



**D1. "Sector Analysis in Poland, Romania and Turkey:
Potentials and Constraints. Questionnaires"**



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**Promoting RTD in aeronautic SMEs of
Poland, Romania and Turkey**

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1. Introduction

The goal of this report is to provide a detailed analysis of the current situation in the aviation sector in Poland, Romania and Turkey. The report concerns R&D and industrial sectors with special emphasis on the role and importance of Small and Medium Sized enterprises. The analysis tackles also the participation of the countries in research projects of European Framework Programmes as well as information on relevant national tools and priorities for supporting the development of aviation industry.

The final effect of this analysis is to show the complete “as-is” situation of aeronautical sector in Poland, Romania and Turkey, taking into consideration its constant changes, creation of new companies, R&D institutes, industrial clusters and new tools and financial support mechanisms for the development of aviation sector in mentioned countries.

2. Aeronautical sector in the involved countries

2.1. Poland

2.1.1. History

The Polish government, appreciating the importance of aviation industry for the defense and development of country, created its first Polish Aviation Factory in 1928 in Warsaw and continuously extended its activities until the Second World War, where Polish Air Forces were totally equipped with aviation equipment constructed and produced in Poland.

After the war, the Polish aviation industry, on different political and economical conditions, was enlarged and developed as an important part of the defense industry, being under a close control of the government.



The Polish aeronautical industry in the past designed, certified, and produced aircraft up to commuter class, subsonic jet trainers, and midsize helicopters. These activities included both airframes and engines. Production of “general aviation” aircrafts during 60’s/70’s was at approximate 600 annually, and Poland, besides of USA, was the largest manufacturer of that type of aircrafts worldwide. At that moment, aviation industry in Poland employed over 80 thousand workers. At the moment, there are only about 20 thousand persons working in this industry. Under these new conditions, efforts were made to consolidate the industry into a bigger body, but without the support of the government, the outcomes were not satisfactory.

The industry was supported by the relevant R&D (test) infrastructure – partially owned and located at airframes and engines integrators (each of them has own R&D capacity), and in a part possessed by Warsaw Institute of Aviation.

2.1.2. Current situation in the country

Due to political and economical reforms in the 90’s, there have been some large changes in the aeronautical sector, also in the field of R&D activities.

The Aviation Valley Association was created as an industrial cluster, gathering the key players of aeronautical sector in Poland. Following this initiative, “Centre of Advanced Technologies AERONET – Aviation Valley” was created, to gather the research institutes and technical universities, that are significantly devoted in supporting the Aviation Valley cluster with its R&D experience. Also, the center has settled cooperation with the Institute of Fluid Flow Machinery in Gdansk and the Technical University of Czestochowa in order to gain synergies with the most advanced institutions supporting the sector of turbo-machinery.

The Polish aeronautical potential was also integrated in two initiatives, with the aim of strengthening research and industrial activities at national and European level:

- Polish Network of Excellence, and
- Polish Technology Platform for Aeronautics, that has recently announced the Strategic Research Agenda, which will be implemented with the significant support of Polish government and Structural Funds



Poland is also very active in different European initiatives like: **ACARE, ASD, IMG4, JTI, EASN, EREA** and many others.

Poland is also a partner of AirT-Net, coordinating national research programs at European level.

2.1.3. Universities and R&D institutions

At the moment, Polish R&D area is gathered around large number of universities, technical universities, and institutes. A number of universities and technical universities have departments that conduct R&D work directly or closely related to aeronautics issues. The remaining part of department's scope of work can be applied in aeronautical solutions.

The breakdown of all institutions is shown below:

INSTITUTES

Air Force Institute of Technology, Warsaw

The Air Force Institute of Technology is a scientific and research organisation, which is supervised by the Minister of National Defence. Its mission is scientific support and research into problems of operating of products of aeronautical engineering.

Owing to the studies in the field of reliability and broadly understood flight safety, the Institute has significantly contributed to the development of Polish aviation. The Institute's output comprises hundreds of elaborations applied in the Air Force Institute.

The development strategy of the Air Force Institute of Technology is directed at increasing research potential through starting cooperation with partners from Poland, Europe and outside of Europe.

The priorities of AFIT's development include participation in:

- 7th Framework Programme of the European Union
- Offset Programmes
- European Defence Agency

Website: <http://www.itwl.pl/en/index.php>



Institute of Aviation, Warsaw

Operating since 1926, Warsaw's Institute of Aviation is a centre of research, development and design activities in aviation and related disciplines. The Institute of Aviation is a state-owned organization. A broad experience base, backed by in-house advanced new technology and knowledge of modern design methods is a guarantee of their capabilities in providing services for a broad spectra of potential customers.

During 5th Framework Programme, the Institute of Aviation participated in three RTD projects: HELIX, HiReTT, NAS-TAURUS, and two SSA projects: UAVNET and X2-Noise.

The participation in FP6 projects was much higher and the final list of projects comprises of: AERONET III (CA), ADLAND (STREP), SCRATCH IV (SSA), HISAC (IP), AirTN (CA), UFAST (STREP), SOFIA (IP), EPATS (SSA), CESAR (IP), SCRATCH (SSA), SUPERSKYSENCE (IP), DRESS.

Website: <http://www.ilot.edu.pl/STRANG/index.htm>

There are also fourteen Institutes related to aeronautics:

- The Szewalski Institute of Fluid-Flow Machinery, Gdańsk
- Foundry Institute, Cracow
- The Metal Forming Institute, Poznań
- Military Institute of Armament Technology, Warsaw
- Telecommunications Research Institute, Warsaw
- Tele & Radio Research Institute, Warsaw
- Institute of Non-ferrous Metals, Warsaw
- Institute of Applied Optics, Warsaw
- Institute of Precision Mechanics, Warsaw
- National Institute of Telecommunications, Warsaw
- Industrial Research Institute for Automation and Measurements, Warsaw
- The Institute of Advanced Manufacturing Technology, Cracow
- Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw



➤ **Stanislaw Staszic Institute for Ferrous Metallurgy, Gliwice**

As an example of success, The Szewalski Institute of Fluid-Flow Machinery in Gdańsk can be shown.

The Institute was founded in 1956. It was destined to conduct fundamental research in the area of principles of operation, design, construction and development of machinery for energy conversion in flows. Presently, the investigations are being carried out in: fluid mechanics, multiphase flows, thermodynamics and heat transfer, plasma physics, laser technique, machine mechanics, tribology and diagnostics of power sector machinery.

Apart from the fundamental research, the Institute offers its services in the area of practical engineering applications such as: turbines, pumps and hydrokinetic couplings, ventilators, marine propellers, solar collectors; their design, calculation and technical expertise; development of unique equipment and apparatus.

The Institute is coordinator of an FP6 STREP project from the Aeronautics priority entitled “Unsteady effects of shock wave induced separation – UFAST” and partner in following projects: AITEB II, ARTIMA, FLIRET, TLC.

UNIVERSITIES & TECHNICAL UNIVERSITIES

The research activity of academia covers: design and testing of aeronautical structures and propulsions, safety and reliability, computational fluid dynamics including wake hazard, flight dynamics, aircraft navigation and control, high angle of attack dynamics, numerical study of leading edge separation; aircraft design: optimisation of aircraft configuration, effectiveness and low cost design; aircraft systems, rotorcraft aeromechanics, aerodynamics, flight dynamics, aircraft design, avionics, airplane design and aerospace research, material science, modern materials and engineering processes, modern production techniques, optimisation of aerodynamic configurations, system analysis and integration of UAV platform.

The overall potential of Polish aero-related academia consists of:

- 15 Universities
- 17 Technical Universities



Warsaw University of Technology and Rzeszow University of Technology having aeronautical faculties are deeply involved in research and training related to all aspects of aeronautics.

Warsaw University of Technology, The Faculty of Power and Aeronautical Engineering

The Faculty of Power and Aeronautical Engineering was established in 1960 joining the former Faculties of Aeronautics and Mechanical Design. The purpose of the fusion was to create a department offering education in most important branches of engineering. The Faculty, in view of both the intellectual capacities as well as experimental background is perfectly suited to become the research centre for aeronautical sciences as well as power and heat transfer technology in Poland. With such a variety of interfering fields of science as aerospace technology, power engineering, robotics, ecological technology for energy transfer, biomechanics and robotics being explored and developed at the same place, the Faculty offers excellent prospects stimulating the scientific progress as well. The faculty is divided into two Institutes:

- Institute of Aeronautics and Applied Mechanics
- Institute of Heat Engineering

In 2003-2007 the Faculty has participated in many Framework Programme projects in the field of aeronautics: ADFCS II, CAPECON, HiReTT, NAS-HiReTT, UAV-NET and M-DAW. Currently, the Faculty is continuing it's participation in FP projects, being a partner in several other projects: ADIGMA, EASN II, NACRE, NEFS, NICE TRIP, SIMSAC and VULCAN.

Website: http://www.meil.pw.edu.pl/index.php?lang=1&id_page=120

Rzeszów University of Technology, Faculty of Mechanical Engineering and Aeronautics

The Faculty is a coordinator of Aeronautica Integra Research Network, uniting research institutions which conduct studies in the field of aeronautics and space technology. The Faculty has achieved the status of an Advanced Technology Centre with the "AERONET – Aviation Valley". It carries out research and training, in addition to practical application and commercialisation programmes for companies which deal with the aviation industry. The Faculty's research primarily focuses on: craft construction and propulsion, IT and avionics, material and surface engineering, as well as modern manufacturing processes.



The University is a member of the Polish branch of STAR (Specialised Training in Aeronautics and Research; STAR-EU/STAR-PL) an EU aeronautic-university association, which is a cooperative forum in this field. Being an active member of -STAR has tremendously increased training opportunities on the international arena and significantly enriched the lab environment.

Website: <http://www.prz.rzeszow.pl/en/FoMEaA/?page=about>

Many of Polish academia representatives are active participants to FP5 and FP6 projects, mainly as partners but with some of them are also coordinators of projects.

Also, a number of institutes is involved in some initiatives with the aim of bringing together Polish R&D and industrial sector, which are described in further part of this report.

2.1.4. Industry and SMEs

In Polish aerospace sector, there are several leading companies that can be identified. Each of them has a vast experience and expertise in aeronautics, being the largest Polish companies in this sector, cooperating with key players in Europe and worldwide. Many of them have also experience in Framework Programmes, starting with FP5, being partners to small and large research projects.

Aeronautical companies in Poland can be generally divided into three main categories:

- Large companies: four companies employing several thousand of workers:
 - propulsion manufacturers: engines for aircrafts and helicopters, propulsion components
 - aircraft and aircraft component producers
 - helicopter and helicopter component producers
- Medium-sized companies: employing less than thousand workers:
 - manufacturers of: oil, air, and fuel systems, chassis elements, control and navigation hardware, simulators and training devices, small aircrafts, gliders and many others
 - Military Aviation Depot – repair and maintenance of military aircrafts
- Small companies, employing small numbers of workers (less than 50):



- hardware and tool producers, general machining cooperation and many others

The overall view of this sector is described by the picture below, showing as an example companies clustered in the "Aviation Valley Association". Companies marked in red are owned by the government, while blue are private owned.



PZL Świdnik

PZL-ŚWIDNIK SA was established in 1951. In the years 1951-1954 there were manufactured control surfaces and wings for the jet fighter **MIG-15**. In 1954 the company profile was changed and licence production of **SM-1** (MIL Mi-1) helicopter began. In the following years its modified version, **SM-2** helicopter, was manufactured, bringing the total number of piston engined helicopters produced to close to 1800.

In 1964 the licence **Mi-2** (2 turbine engines GTD-350 400KM or two GTD-350W 425KM, 9 seats, MTOW 3550kg) light twin-turbine helicopter production was commenced. Up to now a total of over five thousand helicopters of this type have been produced and sold.

The main model of the helicopter manufactured at the moment in Świdnik is the multipurpose **PZL-Sokół**.



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PZL co-operates with various companies, such as EADS, LATECOERE, EUROCOPTER DEUTSCHLAND, AGUSTA as well as with DASSAULT, SNECMA, FOKKER, RATIER-FIGEAC, BOEING.

Having huge experience and technical background, PZL-Świdnik SA offers industrial co-operation in the following areas:

- development of metal structures
- development of composite structures
- manufacturing of aircraft mechanical parts
- metal parts machining
- assembly of aircraft mechanisms
- bonding of metal and composite materials
- heat and surface treatment
- welding
- designing, research and development
- testing

PZL Świdnik is also an active participant of European Framework Programmes. They began in FP5 with two projects: CAST and MALVINA. New experience and contacts resulting from this cooperation allowed company to extend their participation in 6th Framework Programme, where they took part in seven projects, including the KMM-NoE Network of Excellence.

While continuing the successful strategy, the company has accessed a number of consortia preparing project proposals for FP7 first call of "Transport incl. aeronautics priority).

Website: <http://www.pzl.swidnik.pl/>

PZL Mielec

Polskie Zakłady Lotnicze (Polish Aviation Factory), a Limited-Liability Company, is presently the largest aircraft manufacturer in Poland. For over 60 years aviation, this industry has been active in the South-Eastern town of Mielec, and the Factory continues as a manufacturer of worldwide-popular agricultural & fire-fighting planes, passenger/cargo commuters and trainer aircraft. They are known world-wide as being producers of airplanes like Dromader or Skytruck.



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The company manufactures aircraft products of its own design and participates in foreign cooperation projects, proud of having such aviation-business giants as BAE Systems, Pratt & Whitney, GKN Westland, SAAB, Lockheed Martin as partners.

With around 1500 employees, including experienced engineering/designer staff and highly-qualified workforce representing the entire range of skills required in aerospace business, the Company has got all organizational, technical and production capability to manufacture aircraft and implement development programs.

At the moment, PZL Mielec is 100% owned by Sikorsky Aircraft Corporation.

Besides of producing various types of aircrafts, Mielec offers subcontractor services in:

- Designing and testing of aircraft
- Sheet-metal forming
- Machining
- Heat- & heat/chemical treatment
- Special processes
- Laboratory testing
- Operations involving CAM/CAD/CAE systems

The company has experience in Framework Programmes project, being a partner of two consortia: ADLAND and CESAR. Mielec is also member of IMG4 and Polish Technology Platform for Aeronautics.

Website: <http://www.pzlmielec.pl/>

WSK Rzeszów

WSK "PZL-Rzeszow" S.A. is a company manufacturing aviation components and complete aircraft power plants. The second area of activity is the production of a wide range of castings, forgings as well as components, assemblies and manufactures for machine-building and automotive industries. The company activity is supported by three main units: Aerospace, Industry and Tooling, operating as independent Business Units running their own account. The remaining activity of the Company is held in supporting units.

Engineering Office offers design services within the range of aviation gearboxes as well as parts and assemblies for turbine engines



Aerospace Business Unit offers:

- Aerospace components:
 - sheet metal manufactures (compressor cases, combustion chambers, nozzles, diffusers, exhausts etc.)
 - compressor and turbine blades/vanes
 - gears, shafts, carriers, disks
 - cases, housings
- investment castings - aviation and industrial blades, stators, fuel control system elements, turbine impellers, compressor impellers
- aircraft engines: jet, turboshaft, turboprop
- engine gearboxes and helicopter transmissions
- overhauls and maintenance of the manufactured aviation products

Tooling Business Unit offers:

- special tools, tooling and instrumentation for aviation and automotive production

WSK Rzeszów is taking active part in FP6 projects, being a partner in three proposals (FILMFREE, NEWAC, VITAL). The company also entered a number of consortia for projects being prepared for the first call of FP7 "Transport incl. aeronautics" priority.

WSK Rzeszów is member of IMG4, leader of Polish Technology Platform for Aeronautics and founder of Aviation Valley Association.

Website: <http://www.wskrz.com/>

AVIO Polska

AvioPolska is a part of the world industrial group AVIO which belongs to the world leaders of aerospace sector. The company AVIO was established in 1908 as a part of Fiat connected with aviation. In the 60's, the company focused on production of the aircraft jet engines. In the 90's the company expanded and started production of space propulsion and MR&O of turbojet engines. Since 2003 Avio has become a separate from Fiat capital group with the annual income of 1,3 billion Euro and employing over 5000 people in Europe, the USA, Southern America and China. Today, Avio Group is a world leader in the production of accessory gearboxes and power transmission



gearboxes for the turbojet engines (it controls about 60% of the world market of these tools for the civil wide-body aircrafts).

AvioPolska Sp. z o.o.

The branch in Poland was founded in 2001 in Bielsko-Biała as a part of Fiat Avio Polska. The plant focused its activity on two centers – Production Centre and Research & Development Centre.

The Production Centre produces rotor blades and stators for turbines for aeroengines and their naval and industrial versions. It deals also with the MR&O services of engines. Thanks to the sale of the naval propulsion and automation systems, the company supports the sale activities of AVIO, especially in Central Europe. The professional and highly qualified personnel is the strength of AvioPolska. Over 280 employees enable efficient and creative work in the company.

In the R&D Centre the most emphasis is put on the research & development, design activities and engineering analyses of technologically advanced components for aeroengines. At present the works on turbines and power transmissions gearboxes for many modern aeroengines are conducted. The important factor supporting engineering works is a very modern computer software: CAD (Unigraphics and Catia) and CAE (Partan, Nastran, Ansy and Marc).

The plant in Bielsko-Biała is still being developed. In the near future the increase in capacity is planned what will widen the offer of products made by the Production Centre and also MR&O services provided by the plant.

AvioPolska cooperates with many scientific centers and high schools (Politechnika Warszawska, Politechnika Śląska, Akademia Techniczno-Humanistyczna) what enables to improve innovativeness.

The company is a member of Polish Technological Platform of Aviation, cooperates with many institutions within the confines of Aviation Valley. In 2004 AvioPolska was rewarded with the title of “The Company of the Year” and received a “Kobuz Statuette” from the authorities of Bielsko-Biała.

SMEs

It is very hard to unambiguously describe sector of Polish Small-Medium sized Enterprises linked with aeronautical industry in Poland. Existing companies can be divided into two categories:



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- the ones, that directly provide services and products for aviation industry, and
- the ones, that products, technologies and solutions could have an application in aeronautical sector.

The largest assembly of such SMEs linked with aviation sector in Poland, can be found within over 50 companies participating in Aviation Valley Association. The long-term objective of the **Aviation Valley Association** is to transform south-eastern Poland into one of Europe's leading aerospace regions, which would be able to provide a diverse cross section of products and services for the most demanding clients. The profiles of the companies participating in this initiative is very extensive and consists of manufacturers of many types of products such as small planes, composite parts, turbines, engine parts, optical products, components and parts for aircrafts and helicopters. Also expedition and logistic companies are present. The Aviation Valley Association is continuously recruiting new members, planning to exceed 100 in coming years.

There is also a large number of SMEs in Poland, which scope of activities does not only limit to applications in aviation industry. Because of that, the identification of such companies is hard. Only after a deeper analysis of possibilities of applications of products, technologies and services offered by those companies, new perspectives of applications in aviation industry arise. Due to it's specifics and diversity of applications, such companies can be valuable business partners as well as sub-suppliers of specialist parts and components for aviation industry.

Many of Polish SMEs have also a large, yet undiscovered, potential which could enable them to become valuable partners to FP7 project consortia.

As an example of successful SME, one of the members of Aviation Valley can be shown – **ULTRATECH**. Company started its activity in July 2000. At the moment it is engaged in production of parts and sub-assemblies for aviation and automotive industries. Products are made by using precision machining of semi products such as steel and aluminium castings, forgings, bars and sheet metal.

The main product and services categories are:

- Aircraft engine parts
- Aircraft landing gear parts
- Tooling design
- And others



Ultratech is participating as a partner in STREP project of FP6 Aeronautics call: “MAGFORMING: Development of new magnesium forming technologies for the aeronautics industry”

Webstite: <http://www.ultratech.pl/>

2.1.5. Scientific and Industrial aeronautical clusters and initiatives

Due to the fact, that Polish R&D and industrial area have found a need to strengthen and facilitate cooperation on the European level, as well as on the national level, several scientific and industrial initiatives and consortia have been set up.

Aeronautica Integra

The scientific network „Aeronautica Integra” consists of ten scientific and research organizations (institutes, universities and tech. universities) and one industrial consortium Aviation Valley.

Mission and main goals:

- ✓ to integrate and to increase the activity of Polish scientific groups working in the area of aviation technologies (scientific and industrial partners) within research and education
- ✓ to build sound foundations for transfer of knowledge
- ✓ to increase participation of Polish partners in the EU Framework Programmes projects
- ✓ to develop co-operation between Poland and foreign partners
- ✓ to join European scientific networks and ESTP

Website: <http://www.aeronauticaintegra.prz.edu.pl>

Centre of Advanced Technologies AERONET “Aviation Valley”

The Centre of Advanced Technology "AERONET - Aviation Valley" was founded in order to realize interdisciplinary, collective and long-term research and training program as well as effective implementation and commercialization of new technologies aimed at the aerospace industry.

The Centre of Advanced Technologies "AERONET - Aviation Valley" became active in the following main scientific fields pertaining to aviation and related areas:



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- design and testing of aviation structures and propulsions,
- aviation teleinformatics and avionics systems,
- modern materials and surface engineering processes,
- modern production techniques in the aerospace industry

The main objective of CAT AERONET is to build and strengthen bridges between universities and industry in two areas:

- Cooperation in education
 - students training at WSK "PZL Rzeszów" (1,5 years duration)
 - university staff attend special training at WSK "PZL Rzeszów"
 - lectures of experts from industry at RUT
 - different kinds of courses offered by RUT for employees from industry (Aviation Valley)
- Cooperation in research
 - common projects
 - improvement of technologies
 - technical expertises
 - etc.

List of partners of this initiative consists of 11 bodies, 7 of them are Universities and Universities of Technology, 3 Institutes and one Industrial partner – the Aviation Valley Association. This initiative is coordinated by Rzeszów University of Technology.

Website: <http://www.aeronet.pl/>

Aviation Valley

The Aviation Valley Association was founded in the first half of 2003, as a mean to furthering the rapid development and growth of the aerospace industry in south eastern Poland. This agreement was made by a group of leading aeronautic producers, suppliers and businessmen. The rising association has been provided with significant funding from Pratt & Whitney. It is located in south-eastern Poland, famous for its aerospace industry and pilot training centers. This region has a heavy concentration of aerospace industry, scientific research centers, as well as educational and training facilities



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The objectives of the Aviation Valley Association are as follows:

1. Organization and development of a low cost supply chain.
2. Creation of favorable conditions in order to enhance the development of aerospace industry enterprises in this region.
3. Further development of aerospace research, aptitude and skill.
4. Cooperation with universities of technology, which would promote new ideas and scientific research within the aerospace industry.
5. Promotion of the Polish aerospace industry.
6. Protection of enterprise and businesses in the aerospace industry.
7. Influence on the Polish government's economic policy towards the aerospace industry and its domain.

The Aviation Valley Association is an aeronautical cluster in south-eastern Poland, which currently represents about 50 companies within the region, with several others in the process of applying for membership. The number of 100 members is expected to be reached within the next few years. Most important short and medium term goals of the Association are:

- to improve the existing manufacturing base.
- to create a strong and reliable network of subcontractors and a low-cost supply chain.
- to attract foreign investment.
- to develop a relationship with other European centers of the aerospace industry.
- to promote joint cooperation of the industry with universities of technology, and research centers.

The long-term objective of the **Aviation Valley Association** is to transform southeastern Poland into one of Europe's leading aerospace regions, which would be able to provide a diverse cross section of products and services for the most demanding clients.

Website: <http://www.dolinalotnicza.pl/>

Aviation Cluster of Bielsko Biala is second Polish aeronautical cluster. It is located in south-western Poland.



Creation of this cluster can be perceived as a summary of many years of cooperation between private aviation companies and R&D institutions from Bielsko Biała region.

First of these companies were created in 1986 and in following years most of them were set up, which created **Federation of Aviation Companies Bielsko** in 2005. It was the basis of creation the Aeronautical Cluster in 2006.

Owners of the companies participating in this initiative characterize with large commitment in the aviation sector, and as a solid proof of that situation – none of them has bankrupted nor changed its profile in significant way. Besides in AVIO Polska which is a large company, the rest of them are small enterprises employing less than 50 workers.

The main interest of the companies gathered in this cluster is manufacturing of airplanes and gliders, as well as cooperative production of airframes and its components for foreign producers. In addition to this activity, the companies also provide services in the field of maintenance and overhaul of aviation equipment (small airplanes and gliders) and aviation training.

The clusters activity was noticed by local authorities, who agreed to set up **Bielski Aviation Technology Park** that will consist of a new airport and 10 thousand square meters of production area. This investment will in significant way increase the position and abilities of the Cluster.

Polish Technological Platform for Aeronautics

PTP for Aeronautics associates the key players of aeronautical sector in Poland – both from industry and science. At the moment, there are 31 partners participating in this Platform, including SMEs and large industrial companies involved in Aviation Valley Association, Rzeszów University of Technology and NCP Poland.

Main tasks the Platform puts ahead are:

- consolidation of Polish aviation industry
- creation of Polish aviation strategy
- active participation in ACARE structures
- active participation in defining and implementing of European Strategic Research Agendas and national agendas
- active participation in 7th Framework Programme



- preparation of strategic, ambitious research programme targeted for the sector companies needs, which could be a part of the National Framework Programme
- cooperation with other branch Platforms
- integration of key scientific and economical partners
- mobilization of essential private and public means
- optimum use of Structural Funds, from the economy competitiveness increase point of view (National Framework Programme 2007-2013)
- promotion and lobbying for the benefit of aviation development

PTP for Aeronautics has recently prepared it's own Strategic Research Agenda, which will be implemented with the significant support of Polish government and with the use of Structural Funds.

KMM NoE

Network of excellence on „knowledge-based multicomponent materials for durable and safe performance” – KMM-NoE is a successful project of the 1st call of FP6 NMP Priority. It is coordinated by the Institute of Fundamental Technological Research, Polish Academy of Sciences.

The main aims are to create a coherent pan-European structure of key academic and research institutions, SMEs and large industry partners in the field of knowledge-based multicomponent materials designed for safe and durable performance in highly demanding loading and environmental conditions. The Network has assembled a critical mass of high level expertise gathered from 36 partners across 10 countries.

KMM-NoE conducts materials research in:

- Intermetallics for High, Moderate, Low Temperature Applications (HiMoLo)
- γ -TiAl based materials
- New Particulate Al and Ti Matrix Composites Produced by Self-high Temperature Synthesis (PARTMMC)
- Direct Powder Deposition (DPD) of MMC for Aerospace Components with Tailored Functionality (DEPOSITCERMET)
- Metal-ceramic Nano-structured Bulk Composites and Coatings (NANOCERMET)



- New Multi-functional 3D Cellular/Porous Metallic Materials/Assemblies with Graded Pore Density/Geometry (CELMET)

KMM-NoE research work is also conducted for the needs of aerospace and automotive industries. Out of 7 Polish partners within this network, one is an industrial representative – PZL Świdnik.

Website: <http://www.kmm-noe.org/>

Association of Polish Aviation Industry

Association of Polish Aviation Industry (APAI) has been established by presidents and directors of Polish aircraft, engines and equipment companies, military aviation workshops research and development center on October 30, 2000. Due to Polish Association Law and Statute of APAI an ordinary member of Association may be a natural person concurrently occupying a position of a General Director or a President of an enterprise of the aircraft industry or any other institution. Companies managed by them, registered in Poland regardless of ownership of the company are supporting members of APAI..

Due to the Statute of APAI the objective of Association shall be:

- 1) participation in creating and realizing the economic policy of the Republic of Poland and its specification in relation to the aircraft industry,
- 2) development and promotion of Polish aircraft industry,
- 3) dissemination of knowledge of technical, economic and social issues connected with aviation and especially its achievements,
- 4) expanding contacts with domestic and foreign milieu connected with the activity of international aircraft industry and participating in international aircraft organizations, attracting domestic and foreign scientists, teachers and social activists to the idea propagated by the Association,
- 5) presenting standpoints of Association in relation to the value, form and rules of offset transactions for the aircraft industry.

The Association shall realize its objectives through:

- 1) undertaking of activities aiming at participation in establishing preliminary decisions concerning the aircraft industry by the Government, Ministries, founding bodies and the Lower House of Polish Parliament,



- 2) establishing and developing of cooperation with overseas aircraft associations,
- 3) undertaking advisory, consultative and propaganda activities within the field of aircraft production,
- 4) analyzing domestic and foreign market research and popularizing the results,
- 5) creating and maintaining of the set of technical standards in the field of aviation and astronautics,
- 6) participation in domestic and foreign presentations and aircraft fair, organizing conferences and symposiums devoted to the subject matter related to aviation.

Beginning from January 1st, 2004 APAI is a member of the European Association of Aerospace and Defense Producers (ASD). President of PZL Świdnik is a member of ASD Board. A few APAI representatives are working in ASD commissions.

Actually APAI is expanding its activity to Polish Defense sector.

2.1.6. Examples of successful aeronautical undertakings

Modern laboratory for materials research for aircraft industry - Rzeszów

On the 1st of July 2007, a new modern Research and Development Laboratory for Aerospace Materials was established at the Rzeszów University of Technology.

The R & D Laboratory shall conduct research and development tasks in the area of advanced material technologies for aerospace industry with collaboration with WSK "PZL-Rzeszów" S.A. and other companies of Aviation Valley Association and the universities associated in the Centre of Advanced Technologies: AERONET "Aviation Valley" and Centre for Advanced Materials and Technologies CAMAT.

In the R & D Laboratory besides research, also the servicing tasks will be carried out, e.g. training courses and scientific seminars for industry and testing for conformity certificates ordered by industrial companies. It will enable students, PhD students and engineers to become familiar with advanced technologies for aerospace and material technologies selection processes. The Laboratory will also promote and propagate achievements in science and engineering in the area of new material technologies and help to implement them in production processes in Polish aerospace industry.

Activities of the laboratory:



Monocrystals / directional crystallization

Heat and creep resisting coatings

High speed machining

Materials characterization

PZL Mielec acquisition by Sikorsky

Foreign investors are eager to utilize the producing potential of Polish aviation companies. They are very competitive in terms of high quality of production as well as low labor costs.

One of the latest large investments in Polish aviation sector was the acquirey of PZL Mielec by Sikorsky Aircraft Corporation at the beginning of 2007. Sikorsky plans to develop and produce international Black Hawk helicopter for global customers. With this investment, Polish aviation sector will create new business possibilities for domestic companies, as the helicopter will be manufactured using the global supply chain.

There are also new foreign aviation leaders, interested in investing in Poland:

- Pratt & Whitney
- EADS
- British Aerospace
- Lockheed Martin, and others

AvioPolska on-board the newest “Jumbo Jet”

AvioPolska is soon to start R&D and design activities for the development of prototypes of components for new generation aircraft engine **GEnX-2B**. Such occasion is of very high importance, as never before Poland was a place, where such state-of-the-art technology was created and implemented. The GenX-2b engine will be used in the used in the newest long-distance airplane of Boeing family – 747-8 which will be the successor of “Jumbo Jet” – the biggest aircraft produced by Boeing until now.

Due to the fact of implementing a number of innovative solutions (ie. blades with thermodynamic and strength properties), new engine will characterize with:

- 15% less fuel consumption
- 30% longer time of flight, using 30\$ less parts



- exhaust fumes emission 95% lower than allowable

First prototypes of those engines are planned to work in 2008, while for commercial use, first engines will be implemented in 2009.

AvioPolska amongst many other partners of this project, will be cooperating with ATH University in Bielsko Biala. Whole team will be lead by General Electric.

EPATS – Future for European aeronautics

Challenge: European air and ground transportation infrastructures are reaching saturation; main airports are congested, while small domestic airports are under-used and smaller cities lose air service. 21st century transportation and mobility demand cannot be satisfied only through investments in the hub-and-spoke and highway systems. For most of the European routes „doorstep to destination” travel time is shorter for a small executive airplane with speed 300 km/h, than for an airline airplane with speed 800 km/h.

The challenge is how to accommodate an expansion of travel demand, and how to increase “doorstep to destination” speed in the existing situation. One of the ways is to develop and deploy in EU a European Personal Air Transportation System (EPATS).

The way is using small aircraft, to serve small communities, served by small airports.

The project consortium consists of partners from Poland, Belgium, France, Netherlands (academia + industry). The project is coordinated by the Institute of Aviation from Poland.

2.1.7. Trends in the aeronautical sector

Polish aeronautical sector has the ability and resources to become the leading producer of light aircrafts worldwide. Companies and institutes have both experienced staff as well as the industrial and research infrastructure sufficient to carry on this role.

There are few very significant opportunities for the aviation sector in Poland, and they involve design and maintenance activities.

Growth of the passenger transport will depend on the policies that will be determined both by the Polish government as well as relevant agencies, that are responsible for the aviation sector.



Also, great opportunities for the passenger and cargo transport can be perceived in the development of Polish regional airports, which can be enlarged using the EU funds as well as by building new airports.

Polish aviation industry has a goal to ensure large development and manufacturing potential. Industry has to be developed basing on previous accomplishments. Those goals can be achieved by conducting active cooperation between national organizations. At the national level, key role is played by Association of Polish Aviation Industry which is member of ASD. As a good example of local cooperation activities in aeronautics, the Aviation Valley Association can be show, as a body which gathers 80% of Polish aviation industry. Poland is also very active in different European initiatives like: **ACARE, ASD, IMG4, JTI, EASN, EREA** and many others.

Further development of Polish aviation industry can be also achieved by:

- modernization of existing production base
- strengthening of economical position
- development of international R&D cooperation
- development of research possibilities
- development of sub-suppliers chain
- utilizing possibilities provided by EU financing: Framework Programmes, Structural Funds, and others.

2.2. Romania

2.2.1. History

Romania has a long tradition in aeronautics, starting with scientists with inventive spirit, like Traian Vuia (first complete flight with onboard means, 1906), Henri Coanda (first jet engine used for propulsion in Aviation, 1990), Aurel Vlaicu (an original and inventive high performance airplane, 1910), Hermann Oberth, and others that are well known as aviation pioneers. Romanian creativity led to fundamental achievements both in the technique and in the art of flying as well as in aviation engineering, e.g. the design and development of multistage missiles, the achievement of reactive and vertical flying, and firing through the propeller arc, the design of “delta” wing aircraft or of non-conventional flying machines.



Romanian aviation started to develop especially from 1920 to 1940 and followed the continuously world progress in this field.

The period between the two World Wars was characterized by the production of aircraft and engines manufactured both under licence or to their own design by domestic defence companies, such as Arsenalul Aeronautic, SET and ICAR in Bucharest, STC in Constanța, ASTRA in Arad, Schiell and IAR in Brașov. One of the best known and appreciated aircraft was the IAR-80 fighter, of full metal construction, with successful aerodynamics and fitted with retractable landing gear, variable pitch propeller, flaps with hydraulic actuation, and cockpit with oxygen installation for high altitude flying. Both the aircraft and its engine were fully designed and manufactured in Romania, ranking the 4-th among the fighter aircraft around the world at that time.

Destroyed partially at the end of World War II or re-oriented towards other fields of activity, the Romanian Aeronautical Industry started its difficult recovery after 1949, by providing aircraft maintenance and repair.

The real development of the aeronautical industry, including R&D, started after 1968. From 1968 to 1989, major R&D and manufacturing programmes were initiated for aircraft, engines and aeronautical equipment and huge investments were made in order to set up new facilities or develop the existing ones in Bucharest, Brasov, Bacau and Craiova. At that time eight enterprises and two research institutes were operating and co-ordinated by a state-owned holding - the National Centre of the Romanian Aeronautical Industry – employing about 35,000 people, of which 2,500 were working in research institutes.

According to the strategy of the time, the following programmes were initiated:

1. fighter aircraft programmes for military aviation, such as IAR-93 manufactured in co-operation with the former Yugoslavia (ceased after 1989);
2. the IAR-99 trainer aircraft programme, designed domestically, meant for military aviation (the manufacturing of the upgraded IAR-99 SOIM continues currently);
3. the engine programmes for IAR-93 and IAR-99, under Rolls Royce licence;
4. the civil and fighter helicopter programmes (IAR-316 Alouette and IAR-330 PUMA), manufactured under Eurocopter licence (for the PUMA helicopter, licenses were acquired both for the platform and for the engine and mechanic assemblies);



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5. the BN-2 light transport aircraft programme, manufactured according to Britten-Norman project;
6. the BAC 1-11 regional airliner, under BAE licence both for the platform and for the engines;
7. the IAK-52 light trainer aircraft programme, under Russian licence;
8. the agricultural aircraft programme, designed domestically;
9. the gliders and motorgliders programme designed domestically;
10. the programmes for airborne instruments and avionics, ejection seats, hydraulic and pneumatic components, and cast and forged parts for aircraft and engines;
11. the IAR-93, IAR-99, IAR-330 flight simulators programme.

During that period, the Romanian Aeronautical Industry manufactured about 80 types of aircraft, 30 types of gliders and motor gliders and 3 types of helicopters, in all about 3,200 aircraft and 2,000 engines and aircraft mechanical assemblies.

After 1989, the former state enterprises became commercial companies mainly state-owned, with some of them being privatized in the meantime. Taking into consideration that both the domestic and the foreign orders for aeronautical products and services decreased dramatically and that certain programmes were stopped or reconsidered, the companies in this field resized their personnel number; at present they employ about 7,000 qualified people fully skilled for aircraft research, design and development, aircraft manufacturing, general assembling, integration of modern avionics and systems, maintenance, overhaul and repair works, upgrade programmes, flight test and certification, customer support.

Starting with 1996, new programmes (including modernization programmes) for services equipment with modern armament systems were initiated, of which the most important are:

1. the upgrade of the MiG-21 LANCER aircraft (defence programme);
2. the upgrade of the IAR-330 PUMA helicopter with the SOCAT system (defence programme);
3. the conversion of the IAR-330 PUMA helicopter into a naval helicopter (defence programme);
4. the modernisation of the PUMA helicopter (export programme);
5. the friend-or-foe identification system, IFF (defence programme);



6. the production and upgrade of the IAR-99 SOIM advanced trainer aircraft (defence programme);
7. the maintenance of helicopters, of their engines and mechanical assemblies (defence programme);
8. the aircraft and aircraft engines maintenance (defence programme);
9. the manufacturing of aircraft and engine components (civil programmes).

2.2.2. Current situation in the country

Today, Romanian Aeronautical sector offers good manufacturing facilities, highly qualified manpower and it covers a wide range of high quality aeronautical products manufacture (aircraft, helicopters, gliders/motorgliders, aircraft engines, helicopter power plants, dynamic assemblies for helicopters, actuators and servovalves, landing gears, brakes, hydro-pneumactical accessories and equipment, electrical/electronic equipment, and parts, components and subassemblies for the these products) and services provision for civil and military aircraft. All products and services are supplied according to the customers' requirements and at competitive prices.

Today, the companies operating within the Romanian Aeronautical Industry employ about 7,000 people altogether and have full capacity and capabilities for: research, design and development, manufacturing structural aircraft items, general assembling, integration of modern avionics and systems, maintenance, overhaul and repair works, upgrade programmes, flight test and certification, customer support.

2.2.3. Universities and R&D institutions

University POLITEHNICA of Bucharest, Aerospace Engineering Department

The Romanian contribution to pioneering in Aviation is substantial and has a worldwide recognition. Names such as Traian Vuia, Henri and Aurel Vlaicu, Elie Carafoli are well known to the aviation world.

In Romania, the higher education in aviation started in 1928, when Prof. Elie Carafoli opened the first course on Aeronautics at the Polytechnic school in Bucharest. He also built the first wind tunnel in South-Eastern Europe (1931),



still in operation. The specialization of Aviation functioning within the Polytechnic of Bucharest during the period 1933-1971 became the Faculty of Aerospace Engineering in 1971, with 180-200 students each year.

INCAS S.A.

Its mission is to increase the knowledge level in the aerospace and aeronautical fields, referring to the General Aerodynamics, Flight and Systems Dynamics, Aerospace Structures, Aeroelasticity, Resistance of Materials applicable in Aeronautics, Aerospace propelling systems.

INCAS draws up computing programs and computing methodologies for the achieved testing benches and installations.

- A very important field of the research-development activity of INCAS refers to: aeronautical and space plants restructuring, retrofit and up-grading.
- For an easier industrial implementation of INCAS's research, in order to reach the expected parameters in a shorter time and more efficiently, the institutes is carrying out associated activities that can be offered to end-users.

National Institute for Theoretical and Experimental Analysis of Aerospace Structures -SC STRAERO SA

STRAERO is a private research center acting as a leading provider of aerospace research and development (R&D) services and consulting in Romania. STRAERO has been established as an independent institute in 1991 and its main activities are R&D applications focused on:

- analysis and experimental testing of structures and materials,
- analysis of flight control systems,
- design and manufacture of testing installations
- IT solutions.

Based on its extensive experience, STRAERO can offer R&D services and consulting for: aeroelastic analysis, dynamic response and modal analysis, structural stress analysis; flight loads measurements, ground and flight vibration tests, flutter tests, static and fatigue tests, validation & certification of aeronautical structures, seismic qualification tests, structural certification, materials selection, composite material products, CAD/CAM/CAE solutions, pilot selection, data bases, IT security solutions, simulation and mathematical models

National R&D Institute for Gas Turbines COMOTI



Main activity developed is in the field of aircraft and industrial gas turbines as well as in that of high speed bladed machines.

In addition to the most relevant institutions mentioned above, there are several national research institutes having direct or indirect aerospace expertise:

- Military Technical Academy
- Asociatia Profesionala Centrul de studii avansate INCAS
- National Research and Desing Institute for Electrotechnics SC ICPE SA
- National R&D Institute for Textile and Leather - INCDTP
- National R&D Institute for Fine Mechanics CEFIN
- Institute for System Analyse – INAS S. A.

2.2.4. Industry and SMEs

The Romanian Aeronautical Industry is dominated by 4 main companies and in addition it comprises companies whose main mission is to accomplish the ongoing restructuring process in order to draw out the value of the entire existing potential - human, technical, technological, and know-how. The achievement of the restructuring process, together with the advantages offered by Romania's NATO membership will allow the integration of the Romanian Aeronautical Industry into the globalised structures of the world aerospace industry and will facilitate the access of the domestic aeronautical companies' access to external markets. At the same time, the focus on the issues dealing with the defence against terrorism and proliferation of weapons of mass-destruction and border control also involves the use of the aeronautical industry capacities as potential bases for the maintenance of the NATO member countries aviation technique.

AEROSTAR S.A.

As a leading Romanian aerospace and defence company, AEROSTAR S.A. has achieved the worldwide acknowledgement in the fields of military aircraft and engines maintenance, repairs and upgrades, production of light aircraft, of hydraulic equipment for aviation and piston engines, as well as the production of electronics and other specialized equipment AEROSTAR continues to provide integrated logistic support for this programme.



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AEROSTAR is an EASA, IR Part 145 approved organization for line and base (light and heavy) civil aircraft maintenance and production of aerostructures and components as an approved subcontractor under JAR-21 subpart G and EASA, IR Part 21G. Programmes are currently under way for providing maintenance and/or modification of BAe ATP, SAAB 340, Boeing 737 aircraft types, classic and new generation).

AVIOANE S.A. CRAIOVA: Aircraft manufacture and overhaul; industrial products manufacture at customer's request. It was established in 1972 for developing, manufacturing and providing product support to the military aircraft of Romanian Air Force. The company began by co-operating with former Yugoslavia and developing the joint project of the ground attack aircraft IAR-93 (more than 200 aircraft were built and entered in service since then). During the 1980's, an advanced jet trainer IAR-99 was entirely designed and manufactured inhere; the aircraft is still currently in production and in Romanian Air Force service, as an up-graded version: IAR-99 SOIM. Designed, manufactured and certified in Avioane's own flight test facilities, it is proof of the company's outstanding capabilities as an ideal partner in aircraft design and manufacture.

IAR S.A. BRAȘOV

Manufactured under Aerospatiale-France (now Eurocopter) licence by IAR S.A. Brasov as a troop carrier and a tactical support helicopter, the 330L Puma proved to be a multi-role helicopter and in financial terms became one of the most successful medium utility helicopter.

IAR S.A. Brasov has manufactured and delivered more than 160 Puma helicopters, of which 57 helicopters have been exported to France, Pakistan, UAE; 104 off delivered to the Ministry of National Defence.

ROMAERO S.A.

The Company is an integrated facility for aircraft manufacturing, aerostructures, detailed parts, jigs & tools, providing also maintenance and repair services

Starting with 2003, ROMAERO was appointed by Government Resolution no. 375/2003 as "National Service Centre for Lockheed Martin C-130 Hercules" and signed a strategic partnership with Lockheed Martin and Derco for maintenance and modernization of Romanian Ministry of Defence C-130 Hercules Fleet.



The following works are currently carried out on the Romanian Ministry of Defence C- 130 aircraft in ROMAERO S.A. Maintenance and Repair Organization: SP, ST structural inspection, structural repair work, SB application, wheels and brakes assemblies repair.

In addition to the main 4 companies described above there are companies having direct or indirect aerospace expertise in different aerospace sub-domains.

TURBOMECANICA S.A.

TURBOMECANICA is a high integrity manufacturing and repair company focused on asserting its experience, know-how and capabilities on the international aerospace and industrial power systems markets, as well as on consolidating a competitive position by high skills, efficiency and a customer-oriented culture.

Turbomecanica focuses on developing its main programs considering the new worldwide opportunities, such as:

- aeroengines (repair of Viper 632, Turmo IV, Allison 501, etc)
- gearboxes and rotorheads for helicopter
- accessories and equipment for the above
- products and for other aircraft power plant control
- sub-contractor for components of aero-nautical, automotive, and transport products.

AEROFINA AVIONICS ENTERPRISE

Research, design, production of apparatus and industrial equipment in the following military aviation, armament and fighting techniques, locomotives and carriages, railway infrastructure domains

- development and manufacturing of tools and checking devices, moulds, test benches and testing equipments;
- plastic injection and aluminum die pressure casting;
- heat treatment, electrochemical surface coating, electrostatic painting
- mechanical- climatic tests, chemical composition tests, physical – mechanical tests;
- services performed for guarantee and post guarantee service to mechanical, electrotechnics and electronic products

ELPROF S.A.



ELPROF SA is a professional electronics manufacturer and has a long tradition in designing, producing and selling electronic equipment.

Main activities: research, design, manufacture, technical consulting, sales, service and maintenance for military radio – communication equipment, industrial electronic equipment and medical equipment.

Military Equipment and Technologies Research Agency - In-Flight Research and Test Centre – CCIZ

- » Certification of new-manufactured/modernized civil and military aircrafts;
- » Flight-tests for aviation equipments certification;
- » Flight-tests for aviation weapons, ammunition and aircrafts store configurations;
- » Flight tests meant to determine flight performances and qualities of civil and military aircrafts;
- » Flight-tests for new-manufactured/repaired aircrafts;
- » Demonstration flights in aeronautical shows and aviation meetings;
- » In flight video-acquisition to determine the launching envelopes of aircrafts equipped with different types of weapons and ammunition;
- » In flight acquisition of different types of parameters, using the last generation digital equipment : aeromechanical, pressures, temperatures, electrical, biological;
- » Developing software for acquisition and processing parameters in real time or offline;
- » In flight test for aircraft vibrations to calculate flutter speed;
- » In flight test of acceptance for homologated airborne for acquisition.

Other relevant companies having direct or indirect aerospace expertise:

- AUTOMATICA BUCURESTI
- CN ROMARM SA
- S.C. HESPER S.A. BUCURESTI
- S.C. SELETRON SOFTWARE SI AUTOMATIZARI S.R.L.



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- S.C.INAV S.A. Institutul de Aviatie
- SC ICPE CERCETARI AVANSATE SA
- Societatea Comerciala pentru Cercetare Proiectare si Productie de Echipamente si Instalatii de Automatizare IPA SA
- SC ROSEAL SA
- OPTOELECTRONICA-2001 SA
- S.C. ELECTROMECHANICA PLOIESTI S.A.

The Romanian Aeronautics Industry offers capabilities in main sub-domains as shown in the tables below.

Directly related to aeronautical sector

Capabilities	
<i>Manufacture of aeroplanes</i>	X
<i>Manufacture air traffic control systems</i>	
<i>Manufacture aircraft operating and control systems</i>	X
<i>Manufacture of avionics, instruments and components</i>	X
<i>Manufacture of computer software, services and databases</i>	X
<i>Manufacture of electrical and electronic components & hardware</i>	X
<i>Manufacture of hydraulic/pneumatic equipment and components</i>	X
<i>Manufacture of oxygen/fire suppression systems</i>	
<i>Manufacture of windows and windshields</i>	
<i>Manufacture of airframes and components</i>	X
<i>Manufacture of composites</i>	X
<i>Manufacture of engines and engines components</i>	X
<i>Manufacture of interior equipment</i>	



<i>Manufacture of landing gears, wheels and brakes</i>	X
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Indirectly related to aeronautical sector

<i>Manufacture of training equipment and services</i>	X
<i>Manufacture of plastic materials</i>	X
<i>Manufacture of glass and related materials</i>	
<i>Consultant services</i>	X
<i>Manufacture of chemicals</i>	
<i>Manufacture of coatings and paints</i>	X
<i>Manufacture of inflatable</i>	X
<i>Manufacture of test and inspection equipment</i>	X
<i>Manufacture of tools and machines</i>	X

2.2.5. Scientific and industrial aeronautical clusters and initiatives

Romanian Space Agency

ROSA is an independent public institution – legal person fully self-financed, organized by the Government Decision no. 923/1995 and defined by Law no. 500/2002.

The main mission of ROSA is to promote, coordinate and develop aeronautical and space research and applications programs/projects in Romania and to represent the Government in relevant international cooperation agreements.

ROSA represents Romania in the relation with the European Space Agency and acts as the head of delegation for the United Nations Committee on the Peaceful Uses of Outer Space.

ROSA develops its own research and development projects and centers. The ROSA Research Centre has been established in 1998 and is developing since 2000 as a centre of excellence. In the research area, ROSA has 20 specialists covering fields as: aeronautics, physics, remote sensing and biology. More than 55% of the developed projects are in international cooperation, ROSA having government agreement with ESA, CNES, NASA, etc. Knowing the importance of the gender issue for R&D Programme it is worth mentioning that in the ROSA's



research activities are involved 10 women.

ROSA is the contract authority for the National Aeronautics and Space R&D Programme (2001-2006) – Ministry of Education and Research and for the SECURITY R&D national programme.

IAROM SA

Consulting, investment and integrated business services for Romanian and foreign companies. Research, design, development.

IAROM proposes to foreign companies seeking business opportunities in Romania to assist them in a wide range of activities, promoting and supporting their interests on the Romanian market through:

- Marketing services and specialised assistance
- Specific assistance in the relations with the Romanian governmental bodies/institutions
- Promotion of offset/counter-party activities, subcontracting within the Romanian aeronautical industry as well as within connected industries
- Financial/economic pre/auditing assistance to finding the most suitable opportunities to acquire shares of Romanian industrial companies
- Quality auditing assistance

Following a policy of strategic financial investments, IAROM became major shareholder of the largest Romanian aircraft manufacturer and repair company – AEROSTAR Bacau and of the military radio-communication and electronics company ELPROF Bucharest. The Group employs approx. 2000 people and has a total annual turnover of more than USD 60 million.

Association of Romanian Aeronautical Companies - OPIAR

Established in 1998, OPIAR is a not-for-profit, apolitical and non-governmental organization, intended to support and to protect the interests of its member companies, facilitating direct contacts with Unions, State representatives, legislative and governmental bodies. The founder members are AEROSTAR SA Bacau, ROMAERO SA Bucharest, IAR SA Brasov, TURBOMECHANICA SA Bucharest and GIAR SA Bucharest.

OPIAR represents the joint interests of its members, Romanian aeronautical and related companies and organizations. Its responsibilities include developing strategies for and promoting the image of the industry in the world market place.

OPIAR plays an active role in the elaboration of the aeronautical industry policy, intending to challenge the industry to work together in order to come up with strong and competitive positions.



OPIAR is actively working with its member companies to ensure that this tremendously important sector remains competitive in the new global economy, trying to develop close co-operation with similar industries around the world.

OPIAR activities are:

1. Lobby activities for promoting the interests of Romania’s Aeronautical Industry;
2. Management and support of the official participation of its members in major international aerospace fairs and exhibitions;
3. Identification of possible funding to sustain current and future programmes developed by the Romanian MoD;
4. Developing and promoting a specific commercial policy for its members on third markets;
5. Sustaining the integration process of the Romanian Aeronautical Industry into the global market structure.

2.2.6. Examples of successful aeronautical undertakings

Some examples of successful aeronautical undertaking in Romania:

1. The upgrade Program for the IAR 330 PUMA helicopter with “SOCAT” avionics/armament system.

The objective of the program is to supply of a modern versatile helicopter capable to perform:

- anti-armour, anti-personnel, close air support, battlefield air interdiction, armed reconnaissance, assault escort missions;
- complex day and night Search and Rescue (SAR) missions.

Beneficiary: the Romanian Ministry of National Defence

Manufacturer: **IAR Brasov**, having as main subcontractor **ELBIT Systems Ltd. – Israel**.

CO-OPERATIONS within the undertaking with:

a. Romanian Aeronautical Companies

AEROTEH Bucharest TURBOMECANICA Bucharest

AEROFINA Bucharest COMOTI Bucharest

SIMULTEC Bucharest AEROSTAR Bacau

STRAERO Bucharest A.E.ELECTRONICS



R.A. ARSENALUL ARMATEI

R.A. ROMTEHNICA Bucharest

b. International co-operation: GIAT, RAFAEL, THALES, MASON, LEACH

2. The Upgrade Program for the training and light attack aircraft IAR 99 SOIM

The objective of the programme is to supply of training aircraft for the Romanian Air Force, with attack capabilities

BENEFICIARY: Romanian Ministry of National Defense

MANUFACTURERS: AVIOANE CRAIOVA S.A. in cooperation **ELBIT Systems Ltd. – Israel**

CO-OPERATIONS:

a. Romanian Aeronautical Companies:

TURBOMECANICA Bucharest SIMULTEC Bucharest

IAR Brasov INCAS Bucharest

AEROFINA Bucharest AEROSTAR Bacau

3. Romania will Participate as Associate Partner in 'Clean Sky' JTI for SFWA and GRA. INCAS will act as the representative of a joint Romanian consortium that includes 2 research centers (INCAS – National Institute for Aerospace Research and STRAERO – Institute for Aeronautical Structures) and 2 largest industrial companies in aeronautics (AEROSTAR Bacau and AVIOANE Craiova). This consortium has the will and is committed to the objectives of the JTI and also there is a strong support in Romania at political level in order to enable this participation.

2.2.7. Trends in aeronautical sector

For the Romanian aeronautic industry there can be observed 4 main trends.

1. As mentioned above, after 1989, the former state enterprises became commercial companies mainly state-owned, with some of them being privatized in the meantime. Today the industrial sector is continuing their privatization/reorganization and the trend is that this process to continue in the future.



2. It will also continue the trend for the integration of the Romanian Aeronautical Industry into the globalised structures of the world aerospace industry.
 3. A potential development will be generated as results of acquisition of military aircrafts that Romania, as NATO country needs, by the associated offset program.
 4. Lately the sub-sector that is developing more rapidly then others is the ATM sector. It can be said that this area will continue to develop in the same manner, starting with the maintenance of the existing capabilities to the ATM systems and airports facilities.
- Research Priorities

2.3. Turkey

2.3.1. History

It is not widely known that Turkey began quite early to be active in aircraft production. At the beginning the aircraft production was supported mainly by the army. After a difficult start-up phase this status changed only gradually. In the course of time, both civilian institutions and private persons worked in this interesting area.

The origins of aircraft production in Turkey can be retraced into the year 1912. In this year the first maintenance center of the Turkish Air Force was opened at the airfield in Yesilköy/Istanbul. During the World War I further maintenance centers were opened in Baghdad, Damascus, Izmir and Konya. They were organized by the 9th Department of Aviation, established on 15.02.1915. The major task of these centers was naturally the maintenance of the airplanes of the Air Force. That was not always simple. During the war the supply with spare parts come often to a standstill. Sometimes the technicians could solve the problem by manufacturing the urgently needed parts themselves. In 1917 a “new airplane”, called Baghdad 1, could build at the Baghdad center by using sections of an Albatros C III a/c and from captured aircraft parts. The experiences of the World War I and the following War of Independence made clear that a national aircraft production had to be established as soon as possible.

In the meantime some modifications were carried out on available airplanes at the Gaziemir / Izmir Air Force Base. At first, in late 1922, two captured Aircro D.H.9 bomber aircraft were converted into dual-control training airplanes. Two years later, in 1924, the unreliable original engines of four SAML B.1 Aviatik training airplanes were replaced with more reliable Mercedes engines of World War I.



But the Turkish aircraft production actually truly began after the establishment of the Turkish Republic in 1923. At the end of that year a small delegation was sent to Europe in order to procure aircraft for the new Turkish Air Force. At the end of the final evaluation the responsible persons decided to procure 16 Bréguet XIV A2, 39 Caudron C-27 and 32 Caudron C-59 aircraft. Starting from 1924 these aircraft were supplied in crates and assembled on the Gaziemir/Izmir Air Force Base under French supervision. After the Turkish Air Force completed their production duties, this armed force withdrew itself from the assembly of the aircraft and was limited to its actual functions. However this situation was only temporary. During the course of technical development, the aircraft became even more technically complicated, and the maintenance also became more complex. Finally the maintenance centers of this armed force were entrusted again with spare part production, assembly or modernization of aircraft. So arose the 1st Air Supply and Maintenance Center in Eskisehir (1926), the 901st Aircraft Main Depot and Factory Command in Polatli (1948, starting from 1962 in Ankara) and the 2nd Air Supply and Maintenance Center in Kayseri (1950).

In 1978 the 2nd Air Supply and Maintenance Center developed the agricultural aircraft Mavi Isik 78-XA-1 (TC-TXA). The first flight was successfully made in February 1979 in Kayseri. In the following years the subsequent samples Mavi Isik-B and the Mavi Isik-G-1 were developed from the prototype. Unfortunately, it did not meet the desired requirements of series production. Instead Turkey bought once again generously abroad. Among other purchases abroad, the Polish agricultural and firefighting aircraft Pezetel M-18A Dromader was bought.

2.3.2. Current situation in the country

There are 17 airliners in Turkey. One of the most well known is THY. In 2006, Turkish Airlines was chosen as the fastest growing airline in the Association European Airlines evaluation. Turkish Airlines (THY) keep his 4 years of journey to success on with the pride of raising it up to 54,5% expand in his fleet and 62,6% increase in passengers. His number of passengers moved up to 16,9 million with 19,9% increase in 2006.

As THY's fleet age decreases to 7,3 with 25 new generation aircraft included in the fleet, THY's aircraft number reached 103 with 24,4% increase. Additionally, the entry of a total 28 aircraft into the fleet is planned, 9 aircraft for 2007, 19 for 2008. In line with the decision of gradually converting 3 A310 passenger aircraft bought in 2006 into cargo aircraft, they will be included in the fleet after their conversions are completed, first of which in 2007.



HABOM

The HABOM Project which is planned to be the aviation maintenance repair center of Europe, Asia, Russia, Turkish States, and Middle East, will be realized in Sabiha Gökçen Airport which will provide a competitive advantage in terms of its location. As the construction process has begun with narrow and wide hull hangars and motor workshop, the finalization of the joint work agreement signed with Pratt&Whitney from the group companies of UTC-United Technologies Corporation of US origin is aimed for the foundation of joint venture company for the aircraft motor maintenance repair center, which is one of the most important parts of HABOM project. Our aim for 2007 is to be placed among the most widely preferred maintenance centers in the aviation maintenance repair market.

Source: Annual Report of THY in 2006

Airbus increases cooperation in Turkey through new contract with TAI. A Memorandum of Understanding for the extension of an important supplier contract was signed in November in Ankara between Turkish Aerospace Industries, Inc. (TAI) and Airbus in the presence of Mr. Muharrem Dortkasli, TAI General Manager, and Mr. Simon Ward, Head of Industrial Co-operation Europe Airbus.

Turkish Aerospace Industries, Inc. (TAI) is a long standing supplier of Airbus and other EADS business units. Today TAI manufactures the Single Aisle fuselage section 18 skins at a rate of nine per month and due to the outstanding success of this aircraft Airbus is looking to further increase the production rate within TAI up to 15 sets per month. This represents a contract extension and value of business approximately \$30 million over the next three years.

Also Airbus is looking to build on the cooperation from A400M project and utilize the TAI design Capability to support it in the A350 XWB development with and design and build contract that will be defined over the next twelve months. This will ensure continuity of TAI excellent Aircraft design capability for the next five years, employing up to 200 design engineers on the latest state of the art aircraft development.

The successful working relationship between TAI and Airbus started originally in 1998 with a first contract for 200 deliveries of Section 18 side panels for the A320 family of Airbus. This then expanded over the years up to 650 panels by 2007. In 2004, a contract for A380 component production was concluded with production starting in 2005 and running up to 2009.



TAI is also shareholder of Airbus Military and an A400M industrial partner responsible for approximately five per cent of the airframe design and production. TAI is responsible for the Forward Centre Fuselage, the Paratrooper Doors, the Rear Fuselage Upper Shell and the Tail Cone plus Ailerons and Spoilers.

Source: Turkish Aerospace Industries, Inc.

2.3.3. Universities and R&D institutions

There is no R&D institution directly related with the aeronautics. There are four directly related universities with the aeronautics education.

Istanbul Technical University (ITU) Faculty of Aeronautics and Astronautics Aeronautical Engineering

The missions of the department are

- i) educate individuals for careers in the aircraft industry at internationally recognized standard and to provide the basis for advanced study,
- ii) ii) attract and retain high quality students,
- iii) iii) conduct basic and applied research in the aircraft field that will contribute to the body of scientific knowledge and support the department's education programs,
- iv) iv) develop and maintain a capability of transforming findings of the research carried out at the department into economical progress and benefit of the society.

Faculty staff has been working in the following research projects and industrial cooperation areas with respect to graduate studies.:

Aviation research, development and implementation

- Measurement, control and determination of temperature in high-speed phenomena
- Rocket nozzle construction with ceramic and composite materials
- Active cooling of rotor blades
- Light aircraft design
- Theoretical and experimental investigation of interacting traces
- Design of unmanned air vehicle



- Wind turbine rotor design
- Design and Calibration of wind tunnels. Hypervelocity impact analysis
- Vibration analysis of T-41D aircrafts wing
- 3-D viscous flow simulation around the arbitrary bodies
- Light commercial helicopter design and construction

Website: <http://www.uubf.itu.edu.tr>

Middle East Technical University (METU) Aerospace Engineering

The research interests can mainly be categorized under five major areas:

Aerodynamics, Aerothermodynamics and Propulsion, Aerospace Structures, Flight Dynamics and Control and Space Physics and Engineering. There are four main laboratories: Aerodynamics Lab, Propulsion Lab, Structures Lab and Modeling, Simulation and Controls Lab. There are many funded research projects that are currently active. These projects are funded both through national and international resources. The department collaborates with distinguished universities and technology centers of the world both on education and research, as well as participating in various EU funded research projects.

Website: <http://www.ae.metu.edu.tr>

Anadolu University School of Civil Aviation

The School of Civil Aviation was established as a vocational school in 1986 with funds provided by the Turkish Government, United Nations Development Programme, and International Civil Aviation Organization

About 70 faculty members and technical staff from the School of Civil Aviation attended academic, research or non-degree programmes of French aviation training institutions like IAS, SUPAERO, ENAC, ENSICA and EMA. Some other faculty members and technical staff were trained by French aviation companies like Sofreavia Service, Thomson-CSF, SOCATA and Eurocopter.

The school currently has five departments: Avionics, Airframe and Power plant Maintenance, Air Transportation Management, Air Traffic Control and Pilot Training. School of Civil Aviation offers an intensive combination of theoretical and laboratory courses in well designed and equipped facilities.

School of Civil Aviation also provides non-degree programmes to train air traffic controllers, aircraft and helicopter pilots and maintenance technicians to meet the needs of organizations such as the Police, Air force, Turkish Airlines



and the General Directorate of State Airports. These courses are custom designed according to the needs of demanding organizations.

Website: <http://www.shyo.anadolu.edu.tr>

Erciyes University Civil Aviation School

Erciyes University Civil Aviation Vocational College was founded in 1994 and started education, consisting one year Preparatory Class and two years of technical training, in Aircraft Airframe, Aircraft Powerplant, Aircraft Electrics and Aircraft Electronics Programs in academic year 1995-1996. The Vocational College was transformed into the Civil Aviation College by the 2000/617 numbered Act of the Council of Ministers, and the establishment of three departments, Airframe-Powerplant, Aircraft Electrics-Electronics and Flight Training, was approved. The Airframe-Powerplant and Aircraft Electrics-Electronics Departments started education by admitting students in the Academic Year 2001-2002.

Website: <http://havacilik.erciyes.edu.tr>

2.3.4. Industry and SMEs

Turkish aeronautics industry and R&D facilities are mainly depended on the following companies THY, TAI, TEI and TAV.

Turkish Airlines Inc (THY) is the flag carrier of Turkey founded in 1933. Today THY fleet consists of 80 aircrafts which serve 105 destinations worldwide. After the fleet enhancement with 51 aircrafts joining, THY fleet will consist of 110 aircrafts at the end of 2008 with an average fleet age below 6 (six). After this fleet enhancement, THY will own one of the youngest fleets in Europe. THY has more than 12,000 seats today and carried more than 12 million passengers in 2004. In addition to passenger transport, THY gives services about cargo transport, technical maintenance, technical and flight training activities both for its own fleet and domestic and international customers. THY announced US\$79,7 m net profit after tax for 2004 with more than US\$2 billion revenues. Headquartered in Istanbul, THY employs nearly 11,000 employees worldwide.

Website: <http://www.thy.com.tr>

Turkish Technic Inc, a division of THY, is a reputable MRO center in Turkey with aircraft heavy and line maintenance, engine and component maintenance repair and overhaul capabilities for both Airbus, Boeing and Avro RJ fleet.



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Turkish Technic provides technical maintenance services both to THY's and significant number of domestic and international customers' fleets from its two hangars in its hub, Yesilkoy Ataturk International Airport, with nearly 3,000 employees.

Website: <http://www.turkishtechnic.com>

Turkish Aerospace Industries Inc (TAI), the center of technology in design, development, manufacturing, integration of aerospace systems, modernization and after sales support in Turkey, was established on 15 May 1984.

The shareholders of the Company are; the Turkish Armed Forces Strengthening Foundation, the Undersecretary for Defense Industries and Turkish Aeronautical Association.

TAI's modern aircraft facilities, located in Akıncı-Ankara, is furnished with high technology machinery and equipment that provide extensive manufacturing capabilities ranging from parts manufacturing to aircraft assembly, flight tests and delivery. Quality system of the Company meets the stringent world standards including NATO AQAP-2110, ISO-9001:2000 and AS EN 9100.

TAI is also engaged in aerostructures manufacturing business for fixed and rotary wing, military and commercial aircraft for worldwide customers. With its proven experience, TAI is a uniquely qualified supplier for AgustaWestland, Airbus, Boeing, CASA, Eurocopter, Lockheed Martin, Northrop Grumman, MDHI, Sikorsky and many more.

TAI's experience includes co-production of F-16 fighters, CN-235 light transport/maritime patrol/surveillance aircraft, SF-260 trainers, Cougar AS-532 general purpose helicopters as well as design and development of unmanned aerial vehicles, target drones and agricultural aircraft. Furthermore, TAI, which is the prime contractor of the Turkish Unmanned Aerial Vehicle (MALE) and the Turkish Armed Forces Attack Helicopter production program, is engaged in design and development of Primary & Basic Trainer (HURKUS) Aircraft.

TAI's core business also includes modernization, modification and systems integration programs and after sales support of both fixed and rotary wing military and commercial aircraft that are in the inventory of Turkey and friendly countries. By utilizing capabilities of the Turkish Armed Forces' Maintenance Centers, TAI also gives maintenance, repair and overhaul services to its customers.

TAI participates, as a partner, in the global scale Joint Strike Fighter (JSF) and A400M design and development programs.



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Being the shareholder of Airbus Military S.L., as National Industrial Institution, TAI has been participating in the design and development activities of A400M with the leading European aerospace companies namely; Airbus (France, Germany, Spain and UK), EADS CASA (Spain) and FLABEL (Belgium).

Determined to keep abreast of global technological developments and secure its place among the major aerospace companies, TAI aims to lead Turkey to new horizons in aviation in the 21st century.

Website: <http://www.tai.com.tr>

TUSAS Engine Industries Inc (TEI), is a joint venture company formed in January 1985 by Turkish shareholders and the General Electric Company. TEI's activities are Engine Assembly & Overhaul, Engine Parts Manufacturing, After Sales Services and Research & Development (F5/T38 – J85 Ejector Design, Future Large Aircraft (FLA) Engine Program, Joint Strike Fighter (JSF) Engine Program). Design Capabilities are Mechanical Design, Structural and Thermal Analysis, Aerodynamics and Code Development.

For more information please visit <http://www.tei.com.tr>

TAV Information Technologies Co. is established recently in order to meet the information systems requirements of all companies under TAV, the operator of the İstanbul Atatürk International Airport.

TAV Information Technologies Co. will develop software and systems on operational and financial optimisation in aviation, particularly Terminal, Flight Management System and Software Programs; and aims to be one of the few companies in the world that can find solutions, and undertake turnkey, integrated airport systems design, construction and operation tasks. The first project of TAV Information Technologies Co., namely "Total Terminal Management System", planned to be launched at the end of 2006, aims at observing all the operations at the terminal, offering developed crisis management skills, offering more effective, fast and reliable flight information services, connecting more than one airport to each other to allow exchange of information and effective resource management, and other similar benefits. The "Total Terminal Management System" to be developed will be able to allow the central management of one or more terminals at airports throughout the world, dynamic custom-made applications and localisation, leading to a product that can easily find a prominent place in the world market. Considering the added value that the resultant product will offer in the operational and financial sense; it will be a product whereby all the administrative, managerial, and operational



systems in the terminal are integrated; therefore, accurate and timely flow of information between the systems are ensured; all resources, mainly personnel costs are used in an optimum manner; and whereby through the effectiveness of the “Total and Central Terminal Management System” brought about by the mentioned “Optimal Resource Management” and “System Integration”, all the stakeholders in terminal (passengers, airline companies, ground handling companies, etc.) can receive faster and more accurate services; and furthermore a product that can allow all terminal-related short and long term planning and reporting.

Website: <http://www.tav.aero>

2.3.5. Scientific and industrial aeronautical clusters and initiatives

There is no scientific and industrial aeronautical clusters and initiatives in Turkey. With some help from FP7 activities, there is a possibility of establishing at least one aeronautical cluster (possibly in Eskisehir). Turkey is one of the partners of ECARE+ project (Clustering Aeronautics Regions). Currently, Turkish companies do not know the advantages of a cluster as well as they are not familiar with European clusters.

Turkey is willing to establish National Technology Platform for Aeronautics" and TUBITAK provides "New Research Grant Programmes" like The Support Programme for the Initiative to Establish Scientific and Technological Cooperation Networks and Platforms which was initiated in 2007. This programme has been drawn up to support the establishment of cooperation networks and platforms between national and international corporations, units and groups in areas such as basic sciences, engineering, health and social sciences.

2.3.6. Examples of successful aeronautical undertakings

TAI participates, as a partner, in the global scale Joint Strike Fighter (JSF) and A400M design and development programs.

Being the shareholder of Airbus Military S.L., as National Industrial Institution, TAI has been participating in the design and development activities of A400M with the leading European aerospace companies namely; Airbus (France, Germany, Spain and UK), EADS CASA (Spain) and FLABEL (Belgium).

Under the A400M program, in which TAI is representing Turkey as the “National Industry Institution”, a total of 10 A400M aircraft will be procured for the Turkish Air Force Command. To compensate for the 10 A400M aircraft to be procured



by Turkey, TAI shall undertake the structural work share which is corresponding to 7.15% of the total work and systems work package, which is 1.26%.

As a partner of Airbus Military S.L., TAI has been participating in the design and development activities of the A400M aircraft with the leading European aerospace companies namely; Airbus (France, Germany, Spain and UK), EADS CASA (Spain) and FLABEL (Belgium) from the beginning of the program.

With this program, TAI shifts to “build-to design” method from “build-to-print.” Being a partner of Airbus Military S.L. (AMSL), our Company will not only own design rights, but also become a partner of Design Organization Approval (JAR-21 PART JA) under AMSL since AMSL has design rights, in general, and type certificate (JAR-25). These approvals will make TAI a company, that has control over all the processes including design, test, certification and delivery.

Taking place as a risk sharing partner in the program, TAI will manufacture the parts under its responsibility in each new aircraft order. The parts, which are under the responsibility (design & production) of TAI are; forward center fuselage, rear fuselage upper shell, parachute doors, emergency exit doors, tail cone, lightning and water/waste systems and aileron and spoiler.

In addition to structural components, TAI is level 1 responsible of the lighting and water/waste systems of the A400M program. Furthermore, the fuselage harness fitting of the A400M is also manufactured by TAI engineers.

TUSAS Engine Industries Inc (TEI)'s activities are Engine Assembly & Overhaul, Engine Parts Manufacturing, After Sales Services and Research & Development (F5/T38 – J85 Ejector Design, Future Large Aircraft (FLA) Engine Program, Joint Strike Fighter (JSF) Engine Program).

2.3.7. Trends in aeronautical sector

Aviation programs managed by the Undersecretariat for Defence Industries (SSM) are under the responsibility of the Department of Air Vehicles. The ongoing programs consist of the acquisition and modernization of air platforms such as fixed and rotary wing aircraft and unmanned aerial vehicles, as well as establishment of maintenance and overhaul infrastructure for these vehicles. The project models calls for indigenous development, international cooperation, local production and direct procurement. The main objectives of the programs to meet the end-user requirements in a cost-effective manner while improving the technological background and the capabilities of the national aerospace industry.

Project Groups



- Aircraft Group
- Helicopter Group
- Unmanned Air Vehicles Group
- Modernisation-Development Group

Aircraft Group:

A400M Transport Aircraft Program

Turkish Land Forces Basic Trainer Aircraft

Command and Control Aircraft Project

F-35 Joint Strike Fighter

Peace Onyx IV (PO IV) Program

Basic Trainer Aircraft

Turkish Primary and Basic Trainer Aircraft Development Program

Helicopter Group:

AS 532 AL/UL Cougar Depot Level Maintenance Project

Attack and Tactical Reconnaissance Helicopter Procurement Program

Coast Guard Helicopter Procurement Project

Lift Helicopter Procurement Project

Light/Medium Class Reconnaissance/Surveillance Helicopter Procurement Project

S-70A Black Hawk Depot Level Maintenance Program

S-70B SeaHawk Naval Helicopter Procurement Project

Turkish Armed Forces Helicopter Procurement Project

Unmanned Air Vehicles Group:

Indigenous UAV (MALE) Development Project

Mini UAV Development

Tactical UAV Development



Unmanned Air Vehicle (UAV) Programs

Modernisation-Development Group:

Peace Eagle (Turkish Early Warning & Control System) Project

Vertical Wind Tunnel Procurement Project

F-5 A/C Avionics and Structural Modernization

Gendarme Helicopter Modernization Project

T-38 Training Aircraft Modernization Project

Maritime Patrol & Maritime Surveillance Aircraft Platform Procurement Project

Maritime Patrol and Coast Guard Aircrafts Mission Equipment Acquisition and Integration

Maritime Patrol and Surveillance Aircraft Project

C-130E/B Avionics Modernization

UH 60 Black Hawk Helicopter Modernization Project

Completed Projects

Engine Test Cell

Transmission Test Stand Procurement Project

Procurement Helicopters For Special Forces Command

1st and 2nd Batch Attack Helicopters

1st Package UAV Procurement Project

Cougar Helicopter Procurement (Phoenix-I/II) Projects

Basic Trainer Aircraft

Black Hawk General Purpose Helicopters

C-130B/E Aircraft Modular Airborne Fire Fighting Kits

Maritime Training Aircraft

Light Transport Aircraft

SeaGull Project Phase I

SeaHawk Project Phase I



3. National and regional research priorities

3.1. Poland

Since 2005 there have been several initiatives set up for boosting Polish R&D sector as well as to encourage better cooperation between science and industry. Every initiative has a broad spectrum of work and does not only apply to one or more specified fields of activity. Therefore a research priority, set for supporting the aeronautical sector in general, can not be identified. Although several closed and ongoing initiatives of the Ministry of Science and Higher Education also can cover the aeronautical sector.

Strategic Research Agenda of Polish Technology Platform of Aeronautics

The first version of the national SRA of Polish Technology Platform for Aeronautics was prepared in September 2006

The main goal of preparing the SRA for Polish aviation industry, was to create common plan of cooperation for Polish aeronautics, which would take into account present state of aviation sector and elements of the strategy, as well as the European vision in the field of aeronautical R&D. The SRA is a tool to prepare a strategy of planning and implementing research programmes on national and European level.

On the other hand, SRA will help to define:

- main research areas, which would be vital for further development of aeronautics both in Poland and Europe
- future participants of research teams, that would participate in national and European research programmes.

The Polish SRA is under permanent consultation process to improve its first version.

National Framework Programme 2007-2013

The main goal of NFP is to focus research & development studies on the sustainable economic development that could lead to improvement of quality of life in Poland.

National Framework Programme closely cooperates with other strategic programmes and directives realized by Polish government:



- Sectoral Operation Programme "Growth of Companies Competitiveness".
- National Development Plan 2007-2013.
- Sectoral Operation Programme "Science, modern technologies and information society, 2007-2013".
- And many others

The structure of NFP is as follows:

- **Strategic research areas**; large-scale undertakings, complying with the long-term scientific and technical policy
- **Priorities of research**; define the narrow topics of strategic research areas.
- **Ordered projects**; defined in terms of priorities of research or priorities described by NFR

Out of all thematic areas covered by NFP, few of them can be applied to aeronautical sector:

- Environment
- Security
- New materials and technologies
- Energy
- Information technologies
- Transport infrastructure

Technological Rod

The Technological Rod programme is focusing on a radical change of the cooperation between business and R&D community, aiming at raising innovativeness basing on Polish intellectual potential.

The Technological Rod programme is a strategic activity. Most of the results are planned to be long-term (3 and more years) but due to the current situation in Poland, it is possible to obtain visible results already from the beginning of the project.

The programme's role is to be a catalyst for supporting undertakings that will benefit on Polish intellectual potential. Technological Rod is an interdisciplinary programme and therefore also projects related to the aeronautical sector can be financed under it.



Technological Initiative I & II

The main goal of this undertaking is development of R&D and industrial activity, favoring the cooperation between science and economy.

The main goal will be realized by the following detailed undertakings:

- raising the scale of utilizing the R&D works results in economy,
- raising of influence of research on raising of the Polish economy competitiveness level,
- raising the number of R&D projects tackling the needs of economy.

Enhancing the cooperation between science and industry will be done in two ways:

- financing of R&D activities in companies, which will result in their larger cooperation with scientific sector
- financing of application research in R&D institutions which will put the research entities closer to the industry

During the first phase of the initiative, which ended in May 2007, there were almost 500 projects submitted, with almost 40% of them being prepared by industry. Over 5% of all submissions concerned “Transport Infrastructure” topic.

Second phase of this initiative is planned to be announced in the second part of 2007. Besides “Transport Infrastructure” topic, there are also others, where projects concerning the aeronautical sector can be submitted:

- New materials and technologies
- Information technologies
- Environment
- Security

Operational Programme “Innovative Economy 2007-2013”



Main goal of the programme is the development of Polish economy, basing on the innovative companies. Goals will be realized by allocating 90% of total funds (9,7 bln Euro) on R&D activities, innovation, information and communication technologies.

There will be seven priorities realized within this programme:

- New technologies research and development
- R&D area infrastructure
- Capital for innovations
- Investments in innovative enterprises
- Diffusion of innovation
- Polish economy on international markets
- Building and development of information society

3.2. Romania

A national coordinated research programme started in 1993. Up to 2001 it was financed by the R&D HORIZON 2000 programme and since 2001 until 2006, it was supported by the Ministry of Education and Research on a multi-year budget basis (Govt Decision No. 556/2001) as a National R&D Programme - AEROSPATIAL. The budget for the programme was 31.25 MEuros. In addition, there was the co-financing rule from the consortia for 31%.

The Romanian Space Agency was the contract authority for the Programme.

The programme was characterized by a continuity of projects and by the stability of management and staff for one decade.

The objectives of the programme were to:

- contribute to the national and global scientific development by participation to international space missions and development of new projects
- improve the national and regional security by means of peaceful space applications
- contribute to the infrastructure of the information society
- develop new space technologies, space spin-offs and commercial space applications
- human resources building to meet the space science and technology development for the 21st Century



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- give a model of capacity building and support the national effort to continental and international integration

The programme comprised 5 sub-programs, as follows:

- **Policy and infrastructure:** Capacity building: technology park, centres of excellence, quality management, GRID, concurrent engineering
- **Space exploration:** Space missions: (INTERBALL, CLUSTER, PLANCK, COROT, AMS . . .) Space science, microgravity & life science
- **Space applications:** Satellite communications, Earth observation, GNSS, precision farming, disaster management, telemedicine, GMES, GALILEO, LPIS, software
- **Aerospace science and technology:** Aerodynamics and flight dynamics, C3 systems, onboard technology
- **Industrial development and spin-off:** Aerospace platforms (UAV's, IAR-99, AEROTAXI), components, high speed facilities, infrastructure.

In 2005 the Ministry of education and Research had launched the '**Research for Excellence Romanian Programme**'. The programme was dedicated to prepare the Romanian participation within the FP7 programme and it proposed concrete actions for strengthen the Romanian Research Area, so that the Romanian institutions to be able to fulfill the requirements that the status of EU member is imposing starting with 2007.

The programme comprised 4 subprogrammes:

- ◆ Complex R&D projects
- ◆ Human resources
- ◆ Promoting Romania's participation in european/international programmes
- ◆ Infrastructure development

The first subprogramme was structured in a same manner as the 'Cooperation' programme of FP7 is structured, in some basic thematic areas:

- ◆ Health
- ◆ Food, agriculture and biotechnology
- ◆ Information and communication technologies
- ◆ Nanosciences, nanotechnologies, Materials and new Production Technologies
- ◆ Energy



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- ◆ Environment (including climate changes)
- ◆ Transport (including Aeronautics)
- ◆ Socio-economic sciences and the humanities
- ◆ Security and Space
- ◆ Nuclear physics
- ◆ Basic sciences

Same as FP7, the programme included the theme called 'Transport – including aeronautics'. The projects financed in Aeronautics, Space and Security themes are managed by the Romanian Space Agency and implies a total budget of 9.5 mil euro for 2006-2008.

For aeronautics, the proposed research directions proposed within the program were in accordance with the directions proposed by the Strategic Research Agenda 2 developed by ACARE. These were:

- the greening of air transport
- increasing time efficiency
- ensuring customers satisfaction and safety
- improving cost efficiency
- protection of aircraft and passenger
- pioneering the Air transport of the future

CEEX is considered the link between the first National Research, Development and Innovation Plan PNCDI I – comprising AEROSPATIAL – and the second one, PNCDI II

PNCDI II was launched in June 2007. It is structured in the same manner as FP7, having 6 sub-programmes:

- ◆ People
- ◆ Capacities
- ◆ Ideas
- ◆ Cooperation on priority domains
- ◆ Innovation
- ◆ Sustaining the institutional performance

The subprogramme 4 has as main objective to enhance R&D competitiveness by stimulating partnerships on priority domains, having as results innovative



technologies, products and services that can solve complex aspects and implementing mechanisms.

There are 9 priority domains, as follows:

- 1 - ICT
- 2 - Energy
- 3 - Environment
- 4 - Health
- 5 - Agriculture, food safety and security
- 6 - Biotechnologies
- 7 - Innovative materials, products and processes
- 8 - Space and Security
- 9 - Socio-economic sciences and the humanities

Theme 8 –‘Space and Security’ comprises aeronautic research topics that are financed at national level through the national R&D programme:

- aeronautic technics,
- flight dynamics,
- CFD,
- manned/unmanned flying platforms,
- simulation, command and control,
- design and manufacture of aircrafts advanced methods and technics, systems and methods for aerospace flight,
- attitude control,
- optimal control,
- air traffic management,
- ground systems, aerospace analyze,
- testing and quality control systems,
- aerospace technologies, systems, instruments and equipments.

3.3. Turkey

T.R. Prime Ministry State Planning Organization



Ninth Development Plan (2007-2013)

Airways

In Turkey, there are 37 airports open to traffic as of the beginning of 2006. While a total of 34,9 million passengers were transported in 2000, this figure went up to 55.5 million passengers in 2005. As a result of reducing the state share over the ticket and starting of domestic flights by private airline companies, passenger demand has increased.

Implementation of the BOT model in passenger terminals of the airports operated by the General Directorate of State Airports Administration (DHMI) was continued. Operation of the terminals in Ataturk and Antalya Airports were transferred to the private sector and activities for increasing the prevalence of this method are continuing.

In spite of the Law issued in 2005, there is need to ensure the efficiency of the General Directorate of Civil Aviation in terms of regulation and supervision in parallel with the growth in the sector.

In the aviation sector, the basic objective is to be leader in the region and a major player in the world with the realization of investments towards increasing air traffic security and capacity, besides the additional measures to be taken.

Capacities will be increased in airports where traffic is more intensive, service standards, including easy access to airports, will be raised, and air traffic control services will be modernized.

Airports will be ensured to have a structure, which is environment-friendly, provides good quality services and has potential to grow. Distorted settlement surrounding airports will be prevented.

Towards meeting long-term demand, new airport investments will be planned primarily in Istanbul region.

In order to meet the requirement arising as a result of the rapid growth in the sector, an adequate number of personnel with the necessary qualifications will be trained by organizations providing training at international standards and it will be ensured that these personnel will be employed in the areas of their expertise.

In order to develop regional air transportation, support of local administrations and non-governmental organizations will be provided, cost reducing measures will be taken and airline companies will be directed towards creating fleets suitable for small (STOL) airport structure and passenger profiles.



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Restructuring of the General Directorate of Civil Aviation will be completed to ensure supervision of the sector, primarily with regard to security, productivity and competition issues.

	2006	2013	2007-2013*
Railway Length of Main Lines (Km.)	8,257	9,195	938
a) New Line Construction			938
b) Line Renewing			1,000
Length of Divided Highways (Km.)	9,441	15,000	5,559
Length of of Bituminous Hot Mixture Coated State and Provincial Roads	7,500	14,500	7,000
Airport Passenger Traffic (Million Passengers)	60	110	50

* Denote developments within the period.

Targets in Transportation Sector

	2006	2013	2007-2013 Percentage Change
Domestic			
Highway (1)	169,500	248,000	5.6
Railway	11,505	25,400	12.0
Maritime	5,400	8,400	6.5
Airline (3)	468	659	5.0
Pipeline			
Crude oil	2,655	2,685	0.2
Natural Gas (Millions of m ³) (2)	29,253	49,844	7.9
International			
Railway	1,730	8,248	25.0
Maritime	749,000	1,740,000	12.8
Airline (3)	2,613	4,777	9.0
Pipeline			
Crude oil (Transit)	7,583	71,174	37.7

(1) The transportation on the 117 kms of motorways and connection roads that were transferred to the Istanbul Metropolitan Municipality is excluded beginning from 2005.

(2) Not included in total.

(3) Turkish Airlines' value

Developments in Freight Transport (Million Tone – Km)

3.4. Correspondence of national and regional research priorities with FP7 priorities for aeronautics

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All initiatives mentioned in the previous paragraph aim at supporting the development of Polish economy and research sector both at national and European level. Due to its interdisciplinary approach, they constitute an excellent tool for supporting Polish aviation industry as an additional source of financing research, development and innovation activity (eg. Materials laboratory in Rzeszów was implemented as a project financed from Structural Funds). National priorities of development also aim at supporting Polish entities in acquiring European funds, also from 7th Framework Programme (National SRA for Aeronautics was prepared as a mirror of the European SRA for Aeronautics). They are an important factors, that can have an enormous significance for the development of Polish aviation sector as well as improvement of European collaboration.

Romania

The topics covered in FP7 are covered in National R&D Programme as indicated in the following table.

FP7			National
Activity	Area	Topic	
The Greening of Air Transport	Green Aircraft	Flight Physics	X
		Aerostructures	X
		Propulsion	X
		Systems and Equipment	X
		Avionics	X
	Ecological Production and Maintenance	Production	X
		Maintenance and Disposal	
Green Air Transport Operations	Flight and Air Traffic Management	X	
	Airports	X	
Increasing Efficiency	Aircraft systems and Equipment for Improved Aircraft Throughput	Systems and Equipment	X
		Avionics	X
		Maintenance and Repair	
	Time Efficient Air Transport Operations	Air Traffic Management	X
		Airports	X
Ensuring customer Satisfaction and Safety	Passenger Friendly Cabin	Design Systems and Tools	X
		Noise and Vibration	
		Systems and Equipment	X
	Passenger Friendly	Maintenance and Repair	



	Air Transport Operations	Airports	X
	Aircraft Safety	Aerostructures	X
		Systems and Equipment	X
		Avionics	X
		Human Factors	
	Operational Safety	Design Systems and Tools	X
		Maintenance	
		Air Traffic Management	X
		Airports	X
Human Factors			
Improving Efficiency	Cost	Design Systems and Tools	X
		Aerostructures	X
		Systems and Equipment	X
		Avionics	X
		Production	X
	Aircraft Operational Costs	Flight Physics	X
		Aerostructures	X
		Propulsion	X
		Systems	X
		Avionics	X
	Maintenance		
	Air Transport System Operational Cost	Design Systems and Tools	X
		Air Traffic Management	X
Airports		X	
Human Factors			
Protection of Aircraft and Passengers	Aircraft Security	Aerostructures	X
		Systems and Equipment	X
		Avionics	X
	Operational Security	Air Traffic Management	X
		Airports	X
		Human Factors	
Pioneering the Air Transport of the Future	Breakthrough and Emerging Technologies	Lift	X
		Propulsion	X
		Interior Space	X
		Life-cycle	
	Step changes in air Transport Operation	Novel Air Transport Vehicles	X
		Guidance and Control	X
		Airports	X

Turkey

There are still some problems integrating the national and regional research priorities with FP7 priorities for aeronautics. Turkish aeronautics industry was not involved a large number of projects during FP6. It is the main problem, that Turkish companies and organizations can not follow the advancements / advantages in FP7.

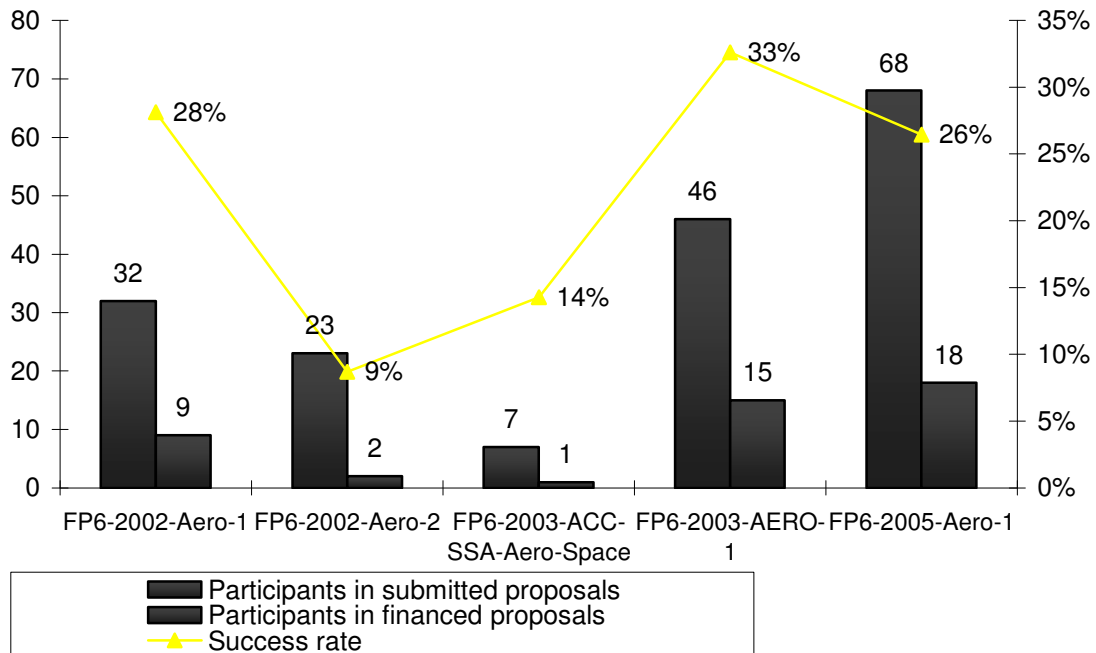


4. Participation of Poland, Romania and Turkey in Framework Programmes

Poland

Participation of Polish aeronautics organizations in Framework Programmes started in 5th FP, in Key Action „New perspectives in aeronautics” of the Growth programme. Several Polish entities participated in a small number of RTD projects. The most successful at that time was the Institute of Aviation, being a partner of 3 RTD (HELIX, HiReTT and NAS-TAURUS) and 2 SSA/CA (UAV-NET and X2-Noise) projects. Also, one of the representatives of Polish aviation industry were present in FP5, namely PZL Świdnik, taking part in two proposals – CAST and MALVINA

Participation of Polish units in FP6 has significantly grown comparing to Polish activity in FP5. In the first two main calls of FP6 Aeronautics priority, over 50 entities participated in submitted proposals, with the average level of success over 30% in projects financed by the EC. Significant raise of participation in submitted proposals could be seen in the last FP6 Aeronautics call, where the overall number of entities in submitted projects was over 60 and was twice as much comparing to the first call. The level of success decreased comparing to two previous calls and was set up at about 26%. Also the number of Polish entities in projects financed has risen almost twice comparing to the first calls.



To summarize, 17 Polish entities participate in 39 projects of FP6 Aeronautics priority. 25 of them are STREP, 9 IP, with 2 CA and 3 SSA.. The most active R&D units are:

- Warsaw University of Technology (7 projects)
- Szewalski Institute of Fluid Flow Machinery (5 projects)
- Institute of Aviation (10 projects),

Three key Polish players of the industrial sector (PZL Świdnik, WSK Rzeszów and PZL Mielec) are present in 8 proposals. Unfortunately, only four Polish SMEs are involved in projects run within this priority: Ultratech participates in "Magforming" (STREP) , P.H. Rector in "FRESH" (STREP), Microtech International in "MOET" (IP) and E-CAB (IP) and also Egida Net in "MOET"..

Also, two Polish institutes successfully submitted coordination proposals:

ADLAND (STREP) – coordinated by the Institute of Fundamental Technological Research, Polish Academy of Sciences with Polish partners: Institute of Aviation and PZL Mielec

UFAST (STREP) – coordinated by Szewalski Institute of Fluid Flow Machinery with Polish project partner – Institute of Aviation.



During the first call of FP7 "Transport including Aeronautics" priority, Polish partners were very active and took part in over sixty proposals submitted to this call. Although preliminary results are not known at the moment, it is presumed that the outcomes of this call, with regards to the number of successful Polish entities participating in financed proposals will be high.

Romania

Romania's FP6 participation was characterized by a weak start -for the first 2 calls for proposals- continued by an increasing of the number of participation both on proposal number and on projects financed at the end of the Programme.

For the first 2 calls, the successful projects were facilitated by previous existing direct contacts between potential partners and for the last 2 calls for proposals by the improved awareness campaigns of the national contact points and of the authorities. In the same time at the beginning it was noticed a low interest for participation to information/dissemination events organized by EU and an increased interest from national authorities (for the second half of FP6). The main observed characteristics of the Romanian FP6 participation in aeronautics were a reduced capacity for collaboration/integration of the Romanian's organizations/ institutions/ companies, some difficulties with internal regulations (financial), low overall success.

The final period of FP6 was characterized by an increased visibility at EU level and the harmonization of national R&D program with EU regulations

During the whole FP6, on Aerospace there were 69 proposals having Romanian partners. From these proposals 21 selected for financing or on the reserve list and 18 were contracted.

Most important successful participations in FP6

IPs

- **CESAR** *Cost Effective Small Aircraft*
- **VITAL** *Environmentally Friendly Aero Engine*
- **TATEM** *Technologies and Techniques for New Maintenance Concepts*

STREPs

- **UFAST** *Unsteady Effects in Shock Wave Induced Separation*
- **AVERT** *Aerodynamic Validation of Emission Reducing Technologies*



- **CoJeN** *Computing Jet Noise*

Other

- **X3-NOISE** *Aircraft External Noise Research Network and Co-ordination*
- **SCRATCH** *Services for Collaborative Aeronautical Technical Research*
- START** *STimulate Aerospace Research and Technology (START) in Associate Candidate Countries (ACC)*

ERA-NET

- **AirTN** *Air Transport Net (AirTN) as one of the key enablers of the prosperous development of Aeronautics in Europe.*

In preparation of FP7, in 2005 the Romanian Ministry for Education and Research had launched a national dedicated research programme – 'Research for Excellence – CEEX) that had as prime objective enhancement of the Romanian participation in FP7. The partnership dedicated programme was in accordance with the FP7's, having as research main areas the same 10 as the themes in the Cooperation programme in FP7, theme number 7 being 'transport-including aeronautics'.

Major goals for the Romanian participation in FP7 for aeronautics sector are

- Higher visibility and integration of existing resources for R&D in aeronautics
- Increased participation in joint research activities in key areas
- JTI participation as Associate Partner for SFWA and GRA
- Participation in 2 Level 2 projects
- Increased participation in Level 1 projects
- Active participation in NoE, SSA and CA
- Increased financial participation in the global overall budget

Specific interests for participation on FP7 are:

- Direct integration of existing research infrastructure with EU industry
- Utilization of structural funds in order to increase existing capabilities and new technological development in "niche" domains in aeronautics
- Development of human resources involved in R&D in aeronautics using specific instruments in FP7



- Increased dissemination at national level for strategic directions and high level technological targets of ACARE – SRA2.
- Better exploitation of the participation in PC7 – Transport

Turkey

Turkey was not involved in any of the FP5 projects. This situation was caused by lack of knowledge on rules and procedures as well as structure of FPs.

During the FP6, participation to the aeronautics calls was not satisfactory, comparing with the other member states and associated (candidate) countries. Turkey participated in four projects: IP (ALCAS), STREP (TURNEX) and two SSA projects (START and Don Q Air) and in 10 not eligible projects during the FP6. Almost all of these projects concern Space sub-priority, not aeronautics.

The situation seems to be changing in the first call of FP7. There are more than five consortiums that Turkish companies are involved in for the 1st call.

5. Potentials and main constraints for SMEs participation in FP7

Poland

A lot has been done in aeronautical sector in Poland recently. Aeronautics research has their national network integrating partly research potential in Poland. Industry however has set up national technology platform gathering most of the current industrial potential in Poland. Also two aeronautics clusters have been set up at regional level. These initiatives have ambition to collaborate closely both at national and European level. To facilitate this also a center of advanced technology has been set up which consists of both industrial and research organizations.



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The Polish aeronautics has its strategy and clear priorities set up in Strategic Research Agenda. As regards infrastructure the Polish aeronautics possesses a modern laboratory for materials and soon will have another laboratory for composite materials.

All these above constitute good climate for better collaboration between research and industry, both big and SMEs and good perspective for the development of the aeronautics sector. However good collaboration between research and industry is still ahead of us. This particularly is true as regards strictly aeronautics SMEs.

Small and Medium sized Enterprises in Poland that can be considered as aeronautics SMEs are strictly aeronautics and aeronautics related. Strictly aeronautics SMEs consists of companies with great industrial potential. They are both producers of parts for big industry as well as providing services for aviation industry. They mostly belong to the two Polish clusters: Aviation Valley Association and Bielsko Biala cluster. Most of them are members of the Polish Technology Platform of Aeronautics:

Due to their specifics the companies can be divided into two categories:

- Medium-sized companies: employing less than thousand people each:
 - Manufacturers of: oil, air, and fuel systems, chassis elements, control and navigation hardware, simulators and training devices, small aircrafts, gliders and many others
- Small companies, employing small numbers of workers (less than 50):
 - Small aircraft and gliders manufacturers, composite structures manufacturers hardware, tool and accessories producers, general machining cooperation, production of airframes and components, maintenance and repair of aviation equipment (small airplanes and gliders), aviation training, and many others.

Due to developing cooperation with the biggest R&D centres and key players of aviation industry (Aviation Valley, Aviation Cluster of Bielsko Biala, Centre of Advanced Technologies AERONET, Aeronautica Integra Network and others) SMEs are ahead of a great opportunity for development, both at national and European level. As participants and members of supply-chains of the biggest Polish aviation companies, the SMEs have possibilities of implementing their technologies in equipment being used in airplanes and helicopters used by the biggest international companies (engines, landing gears, airplane and helicopter equipment parts and many others).

The report shows that Poland has quite big potential in aeronautics - fortunately now being more and more involved in European Framework



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Programs. However this is not the case for the Polish SMEs (strictly related to aeronautics).

Small engagement (almost none except one company ULTRATECH) of Polish strictly aeronautics SMEs in research projects of Framework Programs can partly be explained as:

- Until certain moment, SMEs did not have enough information about benefits coming from cooperation in international R&D projects (i.e. acquisition of outside funding for activities that could not be carried in another way, possibilities of establishing new contacts, both business and scientific).
- Long period between preparation and submission of project, as well as realization and receiving the end results. In case of small companies, there is a need of adapting and implementing new products and technologies as soon as possible, which enables to reach potential and new clients faster, and to broaden the company's offer.

But most important is lack of good contacts at European level and opportunities for business collaboration.

All these constraints mentioned above do not shut the enormous potential, that Polish aeronautical SMEs offer. Due to vast experience in this branch, endorsed by several tens of years of tradition, the sector of Polish aviation SMEs can be a potential cooperation partner in many projects. Thanks to developing and ongoing cooperation with leading R&D units in the country, the companies seem to note the growing need for investing in research and development activities, which can be a key factor in their further development and success at European level.

For the moment being, a growing interest from Polish SMEs in European and national funding can be seen. Many companies start to submit proposals to apply for funds which are available under national and European programmes (Structural Funds. Technological Road, Innovative Economy etc.)

Due to specifics and profiles of many of such SMEs, it is likely that the most suitable tools, of which those companies would take advantage in their begging phase of Framework Programmes activities are CAPACITIES theme projects ("Research for the benefit of SMEs") as well as small projects within the "Transport incl. Aeronautics" priority of the COOPERATION theme. Participation in large projects is also not included.

Finally it is important to stress that among Polish SMEs there is a large number of SMEs that can be producers of technologies and provide services for aeronautics besides of its original application sector. These are aeronautics



related SMEs and will be identified later, during the DonQ Air project implementation.

Romania

As shown in the report above, Romanian aeronautics domain offers a lot of capabilities and a lot of potential for future common actions at European level, being those industrial or for research. As mentioned already, the aeronautics community became more and more interested in cooperation with similar European community within FP6 and the beginning of FP7 showed an increased interest in this direction during the events for FP7 promotion and launching that were organized.

The main constraint identified for the SMEs participation in FP7 is the co-finance issue that the SMEs are forced to support. It is true that compare to FP6 the conditions are more relaxed, but still, the main obstacle in submitting proposals in FP7 is related to this aspect.

Turkey

Most of the SMEs in Turkey are family oriented companies. There is no strong relationship with the industries and the universities. There isn't enough employment for engineers in the SMEs. Their international relations will be too weak, since most of them are targeted on short term sale and commercial relations. Long term and R&D based relations are the must for SMEs in Turkey. They are working with big industry companies and they are linked to them for the continuation of their companies.

Even if they have a project idea, the usage of national and international R&D funds by SMEs are not enough because of their lack of information about the application procedure. Most of them needs for consultancy to accomplish and to pass this stage. They do not have strategy to make a business in abroad and to promote themselves.

Although there are lots of constraints for SMEs, they have positive trends to establish/improve their R&D facilities by using the opportunities from the international programmes. They are more interested than before to be a part of an international consortium in the FP7. They just want to see some success stories from Turkey to take them as a model.

In addition, companies are beginning to identify the advantages of FP7 to strengthen their position in the future aeronautics industry.



6. Conclusion

Polish aviation sector has many strong points, that can be a key factor in further development and successful cooperation at international level:

- long lasting tradition, that makes Polish aviation a specialty, renowned in Europe and worldwide
- defined strategy
- a number of national R&D programmes
- excellent and numerous resources of well trained and excellent staff
- well developed and very experienced scientific base
- renewing cooperation in national aeronautical sector, progression in integration process
- rapid setting up and development of small and medium sized companies, clustered around former Polish Aviation Works and others
- recognition of foreign global concerns and SMEs by governmental bodies
- competitive level of costs, both at production and R&D area
- quite satisfactory quality of R&D infrastructure

Main technological and research goals of Polish aviation industry arise from needs and structure of the aviation sector in general: aviation equipment producers (including supply chain), air carriers and airlines, infrastructure management companies and governmental bodies.

Goals include the general overview of capabilities of R&D institutes, universities and entrepreneurs, with simultaneous assumption of future growth of those capabilities.

Goals of Polish aviation sector conform the priorities of European platform ACARE, where research goals in general overview concern:

- Quality and Affordability
- Environment
- Safety
- Air Transport System efficiency
- Security



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Romania is EU member starting from 1 January 2007. As a result, the Romanian authorities have tried to anticipate the impact that accession will have and the Romanian National R&D Program has been adapted accordingly;

As EU member, Romania has the opportunity to fully exploit existing capabilities in FP7 program. Several changes in the current legislation will boost this process.

Romania has a strong market potential for aeronautics, solid infrastructure and human resources for sustainable development. FP7 is an opportunity for existing companies to integrate new technologies and to increase their competitiveness.

Turkish aeronautical sector is also an excellent partner for widely understood international cooperation. Many years of tradition, reaching back to the beginning of 18th century and large experience, put Turkish industry in the position of an valuable partner for European partners. Large industrial aviation sector in Turkey is appreciated partner at European and worldwide level, being partner in many international undertakings with large significance for the global aviation industry.

Also, sector of SMEs in Turkey, consisting mainly from small family-oriented enterprises is slowly developing its interest in international cooperation. Despite the lack of sufficient numbers of technical staff with enough technical potential, Turkish companies feel the growing need of developing research cooperation at national and European level. Also, many companies by boosting the expenses on R&D activities, identifies new research ideas and needs, which can result with new, interesting project ideas, which can be realized with the support of financial instruments of European Framework Programmes.

To summarize, aeronautical sector in Poland, Romania and Turkey, having many years of history, tradition and experiences is an excellent partner for key players of aviation industry in Europe. Small and Medium Sized companies from all countries, widely cooperating with representatives of national industry have great opportunity to start and expand the existing cooperation with key players of European aviation sector as well as to become more and more involved in research projects of European Framework Programmes and other instruments for financing international cooperation. Due to large manufacturing potential and growing need of R&D activity development, SMEs from Poland, Romania and Turkey can be valuable partners to many international consortia.