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The big picture

A Rolls-Royce Trent 900 engine is tested.

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08/17 Research
The Future Is Being Written Today

18/27
France's Helicopter Industry
Ambitions on a Par with Its Qualities

Aeronautics
Exporting French Know-How

Dominique Bussereau,

Secretary of State for Transport

How does the DGAC act to support the aeronautical construction industry?

The DGAC's role is essential, because the stakes involved in the sector are considerable. The authority provides assistance in two ways. On the one hand it provides financial support via repayable advances and research credits and on the other it engages in a wide range of activities to promote international cooperation. These include economic monitoring, market studies and actively maintaining a web of relationships, notably on the international level. I should add that these missions cover most of the sector's activities: planes, engines, helicopters and equipment. Indeed I would like to salute the work being put in by DGAC staff to support France's aeronautics industry, at a time when each individual effort counts more than ever.

//—I would like to salute the work being put in by DGAC staff to support France's aeronautics industry, at a time when each individual effort counts more than ever.—//

After the A380, the big task ahead for Airbus is the A350. Do you think French companies will be able to benefit from that project?

I have no doubt that they will. Providing they show themselves to be creative and innovative. Every time a major new aircraft construction project gets under way, the relationships between manufacturers, assemblers, lead contractors and partners evolve. The A350 is no exception to that rule, and Airbus is proposing a type of organisation close to that of Boeing. The European manufacturer wants less direct sub-contractors and more major risk-bearing partners who will become sources of new ideas and innovations, while at the same time agreeing to share the risks and finance part of the development costs. Such top-ranking partners/suppliers will thus be in direct contact with Airbus and will coordinate the work of contractors further down the line. This is an opportunity for the companies concerned, and we will help them to evolve accordingly.

A turbofan engine for light aircraft

Price Induction, a small company located in south-western France, has spent 10 years developing a jet engine for light planes, and its DGEN 380 became a reality in October 2006, when it underwent its first test-bed trial. At the conclusion of a series of tests, it is featuring in the Paris Air Show. The engine is aimed at "personal light jets", a whole new category of aircraft which will be the modern equivalent of the four-seater workhorses dating from the end of the 20th century. The new planes will be twin-engined, weigh around 1.7 tonne and fly at around 230 knots (426 km/hour) at 12,000 feet with a range of up to 700 nautical miles, or almost 1,300 kilometres. Created by an enthusiastic team of young engineers with help from their elders, the new power unit has a lot going for it. Fully equipped it will weigh only 65 kilogrammes, have a noise level of under 55 dBA and be both small and economical in terms of fuel consumption. Both start-up and electricity generation is provided by an alternator/starter powered directly by the engine's high-pressure unit(1), and all accessories are powered by an electric motor, an innovative concept which justified support from the DPAC.

— Régis Noyé

(1) The high-pressure part of the engine is located downstream of the compressor.

Aerospace Valley

The Aerospace Valley world competitiveness cluster is a grouping of some 500 companies, research institutes, training centres and other institutions located in south-western France. It is making its first appearance at this year's Paris Air Show. Given the official go-ahead by the French government in July 2005, it now accounts for almost 94,000 industrial jobs in all – a third of all aeronautics-related employment in France - spread over the Midi-Pyrénées and the Aquitaine region. The creation of "competitiveness clusters" is aimed at providing financial support to research and development projects which bring together small-to-medium sized firms, labs and other research centres, and larger companies. The arrangement should make it possible to complement support provided by European institutions, plus specific national assistance provided by the DPAC, for the strategic projects of aeronautics companies. Among the various support arrangements on offer is the Single Inter-Ministry Fund, managed by the French Ministry for Industry with help from the DPAC. Other official French bodies, and notably the regional authorities, play a role and contribute to financial support for projects that have been selected. Two other aeronautics-related clusters, ASTech in the greater Paris region and PEGASE in the south-eastern region of Provence Alpes Côtes d'Azur, could gain official approval by the end of 2007. All players in France's aeronautical industry and research community would thereby be part of the action.

Where most of the companies are to be found

ANIBAL, a quiet propeller

Gliding would be a completely silent sport if it wasn't for the sound of the powered planes need to tow its practitioners into the air. To try and reduce the noise of light aircraft in general, France's National Aerospace Research Agency (ONERA), working with the Lyon-based company Duc Hélices and the French Federation of Gliding Clubs (FFVV), has designed and produced a propeller that provides a 10-decibel reduction in noise at the expense of only a three-percent loss of performance. Code-named ANIBAL (for "Atténuation du NIveau de Bruit des Avions Légers") and supported by the DPAC, the project is one pointer to a more environmentally-friendly light aviation sector. ANIBAL comprises three key techniques for reducing propeller noise: thinner blades, thanks to the use of carbon-based composites, lower load levels on each individual blade, due to an increase in the number from two to five, and lower blade-tip speeds, thanks to a reduction in diameter from 1.93 to 1.68 metres. Having successfully passed static tests with Duc Hélices at the start of the year, the ANIBAL propeller, mounted on a 180-horspower engine, was due to undergo dynamic trials in the spring, on a test bed operated by France's SEFA training and operational service. After around 50 hours of endurance trials, the new propeller was due to be tested in flight in June 2007.

News In Brief
A US-Europe conflict

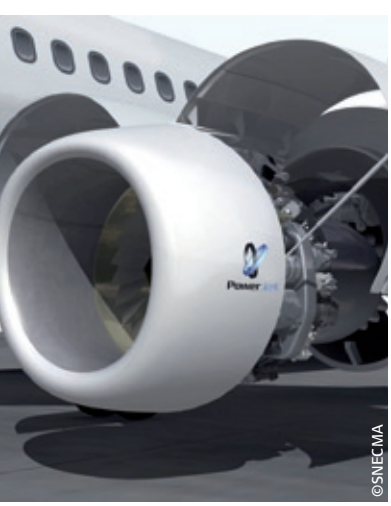
Early last February Europe responded to the objections raised by the United States concerning the way the European Union provides support for Airbus. A ruling on the case is expected from the WTO (World Trade Organisation) working group at the end of October 2007. For Europe, the support in question takes the form of repayable launch aid of up to 33% of the development cost of major programmes, as laid down in an agreement reached between the two parties in July 1992. The credits thus provided are repaid by the beneficiaries as each programme moves ahead, and in proportion to its success. Once the advances have been repaid, the programme calls for the payment of royalties. On the other side of the Atlantic, such support takes the form of research subsidies amounting to four percent at most of the civilian-sector turnover of the manufacturer concerned, ie Boeing.

After the launch of the Boeing 787 programme, the United States denounced the 1992 agreement and made a formal complaint to the World Trade Organisation. The argument they put forward was that the Europeans' repayable advances amounted to subsidies in all but name. "That is clearly untrue," says Elisabeth Dallo, the deputy head for European and International Cooperation in the Aeronautical Programmes and Cooperation Department of France's Civil Aviation Authority. *"Our system is much sounder than theirs. Over there, the funds are provided without anything being demanded in return. In Europe, they are repayable."*

In response to the case brought by the United States, Europe has in its turn filed a complaint over public-sector subsidies to Boeing. The US authorities are due to reply on June 14, 2007 to the arguments put forward by the EU in its March 22 filing in Geneva.

Ground testing for the SaM 146 engine

The Franco-Russian SaM146 power unit, due to equip the twin-engined 100-seater SSJ100 aircraft being developed by Sukhoi, is due to begin ground certification tests in Russia in the spring. The trials will take place on a new open-air facility which includes a mast from which the unit in its nacelle can be suspended high in the air and therefore out of reach of ground effects. This allows for both performance tests and certification trials on such issues as vulnerability to bird strikes, water and hail, etc. Rotation trials that began in the summer of 2006 have already shown that the new unit will have a maximum certifiable thrust of 18,000 pounds (8,150 kilograms). Flight testing, to take place from June, will be on a flying test-bed mounted on a modified Ilyushin 76 aircraft. The SSJ100 itself is due to roll out of the factory for the first time in September 2007. The all-new SaM146 is being jointly developed by SNECMA and Saturn, in a 50-50 joint venture called PowerJet and set up under French jurisdiction. The new engine grew out of the DEM21 demonstrator developed in the early 2000s, for which France's DPAC signed an assistance contract. Aid was provided in the form of repayable advances.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Charles Edelstenne,
HEAD OF THE FRENCH INDUSTRY GROUPING GIFAS

For the French Aeronautical and Space Industries Grouping GIFAS, 2006 was a "remarkable" year for the sector. A lot of challenges still have to be met, however, and they will require a strong commitment on the part of government. An interview with the GIFAS president.


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How is the French aeronautical industry doing?
Very well. The good results recorded in 2006 confirmed those for 2005, and were in line with both the dynamism of air traffic and the needs of airlines from high-growth countries. The results illustrate our know-how, and the ability of our industry to take advantage of worldwide growth.

What challenges will have to be met in the years to come?
Plenty. There's the catastrophic dollar-euro exchange rate, which is cutting into our cash flow and eating 40% of our profit margins, plus the rise of new competitors and the globalisation of the aeronautics industry. Those three factors are undermining the supply chain. Lastly, the new constraints imposed by environmental regulations and the growing scarcity of oil resources are also serious issues.
To respond, our industrialists are working actively to develop their activities outside France, but they ask the government to provide policies to support exports, particularly to help small-to-medium companies and the defence sector.

Flying High: France's Aeronautics Sector

With sales up nine percent, to 32.1 billion euros on a constant perimeter basis, France's aeronautics and space industry is in good shape. Growth has been helped by a very high level of orders, for a total of 50.2 billion euros. Deliveries for export were at an all-time record level of 18.7 billion euros. Equipment manufacturers continued to see strong growth both on domestic and export markets, with a 13% rise overall,. Last but not least almost 9,000 people were hired in 2006, along with 8,000 others who took temporary work equivalent to full time employment. The sector currently employs 132,000 people in all.

//–Setting Our Sights on Success–//

Research and innovation are at the heart of this industry. What does GIFAS expect from the French government and the European Commission on that level?
R&D is indeed a key issue for our industry. The successes our products are currently enjoying are the fruit of investments we have made in R&D over the past twenty years.
Public-sector support, coordinated and harmonised between national and European institutions, is essential in this field. In the United States, R&D in aeronautics has just been declared a national priority. In France, funding for the Civil Aviation Authority's Aeronautical Programmes and Cooperation Department[1] is down 53% since 1990 and the budget for upstream studies commissioned by the National Defence Agency[2], even though on the rise over the past four years, is in constant euros still 37% below its level of 1990.
GIFAS calls for the creation of a genuine policy of aeronautical and space research, both civilian and military, backed up by budgetary resources on a par with the challenges and our country's ambitions.
— Interview by Béatrice Courtois

(1) The DPAC, part of the DGAC Civil Aviation Authority.
(2) The Direction générale de l'armement, part of the Defence Ministry.


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The Future Is Being Written Today

The future of aviation is forever being invented! Greenhouse gas emissions to be cut, oil becoming increasingly expensive and, in the medium term, increasingly rare, the airspace of western countries tending towards saturation in the near future, the emergence of "low cost" airlines, new demands as regards security, not to speak of fierce competition between aircraft manufacturers: all these factors are challenging assumptions which at one point seemed to be here to stay.

They also illustrate the growing complexity of what could be called the "air transport system", and they have to be taken into consideration when deciding on research orientations. To be even more relevant in the future, research policies will indeed have to ensure better combinations of skills and knowledge; they will also have to be based on systemic approaches. The Advisory Council for Aeronautics Research in Europe (ACARE) showed the way, in 2004, with the second edition of its strategic research agenda. The European Union's seventh Framework Programme for Research and Development, or FP7, is now providing the opportunity to bring this approach to bear on key developments for the air transport system. The "Clean Sky" initiative on the environmental front, and the SESAR project as regards improving air traffic management, will help improve the running of aeronautical research in Europe.

— Jean-Luc Tinland
(deputy head of research and development at the DPAC)

(1) Advisory Council for Aeronautics Research in Europe.

Interview with European Science and Research Commissioner Janez Potocnik


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Why has the duration of the Seventh Framework Programme been extended to seven years, instead of the previous four-year period?
Primarily the decision to have a seven-year programme was to align it with the EU's overall budgetary programming period, which runs from 2007 to 2013. Having said that, I believe the longer time-frame has the added benefit of giving more stability and certainty to the European research community. At the same time the programme is designed to be adjusted to emerging needs over the period, with annual work programmes and the possibility of a mid-term review if fundamental changes are required.

The budget drawn up for aeronautics amounts to 2.2 billion euros. In what way can it be compared to the former PCRD? What is the meaning of this budgetary increase?
It's not straightforward to compare FP6 and FP7, as the new programme has quite a different structure. Certainly I can say that the budget for 'classical' collaborative research in aeronautics in FP7 will increase slightly compared to previous FPs, with €1.1 billion earmarked over the seven years of the programme.
However, in addition, FP7 will support new public-private partnership initiatives in the form of Joint Undertakings. The relevant ones for aeronautics currently under discussion are the "Clean Sky" Joint Technology Initiative (JTI) for Europe's Aeronautics industry and the "Single European Sky ATM Research" (SESAR) for an enhanced air traffic management system in collaboration with *Eurocontrol*. About €850 million and €350 million have been earmarked respectively for these initiatives, which brings the overall level of direct support to aeronautics to about €2.2 billion.
There is also a new body created called the European Research Council, which is inviting applications from engineering among other scientific disciplines. As the awards will be given to the best projects, it's impossible to say in advance how much will go to aeronautics.

What are the main lines of research for Aeronautics in this 7th Framework Programme?
Our overall objective with aeronautics research is to meet the future needs of our society as regards transport, environment, safety, and security and at the same time ensure the international competitive position of Europe's aeronautics industry and the researchers working in that field.

The six main research lines in the Aeronautics field will follow the Strategic Research agenda established by the European Technology Platform in this area, the Advisory Council for Aeronautics Research in Europe (ACARE). So we will be covering issues such as the greening of air transport, increasing time efficiency, ensuring customer satisfaction and safety, improving cost efficiency, protecting aircraft and passengers and pioneering the air transport of the future.

With Joint Technology Initiatives such as "Clean Sky" or SESAR, the 7th Framework Programme is introducing new research implements. What can they lead the Commission to expect?
Joint Technology Initiatives are designed to create public/private partnerships in a few very specific areas that are deemed important to European competitiveness, but where an extra technology push is needed. The concept is to create these partnerships which act as a centre of gravity for research in that particular field, attracting funding from public and private sources, and ensuring that research is well-coordinated and responds to the needs of European industry. The ultimate objective is for Europe to become the global leader in developing new technologies in these specific fields.

What is your first assessment of the setting up and running of the technological platforms?
I believe that European Technology Platforms are a perfect example of what we can achieve by working together at the European level. In the Aeronautics sector, for example, we've seen the industry agree on a vision of where they want their industry to be in 2020 and establish an agenda for the research needed to get them there. That research agenda has formed the basis of the European research programme, and with the involvement of the national mirror groups, of national research programmes as well. Overall we can increase the efficiency of our research, avoid fragmentation, all while delivering what industry needs.

• • •

CLEAN SKY

Towards the Future Green Aircraft

How can increasing air traffic be reconciled with sustainable development? Answer: by imagining new tools aimed at boosting and optimising European research efforts via public-private partnerships and lateral coordination. Such is the thinking behind the Clean Sky Joint Technology Initiative.

Are the aeronautical objectives of the ACARE strategic agenda up to 2020 still valid or have they evolved since their last updating in 2004?
As far as I am aware, the 2004 version of ACARE's Strategic Research Agenda is still valid. It is certainly the basis on which we drew up our 2007 Work Programme in this sector. But the whole idea is that such agendas can evolve, to address new issues, such as the proposed inclusion of the aviation industry in the European Emissions Trading Scheme. And of course, our work programme, adopted on an annual basis, will be able to mirror such adjustments.

Regarding the current difficulties of Airbus, do you consider that the efforts made in technological innovations are sufficient to enable the European aircraft manufacturers to meet the forthcoming challenges?
The Aeronautics Programme of FP7 is designed to address the industry's future technology needs through research. This is of course one step removed from the industrial issues facing Airbus at the moment. Having said that, current R&D efforts address the entire technology supply chain within the industry (including for Airbus), so research can clearly help to ensure the technology readiness of future generations of civil aircraft. We are supporting airframe manufacturers, of course, but also the aero-engine industry, avionics and on-board systems suppliers, with a view to developing high-tech products that can be supplied to aircraft manufacturers the world over. I believe that initiatives such as ACARE and the Clean Skies JTI will enhance the work we are doing with the aviation industry and give it a real chance of strengthening its global position.

Given the traffic growth expected in these early years of the new century, reducing the environmental impact of air transport is a major challenge for the aeronautics industry. This can be seen from the targets set by the Advisory Council for Aeronautics Research in Europe (ACARE), which aim to cut perceived noise levels by a factor of two, reduce carbon dioxide emissions by 50% and those of nitrogen oxides (Nox) by 80% between now and 2020. The council is also seeking to reduce the environmental impact of both the production of new aircraft and the decommissioning of old ones. To achieve these aims and create a truly green airplane, says Jean-Luc Tinland, deputy head of research and development at the Aeronautical Programmes and Cooperation Department (DPAC) of France's Civil Aviation Authority, *"we must work on highly innovative ideas which allow us to make a technological quantum leap when we can't make significant progress in the ordinary way."* It was in order to develop such research programmes within its 7th Framework Programme for Research and Technological Development (FP7), that the European Commission, in 2004, launched the idea of the Joint Technological Initiative (JTI). This is a specific legal structure based on the principle of public-private partnerships (PPP), with innovative operational and governance rules. With strong support from France's DPAC and the participation of eleven European companies(1), Clean Sky is one of these new structures, and it is expected to have a powerful effect on both industrial competitiveness and growth, while also contributing to wider political objectives. A notable feature of Clean Sky is the way it is organised around technological demonstrators based on aircraft "platforms", such as transport aircraft, business jets, regional aircraft and helicopters, combined with three transversal "platforms" : engines, systems, and the so called "eco-design" platform (see box). The advantage of this arrangement is that it breaks down the barriers between the different fields of work, and allows integrated development of major technological demonstrators, while also verifying as quickly as possible the validity of a choice. For example, the companies working together on Clean Sky are being asked to look into the concept of an "intelligent wing", which would offer major load gains in terms of both performance and respect for the environment. *"Today we need to move into a new phase, given that we haven't been able to achieve an adequate level of maturity for certain technologies, particularly as regards limiting environmental impacts,"* says Bruno Stoufflet, head of Prospective Studies and Scientific Strategy at France's Dassault Aviation. *"Clean Sky should enable us to reduce the risks inherent in launching a programme, while bringing technology to maturity more efficiently."*

Towards greener aircraft production methods

Within Clean Sky, Dassault Aviation is a co-pilot for the "eco-design" technological demonstrator. This is more exploratory in nature than the other platforms, and will have the special task of looking at the whole aviation production process in order to assess environmental impacts both in the making of products and during their entire life cycle. In a regulatory framework which is becoming ever more demanding, this technological demonstrator will notably explore ways of eliminating toxic substances and components, making production processes less energy intensive and obtaining more easily recyclable composite fibres. Another aim, says Bruno Stoufflet, will be to *"see how we can move towards cleaner aircraft by using only electrical energy on board."* A key aim for the French company will be to integrate such innovative technologies into the next generation of business aircraft.


©Dassault Aviation

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An A380 on a test flight over Canada.

Greening allied with market pragmatism

To achieve its aims, Clean Sky benefits from a technology assessment system which enables it to identify the most promising technologies and concepts and analyse their potential advantages. A complete novelty in the field of civilian research, this orientation tool will have to *"take account of the full range of technological possibilities, be they specific to a given "platform" or shared by all of them, in order to inform our choices and make it possible to build the most relevant demonstrators,"* says Jean-Luc Tinland. Industrial companies are expected to show a strong commitment to this technological evaluation system, in which leading European research institutes such as France's ONERA and Germany's DLR *(Deutches Zentrum für Luft- und Raumfahrt)* will also be key stakeholders. This illustrates the pragmatic nature of an approach which brings together collective environmental objectives while responding to the market concerns of companies. Another advantage of Clean Sky is that it combines major funding from the public sector (800 million euros from the European Commission) and from private companies (also 800 million euros), over seven years – a timescale that is long enough for high quality demonstrators to be both designed and built. Last but not least, this Joint Technology Initiative involves cost rationalisation and measures to avoid duplication of effort.

//—Clean Sky is one of those path-breaking projects which are set to have a strong impact on industrial competitiveness and growth.—//

What remain to be defined, however, are the rules of governance for the new entity, so as to best reconcile the principles of transparency and equity with efficient decision-making. The method currently under study would involve organising Clean Sky around an executive committee made up of representatives of the companies involved in the project and the European Commission, along with "platforms" to be run by one or two companies which would report to the executive committee, and a general assembly that would include all the stakeholders. This issue has given rise to long and arduous debate among the different participants in the Clean Sky project, but according to Jean-Luc Tinland, *"there has been good progress."* An essential step if the green aircraft of the 21st century are one day to rise into the sky.

— Henri Cormier

(1) Airbus, Dassault Aviation, Safran, Thales, Eurocopter, Rolls-Royce, Agusta Westland, Alenia Aeronautica and Liebherr Aerospace. Saab Aerospace may later join these nine founder members.


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SESAR

Europe's New Strategy

The Single European Sky ATM Research (SESAR) project, launched in November 2005, sets out new arrangements for air traffic management research. Further down the line, the aim is to optimise Europe's air control system.

"The basic techniques used in air traffic control are now several decades old," said Jacques Barrot, the EU's Transport Commissioner, in November 2005. *"The idea behind SESAR is to make a real technological leap."* Launched on the heels of GALILEO, this major new programme is aimed at bringing in a new-generation ATM (air traffic management) system over the next two decades. With traffic expected to reach some 16 million flights per year by 2020 the stakes are high indeed, and the challenge in terms of research and development is enormous. First and foremost, SESAR has to create a method of organisation and work processes capable of optimising research efforts and avoiding the dispersion of both human effort and financial resources that results from a lack of coordination and the traditional "every man for himself" attitude. *"In the field of air traffic management it has to be acknowledged that research and development was not really coordinated,"* says Christian Dumas, head of the SESAR project. An opinion shared by Dominique Stammler, deputy to the manager in charge of planning and strategy at France's Air Navigation Services Department, part of the Civil Aviation Authority. He points to the difficulty of keeping research priorities in line with expectations out in the field: *"Before we launched SESAR, the message we kept getting from users was that they didn't feel they were in the decision-making loop, and their interests were not being sufficiently catered for."* The first "definition" stage of the process, started at the end of 2005 and due to run until March 2008, is devoted to setting up a participative working method that brings together all the players involved in air traffic management. They include air navigation service providers across Europe, the users of airspace themselves, and the main airport management bodies. Over thirty members of the SESAR consortium(1) have already come together and drawn up a report on the present state of air traffic control, along with a shopping list of their expectations for the future. They are now working on drawing up the operational concept and a proposed architecture, as well as identifying the technologies to be used in the European air traffic control system of the future. An entirely new type of cooperation which should make it possible to reconcile individual concerns and the collective interest. *"by agreeing on solutions which do not simply come down to the lowest common denominator,"* says Christian Dumas.

//—The reorganisation of research should make SESAR into the main force behind the modernisation of Europe's air traffic control system.—//

An ad hoc approach to marshalling resources

Whatever the technological solutions adopted, the work being done collectively during this first stage should therefore result in a consensus on precise objectives as to research orientations. Everybody should be in agreement on the avenues to be explored on such issues as optimised flight path management, advanced decision-making aids for controllers, on-ground traffic management systems, air-to-ground communications systems and satellite navigation, not forgetting the preservation of operational separations thanks to on-board systems. The initial stage of definition is being jointly financed to the tune of 60 million euros by the European Commission and Eurocontrol, with each party putting up half of the funds. In terms of human resources it is expected to involve the equivalent of some 3,000 person-months spread over two years.


©Skyguide

Thanks to a better innovation strategy, the European programme should boost the capacity of air traffic control, making it safer, more environmentally friendly and helping rein in costs.

Once it is completed, SESAR is due to go into the development phase, which will run until 2013. At that point a different type of organisation, a joint undertaking, is due to come into force. This will be an ad hoc legal entity bringing together the Commission and Eurocontrol along with air navigation service providers and companies. With a budget of 2.1 billion euros over seven years, the joint undertaking will coordinate the projects laid down in the master plan, and in particular the research activities that will have been agreed on. One of the main advantages of the joint undertaking, says Dominique Stammler, will be its ability *"to bring together financial and human resources from a variety of different sources and use them in the most coherent way possible, while both covering all the key ground and avoiding doubling-up."*

The creation of such an autonomous structure also aims to bring all the research finance to be devoted to the future air traffic management system under the same umbrella, and to optimise its use. It is particularly important, notes Christian Dumas, to tread a fine line between the need to rationalise research efforts and the need to give free rein to innovation. *"Today we hear people say that only eight percent of ATM research projects actually ever get used. That is indeed very little, but to imagine that in the future we can bring the proportion of projects that are actually implemented up to 95% is completely unrealistic. If we are to avoid killing off innovation, we have to accept that research sometimes does not go in the right direction,"* he says. Which is why there will be one exception to the rule that resources must not be dispersed, and it will be a specific budget for path-breaking research that can escape oversight by the joint undertaking. The bottom line is that the ongoing reorganisation of research will make SESAR into the driving force behind the modernisation of air traffic control in Europe. A programme aimed at substantially upgrading the capacity of Europe's infrastructure, making air traffic control safer by a factor of ten – the expected decrease in the number of accidents as a proportion of flying time – cutting the environmental impact of air traffic by 10% and slashing the cost of the ATM system by a factor of two.

— Henri Cormier

(1) Plus a group of around 20 associate members comprising research institutes, industrialists and bodies representing staff.

Composites

Latécoère Gains Altitude

France's Latécoère group is currently setting up all the structures it needs to become a major partner of top world manufacturers in the field of composite materials.

A major player in aerostructures

The Latécoère group, which in 2007 will be celebrating its ninetieth birthday, is a specialist in aerostructures. It notably provides fuselage sections for the Airbus A330/340 and A380 aircraft, as well as aircraft doors, of which it produced 1,500 in 2006. The latter include the doors for the all-new Boeing 787. The group is also present in on-board cabling structures, as well as in engineering and services. With a total of 3,400 employees in France, it chalked up sales of 433 million euros in 2006, an increase of 22% over the previous year.

The Toulouse plant where Latécoère has set up its Composites Competency Centre for research and technology.

Latécoère has every intention of being part of a market that is growing by nine percent a year, and was working on composite materials well before they attained their current prominence. Back in the 1980s, the French equipment maker was already building engine nacelles out of composites. As Christian Beugnet, the group's general secretary, explains: *"We could see that composites were going to be increasingly used in aircraft structures themselves. So in 2002 we decided to develop our industrial strategy so as to stay ahead of the curve. Which is why we took, in that year, a 25% stake in the Corse Composites company."* The group was thereby able to transfer all of its standard production facilities using composites to the new unit. This freed up space in the Latécoère plant in Toulouse for the new Composites Competency Centre, created in 2004. The new structure, which currently employs some fifty engineers and technicians, aims to provide a team dedicated to composites and bringing together all the relevant skills, from design and IT through preparation, manufacturing and tooling right down to quality control. Latécoère is thereby able to support its development programmes, and develop activities in composites for all its business sectors.

//— "We could see that composites were going to be increasingly used in aircraft structures themselves. So in 2002 we decided to develop our industrial strategy and stay ahead of the curve." —//

The group has also gained a new boost from its Letov subsidiary in the Czech Republic, acquired in 2000. Its 20-million-euro plant in Prague is dedicated to manufacturing aircraft door components in composites, and benefits from the country's low labour costs. In a few months it will begin turning out the doors for the Boeing 787. Latécoère will thereby be producing the first passenger aircraft door in the world made of composite materials and certified for a civilian airliner(1).

And there is more to come: Latécoère expects to decide, in mid-2007, to build a new plant in France to produce composite fuselage parts.

Technological turning-point

The trend towards composite materials for both fuselages and doors being unstoppable, Latécoère has launched two major technology and research programmes. One of them is COMDOR (COMposite DOoR), aimed at building a demonstrator for a monobloc passenger door made of composites. The aim being to achieve weight savings of 20% and to increase working life, all at a competitive price. The first working-size demonstrator is due to be delivered in May 2008. The new door, designed as part of the Toulouse "Aerospace Valley" competitiveness initiative and financed to the tune of 50% by the Aeronautical Programmes and Cooperation Department of France's Civil Aviation Authority, could enter production by around the middle of the next decade.

The second programme goes by the name of ADFUS, for ADvanced FUSelage, and involves the production of a cylindrical fuselage section demonstrator in composite materials. Again, a weight saving of some 20% is expected, thanks to the replacement of metal parts by carbon fibres. Latécoère is being supported in this initiative by France's Agency for Industrial Innovation (AII). The aim is to present a demonstrator for a six-metre diameter fuselage section in the course of 2008. The project is a logical follow-on from the way composite components are being introduced into aircraft structures. The trend started with secondary structures, such as landing gear doors, radomes, spoilers and control surfaces. It then moved into primary elements such as flaps, rudder casings and horizontal stabilisers. Composites then started showing up in simple-structure primary parts such as main struts and pressurisation bulkheads, as well as complex primary assemblies like central wing structures and caissons. As a result, around 52% of the future A350XWB will consist of carbon fibres – as much as in the Boeing 787 – as against the 40% that had been planned originally.

By aiming to become a front-line player in composite fuselages and passenger doors, Latécoère intends both to ensure its own foothold in the future, and as Christian Beugnet puts it, to *"be a partner for the A350XWB, and further down the line for the future programmes of major manufacturers. Among them we can already look forward to the planes that will one day replace the present Airbus A320 and Boeing 737 NG aircraft."*

— Olivier Constant

(1) The group is also on the point of shipping thermoplastic (carbon fibre) racks for the Airbus A400M military transport.

The Letov plant in Prague, a subsidiary of the French equipment maker.

Airbus

Changing Course

For over two years now, Airbus has been giving a new direction to its research policy. It involves opening up to new partners, developing networks which bring together both public bodies and private players, seeking to boost the efficiency of certain partnerships and building on new national, European and global trends.

The launch in 2003 of Boeing's 787 *Dreamliner* project, a plane due to be based on composite materials, undoubtedly marked a new stage in the technological race which Airbus had been leading for a considerable time. The change initially came as a surprise to observers, who had grown used to identifying the culture of innovation with the European manufacturer. For in the space of just over three decades Airbus had drawn level with its US rival, first with the A310 and its two-pilot flying crew, then with the appearance of fly-by-wire technology on the A320, and then via the introduction of composites. Had Airbus therefore grown too sure of itself, underestimating the technological progress represented by the B787?

For Jacques Fontanel, the head of research at Airbus France, things aren't so simple. *"We knew that Boeing was building up steam. But Airbus was hard at work on its own programmes, and it was difficult to push ahead with the A380 and the A400M, while at the same time channelling extra resources into research. It is also true that we didn't immediately grasp the precise nature of the lead that Boeing was building up thanks to massive inflows of cash. On that level, Airbus's own resources just can't compare."*

The fightback began in 2005 with the decision to reorganise activities around an ambitious programme to mobilise the full force of Europe's research community. Airbus decided to broaden its network of outside partners. At the end of 2005 the company therefore held information sessions in France, Germany, the UK and Spain to explain its requirements to European researchers and thereby launch a vast and broad-based appeal for projects. *"This partnership policy is an engine of innovation,"* says Jacques Fontanel. *"The latter often emerges from the confrontation of different cultures, but we also have to be capable of mobilising vital research energy across the board, both in the private and public sectors."* The change of approach should allow Airbus to boost its capacity to innovate by drawing on the resources of universities and research institutes, building up a network of acknowledged centres of excellence both in Europe and worldwide. The next stage will be for the manufacturer to speed up the creation of networks bringing these research institutes and universities into contact with small-to-medium sized companies in their areas, around clearly-defined projects.

//—"This partnership policy is an engine of innovation, which often emerges from the confrontation of different cultures."—//

More effective partnerships, better funding

Last but not least, the new approach is aimed at boosting teamwork between Airbus and its strategic partners, be they other industrial companies, research institutes or universities. Plans call for the EADS research centres in France and Germany, respectively ONERA *(Office national d'études et recherches aérospatiales)* and DLR *(Deutsches Zentrum für Luft-und Raumfahrt),* to serve as bridgeheads towards second - or third-tier research networks, making it possible to build a much more rational network. France's National Scientific Research Centre (CNRS) is also a key player.

At the same time Airbus intends to boost research via communities on the national, European and global levels. In France, the manufacturer can rely on aeronautics facilities such as Aerospace Valley and the EMC2 and RTRA groupings[1]. On the European level, Airbus is involved in a number of major projects with other partners, such as the Clean Sky Joint Technology Initiative. Clean Sky's budget of 1.6 billion euros is a sign of the importance attached to reducing the environmental impact of air transport. On the global level, Airbus has almost 250 partners in all, of which 80 are considered major. For example, the company has just signed an agreement with the US National Institute of Aerospace (NIA), centring particularly on aerodynamics. Projects underway in Russia, China, India, South Africa or Japan are more modest in scale.

It is not enough however just to launch a vast research programme and create ever more partnerships. The bottom line is of course funding, and that involves increased public support. While Airbus is expecting great things from European Union programmes such as Clean Sky, it is also counting on more financial effort from member states. *"The level of support for research is crucial for the future, and we have pointed out, notably during the last Paris Air Show in 2005, that we need an exceptional effort over four or five years if we are to counter the Americans,"* says Jacques Fontanel. With external research aid totalling around 60 million euros, the European consortium's position *"is unbalanced compared to that of Boeing, which can count on around ten times as much outside aid,"* he adds, noting that states have begun responding, or are in the process of responding, to the appeal made in 2005 (see above). This is the case in France, for example, where talks on a research protocol are under way with the Civil Aviation Authority's Aeronautical Programmes and Cooperation Department (DPAC). Among similar initiatives in other countries is the *Integrated Wings* project launched by Britain's Department of Trade and Industry. In Germany the Lufo 4[2] programme was launched in January, with major financial aid from the federal government, while in Spain the CENIT programme is supported by the national Centre for Technological and Industrial Development (CDTI).

//—Airbus aims to create an impetus for research at the French, European and global levels.—//

Airbus's strategy of externalising and reorganising research, launched two years ago, covers the full range of its needs, including composites, aerodynamics, systems, energy, architecture and aircraft integration. It will allow the company to offer innovative solutions across the board, and stay in the race for the 21st century.

— Henri Cormier

(1) Aerospace Valley is a research complex centred on Toulouse. EMC2, or Ensembles Métalliques et Composites Complexes, is a research facility based in the western French region around the cities of Nantes and Saint-Nazaire. RTRA is France's Thematic Advanced Research Network.
(2) Lufftfahrtforschungsprogramme; a federally-funded aeronautical research initiative.

A computer image of the future A350's cockpit.

©STAC/Alain Paringaux

France's Helicopter Industry

Ambitions on a Par with Its Qualities

Able to take off and land vertically, to hover and to carry loads, the "chopper" is a truly extraordinary flying machine, with a range of potential uses that is probably still underestimated, despite a fast-growing market.

France can boast one of the most powerful helicopter industries anywhere in the world. Eurocopter produces extremely modern aircraft, and Turbomeca is the world leader for helicopter engines. The country is indeed still able, as shown by Bruno Guimbal's Cabri, to produce a top quality machine via a purely private initiative. If the industry is to retain its competitiveness, however, it will need an active research and development policy. That fact is of course not preventing the industry from engaging in a far-seeing long-term policy of boosting its cash flow and seeking international cooperation agreements with Asia-Pacific countries, thereby sealing "win-win" partnership contracts.

Meanwhile the operational use of helicopters is spreading in France, notably in the field of low-altitude flights under instrument flying rules, for the transport of patients and accident victims.

Eurocopter's EC175

A Franco-Chinese Workhorse

In partnership with China, Eurocopter is currently developing a twin-engine medium-size helicopter, the EC175, which will weigh between six and seven tonnes and be capable of carrying up to 15 passengers. The details of this major programme are outlined by Andreas Loewenstein, the Eurocopter group's senior vice-president for strategy and development.

Why the EC175?

Eurocopter's strategy is to bring in at least one new programme every ten years, to keep our skills honed to perfection and stimulate innovation. From the permanent contacts we have with the Chinese, it emerged that there was a new opportunity for a shared project following on the heels of the little EC120 Colibri, the first aircraft we jointly developed and manufactured.

Given the growing market for civilian helicopters on the one hand, and the way our own customers' demand is evolving on the other, it appeared that there was a need for an aircraft between the Dauphin and the Super Puma. That particular size also seemed to be especially well suited to the Chinese market, which is expected to see strong growth once the country's internal airspace is opened to civilian operators.

What are the costs involved, and how is the EC175 being financed?

The one-off development costs are estimated at around 600 million euros, to be shared half-and-half between us and our Chinese partners. Within the terms of European Union rules, Eurocopter is benefiting from support from the French Aeronautical Programmes and Cooperation Department (DPAC) in the form of repayable advances. The amounts to be paid back, on each delivery of the aircraft, have been worked out on the basis of market estimates and the expected shipping schedule, but there is no preordained limit.


©Eurocopter

The EC175, rounding off Eurocopter's range of civilian helicopters.

Needless to say, the Chinese share has been based on economic parameters worked out under a common agreement, with efforts being made to both make it as valuable as possible while also factoring in the lower labour costs compared to those in Europe.

How is the programme being shared out?

The particular skills of each partner were taken into consideration in sharing out the technical tasks. On the EC120 project the Chinese had particularly focused on production of the fuselage. Each partner will be developing a certain number of sub-systems, so as to share out the development costs equitably and allow each one to focus on areas in which he has special expertise. The manufacture of standard components will respect the breakdown established for the development stage and will be carried out, for each partner, in a single country. There will be two assembly lines, one in each country; in China the aircraft will be designated the Z15. On the sales front, each partner will be responsible for his own domestic market and those of neighbouring countries; marketing in the rest of the world will be done by Eurocopter.

What's the development schedule?

Just over a year after we signed the cooperation contract, and at the end of the initial studies carried out by Eurocopter, the programme has just passed the key milestone of its preliminary design review, which basically defines what the aircraft will be. We are now in the second phase, of detailed studies, which will be carried out by separate teams in France and China. The first prototype is due to fly in 2009, with EASA certification set for 2011.

— Interview by Régis Noyé

Helicopter engines

Turbomeca's Winning Strategy

Turbomeca, a subsidiary of the Safran group, is the world leader for the design and production of gas turbine helicopter engines. The company is working on strategies to ensure it stays number one.


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With output up 25% between 2005 and 2006 and a well-stocked order book, the engine maker is set to keep on growing in both France and the United States.

"Very recently, we entered an easily foreseeable phase during which the worldwide helicopter fleet that had been gradually built up, since the 1970s as regards military aircraft and the 1980s for civilian ones, is being replaced," says Charles Claveau, in charge of products and markets strategy at Turbomeca. However obsolescence of the earlier generation is not the only reason why the market is currently buoyant; there is also the continuing expansion of helicopter use into new types of mission, not to mention the strong rise of markets in the Asia-Pacific region, led notably by China, India and Russia[1]. *"Globally, sales of new helicopters are set to reach 1,500 machines in 2009 – double the number sold in 2005,"* says Charles Claveau. *"They will break down more or less half-and-half between civilian and military machines, and the overall level of sales is expected to stay the same until at least 2015."*

The world leader

Turbomeca is riding the crest of this wave; in 2006 it turned out 1,087 engines, 25% more than the previous year, and booked orders for 1,034, on top of pre-existing orders. Sales were up 20%, to 870 million euros, and the payroll increased by 500 to a total of 5,048 employees worldwide, spread over 14 sites[2]. Just one of the company's products, the Arriel turbine, accounted for 65% of output, being used on no less than ten different helicopters. Support and maintenance generated 60% of company sales, with the production of spare parts being equivalent to 500 complete engines.

The past year thus allowed Turbomeca to confirm the rank of world leader it had so painstakingly built up since its creation in 1938, thanks both to high quality products and a strongly client-oriented approach. Among its key customers are of course Eurocopter, for which Turbomeca is the main engine supplier. The company provides 46% of Eurocopter's engines overall, and 53% as regards civilian and para-state contracts. And Turbomeca has another reason to be proud of its record. *"Unlike all our competitors, we are the only firm which makes its living exclusively from helicopter engines,"* notes Charles Claveau.

//—2006 allowed Turbomeca to confirm the rank of world leader it had so painstakingly built up since its creation in 1938, thanks both to high quality products and a strongly client-oriented approach.—//

Keeping up production levels

Important measures have had to be taken to keep abreast of demand. The first has been to have parts manufactured not only inside the company but also by outside contractors. The second has been to boost output, both in France and the United States. *"Our aim is to double our production within the next five or six years,"* says Charles Claveau. That is precisely one of the objectives of an industrial project code-named EOLE, which includes the complete rebuilding of Turbomeca's factory near the south-western French town of Pau, due to be completed in 2009. In the United States the capacity of the assembly plant in the Texas town of Grand Prairie is due to be doubled during 2007, to 550 engines per year. Turbomeca has also just announced the opening of a new production unit in the US – for the end of 2008 – but has so far not said where it will be located.

Relying on demonstrators

Looking further ahead, Turbomeca is of course working to ensure that it retains its number-one ranking. The two planks of that policy are the use of demonstrators, and international cooperation. On the technical level the aim is to be able to predict what manufacturers will be demanding, thereby cutting the time needed to bring new engines to market, and ensuring that the technology is both modern and perfectly mature. This strategy, which is notably being aided by the French Civil Aviation Authority's Aeronautical Programmes and Cooperation Department, consists of developing four demonstrators of increasing power in the 500 to 3,000 horsepower range, where there is most demand. These demonstrators will correspond to four different types of engine architecture including the latest technology; once they are ready it will only be necessary to integrate them into new models.

Wide-ranging cooperation

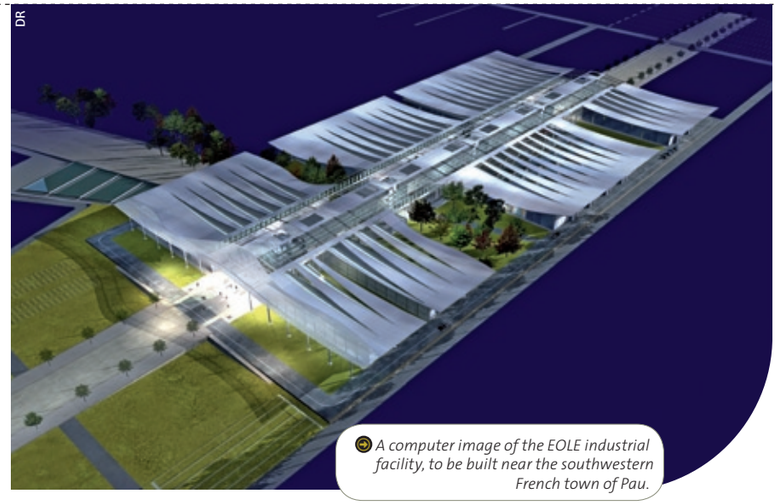
Turbomeca's cooperation policy aims to underpin contracts by signing local co-production deals, and to acquire the status of a strategic partner in certain countries. The first cooperation agreement was reached in China more than 25 years ago. Today the Chinese firm SAIC holds the licence for Arriel engines, and has just signed an order for 200 new units, to be manufactured half-and-half by the two partners and mounted on the Z9 aircraft, produced on the basis of a Dauphin licence signed by the Chinese with Eurocopter in 1980. Meanwhile in India, Hindustan Aeronautics Limited (HAL) is working with Turbomeca on the Ardiden 1H engine, due to equip a future version of the national "Dhruv" helicopter, which today is driven by the TM333 power unit. Turbomeca reckons that within five or six years India will be its second-biggest customer.

Last but not least there are great expectations for Russia, which could become a partner for the production of several engines to fill market slots that are not catered for by local manufacturers.

— Régis Noyé

(1) Within the next ten years, purchases of helicopters in that part of the world are expected to catch up with those of the United States or the European Union.

(2) Of the total payroll, 4,048 are employed in France, where Turbomeca has three sites and two subsidiaries.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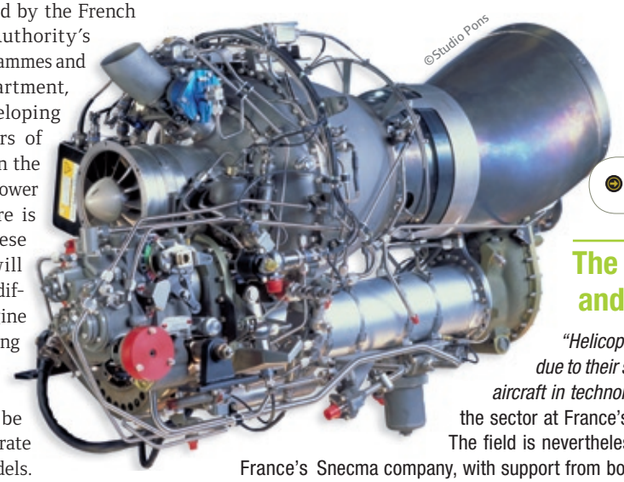
A computer image of the EOLE industrial facility, to be built near the southwestern French town of Pau.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The Arriel 1E2 turboshaft engine.

The importance of research and development

"Helicopter engines, which are subject to stricter constraints due to their small size, are globally lagging behind those of other aircraft in technological terms," says François Garnier, in charge of the sector at France's National Aerospace Research Agency (ONERA). The field is nevertheless benefiting from research being carried out by France's Snecma company, with support from both ONERA and the Aeronautical Programmes and Cooperation Department, or DPAC. The need to ensure that helicopter engines catch up explains the dynamic and diverse research programme being run by Turbomeca, which is devoting 15% of its turnover to R&D, and financing 78% of the cost from internal resources.

The number-one objective is of course to slash atmospheric pollution and noise, initiatives which also help cut fuel consumption. *"It should be noted however that France's overall fleet of helicopters is responsible for only one twenty-five thousandth of the pollution caused by its cars,"* says Gérard Patty, the head of research at Turbomeca.

Other concerns are finding materials that can withstand very high temperatures, such as a new-generation monocrystalline structure being developed by ONERA. Making use of rare metals such as rhenium and ruthenium, it can boost heat resistance by a margin of between 10 and 20°C. Research is also focusing on how to protect engines against wear and corrosion, notably via particle separators, protective coatings and filters. Looking further ahead, there are also plans to adapt engines to run on alternative fuels, and to develop power plants with more electrical potential.

Bruno Guimbal's Cabri

A Remarkable Private Initiative

French industry is not only about major companies; there are also gems of creativity and perseverance lurking among the country's medium-sized firms. A good example being the extraordinary human and technological adventure that is Hélicoptères Guimbal.

"Adventure has become very hard to find: even though our country was the cradle of aviation, my company will no doubt be among the last to obtain certification for an aircraft based on a purely private initiative," says Bruno Guimbal. As of late February 2007, a certain feeling of impatience on his part was understandable, given the time being taken to certify his craft, which as these lines are written was still expected to feature in the Paris Air Show. Through his initiative, Bruno Guimbal has nevertheless proved that such private enterprise is still possible.

The craft in question is the Cabri G2 light helicopter, a two-seater piston-engined[1] craft intended mainly for flying schools and leisure users. It is aimed at a market which currently amounts to some 8,000 machines worldwide, and is overwhelmingly dominated by the US firm Robinson's R22. Guimbal expects the Cabri to sell some 200 units a year.

The private initiative is that of Hélicoptères Guimbal (HG), named for its CEO and which currently employs twelve people. The firm has been developing the new Cabri for the past six years from its base at Aix-en-Provence in the south of France. Bruno Guimbal, a graduate of France's Arts et Métiers engineering school, spent 18 years working for Eurocopter's consultancy service, of which 10 on rotor development and three on the Colibri, the latest single-engine craft to emerge from the company's Marignane factory near Marseille. Which explains why his project has always been taken seriously, and why he gained the backing not only of 40 industrial partners willing to invest in risk-sharing, but also of institutions such as the French Ministry of Research and the DPAC and ANVAR agencies[2].

//—A very high level of modernism and safety, resulting from the use of technologies that are usually seen on much heavier aircraft.—//

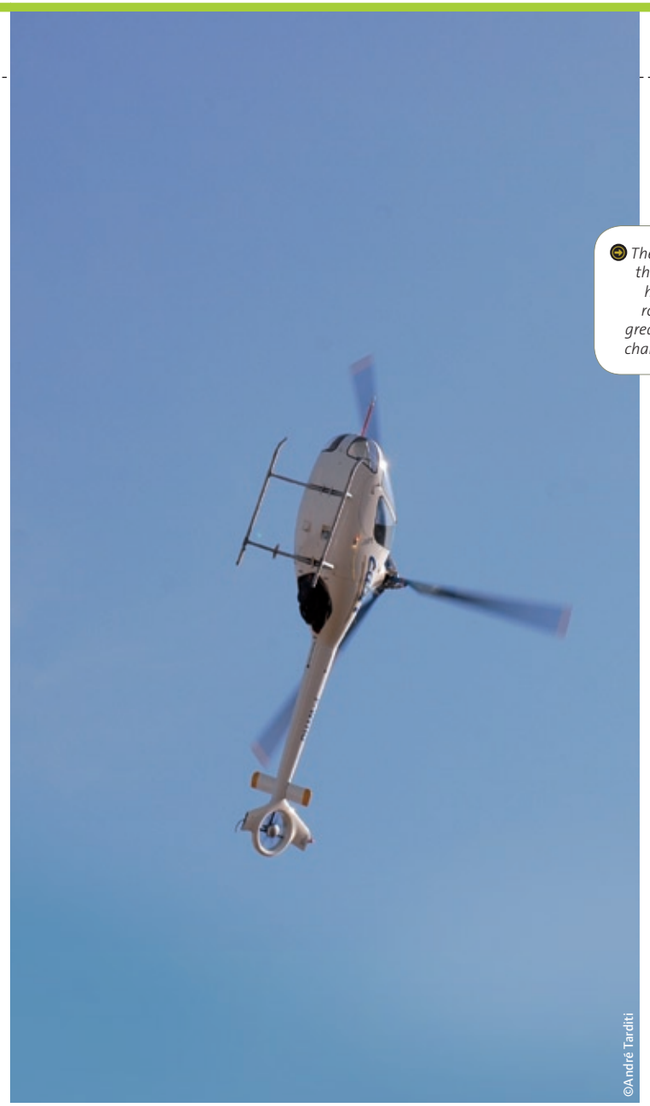
©André Tarditi

A small and light two-seater for training, minor aviation tasks or leisure flying.

A modern and safe aircraft

Among the Cabri's many advantages are its modernity and safety, the result of technologies which are generally found only on larger helicopters. As a result, Eurocopter has acquired the exclusive rights to any technological advances emerging from the Cabri which could benefit the group's own craft. One example is the injected plastic material used to manufacture the rear rotor blades over metal spars. They are more economical because easier to manufacture and use than all-metal blades, and the technology involved makes the fenestron-type tail rotor system – a safety feature – cheaper on such a small aircraft.

Among other key technological features are the Cabri's three-bladed main rotor, which has great inertia and manoeuvrability, and uses elastomer mountings and shock-absorbers. This gives the craft a high capacity for autorotation, great ease of flying and wide safety margins, an important consideration in a machine aimed at schools. The main rotor blades are made of composites with unlimited life, as is around half of the whole craft, which weighs a mere 425 kilograms when empty.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The G2 Cabri's three-bladed, high-inertia rotor gives it great handling characteristics.

Crash resistance

But one of the Cabri's most important qualities is its crash resistance, the result of research carried out jointly with EADS Composites Aquitaine with financial support from France's Aeronautical Programmes and Cooperation Department as part of a technological demonstration programme on flight safety. In addition to a fuel tank with a reinforced lining that can withstand a fall from 15 metres, the craft also has seats and seat mountings with very high energy absorption in the event of an accident. Pulse tests carried out at the Millbrook proving ground in the UK, under European Aviation Safety Agency (EASA) supervision, showed that passengers could survive a crash after a vertical fall at 2,000 feet per minute, or 10 metres a second.

Ready for action

The Cabri nevertheless has to get through the certification process laid down by the EASA, which Bruno Guimbal views as extremely strict, and above all ill-fitted to this type of craft. He notes that the Cabri has a take-off weight of some 700 kilos, whereas the EASA tests were drawn up for machines of up to 2.7 tonnes.

The certification delay has somewhat upset Bruno Guimbal's well-laid plans; he has to keep a close watch on his costs in order to keep going until the first deliveries can be made. To date he has taken in 12 down payments amounting to 30% of the sale price of each 240,000-euro aircraft. Certification is set to be another milestone in the Guimbal saga, on a craft which has already cost some six million euros.

//—Certification will be a key milestone in the Guimbal adventure – production-wise, everything is ready to roll.—//

It will also be the start of a new adventure, for everything is ready to get the Cabri rolling off its production line. Around half of costs to date have gone on facilities and tooling up, and a total of 1,800 of the helicopter's 2,000 parts are already in production, in some cases with around 100 already stocked up. The plant is already being certified for design organisation approval to European JAR21 standards.

It is therefore hard to believe that Guimbal's adventure will not go forward. And there is already talk of a four-seater Cabri.

— Régis Noyé

(1) The power unit is an American 180-hp Lycoming engine, flat-rated to 145 hp.
(2) DPAC is the Aeronautical Programmes and Cooperation Department of the Civil Aviation Authority. ANVAR is the French National Agency for the Promotion of Research.

Plans for a Cabri-based drone

Some of the Cabri's features give it potential as an unmanned aerial vehicle, or drone. It is highly manoeuvrable, reliable and easy to maintain and has a long range thanks to its fuel-carrying capacity. Qualities which interest the French navy, on the look-out for a certified UAV capable of landing on ships, even in bad weather. As Hélicoptères Guimbal could not carry out such a project on its own, it has teamed up with Eurocopter in a company called Vertivision, for a project that is code-named VSR700. Eurocopter is working on the automatic piloting system, a field in which it has skills recognised all over the world.

At the end of 2006, the team was retained by the French National Defence Agency as part of a project called the joint forces vertical take-off drone – "DEVIL" according to its French acronym.

Eurocopter's production plant in Donauwörth, Germany.

TOMORROW'S HELICOPTERS

Discretion and Safety

Handling adverse weather conditions, becoming both safer and quieter; such are the challenges that helicopters will have to meet in the future. All the more need for a permanent research effort on the European level.

"The key issues for the success of civilian helicopters today are public acceptance and ease of use," says Blanche Demaret, deputy head of rotary wing research at France's National Aerospace Research Agency (ONERA). Other issues are the strategic concerns of manufacturers, which in general turn on reducing aircraft development and running costs. Plus, in the background, the need to boost performance and energy efficiency, which depend both on aerodynamics and power units. All of which adds up to a lot of work ahead for the French helicopter industry, which despite managing to finance a high proportion of research and development via its own cash flow, benefits from government aid via the Civil Aviation Authority's Aeronautical Programmes and Cooperation Department and research labs such as ONERA. All industry players are in agreement on the need to maintain the national research effort, alongside European programmes. *"While the latter allow us to push ahead with programmes that we couldn't do on our own, the former is essential if we are to hold on to our strategic projects,"* says Yves Favennec, head of research at Eurocopter.

"France is right at the top in several fields, such as aero acoustics and flight control commands, and can justify a development effort, either alone or with others, for more modern aircraft," says Blanche Demaret. *"We're not likely to see any technological quantum leaps before around 20 years, but we can expect significant steps forward, promising real improvements in strategic fields."*

//— "France is right at the top in several fields, such as aero acoustics and flight control commands, and can justify a development effort, either alone or with others, for more modern aircraft."—//

Quiet, please

As regards acceptance by the general public, the main obstacles in the way of what Eurocopter calls the "good-neighbour helicopter" are noise, passenger comfort and safety. *"We've made remarkable progress, but there's still a way to go as regards accessibility, noise levels, cabin temperatures and liveable cabin space,"* says Yves Favennec.. Of all these issues it is noise which attracts the most research. It is notably the subject of a European project named "Friendcopter". *"One has to distinguish between measured noise, which in fact comes more from the rotor than the engine, and perceived noise,"* notes Yves Favennec. *"The latter can be reduced thanks to the right approach procedures, which is one of the aims of the European Union's OPTIMAL[1] programme."*

There are basically two ways of reducing rotor noise under study, both of them targeting aerodynamic phenomena occurring at the blade-tips. The first consists of optimising blade shape and twist angle. An application of the "Pale 2005" (Blade 2005) R&D technological demonstration programme, supported by DPAC and carried out by Eurocopter with help from ONERA, is expected to take to the air in the course of the current year.

The second method consists of using reactive techniques that modulate the working of the blades at each rotation. A concept proposed by ONERA underwent wind-tunnel tests in 2005, and showed a drop of some three decibels in noise level. The same concept, jointly developed in a full-scale test version by Eurocopter Deutschland and the DLR[2], flew in the same year in Germany.

Bringing together aims and means

Beyond the issue of noise reduction, research under way to expand the number of uses for helicopters often converges with work on how to make them safer.

Providing new automatic systems and informational aids to pilots should help lighten their workload, freeing them up to concentrate more on the mission itself. During landings, for example, it should become possible to bring the aircraft down in stages, with steeper drops than in a standard steady-state descent. In built-up areas this has the advantage of cutting the perceived noise level, but it also requires more delicate manoeuvring.

Systems to help a pilot to better delineate his descent area when coming down in strong winds on small spaces such as hospital or oil rig landing pads can also be useful.

Also of interest are technologies to combat problems such as icing, of both rotor blades and engine intakes, lightning strikes on the rotor or parts of the composite structure, and to provide crash protection. Such techniques can allow choppers to operate more safely in bad weather conditions.

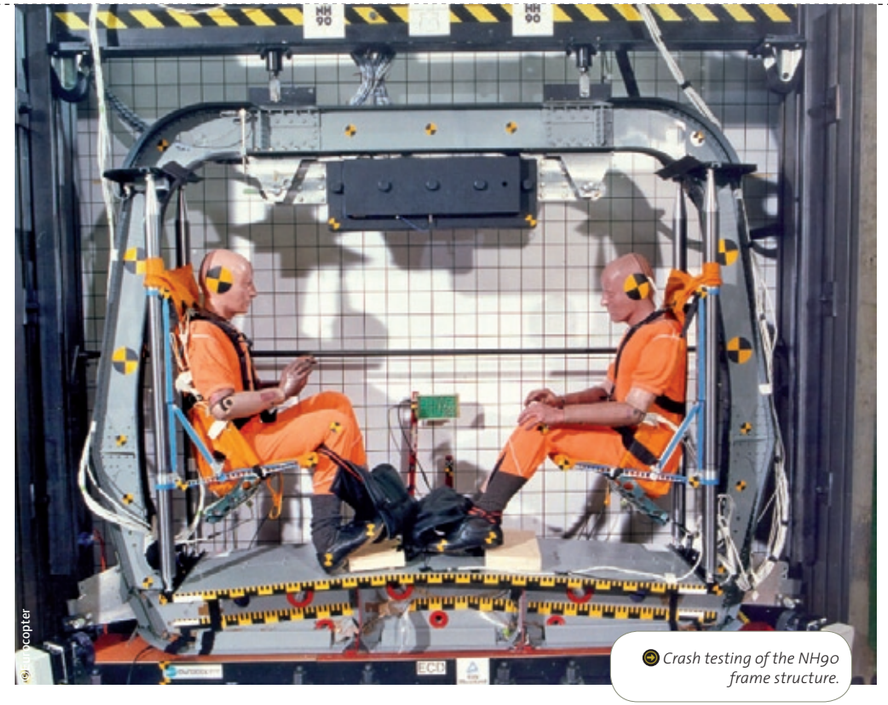
Twenty years ahead

Major technological advances are expected in a time-frame of around two decades. Active, or smart, rotor blades, for example, could significantly reduce noise. Another exciting possibility is the use of microjet or plasma control to reduce aerodynamic interference between the different parts of the aircraft – the main and rear rotors and the bottom of the fuselage, for example. This could significantly cut fuel consumption.

Last but not least, higher flying speeds could be attained by the use of the tilt-rotor concept, which is attractive but both complex and expensive. In addition to the experimental nine-seater BA609 developed by Bell and Agusta-Westland, currently undergoing flight tests, the European Union is currently working on a 19-seater "Novel Innovative Competitive Effective Tilt-Rotor Integrated Project", or NICETRIP.

— Régis Noyé

(1) Optimised Procedures and Techniques for Improved Take-Off and Landing. See article page 26.
(2) Deutsches Zentrum für Luft-und Raumfahrt: the German Aerospace Centre, equivalent of France's ONERA.



Crash testing of the NH90 frame structure.

The role played by the ONERA

France's National Aerospace Research Agency ONERA plays a key role in helicopter research via both aerodynamics and the drawing up of computational methods for simulation. Among its key facilities are wind tunnels and a vertical crash tower. Looking beyond the simple supply of scientific data and computational power, ONERA aims to explore new technologies more generally, and provide expertise for the industry as a whole. It works in liaison with its German opposite number, the DLR, just as Eurocopter enjoys a close relationship with its subsidiary in Germany.

A Super Puma mock-up in a wind tunnel.

Helicopter use in France

Towards Low-Altitude All-Weather Flying

Although a common practice for fixed-wing aircraft, navigation via instrument flight rules (IFR[1]) has so far been little used by helicopters, except those serving offshore rigs. However a series of technological breakthroughs means that the technique will soon be useable over land. The first beneficiaries are likely to be medical transport services, which are increasingly using choppers to ferry patients from one hospital to another.

Helicopters are widely used in rescue operations, for example after road, mountaineering or maritime accidents. However there is another type of evacuation, less well known to the general public but every bit as important: the ferrying of patients between hospitals. *"This type of transport is growing fast due to restructuring and the rationalisation of health care facilities in France, which is tending to concentrate certain medical specialities in certain hospitals,"* says Dr. Nicolas Letellier, the head of ambulance services in the town of Dreux, south-west of Paris. Indeed, although all-round services are still available in many small hospitals, certain types of treatment require patients to be taken to a specialist unit.

Held back by the weather

The problem to date is that such trips can only be made in daytime, and then weather permitting. *"Around 97% of helicopter flights inside France take place under visual flight rules,"* says Raymond Rosso, deputy head of the Civil Aviation Authority's Air Navigation Services Department (DNSA). That is because the rules and procedures designed to allow aircraft to fly on instruments alone were originally drawn up for fixed-wing craft only. Despite their widely-acknowledged usefulness, helicopters had up until now been left out of the equation.

Furthermore, says former chopper pilot Charles Schmitt, "most ambulance flights are over short distances, during which the aircraft will in any case not be flying at high altitude, because the patient's condition doesn't allow it."

French operators of such services have come together in the Association of Hospital Helicopter Services (AFHSH), which notably includes 57 local ambulance units[2] that regularly use choppers. They are particularly interested in all-weather low-altitude IFR flying, and have plenty of arguments to justify the practice. In the ten months up to the end of January 2007, no less than 10,000 medical helicopter flights took place in France, for a total of 7,500 hours of flying time. More than 60% of them were inter-hospital flights. The main problem is that such flights cannot take place either at night or during bad visibility in daytime. Which means that an increasing number of such trips have to be undertaken by road, particularly in wintertime when the days are short.

These issues are being examined by an "All Weather Helicopter"[3] research and study programme led by Eurocopter and supported by the French Aeronautical Programmes and Cooperation Department. Thanks to the determination of the AFHSH, and to excellent cooperation between the various services of the Civil Aviation Authority (DGAC)[4] and both Eurocopter and Thales, significant progress has been made. The main driving force has come from a shared determination to progressively reach operational solutions that are both safe and economically viable.

Solutions

Flying a helicopter under IFR at low altitude, particularly with a patient aboard, is by no means simple. A wide range of technical, regulatory and safety factors have to be taken into consideration.

Firstly, the aircraft concerned has to be able to take off and land in conditions of low visibility, using a wide range of sites, many of which are located in or near hospitals and are therefore not equipped with ground approach systems such as ILS beacons[5].

The solution lies in global navigation satellite systems or GNSS, which are in wide use in the United States and are currently based on the American Global Positioning System. Helicopters using the system therefore have to be fitted with a GPS receiver, but the absence of vertical guidance means that the pilot cannot simply return to visual flight rules when close to the landing point.

The required vertical guidance could become available in the near future, thanks to overlay signals from geostationary satellites provided by the European EGNOS system[6] *"As early as 2003, our EC155 all-weather helicopter was able to use the EGNOS system to make approaches,"* says Philippe Rollet, in charge of operational research at Eurocopter.

Other obstacles

However other problems have to be dealt with, like the need to avoid temporary flight-path obstacles such as construction cranes, or even permanent ones such as wind turbines. There is also the problem of providing the relevant weather information to pilots, which could mean that hospitals would have to be equipped with both monitoring and recording equipment. Whatever the case, says Raymond Rosso, *"the generalisation of these techniques will oblige users to accept the corresponding responsibilities, which will include setting up their own 'operations' departments."*

En route navigation for such helicopters could be based on the same satellite navigation system, but there is still the problem of avoiding collisions with either another helicopter or other types of aircraft. To tackle this problem the French authorities are considering the creation of special low-altitude all-weather flight corridors. Pending the adoption of an appropriate permanent status for such areas, the airspace in question could be defined as a temporarily regulated zone, or ZRT.

First steps

A number of recent events have provided a practical illustration of how these ideas are being put into practice. Firstly, civil rescue and ambulance services around the eastern French town of Besançon have asked the Civil Aviation Authority's Air Navigation Services Department (DNSA) to look into the first application of IFR approach procedures for helicopters, based on GNSS, at the town's airport. The initiative is expected to be announced soon.

A second stage will involve the study of procedures allowing helicopters to take off and land within the hospital grounds. At the same time, a European project known as OPTIMAL[7] is seeking to lay down specific instrument landing approach procedures for helicopters, distinct from those used by fixed-wing craft. Such systems would make it possible for both types of aircraft to operate at the same time without interfering with one another. An initial test of such a procedure is due to take place in the near future in Toulouse, using a Eurocopter EC155 craft.

An experiment near Paris

As regards low-altitude flying, a three-stage evaluation process is currently under way. The first phase, successfully completed in January 2007, involved showing that an appropriately equipped helicopter could with sufficient precision make a flight under GNSS between the hospitals of Nogent-le-Rotrou, near Paris, and Dreux, further to the south-west. The flight took place at around 2,000 feet, with unbroken radar and radio contact being maintained with air traffic control.

A second more complicated stage calls for the same flight to be made, but this time at least partially under IMC conditions[8], and still using satellite navigation. IFR procedures are also to be brought in for departure from and arrival at each hospital. Studies are currently under way for this part of the programme. During the third and final stage, the Dreux ambulance service would carry out the flight in real operational conditions. The model thus drawn up could then be brought in on other itineraries regularly used by ambulance services, leading to an airspace structure along the lines of "mini low-altitude, all-weather corridors"[9] for medical flights. It would then remain to bring in the required regulatory changes.

— Régis Noyé

(1) Flying by instruments, without the pilot necessarily being able to see obstacles on his route.
(2) Forty-two French ambulance services have their own helicopter, financed by the national health ministry, or in some cases by regional authorities. Others call when necessary on civil rescue services, the gendarmerie or a small number of specialist private services.
(3) HTT in French parlance.
(4) The different services concerned are the Air Navigation Services Department (DSNA), the Strategic and Technical Affairs Department (DAST), the Safety and Security Monitoring Department (DCS) and the Aeronautical Programmes and Cooperation Department (DPAC).
(5) French ambulance services currently have a total of 635 helicopter landing and take-off sites at their disposal.
(6) European Geostationary Navigation Overlay System.
(7) Optimised Procedures and Techniques for Improved Take-off and Landing – www.optimal.isdefe.es
(8) Instrument Meteorological Conditions: weather or light conditions that make visual navigation impossible, and therefore require IFR.
(9) "Mini-routes IFR" in French parlance.

An EC135 being used by ambulance services in France's Loire region.

©Eurocopter

An avionics proposal from Thales

In all-weather IFR flights the "man-machine interface", particularly as regards avionics, is especially important. The system has to provide reliable and secure information, and also help reduce the pilot's workload. France's Thales has proposed an integrated avionics system named TopDeck, designed specifically for helicopters. Its main selling point is its simple and powerful interactivity with the pilot. All of the information needed is displayed on four or five large liquid-crystal screens. The system includes GPS-EGNOS/Galileo data, Enhanced Vision System (EVS) technology and the Terrain Awareness and Warning System (TAWS). The latter provides alerts in the event of ground proximity, of special importance in low-altitude IFR flights. Sikorsky, one of the major US helicopter manufacturers, has retained TopDeck for the latest version of its S76 aircraft. The system is due to be certified and brought into service in 2009, notably by medical emergency services.

Aeronautics

Exporting French Know-How

In addition to drawing up and implementing public-sector support policies for research and development in the field of civil aviation, within the terms of international regulations governing such issues, France's Aeronautical Programmes and Cooperation Department (DPAC) is responsible for promoting the sector's interests on both the European and the wider international level. The job of promoting French aeronautical know-how extends across the board and includes key missions such as staff training and engineering consultancy, etc. By carrying out economic monitoring and market studies, and maintaining its international network of relationships, the DPAC helps export both French and European expertise around the world.

Singapore's international airport.

Tourism is a mainstay of the Cambodian economy. To help strengthen it, the south-east Asian country has launched a programme to ensure that it complies with international standards.

CAMBODIA

France's DPAC(1) as Expert

The Phnom Penh international airport.

Cambodia is home to a world-class tourist site, the Angkor Wat temple complex. It is by no means the only remarkable attraction in the country, but tourists have a tendency to bypass the others, including those around the town of Sihanoukville, also known as Kampong Som.

Since it embarked on its post-war reconstruction Cambodia has relied heavily on tourism, but many visitors only stay a very short time, as part of tours also taking in other countries. In a bid to diversify and attract longer-staying visitors, the authorities have recently launched a number of major development projects. The aims include compliance with international standards, notably in the aeronautical field.

The need for such standards was underlined by the International Civil Aviation Organisation (ICAO) back in 1999, when it launched a programme of safety oversight audits. The initial schedule called on ICAO member states to ensure compliance with international standards as regards airworthiness, licences and aircraft operations. As of 2006 the audits were expanded to include air navigation services, accident investigations and airports.

France and Cambodia have long-standing relations in the aeronautical field, notably thanks to a technical cooperation agreement signed in April 1999 by the Cambodian civil aviation authority and the French DGAC. When the ICAO safety audit programme was expanded to cover all aspects of both safety and security, the Cambodian authorities called on France to provide assistance. On January 1, 2007 a French expert started a one-year mission to help the local civil aviation authorities get ready for their ICAO audits, and notably those due during the year. The operation was set up with financial assistance from the French group Vinci, which has an operating contract for the three main airports of Phnom Penh, Sihanoukville (which reopened in mid-January) and Siem Reap. The DPAC is providing technical support, says Emanuela Lacaze, in charge of the Asia-Pacific region at the French agency.

In addition to preparing for the 2007 audits, the expert is reviewing the overall situation, and in particular actions required as a result of the ICAO's first wave of audits. His role consists of helping the Cambodian civil aviation authority bring in technical regulations which may be lacking or incomplete in certain fields, and to strengthen the safety enforcement role of the authority itself. Following on from that, his job will be to set up a programme to help the country train its own staff, along with a calendar for implementation. The training plan itself could begin in 2008, and France's National Civil Aviation School (ENAC) seems an obvious candidate to help implement it.

As is often the case in such situations, the Cambodian civil aviation authorities have only limited financial means, and also suffer from a dearth of qualified experts. *"Which is why it's important for us to help them,"* notes Emanuela Lacaze. The sending of an expert is one step in that direction.

— Germain Chambost

(1) DPAC is the French abbreviation for the Aeronautical Programmes and Cooperation Department, part of the Civil Aviation Authority.

UKRAINE

Complying With Standards

In response to a request from the European Commission, France, assisted by Poland, is to help Ukraine get up to speed as regards international civil aviation standards.

Countries seeking to join the European Union, or initially just to gain access to the European air transport market, must comply with a certain number of criteria to ensure that they are more or less at the same level as EU member states. One such country is Ukraine, which needs to acquire Airbus aircraft and is also seeking to export the products of its famous Antonov company.

To put it simply, the country has to comply with the standards laid down by the European Aviation Safety Agency (EASA), which certifies civil aircraft in Europe Ukraine has already received an initial stamp of approval from EASA's American counterpart, the Federal Aviation Administration. In Europe, the body in charge of enforcing these standards, and thereby seeking the best possible safety levels, is also the EASA.

//—Under the EU programme, French and Polish experts will be sent to train their Ukrainian counterparts.—//

To bring its system up to scratch Ukraine needs outside aid, which it freely accepts and which will be provided with total respect for its national sovereignty. The European Commission accordingly drew up a set of specifications for member states which are willing to help Ukraine via a twinning agreement involving the civil aviation authorities of both countries. The invitation to tender was launched in February 2006, and three countries responded: Germany, France and Poland. Thanks to its experience and aeronautical traditions, France was chosen. The Commission nevertheless asked the winning bidder to take on board Poland, whose historical links to Ukraine are well known. Moreover, by setting up a dual arrangement involving an EU founder member and one of the recent entrants, the Commission was also sending a strong political signal, notes Maurice-Gustave Mamie, manager in charge of the project at the French Aeronautical Programmes and Cooperation Department (DPAC).

France is thus playing the lead role in the twinning arrangement, for which a 15-month work schedule has been drawn up. Finance, to the tune of a million euros, is being provided by the European Commission. In practical terms, the project will involve both French and Polish experts going to Ukraine and training their local colleagues in the content of European regulations, how they are applied in their two home countries and how they could be implemented in Ukraine. *"For our Ukrainian colleagues it will be a question of absorbing the spirit of these texts, and then bringing their own into line and applying them,"* says Maurice-Gustave Mamie,. To conclude this task, a manager of the project follows the work from Paris, there is a permanent adviser in Kiev and Maurice-Gustave Mamie, who suggested the twinning arrangement to the Ukrainians, is in charge of the coordination of the overall project on the French DGAC side. A similar structure has been set up in Poland.

The success of this first twinning arrangement will provide a pointer to the future; no less than 26 other projects have already been planned for Ukraine alone.

— Germain Chambost

© AFP Getty

The cargo version of the Antonov 90 gives a flight demonstration at the 2006 air show at Gostomel, near Kiev.

©Sven Torfinn/Panos

The Mogadishu airport.

AFRICA

Handing on Skills

The Agency for Air Navigation Safety in Africa and Madagascar (ASECNA), set up in 1959, brings together France and 17 French-speaking African states. Based in Dakar, Senegal, it is governed by a convention signed in that city on October 25, 1974. With help from France's DPAC cooperation agency, DSNA Air Navigation Services Department and ENAC Civil Aviation University, the ASECNA has become a major tool for regional integration and cooperation in Africa.

From its headquarters in Dakar on Africa's west coast, the ASECNA watches over airspace one and a half times as big as that of Europe, comprising six flight information regions which each has its own en-route control centre. The agency has overall responsibility for air traffic control and the provision of weather data.

Aircraft are currently tracked and supervised on the basis of flight plan authorisations. Controllers are able to keep track of flights, and ensure that they are sticking to their announced itineraries, thanks to data transmitted by aircraft on HF/VHF frequencies.

To stay abreast of a continuing increase in traffic the ASECNA has decided to equip its en route centres with automatic flight control systems and to install secondary radar stations. New equipment and working methods, such as monitoring aids, should make it possible to improve communications and coordination between centres, to give a better overall view of the traffic situation at any given time and generally facilitate the work of controllers.

In 2005, to help implement this programme, the ASECNA decided to set up a pilot scheme at its centre in N'Djamena, capital of Chad. It called on France's DPAC to help train air traffic controllers. The DPAC and France's National Civil Aviation University (ENAC) on the one hand, and ASECNA's operational department on the other, drew up an assistance and training plan, aimed mostly at training instructors in France and Africa, mainly in N'Djamena. However, as noted by Bernard Catlla of DPAC and Marie-Claire Dissler of ENAC, the partnership also provided the opportunity for assistance with project management, for the drawing-up of a plan of action for the technical aspects, and for the monitoring of the said plan. It was also possible to provide aid as regards the overall impact of the programme on the organisation of the centres, notably via support with the writing of operational manuals.

A progressive transfer of skills

The assistance provided by DPAC and ENAC aims to progressively transfer skills to the ASECNA, and in particular to the Civil Aviation School of Africa and Madagascar (EAMAC), located in Niamey, capital of Niger. Skills to be handed on relate to the rules of the air, ATC procedures, practical instruction and the creation of teaching simulations. As regards air traffic control itself, the aim is to provide surveillance and assistance in complete safety. Radar vectoring is not yet in the pipeline.

As regards training on regulations, the French ENAC has run sessions for both the EAMAC's instructors and the N'Djamena controllers. The instructors have thereby been able to progressively acquire the expertise needed to carry out future programmes at other sites themselves.

Meanwhile the ENAC's experts in educational engineering have trained the N'Djamena instructors via a teaching method which makes it possible to design step-by-step simulations covering the required pedagogical ground in the best possible way. The simulator used is identical to the operational tools required for the job, and the data is based on geographical information relating to N'Djamena. Instructors from the Regional Air Navigation Centre for south-western France provided training for the three groups of controllers, who reached the required level of safety.

The training programme was drawn up in July 2005, updated and fine-tuned in both France and N'Djamena. By July 2006, ASECNA air traffic controllers were already qualified and ready for action. Once the required conditions – the working of the technical facilities, procedures for keeping the new equipment operational, safety studies and the availability of qualified controllers – have been fulfilled, it should be possible to open the N'Djamena centre by summer 2007. The experience gained in N'Djamena, backed up by the training skills of the EAMAC, can then serve for the other regional centres. French assistance is continuing on a more occasional basis in Niger, with the opening of the Niamey centre due to take place in 2008. For subsequent sites, the ASECNA will clearly be able to carry on under its own steam.

— Germain Chambost

Mexico City's international airport.

LATIN AMERICA/CENTRAL AMERICA

Airport Upgrades

France is present in Latin America in the field of airport technology. Over the past decade, French companies have been helping to upgrade the region's international airports.

For lack of financial resources many Latin American countries had been putting off work on their main airports, ranging from simple refurbishment and modernisation to improvements needed to bring them into line with new safety standards. This often resulted in the facilities in question losing their ratings, and therefore suffering significant drops in traffic volume.

Some countries reacted by signing total or partial concession deals to allow either local or foreign private firms to run their facilities.

Mexico was one of the first countries to go down that path. As Patrick Andrieu, Americas manager for France's DPAC[1] points out, it adopted an original approach. Rather than sign concessions for its airports one by one, the Mexican authorities parcelled them up into three regional groupings, designated South-East, North-Central and Pacific. Each grouping contained one main airport and several smaller ones; the South-East comprising nine facilities based on Cancun, the North-Central region 13 including Monterrey, and the Pacific 12, of which Guadalajara.

//—Some countries have signed total or partial concession deals to allow either local or foreign firms to run their airports.—//

In June 2000 a partnership between Aéroports de Paris (ADP), which runs all the Paris-region airports, and a Mexican construction company was granted a 50-year concession to run the North Central grouping. More recently, in October 2006, the concession to run the main airport in the Colombian capital Bogota was granted to a group of local construction firms allied to the operator of Zurich airport in Switzerland. Via its engineering subsidiary ADPI, Aéroports de Paris is working with the group on the studies required to refurbish the Bogota facility.

"Given the traffic growth in this region, refurbishment and enlargement projects can be expected at other airports in Central and South America," says Patrick Andrieu. *"And thanks to the ongoing relationships we have with the civil aviation authorities in the countries in question, we are able to provide a sort of technological monitoring service, and to alert French firms, or major French airports, whenever we hear of opportunities that might interest them."*

— Germain Chambost

(1) The Aeronautical Programmes and Cooperation Department, part of the French Civil Aviation Authority.

INDIA

Industrial and Institutional Teamwork

Cooperation between France and India in the aeronautical field is nothing new. It is set to grow further to help fulfil the sector's great potential.

Indira Gandhi International Airport, New Delhi.

Industrial cooperation in aeronautics has existed for decades, dating from the period when the French Aérospatiale company had a helicopters division, and continuing into the age of Eurocopter. India has long used, and continues to use, the French Alouette III, which it renamed the Chetak, as well as the Lama, known locally as the Cheetah. The relationship between Eurocopter and the Bangalore-based Hindustan Aeronautics Limited (HAL) therefore goes back a long way. The two firms have an industrial production and cooperation agreement under which, for example, HAL manufactures parts for Eurocopter's Ecureuil and Fennec helicopters.

//—India plans to boost its cooperation with France by setting up a civil aviation academy.—//

The aircraft in question have turbines made by Turbomeca, which today is part of France's Safran group and is the world number-one for helicopter engines. Thanks to that relationship HAL and Turbomeca have close links, of which a current manifestation is HAL's Advanced Light Helicopter, or ALH, project. Hindustan Aeronautics has launched production of the craft, which in India is being called Dhruv and is powered by two Turbomeca TM333-2B2 turboshaft engines. HAL has asked the European Aviation Safety Agency (EASA) to certify the craft so it can market it internationally. Licensing agreements for the development of the TM333-2B2 were signed by Turbomeca and HAL in 2003.

For the Snemca engine manufacturer, which is also part of the French group Safran, HAL is manufacturing aluminium fan blades for the CFM-56 jet engines which are used on the Airbus 320 family of passenger planes, among others. The Indians are also making the passenger doors for the A320.

Very high growth rates

"The cooperation process set in motion by the manufacturers will also extend to the institutional level," notes Francisco Mena, in charge of Middle Eastern and Asian operations at France's Aeronautical Programmes and Cooperation Department (DPAC). India is experiencing very high rates of air traffic growth, of over 22% between 2004 and 2005, and also between 2005 and 2006. The figures are even more impressive for domestic traffic, which grew 47% in 2006 to reach 32.8 million passengers. Between now and 2020 India is expected to buy some 1,000 commercial aircraft, for a total of some 80 billion dollars, and to carry out infrastructure work on its airports to the tune of 30 billion dollars. And for the five years to come, the country's specialist manpower needs are estimated at 3,600 aeronautical engineers, 2,500 pilots and 7,500 commercial flying staff.

India's civil aviation authority is seeking to strengthen its cooperation with France via the setting-up of a civil aviation academy with help from both the DPAC and the French National Civil Aviation School (ENAC). It would like to develop partnerships to train white-collar staff for both its own services and for Indian airlines, and also other industrial staff who India badly needs.

— Germain Chambost

Welcome to the Paris Air Show!

The 47th International Paris Air Show runs from June 18 to 24. What does this year's edition of the great trade gathering have in store?

"The prospects couldn't look better," says Louis Le Portz, commissaire général of the show. And indeed it's all systems go at Le Bourget. By the end of March, 563 major companies and lead exhibitors for small-to-medium firms were already signed up, and 1,200 other small-to-medium businesses were in the process of enrolment. Almost 2,000 exhibitors are expected in all, around the same number as in 2005.

Much-noticed participants

The exhibition space, larger than that of 2005, will be well-stocked. Aircraft manufacturers are in the "Rotonde" area, while the main 1/2 hall hosts western European country stands. The 4/5 hall is home to major international groups such as Rolls-Royce, UTC and Goodrich, as well as a space set aside for small-to-medium European companies, grouped by region. Hall 3 is given over to US companies, well represented this year with the likes of Bell AG, Boeing Company, Lockheed Martin and many others. There are also strong showings by Germany, Canada, South Korea, Israel, Japan, Switzerland and Turkey, which have increased their stand areas. As a result, the most recent civilian aircraft, including business aircraft, will be on show.

Business and technology forums

The great novelty of this 47th Paris Air Show will be the holding of business and technology forums devoted to B-to-B meetings. With the main aircraft manufacturers externalising part of their production due to restructuring plans, new sub-contractors are being sought not only by the big players but also by smaller companies linked to them, seeking small-to-medium sized firms to help them out. The Air Show aims to facilitate such contacts by organising meetings, either on the stand or in a special business zone in the heart of the exhibition area, from 10:00 am to 6:00 pm each day between June 19 and 21. Some 550 companies will thus be able to make contact with a good 100 major potential clients, be it to clinch a deal, discuss a partnership or just talk.

More than ever, the Paris Air Show is the event not to be missed for everyone in the aeronautical industry.

— Béatrice Courtois

//—The great novelty of the 47th Air Show is the holding of business and technology forums. Some 550 companies will be able to make contact with almost 100 major potential clients.—//

For the general public

The show is open to the general public on June 22, 23 and 24. To enhance the event's broad appeal, the organisers have paid special attention to putting on a good show for them. Visitors have access to a 30,000-square-metre (320,000-square-foot) open-air zone giving onto the runway and its flight demonstrations; it includes a 2,700-seat viewing stand and giant screens. The action-packed demonstration programme features shows drawn up with partners, and carefully-designed reception facilities. In other words, everything needed for a great day out with one's head in the clouds.

More info on the web, at www.salon-du-bourget.fr/en/

dgac

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