

Editorial

The organization started 19 years ago in Garmish-Partenkirshen between the British, French and German societies as informal periodical meetings. It evolved as a Confederation at Farnborough in 1992. Today, CEAS has abandoned its confederation status to become a strong pan-European society. The early years of CEAS are now achieved and I am proud to have been the originator of this adventure.

The new society gathering European national aerospace societies is also comprised of Branches whose membership is open to any individual member from the constituent societies wishing to join CEAS on an individual basis. The Branches will have their own entity, with a series of technical committees (29 as of today) that represent nearly 800 aerospace experts, but also a Branch newsletter and several other professional services. New publications are under preparation in the space area and announcements will be out soon. The first CEAS Air & Space conference entitled *Century Perspective* is going to be held in the prestigious city of Berlin on September 10-13. With more than 500 papers in aeronautics and space it appears to be a promising aerospace event in Europe. There is now a mutual recognition of the national fellowship programmes within Europe and the establishment of a European Fellowship programme is under discussion that should lead to a European roster of career achievements and aerospace experts.

This newly reshaped CEAS is most welcomed all over the world from aerospace industry, agencies to non-European societies. Our American colleagues of the American Institute of Aeronautics and Astronautics have agreed on signing a memorandum of understanding with the CEAS to provide a framework for boosting transatlantic cooperation. The same interest has been received from Russia, India and China with cooperative initiatives under consideration. In the meantime CEAS is opening the door to new member society adhesions in a process to gradually enlarge CEAS in Europe that should reach over 40,000 members. This will make CEAS the largest aerospace society in the world. No doubt that each constituent society will benefit from this European dimension and from the space and aeronautics duality that most organizations do not have yet. This significant step in Europe will also constitute a strong appeal to new individual members enlarging national society memberships and to young generations that are most welcome in this new venture.

DR JEAN-MICHEL CONTANT
VICE-PRESIDENT, EXTERNAL RELATIONS AND PUBLICATIONS




Jean-Michel Contant

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THE 2ND CEAS TRUSTEE BOARD MEETING

The 2nd CEAS Trustee board meeting took place in Noordwijk (NL), at ESA/ESTEC, on 7 March 2007.

Welcome

The President Sir Colin TERRY opened the meeting, welcoming all board members, thanking the host, Dr Stavrinidis for organizing the meeting and for the nice dinner, all enjoyed the evening before.

Participants

Sir Colin TERRY	CEAS President
Jean-Michel CONTANT	CEAS Vice President External Relations and publications ; AAAF Trustee
Dr Ulf OLSSON	CEAS Vice President, Awards and membership ; FTF Trustee
Dr C. STAVRINIDIS	Head of Space Branch
Dr Dieter SCHMITT	CEAS Director
Andrew LITTLE	RAeS Trustee
Dr Christophe HERMANS	NVvL Trustee
Pieter KLUIT	NVvL Trustee
Gérard FOUILLOUX	Head of PCC
Dr Joachim SZODRUCH	DGLR Trustee
Peter BRANDT	DGLR Trustee
Dr Wilhelm KORDULLA	ESA/ESTEC

Apologies for absence have been received from:

Alain GARCIA	Head of Aeronautics Branch
Mario PELLEREI	AIDAA Trustee
Michel SCHELLER	AAAF Trustee
Julián SIMÓN CALERO	CEAS Vice President, Finance; AIAE Trustee

About the Technical Committees (TCs)

GENERAL INFORMATION

- Dr Dieter Schmitt had circulated before the meeting the proposed TC structure. Some members proposed to slightly revise some names in order to improve the understanding. It was also asked to have a short definition of the scope of each TC. Mr Andrew LITTLE volunteered to propose this definition of scope, following the RAeS experience.
- Two new Committees have been added : Rotorcraft and UAV.
- Anyway, the TC structure will be held flexible and when needs arise, new TCs can be created.
- Each Society should now propose their national experts to the Head of Branches, in order to nominate the chairmen and start operation of these Committees, which will really constitute the hard core of the CEAS.

THE AERONAUTICS BRANCH

Dr Dieter SCHMITT reported that Alain GARCIA, Head of Aeronautics Branch, has made in an upfront meeting a proposal for the structure of the Technical Committees (TCs) and has also endorsed the Terms of Reference (ToR) for his Branch.

THE SPACE BRANCH

Dr Constantinos STAVRINIDIS reported that for most of the Space Branch TCs, the members and Chairmen have been appointed. Only three TCs have still to be completed. He also stated that CEAS should use the existing Quarterly Bulletin and magazines to announce and foster the CEAS label and report on CEAS activities.

Remark

Concerning the Terms of Reference (ToR), it is evident that after first experiences of real operation, there will always be room and time to adapt them as required.

CEAS TECHNICAL COMMITTEES STRUCTURE

Decided by CEAS Council on 7 March 2007

AERONAUTICS	GENERAL	SPACE
Aeroacoustics	Air + Space Law	Mission design +
Air Transport system	Aerospace Medicine	Space systems
Avionics (GNC)	History	Aerothermodynamics
Flight Physics/Aerodyn.	MultiDiscipl Optimiz.	ECLS
Onboard Energy	Systems Engineering	Guid.-Nav-Control
Passenger Systems	Environment	Mechanisms
Propulsion	Education	Propulsion
Structures & Materials		Power
Systems		Robotics
Vehicle Design		Structures
Rotorcraft		Thermal
UAV		

About the financial status.

Dr Dieter SCHMITT had circulated a first financial status, showing a big difference between the expected revenues and the expenses to setup a minimum secretarial office. A lengthy discussion followed, where several options proposed to reduce the expenses and raise the revenues.

Jean-Michel CONTANT proposed to have a look at a mid-term view and the following preliminary agreements have been expressed:

- (i) The Society which is holding the presidency will also provide the necessary secretariat support for CEAS, till financial situation is more stable.
- (ii) The revenue situation should be improved by asking for a specific levy fee for all sponsored CEAS conferences.
- (iii) DGLR will check, whether for the 1st CEAS Conference in Berlin, an additional CEAS fee could still be raised, keeping in mind the attractiveness of fees and the risk for DGLR.
- (iv) All Societies will do a maximum to give a kind support for CEAS as much as possible in order to facilitate the start of operations.

- (v) A CEAS office in Brussels and specific commitment for CEAS secretarial support will be postponed to 2008.
- (vi) Additional revenues can be generated from the proposed 2008 CEAS conference in Brussels, the organisation of which will be conducted by the AAAF.
- (vii) Dieter SCHMITT will prepare a proposal for the 1st call in FP7, where there are possibilities for supporting means. Andrew LITTLE, Peter BRANDT and Jean-Michel CONTANT will give support as requested for the next 2 months, to finalize the proposal.

New membership recruitment

Ulf OLSSON reported that societies in **Finland**, **Greece** and **Poland** had expressed their interest to join the Council. It was decided that Dr OLSSON should invite them to present themselves at the next meeting in Paris on the 20th of June.

DIETER SCHMITT
JEAN-PIERRE SANFOURCHE

Gérard FOUILLOUX, THE HEAD OF PCC



Gérard Fouilloux (68) is Graduate from the Ecole Nationale Supérieure des Mines de Paris.

His professional cursus, in brief

• Since february 2003

JHL Conseil, Brussels and Paris. Company manager (gérant) and partner responsible for R&D and the aerospace/defence sector.

• From 1990 to 2002

Director of European affairs for the SNECMA group, Brussels.

- Creation of the European office in 1990.
- Responsible for all issues related to the EU and

NATO, including relations with national Governments. Focus on:

- competition, with direct report to the CEO and supervision of the in-house and external counsel work done in this field;
- financing issues, in particular successive framework EU R&D programmes (from 3rd to 6th), TACIS, ECIP;
- Chair of the AECMA (now ASD) environment committee;
- Sherpa of the Star21 chairman, Mr BÉCHAT (SNECMA's CEO);
- Founding member of EDIG (European Defence Industries Group);
- Member of numerous organisations active in Brussels.

• From 1964 to 1989

- Managerial positions in different companies: Retal, Sopelem, SAMM, Messier Hispano-Bugatti.

Other activities

- Honorary professor for European affairs at the Ecole Nationale Supérieure des Mines de Paris.
- Lecturer on EU affairs in numerous universities.

THE CEAS AWARDS

The CEAS Council has decided that the Award for 2007 will be presented to Professor David SOUTHWOOD. Professor SOUTHWOOD joined Imperial College in London in 1971 and eventually became head of its Blackett Laboratory. From 1997 to 2000, he was head of Earth Observation strategy at ESA where he introduced a new programme in Earth science, "The Living Planet". He has been the Director of Science at the European Space Agency since 2001, where he manages Europe's programme of scientific exploration of the solar system and beyond. He has been chairman of many space science committees in Europe and at ESA, including the Science Programme Committee (SPC) and the Space Science Advisory Committee (SSAC). He has more than 200 publications and scientific articles in solar terrestrial and planetary physics. The medal will be presented to Prof Southwood at the 1st CEAS Conference in Berlin in September this year. The Council has also decided that the Award for 2008 will be given to Mr Jean-Paul BÉCHAT, Chairman and CEO of Snecma, for a life time of outstanding contributions to the aerospace industry. Mr Bechat joined Snecma in 1965 and has spent his entire career with the group, except for 1994-95, when he was chairman and CEO of SNPE, the French company making gun powder and rocket solid propellants. After

taking over as chairman of Snecma in 1996, he multiplied the groups sales amply confirming his qualities as a visionary industrial leader. From 1997 to 2001, he was President of GIFAS, the Society of French Aerospace Companies and from 2001 to 2002 of AECMA, the European Association of Aerospace Industries (now ASD). In this position he oversaw the publication of the landmark Star 21 report about the future of the European aerospace industry.

The CEAS Technical Awards

The CEAS Council has approved the recommendation by the CEAS Aeroacoustics Specialist Committee to give the CEAS Technical Award for 2007 to Professor Ann DOWLING, Cambridge and Dr Dominique COLLIN, Snecma. Ann DOWLING is Professor of Mechanical Engineering at the University of Cambridge. She has led the Cambridge-MIT Silent Aircraft Initiative and chairs the Rolls-Royce Propulsion Systems Advisory Board. Dominique COLLIN has been the driving force behind the joint European research strategy in aeroacoustics leading to the EC Thematic Networks X-NOISE and X2-NOISE and the Technology Platform SILENCER. The Awards were presented at the AIAA-CEAS Aeroacoustics Conference in Rome 21-23 May 2007.

ULF OLSSON
VP, Awards & Membership

Among the Main Coming Events

● 10-13 Sept. 2007, BERLIN, Germany, Estrel Hotel
First CEAS European Air & Space Congress
www.CEAS2007.org

● 10th European Conference on Spacecraft Structures Materials & Mechanical Testing: 10-13 Sept. 2007, Berlin, in connection with the CEAS Congress.

● International Carbon Conference in Aerospace Valley – Solutions for high demanding applications, 17-19 Sept. 2007, Arcachon, France

● Space Propulsion 2008: 5th Int. Spacecraft Propulsion Conference, 2nd Int. Symposium on Propulsion for Space Transportation, 5-9 May 2008, Heraklion, Crete, Greece (www.propulsion2008.com)

Editorial Board

DIRECTOR OF THE PUBLICATION

Dr Jean-Michel CONTANT
CEAS, VP, External Relations and Publications
sgeneral@iaaweb.org

EDITOR-IN-CHIEF

Dr-Ing. Jean-Pierre SANFOURCHE
3AF • 6, rue Galilée – F-75016 PARIS
Tel. +33(0)1 56 64 12 30 - Fax +33(0)1 56 64 12 31
m.aude@club-internet.fr

GENERAL

Dr Hywel DAVIES
52 Brittain Lane • Sevenoaks – TN 13 2JP – UK
Tel./Fax +44 1732 45 6 359
hyweldavies@aol.com

AERONAUTICS BRANCH

Alain GARCIA
Head of the CEAS Aeronautics Branch
Exec. VP, Eng., Airbus S.A.S.
1, rd-pt Maurice Bellonte – F-31707 Blagnac Cedex
Tel./Fax +33(0)5 62 11 05 01
alain.garcia@airbus.com

SPACE BRANCH

Dr Constantinos STAVRINIDIS
Head of the CEAS Space Branch
ESA/ESTEC P.O. Box 299
NL – 2200 AG NOORDWIJK ZH
Tel. +31 71 565 4296
constantinos.stavrinidis@esa.int

CONTACT DETAILS

- Sir Colin TERRY
colin.terry@cgaero.fsnet.co.uk
- Julián SIMÓN CALERO
simoncj@inta.es
- Pr Dr-Ing. Dieter SCHMITT
dieter.schmitt@airbus.com
- Dr Ulf OLSSON
ulf.olsson.thn@telia.com
- Gérard FOUILLOUX
gerard.fouilloux@jhl.fr

EDITION

Sophie Bougnon
26, rue de Crussol • F – 75011 Paris
soboo@club-internet.fr



PERSONALITY INTERVIEW

> Alain Garcia

J.-P. SANFOURCHE, Editor-in-Chief of the CEAS Quarterly Bulletin interviewed Alain Garcia



CEAS

CEAS bulletin

The Council of European Aerospace Societies was publicly launched on the occasion of the Aeronautics Days, Wien, 19-21 June 2006. What are, in your opinion, the main goals towards which the efforts of this new institution should be directed ?

Alain Garcia

Let me take an example : the AIRBUS building story. This is because we have been able in Europe, to progressively put together under the same umbrella, then the same house, the national proficiencies and expertises in aeronautics, that we have been able by sheer forces of cooperative work, to develop the best products on world level. So, the Airbus family aircraft are unquestionably European products, but on the other hand, it should not be lost sight of the fact that they are finally the resultant of convergent local forces.

Considering the new CEAS, I think it is desirable to conceive it as a collecting of the eight member societies' specific skills, specific knowledges, specific know-hows and relations. This organisation should gradually become an effective and efficient **know-hows and best practices exchange centre**. The notion of "best practices", in my mind, is very important because the aeronautics projects are, like all high technology projects, made of a succession of practical difficulties to be overcome. The good achievements have to be known, but also – and especially I would say – the errors, the failures. **Lessons learned** : this is what the CEAS should allow to exchange between its member societies. Talk practical, talk realities, this is from my viewpoint quite essential.

Besides, we should take into consideration science, technology and manufacturing aspects, but also others, such as in particular education and training, human resources management, societal aspects. It would be highly useful to compare the engineers education and training in the different countries and to assess the differences with a view to identifying the advantages and disadvantages of the respective systems : Germany, France, UK, etc. We should conduct reflections in each national member society on the question : are all European needs correctly covered in our higher schools and universities ? Are module exchanges, teacher exchanges... sufficient ? A nice motto could be :

Chance equality for all European citizens

Alain Garcia, executive Vice-President, Eng., Airbus, is Head of the CEAS Aeronautics Branch.

In short, I see the CEAS as a forum of best practices exchange : we should start our development process with this goal as a first target in our line of sight.

CEAS bulletin

How do you envisage the working links between the CEAS and the National Aerospace Societies in order to avoid any conflicting situations or at least to minimise the possible conflicts ?

Alain Garcia

The CEAS is a system of national member societies, so I see these relationships as a kind of intra-system links. When a Member Society works at a purely national level, there is no interference with the CEAS. This is the case for national conferences, national workshops, ... *A contrario*, within the framework of a CEAS Technical Committee, all experts concerned must conduct their work in a perfect European spirit, considering only Europe's interests. In fact, it is absolutely essential to minimise conflict probability, to : (i) make a point of constituting the different CEAS working groups in coherence with those of the national member societies ; (ii) manage the event programming with the intention to avoid any duplication between CEAS and member society ones, while on the contrary always favouring co-operations, complementarities and mutual enrichings. In this respect, the role of the Programme Coordination Committee (PCC) will be fundamental.

Besides, there are subjects for which the synergy spirit is evident. Let us come back to what I said in answer to your first question, "best practices exchange" : here we need activities conducted in parallel to finally result in a clear synthesis. Among the subjects I have in mind, is system development. How to optimise the system development process from the high level specification until the green light for manufacturing ? How to derive the specifications at equipment level ? How to validate, in laboratory or in-flight ? How to reduce the number of iterative loops ? How to assess the maturity of the system, and as soon as possible ? etc. It would be particularly useful to conduct interviews in one or two big system

companies(s) in each CEAS nation and then, to put together at CEAS level the conclusions in the form of a lessons learned compilation, highlighting the obstacles encountered, the errors made, etc. A clear objective : to build-up aids for the future, to generate know-hows for the future. An excellent subject for a symposium, is not it ?

CEAS bulletin

Don't you think it would be highly desirable to establish, as soon as the very beginning, clear cooperation and coordination rules with the European organisations concerned – EC, ACARE, EASA, Eurocontrol, ASD, ESA, EUROCAE, AEA, EREA,... with a double objective : (i) to avoid possible duplications (in particular for the organisation of conferences, symposia...) ; (ii) to be as efficient and useful as possible ?

Alain Garcia

Your question is meaningful, of course. But I would not say "as soon as the very beginning". Why ? Because first of all, we have to show and demonstrate our effective existence, to make known our works, to establish our reputation by some successful achievements, in short to solidify a hard nucleus. When we have acquired our specificity, our personality, then yes, it will be necessary – and easy – to develop those co-operations. Before that, we should clearly identify our customers, and the objectives we want to associate to each of them : industry, academics, policy makers, ...

CEAS bulletin

We congratulate you for your nomination as head of the Aeronautics Branch. What are the main lines and principles you have in mind to constitute and then to structure your Group ?

Alain Garcia

I am constituting a working group with a limited number of experts in order to define the goals and the organisation of the Aeronautics Branch. I shall be able to present a complete project in the first half of 2007, not before. What I can tell you immediately, is that I do not intend to deal only with technical topics. I plan to take also into consideration public policy, sociocultural aspects... Among the subjects I have in mind : how to encourage high-talented students and engineers to choose an aeronautical career ? There is today a certain disinterest of the scientific "elite" for the aerospace sector in some countries in Europe : how to reverse this trend ? Also a good subject for a European Conference, perhaps.

CEAS bulletin

When do you think it will be possible to establish the Aeronautics Branch event Calendar covering the years 2007, 2008 and 2009 ? – Workshops ? – Symposia ? – CEAS alone ? Or CEAS in cooperation with other organisations ?

Alain Garcia

My answer is the same as for the previous question. Not before the end of June. We have to work closely with the Programme Coordination Committee. But anyway, it is clear that the first event we have to quite successfully perform is the 1st CEAS Congress, Berlin, 10-13 September 2007. Let us succeed in it, then the horizon will be made clear !

CEAS bulletin

Concerning the technical publications, is your concept similar to **Dr Stavrinidis** one for space ? What are the topics you intend to deal with ?

Alain Garcia

We have still to deepen our thinking on that subject. Our philosophy will be defined by a dedicated working group in mid-2007. However, it is already my intention to include in each issue of the Aeronautics Technical Journal a Reader Digest of the most significant knowledge publications which exist in the different disciplines : structures, materials, flight control and guidance,... This will represent a fantastic added value. It will be naturally indispensable to find competent contributors to this reading and synthesis work : I think we can.

CEAS bulletin

The AIAA publishes a high standing magazine : "Aerospace America". Would you be in favour of setting up a small working group put in charge to conduct a preliminary study concerning the creation of a similar magazine for the CEAS?

Alain Garcia

Yes, but I am conscious that it is a very ambitious objective, difficult to be reached. We should proceed step by step, carefully, pragmatically. First, a good quarterly CEAS bulletin in 2007, then we could set up a working group to think about possible future developments.

CEAS bulletin

What are your 3 main wishes for 2007, regarding the CEAS development ?

Alain Garcia

1. The effective entry into application of the CEAS administration rules.
2. The full success of the 1st CEAS Congress in Berlin.
3. The constitution of all necessary specialized committees.

AN HISTORIC EVENT : THE A380 CERTIFICATION

On 12 December 2006 Airbus celebrated a special day in the history of civil aviation by receiving the EASA and FAA type certification for the A380, the world's largest civil airliner. The event was a premiere in several areas :

- it was the first time such an aircraft, the first true passenger double deck airliner, was successfully developed and declared technically ready to enter service ;
- it was the first time an all-new Airbus type was jointly certified by the European and American Authorities – and that in itself was a great achievement ;
- it was the first time the recently created European Aviation Safety Agency (EASA) granted such a type certificate ;
- and – last but not least – it was Airbus' first type certificate in the 21st century.

Some 600 people from both airworthiness authorities, from suppliers, Airbus engineers and top management attended this historic event.

The design of the A380 is a classic case of 21st century engineering. It will make history in this century, as the venerable 747 did in the last century. The A380 is not only the most spacious civil aircraft ever built, it is also the most advanced, representing a unique platform from which all future Airbus aircraft programmes will evolve. Flight tests have proven that the aircraft is standing on its promises, by meeting – or even exceeding - the expectations in terms of performance, range, environmental friendliness and cabin comfort.



Airbus has a long and successful record of pioneering new technology in an evolutionary and responsible manner, to ensure better aircraft performance, lower operating costs, easier handling and greater comfort. This is the corner-stone of Airbus' success in the marketplace, enabling Airbus aircraft to retain a strong competitive edge over other products. The application of advanced technology translates into immediate benefits for customers, operators, pilots, crews and passengers alike.

The A380 is a success for aviation industry and a great success for Europe, and it will become the flagship in many airline fleets all over the world. With a demand estimated at 1,665 passenger and freighter aircraft in this category over the next 20 years, it is an indispensable member of the Airbus portfolio. Together with the A350 XWB, which was formally launched on 1 December 2006, they will be the workhorses in the twin-aisle segment for the decades to come. They are the future, a future that Airbus' highly skilled and talented engineers have in their hands, because technology is at the root of it.



From left to right : John HICKEY, FAA, Director of aircraft certification services – Marion BLAKEY, FAA Administrator – Nick SABATINI, FAA, Associate Administrator for Aviation Safety – Alain GARCIA, Executive Vice-Pdt Engineering, AIRBUS.

Technology will be the key driver for the future, especially in a world that will be more and more submitted to environmental constraints. Technology will be more and more needed to allow Airbus to meet societies' expectations and to be given the permission to grow. The aeronautics industry will only then be able to remain an economical and development driver. Noise, emissions, rising fuel prices before this source of energy becomes scarce and is eventually replaced by some-

 European Aviation Safety Agency	
TYPE-CERTIFICATE	
EASA.A.110	
<small>This Certificate, established in accordance with Regulations (EC) No 1592/2002 and (EC) No 1702/2003 and issued to</small>	
AIRBUS	
<small>1 Rond-point Maurice Bellonte F-31707 Blagnac Cedex FRANCE</small>	
<small>certifies that the aircraft type design listed below complies with the applicable Type Certification Basis and Environmental Protection Requirements when operated within the conditions and limitations specified on the associated Type Certificate Data Sheet No A.110</small>	
Model A380-841/-842	Date of issue December 12, 2006
<small>This Certificate and its associated Type-Certificate Data Sheet, which is a part thereof, shall remain valid unless otherwise surrendered or revoked.</small>	
<small>For the European Aviation Safety Agency,</small>	
 Patrick GILDON <small>Executive Director</small>	

AN HISTORIC EVENT : THE A380 CERTIFICATION

thing else, all these factors will be tremendous challenges to overcome. These challenges can only be met by an innovative and strong aviation industry, and an industry, which works through international co-operation. It will require the whole creativity of engineers at Airbus, but also the research institutes, and the universities, to continue being even more creative than in the past to make the unconceivable a reality. We need to continue to increase our investment in R&T at all levels for this industry to secure its future.

In the past two years Airbus has doubled its annual R&T investment to more than € 300 million. The EU and national governments have yet to match this effort if we want to secure the future of the air transportation industry, which is vital in today's and tomorrow's economy.

The joint European and American certification, the first time ever that an all new airliner is granted both type certificates simultaneously, demonstrates that, despite the very strong competition that prevails on the commercial side, engineers, administrations and all the parties involved who have one single and the same objective, namely that of ensuring safe air transportation, can productively work together in a level playing field and in a well coordinated approach. Evolution took place over the past decades at the industrial level, with the industries of the major countries integrating more and more, and this has now been complemented by the administrations of the various European countries. Now, in the early days of the 21st century, Europe has at long last one single European Aviation and Safety Agency, which has fully played its role in the certification process of the A380. The European type certificate is valid in 31 countries, the 27 Member States of the European Union as well as in Iceland, Norway, Switzerland and Liechtenstein.

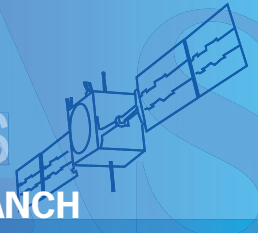
Aviation brings people and economies closer together, promotes trade and cultural exchanges, and last but not least, provides millions of jobs worldwide. The aviation industry is becoming more and more global. The current Airbus products are developed and produced in many countries around the world, and this will apply even more to the A350 and to any future aircraft beyond from any manufacturer. The airplanes will all be flown all around the world. And the technologies that will be needed in the future will also be global.

The safety of aircraft are the result of both, a good design and, to a significant amount, the result of an intelligent oversight from the airworthiness authorities. However, airworthiness and flight safety standards can only be of the same stringent level all around the globe. It would therefore be extremely helpful to all parties, including the operators, if the

airworthiness authorities would be able to further develop and reinforce their capability of developing methods that allow mutual acceptance of the other's rules and regulations. Airbus strongly believes that this can only be to the benefit of an even further enhanced air transportation safety, which is the prime concern of all stakeholders.



From left to right : Rachel DAESCHLER, EASA, Project Certification Manager – Patrick GOUDOU, EASA, Managing Director – Alain GARCIA, Executive VP Engineering, AIRBUS.



NEWS FROM THE CEAS SPACE BRANCH (EUROPEAN SPACE SOCIETY, ESS)

PRORA-USV: The First Dropped Transonic Flight Test

The USV First Flight: The first Dropped Transonic Flight Test (DTFT-1) of USV (Unmanned Space Vehicles), performed with Castor, the first of the two flying laboratories developed within the USV Programme by CIRA (Italian Aerospace Research Center), was performed on 24th February 2007, from Tortoli Airport in Sardinia.

At 8:30 a.m. the 340000 cubic meters helium stratospheric balloon lifted off from the East coast of Sardinia, bringing the Flying Test Bed #1 (FTB-1) up to the altitude of 20.1 km before release within the isolated sea polygon controlled by Italian Air Force Fire Test Range in Salto di Quirra (PISQ). The mission ended at 10:30 a.m. with the splash-down of the components of the system vehicle-gondola-balloon.

The mission itself was very good, with a nose-up manoeuvre under highly unsteady transonic conditions, reaching a maximum Mach number as high as 1.07. Nominal flight conditions were achieved up to the beginning of the vehicle recovery final phase, when the opening sequence of the three-stage parachute system should have guaranteed the recovery of the FTB-1.

Unfortunately, a failure in the first stage parachute caused a too high velocity splash down with the consequence that the vehicle was broken in three major parts, two of which were recovered.

The main mission target and achieved data were as follows:

PARAMETER	TARGET	ACHIEVED
• Max Mach:	1 – 1.1	1.07
• Release Altitude:	19-21 km	20.1 km
• Attitude:	$\alpha > 4^\circ$	$\alpha \approx 7.5^\circ$
• Aerodynamic Efficiency:	L/D > 2.5	L/D > 2.5

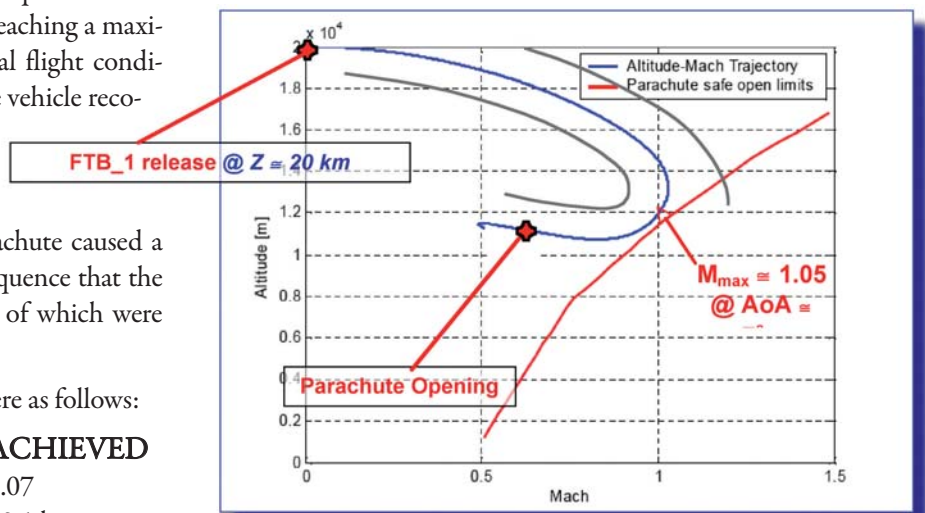
Some 2 million measurements were taken related to flight data, housekeeping, as well as 500 aerodynamic and structural experimental sensors, while flying in the Mach number range between 0.6 and 1.07.

Many national and international institutions and industries contributed to the mission preparation and execution, under the supervision and technical guidance of CIRA: Italian Space Agency, Italian Air Force, Italian Navy, Italian Civil Aviation Authority, Italian Company for Air Navigation Services, Port Authorities, European Space Agency, Techno System Dev., Vitrociset, Carlo Gavazzi Space, Space Software Italia, Alcatel Alenia Space Italy, and ISL-Altran Group. It is worth underlying that SMEs from the Campania region played an important role as most of the vehicle manufacturing

was performed by them.

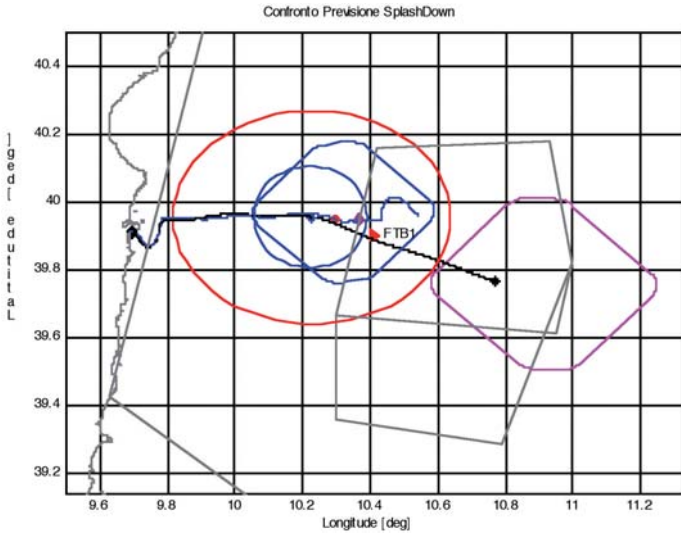
DTFT-1 will be followed by at least three other experimental missions of similar type, looking at higher maximum Mach numbers (up to 1.8) and more complex flight manoeuvres thanks to a wide range of release altitudes (from 10 km up to 35 km).

The DTFT-1 Mission: The DTFT-1 designed mission scenario is illustrated in the following figure. The nominal flight path (blue line) was defined in order to keep the vehicle always within the parachute 4.5 g safe opening limits (red line). Given the target to reach transonic flight conditions, it was chosen to release FTB-1 from Carrier (balloon system) at 20 km altitude, having to accept the probability to cross the parachute safe opening limit because of variations in the flight path due to dispersions (see gray lines).



The Carrier trajectory during the ascent phase and up to the FTB-1 release point was perfectly nominal, as well as those of the parachuted gondola and broken balloon after the release and up to the splash down. The following figure shows those actual trajectories as per the available telemetry data that appear to be very near the projected ones.

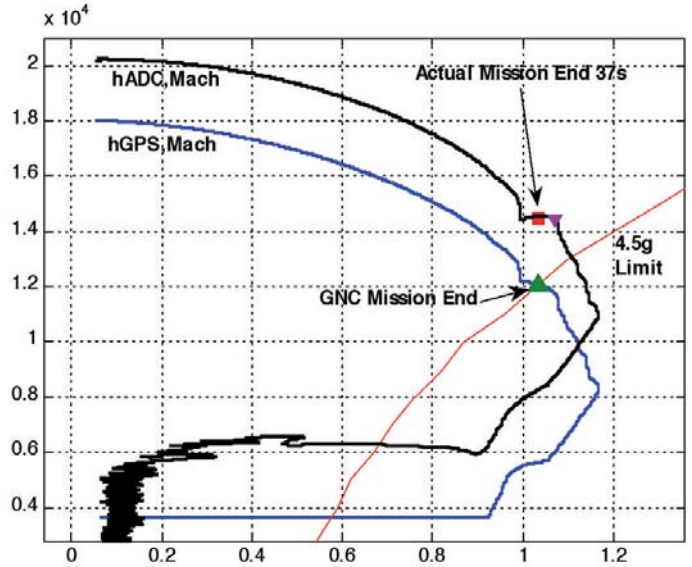
Expected and actual trajectories of the system components before and after the release, and up to the splash down. (Black line: Expected trajectory in case of timer imposed flight end; blue line: Actual Carrier trajectory up to the gondola splash down; red circle dot: Actual FTB-1 release point; violet squared dot: Broken balloon splash down point; red triangle dot: FTB-1 splash down point; blue broken curve: Expected FTB-1 release area; red curve: Expected FTB-1 splash down area; violet curve: FTB-1 + gondola splash down area following the release caused by the timer imposed flight end.)



The essential FTB-1 flight phases, after release from the balloon, were free fall, acceleration, transonic manoeuvre and deceleration, where the last phase failed to occur.

The following graph shows the actual trajectory. The GNOB (Guidance Navigation On-board Computer) was based on GPS data and ended the mission at the crossing of the parachute safe opening limit (red line). It must be said that an error has been identified during the post-flight analysis on the GPS-based measurement of altitude. The actual altitude as measured by the Aero Data Computer (hADC) is 2000 m higher than the hGPS, with the consequence that the actual trajectory is the black one.

In terms of mission data acquisition assessment, the actual status is summarized in the following table. It can be easily seen that a very large part of flight data were acquired and transmitted to ground via both direct and satellite (Artemis of ESA) telemetry channels. The analysis of the flight data is on-going.



DTFT-1 MISSION DATA ACQUISITION ASSESSMENT

Flight Component	Phase	Data Available
CARRIER	up to splash down	100%
FTB-1 via Artemis	up to RESY opening	~ 90% (a 10 Hz)
PEX (500 sens + flight)	up to splash down	100% (a 100 Hz)
1 st on board video	up to splash down	100% (6 fps)
2 nd on board video		0%
Trajectories from radar (PISQ)	up to splash down	100%

G. RUSSO
CIRA, Capua, Italy

COROT

The COROT satellite has been successfully launched on 2006, December the 27th, by the new 2.1b version of the Soyuz launcher. After a smooth and successful in-flight tests, the scientific mission started at the beginning of March 2007.

WHAT IS COROT ?

The COROT mission is part of the Small Mission Initiative of the French Space Agency CNES, and has two scientific objectives, both requiring long uninterrupted observations with very high photometric accuracy : stellar seismology, and search for exo planets.

Concerning the stellar seismology, a star is a mass of hot gas, subject to forces of gravity, pressure and Coriolis inertia when it rotates. These forces play like the spring forces of an oscillator with eigenmodes. The stationary waves associated with these hydrodynamic processes make the surface distort and are

the source of photon flux oscillations, whose amplitude is expected to be about a few 10⁻⁶ (ppm). The high precision photometry of COROT makes possible the measurement of these oscillations, in the frequency domain.

Concerning the planet hunting, the COROT planet-finding program aims at detecting the presence of extrasolar planets when they transit in front of their parent star. The detection is based of the analysis of the photometry signal in the time domain.

This mission uses the so-called PROTEUS Satellite bus. With the latter, only low earth orbits are accessible. In order to observe the same direction of the sky for a long period of time (several months), not being blinded by the Sun or occulted by the Earth, the satellite must have a polar inertial orbit and a line of sight roughly perpendicular to the orbit plane. The spacecraft is orbiting around the sun and then should slew through 180 degrees two times a year, at equinoxes.



The Partners

COROT is a French national-lead programme which introduces a new type of collaboration with ESA. National space agencies usually contribute to ESA programmes by supplying science instruments or equipment. For COROT, the roles have been reversed. CNES is the prime contractor for the mission, the payload development is driven by an integrated team with people from CNES and CNRS laboratories (LESIA in Meudon, IAS in Orsay and LAM in Marseille) and including European partners (Austria, Belgium, ESA and Germany). Alcatel Alenia Space is responsible for the platform and the integration of the satellite. As for the satellite, the Ground Segment is developed within the same frame of cooperation between CNES, CNRS laboratory (OMP in Toulouse) and international partners (Brasil and Spain). The satellite mission and control centers are located at the Toulouse Space Center. Communication with the satellite is provided by means of the CNES 2GHz network, an antenna in Alcantara (Brasil) and an antenna in Vienna (Austria). The data is then distributed to the mission's scientists.

Technical Challenges

There are a number of technical challenges to be met on board this satellite, as the signal to be measured is weak (variations of approximately one millionth in seismology). These challenges particularly include:

- **The pointing stability**

For the stellar seismology measurements, because of the non-uniformity of the pixel-to-pixel response, the pointing jitter produces noise. In order to keep this noise lower than the photon noise, a stability of 0.25 pixel is. That means a stability of 0.5 arc-second. This level of accuracy is achieved by using the instrument in the control loop.

- **The protection against the straylight**

The requirement to be almost completely protected against the light reflected by the Earth lead to design a telescope with an off-axis un-focused parabolic (2 mirrors) system completed with a baffle which has a rejection factor never achieved before (10^{-13} at 20 degrees).

- **The thermal stability**

The quantum efficiency and the dark current are function of temperature. In order to fight against the periodic noise (orbital period) induced by fluctuations of temperature, the CCD must be at -40°C with a stability better than 0.05°C over 1 hour. In order to reach this performance, a passive modular concept has been used, with separate and isolated "cells":

Management Challenges

The counterpart of international cooperation is a complex management of the project with a high number of interfaces. There are plenty of factors of complexity :

- The responsibility of CNES at all levels from the procurement of parts up to the whole system integration and going through equipment, subsystems, the instrument and the ground and space segments.
- The different nature of relationship between actors. Agreements with international partners, Convention with the french laboratories (CNRS) and the Contract with manufacturers. The project has to manage 6 International Agreements, 3 Conventions and more than 100 contracts.
- The difference of cultures and experience which leads to always privilege the content to the form.

It is to be noticed that once the programme has been stabilized by the fall of 2003, the development of the flight hardware and the whole system has been done in less than three years.

Concerning the technical management, the number of interfaces has imposed to the project a strong system engineering and management in order to keep everything consistent.

Results

The data processing is being actively performed in many centres and the scientific community is delighted with the first results, wich are very promising. It appears that the PROTEUS platform and instrument performances are often better than specified.

D. ASSEMAT
CNES/CST
Toulouse, France

MET OP

MetOp, Europe's first polar-orbiting satellite dedicated to operational meteorology, was launched on 19 October 2006 from Baikonur Cosmodrome, in Kazakhstan, by a Russian Soyuz 2/Fregat rocket operated by Starsem.

- MetOp-A is the first in a series of three satellites, developed as part of a joint undertaking between ESA and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), whereby MetOp forms the space segment of EUMETSAT's Polar System (EPS). MetOp represents the European contribution to a new cooperative venture with the United States providing data to monitor climate and improve weather forecasting. To fulfil its ambitious mission, MetOp-A incorporates a comprehensive remote-sensing payload consisting of a set of new-generation European instruments, plus a set of 'heritage' instruments provided by the United States similar to those flown on current NOAA satellites.

PAYLOAD INSTRUMENTS

- The Infrared Atmospheric Sounding Interferometer (IASI), developed by the French space agency CNES. Its soundings will be complemented by measurements from the US heritage instruments AVHRR (Advanced Very High Resolution Radiometer), HIRS (High Resolution Infrared Radiation Sounder) and AMSU (advanced Microwave Sounding Unit) and from the Microwave Humidity Sounder (MHS), a five-channel microwave radiometer developed by EUMETSAT.
- The improved Global Ozone Monitoring Experiment (GOME-2), a scanning spectrometer designed to probe the atmosphere for profiles of ozone concentrations as well as other trace gases.
- Another instrument with a strong ERS programme legacy is the Advanced Scatterometer (ASCAT).
- A new instrument developed in the frame of MetOp is the GNSS Receiver for Atmospheric Sounding (GRAS).

- The NOAA-supplied instruments include: the third-generation (AVHRR-3); two 15-channel (AMSU/A); and the fourth-generation HIRS, a 20-channel equivalent of the IASI interferometer.
- In addition, MetOp-A carries an advanced Argos data collection system supplied by CNES.

The Soyuz 2 launcher, on its first operational mission, lifted off with the 4093kg spacecraft encapsulated in a new 4.1m diameter payload fairing. Some 69 minutes after launch, the Fregat upper stage released the first MetOp satellite into a 'sun-synchronous' circular orbit at an altitude of 837km over the Kerguelen archipelago in the South Indian Ocean. This orbit will enable MetOp-A to circle the globe from pole to pole while always crossing the equator at the same local time, i.e. 9:30 am.

This was the start of the early operations phase, under ESA/ESOC control, and included the execution of the automatic deployment sequence of the satellite's solar array and release of the reaction wheels; the attitude acquisition and the payload antenna deployments. Satellite manoeuvres were also performed to allow the final operational orbit to be reached. Activities were completed, without incident, by 22 October 2006, when control of the satellite was passed to EUMETSAT.

The satellite In-Orbit Verification (SIOV) phase had then started, with the successive switch-on and check-out of the payload instruments. A delay is required at the start of this process to allow the cooled instruments (IASI, AVHRR, HIRS and GOME) to decontaminate their sensitive optical and thermal surfaces.

By the end of last year, all instruments had been switched on and "first light" data was available. No major anomalies were encountered for the instruments, and the performances were as expected. The phase has been successfully concluded on 29 March 2007 after which EUMETSAT, with the support of ESA, has started the Commissioning phase, aimed at calibration/validation activities, for the overall system. This should be completed mid May 2007, and routine operations will then be started.

In the mean time the MetOp-B and MetOp-C spacecraft have largely completed their integration and are placed into storage, waiting for the restart in 2009 for the next launch (MetOp-B), foreseen in 2011. MetOp-C is slated for launch in 2015.

**P. EDWARDS, C. FRANSEW,
ESA/ESTEC, EOP-PT
NOORDWIJK, NL**

