

***Understanding the
developments in the
provision of air
navigation services
in Europe***

Coping with increasing
pressures

Industry Survey

September 15, 2006

Executive Summary

Civil aviation is critical to most national economies of Europe and to the health of the European community as a whole. Over the last decade, air traffic has grown by more than 50%. Europe now has close to 8.5 million flights per year and up to 28,000 flights on busy days. More planes carrying more people and more goods to more destinations are exerting ever-increasing pressure on Europe's Air Navigation Service Providers (ANSPs) to handle the traffic safely and without delays.

In this study the developments in the European Air Navigation Services landscape are studied to see where the industry stands today and how the ANSPs are reacting to the pressures. A selection of industry executives and CEO's were interviewed, enhanced by desk research. This report represents solely the independent professional opinion of Arthur D. Little. Neither the Air Navigation Service Providers nor the interviewees were asked to approve our findings and conclusions.

Three major trends are driving changes in the Air Navigation Service Provision landscape

Firstly, a trend towards greater government independence can be observed. This trend is amongst others caused by financial constraints and government budget limitations. Moreover, the ability to more effectively deal with congestion and delays in view of the projected traffic growth is also seen as an important underlying driver. Improving the strategic position of the ANSP in view of participation in international Functional Airspace Block (FAB) ventures is also seen as an underlying driver to greater government independence. Creation of an incentive for the ANSPs management to operate in a business and client oriented way can be considered to be an important contributor to greater government independence.

With safety being the foremost priority for any ANSP, from our interviews and desk research it can be concluded that no correlation could be found between safety performance and the corporatisation process. Improved management tools, access to cash flow and modernisation of technology are considered to be key drivers behind efficiency improvement at corporatised ANSPs. In some cases corporatisation caused a shift in (management) culture from a government orientation to the aviation community. Amongst others, public interest can be protected through careful selection of the ANSP shareholders and deployment of the appropriate regulation and oversight.

Secondly, a trend towards international cooperation beyond simple operational cooperation can be observed throughout Europe. Cooperation in support functions, technology development and cooperation in Functional Airspace Blocks are considered to be good examples.

Finally, a trend towards civil-military integration can be observed. Co-location or even civil-military integration is possible with the civil ANSP being corporatised. Even in case the military Air Navigation Service (ANS) is co-located or fully integrated, the civil ANSP can be privatised without the military disentangling their ANS.

Seven themes drive Air Navigation Service Provider strategies in Europe

Upon reviewing the strategy and mission statement of most European Air Navigation Service Providers, seven themes could be observed driving their strategies; the three most important themes include focus on safety, efficiency and cost, whereas the second important theme deals with international cooperation. The third key theme is expansion of non-core business. Surprisingly, only a limited number of ANSPs reviewed explicitly address the environmental issues and innovation, whereas only a few ANSPs stated the ambition to be leading on the technology front. As expected, the privatized ANSPs explicitly state that they intend to run their business on a commercial/competitive basis. Finally, only a few ANSPs explicitly address customer orientation in their strategy/mission statement.

Despite the projected traffic growth, fewer service providers are expected to handle air traffic in the future.

According to EUROCONTROL forecasts, European air traffic is expected to grow 25% by the year 2011. In addition, the European Commission is pushing for efficiency improvements and cost reductions to counteract fragmentation of EU airspace. With Global restructuring of the airline industry well underway and most airports currently in the process of being privatised, the question can be raised if provision of air navigation services is going to be the next link in the aviation value chain which is going to restructure. Giving more independence to ANSPs is still a politically sensitive subject since they are an important part of the aviation value chain and perform a vital public task which every country is required to provide under the 1944 Chicago Treaty. In view of the observed international trends it is expected that ANSPs will find themselves in a similar position to airlines and airports in which they are “forced” to explore the option of reducing their costs through economies of scale.

Three conclusions can be drawn:

- Cooperation between European ANSPs: a matter of “how” rather than “if”
- The first steps towards cooperation have been taken; however, a lot still remains to be done
- Safety is unlikely to be affected and remains the foremost priority for any ANSP

1. Introduction

Civil aviation is critical to most national economies of Europe and to the health of the European community as a whole. Over the last decade, air traffic has grown by more than 50%. Europe now has close to 8.5 million flights per year and up to 28,000 flights on busy days. More planes carrying more people and more goods to more destinations are exerting ever-increasing pressure on Europe's Air Navigation Service Providers (ANSPs) to handle the traffic safely and without delays. In spite of modernisation and streamlining, Europe's Air Traffic Management (ATM) system remains safe but fairly costly. It is also hampered by heterogeneous working practices and constrained by air route networks which, on the whole, are based on national borders rather than on air traffic flows.

Efforts are being taken at different levels to address these issues. The Single European Sky (SES) initiative for example, was put forward in 2004 by the European Commission as a legislative approach to solve the issues that currently affect air transport as well as enabling ATM to cope with future demands. It aims to restructure European airspace as a function of air traffic flows, instead of according to national borders, and it aims at creating additional capacity and increasing the overall efficiency of the ATM system. The creation of Functional Airspace Blocks (FABs), in which multiple States cooperate intensively on ATM, is an example of how SES attempts to restructure airspace.¹

No two Air Navigation Service Providers (ANSPs) are precisely alike; each provider has substantive duties mandated by law that are unique to each specific provider. For example, the Irish ANSP not only operates and manages air navigation services, but also performs medical examinations of holders of airmen certificates and regulates airworthiness of aircraft. Hence, governments define the functions to be performed by ANSPs and these functions may go beyond the "core business" of providing air navigation services².

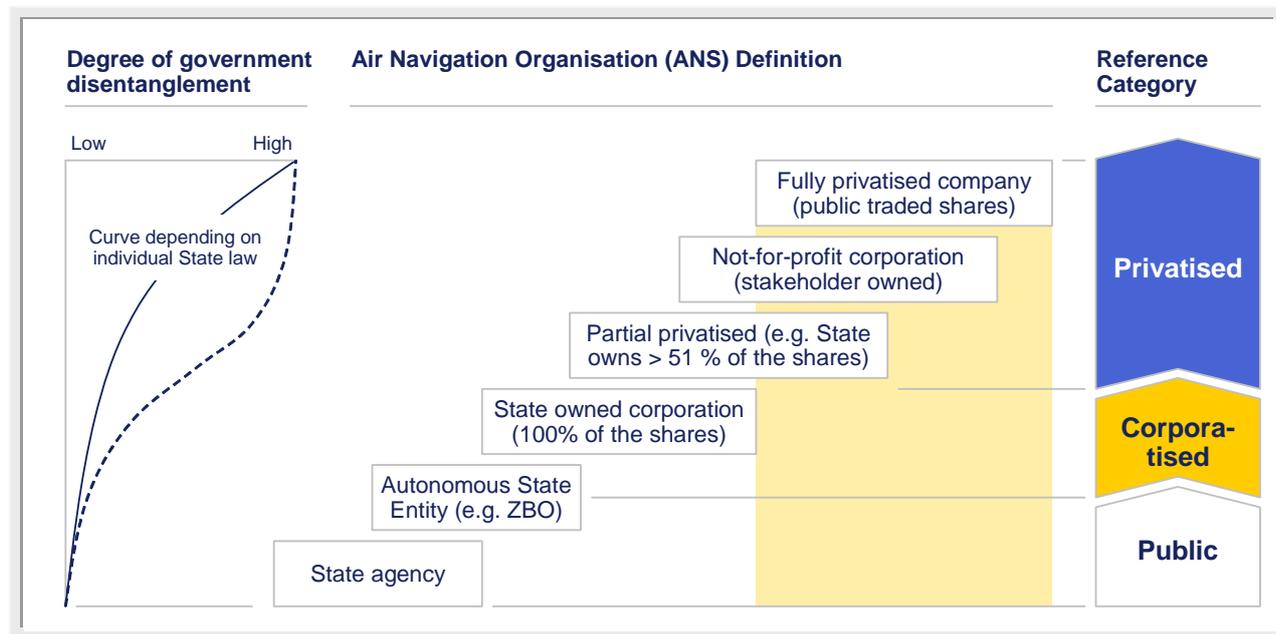
ANSPs are engaged in both Core and Non-core business. Activities executed to deliver or support an ANSP's primary task of providing Air Navigation Services are referred to as 'core business'. Apart from providing Air Traffic Control, core business activities include training of Air Traffic Controllers and offering Aeronautical Information Services. Activities not related to ANS are referred to as 'Non-core business'. Examples of non-core business activities are engaging in consulting activities or running airports.

For the purpose of this study we have categorised Air Navigation Service providers in three main reference categories (exhibit 1.1)

¹ Source: EUROCONTROL

² Source: The McGill report on Governance of Commercialized Air Navigation Services, McGill University, Center for Research on Air & Space Law, 2005

Exhibit 1.1: Definitions used with respect to “commercialisation”



Source: Arthur D. Little analysis

- State agencies.** These organisations are considered to be a governmental department with a department head reporting directly to the executive level of a government. Staff consists of civil servants. Costs are funded by the government from general taxation, user charges or a combination of both. Typically, this organisation form does not have shares nor does it have a balance sheet.
- Corporatised organisations.** Typically, these organisations can come in many forms, they can either be an autonomous public sector organisation (e.g. ZBO) or take the form of a 100% State owned corporation under private law. In general, the government owns the shares (if any) of the organisation and appoints the Board of Directors to oversee the operations. These organisations are usually self-financing by means of imposing user charges in order to provide sufficient capital to cover operating and capital expenditures. In case of a corporation under private law the employees are no longer considered civil servants. In some cases (e.g. Switzerland, Austria, Italy and Norway), the government has included the option to sell shares (some up to 49%) to non government organisations by law.
- Privatised organisations.** These organisations include those that have shares which are held by non-governmental organisations ranging from stakeholders to private parties. In our definition used it also includes public-private partnerships (such as is used by NATS in the UK and DFS in Germany) and fully private non-share (and non-profit) capital corporations (e.g. the stakeholder cooperation model used in Canada). In its most ultimate form, a privatised company has public traded shares; however, at this moment no ANSP has been identified using this kind of organisation model.

2. Current situation and international developments

Until recent years, all governments carried out their responsibilities to provide Air Navigation Services themselves. The movement from state to “corporatised” and privatised Air Navigation Services (ANS) has been motivated by considerations of cost efficiency, procurement benefits, the growing needs of users for improved and updated infrastructure to address pressing capacity needs, and the desire of governments to move from tax-based to user-fee-based³ and private capital market-based finance. It is also part of a broader trend to substitute public/private partnership for government provided services in order to introduce market incentives into the provision of traditional public services⁴.

Three major trends could be identified driving changes in the Air Navigation Service Provision landscape, whereas seven themes could be identified driving ANSP strategies across Europe. Finally, fewer service providers are expected to handle air traffic in the future.

2.1 Three major trends are driving changes in the Air Navigation Provision landscape

a. *Trend towards greater government independence*

There is a global trend in the aviation industry towards greater government independence. Today, most airlines have become totally independent from their government which allowed them to save costs by forming global alliances and mergers. Most ANSPs have undergone corporatisation processes since the earliest days; with a significant increase during the 1990's (refer to exhibit 2.1). In general we could distinguish four main reasons for corporatisation:

- i. *Financial constraints and government budget limitations.* For example, in Germany, DFS was corporatised in 1993 and privatized in 2006⁵ (decision to privatise was taken in 2004) because the federal government financial restructuring requirements. The same kind of rationalization can be observed in the UK during the privatization of NATS. On the other hand, governments may decide to corporatise their ANSP in order to provide the ANSP with more flexibility to finance technology upgrade programs. This is done amongst others by allowing ANSPs to borrow funds externally. For example, Austria was facing severe capacity issues in the 80's due to outdated technology. However, the government needed to make a trade-off between this investment and other investment needs; hence no additional government funds could be made available for investing in air navigation technology.
- ii. *Ability to more effectively deal with congestion and delays in view of the projected traffic growth.* The growing traffic put pressures on ANSPs to act

³ Note: The European Air Navigation Service Providers are user fee based since 1971.

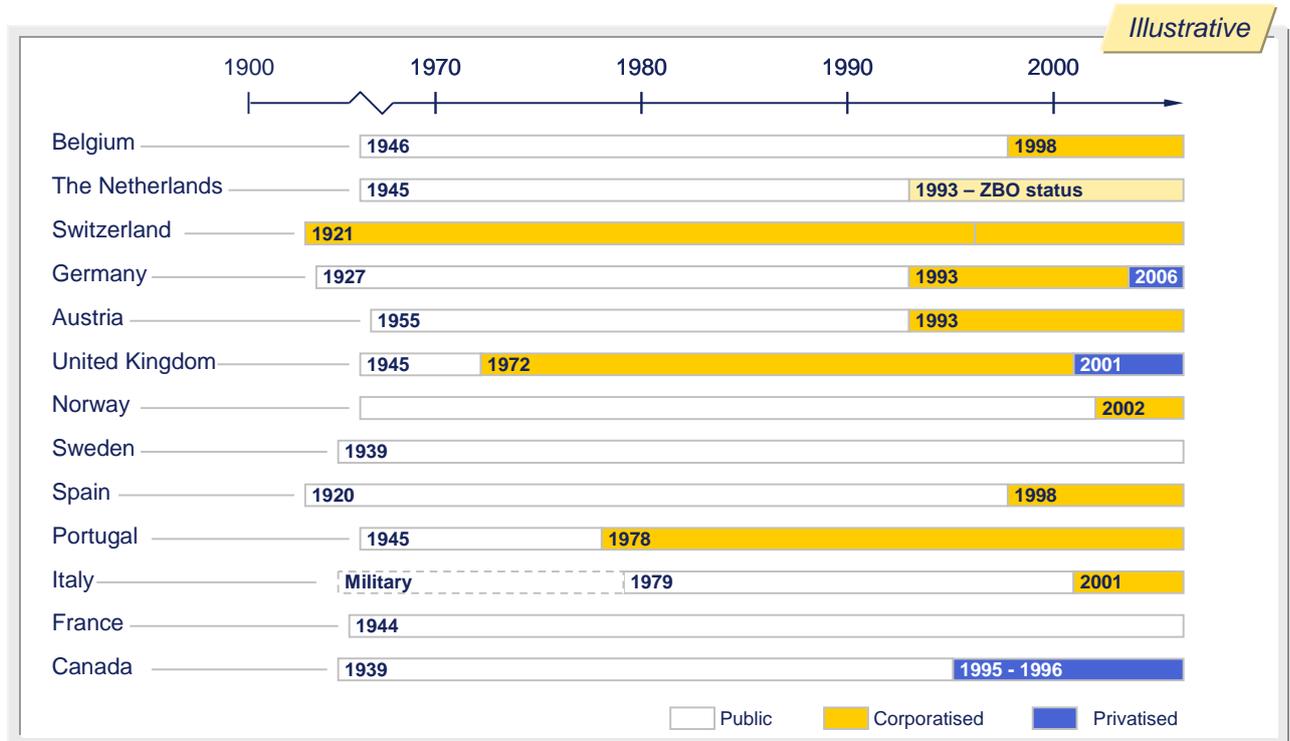
⁴ Source: The McGill report on Governance of Commercialized Air Navigation Services, McGill University, Center for Research on Air & Space Law, 2005

⁵ Note: The subsequent German aviation law changes were not entered into force when finalising this study.

quicker and respond to the increasing traffic and delays. It was found that ANSPs needed more freedom from their governments to take effective measures to solve the problems and act in a proactive manner by anticipating on increasing future ATCO capacity needs. In Canada for example, the growing air traffic caused delays since there were not enough ATCOs (due to training budget restrictions). In Germany, one of the reasons that airspace became congested was the lack of ATCO capacity.

- iii. *Improve the strategic position of the ANSP in view of potential participation in international ANS (FAB) ventures.* For example, in view of international developments, Austria found it important to have all options for international cooperation open and saw corporatisation of their ANSP as an important contribution to success.
- iv. *Create an incentive for the ANSPs management to operate in a business-like and client oriented way.* In most cases, being part of a government department, the government is seen as the “customer” instead of the actual users of the Air Navigation Services. Customer orientation was one of the reasons for the Canadian government to corporatise (and later privatize) their ANSP in 1995. In this case, placing the management in the hands of private sector executives increased customer focus and improved the ANSP's efficiency.

Exhibit 2.1: ANSP corporatisation and privatisation time lines



Source: CANSO, company websites and Arthur D. Little analysis

Resulting from our interviews and desk research we found three main areas in which the effects ranged from neutral to positive as a result of corporatisation of the ANSP. Those three areas include safety, efficiency and culture. A more detailed description of each of these points is listed in appendix A. In summary, the following effects resulting from corporatisation can be observed:

- v. *Safety being the foremost priority for any ANSP, no correlation between safety performance and the organisation type could be confirmed.* ANSPs which were corporatised (or privatised) continue to focus on safely moving aircraft. It was clearly stated during our interviews (and in each ANSP's annual report) that safety is the foremost priority and concern. Moreover, international studies^{6,7} into the effects of corporatisation confirm the focus on safety of corporatised ANSPs. Moreover, formal safety programs and "external" safety regulation are additional factors securing safe operation of ANSPs (independent of their corporate structure).
- vi. *Improved management tools, access to cash flow and modernisation of technology are considered to be key drivers behind efficiency improvements at corporatised ANSPs.* Improved management tools allowed some ANSPs to increase their ANS efficiency and increase controller productivity. In addition, access to cash flow and borrowed funds have facilitated modernisation; many examples show that corporatised ANSPs become more efficient since they are able to upgrade (modernise) their technology. Even though certain costs are due to the corporatisation of an ANSP and investments are needed for cooperation through joint ventures, there are also short-term savings resulting from changes in the internal and external (more business like) culture of the ANSP.
- vii. *In some cases a shift in (management) culture could be observed resulting from corporatisation.* Providing more autonomy for ANSPs has tended to cause reorientation from government to the aviation community. Prior to corporatisation, government priorities, politics and budgets directed the business and not the customer needs. After corporatising, the ANSP can focus its energy on the customer needs. The agility to reach a decision and the flexibility to carry it through increased. ANSPs became more accountable, not having to deal with the multiple government layers and the management runs the ANSPs in a more business oriented way. For example, a corporatised (or privatised) ANSP can more easily bargain and negotiate with its clients, customers and employees. At NATS, after becoming more independent, it became possible to attract private sector executives as Paul Barron (CEO), who was able to fully use his entrepreneurial and business skills to promote NATS and reach for business opportunities.

⁶ Air Traffic Control, Characteristics and performance of selected international air navigation service providers and lessons learned from their commercialization, Report to Congressional Requesters, United States Government Accountability Office, July 2005.

⁷ Air Traffic Control Commercialization Policy: Has it been effective?. mbs Ottawa inc, January 2006.

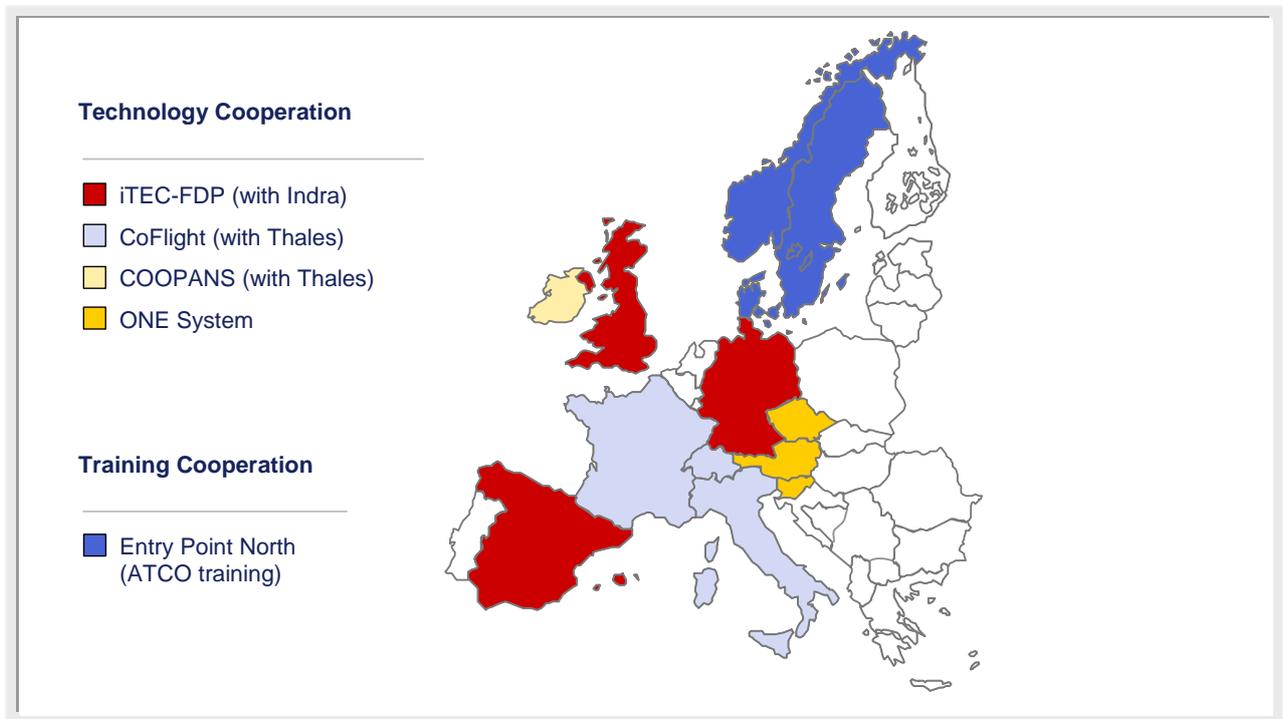
This allowed shareholders to get a dividend for the first time in 2005 after having gone through the difficult times following September 11th, 2001. Another example from our interviews is AVINOR, the Norwegian ANSP, where the airport department became more client oriented after corporatisation.

It should be noted that in the majority of the cases the State remains majority shareholder in order to protect the public interest. Having all shares of the corporatised ANSP owned by the State is one way to protect the public interest. Another way is to sell non-voting shares to a national stakeholder or independent organisation that will also ensure the public interests are protected, as was done in Switzerland in which case 0.15% of the shares were sold to Swiss airports, aviation related organizations, staff associations and Credit Suisse. It has also been the case in Austria where Austrocontrol can sell up to 49% of its shares to airports. Even though three ANSPs have been privatized, Governments also ensured that the public tasks are well protected. In the UK, NATS for example sold shares to stakeholders to share the control. In Canada the government created a non-profit company.

b. *Trend towards international cooperation beyond simple operational cooperation*

Following the Single European Sky (SES) initiative to counteract the fragmentation of European airspace, accommodate the growing amount of traffic and reduce the high costs of new technology, European countries are required to cooperate more intensively, primarily because of the obligation to establish cross border Functional Blocks of Airspace. Examples of cooperation include cooperation in support functions and cooperation in technology development; often together with technology providing companies in order to mitigate risks (refer to exhibit 2.2). Another example of cooperation is the creation of Functional Airspace Blocks (FAB) in order to enhance overall efficiency and organisation of European airspace (refer to exhibit 2.3).

Exhibit 2.2: International cooperation between Air Navigation Service Providers



Note: Denmark and Sweden, together with Ireland, also participate in the COOPANS initiative and Austria, Germany and Sweden cooperate in NUP II+

Source: Arthur D. Little analysis

It can be seen that the number of ANSP-ANSP co-operations has increased over the last years and that most corporatised ANSPs are participating in co-operations. There are several forms of co-operating, some examples are given below:

- i. *Cooperation in support functions.* A recent example is the training school joint venture of Entry Point North: the Nordic ATS Academy (2005) formed by Avinor, LFV-ANS and Naviair. A joined ATS academy was established to reduce costs, harmonize training curricula in order to be able to use

European standardization and to address the lack of scale and continuity of supply of the individual training centers (Entry Point North, 14-03-2006).

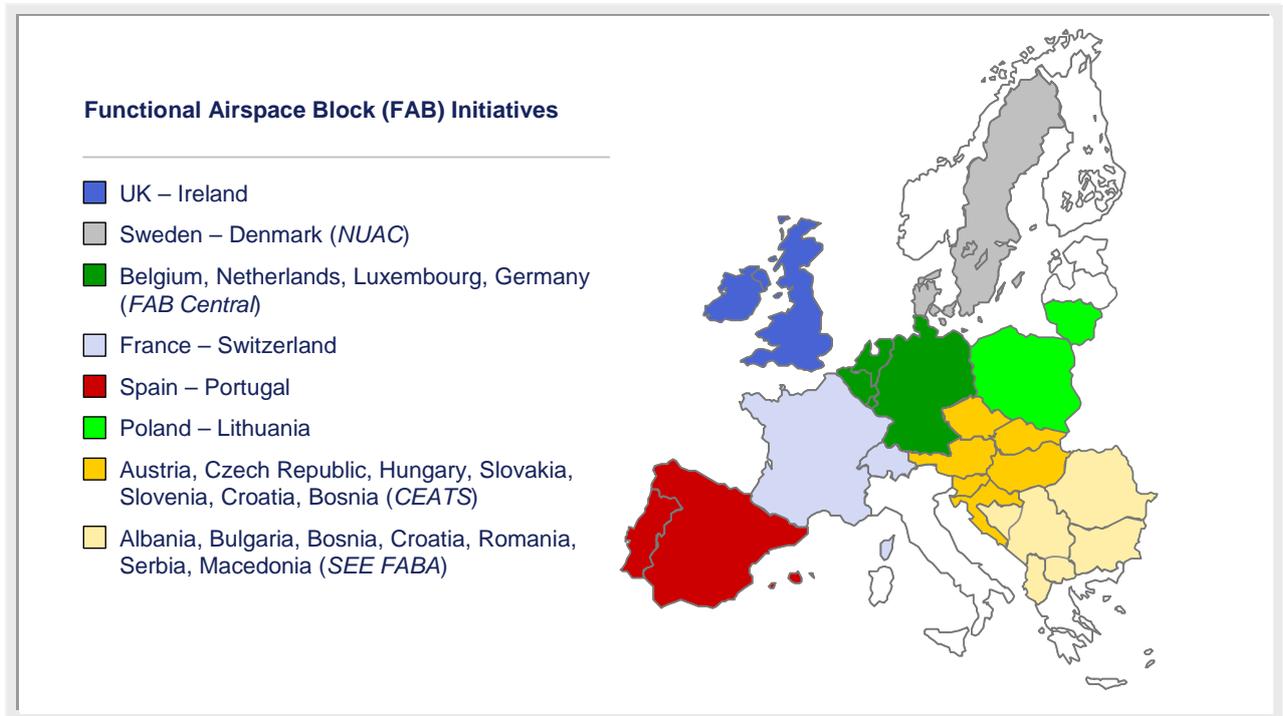
- ii. *Cooperation in technology development.* The first phase of a dedicated programme facilitating the modernisation of the European air traffic infrastructure (SESAR) has been initiated and put under EUROCONTROL's responsibility⁸. This programme will combine technological, economic and regulatory aspects and will use the Single Sky Legislation by synchronising the implementation of new equipment, from a geographical standpoint in all European Union member states, as well as from an operational point of view by ensuring that aircraft equipment is consistent with technological evolutions on the ground. SESAR is an initiative which was initiated by ATM equipment manufacturers, but now receives the support and commitment of the whole air transport community. Besides this industry wide technological programme, which has a time horizon up to 2020, other specific technology co operations with a much shorter time horizon have been initiated by individual ANSPs. Four relevant examples include:
- An example of a cooperation in developing technology is iTEC-eFDP (2001), formed by DFS and AENA, together with NATS. They decided to adopt the iTEC eFDP system for SACTA 4. iTEC-eFDP consists of core functions together with automated support to ATC functions in a stripless environment and interfaces to external systems. The iTEC-eFDP system is based on a modular concept and is configurable and scaleable to meet different customer needs. This cooperation is done as a contractual cooperation, with Indra as the contractor (source: www.itec-fdp.com).
 - An additional example is the CoFlight (2003) (Cooperative Flight) system, a jointly financed product development by ENAV, DSN and Skyguide. Coflight will play a major role in the development of interoperability of ATM systems in Europe. Processing of flight data will be harmonized within a geographical zone (France-Italy-Switzerland), representing more than five million flights controlled per year (source: www.thalesatm.com).
 - COOPANS (2003) is a third example of a technology cooperation, in which Naviair, LFV-ANS and IAA are working together in the joint procurement of Thales Air Navigation Systems. This will result in interoperability of systems, risk reduction and the benefits of economies of scale (www.aerospacemedia.com, 04-05-06).
 - In the NUP (NEAN Update Program) I, II and II+ programs, Eurocontrol, ANSP's and industrial partners (Rockwell Collins, Boeing, Airbus, etc..) jointly develop ADS-B (Automatic Dependent Surveillance – Broadcast)

⁸ Source: European Commission

and 4D trajectory technologies. This research project is 50% funded by the European Commission. The ANSP's involved in NUP II+ are: LFV (in a coordinating role), Austrocontrol and DFS. This is done in a contractual cooperation. (source: www.nup.nu)

- Finally, ONE SYSTEM (2004) is another technology initiative, formed by Austrocontrol, ANS Czech Republic & Slovenia Control. This is a co-ordinated ATM system, which includes harmonised investment planning. This system is open for other ANSPs (source: CANSO, update Europe, Issue 5, December 2004).
- iii. *Cooperation in Functional Airspace Blocks (FABs)*. A Functional Airspace Block (FAB) is defined as an airspace block, based on operational requirements, reflecting the need to ensure more integrated management of airspace, regardless of existing boundaries. Member States have the legal obligation to reconfigure their airspaces into functional airspace blocks, as part of the Single Sky package came into effect in April 2004. Article 5 of the airspace regulation⁹, stipulates that airspace restructuring should be based on traffic flows instead of national boundaries. Article 5 defines six other criteria a FAB should adhere to, amongst others it has to be supported by a safety case and that it has to be justified by its overall added value.

Exhibit 2.3: Functional Airspace Blocks (FABs) initiatives in Europe



Source: European Commission, DG for Energy & Transport, status report on FAB's, June 22, 2006.

⁹ Regulation EC/551/2004 of the European Parliament and the Council of 10 March 2004 on the organisation of the airspace in the single European sky (Airspace regulation), OJ L 96, 31.03.2004, p. 10.

The current status of the various initiatives (refer to exhibit 2.3) can be summarized as:

- *Central Europe:* CEATS (Central European Air Traffic Services), this initiative started in 1997 by the ANSPs of Austria, Hungary, Czech Republic, Slovenia, Croatia, Slovakia, Bosnia and Italy (only part of the Italian airspace was considered to be included in this FAB). One of its initial goals was the establishment of an upper air control center; however, CEATS is presently experiencing difficulties after Italy withdrew itself from this FAB initiative. For the moment it is unclear how this FAB will develop itself going forward.
- *UK and Ireland:* A study was commissioned to address the feasibility of the establishment of a functional block of airspace including the airspace of the UK and Ireland. The feasibility study concluded that there is a prima facie case for establishing a FAB in UK and Irish airspace¹⁰.
- *Germany and Benelux:* Belgium, Luxembourg, The Netherlands and Germany are investigating the establishment of a functional block of airspace (FAB Central). The preliminary high level feasibility study completed in 2005 will be followed up by a detailed feasibility study which has started mid 2006.
- *Sweden and Denmark:* Initially, Norway was also involved into studying the feasibility of the establishment of a functional block of airspace. Currently, Sweden and Denmark (NUAC) are in the process of developing plans for joint management of upper airspace.
- *France and Switzerland:* France and Switzerland have completed a feasibility study and are developing plans going forward. Moreover, the French government is considering investigation of other options (e.g. joining FAB Central).
- *Balkan:* The functional airspace block covering a range of Balkan countries (SEE FABA) is in its early days, no feasibility study results have been published so far.

In general, corporatisation of the ANSP is an important prerequisite for participating in international joint ventures. Moreover, as corporatised ANSPs often have better aligned business goals, cooperation will be made easier. It is expected that due to increased cooperation and re-division of airspace into functional air space blocks, the number of air traffic control centers within the territory of the European Union has been reduced from over sixty to less than twenty¹¹ by the year 2020.

¹⁰ Study into the issues and options associated with establishing a functional airspace block in UK and Irish airspace. Martin Hawley, John Raftery, Seve O'Flynn, Solar Alliance, June 2005

¹¹ Source: CANSO yearbook Air Traffic Management 2004

c. *Trend towards civil-military integration*

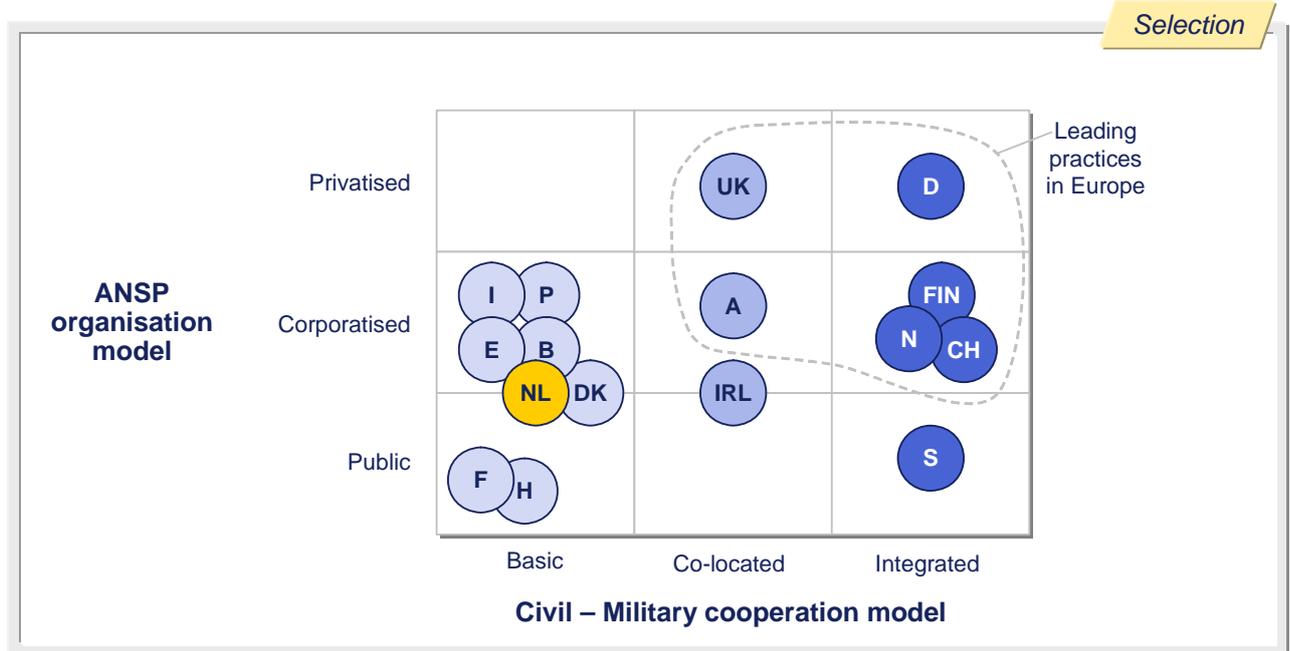
In Europe alone, there are eight ANSPs that have decided to co-locate or even fully integrate the military air navigation services¹² (refer to exhibit 2.4). In order to classify the different forms of military-civil cooperation three different categories are used in this study:

Basic: in this case both the civil and military ANSP operate their own dedicated infrastructure and employ their own ATCOs. In some cases flexible use of air space (FUA) is agreed on. In some cases airspace can be integrated from an operational point of view, which recently is the case in Belgium where civil-military airspace integration has been approved.

Co-located: in this case the military ATCOs are using the infra structure of the civil ANSP, however, the military ATCO staff will remain military staff and remain under military command. In some cases (e.g. Austria), the military ATCOs also handle civilian air traffic.

Integrated: in case the ATCOs both handle military and civil air traffic we refer to an integrated military-civil air navigation service operation. In the case of DFS the ATCOs still wear a uniform, however, in the case of SkyGuide, there is no difference between the military and civilian ATCOs.

Exhibit 2.4: Civil-military integration trend in Europe



Source: Arthur D. Little analysis

¹² Excluding fighter control in most cases

Integration allows for common services, systems and training facilities with greater co-ordination at operational, technical and managerial level. In the UK and Austria for example, the military uses common infrastructures, sharing meteo services, radar data and flight information data. This consequently leads ANSPs to reduce their cost while increasing the flexible use of airspace, thus allowing the ANSPs to better handle the growing traffic requirements.

An interesting example is the civil/military integration with the public ANSP in Sweden, where ANS for the military has been provided by LFV since the 1970's. The integration took place over four years in three steps: first a new generation of ATCOs was trained, then common headquarters were established and finally operations were synchronized. If ATCOs were necessary for peacekeeping missions abroad, LFV would second their personnel which would be wearing uniforms in their new role. An excellent working relation exists between LFV and the military.

Two key observations with respect to corporatisation (or privatisation) of the ANSP in relation to cooperation with the Military include:

- *Co-location or even civil-military integration is possible with the civil ANSP being corporatised.* Austria, Norway, Finland and Switzerland are good examples of this.
- *Even in case the military ANS is co-located or fully integrated, the civil ANSP can be privatised without the military disentangling their ANS.* This was demonstrated in two recent examples in the UK and Germany where in both cases the military ANS was either integrated or co-located while the ANSP was privatised.

It is however essential for the military to preserve their ANS competencies in order to remain effective in military operations abroad (for example peace keeping missions) or to take control of the national ANSP in hostile conditions. For this reason, the Germany military for example made sure that the appropriate regulations were in place to protect their expertise by allowing the military to place their ATCOs at various operational and management levels at DFS. The German government also introduced a regulatory framework that allows the military to overtake the ANSP or shift the reporting lines in threatening situations. Similarly, in Norway, Avinor's management reports to the ministry of defence rather than the ministry of transport in war time situations. Finally, the military in Belgium has strengthened their position by having regulations that allows them to place military personnel in the policy making department and in the National Supervisory Authority (NSA), to oversee Belgocontrol's activities. For the moment, even the NSA president is considered to be military staff.

2.2 Seven themes drive Air Navigation Service Provider strategies in Europe

Seven themes have been observed when studying the most recent publications of a selected number of ANSPs¹³. In summary, three key themes can be observed:

- All ANSPs reviewed state *safety* as being their main objective, however, efficiency, cost-effectiveness and capacity increase can also be regarded as common denominators in ANSP strategies.
- Most ANSPs reviewed articulated their ambitions for *international cooperation* in their core business (the provision of air navigation services).
- Moreover, it can be seen that most ANSPs already have *diversified* into activities considered to be non-core business; some of the ANSPs explicitly state their intention to expand the non-core business activities on an international scale.

In addition, four less frequently mentioned themes can be observed in ANSP's strategies. Surprisingly, only a limited number of ANSPs reviewed explicitly address the environmental issues and innovation, whereas only a few ANSPs stated the ambition to be leading on the technology front. As expected, the privatized ANSPs explicitly state that they intend to run their business on a commercial/competitive basis. Finally, only a few ANSPs explicitly address customer orientation in their strategy/mission statement.

Exhibit 2.5: Seven themes in European ANSP strategies



Source: Arthur D. Little analysis

¹³ The selection included 15 European ANSPs (Austria, Belgium, Denmark, Finland, France, Germany, The Netherlands, Ireland, Italy, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom) and NavCanada as reference ANSP given their long standing experience as privatised ANSP.

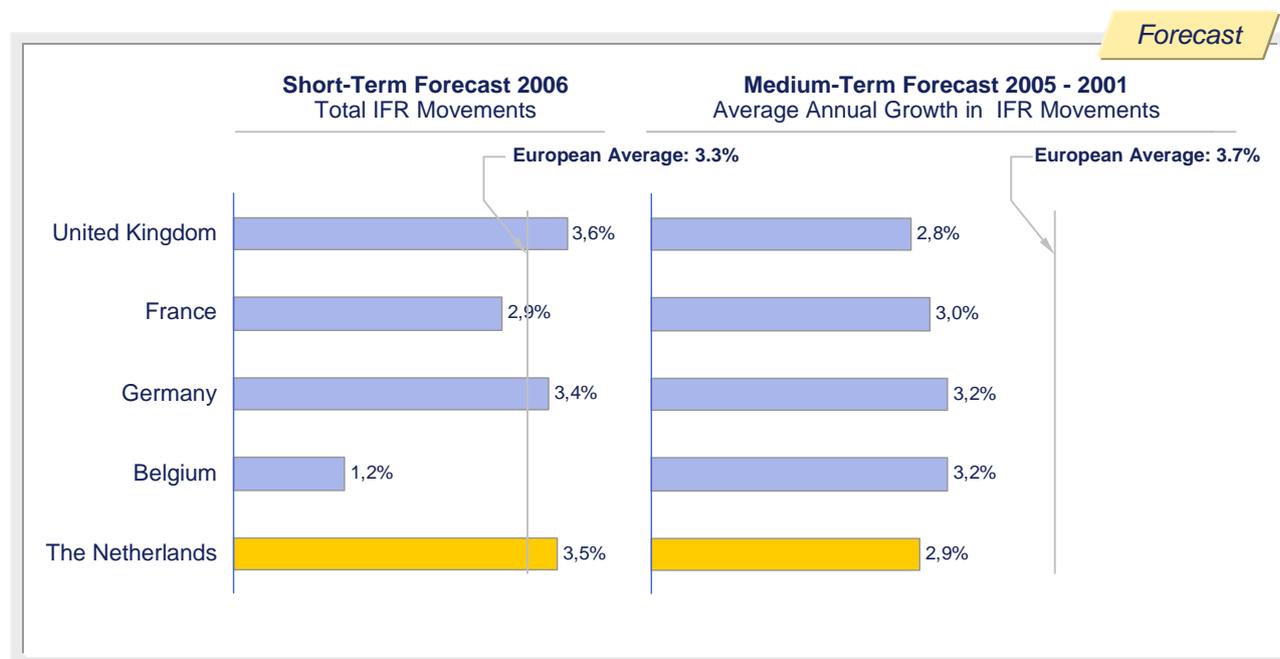
All ANSPs reviewed state safety as being their main objective but also value being efficient, cost-effective in regard to the increase in capacity and Single European sky initiatives. Moreover, most ANSPs already have non-core businesses activities and some of those ANSPs explicitly state their intentions to expand these activities on an international scale. It was also found that a limited number of ANSPs explicitly addresses the environmental issues and innovation. Only a few ANSPs have the ambition to be leading on the technology front. As expected, the privatized ANSPs explicitly state that they intend to run their business on a commercial/competitive basis. Finally, only a few ANSPs explicitly address customer orientation in their strategy/mission statement.

A more detailed description can be found in appendix B.

2.3 Despite the projected traffic growth, fewer service providers are expected to handle air traffic in the future

a. *Traffic is expected to grow 25% in Europe¹⁴ by the year 2011.* Over the last decade, air traffic has grown by approximately 50% in Europe. The 36 ANPS that make up EUROCONTROL now handle close to 8.5 million IFR flights per year and up to 28,000 IFR flights on the busiest days. To accommodate the extra traffic, airspace capacity has been increased by 80% since 1990. EUROCONTROL expects that today's traffic will have doubled by 2020. The high traffic growth is expected to stem mainly from Central and Eastern European countries. Although air traffic keeps growing in the neighbouring countries of The Netherlands, the medium term forecast indicates a growth rate slightly below the European average of 3.7% (refer to exhibit 2.6).

Exhibit 2.6: Air Traffic Forecast



Source: Arthur D. Little analysis, data source EUROCONTROL

b. *The European Commission is pushing for efficiency improvements and cost reductions to counteract fragmentation of EU airspace.* In the late nineties, the European Commission took measures to reduce the high unit rates of individual ANSPs and to handle increasing traffic. The Single European Sky package was initiated as a legislative approach to reduce fragmentation between States, civil and military ANSPs and ATM systems. It is expected that the Single European Sky initiative will lead to more structural cooperation on core and support tasks between ANSPs through joint-ventures and alliances leading to improved cost effectiveness in Europe.

¹⁴ Source: EUROCONTROL

Creating an optimum sector structure (i.e. air space redesign) is considered to bring significant economic benefits from reducing the number of Area Control Centers (ACCs). EUROCONTROL estimates that the number of ACCs can be reduced from 60 centers in the current situation to around 20 centers after optimisation of the sector structure¹⁵. This argument can be further supported by the fact that the FAA handles about 40 million IFR flight movements with 20 ACCs in the United States whereas in Europe 60 ACCs are deployed to handle close to 8.5 million IFR flight movements per year.

- c. *With Global restructuring of the Airline industry well underway and most Airports currently in the process of being privatised, is provision of Air Navigation Services going to be the next link in the aviation value chain to restructure?* In the fifties and sixties airlines were the proud symbols of their respective countries, in which governments and their respective airports spared no efforts in promoting the development needed for their national carriers. In the late seventies, traffic had grown dramatically and insufficient public funds to invest made it stringent for the government to keep a closer grip on their national carriers.
- New wide-body aircraft and a massive growth in air travel led to changes: airlines expanded and increased in number. Governments were faced with the difficulty of selective assistance for certain airlines. If left unchecked, this situation would need massive injections of funds, encourage discriminatory treatment and stifle the growth of the industry overall. By the end of the 1970's, it was decided to create more distance between governments and airlines. One of the most symbolic results of deregulation was airline privatization. Today, a far greater number of passengers are flown by privatized airlines than by government-supported airlines. Furthermore, governments gave the market the power to decide whether airlines would thrive or disappear in the fully competitive environment. Nowadays, new airlines emerge based on different business models (such as low-cost airlines) and mergers and takeovers take place between the bigger airlines forced by the need to cut costs and to use the benefits of economies of scale (e.g. Air France merges with KLM). Global alliances emerge (e.g. Star Alliance, Oneworld, Skyteam) and it is expected that airline consolidation will end in a small number of airline clusters.

Airports were also viewed as significant to national interests, but in the late seventies they also faced public sector budgetary pressure, which led to the privatization wave through Europe. This forced governments to rethink their public sector strategies. In 1995, major airports like Copenhagen, Vienna, Hamburg, Berlin and many others were privatized. Today some airports have expanded their activities to other airports or even acquired parts of them to leverage their expertise. Furthermore, the airport industry is under strong influence of multinational airport operators, especially the specialized airport management firms that acquire and manage multiple airport networks. For example, British Airport Association (BAA) takes the responsibility to manage whole airports. It runs seven airports in the UK, three being the major London airports.

¹⁵ Source: CANSO yearbook 2006 – Why ANSP co-operation is a difficult but a vital goal.

It also operates the Indianapolis airport under a ten-year contract, several airports in Australia (including Melbourne) and the Naples Airport (Italy). Besides this BAA manages a group of other properties. AENA, the Spanish ANSP, is another example of an organization that manages airports at a global scale.

ANSPs are facing the need to become more cost effective. Giving more independence to ANSPs is still a politically sensitive subject since they are an important part of the aviation value chain and perform a vital public task which every country is required to provide under the 1944 Chicago Treaty. For this reason, most of the European ANSPs have only undergone corporatisation to allow them to raise the internal efficiency of their business by freeing them from the government budget cycle. So far, two European countries (United Kingdom and Germany) have taken the lead by privatizing their ANSPs. It is expected that ANSPs will find themselves in a similar position to airlines and airports in which they are forced to explore the option of reducing their costs through economies of scale. It is expected that the establishment of FABs leads to structural collaboration on an organizational level in a similar way as airlines and airports have done over the last decade.

3. Conclusions

The European Commission is pushing for efficiency improvements and cost reductions to counteract fragmentation of EU airspace. Furthermore, ANSPs are faced with the need to cope with an ever increasing number of flights. The industry is changing and three trends have been observed in the European ANSP landscape: a trend towards greater independence from governments, a trend towards international cooperation and a trend towards civil military cooperation. The strategies of most ANSPs support international cooperation and also show a desire to expand in non-core activities. Our three main conclusions are:

Cooperation between European ANSPs: a matter of “how” rather than “if”

Due to the pressures to reduce costs, it is expected that ANSPs will find themselves in a similar position to airlines and airports in which they are forced to explore the option of reducing their costs through economies of scale. The establishment of FABs will most likely lead to structural collaboration on an organizational level in a similar way as airlines and airports have done over the last decade.

The first steps towards cooperation have been taken; however, a lot still remains to be done

It has been observed that a large number of the European ANSPs are reacting to the changing environment by explicitly addressing their desire to engage in international cooperation and to expand into non-core business. The development of new technology is increasingly done by multiple ANSPs, which reduces the costs and leads to standardization. It is expected that international cooperation will intensify beyond the current level and also include support services (such as training) and eventually the core task of Air Traffic Control. The need for increased efficiency and the need to handle an ever-increasing number of flights will also promote civil-military integration and flexible use of airspace, which is already happening in a number of countries. Due to national interests and the States' obligation to provide ANS, the process of ANSP consolidation will happen only slowly. At this moment it is too early to indicate how this consolidation process will take place going forward.

Safety is unlikely to be affected and remains the foremost priority for any ANSP

In spite of all the changes and pressures affecting this industry, all ANSPs explicitly mentioned safety in their strategies. It was found that safety has not been affected by the corporatization of ANSPs. It is expected that establishment of independent NSAs throughout Europe will further enforce existing safety levels.

Appendix

- Appendix A – Implications of corporatisation in view of international experience and lessons learned
- Appendix B – Themes driving ANSP strategies in Europe
- Appendix C – List of references
- Appendix D – Glossary

Appendix A – Implications of corporatisation in view of international experience and lessons learned

International experience suggests neutral to positive effects in four main areas resulting from corporatisation of the ANSP. Resulting from our interviews and desk research we found four main areas in which the effects ranged from neutral to positive as a result from corporatisation of the ANSP. Those four areas include safety, efficiency, cost and culture.

A.1. Safety being the foremost priority for any ANSP, no correlation between safety performance and the organisation type could be confirmed

- i. *ANSPs which were corporatised (or privatised) continue to focus on safely moving aircraft.* It was clearly stated during our interviews (and in each ANSPs annual report) that safety is the foremost priority and concern. Moreover, international studies^{16 17} into the effects of corporatisation confirm the focus on safety of corporatised ANSPs. A US policy study¹⁸ demonstrates that safety has improved in Canada and the United Kingdom since corporatisation. There is certainly no evidence that safety standards are affected by corporatisation as long as appropriate oversight structures are in place. In some instances, government policy requires that the ANSP considers safety in any and all decisions affecting operations and service. For example, German legislation requires DFS to observe ICAO's standards and recommended safety practices, as well as adhere to the objectives and policies of international organisations in which the German government participates, such as EUROCONTROL.
- ii. *Corporatised ANSPs have established formal safety programs.* For example, DFS and NATS apply a systematic Safety Management System in accordance with EUROCONTROL's safety requirements, to all of their operational activities. This system forms the basis for risk assessment, safety assurance, safety control and safety monitoring through standards that comply with national and international obligations. Although safety (loss of separation¹⁹ / air proximities²⁰) is measured by most (if not all) ANSPs, a lack of comparable data makes it extremely difficult to compare safety performance amongst ANSPs. EUROCONTROL's Performance Review Unit (PRU) reports safety performance in accordance to each ANSPs own definitions with respect to loss of separation / air proximities. No further statistical analysis has been performed in relation to corporatisation of an ANSP and safety performance.

¹⁶ Air Traffic Control, Characteristics and performance of selected international air navigation service providers and lessons learned from their commercialization, Report to Congressional Requesters, United States Government Accountability Office, July 2005.

¹⁷ Air Traffic Control Commercialization Policy: Has it been effective?. mbs Ottawa inc, January 2006.

¹⁸ Policy Study No. 307, Why an Air Traffic Control Corporation Makes Sense, Reason Foundation, 2003.

¹⁹ Loss of separation is an occurrence or operation that results in less than the predefined separation between an aircraft and another aircraft; a land barrier (such as high terrain); or a vehicle on the runways of airports.

²⁰ An aircraft proximity incident occurs when the pilot or air traffic controller deems the safety of aircraft involved to be endangered, whether because of speed or non-adherence to minimal standards for separation between aircraft (as defined by ICAO).

- iii. *Corporatised ANSPs are subject to external safety regulation.* As part of the Single European Sky initiative, governments have to appoint an independent National Supervisory Authority (NSA) to supervise their ANSP. The NSA will inspect an ANSP regardless of its legal status and issues relevant certificates to Air Navigation Service Providers.

A.2. Improved management tools, access to cash flow and modernisation of technology are considered to be key drivers behind efficiency improvements at corporatised ANSPs

- i. *Improved management tools allowed some ANSPs to increase their ANS efficiency and increase controller productivity.* In order to increase efficiency within the given operational parameters of an ANSP, SkyGuide, for example, started using management tools to optimize the workload for ATCOs. There are three categories of tools: tools of the first category derive the optimum airspace configuration for a given forecasted traffic situation. These tools are being developed together with EUROCONTROL to be used in congested areas. SkyGuide also has another tool that uses the output as a baseline for establishing duty rosters, so that staff can be deployed as close to the traffic demand as possible. In addition, this tool uses an optimizer to reduce time leakage within the roster to a minimum. These tools are all used during the strategic and pre-tactical planning phases. Tools of the third category are used during the tactical operation itself. They assist the Operations managers on duty by helping them to manage the relieve of controllers for breaks and to manage unforeseen absences (i.e. due to sickness). All those tools have been developed in-house and require a certain flexibility of staff, namely individual rostering and the possibility to start duty shifts basically at any time during the day. The three tools together lead to a more efficient use of ATCO time and an increase of ATCO productivity.
- ii. *Access to cash flow and borrowed funds has facilitated modernisation.* The restrictions associated with the national government budgeting cycle make it difficult for ANSP agencies (as part of a government department) to plan ahead for multiple years. Corporatised ANSPs use current operating revenues or borrow funds to pay for capital projects. For example, NAV Canada obtains all of its financing in the public debt markets. In Germany, DFS mainly finances its capital expenditures by drawing on a capital market program which issues notes to private investors in the market.
- iii. *Many examples show that corporatised ANSPs become more efficient since they are able to upgrade (modernise) their technology.* Efficiency is strongly linked to ATCO productivity, which in turn is strongly linked to the technology used. For example, Air Services Australia reported increases in controller productivity following the introduction of the Australian Advanced Air Traffic System. DFS is also eliminating systems that depend on paper strips and expects productivity gains and cost savings to follow.

A.3. In some cases a shift in (management) culture could be observed resulting from corporatisation

- i. Providing more autonomy for the ANSP has tended to cause reorientation from government to the aviation community. Prior to corporatisation, government priorities, politics and budgets directed the business and not really the customer needs. After corporatising, the ANSP can focus its energy on the customer needs.
- ii. The agility to reach a decision and the flexibility to carry it through increased. ANSPs became more accountable, not having to deal with the multiple government layers and the management runs the ANSPs in a more business oriented way.

Appendix B – Themes driving ANSP strategies in Europe

- *All ANSPs reviewed state safety as being their main objective but also value being efficient, cost-effective in regard to the increase in capacity and Single European sky initiatives.*
- *Most ANSPs reviewed have ambitions for international cooperation in their core business.* Austrocontrol for example has extensive experience with international projects and sees it vital to expand in that direction. DFS for example, declares that they developed feasible models for cross-border ATC with surrounding ANSPs, in order to defeat arising challenges. Exceptions include Ireland which refers to their cooperation with NATS and does not seem to have further international ambitions.
- *Moreover, most ANSPs already have non-core businesses activities and some of those ANSPs explicitly state their intentions to expand these activities on an international scale.* Activities like training and consulting are most frequently mentioned. Belgocontrol and IAA have a clear desire to build or expand those activities. Others like AENA, AVINOR and LFV state their desire to grow their airport operating and maintenance activities at a national but also at an international level. As another example, LFV and a Dutch business jointly own a company (ASDC, Arlanda Schiphol Development Comp. AB) that develops airport shops, restaurants and currency exchange offices. Finally, DFS states their desire to expand as a crucial task: “We will grow beyond our core business and become one of the most competitive traffic safety providers”.
- *Limited number of ANSPs explicitly addresses the environmental issues and innovation.* Austrocontrol, Finavia, LVNL, NavPortugal and Naviair focus some attention on responding to environmental demands. As an example of an ANSP committed to innovation, Finavia states that they are prepared to innovate, while NavCanada sees itself as the most innovative ANSP worldwide in terms of technology.
- *Only a few ANSPs have the ambition to be leading on the technology front.* AENA and NATS participate in vanguard technology programs in which they maintained a leading position in Europe. In addition, DFS states that their company is synonymous with technological competence. In order to achieve a leading role, LVNL established a ‘center of excellence’ to develop, exploit and maintain ATM-systems around busy airports, based on its experience around Schiphol, and engage in consultancy activities with governments and sister businesses.
- *As expected, the privatized ANSPs explicitly state that they intend to run their business on a commercial/competitive basis.* Surprisingly, the Nordic ANSPs, which are public or corporatised, also state that they intend to run their business on a commercial basis, which could be explained by the fact that they also operate airports.
- *Finally, a few ANSPs explicitly address customer orientation in their strategy/mission statement (e.g. Austrocontrol, Finavia, IAA, LVNL, NavCanada, NavPortugal and Naviair).* Unexpectedly, the privatized European ANSPs do not explicitly address customer focus in their mission statements or strategy documents.

Appendix C – List of references

- Air Traffic Control Commercialisation Policy: Has It Been Effective? Mbs Ottawa inc, Canada, January 2006
- ATM Cost Effectiveness (ACE) 2004 Benchmarking Report, Final Draft Version 0.3, EUROCONTROL, May 2006
- Air Traffic Management 2006: the CANSO yearbook, CANSO, 2006
- Institutional and structure changes in air navigation service providing organisations, Kenneth Button, School of Public Policy – George Mason University, USA
- Why An Air Traffic Control Corporation Makes Sense: A Response To The NATCA White Paper, Robert W. Poole, Policy Study 307, Reason Foundation, 2003
- The Corporatisation of Air Navigation Services Provision, D. McLauchlan, Secretary General, Civil Air Navigation Services Organisation, 1998
- Characteristics and Performance of Selected International Air Navigation Services Providers and Lessons Learned from Their Commercialization, United States Government Accountability Office - GAO, Report to Congressional Requesters, GAO-05-769, July 2005
- ICAO Secretariat study on the safety and security aspects of economic liberalisation, June 2005.
- Regulation (EC) No 552/2004 of the European parliament and the council of 10 March 2004 on the interoperability of European Air Traffic Management Network.
- EUROCONTROL, Air Traffic Flow & Capacity Management Safety.
- High Level Feasibility Study, Cross Border Airspace Block for Germany and the Benelux countries, October 2005, Arthur D. Little.
- Study into the issues and options associated with establishing a functional airspace block in UK and Irish airspace, Martin Hawley, John Raftery, Seve O'Flynn, Solar Alliance, June 2005

Appendix D – Glossary of acronyms and abbreviations used in this report

ACC	Area Control Centre
ACE	ATM Cost-Effectiveness
AENA	Aeropuertos Espanoles y Navegacion Aerea
AIS	Aeronautical Information Services
ANS	Air Navigation Services
ANSP	Air Navigation Service Provider
ASDC	Arlanda Schiphol Development Company
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATM	Air Traffic Management
CANSO	Civil Air Navigation Services Organisation
CEATS	Central European ATS
DFS	Deutsche Flugsicherung
DGAC	Direction Generale de l'Aviation Civile France
EC	European Commission
eFDP	Electronic Flight Data Processing
FAB	Functional Airspace Block
FAB Central	Working term for FAB comprising Belgium, The Netherlands, Luxembourg and Germany
FUA	Flexible Use of Airspace
IAA	Irish Aviation Authority
ICAO	International Civil Aviation Organisation
iTEC	Interoperability Through European Collaboration
LFV	Luffartsverket
LVNL	Luchtverkeersleiding Nederland
MUAC	Maastricht Upper Area Control Center
NATS	National Air Traffic Services
NSA	National Supervisory Authority
NUAC	Nordic Upper Area Control Center
PRU	Performance Review Unit
SES	Single European Sky
SESAR	Single European Sky ATM Research Programme
ZBO	Zelfstandig Bestuurs Orgaan

Arthur D. Little Travel & Transportation contacts:

Survey Director

Rens P. Bouman
+31 10 201 8811
bouman.rens@adlittle.com

France

Vincent Bamberger
+33 1 55 74 29 47
bamberger.vincent@adlittle.com

Germany

Axel Boss
+49 89 38088 791
boss.axel@adlittle.com

Benelux

Bernard Gustin
+32 2 7617 382
gustin.bernard@adlittle.com

Italy

Monika Stoiber
+39 02 67376 209
stoiber.monika@adlittle.com



Asia

Thomas Kuruvilla
+65 6320 6232
kuruvilla.thomas@adlittle.com

UK

James Catmur
+44 870 336 6780
catmur.james@adlittle.com

Spain

Jesus Portal
+34 91 7027 436
portal.jesus@adlittle.com

USA

Roger Hill
+1 617 443 0309
hill.roger@adlittle.com