



Editorial

LET'S MOVE POSITIVELY FORWARD !

I noticed during the last Council session held on 29 November 2007 in London that I am already one of the most senior members since I joined the CEAS (at this time a Confederation, not a Council) in 1996. I have to pay my greatest respect to the achievements made in the past twelve years thanks to the relentless efforts of many "quiet workers".

CEAS is a classical European endeavour, with all its aspects, in particular the fact that the larger societies and the smaller ones all have equal rights and duties. So, to find common solutions is difficult but the best proof of attraction is the aspiration of new candidates for joining us. Recently, the Greek society joined and more to come – Finland, Poland, the Czech Republic, Portugal – whilst discussions for close collaboration with Russia are on the way. Furthermore, MOU's for cooperation have been concluded with China, and with more to be seen in the near future.

We have to make big efforts to bring the CEAS to a fully working organisation. A lot of initiatives are being taken, but not all can be quickly realised, we must therefore prioritise:

- We must find the balance between projects and visions on the one hand, and on the other hand financial resources and available manpower.
- We must harmonise congress dates with individual society activities.
- Activities of CEAS and its Member Societies must be co-ordinated with other European organisations having similar objectives.
- CEAS must be more visible on the European scene in all major aeronautics and space events.
- We must make visible the CEAS added value to its members in the national societies.
- We should also look for a mutual access to partner societies for members travelling to the other European countries.

The first CEAS Congress, Berlin 10-13 September 2007, was very successful; the next one will be in Edinburgh in 2009, devoted essentially to "Air Travel Greener by Design": the strategic importance of this event obliges us to engage from now onward in its preparation.

CEAS is a community depending mostly on the goodwill of individuals. Many devote their time to CEAS in a classical "Swiss way" of servants without honours and fee! Such a community is always fragile and needs a maximum of help from the national societies. Let's move positively forward in this true European spirit!



Georges BRIDEL



Georges Bridel
President, CEAS

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THE LIFE OF THE CEAS

GENERAL ASSEMBLY MEETING

RAeS, London, 29 November 2007, 9:00 a.m.

The CEAS President, Sir Colin Terry, opened the meeting and welcomed all participants.

– Discharge and appointment of Trustees:

- 3AF: Jean-Michel Contant is replaced by Jean-Marc Garot;
- AIAE: Julián Simón Calero is replaced by Antonio Martin-Carrillo Dominguez and Angel Mateo by Leandro B. Fernandez Sáinz;
- NVVL: Peter Kluit is replaced by Fred Abbink;
- RAeS: David Marshall will replace Sir Colin Terry from 16 May 2008, Andrew Little is replaced by Paul Bailey.

– 2007 Accounts and 2008 Budget

The 2007 budget was agreed at the Berlin meeting, 10 September 2007. The size of the 2008 budget and the membership fees will be the same as they were for 2007.

– Election of Members

The Hellenic Aeronautical Engineers Society (HAES) has been officially inducted into the CEAS.

THE 5th MEETING OF THE BOARD OF TRUSTEES

RAeS, London, 29 November 2007, 10:00 a.m.

WELCOME AND PRESIDENT'S MESSAGE

Sir Colin welcomed all representatives particularly those of HAES. He thanked all those who had stood down from the Board and welcomed the newcomers from their respective Societies.

NEW CEAS MEMBER SOCIETIES

– The Finnish Aerospace Society

After the presentation given by Roschier Markku, it was readily agreed that their application to join the Board was approved and that the CEAS President will write to them confirming this.

– Update on other applications

Portuguese Society: a response to Ulf Olsson's letter is still awaited. Aeronautical Society of the Czech Republic: Ulf Olsson will contact it inviting them to become a Member. Agreements with Russia and Ukraine: the VP "External Affairs" will enter into contact with the relevant Bodies.

BRANCH CHAIR STATUS REPORTS

Aeronautics Branch

- The Technical Committees are in course of being set up.
- The Aeronautics Journal and its contents were discussed.



The CEAS dinner, London, 28 November 2007

Space Branch

Dr Stavrinidis has asked to be allowed to produce the CEAS Space Technical Journal: the Board approved this request.

RELATIONSHIP WITH EUCASS

On the invitation of Sir Colin, Prof. Dr W Koschel, President of EUCASS (EUropean Council of AeroSpace Sciences), made a detailed presentation of this organisation. A question was debated. EUCASS and CEAS plan to hold a Technical Conference in 2009. Will it be a joint Conference or two separate Conferences? An optimised solution should be found at the next CEAS Board Meeting.

ICAS-CEAS STATUS

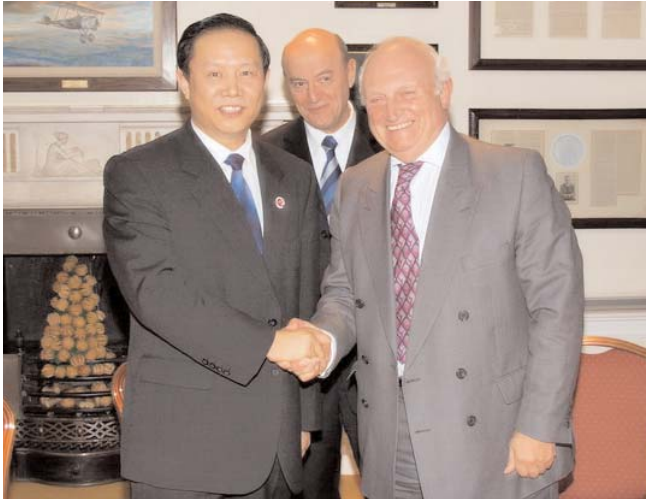
Quite good working relationships: an MOU has been signed.



The signature of the MOU with ICAS, 29 November 2007; from left to right: Dr Fred Abbink, Dr Jean-Michel Contant, Sir Colin Terry.

MOUs

- The MOU with China was signed. Besides, a Memorandum of Understanding process is being initiated for India and Korea.



The signature of the MOU with China, 29 November 2007; from left to right: Mr Yang Junhua, Vice-President of the Chinese Society of Astronautics, Dr Jean-Michel Contant, Sir Colin Terry.

CEAS QUARTERLY BULLETIN

Mr Sanfourche will continue with this publication which has been considered as a highly successful one.

CEAS CONFERENCES

- *The 2008 RAeS Annual Conference*, London 22-24 April will have a political/economic context with the CEAS badge. All necessary informations are given in page 16.
- *The next CEAS Technical Conference*

It will be held in September 2009 in the UK, probably in Edinburgh. It will have the title: **“The environment: this Century’s Challenge for Aerospace Engineering”**. A levy of € 50 per attendee would be returned to the CEAS. The RAeS has a “Greener by Design environmental” committee and



From left to right: Dr Antonio Martin-Carrillo Dominguez, Dr Georges Bridel, Sir Colin Terry, Pr Dr Leandro B. Fernandez Sáinz.

this will set up to run the Conference.

WEB PAGES

The user name is ‘ceas’ and the password is ‘ceas2000’. Information is to be sent to Dr Antonio Martin-Carrillo Dominguez.

AWARDS

Sir Colin Terry has asked industrial companies to sponsor the next five gold medals and a new die (to be arranged with the RAeS) to create them.

ELECTION OF OFFICERS

- President

Sir Colin Terry stepped down as President. He has been replaced by Dr Georges Bridel whose appointment was approved unanimously by the Board.

- Vice-Presidents

- Dr Antonio Martin-Carrillo Dominguez was unanimously elected as the new Vice-President ‘Finance’.
- Dr-Ing. Joachim Szodrich was unanimously elected as the new Vice-President ‘External Affairs and Publications’.

- CEAS Director General

Following a vote, Prof. Dr Leandro B. Fernandez Sáinz was elected as the new Director-General. The AIAE will take on full secretarial support with no cost attached to either this or the Director-General support.

NEXT MEETING

Athens, on 17-18 April.

CONCLUSION

Sir Colin Terry again thanked the Board for its support over the year 2007. He thanked all those who were stepping down as Trustees and Board members and wished every success to the new President, Dr Georges Bridel, as well as the new Vice-Presidents and the new Director-General. In turn Dr Georges Bridel thanked Sir Colin and assured the Board that he would do his very best to pushing the CEAS in 2008.

CEAS ANNUAL REPORT 2007

This has been an eventful year as CEAS starts to put in place the various mechanisms to allow it to move from its Confederation status and function effectively as a Council. It has rapidly established its credentials as the leading proponent of Aerospace in Europe and in effect, with eventually 40,000, members this will make it the largest aerospace society in the world.

In terms of officials, the New Year saw the establishment of the new President, Sir Colin Terry, who has been supported throughout most ably by his three Vice Presidents; Dr Jean-Michel Contant, Dr. Ulf Olsson and Mr. Julian Simon Calero together with the rest of the Board. However, particular mention should be made too of the Director, Dr. Dieter Schmitt and his excellent work in pulling together the governance and other legal issues.

Board meetings had taken place in The Hague, Paris, Berlin and at the time of writing this report, at the end of November in London.

Significantly a realistic budget was set which again relied heavily on individual Societies' subscriptions. That said, there was a concerted wish to plan for a reasonable levy on CEAS sponsored events whenever that was practical. A set of 'Deliverables' was produced to encapsulate the aims of CEAS and to broadcast them to a wider audience.

On the publications side three noteworthy Bulletins were produced which were well received and many societies were able to post them on their websites to avoid extra expenditure and reduce the carbon footprint. Work continued on determining the way forward on the DLR/ONERA Aerospace Science and Technology Journal.

The Technical Committee Structure was agreed with three main pillars of Aeronautics, Space and General. The two Branches of Aeronautics and Space were set up under the leadership of Mr. Alain Garcia and Dr. Stavrinidis respectively with representatives from across the member nations, and the Programme Coordination Committee, under Mr. Gerard Fouilloux, met to coordinate individual events across Europe.

Turning to the external activities: following various presentations, the Council welcomed the Greek Aerospace Society on to the Council. It was hoped though that in due course the Polish Society could be similarly brought on board. Furthermore, the Finnish Society was due to make a presentation in London to seek membership and a dialogue had commenced with the Portuguese Society. Of particular note,

an initial approach had been made to EUCASS to seek a greater understanding of each other's aspirations.

CEAS had been invited by the European Commission to provide a representative for the SESAR Administrative Board and Dr. Hecker's name has gone forward. On the subject of EU support, two visits had been made to the Commission to determine what financial support, if any, might be forthcoming to CEAS and other bodies.

A revised MOU is signed with the AIAA in Berlin and a new MOU was about to be signed with ICAS. Significantly, an MOU is due to be signed in London this month with the Chinese Society of Astronautics, and work continues to set up similar vehicles of understanding with the Indian, the Republic of Korea's and the Russian Societies.

Most importantly, the first CEAS Air and Space Conference took place in September in Berlin organized by the DGLR where over 1000 delegates from all over the world attended and in excess of 500 papers were presented. This was an outstanding success and was attended by National Government and European Commission representatives. The prestigious CEAS Gold Medal was presented to Professor David Southwood, Scientific Programme Director of the ESA.

A CEAS Technical Conference is now planned to be held in the UK in 2009 with among its main themes the environment.

In sum, 2007 has been a challenging year where significant progress has been made on a number of fronts. Much still remains to be done but there is no doubt that CEAS is now seen as a major body for the promotion of Aerospace not only in Europe but increasingly in the rest of the world.



SIR COLIN TERRY
PRESIDENT, CEAS
November 2007

Some biographical information

Georges Bridel

Our new CEAS President

- Studied at the Swiss Federal Institute of Technology, ETHZ, Zurich from 1966 to 1971.
- Swiss-born (1946), Georges BRIDEL studied mechanical engineering at Zurich's Federal Institute of Technology and worked at this University in scientific research areas, receiving his PhD in 1978.
- He is Ms Mechanical Engineer and PhD in Aerodynamics.
- He headed the ALR (Arbeitsgruppe für Luft und Raumfahrt) Aerospace Project development group in Zurich for 15 years working on projects for light combat and training aircraft. The most challenging was joint venture with the former Boeing Military Airplane Company.
- He also contributed to the Indian Light Combat Aircraft programme, together with MBB, initiated and led the development of the FFA-2000 Eurotrainer.
- In 1993, he joined Daimler-Benz Aerospace as technical programme manager. He focused on potential specifications and requirements for fifth Generation Combat Air Systems. He worked in particular on the X-31 Vector as well as UAV and UCAV activities, Air Ground Surveillance and other concepts for aerial reconnaissance and combat, such as Future Airborne Weapon System (FAWS) and the German contribution to the European Technology Acquisition Programme (ETAP).
- He is presently Vice-President Advanced Developments for Military Air Systems at EADS, Munich.
- His challenge is to develop concepts for future air warfare, future weapon systems and operation analysis, and to prepare R&TD programmes for future training and combat aircraft.
- He was President of the Schweizerische Vereinigung für Flugwissenschaften from 1981 to 2001.

Leandro B. Fernandez Sáinz

Our new Director-General



Position held:

- Professor at CEPADE Universidad Politecnica de Madrid;
- Consultant for Empresarios Agrupados, Madrid - Instituto Tecnológico de Castilla y Leon, Burgos - TALGO S.A. - CESA- Symmons-Gabitat;
- Evaluator for the benefit of the European Commission, the European Research Council and INNOVAMAR (PROFIT).

From 1988 to 2000:

- 1989-2000 – Deputy Director of Innovation and Technology Development at Construcciones Aeronauticas S.A., Directorate of Strategic Planning, Madrid;
 - 1988-1989 – Deputy Director, Directorate for Projects, Programmes and Technology at National Institute for Industry, Madrid;
 - 1987-1988 - Senior Engineer, European Space Agency, Paris – Long-Term planning, Columbus and Preparatory Programme of Infrastructure for Manned Space Flights.
- He has been a member of AECMA (now ASD) Economics Commission from 1990 to 1997.

As evaluator for the EU Framework Programme FP-7, he covered the following themes: Aeronautics and air transport – Security - Sustainable surface transport (rail, road and waterborne) - Integration of technologies for industrial applications - Cross-cutting activities for the implementation of the Transport Programme.

Among his realisations: design and development of an Optical Scanning Mechanism with minimum momentum transfer (1981) - "On the use of the orthogonal Collocation Method for solving the boundary layers equations", Doctoral Thesis University of California, Santa Barbara (1973) - "On the expansion of chemical releases in the upper atmosphere", Diploma in Space Sciences, University College, London (1968).

Antonio Martín-Carrillo

Our new Vice-President Finance



- Is M.S. Aeronautical Engineer (Polytechnic University of Madrid), MBA (University of Bridgeport, USA) and Doctor in Economic Sciences (Complutense University of Madrid).
- He is presently Dean of the College of Aeronautical Engineers of Spain and President of the Direction Committee of "The Aerospace Foundation".

- He is President of the Association of Aeronautical Engineers of Spain (AIAE)

- His professional career includes:

- Head of Cabinet of the Secretary of State for Transportation and Infrastructures, 1996-97;
- Managing Director of Organisation, Executive Assistant of the President of National Railways of Spain and Chief of Technology & Innovation of AVE (Spanish High Speed Train);
- Deputy Project Manager of Eurofighter, 1989-91, and Chief of Production, 1987-89, at Getafe Plant, CASA;
- Aeronautical Engineer at Sikorsky Aircraft (United Technologies Corp.), Connecticut, USA, 1985-87.

THE WORD of Dott. Triantafillos TSITINIDIS



On the left, Dott. Triantafillos Tsitinidis, President of the HAES ; on the right, Sir Colin Terry.

“The Hellenic Aeronautical Engineers’ Society (HAES), established in 1975, is the professional and scientific association of all licensed Aeronautical Engineers in Greece. HAES is a branch organisation of the Technical Chamber of Greece (TEE), and a Member of the International Council of Aeronautical Sciences (ICAS) as the National Representative for Greece.

The founding purposes of HAES, as stated in its constitutional declaration, include the advancement of scientific knowledge and professional status of its members, the provision of support to the State in all aspects relevant to the professional and educational disciplines of the members of the Society, and the promotion of Aeronautical / Aerospace Science and Engineering in Greece. Developing close relations and effective cooperation with scientific and professional organisations of similar scope, in Greece and abroad, is one of the main objectives of the Society perceived as a high value “tool” for the fulfilment of its goals.

In this framework, participation of HAES in an established European Society like CEAS is perceived as an important step towards the promotion and systematic integration of national activities in the global aerospace arena, and the enhancement of international cooperation towards the harmonisation and effective contribution of in-country capabilities and expertise to projects and developments of intra-European interest.

As a member of CEAS, we expect to have the opportunity to:

- follow, participate and contribute to future developments in Aerospace Research and Technology in Europe more efficiently;
- enhance the international cooperation prospects of the Hellenic industry and research in the field of aerospace;
- support the harmonisation process to European regulations and quality standards;



- elaborate on matters like professional qualification requirements, standards of professional practise and codes of ethics in the aerospace field, particularly in the area of civil aviation;
- explore means for intersectoral (industry – academia / research) communication and mobility;
- assess potential improvements in aerospace education in Greece;
- enhance Hellenic representation in European (and international) fora.

Already, since the HAES election to CEAS, the Society has commenced actions to the Technical Chamber of Greece, the General Secretariat for Research and Technology, the National Observatory of Athens, and the industrial and research organisations involved in aerospace activities in Greece, in order to mobilise the involved parties towards a constructive Hellenic participation in CEAS. Overall, HAES expects to contribute to CEAS activities by:

- Participation of members (in the wider context) of the Technical Chamber of Greece in the various CEAS functions, including the Aeronautical and Space Branch Technical Committees and Study Groups.
- Supporting the organisation and materialisation of CEAS events.
- Being actively involved in CEAS initiatives, such as conferences and publications.
- Promoting the dissemination of CEAS activities and publications in Greece.

As a first step, HAES shall be pleased to host the next meeting of the CEAS Board of Trustees in Athens, Greece.

HAES is honoured to have joined the family of CEAS and commits to actively work together with CEAS and the CEAS member Societies towards closer European relations in the aerospace field and the fulfilment of the CEAS statutory objectives.

On behalf of the HAES Board we are looking forward to meeting the CEAS Board members next April in Athens.”



PERSONALITY INTERVIEW

Jean-Pierre Sanfourche, Editor-in-Chief of the CEAS Bulletin, has interviewed Denis MAUGARS



Denis Maugars is President of ONERA since 1st April 2003 and new President of the EREA (European Research Establishments in Aeronautics) since 1st January 2008.

1. What is your view of EREA's current situation: its strengths? its weaknesses?

EREA is an association that was founded at the start of the 90s at a time marked by various industrial regroupings in the European aeronautics sector. The idea of a parallel initiative aimed at unifying the public R&TD efforts in the sector was therefore perfectly natural.

EREA has shown itself to be active and has gradually proved itself to be relevant and representative on the European scene. EREA has succeeded in establishing good internal consultation as it is demonstrated by the example of test facilities with the creation of the Aero Testing Alliance (ATA) and the setting up of the network of excellence EWA (European Wind tunnel Association). Progress has still to be made in order to realise the initial ambitions in terms of joint research programmes and exchanges of personnel, in particular.

2. Could you briefly remind us of the most significant advances that the organisation has made in the last two or three years?

To put it concretely, EREA now has a very good idea of how to speak with one voice and defend the interests of its members in many areas concerning the European Union's research activities as well as within the ACARE: consultation when drawing up the work programmes, coordination at the level of the proposed projects, taking positions (for example vis-à-vis the Green Paper on the European Research Area), consultation about our participation in the Clean Sky Joint Technology Initiative and the SESAR Joint Understanding, discussion on the problems of infrastructures, etc.

EREA created in 2006 an internal group dedicated to the coordination of the actions in the EU's Security programme, in the image of a group that has been working for many years for aeronautics. The same year also saw the setting up of a group dedicated to the mobility aspects as well as a prize for the best scientific publication and a prize for the best innovative idea.

3. What is EREA's relationship with ASD?

Our relationship with our (very imposing) partner, ASD, is at one and the same time close, good and tinged with com-

plexity. For example, in the matter of community research programmes, we, at EREA, are by nature more inclined to defend an effective presence of upstream studies and research whereas the industry naturally has a tendency to 'pull' everything downstream. We have to defend our territory at the level of projects and sometimes that means that we are in competition. Nevertheless, together (in particular within ACARE) – and this is the most important thing - we defend the overall interests of the aeronautic sector. The best recent example that I can give is the reaction of ACARE to the Green Paper on the European Research Area which was finalised by the ASD and very influenced by the EREA points of view that were also transmitted to the Commission.



EREA
JOINTLY PROVIDING
R&T FOR EUROPEAN
AERONAUTICS

The association of European Research Establishments in Aeronautics (EREA) was created in 1994 by the seven major national Research Establishments in the European Union to provide industry, operators and governments with a cost effective high quality aeronautics technology base through the coordinated use of capabilities, resources, personnel and facilities.

Today, the 7 full members of the association are: CIRA (Italy), DLR (Germany), FOI (Sweden), INTA (Spain), NLR (the Netherlands), ONERA (France) and VZLU (Czech republic).

Four Associate members joined EREA in 2006: ARC (Austria), ILOT (Poland), INCAS (Romania) and VKI (Belgium)

4. Do you plan to enlarge EREA in the short term and if yes with which establishments?

When it was created, EREA was made up of 7 partners: CIRA (Italy), DLR (Germany), DRA (United Kingdom), FFA (Sweden), INTA (Spain), NLR (Netherlands) and ONERA (France). The transformation of the DRA into DERA and then into QinetiQ meant that in the end the British research establishment did not fit naturally into the Association. They left in 2003 but the Czech VZLU joined us as soon as that country acceded to the European Union, i.e. in 2004. EREA has also created the status of associate member in order to be as wide open as possible without at the same time making the running of the Association more cumbersome. ILOT (Poland), VKI (Belgium), ARC (Austria) and INCAS (Romania) joined us in 2006. Furthermore, ILOT will become a full member of the association in the course of 2008.

5. Can you tell us about the main lines of the strategy you intend to implement in 2008 which affairs will be dealt with in en priority?

Naturally, I wish to see my activities as a continuation of those of my predecessors, in particular in terms of external communications: EREA will participate in the main aeronautical events like the air shows (ILA 2008 and Le Bourget 2009), the "Aerodays" and the large European scientific conferences. I also propose to sign the European Charter for researchers and the code of conduct for their recruitment with the Commission.

As I already mentioned, we have successfully integrated new members, now we need to develop our joint actions in favour of forward looking research and also and above all encourage (at last) mobility between our member establishments.

6. CEAS has undertaken the creation of two technical publications: the "CEAS Aeronautics Technical Journal" and the "CEAS Space Technical Journal". How do you see EREA's participation in these two publications?

First of all, I would like to remind you that EREA is made up of a formidable reservoir of scientists covering all of the disciplines in aeronautics research: more than 4,000 engineers and researchers, 170 PhD theses per year and several thousand publications. The scientific and technical journals are an indispensable tool to enhance the work of our researchers. This CEAS initiative seems therefore quite promising for the European aerospace R&TD.

Clean sky: A joint technology initiative for aeronautics and air transport

On 20 December 2007, the final approval of the regulation creating the Clean Sky Joint Technical Initiative (JTI) was signed in Brussels and the celebration of its launch took place on 5 February 2008.

Aviation is an essential element of today's global society, bringing people and cultures together and creating economic growth across the globe. The air transport industry does not ignore the growing concerns over the environment, related to air pollution, noise and contribution to climate change, although today the contribution of air transport to man-made green house gases is only 2 %.

"CLEAN SKY" will develop breakthrough technologies to significantly improve the impact of air transport on the environment.

This JTI will be one of the largest European research projects ever, with a budget estimated at Euros 1.6 Billion, equally shared between the EC and industry, over the period 2008-2014. This Public Private Partnership will speed up technological breakthrough developments and shorten the time to market for new solutions tested on Full Scale Demonstrators.

It will offer opportunities to the entire aeronautic supply chain from all Member States and Associated countries and will encourage the participation of SMEs to ensure their full involvement in the programme.

Moreover, the indirect economic and social impact of the sector is even greater and more widespread. Based on projected growth, over the next twenty years, air transport could contribute an additional 1.8% of GDP to the EU (equivalent to Euros 200 Bn per year).

At the same time, it takes more than a decade to develop a new generation of aircraft whilst aircraft are in service for more than 30 years.

The objectives

To make major steps towards the environmental goals set by ACARE and to be reached in 2020:

- 50% reduction of CO₂ emissions through drastic reduction of fuel consumption;
- 80% reduction of external noise;
- a green product life cycle: design, manufacturing, maintenance and disposal/recycling.

The benefits

Clean Sky is expected to: (i) accelerate the delivery of the technologies necessary to reach the above goals; (ii) increase the competitiveness of the European industry, thus contributing to the Lisbon Strategy objectives; (iii) encourage the rest of the aviation world to make greener products.

The participation

The current Members of the Clean Sky programme represent 86 organisations in 16 countries including: 54 industries including 20 SMEs; 15 Research Centres; 17 Universities. A significant part of Clean Sky will be performed by Partners and Subcontractors selected through Calls for Proposals and Calls for Tenders.

The Integrated Technology Demonstrators



The Clean Sky JTI is articulated around six demonstrators:

- Smart Fixed Wing Aircraft;
- Green Regional Aircraft;
- Green Rotorcraft;
- Sustainable and Green Engine;
- Systems for Green Operations;
- Eco-Design.

• SMART FIXED WING AIRCRAFT (SFWA)

The SFWA demonstrator will develop and test an all new “smart wing” design that makes use of passive and active flow and load control technologies and will help to reduce the drag of the wing in cruise. The studies will be conducted within the framework of an optimised and integrated overall aircraft system, including all aspects of aircraft design: flight physics, structure and systems.

A new aircraft architecture

Progress in engineering design is still offering high improvement rates in specific fuel burn. This is envisaged by developing “Gamechanger” technologies like the geared turbofan or the open rotor to a higher level of maturity. Installing these novel engine types may require significant changes to aircraft architecture and may involve finding new solutions to as yet unknown technical problems.

The most promising new engine concept will be selected by the SFWA and SAGE ITDs. The impact and consequences for the aircraft architecture and possible solutions, such as alternative engine positions and a modification of the rear empennage, will be envisaged.

• GREEN REGIONAL AIRCRAFT (GRA)

The objective of the Green Regional Aircraft ITD is to validate and demonstrate the technologies best fitting the environmental goals for the regional aircraft entering the market in 2015-2020. This ITD will deliver low-weight solutions using smart structures and new materials, as well as low external noise configurations.

Demonstration

Full scale structural assemblies, low noise aerodynamics configurations, integration of advanced systems and avionics on aircraft, will be tested on ground and in flight as appropriate, along with large scale wind tunnel tests of advanced aircraft and powerplant configurations.

• GREEN ROTORCRAFT

Rotorcraft operations are expected to grow sharply in the future to face the European citizen’s demand. The areas of technology development are the external noise reduction and the way to obtain a cleaner and more efficient power use.

External noise reduction

The programme foresees two areas of investigation: (i) the rotor blades-passive optimisation and active control techniques to minimise impulsive air loads hence the radiated noise; (ii) concerning turboshaft engine installation: design of intakes and exhaust nozzles to mask or absorb the noise especially in hover and low speed flight conditions.

Cleaner and more efficient power use

- Cabin volume, tail unit, rotor pylon and hub will be designed with the objective to reduce aerodynamic drag and download in cruise flight conditions.
- Engine integration will be based on two complementary activities: adaptation of Diesel engine technology to light helicopters and turboshaft engine installation optimised for minimal power loss.

• SUSTAINABLE & GREEN ENGINES

The Challenge

The engine, as the biggest environmental contributor, must make radical changes to its architecture. Innovative products are needed and to develop them, it is imperative to design, build and test engine demonstrators, which is the only way for maximising the benefits identified in existing collaborative research programmes.

The response

It is foreseen to build and run up 5 demonstrators during the 7 years of “Clean Sky”. The current focus is for engines to address the replacement of Airbus A320 and Boeing 737 families expected in the second half of the next decade.

The current priority of Rolls-Royce and Safran as ITD leaders is to accelerate the evaluation and validation of Open Rotor engines. In addition demonstrators are likely to be launched to validate alternative architectures for ducted engines e.g. a geared turbofan, large direct drive turbofan and new rotorcraft engine.



● **SYSTEM FOR GREEN OPERATIONS**

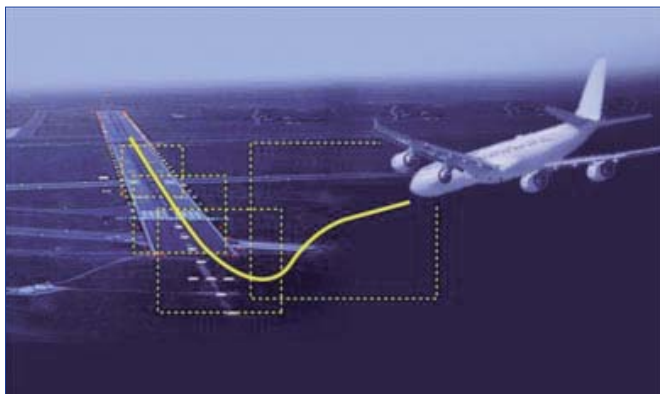
This ITD will create value for improved aircraft operation through the management of aircraft energy and also the management of mission and trajectory. The highest overall benefits will be realised during the approach, on-ground and departure phases, where the environmental impact near built-up areas is directly affected. In addition, the technologies from this ITD are enablers for further improvements in environmental impacts at the vehicle level.

The management of aircraft energy

It encompasses all aspects of on-board energy provision, storage, distribution and consumption. The goals are directly related to the overall “Clean Sky” objectives: (i) optimisation of power consumption as well as of the aircraft energy along the mission; (ii) reduction of maintenance-related environmental impacts, such as elimination or at least drastic reduction of undesirable fluids like hydraulics or cooling fluids. The main focus of the demonstration will be the validation and maturation of technologies and sub-architectures, in order to show that the technologies work in the relevant altitude, temperature, vibration and pressure environment.

Management of mission and trajectory

New approaches have to be adopted for an overall optimisation of the aircraft and systems.



Avoiding bad weather whilst following future Air Traffic Management rules are a challenge.

- **Green Trajectories** will be based on more precise, reliable and predictable 3-Dimension flight path, optimised for minimum noise impact and low emission, including agile trajectory management, in response to meteorological hazard.
- **Smart Ground Operations**, on the airfield itself, will use new systems solutions and new ground procedures, so as to allow aircraft engines reduce fuel consumption and offer additional environmental benefits.
- **Green mission** : this mission, from start to finish, will be conducted with management of new climb, cruise and

descent profiles, based on new aircraft performances database including noise parameter and allowing multi-criteria optimisation (noise-emissions-fuel-time), including also management of weather conditions which could negatively impact the optimum route and result in additional fuel consumption.

● **ECO-DESIGN**

This ITD aims at minimising: (i) consumption of non-renewable fossiled materials, emission of gaseous, liquid or solid effluents presenting a danger for the atmosphere, the earth and the water; (ii) impact of production means on operators (their physical & psycho health) and consumption of natural resources (water, minerals,...).

Eco-Design for Airframe

This ITD focuses on on the complete life cycle of an aircraft, from early design and raw materials to the phasing out of the final product. The objective is to reduce:

- inputs, viz, energy, non renewable materials, water, ...
- outputs, such as gaseous and liquid effluents, soiled water, material scraps...
- the use of CMR (Carcinogenic, Mutagenous, Reprotoxic) compounds for structures, cabin interiors, vehicle systems components and equipment, engine components, electronics.

The regulations concerning restrictions on the use of certain hazardous substances will be strongly taken into account by studying alternative solutions to replace the prohibited substances.

Eco-Design for Small Aircraft Systems

The primary objective is to demonstrate the feasibility and highlight the economic benefits at aircraft level of the “oil-less power-by-wire” for the small cabin aircraft.

- The removal of hydraulics is the major incentive to consider the evolution of small aircraft towards a completely all-electrical aircraft. It will provide significant benefits on the environmental impact in terms of maintenance and disposal. The use of On board power-by-wire as only media offers a lot of possibilities: energy management by intelligent load shedding, power regeneration on actuators, sharing of Electrical Control Unit over actuators...
- The on board power-by-wire concept provides benefits: a greener power efficiency, fuel consumption, thus reducing CO₂ and NO_x emissions.

JEAN-PIERRE SANFOURCHE

From information data provided by the European Commission, DG-Research, Aeronautics

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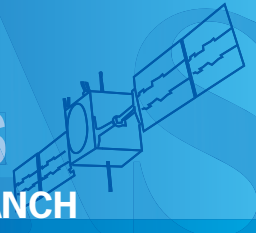
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THE ESA SCIENCE PROGRAMME IN 2008

By David Southwood, Director of the Scientific Programme, ESA

CEAS



The ESA Science Programme is an acknowledged European success, an example of Europe doing together what its individual countries could not achieve alone.

The past year has been a good one. After a lot of preparation throughout the European science community, a

new set of goals for European space science has been set. The missions now short-listed for Cosmic Vision 2015-2025 fit well with four themes, the conditions for life and planetary formation, the origin and evolution of the Solar System, the fundamental laws of our cosmos and the origin and structure of the Universe. The specific missions themselves range from study of the interaction of Sun and Earth, a mission to return an asteroid sample, possible missions to Jupiter or Saturn systems, a search to understand dark energy, a next generation X-ray observatory, a further step in the search for extra-solar planets, and a next generation infra-red observatory. The breadth shows the maturity of the European space science community and the vitality of their stock of ideas.

A striking feature of the proposals is the part international cooperation is planned to play in many of the proposed missions. This is deliberate; science opens doors to wider cooperation in the long term. Inevitably a result is that some missions will be “world missions” and ESA is thus taking a key part in orchestrating global space science.

Is there or should there be more than science in the ESA Science Programme? It is special, the only mandatory ESA programme; all ESA Member States must contribute to it. As such it should be seen as not only as a flagship but also it

should serve as a backbone. It should set technical challenges to industry and play a wide part in maintaining space industry capability across Europe. By the same token, industry should see the need to use it and, when necessary, defend it. In the past year, an external Science Programme Review Team (SPRT) reported. Its judgement gave good marks to the management but it nonetheless has come up with an array of recommendations to be implemented henceforth. Most importantly, it has set long term goals for the adjusting the balance between investment and exploitation.

Is all well then with the programme? Its very success and wide levels of acceptance and satisfaction in the community bring the danger of complacency in taking the virtues of the programme for granted. In the coming year, there will be a Ministerial Council. Political battles will rage in the coming over the content of the various optional programmes brought for Member States to sign up to. Ultimately all Member States must approve the level of the mandatory programme unanimously. The SPRT has shown the programme is now functioning about as efficiently as it could. Now would be a good time to recompense success and even increase the programme budget. Will this happen? It is a challenge to the complex political European process that the Science Programme, the flagship and the one programme that all contribute to is seen not just as a support to industrial development nor as bargaining counter, nor as a tax, not even as a good way to build European science but also as one of the best external evidences that Europe together can explore grand goals and achieve great things.

THE EUROPEAN SPACE MISSIONS IN 2008: A VERY LOADED CALENDAR !

This year will see an exceptionally high number of launches, all of greatest importance.

- **7 February:** Space Shuttle mission STS-122/Columbus. This mission of Atlantis to the ISS is particularly important for Europe since it will carry Columbus, the new European science laboratory the installation of which represents a new step in Europe's capability to perform cutting-edge research. In addition, the Shuttle's crew of seven includes ESA German astronaut Hans Schlegel and ESA French astronaut Leopold Eyharts, both on their second spaceflight.

- **2nd half of February:** Launch of ESA's first Automated Transfer Vehicle “Jules Verne” to the ISS onboard an Ariane 5, from CSG Kourou.



Columbus was onboard NASA's Space Shuttle Atlantis when it lifted off from the Kennedy Space Center in Cape Canaveral, Florida at 20:45 CET, 7 February 2008. For this one-way trip to Earth orbit, Columbus is in the expert hands of a crew of seven astronauts, including two members of the European astronaut corps: Léopold Eyharts of France and Hans Schlegel of Germany.

THE EUROPEAN SPACE MISSIONS IN 2008: A VERY LOADED CALENDAR !

- 25-26 April: Launch of GIOVE-B satellite for the Galileo system onboard a Russian Soyuz, from Baikonur, Kazakhstan.
- 31 May: Launch of ESA's GOCE (for Earth gravity field observation), onboard a Rockot launcher, from Plesetsk, Russia.
- October: Launch of ESA's Herschel and Planck spacecraft onboard an Ariane 5, from CSG, Kourou.
- October: Launch of ESA's SMOS (Soil Moisture and Ocean Salinity) mission, together with the Proba-2 satellite, onboard a Rockot, from Plesetsk, Russia.

JPS.

From information provided by ESA Media Relations Office. Tel.: +33(0)1 53 69 72 99

GALILEO: A GLOBAL CIVIL SYSTEM

by Dominique Detain, Directorate of Telecommunication and Navigation, ESA

In April the second Galileo satellite called GIOVE B (for Galileo In Orbit Validation Element) will be launched by a Soyuz rocket from the Cosmodrome of Baikonur, Kazakhstan. This will be another concrete sign that Galileo is moving ahead. Indeed Europe, thanks to a close cooperation between the European Commission and the European Space Agency is currently setting up its own global satellite navigation system, Galileo, which will offer very accurate positioning and timing, under civilian responsibility.

Why Galileo, in addition to GPS and Glonass?

Galileo will be compatible with the two other existing systems, GPS and GLONASS. A user will be able to use the same receiver to calculate his position from signals sent out by any satellites combination, however Galileo will offer to all users a bi frequency system that will allow knowing position within one meter of accuracy, which is unprecedented for an openly accessible service.

Apart from extreme circumstances, it will always be available and its users will be informed in a few seconds of a potential disruption of one of the satellites. Thus it will be usable for safety of life applications, requiring the highest security level, such as plane landing, train circulation or car guidance.

Today European users have no other choice than use data provided by the American GPS or Russian GLONASS to know their position. But military operators of both systems don't wish to give any guarantee on the continuity of service. Satellite localization has become the standard for high sea navigation and it will soon be the case for terrestrial transports and air traffic. If it would happen one day that the signal be disrupted a lot of sailors would find it difficult to go back to conventional methods of sailing and to use old almanacs and sextants to calculate their positions. In a few years, when satellite positioning will be generalized, the consequences of a signal disruption will be worse, endangering not only the efficiency of transports systems but also the security of people.

As early as beginning of the 90s, European Union understood how important it was that Europe has its own world-

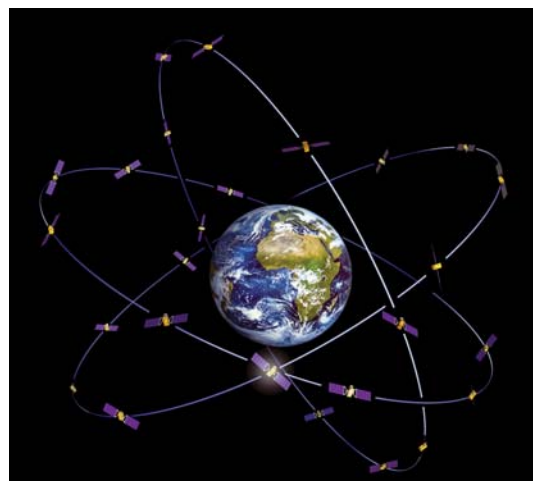
wide satellite navigation system. The decision to develop such a system can be compared to decisions taken in the seventies to launch other big European projects like Ariane or Airbus. The European Commission and the European Space Agency have therefore joined forces to create Galileo, an independent system, under civilian control and whose quality will be permanently guaranteed.

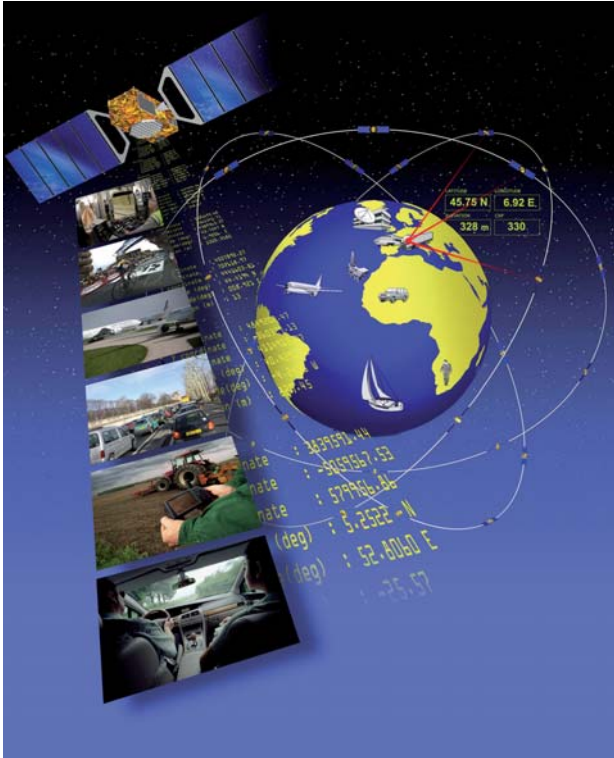
Finance

The Global Navigation Satellite System (GNSS) will allow the emergence of new value added services and products meant for road, rail, air and maritime transports but also for professional applications such as fishing, precision farming, oil prospecting etc. Furthermore it will become a crucial tool for civil protection.

Social and economic spin-offs from Galileo, in Europe as in the world at large, are huge. They will notably come from the additional capacities that this system will bring to GNSS.

Until now the design, development and in orbit validation phase have been co-financed by the European Commission and the European Space Agency and it has been recently decided that the deployment of the overall system will be also financed by public money, the private sector coming into the picture for operations once the system is fully installed.





GIOVE-A, GIOVE-B, and the Full System

A first Galileo satellite was launched in December 2005. This satellite named GIOVE-A (Galileo In Orbit Validation Element) marked the concrete start of Galileo in space. This successful launch allowed to secure the frequencies allocated to Galileo within the International Telecommunications Union and also to check critical technologies currently under development for the Galileo system. Indeed before having a full system operational on orbit it is mandatory to double check any new technology since in the very hostile environment of space there is no way back, this is why everything has to be achieved step by step. For example with GIOVE-A, and GIOVE-B to be launched this spring 2008, new types of atomic clocks are tested, a key issue since time is at the heart of any satellite navigation system.

The Galileo clocks will be accurate from 1 nanosecond to 10 nanoseconds over 24 hours! Also the particular orbit chosen for the satellites has to be understood since it is the first time Europe launches a satellite in what is called the Medium Earth Orbit, at 23222 km of altitude, and it is necessary to monitor the radiation encountered so as to characterize this specific environment and therefore build the operational satellites accordingly. The lessons learnt from this phase are taken for the following step: four satellites to be launched to validate the basic design of the Galileo constellation and its associated ground segment.

The first results from GIOVE-A in space are very encouraging since they are in line with what was expected giving confidence that Europe can achieve it!

When this "In Orbit Validation" phase will be done the remaining satellites will be launched to get to full operations capa-

city. Once fully deployed the Galileo constellation will comprise 30 satellites (27 operational and 3 backup), posted on 3 orbital planes with an inclination of 56° with the equator. This will ensure a perfect coverage of our planet with the help of a network of stations distributed all around the earth, Galileo being the first complete civil satellite navigation system.

Europe already in the satellite navigation system field

Waiting for Galileo, Europe is already working in the satellite navigation field: ESA, with the European Commission and Eurocontrol, is developing EGNOS (European Geostationary Navigation Overlay Service). This is a network of ground stations correcting and processing GPS signals and transmitting the improved data via geostationary satellites. Compatible with equivalent systems in the world such as WAAS (Wide Area Augmentation Systems) in the US or MSAS (Multifunctional Satellite Augmentation Systems) in Japan, EGNOS is now in pre-operational service for non safety of life applications and will be later certified for safety of life services. With EGNOS Europe can already show its know how in satellite navigation with the European Industry engaged in working in this promising new technologies whilst at the same time a strong community of users can start developing many value added services, notably in the transport domain. Already with EGNOS many applications have been demonstrated from tracking the riders on the Tour de France to guiding the blind persons, virtual tolling on highways and monitoring rail traffic.

This development of EGNOS is a tremendous experience, paving the way for Galileo. But of course if GPS is disrupted EGNOS will warn about it but will not be able to continue on its own... This is why the second step, Galileo, is necessary!

Galileo: made in Europe, for Europe and beyond

When operational, Galileo will allow a full set of services: from the Open service, similar to what GPS provides today but with a better accuracy, to services that GPS, a military system, cannot or does not want to offer: Commercial services, Safety of Life for civil aviation, maritime transport etc. and also Search and Rescue service: a person in distress will be able to send an SOS associated to its position in quasi real time, a message that will be acknowledged and the S & R team will be able to intervene rapidly in a very well defined area.

And finally the Public regulated service will be at the discretion of each European Union government for its ambulance, its customs, and its police forces.

Galileo will be this new and safe tool made in Europe for Europe and beyond, whose foundations are currently being built by the European Space Agency.

Future Space Regulations based on the Aviation Model

Workshop at 1st CEAS European Air & Space Conference 2007

The current space treaties provide generic principles but no implementing rules. They were produced at a time in which two countries, U.S. and Soviet Union, locked in the Cold-War, had a near monopoly on space activities with not much presence of the private and commercial sector. The space treaties were therefore conceived in a past epoch for the purpose of defining the overall limits applicable to each nation's governmental space activities, and not to facilitate and promote commercial and civil international cooperation.

The emerging trend for the 21st century is instead towards a global space industry involving together with the traditional space powers a multiplicity of government and corporate stakeholders worldwide.

A mixture of factors ushered this new space age. The worldwide spreading of (dual) space technologies and services, global economic trends, but also the dramatic socio-economic and political changes that followed the end of the Cold-War, the collapse of the Soviet Union, and the abandonment of the communist economic orthodoxy by China. Finally the Shuttle Columbia accident in 2003 precipitated an overhaul of the U.S. space policy, first as re-direction of NASA towards exploration missions, and later in October 2006 with the enunciation of a new U.S. overall civil, commercial and (in particular) military space policy. This policy made overnight the previous concept of "outer space" obsolete or

at least pushed it somehow beyond the geostationary orbits, while a sort of "near space" has taken shape which a nation has the right to exploit for its own interest and no more as an *ambassador of the mankind for the benefit of all*. The new U.S. space policy is not revolutionary but it is just a factual picture of what the nearest region of space has become. Commercial and military space-based systems are nowadays synergetic with the systems on Earth and indeed essential to human activities. Space is another realm of human activities where it is in the interest of the global community to operate in accordance with clear international rules instead of vague principles. Not only orbits and frequencies allocations, but also traffic control, safety and a number of support services such as space weather forecast and orbital debris monitoring need to be coordinated transparently and effectively at and international level.

In this dynamic context the establishment of an international civil space regulatory framework is no longer a matter of "if" but "when". This point and in particular the possible extension to space of the "ICAO model" was the theme of a workshop organised at the occasion of the CEAS Conference 2007 in Berlin by the IAASS (International Association for the Advancement of Space Safety). The workshop discussion was supported by leading experts in space technical and policy fields, including the notable participation of Gérard Brachet, chairman of the United Nations COPUOS (Committee on the Peaceful Uses of Outer Space). The main conclusion of the workshop was that the pre-requisite for the creation of an international regulatory framework should include the establishment of international consensus standards for space safety and space traffic control, managed and driven by a steering board made of representatives of institutional stakeholders from all spacefaring countries. Such international consensus standards would

then be enforced legally at national level. In the process, close interfaces would be maintained with ICAO for promoting all the necessary rules for the integration of aviation and space traffic control (through the airspace), and also for the definition of certification standards for emerging hybrid systems (i.e. aero-spacecraft and spaceplanes).

T. SGOBBA, ESA, Noordwijk, Netherlands



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The CEAS:an International Non-Profit Association
Located: Belgium - Rue du trône 98 - 1050 Brussels

The CEAS aims to develop a framework within which the major aerospace societies in Europe can work more closely together. The Member Societies: AAAF (France), AIAE (Spain), AIDAA (Italy), DGLR (Germany), FTF (Sweden), HAES (Greece), NVvL (Netherlands), RAeS (United Kingdom), SVFW (Switzerland). Following its establishment as a legal entity conferred under Belgium Law, this new organisation began its operations on 1st January 2007.

The basic mission of the Association 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, industry, governments and academia. The Council is governed by a Board of Trustees, with representatives of each of the Member Societies.

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Among the Main Coming Events

- **22-24 April 2008: AEROSPACE 2008, THE WAY FORWARD**



The RAeS Annual Conference will take place in London on 22-24 April. It will include the Political/Economic Conference of the CEAS. 2008 sees the centenary of British Aviation, so it represents an appropriate time to look forward at the state and future of aviation worldwide for the next 100 years and to consider the strategic challenges that lie ahead.

- **22 April, the Military day:** technology has hugely extended war-fighting capability but constraints have arisen from new areas such as information management and developments in international law. How will things have to change?
- **23 April, the Research & Technology Development Day:** environmental issues are now to the fore but so are security concerns over the terrorist threat. Is research being focused in the right areas and are Governments doing enough to show leadership and underpin that leadership with funding?
- **24 April, the Air Transport Day:** the demand for civil air travel continues to grow but can we identify the limiting aspects of the future? If so, how should we react and what should the aviation and aerospace community be doing now?

The RAeS is seeking ministerial keynotes for each of the three days and anticipating strong attendance and support.

CEAS Members are welcome to attend at the Member rates. Persons wishing to present a talk at the conference should contact :

Lorraine Reese on: conference@raes.org.uk

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Contact: Kirstie Eaton – Tel.: +44(0)20 7670 4345

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- **5-9 May:** Space Propulsion 2008 – 5th Int. Spacecraft Propulsion Conference, 2nd Int. Symposium on Propulsion for Space Transportation. **Venue:** Heraklion, Crete (Greece) www.propulsion2008.com
- **26-27 May:** EUCOMAS (Eur. Conf. Mat. & Strat. in Aero.). **Venue:** Berlin
- **27 May-1st June :** ILA 2008. **Venue:** Berlin
- **28-30 May:** IAA 1st Symposium on Private Manned Access to space. **Venue:** Arcachon (France) www.avantage-aquitaine.com

- **9-11 June:** Avignon (France). International Symposium: On-Board Energy Materials – secr.exec@aaaf.asso.fr – www.aaaf.asso.fr
- **30 June-5 July:** 8th World Congress on Computational Methods in Applied Sciences and Engineering. **Venue:** Venice (Italy) www.iacm-eccomascongress2008.org
- **8-11 July,** Prague (Tch. Rep) 5th International Symposium: Anti-Missile Defence – secr.exec@aaaf.asso.fr – www.aaaf.asso.fr
- **3-5 September,** Braunschweig (Germany) Workshop: Composite Airframe Structures geschaeftsstelle@dglr.de – www.dglr.de
- **16-18 September,** Liverpool (UK). International Symposium: Rotorcraft Forum – www.raes.org.uk/conference
- **23-25 September,** Darmstadt (Germany). Annual Aeronautics and Astronautics Conference, DGLR – geschaeftsstelle@dglr.de www.airshipconvention2008.org
- **9-11 October,** Friedrichshafen, Germ., 7th International Airship Convention 2008 – geschaeftsstelle@dglr.de – www.eucomas.eu
- **13-17 October:** 6th Aerothermodynamics Symposium for Space Vehicle Design. **Venue:** Onera, Chalais-Meudon (France).
- **14-16 October,** Liverpool (UK) Conference: Designing the next Generation of Civil Aircraft Structures (CEAS/Str.&Mat. Group) www.aerosociety.com/conference
- **22-24 October,** Hamburg (Germany). International Meeting, Aviation Product Support – geschaeftsstelle@dglr.de – www.imapp.org
- **27-29 October,** London, UK, CEAS/Aerodynamics Group Conference: The Aerodynamics of Novel Configurations – www.aerosociety.com/conference

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