



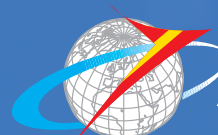
Agenda

Strategic
Aerospace
Research
Agenda

Executive
Summary



20
08



PLATAFORMA

AERESPACIAL
ESPAÑOLA

Executive Summary

First Edition
October 2008

Agenda

Agenda

Strategic
Aerospace
Research
Agenda

Edition: Spanish Aerospace Platform

Coordination: Miguel Ángel Llorca

Design & impression:  S-markmedia

Acknowledgments:

The secretariat of the Spanish Aerospace Platform expresses its sincere gratitude for all collaborations received in the execution of this exercise from the different working groups of all associated entities, from other companies and Academia. The common effort of all participants and the high consensus reached in all debates made this first edition possible.

All rights are reserved. No reproduction, storage in information retrieval systems, or transmission in whole or in part of this document, by whichever means, is allowed without the previous written authorization of the owners of the intellectual property rights.



Executive Summary

Introduction

The purpose of this document is to summarise the contents of the Strategic Aerospace Research Agenda written by the working groups of the Spanish Aerospace Platform.

● The origins of the aerospace sector

The tradition of aeronautics in Spain dates from the beginning of the twentieth century with the first flight of an aeroplane, the Brunet-Olivert, designed by Gaspar Brunet and piloted by Juan Olivert. Throughout the last century, the Spanish industry has become consolidated as one of the few that is capable of carrying out the whole value chain of the complete plane and, in particular, of developing certain essential components. The industrial space activity in Spain began later, in the decade of the 1960s. Since then, the spectacular industrial and technological development has been worthy of widespread international recognition.

Owing to their history, nature and technologies –often shared– and to the actors that play a leading role in aeronautics and space, both activities have converged into what is called today the Spanish aerospace sector.

● The dimension of the sector

In 2007 this sector represented in Spain a business volume with a figure of 4.42 billion euros, providing direct employment for 34,193 very highly qualified people and indirect employment for over 100,000 more. Moreover, this sector invests an average of 14% of its turnover in R&D, which indicates the high added value of its activity. As a consequence, aerospace activities are among those that can contribute in a greater measure to increasing industrial productivity, an aspect on which Spain must concentrate if it wishes to continue the strong economic growth of recent years. The size and repercussion of the aerospace activity confers it with the consideration of a strategic sector, all the more so when its by-products contribute to keep the technology sovereignty and situate Spain in the fifth place among the most developed countries in Europe in this area and in a very prominent position in the global context. Within the European sphere, the Spanish sector represents 4.5% of its volume, with the consolidated sales figures* shown below¹.

		Consolidated Sales (M€)	Direct Employment
Spain	Aeronautics	3.912	31.393
	Space	510	2.800
	Aerospace Sector	4.422	34.193
Europe	Aeronautics	94.600	442.100
	Space	5.360	29.637
	Aerospace Sector	99.960	471.737

(*) Consolidated sales: Calculated as total sales less intercompany sales.

¹ Figures relative to the year 2007. Source: ATECMA and ProEspacio



● The Strategic Agenda and the Spanish Aerospace Platform

The background to the content of this Strategic Agenda dates back to the year 2001, when a group of experts, sponsored by the European Commission, prepared a document, “A Vision for 2020”, which reflected the long-term needs of civil aeronautics. This document led to the creation of the European Aeronautics Technology Platform called ACARE², in which the most relevant players of the sector are represented. This European Platform expresses its strategy by means of successive editions of a document called the “Strategic Research Agenda” which serves as a permanent reference in the European aeronautics sphere.

Inspired in this context, on 16th November 2006 the Spanish Aerospace Technology Platform was created, which became known as the Spanish Aerospace Platform, or its Spanish initials PAE, with the objective of becoming established as the reference body for the Spanish sector with regard to the needs and strategies of the aerospace activities, both civil as well as defence and security. As in the case of ACARE, the said needs are reflected in the strategy document entitled Strategic Aerospace Research Agenda (hereinafter the Strategic Agenda or simply, the Agenda). The PAE was an initiative of ATECMA³, supported by the CDTI⁴, INTA⁵, ProEspacio⁶, Fundación Aeroespacio and with the economic aid of the Ministry of Science and Innovation. All of these, together with the Ministry of Public Works, incorporated at a later date, constitute the Platform members.

More information regarding the members can be found on the website of the Spanish Aerospace Platform:

(((www.plataforma-aeroespacial.org)))

● Methodology and content of the Strategic Agenda

The Strategic Agenda begins with a description of the aerospace sector in Spain and in Europe, with a special mention for the Defence and Security area. It then goes on to propose a series of challenges for the sector up to the year 2020 and beyond, before detailing ten priority lines of action.

On another level, the Agenda describes the priority technological areas together with a business analysis in the form of SWOT⁷ type tables and details the spheres of influence and action of the Agenda.

Finally, the document describes a road map detailing the most prominent messages on its time horizon. For its preparation reference has been made to the strategic plans of the Spanish Aeronautics Sector (2008-2016), the Space Sector (2007-2011) and General Aviation prepared by CDTI and which outline the Spanish strategy in the aerospace sector in periods shorter than those covered by the Strategic Agenda.

● The Spanish context

The aeronautics industry is, together with the pharmaceutical's, one of the most intensive in R&D in the global sphere. In this case the Spanish industry is no exception and the average Spanish investment is situated at between 12% and 15% of turnover. This level is similar to that of other similar countries. However, this figure varies at the different levels of the supply chain.

Employment in the Spanish aeronautics industry is very heavily concentrated geographically, distributed as follows:

• Community of Madrid	57%
• Andalusia	20%
• Basque Country	11%
• Castile la Mancha	5%
• Castile and Leon	2%
• Catalonia	1%

² ACARE: Advisory Council for Aeronautics Research in Europe

³ ATECMA: (Spanish Association of Aerospace Industries)

⁴ CDTI: Centre for Industrial Technological Development

⁵ INTA: National Institute of Aerospace Technology

⁶ ProEspacio: Spanish Association of Space Companies

⁷ SWOT: Strengths, Weaknesses, Opportunities and Threats



The Spanish aeronautical companies with the highest sales are (in alphabetical order): AERNNOVA, Airbus España, EADS CASA, Iberia Mantenimiento, INDRA and ITP which concentrate more than three quarters of the sector's sales. Together with the auxiliary industry, the sector can be classified in four levels: Prime Contractor, System Integrator, Auxiliary Industry and Maintenance Industry. Their sales and employment volume are summarised in the following table:

Types of company (Aeronautics)	Aggregated Sales (M €)	Consolidated Sales (M €)	Employees
Prime Contractors	1.053	1.044	5.383
System Integrators	2.211	1.960	11.241
Auxiliary Industry	878	218	11.076
Maintenance industry (airlines)	690	690	3.693
Totals	4.832	3.912	31.393

Regarding the space industry, since the creation of the European Space Agency in 1975, the Spanish space sector has made a growing contribution, in quantity and quality, to the most relevant space projects in the international sphere. The beginning of the nineteen-nineties saw a qualitative leap in this contribution. On the one hand, the first satellite communications operator, Hispasat, appeared and, on the other hand, the industry began a restructuring process in order to achieve a qualitative improvement in returns. As of today, the main challenge pending for Spain is to entirely develop and operate its own fully operational satellite. This is an ambitious goal but it is viable owing to the fact that more than fifty years' experience in space has created an adequate breeding ground in which to develop a strong Spanish space sector, with a dimension appropriate to that of one of the most vigorous economies in the world at present and in line, all of this, with a notable increase in industrial capacities.

The classification of companies in the space subsector is somewhat different to those of the aeronautics. They will therefore be distributed between satellite, launcher and ground segment companies; service companies and operators, the dimensions of which are reflected in the following table:

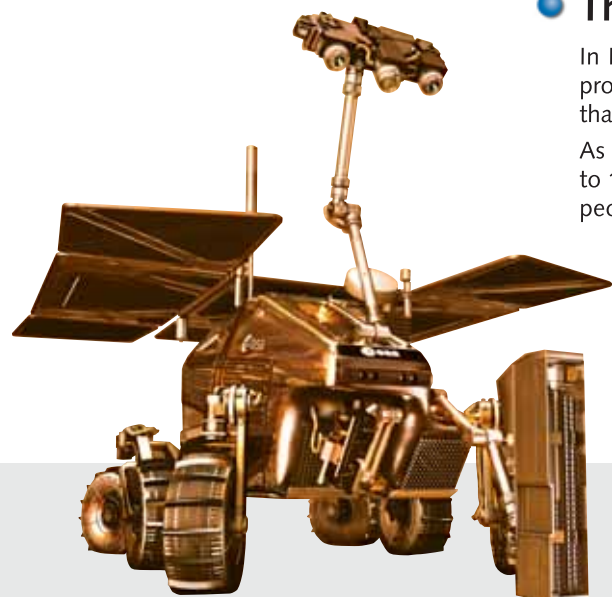
Types of company (Space)	Sales (M €)	Employees
Satellite systems, launchers and ground segment	295	2.151
Service Providers	47	572
Operators	168	77
Totals	510	2.800

● The European context

In Europe, the aerospace sector has been developed around sectoral R&D programmes in aeronautics and space and also, although to a lesser extent, thanks to national defence and security programmes.

As has been stated above, the turnover for the industry in Europe was close to 100 billion euros in 2007 providing employment for almost half a million people.

In consideration of the strong global competition, the European industry has followed the footsteps of the large concentrations in the United States, leading to a the consolidation of a large global operator, EADS, and that of other groups which, initially being national champions, are currently crossing the old frontiers to become transnational companies (this is the case of BAE Systems, Rolls Royce, Thales, Dassault, Finmeccanica and Indra).





Currently, the European programmes in aeronautics are being organised by joint technological initiatives, known as JTI⁸, promoted by the European Commission. These are the Clean Sky and SESAR⁹ programmes. And in Space, everything continues to revolve around the ESA, EUMETSAT, the CE and the Community programmes Galileo and GMES¹⁰.

And the Spanish industry, in relation to Europe, has adapted adequately to the required competitiveness and, in many cases, to the policies of the large industrial groups to which they belong. This has derived, in the aeronautics subsector, in the consolidation of the system integrator EADS CASA, the only company considered to be an Original Equipment Manufacturer or OEM¹¹, around which systems industries have developed with technical and financial size and capacity. In the space sector, companies with system integration capacity already exist, in both the space and ground segments.

● Defence and Security

In Spain, the Ministry of Defence has prepared the R&D Master Plan for Defence and the National Security Programme, promoting collaborations between civil and military TR&D¹² activities and making known the operative needs of the Armed Forces which inspire new technological developments in the area of defence and security.

With regard to R&D, this is organised, on the one hand, by the 6th National Plan for Scientific Research, Development and Technological Innovation of the former Ministry of Education and Science which, in its Instrumental Lines of Action, groups thirteen national plans. In addition to its Area 3 it contains a specific section dedicated to Defence and Security.

And with regard to European programmes, the 7th Framework Programme of the EC has begun a specific topic to finance activities in the field of security. Moreover, the European Defence Agency (EDA) acts by coordinating and planning research activities, promoting joint Defence TR&D with some well defined objectives, and collaborating with the European Commission in research activities. However, the largest budgets for the financing of this type of activities come from national programmes for security and defence.

Finally, it should be emphasised that Spain participates jointly with five other countries in the European Technology Acquisition Programme (ETAP¹³) and, obviously, in the Research and Technology Organisation (RTO) of NATO to improve, increase and forecast the defence requirements of the member countries of the Alliance.

● Horizon 2020+

The immediate future of Civil Aeronautics is very bright, boosted by the high rate of growth in passenger/cargo traffic. To the huge order book of the two largest manufacturers, it should be added that they are both holding back the launch of their new family of single aisle aircraft, pending confirmation by the engine manufacturers that their new products include specifications for reduction in fuel consumption, noise and polluting emissions, since the new environmental conditioning factors will be determinant for all future developments in civil aeronautics. Beyond 2020, new ideas appear regarding promising advanced configurations for large capacity commercial aircraft based on the concept of the "blended wing-body", which, if confirmed, will oblige the national industry to participate outside the traditional tail surfaces.

Defence aeronautics is also very attractive for the national industry. The development of the basic version of the new A400M military transport aircraft will continue until the year 2010 and its operative life will extend beyond the year 2050. In this field, the greatest challenge will be the development of a future medium tactical transport plane which, complementing both the current family of CASA aircraft and the A400M itself, will allow the national industry to continue maintaining the capacity to design, develop and manufacture complete aeronautical products.

Another market that is currently experiencing high demand is the integration of systems for mission aircraft. The integration of CASA in EADS has allowed the Spanish industry to accede to another type of platform, improve access to the Airbus platforms and complement its traditional activity on CASA aircraft and other aircraft in service within the Spanish Air Force (P-3 Orion).

Within the sphere of mission aircraft, the perspectives are numerous both in the field of Intelligence, Surveillance and Reconnaissance missions, and that of in-flight refuelling aircraft ("tankers"), this latter activity being favoured by the aging of the current fleet and the new air traffic and environmental regulations.

In the field of combat aviation, the EF2000 also has its future assured for some time beyond 2020, with the development of the so-called Tranche 2 and Tranche 3, fundamentally centred on the substitution of obsolescent equipment, on the improvement of air-to-air and air-to-ground weapons, and on the integration of a new "phased-array" type radar with active electronic scanning.

⁸ JTI: Joint Technology Initiative

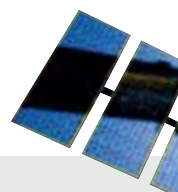
⁹ SESAR: Single European Sky ATM Research

¹⁰ GMES: Global Monitoring for Environment & Security (now named Copernicus)

¹¹ OEM: Original Equipment Manufacturer

¹² TR&D: Technology Research and Development. Term generally used in defence (R&D)

¹³ ETAP: European Technology Acquisition Programme



And with regard to missiles, Spain can consider itself to be at the highest level, since it manufactures, integrates, develops flight software, makes the payload and will shortly have earth reconnaissance capacity to choose targets and routes with the Ingenio and Paz satellites. This makes Spain one of the ten countries in the world with total capacity in this area.

The need for continuous surveillance over large areas and the reduction of the interval between detection and attack has recently given a large boost to the market for unmanned aircraft or UAV¹⁴. The Defence Ministries of France, Germany and Spain have launched a risk reduction phase for the joint development of a future modular family of autonomously operated unmanned air vehicles propelled by high performance jet engines. The participation of the national industry in this programme is vital for its consolidation.

Activity in the field of rotary winged aircraft presents a panorama of growing activity up to the 2020 horizon. Eurocopter España has its future assured, initially centred on the supply of military helicopters to the Spanish Air Force and paramilitary services. But, in addition, the company will work on the integration of new equipment and arms and will be open in the future to participation in other civil or military programmes.

And finally, some synergies in the space subsector can be mentioned. Telecommunications and earth observation satellites may reach saturation in the forthcoming decades, given the high density of spacecraft in the LEO¹⁵, GEO¹⁶ and sun-synchronous orbits. Therefore, in telecommunications, it will be necessary to restrict their use in certain cases. One idea which is being considered is to use balloons which operate as repeaters at high altitude. In observation, the alternative may be the unmanned aircraft that also fly at high altitude and with a high degree of autonomy (up to several weeks' flight at an altitude of 50 Km.). These devices will provide images with very high definition. Their problem may lie in the crossing of different air spaces, but in this respect it will be necessary to trust in aeronautic and space Law and the trend towards the *Global Village*.

Regarding space, an analysis can be made in two large areas: in a closer context such as the programme of the ESA and other agencies and in a longer term with a vision of the future.

In the first case, the space programmes can be divided into science and space exploration and applications. Science and space exploration in the long term is contemplated in the COSMIC VISION programme of the ESA corresponding to the period 2015–2025.

And with regard to applications, these can be divided into:

- Telecommunications, with an offer of new services which require a more flexible and efficient use of the radio-electric spectrum.
- Navigation, with the consolidation and implementation of the GALILEO Constellation in 2013.
- Earth observation, with the deployment of the Kopernikus constellation (hereinafter GMES¹⁶) in which the Spanish contribution is twofold: the participation in the development of the constellation satellites (Sentinel) and the national system INGENIO.
- Infrastructures. The insertion of the European laboratory Columbus in the International Space Station and the James Webb Space Telescope which will substitute the Hubble Telescope in 2013, will open new doors to research in microgravity and astronomy
- Finally, the existence of the Ariane launcher is guaranteed thanks to the continuous application of the improvements required by the market, which grant maximum reliability. But projects are already underway for a new generation of launchers, reusable or not, which guarantee competitive launch services in the long term.

Regarding a futurist vision, it can be pointed out that all space exploration today is limited by the old concept of propulsion by rocket engines. This means that the current state of the art only allows manned flights to low orbits and, at the most, to the moon. We must not forget that the Apollo missions to the moon, almost four decades ago, used a Saturn V rocket that, weighing 2,900 tonnes at liftoff, was only capable of carrying to the lunar orbit a payload of 47 tonnes, that is, 1.6% of its weight.

This limitation has kept manned interplanetary flights at a standstill. Should Society be convinced some day of the convenience of using bases on other planets to exploit extraterrestrial materials and the international legislation allows it, perhaps in this case voyages using orbital mechanics would not be sufficient, since their long duration would make manned flights unviable.

As well as propulsion, other areas should be mentioned as technological challenges such as space robotics, so stagnant in recent times, active thermal control, rendez-vous and docking of spacecraft and the necessary technology for autonomous operation without excluding human intervention.

The development of applications for space tourism, which are emerging in the world's space powers, should not be excluded. Suborbital flight with the old rocket engine could derive towards mixed propulsion, between the scramjet and the rocket to avoid a substantial part of the oxidant.

A new concept in propulsion would be necessary. It would even serve to intercept in a reasonable timeframe asteroids which could collide with the earth. In conclusion, everyday space opens its doors wider to the exploitation of its resources (including solar energy) and science. Both are inexhaustible sources.

In conclusion, everyday space opens its doors wider to the exploitation of its resources (including solar energy) and science. Both are inexhaustible sources.

¹⁴ UAV: Unmanned Aerial Vehicle

¹⁵ LEO: Low Earth Orbit

¹⁶ GEO: Geostationary Orbit



● The basic objectives of the aerospace sector

The Agenda, based on a strategic analysis of the aerospace sector, completes the strategic plans prepared for the Aeronautics, Space and General Aviation sectors with a series of short, medium and long term proposals with the aim of improving Spanish presence in Europe and the rest of the world.

Within this field, ten objectives are considered to be attained.

Essentially, the strategic objectives aim to describe the large challenges that justify the conservation and even improvement of the Spanish technological level in the European and global context. Given the importance that has been assigned to these proposals, it is worth including their full wording in this summary:

- **The capacity to develop complete products and with high added value should be maintained and fostered by means of the sector's growth following a strategic plan.**

The Spanish products developed in recent decades have enjoyed a favourable reception on the world market, both civil and military, reaching a position of leadership in the medium / light military transport segment.

From the national strategic point of view, the objective should be to maintain the position reached, reinforcing it with the appropriate technological programmes to facilitate the incorporation of new technologies that allows offering competitive national products on the international market and thus consolidating the current market share.

- **An effort should be made to reinforce the international positioning of companies and the service sector.**

The development of the world aerospace industry, and especially that of the emerging economies, signifies a challenge and a market opportunity for national companies. With the object of maximising competitiveness with a view to international positioning, a strategy should be considered for cooperation / subcontracting with low cost countries, of production packages of low technological level in which the labour cost is a fundamental factor. This would permit an increase in the competitiveness of the national industry without losing the technological differentiation.

- **An education policy adapted to the strategic requirements of the sector will be promoted.**

Traditionally, education plans in Spain have shown great depth in many disciplines but with little connection to the industrial world. This implies that the education necessary for the new graduates (Senior Engineers, Technical Engineers and specialists) should be focused towards complementing the theoretical studies with other disciplines at postgraduate level and work experience that will facilitate, to the new professionals, a better and faster adaptation to the business world, and not only in Spain, but in the rest of Europe and worldwide, taking into account the growing job mobility in an increasingly globalised world.

- **The efficient use of the existing national and regional scientific and technological infrastructures will be promoted and the necessary expansions will be analysed in order to enable the sustainability and growth of the sector.**

The number of technological infrastructures in Spain is growing markedly. Therefore, greater coordination is necessary between the existing installations, with the objective of avoiding unnecessary redundancies and overlaps, both in resources and activities.

To harmonise an optimum use of these, an infrastructure map should be drawn up that determines the current availabilities and shortages and an investment plan should be designed for the development and construction of the new installations which are considered strategic.

- **Efforts should be made to promote the creation of a long term National R&D Programme for the aerospace sector with its own identity and to establish the grounds to coordinate the various financial sources of the sector to allow for a proper implementation of the objectives of this Strategic Agenda.**

In Spain various sectors of the Central Administration contribute important funds to the development of aerospace technology and its applications, such as the Ministries of Industry, Tourism & Trade, Defence, Public Works, Environment, Interior and Science & Innovation. In order to provide coherence and maximise the efficacy and efficiency of said actions, the public investment efforts (national and regional) should be coordinated in order to harmonise policies such as the scientific, technological, commercial, industrial and environment, within a dedicated National Aerospace Plan.



- **Strategic objectives will be defined in line with the recommendations of the different European initiatives (Clean Sky, SESAR, Galileo, GMES, etc.) Furthermore, the integration of infrastructures and air traffic management will be promoted within the Single European Sky initiative (SESAR).**

The 7th Framework Programme of the European Commission highlights two priority lines; the development of aeronautical technologies which are more respectful to the environment and air traffic management in the Single European Sky. Both correspond to the technological initiatives Clean Sky and SESAR respectively. The applicable objectives described in this Agenda should be in accordance with these two criteria which the EC has declared top priority.

And with regard to Galileo and GMES, the collaboration between ESA and the EC will be fully promoted with the objective of reinforcing European sovereignty in the areas of global satellite positioning and earth observation by means of the creation of their specific infrastructures with a high degree of Spanish industrial participation in technological developments and their applications.

- **The creation of an auxiliary industrial network will be fostered with highly competitive companies distributed by competence centres.**

As has been previously stated, the auxiliary industry plays a leading role in the whole value chain. This industry should be developed according to its excellencies, seeking specific technological niches where it can demonstrate its maximum competitiveness.

Moreover, the space subsector has some specific objectives that complement those of aerospace in general. These objectives are summarised in the following three points:

- **The consolidation of prime contractors will be fostered, according to the different areas of mission, platform, payload and ground segment.**

The high technological level reached by the Spanish space industry makes it necessary to consolidate prime contractors surrounded by an adequate industrial network in order to be able to show maximum competitiveness in commercial markets traditionally in the hands of the large industries of the rest of Europe and the United States.

- **The creation of bilateral cooperation programmes between Spain and other countries will be supported with the main objective of promoting joint missions that allow the companies and organisations to obtain flight opportunities and experiment their developments in orbit.**

The participation of Spain in ESA has been the main engine of industrial space development. However, the management of this participation is complex since it requires ample consensus in a multinational structure. For certain technological development programmes and flight opportunities, it has been shown that bilateral agreements with other space agencies give optimum results. As a consequence, the consolidation and possible enlargement of the said agreements should be fostered. These agreements are likewise productive for the aeronautics subsector.

- **Companies should obtain maximum returns on the investment made with public funds by means of ample participation in commercial and technology transfer programmes. This would lead to competitive industrial growth.**

The aerospace sector has had a marked institutional character in its origins. However, the large market of commercial programmes should motivate the industry to profit from the public investments obtaining ample results in this market.



● Priority technological areas

One of the most important points, within the sector strategy, is the identification of the priority technological areas in both the aeronautical and space spheres. These areas can be seen in the following table, in which the order does not imply the level of priority. With regard to space, an attempt has been made to adapt the classification of the technological areas to that made by the ESA in the document *ESA Technology Tree*.

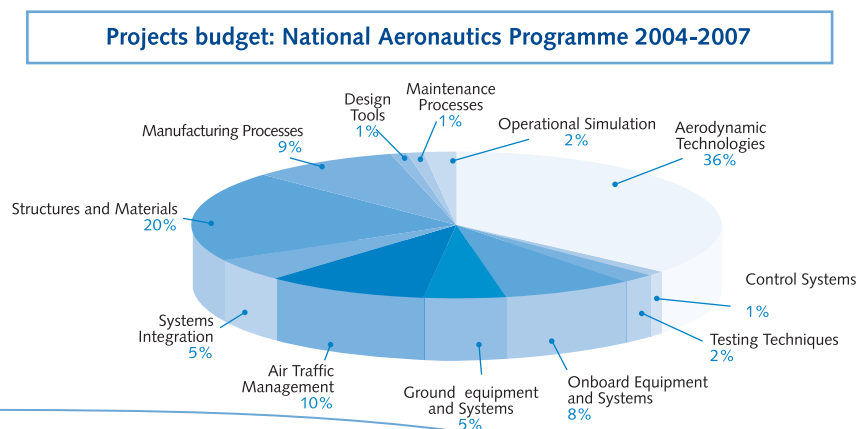
Aeronautics	Space
1. Structures and Materials	1. Telecommand and Data Handling
2. Manufacturing Processes	2. Power
3. Maintenance Processes	3. Guidance, Navigation and Control
4. Design Tools	4. Propulsion
5. Operational Simulation	5. Structures, Thermal Control and Environmental Control
6. Aerodynamics	6. Robotics and Mechanisms
7. Control Systems	7. Communications and RF Payloads
8. Test Techniques	8. Other Payloads
9. Onboard Equipment and Systems	9. Mission Analysis, Design and Operations
10. Ground Equipment and Systems	10. Ground, User and Space Applications Systems
11. Air Traffic Management	11. Materials, Components and Methods
12. Systems Integration	

In the future, these priority technology areas of the aerospace sector may vary with a view to be adapted to the needs of the sector, to the new issues of the ESA's Technology Tree and to the thematic priorities of the National Space Plan and Strategic Plans.

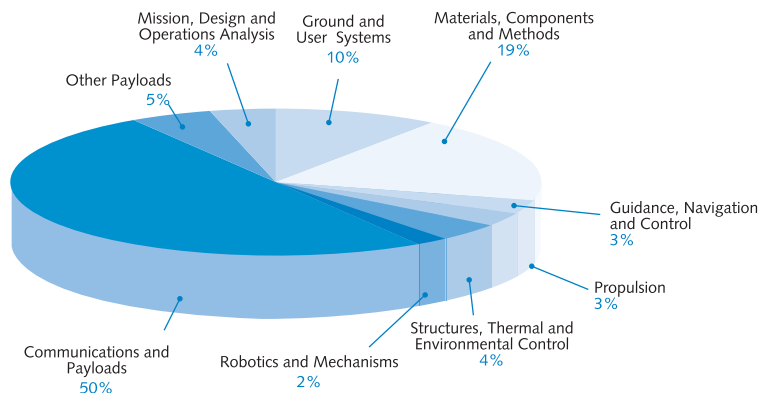
The following sections show what can be considered as the spheres of influence and action of the Agenda:

● The R&D situation in Spain

The following two diagrams show the budget breakdown of Spanish R&D projects in aeronautics and space:



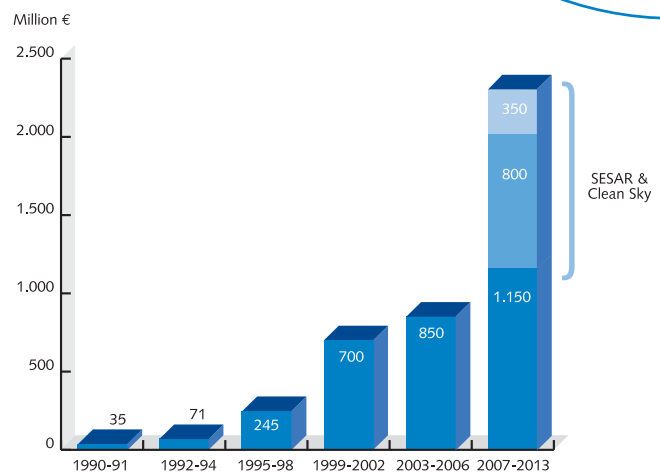
Projects Budget: National Space Programme 2005-2007



European programmes

The following graph shows the growing rhythm of the assignment of European Commission funds to aeronautics programmes including the transport area.

In the graph, the importance of the Clean Sky and SESAR initiatives in the budgets can be appreciated. However, in the space area, even though the Commission allocates a budget of 1.43 B€ for Galileo and GMES, the nucleus of the budgets goes to ESA which, though small in growth, has a Spanish contribution merely duplicated in the recent years. The following graph shows the institutional investment (thousands of €) for the space sector in the international context.

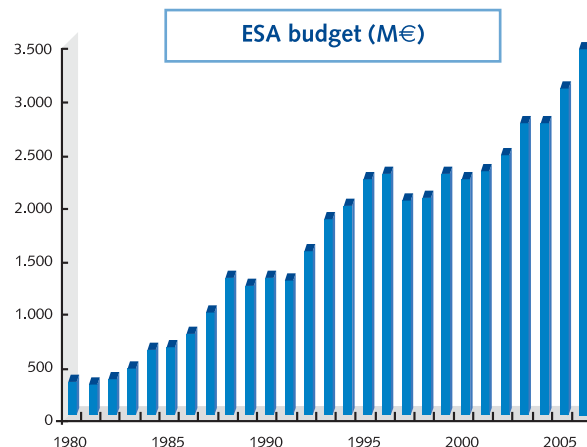


Other Spanish Technological Programmes

The PAE will promote meetings with other technological platforms in order to stimulate the cooperation of the companies in areas of interest for aeronautics and space.

Industrial Clusters

In Spain, the regions of Andalusia, Catalonia, Madrid and the Basque Country have taken a first step by fostering the creation of industrial clusters and which are now known as AEIs¹⁷. Currently, other communities are joining this initiative and it is to be expected that in a short time this new entrepreneurial world will extend across the whole of Spain. The objective of the PAE is to coordinate the national and regional R&D efforts with these associations and foster cooperation between companies and especially with SMEs.



¹⁷ AEI: is the acronym of the Spanish term Agrupaciones Empresariales Innovadoras or Innovating Industrial Groupings



● Education Plans

In the past, the aerospace industry has generally comprised graduates in senior and technical aeronautical engineering. However, the wide range of disciplines in the sector and the excellent preparation of professionals from other branches has allowed other graduates such as telecommunications and mechanical engineers, as well as those holding degrees in physics, mathematics, etc. to join the market. Being conscious of the importance of education (basic objective No. 3), the industry will offer to cooperate with the University to define the subjects that are most necessary for postgraduate courses and to foster a rapid adaptation of new graduates to industrial requirements.

● Scientific and Technological Infrastructures

None of the R&D plans and activities could be carried out without the necessary collaboration of a network of national and European installations. Since this is also a priority exercise, the Spanish Aerospace Platform has initiated the preparation of a detailed inventory of the said installations in order to facilitate a better coordination of those which are already available, proposing the necessary investments for the implementation of other new installations which, all together, will increase the efficiency in development programmes and reduce the unnecessary costs caused by duplications.

● General Aviation

In the Strategic Plan for General Aviation (Ministry of Industry / CDTI) this activity is described as a “personal and corporate aviation and the small scale transport of passengers”.

It is very probable that the said activity will open its doors to the general public, as and when small aircraft, their consumption, preventive maintenance and navigation aids become cheaper, by means of the latest technologies. To support this growing activity, it is essential to encourage the most intensive use of the remaining capacity in secondary Spanish airports and to make the air transit rules applicable to this aviation niche more flexible.

● Financing Forecasts

The financing plans of the sector to bring to fruition the objectives expressed in the Strategic Agenda will be closely related to the strategic plans of Aeronautics, Space and General Aviation published by the Ministry of Industry and CDTI, as well as the funds available in the regions, the contributions of Spain to ESA, the 7th Framework Programme, bilateral programmes, public procurements and other European programmes. These public funds will complement, to a large extent, the investments of the companies in pre-competitive programmes.

Notwithstanding the above, the different investment criteria in the two cases of aeronautics and space should be specified:

● Aeronautics subsector:

In aeronautics programmes, investments are marked by economies of scale, since they produce large series (Airbus, military transport aircraft, etc.). Support programmes for R&D are very much directed by the European Community rules; it is therefore proposed to:

- Increase the level of intensity of the economical aid up to the maximum permitted by the Community framing.
- Make participation rules more flexible
- Encourage national programmes.
- Establish coverage for technical and market risk.
- Allocate a percentage of the budget to SMEs



● Space Subsector:

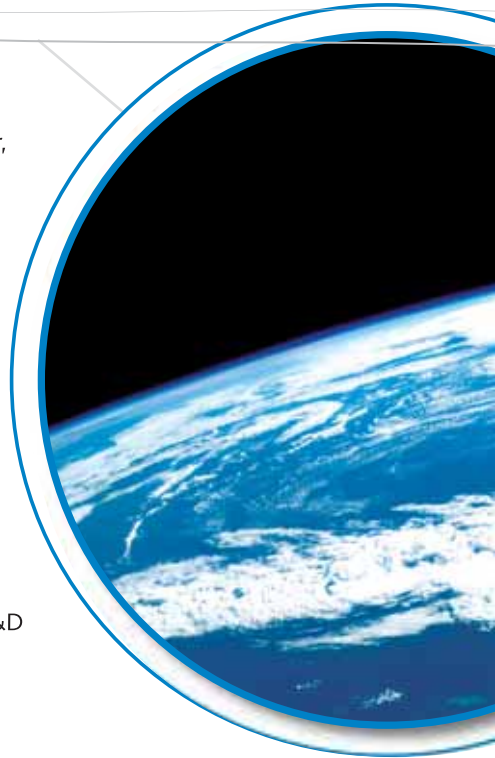
Except in the case of platforms for communications satellites and the Ariane launcher, in these programmes serial production does not exist, since they are far away from the market. That is why they require a strong institutional support.

These specific characteristics of Space R&D are included in the Strategic Space Sector Plan of the CDTI, owing to which the space subsector will comply with the same in the preparation of its plans.

As a summary, the most important characteristics of the Plan can be quoted below:

- Gradually increase participation in the ESA to reach in 2008 the rates equivalent to Spanish relative GNP and subsequently maintain them in real terms.
- Undertake a diversification regarding the programmes of ESA by means of the fostering of, among others, a powerful National Space Programme which includes the National Earth Observation Plan; Bilateral Programmes with other space powers; the incipient regional programmes and the activities linked to the programmes of the EU (Galileo and GMES).

And all of this is accompanied by an important private investment effort in those R&D programmes close to the market, estimated at 15% of the total investment.



Road map and top ten challenges

Three phases are proposed to put into practice the priorities and challenges of the aerospace sector.

Short term

To promote an aerospace policy oriented towards establishing the sector as strategic and making the necessary efforts to maintain Spanish technological capacities.

Medium Term

To consolidate and integrate the strategic activities of the sector within the international sphere.

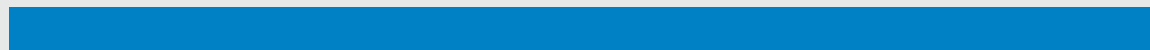
Long Term

To strengthen the scientific and knowledge infrastructure that provides support to the Spanish sector.

Road map

In conclusion, the following table shows the top ten challenges of the sector:

Priority	Challenges
1	Declaration of aerospace activity as a strategic sector
2	Consolidate Spain among the 5 most industrialised countries of the EU in the aerospace field
3	Orchestrate the measures to coordinate the financial sources of the aerospace sector with the objective of implementing the objectives of this Strategic Agenda
4	Maintain the capacities of generation of own products and the integration of complete systems
5	Promote the technological excellence of the whole value chain and, especially, that of SMEs
6	Maintain national technological and commercial supremacy, especially in transnational companies with presence in Spain
7	Extend the commercial presence of the companies throughout Europe and the rest of the world
8	Promote the development of adequate technological infrastructures in Spain
9	Develop a network of organisations (companies, PROs and universities) that generate knowledge
10	Promote the integration of Spanish R&D projects in the European context (ACARE, ASD, GMES)



www.plataforma-aeroespacial.org

www.plataforma-aeroespacial.org



Plataforma AeroEspacial Española

C/ Francisco Silvela, 71 - 1º D
28028 Madrid

Tel.: +34 91 782 15 90

Fax: +34 91 782 15 92

e-mail: mallorca@atecma.org



ATECMA



MINISTERIO
DE FOMENTO



**Centro para el Desarrollo
Tecnológico Industrial**