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Adaptability and competitiveness of Romanian aeronautical industry in the European context

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Abstract. *The aeronautical sector is one of the world leaders with an annual turnover that exceeds 100 billion euro and provides employment for about 750000 people. Also, the European aeronautical industry is facing an international competition that is investing significantly in research and development programs, as well as European environmental standards. This paper provides a synthesis of the new European policy and the European programs regarding European aeronautics industry development and its objectives. For this purpose, the main European documents were analyzed and the results of the main ongoing projects developed under the common initiative Clean Sky, were used in the aeronautical industry. This paper presents the current state of Romanian aeronautical industry and its ability to rise to the European aeronautical industry in order to achieve the EU's objectives.*

Keywords: aeronautical industry, flight path 2050, Europe 2020, Horizon 2020, Clean Sky.

JEL Classification: L22.
REL Classification: 17E.

Introduction

Aviation sector in the European Union (EU) contributes significantly to the economies of our countries generating an annual turnover of 100 billion euro, connecting markets and people around the world. The Economic and social benefits have been immense with the efficient and fast transportation of people and goods. The growth of air traffic over the past 20 years has been spectacular, and will continue in the future, particularly in the emerging markets in the Far East. In Europe are 448 airlines and 701 commercial airports that allow free movement of people and goods across borders (A new beginning for European Aviation Research, About Acare). "Research and innovation are essential to maintain the capacity and competitiveness of Europe" (Thomas Enders, CEO EADS, Chair ACARE). On average, almost 7 billion per year for civil aeronautics are reinvested in research and development, particularly due to the fact that countries such as USA, Brazil, Canada, China, Russia, are investing in research and development programs. In this paper I provided a synthesis of the new European policy and the European programs regarding European aeronautics industry development and its objectives. For this purpose, the main European documents were analyzed and the results of the main ongoing projects developed under the common initiative Clean Sky, were used in the aeronautical industry. Also, this paper presents the current state of Romanian aeronautical industry and its ability to rise to the European aeronautical industry in order to achieve the EU's objectives.

The policies and European research programs

European vision on developing of the aviation sector had main representative ACARE - Advisory Council for Aeronautical Research in Europe (www.acare4europe.com). Members of the European Commission have invited personalities from key stakeholders of the main sectors concerned, European aviation industry and the research community to agree how aviation could better serve society's needs and maintain global leadership in aeronautics. The result was the "European Aeronautics: A Vision for 2020", which was published in January 2001. The group of personalities agreed to establish an Advisory Council for Aeronautics Research in Europe (ACARE), which includes leaders (CEO) of stakeholder organizations in aeronautics and air transport to develop and maintain a Strategic Research Agenda (SRIA) that will help to achieve the goals of Vision 2020. ACARE was launched at the Paris Air Show in June 2001 and attracted over 40 member of the organizations and associations including representations from the Member States, the Commission and stakeholders: manufacturing industry, airlines, airports, service providers, regulators, institutes research and

academia (A new beginning for European Aviation Research, About Acare). Implementation of the Strategic Research Agenda of the development and innovation through European and national public and private programs was a key element in achieving and maintaining the leading position of Europe in the aeronautical sector supporting in the same time the society needs.

Programs of aeronautics and air transport research in cooperation with the European Union, such as the Clean Sky Technology common Initiative, Common Undertaking SESAR resulted from 7th Framework Program, national programs from many Member States as well as research programs of private companies, providing important initiatives and bring benefits to aviation industry. So far, ACARE has brought a significant contribution with regard on the overall objectives of the Vision 2020.

In the same period, a number of boundary conditions have determined members to reconsider ACARE Vision 2020 objectives aim to expand to a new horizon for 2050 – Flight path 2050. Innovation in aviation is complex, capital intensive and takes time, partly driven by very stringent certification requirements, consistent with the paramount importance of safety in the sector. Aeronautical programs involve very long research and innovation cycles, are very expensive and generally involves obstacles along the way being, thereby associated with a higher than acceptable risk for the industry or financial community. Low profitability discourages private investment, making the public financial intervention being necessary. Infrastructure development is dependent on the availability of excellent research capabilities, testing and validation. Vehicles additionally require platform integration and full-scale demonstration. For this reasons, the SRIA roadmap is staggered over three times scales:

1. Short – term – to 2020.
2. Medium – term - to 2035.
3. Long – term – to 2050.

ACARE has played a central role in supporting the High Level Group for Aviation Research, convened by the European Commission that has formulated a new vision beyond 2020 that extends till 2050. In response to this new vision, a new strategic research and innovation agenda was developed by ACARE in 2012, in the same time with the establishment of the new research programs in Europe and at national level, including the "Horizon 2020".

Horizon 2020 - is the financial instrument implementing the innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. "Europe 2020" emphasizes the need of developing of some favorable conditions for research and innovation investments. The Horizon 2020 program will run in 2014-2020 period with an €80 billion budget. Within this

frame the European commission, EU Member States and European industry will invest more than €22 billion over the next seven years in innovation for sectors that deliver high quality jobs (Skyline, Horizon 2020: A step closer to the innovation union, 2013). Most of the investment will go to five public-private partnerships in innovative medicines, aeronautics, bio-based industries, fuel cells and hydrogen, and electronics. These research partnerships will boost the competitiveness of EU industry in sectors that already provide more than 4 million jobs.

Common Initiatives Technology has been created by the European Commission under Framework Program 7 (FP7) to allow the achieving of ambitious and complex research objectives. The discussion was started between the European Industry and research establishments on a new Common Technology Initiative, since 2004. At that time we talked about a possible FLIP (Flexible Long term Integrated Program). Given the fact that the U.S. has been running in a large scale demonstration programs for a long time Europe should not stay behind (Adrian De Graaff, Interview, Skyline, 2011).

Clean Sky

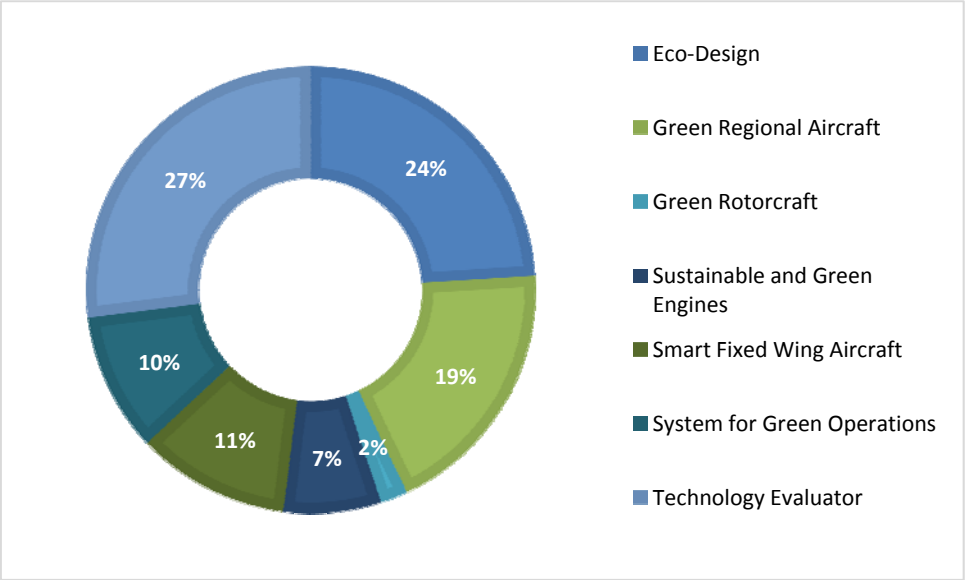
Clean Sky Partnership and program (CS) is a direct result of the ACARE vision and a success of EU policies in research and development field. Clean Sky is the most ambitious aeronautical research program ever launched in Europe. Its mission is to develop breakthrough technologies to significantly increase the environmental performances of airplanes and air transport, resulting a less noisy and more fuel efficient aircraft. Despite of a slower establishment than was hoped, Clean Sky proved to be a good thing. Partnership Clean Sky has created a program with a wide and diverse participation of all key stakeholders, including with a significant involvement of the small and medium enterprises (SMEs). 77 Members - 12 ITD leaders and 65 associates - have joined forces at the beginning of the program in 2008 to develop and mature the new and breakthrough 'clean technologies' for Air Transport *(Clean Sky a success story, 2013*). This approach sets up the solid basis for large and sustainable projects and encourages the active involvement of Partners. This makes Clean Sky the largest ever aeronautical program in Europe and one of the most promising Common Initiatives Technology. Also, was taken into account the assurance of European industry competitiveness, supported by a strong network of research and by a balanced regulatory framework in the face fierce competition from rivals part. There were established the following measures for aeronautical field in developing:

- maximization of the economic contribution of the aviation sector and the creation of added value;

- attracting the best people and talents;
- serving social and market needs for connection affordable, durable, reliable for passengers and freight transport with sufficient capacity.

A key objective of Clean Sky is to overcome the so-called "market failure" by using public support to reduce the development risk of non conventional technologies to a level that is considered to be financially viable by industry (Bertolini et al., 2012).

Activities were integrated in Clean Sky frame in six demonstrators (DTI) "Integrated Technology Demonstrators" and "Technology Evaluator". The scheme below presents the members contribution on each technological demonstrator:



Between 2009 and 2012, 13 Calls have been evaluated. More than 550 topics have been issued so far. The average cost of a topic is 515 000 euro. Since the launch of the programme, 1223 proposals have been received, and 405 have been funded: the selection rate for applicants is around 30%. In total – Members included – more than 550 Participants take part in the Clean Sky programme. More than 470 Partners are involved in Clean Sky projects through Calls for Proposals. More than 50% of Clean Sky's Beneficiaries are Newcomers in European funded research programmes.

A key issue of Horizon 2020 program is that for the first time EU funding for research and innovation is put together in a truly integrated program. The aim is to

obtain a greater impact on each euro spent, and to radically simplify the complex landscape of funding programs that currently exist. Implementation will be simplified and standardized, covering both funding schemes and rules. Public-private partnerships will have to play an important role in the implementation of Horizon 2020, based on experience in FP7. Also, this does not automatically mean that every common initiative will continue her mandate in the same form. Expanding the scope of the Commission's program of aviation transport in light of the new Transport White Paper regarding Flight Path 2050 for aviation will certainly need to be considered for the future proposals ITC. Clean Sky Programme 2 will maintain the basic structure of the Clean Sky program, will be based on technologies developed and the demonstrators in it, but will include three innovative aircraft demonstrator platforms (IADP).

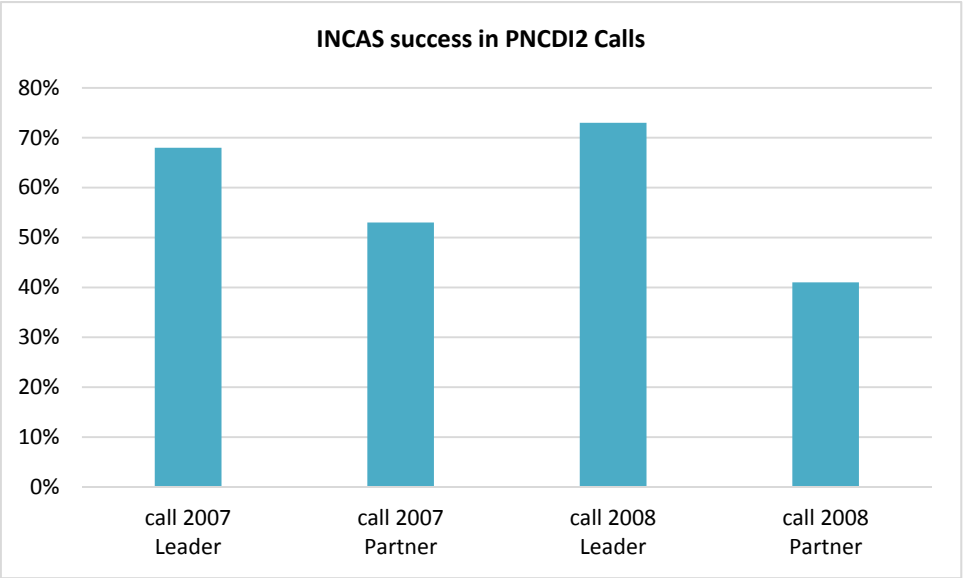
- Large Passenger Aircraft;
- Regional Aircraft;
- Fast Rotorcraft.

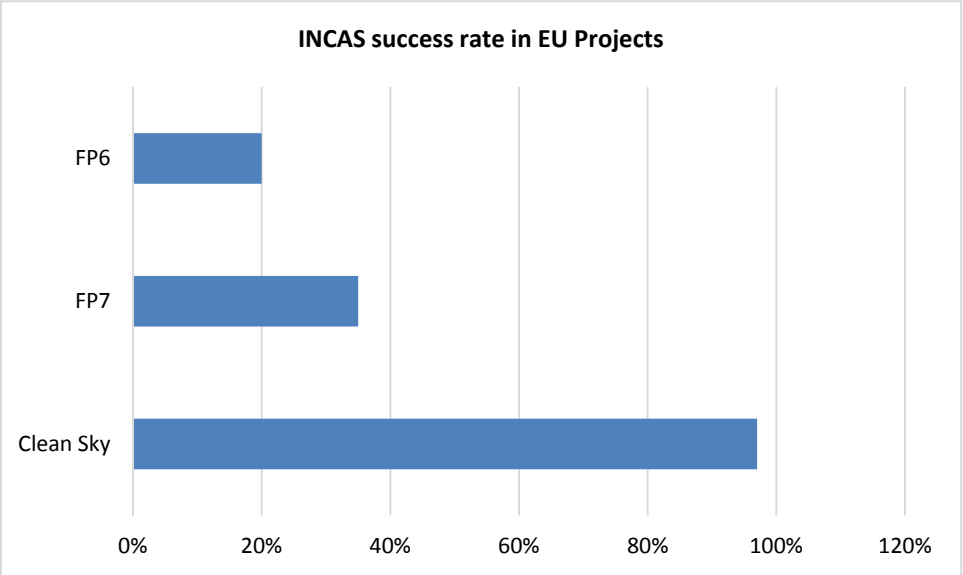
Regarding the current program Clean Sky will be retained as an important tool, and its role will be strengthened. This will allow a detailed assessment of the environmental benefits associated of new technologies and will measure the impact of various technological advances in relation to their specific targets.

Aviation Sector in Romania

Aeronautical sector in Romania, both at research level, but especially at industrial, take part in the main actions worldwide, both through participation in specific aviation lounges, like Le Bourget, Farnborough and ILA-Berlin, and other actions organized at EU level, such AeroDays – 2011 or Clean Sky Forum. These participations highlight the significant progress that research registered, as well as high degree of integration of the aviation industry international level. Obviously, the ultimate goal is to attract new partners and the involvement in major projects and outlook (Market Watch, 2011). Since the state budget for research and development has been limited, efforts to attract European funds for research into aviation industry and other fields have been intensified. Thus, within the European Framework Programmes were conclude research contracts and technological development with key partners, aeronautics, and DLR, ONERA, NLR, CIRA, INTA, FOI, VZLU, ILOT and developed partnerships for collaboration in future international research consortium. Romania is part of Clean Sky by Incas Cluster as a founding member in the Integrated Technology Demonstrato Smart Fixed Wing Aircraft and was also selected as a partner in CIRA Plus Group in Green Regional Aircraft Demonstrator. INCAS has accumulated massive experience and competence in recent years participation in

international activities, especially in FP6 and FP7, with the significant participation of Romania in the EU program as Clean Sky.





By participating to Clean Sky in the INCAS Cluster, Romania has a privileged position and an unique development opportunity. Consortium led by INCAS – National Institute for Aerospace Research "Elie Carafoli" brings together outstanding research capabilities offered by the Incas and STRAERO, as well as technological and industrial potential offered by ROMAERO Bucharest and

Craiova AIRCRAFT, in the context of integrating these capabilities to develop new technologies in aerospace field. Base participation is in Integrated Technology Demonstrator (ITD) called SFWA - Smart Fixed Wing Aircraft, together with EU industry represented by Airbus, SAAB, Dassault and the largest research centers in Europe, represented by DLR, ONERA and NLR. In Europe are aproximativ 12 countries with aeronautic potential. Romania is one of those countries. Obviously, the same thing can be said about the Czech Republic and about Poland – or else, given how currently is discussing about a certain European aeronautics industry, we can take into account that both in Romania and in Czech Republic and Poland, there is an unused potential that can be integrated at the level of a new technological initiative (Nae, Money Factory, 2010).

Given the experience that a research institute as INCAS and it's tradition as an integrator of industrial activity in Romania, and also the currently existing capabilities at the main factories in aviation industry as ROMAERO, AIRCRAFT Craiova, Aerostar Bacau and Brasov IAR - to enable the formulation of a development plan for a technology demonstrator. Romania is the only country in Central and Eastern Europe that participate as a member of JTI - CS. This participation allows a particularly technology leap at the industry level, that comes in direct contact with the technologies associated to a class of aircraft destined for years 2020, and on design level, where research has the possibility to implement technologies that are on different levels of maturity. INCAS represents Romanian aeronautics industry in Program - FP7, also in the new ACARE, because Incas is the responsible entity for all major aeronautical projects from Romania, civil and military, both past and from present.

Due to Clean Sky participation, Incas managed first of all to secure a large number of position in research. Also we were in a position to create other jobs for some of the activities, where we wanted to develop new competences. At ROMAERO, a manufacturing unit, there is a large number of jobs secured as a result of activities undertaken within the partnership (Nae, Skyline, 2012).

Conclusions

Europe is entering a new era where it faces many challenges such as globalisation, the financial system in need of reform, climate change and an increasing deficit of resources. This is why the European air transport system is directly concerned by new challenges regarding its competitiveness, performance and sustainability.

The importance of research and development cooperation in the aeronautical field has grew steadily due to increasing of risks and costs of innovation complexity. Collaborations between firms appear especially in technology-based industries.

Firms that engage in innovation activities are aware of the need to establish a cooperative research and development to achieve results that can not be generated inhouse. Such collaborations are defined as partnerships for achieving a common goal, for developing new and improved products (Marini et al, 2012). International cooperation will be an important cross-cutting priority of Horizon 2020 program. Furthermore, Horizon 2020 program is fully open to international participation, specific actions with key partner countries and regions will focus on the strategic priorities of the EU. Strategic Research and Innovation Agenda represents an essential contribution for maintain and expand this excellence into the future and provide guidance on research, development and innovation necessary for vision Flightpath 2050. Air transport imposed requirements, for the years 2050, causes a massive reorganization and new partnerships in order to develop new associated technologies. A number of major initiatives at EU level provide an unique opportunity to integrate research and technological potential existing in Romania in strategic partnerships aiming a new transport system. At this moment, Romania is in the situation where has a potential market in terms of funding that can be provided through the Framework Programme 8, towards redefining its policy, and also in the national perspective - in this case - to highlight the unused capabilities and to support them through the use of available funds in Romania and of the other countries in the EU perspective of integration.

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