



The Quarterly Bulletin of the

# CEAS

COUNCIL OF EUROPEAN AEROSPACE SOCIETIES

3AF-AIAE-AIDAA-CzAeS -DGLR-FTF-HAES-IIK-NVvL-PSAA-RAAA-RAeS-SVFW-TsAGI-VKI



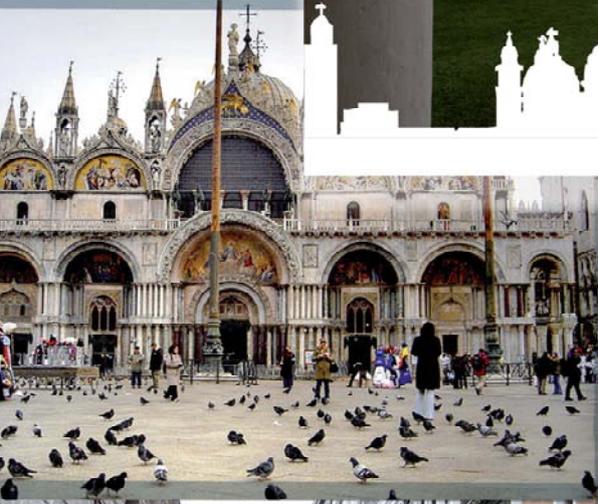
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**CEAS 2011 AIDAA**  
FLYING TO THE FUTURE

The International Conference of the European Aerospace Societies

**Venice**  
**24 - 28 October**



- THE THIRD CEAS EUROPEAN AIR & SPACE CONFERENCE "FLYING TO THE FUTURE" WILL TAKE PLACE FROM 24 TO 28 OCTOBER 2011 IN VENICE AT GIORGIO CINI FOUNDATION.
- OBJECTIVE: TO PROMOTE CO-OPERATION AND KNOWLEDGE DISSEMINATION BOTH IN AIR AND SPACE APPLICATIONS, IN CIVIL AND MILITARY CONTEXTS.



## 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 14 Member Societies: 3AF (France), AIAE (Spain), AIDAA (Italy), CzAeS (Czech Republic), DGLR (Germany), FTF (Sweden), HAES (Greece), IIK (Finland), NVvL (Netherlands), PSAS (Poland), RAAA (Romanian Aeronautical & Astronautical Association), RAeS (United Kingdom), SVFW (Switzerland), TsAGI (Russia) and EUROAVIA, VKI ((Von Karman Institute, Belgium).

Following its establishment as a legal entity conferred under Belgium Law, this association began its operations on January 1<sup>st</sup>, 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](http://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 Aeronautical Journal
- CEAS Space Journal
- CEAS Quarterly Bulletin

### 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 2011:

President: [Pierre Bescond](#)  
[pierre.bescond@laposte.net](mailto:pierre.bescond@laposte.net)

Vice-President, Finance: [Pierre Bescond](#)

Vice-President, Publications and External Relations: [François Gayet](#)  
[gayet.transitions@orange.fr](mailto:gayet.transitions@orange.fr)

Vice-President, Awards and Membership: [Kaj Lundahl](#)  
[klundahl@bredband.net](mailto:klundahl@bredband.net)

Director General: [Ms Mercedes Oliver Herrero](#)  
 (including Financial Management)  
[Mercedes.Oliver@military.airbus.com](mailto:Mercedes.Oliver@military.airbus.com)

Chairman of the Aeronautics Branch: [Christophe Hermans](#)  
[christophe.hermans@nlr.nl](mailto:christophe.hermans@nlr.nl)

Chairman of the Space Branch: [Constantinos Stavriniadis](#)  
[constantinos.stavriniadis@esa.int](mailto:constantinos.stavriniadis@esa.int)

Chairman of the Programme Coordination Committee: [François Gayet](#)

Editor-in-Chief of the Quarterly Bulletin: [Jean-Pierre Sanfourche](#)  
[jpsanfourche@dbmail.com](mailto:jpsanfourche@dbmail.com)

Quarterly Bulletin, Design & Page Setting  
[Sophie Bougnon](#)  
[soboo@club-internet.fr](mailto:soboo@club-internet.fr)

# EDITORIAL

## THE CEAS: THREE NEW SERVICES



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

**T**hree new services from the CEAS are presently being offered – the Aeronautical Journal, the Space Journal and the Aerospace Events Calendar – which demonstrates the vitality of our organisation.

Some years ago, the CEAS Member Societies took the decision, under the leadership of the German Aerospace Centre (DLR) and of the European Space Agency (ESA), to launch with Springer, two aerospace science and technology oriented publications: the CEAS Aeronautical Journal on the one hand, the CEAS Space Journal on the other.

As Dr Joachim Szodruch said: “[...] *the increasing co-operation within the European scientific environment and the merging of various organisations, specifically in the industry, have stimulated the need to reduce fragmentation and to create a powerful European scientific journal.*”

The first issue of the Aeronautical Journal has recently appeared and is presented in this bulletin whilst the first issue of the Space Journal is following within the next few weeks. So, the CEAS accedes now to the rank of “Learned Society”, providing worldwide high-level information on aerospace technology, engineering and science. Scientists and engineers belonging to the Member Societies will henceforth be permanently encouraged to submit appropriate papers to these journals, from which they will get recognition: a movement has been launched, it must be (and it will be) maintained and even amplified.

*The Aerospace Events Calendar* is being developed by the CEAS in co-operation with the AeroSpace & Defence Industries Association in Europe (ASD). Combining in a single and user-friendly Website the main worldwide upcoming aerospace events organised by Institutions, Industry and Academia, its aim is to facilitate searches for various categories of events – Conferences, Air Shows, Workshops, Lectures – programmed at -short and medium-term time horizon. An advanced search engine can select the events accor-

ding to specific topics and keywords, allowing the user to delimit the field of search. Thanks to this tool, it will be possible to rationalize the programming of the future events by avoiding overlaps and redundancies, but on the contrary suggesting possible co-operations and synergies between the organisations concerned with a given subject.

The success of an association is based upon the tangible services it is able to provide to its members: the achievements herein presented give us cause to think that we are moving in the right direction.

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## THE 37<sup>TH</sup> TRUSTEES BOARD MEETING

The 17<sup>th</sup> Trustees Board Meeting was held on 23 June at the Aéro-Club de France in Paris.

### • Welcome

Mr Pierre Bescond, CEAS Chairman, welcomed all the attendees and particularly Prof. Ion Fuiorea, trustee of the Romanian Association for Aeronautics and Astronautics (RAAA), our 16<sup>th</sup> Member Society, as well as Mr Simonov who attended on behalf of TsAGI.

He informed that many people had contacted him, showing their intention to approach the CEAS.

### Programme Coordination Committee (PCC)

Mr Jean-Pierre Sanfourche (CEAS) and Mr Marc de Champs (ASD) presented the preliminary design of the future Conference Programming Management Information System – **CPMIS** –, making an on-line demonstration and commenting its main features. The search is based upon categories and keywords that will be reviewed after the first year of use. This presentation was positively received by the Board members.

A prototype was presented at the CEAS Strategy and Policy meeting which took place on 7 September in Paris and it is expected that the operational tool will be available at the time of the Venice CEAS Conference in the end of October.

### Co-operations

- Two actions are in course: (i) contact with India for a possible co-operation; (ii) preparation of a potential Memorandum of Understanding with Japan.
- Mr Klaus Dannenberg, Deputy Executive Director and Chief Strategy Officer of the AIAA, joined the meeting to confirm the official AIAA-CEAS agreement on the European Acoustics Conference organisation principles by the Aero-acoustics Specialists Committee (ASC). The next ASC Conference in Europe will take place in Berlin in 2013. An extension of the ASC MoU signed in 1996 is under preparation: the new version is going to be signed in next September.

### Aeronautics Branch Report

Dr Christophe Hermans highlighted the most relevant activities of the Technical committees and in particular the following ones:

- *Aero-acoustics* (chairman: Daniel Juvé). The 17<sup>th</sup> AIAA/CEAS Aero-acoustics Conference was held on 6-10 June 2011 in Portland, Oregon. The 15<sup>th</sup> CEAS ASC workshop will take place in Lausanne on 13-14 October 2011; it will deal with the topic: "Acoustic Liners and Associated Propagation Techniques".
- *Rotorcraft* (chairman: Christophe Hermans). The European Rotorcraft Forum (ERF) held in Paris in September 2010 was very successful. The preparation of

ERF 2011 is in process of completion: Versiate, 13-15 September.

- *Systems-Avionics* (chairman: Robert Luckner). The first CEAS EuroGNC Conference held in Munich on 13-15 April 2011 was a success. A summary of this event is published in the present issue (pp. 6-7), the revised conference papers have been published by Springer. It is to be noticed that the Technical Committee membership comprises both Aeronautics and Space experts.
- Two new Technical Committees are created:
- GNC (Guidance, Navigation and Control);
  - IFASD (Internal Forum of Aero-elasticity and Structural dynamics).

### Space Branch Report

Dr Constantinos Stavriniadis distributed the updated list of Technical Committees including a detailed description of each of them, together with their chairmen's and members' names. All CEAS Member Societies are invited to communicate to him the names and coordinates of the persons who might be interested.

### CEAS 2011 Air & Space Conference, Venice 24-28 October

On 23 June, 290 paper abstracts had been received and the selection process (220 selected) was already completed.

A dedicated *Forum Day* has been agreed with E-CAERO/ECCOMAR.

Constantinos Stavriniadis presented a proposal for Space Plenary Events. This proposal is being included in the Final Programme.

### Awards



It was decided to award Dr Otto Sensburg with a silver plaque to mark our recognition for the outstanding contribution of the IFASD creation and development.

Dr Sensburg, an eminent aero-elasticity and structural dynamics engineer who spent all his professional life in MBB, lately DASA and today EADS, is one of the original organisers of IFASD in 1981, and he has been member of the IFASD Programme Committee until now.

The presentation ceremony took place in Paris during the 15<sup>th</sup> IFASD Forum, Paris 26-30 June, more precisely on the occasion of the 30<sup>th</sup> IFASD Anniversary Cocktail on 27 June.

### Finances

Ms Oliver-Herrero presented and commented the Finance Report dated 23 June 2011.



### Next meetings

- 26 October 2011, Venice: PCC meeting, 7<sup>th</sup> General Assembly and 18<sup>th</sup> Board Meeting.
- February 2012, location still to be decided: PCC Meeting, 19<sup>th</sup> board Meeting.

27 June 2011, Paris: Mr Pierre Bescond, CEAS President, is presenting the IFASD Award to Dr Otto Sensburg.  
Photo 3AF

## THE CEAS AERONAUTICAL JOURNAL IS BORN

The first issue of the CEAS Aeronautical Journal has been published in the end of August: CEAS Aeronautical Journal, Vol. 1, Issue 1. You can find it on its Website, which is hosted by Springer, applying the following sequence:

[www.springer.com](http://www.springer.com) > welcome to Springerlink > CEAS Aeronautical journal vol1 issue 1.

This new publication is presented by Joachim Szodruich in his Editorial.



### Editorial

Joachim Szodruich

Published online: 16 August 2011  
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With this first issue of the all-new CEAS Aeronautical Journal the Council of European Aerospace Societies (CEAS) is proud to offer scientists and engineers in Europe and around the world a first-class journal for the publication of their high-quality research, technological and developmental results. The CEAS would like to thank the German Aerospace Center (DLR) for creating this journal, thus realising a new milestone in European scientific publications.

In the past decades Europe has produced a number of various journals offered in different nations and organisations. However the increasing cooperation within the European scientific environment and the merging of various organisations, specifically also in the industry, have stimulated the need to reduce fragmentation and to create a powerful European scientific journal. The CEAS member societies started to push for a new common approach some

years ago. As a matter of fact it was an early decision to cover the entire field of aerospace and therefore under the leadership of the DLR and ESA (European Space Agency), two new journals were launched with Springer, the present aeronautical one and in parallel the "CEAS Space Journal".

Over the past two or three decades the European research and technology base has not only moved closer together but developed into a worldwide top-class scientific community in terms of its quality and quantity. In order to secure and further develop these achievements an independent approach to scientific publications is required. Conserving know-how, generating synergy effects, promoting scientific communication, and stimulating a broader understanding of scientific and engineering work were some of the main reasons for creating this journal. With the intention of providing broad and interdisciplinary coverage of aeronautical topics, the journal is a mandatory contribution to Europe's high-quality aeronautical research, technological and developmental environment. As an example this first issue predominantly focuses on helicopter topics, a highly successful and competitive research, engineering and industrial sector in Europe.

All who contributed and were engaged in realising this first issue can be proud of the results. I would like to thank everyone involved but can only mention a few here: first Mrs. Silvia Schilgerius from Springer for her positive attitude and our many fruitful discussions, secondly the commitment of the initial Editor-in-Chief Prof. Andreas Dillmann from the DLR as well as the Managing Editor Dr. Hans-Peter Kreplin, the entire Editorial Board and the many Field Editors, all of whom accepted the task without hesitation. The support of all the members of the Board of the CEAS was essential and is highly appreciated.

J. Szodruich (✉)  
Thelsys GmbH Blohmstrasse 12, 21079 Hamburg, Germany  
e-mail: Joachim.Szodruich@thelsys.de

# THE FIRST CEAS SPECIALIST CONFERENCE ON AEROSPACE GUIDANCE, NAVIGATION AND CONTROL “CEAS EUROGNC 2011”

By Philip Nickenig  
Secretary General of the DGLR

FROM 13 TO 15 APRIL 2011, THE FIRST CEAS SPECIALIST CONFERENCE ON AEROSPACE GUIDANCE, NAVIGATION AND CONTROL SO CALLED “CEAS EuroGNC 2011” TOOK PLACE IN THE TECHNICAL UNIVERSITY MUNICH, GARCHING. THIS EVENT WAS A SUCCESS: AS A MATTER OF FACT, THE FEEDBACK WE OBTAINED WAS GENERALLY POSITIVE, WITH THE CONFERENCE SCOPE HIGHLIGHTING THE SYNERGIES BETWEEN AERONAUTICS AND SPACE ON THE APPLICATIONS AND BETWEEN GUIDANCE, CONTROL AND NAVIGATION ON THE METHODOLOGY’S SIDE.

After the opening speeches delivered by Philip Nickenig, Secretary General of the DGLR and Prof. Dr Florian Holzapfel, representing the Organising Committee, Mr. Alfred Lief, EADS Deutschland GmbH, presented a keynote about the challenges of leadership, control and navigation of unmanned aerial vehicles from the Cassidian’s point of view.



Mr Alfred Lief, Cassidian, delivering his opening speech.  
Photo DGLR

## More than 120 delegates

Within the framework of 18 technical sessions, 58 contributions were presented, which were followed by more than 120 delegates coming from Europe, Japan, Singapore, China, Russia, USA and Canada.

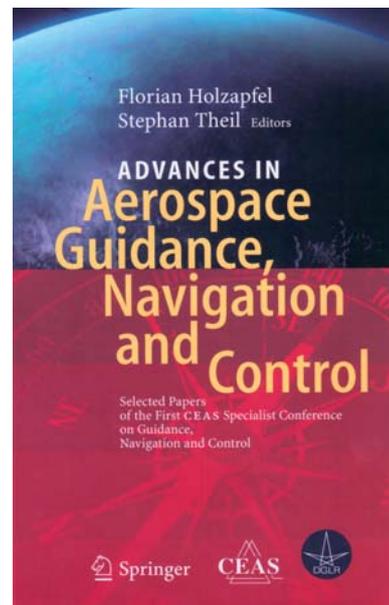
## Two parallel sessions

The concept of bringing together in a Joint Venture Flight Guidance and Control with Navigation on the one hand, and Aviation and Space on the other hand, was as expected very well received. In effect this combination corresponds to the natural professional orientation and the common interests of the relevant professional community. Thereby the format - two parallel sessions - was defined: Guidance & Control next to Navigation and Aeronautics next to Space.

## Main topics

Among the most important themes which were dealt with: trajectories, fault-tolerant algorithms, adaptive control, wind estimation, inertial navigation, vision-based navigation, attitude determination for spacecraft and sensor data fusion, missile dynamics and control, lunar landing. A special session dealt with the project “LAPAZ”, an optionally manned flight system demonstrator based on the Stemme S15 (Stemme AG is a German glider manufacturer – S15 is a prototype UAV).

## Selected Papers of the First CEAS Specialist Conference on Guidance, Navigation and Control



Selected conference papers that had been run through the two-stage review process successful, were published in a ‘Springerbuch’ (ISBN 978-3-642-19816-8), which was already handed over to the registered participants, which also had online access to all papers ahead the conference, which led to very positive feedback.

For this conference, the International Technical Committee established a formal review process. At the end of the review process papers were selected for publication in the book edited by Springer “Avances in Aerospace Guidance, Navigation and Control” (474 pages, see cover page here above). All submitted papers were assigned to one of the areas:

- atmospheric applications;
- guidance and control;
- sensors, data fusion and navigation;
- space applications.

## The State Reception in the Emperor's Hall of the Munich Residence: a highlight of the Event

A highlight of the GNC Conference was the State Reception hosted by the Secretary of the Bavarian State Ministry for Economic Affairs, Infrastructure, Transport and Technology, Ms. Katya Hessel, on the evening of the 13<sup>th</sup> April in the Imperial Hall of the Munich Residence. The chief Undersecretary of the Department VIII (Innovation, Research, Technology), Dr. Ronald Merz, whose area of expertise also includes Aerospace, highlighted the importance of the subject areas covered in the CEAS Conference for the Bavarian region. Pierre Bescond, President of the CEAS, who had travelled from France for the event, and DGLR President Detlef Müller-Wiesner presented the spirit of the CEAS in a very authentic and inspiring way.

### What will happen next?

Overall, the response to the entire conference event was consistently positive. The restriction to two parallel sessions as well as the cut on aerospace and flight management / control and navigation found good acceptance. The main result can be reported from the following conference held, the first plenary session of the Technical Committee second EuroGNC 2013 will be held in Delft. The goal of a further continuation of the European conference in GNC is reached. In addition, all members of the Conference Committee explained their willingness to engage in the longer term for the project. The offer, as CEAS Specialists' Committee to represent the area permanently GNC, was forwarded to CEAS President Bescond. CEAS - the "Council of European Aerospace Societies" ([www.ceas.org](http://www.ceas.org)) provides the National Aeronautics and Space Agencies in Europe, a common platform for cross-border implementation of common interests. An intended target is to support the scientific and technical exchanges within disciplines, such as through dedicated conferences and technical committees. To grow, this idea needs the initiative of its members.

Examples are the aero-acoustics and the activities in the field of helicopter as success stories for joint European activities under the umbrella of the CEAS. The European Rotorcraft Forum or the AIAA / CEAS Aeroacoustics Conference are events with great international appeal. In this sense, the goal of EuroGNC is to create an annual European complement to the "AIAA Guidance, Navigation, and Control Conference" taking place in North America during autumn season. There are mainly working professionals active in the fields of GNC researchers, scientists and engineers – this results in the immediate need to keep fees as low as possible.

At this point it seems appropriate to mention particular thanks to the DGLR. Under its former general secretary Peter Brandt and the former president Joachim Szodruch the German Society agreed to take over the organizational and financial risk for the first attempt. DGLR representative Robert Luckner and his CEAS correspondent accepted the idea, so that the new conference enjoyed the support of the parent company from the beginning on. We also thank the AIAA, which agreed to act as an official co-sponsor for the conference. Special thanks to the sponsors BavAIRia, Eurocopter, MBDA, Astrium and especially the main sponsor Cassidian. You made it possible by your donations, to give the event an attractive framework despite the low enrollment fee. Their stands outside the lecture rooms variegated the conference.

In addition to the national organizing committee consisting of Joerg Ditttrich, Walter Fichter, Stephan Theil, Robert Luckner, Philip Kramer and Florian Holzapfel, a special mention has to be addressed to the event organisers, Brigitte Beck, Peter Brandt, his successor Philip Nickenig, Petra Drews and Carsten King (AIAA), who assumed the full organizational responsibility brilliantly. The two-stage review process for the technical committee was supported by numerous volunteers: CEAS Member Societies, and also USA, Canada and Israel. Thanks to them!

The first CEAS EuroGNC has managed to lay a foundation to stimulate the spirit of the CEAS, European and international cooperation for the advancement of aeronautics and astronautics, so it might flourish.

See you again in 2013 in Delft for the "CEAS Specialist 2<sup>nd</sup> Conference on Aerospace Guidance, Navigation, and Control".



The highlight event of the CEAS EuroGNC Conference was the State Reception in the Imperial Hall of the Munich Residence. Photo DGLR

## PREPARING FOR THE FUTURE OF SPACE SITUATIONAL AWARENESS (SSA) SHARING

By James D. Rendleman, Member, AIAA International Activities Committee Colorado Springs, Colorado, USA



James D. Rendleman

Growth in the numbers of space objects in Earth orbits is leading to significant safety of flight concerns for the global space community (See Figure 1). Velocities for space objects are significant, especially in low earth orbit, so even small objects, some as small as a paint chip, can damage other objects they impact (See Figure 2). Given space traffic growth, risk management is both a challenge and a significant concern to those who hope to peacefully leverage the benefits of the capabilities enabled by space systems. (See Figure 3)

The global space-faring community has taken a number of important steps to cooperatively fight the risks associated with orbital crowding. These include developing improved launch safety and debris mitigation standards among space operators. These informal efforts have been documented by the UN Inter-Agency Space Debris Coordination Committee (IADC), an advisory body composed of representatives of national space agencies. The IADC focuses on exchanging information and facilitating cooperation on space debris research, mitigation options, and best practices. The committee involves 11 governmental agencies; the United States (U.S.) is represented by NASA. Participating nations develop their own standards, regulations, and laws relating to space debris mitigation

efforts. In addition, the International Organization for Standardization (ISO), a non-governmental federation of national standards bodies of 149 countries, established an Orbital Debris Coordination Working Group in 2003. The Working Group has several standards projects addressing space debris mitigation, disposal of satellites operating at geosynchronous altitude, and prevention of the break-up of unmanned spacecraft.

Leading space debris analysts conclude that the new operational procedures have slowed the growth in orbital debris, but “these procedures have not been adequate to prevent growth in the debris population from random collisions... A more focused collision avoidance capability may help, but without adherence to current guidelines and an active debris removal program, future spacecraft operators will face an increasing orbital debris population that will increasingly limit spacecraft lifetimes.”<sup>1</sup> Successful collision avoidance activities and active debris removal proposals are dependent on a good understanding of the orbital environment provided through space situational awareness (SSA) capabilities.

The U.S. National Space Policy, released on 28 June 2010, significantly expands its emphasis on space debris compared to past versions of the policy. The policy sets as a goal: “Strengthen stability in space through: domestic and international measures to promote safe and responsible operations in space; improved information collection and sharing for space object collision avoidance; ...and strengthening measures to mitigate orbital debris.”<sup>2</sup> Consistent with this policy, the U.S. Department of Defense (DoD) gives authorized non-U.S. government-affiliated entities access to space surveillance information developed from the data collected by the its Space Surveillance Network (SSN) under the auspices of its SSA Sharing Program. The SSN is a global network of optical telescopes and radars. Information and services provided through the program are

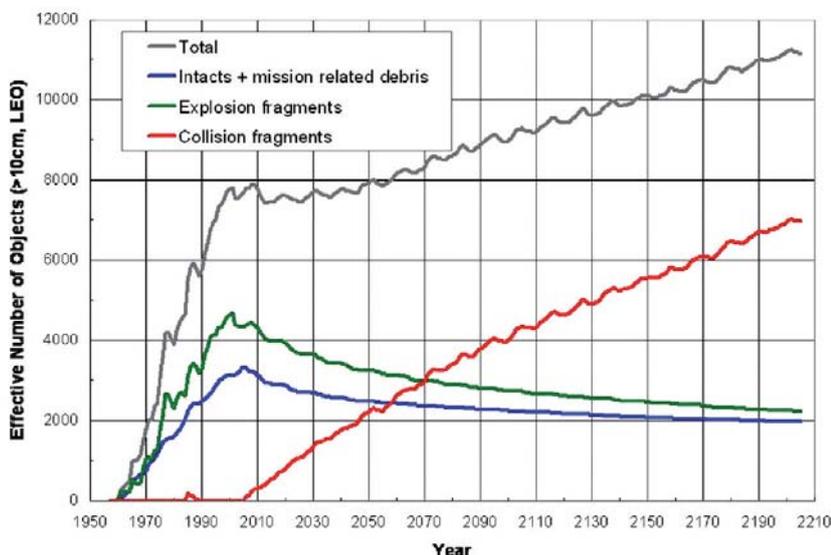


Figure 1: The plotted NASA projection of orbital debris population increases assumed no launches of any spacecraft after 2006. Graphic: NASA.

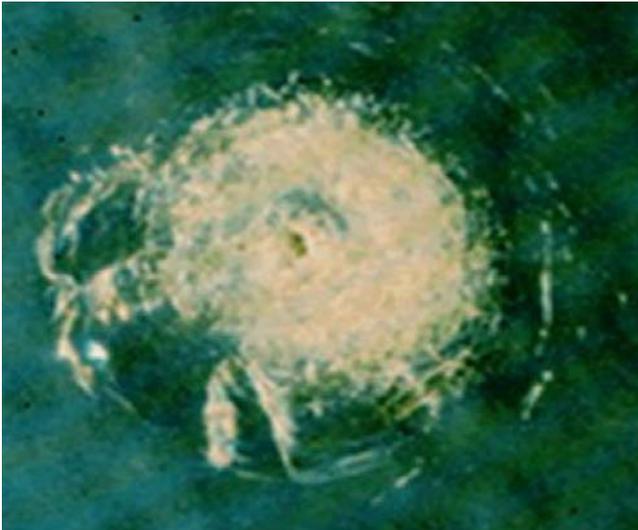


Figure 2: Even tiny debris can do significant damage. The pictured crater in a Space Shuttle Window is from a 0.2 mm paint chip. Photo: NASA.

made available through the US Strategic Command's (USSTRATCOM) Joint Space Operation Center (JSpOC) and its space-track.org website.

The SSA Sharing Program provides emergency notifications where the JSpOC analyzes and concludes there may be a risk of collision from a close approach. It then works hard to notify the affected satellite operator or government of the risk.<sup>3</sup> In the event of a close approach that involves an enhanced risk of collision, the JSpOC conducts a more in-depth analysis. It attempts to warn owner/operators of danger 72 hours before close approaches.<sup>4</sup> While intimately involved in warning of pending conjunctions, JSpOC does not decide whether or not any proposed collision avoidance maneuver is justified, nor does it direct that one be executed by a non-DoD satellite. Those decisions are made by each owner/operator, who conducts a cost-benefit analysis, balancing the risk of collision against the dis-

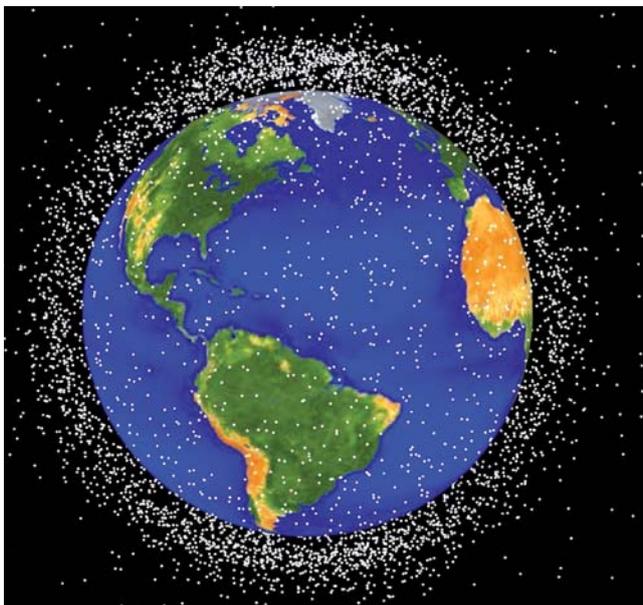


Figure 3: As more satellites are launched, space is getting crowded. SSA Sharing will be vital to collision avoidance activities. Image: NASA

ruption in mission and cost in propellant and other resources associated with the avoidance maneuver.

The space-track.org website provides unclassified space surveillance information on the current and historical orbital positions of man-made space objects while also providing some minimal analysis on future potential collisions. Requesters seeking SSA Sharing Program services must enter into a bilateral User Agreement with USSTRATCOM before requesting launch support, conjunction assessment, and permission to redistribute two-line elements (TLEs<sup>5</sup>) and analysis provided through the program.<sup>6</sup> The services are currently provided at no cost to users.

Consumers of the SSA Sharing Program information do not get everything the JSpOC tracks, however. The JSpOC also maintains a separate catalog commonly referred to as *the High Accuracy Catalog*. Using its enhanced special perturbation (SP) techniques and covariance data, space object positions are much more precisely known. *The High Accuracy Catalog* is used to support many U.S. national security space control and spaceflight safety tasks, including conjunction assessment and re-entry prediction. The United States has engaged in internal discussions related to providing wider access to *the High Accuracy Catalog*. Consistent with the 2010 U.S. National Space Policy, it is seeking to reconcile the need to help "coordinate global space traffic management" and a "natural disinclination of the military to make public what is still considered strategically sensitive information."<sup>7</sup>

### Evolving Global SSA capabilities

Many non-U.S. countries and commercial entities perform SSA activities, notably Russia, China, Japan and France. In addition, the European Space Agency (ESA) is developing its own capacity under the *European SSA Programme*.<sup>8</sup> The Center for Space Standards and Innovation (CSSI), the research arm of Analytic Graphics, Inc. (AGI), provides SSA services. CSSI operates the satellite tracking web site, CelesTrak, which redistributes TLEs and information from the DoD's Space Track website with added value, and then supplements it with its own data and analysis, including lists of satellite constellations and a list of active satellites.<sup>9</sup> CSSI also offers a service entitled Satellite Orbital Conjunction Reports Assessing Threatening Encounters in Space (SOCRATES). SOCRATES provides information on pending orbital conjunctions during a coming week, including assessment of conjunction specific systems, listing top ten conjunctions by maximum probability and minimum range, and visualization of the conjunction scenarios.<sup>10</sup> CSSI uses SOCRATES to engage in close partnerships with commercial GEO belt satellite operators. Member commercial operators provide orbit data in confidence to CSSI. CSSI then provides continuous vigilance of close approaches, including threat warning to the participating operators.<sup>11</sup> A number of low earth orbit (LEO) satellite owner/operators also work with CSSI to obtain SOCRATES-based services. These services support operations of over 100 satellites.<sup>12</sup>

A separate SSA observation program, the *International Scientific Optical Network (ISON)*, describes itself as a “scientific project”<sup>13</sup> and it was initiated by the Keldysh Institute of Applied Mathematics and the Pulkovo Astronomical Observatory of the Russian Academy of Sciences.<sup>14</sup> The project now involves cooperation started among entities in Great Britain, ESA and Switzerland. ISON obtains its data with a network of 25 optical telescopes located at 18 facilities in 9 nations around the world.<sup>15</sup>

The *Space Data Association (SDA)* was formed in 2009 by the world’s three largest commercial satellite companies: Inmarsat, Intelsat, and SES.<sup>16</sup> Leveraging the experience and capacity, particularly with SOCRATES, AGI was selected competitively to design and operate SDA’s Space Data Center (SDC). Under this commercial initiative, SDA collects, standardizes, and shares orbital and radio frequency information with its members.<sup>17</sup> According to SDA, its program provides “an automated space situational awareness (SSA) system designed to reduce the risks of on-orbit collisions and radio frequency interference. It is the satellite industry’s first global operator-led network for sharing high-accuracy operational data to improve overall space situational awareness and satellite operations. Built on AGI’s commercial software, the SDC will provide SDA members networked access to operational capabilities through a service-oriented architecture. The SDC will automatically ingest and process operator-supplied orbital data; perform conjunction assessments; and generate automated warning alerts. It will also support avoidance maneuver planning, RFI mitigation and data sharing.”<sup>18</sup>

SDA is presently engaged in dialogue with the DoD’s SSA Sharing Program, as well as ISON and the European SSA Programme, about potential data-sharing partnerships and collaboration.

## The future

Global interests to ensure the safety of space operations and economic considerations are tipping the balance toward sharing more data. However, facilitating exchange of information concerning satellite positions and velocity, while safeguarding a country’s national security or corporate proprietary interests, will generate some tension. Most nations want to protect attributes, vulnerabilities, and maneuver capabilities of their national security satellites systems. Similarly, most commercial operators desire to limit exchanges of information that could give competitors insight into sensitive proprietary information relating to the capabilities, health, and life of their satellites. Identifying the most important data to protect should lay the groundwork for what kind of data can and should be exchanged, and span the gaps necessary to share data that heretofore has been protected.

The DoD has boasted that its SSA Sharing Program will be expanded.<sup>19</sup> Such an expansion will be made only when consistent with operational constraints. Indeed, SSA sharing cooperation presents tremendous opportunities to develop dependencies among nations that may obviate conflict. Such cooperation may foster improved understanding, and, indeed, friendship.

Given the importance of international cooperation to successful space debris mitigation, the American Institute of Aeronautics and Astronautics (AIAA) works to foster professionalism and improve the capacities of the global SSA communities. It does this through sponsored and co-sponsored conferences, workshops, symposiums, training and education programs, and networking events hosted in the United States and throughout the globe and by serving as the international secretariat for the ISO Space Systems and Operations subcommittee. ■

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17. Ibid. See also Richard DalBello and Michael Mendelson, keynote address to Space Law and Policy 2010, Washington, DC, 11 May 2010.
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# SAFETY INVESTIGATION INTO THE ACCIDENT ON 1 JUNE 2009 TO THE AIRBUS A330-203, FLIGHT AF447

IN JUNE AND JULY 2011, ANALYSIS OF THE DATA RECOVERED FROM THE FLIGHT DATA RECORDER (FDR) AND THE COCKPIT VOICE RECORDER (CVR) HAS MADE A DECISIVE CONTRIBUTION TO THE INVESTIGATION. THIS HAS MADE IT POSSIBLE TO DETERMINE THE PRECISE CIRCUMSTANCES OF THE ACCIDENT, TO ESTABLISH NEW FACTS AND TO ISSUE SOME NEW SAFETY RECOMMENDATIONS WHICH ARE INCLUDED IN THE INTERIM REPORT N°3 PUBLISHED ON 29 JULY 2011 BY BUREAU D'ENQUETES ET D'ANALYSES POUR LA SECURITE DE L'AVIATION CIVILE (BEA).

THIS REPORT COMPRISES FIVE MAIN CHAPTERS: FACTUAL INFORMATION – HISTORY OF FLIGHT: POINTS FROM THE ANALYSIS – CONCLUSIONS/NEW FINDINGS – SAFETY RECOMMENDATIONS – CHANGES MADE AFTER THE ACCIDENT (Air France and Airbus).

IT IS IMPORTANT TO NOTE THAT **THE REPORT N°3 IS AN INTERIM** REPORT AND THAT USING IT FOR ANY PURPOSE OTHER THAN FOR THE PREVENTION OF FUTURE ACCIDENTS COULD LEAD TO ERRONEOUS CONCLUSIONS. THE INVESTIGATION IS CONTINUING IN ORDER TO DEVELOP THE ANALYSIS TO DETERMINE THE CAUSES OF THE ACCIDENT WHICH WILL BE MADE KNOWN WITH THE PUBLICATION OF **THE FINAL REPORT DURING THE FIRST HALF OF 2012**.

THE PUBLICATION OF THE INTERIM REPORT N°3 WAS NECESSARY IN ORDER TO ISSUE SEVERAL NEW SAFETY RECOMMENDATIONS. THE LATTER ARE SUMMARIZED HERE BELOW.

## THE NEW SAFETY RECOMMENDATIONS PUBLISHED IN THE BEA INTERIM REPORT N°3

There are four categories of recommendations: operations, certification, flight recorders and transmission of flight data.

### 1. RECOMMENDATIONS ON OPERATIONS

- **Training for Manual Aircraft handling:** BEA recommends that EASA reviews the content of check and training programmes and make mandatory, in particular, the setting up of specific and regular exercises dedicated to manual aircraft handling of approach to stall and stall recovery, including at high altitude;
- **Relief Captain:** BEA recommends: (i) that EASA defines additional criteria for access to the role of relief Captain so as to ensure better task-sharing in case of relief crews; (ii) that provisionally, the DGAC (Direction Générale de l'Aviation Civile, France) defines additional criteria for access to the role of relief Captain so as to ensure better task-sharing in case of relief crews.

### 2. RECOMMENDATIONS RELATING TO CERTIFICATION

- **Angle of Attack Measurement:** BEA recommends that EASA and the FAA evaluate the relevance of requiring the presence of an angle of attack indicator directly accessible to pilots on board airplanes.

### 3. RECOMMENDATIONS RELATING TO FLIGHT RECORDERS

- **Flight Recorders:** BEA again recommends: (i) that ICAO requires that aircraft undertaking public transport flights with passengers be equipped with an image recorder that makes it possible to observe the whole of the instrument panel; (ii) that at the same time, ICAO establishes very strict rules for the readout of such recordings in order to guarantee the confidentiality of the recordings. In addition, BEA recommends: (i) that EASA and the FAA make mandatory the recording of the position of the flight director crossbars on the one hand, and on the other hand, of the parameters relating to the conduct of the flight displayed on the right side, in addition to those displayed on the left side; (ii) that EASA and the FAA evaluate the relevance of making mandatory the recording of the air data and inertial parameters of all of the sources used by the systems.

### 4. RECOMMENDATIONS RELATING TO FLIGHT DATA

- **Transmission of flight data:** BEA recommends: (i) that EASA and ICAO make mandatory as quickly as possible, for airplanes making public transport flights with passengers over maritime or remote areas, triggering of data transmission to facilitate localisation as soon as an emergency situation is detected on board; (ii) that EASA and ICAO study the possibility of making mandatory, for airplanes making public transport flights with passengers over maritime or remote areas, the activation of the emergency locator transmitters (ELT), as soon as an emergency situation is detected on board.

*J.-P.S. This article comes in the continuation of the AF447 related papers published in the issues 1-2011 (March) and 2-2011 (June) of the CEAS Quarterly Bulletin. It has been written from the information available on the Website <http://www.bea.aero>*

## EASA HAS PUBLISHED LATEST REVIEW OF AVIATION SAFETY IN EUROPE



The European Aviation Safety Agency (EASA) has published its Annual safety review for 2010. The review shows a high level of safety for commercial air transport operations in EASA Member States (27 Member States of the EU, plus Iceland, Liechtenstein, Norway and Switzerland).

Commenting on the release of the review, EASA's Executive Director, said: "Action on safety issues of crucial importance such as loss of control and runway excursions must

continue. Only by implementing safety management and facilitating the integration of new technologies can we ensure positive safety trends in times of air traffic growth."

The Annual Safety review has chapters dedicated to Air Traffic Management, General Aviation, Aerial Work as well as the European Central Repository. In addition, the review includes analysis of accidents involving light aircraft on data reported directly to EASA from its Member States.

[www.easa.europa.eu](http://www.easa.europa.eu)



## INTERNATIONAL PARIS AIR SHOW : GREAT SUCCESS FOR CLEAN SKY

THE FIRST CLEAN SKY ROUND TABLE AT PARIS AIR SHOW, 20-26 JUNE 2011, DREW A FULL ATTENDANCE: "FLIGHTPATH 2050", THE RENEWED ACARE (ADVISORY COMMITTEE FOR AERONAUTICS RESEARCH IN EUROPE) VISION ON AERONAUTICS THROUGH THE MIDDLE OF THE CENTURY. THROUGHOUT THE WEEK SEVERAL ROUND TABLES WERE ORGANISED ON CLEAN SKY MOST INTERESTING TOPICS.

**"Towards less than 1 minute delay for Flightpath 2050!"**

**Axel Krein**, senior Vice President for Research & Technology of AIRBUS explained the importance of meeting customer needs in terms of their travel experience: enabling 90% of Europeans to make door to door travel within 4 hours and with no more than 1 minute delay. He stressed the importance of future capabilities and workforce and a competitive European industry to achieve this vision. Concerning the question of environmental impact, 2050 performance would need to include **75% reduced CO<sub>2</sub>, 90% reduced NO<sub>x</sub> and 65% less noise compared to 2000**. He reported that current estimates indicate a need for 250 Billion Euro in Research & Development for enabling this vision.

**Marco Brusati**, DG RTD, European Commission, shared with the attendees how the Commission was making progress towards a new **Common Strategic Framework (CSF)** for research. He noted the interconnected nature of Europe's needs: meeting societal challenges, ensuring competitiveness and assuring the capabilities within the EU. He stressed the importance of seamless flow from

basic upstream research into industrial innovation, and the Commissioner's commitment to underpin this. The need for partnership and purpose-built vehicle to achieve this, perhaps like Clean Sky was created to "operationalise" the 2020 vision was highlighted.

**François Quentin**, former executive Vice President of Thales and co-chairman of ACARE broke new ground into debate, emphasizing the "system-of-systems" nature of air transport, and the need to build fundamentally higher levels of security, resilience and safety into the system. He challenged the air transport sector actors – the stakeholders – to build system-of-systems level competencies, to draw in the talent and resources of other sectors and to accept that only a network-centric approach would meet society needs of air transport in the future.

### ROUND TABLES

During the Paris Air Show, several round tables were organised on Clean Sky most interesting topics, with generally thick audience:

- Beyond Clean Sky: the environmental objectives of the Flightpath 2050;
- Eco design and Life Cycle Assessment (LCA) in aeronautics;
- Future engines;
- Airframers: Future green rotorcraft;
- Airframers: Future green aircraft;
- Green systems;
- Clean Sky and aeronautical research in Central and Eastern Europe;
- Clean Sky and green aviation explained to future generations.



On the left, Eric Dautriat, Clean Sky Executive Director, and on the right, Dr Wischhusen, XRG Simulation Director. © Clean Sky

### XRG: THE 400<sup>th</sup> PARTICIPANT IN CLEAN SKY

During Paris Air Show, Clean Sky awarded a symbolic trophy to the 400<sup>th</sup> participant in the programme: XRG Simulation GmbH, a German small 14-staff enterprise specialized in energy system simulation.

J.-P. S. From information provided by Clean Sky JU - [www.cleansky.eu](http://www.cleansky.eu)

## NEWS FROM SESAR

### AIRPORTS AND SESAR TOGETHER TO MODERNISE EUROPEAN AIR TRAFFIC MANAGEMENT

SESAR JU has signed a contract and cooperation agreement with ACI EUROPE – the European Airports' trade body – to engage its technical expertise in the SESAR programme in order to modernise together the European sky. The two organisations signed a contract on 16 June 2011 during the 21<sup>st</sup> ACI EUROPE Annual Assembly, to involve ACI EUROPE on various research projects, developments and communication activities, specifically focused on the role and contribution of airports in SESAR. Building upon the work of the Single European Consortium – Aéroports de Paris, BAA, Flughafen München, Fraport, Schipol, Flughafen Zurich – this agreement will yield a better integration of the entire airport community into the SESAR JU's work with the aim of making the European aviation system more efficient.



Airports and SESAR together to modernise European ATM  
SESAR JU has signed a contract and cooperation agreement with ACI EUROPE

### NEW MACROECONOMIC STUDY ON SESAR BY MCKINSEY

This study provides a quantification of the impact of SESAR on the EU economy, society and environment based on the European ATM Master Plan targets. The results show that the timely, effective and efficient implementation of SESAR will contribute to at least 3 of the 5 goals of the EC's "Europe 2020" strategy: creating employment, improving European R&D and helping fight climate change.

### FLY4D AND SESAR



The Fly4D consortium – led by AIRBUS with Cassidian, Honeywell, Lufthansa Systems and Sabre Airline Solutions – has been awarded a contract to perform a work addressing the definition, the development and the validation of Airspace User's future flight planning and control systems and procedures in support of the **SESAR ATM Target Concept**, concept which is trajectory-based operations. A trajectory representing the business/mission intentions of the Airspace users, and integrating Air Traffic Management (ATM) and airport constraints, is elaborated and agreed for each flight. Trajectory-based operations ensure that the Airspace User flies its trajectory close to its intent in the most efficient way. First validation results are expected by the end of 2012.

Patrick Ky, Executive Director of SESAR JU commented: "We are the first in the world to start to integrate ATM future concepts with airlines operations. This is truly a breakthrough in our sector of activity".

### OPTIMI RESULTS

In June 2009, as a consequence of the AF447 accident, the European Commission requested SESAR JU to take an action on the improvement of the monitoring of air traffic in oceanic and remote low density airspace. SESAR launched OPTIMI (Oceanic Position Tracking Improvement and Monitoring Initiative) as a collaborative project with air navigation service providers, airlines, manufacturers, SATCOM providers and other entities involved in the aviation sector at the European Atlantic airspace. The study identified a range of short and medium term solutions that would lead to a significant improvement in flight tracking, requiring in some cases only minor, inexpensive modifications to existing systems.

J.-P. S. From information provided by SESAR JU. [www.sesarju.eu](http://www.sesarju.eu)

## ABOUT THE EDA

### COUNCIL APPROVED ON 12 JULY THE EDA'S STATUTE, SEAT AND OPERATIONAL RULES



Catherine Ashton



Claude-France Arnould

On 12 July 2011 in Brussels, the EU Council adopted a Decision defining the Statute, Seat and Operational Rules of the European Defence Agency. This Council decision repeals the Council Joint Action 2004/551/CFSP of 12 July 2004 on the EDA.

The Decision underlines the EDA's key role in support of the Council and of Member States in improving the EU's defence capabilities. It implements the Lisbon Treaty articles governing the Agency, including its tasks, which are to contribute to identifying the Member States' military capability objectives; to promote harmonization of operational needs, to propose multilateral projects; to support defence technology research; and to contribute to strengthening the industrial base of the defence sector. It will also provide for the EDA's support to permanent structured cooperation, should the Council decides on its establishment.

Ms Claude-France Arnould said: *"This Decision reinforces the Agency's mandate in accordance with the Lisbon Treaty. It preserves the established mechanisms of the Agency for establishing collaborative capability development projects and programmes. EDA will continue to develop and implement joint*

*solutions to address the capability requirements of its Member States and to play an important role in the area of Research & Technology, Armaments and Industry & Market".*

## TOP MANAGEMENT

### HEAD OF THE AGENCY

EU High Representative for Foreign Affairs and Security Policy Catherine Ashton is Head of the Agency, chairing the Ministerial Steering Board. In her capacity as Head of the Agency she reports twice per year to the Council. She is Head of the EDA from 1<sup>st</sup> of December 2009.

### CHIEF EXECUTIVE

Claude-France Arnould is EDA's Chief Executive. She acts under the authority of the Head of the Agency and in accordance with the decisions of the Steering Board. She is appointed by the latter for three years.

### AGENCY MANAGEMENT BOARD

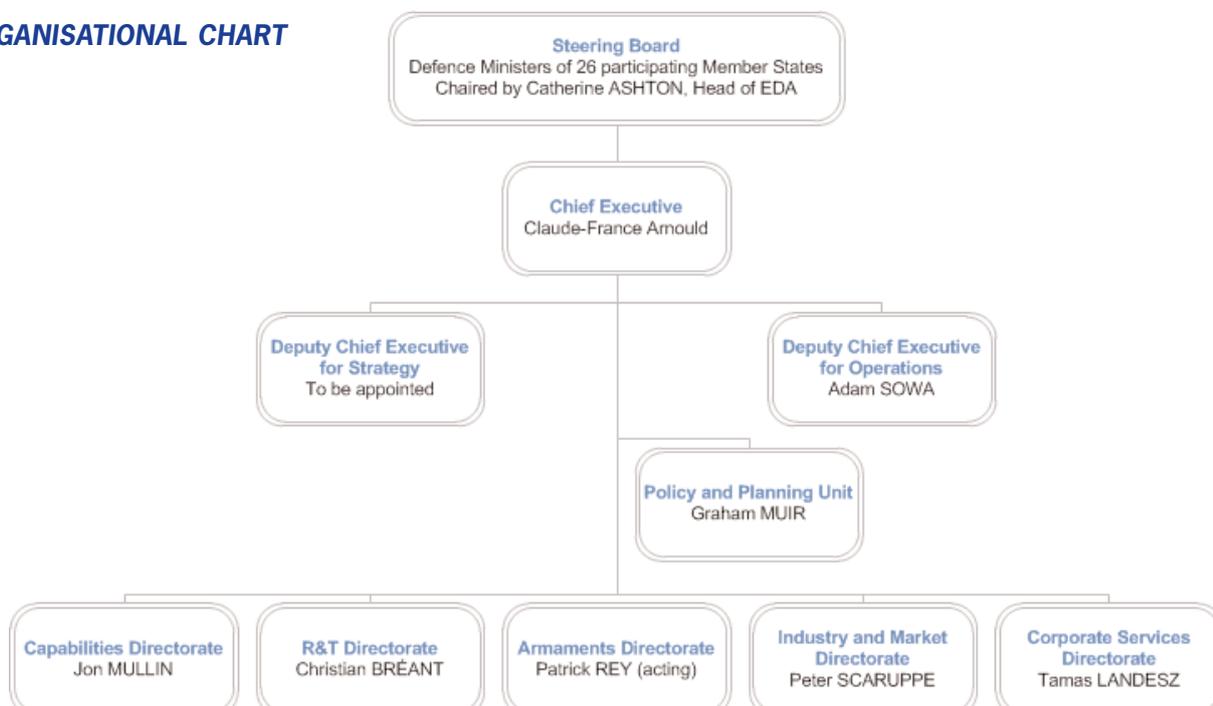
The Agency Management Board is the internal body insuring coherence of all EDA activities. Its members are: the Chief Executive, the Deputy Chief Executive, the 5 functional Directors – Capabilities, Research & Technology, Armaments, Industry and Market, Corporate Services.

### EDA PARTICIPATING MEMBER STATES (pMS)

26 EU Member States participate in EDA: all EU Members except Denmark. Together they form the Agency's stakeholders: they sit in the EDA Steering Board; they pay the annual budget; their national experts participate in EDA's activities; they invest in projects and programmes to improve their capabilities.

EDA is an 'instrument' in the hands of the pMS, in particular of their Ministries of Defence.

## ORGANISATIONAL CHART



## PARIS, 13 JULY 2011, TOOK PLACE THE WEIMAR HIGH LEVEL SEMINAR ON CAPABILITIES: "POOLING, SHARING AND COOPERATION, A COMPULSORY CHALLENGE"

THIS SEMINAR, ORGANISED BY FRANCE IN FULL COOPERATION WITH GERMANY AND POLAND FOLLOWED PROPOSALS BY THEIR DEFENCE AND FOREIGN AFFAIRS MINISTERS TO Ms CATHERINE ASHTON, HIGH REPRESENTATIVE OF THE EU FOR FOREIGN AFFAIRS AND SECURITY POLICY, ON HOW TO REINFORCE EU-NATO COOPERATION, THE EU'S ABILITY TO PLAN AND CONDUCT OPERATIONS, AND COOPERATION ON MILITARY CAPABILITIES.

**Ms CLAUDE-FRANCE ARNOULT, EDA'S CHIEF EXECUTIVE, ATTENDED THIS SEMINAR.**

Ms Arnoult spoke in two panels.

In the first, which she shared with Patrick Bellouard, Director of OCCAR's Executive Administration, she spoke about "EDA added value for European cooperation – EDA-OCCAR synergy".

In the second panel, which she shared with General Stephane Abrial, NATO's Supreme Allied Commander for Transformation, she addressed the issue of "EU Pooling and Sharing initiative and NATO Multinational and Innovative Approaches: comparative advantages".

"In the context of budget cuts, Pooling and Sharing is a key priority for the Agency: we need to improve cooperation.

Pooling and Sharing has been a driver for the Agency for some time. But European involvement in Libya should act as wake-up call. The Agency needs to continue to deliver and benefit from the high level support", Ms Arnoult said. Together with General Abrial, she underlined the need for reciprocal transparency with NATO. "Coordination with NATO is essential because both share the same goal, namely to improve capabilities in a constrained financial environment", she added.



General Abrial and Ms Arnoult. Credit [www.defence.gouv.fr/das](http://www.defence.gouv.fr/das)

## EUROPEAN DEFENCE AGENCY : MINISTERIAL STEERING BOARD

EUROPEAN DEFENCE MINISTERS MET ON 23 MAY 2011 IN BRUSSELS, IN THE EDA STEERING BOARD. FOLLOWING THEIR DISCUSSION IN THE FOREIGN AFFAIRS COUNCIL, MINISTERS ADDRESSED CURRENT AND FUTURE EDA ACTIVITIES ON POOLING & SHARING.

Ministers tasked the EDA to produce, in close co-operation with EU Military Committee and other EU actors, proposals on how to European Pooling & Sharing could be taken forward for presentation in the autumn. They also addressed two specific Pooling & Sharing projects:

- European Air Transport Fleet (EATF);
- Counter-Improvised Explosive Devices.

They decided to launch a "European Air Transport Fleet" (EATF) category "A" project. The signature of the EATF Letter of Intent on 17 November 2009 by 14 Ministers of Defence (Belgium, Czech Republic, Finland, France, Germany, Greece, Italy, Luxemburg, NL, Poland, Portugal, Slovakia, Spain and Sweden plus Romania, who signed a few months later) expressed the clear political will to move forward and enhance efforts to increase the military airlift provision within Europe. Presently, this pooling & sharing initiative took a further step forward through the signature



A view of the EDA Ministerial Steering Board meeting held on 23 May 2011 in Brussels. Credit EDA.

of a Programme Arrangement by 17 Ministers of Defence: Austria, Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Greece, Italy, Luxemburg, NL, Poland, Portugal, Romania, Slovakia, Spain and Sweden.

The EATF Fact Sheet is reproduced in its integrality in page 16. "The EATF Programme will increase efficiency and effectiveness across the range of logistics, training, administration and capacity utilisation", said Ms Claude-France Arnoult, EDA's Chief Executive.

J.-P. S. From information provided by the EDA.  
[www.eda.europa.eu](http://www.eda.europa.eu)

# European Air Transport Fleet (EATF)



European Defence Agency



- The signature of the European Air Transport Fleet (EATF) Letter of Intent (LoI) on 17 November 2009 by fourteen Ministers of Defence (Belgium, Czech Republic, Finland, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Spain and Sweden) and by the Minister of Defence of Romania a few months later expressed the clear political will to move forward and enhance efforts to increase the military airlift provision within Europe.
- The main objectives of EATF are: to improve airlift provision within the European Union; to develop concrete solutions for better use of existing and future airlift assets made available by the pMS for military needs to meet operational requirements; to develop means for optimisation of interested existing and future air transport organisations and structures; and, finally, to be able to transport any personnel/equipment by any asset with a minimum of constraints.
- EATF will consist of a framework federating different projects identified, different structures and different types of assets, in order to create synergies through far-reaching cooperation and coordination. It will be a flexible and inclusive partnership between national and multinational military air transport fleets and organisations in Europe aimed at the enhancement of standardised air transport services through cost-effective pooling, sharing, exchange and/or acquisition of various capabilities, including aircraft, training programmes, cross-servicing activities, cargo handling, maintenance activities, spare parts.
- Currently, the work of the Project Team EATF is focused on identified and prioritised air transport issues to improve the efficiency of the European air transport, avoiding duplication of effort and sharing outcomes and information with as many entities as possible. Three Ad Hoc Working Groups (AHWG) are active under the umbrella of PT EATF working on specific work strands: the AHWG Governance to address the governance and legal issues, the AHWG Operations and Training Tactical Air Transport looking at improving interoperability between partners and the AHWG Diplomatic Clearances (DIC) to develop a simplified/harmonised mechanism for diplomatic clearances inside and outside the EU. Common arrangements and harmonised procedures for DIC for EU registered military transport aircraft within the EU are under development by the AHWG Diplomatic Clearances. This work will be to the benefit of all pMS.
- In the meantime, contacts have been established and meetings organised with different organisations (European Commission, EUROCONTROL, EATC, MCCE, EAG etc.) to avoid any duplication of work and combine efforts as much as possible.
- The European Defence Agency's EATF initiative is an example of pooling and sharing, through aiming at increased military airlift provision for European countries. The programme focuses on pooling and sharing of services, training, maintenance and logistics among its contributors for both existing transport aircraft and future transport aircraft like the A400M.
- Work is on-going in the area of common diplomatic clearances (DIC) rules for military aircraft within the borders of willing pMS, with a view to streamlining an often time-consuming process for allowing cross-border national borders. Common arrangements, harmonised procedures and a common DIC format for EU registered military transport aircraft within the EU are under development through the AHWG Diplomatic Clearances.
- A first EATF flying event will take place in Spain in June 2012 to increase interoperability between EATF crews and enhance common procedures. This event should lead in the near future to the creation of a European advanced tactical airlift course, similar to the one existing in the US and in line with what is organised for the fighter aircraft at the Tactical Leadership Programme in Albacete/Spain.
- The Steering Board in Capabilities formation approved on 09 March 2011 the establishment of the EATF Category A Programme linked to a set of separately launched subordinate EATF Category B projects and other subordinate EATF work strands by approving the Outline Description (OD) for this Programme. Since then, the AHWG Governance, consisting of EDA and experts of all interested participating Member States, finalised the Programme Arrangement for this Programme.
- On 23 May 2011 the Ministers of Defence of Austria, Belgium, Bulgaria, Finland, France, Germany, Greece, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Czech Republic, Romania, Spain and Sweden decided to launch the EATF Category A Programme by signing the EATF CAT A Programme Arrangement (PA) and establishing a Management Committee (MC) for supervising its management and implementation for its total duration. The EATF Category A Programme contributing Member States (cMS) are encouraged to actively engage in this Programme and initiate subordinate EATF Category B.

## SIGNING OF EDA-ESA ADMINISTRATIVE ARRANGEMENT

ESA's DIRECTOR GENERAL JEAN-JACQUES DORDAIN MET EDA CHIEF EXECUTIVE CLAUDE-FRANCE ARNOULD THE LE BOURGET AIR SHOW ON 20 JUNE 2011 TO SIGN AN ADMINISTRATIVE ARRANGEMENT ON CO-OPERATION BETWEEN ESA AND THE EUROPEAN DEFENCE AGENCY (EDA). THE CONCLUSION OF THIS ARRANGEMENT FOLLOWS THE INVITATION SENT BY THE HEAD OF THE EDA, BARONESS ASHTON, TO ESA'S DIRECTOR GENERAL TO ENTER NEGOTIATIONS FOR SUCH AN ARRANGEMENT AND ITS APPROVAL BY THE EU COUNCIL AND THE ESA COUNCIL IN MAY AND JUNE 2011, RESPECTIVELY.



EDA Chief Executive Claude-France Arnould met with ESA Director General Jean-Jacques Dordain on 20 June at Paris Air Show to sign the EDA-ESA Administrative Arrangement. Credit EDA

### THE AIM

The aim of the Arrangement is to provide a structure relationship and a mutually beneficial co-operation between ESA and EDA through the coordination of their respective activities. Although both organisations include many of the same states in their membership – EDA is part of the Common Security and Defence Policy (CSDP) –, they are presently separate legal entities. So the pair hopes closer ties will help them avoid duplication and reduce the cost of space activities where they have shared interests, making it easier to exchange technical and catalogue data.

These areas include satellite remote-sensing and communications: as matter of fact, one typical example of overlap concerns ESA's desire to develop a Space Situational Awareness (SSA) programme. This will use radar and other technologies to track and catalogue the precise movements of all bodies moving in orbit, from spacecrafts to asteroids: a priority for ESA because it often has to shift its satellites to avoid collisions with a piece of debris (there are now thousands of objects floating above Earth). On the other side, European Armed Forces have an intelligence interest in knowing what is moving overhead – in particular

others' spy satellites – and they are already deploying radar capability to ascertain such information. So, the co-operation will particularly aim at exploring the added value and contribution of space assets to the development of European capabilities in the area of crisis management and the Common Security and Defence Policy.

"I am convinced that an increased dialogue and coordination between the space and defence communities is of mutual interest and will allow European space programmes to better support Europe's security and defence needs. [...] Reinforcing the cooperation between EDA and ESA will allow us to further develop the security dimension of the European space policy in coordination with other EU stakeholders", Mr Dordain said.

"I am looking forward to explore further synergies between the needs of the defence community and ESA activities to the benefit of our respective Member States", Ms Arnould said.

### SOME BACKGROUND INFORMATION

The co-operation between EDA and ESA will in particular involve:

- Identify those capability gaps or shortfalls that could be filled by shared assets for the sustainable and effective implementation of the relevant EU policies;
- Investigate whether capability requirements can be shared and thus supported by both ESA and EDA;
- Coordinate research, technology and demonstration activities, including access to study results as appropriate and subject to their respective rules;
- Investigate synergies between existing dedicated EDA and ESA programmes and their future evolution;
- Explore synergies and coordinate activities in support of industrial competitiveness and European non-dependence issues.

Within the scope of this cooperation, EDA and ESA may enter into implementing arrangements for specific projects in accordance with their respective rules and procedures.

A first Implementing Arrangement is going to be concluded in the area of unmanned Aerial system (UAS) Command and Control over Satellite for a joint demonstration mission.

Other activities of common interest focus on:

- Intelligence, Surveillance, reconnaissance;
- Civil-military synergies in earth observation;
- Satellite communications;
- Space Situational Awareness (SSA);
- Critical space technologies for European non-dependence.

J.-P. S. From ESA press release N° 19-2011. For further information, contact: ESA Communication Department  
Tel: 33 (0)1 53 69 72 99 – [www.esa.int](http://www.esa.int)

## ABOUT GALILEO

### THE FIRST GALILEO NAVIGATION SATELLITE IS READY TO BEGIN PREPARATION FOR LAUNCH ON 20 OCTOBER

Packed within its protective and air-conditioned container, the first Galileo navigation satellite has arrived in French Guiana on 7 September, coming from Thales Alenia Space Italy's Rome Facility, where it was built. It was immediately moved into the preparation facility of the Guiana Space Centre.

This first Galileo satellite is due to be launched aboard a Soyuz ST-B vehicle on 20 October, together with a second one that will arrive a few days later in French Guiana: these are the two first satellite of the Galileo constellation (30 satellites in total).

**An historic event:** on 20 October, it will be the first launch of Russia's workhorse Soyuz rocket from the Guyana Space Centre. It will take place from a new facility 13 km northwest of the Ariane 5 launch site.



The first Galileo satellite landed in French Guiana on 7 September 2011, for launch on 20 October 2011. Credit: ESA

In 2012, the second pair of satellites will join the first one in orbits at 23222 km altitude, proving the design of the Galileo system in advance of the other 26 satellites destined to join them.

[www.esa.int](http://www.esa.int)

## PROGRESS 44 ACCIDENT AND ITS CONSEQUENCES FOR INTERNATIONAL SPACE STATION

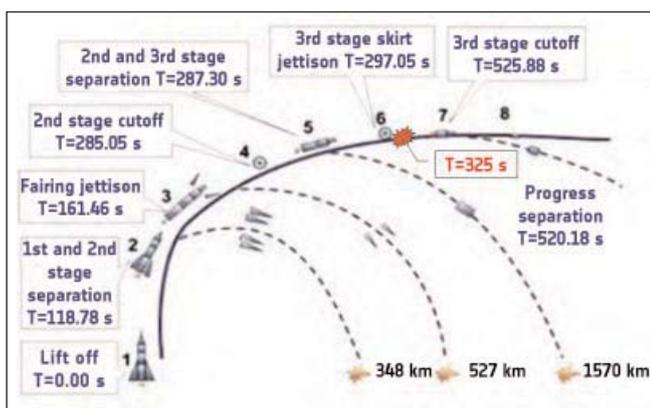
THE SIX ASTRONAUTS ON THE ISS ARE SAFE AND CONTINUING THEIR NORMAL WORK AFTER THE LOSS OF THEIR SPACE-BOUND CARGO CRAFT ON 24 AUGUST.

THE PROGRESS 44 FREIGHTER, CARRYING 2670 KG OF CARGO FOR THE ISS, FAILED TO REACH PROPER ORBIT AFTER THE PREMATURE SHUTDOWN OF ITS THIRD-STAGE ENGINE 325 SECONDS AFTER LAUNCH FROM BAIKONUR COSMODROME.

THE REMNANTS OF THE STAGE AND PROGRESS FELL BACK TO EARTH FROM AN ALTITUDE OF ABOUT 200 KM OVER THE ALTAI REPUBLIC IN SOUTHERN SIBERIA.

No remnants have been found so far and it is possible that the Progress and its third stage – both loaded with fuel and oxygen – burned up in the atmosphere. The search crews are still probing the large areas of difficult terrain in severe conditions looking for evidence.

Launches of Soyuz rockets have been suspended until the cause of the engine malfunction is identified.



Soyuz-U launch sequence. Credit ESA

While the cause of the accident is being sought by a Russian commission, the ISS partners are preparing for several scenarios to ensure the safety of the crew and the orbital outpost.



An earlier Progress Approaches ISS for Docking. © ESA

### STATION CREW IS SAFE

The new situation has not put the ISS in danger and the safe of Expedition 28 aboard is not compromised. There are plenty of supplies for the crew and station to next spring. The next Progress freighter is being prepared for launch, but the date has not yet been specified because it depends on the commission's findings.

Russian planners would like to see two successful unman-



ned launches of the Soyuz-U rocket before the next manned spacecraft, so the dates of the future missions, including the flight of ESA astronaut André Kuipers, are being addressed.

*This is the first accident for this spacecraft since the first Progress in 1978. So far, the Russian Space Agency has launched 745 Soyuz-U vehicles, with 724 successes. Progress freighters were carried on 136.*

< Mike Fossum working in the Destiny laboratory. Credit ESA

## 21 JULY 2011 : THE END OF THE SPACE SHUTTLE ERA

### THE STS-135 MISSION: THE LAST SHUTTLE FLIGHT

Shuttle *Atlantis* and its four-astronaut crew landed on 21 July 2011 at 5:57 a.m. EDT at NASA's Kennedy Space Center (KSC), Cape Canaveral, Fla., ending a 13-day mission – the launch took place on 8 July at 11:29 a.m. EDT . It was the conclusion of the STS-135 mission, the 135<sup>th</sup> and final shuttle flight, *Atlantis*' 33<sup>rd</sup> flight and the 37<sup>th</sup> mission dedicated to International Space Station (ISS) assembly and maintenance. It was the 26<sup>th</sup> night landing (20<sup>th</sup> night and 78<sup>th</sup> total landings at KSC).

The STS-135 crew consisted of Commander Chris Ferguson, Pilot Doug Hurley, Mission Specialists Sandra Magnus and Rex Walheim. They attached to the ISS the ESA Italian-built *Raffaello* Multi-Purpose Logistics Module (MPLM) which has been instrumental namely for deploying ISS research racks. They delivered more than 9,400 pounds of spare parts, spare equipment and other supplies – including 2,677 pounds of food – that will sustain ISS operations for the next year.



8 July 2011, 11:29 a.m. (EDT), Kennedy Space Center, lift-off of the Space Shuttle *Atlantis* for the STS-135 mission to the Internal Space Station.

Photo credit: NASA/Photo/Houston Chronicle, Smiley N. Pool

*"This final shuttle flight marks the end of an era, but today, we recommit ourselves to continuing human spaceflight and taking the necessary – and difficult – steps to ensure America's leader-*



21 July 2011, Space Shuttle *Atlantis* is landing at KSC, completing its 13-day mission STS-135 to the ISS and the final flight of the Space Shuttle Programme.

Photo credit: NASA/Bill Ingalls

ship in human spaceflight for years to come.”, NASA Administrator Charles Bolden said.

Since STS-1 launched on 12 April 1981, 355 individuals from 16 countries flew 852 times aboard the shuttle. The five shuttles travelled more than 542 million miles and hosted more than 2,000 experiments in the fields of Earth, astronomy, biological and materials sciences.

The shuttles docked with two space stations, the Russian Mir and the ISS. Shuttles deployed 180 payloads, including satellites, returned 52 from space and retrieved, repaired and redeployed seven spacecraft.

## EUROPE AND SPACE SHUTTLE

### SPACELAB

NASA's invitation in 1969 to participate in the post-Apollo programme led Europe in 1972 to agree to develop Spacelab, a reusable pressurised module as an integral part of the US Space Transportation System (STS). It was sized for the Shuttle's cargo bay. The ESA-NASA cooperation meant that European astronauts flew on the Shuttle as the first non-US crewmembers. Beginning with the flight of ESA's Ulf Merbold in 1983 on STS-9, Spacelab Mission one, 24 European astronauts have flown on 25 Shuttle

missions. The last was Roberto Vittori, on the craft's penultimate flight in May 2011.

### COLUMBUS

Europe's Columbus Laboratory module was delivered by the Shuttle to the ISS, like the other European-built ISS infrastructure elements which provide a major portion of the habitable environment.

### SHUTTLE AND THE HUBBLE SPACE TELESCOPE

Impressively, the Hubble Space Telescope was delivered into orbit, repaired and maintained by Shuttle on five successful missions.

### TRIBUTE TO THE SPACE SHUTTLE

To celebrate the Space Shuttle and tell the stories of Europe's fliers, ESA has opened on 4 July 2011 the dedicated site 'Tribute to the Space Shuttle'. [www.esa.int/SPECIALS/shuttle/index.html](http://www.esa.int/SPECIALS/shuttle/index.html)

*From NASA Press Releases 11-216 and 11-240 and from ESA News dated 4 July 2011.*



Since 1981, NASA space shuttles have been rocketing from the Florida coast into Earth orbit. The five orbiters — Columbia, Challenger, Discovery, Atlantis and Endeavour — have flown more than 130 times, carrying over 350 people into space and travelling more than half a billion miles, more than enough to reach Jupiter. Designed to return to Earth and land like a giant glider, the shuttle was the world's first reusable space vehicle. More than all of that, though, the shuttle program expanded the limits of human achievement and broadened our understanding of our world.

It all started with STS-1, launched on April 12, 1981, just twenty years to the day after Soviet cosmonaut Yuri Gagarin became the first human in space. When astronauts John Young and Robert Crippen launched that morning in Columbia, it was the first time in history a new spacecraft was launched on its maiden voyage with a crew aboard.

For an entire generation, the space shuttle was NASA. We've watched a parade of firsts -- Sally Ride, Guy Bluford, Kathy Sullivan, John Glenn and others. We've seen astronauts float free, and launch and repair spacecraft like Hubble which have fundamentally changed our understanding of the universe.

In this feature, we look back at the Shuttle's historic missions, the people it flew into space, and its achievements.

## THE CEAS MEMBER SOCIETIES

**Association Aéronautique et Astronautique de France (3AF)**

6,rue Galilée – F-75016 Paris  
Tel.: + 33(0) 1 56 64 12 30  
3af@aaaf.asso.fr – www.aaaf.asso.fr

**President:** Michel Scheller

**General Delegate:** Jacques Sauvagat  
jacques.sauvagat@aaaf.asso.fr

**Secretary General:** Gilles Marcoin

**CEAS Trustees:** Pierre Bescond

(CEAS President, 2011)  
pierre.bescond@laposte.net  
and François Gayet

francois.gayet@asd-europe.org

**Executive Secretary :** Anne Venables  
secrexec@aaaf.asso.fr

**Event Coordinator:** Lisa Gabaldi  
lisa.gabaldi@aaaf.asso.fr

**Asociación de Ingenieros Aeronáuticos de España (AIAE)**

Francisco Silvela 71, Entreplanta  
ES-28028 Madrid  
Tel.: + 34 91 411 3002

CEAS@coiae.com - www.coiae.com

**President:** Mr Felipe Navio Berzosa  
fnavio@coiae.es

**CEAS Trustees:**

Mr José Luis de Luna Lázaro  
jldluna@fcc.es

Dr Leandro B. Fernández Sáinz  
lfernandezs@coiae.com

**Secretary:** info@coiae.com

**Associazione Italiana di Aeronautica e Astronautica (AIDAA)**

Casella Postale 227 – I-00187 Roma V.R.  
Tel / Fax : + 39 06 883 46 460  
info@aidaa.it – www.aidaa.it

**President:** Prof. Franco Persiani  
franco.persiani@unibo.it

**Secretary General:** Prof. Antonio Castellani  
a.castellani@aidaa.it

**CEAS Trustees:**

Prof. Franco Persiani - Università de Bologna – Via Fontanelle 40  
I - 47100 Forlì

Prof. Amalia Ercoli Finzi  
Politecnico di Milano – Via La Masa 34  
I - 20156 Milano  
amalia.finzi@polimi.it

**Secretary:** Daniela Vinazza  
daniela@aidaa.it

**Deutsche Gesellschaft für Luft-und Raumfahrt Lillenthal-Oberth e.V. (DGLR)**

Godesberger Allee 70 – D- 53175 Bonn  
Tel.: + 49 228 30 80 50  
info@dglr.de – www.dglr.de

**President:** Dr-Ing. Detlef Müller-Wiesner  
detlef.mueller-wiesner@eads.net

**CEAS Trustees:** Dr-Ing. Norbert Arnt and Philip Nickenig

**Secretary General:** Philip Nickenig  
philip.nickenig@dglr.de

**Adm. Assistant:** Petra Drews  
petra.drews@dglr.de

**Flygtekniska Föreningen (FTF) – Swedish Society for Aeronautics and Astronautics**

Anna Rathsmán – c/o Rymdbolaget  
Box 4207 – SE-171 04 Solna  
Tel: +46-8-627 62 62

anna.rathsmán@ssc.se

**President:** Captain Roland Karlsson  
Drottninggatan 18, SE – 602 24 Norrköping, Tel.:  
+ 46(0)11 345 25 16

Mob.:+ 46 (0)705 38 58 06

rkrolandk@gmail.com

**CEAS Trustees:** – Kaj Lundahl  
Wiboms väg 9 • SE - 171 60 Solna  
klundahl@bredband.net

+46 8 270 264 – +46 703 154 969 (mob)  
– Prof. Petter Krus : Linköping University  
SE - 58183 Linköping – petter.krus@liu.se  
+46 13 282 792 – +46 708 282 792 (mob)

**Secretary:** Bengt Moberg

Norrbackagatan 22,2tr  
SE-113 41 Stockholm  
Tel.: +46 709 97 90 60 – bengt.moberg@sas.se

**Hellenic Aeronautical Engineers Society (HAES)**

3, Karitsi Str. 10561 – GR-10561 Athens  
Phone.& Fax (HAES): +30-210-3239158  
Working hours Phone:+30 22620-52334  
Mob.:+30 697 997 7209

E-mail (HAES): admin@haes.gr

**President and CEAS Trustee:** Dott.Triantafillos  
Tsitinidis

E-mail (pers.): ttsitinidis@haicorp.com

**Iltmailuinsinöörien kerho (IIK)**

PL 14100 – FI-00076 Aalto - (Finland)

**President and CEAS Trustee:**

Markku Roschier – markku.roschier@almt.fi  
enna.peltoniem@vtt.fi  
Tel.:+358(0)40 7029 375

**Nederlandse Vereniging voor Luchtvaarttechniek (NVvL)**

c/o National Aerospace Laboratory  
Anthony Fokkerweg 2  
NL- 1059 CM Amsterdam

Tel.: + 31 20 511 3651 (secretariat)  
nvvl@nlr.nl – www. nvvl.org

**President and CEAS Trustee:**

Fred Abbink – f.j.abbink@planet.nl

**Secretary General and CEAS Trustee:**

Christophe Hermans  
Tel.:+31 20 511 3651 – hermans@nlr.nl

**Polish Society of Aerospace Sciences (PSAS)**

Prof. Zdobyslaw Goraj

goraj@meil.pw.edu.pl

Prof. Jacek Rokicki

jack@meil.pw.edu.pl

Nowowiejska 24 – 00665 Warsaw – Poland

**Romanian Aeronautical & Astronautical Association (RAAA)**

220D Iuliu Maniu Ave – 061126 Bucharest 6 -  
Rmania, P.O. 76, P.O.B. 174 www.comoti.ro  
valentin.silvestru@comoti.ro

**Royal Aeronautical Society(RAeS)**

No.4 Hamilton Place – London

W1 J 7 BQ – United Kingdom

Tel.:+ 44(0)20 76 70 4300

raes@aerosociety.com

www.aerosociety.com

**President:** Lee Balthazor

**CEAS Trustee:** David Marshall  
marshall.david@yahoo.fr

**Chief Executive:** Simon Luxmoore

Tel.:+44(0)20 7670 4302

simon.luxmoore@aerosociety.com

**PA to the Chief Executive:**

Anne Tompkins

anne.tompkins@aerosociety.com

**CEAS Trustee:** Paul Bailey

paul.bailey@aerosociety.com

**Conf.&Events Manager:** Vicky White  
conference@aerosociety.com

**Schweizerische Vereinigung für Flugwissenschaften/Swiss Association of Aeronautical Sciences (SVFW)**

RUAG/Aviation – Seetalstrasse 175

PO Box 301 – CH-6032 Emmen

Tel.:+41 41 268 4049

www.svfw.ch

**President:** Dr Jürg Wildi

Vice-President, Innovation & Technology  
juerg.wildi@ruag.com

**CEAS Trustee:** Dr Georges Bridel

a/o ALR – Gotthardstr. 52

CH-8002 Zurich

Tel.: + 41 79 405 7645

georgesbridel@aol.com

**Central Aerohydrodynamic Institute Russian Aerospace Society (TsAGI)**

1, Zhukovsky St. – Zhukovsky, Moskow region,

140 180, Russian Federation

Tel.: +7(495) 556 - 41- 01

**Chief Executive:**

Sergey L. Chernyshev, D.Sc.

ved@tsagi.ru – www.tsagi.com

**ASSOCIATE MEMBERS****Associate Member: Czech Aeronautical Society (CzAeS)**

Faculty of Mechanical Engineering/

Dept Aerospace

Karlovo náměstí 13 - 121 35 Praha 2 - Czech

Republic - Daniel.Hanus@fs.cvut.cz

www.czaes.org

**EUROAVIA**

Kluyverweg 4 - 2611 TS, Delft, NL

Tel.:+31 6 34 84 7035

thomas.vermin@euroavia.eu

www.euroaviadelft.com

**Von Karman Institute for Fluid Dynamics (VKI, Belgium)**

Chaussée de Waterloo, 72 - B- 1640 Rhode-St-  
Genèse - www.vki.ac.be arts@vki.ac.be

**SOCIETIES WHICH HAVE SIGNED A MEMORANDUM OF UNDERSTANDING WITH THE CEAS:****American Institute of Aeronautics and Astronautics (AIAA)**

1801 Alexander Bell Drive, Reston, VA 20191

megans@aiaa.org

carols@aiaa.org – www.aiaa.org

**Chinese Society of Astronautics (CSA)**

PO Box 838 – 10830 Beijing, China (PRC)

Pr Wang Jia

csa\_space@yahoo.com.cn

www.csaspace.org.cn/

**International Council of the Aeronautical Sciences (ICAS)**

President: Dr-Ing. Detlef Müller-Wiesner

Executive Secretary: Axel Probst

c/o DGLR

Godesberger Allee 70 – D- 53175 Bonn

icas@icas.org – www.icas.org

**Korean Society for Aeronautical and Space Sciences (KSAS)**

Prof. Seung Jo Kim

Prof. In-Seuck Jeung

enjjs@snu.ac.kr

sjkim@snu.ac.kr

## YEAR 2011 - FOURTH QUARTER

3-7 October • **IAF - IAC 2011** – 62<sup>nd</sup> International Astronautical Congress – Central theme: African Astronautics – Venue: Cape Town International Convention Center (CTICC), Cape Town, South Africa.  
[www.esa.int/esaLP/LPcalende.html](http://www.esa.int/esaLP/LPcalende.html) - [www.iafastro.org/index.html?title](http://www.iafastro.org/index.html?title)

11 October • **EC** – Workshop GMES “Satellite Applications as Enablers of Smart Public services” – EC, Brussels (Belgium) – [www.gmes.info/](http://www.gmes.info/)

17-19 October • **IAASS** – Conference on “A Safer Space for a Safer World” – Salle des Congrès – Versailles (France) – [www.conferences.esa.int/](http://www.conferences.esa.int/)

18 October • **ESA** – Workshop on “Challenges for space antennas” – ESTEC, Noordwijk (NL) – [www.conferences.esa.int/](http://www.conferences.esa.int/)

18-20 October • **ICAO** – Workshop on Aviation and Sustainable Alternative Fuels (SUSTAF). Montréal, Canada.  
[www.icao.int/](http://www.icao.int/)

18-21 October • **SAE** – SAE 2011 Aerotech Congress & Exhibition – Centre de Congrès Pierre Baudis, Toulouse (France). The Aerospace community: preparation for future challenges and opportunities.  
[www.sae.org/events/atc/](http://www.sae.org/events/atc/)

24-28 October • **WCERS, ESA, NOAA, NASA, NSF, EUMETSAT, UCAR, NCAR, NCA, AMS, CIRES, START** – WCRP Open Science Conference: Climate Research in Service to Society – Denver (CO), USA.  
[www.esa.int/esaLP/LPcalende.html](http://www.esa.int/esaLP/LPcalende.html)

24-28 October • **CEAS** – 3<sup>rd</sup> CEAS European Air & Space Conference – Giorgio Cini Foundation – Venice, Italy.  
[www.ceas2011.org](http://www.ceas2011.org)

- Monday 24 October: Opening Plenary, Keynote speech Parallel Sessions, Exhibition, Welcome Reception
- Tuesday 25 October: Keynote Speech, Parallel Sessions, Exhibition, Civic reception
- Wednesday 26 October: Parallel sessions, Exhibition, Gala Dinner
- Thursday 26 October: Parallel sessions, Exhibition, Closing Plenary
- Friday 27 October: Technical Tours

25-26 October • **RAeS** – RAeS Unmanned Aircraft Systems Annual Conference – RAeS/HQ N° 4 Hamilton Place – London (England). [emma.bossom@aerosociety.com](mailto:emma.bossom@aerosociety.com) – [www.aerosociety.com/events](http://www.aerosociety.com/events)

17 November • **IAA** – Conference: Climate Change and green systems, Disaster Management & Natural hazards, Planetary & Lunar exploration, Human Spaceflight. Ronald Reagan Building and International Trade Center, Washington DC – [sgeneral@iaaweb.org](mailto:sgeneral@iaaweb.org)

29-30 November • **Air and Space Academy** – International Conference: Air transport Pilots Facing the Unexpected – DGAC, 50 rue Henry Farman – Paris (France) – [www.air-space-academy.org](http://www.air-space-academy.org)  
 This Conference is directed at all air transport players, whether involved in operations, design, training and regulations. Its main objective is reduce human risks arising from unexpected operational situations based on the observation that technology, procedures and training cannot, to date, compensate for human inadequacies when faced with stress.

29 Nov. - 2 dec. • **ESA, SOLAS, EGU** – Earth Observation for Ocean-Atmosphere Interactions Science – Frascati (Italy)  
[www.esa.int](http://www.esa.int)

1-2 December. • **ESA, SOLAS, EGU** – Earth Observation for Ocean-Atmosphere Interactions Science – Frascati (Italy)  
[www.esa.int](http://www.esa.int)

5-6 December. • **IAIA** – Conference GMES “Climate Change and impact Assessment” – Congress Center, Beijing (China) – [www.gmes.info/](http://www.gmes.info/)

15 december • **ICAO** – ICAO’s Next Generation of Aviation Professionals (NGAP) Conference – DGAC, 50 rue Henry Farman, Paris (France) – [www.icao.int/](http://www.icao.int/)

## YEAR 2012

9-12 January • **AIAA** – 50<sup>th</sup> AIAA Aerospace Sciences Meeting – Nashville (Alabama) – Nashville Convention Center - [www.aiaa.org/](http://www.aiaa.org/)

19-21 January • **Bahrain Airshow Org** – Bahrain International Airshow 2012 – Bahrain (Saudi Arabia) – Sakhir Airbase [www.bahraininternationalairshow.com](http://www.bahraininternationalairshow.com)

14-19 February • **Experia Events Pte Ltd** – Singapore Airshow 2012 – Singapore – New Changi Exhibition Center – [www.singaporeairshow.com](http://www.singaporeairshow.com)

20-23 March • **ESA** – European Conference on Spacecraft Structures, Materials and Environmental Testing – ESTEC. Noordwijk (NL). [www.conferences.esa.int/](http://www.conferences.esa.int/)

23-25 April • **ACI Europe** – 21<sup>st</sup> ACI Europe Airport Trading Conference & Exhibition – Oslo Airport – Oslo (Norway) – [www.aci.conferences](http://www.aci.conferences)

22-25 May • **IAF/AIAA** – Global Space Exploration Conference – L’Enfant Plaza Hotel – Washington DC (USA) – [www.iaf.com](http://www.iaf.com)

18-20 June • **AIAA/IAAC** – 3<sup>rd</sup> International Air Transport and Operations Symposium (ATOS)/6<sup>th</sup> International Meeting for Aviation Product Support Process (IMAPP) – Delft University of Technology – Delft (NL) – [www.aiaa.org](http://www.aiaa.org)

25-28 June • **AIAA** – 42<sup>nd</sup> AIAA Fluid Dynamics Conference – Sheraton – New-Orleans (USA) – [www.aiaa.org/](http://www.aiaa.org/)

09-15 July • **Farnborough Org** – International Farnborough Air Show – Farnborough (England) [www.farnborough.airshow](http://www.farnborough.airshow)

4-7 September • **NVvL** – European Rotorcraft Forum – ERF 2012 – Amsterdam (NL) – [hermans@nlr.nl](mailto:hermans@nlr.nl)

11-16 September • **BDLI Messe Berlin** – ILA Berlin 2012 – Brandenburg Airport – Berlin (Germany) [www.ila-berlin.de/ila2012/home/index.cfm](http://www.ila-berlin.de/ila2012/home/index.cfm)

23-28 September • **ICAS** – ICAS2012 Congress – Brisbane, Australia - [secr.exec@icas.org](mailto:secr.exec@icas.org)  
Call for Papers is now downloadable. ICAS Secretary: Mr Axel Probst – ICAS Secretariat: c/o DGLR – Godesberger Allee 70 – 53175 Bonn, Germany. Tel.: +49 228 3080519

1-5 October • **IAC** – 63<sup>rd</sup> International Astronautical Congress- IAC2012  
Nostra D’oltremare Convention Center- Naples, Italy

**Colloque international / International conference**



**Académie de l'Air et de l'Espace  
Air and Space Academy**



**PILOTES DE TRANSPORT  
AÉRIEN FACE À L'IMPRÉVU**

**AIR TRANSPORT PILOTS  
FACING THE UNEXPECTED**



**29 & 30 Nov. 2011**

**DIRECTION GÉNÉRALE DE L'AVIATION CIVILE DGAC**

**PARIS - FRANCE**

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