Editorial: What future for the European combat aircraft industry?

For the past twelve months, the Defence Commission of the Air and Space Academy has been carrying out an in-depth study into the future of the European combat aircraft industry. This issue is a real cause for concern since no major new programme is currently underway in European countries. The JSF/F-35 programme is essentially American with European industry acting basically as subcontractors to American industry.

The analysis by the Defence Commission, the conclusions of which were made public in mid June(1), can be summed up as follows: Air warfare scenarios without advanced combat aircraft are not realistic.

Among the various possible crisis scenarios, analysts emphasise the risk of asymmetric war with terrorist organisations as well as multinational interventions against rogue states. As can be seen in the current crisis in Libya, sophisticated air combat forces are essential in order to identify targets, ensure strike accuracy and avoid collateral damage.

Europe runs the risk of losing its Air Power independence.

A state relies for its independence on its capacity to project its power, which in turn depends on an advanced combat air system. Today three aircraft – Eurofighter, Gripen and Rafale – are currently produced, fulfilling European defence needs and securing industrial and strategic independence. In view of a future joint successor, the industrial capacity must be optimised but to date no initiative exists to secure this know-how so crucial to the future of Europe. Europe’s strategic independence is therefore at stake if no action is taken to secure independent Air Power capabilities. State-of-the-art air systems used in operational conditions are reliant on continuous and close industrial support. Such support services are equally needed to ensure proper evolution of the system throughout its life cycle. Know-how must be maintained by working on concrete projects including research on new technologies, thus supporting the activity of design offices and maintaining the necessary development and production tools.

No government is about to launch a new combat aircraft programme and neither can national manufacturers maintain their know-how on a purely national basis. The future will therefore necessarily be European.

If no decision is taken on a European level, the industrial capability to design and produce combat aircraft will gradually be lost and could only be rebuilt by means a tremendous effort lasting decades. The Defence Commission lists in conclusion a series of decisions that must be made in order to safeguard the European fighter aircraft industry, including the following:

- Any definition of a future European combat aircraft programme must stem from the expression of joint operational needs and clearly specify the required industrial capabilities.
- Urgent actions must be taken in Europe in order to ensure the survival of the avionics industry (radars, sensors, on-board systems) and weapons industry.
- Further consolidation of European industry is required in order to develop new technologies, demonstrators or capabilities. To achieve this, it is important to go beyond traditional cooperation schemes and investigate new, innovative industrial organisations – for instance an integrated industrial structure for each programme or a European integrated company for air combat industry. Experience has shown that industrial consolidation remains artificial and is doomed to failure if it is not based on a major programme.
- The best way to be successful in a multinational major programme is to rely on initiating the programme with a limited number of cooperating states, all of which should agree on their respective roles and then aggregating other states with attractive conditions.
- Lastly, a comprehensive long-term investment plan must be set up, sponsored by industry and European as well as national institutions in order to secure Europe’s future capacity to design, develop, produce and operate a new generation of combat aircraft.

1. The full text of the statement drawn up by the Defence Commission can be downloaded from our website.
LUNAR LASER TELEMETRY
Lunokhod 1 has been found

Five laser reflectors were placed on the Moon during the Apollo and Lunokhod programmes, some forty years ago. Lunokhod 1, thought to be lost in 1975, was rediscovered in 2010.

It seemed like a good moment to take stock of this Lunar Laser Ranging (LLR) programme, still very much in use today by the Americans, Russians and French.

The role of the Pic du Midi’s Director, Jean Rösch
Laser echoes on the Moon, laser telemetry on reflectors placed on the Moon, call it what you like: in 1967 in France, the idea of combining a telescope with a powerful laser was gaining ground. The Pic du Midi’s Director, Jean Rösch, whose offices were in the former Jolimont Observatory – the Academy’s current headquarters –, suggested using the 1.1-m telescope while Alain Orszag from École Polytechnique’s laboratory examined the new possibilities opened up by the powerful lasers of the CGE General Electric Company (Compagnie générale d’électricité).

Nobel Prize-winner for Physics, Nicolay G. Basov, contacted CNES with the idea of placing laser reflectors on the Moon
As the Diadème satellites were being sent into orbit – thus proving that laser reflectors were capable of measuring distances between stations and satellites with decimetre accuracy – so cooperation with the USSR was developing and, in 1968, CNES was commissioned by the Russians to build laser reflectors to be placed on the Moon. The proposal came from the Lebedev Institute, directed by Nicolay G. Basov, Member of the Academy of Sciences of the USSR and Nobel Prize for Physics in 1964 for his work on lasers. It was in collaboration with him and Mr Kokurin that the laser reflector was dimensioned from studies carried out by Sud-Aviation.

Presentation of the Lunokhod 1 lunar mission
On 17 November 1970, the Luna 17 automated station soft-landed on the Moon near the Mare Imbrium, at a point 50 km to the south of Cape Heracles. This station carried a roving vehicle called Lunokhod 1(1) (fig. 2). Weighing 750 kg on Earth, it was self-propelling and carried scientific instruments in a hermetically sealed, temperature controlled container. It also included French laser reflectors for studying the Moon’s movements. The reflector panel, made up of 14 corner cubes prisms and protected by a cover, was situated on an extendible device towards the front of the vehicle. It is quite visible on figure 2.

Active operations went on with this vehicle over a period of seven lunar days, coming to an end on 17 June 1971; this vehicle ran on solar charged batteries and could not therefore move during lunar nights.

Observation campaigns
The first echoes from this reflector were obtained on the night of 5-6 December 1970(2). A ruby laser had been set on a 1-m diameter telescope in the Pic du Midi Observatory(3). This telescope was used both to emit light and to receive it after reflection on the lunar reflector. Then the Lunokhod vehicle moved on. It came to its final stop on a site situated around 2.3 km north of its point of landing. Due to some technical hitches, these laser emissions were discontinued at Pic du Midi but the decision was taken to build an instrument dedicated to lunar laser telemetry and to install it in the CERGA(4) centre for geodynamic and astronomic studies (since merged with the Nice Observatory to form the Côte d’Azur Observatory). The resulting Lunar Laser Ranging station was a major experiment set up on the Calern plateau, situated in the mountains to the north of Cannes at an altitude of 1,270 m.

During the first few years of observations, the strategy consisted of concentrating on the reflector placed by Apollo 15 which had a higher quality output and was easier to locate. Like all reflectors placed by the Apollo missions, there was little loss of signal during low lunar lighting conditions. Tests were successfully carried out on the reflector on the second Russian lunar vehicle Lunokhod 2 (Luna 21 mission in 1973). At the time, the need to have measurements rapidly led to the decision to abandon laser emissions to the Lunokhod 1 reflector before results had been obtained for the Calern plateau. Figure 3 gives the distribution of data according to the different reflectors for the Calern station.

Scientific applications
Moon observation has been one of the main astronomic objectives since ancient times. During Antiquity, the distance could be...
calculated, through triangulation, to within a few percent. But whilst this margin of error represented a difference of thousands of kilometres at the time, it is now measured in millimetres, a progress of 8 to 9 orders of magnitude. It is interesting to note that lunar observations from ancient times, especially Ptolemy’s eclipse observations, are still used today to gauge long-term effects of the Moon’s movement, such as its secular acceleration, already predicted in 1693 by Halley (the angular movement of the Moon appears to slow down in relation to contemporary rules of celestial mechanics). Accurate measurement of the Moon’s movement remains one of the main aims of LLR and one of the first successes achieved through this technique.

Study of the Moon’s rotation

The network of reflectors set on the Moon makes it possible to analyse the Moon’s rotation on its axis. The Moon makes a full turn on its axis in the time it takes to revolve around the Earth, swinging slightly back and fro around an average position. This rotation depends on numerous parameters such as, for example, the internal structure of the Moon. Measurements have demonstrated that the Moon has a fluid core, contrary to the previous opinion of many scientists.

The Moon and deep oceanic circulation

The Moon’s orbital movement around the Earth is very well mapped by LLR. Ocean and Earth tides account for a high level of energy dissipation which slows down the Earth’s rotation and that of the Moon around the Earth. This secular acceleration of -25.88”/century results in the Moon’s orbit being elongated along the Sun-Earth axis in relation to an orbital calculation based on the assumption of M_0 = M equivalence. LLR measurements currently help validate the principle of equivalence with an accuracy of 10^{-10}. The CNES is currently developing the Microscope project which aims to attain an accuracy of 10^{-11}.

Results of observations

LLR telemetry data from is now processed at the Paris Observatory, the Institute for celestial mechanics and ephemerides calculations (IMCCE) and the SYRTE department. The LLR station at the Côte d’Azur Observatory began producing results in June 1981. Until June 1986, at which time the ruby laser was replaced by a Nd-YAG laser, the station achieved an accuracy of a decimetre\(^1\). Then began a period of centimetre telemetry which came to an end in 1995, when the station became millimetre accurate (fig. 4). Today, by means of a series of measurements containing around a hundred echoes obtained over 10 minutes, a normal point on the Moon can be placed to an accuracy of around 5 mm.

Lunokhod 1 has been found

On 18 June 2009 NASA launched a lunar satellite LRO (Lunar Reconnaissance Orbiter) into polar orbit on 23 June at an altitude of 50 km. Thanks to its high resolution camera, the surface of the Moon could be explored and the search began for Lunokhod 1. In March 2010 an American team led by Mark Robinson from the University of Arizona succeeded in detecting Lunokhod 1 thanks to the Sun’s reflection on the vehicle; the team deduced the coordinates of Lunokhod 1 to within 100 m. On 22 April 2010, Professor Tom Murphy’s American Apollo (Apache Point Observatory Lunar Laser-ranging Operation) team obtained laser echoes from the Lunokhod 1 reflector\(^2\). The reflector’s position is now known to within a few centimetres and constitutes a new point of reference on the Moon’s surface; according to the American team, it provides higher quality results than those of Lunokhod 2. In October the McDonald (U.S.) station also obtained echoes from this reflector. The reflector set in place by Lunokhod 1 should, through its position on the Moon, make it possible to determine more precisely the Moon’s rotation parameters on its axis and thus improve our knowledge of the temporal evolution of the Earth-Moon system.

Conclusion

With the aid of these 5 reflectors set in place in 1969 and a number of LLR stations – one of which, on the Calern plateau, has been updated to millimetre accuracy – scientists now posses a tool to study the Earth-Moon system and make new discoveries. The Calern plateau is also equipped to study the Earth’s artificial satellites.

With luck, Lunakhod 1 should very shortly be observed from the Côte d’Azur Observatory. It is indeed fortunate that French-Soviet cooperation enabled French scientists to play a truly active role in international cooperation on this programme alongside Russians and Americans.

1. G.I.Petrov, “Investigation of the Moon with the Lunokhod 1 space vehicle.” Space Research, XII, 1-12, (1972)
The sixth European aeronautics days “Aerodays 2011”, organised by the European Commission and the Spanish Ministry for Science and Innovation, took place in Madrid from last March 30 to April 1. This event was a real success, not simply because of the quality of the topics and speakers, but also due to the high level of attendance, with over 1,400 participants. The latter could not be indifferent to the conference venue, the new, easily accessible Municipal Congress Palace in Madrid. Organisers should be congratulated on this choice.

The overall theme for the event was: “Innovation for sustainable aviation in a global environment”. The conference tackled the following aspects: “Sustainable Air transport”, “How the global scene is evolving”, “Mastering the Future in Aeronautics”, “The Future of Air Traffic Management” and finally “Preparing the Future of Aviation, a joint effort of Europe”. The high point of the two days was the European Commission’s presentation of the Vision 2050 report on aviation “Flightpath 2050” for the attention of the EC Vice-president, Slim Kallas, and Máire Geoghegan-Quinn, member of the Research, Innovation and Science Commission. This report was drawn up by representatives of several sectors of activity (infrastructures, aircraft manufacturing, operations, fuels and research). This high level group on aviation and aeronautics research was set up in December 2010. Its report mainly promotes a driving role for the European sector in the international arena and calls for action in favour of a competitive, clean, safe and reliable aviation sector by 2050. Particular attention is also paid to individual needs and those of society as a whole. The new European Union Strategic Research Agenda for aeronautics, following on from the two previous ones, will be based on this new vision. An appropriate management structure, via an organisation such as ACARE (Advisory Council for Aeronautical Research in Europe), will be set in place to create this strategic agenda and ensure its proper execution. It is likely that, as for previous agendas, orientations for national and private-sector research will mirror directions set by the Vision 2050. The 8th Framework Programme for research and technological development will be influenced by this strategic agenda.

It must be noted that the objectives fixed by the Vision 2050 are very ambitious in terms of society; they stipulate for instance that 90% of travellers in Europe should be able to travel door to door in under 4 hours and that European industry should hold on to at least 40% of the world market, whilst at the same time pursuing its efforts to reduce CO2 emissions by 75% with regard to 2000 levels! It will be difficult to meet some of these aspirations purely through innovation in aviation. Other sectors of activity such as energy and other modes of transport will have to do their bit as well!

For its part, the Academy’s Foresight commission, whose mandate was to study air transport issues within a 2050 timeline, is now, after two years concentrated work, ready to publish its recommendations (c.f. p7). These recommendations are the result of studies carried out into all aspects of air transport as well as interactive exchanges between the different groups. This point must be brought out since it constitutes one of the original features of the work of the Foresight commission, above and beyond the independent nature of the viewpoints expressed.

Forecasts concerning international and domestic traffic growth will be established based on global societal and economic changes, passenger needs, energy availability, airport and air traffic control capacity, the need for space-related solutions, innovative design on behalf of aircraft and their piloting, effects on the environment. The conclusion of each chapter will send out some warning signals, highlight wrong tracks and present recommendations for action for the attention of strategic and industrial policy makers.

Naturally these conclusions are also designed to advance preparation of the above mentioned EU strategic research agenda.

An international conference will be organised by the Academy in early 2012 in order to set up contradictory exchanges on viewpoints put forward by the Foresight commission before publishing a final report. Top European and international specialists in the subjects under study will be convened on this occasion.

Airports and their Challenges

On the occasion of Aerodays, Marc Noyelle, Programme Committee Chairman for the Airports and their Challenges conference organised by the Academy with funding from the EC FP7, presented 10 widely accepted conclusions of this conference.

He also put forward some elements to throw light on airports of the future.

Two aspects of Aerodays 2011 particularly struck him:

- the total acceptance and all-pervasiveness of the (very necessary) idea of “greening the air transport system”;
- the conclusion on the part of Zuoming Lin, President of Chinese manufacturing company Avic: “Let us not lose time in useless competition, there is so much to do and we are all partners”...!
Air transportation’s image, as perceived by the French, is globally very positive. Unsurprising, perhaps, but interesting nevertheless coming on the heels of severe disruption caused by a violent volcano eruption – which will go down in the annals of civil aviation – some no less impressive snowfall and recurring union actions that tested the patience of travellers. This is the conclusion at least of an extensive survey commissioned recently by the DGAC French civil aviation authority. So what emerges from this report? Basically that air transportation has become a fully accepted, familiar part of our daily life. We are used to its workings and have answers to most questions likely to spring to mind. This does not mean that there are no surprises reserved in the opinions expressed.

For instance, 69% of us are scared of flying (is that really the right term?), 38% express doubts as to the safety level of low-cost airlines and 53% are willing to pay extra to help fund environmental programmes. These are some of the lessons learned from the survey.

75% of travellers fear an accident, but 95% consider air transport to be “quite safe” or “totally safe”. Better still, 61% of persons interviewed consider the risk level to be lower than 10 years ago. The AF447 and Comoros accidents have clearly not caused lasting trauma in passengers, who are obviously capable of putting these tragedies in a realistic context.

On the other hand, 38% of those surveyed judged that the safety level of low-cost airlines is below that of traditional carriers. In previous years, 48 to 56% held this opinion, a good example of prejudice with absolutely no basis in truth. Indeed, statistics clearly show that the record of Ryanair, EasyJet et al is, in this respect, above suspicion. Subconsciously, however, a link exists between low price and presumed breach of safety standards. In general, low-cost airlines enjoy 69% of positive opinions, due largely to their very attractive fares, although 16% of persons surveyed voiced criticisms as to quality of service. The contradiction is clear. At any rate, low fares constitute the priority for 44% of passengers; indeed one would be forgiven for supposing this level to be even higher. Protection of the environment is also uppermost in our minds. To such an extent that 53% of passengers are apparently ready to pay a higher fare (up to 15 euros on average) in order to help finance environmental programmes. An attitude that seem slightly illogical, if one bears in mind the example given: that of a Paris-Marseilles return ticket for 180 euros. To contribute 15 euros to an ecological project is undoubtedly a worthy gesture but, then again, the high-speed TGV and idTGV offer lower prices along with a very competitive door to door time (a little over 3 hours for Marseilles/Saint-Charles to Paris/Gare de Lyon). However, this would be to go beyond the possibilities of a straightforward survey requiring yes or no answers by definition. Nevertheless, the DGAC survey indicates that 76% of travellers consider air transport to be a current source of pollution, but only 26% take this into account in deciding between air and rail. Previously 43 or 44% attested to a high ecological conscience, a surprising evolution which seems to fly in the face of the march of history. Make of that what you will.

One also notes a certain maturing on the part of air travellers. They now understand and accept the reality of security controls, considering themselves properly informed as to passengers’ rights. Far fewer of them than in the past are likely to put off planned trips due to the current difficult economic climate. The conclusion that leaps out from the page is that air transport has become an accepted feature of the landscape.

Of course, France’s dimensions are such that the domestic network was developed very early on to reach its current excellence, with an average flight time of approximately an hour. Which might go some way to explaining this rosy picture.
The Academy held its spring session in London on 7 and 8 April at the invitation of the Royal Aeronautical Society (RAeS).

Air Commodore Bill Tyack, Learned Society Board Chairman, opened the private session by presenting the history and current activities of this prestigious, ancient aeronautics association, which numbers nearly 20,000 members in over 100 countries. The public session was the occasion for three very absorbing presentations by:

- David Marshall, former RAeS President, on “Aerospace without frontiers”;
- Iain Gray, responsible for Technology strategy for the British government, on “Research in Aeronautics and Space, views from UK”;
- Alain Garcia, Academy Fellow, on the theme “Aeronautics Research in Europe; the point of view of ACARE”.

The second day was given over to visiting three key institutions in the London area: the Aircraft Research Association (ARA) in Bedford, specialising in aerodynamics, the aeronautics departments of the University of Cranfield and, in the space field, the Astrium aeronautics divisions of the University of Bedford, specialising in aerodynamics, the Aeronautical Society (RAeS).

The Academy has been invited by the Toulouse Municipality to play an active part in the 2011 edition of this festival, contributing specifically to the theme celebrating the 25th anniversary of the launch of the SPOT-1 satellite. The Academy will organise public lectures on the subject and encounters with Academy members who played a leading role in this great scientific and industrial adventure.

The Academy has lost one of its eminent founding members, Jean Boulet. He passed away in Aix-en-Provence on 15 February, at the age of 90 years. Along with him, whole swathes of French aviation history have disappeared, particularly in the area of rotorcraft. He spent most of his career in the Helicopter division of the SNCASE and, over the years, left a lasting imprint.

Today, it is difficult to decide what to admire most: his exceptional talent as a pilot, his kindness or his modesty. And yet he had early experience of fame, beating many records. One of these will always stand out: the world helicopter altitude record: 12,442 metres (40,814 feet), on 21 June 1972, a feat that Jean Boulet accomplished on a Lama, and which remains unbeaten to this day.

On graduating from Polytechnique, he chose to enter the French air force, obtaining his fighter pilot license in the U.S. He enjoyed talking of his discovery of the U.S. in the 1940s, his early training on Stearman PT13 and T-6 and the feeling of being let loose on the P-47.

In February 1946, Jean Boulet returned to France and decided to hang up his uniform for good and enter industry, joining the French aircraft manufacturer SNCASE’s flight test team. He flew mainly on Vampire and Mistral and a flat spin was accidentally to win him his first colours: as the first French pilot to use an ejection seat. A training course on rotorcraft was a prelude to a long, outstanding career on the Alouette, Puma and Frelon series, among others. Jean Boulet conserved his modesty in all circumstances. Indeed little was heard from him after his retirement, despite the very high respect in which he was held by his peers.

A founding member of the Air and Space Academy, where he rejoined his friend André Turcat, he took up his pen, alas too rarely, to write a “Histoire de l’hélicoptère racontée par ses pionniers” (History of the helicopter as told by its pioneers). Jean Boulet will be sorely missed.

P.S.
Publications

Comprehensive list and ordering facilities on our website:
www.air-space-academy.org

Dossiers
(bilingual French-English series)
22 Europe and Space Debris, 2005, 68pp, €15
23 The Ballistic Threat: what policy
25 The UAV Revolution, 2005, 88pp, €15
26 Air Transport and the Energy
28 Space: a European Vision, 2007, 60pp, €15
29 Air Transport and the Energy
30 The Role of Europe in Space
31 For a European Approach to
32 Risktaking, conclusions and
33 Airports and their Challenges,
34 Long-term Strategy for European
80pp, 2010, €15
2000, 64pp, €15
recommendations, 84pp, 2009, €15
80pp, 2010, €15
33 Airports and their Challenges,
80pp, 2010, €15
recommendations, 84pp, 2009, €15

General works
In French unless marked with an asterisk
• Annales 2001-2007
Tome 1 - Travaux, 284 p, €20
Tome 2 - Communications, 350 p, €20
• Lexique français-français, 2009, 70 p
A5, €10
• Les Français du ciel, historic dictionary
published by cherche midi under the
direction of L. Robineau, 2005, 784pp, €35
• *A positioning system “GALILEO”:
strategic, scientific and technical
stakes, English version 2004, 200pp, €19
• Ciels des Hommes, anthology proposed
by L. Robineau, cherche midi, 1999, 222pp,
€15

Conference proceedings
English and French according to speaker
• Air transport and Meteorology, 2011,
online, 15€
• Airports and their Challenges, 2010,
CDRom, €20
• Risktaking: a human necessity that
must be managed, 2008, CDRom, €20
• Scientific and Fundamental Aspects of
the Galileo Programme, 2008, CDRom,
€20
• Air Transport and the Energy
Challenge, 2007, CDRom, €20

Report: Flying in 2050
This report, drawn up by the international experts of
the Air and Space Academy’s Foresight
Commission, looks into the hurdles facing the air
transport system by 2050 and puts forward some
solutions.
One of its original aspects is to have sought to pool
viewpoints of the different activities making up air
transport and deal with their interactions.
This report will be used as a basis for a conference
in 2012 on this theme in order to provide a roadmap
for the attention of European policy makers.

*Topics:
1. Economy and Society
2. Aviation market
3. Quality of service
4. Energy
5. Airlines and Airports
6. Air Traffic Control
7. Role of Space
8. Aircraft design and production
9. Environment

Available for download in the week
of 20 June on the Academy’s
website:
www.air-space-academy.org

Members’ publications
Chroniques Aéronautiques Tome 2
Pierre Sparaco, 356 p, Pascal Galodé editions, 2011, €22
These chronicles analyse the main
events in the aviation world in 2010
without compromise or taboo and with
a healthy pragmatism. Some of the
most important subjects are dealt with
episodically as, over several months,
the story unfolds in often very surprising ways. A fascinating read.

Irons-nous vraiment un jour sur Mars?,
Jacques Villain, 128p, Vuibert editions, 2011, €15
The planet Mars has never ceased to
fascinate human beings. Enticingly
close to our Earth, it inspires the dual
hope of finding new forms of life and
a new territory to conquer. In 2010,
Barack Obama made sending
humans to Mars an objective for
2035... But will mankind’s future
really be played out in space, or is this
just a vast illusion?

Les Horizons terrestres. Réflexions sur
la survie de l’humanité, André Lebeau, 272p,
Collection Le Débat, Gallimard, 2011, €17.90
What can the human species do to escape from the
cul-de-sac it has been forced into by the forces of
technological change and the resulting
social models? Following on from
“L’Engrenage de la technique” and
“L’Enfermement planétaire”, André
Lebeau here looks into the possibility
of opening up sustainable, if possible
harmonious, ways forward for humanity.
How best to meet the main challenges – in terms of energy,
demographics, climate, etc. – now facing the
inhabitants of the planet?

The Handbook of Human-Machine
Interaction; A Human-Centered Design
Approach, edited by Guy A. Boy, Ashgate editions
478p, 2011, US, £75
The Handbook of Human-Machine Interaction
features 20 original chapters and a
conclusion focusing on human-machine interaction (HMI)
from analysis, design and evaluation
perspectives. It offers a comprehensive range of principles, methods,
techniques and tools to provide the
reader with a clear knowledge of the
current academic and industry
practice and debate that define the
field. The text considers physical, cognitive, social and
emotional aspects and is illustrated by key application
domains such as aerospace, automotive, medicine
and defence.
For your diary

**Conference: Air Transport Pilots facing the unexpected**

29-30 November 2011, DGAC, Paris

Despite great progress which has led to a considerable reduction in the proportion of unexpected situations a pilot will meet in the practice of their profession, the unexpected is and will always be present, with often dangerous consequences. Like human error; it is impossible to eradicate.

Faced with constant technological advances and the effects of globalisation, pilot training must evolve to embrace safety and efficiency aspects, regardless of the resulting financial pressure. This evolution must aim both to correct existing deficiencies and to anticipate changes needed in the profession in coming decades.

This conference is directed at all air transport players, whether involved in operations, design, training or regulations.

Its main objective is to reduce human risks arising from unexpected operational situations, based on the following major observation: technology, procedures and training still cannot make up for human shortcomings in stressful situations.

A study of human behaviour when under stress in the cockpit could lead to modifying operational interfaces and thus facilitating training.

**DRAFT PROGRAMME**

1- The unexpected. President: Maxime Coffin, DGAC
   - Different types of unexpected events
   - Upstream processing, looking forward
   - Downstream processing.
   - Feedback from experience

2- Pilots’ response to the unexpected
   President: Guy Boy, Florida Institute of Technology
   - Diagnosis and decision; Short-term processing. 3 case studies
   - Cognitive and emotional mechanisms at play
   - Medium-term processing once flight safety ensured
   - Link with automated systems; undesirable side-effects
   - Errors of interpretation

3- Training pilots for the unexpected; the present situation.
   President: John Faulkner, Royal Aeronautical Society
   - European regulations
   - Training military tactical transport pilots
   - Pilots’ point of view
   - Changing regulations

4- Current thinking and future prospects
   President: Nancy Graham, ICAO
   - Qualities needed to adapt to the unexpected
   - Detection of these qualities; selection criteria
   - Ab initio training
   - In-house airline training
   - Astronaut training

Conclusions

For more information, registration, etc: [www.air-space-academy.org](http://www.air-space-academy.org)

**For more information on our events: [www.air-space-academy.org](http://www.air-space-academy.org)**

**Lectures 2011**

28/06 A century of naval aeronautics, Robert Feuillot, in French at 6pm. in the Toulouse Médiathèque José Cabanis

29/06 ATV Automated Transfer Vehicle, a cargo to the International Space Station, Philippe Couillard, in English, at 12.30pm at the Académie royale de Belgique

27/09 Terrorism and aviation safety, Bernard Pestel, in French at 6pm. in the Toulouse Médiathèque José Cabanis

20/10 Return to the Moon?, David Mimoun, Alain Pradier, Armel Kerrest, in French, 2pm. to 5pm., at the Palais de la Découverte, Paris (booking obligatory):

25/10 On the footsteps of Aeropostale pioneers, Yves Marc et Jean-Jacques Galy, in French at 6pm. in the Toulouse Médiathèque José Cabanis

16/11 Flight testing the A400M, Michel Gagneux, in French at 6pm., Airbus, Toulouse

29/11 Flying in 2050, Alain Garcia, in French at 6pm. in the Toulouse Médiathèque José Cabanis

* = in partnership with 3AF

**Annual Plenary Session**

25 Nov. 2011, Hôtel de Ville, Toulouse.

**Prize for Law, economics and sociology of air and space transport**

Candidates for this prize in 2012 should note that theses must be received by the Academy by 31 December 2012 (full conditions on our website).

**Supported events**


The Academy will be present at this prestigious air show on the GIFAS stand. Members will present forthcoming activities. [www.paris-air-show.com](http://www.paris-air-show.com)

3**th** conference on Scientific and fundamental aspects of the Galileo Programme, 31 Aug. - 2 Sept. 2011, Copenhagen

Conference organised by ESA in collaboration with DTU Space, Danish National Space Institute, Technical University of Denmark, and supported by the Academy. [www.congrox.nl](http://www.congrox.nl)

7**th** Gimont Aerospace meetings

28 Sept. 2011 - 2 Oct. 2011, Gimont, France

This festival will include workshops for youngsters, a job forum, lectures, film projections, a pyrotechnics show, exhibitions and an air show. [www.gimont-aero.com](http://www.gimont-aero.com)


CEAS 2011 will be a unique opportunity for aerospace industries, academia, organisations and associations to communicate, share and debate innovative concepts and technical solutions in the aerospace domain. [www.ceas2011.org](http://www.ceas2011.org)

**La Novela Festival**

7-23 Oct. 2011, Toulouse, France

Festival of scientific culture, aiming to present the sciences in a new way, through wonder, aesthetics, discovery and encounter.

[www.novela.toulouse.fr](http://www.novela.toulouse.fr)

**Blagnac aerospace image and book festival**, 17-20 Nov. 2011, Blagnac, France

Annual meeting organised by the Blagnac Municipality with the association “Des étoiles et des ailes” on aerospace activities, with projections, lectures, dedications.

[www.desetoilesetdesailes.com](http://www.desetoilesetdesailes.com)

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