

AIRBUS PROSKY OR THE FUTURE OF AIR TRAFFIC MANAGEMENT

How to reconcile the requirements for growth with environmental considerations?

The new subsidiary of Airbus (EADS), Airbus Prosky, launched in January 2010, is a first step in this direction. Headed by a CEO (Eric Stefanello) and dedicated to the development and support of air traffic management (ATM) and information management, Airbus Prosky is a natural extension of Airbus's business and forms part of its global strategy. On the one hand, Airbus has always been involved in the best possible integration of its aircraft in air navigation. On the other hand, the group has participated in SESAR (Single European Sky ATM Research) since the late 1990s to contribute to the development of air transport. This strategy included the creation, in 2002, of a GIE (groupe d'intérêt économique - economic interest group; with Thales) "Air Traffic Alliance," for the transformation of ATM and leading to the launch of SESAR.

SESAR's Definition Phase took place between 2006 and 2008, resulting in the European ATM

Master Plan and the launch of the development phase. Early deployment is scheduled for 2013, with significant budgetary decisions to be taken beginning that year.

Airbus seeks to improve the management of aircraft in their environment amid growing air traffic by optimising routes and flight efficiencies.

"I am convinced that technology and innovation are the keys to reducing the environmental impact of air traffic and increasing eco-efficiency," said Tom Enders, Airbus president and CEO. Thus, the overall budget of 23 billion euros for civilian aspects of SESAR is justified by the earnings expected: the project aims to decrease fuel consumption per flight by eight to ten percent, given that 20 billion euros of EBIT are lost in this area each year, worldwide, by airlines.

During the past 40 years, considerable progress has already been made: aircraft have reduced their CO2 emissions by 70 per cent and noise pollution by 90 per cent. However, Airbus Prosky and its

partners have decided to pursue their efforts in this direction, in order to make the skies safer, both for civilian aircraft and military aircraft, amid increasing air traffic. Routes must take the most direct paths based on aircraft performance and weather. As the business case for airlines is positive, public-private funding solutions will certainly help to rapidly launch the programme.

The outcome will also depend on the willingness of countries to optimise their system. In this regard, Airbus Prosky provides the example through its cooperation agreement with Boeing, signed in 2008 between Scott Carson (Boeing) and Tom Enders, which transcends the competition that naturally exists between two giant aircraft manufacturers.

The transformation of ATM will be achieved by new technology deployments and renewed organisation, from finances to management. The search for synergy between communication, navigation and surveillance will be the top priority, along with the pooling of resources.

What impact for military flights?

Civilian and military flights share the same airspace. They are developing some form of integration by sharing more and more information, which should lead to the establishment of a more efficient interoperable system based on a civil-military partnership. This cooperation is based on collaborative decision making between civil and military authorities within the ATM, in a

context where the capability requirements for performance are increasing. Developing dedicated legislation can optimise civil-military interoperability, in order to prevent incidents or decrease their impact. Military users are already used to operating network-centric systems, particularly in the field of communications and secured airspace. SESAR and NextGEN are interesting opportunities for

the military and the entire defence industry to popularise their "best practices" and use additional dual technologies. In France, the Air Force is, according to sources close to the Chief of Staff, fully aware of these challenges. This is also the case in the U.S. with the U.S. Air Force, which wants to exploit these new systems, rich in dual technologies, for their own R & D.

THE AIRCRAFT, THE TRAJECTORY AND INFORMATION

Across the oceans: how NATS is participating in the “greening” of aviation

When Louis Bleriot landed on the cliffs above Dover, he made history as the first pilot in the world to have flown over the sea. His pioneering spirit, determination and inventiveness allowed him to achieve what in 1909 was considered almost impossible: to cross the English Channel. In 2011, the “Bleriot” spirit seems alive and well, even if the innovations have surpassed those of the past.

Innovation is at the heart of what EADS produces. The group is at the threshold of a new understanding while research on aviation’s impact on the environment is opening up new possibilities. Following the recent economic crisis, considerable efforts have been made towards reducing aircraft CO₂ emissions (between two to three per cent of total CO₂ production) Although, at first glance this challenge seemed impossible, the progress is clear.

One of the many areas where NATS is involved concerns the procedures across oceans. “The Atlantic Interoperability Initiative to Reduce Emissions” (AIRE) is composed of 18 projects funded by the SESAR Joint Undertaking. The purpose is to rethink the management network traffic to significantly reduce major pollution emissions. The AIRE agreement was reached in 2007 between the European Commission and the FAA. This programme aims to reduce CO₂ emissions through greater use of “best practices” of air traffic management as well as through the benefit of technological progress of the aircraft. This

agreement supports the implementation of environmentally friendly procedures for all phases of flight. AIRE is an important component of the “green” SESAR and the SESAR Joint Undertaking is responsible for its management at the European level. The purpose of AIRE in 2011 is to facilitate the transition from “green” experimentation to “green” operations implementation. One of the projects of the Airbus A380 flight from Paris to New York in partnership with Air France, NAV Canada, the FAA, airports Charles

NATS is the main organisation for air traffic management in the United Kingdom. It handles air traffic control services en-route across the United Kingdom as well as approach control and airport control for around 15 airports. Originally a publicly owned organisation, National Air Traffic Services (NATS) is now a private company with approximately 5,000 employees, most of them air traffic controllers, technicians and assistants controllers.



De Gaulle in Paris and JFK in New York, is to explore each part of the chain of connections in this 3,600-mile journey, in order to create what may be called the “perfect flight.” Each element of the transatlantic voyage (taking altitude, trajectory...) is being examined to see how it can be improved, to “save” tens of thousands of tonnes of CO₂.

The three other AIRE projects are: reduction of longitudinal separation over the North Atlantic, the optimisation of routes for Air France flights from Paris to the Caribbean and the definition of more efficient flight profiles in Canadian-operated airspace over

the North Atlantic. This initiative for a cleaner and more ecological flight is part of SESAR’s project to harmonise European air traffic by 2020 – one of the major objectives of which is a 10 per cent reduction in CO₂ emissions. In this regards, NATS also plays a key role as part of the joint undertaking to more effectively integrate new land-based technologies and procedures. The goal of NATS is to explore future technologies, as well as, in collaboration with Airbus, the dynamic planning of flights. SESAR must help shape tomorrow’s air traffic management network.

THE AIRCRAFT, THE TRAJECTORY AND INFORMATION

The quest for an optimal trajectory

According to the International Air Transport Association, 468 million kilometres of unnecessary flight were identified in 2007. In the context of SESAR, Airbus Prosky is seeking to eliminate these unnecessary kilometres and will participate in the development of all means that allow an optimised management of flight trajectories. This system has led to the search for a concept of 4D trajectories that can take into account a flight, not as a plane, but as a path that must be adjusted to optimise and secure the flight. Moreover, this quest for new paths will lead to a "cleaner" airspace. According to the European Union, implementation of SESAR will result in a decrease of 16 million

tonnes of CO₂ per year through across three aspects:

- More efficient air traffic control
- Shorter routes
- Short time-loop

Thus, the E.U. and Airbus are launching discussions to rethink air traffic control. "Right now defined by the controllers, trajectories follow routes that are not optimal because they are too dependent on the geographic fragmentation of national management systems and military training areas,"



explained Patrick Ky, executive director of SESAR.

"Thus, it is estimated that current trajectories deviate from three to five per cent compared to optimal trajectories, which generates excessive consumption of fuel, pollution, loss of time and money."

Optimising information management

Information is a fundamental part of the strategy. Accordingly, the information system is also an essential tool in the corporate strategy, a fact that has been taken into consideration in the transformation of ATM. Information management is now an essential feature of efficiency.

However, given the growing amount of information, mastering technical tools, while necessary, does not immediately imply more effective management, especially from the control towers. The goal is to have an information hierarchy that is readily available and that

reduces low value-added tasks. Will this involve the creation of an ATM Intranet? The only certainty is that the goal is to create a dedicated infrastructure that should optimise communications in order to provide more security to customer service.



No war between Boeing and Airbus

Competition between Boeing and Airbus is not appropriate in this field. Indeed, in 2008, the two aerospace giants signed a cooperation agreement to ensure interoperability of SESAR and NextGen future standards. The agreement was concluded on the sidelines of the third Aviation and the Environment Summit in Geneva to support the reduction of aviation's impact on the environment. The two companies shared a common vision on the environment and safety issues and it appeared in everyone's interest to cooperate in order to reach common goals more quickly.

SESAR, TECHNOLOGICAL ELEMENT OF THE SINGLE EUROPEAN SKY

“The European SESAR, including our subsidiary Airbus, is a fundamental pillar with the SESAR JU. It will support the development of automated management to ensure a better rotation of aircraft in the same airspace and will significantly reduce energy consumption by about 10 per cent thanks in particular to more direct approaches and shorter routes. We are also working for the long term future on the recovery of solar energy through satellites and its transformation into a laser beam and then into energy. One of our teams is continuously working on the development of our expertise in the field of sustainable development.” Louis Gallois, 2010 (hearing at the National Assembly).

Programme background: technological innovation

Air traffic in Europe should, according to projections, grow significantly over the next 20 years. In some areas, traffic is expected to double or even triple. Experience has shown that increases in the cost of European air traffic control systems (which are currently around seven billion euros per year) are generally proportional to increases of traffic. With the actual model, the ATM could cost between 14 and 18 billion euros annually by 2020. Not to mention traffic security, which is a constant concern of political authorities. Thus, the E.U. wanted to promote technological innovation in order to optimise traffic and revolutionise the entire chain of aviation operations. Large industrial projects such as Galileo, the satellite navigation system, are already contributing to the E.U.'s technological growth. It is with the same idea that the E.U.'s SESAR aims to develop the next generation of air traffic control systems in Europe. The challenge is to develop technologies, methods of organisation and industrial components that can guarantee safety and fluidity of air transport over the next 20 years, not only in Europe but worldwide.

SESAR involves the management of a European network. It includes



research and development, coordination of investment programmes and development from E.U. member States with the production of common technical standards. In this regards, the company Eurocontrol is participating in the SESAR project

jointly launched with the European Union, and whose aim is to define, in cooperation with the entire airline industry, the future network traffic management for 2020. Airspaces will no longer be considered as national, but “without borders” (seamless) through Functional Airspace Blocks (FABs), to be commonplace by 2012. SESAR is the key instrument for the single European sky, including the technical nomenclature that will necessarily be interoperable with neighbouring airspace.

Air France at the centre of developments

Air France-KLM is tracking all unnecessary fuel consumption and is reducing CO₂ emissions per passenger each year. In this ongoing quest, the company is exploring all avenues. The "A380 Transatlantic Green Flight" project, carried out in partnership with the NATS, Nav Canada, the U.S. Federal Aviation Administration as well as the Airbus company, aims to optimise from end to end the New York JFK - Paris CDG line, flown daily by Air France's A380. At each stage of flight, and without ever jeopardising its security, the implementation of optimised

procedures by the pilots allows the reduction of fuel consumption and therefore contributes to a reduction in CO₂ emissions. More specifically, the JFK control tower provides a run time estimate in order to optimise the aircraft's operation on two engines. Then, taking advantage of the aircraft performance and its capability to fly above FL400 level, i.e. beyond NATS tracking, the ocean crossing will end up optimising the path. The test flights began in January 2011 and will last four months and represent a potential reduction of 930 tonnes of CO₂ per year.

SESAR, TECHNOLOGICAL ELEMENT OF THE SINGLE EUROPEAN SKY

What is SESAR?

SESAR Joint Undertaking is a European organisation created in 2007, in charge of controlling the definition and implementation of a new master plan for air traffic management in Europe. The European Commission and Eurocontrol are founding members of SESAR. Legally, it is a joint venture under the terms of Article 171 of the Treaty establishing the European Community. The statute provides that it will cease to exist by 31 December 2016 or eight years following the approval of the new master plan by the Council of the European Union, which took place 30 March 2009. The ATM Master Plan is the roadmap for the phases of development and deployment of SESAR, a technological pillar of the European Single Sky policy. SESAR aims to create the next generation system for air traffic management that will ensure security and efficiency for air travel throughout Europe during the next 30 years.

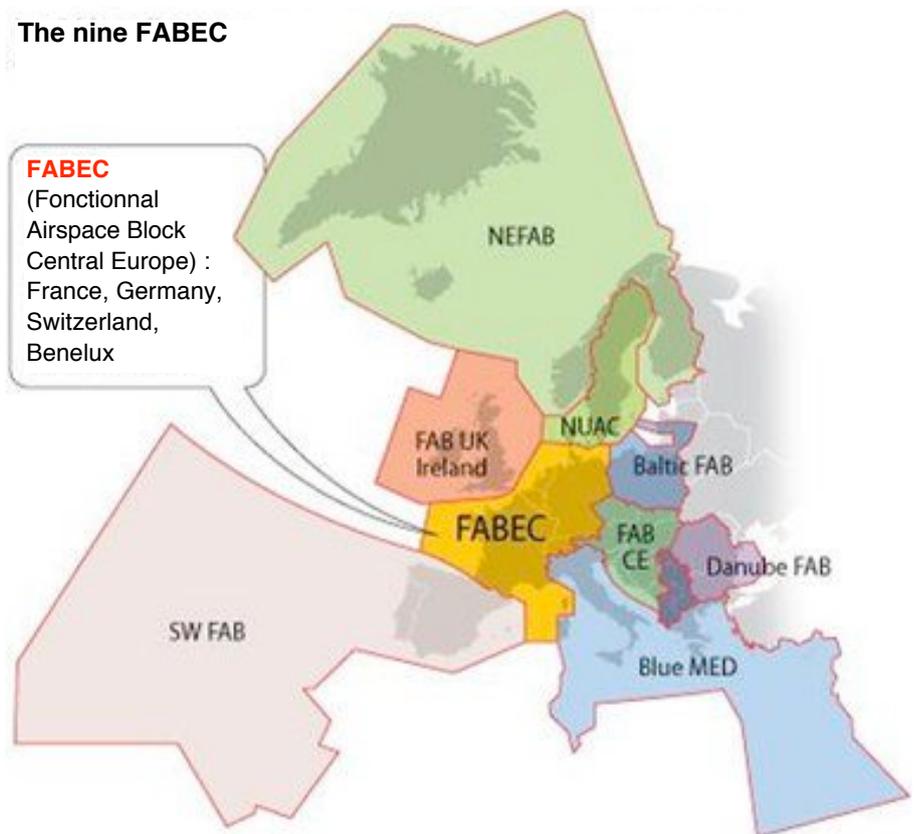
The implementation of new technologies to facilitate information sharing between all stakeholders (air operators, airports, providers of air navigation services) will be a key feature of the proposed developments to ensure more integrated management of flights in their different phases, from departure to arrival, reducing waiting times both on the ground and in flight, which generate excessive consumption and pollution. Further integration between the ground systems ("ATC") and on-board ones will

develop new operational concepts such as "business trajectory," path optimised according to criteria specific to each airline operator, the automatic "deconfliction" of trajectories, delegations of ground to on-board responsibility, etc...

The widespread use of satellite navigation systems will allow

in the field of ATM and cope with traffic over the next 20 years. SESAR provides detailed planning with figures for the 2025 - 2030 period, based on observations of current air traffic: in 2025 air traffic is expected to double (lower estimate). In the era of Internet and satellites, air traffic control still uses radio, or what

The nine FABEC



The Single European Sky project

more precise procedures and with fewer steps, less noisy and more fuel efficient, such as continuous approaches and climb and the reduction of low-altitude overflights of dense population areas.

The goal of SESAR is to regroup research and development efforts

could be described as "artisanal" means. The technology is ageing, the last major change being secondary radars. The last 20 years of research have brought almost nothing and air traffic control is still done as it was in the 1980s. The principle of control areas is too restrictive.

THE INTERNATIONAL DIMENSION: THE OTHER PRIORITY OF AIRBUS PROSKY**Participation in the development of Asian ATM**

The stakes of ATM know no borders. Hence, the volume of China's air traffic could increase by 7.6 per cent per year in the next 20 years. More generally, the Asia-Pacific region could see its traffic increase by 6.8 per cent per year, above the world average growth of 5.3 per cent. Within 20 years, airlines in the Asia-Pacific region will be delivered with about 8,560 new aircraft, which represents 33 per cent of the 25,850 planned deliveries of new aircraft worldwide, worth a total of 1,200 billion dollars, or 37.5 per cent of the total value of the 3,200 billion over the same period. The Asia-Pacific region will thus become the major air transport market, bigger than North America and Europe. This strong increase will mainly be driven by the growth of low-cost airlines in Asia, and the opening up of new flights path,

mainly domestic ones in China, India and Southeast Asia.

General aviation will also take on more importance in airline transport in China. During the Zhuhai Air Show (2010), China announced it would open a portion of its low altitude airspace in order to promote general aviation in the country, including private flights. A decree jointly signed by the Business Council of State and the Central Military Commission stated that the low altitude airspace of the country will be divided into three sections: areas under control, surveillance zones and areas where aircraft can freely fly after having previously filed a flight plan.

Within this context of traffic intensification, China has recognised the need for more a intelligent management of ATM with

the ambition of developing a modernisation of all systems for greater interoperability. In this prospect Airbus Prosky will bring its support to China in signing a MoU with the Chinese office of ATM (ATMB). This will establish the foundation for a long term cooperation of a Sino-European ATM. "Good Practices," R&D, training and integration of new technologies will be discussed as part of this cooperation. In order to meet the requirements of Chinese authorities, Airbus will also be a coordinator of the key players in European ATM expertise, such as Quovadis, Cassidian, as well as the German navigation services provider (DFS). In this context, the European pool coordinated by Airbus should offer new synergies and solutions for Chinese ATM.

Anticipating ATM issues in the Middle East

Middle East air traffic saw an increase of 11.2 per cent in 2009. Intelligent management of the regional ATM is becoming a crucial issue on which the entire economic future of the Middle East virtually depends. The International Air Transport Association (IATA) has underscored the impact of the various revolutions in the Middle East on air traffic in February: it believes that the crisis resulted in the loss of one per cent of growth. Air traffic however increased (+6 per cent) in February over the same period the year before, but much less than the figures recorded in January (8.4 percent, according to

revised figures). The fact remains that all regional authorities wish to anticipate the intensification of air traffic to better manage the risks.

The Middle East wants to become a major "air hub" for long-flights. And experts are already seeing that global air flow is reoriented towards the Middle East. European or American passengers will increasingly use the central hubs of Dubai and Abu Dhabi as hubs to Asia. Thus, the idea of regional ATM modernisation and the creation of a "single sky of the Middle East" is gaining ground and Airbus could play an essential role as a "neutral coordinator" in

representing the needs of airlines in terms of more direct routes and fuel savings. Airbus supports the initiative launched in early 2011 by CANSO (Civil Air Navigation Services Organisation), which is considering the optimisation of the Middle East airspace as a whole (Middle East Regional Airspace Review – MIDRAR). The MIDRAR will identify key points that will make it possible to solve problems requiring immediate action while considering a more long term approach. The first results of this "review of the airspace of the Middle East" should be issued in 2012.