The Quarterly Bulletin of the

CEAS

COUNCIL OF EUROPEAN AEROSPACE SOCIETIES

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

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Special Edition

CEAS 2009 European Air and Space Conference

WHAT IS THE CEAS ?

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

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

www.ceas.org

WHAT DOES CEAS OFFER YOU ?

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

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

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

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

EUROPEAN PROFESSIONAL RECOGNITION:
- Directory of European Professionals

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

YOUNG PROFESSIONAL AEROSPACE FORUM

SPONSORING

THE CEAS MANAGEMENT BOARD

IT IS STRUCTURED AS FOLLOWS:

- General Functions: President, Director General, Finance, External Relations & Publications, Awards and Membership.
- Two Technical Branches:
  – Aeronautics Branch
  – Space Branch

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

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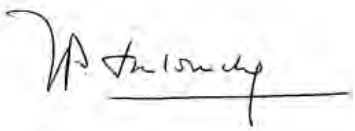
EDITORIAL

MANCHESTER 2009

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

The CEAS 2009 Air and Space Conference was hosted by the Royal Aeronautical Society and took place from 26 to 29 October at the Manchester Central Convention Centre. The central theme was 'New beginnings: challenges for aerospace innovation' and intended to offer the aerospace world – but in particular the European community –, a comprehensive showcase for innovation, research, technical developments and studies across both civil and military air and space applications.
The event was successfully organised by the RAeS, and was pleasantly punctuated with several high-profile social events including a Welcome Reception on the opening day. This was followed on successive days by a Civic Reception in Manchester's Landmark Palace Hotel and a Gala Dinner in the Concorde Suite at the Manchester Airport Aviation Viewing Park. The itinerary also included many tourist tours for delegate partners. The conference offered the opportunity for a number of high level personalities within the industry to provide the attendees with an informed and learned light on the main challenges the aerospace profession has to take up. Some 100 technical parallel sessions were run, the programme for which had been designed and managed jointly by representatives from the CEAS Board and the RAeS Specialist Groups. In covering about fifteen disciplines in aeronautics and ten in space, it gave rise to approximately 350 outstanding papers presented by experts coming from various institutions and industrial companies. The programme also included a special one-day session conducted by the RAeS on the fundamental theme of 'Greener By design'.
Throughout the conference, the 'Aerospace and Defence Knowledge Transfer Network' (A&D KTN) exhibited in the Main Hall, allowing delegates to find out more about its mission to assist in the promotion of innovation and collaboration across UK industry, Government and academia. Although limited to the UK so far, its organisers offered the promising opportunity for other Aerospace Societies to engage.

Finally, on day four of the Conference, in the Manchester Museum of Science and Industry, the launch of the European Young Aerospace Professionals Forum took place. This aims to be the official young persons' arm of CEAS, mirroring the 'Young Members Board' (YMB) of the RAeS. This initiative, formally entitled 'Young members, the European Connection', will be an important tool in connecting with young professionals across Europe and is expected to be a great success.
In total around 550 delegates participated in CEAS 2009, coming not only from Europe but also all over the globe with 25 nations represented, making this a significant event for the industry. The success of the conference was in no small part due to the expertise and professionalism of the RAeS Conference organising team: according to Dr Mike Steeden, the RAeS President:" This Conference was perhaps the largest to which the Royal Aeronautical Society has played host in recent years."
Two years after the successful CEAS 2007 Conference held in Berlin, it clearly marks a decisive milestone in the progress of our Council and it is the reason why we have dedicated this 'Special Edition' of our quarterly bulletin to commemorate its success.



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Message from the CEAS President

It was a great pleasure and an honour for me to address the distinguished guests, the CEAS members and many participants at the opening ceremony of our second CEAS Air and Space Europe conference in Manchester. I am absolutely impressed with the Royal Aeronautical Society and the Programme Committee for having assembled exciting plenary speeches and sessions of high quality clearly showing the advancements in the field of aeronautics and space. I would like to congratulate and thank the RAeS, the Programme Committee, the speakers, the sponsors and the participants of this second CEAS conference for their enthusiasm, their continuous support and their excellent work. In many discussions during and after the event I was given the feedback that the quality and the organisation of the conference were outstanding.

The gala dinner including the ceremony for the CEAS Award 2009 was arranged underneath the Concorde. Largely protected and dominated by the delta wings of this masterpiece of engineering this was certainly one of the highlights of the conference and in a way being a symbol for what CEAS is standing for: stimulating the aeronautical visions for the future, advancing the technologies in aerospace and bringing together people from all over Europe, inviting guests from all over the world to participate.

Those who are engaged in CEAS, who are members of CEAS, we all can be proud of what has been achieved so far. This is our common as well as your personal achievement and I would like to thank you all for that. But there are many tasks open and much left to reach our goals. We are on the right track and we will continue to develop the spirit, the environment and the specific CEAS organisation in Europe. In this we also need to go the "European Way", we need to utilize our different cultures, our different mentalities, our different approaches in science and technology. This is strength and not a weakness. But at the same time cooperation is mandatory and we have to recognise, to trust and to learn to work with each other. There is another issue which is absolutely mandatory and where we should not compromise and that is securing the quality and quantity of young professionals in our business.

In all this CEAS is definitely leading the way and I only can invite anybody or any organisation to join us to make our work more efficient, build networks, avoid duplication and harmonise our goals and programmes for the benefit of aeronautics and space and for strengthening Europe."

Joachim Szodruch

Message from the President of the Royal Aeronautical Society

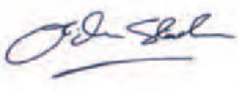
Welcome to this special issue of the CEAS Bulletin which commemorates the success of the CEAS 2009 European Air and Space Conference in Manchester.

As President of the Royal Aeronautical Society, I was delighted to welcome all delegates to the conference in Manchester and I hope that this issue goes some way to highlighting how successful we believe the conference was.

As ever, I would like to offer my personal thanks to both the Programme Committee, who prepared the excellent conference programme, and the Regional Advisory Group who provided the event with very much a local flavour courtesy of an exciting partner programme and links with local dignitaries and businesses.

Finally, I would like to thank our sponsors and the City of Manchester for their invaluable support, and to those delegates who were able to attend in spite of these tight economic times.

We now look forward to building on the success of the conference and to continuing the good work of the 11-nation Council of European Aerospace Societies, of which the Royal Aeronautical Society is proud to be a member.



Dr Mike Steeden

Memorandum of Understanding signed between CEAS and KSAS from Korea

Aeronautics and Space have a global market, have global challenges and require global actions and solutions. CEAS is focussing initially to build the most important and effective European Aeronautics and Space organisation, however, with the aim to open up for further important contacts to other parts of the world. Thus we have signed in the past MoU's with other global acting organisations like IAF and ICAS but also with single societies like the AIAA from the USA and the CSA from China. The discussions on further cooperation partners were focussing soon on nations with a strong aerospace community and a corresponding active society.

Thus CEAS decided to enter into a partnership with the Korean Society for Aeronautics and Space Sciences (KSAS).

CEAS and KSAS have agreed to establish this Memorandum of Understanding (MoU) to better serve the common interests and welfare of their memberships. This agreement is based on the mutual understanding that the cooperation between representative organisations in countries is essential to the eventual goal of the progress of aeronautical and space science.

The major aims are:

1. Jointly create and organise conferences, tutorials and workshops to address topics and disciplines of common interest.
2. Giving professional engineers / scientists and specifically students from both organisations the possibility to meet each other on organised networking events.
3. Encourage, where feasible, cross attendance or joint participation in professional or student related evens sponsored or hosted by either organisation. Typical events may be exchange of lectures and guest between both organisations, participation in one another's Technical Committees or participation of CEAS members and KSAS members in their respective conferences.
4. The two organisations will exchange their respective time schedule for Conferences as well as journals and magazine written in English and encourage their members to publish research and technical papers in their counterpart's journals.

In a ceremony during the opening of our 2nd CEAS European Air and Space Conference in Manchester this Memorandum was signed by the two Presidents of the Societies, Prof. Seung Jo Kim for KSAS and Prof. Szodruch for CEAS. Both parties declared again the large advantages of this cooperation agreement and the benefits for their members. Any ideas and concrete actions with our new partner in Korea are most welcomed by you, our Societies or our members.

CEAS was honoured and we appreciate very much that the President of KSAS joined us in Manchester for the signature and a return visit to Korea is planned for the next year.

Joachim Szodruch
President CEAS

The award Ceremony: All Honour to Dr Fichtmüller

At the beginning of the gala dinner in the famous Concorde Hall of Manchester Airport, on Wednesday evening 28 October, Dr Carl Peter Fichtmüller received from the hands of the CEAS President Joachim Szodruch the prestigious CEAS Golden Award. Let's recall in a few words the exemplary carrier of the personality elect.

Dr Fichtmüller was born in 1936 in Hanover. He joined MBB in 1969, where he became President of the Aircraft Division in 1983. In 1989 and 1990, he also headed the Dynamic Division and in 1992, he was nominated Chief Operating Officer of the Company.

After 27 years at MBB, he took up new responsibilities in the AeroSpace and Defence Industries Association in Europe ('AECMA', now 'ASD') in Brussels, where he served as the General Secretary until 2001 and as the Head of the Policy Commission for some more years.

Dr Fichtmüller has been also a member of the Supervisory Board of Panavia, Eurofighter, Eurocopter and Euromissile. In his speech, after having warmly thanked Pr Szodruch for the laudatory words of his presentation, he expressed his great satisfaction in seing the enormous progress accomplished by the CEAS in the course of these last years and addressed to its Management Board his best wishes for the New Year 2010 and beyond.

Aerospace, Space and Europe

Ian Lucas, Minister for Business and Regulatory Reform, UK

The Ian Lucas's address to the CEAS2009 Conference is summarized here below. Three themes were developed: Aerospace, Space and Europe.

AEROSPACE

As Minister with responsibility for the aerospace sector, Ian Lucas confirmed that the Government views this sector as being at the heart of advanced manufacturing, and vital to the UK maintaining a balanced economy. Several facts demonstrate the importance attached to aerospace. For instance:

- within the framework of its active *'New industries, New Jobs'* industrial strategy, the Government has recently agreed over half a billion pounds of repayable launch investments for Airbus, GKN and Bombardier, and 45 million pounds of grants for Business Investment for Rolls-Royce;
- it continues to invest in the National Aerospace Technology Strategy programmes;
- it supports the UK supply chain companies in areas such training, business process and supply chain improvement.

Ian Lucas expressed his great satisfaction in seeing first hand a great deal of the UK's excellent capability and skills at Airbus Broughton, Airbus, GKN and Rolls-Royce in Filton, Airbus in Toulouse. He pointed out the success of military deployment of Unmanned Air Systems in support of UK's services, as well as the programme directed at opening up civil use of these systems called ASTRAEA. This shows the powerful benefit of collaboration in an exciting and evolving technology area, with huge market potential.

SPACE

The UK's Space sector contributes just below 6 billion pounds to the economy and employs over 68,000 highly skilled people. There is a thriving satellite manufacturing in the UK: nearly 50% of Astrium's communications satellites are built in the UK. Inmarsat, one of the world's leading satellite operators, runs its global network from London.
Space is a growing, innovative, successful sector in the UK. In June 2009, industry and Government launched an Innovation and Growth Team (IGT) for Space, its findings will be published early in 2010.

EUROPE

Ian Lucas reviewed the main activities conducted at the European level and in which the UK is participating, in particular: the EU Framework Programme, ACARE (Advisory Committee for Aeronautics Research in Europe), Clean Sky Joint Technology Initiative. He highlighted the fact that the challenges are not just European, but global, and that "*the biggest challenge facing us all – and requiring all the very best innovation to help us overcome it – is that of environment.*" After having said that the global economy is increasingly dependent on air travel, for exports, tourism and inward investment, that aviation also has a high societal value, he developed the theme:

"HOWEVER, SUSTAINABLE ECONOMIC GROWTH REQUIRES RECOGNITION OF ENVIRONMENTAL RESPONSIBILITIES"

Although many improvements have already been achieved in terms of fuel consumption and noise, it is quite clear that the quest for further efficiency continues on a number of fronts:

- reduction of the level of emissions per passenger or over the distance flown;
- reduction of the weight on board, employing alternative power units where possible and using new landing procedures;
- infrastructures improvement;
- economic measures which provide incentives for the industry to reduce emissions though buying more efficient aircraft;
- use of sustainably produced bio-fuels or alternative fuels delivering significant carbon savings.

Major advances on all these fronts will be necessary to reach the scale of the emission reductions required.

Ian Lucas concluded:

"From funding research into new technologies, to shortening routes, to optimizing air navigation infrastructure, we believe that governments have a vital role to play. However, individual government action is rarely enough: aviation is a global industry and climate change is a global problem. Governments must co-operate to find solutions for aviation. We are also supportive of the decision that, in the absence of a global agreement, carbon dioxide CO_2 emissions from aviation will be subject to a legally-binding, tightening cap from 2012 through the EU Emissions Trading System (ETS), as an initial step towards a global basis, but recognize that progress on this scale can be slow, and sometimes action needs to be taken on a national or regional basis.
In recognition of this, the UK Government has announced a new target to bring CO_2 emissions from UK aviation below 2005 levels by 2050, and the Committee on Climate Change is currently identifying how this could be achieved. Establishment of this target sets a clear long-term framework to focus the industry and shape long-term investment decisions made by business.
We have highlighted the challenges and opportunities associated with low carbon aerospace and aviation in our recent low carbon strategies, and will continue to engage with stakeholders in identifying innovative solutions to decouple emissions growth and actual growth."

WHAT A YEAR!

Allan Cook
President of ASD 2008-2009
Chief Executive, Cobham

Here below are reproduced very large excerpts from the speech delivered by the orator.

"[...] A little over a year ago I was elected as President of ASD, a position I held until earlier this month. And what a year it has been! We have been witnessing unprecedented economic developments, which have further complicated the environment in which we must make decisions.
The global economic crisis has had a major impact on our industry, leading to our commercial customers having less to spend on our products, with severe tightening of credit conditions making it increasingly difficult for airlines to finance the purchase of new aircraft.
Our governments are finding themselves under increasing pressure to spend more on social programmes and provisions and even less on defence, despite worrying geopolitical developments. So what do you invest in and where should innovation be focused given such a dynamic geopolitical and economic environment?

Investment in technology

[...] To remain responsive in a dynamic, unpredictable global market requires investment in R&D, particularly if we are to make meaningful progress tackling many of the environmental challenges we face.
All of our trade associations spend time, resources and money promoting this approach. In many areas we succeed – in the UK we have managed to persuade the Government to continue to invest in commercial aerospace, strongly supported by the newly formed A|D|S. However we are losing the argument across Europe! The recent preliminary draft general budget of the European Union for 2010 calls for a reduction of almost e50 million in Aerospace research and development. Enhanced and increased levels of research and development funding are a part of the solution to our global challenge.
The European Union position defies all reasonable logic and reflects the unfortunate short term focus of politicians. We must fight against this approach at every level.

Further investment to meet environmental objectives

Despite the economic and political turbulence, we are not losing sight of our broader environmental responsibilities. What society expects from us today, more than ever, is continued progress on the environmental front. I firmly believe that to travel by air is still one of the greatest freedoms of the 21st century.
Our industry with its long history of technical innovation and determination has to be part of the solution - not perceived as the cause. We need to do more to develop an industry that is sustainable environmentally and economically, because they are complementary objectives.[…]
Further investment in technology is necessary if we want to be able to meet the objectives established by ACARE.

The importance of skills

The lost opportunity cost of having an R&D budget without the right resources to develop products and services is significant. One of the distinguishing characteristics of our industry is that we are dependent, more than any other industry, on access to outstanding scientific and technical skills to be able to meet the exacting demands of the aeronautical and defence sectors.
We operate in a truly global industry, and the harsh reality is that the world is still a dangerous place. Risks which existed after 9/11 have not been retired – tensions in Iraq, Afghanistan, Pakistan, Iran and the Middle East are unfortunately still with us. The battlefield is no longer confirmed to traditional theatres of war, it is all around us. We now have to be vigilant with both state and non state players who use all forms of warfare and tactics, acting with a disarming speed and agility. In this C4ISR environment, every land, sea, air and space platform has become a node in a network, with much greater emphasis on the payloads they carry and an increasing dependence on satellites to enable communication. People want the information they want, when they want it, on the device of their choice to be delivered fast, securely and accurately.
This is exciting stuff, but we must be capable of attracting, retaining and motivating the best talent so that we can do the job that our customers and our nations are relying on us to do.
Here is an opportunity to communicate with schools, colleges and universities to tell our young people that our industry has the best opportunities to create an exciting career.
We don't just need talented engineers; we also need skilled people to manage complex projects across many national borders, with extended supply chains. It's a capability we have developed internationally, in some cases the hard way, and an area in which we must further invest. [...]

AN IMPRESSIVE VIDEO: DID YOU KNOW?
www.youtube.com/watch?v=zAxv115dONo

As you saw in that video, we are currently preparing students for jobs that don't yet exist, using technologies that haven't been invented, in order to solve problems we don't even know are problems yet.[...]
We must continue to innovate, but in the words of Albert Einstein "**We can't solve problems by using the same kind of thinking we used when we created them.**"

It's up to us to create the future."

Managing innovation in challenging times

Pier Francesco Guarguaglini
New President of the AeroSpace and Defence Industries Association of Europe (ASD)
Chairman and CEO of Finmeccanica

Mr Guarguaglini introduced himself to the audience as the new President of ASD, succeeding to Mr Allan Cook. He recalled that he was elected for a second time since he became President of ASD for the first time five years ago in Gothenburg.

He commented the situation of the aerospace sector in Europe within the context of the present economic crisis: on the civil side, fewer aircraft orders and perhaps even the postponement or cancellation of some existing ones, more investment in defence has become increasingly difficult to make. However, taking into consideration the different forecasts of the OECD, of the European Commission..., he declared to be rather optimistic about the medium and long-term future:

"*... recovery there will be, and our industry will come out stronger of the current period to harvest the fruits of tomorrow's growth!*"

He expressed his hopes in the new EU political landscape that will result from the entry into operation of the Treaty of Lisbon on 1st January 2010: some areas of direct interest for our industry will gain greater importance and will fall under the co-decision procedure (the European Parliament and the EU Council on equal basis), in the Council these areas will be subject to the qualified majority voting and no longer unanimity, which will facilitate decision-making; space will also be subject to the co-decision procedure; and as for defence, the Member States having the capabilities and the willingness to do so will be allowed develop a so-called structured co-operation that could pave the way to a common defence policy.

But in spite of all these positive aspects, Mr Guarguaglini expressed the opinion shared by the profession, which feels that the aerospace industries increasingly fail to receive the attention they deserve from EU policy makers. This is an unfortunate trend so true it is that aeronautics, defence and space are crucial sectors for Europe.

How to counter this negative trend? The orator announced that a decision originating from ASD's Air Transport Commission, had been recently taken to prepare a campaign aimed at raising the profile of our industries among EU decision-makers. An important event during this campaign will be the organisation before the end of 2010 of an '*Aero-week*' dedicated to the promotion of our sector inside the European Parliament in Brussels. We have received some encouraging signals pointing to the importance that the new European Commission will give to research and innovation but it will be our task that this renewed interest in R&TD and innovation is directed towards aerospace.

ASD will have other priority actions to undertake over 2010: to monitor the implementation process of the EU Defence Package [...] which is aimed at paving the way for the emergence of a genuinely European defence equipment market. We will actively plead in favour of the adoption of complementary policies that will allow EU Member States to shape the desired European Defence Technological & Industrial Base (EDTIB).

Concerning the space domain, Mr Guarguaglini drew special attention on a crucial issue for the future of the sector: the implantation of the initial operations of the GMES (Global Monitoring for Environment and Security) programme.
In the area of security, ASD will continue its monitoring and lobbying work around the so-called '*Stockholm Programme*', which is to define, for the period 2010–2014, the framework for EU co-operation in police and customs, rescue services, criminal and civil law cooperation, asylum, migration and visa policy.

"THE WORST IS BEHIND US BUT THE CRISIS IS STILL THERE."

Joseph Stiglist
American economist

Mr Guarguaglini concluded in these terms:

"We all live in a competitive arena, vying against each other to increase our market share and develop ever more technologically advanced-products. However we are also aware of the virtues of partnership, which are never more evident than during the kind of period we're currently going through: partnership among ourselves, to join forces on issues of common interest; partnership with our governments, which shape the environment in which we can operate and succeed; partnership with our American friends and colleagues.

It will be my role and duty, as President of ASD, to bring these partnerships to new heights, and to ensure that this great organisation continues acting, more efficiently and cohesively than ever, as the collective body and common voice of our industries."

European Aeronautics Research & Technology - A Response to the Global Challenges

András Siegler
Director, RTD-Transport
European Commission

Dr Siegler illustrated the way Europe undertakes joint effort in finding the right technology responses to the global challenges in the air transport area. He successively addressed these challenges, explained the strategic approach of Europe through ACARE and gave an overview of Framework Programme 7.

The Challenges for Aeronautics

If the current crisis has a severe short- term impact, it is expected not leading to a major reduction of air traffic growth in the long-term. So, this expected growth brings challenges to the air transport capacity and safety, and - together with the world-wide concerns about global warming - to the environment requirements to future air traffic concerning emissions and noise.

The extension of the Emission Trading Scheme (ETS) to aviation was a logical step of the EU, which started officially in 2009 with a transition phase until 2012.Although the air transport contributes only 2 – 3% of the global CO_2 emissions, the significant increase of air transport requires measures to achieve a substantial reduction.

With a peak crude oil price of more than 150 US$ / barrel in summer 2008 (even if it is down now due to the crisis), in the long-term the expected global energy demand will lead to rising prices and call for a significantly higher fuel efficiency in future transport.

In the view of the challenges by global warming and for the definition of the European Union Position for the Copenhagen Climate Conference in December 2009 the ENVIRONMENT Council of the EU adopted conclusions on Aviation emissions at his meeting in the week 16 October in Luxembourg:

"*The Council of the EU considers that global reduction targets for greenhouse gas emissions from international aviation should be set by UNFCCC (which includes also the USA) to -10 per cent for the aviation sector below 2005 levels by 2020 to be implemented globally. For the implementation global market-based instruments should be used, which should be developed within ICAO as the relevant international body.*"

A Joint Strategic Approach for Aeronautics Research in Europe

The Advisory Council for Aeronautics Research in Europe (ACARE) was established in 2001. It developed the first Strategic Research Agenda (SRA) in 2002. In 2004 the 2nd Issue of the Strategic Research Agenda identified six High Level Target Concepts which were transferred to the FP 7. Last year ACARE reviewed the SRA and produced the *2008 Addendum*, which mainly concluded: the orientation of the SRA is still valid, but more efforts and resources are needed for achieving the 2020 goals for the society's needs and the global leadership of European industry.

- 80% cut in NOx emissions
- Halving perceived aircraft noise
- Five-fold reduction in accidents
- Air traffic system capable of handling 16 million flights a year
- 50% cut in CO_2 emissions per pass-km
- 99% of all flights within 15 minutes of timetable
- 50% reduction of time to market

FP 7: one of the key instruments of the EU

The FP 7, lasting from 2007 until 2013, is the largest international R&T acquisition programme, to which not only the 27 Member States of the EU contribute but also 10 associated countries. Other countries are in negotiation for joining FP 7 such as Russia. In addition collaboration in joint research projects is possible with nearly all countries of the world.

For Aeronautics, the 2nd Strategic Research Agenda addresses:

- The greening of air transport
- Increasing time efficiency
- Ensuring customer satisfaction and safety
- Improving cost efficiency
- Protection of the aircraft and passengers
- Pioneering the air transport of the future

Next Calls for Proposal

Three Calls took already place, the last one in July 2009. Due to the limited budget of the latter, the work programme for 2010 focuses on those Specific Programme activities that are of greater strategic importance:

- The Greening of Air Transport
- Improving Cost efficiency
- Pioneering the Air Transport of the Future

It is planned that the following call that will be launched in summer 2010 will mainly address topics for large scale Level 2 research projects and additionally future oriented break-through research.

Before concluding, Dr Siegler gave some examples of research collaboration in key technology areas within FP 6: flight physics, new aircraft concepts, aero-engine technology, structures and manufacturing.

The cleansky Joint Technology Initiative

Eric Dautriat
Executive Director,
Clean Sky Joint Technology Initiative

Eric Dautriat briefly recalled what Clean Sky is: "the operational arm which makes concrete the ACARE's goals in the field of environment through leap changes". Concerning its characteristics, he said:

"The overarching characteristic of Clean Sky is this: it is a so-called Joint Technology Initiative (JTI). It is a Public Private Partnership (PPP), a € 1.6 billion programme, funded in equal parts by the European Commission and by the industry: quite a lot of money, over seven years.

The PPP also means shared governance. The JTI will be managed outside of the Commission by a dedicated body, the Joint Undertaking (JU). Besides aeronautics, four other JTIs are being implemented at the same time, in the fields of medicines, fuel cells and hydrogen, embedded software and nanoelectronics. The JU will employ around 20 staff members. I'm still performing the last recruitments. Applications are welcome! In this team, staff members coming from the Commission and from the industry or research institutes come together. We should start our autonomous operations within a few weeks. From this moment, an annual funding will be granted by the Commission to the JU, and the JU will allocate it and coordinate the activities through contracts with the participants. In the meantime, as the work has already started, the management has been performed by an interim team belonging to the Commission.

A second feature of Clean Sky is its focus on high levels of technology readiness: it builds upon technologies already studied with more "basic" research activities, in order to mature up to integrated system demonstrators, either on-ground, or, quite often, in-flight. Given the long cycles of aeronautics, it is of utmost importance, if we want these environmental benefits to be concrete, not to miss the next generation of aircraft in each category. This is why time should be a major driver of this research programme.

A third feature is the way the funding is shared. Focused on efficiency, Clean Sky is organised around 12 industrial leaders, around which are associated either industrial firms, research institutes or universities; these are the more than eighty members of Clean Sky, who are committed for the full duration of the programme. A third row of participation involves partners, who are selected through competitive calls for proposals."

He then explained the organisation, founded on six pillars which are called the Integrated Technology Demonstrators:

1. *Smart Fixed Wing Aircraft*
2. *Green Rotorcraft*
3. *Regional Aircraft*
4. *Engines ('SAGE' project)*
5. *Systems ('SGO' project)*
6 *Eco-Design*

He noted that these technologies put together into demonstrators, result in targets different from one ITD to the other, or one kind of aircraft to the other, and that Clean Sky alone cannot allow reach all ACARE objectives. Other sources will contribute, as for instance SESAR programme, as well as the ongoing technology improvement.

He insisted on the fact that representing a € 1.6 billion of public and private investment, *this programme must be monitored*, in order to check, throughout the seven years, that the technologies involved will actually meet the environmental targets. To do so, a set of models will be developed, and put together, in order to predict the emissions and noise at mission level, operational level and fleet level: this is the *Technology Evaluator*.

About governance

Eric Dautriat commented: " Again, Clean Sky is a public private partnership. This is reflected in the governance. Major decisions are taken by a Governing Board involving the twelve ITD leaders, plus one associate per ITD, plus, of course, the Commission. As an Executive Director, I report to this Board. You can see that several consultative bodies are there, including the National States. I will also directly report to the European Parliament and the Council."

About the Calls for Proposals

"These 25% of the programme are very important because they are the way to involve many participants, including universities, including SMEs, including new members of the European Union", Eric Dautriat said, adding later, " The topics for these calls are different from the topics for collaborative research. The specifications are quite focused. [...] This precise focus should favour the involvement of SMEs. The first call will result soon in a series of new contracts. The second call is on its way. And so on. The two coming years will be very busy with involving new partners. They are there for a given period of time, say one to three years for a given topic."

As a conclusion

Eric Dautriat declared in particular, concerning Clean Sky: " I have no doubt about the soundness of the concept but it has still to be demonstrated to the external world [...]. We have to be very careful not to deviate from the environmental focus, whatever the contingencies and technical re-orientation that will no doubt occur. As well, it would not be enough to have demonstrated smart and effective technologies if they were not applied for commercial use [...]. And at the end, both for the global warming mitigation and the local environment in the airports area, the final customer of this Initiative, of course, is the European citizen, and to some extent the world citizen."

Space and Innovation

Giuseppe Morsillo
Head of Director General's Policy Office, European Space Agency

Giuseppe Morsillo began his speech by discoursing on imagination, absolutely necessary to fuel space research achievements, but which has to be harnessed to strict engineering and innovation to convert a dream into a tangible and successful space mission. Innovation: a key word!
Most of the studies about this concept during the last fifty years have been performed in a competitive environment where side market forces can be identified as driving innovation. But the market structure of the space sector is fundamentally different. The achievements of dreams in space impose to take risks and to develop the systems in such a way that they work perfectly first time (impossibility to repair in space in most of missions).

Some circumstances are favouring inventiveness:
• attractive stimuli, difficulties and challenges (landing a probe in an unknown and hostile "world" 1.4 billion km from the Sun after 7 years and 3.5 billion km of interplanetary trave – Huygens lander on the Saturn moon Titan; going to the Moon with less energy than the amount of fuel it would be used driving from here to the South of France – SMART-1 - …);
• high rate of information exchange (European space missions adopt an open approach to intellectual property and its exploitation);
• freedom and risk taking (innovation in risk management);
In December 2008 the EU Council recognised space as an element of the European Plan for Innovation, and in May 2009 the sixth Space Council emphasized the contribution of space to innovation and competitiveness in the context of the European Plan for Innovation and the European Economic Recovery Plan.
What can space agencies do to promote higher levels of innovation? At ESA, the approach has been to encourage our Member States to increase their investment in technology programmes, to develop the readiness of new technologies to a higher level before incorporating them into missions and to make use of relatively inexpensive precursor missions to test and prove new technologies. Giuseppe Morsillo detailed the ESA innovation philosophy in these terms:

"Innovation comes in several forms, with their own mechanisms and dynamics. By their very nature, most of our investments in technology programmes are dedicated to incremental, sustaining innovation, gradually improving our systems and thus increasing Europe's competitiveness. The coordinated European technology master plan with clear roadmaps and technology goals in mind embodies these improvements. Preparing responsibility for an always-unknown future involves also considering radically different approaches, trends from the edges, what is generally called potentially disruptive or radical innovation. It obeys to different rules and requires very different processes and methods.
We therefore have created the Innovative Triangle Initiative and our Advanced Concepts Team and its Ariadna scheme, dedicated to disruptive innovation and breaking down the risks of space becoming isolated from other disciplines. The Advanced Concept team, an interdisciplinary team of post-docs performs short, inexpensive studies involving research into radical new technologies and their potential for influencing space, such as biomimicry. This is done through the promoting contacts with university research departments across Europe, most of which have never previously had any contact with the space sector.
The ratio of sustaining to disruptive innovation also depends strongly on the mission we are given by our stakeholders: the harder, the more challenging, the bolder the goals we are asked to achieve, the more our scientists and engineers will be encouraged to come up with and embrace disruptive innovation. While made under different circumstances, the essence of a famous speech by J. F. Kennedy on space in 1962 still holds true for many of our activities:

"WE CHOOSE …TO DO THESE THINGS, NOT BECAUSE THEY ARE EASY, BUT BECAUSE THEY ARE HARD"
J. F. Kennedy, famous speech on space, 1962

Therefore, in all this, let us not forget the human factor when considering innovation: space for us is "A Theatre of Dreams": achieving what has not been achieved before, 'being the first' and 'being recognised as better' are extremely powerful motivations, that empower and stimulate not only current engineers but also students to enter scientific and technical careers.
We are by no means complacent and are always looking to learn new ideas from other sectors. For example, prizes were a major stimulus to the development of commercial aviation in the early Twenty-First Century is perhaps something that should be evaluated, following the way in which the X-Prize has stimulated the development of the fledging space tourism business.

I would like to conclude with some remarks and an open question:
• first, when you cannot be cheaper you have to be better, and innovation can help in trying to be better;
• second, innovation in space activities has changed as the sector has matured: space was a disruptive discipline per se and dominated by disruptive, radical innovation during its early decades? Its success has created new industries and markets and we have naturally shifted towards sustaining innovation.
Today, are we going towards the right balance?"

Air Power: technology as the insurance against the unknown

Sir Brian Burridge, Chairman Learned Society Board, RAeS

Sir Brian Burridge defined the importance of air power in future defence and security strategies, identified some of the key technologies that will make it relevant and proposed how fleets should be managed to capitalize on what technology and engineering can offer.

THE RELEVANCE OF AIR POWER

Four things are to be provided:

- Control of the Air and Space
- Air Mobility and Lift
- Intelligence and Situational Awareness
- Attack

The orator said: "Politically, it is the first duty of any state to protect its airspace – and a post 9/11 world is more complex in this respect – plus the duty to protect its territorial waters and borders. Equally, placing soldiers in harms way without air superiority is no longer something that politicians would contemplate. Thus for aircraft in this category, their relevance has to be derived from multi-role and, better, swing-role capability, that can provide air dominance plus offensive action whilst continually feeding the insatiable ISTAR machine. Relevant future technologies are stealth – a true force multiplier in gaining control of the air - and electronic attack through airborne active electronically scanned radars where we can achieve hard-kill non-kinetically thus taking-out the opposition's radars, networks and communications at both the sophisticated and unsophisticated level."

THE COMMON TECHNOLOGIES

It is absolutely necessary to look at the underlying components of capability that give aircraft their effectiveness in the ambiguous battlespace of today and tomorrow: situational awareness, self-protection and lethality. Brian Burridge explained how to seek ways, in the framework of the UK armaments, to optimize these facets.
Some basic idea emerged, in particular:

"Incremental capability enhancements will come from software, systems and sensors. In other words, the platform itself is a design and production issue whereas the avionics are a continuous development issue. We could apply a sliding scale across other military equipment and find that mechanical engineering will make a continuing but reducing contribution. Helicopter technological developments will see the retro-fitting of active blades and anti-vibration systems but they are increasingly approaching the same architectural and mission system complexity of fast-jet aircraft. […] Of course, uninhabited air systems rely on their mission systems to an even greater extent, particularly as we enter the realm of real autonomy. Here, we might be left wondering who, ultimately, will be responsible for the safety case.Plausibly, as the air vehicles become a commodity, the air-framer could have to give way to the systems house when it comes to design authority status and hence ownership of the safety case."

TECHNOLOGY INSERTION

Brian Burridge listed the key technologies that Europe should nurture in order to maintain the operational edge, provide sovereignty of decision-making and hence management of risk, and be competitive in a global market place:

- electronically scanned radar with its ability to sort multiple small air-to-air targets, detect diffuse and ambiguous targets on the ground, provide a method of electronic attack and a high-bandwidth means of being part of the network: and all this at lower mean-time-between failure, giving lower life-cycle costs and greater combat availability;
- electrooptics and the significance of fourth generation surveillance and targeting pods with their ability to provide automatic target recognition and classification. High performance cooled and un-cooled infra-red detectors are another stream;
- and the real key to flexibility, open systems architectures. The underpinning science is clearly detection, materials science, signal processing and themathematics of algorithms.

To get affordable cost and low risk, the resulting technology will have to be inserted incrementally through availability contracts.

FLEET MANAGEMENT

By comparison with earlier times, many nations will have only relatively small fleets. Fly-away price is only one consideration here. So, air forces will be forced to embody the resulting equipment in only a proportion of their fleets, in other words to run 'fleets-within-fleets'.

Brian Burridge concluded:

"… air power will continue to be a vital component of a nation's defences, particularly for control of the air. Increasingly, capability will rest on systems, software and sensors but nations, both individually and collectively must actively manage the required technology streams through targeted R&D plus domestic market encouragement. The resulting technology will have to be inserted incrementally through availability-based availability contracts rather than through cumbersome return to works programmes. Finally, airmen will have to accept the need to run 'fleets-within-fleets'. Taken together, these aspects will indeed form an insurance policy against the unexpected."

INNOVATION IN AVIATION : CREATING A SUSTAINABLE FUTURE FOR AVIATION

Iain Gray, Chief Executive, Technology Strategy Board

Iain Gray gave the audience an overview of the challenges we all face and the role that the 'Technology Strategy Board', in the UK, plays in stimulating innovation and how it applies in the world of Aerospace and Space.

SOCIETY FACES MANY CHALLENGES

After having enumerated the numerous challenges Society faces today – to provide food and water for us all, to look after the old and sick, a place to live, to provide the means of travel, and the energy to do all these things… all within our resources – he insisted on the need to share knowledge more to do this. He expressed his belief in the fact that, in particular, the environmental question of the 21st century can be a real driver of new opportunities, motivating the engineers to come up with new technology inspired solutions and simultaneously creating new business opportunities along the way.

"IT IS NOT THE STRONGEST OF THE SPECIES THAT SURVIVES, NOR THE MOST INTELLIGENT.
IT IS THE ONE THAT IS THE MOST ADAPTABLE TO CHANGE …"
Charles Darwin

Concerning Climate Change, the specialized committee is in the process of preparing a response to questions asked around UK aviation, addressing questions around scenarios, analysing potential for improvements, assessing the scope for alternative fuels and hydrogen and considering high level aspects of a global framework for aviation.
The orator pointed out the importance of investing in the industries of the future: among others, the Aerospace and Space industry should be at the heart of the revolutions to meet the environmental challenges whilst providing real business success.

THE TECHNOLOGY STRATEGY BOARD

www.innovateuk.org
It is a national body set up to invest in business innovation, from business and the public sector, working across business, universities and government, investing £1bn + supporting innovative business in UK. Spreading thinking, advances,best practices and bringing people together, it is at the heart of Knowledge Transfer.

Two words sum up its strategy: connect, catalyse.

Connect: connecting business to business, business to academia, business to government.
Catalyse: describing the tools which make something happen that otherwise would not happen.

Three key strands of innovation: Technology Inspired Innovation, Challenge Led Innovation, Innovation Climate.

– Technology Inspired Innovation is about building capability in the underpinning areas that enable a sure and effective response to market needs: 7 key areas – advanced materials; bioscience; electronics, photonics and electrical systems; information and communications technology; high value manufacturing; nanotechnology; emerging technologies - most of which have strong links to aerospace and space.
– Challenge Led Innovation is about technology and innovation pull though, whether it is market challenge or societal challenge (objective: to focus clearly on challenges as a stimulus to innovation and business prosperity).
– Innovation Climate is about people, about reward, recognition and knowledge exchange.

THE TECHNOLOGY STRATEGY BOARD AND AEROSPACE AND SPACE

In terms of Environmental Challenges, the aerospace sector has been ahead of most other sectors in setting its own targets (ACARE targets related to environment). Besides the UK industry has responded with its own technology roadmaps, established through the National Aerospace Technology Strategy (NATS), which has developed priority roadmaps: rotorcraft, fixed wing airframe, engines, equipment and autonomous systems.

THE AEROSPACE & DEFENCE KNOWLEDGE TRANSFER NETWORK (A&D KTN)

The aerospace community is involved in many KTNs, but principally the Aerospace & Defence Knowledge Transfer Network (see page 24). Among the projects: 'ASTRAEA' (Autonomous Systems Technology Related Airborne Evaluation & Assessment), support to Rolls Royce through the 'Environmentally Friendly Engine'; the Next generation Composite Wing and the development of Manufacturing Centres.

Space: Moving on the world of Space the A&D KTN has recently put in place a special interest group to cover space activities, an important initiative at a time when the Technology Strategy Board is taking on the responsibility for the 'innovation elements' of the British National Space Centre budget.

In summary

"In summary the UK has a strong track record of innovation in this sector; it is committed to manufacturing and to future technology investment in aerospace and space. The environmental challenges are huge but are the key to future sustainability. The Technology Strategy Board is committed to supporting this sector and plays its part in ensuring that investment in Innovation is at the heart of the investment actions being taken though this downturn."

THE CEAS 2009 CONFERENCE FOR YOUNG PROFESSIONALS: THE EUROPEAN CONNECTION

By Dr Stephen Liddle
Chairman, RAeS Young Members Board

As part of the CEAS 2009 conference, the YMB (Young Members Board) of the Royal Aeronautical Society (RAeS) held its usual annual conference in Manchester on October 29th, day four of the event. Entitled 'The European Connection', the conference was held in the impressive grade 1 listed 1830 Warehouse at the Museum of Science and Industry (MOSI). The aim as always was to bring a high level insight into topical aerospace industry issues. This year however, the opportunity was taken to expand into a two stream format: 'European opportunity' took the place of our standard event, with the parallel 'Developing professional' stream offering practical career advice.

The keynote speech from Rory Linehan

The keynote speech was delivered by Rory Linehan, VP International Sales at Cobham PLC. Rory delivered a fascinating and thought provoking presentation on the challenges of expanding in the aerospace and defence business; growth rates in North America and Europe will continue to be low while much more expansion can be expected in Asia and the Middle East. To prosper, the contractor must be prepared to understand the myriad of cultural and political challenges in what has become a buyer's market. One challenge that Rory identified during a lively Q&A debate following his talk, was the provision of sufficient contract offset to satisfy the customer. The expectation of this has grown in recent years and demands new ways of thinking about partnerships. Rory answered a large number of questions from the audience, many of them (as he admitted himself) from the President.

EUROPEAN OPPORTUNITY

• David Bishop of the Airport Operator's Association made no apologies for suggested that flying was a good thing. He particularly emphasised that air transport had to reduce its emissions and climate change contribution; in his view, a significant reason for the targeting of the industry on this front in the UK, is the visibility of large numbers of civil aircraft over the crowded South East. He was adamant that the economic contribution of air transport in terms of stimulating external investment is immense and ways must be found of protecting this.

• When putting together the programme for the day, one area that clearly could not be ignored was the field of collaborative projects. Bob Regan, Head of the International relations group at DE&S, discussed the challenges of such programmes while concentrating on the overall benefits, including larger production volumes. Standardisation of the requirements between the customers of the consortia was seen as critical; Bob gave the example of the NH90 helicopter which currently has at least twenty three different configuration standards, with the corresponding challenges for support. Despite its well publicised troubles, Bob was upbeat about the prospects for the A400M, which he felt might even be operated by the US military in the fullness of time.

• David Marshall, former President of the Royal Aeronautical Society, gave an interesting and informative talk on the exciting future developments that will be the next generation of two of today's most common aircraft in our skies, the Boeing 737 and the Airbus A319/20/21 families. During his talk David explained the key phases of the development of the new aircraft including research into new technologies, testing and finally acceptance of these new, as yet unproven, technologies and inclusion into new products such as next generation commercial aircraft. David emphasised the massive variety of industries that are involved in such a new development and the many roles that may be played by today's young aerospace professionals. Whatever the direction these challenging new aircraft take, at least some of our delegates and young members are sure to play a key part.

• Professor Phil Withers, from Manchester University's Materials Science Centre explained to delegates the variety of opportunities for young aerospace professionals in research, either as valuable early or mid career experience, or, as an entry into a career in academia itself. Phil went into great detail on the research and development phases of the technology cycle previously highlighted by David Marshall. Phil emphasised that research opportunities and funding are available regardless of an individual career progression and future plans. A focused research opportunity provides young aerospace professionals with a great opportunity to learn new skills and significantly expand on existing skills whilst allowing an interest in a particular area to be focused on and developed whilst potentially providing new technologies or opportunities to the aerospace industry as a whole. Working in research provides a great opportunity for young professionals to work with leading academic institutions and many of the world top aerospace companies in developing the most cutting edge technologies and products across the whole aerospace sector.

DEVELOPING PROFESSIONAL

• This stream commenced with Elizabeth Donnelly, from the recently formed trade group A|D|S, speaking about the work she was undertaking with Industry to understand future skills requirements. In general, this showed that more highly skilled workers were those that would be most

Young Members The European Connection

Young Members: the European Connection

in demand, especially in areas such as project management, systems integration and people leadership.

• Mark Boxall from Deloitte touched on areas that were new to many of the audience, highlighting current issues that the Company and it clients were dealing with. These included the current overcapacity of aircraft in the leasing market (by around 10%) and the health of some of the major lessons themselves during the current recession. He also highlighted that one carrier was now placing the value of landing slots on its books and speculated whether other carriers may follow suit.

• The afternoon session in Stream Two was devoted to the subject of Professional Registration. The first speaker of the afternoon was Stephen Timms OBE, trustee of the Engineering Council. Stephen provided a comprehensive overview on the work recently undertaken by the Engineering Council to rebrand the routes to professional registration. Covering Chartered Engineer, Incorporated Engineer and Engineering Technician, Stephen's talk providing high levels of detail on the market research recently undertaken by the Engineering Council. For example it was noted that 87% of registered engineers value that registration highly.

Following on from Stephen, the conference heard from Simon Vaitkevicius on his personal experiences while achieving professional registration. As well as sitting on the Young Members Board and Professional Standards Board of the Royal Aeronautical Society, Simon mentors and assesses candidates for registration through the Institute of Engineering Designers (IED). Simon's talk focussed on his career to date from childhood through to his many roles in Mechanical Design at Nokia. Among the top tips suggested by Simon for the Professional Review were to bring examples of work or something similar that provides a tangible link demonstrating the candidate enthusiasm for their profession. Furthermore he noted that all candidates need to ask themselves, and be prepared to answer the following question: "Why do you want to achieve Professional Registration?" For those struggling with that question, the earlier talk by Stephen Timms should have provided some ideas for further study!

THE LAUNCH OF THE EUROPEAN YOUNG AEROSPACE PROFESSIONALS FORUM

Following the conclusion of the parallel sessions, the focus shifted to the presentation of the RAeS young persons awards, by the President Dr Mike Steeden and Prof Jeff Jupp of the Medals and Awards Committee.
The final act was the launch of the European Young Aerospace Professionals Forum (EYAP). This project has been taken on by the YMB on behalf of CEAS, with the aim of providing a virtual venue for young aerospace professionals from around the continent to meet and share ideas.

THE FOCUS WILL BE A WEBSITE AT
www.eyap.org
THE YMB WILL BE DEVELOPING THIS FACILITY IN THE COMING MONTHS AND OF COURSE WOULD WELCOME CONTRIBUTIONS AND IDEAS.

Thanks from the YMB team
The YMB team greatly appreciate the efforts of all of our speakers and thank the delegates and award winners for attending. Our thanks also go out to MOSI (Museum of Science & Industry) and the RAeS conference team for their help.

Get involved with the Young Members' activities
by e-mailing us at
youngmembers@aerosociety.com
or visiting www.aerosociety.com/youngmembers

AERONAUTICS

AERONAUTICS TOOK QUITE AN IMPORTANT PLACE. IN TOTAL 17 TOPICS, EACH OF THEM HAVING GIVEN RISE TO SEVERAL SESSIONS:

- AERODYNAMICS: Applied Aerodynamics, Wake Vortex, Flow Control, Unsteady, Flight Control, High Speed, Experimental Activities, CFD, Flight Loads, Flight Performance
- PROPULSION: Propulsion CFD, Novel Power Plant Configuration, Fuel, Simulation &Tests
- STRUCTURES&MATERIALS: Failures and Damages, Design, Manufacturing
- AEROACOUSTICS: Noise Issues, Vibroacoustics
- AVIONICS&SYSTEMS: Flight Controls, R&D for Fault Tolerant Flight Control System
- AIR TRAFFIC MANAGEMENT: Genetic Approach to Automated Aircraft Separation, Automatic Dynamic Airspace Control, Airborne Self separation
- AIR TRANSPORT: Future Concepts, Flight Operations, Air Traffic Management
- HUMAN FACTORS – MAN/ MACHINE INTERFACE: Selection and Development, Influence of Working Patterns and Fatigue, Cabin Environment
- SAFETY & SECURITY: EASA Mission, Integrated Safety Management Systems, Witness Interview, Aircraft Survivability Assessment
- ENVIRONMENT: The Environmental Impact of current ATM and Airspace Charging in Europe, the Impact of Alternative Fuels, Acoustic Challenges, Greener Aero-Structures, High By-Pass Ratio Engine, Emissions Comparisons of Turbofan and Open Rotor Engines, De-Icing, Green Route Optimisation
- GREENER BY DESIGN: Aviation Climate Impact, The NGO Perspective, International Airline View, Carbon Budget for UK Aviation Emissions, EU Emission Trading System (ETS), Airframe Improvements, Advances in engine technology, Operations, AGC Improvements, Biofuels
- GREEN AIRPORT
- AIRWORTHINESS & MAINTENANCE
- VEHICLE DESIGN CONCEPTS: Whole Mission Simulation for Aircraft System design and Optimisation
- ROTORCRAFT
- UNMANNED AIR SYSTEMS (UAS)
- AIR LAW

Within the limits of the allocated editorial volume, it has been chosen to give, as an illusttration, a summary of three presentations: “Greener Aviation: a Technology Programme”, by Pr Ian Poll, “Aviation Climate Impact: Scientific Studies”, by Pr Ulrich Schumann, “The Inclusion of Aviation in the EU Emission Trading system (EU ETS)”, by Philip Good.

Greener Aviation: a Technology Programme

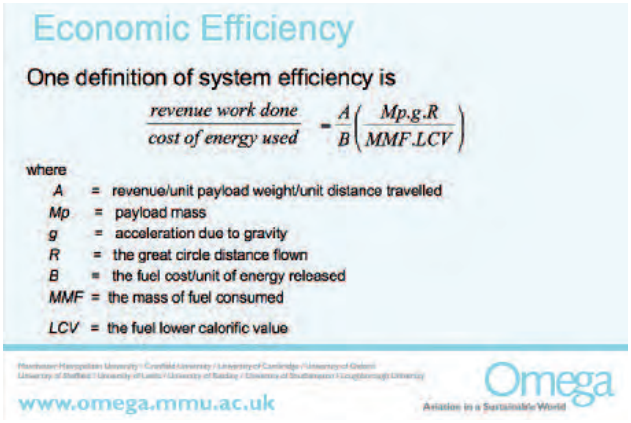
The here below article is a summary of the presentation given on 28 October by Pr Ian Poll, Cranfield University, within the framework of the session ‘Aircraft Performance Implications for reduced Environmental Impact’.

THE LINE OF ARGUMENT:

- AIRCRAFT USE FUEL TO ACHIEVE AN ECONOMIC OBJECTIVE
- THE AMOUNT OF FUEL USED TO CARRY OUT A SPECIFIC TASK DEPENDS UPON:

– THE BASIC CAPABILITY OF THE AIRCRAFT (TECHNOLOGY LEVEL)
– THE EFFICIENCY OF THE OPERATIONS
– THE CONSTRAINTS IMPOSED ON THE OPERATIONS e.g. REGULATOR AND AIR TRAFFIC MANAGEMENT

ECONOMIC EFFICIENY



So, in the future, if fuel prices rise and fuel cost becomes increasingly important in Direct Operating Cost, operators will want aircraft for which the ratio of energy liberated to revenue work done:

$$ETRW = \frac{MMF.LCV}{Mp.\ g.\ R}$$

is as small as possible i.e. minimum fuel/unit payload/unit distance travelled.

Both the economic efficiency and the coefficient of environmental performance, *CEP = emissions mass.LCV/useful work done,* are best when ETRW has its smallest possible value.

PROPOSED ROLE FOR TECHNOLOGY

The technology programme proposed by Pr Ian Poll is directed towards two main objectives:

1. Minimise ETRW within the safety based constraints;
2. Avoid the altitudes where the air is supersaturated with respect to ice. In addition, with alternative fuel it is possible to also independently reduce the rate of increased CO_2 in the present day atmosphere.

WHEN DOES THE BEST VALUE OF ETRW OCCUR?

After having taken in consideration the different components of the aircraft mass breakdown and determined what factors affect ETRW, the orator came to the following conclusions:

- The best value of ETRW occurs when the aircraft carries the maximum permitted payloads and takes-off at the maximum permitted take-off weight.
- Operational issues are very important: (i) high load factors are better than low load factors; (ii) long routes are better than short routes.

He then presented many best values resulting from calculations, ETRW values for current aircraft, fleet average fuel burn. And he pointed out some basic remarks, in particular: the load factor alone accounts for 50% of the efficiency loss and shows how important passenger load factors and cargo can be to the efficient operation of passenger aircraft; excess fuel is burnt due to en route deviations, inefficient climb and descent, manoeuvring and holding in the departure and terminal areas; short haul flights are intrinsically less than longer flights and more sensitive to extra fuel burnt due air traffic (safety) restrictions.

OMEGA'S TECHNOLOGY PROJECTS

- ***Study of Advanced Open Rotor Powered Aircraft***
- ***Sustainable Fuels for Aviation***
- ***Emissions and Impacts of supersonic Business Jets on Atmosphere***
- ***Climate related ATM***
- ***International Alternative Fuels Conference***
- ***Seminar – Disruptive Technologies***
- ***Influence of Implementation of Composite materials***
- ***Omega Alternative Fuels data centre***
- ***Balancing Noise Costs Against Reduced Carbon Emissions in Advanced Rotor Engines***
- ***Control Strategies for Cleaner exhaust***
- ***Environmental Effects of Aircraft Operations and Airspace Charging Regimes***
- ***Understanding Jet Efflux***
- ***Prioritising Engine and Airframe Technology***

Pr Ian Poll commented about modelling's objectives, constraints consideration and method. The objective function: (1) maximum payload fraction; (2) minimum fuel burn; (3) minimum direct operating cost; (4) minimum environmental impact.

WHY DO WE NEED TO HAVE ACADEMICS INVOLVED?

The orator gave five basic reasons: technology capability is at the core of many major aerospace companies; capability, know-how and information are often the foundation upon which the wealth creation is built; as a consequence, future plans and new developments are sometimes commercially sensitive; great case is taken over the information that is released into the public domain and sometimes the whole story cannot be told; academic rigor is a powerful element in the debate.

A FEW WORDS ABOUT OMEGA

Omega is a one-stop-shop providing world-class academic expertise on the environmental issues facing aviation to the wider aviation sector, Government, NGO's and society as a whole. Its aim is independent knowledge transfer work and innovative solutions for a greener aviation future. Omega's areas of expertise include climate change, local air quality, noise aircraft systems, aircraft operations, alternative fuels, demand and mitigation policies.

Omega draws together world-class research from nine major UK universities. It is led by Manchester Metropolitan University with Cambridge and Cranfield. Other partners are Leeds, Loughborough, Oxford, Reading, Sheffield and Southampton.
Launched in 2007, Omega is funded by the Higher Education Funding Council for England.
www.omega.mmu.ac.uk

Aviation Climate Impact: Scientific Status

by Ulrich Schumann, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Institute of Atmospheric Physics, Oberpfaffenhofen, Germany.

The ACARE objectives from 2001 have set important priorities for carbon dioxide (CO_2) and nitrogen oxides (NOx) emission reductions for a sustainable future of grow-ing aviation traffic. This paper reviews the climate science knowledge which lead to these priorities.

Aviation in 2005 was recently estimated to cause about 5% of total anthropogenic radiative forcing (range 2–14%). About 2/3 of this RF comes from non-CO_2 emis-sions, with the largest share from aviation induced cloudiness.

NOx from subsonic aviation produce ozone, which is a greenhouse gases, but also reduces methane, another greenhouse gas, and the methane reduction in turn causes a long-time ozone reduction. Consequently, aviation NOx has the potential to ultimately cool the Earth system.

Satellite observations of cirrus cover in correlation with traffic and modelling. suggest that contrails are forming the largest contribution to the non-CO_2 aviation climate impacts. A new “Contrail Cirrus Prediction Tool” CoCiP has been developed which ex-plains these observations. The model accounts for soot in controlling the initial num-ber of ice particles formed in fresh contrails. Most of simulated contrail cirrus form inside existing cirrus and makes them optically thicker. The climate impact of con-trails increases with the number of soot particles emitted. Hence a significant reduc-tion of engine soot emissions (by number, not only by mass) might be beneficial for climate. Model studies show that changes in flight altitude by 1000 feet up or down, depending on the actual weather situation can reduce the global radiative forcing from contrail cirrus by more than a factor of two. This mitigation method has a poten-tial which should be considered further.

The global mean surface temperature increases with time as a function of a weighted integral over the past radiative forcing, with a weight function that decreases with time on time scales of 30 to 50 years according to thermal inertia of the Earth-atmosphere-ocean system. The global mean concentration of CO_2 and the related radiative forcing from CO_2 in turn increase with time as a function of a weighted inte-gral over the past CO_2 emissions, with a weight function that decreases according to take up of CO_2 by the oceans on time scales of 30 to 300 years. Therefore, global warming from aviation CO_2 continues to increase for some decades even when CO_2 emissions would be set to zero suddenly.

In contrast, the global mean radiative forcing from short-time non-CO_2 effects in-creases directly with the magnitudes of the non-CO_2 emissions. Hence, global warm-ing from the short-lived (non-CO_2) “emissions” (including contrails) starts to decline immediately, when the non-CO_2-emissions get reduced.

For protection of climate for centuries, reduction of CO_2 emissions (fuel burn) is the first priority. For short- term climate protection (at time scales of decades), e.g. for avoiding a heating beyond a critical level in the coming 50 years, the short-lived con-tributions, in particular contrails, offer stronger mitigation potential. This view should be considered when revising the ACARE objectives. In particular, a future revision of the ACARE objectives should include soot and route dependent contrail formation with at least the same emphasis as fuel consumption and NOx emissions.

INCLUSION OF AVIATION IN THE EU EMISSIONS TRADING SYSTEM (EU ETS)SIONS TRADING SYSTEM (EU ETS)

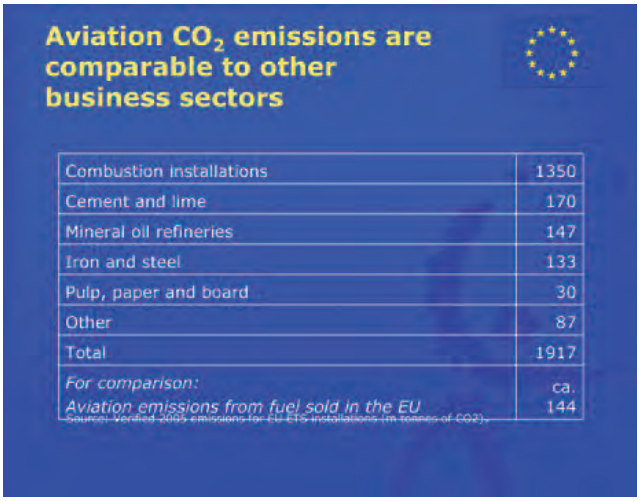
Philip Good, DG Environment at the European Commission, presented the situation of aviation within the framework of the EU climate policy and explained the EU ETS aviation legislation.

EU CLIMATE CHANGE OBJECTIVES

After having recalled these well-known general objectives, he showed that aviation GHG emissions are growing rapidly and that aviation CO_2 emissions are comparable to other business sectors (see slides inserted). Aviation is a significant emissions source and must contribute to efforts to tackle climate change. In fact aviation expands the total EU ETS cap by approximately 10%, it was therefore fundamental to include aviation in the EU ETS. Besides there were in fact six clear reasons to do so: (i) international aviation was not covered by Kyoto; (ii) Kyoto envisaged Annex 1 countries to take action through ICAO; (iii) so far there was little action from ICAO; (iv) in 2004, ICAO endorsed incorporation of aviation in national/regional trading schemes such as EU ETS, rather than a sector specific mechanism; (v) ETS has benefits viz. least cost emission reductions and a guaranteed environmental outcome; (vi) trading is preferred option of the aviation business.
Emissions'trading is considered as a good solution for the aviation sector.

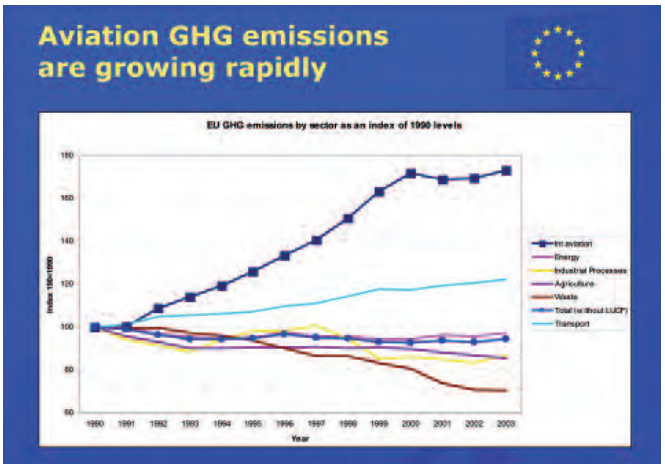
EU ETS AVIATION LEGISLATION

The EU ETS Directive 2008/101/EC (13 January 2008) gives guidelines on the aviation activities, covering all flights to and from EU airports from January 2012. From that date, aviation will be fully included in the EU ETS.



the price of air tickets (by €39.60 to €39.60 in 2020 depending on the journey length and allowance price), limited impact on demand growth (from 142% to 135% according to forecast). The allocation of allowances is distributed as follows: 82% to operators based on benchmarking (tonne/km), 15% by auction, 3% held in reserve for new entrants and fast growing operators.

Each aircraft operator is administered by one Member state: the list published on 5 August 2009 specifies the administering member State for each aircraft operator (around 4000 operators are potentially covered), it will be revised each year by 1 February.
The EU ETS implementation activities for aircraft operators have already started: see timeline here below.



– By 2020 EU ETS forecasts to save additional 190 million tonne CO_2 through inclusion of aviation.

The economic impact of including aviation in the EU ETS is as follows: little distortion in competition, small increase in

Philip Good concluded his presentation by saying that EU would like future international agreement on climate change to include international aviation.
www.ec.europa.eu/environment/climat/aviation_en.htm

SPACE

Space activities occupied a large place in the Conference, with more than 100 working sessions distributed along the following topics:

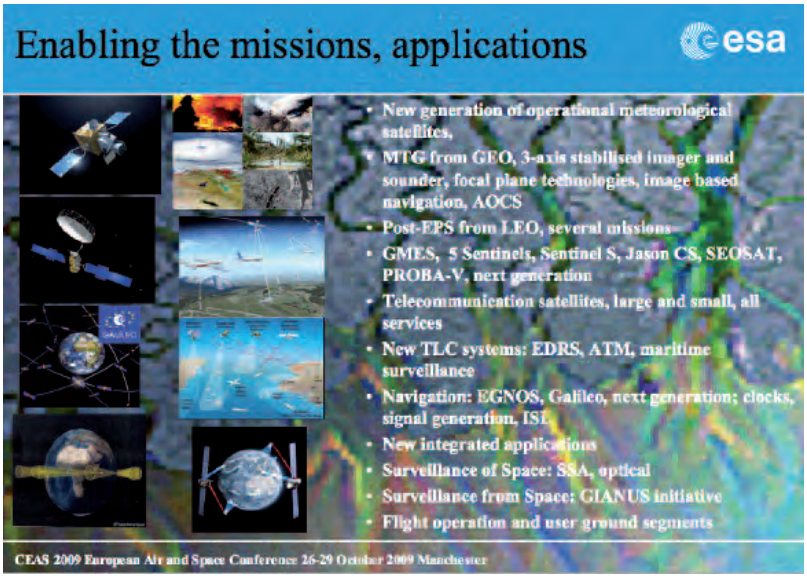
- Innovation and Technology Perspectives
- Launchers
- System Engineering
- Robotic and Artificial Intelligence
- Satellite Components
- Satellite Communications
- Satellite Observation Data
- ATV (Automated Transfer Vehicle) Re-entry
- Aero-thermal and Noise Phenomena
- Hypersonic Flow
- Debris
- Education for Space engineering

Within the allocated editorial volume, it has been chosen to give, as an illustration, a summary of two presentations: 'ESA challenges and future perspectives', by Michel Courtois, and 'Systems and Technology', by Eike Kirche.

ESA CHALLENGES AND FUTURE PERSPECTIVES

Mr Michel Courtois, Director of Technical and Quality Management at ESA/ESTEC, presented a detailed panorama of the difficulties to be presently overcome and of the main challenges to be taken up, and he expressed his views on some essential orientations to be followed in order that ESA can prepare for the future in the best possible manner.
After having recalled the ongoing projects to be successfully achieved – Soyuz and Vega launchers, Bepi Columbo, Earth Care, Aladin, Galileo IOV (In Orbit Validation) and FOC (Fully Operational Constellation), GMES (Global Monitoring for Environment and Security), MTG (Meteosat Third Generation) – , he laid stress on three major long-term programmes: robotic exploration, human exploration, future launchers.

The last ESA Council Meeting at Ministerial Level (CM 08) was successful but a number of thorny questions are in front of us: how to cope with the present economic crisis and the serious situation of Member States debt for making decisions on future new projects, improving competitiveness of industry, maintaining competence, operating present systems and in parallel developing future projects? And in addition to the financial aspects, there are the environmental constraints: space debris, REACH (Registration Evaluation of CHemical products), carbon footprint.
The 'Application' Missions in course of development are numerous and all absolutely essential: enabling them to be achieved in due time will not be easy.
Besides about this subject, Michel Courtois pointed out to the audience that it is a masterful necessity for the future space projects and systems to be more and more service driven and more operational: service to citizens, a useful space, such should be our permanent key cares.

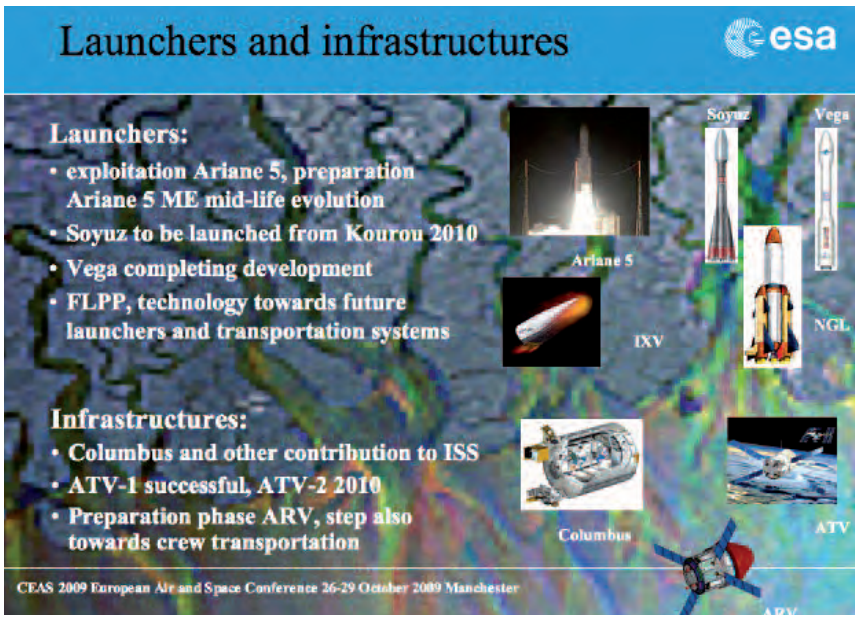


The present 'Research' Missions being conducted cover four main areas: Earth Exploration, Cosmic Vision, Human Exploration, Robotic Exploration of Mars. They are extremely ambitious and here also, the above mentioned constraints make these challenges even more difficult.
The same concern applies to the 'Launchers and Infrastructures' domain.

Then Mr Courtois reviewed in detail the improvements to be accomplished by the ESA engineers with a view to better overcoming the present difficulties and especially to correctly approaching the projects of the coming decades:

- Concurrent Engineering for efficiency;
- Cost and Planning Management: how to deliver in cost and time?
- More technical rigor, more general space systems competence, more accountability, more solid engineering and a more adequate documentation system ;
- Identifying non space technologies and funding their application to space projects needs, awareness of the rest of the world (USA, Japan, India, China…), especially in the area of electronics;
- Concerning industry, a complete procurement reform: basically more competition in order to get better opportunities, an improved cost-effectiveness and an improved global efficiency, stronger contract rules, monopoly situation to be reconsidered;
- As regards evolution of ESA: closer internal cohesion, closer relationships with the EU and between Member States;
- Improvement of the EU-ESA co-operation: better working relations with the European Commission, simplification of the decision making processes (GMES, Galileo,…) – Security dimension to be taken into account (new partnerships, aggregation of needs) – New mechanisms to be put in place – Political weight is required for major undertakings, e.g. Mars Exploration.

Mr Courtois insisted on the eager obligation for endless innovation efforts because as a matter of fact, space missions needs often translate into technology breakthroughs. So, ESA tries to anticipate the latter within the framework of the basic 'Technology Research Programme' (TRP) and its initiatives, the 'Innovation Triangle Initiative (ITI) on the one hand, 'Startiger' on the other hand. He noted that ESA is interested in non-space domains for solutions, promoting 'open innovation' with no borders across space and non-space programmes .



As a conclusion, he said:

"We have entered a new era. Space will continue to serve to serve, to strengthen European identity with Exploration, but it will have to be useful, in providing solutions to public concerns, in supporting economic recovery and growth, in addressing grand challenges of climate change, energy, water and food, and in contributing to major scientific progress. The present context of tight budgets, competition and fast changing technology base poses technical and managerial challenges to all partners. Success depends on our skill to address those challenges… and to work hard."

Systems and Technology

Mr Eike Kirche, Directorate of Technical and Quality Management at ESA/ ESTEC, gave a very detailed presentation on "Systems and Technology", of which a summary is given here below.

MAIN CHALLENGES

The orator recalled the main challenges, and therefore the main objectives assigned by ESA management: enabling the research science of, from and in space and exploration missions – enabling the application missions in traditional and new domains and multi-domain integrated applications – developing the next generation of launchers and orbital infrastructures – strengthening the competitiveness of European industry and assuring non-dependence: being able to develop, deploy, operate and exploit space systems. Quite a difficult roadmap due the constraining context of tight budgets and increased competition, fast moving technology base, changing industrial landscape, e.g. delocalization of key capabilities, changes in ownership, etc.!

RESEARCH SCIENCE

The space sciences missions can be classified in four categories: Cosmic Vision programme, Earth sciences, Robotic Exploration with the MSR (Mars Sample Return) main objective and Human Space Flights (International Space Station), Moon future missions (through cargo landers, then human missions), which implies massive need for technology development.

APPLICATIONS

Six domains are concerned: Meteorology – GMES (Global Monitoring for Environment and Security) – Telecommunications – Navigation, the Global Navigation Satellite System (GNSS) with in particular the major GALILEO programme – Space Situation Awareness (space debris, space based observer) – Integrated Application (safety, health, mobility, security…).

LAUNCHERS AND INFRASTRUCTURES

The launcher objectives are very precise: exploitation of Ariane 5, preparation of Ariane 5 mid-life evolution, Soyuz to be launched from Kourou in 2010, Vega completing development, technology towards future launchers and transportation systems.
And as regards the infrastructures, the works will concentrate on contribution to ISS, with notably Columbus, the ATV-2 2010 (Automated Transfer Vehicle number 2), the ATV-1 re-entry, and also studies towards crew transportation.

INNOVATION IS A CONTINUOUS ATTITUDE, IT CAN COME AT ANY TIME, THEN DECISIVE ACTION HAS TO BE TAKEN, IT IS ABOUT INTELLIGENT RISK TAKING.

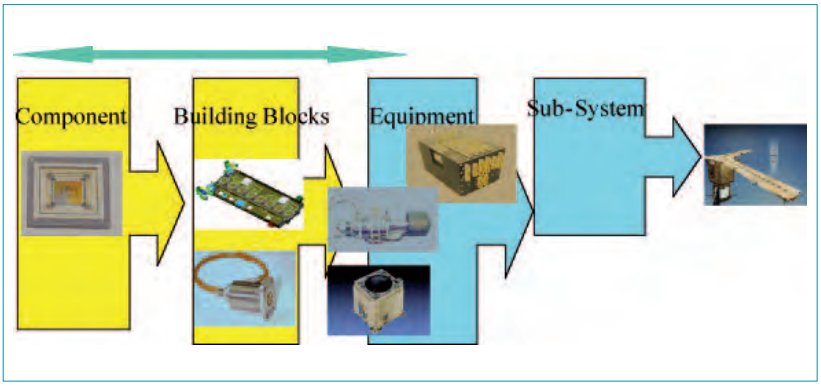
ABOUT COMPETITIVENESS

Innovation and efficiency are indispensable to be better and as far as possible cheaper. The achievement of these two objectives runs through improvements in System Engineering (SE). New user needs demand new 'SE' responses because systems complexity and budget constraints call for more efficient approaches. Service driven missions will require fast responses, physical single satellite limitations demand satellite formation, new integrated applications imply systems working in concert, higher functionality and capability of processing systems will directly impact the software, imposing more industrial approaches to 'system-software engineering'.

Eike Kirche deeply detailed the various areas of the improvement programme:

- Concurrent Engineering (CE) methods implementation;
- Early introduction of software requirements because systems functionality and autonomy increase, and software precisely is the expression of such functionality;
- Pre-development of so-called 'Building Blocks' (BB) thanks to the standardization of architectures.

He explained how the recommended Systems Engineering procedures should be applied: (i) in the case of Light satellites ('Lightsat'): approach to development and operation for in-orbit demonstration and for special actions, e.g. gap-filler deployment; (ii) in the case of multi-spacecraft (satellite formation flying) and complex systems of systems.



The evolution of technology has of course to be a major consideration in Systems Engineering: miniaturization as necessary to put significant payloads in Exploration missions will change the classic 'box-concept', technology should be developed in system context, ESA carries out technology and impact studies.

TECHNOLOGY: AN ENABLER IN SYSTEM CONTEXT

Technology as a matter of fact is an enabler, allowing reaching the performance required by the mission objectives. Technology, essential for science, also provides the advantage in the commercial markets: reliable and efficient platforms, flexible high performance payloads. An illustration: the gravity field study 'GOCE' satellite's accurate drag compensation allows to exploit the high sensitive accelerometers, in turn mounted on an ultra-stable bench in Carbon-Carbon composite.

TECHNOLOGY: RISK IF NOT TIMELY

It is clear that technology must be ready at right 'TRL' (Technology Readiness Level) for utilisation by the project, failure to reach maturity being one of the main causes of delays in projects and of cost overruns. In some cases, in-orbit demonstration may be required.

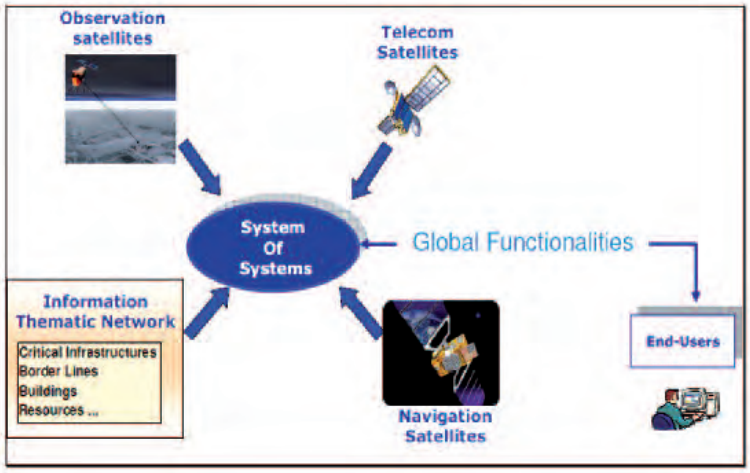
THE ESA PROGRAMME FOR TECHNOLOGY

www.esa.int/SPECIALS/Technology/index.html

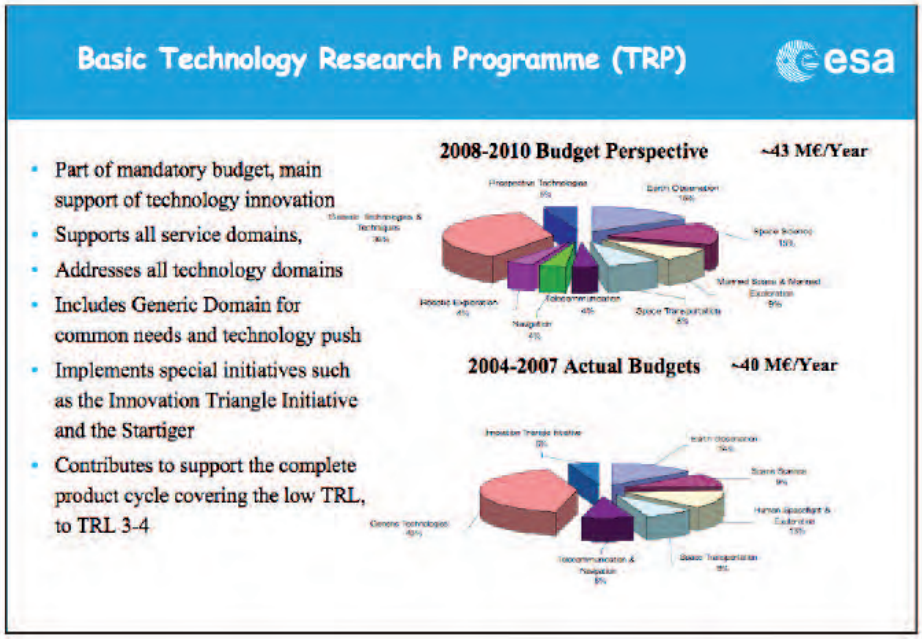
For ideas to become products significant investments are required, in particular to climb the mid-high Technology Readiness Levels, and precisely the ESA Technology Programmes aim at a balance between innovation and product orientation. It tries to anticipate technology breakthroughs via targeting innovation, looking forward, and also bottom-up ideas.

SPACE BRINGS TECHNOLOGY INNOVATION BACK TO EARTH

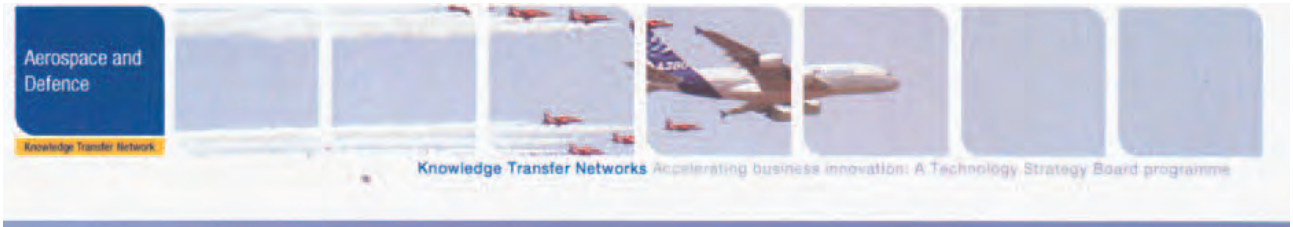
ESA promotes ***Open Innovation***, spin-in, spin-out, joint action. It encourages the transfer of space technology to terrestrial applications: energy (from generation to consumption), transport (management of land-based industrial vehicle fleets, marine and fluvial navigation, air transportation), etc. In short there are no borders across programmes, space and non-space.



THE ESA BASIC TECHNOLOGY RESEARCH PROGRAMME (BTRP): SOME FIGURES



Part of the mandatory budget, the BTRP is the main support of technology innovation. It supports all technology domains. It implements special initiatives such as the Innovation Triangle Initiative "Inventor-Developer-Customer".



The Aerospace and Defence Knowledge Transfer Network

At CEAS2009 the Aerospace &Defence Knowledge Transfer Network (A&D KTN) has been delivering a conference about the National Aerospace Technology Strategy (NATS) and its significance to the UK aerospace sector. The CEAS2009 delegates had thus the occasion to hear about this important partnership between industry, academia and Government, which has enabled innovation in the UK Aerospace sector through establishment of collaborative R&D programmes.
A&D KTN is hosted by the Society of British Aerospace Companies and is funded by the Technology Strategy Board. Its priorities include:

- ***To deliver improved industrial performance through innovation and new collaboration, maximising the impact of new research and technology and better coordination of resources for the delivery of the NATS.***
- ***To make the UK a more globally competitive environment for investment in aerospace and defence research and technology.***
- ***To facilitate innovation and knowledge transfer across the civil and defence sectors and enable closer collaboration between academia, industry and the Ministry of Defence. The National Technical Committees are core of this aim.***
- ***To improve coherency and effectiveness of industry in science, technology and innovation towards Government, supported by more rigorous analysis and technology roadmapping.***

The CEAS non-UK Member Societies are strongly encouraged to enter into relation with the management board of A&D KTN with a view to establishing cooperative working links.

KTN MEMBERSHIP IS FREE! TO REGISTER, VISIT:
www.aeroktn.co.uk/register

The management Board

Its role is to stimulate technology-enabled innovation in the areas which offer the greatest scope for boosting UK growth and productivity. It spreads knowledge, bringing people together to solve problems or make new advances.It advises Government on how to remove barriers to innovation and accelerate the exploitation of new technologies.
To learn more: www.innovateuk.org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Among Upcoming European Aerospace Events 2010

25-29 January • **ESA/ESRIN** – 3rd International workshop on Advances in SAR Oceanography from Envisat and ERS **Missions Frascati, Italy** http://earth.esa.int/workshops/seasar2010

3-5 February • **3AF** – International Symposium on Optronics in Defence and Security 'OPTRO 2010' **Paris, France** www.optro2010.com - anne.venables@aaaf.asso.fr

4-5 February • **ESA/ESTEC** – First ESA Workshop on Multibody dynamics for Space Applications **ESTEC, Noordwijk, NL** www.congrex.nl/10m02/

9-12 February • **3AF** – International Conference: 'Missile Defence, Challenges in Europe' **Lisbon, Portugal** lisa.gabaldi@aaaf.asso.fr

9-19 February • **FTF** – MODPROD International Workshop on Model Based Product Development **Linköping, Sweden** bengt.moberg@sas.se

25 February • **RAeS** – Weapon System Integrity vs Interoperability – WS&TG Group Conference, Boscombe Down, **Salisbury, UK** – www.aerosociety.com/conference

17-19 March • **ESA/ESRIN** – Hyperspectral Workshop 2010 – **Frascati, Italy** www.congrex.nl/10c02/

12-14 April • **ESA** – 4th European Conference on Antennas and Propagation – **Barcelona, Spain** www.eucap2010.org

22-24 March • **3AF** – International Symposium Applied Aerodynamics – **Marseille, France** anne.venables@aaaf.asso.fr

13-16 April • **ESA/ESTEC** – 24th European Frequency and Time Forum – **Noordwijk, NL** www.eftf2010.org/

21-22 April • **RAeS** – Aerospace 2010: Celebrating Synergy – RAeS Annual Conference **London, UK** www.aerosociety.com/conference
The 2010 Conference should adopt a 'far horizon' position, looking forward to science and technology developments that may be expected to reach utility in the next few decades. By this means, we should aim to counter the ever-growing pressure to curtail civil aeronautics, instead showing how it may be made more acceptable. Equally, dramatic changes in military aeronautics should be foreshadowed.

28-30 April • **ISROS** - 2nd International Symposium on Reliability of Optoelectronics for Space **Cagliari, Italy** www.isros.org/en/

3-6 May • **ESA and 3AF** – 6th International Spacecraft Propulsion Conference and 3rd International Symposium on Propulsion for Space Transportation – **San Sebastian, Spain** lisa.gabaldi@aaaf.asso.fr www.propulsion2010.com

17-20 May • **IEEE** – 15th International Symposium on Electromagnetic Launch Technology **Brussels, Belgium** www.emlsymposium.org

18-20 May • **ESA** – 4th International Conference on Astrodynamics Tools and Techniques **Norway** – www.congrex.nl/10a08/

19-21 May • **ONERA/AAE** – 5th International Congress and Exhibition, Embedded Real Time Software and Systems – **Toulouse, France** www.erts2010.org

24-26 May • **ESA** – Ultra-Luminous X-ray sources and Middle Weight Black Holes – Workshop **Madrid, Spain** http://xmm.esac.esa.int/external/xmm_science/workshops/2010_science/

25-26 May • **RAeS** – Human Factors Conference – **London, UK** www.aerosociety.com/conference

Among Upcoming European Aerospace Events 2010

31 May-4 June • **ESA** – The 4S Symposium, 'Small Satellite Systems and Services' **Funchal, Madeira, Portugal** www.congrex.nl/10a03/

7-8 June • **DGLR/EUCOMAS** – International Conference – **Berlin, Germany** petra.drews@dglr.de www.vdi-wissensforum.de/index.php?id=766

8-13 June • ILA 2010 Berlin Air Show –

9-10 June • **RAeS** – Flight Simulation Technology, 40th Anniversary of the First RAeS International Conference **London, UK** www.aerosociety.com/conference

9-11 June • 8th international ERCOFTAC Symposium on Engineering Turbulence Modelling and Measurements – **Marseille, France** www.ERCOFTAC.org/ETMM8

14-18 June • 7th International Planetary Probe Forum Workshop – planet Protection Short Course **Barcelona, Spain** www.planetaryprobe.eu

16-17 June • **RAeS**- Operating Helicopters Safely in a Degraded Visual Environment: How Can helicopters Operate More Safely in Day/Night and Adverse Atmospheric Conditions? – Rotorcraft Group Conference **London, UK** www.aerosociety.com/conference

28 June-2 July • **ESA** – ESA Living Planet Symposium – **Norway** www.congrex.nl/10a04/

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

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

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

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

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

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

18-19 October • **FTF** – 7th Swedish Aeronautical Congress 'Flygteknik 2010' bengt.moberg@sas.se

20-21 October • **RAeS** – Joint Greener Aviation by Design & Propulsion Conference **London, UK** www.aerosociety.com/conference

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

30 November-1st December • **CEAS/ASD AEROWEEK** – **Brussels** – Objectives: Enhanced Visibility to aeronautics industry in the European Parliament during one week.
Thematic approach: aviation growth is environmental friendly - aerospace is a technology-driven industry which provides highly-skilled jobs.

COUNCIL OF EUROPEAN AEROSPACE SOCIETIES

FROM 26 TO 29 OCTOBER 2009, RAeS HOSTED CEAS CONFERENCE IN MANCHESTER

The second European Air and Space Conference of the Council of European Aerospace Societies (CEAS) was held on 26-29 October 2009 at the Manchester Central Convention complex. A total of 550 visitors from 25 countries attended the event.

At the Civic Reception in Manchester's Landmark Palace Hotel on 27 October evening, The Right Worshipful The Lord Mayor of Manchester, Councillor Alison Fifth, during her speech.

On the left, Joachim Szodruch, President of the CEAS, and on the right, Mike Steeden, President of the RAeS

The Gala Dinner was held on Wednesday 28 October in the prestigious Concorde Hangar at Manchester Airport Viewing Park.

The Young Members conference took place on Thursday 29 October at the Manchester Museum of Science and Industry (MOSI).

One of the numerous parallel sessions which took place in small meeting rooms: here a session of the Space Branch.