The Quarterly Bulletin of the

CEAS

COUNCIL OF EUROPEAN AEROSPACE SOCIETIES

3AF– AIAE– AIDAA– DGLR– FSAE– FTF– HAES– NVvL– PSAS– RAeS– SVFW–TsAGI

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June

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ON 1-2 DECEMBER 2010, WILL TAKE PLACE IN BRUSSELS THE ASD/CEAS CONFERENCE 2010 :

AEROSPACE FOR EUROPE : MORE THAN JUST FLYING

WHAT IS THE CEAS ?

The Council of European Aerospace Societies (CEAS) is an International Non-Profit Association, with the aim to develop a framework within which the major Aerospace Societies in Europe can work together.
It presently comprises eleven Member Societies: 3AF (France), AIAE (Spain), AIDAA (Italy), DGLR (Germany), FSAE (Finland), FTF (Sweden), HAES (Greece), NVvL (Netherlands), RAeS (United Kingdom), SVFW (Switzerland), TsAGI (Russia).
Following its establishment as a legal entity conferred under Belgium Law, this association began its operations on January 1st, 2007.
Its basic mission is to add value at a European level to the wide range of services provided by the constituent Member Societies, allowing for greater dialogue between the latter and the European institutions, governments, aerospace and defence industries and academia.
The CEAS is governed by a Board of Trustees, with representatives of each of the Member Societies.

Its Head Office is located in Belgium:
c/o DLR – Rue du Trône 98 – 1050 Brussels.

www.ceas.org

WHAT DOES CEAS OFFER YOU ?

KNOWLEDGE TRANSFER:
- A well-found structure for Technical Committees

HIGH-LEVEL EUROPEAN CONFERENCES
- Technical pan-European events dealing with specific disciplines and the broader technical aspects
- The CEAS European Air and Space Conferences: every two years, a Technical oriented Conference, and alternating every two years also, a Public Policy & Strategy oriented Conference

PUBLICATIONS:
- Position/Discussion papers on key issues
- CEAS Aeronautics Journal
- CEAS Space Journal
- Periodic Newsletter on CEAS activities and general information

RELATIONSHIPS AT A EUROPEAN LEVEL:
- European Commission
- European Parliament
- ASD (AeroSpace and Defence Industries Association of Europe), EASA (European Aviation Safety Agency), EDA (European Defence Agency), ESA (European Space Agency), EUROCONTROL
- Other European organisations

EUROPEAN PROFESSIONAL RECOGNITION:
- Directory of European Professionals

HONOURS AND AWARDS:
- Annual CEAS Gold Medal to recognize outstanding achievement
- Medals in technical areas to recognize achievement

YOUNG PROFESSIONAL AEROSPACE FORUM

SPONSORING

THE CEAS MANAGEMENT BOARD

IT IS STRUCTURED AS FOLLOWS:

- General Functions: President, Director General, Finance, External Relations & Publications, Awards and Membership.

- Two Technical Branches:
  – Aeronautics Branch
  – Space Branch

Each of these two Branches, composed of specialized Technical Committees, is placed under the authority of a dedicated Chairman.

THE OFFICERS OF THE BOARD IN 2010:

President: Prof. Dr-Ing. Joachim Szodruch – joachim.szodruch@dlr.de

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EDITORIAL

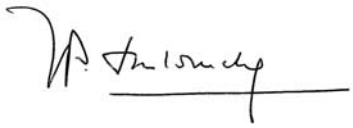
ABOUT THE UPCOMING ASD/CEAS CONFERENCE

Jean-Pierre Sanfourche
Editor-in-Chief,
CEAS Quarterly Bulletin

Since its conversion from Confederation into Council, in January 2007, the CEAS has achieved rapid advances among which is the successful commencement of our bi-annual technical conference series: Berlin in September 2007 and Manchester in October 2009.

From the beginning of our new CEAS, we had the vision of engaging not only in purely technical matters but also in strategy and policy areas. This is the reason why in our 'deliverables' list (p. 2), it is now stipulated that we have to organise every two years a technical oriented conference, and alternating every two years also, a public policy and strategy oriented conference.
The first event of this new series will take place in Brussels on 1 and 2 December 2010 within the framework of 'AEROWEEK', organised by the ASD (AeroSpace & Defence Industries Association of Europe) from 29 November to 3 December. As an integral part of the 'AEROWEEK' programme, a joint ASD/CEAS political conference is being organised with the objective of presenting and discussing the strategic issues facing European Aerospace, as well as the challenges and opportunities resulting from the European political choices. Bringing together representatives of EU institutions, national governments, non-governmental agencies, industry, research institutes, the financial community and the media, it will be structured with two High-Level Round Tables and a number of Workshops which will allow deep discussions of many fundamental subjects: education in aerospace, research and innovation in aeronautics, 2050 vision and economic development in aeronautics, application of space to the benefit of the citizens and a vision for the future concerning space activities.

This conference is being organised by the DGLR in close co-operation with the ASD and all necessary actions are being taken in order to make this event a complete success, which should give our CEAS a welcome new dimension.
The ASD management has to be warmly thanked for supporting our ambitious goal.



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THE 13TH TRUSTEES BOARD MEETING

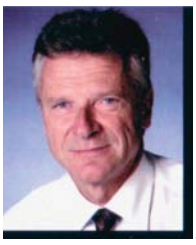
From left to right: Wilhelm Kordulla - Leandro B. Fernández Sáinz - Zdobyslaw Goraj - Constantinos Stavrinidis - Kaj Lundahl - Amalia Ercoli Finzi - Joachim Szodruch - Mercedes Oliver Herrero - Jean-Pierre Sanfourche - Pierre Bescond - Paul Bailey - David Marshall - Christophe Hermans - Peter Brandt - François Gayet - Georges Bridel.

The 13th Trustee Board Meeting was held at the NLR Office, Anthony Fokkerweg 2, Amsterdam, on Friday 23 April 2010.

The main decisions taken are listed here below:

- Mr Pierre Bescond (3AF, France) replaces Dr Antonio Martín-Carrillo as Vice-President, Finance.
- Dr Christophe Hermans (NVvL, NL) has been nominated Chairman of the Aeronautics Branch.
- The ASD/CEAS Conference will take place in Brussels on 1st and 2nd December in Brussels (instead of 30 November and 1st December as previously announced). A special session dedicated to Young Professionals was added.
- Venice has been chosen to host the CEAS 2011 European Air and Space Conference: 17-21 October 2011.
- The CEAS 2013 European Air and Space Conference, will take place in Linköping (Sweden) and will be combined with the FTF Annual Conference.
- The Board has endorsed the proposal from the CEAS Award Committee, to confer the CEAS Award 2011 to Prof. Stamatios M. Krimigis.
- The Programme Coordination Committee (PCC) has been re-established.
- Membership: the contacts with Belgium, Czech Republic, Romania and Baltic Republics are being actively pursued.
- Young Professionals: EUROAVIA, the European Association for Aerospace Students, is henceforth associated with the CEAS.

CEAS Annual Report 2009



At this Board Meeting, President Szodruch presented the CEAS Annual Report 2009, from which we publish here below broad excerpts:

« After years of intensive work within the new structure of CEAS we have achieved many of the set goals but of course not everything is in operation yet. Overall however the past three years have been a tremendous success story. After all we are the only general Aeronautics and Space Society in Europe, we are strongly supported by our members, we are recognised globally, and we are respected at home by all the stakeholders.

On 5th December 2008 in Paris Dr Joachim Szodruch from the DGLR, the German Aerospace Society was elected as new President continuing the programme established by the former Trustees under the leadership of Dr Georges Bridel. Georges' intensive engagement and the motivation he gave during the past year is a major part of the success we enjoyed in 2008. [...]

Board Meetings

Board meetings during the year 2009 had taken place in Madrid (24 April), in Rome (4 September), in Manchester (28 October) and in Brussels (17 December). We are very grateful to the local hosts of all the CEAS Board meetings. [...]

Some changes in the Board

This year has seen quite a large number of changes in the Board and all the representatives devoted quite some time and effort to CEAS. [...] Our General Director was newly appointed in Madrid and based on a proposal by the President we were happy to elect Mercedes Oliver Herrero, also from the Spanish Society, for this important position. [...]

Two new Member Societies

– Concerning new members we are proud to have now also the Russian community represented in CEAS. At the April meeting TsAGI, the Central Aerohydrodynamic Institute and Russian Aerospace Society was unanimously accepted as a full new member to CEAS. Dr. Sergey L. Chernyshev and Dr. Andrey Shustov were proposed as TsAGI Trustees.
– Furthermore the Polish Society of Aerospace Sciences (PSAS) has applied to join the Council as Associate Member. After a presentation during the December meeting the request was unanimously approved and consequently the Board appointed Prof. Zdobyslaw Goraj as PSAS Trustee.

Major goals in 2009

– One of the major goals in 2009 was the successful continuation of our technical bi-annual conference series, here the CEAS Air and Space Europe Conference in Manchester in October.
– As part of the conference programme CEAS also emphasised the intent to further cooperate in specific cases with other Societies outside Europe. Thus we arranged in Manchester the signature of the MoU between CEAS and the Korean Aerospace Society KSAS. [...]
– Other European Conferences were performed successfully as well. As one of the annual events the European Rotorcraft Forum, ERF was held in September in Hamburg. [...]

Publications

– **Aeronautics**. After more than a year of discussion and preparation the contract between the German Aerospace Centre DLR and the publisher Springer was signed on 16th November in Hamburg. This marks the start of a new era for scientific publications in the field of aeronautics and the air transport system.
– **Space**. Under the general MoU between the DLR, ESA and CEAS next to the CEAS Space Journal now also the CEAS Aeronautical Journal is offered to provide an appropriate platform for excellent scientific and engineering publications. It needs to be mentioned that after initial agreement the French ONERA stepped out of their earlier commitment to support the two CEAS Journals.

– **CEAS Bulletin**. During the year we saw an increase in the interest in our CEAS Bulletin. Due to its importance we therefore we agreed to increase its size for specific issues, like the Manchester Conference. Also the distribution was expanded towards representatives from the European Commission, European Parliament, European professional organisations, research and industry in general.

CEAS/ASD Conference, 1st December-2nd December 2010, Brussels

In the second half of 2009 we started to concentrate our efforts towards the preparation of our major conference in 2010 which is the more political event we intend to hold every second year in Brussels. We were happy that ASD was willing to join us in organising the CEAS / ASD in Brussels in end of November / beginning of December. This fits very well into the planned ASD Aero Week in the European Parliament. Due to our commitment and discussions with the European Commission the planned 'Aerodays' for the same time frame were postponed to spring 2011. How CEAS can contribute to that event as well, like 2006 in Vienna, is still open.

IN SUMMARY

In summary 2009 was quite a successful year for CEAS. [...]

– The CEAS 2009 Air and Space Conference in Manchester was the major event in our community and proved to be successful as our first one.
– The introduction of two new Aeronautical and Space Journals by the end of this year has been reached.
– We increased support for students and young professionals with regard to our conference, symposia, awards, etc. The launch of the European Young Aerospace Professionals Forum during the Manchester Conference was an excellent start initiated by the RAeS. [...]
– We enlarged our perimeter by adding one new European Aerospace Societies to our Membership.
– We successfully started the preparation for our Policy & Strategy Conference in 2010 in Brussels.

Those of you who are heavily engaged in CEAS and also the supporting members of CEAS, we all can be proud of what has been achieved so far. This is a result of our common efforts as well as your personal achievements and I would like to thank you all for that. »

THE AERONAUTICS BRANCH HAS A NEW CHIEF

During the CEAS Trustees Board Meeting of April 23, 2010, Christophe Hermans (NVvL) was elected as the new chief of the CEAS Aeronautics Branch. In a few words, he informs us of the manner in which he intends to exercise his mission.

« When I joined the CEAS Board of Trustees as NVvL representative in 2007, CEAS was finalizing the restructuring process. Under the leadership of Alain Garcia the Aeronautics branch was established, constituting a variety of technical committees that have been populated by subject matter experts from the CEAS member societies. As manager of NLR's Helicopter and Aeroacoustics department and member of the so-called International Committee of the European Rotorcraft Forum ERF, that yearly organizes the ERF Symposium, I took the initiative to set-up the CEAS Rotorcraft Committee.

I'm honoured to be elected as the new branch chief since the branch is in good shape. Step-by-step the committees are getting better populated and activities are being conducted. The committees are a major element of CEAS to establish Aerospace knowledge and experience in Europe, prepare technical papers in different areas of technology, organize exchange of knowledge, support the European industrial and scientific community, establish meetings and conferences and foster communication and motivation for young engineers and scientists.

The major goal I would like to achieve in the upcoming period is to embed already existing European networks of experts that organise international events with involvement of national societies, into the Aeronautics branch. Special attention will be given to representation from new CEAS 'nations' like Russia and Poland. It will allow them to take advantage of CEAS excellent international branding, communication channels like its website and the newly established Aeronautics Journal. In this way I hope the number of active committees can be increased and the already running committees can be reinforced. »

Christophe Hermans

THE PROGRAMME CO-ORDINATION COMMITTEE (PCC)

THE PCC AIMS TO :

- Maintain regularly updated a status of all European and major global aerospace events;
- Contribute to better optimize the European Aerospace Event programming;
- Initiate and agree on specific CEAS Events (symposia, workshops, etc.);
- Nominate Programme Committees for the CEAS events;
- Ensure a high quality of the CEAS events (standing of the presentations, impact on decision-makers, participation);
- Contribute to optimise the costs.

THE AEROSPACE EVENTS TO BE TAKEN INTO CONSIDERATION

• Aerospace events organised at European level

CEAS – European Institutions and Organisations [European Council – European Parliament – European Commission – ACARE – CLEAN SKY – SESAR – EASA –EUROCONTROL - EDA – OCCAR – ESA – AEA – ACI Europe – CANSO – ASD – ASD/EUROSPACE, …]

• International events taking place in Europe

ICAS, IAF, IAA, Joint AIAA/CEAS, others

• Aerospace events organised at national level

CEAS Member Societies – National Aerospace institutions and Academia

ORGANISATION

Members of the PCC Executive Team: – *Chairman*,François Gayet – *Executive Secretary*, Jean-Pierre Sanfourche – *Aeronautics Branch*, Christophe Hermans – *Space Branch*, Contantinos Stavrinidis – *3AF*, Pierre Bescond – *DGLR*, Peter Brandt – *RAeS*, Paul Bailey.

Correspondents of the PCC: *AIAE*, Leandro B. Fernández Sáinz – *AIDAA*, Amalia Ercoli Finzi – *FTF*, Kaj Lundahl – RAeS, Lorraine Reese – Others, to be nominated by respective Associations.

The PCC Executive Team will meet three times a year, the day before each Board Meeting and at the same venue. **Next meeting:** Hamburg, 1st September afternoon.

ACTION PLAN: (i) to complete the event calendar published in the CEAS Quarterly Bulletin; (ii) to undertake the definition and design of the future PCC computerized tool named CPMIS (Conference Programming Management Information System).

Jean-Pierre Sanfourche,
Executive Secretary of the PCC
jpsanfourche@dbmail.com

PROF. STAMATIOS M. KRIMIGIS: A MOST WORTHY RECIPIENT OF THE CEAS AWARD 2011

Prof. Stamatios M. Krimigis has had a distinguished career as a space plasma physicist, with seminal contributions in Solar and Interplanetary Magnetosphere, and space science instrumentation, and also as an initiator and manager of major Earth and planetary missions over the past forty years.

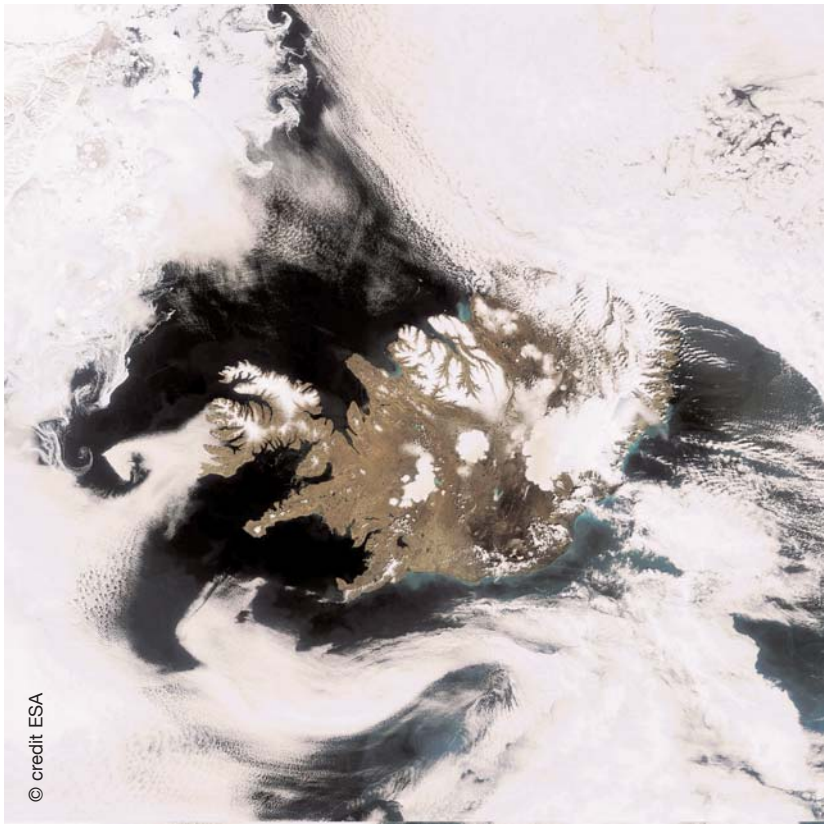
Science

• Principle Investigator and Co-Investigator in series of missions beginning in the mid-1960's, including Mariner-4 and Mariner-5, IMP-7 and IMP-8, Voyagers 1 and 2, AMPTE, Ulysses, Galileo, Cassini-Huygens, MESSENGER, and continuing to date.

• Among his main discoveries: first observations of electrons in the solar event (1965), helium and medium nuclei in the Van Allen belts (1966-1970), ion and electron acceleration in interplanetary shocks (1970 and 1976), high-beta plasmas in outer planets magnetosphere (1979 – 1989), energetic neutral atoms from Jupiter and Saturn (1981), imaging of magnetospheric and heliospheric plasmas (2004-present).

Technical achievements

In 1991, Prof. Krimigis became Head of the Space Department at the John Hopkins University Applied Physics Laboratory. He played a fundamental role in a number of innovative missions: the first NASA Discovery mission; 'NEAR', that orbited the asteroid Eros and landed on it after a year in orbit; the ACE mission et L1 providing real-time space weather data since 1997; the first NASA Solar Terrestrial Probe; the MESSENGER spacecraft scheduled to orbit the planet mercury in 2011; and the New Horizons mission en route to a Pluto flyby in 2015.
Stamatios Krimigis has built instruments and analyzed data that visited all 8 planets, and may well complete the set with the New Horizons arrival at Pluto.



© credit ESA

This image, acquired by Envisat's Medium Resolution Imaging Spectrometer on 24 May 2010, features a smoke-free Iceland.
The Eyjafjallajokull volcano, which had a series of eruptions in April and May, is visible in the dark area on the southern coast. The Vatnajokull glacier (visible in white northeast of Eyjafjallajokull) is the largest in Iceland and in Europe. The white circular patch in the centre of the country is Hofsjokull, the country's third largest glacier and its largest active volcano. The elongated white area west of Hofsjokull is Langjokull, Iceland's second largest glacier (Credit ESA).

THE POLISH SOCIETY OF AEROSPACE SCIENCES

Prof. Zdobyslaw Goraj, Warsaw University of Technology, Institute of Aeronautics and Applied Mechanics, is President of the Polish Society of Aerospace Sciences.

At the end of 2009, the Polish Society of Aerospace Sciences (PSAS) was admitted to enter into the CEAS, becoming our twelfth Member. Prof. Zdobyslaw Gorav, President of the PSAS, presents an overview of the Polish Aeronautical Industry as well as his views on the position of PSAS within the CEAS framework.

ABOUT THE POLISH AERONAUTICAL INDUSTRY

Polish aeronautical industry in the past has been making design, certification, and production of aircraft up to commuter class (19 000 lb), subsonic jet trainer, and midsize helicopters. This activity included both airframes and engines (turboprops up to 737 kW, and turbo-jet up to 1600 daN of thrust). The industry was supported by 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** (established in 1926).

Due to political and economical changes they started in early nineties the whole aeronautical sector and its R&D support have been re-arranged. It was involved by several reasons, mainly due to higher demands about economical efficiency and broken ties with huge Russian market. It must be emphasized that in Soviet era the Polish aerospace industry and research sector was strongly oriented on cooperation with partners representing the so-called Warsaw Pact countries. As a result, after the political change, the volume of production and corresponding level of employment drastically fell down from about 70 to 15 thousands employees (figure 1). However, during the last 15 years one can observe a consolidation and rebuilding process – Polish aerospace sector becomes more efficient and competitive. Worldwide key players are present in Poland now: United Technologies in Rzeszow (engines plant – 6 000 employees), Agusta-Westland in Swidnik (helicopter plant – 3000 employees), EADS CASA in Warsaw (aircraft structure plant - 2000 employees), AVIO POLSKA in Bielsko (engine plant – 1000 employees), General Electric in Warsaw (Engineering Design Center GE AVIATION – 800 employees) and others. More than 60 related to aerospace SMEs are present and active in Poland (figure 2).

THE AERONET – AVIATION VALLEY

An important role is played by the industrial-research cluster – **'Aviation Valley'** – created and then re-organized into the so-called **Centre of Advanced Technology 'AERONET – AVIATION VALLEY'**. The idea for that centre was to group research institutes and technical universities significantly involved in R&D support of industries under Aviation Valley umbrella. It is worth mentioning that many Polish universities, including Warsaw University of Technology, Military University of Technology, Rzeszow University of Technology and other (Gdansk, Czestochowa, Cracow) are involved in aerospace related research and education. Polish research aeronautics potential (Academia and Research Institutes) was integrated by establishing a **Polish Network of Excellence** whose strategic objective is to strengthen research activities both at local and European level. More integration between Polish industry and research is a result of setting up **Polish Technology Platform for Aeronautics**, which has announced recently a **Polish Strategic Research Agenda**, and

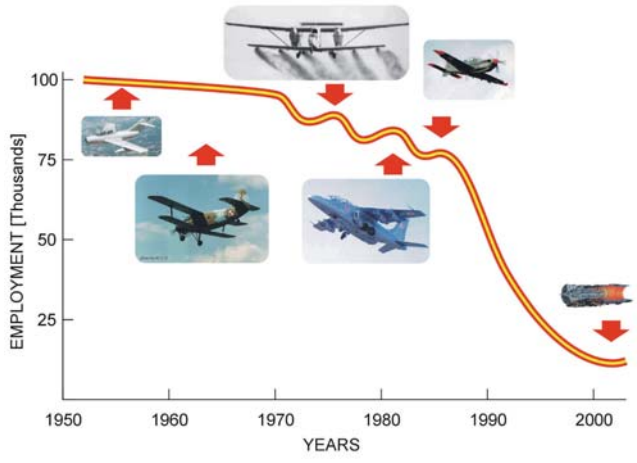


Figure 1.Employment in Polish aerospace industry over the last 60 years.

Figure 2.An example of a successful SME's activity in Poland: Light Sport Category aircraft being produced by the new established AERO AT Company.

at the moment being implemented with the financial support both of Ministry of Science and Higher Education and Ministry of Economy coming from national budget and structural funds.

After World War II in Poland there were produced more than 26 thousands aircraft (figure 3). Nevertheless, Poland belongs to the group of countries with limited aerospace sector and urgently needs wider international cooperation both in research, development and production.

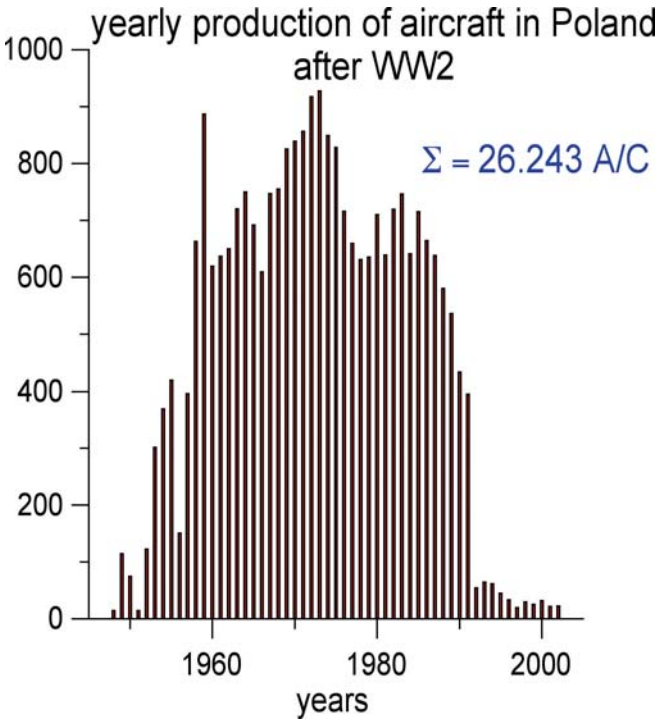


Figure 3.History of production of aircraft in Poland after WW II.

THE ROLE OF THE CEAS

Just for this kind group of countries, CEAS is especially important and can play essential role by promoting international cooperation, supplying information about important events, conferences, workshops, new technologies, modern approaches to aviation business, courses for young researchers, training for engineers, managers etc. Aerospace is international by nature, and can not be limited by any borders. Today it is evident that even the biggest European aerospace players (France, Germany, Italy, Spain, UK) work together to be more competitive on global market, and it is even more demanding for countries with smaller aerospace potential, as for example Poland, Czech Republic or Romania. In Poland for a long time there are been acting different aviation-oriented societies, for example: (i) Aviation Section of Polish Technology Organisation (NOT); (ii) Society of Aerospace Development (STAR) or (iii) National Council of Aviation (Krajowa Rada Lotnictwa). They have different, mainly very ambitious goals, as technical development of aviation, increasing the role of aerospace industry in national economy etc.

THE POLISH SOCIETY OF AEROSPACE SCIENCES

In 2006 PSAS (Polish Society of Aerospace Sciences) was created and its main goal, written in the statutes, was expressed as promotion of research in aerospace both at national level and through international cooperation. So, the natural consequence is the membership in CEAS, and a support for any international co-operation in aerospace oriented research.

About Prof. Zdobyslaw Goraj

Prof. Zdobyslaw Goraj is aircraft designer and specialist in flight dynamics, head of the Aircraft Design Department and course director for Aerospace Engineering at the Warsaw University of Technology. He spent 7 years in Polish aerospace industry as senior designer (1983 –1989). His major topics of interest covers aircraft design and optimisation, stability and manoeuvrability of flying objects; high angle of attack aerodynamics, aircraft performances and flight safety. Very active on the international level – member of various consortiums under the 5/6/7 Frameworks Programmes of the EU, he is regularly asked for reviews and opinions about submitted papers and international projects, both from Poland and from abroad (European FP, Clean Sky, etc.). He is the initiator and main organiser of the International Seminars entitled: 'Recent Research and Design Progress In Aeronautical Engineering and Its Influence on Education', now READ (Research and Education for Aircraft Design). He is member of Editorial Boards of some aeronautical Journals and author of numerous papers (more than 100). Doctor Honoris Causa of 2 foreign universities: Moscow State Aviation Institute (2002) and Vilnius Gediminas Technical University (2009), AIAA member; ICAS Programme Committee member, member of EASN Board of Directors and Secretary General. He supervised 7 Ph.D. theses.

THE PROFESSIONALS OF TOMORROW

How EUROAVIA prepares aerospace students for a life after graduation.

Ever since the idea of a united Europe dawned, countless efforts were made to cross our cultural differences and the economic challenges that lay within our boundaries.On all levels, from the small towns to the highest regions of government, people showed resolve to embrace the future as one. As this idea inspired the academic world, a small group of students founded an association for aerospace students in Europe. The name, EUROAVIA, would stand synonymous for broadening the horizon of aerospace students in the next fifty and one years.

Established in Aachen in 1959, EUROAVIA has since become the leading student association in aerospace engineering. When all the affiliated societies met last April in Pisa, the diversity among the group of students could be clearly seen. Fifty-four representatives came from across the association, as far as Kyiv, to talk and discuss about the opportunities and challenges in our time, defining the future of aerospace students.

Although EUROAVIA has spread to 33 universities in 16 European countries so far, the association still lives by the three principles it was founded on: (i) to stimulate contacts between the university student and the aerospace industry, (ii) to offer opportunities and acquaintances among the students themselves and (iii) to represent the students at an international level. Every single one of these three principles prepares the student for a live after graduation. There is a need to let students experience the world they will be working in, and the purpose of EUROAVIA is not only fulfilling that need, but to develop better professionals for tomorrow.

During one's academic career there are very few opportunities available to get in contact with companies. In the few cases during the study where the student is required to contact a company, applying for an internship for instance, the university acts as a mediator. This limits both the knowledge and understanding of the student, making the transition from the academic world to the aerospace industry a tough one. By lowering the boundary for companies to contact students directly through EUROAVIA, whether this is to give a presentation or to organize a workshop, the gap between the student and the company is bridged.

A sense of pride and joy fulfils a student every time when they receive a positive feedback from a company. Every student looks up to the aerospace industry, for it is unfamiliar to them and without reason they would not contact them. Giving the company and the student the opportunity to familiarize with each other, forges a companionship that goes beyond an informative talk. For the company, a unique insight is given into the selection of young people that one day will define the aerospace industry and their company. For the student, it comes with realization that the company they dreamt of working at yesterday might be the company they will be working with tomorrow. That is what EUROAVIA stands for.

Thomas VERMIN,
President-elect EUROAVIA
EUROAVIA
The European Association for Aerospace Students
For more information regarding EUROAVIA or this paper, please contact Thomas Vermin at thomas.vermin@euroavia.eu

A fewof the future professionals, as 33 universities meet in Pisa to discuss the future of EUROAVIA

Aeronautical and Space Training in Europe

Last year we celebrated the centenary of the oldest higher education establishment for aeronautics and space engineering in the world, Supaero. Since 1909, with the escalation of aeronautics and space activities, a host of degree courses have been set up. I would like to give an overview of the main courses currently available in Europe and examine the main trends for coming years.

Philippe Couillard
Vice-president of the Academy, Chairman of the Board of ISAE Institut supérieur de l'aéronautique et de l'espace

Specialised aeronautics and space engineering courses

On the Academy's website, the reader will find a list of all the aerospace training institutes in Europe. They are so numerous that it is impossible to list them all in this article. We might just note that each year, several thousand engineers graduate from different levels of aeronautics and space degrees. All do not stay in the area and many use their talents in other sectors of the economy. The technical and managerial complexity of aeronautical and space systems leads to degree courses which are valued in many highly technical areas. However, the European aeronautics and space sectors attract most of them, between one and two thousand each year.

Factors of evolution

The dawn of this new century is characterised by a move towards globalisation, in which aeronautics and space are playing a major role. Currently only two major powers are capable of offering a comprehensive palette of aerospace products: the United States and Europe. Despite its great weakness following the Second World War, the latter succeeded in developing its skill base and pulling itself up to the top rung in a whole range of products. Behind these two, other competitors are now preparing to make their entry shortly. Chinese ambitions in the area of aeronautics and space are particularly obvious, but neither is India concealing its desire to become a major player. Russia is rediscovering its ambition and would like to return to its old position. Canadian aerospace policies, within the North American environment, and the more independent policies of Brazil, are also very clear.

In this context of globalisation, the only players are the major economic entities. In our case, this means Europe. Neither the United Kingdom nor Germany nor France, on their own, can be significant actors in the world market. Our flagship products are all European: Airbus, Ariane, telecommunications satellites, tactical and cruise missiles, civil and military helicopters, business jets.

Europe brings together prime contractors, designers and manufacturers of all these high tech products. This pooling of talents happens at all levels. On the industrial level, obviously, with the setting up of EADS and its many European subsidiaries – Airbus, Eurocopter, Astrium – but also Thales which brought together Thomson and Racal (United Kingdom) and acquired an Italian branch with its subsidiary Thales Alenia Space. MBDA, joint subsidiary of EADS, BAE Systems and Finmeccanica, concentrates the industry of tactical missiles. The development of military transport aircraft A400M is entrusted to Airbus with a turbojet manufactured by the European consortium Europrop International. On a level of public prime contractors, ESA is the main developer of space products. The operational implementation of its programmes is carried out by Eumetsat for meteorology or Eutelsat for telecommunications. In the armaments sector, OCCAR (Organisation for joint armament cooperation), a European organisation of as yet modest size, was set up recently and puts in orders relating to the A400M. In terms of air traffic control, the role of Eurocontrol has grown considerably in the course of the past decade. Lastly the European authority for certification of aircraft is the European Aviation Safety Agency (EASA).

European integration in the aerospace domain is therefore moving forward and undoubtedly set to continue. It goes without saying that aerospace training courses cannot ignore this movement, on the contrary, they must actively embrace it. Schools and universities in this area have taken note of this and actions have already been initiated. It is essential to carry on in this direction and European cooperation in the area of education is, undoubtedly, a priority which must, on the one hand, boost the quality of our future engineers and technicians and their capability to lead joint programmes and, on the other, enhance Europe's role in the world by offering internationally acclaimed training courses.

Let us have a look at what has already been achieved and actions currently in progress. For some time past, the Pegasus network has been active. There is also the ECATA grouping which should be further reinforced.

PEGASUS

Set up in 1999 at the instigation of the French member schools of the GEA (ENAC, ENSICA, ENSMA and SUPAERO), the PEGASUS network (**Partnership of a European Group of Aeronautics and Space universities**) is made up of the best European Grandes Écoles and universities providing courses in aerospace. It includes most establishments which correspond, in size and educational standards, to our aeronautical grandes écoles and is responsible for most student exchanges.

Currently the PEGASUS network comprises 23 members from 9 countries of the European Union and Norway:

- France: ISAE, ENAC, ENSMA
- Spain: ETSIA (Universidad Politecnica de Madrid) and Seville
- Italy: Politechnico di Milano, Politechnico di Torino, Università degli Studi di Pisa Università di Napoli, Università di Roma

One of ISAE's auditoriums. Credits ISAE – Jean-Philippe Guiraudie

- Sweden: Kungliga Tekniska Högskolan of Stockholm
- Germany: Technische Universität Braunschweig, Technische Universität München, Universität Stuttgart, RWTH Aachen, Technische Universität Berlin, Technische Universität Dresden
- United Kingdom: Cranfield University, University of Glasgow, University of Bristol
- Netherlands: Technische Universiteit Delft
- Portugal: IST Lisboa
- Czech Republic: CTU Prague

Candidates to such a network have to respect a set of criteria. Partner institutions certify for example that:

- the recruitment process for admission, based on an assessment of the scientific capacities of the student, is sufficiently selective to guarantee the high level of their graduate engineers
- each establishment proposes a engineering degree syllabus that meets with the highest European standards
- these engineering programmes include a solid general and scientific basis, relevant for aeronautics and space engineering, and an in-depth specialisation in at least one of the areas of aeronautics or space.

PEGASUS partners produce around 2000 aeronautics and space engineering graduates per year. It is difficult however to make a simple comparison of these different training courses since no collective data is available and national systems remain highly specific. A very comprehensive brochure has been published by the network and is available on the website www.PEGASUS-europe.org.

ECATA (European Consortium for Advanced Training in Aerospace)

The ECATA consortium was formed in 1991, before Pegasus, on the initiative of European industrials. It aims to develop training programmes adapted to the needs of companies in the aerospace sector and thus reinforce the competitiveness of European industries. It comprises seven universities (ISAE, Cranfield, TU Munich, DIAP Pisa, ETSIA Madrid, KTH Stockholm, TU Delft) and eight aerospace industrials (EADS, Airbus, Safran, Alenia, Aermacchi, Dassault Aviation, BAE Systems, SAAB). A consortium agreement was signed by the different university members in lieu of statutes in which one of its members, ISAE, manages the consortium in the name of the other partners and accommodates the headquarters in its premises.

Consultation between the academic and industrial partners has given rise to the elaboration of a joint programme carried out each year in two member universities, which leads to a European degree signed by all academic members. This **ABI (Aerospace Business Integration)** course, with its cultural management and systemic approach component, is one response to the needs of European industrial players for a solid skill base in the area of complex multinational programme management. It comes under the heading of continuous engineering training.

Student using a flight simulator (ISAE). Photo credits ISAE – Jean-Philippe Guiraudie

Since it was set up, the ABI programme has trained approximately 15/20 European auditors per year. Former pupils – about 300 for the moment working in 25 companies and research centres – have formed a very active association ECALAS. One should also point out that ECATA has carried out studies on behalf of the European Commission and proposes tailored international training courses, European symposia and research projects within the European FPRTD (Framework Programme for Research and Technological Development). For more information please consult www.ecata.org.

ECATA's perimeter of action is wide and covers all partnership actions in such a way as to promote European competitiveness. For instance it called for the setting up in 2005 of a more in-depth course to be spread over two years. This is the European Master EUMAS **(European Master in Aeronautics and Space Technology).** This new, ambitious programme attracted students from the whole world into our European universities (Cranfield, Pisa, Madrid, TU Munich and ISAE).

The master is organised by two universities on a rotating basis with each new intake. Pisa and Supaero hosted the first session for 2005-2007. Then Munich and Madrid took charge of the 2006-2008 session. Rotations are continuing with Pisa and Madrid for 2007-2009, Cranfield and ISAE for 2008-2010 and Cranfield and Munich for 2009-2011.

25 students are admitted each year and have the choice of an aeronautics option and a space option. A rigorous selection process operates for admission. ISAE and Cranfield, for instance, received 365 applications for the 2008-2010 session. www.eumas.org

European Aerospace Institute

The dynamic initiated twenty years ago in the framework of the ECATA network is now optimised to go beyond the ABI concept and classic student exchanges and set up a more integrated European aerospace training course. The aim is to set up a more integrated European aerospace degree course.

The approach instigated by ECATA members and Prague university is the following: in each university, a certain proportion of degree students, 15% to 20%, constitutes a European class. These students constitute the **European Aerospace Institute (EASI).** They receive top quality joint scientific and technical training. The courses are spread over five semesters in at least two to three establishments, and include an industrial or research project. By means of projects led by international teams, exchanges of lecturers, courses in the language and culture of their partner(s), the students obtain a joint degree and thus are better prepared to join a transnational European company.

This European aeronautics and space class aims to enter the future **European Institute of Technology (EIT).** This organisation has the triple goal of higher education, research and innovation. Its objective is to improve European competitiveness in terms of innovation by bringing together the relevant players (scientists, universities, businesses). EIT is to be organised around a restrained central management structure, the governing board, and a network of **Knowledge and Innovation Communities** (KICs). The European Aerospace Institute, associated with European companies and research organisations involved in aerospace, clearly possesses the characteristics to constitute the Aerospace Knowledge and Innovation Community for the European Union. The founding texts of such a KIC can be rapidly drawn up.

The ambition is to constitute the first EASI intake in the coming academic year. The wager is not yet won because many factors are weighing heavily on education and other areas at present and there is also the question of successfully funding the extra costs inherent to this Europeanisation, but the will to go forward does exist. This new training course will be proof that further education centres in Europe are keen to meet the needs of the sector's research centres and industry which themselves constitute clear examples of successful Europeanisation. Armed with a greater awareness of European cultures, the new generations will thus be more eager to defend Europe in the face of globalisation than their own nation against another within the old Europe.

This is the challenge at the heart of the European Aerospace Institute (EASI).

ABOUT SESAR (SINGLE EUROPEAN SKY ATM RESEARCH)

ATC Global, Amsterdam, 9 March 2010.

1,400 ENGINEERS INVOLVED ALREADY IN THE MODERNISATION OF EUROPEAN SKY

Nine months after kick-off already 1,400 engineers at the SESAR member organisations located in 17 European countries took up the challenge and initiated 75% of the almost 300 projects equalling to € 1.9 billion worth in distributions.

In his opening speech at ATC Global the largest international ATM/ATC Exhibition & Conference, in Amsterdam on 9 March 2010, Patrick Ky, Executive Director of the SESAR Joint Undertaking (SJU), declared: "The mindset of SESAR is crystal clear. We work with a distinct implementation goal in mind, in the short, mid and long term. For this reason end-users of the SESAR systems need to be involved in all the steps of the programme."

SESAR Joint Undertaking was founded by the European Commission and by EUROCONTROL. Fifteen companies are members of the SJU: AENA, Airbus, Alenia Aeronautica, the DFS, the DSNA, ENAV, Frequentis, Honeywell, INDRA, NATMIG, NATS En Route Limited, NORACON, SEAC, SELEX Sistemi Integrati and Thales. In addition, SJU is involving major airlines, business & general aviation and the main users' associations to assure their specific advice and input. Similarly, 5 major staff associations representing pilots, air traffic controllers and assistants, handling staff, flight and air traffic safety electronics engineers enrich the programme.

The academic world is integrated through a dedicated work package and the SEASR Scientific Committee.

The mission of the SESAR programme is to enhance the capacity, safety and efficiency of the European Air traffic Management (ATM) network while reducing the environmental impact by 10%.

2010 FOCUS ON EARLY BENEFIT:

- Information management: development of information models and of first software prototypes allowing data exchange between the aircraft information management systems and airports.
- Route assignment and guidance: first mock-ups and cockpit simulators for taxi clearance and data-link routing.
- Advanced Surface Movement Guidance and Control Systems routing and planning validations on two European airports.

400 TONNES OF CO_2 SAVED ON 'AIRE' FLIGHTS

First quick wins in terms of fuel efficiency and time-savings are already achieved through green descent and climb approaches, tested under 'AIRE' (Atlantic Interoperability initiative to Reduce Emissions).

What is 'AIRE'? In 2008, the SJU initiated the execution of green flight trials on the ground, in approach and climb areas as well as in the oceanic domain with a very simple and proactive approach: how can we work together in making aviation become greener? AIRE is a joint initiative between the European commission and the FAA (Federal Aviation Administration), it is the green component of the SESAR programme. While the main aim of the test campaign was to evaluate the applicability and effectiveness of green flight procedures, concrete fuel and CO_2 savings could be measured. In total 1,152 flights were performed in 2009 showing encouraging results: in particular 400 tonnes of CO_2 could be saved.

Brussels, 8 April 2010

AIRE: REDUCED NOISE AND EMISSIONS OF FIRST COMPLETE TRANSATLANTIC GREEN FLIGHTS

The two first complete (gate-to-gate) green transatlantic flights were operated on 6 and 7 April 2010 from Paris-Charles De Gaulle to Miami airports. The flights were carried out by Air France (6 April) and American Airlines (7 April). During the 9 hours flight, enhanced procedures were used to improve the aircraft's energy efficiency.

Among the procedures applied: shorter taxiing times, continuous ascent, optimum altitude and speed during the cruise phase, continuous descent, procedures helping minimise noise levels during the departure and arrival phases.

Air France estimates that the coordinated application of environmental friendly procedures during the flight cut CO_2 emissions by 6-9 tonnes and save 2-3 tonnes of jet fuel.

Applying these optimisations to all Air France long-haul flights to and from North America, would result in a cut of CO_2 emissions by 135,000 metric tonnes per year, with fuel savings of 43,000 metric tonnes.

Brussels, 18 May 2010

LOW FARES AIRLINES SESAR TEAM UP

Following an open call for tenders, SJU signed on 18 May 2010 a framework contract with the European Low Fares Airlines Association (ELFAA) to include its expertise in the execution of the SESAR work programme. Three ELFAA airline members have confirmed their participation: Ryanair, Jet 2. Com and Flybe.

J.-P. S. From SESAR Joint Undertaking Press Releases dated 9 March, 8 April and 18 May 2010.

ICAO ESTABLISHES A TASK FORCE TO DEAL WITH VOLCANIC ASH

IN RESPONSE TO THE UNPRECEDENTED DISRUPTIONS TO COMMERCIAL AIR TRAFFIC IN EUROPE CAUSED BY THE ERUPTION OF ICELAND'S EYJAFJALLJÖKULL VOLCANO ON 14 APRIL 2010, ICAO HAS ESTABLISHED ON 29 APRIL AN INTERNATIONAL ASH TASK FORCE TO DRIVE THE DEVELOPMENT OF A GLOBAL SAFETY RISK MANAGEMENT FRAMEWORK THAT WILL MAKE IT POSSIBLE TO ROUTINELY DETERMINE THE SAFE LEVELS OF OPERATION IN AIRSAPCE CONTAMINATED BY VOLCANIC ASH.

The ICAO European and North Atlantic Volcanic Ash Task Force (EUR/NAT VATF) agreed on a common working agenda to improve contingency plans in the European and North Atlantic Regions. The group was convened to establish a coordinated region-wide operational approach by aviation to volcanic ash emergencies.
The multidisciplinary team of experts from States and industry facilitated by ICAO will prepare **by 1 August** a report on lessons learnt from the crisis and identify guidance material and contingency plans which need to be updated. Building on the report, a roadmap for establishing globally-harmonized ash concentration thresholds, options for improved detection systems of volcanic ash, as well as recommendations to improve notification and warming systems is presently being completed.
On 12 May, the Task Force's meeting, hosted by the European and North Atlantic Regional office of ICAO, was attended by more than 50 participants from States, the European Commission, the scientific community and industry organisations representing airlines, air navigation services providers, pilots and engine manufacturers. "The fact that all concerned parties are involved in the discussions shows a high level of resolve to propose options that will significantly improve responses o future volcanic ash emergencies, with emphasis on both safety and efficiency", said Karsten Theil, ICAO EUR/NAT Director.

The Task Force has already identified key areas for improving the efficiency of responses to volcanic ash. It met **from 8 to 10 June** to finalize proposals to amend the current 'Volcanic Ash Contingency Plans', for subsequent endorsement by the Air Navigation Planning Group and the North Atlantic Systems Planning Group.

J.-P. S. From ICAO News – 13 May and 29 April 2010.
www.icaopressroom.wordpress.com/2010/05/

THE EUROPEAN DEFENCE AGENCY

9 February 2010 : The EDA Hosted Its Fifth Annual Conference

Catherine Ashton

Alexander Weis

CALL FOR CONCRETE SYNERGIES BETWEEN CIVILIAN AND MILITARY

This Conference, dedicated to the topic '***Bridging Efforts: Connecting Civilian Security and Military Capability development***' gathered about 250 representatives from Member States, other European Institutions and international organisations, as well as industry. It intended to take stock of experiences and lessons identified with regard to overlapping capability needs in civilian and military missions and operations, to investigate opportunities for the effective coordination of capability requirements definition and to identify related dual-use capabilities and explore their development, including through coordinated research and technology investments. It looked into exploring possible ways ahead for EDA to act as one of the facilitators in this overall process.

Ms Catherine Ashton, High Representative for Foreign Affairs and Security Policy and Head of the European Defence Agency, welcoming this Conference, highlighted that "[...] we have to start in a very pragmatic way to coordinate our day-to-day activities at EU level. We need to be driven by strong commitment to provide effective solutions. The Lisbon Treaty provides us with a sound legal and political basis to do so. [...]We have to make real bridging efforts in particular at the EU level but also national level, fully exploring the potential in research for dual-use technologies, because security is indivisible."

Mr Alexander Weis, EDA Chief Executive, underlined that "[...] the EDA is willing to support such process when it comes to generating defence capabilities for CSDP missions and operations, building wherever possible and in a systematic fashion on synergies with our civilian counterparts. [...] Bridging efforts does not mean merging or blurring the lines of responsibility. The different actors will have each a dedicated role to play, though making sure that they are complementary and mutually reinforcing."

SIGNATURE OF FIRST COORDINATED EDA/ESA STUDIES ON "SATELLITES SERVICES FOR UAS MISSIONS"

The EDA and the ESA signed contracts with two consortia regarding feasibility studies on "Satellites Services for the integration of Unmanned Aircraft Systems (UAS) into European Airspace": Mr Alexander Weis signed a first contract with EADS Astrium Services/EADS Defence & Security-Military Air systems (France) and in parallel ESA's director of Telecommunications and Integrated Application, Ms Magali Vaissiere, signed a second contract with INDRA Espacio (Spain).

The two studies, worth € 400 k each, will explore the feasibility of a demonstration mission in the timeframe 2010-2011. It is to be noticed that EDA and ESA had joined forces since early 2009 to demonstrate that technological challenges in Command and Control / Air traffic control can be overcome through the use of satellite services.

26 APRIL 2010: REPORT BY THE HEAD OF THE EUROPEAN DEFENCE AGENCY TO THE COUNCIL

In this basic document, Ms Catherin Ashton presents the roadmap for the EDA at the short- and mid- term time horizons. Among her statements:

- "The Lisbon Treaty has reinforced the Agency's central role in the improvement of European capabilities for the Common Security and Defence Policy (CSDP). This added thrust, brought forward by the institutional reform, now needs to be fully utilised."
- "The Agency and its participating Member States will now be challenged – also due to the current budgetary constraints – to fully exploit the added value which European cooperation has to bring."
- "The enhanced institutional framework of European cooperation offers opportunities to collaborate for cost-effective capability development."
- **Defence Capability Development (CDP) – towards more synergies with other stakeholders**. "The process of updating the CDP is ongoing, with the aim of completing this work in the second half of 2010."
- **An improved environment for defence research**. "Europe has to harness all its resources for a globally competitive European Defence Technological and Industrial Basis (EDBIT) and here better coordination can make real difference."
- **A stronger defence industrial base for Europe – built on more competition, harmonised requirements and common standards**. "European industrial capabilities need to be supported by an open and transparent European defence Equipment Market (EDEM), based on trust of in adequate security of supply of defence equipment." [...] A further prerequisite for a strong EDTIB will be the creation of standards that can serve as a catalyst for joint technology development [...], the Agency will take over from the Commission the maintenance and development of the European Handbook on Defence Procurement."

J.-P. S. From information data provided by EDA
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European Defence Agency– Rue des Drapiers 17-23
B-1050 Brussels

A FUTURE FOR THE AIRBUS MILTARY A330 MRTT

Airbus Military has for the first time demonstrated in flight "buddy" refuelling between two A330 MRTT aircraft.

On 17 May 2010 three such flights have been performed, the last one being part of the certification flight trials. This operation illustrates the capability of the new-generation A330 Multi Role Tanker Transport (MRTT) to refuel any kind of large receiver, even wide-body aircraft like another A330 MRTT or receiver aircraft with complex aerodynamics such as the E-3 AWACS tested in February.

The two aircraft used for these flight trials were the first A330 MRTTs built for the Royal Australian Air Force. During the flights, performed over the Gulf of Cadiz, fuel was passed from the refuelling aircraft's Air Refuelling Boom System (ARBS) to the receiving aircraft's Universal Aerial Refuelling Receptacle System Installation (UARRSI).

"*This latest flight demonstrates the ability of the A330 MRTT to refuel a true wide body aircraft and to conduct buddy-buddy refuelling between two tankers, which is a vital enabler for even longer range deployments*", said Antonio Caramazana, programme director Airbus Military Derivatives.

EADS NORTH AMERICA INTENDS TO SUBMIT PROPOSAL FOR U.S. AIR FORCE TANKER

On 20 April EADS North America announced its intention to submit a proposal on 9 July 2010 for the U.S. Air Force's tanker modernisation programme and that it will offer the KC-45, the most capable, American-built solution that is flown, proven and in production now.

WHAT IS THE KC-45?

The KC-45 is the U.S. military version of the proven A330 MRTT. To date 28 aircraft have been ordered by four U.S. allies. At the heart of the KC-45 is the most capable aerial refuelling system operating today.

EADS North America will build and modify the KC-45, along with A330 commercial freighters, at an EADS North America/Airbus production facility to be constructed in Mobile, Alabama.

"*The KC-45 offers what the Air Force needs today: a modern military tanker that is in production now with deliveries beginning this year*", said Sean O'Keefe, EADS North America Chief executive Officer.

J.-P. S. From Airbus Military Information
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ABOUT THE GMES PROGRAMME

Global Monitoring for Environment and Security (GMES) has been established to fulfil the growing need amongst European policy-makers to access accurate and timely information services to better manage the environment, understand and mitigate the effects of climate change and ensure civil security.
Under the leadership of the European Commission, GMES relies on data from satellites observing the Earth. Hence, ESA – in accordance with the European Space Policy – is developing and managing the Space Component for the initiative. The European Commission, acting on behalf of the European Union, is responsible for the overall initiative, setting requirements and managing the services.
In essence, GMES will help shape the future of our planet for the benefit of all.

Observing our planet for a safer world. (Credit ESA)

Sentinel-1: the first Earth observation satellite for the GMES programme; ESA – Thales Alenia Space contract. (Credit ESA - P. Camil)

Sentinel-2: this satellite will provide systematic global acquisition of high resolution multispectral imaging for GMES. ESA – Astrium contract. (Credit ESA – P. Camil)

THE SPACE COMPONENT

SENTINELS

To ensure the operational provision of Earth-observation data, the Space Component includes a series of five space missions called '**Sentinels**', which are being developed by ESA specifically for GMES. The Sentinel missions include radar and super-spectral imaging for land, ocean and atmospheric monitoring. The first three Sentinels are currently under industrial development.

- **Sentinel-1** is a polar-orbiting, all-weather, day and night radar imaging mission for GMES land and ocean services. The first Sentinel-1 satellite is planned for launch at the end of **2011**.
- **Sentinel-2** is a polar-orbiting, multispectral high-resolution optical imaging mission for GMES land monitoring to provide, for example, imagery of vegetation soil and water cover, inland water ways and coastal areas. It will also provide information for emergency services. The first Sentinel-2 satellite is planned for launch at the end of **2012**.
- **Sentinel-3** is a multi-instrument mission to determine parameters such as sea-surface topography, sea- and land-surface temperature, ocean colour and land colour with high-end accuracy and reliability. The first Sentinel-3 satellite is planned for launch in **2013**.
- **Sentinel-4** is a payload devoted to atmospheric monitoring. It will be embarked upon a METEOSAT Third Generation (MTG) satellite in geostationary orbit which will be launched in **2017**.
- **Sentinel-5** is a payload which will be embarked on a post-EUMETSAT Polar System (EPS) spacecraft. Its launch is expected to take place in 2019. This mission will be devoted to atmospheric monitoring. A Sentinel-5 precursor mission is planned to be launched in **2014**, to avoid data gaps between ENVISAT ('Sciamachy' data in particular) and Sentinel-5.

Sentinel-3: its mission objective is to determine parameters such as sea-surface topography, sea- and land-surface temperature as well as ocean- and land-surface colour; ESA - Thales Alenia Space contract. (Credit ESA - P. Camil)

CONTRIBUTING MISSIONS

Beyond the development of the Sentinel missions specifically developed for GMES, the Space Component also entails the coordination of assets made available by Member States and EUMETSAT known as 'Contributing Missions' to realise a synergic and complete operational system in Europe. These Contributing Missions include both existing and new satellites, whether owned and operated at European level by the EU, ESA, EUMETSAT and their Member States, or on a national basis. Before data from the Sentinel satellites is available, they are going to play a crucial role ensuring that an adequate dataset is provided for the GMES services. It is to be noticed that their role will continue to be essential once the Sentinel are operational by complementing Sentinel data and ensuring that the whole range of observational requirements is satisfied. Contributing Missions are operated by national agencies or commercial entities within ESA's Member States, EUMETSAT or other third parties.

The Space Component – Sentinels + Contributing Missions – constitutes the European contribution to the worldwide Global Earth Observation System of Systems (GEOSS).

GMES Contributing Missions data initially address services for land and ice and also focus on ocean and atmosphere. Current services mainly concentrate on the following **observation techniques**:

- Synthetic Aperture Radar (SAR) sensors, for all weather day and night observations of land, ocean and ice surfaces.
- Medium-low resolution optical sensors for information on land cover, for example, agriculture indicators, ocean monitoring, coastal dynamics and ecosystems.
- High-resolution and medium-resolution optical sensors – panchromatic and multispectral- for regional and national land monitoring activities.
- Very High Resolution (VHR) optical sensors for targeting specific sites, especially in urban areas as for security applications.
- High accuracy radar altimeter systems for sea-level measurements and climate applications.
- Radiometers to monitor land and ocean temperature.
- Spectrometer measurements for air quality and atmospheric composition monitoring.

The acquisition of reliable information and the provision of services constitute the backbone of Europe's initiative. Services will be based on data from a host of existing and planned Earth observation satellites from European and national missions, as well as a wealth of measurements taken in situ from instruments carried on aircraft, floating in the oceans or positioned on the ground.

THE GROUND SEGMENT INFRASTRUCTURE

The GMES multi-mission Ground Segment facilitates the harmonised access and distribution of Earth-observation data and products from all the dedicated Sentinel satellites and Contributing Missions for GMES services. It also comprise the mission control to operate the Sentinel satellites and the payload ground segment to handle data received from the dedicated Sentinel satellites and to elaborate the data into products for GMES Services.

The Ground Segment, which is spread out geographically, relies on existing national public and private facilities and infrastructures that are managed coherently.

GMES data access is coordinated from ESA-ESRIN (Italy)

Since the GMES Space Component includes a complex and evolving constellation of Contributing Missions, it is proposed that each of these missions will provide its own ground segment services.

The Coordinated Data Access System

As part of the GMES Ground Segment, the Coordinated Data Access System (CDS) will ensure the harmonised provision of data from the Sentinels as well as from the Contributing Missions. It will also support the building of the Earth Observation product collections defined within the so-called Data Access Portfolio.

A dedicated GMES Space Component Data Access website has been set up for GMES Services to access Earth Observation data.

SERVICES

GMES is all about products and services. It will provide services for air quality prediction, flood warning, early detection of drought and desertification, early warning of severe weather, oil-spill detection and drift detection, sea-water quality, crop analysis, forest monitoring, land-use change, agriculture and food security, humanitarian aid, etc.

The Services Component of GMES is under the responsibility of the European Commission (except the in situ data Services Component).

Both ESA and the European Commission worked together on building the '**GMES Services Element**' (GSE), through which pre-operational services and products for users were developed and validated. More than 400 users in Europe were gathered through initial GMES Pre-operational Service Development. Most of the original 10 service portfolios have been transferred to the European Commission and become fast track services for five domains:

- **Services for the marine environment** focus on marine safety and transport, oil spill monitoring, water quality, weather forecasting and the polar environment.
- Services for the **land environment** focus on water management, agriculture and food security, land-use change, forest monitoring, soil quality, urban planning and natural protection services.
- **Atmospheric services** focus on air quality ultraviolet radiation forecasting, and climate change studies.
- **Emergency response services** provide help to mitigate the effects of natural and manmade disasters, food, forest fire, earthquakes and humanitarian aid.
- **Security** services provide support for peace-keeping efforts, maritime surveillance and border control.

The GMES in situ Component is based on an observation infrastructure owned and operated by a large number of national and European stakeholders coordinated, in some cases, within the framework of European and international networks. The *in situ* Component is under the responsibility of the European Environment Agency (EEA).

From information data provided by ESA – Living Planet Programme – GMES – www.gmes.info

Atmosphere services - Global pollution map NO_2.

Emergency response services

GMES Partners:

- **ASI** – Italian Space Agency
- **BNSC** – UK Space Agency
- **CDTI** – Industrial Technology Development Centre, Spain
- **CNES** – French Space Agency
- **CSA** – Canadian Space Agency
- **DLR** – German Aerospace Centre
- **EUMETSAT**

Among the latest news

- **28 April 2010:** ESA calls for Sentinel-3 Advisory Group Members.
- **31 March 2010:** ESA has awarded a contract worth €105 million Astrium to build the second Sentinel-2 satellite.
- **31 March 2010:** ESA calls for sentinel-2 Mission Advisory Group members for the Sentinel-2 mission.

CRYOSAT-2 ICE SATELLITE

8 APRIL 2010 : SUCCESSFUL LAUNCH FOR ESA'S CRYOSAT-2 ICE SATELLITE

The CryoSat-2 launch, 8 April 2010.

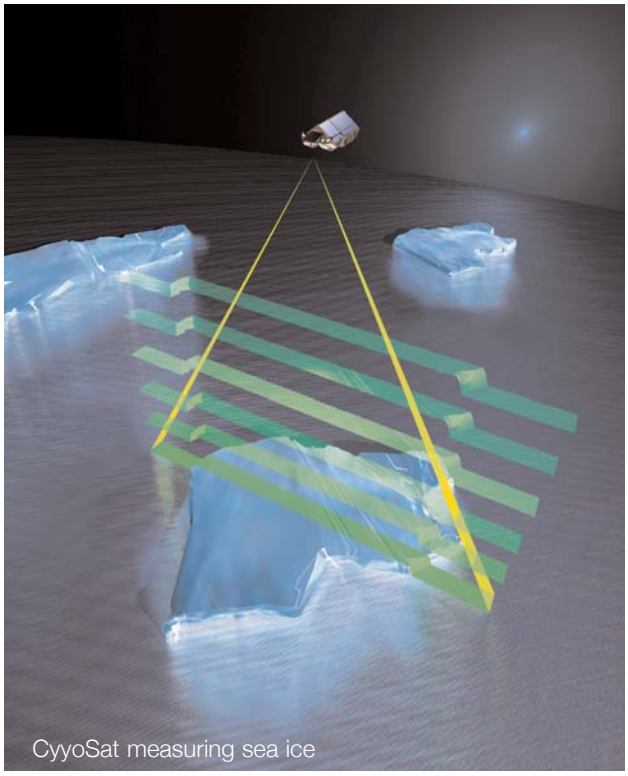
Europe's first mission dedicated to studying the Earth's ice was launched from the Baikonour Cosmodrome in Kazakhstan on 8 April at 13:57 UTC on a Dnepr rocket provided by the International Space Company Kosmotras.

Mission objectives : to measure changes in the thickness of the vast ice sheet that overlie Antarctica and Greenland, as well as variations in the thickness of the relatively thin ice floating ih the polar oceans in order to understand how the volume of ice is changing.

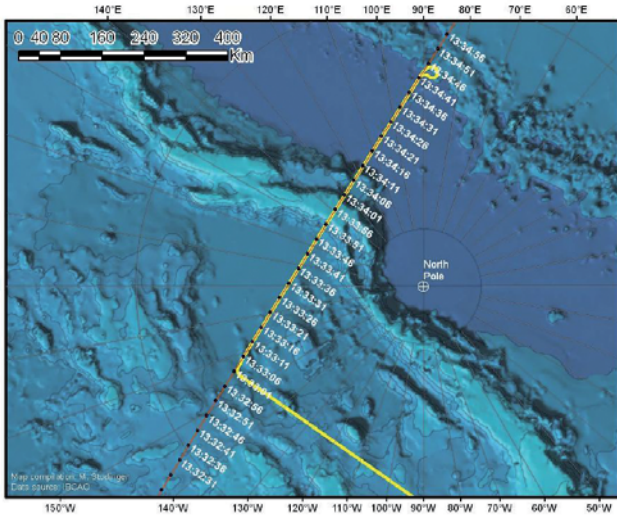
CryoSat-2 is carrying the first radar altimeter of its kind to overcome the difficulties of measuring icy surfaces. The sophisticated SAR/Interferometric Radar Altimeter was developed by Thales Alenia Space.

The CryoSat-2 satellite was built by a consortium led by EADS Astrium. The satellite is in polar orbit, reaching latitudes of 88°. This is closer to the poles than earlier Earth observation satellites, resulting in an additional area of about 4.6 sq km being covered. The combination of the technology onboard and this polar orbit will provide evidence to further our understanding of the relationship between ice and climate.

As early as 11 April, the altimeter was switched on and delivered its first radar echo data.



CyyoSat measuring sea ice



NASA DC-8 underflies CryoSat-2

ESA'S CRYOSAT-2 AND NASA'S DC-8 STAR IN ARCTIC COOPERATION

Taking advantage of NASA's 'Operation Ice Bridge' campaign, measurements of Arctic sea ice have been made from an aircraft flying directly under CryoSat-2's orbital path. These measurements offer a unique opportunity to check the quality of the satellite's data over sea ice.

The NASA campaign uses a DC-8 aircraft carrying the Airborne Topographic Mapping laser, which sends pulses of light in circular scans to the ground. The pulses reflected back to the aircraft are converted into elevation maps of ice surface below.

Since the campaign is being carried out in the Arctic, ESA and NASA seized the opportunity to collaborate by timing one of the DC-8's flights to coincide with CryoSat-2 orbiting above. The DC-8 flew from Thule in north-western Greenland over the Arctic Ocean on 20 April to pass under the satellite orbiting close to the North Pole. The plane took around 750 km-worth of data, which will be compared with the CryoSat-2 observations from space.

It is to be noted that for a satellite mission aimed at providing global maps of ice-thickness change all over the time and down to centimetre level, validation is an essential element of the mission. ESA's next campaign in the Arctic is planned for this summer.

J.-P. S. From ESA information data
www.esa.int/esaEO/

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Among Upcoming European Aerospace Events 2010

1 July • **EDA and EC** – First European High level Unmanned Aircraft Systems (UAS) Conference – Brussels, Belgium. info@eda.europa.eu

11-15 July • **ESA** – 4th International Symposium on Physical Sciences in Space – Bonn Bad Godesberg, Germany. www.esa.int

19-25 July • **FARNBOROUGH INTERNATIONAL AIR SHOW 2010**

20 July-4 August • **Germany** – International Air Cadet exchange (IACE) petra.drews@dglr.de

27 July-5 August • **ESA** – Summer School Alpbach 2010: 'New Space Missions for Understanding Climate Change' - Alpbach, Austria. www.esa.int – michaela.gitsch@ffg.at

27-28 July • **RAeS** – Applied Aerodynamics Conference; Capabilities and Future requirements – Bristol, UK www.aerosociety.com/conference – conference@aerosociety .com

31 August-2 September • **DGLR** – 59th German Aeronautical and Astronautical Congress **Hamburg, Germany** petra.drews@dglr.de

5-7 September • **ESA** – 3rd International Workshop on Analogue and Mixed Integrated Circuits for Space Application (AMISCA 2010) – ESTEC, Noordwijk, NL. www.esa.int

7-9 September • **ERF/3AF** - 36th European Rotorcraft Forum – **Paris, France** lisa.gabaldi@aaaf.asso.fr www.erf2010.org

8-9 September • **EASA** – International Air Safety Climate Change Conference – Cologne, Germany. The objective will be: (i) to raise awareness on the issue and outline a possible action plan; (ii) to provide a forum for meteorologists, operators, manufacturers and regulators to identify risks and work towards effective safety measures. Cologne, Germany. IASCC@easa.europa.eu

13-17 September • **ESA/ESTEC** – 7th ESA Round Table on Micro and Nano Technologies for Space Applications & CANEUS 2010 – International week on MNT - ESTEC, Noordwijk, NL. www.esa.int

16 September • **RAeS** - Reducing Maintenance Costs through Innovation – Airworthiness & Maintenance Conference, Cranfield, UK. www.aerosociety.com/conference

19-24 September • **ICAS**, hosted by 3AF – 27th Congress of the International Council of the Aeronautical Sciences (ICAS) **Nice, France** – secr.exec@icas.org – lisa.gabaldi@aaaf.asso.fr – www.icas.org

20-24 September • **EUMETSAT** – Meteorological Satellite Conference – Cordoba, Spain. conference-organisation@eumetsat.int

21-23 September • **ESA** – Workshop on Tracking, Telemetry and Command Systems for Space Applications – ESTEC **Noordwijk, NL** www.congrex.nl/10a07/

22-23 September • **RAeS** – The Global Market Place: Challenges for Flight Crew Training – Annual 'FCT' Conference. www.aerosociety.com/conference

28-29 September • **RAeS** – 4th European Flight Test Safety Workshop – Flight Test Conference. www.aerosociety.com/conference

28-29 September • **EASA** – European Commercial Aviation Safety Team (ECAST) – Plenary Session – Cologne, Germany. www.easa.europa.eu – Heidi.kammer@easa.europa.eu

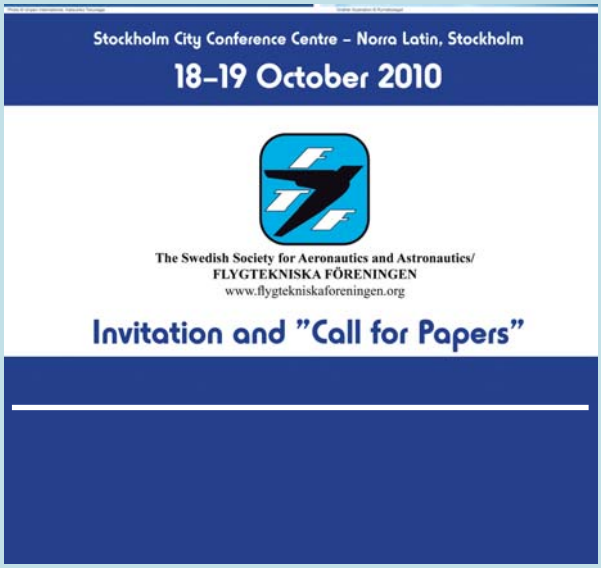
Among Upcoming European Aerospace Events 2010

4-8 October • **ICSO – ICSO 2010** – International Conference on Space Optics – **Rhodes Island, Greece** www.congrex.nl/10A02/

13-15 October • **ESA** – 4th International Workshop on System & Concurrent Engineering for Space Applications – SECESA 2010 – Lausanne, Switzerland. www.esa.int

15 October • **RAeS** – Women in Aviation & Aerospace – Conference. www.aerosociety.com/conference

18-19 October • **FTF** – 7th Swedish Aeronautical Congress 'Flygteknik 2010' – Aerospace Technology 2010 – Aerospace Industry 2020-2040: What we do today? The Congress is arranged for the seventh time by the Swedish Society for Aeronautics and Astronautics (SSAA) in co-operation with the Royal Academy for Engineering Sciences and the Swedish Mechanical Engineers Society - Stockholm City Conference Centre – Norra Latin - Stockholm, Sweden. www.flygtekniskaforeningen.org



20 October • **RAeS** – Joint Greener Aviation by Design & Propulsion Conference **London, UK** www.aerosociety.com/conference

26-28 October • **RAeS** – 2010 Aircraft Structural Design Conference. www.aerosociety.com/conference

28-29 October • **ESA** – 2nd International Workshop on On-Board Payload Data Compression – OBPDC 2010 – CNES/Toulouse, France. www.esa.int

10-11 November • **RAeS** – Unmanned Air Systems Conference – **London, UK** www.aerosociety.com/conference

17-18 November • **RAeS** – General Aviation Group Conference. www.aerosociety.com/conference

23 November • **RAeS** – Autumn Flight Simulation Group Conference. www.aerosociety.com/conference

29 Nov. - 3 december • **AEROWEEK** – Brussels, Belgium. www.asd-europe.org

1st Dec. -2nd December • **CEAS/ASD Conference - Aerospace for Europe: more than just flying** – Conrad Hilton Hotel, Avenue Louise 71, Brussels, Belgium. See details page 24 www.asd-ceas2010.eu

8-10 December • **5th ESA Workshop on Satellite Navigation Technologies** – ESTEC – Noordwijk, NL – www.esa.int

15-16 December • **EASA** – European Commercial Aviation Safety Team (ECAST) – Plenary Meeting – Cologne,Germany. Heidi.kammer@easa.europa.eu

First Announcement

ASD/CEAS Conference 2010

www.asd-ceas2010.eu

Brussels, 1–2 December 2010

AEROSPACE FOR EUROPE – MORE THAN JUST FLYING

The key objective of the conference is to present and discuss the strategic issues facing European Aerospace in the light of the economic and environmental realities of the day, as well as the challenges and opportunities posed by the European political choices as the Union charters its way ahead for the next decade.

Aerospace drives innovation in science and technology, providing technology transfers and spill-over benefits to a variety of other economic sectors. Beyond its socio-economic importance, the aerospace sector is a powerful driver of European integration and can be considered as a vital part of the EU economy. But in the face of growing challenges stemming from climate change, much more needs to be done.

The skills and competences of its workers are a major component of EU's productivity, sustainability and innovation. In recent years however, there has been a marked decrease in interest in scientific studies among young people, resulting in a worsening mismatch between the needs for new skilled engineers and technicians, and the number of graduates provided by the education system. Public authorities, educational establishments and industry must join forces to reverse the trend.

These are some of the main topics to be discussed at the Conference, which is an integral part of the forthcoming **ASD Aero Week** (29 November – 3 December 2010). In order to do this, the ASD/CEAS will bring together representatives of EU institutions, national governments, non-governmental agencies, industry, research institutes, financial community and the media.

More information, Registration and an update on the programme will be available on our webpage **(www.asd-ceas2010.eu)**. The conference registration fee will include the attendance of the whole conference, lunch on the first day and all coffee breaks and the Conference.

	Registration until 15 October	Normal
Members of CEAS or ASD	500,00 Euro	600,00 Euro
Non-Members	550,00 Euro	650,00 Euro
EU Institutions	150,00 Euro	150,00 Euro
Students	tbd	tbd

English will be the official language at the ASD/CEAS 2010 Conference. There will be no simultaneous translation.

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