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*E d i t o r i a l*



*The success of Airbus: a spin-off from Concorde*

On 28 November 2008, on the occasion of its annual plenary session, the Air and Space Academy is celebrating its 25<sup>th</sup> anniversary. 2009 will also be rich in commemorations, two of which – closely involving members of our Academy – I would like to compare: on 2 March 1969, Concorde's first flight, and on 29 May of the same year, the signing of the Airbus Intergovernmental Agreement, the founding document for future cooperation. For my final editorial as President, the conjunction of these two events will help shed light on an aspect that has too often been left in the background: the importance of Concorde in the success of Airbus.

**In the technical domain**, the excellence required to build Concorde raised the overall level of competence of Sud-Aviation and its suppliers, thus creating an excellent foundation for later developments. This progress enabled Airbus to set itself apart from its more traditional competitors.

The following developments in fundamental technologies were ploughed back into Airbus development:

- new materials, aluminium alloys, special highly resistant steel, titanium and the very first composites;
- optimised structural design with the aid of calculators (finished elements...) and more flexible manufacturing schedules (panel and wing spar filing, chemical machining...);
- methods and use of wind tunnel trials;
- high hydraulic pressure enhancing systems efficiency;
- improved braking thanks to the use of carbon brake pad fittings;
- enhanced tyres in order to satisfy landing conditions for Concorde (the new tyres developed by Michelin after the accident in 1992 are the latest example).

Other technical developments undertaken for Airbus include the elaboration of complex systems and their integration into an overall optimisation of the aircraft:

- cockpit design taking more and more account of the "human-machine interface";
- systemic innovations adapted from Concorde: automatic pilot enabling all weather landing, automatic throttle for controlling the engines, fly-by-wire controls, centring management of the aircraft in flight thanks to fuel transfer...
- centralised alarm management system for greater safety.

**Testing methods and means** developed for Concorde were directly reusable in the Airbus programmes:

- the methods and sophistication of aerodynamic trials;

- the CEAT installations for static testing of structures, materials, landing gear, wheels, tyres and brakes ...
- the use of a full aircraft integration bench linked to a simulator for the development of systems and equipments in a configuration resembling the real plane;
- the design and development of simulators for finalising and preparing for flight testing;
- flight testing and data processing means reused for the first Airbus;
- the ATEC test bench (Appareillage de test d'équipement complexes) invented for Concorde was adapted to the Airbus products for both manufacturing and maintenance tests.

**In terms of regulation and certification**, Concorde's unique characteristics led to a specific set of regulations. The work carried on at the time in collaboration with our British partners was appreciated by FAA representatives and helped to establish the European authorities' credibility for certification of the Airbus products.

Concorde's **production processes** required new procedures and the setting up of industrial processes which helped launch Airbus production in a very favourable context with relation to the competition.

**Growth in the aerospace sector** during the Concorde programme (aircraft, engine and equipment manufacturers, suppliers, sub-contractors) gave rise to an exemplary participation of European industry in the Airbus programmes.

**In terms of cooperation**, the lessons learned from Concorde's weaknesses on an organisational level encouraged suitable rules to be set up for Airbus, increasing its future efficiency:

- management entrusted to industry with no state intervention;
- prime contractorship and marketing carried out by a joint entity with full responsibility as regards third parties (suppliers and customers);
- flat rate public funding for development in the shape of repayable advances.

This non exhaustive list reminds us of the importance of Concorde in the success of Airbus; I think it should be kept in mind during 2009's celebrations: **"Thank you Concorde, without you, Airbus would not be what it is today!"**

  
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Academy President, Former Deputy Director of  
the Aircraft Division, Aerospatiale

**Pierre-Yves DEBROISE**

Academy member,  
Expert at the Appeal Court of Aix-en-Provence



This article is taken from a dossier submitted by its author for study by Section IV of the Academy (Ethics, law, sociology and economy of air and space). The dossier, drawing on legal texts, jurisprudence and a full bibliography, has not as yet been examined by Section IV's members; this article is not a comprehensive reproduction of the dossier but rather seeks to raise possible avenues for exploration.

*Introduction*

We will first describe the legal expert's mission in both criminal and civil law. We will study the deontological constraints imposed by the law and by the experts' companies. We will then examine whether it is possible to reconcile the expert's independence as regards the different parties with the maintaining of their technical expertise; we will study the relationship between aeronautics experts and the law. Finally, we will review solutions put forward to ensure independent, impartial experts' reports, before concluding with some personal proposals.

*The expert's mission*

Judges call on aeronautics experts because they have neither the technical competence nor the knowledge of the specific regulations (Civil Aviation Code, EASA regulations and guidelines, international conventions...) governing the case they are required to judge. They have total faith in the report which is submitted: in the final analysis then, the expert's arguments carry authority.

The main differences between criminal and civil expert reports are the following:

- **criminal expert reports**, in spite of the law of 2004 which slightly changed the rules, are subject to investigative secrecy; the cost of these reports is met by the justice ministry, and therefore ultimately the taxpayer;
- **civil expert reports** are subject to strict respect of the adversarial principle: each party has access to all dossiers and can comment on them to the expert who must take account of these commentaries; the cost of these reports is initially at the charge of the plaintiff.

In either case, a climate propitious to dialogue and mutual trust must be established between judge and expert. Communication should begin at the stage of defining the mission (a mission with fuzzy technical specifications or which is too roughly defined is unlikely to result in a good report) and should be pursued throughout the different stages until the expert commentates their report: it is vital that the judge understands what the expert has written, so the latter must use simple terms and be ready to clarify issues raised by their report.

*The law and the expert's code of ethics*

The law (the Criminal and Civil Codes) defines the 10 commandments that must be uppermost in the expert's mind. These ten commandments are summarised by the French council of legal experts' companies, CNCEJ (see box opposite).

The law also possesses a whole spectrum of disciplinary, criminal and civil sanctions against any expert who fails in their mission.

The CNCEJ (formally known as FNCEJ) has laid down a code of ethics to which all experts working for a company (which is generally the case of legal experts) must subscribe; guideline agreements on good behaviour have been decided

between experts' companies and the bar.

These texts have the merit of existing despite remaining very theoretical.

These rules could, nonetheless, also be applied to "private" expert reports at the moment of signing the contract between a professional expert consultant (on an appeal court list) and their client.

**Technicians must accomplish their mission conscientiously, objectively and impartially**

*The independence of aeronautics experts*

The law specifies that the legal expert is an "occasional assistant of justice"; this means that they must have other sources of revenue. The aeronautics world is very small at least in its upper echelons; in their career, since they must work in an area linked to their declared speciality, they have necessarily worked, and sometimes still work, alongside or on behalf of the different parties: manufacturers, operators, administration, etc. If this is not the case, doubts could be cast on their technical expertise.

Their independence also has a juridical limit: they proceed with their mission "under the control of a judge or magistrate..."

Rather than talking of an expert's independence, we would prefer to talk of their impartiality: the law specifies that "the technician must accomplish their mission conscientiously, objectively and impartially".

This impartiality can be tested by the parties' attitude towards the expert, which can generate "emotional" reflexes in return. The expert must distance themselves from this risk in their presentation of the facts.

## The work of the aeronautics legal expert

We will limit ourselves here to the case of criminal expertise.

An aviation accident constitutes a disturbance of public order, and so immediately sets in motion a criminal procedure.

A number of different players are involved: police officers, the public prosecutor, the Judge, the French air transport police or border police, the administration's technical investigators (BEA or BEAD Air), the specialised laboratories, the manufacturer, the expert (when the judge decides to commission one, or a panel). Each player theoretically has a well defined role; these roles should be complementary.

**The law possesses a whole spectrum of disciplinary, criminal and civil sanctions against any expert who fails in their mission**

The expert should be the leader of this group, since in matters of aeronautics technology, they represent the judge throughout the investigation.

To sum up, the expert must

## The 10 commandments as summarised by the Conseil national des compagnies d'experts judiciaires (CNCEJ)

### An expert is expected to:

- personally carry out their mission;
- be constantly informed by awareness, objectivity and impartiality;
- keep to strict deadlines;
- respect the adversarial principle only in civil law; convoke all parties in regulatory fashion and transmit all documents to them;
- unless written agreement has been obtained from all parties, limit themselves to their mission;
- reveal no information if useless or unlawfully obtained;
- respond scrupulously to hearsay;
- inform the judge of the need to extend their mission or in the event of obstacles to its successful accomplishment;
- forewarn the judge to put an extra element on the record;
- be decried if between themselves or their spouse and the parties there exists any relationship of custom, council, subordination, family, friendship, enmity or money.



*Top right: In June 2007, the Academy organised a conference at the headquarters of the French civil aviation authority (DGAC) on the theme "Aviation Accidents: legal expert reports".*

*Bottom right: Conference Chairman and Academy member Gilbert Guillaume, former President of the International Court of Justice at the Hague.*

*Photo credits: Guy Zunino*



pronounce the Fact, and the judge must pronounce the Law. It just so happens that in aeronautics, the fact is tricky to dissociate from the law, due to the highly technical regulations and associated administrative guidelines governing design, production, maintenance, operations, training and qualification.

In these technical matters, the judge calls repeatedly on the expert to help them determine responsibilities. Usually this involves checking whether (or not) a technical rule has been respected. In doing so, the judge, in practice, delegates the task of pronouncing the Law to the expert. This is why we have written that in the final analysis, the expert's arguments have full authority.

## Conclusions

Proposals have been made during recent conferences aimed at raising the quality of expert reports. These include the idea of creating a "pole" of specialised judges, of recruiting "professional" experts, of a declaration of independence, etc. The author of this article would like to add the following proposals:

- **to create a commission charged with examining expert reports** at the request of a judge or one of the parties; the Supreme Court of Appeal and the Observatory of Expertise could be driving forces in this matter;
- **to create a national company of legal experts in aeronautics and space** (this company was created on 19 September last, after this article was written) which could usefully advise on the previous point, give an opinion on initial and subsequent enrolment of aeronautic experts on the lists of Appeal Courts, and enforce, if necessary, the maintaining of technical and regulatory competence on the part of member experts (the general legal training of the expert remaining the responsibility of the companies of Appeal Courts). It could also detail the expert's technical realms of competence: the term "aeronautics" covers a multitude of professions: an expert in micro-light aircraft is not necessarily knowledgeable in commercial transports, an airline pilot is not necessarily an engine or a systems specialist.

We thus would like to suggest that a directory, giving details of the experts' specialities, be sent out to the different Appeal Courts.

**These proposals, in our view, would contribute to improving the impartiality and quality of expert reports in aeronautics.**





**Jean-Claude CHAUSSONNET**  
*Secretary General of the Academy,  
former General Manager Airbus France*

## Session of 24 September

The Academy's latest session took place on 24 September at the Toulouse Cité de l'Espace, in the presence of its Director, Bernard Burel. Many new members, correspondents and foreign associates were welcomed during this session. The Academy proceeded to the election of its new president Gérard Brachet, and two vice-presidents, General (Rtd) Gérard Paqueron and Philippe Couillard, whose mandates will begin on 1 January 2009. The new Board of governors thus constituted will be sworn in at the plenary session on 28 November 2008, which will also take place at the Cité de l'Espace.

The assembly also voted for the different prizes and medals awarded by the Academy in 2008, which will be presented during the plenary session in November (see box p.6).

During the public session, Jean-Pierre Haigneré, Sergio Marchisio and Anny Cazenave gave three lectures on space themes to an enthralled audience.

## New Website

The Academy's new website, which can be accessed at the following address: [www.academie-air-espace.com](http://www.academie-air-espace.com), was also previewed at this session. Among the new elements of this bilingual website you will find a directory of members and the Academy's documentation centre catalogue, comprising some 800 works. Information can of course be found on all events organised by the Academy and all publications, which can be ordered on line.

## Public Lectures

Wherever possible, the presentations and audio recordings of our lectures will also be accessible on this site.

The latest lecture at the Toulouse Médiathèque on the theme "Scientific aspects of the Galileo programme" attracted a large audience and many thanks go to the speaker, Félix Perosanz, an engineer with French space agency CNES and member of the GRGS research group into space geodesy, who succeeded in making this fascinating subject accessible to the public.

## Homage to General Pierre Lissarrague

French Air Force Major General Pierre Lissarrague, historian, founder member of the French Air and Space Academy, passed away on 18 August 2008.

Pierre Lissarrague entered the Ecole de l'Air in 1939. He became a bomber pilot, later a transport pilot before taking part in the Indochina operations with the group *I/25 Tunisie*. Among other assignments, he was in charge of the *Nord-2501* programme and then Air attaché in Madrid, Commander of FAF base *Commandant Marzac* in Cazaux, Director of the Ecole supérieure de guerre aérienne (FAF Air War College), before being promoted to the rank of Brigadier-General in 1970 and Second in command of the French Air Force Training Command. He ended his military career as Assistant to the Technical Director for aeronautic construction, our late fellow member Jean Soissons.

From 1973, he continued to put his passion for aeronautics and his talents as a historian to use at the Musée de l'Air, which he was to manage for 12 years. He organised its installation at Le Bourget airport and then went about improving on it constantly, setting up the Space section in 1983, to make it one of the most important and beautiful air and space museums in the world, undoubtedly the richest and most comprehensive on the theme of the

early days of aviation. He was passionate about Clément Ader, publishing several studies and two books on the work of this pioneer, painstakingly and faithfully restoring the latter's Avion-3. He founded the magazine of the Friends of the museum *Pégase*.

At the same time, anxious to pass his knowledge on to the young generations, he started up a course on aeronautics and aerial warfare history at the Ecole de l'Air, and personally wrote the manuals. He was also one of the two main authors of the monumental *History of French Military Aviation*, published in 1980.

He was naturally co-opted as founding member of the Académie nationale de l'air et de l'espace. He created its history, arts and literature section, presiding it until 1995, except for the years 1985 and 1986, when his renown sent him to Washington to occupy the Lindbergh Chair of the National Air and Space Museum.

Pierre Lissarrague was born on 9 February 1920 in Buenos Aires. He was promoted Commandeur of the Legion of Honour, the Grand-Croix of the National Order of Merit, the Médaille de l'aéronautique and the Croix de guerre des Théâtres d'Opérations Extérieures with five mentions.



## Our members' publications

### L'ÊTRE TECHNOLOGIQUE ; une discussion entre un chercheur et un pilote d'essais

by Guy Boy and Jean Pinet

This book is a dialogue between two members of the Academy, Guy Boy and Jean Pinet, on the theme of cognitive engineering, a recent discipline which is currently vying for a place within the engineering sciences. They discuss the place of human beings in the current technological evolution and the advantages and limits of technology in terms of human factors and emerging practices.

ISBN: 978-2-296-06004-3 • September 2008 • French • 256 pages • €23



## Public Plenary Session

*Change of place and time: Cité de l'Espace in Toulouse, 28 November 2008, from 11.45*

### programme

- 11.45 **Public lecture** by **Bruno Revellin-Falcoz**, Academy member, former Vice-President and Director General of Dassault Aviation on  
**"Dassault Aviation: 45 years of technical innovation"**
- 12.30 Break
- 14.00 Presentation of new **Board of Governors**
- 14.15 Welcoming of **new members**
- 15.05 Presentation of **medals**
- 16.00 **Law and economy of air and space transport Prize** awarded to **Nadège Chapier-Granier**, lawyer at the Paris bar, for her thesis on **"Commercial airports; between public and private administration."**
- 16.15 **Grand prize** to **Jean-Cyril Spinetta**, chairman and chief executive officer of Air France KLM, and **Léo Van Wijk**, vice-chairman of the Air France KLM Board of Directors, for their decisive role in the merger of the two airlines, Air France et KLM.
- 16.30 Break
- 16.45 President's report
- 17.00 Projection in **Imax 3D** cinema of a film on **"The International Space Station"**
- 18.00 **Cocktail** sponsored by the **Toulouse Municipality**

### Medals awarded in 2008

#### Vermillion Medal

- **Dr. Ludger Leushacke**, Director of the RWA (Radar Techniques for Space Reconnaissance) Department of the German FGAN research institute, and **Dr.**



TIRA Tracking and Imaging Radar.

**Dieter Mehrholz**, former Director of RWA, for their work which led to the realisation of the German

#### Silver Medals

- **Sophie Coutin Faye**, Head of the "Altimetry and accurate positioning" Section at the Orbital projects directorate of the French Space Agency CNES, for her work in the area of space altimetry and accurate positioning.
- **Jean-Jacques Ferrier** and **Johannes Frese**, "vehicle architects" at Eurocopter, for their decisive role in many innovations in the use of composite materials in helicopters.

#### Bronze Medals

- **Pierre Neirinck**, a professional astronomer, specialist in artificial satellites, for his life's work devoted to space observation.
- **Lucio Perinotto**, Official painter of the air, for his life's work which brings to life with great talent some of the most beautiful episodes of civil and military aeronautics.
- **Jacques Rosay**, Chief Test Pilot for Airbus, for his book *"At the controls of the A380 - as told by the first test pilot"* (Éditions Privat Toulouse), an original literary reflection on our era.
- **Jean Tensi**, specialist in experimental aerodynamics, responsible for the "Concrete Wind Tunnel" at ENSMA, Regional President of Poitiers-Centre Atlantique group of 3AF, for the film: *"Cathedrals for wind"*, which describes the great French wind tunnels.



For more information:  
[www.anae.fr](http://www.anae.fr)

### In Toulouse

#### Final lecture in the D'Air et d'Espace cycle

Tuesday 25 November at 6pm in the Toulouse Médiathèque, in French

**Essais en vol de l'A380 ; un bilan**  
Jacques Rosay, Chief Test Pilot, Airbus

The programme for 2009 will soon be available on our website

#### JIEE'08

#### "Competitive Enterprise"

11 December 2008 - Toulouse

The 3<sup>rd</sup> "National study day for economic intelligence in enterprise" is organised by the Académie de l'Intelligence Economique and supported by the Air and Space Academy. This day of discussions between company managers and experts in strategy and economic intelligence is aimed at presenting and analysing the results of experiments into setting up economic intelligence practices in companies in order to increase competitiveness.

On-line registration:

[www.academie-ie.org/JIEE08.php](http://www.academie-ie.org/JIEE08.php)

### In Paris

Afternoon of lectures at the Paris Palais de la Découverte (in French):

#### Security in Air Transport

4 December 2008

- **Aviation security: "one accident per week"?** Michel Guérard, VP Product safety Airbus
- **Automation at the service of air traffic controllers**, Jacques Villiers, Academy member, Civil Aviation engineer
- **Sleep, jet lag, vigilance!**, Jean-Claude Bück, Academy member, former pilot with Air France
- **Medical examinations of flying crew**, Jean-Georges Mouchard, Academy member, Director of the Toulouse CEMPN

The following afternoon of lectures on the *Evolution of aerospace vehicles* will take place on 5 February 2009  
For more information: [www.palais-decouverte.fr](http://www.palais-decouverte.fr)

#### 7<sup>e</sup> COMAERO meeting

26 November 2008 from 14.00 to 18.00 at ENSTA, amphithéâtre Renard, 32 boulevard Victor, 75015 Paris

#### Two lectures (in French):

- **L'incontournable dollar dans l'aventure Airbus**, Georges Ville, President of the Air and Space Academy
- **Les missiles à statoréacteur : l'ASMP**, Jean-Paul Gillyboeuf

Registration:

[histoire@chear.dga.defense.gouv.fr](mailto:histoire@chear.dga.defense.gouv.fr)

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- No.57 *Europe and Space Exploration*, March 2008
- No.56 *Aviation and Alzheimer*, January 2008
- No.55 *Safety and human behaviour*, Nov. 2007

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