfil all our business agreements. I am convinced that this situation will create new opportunities of growth in all spheres of activity and with all our customers.

In this issue we address a matter of great importance to the sector and industry: Advanced Manufacturing, the focal point of our development which has been reinforced by the recent inauguration of the CFAA (Advanced Aeronautics Manufacturing Centre), a technology centre which enables the integration between the company and our supply chain, where we can apply innovative technologies in a representative environment.

We also cover relevant topics such as the production ramp up in our industry and the objectives set in our ITP 2020 Strategic Plan.

I hope these topics are of your interest.

Yours faithfully.

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- P. 8 Gulfstream Aeroespace
- P. 13 Bizkaia Foru Aldundia
- P. 22 Norsk olje og gass
- P. 26 El Economista
- P. 31 El Correo





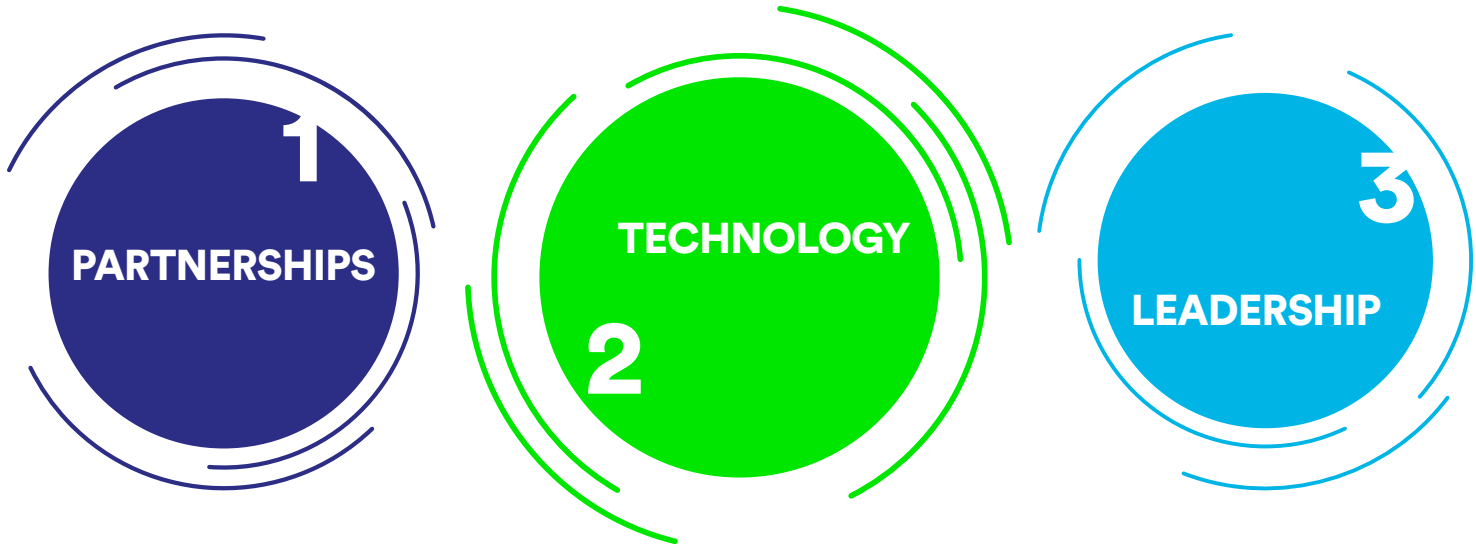
# A renewed brand

ITP Aero has sharpened its brand in order to adapt it to the highly competitive aeronautics industry, adding the suffix "Aero" as an additional descriptor to its newly designed logotype.

The updated image marks the start of a new chapter in ITP Aero's 28 year successful growth story. The ITP Aero brand will embrace all the company's subsidiaries and business units, unifying them under one name.



The current logo is the sum of all ITP Aero's values, reflected in **three basic concepts** which have been the basis of the design of the new identity.



The first of these are **partnerships**: the two rotating shapes are tailor-made to represent the brand's new spirit and the manner in which the company collaborates with all its industry partners, customers and suppliers.

The second concept is **technology**: the two shapes also reflect the dynamic and innovative nature of ITP Aero, the source of this proprietary technology and of its constant innovation.

The third concept is **leadership**: reflected in the contrasting blue tones of the symbol, which represent the scale and amplitude of the sky and highlight ITP Aero's leadership position in the industry.

*"This new identity reflects the company's global leadership in the aeronautical engine market, the manner in which it combines proprietary technology, commitment to excellence and important collaborations with its customers."*



# ITP Aero, more global than ever

ITP Aero will soon be celebrating its 30<sup>th</sup> anniversary, over a quarter of a century in which it has grown and evolved, positioning itself among the ten most important aeronautical engine and component companies in the world.

At the end of 2017 and after a change in its ownership structure, ITP Aero embarked on a new phase as part of the Rolls-Royce Group; a new opportunity to consolidate its extensive customer portfolio and continue to grow on a global scale, becoming part of one of the largest technology groups in the world.



## In line with the ITP2020 Strategic Plan

The ITP2020 Strategic Plan will continue to be the roadmap whereby ITP Aero will further consolidate itself as one of the world's leading aeronautical engine and components companies. ●

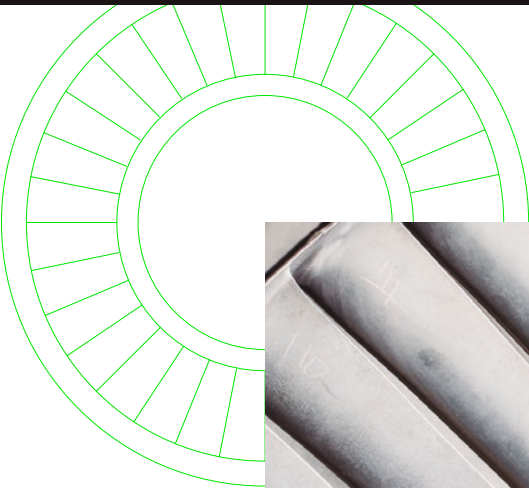
## Excellence and technology at the service of all

ITP Aero is positioned as a corporate entity within the Rolls-Royce Group, a status which allows it to fulfil all the commitments acquired with its different customers, both present and future. Additionally, the responsibility for the company's management has not been altered in any way, being ITP Aero's management team the body responsible for the decision-making.

This new status allows the corporate entity to continue to work as it has always done, applying the necessary protection measures to safeguard the intellectual property and commercial interests of all parties involved.

This commitment, acquired between ITP Aero and Rolls-Royce, is the cornerstone of the integration process of both companies. The objective is not only to protect, but also to strengthen ITP Aero's partnerships with all the OEMs with which it works (GE, Honeywell and Pratt & Whitney, among others).

Throughout its history, ITP Aero has built relationships based on trust with all its customers and suppliers as a result of an ongoing commitment to proprietary technology, product quality and customer satisfaction. As a Rolls-Royce Group company, ITP Aero reinforces those very principles which have positioned it as an industry leader, strengthening its commitment to excellence and partnerships with all its stakeholders.



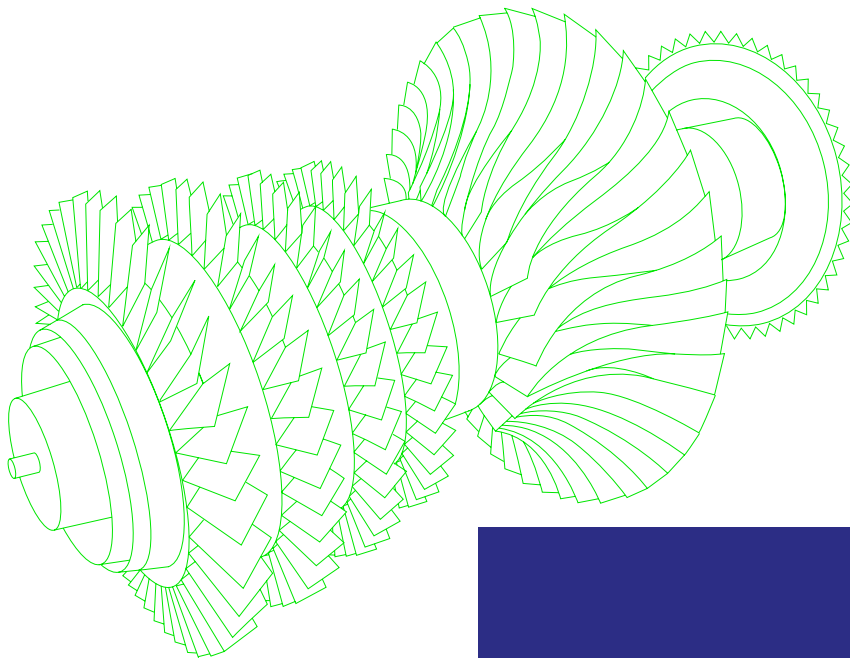
# Flying high with Pratt & Whitney

ITP Aero is a risk and revenue sharing partner (RRSP) for the Pratt & Whitney Pure Power® PW1000G program and for the PW800 engine produced by Pratt & Whitney Canada. In this production process ITP Aero participates in the design, manufacture and aftermarket of both programs and supplies structures, externals and compressors.

During this year, ITP Aero continues with the ramp up of the PW1100G-JM family that powers the A320neo and the PW1500G that powers the Bombardier C Series aircraft. In addition, ITP Aero has integrated Pratt & Whitney's latest engines in its portfolio which enters into service in 2018: the PW1900G for Embraer's single-aisle plane E190-E2, that has recently achieved the Federal Aviation Administration (FAA), European Aviation Safety Agency (EASA) and the National Civil Aviation Agency of Brazil (ANAC) certificates; and the PW814 engine for the business aviation aircraft Gulfstream G500. ●



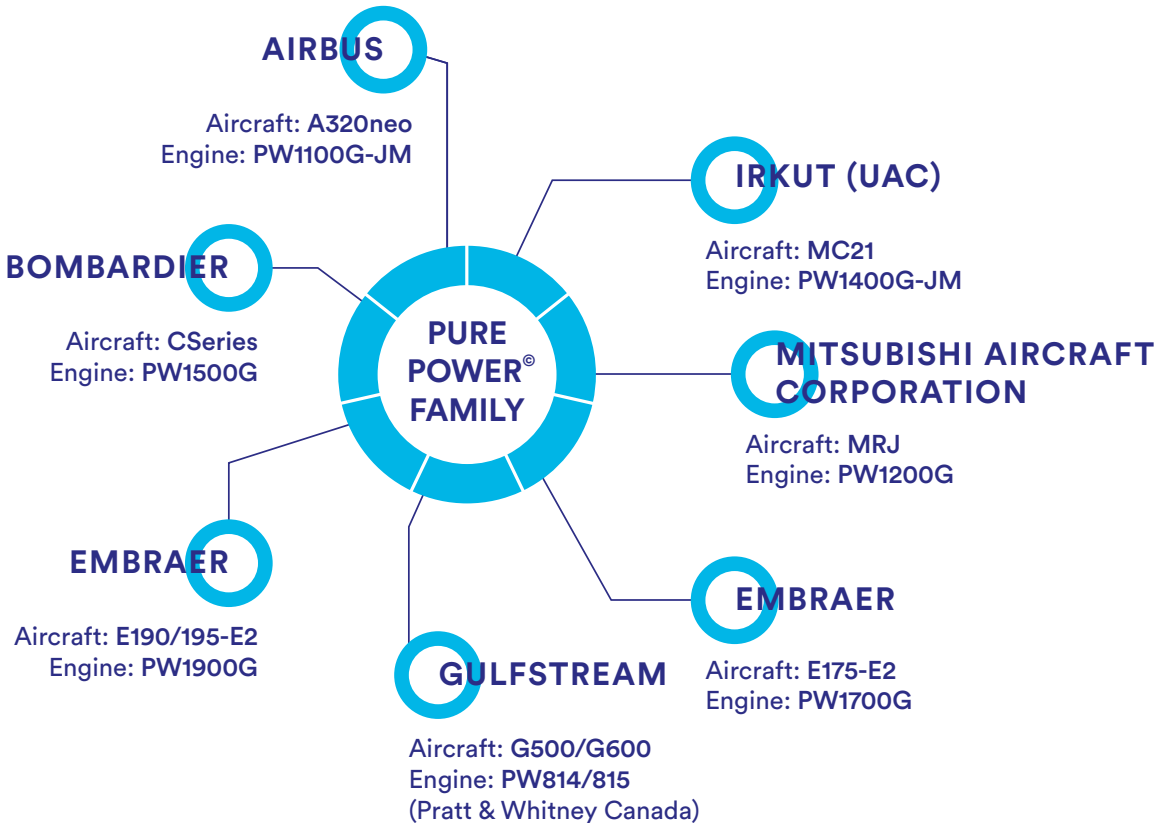
Gulfstream 600G.



## Production highlights in 2017

- Manufacture of more than 1.000 tubes per week for the PW1100G-JM and PW1500G engines.
- Development of 100 Mid Turbine Frame (MTF) modules for the PW800 family.
- Manufacture of more than 200 IBR (Integrated Bladed Rotors) for the PW800 engine.
- Production of more than 600 outercases.

## ITP Aero, Pratt and Whitney's trusted partner



# Advanced Manufacturing as an industrial renewal factor

*Advanced Manufacturing is currently one of the pillars of the aeronautics industry, since it enables the development of R+D+i initiatives for final factory integration.*

## 1. ADVANCED UNDERSTOOD AS CLOSE TO REAL PRODUCTION

In all fields of technology, as initial developments progress, tests must be performed in a representative environment using real machines in a factory rather than a laboratory environment. Consequently, the cost of this type of developments is much higher, since they require significant effort in terms of logistics.

Advanced Manufacturing enables the development of Manufacturing Readiness Levels 6-7, which require validation testing in representative environments to subsequently introduce technology directly in-factory.

Manufacturing Readiness Levels are used as metrics to define the maturity of any technological development. There are a total of ten levels, ranging from research into scientific principles to the entire production process, fulfilling requirements relating to efficiency, quality, engineering, etc.

## 2. ADVANCED IN THE SENSE OF MANUFACTURING DIFFERENTLY

New forms of manufacturing are being developed including, namely, additive manufacturing, but also other welding or cutting methods such as, for example: electrical discharge machining.

## 3. ADVANCED DUE TO THE USE OF ARTIFICIAL INTELLIGENCE

Industry 4.0 is the digitalisation of production processes to transform them in order to obtain greater efficiency. It integrates the concepts of connectivity and machine-learning, which enable the inclusion of artificial intelligence in the industry.

## Advanced manufacturing at ITP Aero

For ITP Aero, Advanced Manufacturing is a priority. In fact, the ITP2020 Strategic Plan includes two initiatives, one of the directly related to advance manufacturing and another dedicated to Simulation of High Performance focused on Industry 4.0.

- **Simulation of High Performance:** it is the process of simulating the performance of machines and processes to avoid having to execute real tests. Particularly interesting results are being already obtained in the simulation of casting processes for improving component design.

Furthermore, ITP Aero has other initiatives under way related to simufact welding and machine performance analysis, whereby they are monitored in order to optimize their operation.

- **Additive Manufacturing:** ITP Aero is very advanced in this field, since it has defined criteria and proprietary design standards which have allowed it to certify an aeronautical component that will be put into service in 2018, in addition to delivering development parts in 2017; furthermore, we are working with next-generation components, which are much more complex both in terms of geometry and materials, in order to fully leverage the advantages of additive manufacturing.

- **Advanced Aeronautics Manufacturing Centre:** the CFAA is a cutting-edge public centre that fosters public-private collaboration in aeronautics manufacturing aimed at improving industrial processes and advanced machinery led by ITP Aero and Danobat, and involves 49 aeronautics industry companies, the Basque Country Provincial Council, the Basque Regional Government, the University of the Basque Country and the Biscay Technology Park.

ITP Aero is integrated in the CFAA due to its supply chain and applies novel technologies such as additive manufacturing, laser welding, electrical discharge machining, etc., in a representative environment where initiatives are developed up to the time of introduction in the factory. In fact, to date 11 projects have been developed at the centre which are implemented at our facilities including, for instance, the machining of new materials for high-speed turbines, the development of automated finishing processes, new automated contact and contactless scanning measurement processes, and *Selective Laser Melting – Laser Metal Deposition* (SLM-LMD) additive manufacturing processes and *Non Destructive Testing* (NDT) digital radiography.

Therefore, technology for ITP Aero's different businesses is developed at the CFAA. For example, for casting, digital radiography processes can be developed for inspections, laser melting deposition for repairs and automated deburring processes in finishing processes. For turbomachinery in general, development of machining, lathing, milling, measurement, welding and finishing processes. For externals, development of welding, X-ray inspection and measurement processes. Also, additive manufacturing processes using *Selective Laser Melting* (SLM) technology.

One of the most interesting aspects of the CFAA is the collaboration between the development of manufacturing technology along the entire value chain of the production process, from those that produce tools and consumables to the original equipment manufacturer, and component manufacturers and machine-tool manufacturers. This transversality provides a "pull" effect that enables harmonisation and collaboration in the development of advanced manufacturing technologies, establishing a common R+D+i investment objective and a clear roadmap aimed at clearly multiplying that effort. ➔



The development of the technology advocated by Advanced Manufacturing has required institutional support through programmes and tenders in which ITP Aero has actively participated.

For the three described programmes, the existence of the CFAA has been essential, due to importance the Centre has had in acquiring a very high development level in Advanced Manufacturing.

According to Alfredo López, Head of Advanced Engineering at ITP Aero: «Previously, we performed initial testing at laboratories and technological centres and subsequently integrate the procedures in our factories, which implied affecting the production chain and required a significant effort in terms of logistics, especially taking the production ramp currently experienced by the industry into account. This prevented many ideas from being developed from start to finish, remaining trapped in the so-called "death valley"».

This initiative allows ITP Aero to increase the conversion of its investment in R+D+i and technology through the "pull" effect produced by the investment of its supply chain and that of the technology centres involved.

1. Within the European Clean Sky 2 Programme, ITP Aero participates as a "core partner" in the research programme for the development of Rolls-Royce UltraFan® high-speed turbines, of which additive manufacturing parts are being developed in the CFAA, making it possible to improve relations with manufacturers, since they can be offered the entire prototype, thereby expediting production times.
2. The CDTI (Centre for the Development of Industrial Technology), under the CIEN 2015 (National Strategic Consortia for Technical Research), approved the FUTURALVE project, an initiative presented by a consortium of companies headed by ITP Aero. The main objective of the project is to develop advanced materials and manufacturing for the new generation of high-speed turbines. Some of the most important developments in the programme include new materials which are more resistant to high temperatures, the creation of processes that enable the use of raw materials, the optimisation of the final processing and, naturally, the improvement in productivity and efficiency.
3. Within the HAZITEK 2016 programme developed by the Department of Economic Development and Competitiveness of the Basque Government, ITP Aero and its CFAA partners participate in the ESCALITURB project, whose main objective is the manufacture of hot structures for turbines. In turn, the TALDEA project has been recently approved under the HAZITEK 2017 programme which, together with part of its continuous supply chain, continues to develop manufacturing technologies and materials for high-speed turbines. ●

In the CFAA, ITP Aero increases its conversion of the R+D+i investment and technology.



Aeronautics Advanced Manufacturing Center (CFAA).



## Inauguration of the CFAA

The Advanced Aeronautics Manufacturing Centre was inaugurated on the 15<sup>th</sup> of November 2017. It is located in Building 202 at the Biscay Technology Park, where an official ceremony took place which featured the presence of the Prime Minister of the Basque Government, Iñigo Urkullu, the Dean of the UPV/EHU, Nekane Balluerka, and the Deputy General of Biscay, Unai Rementería. It was also attended by the Regional Minister of Economic Development and Infrastructure, Arantxa Tapia, and the Regional Minister of Education, Cristina Uriarte, in addition to Imanol Pradales, Foral Deputy for Economic and Territorial Development, Itziar Epalza, General Manager of the Biscay Science and Technology Park, and Antxon López Usoz, Director of Innovation for Danobat and representative of the machine-tool industry.

Prior to the inauguration, a guided tour was made to the facilities, accompanied by the Director of the Centre, Norberto López de Lacalle.



# Ramping up

The new reality of the aeronautics industry is marked by what is known as market "ramp-up", which requires a production effort that meets the industry's needs in terms of cutting costs, increasing its fleet and improving technical characteristics to minimise airline maintenance time.

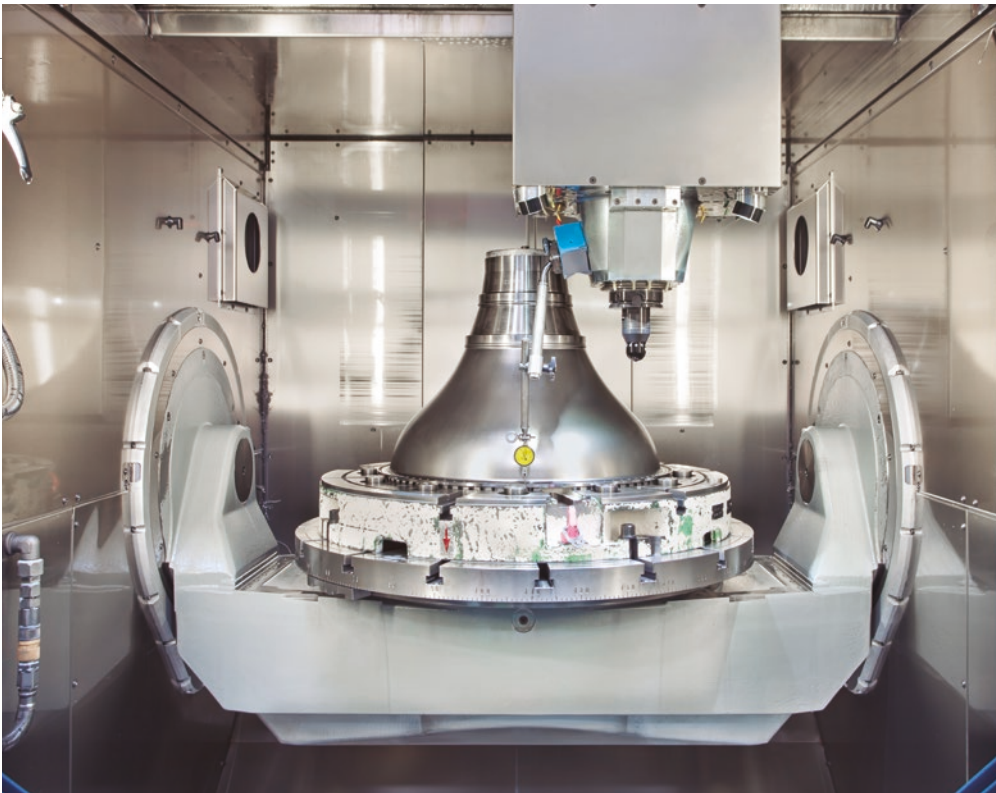
In 2017 a total of 2,622 engines were installed, 40 more than in the previous year (2018 Aero Engine News Study). Demand remained high in 2018, as reflected by the volume of orders, especially for single-aisle aircraft, up 7.5% on the previous year.

Anticipation and organisation in this regard has allowed ITP Aero to make 30% more deliveries in 2017 than in the previous year. This figure grew by at least 20% in 2018.

Ramp-up was stronger than initially envisaged and, therefore, efforts must be doubled to address demand in 2018. In this regard, Luis Alvarez, Chief Operating Officer (COO) of ITP Aero, highlights the importance of increasing the efficiency of its facilities with the aim of breaking a record based on Overall Equipment Efficiency (OEE), the standard for measuring manufacturing productivity.

From this perspective, it is interesting to consider the optimisation of machine cycles paying careful attention to all aspects, from supply chain to delivery logistics, performing major engineering work and time analyses in order to achieve continuous-flow production (Lean Manufacturing) through a management model focused on creating maximum value for customers using resources more efficiently.

Production capacity is determined by various factors including, namely, machines, number of operating hours thereof and, naturally, employees (number and qualifications). Likewise, in 2018 ITP Aero continues its solid investment plan and has linked 24-hour production processes, optimising weekends to perform the necessary preventive maintenance work on the machines.



## Origin of the Lean Manufacturing philosophy

The Lean Manufacturing philosophy was developed in response to Japan's need to increase its productivity and rebuild the country's economy after World War II. Automobile company Toyota successfully applied said notions, breaking production model paradigms of leading American competitors in the nineties. ITP Aero has been applying Lean fundamentals for years, whose results in productivity were confirmed by production line analyses.



Luis Alvarez, Chief Operating Officer, ITP Aero.

The identification of the so-called "waste", that is, all costs incurred that do not contribute to a part's features or to the perception of customer service, is a constant pursued at the company in the areas of manufacturing and support function processes. Production routes and employee training and multi-tasking are designed from this approach in order to achieve continuous-flow production from a "pull" perspective, positioning the customer as an element of the chain, aimed at eliminating surplus inventory and avoid reprocessing. This makes it possible to improve Lead Time, which is the average time that elapses from the moment a part is launched in planning and follows all the work route processes, inspections, etc., until it is delivered to shipping.

Moreover, Industry 4.0 allows symbiosis of production means with operators' talent and skills through the incorporation of automations and "dialogue" between machines to adjust parameters in real time. Robotisation improves handling safety, ergonomics, reduces variability, times and enables better orientation of employee added value.

The materials and alignments defined in turbine design are exceptionally more demanding and difficult to machine than those used in other industries, which -together with close dimensional tolerances and their functional impact- implies having especially robust and reliable machinery. Productive saturation affects the industry as a whole, due to which supplier output is key to avoiding disruptions in productions.

Undoubtedly, one of the most important elements for ITP Aero is to promote proximity to the supply chain, thereby reducing the number of parts in circulation, in addition to the evident advantages of interaction to manage quality, improvements and service.

Further, the development of facilities, machinery and contracts follows the roadmap for capacity growth under the ITP2020 Strategic Plan. ●

## Meet Luis Alvarez

Luis Alvarez defines himself as a friendly, methodical and demanding person who highlights the power of conveying optimism to his team, given that motivation is a key element for achieving sustained fulfilment of objectives. His work is governed by the analysis of the results of each operational line and focuses on two pillars: perseverance in the work of the supply chain, ensuring quantitative and qualitative capacity, and learning in order to prevent problems from being repeated a second time in any area.

Lastly, he reflects on innovation in this sphere, ensuring that work through external technology centres is key to favouring less interruptions in serial production activity from tests that may imply a significant advantage. Therefore, they facilitate management of R+D+i proposals and some of the suggestions for improvement made by employees in terms of innovation and manufacturing techniques, in addition to theoretical proposals and analytics put forward by reference researchers.



# Meet Clara de la Torre



**CLARA**  
DE LA TORRE

She has a Degree in Economy and Business Administration from the Autonomous University of Madrid.

After two years working in the private sector, she became a member of the European Civil Service in 1987. Since then, her professional career has focused on the design and execution of the EU's science and innovation policies, until occupying the position of Transport Director at the Directorate-General of Research and Innovation of the European Commission.

## Horizon 2020

The European Union concentrates most of its activities on research and innovation under the Framework Programme, called Horizon 2020 (H2020) in its 2014-2020 edition. For the first time, this programme integrates all the stages from the generation of knowledge to its commercial application and is based on three pillars: it contributes to addressing the main social challenges, promotes industrial leadership in Europe and reinforces the excellence of its scientific base. In order to achieve its objective, it has been allocated a budget amounting to 76,880 million euros.

Clara de la Torre is Transport Director at the Directorate-General for Research and Innovation of the European Commission and is a member of the Governing Board of Clean Sky 2.

Her professional career is inspiring, which is why we wanted to learn more about her:

1

**After having worked in the private sector, what was your main motivation to aspire to form part of the European Commission?**

My experience in the private sector was very positive. However, at the time Spain had just entered the former "European Economic Community". It was a unique opportunity for those of us who had always dreamed of creating a united Europe. I also had a somewhat personal motivation, given the international nature of my own family and my childhood.

2

**What led you to specialise in the design and execution of science and innovation policies?**

Life can guide you in unexpected directions. I was fortunate enough for my career in the European Commission to lead me to deal with science and innovation policies. These policies captivated me completely. They are intellectually very stimulating, allowing you to meet brilliant people and discover new, nearly unimaginable ideas. Moreover, it is becoming increasingly evident that they are the policies of the future, indispensable for social well-being, economic growth and for staying on the map of leading world regions.

3

**As Transport Director at the Directorate-General for Research and Innovation of the European Commission, what are the values that govern your professional life?**

The first value by which my professional life is governed is public service. I think it is very revealing that the term that designates our profession is European "civil servants". It is not only a profession, but rather a vocation.

Second, never betray the principles of ethics and co-existence, which are the basis of our action.

Third, institutional loyalty to my colleagues, that is, give my full support to the policies and values of the European Union.

In my case, part of these values include the dual obligation of serving, on the one hand, European R+D+i and, on the other, improving transport, particularly its decarbonisation as an opportunity rather than a burden for industry and citizens.

4

**Considering transport within the European Union as a key element of cohesion, what do you think are the main challenges facing its development in the coming decades?**

We must achieve a European Transport Space that:

- Is at the service of all citizens and entrepreneurs.
- Is environmentally friendly.
- Helps to fulfil international commitments, such as those of the United Nations Climate Change Conference (COP23).
- Is capable of addressing the growing demand for mobility and transport of people and goods.
- Permits European industry to lead both the manufacture of vehicles, systems and infrastructures, and the provision of transport-related services.

5

**In relation to transport, what role do you think air transport will play in the European Union in an increasingly "digitalised" world?**

Digitalisation is a trend that affects the industry and services as a whole. Air transport is no exception. Spearheaded by digitalisation, innovation in air transport can be more disruptive through cross-cutting technologies such as:

- Virtual modelling and virtual reality applied to engineering and to passenger services.
- Analysis of big data, especially for air safety and maintenance.
- Artificial intelligence and merging of sensor data, for example, for greater aircraft autonomy, particularly drones for civil use.
- Intelligent manufacturing technologies, including additive manufacturing, as I had the pleasure of observing during my interesting visit to the Advanced Aeronautical Manufacturing Centre (CFAA), recently inaugurated in Bizkaia. →

6

**In your opinion, are Clean Sky 2 objectives being achieved?**

Yes, in the case of both Clean Sky and Clean Sky 2, I think that the technological objectives linked to environmental and industrial competitiveness challenges are being achieved, but Clean Sky 2 still has a long way to go.

It is true that achieving the ultimate goals and guaranteeing the ultimate success of the investment will only be achieved through effective introduction in the market, which will depend on other factors beyond the technological quality of the investment, such as fuel prices.

7

**In terms of Research and Innovation, do you think there is sufficient integration between the plans of the European Union and those of each of the Member States?**

It is convenient to recall that Research and Innovation policies are a competence shared between the European Union and its member states.

That said, no one denies the so-called "federative effect" and thrust of the EU Framework Programme for favouring both the volume of additional investment and the contents of many national programmes, some of which inspired me profoundly.

Furthermore, we must not forget that each member state may have different interests, due to which it is legitimate and logical to assign resources to their specific needs.

8

**In November, you participated in ITP Aero's Technological Convention, an event that brought together over 150 engineers to delve deeper into the technological aspects that are making it possible to achieve the objectives set by the company for 2020. We would like you to share the aspect of this event you considered most relevant.**

On the one hand, it led me to consider ITP Aero as a Spanish team perfectly integrated in the global aeronautics market, level with teams of other multinational companies. I was struck by the team's degree of enthusiasm and commitment to their work and the company, in addition to their high qualifications.

On the other, the event accurately reflected the harmonious and productive integration of ITP Aero in the Basque industrial and institutional environment, and in the academic sector. This integration must set the example for other spheres of activity and for other European regions.

9

**In your speech at this event, you pointed out that public-private partnering was essential to the development of transport technologies. Could you explain why?**

The sphere of transport is a magical combination of vehicles, infrastructures and services provided by the public and private sectors to meet the needs of citizens, cities, regions, states and the single European market, or even the global market, as in the case of aviation.

It is therefore essential for both parties to combine efforts, starting with ideas and including financing and resources in general, which are the best proof of shared interests and commitment.



Left to right: Pedro Arrazola, Nekane Balluerka, Clara de la Torre and Iñaki Ulizar.

HORIZON 2020

10

**Do you consider the awareness of the general public about research programmes important? Do you think there is enough awareness about the Horizon 2020 Programme?**

Yes, it is very important. As the public sector, we are obliged to explain the usefulness of the investments made with European taxpayers' money. We are also obliged to remind that, without R+D+i, there is simply no future. We must spare no effort. At the European Commission and also at the National Points of Contact we do our best to improve, but there is still a long way to go. Companies such as ITP Aero, very active in European programmes, could also be great ambassadors of European science!

11

**What are your main professional challenges in the coming years?**

I would highlight two challenges: first, that the endowment of the new multiannual financial framework of the European Union beyond 2021 is adequate to R+D+i; second, that the different EU policies on environment, energy, transport, etc., are based on the available scientific and technical knowledge.

Greater knowledge will lead to better decisions, such as, for example: legislation that will promote innovation. ●



## New milestone in the Rolls-Royce Trent engine family

The Rolls-Royce Trent XWB-97, the latest and most powerful version of the Trent XWB, has entered into service with Qatar Airways. The engine obtained EASA Type Certification in August 2017, which endorses the engine's capacity for transporting commercial passengers with the highest safety standards.

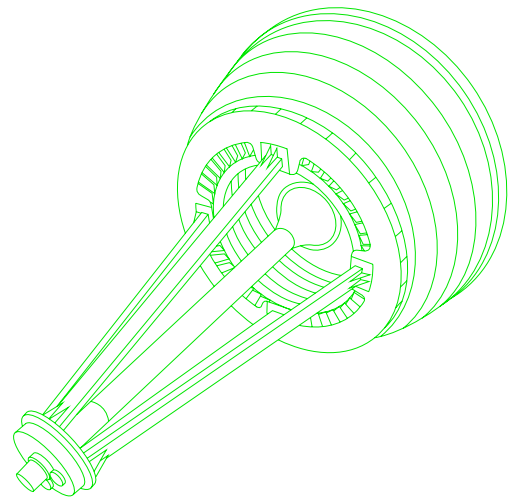
This engine, with 97,000 lb of thrust, exclusively propels the Airbus 350-1000, an enlarged version of the A350-900 with a capacity for over 350 passengers and a range of more than 14,000 km. The XWB-97 combines the lessons learned and technology developed in its smaller counterpart, the Trent XWB-84, with a thrust of more than 84,000 lb, which converts it into the most efficient civil turbofan in the world. Despite the few visible differences with its smaller counterpart, the greater thrust needs have led to the implementation of advanced technologies to achieve an optimum efficiency.

In this programme, ITP Aero is responsible for the design, manufacture, integration and validation of the low-pressure turbine (LPT) of the Trent XWB-97, delivering a complete module from the Ajalvir production line that will be subsequently integrated in the engine assembly line.

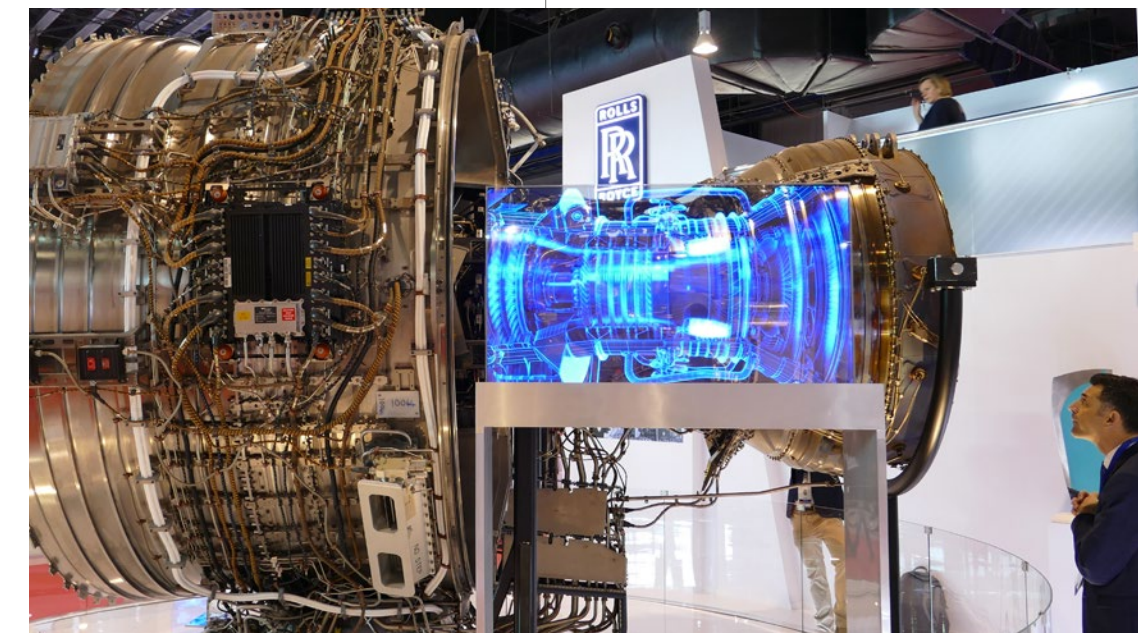
ITP Aero has placed special emphasis on achieving a high degree of productive maturity that will enable the company to address the production ramp of the two engine variants, XWB-84 and XWB-97, with the highest possible flexibility and efficiency. The high combined production volume of both programmes, with requirements of up to one LPT per day, was instrumental in allowing ITP Aero to develop and reinforce the integration of the local supply chain, developing an industrial environment that drives economic growth.

The design of the low-pressure turbine of the XWB-97 has a very significant impact on various essential aspects of the engine, such as fuel consumption, reduction of the CO<sub>2</sub> footprint and reduction of the environmental impact in terms of noise, reliability and safety.

ITP Aero has a system of proprietary design, the result of its heavy investment in R+D+i. This has allowed to achieve improvements in the aerodynamic efficiency of the turbine which, combined with the optimised weight of the components using next-generation manufacturing technologies, represents a significant reduction in fuel consumption and CO<sub>2</sub> emissions. Additionally, the design of the XWB-97 turbine incorporates cutting-edge technology in noise attenuation, which contributes to ensure that the engine is compliant with the most demanding standards required by the authorities. The design and manufacture of all LPT components is not only aimed at minimising the environmental footprint of the engine, but rather fulfil -like the rest of the engine- the strictest safety and reliability requirements of the aerospace industry. ●



**ITP Aero has been a risk and revenue sharing partner for the Trent XWB programme since 2009 and is responsible for the design, manufacturing and assembly of the low-pressure turbine.**



Rolls-Royce Trent XWB.



# Heli-One and ITP Aero join forces to optimize helicopter maintenance costs

In such a competitive market as the airline sector is, engine maintenance cost is very high, almost 40% of the aircraft value in some cases. Hence why airlines need to thoroughly monitor engine performance to identify the most cost-effective moments to carry out the required maintenance operations.

Historically, the helicopter market has always behaved in a different way due to the significantly less flying hours helicopters are exposed to. Thus, the helicopter industry has not installed these kind of maintenance cost optimization processes, despite the cost-effective benefits they entail.

CHC Helicopters, however, has. This specialized helicopter service company for oil and gas platforms has a fleet of 45 Sikorsky S-92 helicopters, powered by the CT7-8A engine. Due to this fleet's high level of flying hours, Heli-One, CHC Helicopter's MRO (maintenance, repair and overhaul) supplier, is optimizing maintenance cost with ITP Aero's support in order to extend the life cycle of each aircraft.



Sikorsky S-92 helicopter from CHC Helicopters' fleet.

Both Heli-One and ITP Aero have joined forces by thoroughly monitoring different parameters daily, analysing the most cost-effective moment to make small maintenance operations that prevent other bigger ones that require further investment from happening.

This successful collaboration agreement is based on ITP Aero's knowledge of the CT7 engine family, having performed MRO services for the CT7-9 engine that powers the CN235 plane; assembling and testing of the CT7-8F5 of the NH90 helicopter from the Spanish Army fleet and the T700 that powers the Blackhawk, Seahawk and Apache helicopters. So far, ITP Aero has repaired more than 400 CT7 family engines. In addition, CHC Helicopter's fleet is comprised by other models such as the Leonardo AW 189, equipped with the CT7-2E1 engine, which has been recently added to the GE engine portfolio that ITP Aero supports and maintains.

In this way, ITP Aero is able to apply new engine assembly mandatory technologies and know-how into MRO activities, achieving high added value services and increasing quality standards. ●



# HAI Excellence Award in Helicopter Maintenance

The Helicopter Association International (HAI) has acknowledged Charles "Chuck" Hagen, Field Service Representative, Salesman and Trainer at ITP Aero in EEUU, with the Excellence in Maintenance of Helicopters Award.



Chuck Hagen, Field Service Representative, Salesman and Trainer of ITP Aero.

**ITP Aero's subsidiary in EEUU is certified by Rolls-Royce as Authorized Maintenance Repair and Overhaul Center (AMROC), specialized in the Model 250.**

This award acknowledges distinguished helicopter maintenance service professionals out of HAI's 18,000 members for their track record in the development of excellence in helicopter maintenance. He received the award on the 28<sup>th</sup> of February at the HAI HELI-EXPO in Las Vegas, the most prestigious international trade fair in the helicopter industry.

Chuck's nomination was supported by various letters from customers highlighting his attitude, oriented towards service excellence, his outstanding knowledge and professionalism, also supported by an extensive professional network which allows him to solve problems other than engine related.

Chuck's career began when he received the *Airframe and Powerplant* (A&P) licence in 1992, which was followed by six years of service in the US Army working as a 68B10 engine turbine mechanic. In 1996 he joined ITP Aero in the United States as a Test Technician and Operator, gradually being assigned increasing levels of responsibility. He occupied the position of Product Manager in the Quality Department as a *Return to Service* representative, before doing so in the Sales and Field Service.

For Ramon Fonoll, General Manager, USA: *"This award is a great honour for ITP Aero. Chuck represents -and this award certifies- the customer service excellence values on which Aeromaritime America's principles are based. Chuck is an example of the effort made by many others to convert maintenance and service excellence into our raison d'être".* ●



ITP Aero Stand at HAI HELI-EXPO.

# A future full of possibility

The Business Conference "The Defence industry: new budgetary scenario", organised by APTIE and El Economista, was held in December 2017 with the participation and sponsorship of Econocom, Airbus, Indra, Navantia, Thales, Sener and ITP Aero. Here, the Minister of Defence, María Dolores de Cospedal, and representatives of the most relevant industry companies, spoke about the challenges facing the industry in the coming years and on the budgetary factors that directly influence this situation.

During the event, mention was made to projects such as the Eurofighter in the eighties or the A400M in the nineties, which were very relevant at a European scale and in which ITP Aero continues to participate, enabling the development of major industrial capabilities in Spain.

María Dolores de Cospedal expressed her interest in reactivating the Defence industry by driving "a new investment cycle in which new programmes will be included, such as acquisitions that do not necessarily have to be integrated in Special Armament Plans (PEAs) and that, without a doubt, represent a change in step and pace in the Spanish Defence industry".

In short, the event made it possible to glimpse a future of possibilities in the Defence industry and that will also drive growth in the civil sphere, due to the cross-cutting nature of the technology to be developed. ●

María Dolores de Cospedal.



New budgetary scenario in the Defence industry

# A recognition to our commitment with R+D+i

ITP Aero received the Research Collaboration Award of the Polytechnic University of Madrid (UPM) for its outstanding support to R+D+i activities.



The award was received by Iñaki Ulizar, Chief Technology Officer at ITP Aero, on the 26<sup>th</sup> of January during the celebration of the academic festivity of St. Thomas Aquinas.

These annual awards granted by the UPM are aimed at the publicly acknowledging of researchers or companies that significantly contribute to research development at the University.

The Research Collaboration Award acknowledges ITP Aero, together with the European Space Agency, as a company committed to technological progress, which is developed through innovative projects in collaboration with centres and organisations in the context of R+D+i of national and European scope. ●



The exhibition compiles the history of the company through engines.

# From Elizalde to ITP Aero: 100 years of aviation engines in Spain



Official opening of the exhibition.

The collaboration between the University and the industry is essential for the development of new technologies and for the training of young talents. Therefore, the ITP Aero Chair of Turbomachinery Studies of the Higher Technical School of Aeronautical and Space Engineering (ETSIAE) was created in 2012, with the objective of training young engineers and supporting them in their entry to and development in the job market.

In this line of collaboration, ITP Aero and the ETSIAE presented the exhibition "From Elizalde to ITP Aero: 100 years of aviation engines in Spain", which included the participation of institutions such as the Airforce Museum, Fundación Infante Orleans and the Science and Technology Museum of Catalonia, which lent historical models for this exhibition. Alfredo López, Head of Advanced Engineering of ITP Aero and Álvaro González Cascón, aeronautical historian, were the exhibition commissioners.

The exhibition was inaugurated by Guillermo Cisneros Pérez, Rector Magnificus of the Polytechnic University of Madrid, and featured the presence of Alejandro Arranz Calvo, Director-General for Research of the Community of Madrid and José Gabriel Díaz Alonso, Director of Engineering and Infrastructures of the MALOG, among other industry representatives, of the Spanish Armed Forces and of the University.

Through this exhibition, ITP Aero commemorated the history of aviation engines in Spain, showcasing historical models such as the Elizalde Lorraine engine and ENMASA flagship engines such as Sirio, Beta, Tigre and other more modern engines such as the military A400M, in which ITP Aero participates.

According to Alfredo López, Director of Advanced Engineering at ITP Aero: *"using real engines and components, the exhibition has shown the magnificent contribution made by Spanish industry to the design, manufacture and maintenance of aviation engines, practically from their beginnings to the present, maintaining a technological capacity that very few countries have in our days"*.

Additionally, Consuelo Fernández Jiménez, Deputy Director of University Extension and Students of the Higher Technical School of Aeronautical Engineering and Space of the Polytechnica University of Madrid, thanked ITP Aero for choosing the school as the most suitable facility in which to hold the exhibition:

*"Co-existing with aviation engines in corridors has transformed the daily lives of our students, who come face to face with industrial reality during each break between classes. It has been a privilege to have such a close-up view of historical, exceptional pieces that evidence the technological evolution of propulsion"*.



Rolls-Royce M 250.

## ITP Aero: heir to Spain's aeronautical tradition

In 1917, Spanish Military Aeronautics (AME) commissioned Elizalde to manufacture a prototype aviation engine intended for training aircraft. At the start of the Civil War, aeronautical industries were nationalised and Elizalde engaged in the manufacture and repair of the engines of the Spanish Republican Armed Forces (FARE). During the industrial reorganisation that took place in the early fifties, the National Industrial Institute (INI) acquired Elizalde, changing the company's name to Empresa Nacional de Motores de Aviación (ENMASA) and continued to design and manufacture engines such as the Sirio, Beta, Tigre and Alción.

In 1951, under the auspices of the INI, work began on the design of the first Spanish jet engine prototype, the INI-11. In 1971, ENMASA transferred its activities to a plant in Ajalvir (Madrid). Two years later, ENMASA was absorbed by CASA (currently Airbus). In 1989, ITP Aero was founded and just one year later it acquired the Ajalvir engine maintenance plant from CASA, through which the company inherited Elizalde and ENMASA. In recent years, ITP Aero has engaged in the repair, inspection, assembly, testing and trials of aeronautical engines at its Ajalvir plant, having repaired nearly 6,000 engines during that period. ●

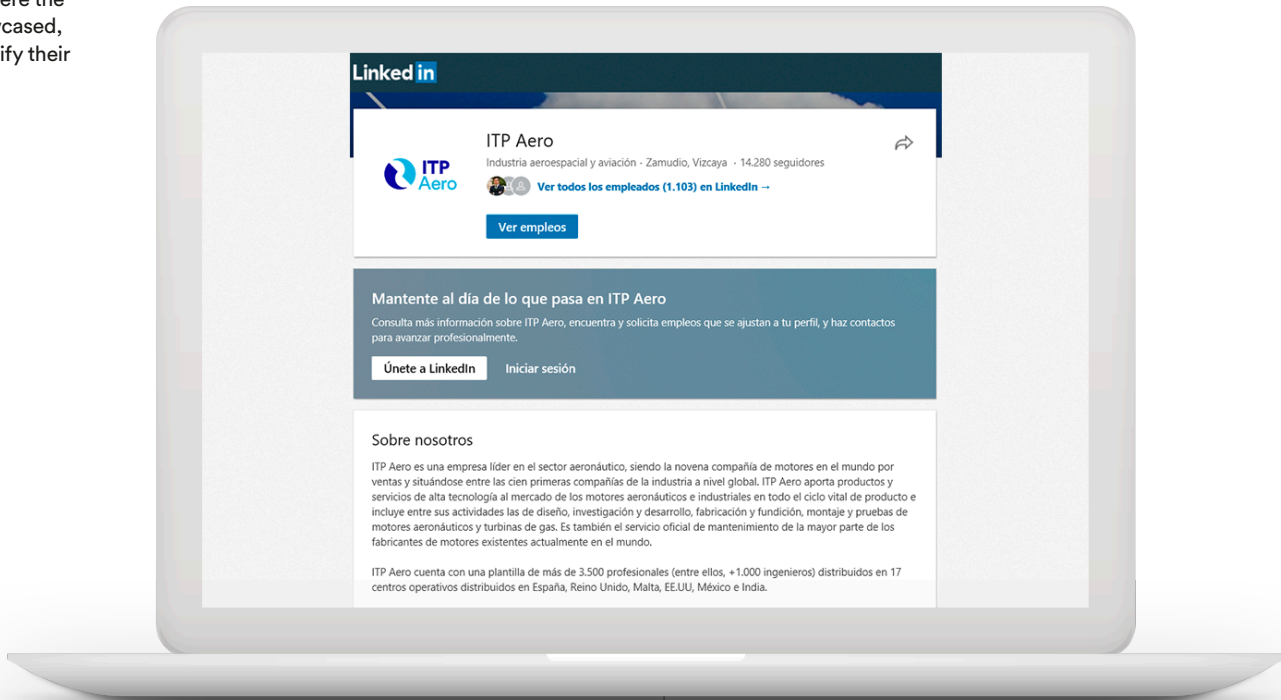


# Looking for talent

The Internet has facilitated the job application and candidate selection process for both candidates and companies. LinkedIn has become one of the most useful tools in the talent recruitment sphere in Spain, although there are other alternatives such as Xing, Yammer or Viadeo, among others.

From the corporate viewpoint, ITP Aero's corporate LinkedIn page allows a first approximation to the company. Articles on the company's different activities and relevant news are shared on ITP Aero's profile. Content is a differentiating factor and a place where the company's values and essence are showcased, which allows potential candidates to verify their compatibility with the company.

During the talent search phase, ITP Aero publishes its job offers in a group called ITP Aero Recruiting. Here, the company's HR employees publish vacancies from their personal profiles and can invite potential candidates to form part of the group. This method makes the procedure friendlier for candidates and, in fact, the company has already received over 10,000 résumés via this system. ●



Following the ITP Aero LinkedIn Recruiting group is the best way of being updated with the professional opportunities that the company is offering.

# Women in Progress: women, employment and technology



Iratxe Las Hayas, Managing Director of Castings, ITP Aero.

Iratxe Las Hayas, Managing Director of Castings, ITP Aero, has taken part in the third edition of «Women in Progress. Women, Employment and Technology», organized by El Correo.

The event gathered female business managers, investigators and entrepreneurs with the aim to inspire the new generations and awake their interest in technological career paths and STEM studies (science, technology, engineering and mathematics).

The scientific-technological call has decreased between the younger generations, especially between women so it is key that the number of students choosing STEM studies increases to meet the demand in the technological sectors. For Iratxe Las Hayas, "the loss of talent availability is a direct consequence of the lack of women in the technological field". ●



# AIR

ITP Aero magazine

