

FINAL REPORT V1.1

STUDY ON AIR TRAFFIC MANAGEMENT (ATM) MARKET ORGANISATION

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EXECUTIVE SUMMARY

Introduction

This report has been prepared for the Directorate General of Energy and Transport (DG TREN) of the European Commission (EC) by Booz•Allen & Hamilton Ltd and Deutsche Flugsicherung (DFS) GmbH. The work has been performed under Contract n° B2000/B2-7040/SI2.260442 and concerns a study on the organisation of the Air Traffic Management (ATM) market.

Background

In Europe, high levels of traffic growth, combined with the liberalisation of the air transport industry within the Community¹ have raised concern on the ability of the ATM sector to meet the projected capacity requirements needed to support increasing traffic demand. Over recent years demand has been growing at between 5% and 7% per annum² and is expected to grow at around 4% per annum on average over the next 15 years³. As a consequence of the inability of the system to keep pace with increasing demand, delays are at levels unacceptable to the users of the system. These delays can be attributed to a number of causes, including the weather, airport capacity, airline operations and the air traffic management system.

The Communication from the European Commission on the creation of the Single European Sky⁴ concluded that, irrespective of the legal and economic structure of air navigation service providers, there is need to establish an adequate overall European regulatory framework to ensure that services meet the necessary levels of safety, interoperability and performance, particularly if they remain to be provided on a monopolistic basis. Structural reform and development of the necessary regulatory framework will require high-level political support and the development of the necessary political and legislative control mechanisms.

The High Level Group

In view of this, and with the support of the European Council, a High Level Group (HLG) bringing together civilian and military representatives of the Community Member States, together with representatives of Norway and Switzerland was formed. The objectives of this High Level Group were to:

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- ¹ The European Community: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom.
 - ² "Single European Sky", Report of the High Level Group, European Commission Directorate General for Energy and Transport, November 2000
 - ³ See, for example, The Airbus Global Market Forecasts 99, Boeing's Current Market Outlook 1999, IATA Passenger Forecast 1999-2003
 - ⁴ Communication from the Commission to the Parliament and the Council - COM(1999) 614 final of 1.12.1999

- define the modalities of functioning of the Single European Sky within conditions of efficient delivery of services and in the respect of public service obligations, responsibilities and safety objectives to the benefit of civil and military users
- examine the technical issues, implementation decisions and restructuring measures to be considered at national or European level in order to achieve such a reorganisation of routes, airspace structures and their operational usage
- propose harmonisation of national systems along a coherent Community approach implying central decision making processes and solidarity mechanisms
- indicate how the Community framework can be supported by the use of the EUROCONTROL organisation in the implementation of its conclusions.

Since first convening in January 2000, this group has developed a report on the Single European Sky⁵ with the objective of undertaking a genuine reform of air traffic management. Primarily, this involves adapting a more coherent organisational role at the Community level, while at the same time complementing growth with more efficient use and organisation of airspace. The principal conclusions of the High Level Group include the following:

- structural changes are necessary and urgent, reinforcing cooperation at service provision level and ensuring separation of service provision and regulatory tasks
- airspace should be managed at European level, acknowledging local specificities
- the European Union offers the only workable mechanism through which the necessary political decisions can be made and the appropriate legislative framework established, retaining the EUROCONTROL framework for cooperation outside of the EU
- the regulation of air traffic must be fully integrated into European Union activities.

In accordance with the conclusions of the European Council of Feira, the European Parliament resolution on the Single European Sky and the conclusions of the High Level Group, the Commission should make appropriate legislative proposals concerning the reform of the ATM sector in the first half of 2001. It doing so it has been determined that the fields of market organisation, economic regulation and airspace management need in-depth investigation, before proposing appropriate legislative measures. To this end, the Commission has launched three parallel studies respectively on market organisation, economic regulation and airspace management and design. These studies are being performed within the overall framework established by the High Level Group and are building on the work performed therein.

The ATM Market Organisation Study

This report has been developed by the study on ATM Market Organisation with the following objectives:

- to review and understand the characteristics and modalities of the provision of ATM related services, principally in the Community but also accounting for other significant areas of the world
- to define potential opportunities for reorganisation of the sector to address the issues and requirements identified by the High Level Group, learning lessons from the

⁵ "Single European Sky" Report of the High Level Group, European Commission Directorate General for Energy and Transport, November 2000

reorganisation of other sectors, and assessing the impact on special or exclusive rights and obligations

- to identify the factors that prevent elements of ATM service provision being organised in a functioning market
- to devise a Community Regulatory Framework to develop, facilitate and enable the process of reorganisation of the sector.

Current model of service provision

The *Conventional Integration Model* of ATM service provision originated from a combination of the implementation of the rights and obligations enshrined in the Chicago Convention and its Annexes into national law and the combination of regulatory and service provision functions in a National Aviation Administration. Originally many of these National Aviation Administrations (NAAs) were integrated military/civil bodies, operating within government or as government agencies under civil service rules.

Subsequently, most NAAs have evolved into Civil Aviation Authorities (CAAs). In some cases regulatory and service provision functions have been, at least partially, separated through the creation of different bodies charged with regulatory type functions and ATM service provision. Many of the ATM service providers are self-regulating through their governance structures. In parallel, a significant number of ATM service providers have been established as autonomous authorities, with management and financial control devolved from government. However, no one model for the structure of the service provider is acknowledged as the best approach.

The significant structural and organisational changes that have been undertaken by ATM service providers have resulted in, for example, better customer focus, more flexible employment conditions and reward schemes outside of civil service rules, revisions to staffing and rostering schemes, potential access to capital for investment programmes, etc. These restructuring programmes have required support from government and, also, buy-in from the employees.

However, the continued national basis of ATM service provision and regulation results in a fragmented system and duplication of systems and infrastructure. Contingency is planned into systems at the national level but no provision is made for provision of equivalent degrees of contingency across borders. The proliferation of interfaces at service boundaries and incoherent regulatory regimes result in inefficiency in the overall system and provide a significant impediment to the realisation of a Single European Sky.

In response to growing delays, a series of harmonisation and integration packages have been undertaken in the European Civil Aviation Conference (ECAC) area, principally managed by EUROCONTROL. These packages have resulted in significant capacity gains over the past ten years and have supported very high traffic growth.

However, although these improvements have brought large benefits over the years they are now probably reaching the limit of their applicability. A more fundamental approach is now required and the High Level Group Report has concluded that:

... without structural changes.....the improvements that could be made to the current system, in place for the last 40 years, would only be palliative.

Furthermore, technological advances are driving changes in the mechanisms used for the provision of services, both at the level of ATC services and supporting functions or ancillary services.

Current market structure

Currently the service, vertically integrated, is offered on a monopoly basis. There is no scope for multiple providers in a given block of airspace nor is there any significant scope for customers, i.e. aircraft operators, to choose alternative providers by changing routes. Without significant technological advances, there is little scope for introduction of competition in the market, particularly in respect to air traffic control.

ATM providers fulfil a number of public service obligations as part of their statutory requirements. These obligations include:

- provision of services, free of charge, to State aircraft
- provision of services in remote/low density regions, which cannot be financially self-supporting
- provision of navigation, communications, advisory and information services outside of controlled airspace, free of direct user charges, usually to general aviation and aerial work
- protection of the environment
- contribution to the implementation of the ATM trans-European network (TEN).

Some services are not financially viable and can be supported through cross-subsidy from other services. Because of the limited accounting systems used, this cross-subsidy is not transparent, nor is allocation of costs to services.

In order to provide ATM services and fulfil their obligations, the ATM providers are granted access to, usually on a predominantly exclusive basis, airspace and frequency spectrum. Airspace is allocated free of charge but, depending on the particular State in which services are provided, access to spectrum can be subject to a licence fee, albeit at costs much below commercial rates.

There is a considerable amount of interaction between ATM service providers, regulators and the military. This interaction, which is organised on a State-by-State basis, covers issues including:

- organisation of airspace, including the flexible use of airspace (FUA)
- coordination of military operational air traffic and civil air traffic
- two-way exchange of data between civil and military ATM providers
- dual use of civil and military facilities, especially DME and TACAN
- national and regional consultation.

A number of potential impediments to ATM market restructuring have been identified under a number of categories:

- legal and political
- social
- operational
- financial and economic
- defence
- technical.

Solutions to these impediments have been identified and will drive the provisions to be included in the Community Regulatory Framework.

Lessons learned from non-European ATM markets

Examination of the situation that has arisen following the restructuring of the regulatory and service provision regimes for ATM in Australia, Canada and New Zealand, points to several conclusions:

- following the restructuring process as undertaken in these States will not result in the creation of a Single European Sky because the single nation solutions reached have only addressed concerns of efficiency, etc. and have not considered regional integration
- despite commercialisation of the service providers described above and implementation of some supporting regulatory measures, there has only been a very limited unbundling of services. This implies that such unbundling is only likely to take place if incentives are provided to support it
- in each case, a strong safety regulation regime, independent from service provision, has been put in place
- in some cases, light regulation concerning charging and competition has resulted in concerns about abuse of monopoly position and disputes concerning levels of charges. This implies that the appropriate depth of regulation and associated transparency in process are required of a successful regulatory regime
- provisions are made in national law establishing the service provider or the licence governing its operation to ensure that public service obligations are fulfilled. Licences for service providers should specify the public service obligations to be imposed.

Lessons learned from other industries

Analysis of restructuring in other sectors – rail, electricity, water and telecommunications – allows additional lessons to be learned, noting that some regulatory systems are designed to encourage competition (electricity, telecommunications) whereas others are designed to regulate monopoly services (rail and water). The latter are most relevant for comparison with air traffic control services whereas the former are most relevant for comparison with meteorological (MET), aeronautical information (AIS), communications, navigation and surveillance (CNS) services, etc.

In the monopoly situation the following conclusions can be drawn:

- the regulatory framework must view the whole European ATM system holistically, concerning seamless interoperability, capacity, investment and other system-wide issues
- separation of regulatory and operational functions is essential for development of safe, efficient and cost-effective networks
- forced unbundling can result in over complexity and inefficiency. Therefore, unbundling should be facilitated but not be mandatory
- conversely, prevention of bundling of services or operators (horizontal and vertical integration) on competition grounds can perpetuate complexity and inefficiency. Therefore, integration should be allowed but should be subject to the normal controls relating to competition, discrimination, access, etc.
- licensing at national level, with the requirement for multiple national licences for international alliances, does not encourage and might actually discourage the setting up of international alliances. Therefore the licensing regime should be set up so that licensing by multiple national authorities is not required
- poorly thought-out performance regimes can promote perverse behaviour on the part of service providers, that is not in the best interest of the users. Therefore, in order to avoid this, the ATM performance regime must be carefully designed and tested.

Analysis of the electricity and telecommunications sectors indicates that the creation of the Single European Sky will need more than application of competition rules and harmonisation of national approaches. It appears that a European licence would be a principal enabler of trans-national service provision. The principal conclusion relevant to ATM is, therefore, that European licences will be required to promote the creation of the Single European Sky.

In addition, some generic lessons concerning restructuring of regulatory environments can also be learned:

- restructuring re-allocates risks within the industry. Here it might be expected that risks will be re-allocated from the State or Community level, which will have a regulatory role, to the service provider, which will have a managerial and operational role. This implies that service providers must take measures to control and mitigate such risk through, for example, implementation of safety and risk management regimes and insurance schemes
- the economic regulatory regime must assess the overall system for disincentives to investment, e.g. near to the end of licensing periods or when the investment is disproportionate to the level of return that could be expected. This could apply in the ATM environment for major investments, such as air traffic control centres
- restructuring often results in the actors in the industry re-thinking their approach to their business strategies. The players may become more broad, e.g. ATM service providers could diversify into new markets, or they may become niche, e.g. a provider that currently provides the whole range of services could specialise on one or two unbundled services
- there may be resistance to change from a wide variety of actors in the sector that wish to preserve the status quo. Therefore, the restructuring of the regulatory environment should include all stakeholders in the process as far as possible to encourage feedback, buy-in and sense of ownership. This is currently being achieved through the Industry and Social Group process
- change will require strong political leadership, supported by strong administrative competence. Political buy-in and support from the Member States, aided by leadership from the Commission, will be essential to ensure the timeliness and success of the Single Sky programme. The High Level Group process is addressing this issue
- however, political interference and extensive compromise can result in dysfunctional or inefficient systems. Therefore, the Commission should drive the activities to ensure that the best overall solution is reached rather than a set of compromises and trade-offs
- rapid implementation of new regimes with subsequent adaptation and fault rectification has generally been found to produce more effective results than a lengthy process to address all issues and options in depth.

It appears likely, therefore, that the process to facilitate the creation of the Single European Sky should proceed as rapidly as possible but should have built in flexibility so that fine-tuning can occur at a later date.

Scope for restructuring of the market

As described above, the output of the High Level Group has identified that structural changes are required in the ATM market. This raises a number of issues to be considered, including:

- preservation and precedence of the safety culture
- separation of regulation and service provision

- the monopolistic nature of air traffic control in a given volume of airspace at least in the current and medium-terms and the scope for unbundling or bundling services
- the need to optimise the ATM system as a whole
- the need to introduce an appropriate system to grant authorisation for service provision
- creation of a social dialogue including all workers affected by the reform process
- harmonised training procedures and agreement of a common European licence to standard qualifications.

One of the key enablers in re-organising the market for ATM is related to the potential for unbundling and bundling services. The decisions concerning bundling and unbundling services should be left to the service providers themselves, in conformity with the regulatory regime in place. The regulator should not interfere beyond determining the regulatory and licensing requirements.

The regulatory regime itself should create structures for service provision that promote the service providers to bundle or unbundle services based on rational safety and efficiency criteria. There should, therefore, be no in-built bias that favours either bundled or unbundled services. To achieve this, the regulatory framework should:

- as far as is practical, apply licences to services on a service-by-service basis irrespective of whether they are provided in an integrated or unbundled form
- ensure the level of transparency in the provision of services is sufficient to determine the validity and effectiveness of any unbundling
- ensure that reporting and accounting processes are separate and distinct for each service irrespective of whether they are provided in an integrated or unbundled form. Standard processes, such as activity based costing (ABC) could be required to ensure the required level of transparency is achieved
- apply performance requirements to services on a service-by-service basis irrespective of whether they are provided in an integrated or unbundled form
- where services are provided on an integrated basis, require the services to be provided by independent cost centres within the service provider organisation, with the appropriate internal service level agreements and internal cash flows governing the relationship between these cost centres
- where services are provided in an integrated form, ensure that standard and transparent cost allocation procedures are applied to determine how costs of shared support functions within an organisation (e.g. finance, human resources, legal services, etc.) are allocated to individual service lines.

The first stage of promoting the unbundling process is to create a generic and mobile skill base through the issue of a common European personnel licence. This would complemented by the promotion of specialised business units or independent companies for the provision of Ancillary Services such as CNS or flight data processing (FDP) services. The process would create competition for the market by allowing service providers to spin-off, outsource or bid for infrastructure services irrespective of national boundaries.

The final stage of unbundling would be to promote, for any given volume of airspace, the optimisation of operational sectors and interfaces with adjacent service providers. This is intended to create additional competition for the market through the provision of En Route, Approach and Aerodrome services by combinations of service providers which can best meet the requirements of the airspace.

In parallel with the promotion of unbundling services, the promotion of bundling services, through horizontal or vertical integration, should ensure the system is optimised as whole.

Market forces will lead the unbundling or bundling of services as service providers search to find the most effective way of meeting the needs of any particular airspace, if bidding, in competition with others, for licences to operate the services.

Restructuring the ATM market will impact on a variety of key elements relating to the service, including the human resources, the rights and obligations of service providers, regulatory requirements, issues of competition and military applications. Re-organisation of the market will also create the need to introduce new mechanisms including the ability to settle disputes or raise appeals and accident investigation for trans-national applications.

Community Regulatory Framework

The Community competence to develop a regulatory framework for ATM is enshrined in various articles of the Treaty establishing the Community, most notably Article 80(2) concerning the implementation of the Common Transport Policy and possibly Articles 155 and 156 concerning Trans-European Networks. Given the need for the creation of the Single European Sky within a harmonised, common regulatory framework, it is likely that a Regulation will be used as the legal instrument. The rationale for this can be justified by examination of other fields, such as telecommunications and rail, where use of Directives as the legal instrument has not resulted in the development of a uniform, common regulatory framework across the Member States.

Based on this competence and the drivers and constraints to market restructuring, an outline of a Regulation has been produced. The Regulation, which does not consider economic, performance and airspace issues, is structured under several headings:

- **Substantive requirements.** This section determines the basic principles of the Regulation, including some that are horizontal across the three domains being considered under the Single Sky initiative – namely restructuring the ATM market, economic regulation and airspace regulation. The areas covered are:
 - the scope of regulation, highlighting Direct and Ancillary Services
 - the objectives of the Regulation, namely facilitating the creation of the Single European Sky
 - the basic principles: including compliance with the ICAO framework; the precedence of safety above all other issues; the separation of regulation and service provision; the independence of the regulator; transparency in regulatory and service provision processes; the basis of standard licences for authorising services; minimum standards for services covering performance, availability and continuity; and protection of the environment
 - the area of applicability of the Regulation
 - definitions.
- **Requirements for service provision.** This section sets out the requirements for organisation of service provision based on a licensing approach. It contains several articles:
 - specifying the role of the regulator at the appropriate level vis-à-vis the issuance, revocation and monitoring of licences. The need for non-discrimination is highlighted. It also describes the functioning of standard licences for Direct Services

and Ancillary Services based on blocks of airspace and geographic coverage respectively

- identifying two levels of regulator. The first at national level dealing with local or purely national issues and the second at pluri-lateral level dealing with trans-national issues through a single entity mandated by the States concerned
 - illustrative examples of licences for Direct and Ancillary Services are provided (Appendix A)
 - acceptance of licences by the appropriate regulator
 - the establishment of service provider rights and obligations of the service provider, which are enshrined in the licence
 - specification of the liability of the service provider and associated insurance requirements
 - requirements for reporting accidents and incidents.
- **Modalities of service provision.** This section specifies the general patterns of service provision. It contains several articles covering :
- bundling and unbundling of services, facilitated by the regulatory requirement for each individual service to be treated in the same way (licences, performance requirements, accounting processes, cost allocation, etc.) irrespective of whether it is provided individually or as an integral element of an overall service bundle
 - freedom of the appropriate regulator to appoint service providers
 - transparency in the service provision process, particularly relating to safety and performance reporting
 - the requirements to be placed on the accounting systems of service providers
 - the management and financial autonomy of the service provider
 - general public service obligations, augmented by specific requirements placed in the licence.
- **Relations between stakeholders.** This section ensures that the different Stakeholders in ATM work to ensure that the system provides for an integrated and continuous service. It contains several articles covering :
- non-discriminatory access to the services by users
 - the rights of access to and protection of data, together with measure to prevent abuse of dominant position related to unique control of essential data
 - human resource issues, including: standardised training, qualifications and portable licences for ATM staff; and human resource planning for the regulator
 - promotion of social dialogue, in line with Community requirements and best practice
 - relations with military service providers, to be concluded through two-way service level agreements between the licensed service providers and States.
- **Ruling arrangements.** This articles specifies the roles of the various institutions in the regulatory process. Several articles are required covering:

- the rule making process
- implementation of rules and granting of licences
- monitoring and enforcement
- appeals, dispute resolution and the arbitration process.

A Phased Approach

Given the phased approach to restructuring the ATM sector proposed by the High Level Group Report, the Community Regulatory Framework should be established in a series of steps, concentrating on *quick wins* in the short term and more strategic and fundamental restructuring in the longer term.

In addition, due to the complex nature of the legislation needed to support the restructuring, multiple instruments of varying types (e.g. Regulation, Directive, Decision), will be needed.

Therefore a phased approach is proposed, comprising of three principal phases of measures to be implemented over the three time periods:

- from 2001 to 2002
- from 2003 to 2004
- post-2005.

The proposed contents of each of these packages are illustrated in the following figure.

Element of Regulation	Phase 1 2001-2002	Phase 2 2003-2004	Phase 3 2005 onwards
Institutional reform	<ul style="list-style-type: none"> Establish overall framework Separation of regulation and service provision Establish autonomy for service providers Define interface between providers and the military Define standard licences 	<ul style="list-style-type: none"> Promote licensing of service providers Facilitate creation of alliances Develop criteria for certification of providers Develop framework licence Facilitate unbundling of services Implement licencing regime 	<ul style="list-style-type: none"> Ongoing licensing process
Social Aspects	<ul style="list-style-type: none"> Define service provider rights and obligations Preliminary work on common training/qualifications Define common public service obligations 	<ul style="list-style-type: none"> Promote social dialogue Establish common European ATC licence Define dispute resolution and appeals procedures 	
Safety Regulation	<ul style="list-style-type: none"> Establish precedence of safety regulation Safety regulation coordinated through SRC 	<ul style="list-style-type: none"> Safety regulation performed by EASA 	<ul style="list-style-type: none"> Ongoing safety regulatory process
Economic and Performance Regulation	<ul style="list-style-type: none"> Establish economic regulatory framework Define accounting scheme for providers Identify interim economic regulator Establish performance regulatory framework 	<ul style="list-style-type: none"> Implement economic regulation regime Implement performance regulation regime Define data access and protection regime 	<ul style="list-style-type: none"> Ongoing economic and performance regulatory process
Airspace Regulation	<ul style="list-style-type: none"> Establish airspace regulatory framework Establish interim airspace regulator Establish mechanism for civil-military coordination 	<ul style="list-style-type: none"> Implement airspace regulation regime Establish optimum blocks of airspace 	<ul style="list-style-type: none"> Ongoing airspace regulatory process
Consultative Process	<ul style="list-style-type: none"> Establish industry/social consultative body Define consultation process for rulemaking Define mechanism for including stakeholders in the technology development process 	<ul style="list-style-type: none"> Ongoing consultation process 	<ul style="list-style-type: none"> Ongoing consultation process
Transparency	<ul style="list-style-type: none"> Define transparency requirements for services Define transparency requirements for regulation 		
Standards	<ul style="list-style-type: none"> Establish common set of definitions Support to EUROCONTROL and European bodies standardisation work Plan overall European system 	<ul style="list-style-type: none"> Support technology and lifecycle convergence through TENS programme Mandate technical and operational standards and procedures 	<ul style="list-style-type: none"> Ongoing standardisation process

Establish Single Sky

Manage Single Sky

Illustration of the activities to be performed in the Package-based approach to development of the Community Regulatory Framework

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1 INTRODUCTION

1.1 GENERAL

This report has been prepared for the Directorate General of Energy and Transport (DGTREN) of the European Commission (EC) by Booz•Allen & Hamilton Ltd Deutsche Flugsicherung (DFS) GmbH. The work has been performed under Contract n° B2000/B2-7040/SI2.260442 and concerns a study on the organisation of the Air Traffic Management (ATM) market.

This document forms the Final Report of the study.

1.2 BACKGROUND

In every region of the world, aviation plays an essential part in fuelling and supporting economic growth. Air transport effectively acts as a catalyst, promoting business and leisure, while contributing to growth and efficiency. Despite a recent slowing of growth trends air transport remains one of the most prominent sectors in the world economy.

In Europe, these factors, combined with the liberalisation of the air transport industry within the Community⁶ have raised concern on the ability of the ATM sector to meet the projected capacity requirements needed to support increasing traffic demand. Over recent years demand has been growing at between 5% and 7% per annum⁷ and is expected to grow at around 4% per annum on average over the next 15 years⁸. As a consequence of the inability of the system to keep pace with increasing demand, delays are at unacceptable levels. These delays can be attributed to a number of causes, including the weather, airport capacity, airline operations and the air traffic management systems. The fragmented nature of the air traffic management structure (operational and regulatory) in Europe, being based on national provision of services, is a contributory factor to the situation. Despite a series of measures, past and ongoing, to remedy the shortfalls, ATM is still seen as a key contributor to delays.

To date, the situation has been, and continues to be, addressed by the European Civil Aviation Conference (ECAC) through the mechanisms available within the European Organisation for the Safety of Air Navigation (EUROCONTROL). These activities have, principally, focussed on the harmonisation of the diverse systems, processes and procedures used in Europe together with the development of technical and operational solutions to specific problems⁹. Even though these measures have been successful, their return is diminishing and a stage will be reached when their application will bring little additional benefit. In order to meet the requirements of increased demand safely, efficiently and at acceptable cost, large scale structural reform of the ATM sector is required at the European level. Given the current level of delays, inefficiency and associated costs being experienced throughout the air transport sector, the need for this reform is urgent.

Traditionally, national aviation administrations have acted both as providers of air traffic services and regulators of the same. Over recent years, the overall ATM sector has started to

⁶ The European Community: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom.

⁷ "Single European Sky", Report of the High Level Group, European Commission Directorate General for Energy and Transport, November 2000

⁸ See, for example, The Airbus Global Market Forecasts 99, Boeing's Current Market Outlook 1999, IATA Passenger Forecast 1999-2003

⁹ Examples of this type of approach include the Central Flow Management Unit (CFMU), the EUROCONTROL Convergence and Implementation Programme (CIP), reduced vertical separation minima (RVSM), 8.33kHz and the European Air Traffic Management Programme (EATMP)

undergo significant change in relation to its institutional and organisational framework. Increasing autonomy from government provides the air traffic service providers with more freedom from political control and flexibility to define their service provision policies in accordance with commercial and corporate practices.

These changes have raised a question on the commercial nature of services as opposed to their monopolistic origin and on whether there exists a relevant market allowing the expansion of existing businesses and on which the public sphere should exert appropriate control to guarantee the respect of public interests.

The Communication from the European Commission on the creation of the Single European Sky¹⁰ concluded that, irrespective of the legal and economic structure of air navigation service providers, there is need to establish an adequate overall European regulatory framework to ensure that services meet the necessary levels of safety, interoperability and performance, particularly if they remain to be provided on a monopolistic basis. Structural reform and development of the necessary regulatory framework will require high-level political support and the development of the necessary political and legislative control mechanisms.

In view of this, and with the support of the European Council, a High Level Group (HLG) bringing together civilian and military representatives of the Community Member States, together with representatives of Norway and Switzerland was formed. The objectives of this High Level Group were to:

- define the modalities of functioning of the Single European Sky within conditions of efficient delivery of services and in the respect of public service obligations, responsibilities and safety objectives to the benefit of civil and military users
- examine the technical issues, implementation decisions and restructuring measures to be considered at national or European level in order to achieve such a reorganisation of routes, airspace structures and their operational usage
- propose harmonisation of national systems along a coherent Community approach implying central decision making processes and solidarity mechanisms
- indicate how the Community framework can be supported by the use of the EUROCONTROL organisation in the implementation of its conclusions.

Since first convening in January 2000, this group has developed a report on the Single European Sky¹¹ with the objective of undertaking a genuine reform of air traffic management. Primarily, this involves adapting a more coherent organisational role at the Community level, while at the same time complementing growth with more efficient use and organisation of airspace. The principal conclusions of the High Level Group include the following:

- structural changes are necessary and urgent, reinforcing cooperation at service provision level and ensuring separation of service provision and regulatory tasks
- airspace should be managed at European level, acknowledging local specificities
- the European Union offers the only workable mechanism through which the necessary political decisions can be made and the appropriate legislative framework established,

¹⁰ Communication from the Commission to the Parliament and the Council - COM(1999) 614 final of 1.12.1999

¹¹ "Single European Sky" Report of the High Level Group, European Commission Directorate General for Energy and Transport, November 2000

retaining the EUROCONTROL framework for cooperation outside of the EU and for the elaboration of technical measures

- the regulation of air traffic must be fully integrated into European Union activities.

The High Level Group has also established an action plan, based on three timeframes:

- short-term (2001-2002)
- medium-term (2003-2005)
- long-term (2005 and beyond).

In accordance with the conclusions of the European Council of Feira, the European Parliament resolution on the Single European Sky and the conclusions of the High Level Group, the Commission should make appropriate legislative proposals concerning the reform of the ATM sector in the first half of 2001. In doing so it has been determined that the fields of market organisation, economic regulation and airspace management need in-depth investigation, before proposing appropriate legislative measures. To this end, the Commission has launched three parallel studies respectively on market organisation, economic regulation and airspace management and design. These studies are being performed within the overall framework established by the High Level Group and are building on the work performed therein. This report has been developed by the study on ATM Market Organisation.

1.3 OBJECTIVES OF THE STUDY

1.3.1 Objectives

The overall objectives of this study on ATM Market Organisation are:

- to review and understand the characteristics and modalities of the provision of ATM related services, principally in the Community but also accounting for other significant areas of the world
- to define potential opportunities for reorganisation of the sector to address the issues and requirements identified by the High Level Group, learning lessons from the reorganisation of other sectors, and assessing the impact on special or exclusive rights and obligations
- to identify the factors that prevent elements of ATM service provision being organised as a market
- to devise a regulatory framework at European Community level to develop, facilitate and enable the process of reorganisation of the sector.

1.3.2 Scope of services considered

The services considered in the "*ATM Market*" are based on the International Civil Aviation Organisation description of air navigation services, illustrated in Figure 1-1.

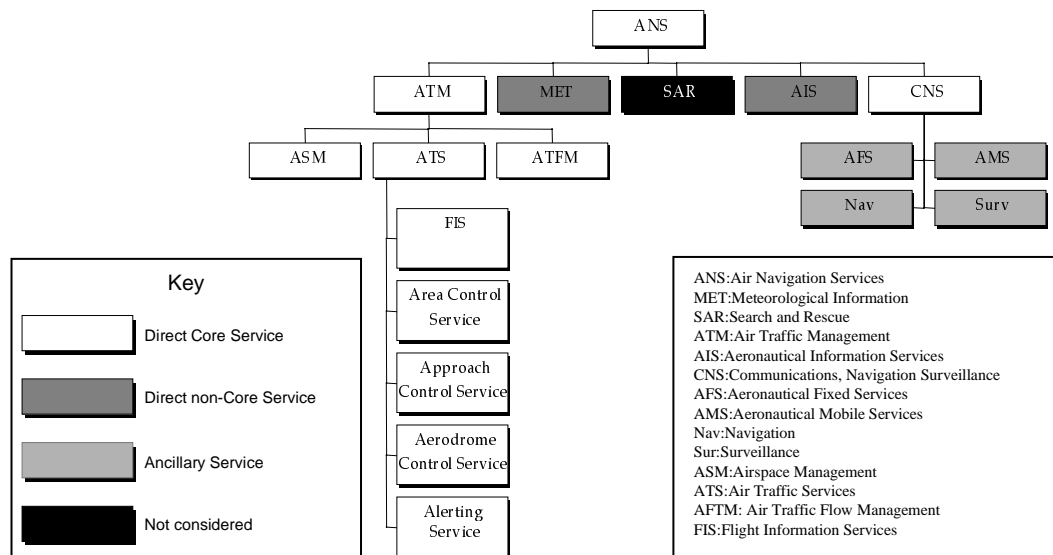


Figure 1.1: Overview of the Air Traffic Management sector

The services considered can be viewed as Direct Core Services, Direct Non-Core Services, and supporting or Ancillary Services, as defined in Table 1-1. It is important to define these services unambiguously. Definitions have been derived based on the assumption that the principal service being provided is that of air traffic control to maintain safety and expedite traffic flow with other essential operations occurring to support this service. The definitions adopted are:

- **Direct Core Services** are those services generally provided by the air traffic manager to an aircraft to organise airspace, prioritise traffic flows and provide tactical control to an aircraft during its flight
- **Direct Non-Core Services** are standalone services that are provided to aircraft (prior and during flight) and also to air traffic service units to provide essential information for planning and tactical purposes influencing but not controlling traffic and individual aircraft
- **Ancillary Services** are services that are provided to enable and facilitate the direct core services.

These are not the conventional definitions but are extremely useful when assessing how the ATM market may be re-organised.

Direct Service		Ancillary Service	
Non-Core	<ul style="list-style-type: none"> • Meteorological information 	<ul style="list-style-type: none"> • Communications <ul style="list-style-type: none"> - Aeronautical fixed services - Aeronautical mobile services 	
	<ul style="list-style-type: none"> • Aeronautical information 	<ul style="list-style-type: none"> • Navigation 	
Core	<ul style="list-style-type: none"> • Airspace management 	<ul style="list-style-type: none"> • Surveillance <ul style="list-style-type: none"> - Surveillance - Surveillance data processing 	
	<ul style="list-style-type: none"> • Air traffic flow management 	<ul style="list-style-type: none"> • Flight data processing¹² 	
	<ul style="list-style-type: none"> • Search and rescue 		
	<ul style="list-style-type: none"> • Flight information services 		
	<ul style="list-style-type: none"> • Air traffic control <ul style="list-style-type: none"> - Area control - Approach control - Aerodrome control 		
	<ul style="list-style-type: none"> • Alerting Service 		

Table 1-1: Definition of services considered

In addition to the direct and indirect ATM services shown in Table 1-1, service providers are typically involved in a number of additional activities, e.g. research and development, consultancy, etc. The majority of these activities are not an integral part of ATM, are not regulated or licensed¹³ and are not considered further. However, training of controllers and engineers is considered an integral part of ATM and is included within the analysis. Training courses and the trainers themselves will require accreditation or licensing in order that the qualifications that they award are recognised and accepted by service providers and regulatory authorities.

1.3.3 Analytical approach

The analytical approach applied to the study is holistic in nature and driven by the overall framework developed by the High Level Group. This approach has the advantage of utilising inputs from the whole ATM sector, while comparing the advantages/disadvantages of methods of structural reform with the conventional methodology of service provision. As it is driven by and consistent with the political conditions created by the High Level Group, it also helps in creating an essential level of buy-in from the main players in the ATM sector. The overall methodology is depicted in Figure 1-2, showing the input taken from the stakeholders but also illustrating the drivers and constraints imposed by the activities and conclusions of the High Level Group.

¹² Flight data processing is not normally considered as an independent function but, because it can be factored out as a self-contained element, it is considered as a self-standing segment of the ancillary services (see for example Section 4.5.2.2 on unbundling of services)

¹³ Note, however, that although the R&D activity itself is not regulated or licensed, its outputs, e.g. systems, equipment or processes, will be subject to a certification process. This certification will require the R&D to be performed in line with accepted standards, e.g. ISO 9000 and RTCA DO-17B

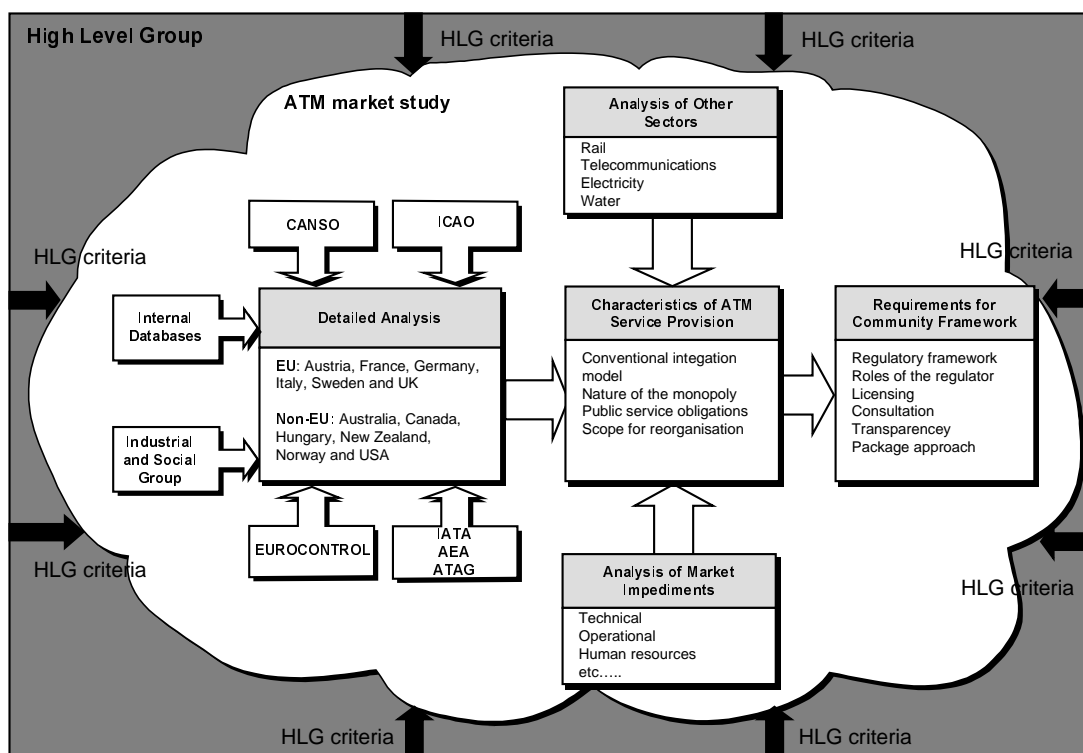


Figure 1-2: Analytical approach

The analysis is based on detailed information collected from a total of 12 States, both within and outside the Community. These are:

- within the Community - Austria, France, Germany, Italy, Sweden and the UK
- outside the Community - Australia, Canada, Hungary, New Zealand, Norway and the United States of America (USA).

The selection of States was used to allow identification of the relevant advantages and disadvantages of both conventional and emerging methods for organisation and thus allow characterisation of the modalities of service provision.

The analysis also utilises data gathered from other stakeholder organisations, mainly through direct contact. Organisations that provided information include:

- the Civil Air Navigation Services Organisation (CANSO)
- EUROCONTROL
- the International Air Transport Association (IATA)
- the Association of European Airlines (AEA)
- the European Transport Workers Federation (ETF)
- the Air Transport Action Group (ATAG)
- ICAO.

1.4 STRUCTURE OF THIS REPORT

The report is structured as follows:

- Section 2 describes the *Conventional Model of Service Provision*, including its legal basis and subsequent evolution into its current form, including trends towards corporatisation, harmonisation and integration activities and the introduction of a focus on performance. The impact of new technology is also considered

- Section 3 describes the characteristics of the so-called ATM market, which at present does not function along conventional market models. The areas considered are the monopoly nature of the service, public service obligations associated with the service, financial sustainability, military and security issues, the special and exclusive rights needed to facilitate provision of the service and impediments to the potential restructuring of the market
- Section 4 highlights mechanisms through which market restructuring could be achieved, including the potential for bundling and unbundling of services, horizontal and vertical integration. The implications of market restructuring are also described
- Section 5 highlights the issues that must be addressed in the regulatory process under several broad headings: Community competence, exercise of regulatory powers, service provision, social provisions, licensing, consultation and transparency
- Section 6 provides an outline of the proposed Community Regulatory Framework, highlighting substantive requirements, requirements for service provision, the modalities of service provision, relations between stakeholders, incentives and ruling arrangements
- Section 7, presents an outline of a package-based approach for the implementation of the Community Regulatory Framework. This is based on three packages to be implemented over the time-frames 2001 to 2002, 2003 to 2004 and post-2004 as proposed in the High Level Group Report
- Finally, Appendix A gives illustrative examples of licences for Direct Services and Ancillary Services.

2 CONVENTIONAL INTEGRATION MODEL OF SERVICE PROVISION

2.1 INTRODUCTION

Originally, ATM services were provided by National Aviation Administrations (NAAs), often integrating the civil and military elements of the activity within one organisation¹⁴. More recently the military and civil parts of the NAAs have been separated, with the civil aspects coming under the responsibility of a Civil Aviation Administration (CAA), either as an integral part of or reporting to a government department.

The CAA typically operates on an annual budget allocated by the government, with all revenue generated through user charges channelled back into the administrations or central Treasury. Under this '*Conventional Integration*' model for ATM service provision, the CAAs have been responsible for providing services in accordance to:

- international obligations
- State specific requirements, including defence
- the types of air traffic involved
- the density of the air traffic
- the meteorological conditions
- other such factors that may be relevant for the airspace concerned.

This section elaborates on the *Conventional Integration Model* of service provision, explaining the background against which it has developed and how it is currently evolving.

2.2 LEGAL BACKGROUND

All European States are signatories to and have ratified the majority of International Conventions and Protocols relating to civil aviation and air transport, including the 1944 Chicago Convention. Under the Chicago Convention, States agree to adopt certain principles and arrangements for the development of international civil aviation. The emphasis of the Convention is to create a framework to facilitate the development of international air transport services and to provide a regulatory regime to secure their safe operation.

The Convention establishes the responsibilities and obligations of signatory States to provide, *inter alia*, for the free movement of international air transport services, the creation of a regulatory system to secure safe operation thereof, and the formulation of regulations as uniform as possible with those established under the Convention (Article 37). The detailed provisions are contained in the eighteen Annexes to the Convention, which establish Standards (recognised as necessary) and Recommended Practices (recognised as desirable) (SARPS).

The Convention recognises the **complete and exclusive sovereignty** of every State over the airspace above its territory and the right of aircraft to overfly the territory of other States and, subject to conditions, to land and take-off. ICAO has no powers to enforce compliance with its standards and recommended practices.

Articles of the Convention with particular relevance when considering the potential of a market for ATM services include:

¹⁴ In some States, the NAA actually fell under the control of the Ministry of Defence

- Articles 11 and 15 which require non-discrimination in the application of regulations, use of facilities and imposition of charges. Article 15 also prohibits the imposition of charges for transit of airspace, i.e. access to the airspace itself
- Article 12 through which each Contracting State undertakes to adopt measures to ensure that every aircraft operating within its territory and every aircraft carrying its nationality mark shall comply with rules and regulations in force in that State. Furthermore, each State undertakes to keep its own regulations uniform, to the greatest extent possible with those established from time to time under the Convention
- Article 28, whereby each State undertakes to provide in its territory airports, radio services, meteorology services and air navigation facilities, to facilitate international air navigation, in accordance with the standards and practices recommended or established from time to time pursuant to the Convention.

From the Chicago Convention, the Annexes and the associated Conventions and Protocols, there flow the basic requirements for any State's legislative and regulatory framework.

The State's **Constitution** is at the highest level, below which there will be a framework **Air Law (or Laws)**. At the third level, there are the **Decrees, Orders and Executive Regulations**, usually promulgated by the President, Council of Ministers or the Minister, and finally, at the base are the **Administrative Rules, Orders and Procedures** issued by the Minister or the Regulatory Authority (CAA). The Regulatory Authority created by a State is responsible for implementing and enforcing the requirements of the first three tiers of legislation by means of the fourth tier.

There are several key points to note arising from the Convention and its application in individual State law:

- the legal responsibility to provide air navigation services cannot be delegated by the State, although the operation or provision of the service can be delegated¹⁵
- the only authority capable of delegating operation or provision of the service in its territory is the State having sovereignty of the airspace in which the operation is delegated and such delegation does not imply derogation of sovereignty¹⁶
- joint operating agencies can be established to, *inter alia*, provide air navigation services within a defined area on behalf of two or more sovereign States¹⁷
- the necessary legislation, although following a standard pattern, can be implemented in different ways and at different levels from State-to-State. Therefore the legislative effort required to implement new frameworks will vary from State-to-State, in many cases requiring changes to law¹⁸ unless the changes can be implemented on the basis of Community legislation.

¹⁵ It may be possible for the sovereign responsibility of individual Member States for air navigation services to be pooled at Community level. A degree of precedence for this has been set by the Montreal Convention of 1999, which allows for ratification by Regional Economic Integration Organisation. In this case, the European Community has assumed some of the responsibilities of the Member States

¹⁶ "Air traffic services", Annex 11 to the Convention on International Civil Aviation

¹⁷ Examples of this include the EUROCONTROL Upper Area Control Centre at Maastricht, the Agence pour la sécurité de la navigation aérienne en Afrique et à Madagascar (ASECNA) and Corporacion centroamericana de servicios de navegación aérea (COCESNA)

¹⁸ In the specific case of Germany a constitutional amendment might be needed

2.3 THE TRADITIONAL APPROACH TO SERVICE PROVISION

Figure 2-1 illustrates the generic organisational structure associated with the *Conventional Integration Model*.

Not only is the provision of services integrated throughout the supply chain, the ownership, control, operation and management of the infrastructure is also integrated within the CAA. The organisational structure is monolithic in the sense that the CAA is self-regulating, i.e. it determines its own safety requirements and compliance against those requirements, pricing structure, etc., relating to provision of services. Furthermore, the CAA is responsible for other regulatory functions, such as:

- personnel licensing
- air transport licensing
- airworthiness
- flight operations
- international/bilateral air transport agreements, etc.

The actual implementation, or service bundle, varies on a national basis. For example, services such as MET and SAR are often provided by other government departments or agencies, but the general concept of service provision as a national monopoly service is usually applied.

Historically, Air Traffic Flow Management (ATFM) was organised by each State in a very laborious coordination process. Today, some of this process has been delegated to the EUROCONTROL Central Flow Management Unit (CFMU), but each State retains a local ATFM service.

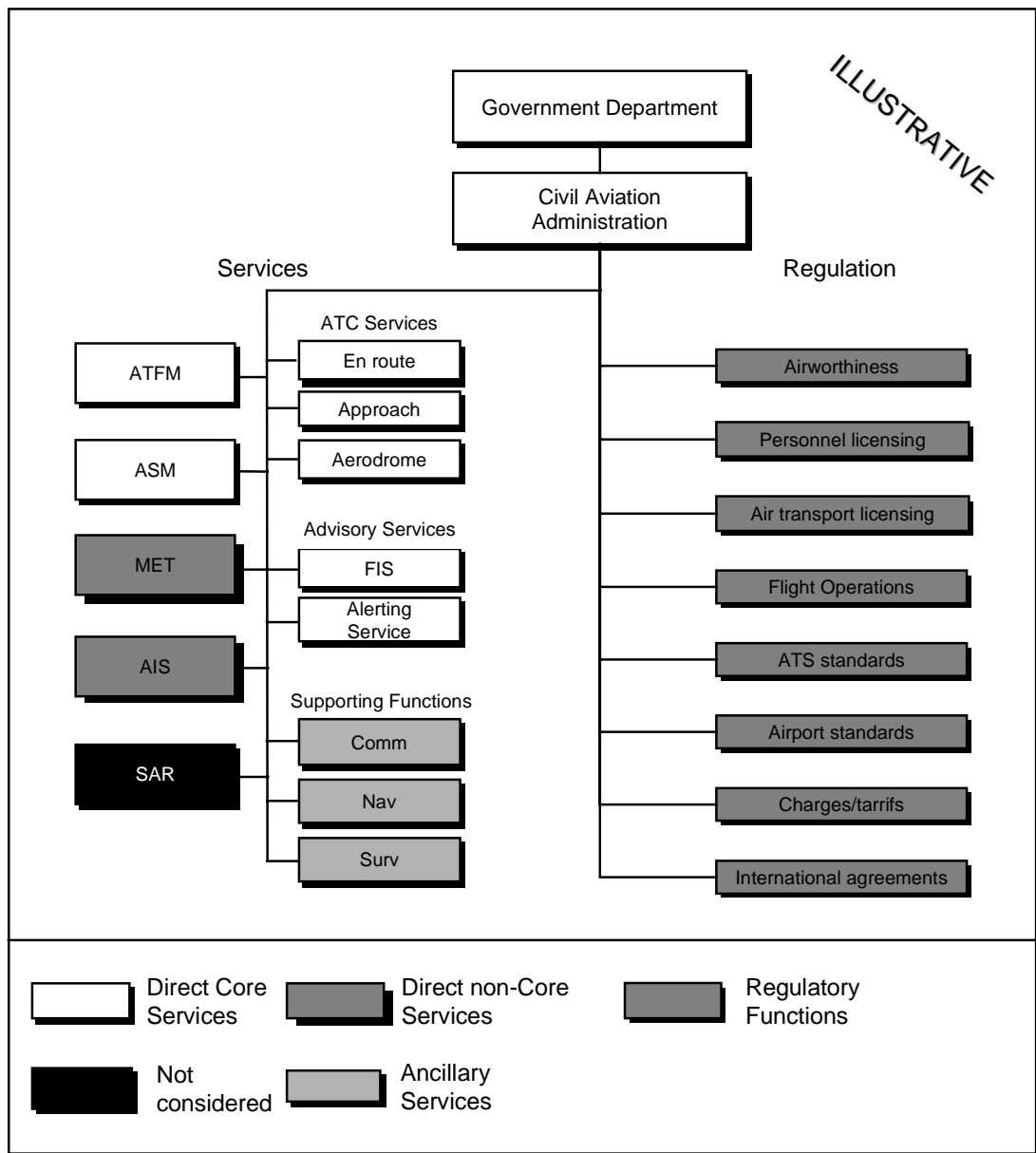


Figure 2-1: Generic organisational structure for the Conventional Integration Model

In the *Conventional Integration Model*, services are provided on a national sky basis in contradiction to the concept of a Single European Sky. The relative disadvantages of the *Conventional Integration Model* in the context of the Single European Sky can be summarised as follows:

- **Fragmentation:** European airspace is fragmented, with a large number of boundaries, corresponding to national boundaries. The High Level Group report has identified this fragmentation as "*a patchwork of national systems*". This leads to a large number of unnecessary interfaces, inefficiency, excessive coordination costs and reductions in the available capacity
- **Duplication and proliferation:** due to the national nature of the *Conventional Integration Model*, there is a degree of duplication of infrastructure, including air traffic control centres, radar, communications and navigation systems. Not only does this proliferation of infrastructure imply higher than necessary investment, operating and maintenance costs, it can have a negative impact on the operational environment, through, for example, frequency congestion

- **Inherent inefficiency:** the *Conventional Integration Model* means that procedures change across interfaces between ATM Service Providers, e.g. separation standards. This leads to inherent inefficiency in the system and means that optimum use cannot be made of the available volume of airspace
- **Incoherent regulatory environment:** national variations on standards and the method used for their implementation means that the European environment is not uniform. This creates barriers to entry into national markets for suppliers, means that equipment and systems need to be bespoke rather than allowing mass production, and can impose higher than necessary costs on users as they need to comply with a number of slightly different standards throughout the region.

There are a number of additional advantages and disadvantages of the *Conventional Integration Model* as summarised in the following table.

Advantages	Disadvantages
All procedures and operations are administered under the same operating regime, facilitating consistency in service application throughout a specific portion of airspace	National requirements, processes and systems often limit the mobility of highly skilled and specialist staff across the Community without significant and prohibitive re-training
The ability of the ATM network to meet national security and national/regional defence requirements remains under the direct control of the State	Capital investments for long term planning and infrastructure upgrades are limited by restrictions associated with public sector borrowing
All staff are trained and supervised to the same specifications facilitating mobility of skilled staff within the State, constrained by local specificities	Integration of ownership, control and management of all of assets and activities, including non-core activities, can lead to high internal costs and inefficiency
Operations occur under a common safety management regime and are able to focus on the specific safety requirements of the services	There is often no formal safety regime in place
The national organisation of service provision means that there is a natural degree of contingency in the overall system	The lack of separation between regulation and service provision can lead to and conflicts of interest, especially in the areas of safety and charging
The State is responsible for the safety of the system and bears the associated liability	The re-use of skills and investment for expansion into other markets is not encouraged
Complex interfaces are managed by one body allowing infrastructure to be designed effectively for the State, thereby controlling costs and user charges	There is significant variation of systems, procedures, processes and application of standards across national boundaries
	Competition for suppliers of equipment and services is possible but is often constrained by national interests
	There can be a tendency towards favouritism for national suppliers and users with implied discrimination against non-nationals
	Civil Service pay rules where they remain applicable can be a disadvantage in the recruitment and remuneration of a highly specialised and skilled staff
	The cost plus charging regime does not encourage cost saving and cross subsidisation can easily occur
	There is no overall performance regime and little incentive to improve service levels
	Technological advances are restricted by the slow international standardisation process and the public sector investment process
	There is no coherent approach to education and training limiting the mobility of staff and requiring duplication of resources

Table 2-1: Illustration of some of the advantages and disadvantages of the Conventional Integration Model

However, it is important to note that the majority of the advantages of the *Conventional Integration Model* are derived from the provision of services/administration being performed on a national level – this comment applies particularly to those advantages associated with defence, national security, safety and liability.

2.4 THE EVOLUTION OF THE SERVICE PROVISION PROCESS

2.4.1 Introduction

In order to overcome some of the disadvantages of the *Conventional Integration Model*, a number of improvements to the overall process have been implemented at European and national levels. Some of these developments are described below.

2.4.2 Creation of autonomous service providers

The International Civil Aviation Organisation (ICAO) has long been a proponent of the concept of commercialised air navigation service providers, or autonomous authorities¹⁹. Over the last decade or so, there has been a growing trend towards creation of autonomous service providers through the commercialisation of ATM service providers. This commercialisation has generally been achieved through the creation of corporatised bodies operating outside of the government Civil Service constraints with certain commercial freedoms to act in the provision of services, defined through a licence that the service provider is granted by the specific government concerned or through national legislation.

This commercialisation is acknowledged as enabling enhanced flexibility in meeting the evolving demands for air navigation services by:

- meeting the need to provide customer-focused services and be responsive to the changing needs of an increasingly wide customer base
- enabling implementation of best and flexible working practices, in agreement with staff and Unions, together with improved human resource management techniques, thereby increasing staff motivation and enabling flexible reward packages outside of Civil Service rules
- providing freedom to manage capital investment programmes, outside of public sector borrowing regulations and restrictions; to support commercially justified projects, to meet the ever-growing demand for services and the introduction of new technologies
- ultimately giving freedom to expand into new markets, for example, the export of air traffic services or the provision of related services in other sectors.

However, restructuring the service provider as an autonomous authority (be it commercialised or not) requires that a number of criteria are met:

- changes in State legislation are needed, requiring firm commitment from the government concerned
- regulation must be separated from service provision to avoid conflict of interest and to ensure the necessary transparency of the overall process
- formal consultation arrangements are needed to ensure that the customers' needs are understood and that both sides understand the strengths and problems of the service provision
- transparency of the corporatised body must be maximised through, for example, external, independent audit, publication of detailed accounts and annual reports.

There are various methods to commercialise ATM services. These include the creation of a:

¹⁹ "Corporatisation of Air Navigation Services", Foreword, Vladimir Zubkov Chief Regional Affairs Office, and Gunnar Finnsson, Chief, Airport & Route Facility Management Section, CANSO, August 1999

- government agency
- government owned, contractor operated entity
- national corporation (e.g. DFS, Airways Corporation New Zealand)
- public-private partnership (proposed for NATS)
- non-share capital, not-for-profit corporation (e.g. Nav Canada).

There is no single acknowledged best option for the service provider²⁰ and different models have been implemented with equivalent degrees of success throughout the world. To date, no ATM service provider has been fully privatised, principally because of the public service nature of air traffic control, although UK National Air Traffic Services (NATS) will be operated as a public private partnership (PPP) from mid-2001.

In Europe, corporatisation has occurred for the majority of service providers. All of the corporatised service providers remain under complete State ownership, except in the UK where NATS is structured as a PPP with 46% of shares being owned by a private sector partner.

There are three main approaches to the regulation of ATM services provided by corporatised entities:

- self-regulation by the service provider, through its governance structure, e.g. through a supervisory board
- external regulation by a specialist agency
- external regulation by a government department or aviation administration.

In Europe, there is only one case of independent service provision and regulation covering the entire range of regulatory functions – the UK. A number of other States have separated service provision and regulation concerning airworthiness, licensing, etc. but rely on self-regulation for ATM (e.g. Germany, the Netherlands, Belgium, etc.). Other States have implemented a regime where the service provider is self-regulating with respect to ATM and also has regulatory responsibilities concerning airworthiness, licensing, etc. (e.g. Austria, Ireland).

The overall situation in the European Economic Area is summarised in Table 2-2.

²⁰ Report on introduction and agenda items 1-6. Conference on the economics of airports and air navigation services. ANSConf-WP115, Montreal, 19-28 June 2000

State	Service Provider	Regulatory environment (excluding safety regulation)	Governance	Autonomous	Ownership
Austria	Austro Control	No separation from regulation. Separated from aviation administration	Corporatised. Established as GmbH	✓	100% State owned
Belgium	Belgocontrol	Separated from aviation administration	Corporatised as a public business entity	✓	100% State owned
Denmark	Flyvesikringstjenesten	Separated from Luftfartsvaesen (SLV) on 1 January 2001	Corporatised	✓	100% State owned
Finland	Ilmailulaitos (Finnish CAA)	Service provision and regulation are integrated within the CAA	State Enterprise	Partial	100% State owned
France	Direction de la Navigation Aérienne (DNA)	Department within the Directorate General de la Aviation Civile (DGAC). No separation from regulation	Government Department	✗	100% State owned
Germany	Deutsche Flugsicherung	Separated from Ministry of Transport and Airworthiness Authority. Self-regulating for ATM	Corporatised. Established as a GmbH	✓	100% State owned
Greece	Hellenic Civil Aviation Authority	No separation from regulation	State Agency	✗	100% State owned
Ireland	Irish Aviation Authority (IAA)	No separation from regulation	State Company	✓	100% State owned
Italy	Ente Nazionale di Assistenza al Volo (ENAV)	Separate from aviation administration. Self-regulating for ATM	Public Agency (corporatisation in progress)	✗	100% State owned
Luxembourg					
Netherlands	Luchtverkeerleiding (LVNL)	Separated from aviation administration. Self-regulating for ATM	Corporatised public entity	✓	100% State owned
Norway	Norwegian Airport and Air Traffic Management	No separation from regulation	State enterprise	✓	100% State owned
Portugal	Navagacao Aerea de Portugal (NAV-EP)	Separated from aviation administration	Corporatised public entity	✓	100% State owned
Spain	Aeropuertos Espanol y Navegacion Aerea (AENA)	Separated from Directorate General of Civil Aviation. Self-regulating for ATM	Corporatised public entity	✓	100% State owned
Sweden	Luftfartsverket	No separation from regulation	State Enterprise		100% State owned
Switzerland	Skyguide	Separated from Ministry of Transport and Airworthiness Authority. Self-regulating for ATM	Corporatised	✓	99.85% State owned
UK	National Air Traffic Services (NATS)	Complete separation from regulator	Public Private Partnership (PPP)	✓	49% State 45% private 5% employee ownership

Table 2-2: Summary of EEA ATM service provision

2.4.3 Harmonisation and integration

To overcome the problems associated with air traffic in Europe, principally unacceptable levels of delays, during the late 1980s, the European Air Traffic Control Harmonisation and Integration Programme (EATCHIP) was initiated by the European Civil Aviation Conference (ECAC) and implemented by EUROCONTROL. In parallel, the Airports and Air Traffic Services Interface (APATSI) Programme was also initiated.

Since then the two programmes have been combined into the seamless gate-to-gate concept and are being further developed with the ATM2000+ Strategy and the European Air Traffic Management Programme (EATMP) by EUROCONTROL.

The gains made during the 1990s by EATCHIP and associated activities were significant. For example, the Central Flow Management Unit (CFMU) has made a major contribution to the optimum use of the available capacity and the management of delays. The Convergence and Implementation Programme (CIP) has resulted, to a large degree, in the harmonisation and interoperability of systems, technology and procedures with capabilities matching the requirements imposed by traffic demand. Overall, the benefit of these activities is exemplified by the provision of additional capacity needed to meet the increasing demand witnessed throughout the 1990s.

Acknowledging the increase in delays observed in the late 1990s, the Transport Ministers of 29 European States initiated stronger action at the Ministerial MATSE 6 meeting held in January 2000. In particular, they:

- launched a comprehensive gate-to-gate ATM strategy for the year 2000+ to cater for the forecast increase in demand up to the year 2015 and beyond
- asked EUROCONTROL to put in place, as a matter of urgency, a short-term action plan to implement the strategy
- agreed to develop enhanced regulatory functions for EUROCONTROL
- invited EUROCONTROL, in cooperation with the European Community, to establish a proper mechanism to reinforce the implementation by all the parties involved of the collective decisions taken through the organisation.

The strategic priorities inherent in the ATM 2000+ strategy are to improve capacity, accelerate integration and realise a seamless gate-to-gate, uniform European ATM system. The strategy is being implemented in three steps:

- step 1 (up to 2005): Capacity improvement
- step 2 (2005 to 2010): Acceleration of integration
- step 3 (2010 to 2015 and beyond): Realisation of the full gate-to-gate concept.

The specific activities being undertaken are described in detail in EUROCONTROL programme plans²¹.

2.4.4 Focus on performance

The provision of and planning for future ATM services is becoming more performance driven.

In Europe, implementation of the ATM2000+ Strategy is based on a top-down, performance driven European Convergence and Implementation Plan²² (ECIP). Targets will be derived through an iterative strategy review and update process that results in the definition of operational improvements to satisfy ATM performance requirements and meet the needs of airspace users. These operational improvements drive the ECIP implementation objectives, which will flow down into local CIP documents to define the actions to be taken at the State level.

The United States (US) has recently announced it intends to translate the service provision parts of the FAA to a performance-based organisation (PBO) in the near future. An example of such a PBO is illustrated in Figure 2-2.

²¹ See for example the European Convergence and Implementation Plan (ECIP)

²² "European Convergence and Implementation Plan – Level I", EUROCONTROL, EATMP Programme Index PPM.M.ECIP-PLN.01, October 2000

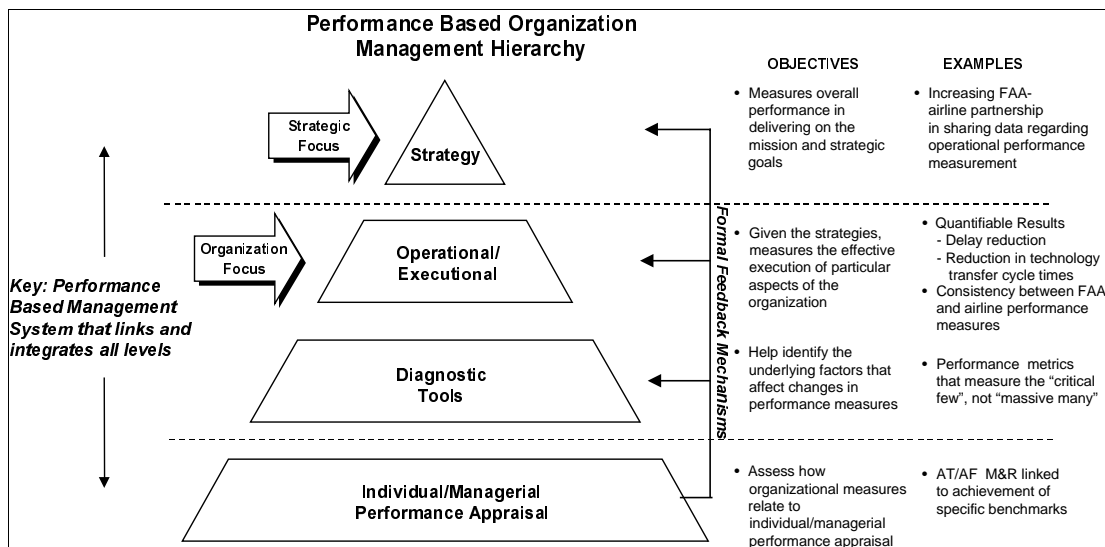


Figure 2-2: Example of a Performance Based Organisation

The successful implementation of a performance-based system has a number of pre-requisites:

- a set of widely accepted, well-understood and measurable performance indicators
- a reliable and transparent performance monitoring system
- a regime to penalise poor performance and reward good performance.

ATM performance in Europe is being addressed through the EUROCONTROL Performance Review Commission (PRC). However, the PRC is restricted to a passive monitoring role and relies on data provided by the EUROCONTROL Member States. There is no enforcement or regulatory mechanism in place:

- to avoid conflict of interest within the PRC
- because the main added-value of the PRC is as an objective observer.

A performance-based approach implies the use of incentives to stimulate the improvement of performance. However, it is vital that incentives, particularly financial incentives, do not jeopardise or inhibit improvements in safety.

2.5 THE IMPACT OF NEW TECHNOLOGY

2.5.1 The ATC process

The general drivers behind technological research and development are:

- user demands, capacity increase, future operational requirements
- reducing controller workload through automation and assistance tools
- giving the pilot an enhanced role in air traffic management
- increasing safety through both ground-based and airborne safety nets.

In the short term, technological advances are aimed at providing assistance to the actors in the current process, which itself remains essentially unchanged.

However, long-term advances are likely to support a revolution in the process itself and may result in the re-distribution of current responsibilities, e.g. assurance of separation may become an airborne function rather than a ground-based function as at present. It is expected that the overall result will be a reduction in the need for active ATC, which will become

more focused on strategic management and monitoring of airspace rather than tactical, executive control. There are several potential impacts to this:

- the responsibilities, tasks and liabilities of controllers and pilots will be changed
- sectors, especially but not exclusively in upper airspace, may become significantly larger and traverse national boundaries
- the aircraft operators will play a much larger role in ATM and will, therefore, expect to see significant reductions in user charges.

2.5.2 Impacts of advances in enabling technologies

There are numerous advances in concepts relating to CNS/ATM technology that require a regional approach to system operation. Examples of these include:

- satellite technology for navigation, such as the European Geostationary Navigation Overlay Service (EGNOS) and Galileo
- automatic dependent surveillance (ADS)
- regional communication networks, such as the European Aeronautical Network (EAN)
- the European Flight Data Processing System (eFDPS).

The approach to the development of trans-national systems has generally been through the formation of a consortium of service providers, sometimes with participation by industry, to develop and implement the technology with the ultimate aim of providing the regional service.

There are a number of mechanisms that are being utilised for organising the relationships between the participants in such activities, particularly with regard to intellectual property, patents and subsequent exploitation of the developments:

- loose alliances, facilitated for example by memoranda of understanding
- joint ventures, involving the creation of new companies with specific purpose
- the European Economic Interest Group (EEIG) mechanism.

The introduction of trans-national technologies also introduces additional requirements and concerns:

- the need to define interconnection agreements for exchange of data with systems in Member States, neighbouring States and regions, together with the arrangements for access to these data
- the need to establish a regulatory environment by which to govern the behaviour of the operator of the system in terms of the charges imposed for a monopoly or quasi-monopoly service and to prevent the abuse of the dominant market position
- rules to facilitate the entry of this type of service provider into the market, especially with regards to ATM Service Providers that are not involved in the cooperation
- the need to define service level agreements, defining output levels, performance monitoring methods, penalties for under-performance and liability chains
- the need to ensure access to the market by potential users of the systems, including those that are not involved in the cooperation

- the need to define appropriate safety regulatory and certification processes to account for the international and distributed nature of the systems.

2.5.3 Enabling mechanisms for trans-border service provision

In order to maximise the benefits of investment in technological development, there will be a need to enable the consolidation of airspace to allow airspace to be treated and managed as a continuum. Continuation of service provision based on the (national) *Conventional Integration Model* is likely to severely inhibit the benefits of new technology. Three levels of cooperation are needed:

1. at the State legislative level to facilitate delegation of the provision of services in sovereign airspace
2. to organise the attribution of responsibility for provision of services in an airspace block to a joint service provider
3. at the service provision level, to consolidate services, infrastructure, etc., in order to provide a joint service in the merged volume of airspace.

Article 28 of the Chicago Convention allows for the establishment of multi-national facilities. This is further elaborated in the Air Navigation Plan for the European Region. Any legislation enabling the consolidation of the provision of service in a given volume of airspace should be suitable for application not only in the Member States of the Union, but also other Member States of EUROCONTROL and ECAC. For example for regional applications such as the Nordic Centre and CEATS, there is a requirement that any legislative framework not only cover Member States in the Community (e.g. Austria and Italy) but also be adopted by non Member States such as Norway and Hungary. EUROCONTROL currently plays a co-ordinating role in this process.

The EUROCONTROL draft '*Umbrella Agreement*', which describes the delegation of ATM by using existing legal and financial mechanisms, might be used in a Community framework to organise the provision of services. However, experience with Maastricht and CEATS have indicated a number of shortcomings with multilateral agreements, including for example:

- the need for unanimity amongst the parties introduces delays into the decision process
- the requirement to distribute facilities, investment and costs across all of the parties introduces inefficiencies into the process and might result in non-optimum operational solutions
- there can be a conflict of interest between the corporatised service provider and the national administration, e.g. creation of a trans-national facility could reduce the revenue for the national service providers.

An alternative, more efficient approach, could be Community delegation of responsibility for service provision in blocks of international airspace to joint service providers. This would imply a pooling of sovereignty in order to maintain compliance with the Chicago Convention (see Section 5.6.5 for a description on Community competence to fulfil this role).

2.5.4 Consequences of technological advances for the *Conventional Integration Model*

Technological advances are driving changes to the *Conventional Integration Model* of service provision:

- irrespective of any efficiency benefits, cross-border integration is being encouraged by new technologies

- service providers are forming alliances and joint ventures in order to develop and operate new technology.

Within the current structural environment, there are impediments to these changes, which are being organised on an ad-hoc, case-by-case basis.

2.6 CONCLUSIONS

This section has reviewed the origins and evolution of the *Conventional Integration Model* of ATM service provision. This model originated from a combination of the implementation of the rights and obligations enshrined in the Chicago Convention and its Annexes into national law and the combination of regulatory and service provision functions in a National Aviation Administration. Originally many of these National Aviation Administrations (NAAs) were integrated military/civil bodies, operating within government or as government agencies under Civil Service rules.

Subsequently, most NAAs have evolved into Civil Aviation Authorities (CAAs). In some cases regulatory and service provision functions have been, at least partially, separated organisationally through the creation of different bodies charged with regulatory type functions and ATM service provision respectively. Many of the ATM service providers are self-regulating through their governance structures. There is only one example in Europe of a complete separation of service provider and regulator. In parallel, a significant number of ATM service providers have been established as autonomous entities, with management and financial control devolved from government. However, no one model for the structure of the service provider is acknowledged as the best approach.

The significant structural and organisational changes that have been undertaken by ATM service providers have resulted in, for example, better customer focus, more flexible employment conditions and reward schemes outside of Civil Service rules, revisions to staffing and rostering schemes, potential access to capital for investment programmes, etc. These restructuring programmes have required support from government and, also, buy-in from the employees.

However, the continued national basis of ATM service provision and regulation results in a fragmented system and duplication of systems and infrastructure. The proliferation of interfaces at service boundaries and incoherent regulatory regimes result in inefficiency in the overall system and provide a significant impediment to the realisation of a Single European Sky.

In response to growing delays, a series of harmonisation and integration packages have been undertaken in the European Civil Aviation Conference (ECAC) area, principally managed by EUROCONTROL. These packages have resulted in significant capacity gains over the past ten years and have supported very high traffic growth.

However, although these improvements have brought large benefits over the years they are now probably reaching the limit of their applicability. A more fundamental approach is now required and the High Level Group Report has concluded that:

... without structural changes.....the improvements that could be made to the current system, in place for the last 40 years, would only be palliative.

Furthermore, technological advances are driving changes in the mechanisms used for the provision of services, both at the level of ATC services and supporting functions or ancillary services.

3 MARKET CHARACTERISTICS

3.1 INTRODUCTION

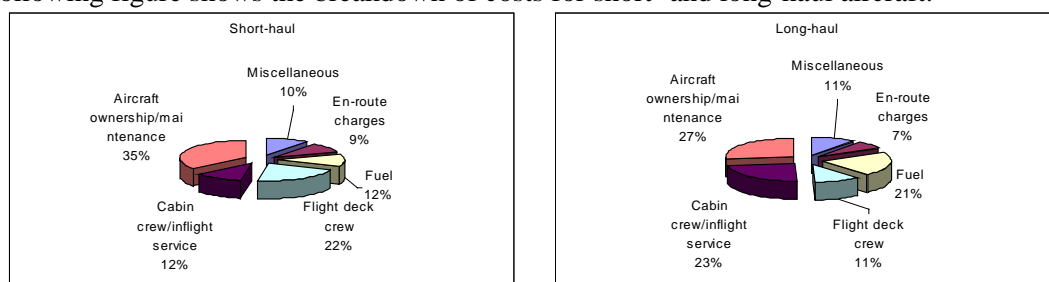
This section describes the characteristics of the market in which ATM services are provided. It should be stressed that this "market" does not follow conventional market rules, is not fully-functioning and has many unique features. The areas that are reviewed below are:

- the monopoly nature of ATM service provision, described in Section 3.2
- public service obligations associated with ATM service provision, outlined in Section 3.3
- the financial sustainability of ATM services, introduced in Section 3.4
- military and security issues, in Section 3.5
- the special or exclusive rights needed to enable ATM service provision, described in Section 3.7
- impediments or barriers to restructuring the mechanisms of ATM service provision, presented in Section 3.8.

3.2 THE NATURE OF THE MONOPOLY

The monopoly characteristic for ATM Services is determined by the fact that only one entity can provide an air traffic control service at the point of delivery (i.e. to the user). There is currently no scope for a multiplicity of providers offering services and the user being able to select a provider, for example on a per-airway basis. This would require significant co-ordination between the service providers and users, thereby impacting on the stringent safety requirements of the service. It would also impact negatively on the efficiency of the ATM services provided. The potential added burden of co-ordination between providers would increase the cost of service provision, compared to that which could be provided by a single entity operating in a regulated monopoly market. In conclusion, the monopolistic nature of ATM Service in a given airspace is justified on both safety and economic grounds, at least in the short- to medium-term. The ATM Service can, therefore, be viewed as a **natural** monopoly.

Furthermore, it must be recognised that the end-customer, i.e. the aircraft operator, has limited choice concerning the service provider. For a given city-pair, the route is very constrained and is governed by the shortest great circle distance and weather conditions. The following figure shows the breakdown of costs for short- and long-haul aircraft.



Source: Association of European Airlines, International Air Transport Association, Booz•Allen & Hamilton

Figure 3-1: Breakdown of costs associated with aircraft operations

The figure shows that compared with fuel costs, en-route charges form a relatively low proportion of the cost of operating an aircraft over short haul flights. This implies that short flight paths are significantly more important than ATC charges, at least for short haul flights. The aircraft operator is, to a certain extent, a captive customer of the service providers that are along the great circle route between city-pairs.

Therefore, based on the current market model, there is no room for competition for air traffic control services **in** the market. However, there is a possibility for introducing competition **for** the market, based on a franchising or concessioning process. This could be augmented through the unbundling of ATM Services by allowing different providers for Area Control, Approach Control and Aerodrome Control services. Furthermore, unbundling of Ancillary Services, such as communications, navigation and surveillance, may facilitate further competition by segmenting the market – there may be scope for competition in the market for these Ancillary Services.

In the long-term future, technological advances and radical market restructuring may mean:

- that competition could be introduced in the market through, for example, multiple providers in a single volume of airspace, alternative providers being in competition on a route-by-route or time sharing basis, etc.
- that the nature of the market will change as more responsibility for separation assurance is assumed by the aircraft operator.

3.3 PUBLIC SERVICE OBLIGATIONS

3.3.1 General

Air traffic management is essentially a public interest function. It has the maintenance and improvement of safety as its principal objective. Efficiency and fairness are additional drivers. ATM also has great public interest from the economic perspective. As previously stated, commercial air transport not only supports economic development but is in many cases a driver for such development. ATM is, of course, a key enabler and facilitator of commercial air transport and is, therefore, a cornerstone of economic policy. Given its public service nature and associated socio-economic benefits, it is essential that the public sector maintains very strong control over ATM and ensure that the appropriate services are provided in the optimum manner.

Apart from commercial air transport, there are other users of ATM to cater for:

- State flights
- military traffic
- other users including general aviation and aerial work.

Provision of services to these users are necessary to ensure that the obligations of the State are met and that the safety within its sovereign airspace is maintained. The ability to provide effective co-ordination between all users across any given airspace is a prerequisite of the ATM service. The most demanding of these State obligations is related to military traffic. Civil-military co-ordination requires a level of interaction between two service providers for two different users – this is discussed further in Section 3.5.

3.3.2 Remote regions

In addition, States have a public service obligation to ensure remote areas are served with an appropriate level of service despite the fact that levels of traffic might not support the services on purely economic grounds. Such services are required to fulfil important social functions. This is based on the requirement to service the needs of local populations, where other transportation systems (such as rail and road) are not viable. Such requirements, although they exist, are not generally as prevalent in Europe as in other regions of the world. This is because Europe is typically covered by a dense distribution of air routes and supporting infrastructure, based on the needs of the commercial user. There are, however, specific regions, such as the northern parts of Sweden and Norway, which require State subsidised operations to serve remote populations.

3.3.3 General aviation and aerial work

Elements of the ATM service are also routinely provided to general aviation and aerial work traffic operating outside of controlled airspace under visual flight rules (VFR). Typical elements of the service utilised by these users comprise:

- navigation, e.g. non-directional beacons (NDB), very high frequency (VHF) omni-directional range (VOR) etc.
- communications facilities situated at air traffic service units (ATSUs) and local units
- flight information service (FIS)
- air traffic advisory services, including radar advisory and information services.

Although in many cases use of these services is not compulsory, they contribute considerably to the level of safety achieved. These services are generally provided free of direct charge. However, the method of funding the services varies from State-to-State and is often not transparent. For example, in some cases the facilities used by general aviation are funded solely by user charges collected from commercial air transport – this implies a cross-subsidy from one section of the user base to another. In other cases, facilities used by general aviation are funded from general taxation.

There is, therefore, a need for a uniform and transparent regime for funding facilities and services used by general aviation. This objective is further complicated by the fact that the use of some facilities is shared between commercial and general aviation, without any data being available to quantify the respective levels of utilisation of each user group.

3.3.4 Environment

In addition, the ATM providers may be required to comply with other important public service obligations. One such example concerns the environment where efficiency should be maximised:

- to minimise the negative impact of aircraft noise
- to minimise the impact of aircraft emissions, through provision of efficient flight profiles, reduction in delays, etc.

3.3.5 Trans-European Networks

ATM and airports are an integral part of the Trans-European Transport Network (TEN-T)²³. It is important, therefore, that ATM Service Providers and Regulators behave in a manner consistent with the development of the TEN-T.

The introduction of inter-modal transport policies on both national and Community levels also introduce an element of public service obligation to the ATM service. In this respect, the impact on the service is related to the progressive optimisation of the overall transportation system and can require the provision of ATM operations which are not solely determined by the needs of the commercial users. Once again the government has a role in defining and implementing such services.

²³ Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community guidelines for the development of the trans-European transport network, Official Journal L 228, 9 September 1996

3.4 FINANCIAL SUSTAINABILITY

3.4.1 Continuity of service

All States that are signatories to the Chicago Convention have the obligation and responsibility of enabling the safe, expeditious and efficient flow of (international) air traffic, based on international and national law and/or regulations. In the past all ATM service providers were State-owned and funded and, therefore, protected from bankruptcy and insolvency. However, the State must now, therefore, provide an effective economic oversight for corporatised air traffic service providers in order to prevent bankruptcies and interruptions in service. The State should also ensure that adequate investment programmes are put in place so that the service provider can meet future demanded in a safe, effective and efficient manner.

In the current situation in Europe, the ATM service providers are expected to be self-financing, funded from user charges (see Section 3.4.2 below). The accounts of the service providers are operated on a cost-plus basis whereby user charges are set on an annual basis to cover the costs incurred by the service provider together with an acceptable return on investment reflecting the cost of capital (usually around 8%). This approach to charging assures the financial sustainability of the service provider, even if it does not provide any great incentive for efficiency savings or guarantee the affordability of the service. Furthermore, as the service providers remain State-owned, each State potentially has the option of providing funding to its service provider.

However, in the future new charging regimes are likely to be put in place, as defined by the Economic Regulation Study (see Section 1.2). Such charging regimes are very likely to result in reform from the cost-plus approach to a more incentive-based regime. Service providers can not be assured, therefore, of recovering costs and will be faced with the prospect of making a loss. However, it is clearly not acceptable for an ATM service provider to become bankrupt as this will result in interruption to the service. The financial health and sustainability of service providers is therefore critical to ensure the continuity of service.

3.4.2 User charges

Where charges are recovered²⁴, ATM services are funded through three sets of charges that may be imposed on the users: en-route charges, approach and aerodrome charges²⁵. ICAO defines the general principles for the determination of these charges²⁶. The charges are based on a number of parameters, including the distance flown, the aircraft weight and a unit charge representing the ratio of the cost of providing the service to the volume of traffic.

In Europe, en-route ATM services are subject to a charge regime defined by the EUROCONTROL Enlarged Committee on Route Charges and administered and collected by the Central Route Charges Office (CRCO). Approach and aerodrome charges are also recovered. Sometimes this is done through landing fees and sometimes through specific navigation services charges. The CRCO also offers a service for the central collection of terminal (approach and aerodrome) charges. Approach and aerodrome navigation charges are collected in a number of ways:

- as part of the landing fees, which are usually weight based.

²⁴ For example, user charges are not collected in the USA, where ATM is funded centrally with significant contributions from departure taxes

²⁵ "Manual on air navigation services economics", International Civil Aviation Organisation, third edition, 1997

²⁶ "Statements by the Council to Contracting States on Charges for Airports and Air Navigation Services", Doc 9082/5, fifth edition, International Civil Aviation Organisation, 1997

- the ATM provider charges the airports, which in turn recovers navigation charges as part of their landing fee or as a separate navigation charge
- the ATM provider levies specific navigation charges directly on users.

It should also be noted that the above navigation charge could be levied as a terminal charge only, a combined terminal and approach charge or as separate terminal and approach charges. Many countries have common charging rates for all their airports whilst others are site specific. The argument for a single charge is based on the services provided at different airports being essentially the same. However, this implies cross subsidy from the larger airports to the small.

3.4.3 Implications

In a commercialised environment, there are several premises concerning user charges in a Single European Sky:

- the system must comply with the ICAO principles and the EUROCONTROL CRCO mechanisms
- the system should be non-discriminatory
- the charging regime should be transparent
- the charging regime and associated reforms should be subject to wide-scale consultation
- cross-subsidy should not be allowed or should be transparent, i.e. the user should only pay for services received or should at least be aware that the subsidy is taking place
- in-line with the *user pays principle*, the user should be required to pay the full cost (internal and external) associated with the infrastructure and service. Noise charges are already included in some airport charges and, in the future, this approach could be expanded to cover environmental costs more generally.

One of the major implications of a charging regime following the above principles is that the user charge is inversely proportional to the volume of traffic. There is, however, a minimum level of infrastructure necessary to support the provision of an ATM service, irrespective of traffic demand. This implies that user charges may be prohibitively high in some areas of low traffic demand as long as it is necessary to recover full costs.

The overall conclusion is, therefore, that subsidy is likely to be necessary to support ATM service provision in some low-density areas and small airports. As stated above, these services are likely to be necessary to fulfil public service or social obligations and will not be sustainable in a commercialised environment.

3.5 MILITARY AND SECURITY ISSUES

3.5.1 Introduction

National security, defence and the military have always been drivers in the organisation of ATM services. Through the ongoing changes in the operation of services and application of regional technologies, there are a number of civil/military interface issues that must be considered. Two such issues are:

- provision of services to military aircraft operating as general air traffic (GAT). In this situation, the military GAT will be treated in exactly the same way as any other aircraft operating in controlled airspace with the exception that some military aircraft, e.g. fast jets, may not be fully equipped with civil avionics systems for operational reasons

- coordination of civil air traffic and military operational air traffic (OAT).

Other issues, discussed below, relate to:

- the organisation of airspace
- two-way exchange of data between civil and military entities
- regional facilities
- commercialisation of ATM service providers
- the consultation process.

3.5.2 Organisation of airspace

Although organisation of airspace is being addressed in detail by the study on Airspace Regulation, it is considered here because it is a driver for the overall organisation of the provision of ATM services. The High Level Group work and other stakeholders have identified the flexible use of airspace (FUA) as a key objective to provide capacity and relieve bottlenecks:

The flexible use of airspace concept, consisting of no permanent areas of segregation, optimised time-periods for segregated military use, should be implemented effectively in all States and harmonised within Europe

FUA has not yet been consistently implemented throughout Europe and a number of deficiencies have been identified:

- lack of harmonisation of civil-military co-operation in European ATM
- failure to address the role of air defence as a co-operation partner in airspace management clearly and uniformly. Air defence operations are not fully integrated into FUA and partially not compatible with the ATS environment
- failure by some States to meet the application and implementation targets of the FUA Concept
- lack of a "Single Sky" even within some individual States where airspace is still rigidly divided into civil and military properties.

The issues that must be addressed through the future regulatory framework include:

- coordination, harmonisation and integration of civil and military ATM requirements and airspace at the **European level** rather than on an individual State basis thereby avoiding, for example, constraints imposed by geographical boundaries
- dynamic and automatic airspace negotiation process and application of FUA in as near real-time as possible to well-defined European rules and priorities, e.g. opening all military training airspace for civil use unless training is taking place within a defined time window.

3.5.3 Exchange of data and services

Civil and military ATM service providers routinely exchange data to facilitate the functioning of their respective systems whilst reducing the need for duplication of equipment and maintaining a degree of control on frequency congestion, e.g. in the secondary surveillance radar (SSR) bands. Sometimes, facilities are also shared, e.g. provision of distance measuring equipment (DME) services using the military tactical aid to navigation (TACAN). Conversely, some DME units provide military-only services.

This exchange of data and services has evolved from the original State-based provision of services and is based on informal understanding or *gentleman's agreements* between the parties concerned.

These arrangements are becoming more formal, in order to ensure:

- continued access to the relevant civil data by the military and vice versa
- continued provision of services with the appropriate performance levels by both sides for use by the other
- correct allocation of costs.

The required degree of formalisation can be achieved by concluding contracts between the military authorities and the relevant service providers. Such contracts should include service level agreements (SLAs) specifying the obligations to be imposed on all parties. The requirement to cooperate with military authorities in this way could be enshrined in the authority or licence granted to the service provider.

Service level agreements between the ATM provider and military authority should:

- define the services and data to be provided by both parties, including for example, surveillance data, training services, maintenance services etc., and the associated pricing schemes
- define the facilities whose use is shared, e.g. air traffic control centres, navigation aids, air-ground communications facilities, networks, etc. and define how the costs associated with these facilities is to be shared
- determine joint investment priorities and responsibilities together with required rates of return on the investment.

For single State services, it is expected that the control of the service and, perhaps, its operation will revert to the military during times of significant crisis. This situation is no different to that of any other strategic asset and service, such as telecommunications or airlines.

3.5.4 Regional facilities

Where control is delegated to regional centres, due provision needs to be made for the preservation of national security and military capability during times of tension and transition to war (TTW).

It is usual, during TTW that ATM reverts to military control on a national basis. However, in the future if ATM is provided on a regional basis, it is likely that individual States will not own or have on their territory sufficient infrastructure to provide a complete service. In this case, the national infrastructure is likely to revert to State control, as described above, and arrangements must be put in place for the appropriate control of joint facilities. Such arrangements are already in place in the Maastricht Upper Area Control Centre (UAC). Conversely, arrangements must be put in place for continuation of provision of services from the regional facility to areas not involved in the crisis or tension. These provisions must be negotiated/imposed by the States concerned on the service providers as they will be specific to the particular situation.

The Common Foreign and Security Policy will facilitate this approach using the red button provision to allow a Member State to object to any regulatory framework that it believes could prejudice its national security interests. Furthermore, the regulatory framework could

include provisions to allow Member States to temporarily withdraw from their obligations during times of national emergency.

Any regional facilities must also make provision to provide services necessary to support, for example, training exercises taking place in the subscribing States.

3.5.5 Impact of autonomous service providers

The requirement of any States' ability to retain a role in the ATM system does not inhibit provision of ATM services by an autonomous authority, but does require appropriate provision in the State legislation. In terms of defining the civil military interface, there are various methods by which this can be achieved:

- **Separate Control Services:** here the civil and military ATC Services operate on a segregated basis, with different facilities. This type of civil-military co-ordination is used in France and Italy
- **Co-located Civil-Military Services:** joint civil-military service providers in which civil and military controllers share facilities. This is a common set-up where the service provider is fully owned by the government
- **Civil Only Provider Services:** here the civil ATC controllers use the civil ATC facilities to provide services for military users. Such an implementation is used in Sweden. In Germany military controllers are given civilian status and work with civil controllers, dealing with civil and military traffic

In all cases, the service provider should be required, under the terms of the State legislation, to provide a level of interface and co-ordination with military controllers and/or traffic. This will be situation in the UK under the proposed public private partnership.

3.5.6 Consultation

There are various bodies in the region that can be used as forums for consultation and co-ordination regarding civil-military interfaces. One of these, which would also have interest in co-ordinating issues at ECAC level, is the EUROCONTROL Military Expert Unit (EMEU). The Terms of Reference of this group are:

- providing military expertise to all CNS/ATM developments of the Agency and especially EATMP
- clarifying, where necessary, the specific requirements of military aviation and related CNS/ATM problems
- advising on the implications of the EUROCONTROL CNS/ATM plans and policies on military aviation and airspace use
- providing guidance to ATM planners to ensure that the future developments satisfy national security requirements in particular with respect to defence needs
- supporting and advising, where appropriate, international organisations, such as NATO, regarding civil military related CNS/ATM issues
- assisting Military representatives in the Assembly, the Council, the Military Interface Standing Committee and other appropriate bodies.

It is clear the ToR for the EMEU is restricted to those activities currently under the domain of the EUROCONTROL EATMP. Furthermore, consideration of operational air traffic (OAT) is outside the scope of the EUROCONTROL Convention. States could be encouraged

to co-ordinate other matters directly through NATO. This raises a problem in terms of the definition of a single consultative body, exacerbated by the multiple and varied State membership of the various interested organisations.

3.5.7 Future perspective

There are three principal approaches to addressing the military and security issues associated with ATM:

- through NATO. This is clearly not the optimum solution from the European perspective
- through EUROCONTROL. However, this has significant limitations, as outlined above, not least the lack of legal competence of EUROCONTROL to address purely military/security issues
- the alternative and possibly preferable solution through the implementation of the Common Foreign and Security Policy (CFSP).

Some matters relating to defence and security came within the competence of the European Union in 1993, with the introduction of the Common Foreign and Security Policy (CFSP) under the Maastricht Treaty. This was subsequently augmented by the Treaty of Amsterdam. The CSFP could, in principle, be used to

- reinforce co-operation between operators of military aircraft from the different Member States
- establish common practices and rules concerning the allocation of airspace to military users throughout the Union, thereby promoting the harmonised implementation of FUA
- to determine common policies concerning the handling of regional and shared facilities and the exchange of data, especially with respect to the obligations of autonomous service providers
- possibly, also, to reinforce cooperation between military and civil actors so as to make best possible use of airspace.

The instruments of the CFSP of most relevance to ATM are:

- **common positions**, where the Council could set out a common position on the issues relating to ATM as outlined above. The Member States would then be required to ensure that their national policies are in line with this common position. Such common positions could relate to, for example, organisation of military training exercises and the flexible use of airspace
- **joint actions**, adopted by the Council where operational action is required. This approach could be used, for example, to create a military coordination and consultation process addressing the issues relevant to ATM, as introduced above.

Key elements of the CFSP that need to be understood should this approach be adopted are:

- the need for unanimity and the veto rights of Member States
- the creation of a link between the CSFP and the Community, i.e. the link between the Second and First Pillars.

3.6 SPECIAL OR EXCLUSIVE RIGHTS

Provision of ATM services requires access to specific resources, principally frequency spectrum and the airspace itself. In a commercialised environment, access to these resources

assumes a high value and, therefore, the exclusive right of the service provider to these resources requires scrutiny.

Furthermore, Article 86 of the EC Treaty covers the granting of special and exclusive rights to undertakings entrusted with the operation of services general economic interest or having the character of a revenue producing monopoly. Clearly, ATM is subject to the provisions of this Article, which in particular highlight the following points:

- the rules of the Treaty, particularly those relating to competition, apply as long as they do not obstruct the performance of the services
- discrimination on the basis of nationality is prohibited (Article 12)
- competition should not be prevented, restricted or distorted by agreements between undertakings (Article 81)
- abuse of dominant position is prohibited (Article 82)
- State aid must not distort competition or affects trade between Member States is prohibited (Article 87).

It could be argued that the current methods used for ATM service provision do not fully comply with the considerations of Article 86 of the EC Treaty.

3.6.1 Airspace

Airspace across any State can be viewed as an economic resource. The more aircraft flying within a given airspace, the greater the revenue for the provider. The Chicago Convention addresses charges that can be imposed in respect of air navigation services:

- Article 15 states that "*uniform conditions shall apply to the use, by aircraft of every contracting State, of all air navigation facilities, including radio and meteorological services, which may be provided for public use for the safety and expedition of air navigation.....No fees, dues or other charges shall be imposed by any contracting State in respect solely of the right of transit over or entry into or exit from its territory....*". This implies, that without a specific exemption from Article 15, a State is prohibited from direct charging for use of or access to airspace
- as under the existing route charge mechanism the service providers do not make any profit from providing the service, it can be argued the cost for airspace use within any given airspace is already covered by the current charges.

The situation may be different for a service provider which, under the terms of any national legislation or licence agreement, is allowed to make a pre-determined profit for the provision of ATM services. Assuming that licences are awarded on a competitive basis, part of the tendering process could include bids for access to airspace. This situation would be analogous to the competitions held for Fourth Generation Mobile Telephony licences (UMTS). This could result, however, in charges being passed back to the end-user, which would contravene Article 15 of the Convention.

In conclusion, therefore, it is not appropriate to make direct charges on service providers for access to airspace. This access should be enabled through the mandate or licence of the service provider.

3.6.2 Frequency spectrum

Allocation of spectrum for the use of Aeronautical Radio-Navigation Services (ARNS) is co-ordinated by the International Telecommunication Union (ITU). Although allocations were

previously granted on an exclusive use basis, recent reviews of the ARNS allocations have been based on shared 'co-primary' allocations with other users. There are bands for aviation which are still 'exclusive' – these include the allocations for radio navigation systems such as ILS and VOR and Mobile Communications links such as VHF Communications.

In an increasingly competitive environment, the sustainability of the allocation for ATM services in the radio frequency spectrum is becoming difficult to maintain and is under pressure from commercial communications providers, e.g. the microwave landing system (MLS) spectrum allocations are shortly due for review.

The recent allocations, still provide the ATM service providers with 'special rights' for use of the spectrum. The special right is based on the requirement to ensure compatibility with other users on a non-interference basis. This is granted in view of the safety-of-life nature of ATM services.

In France and the UK, the licensing of services in the ARNS is charged by the government. Charging is based on non-commercial rate commensurate with the public service, safety-related end use of the service. The service provider then recovers the cost for the licences to operate facilities through the user charges.

This type of charging is very different to that applied to the new generation of UMTS licenses. For the auction of UMTS licences, it has generally been left up to the market to determine the rate. This resulted in very high fees (tens of billions of EURO) being generated. Noting this, States such as Norway, Sweden and others, have not held auctions for UMTS licenses and such licences have been awarded according to a '*beauty contest*'. This second approach is based on the high user charges needed to generate return on prohibitively large investments, meaning:

- access to the market will be discouraged for many potential users
- services will not be provided in remote or sparsely populated areas.

Given the reliance of ATM on the availability of protected, interference-free radio-based facilities, the need for large-scale international coordination and the monopoly nature of the service, it is clear that charging for frequency spectrum on a commercial, purely market-driven basis is not appropriate. However, reasonable charges could be levied by States on service providers for access to the spectrum.

3.7 IMPEDIMENTS TO MARKET RE-ORGANISATION

3.7.1 Legal/political

Each State has rights and obligations arising from the Chicago Convention (see Section 2.2), including:

- sovereignty of airspace
- provision of standardised air navigation services
- charging mechanisms, based on cost recovery principles
- exemptions for State aircraft.

Generally each State, meets its obligations in a slightly different way through an air navigation services structure that is enshrined in national law, which describes the rights, obligations and liabilities of the respective service providers. Therefore, in terms of re-organisation, each State will be starting from a different basis.

⇒ the structural re-organisation must acknowledge that States will start from different points, with some nearer to the overall objective than others. Sufficient time and flexibility must be allowed in the schedule to account for this

Furthermore, there is no common understanding of the meaning of "*separation of regulation and service provision*". The philosophy employed varies from State to State and includes:

- functional separation of regulation and service provision within the same organisational framework
- regulation through the governance structure of the organisation
- organisational separation, albeit with ultimate responsibility lying within the responsible government department.

⇒ the regulation must define precisely what is meant by terms such as *separation*, *regulation* and *service provision* in order to ensure uniform understanding and application. Wherever possible the regulation should demand organisational separation

Provision of services on a trans-national basis will require delegation of the control of airspace and, perhaps, rationalisation of infrastructure to below that required to provide services using the current model. Taken to the extreme, some States may not be required to operate any air navigation services at all. This implies that States will become mutually dependent on each other to meet their Chicago Convention obligations. This could be interpreted as a pooling or joint management of sovereignty, as enabled by the EC Treaty. However, there may be resistance from some States to this approach. Furthermore, local laws may require services to be provided by a predominantly national operator (although this could be viewed as being in contravention to competition provisions in the Treaty). Behaviour of this type is exemplified in the rules governing ownership of airlines despite extensive liberalisation in air transport in Europe, the US and elsewhere – this occurs because of the conflict between some regional and international obligations.

⇒ Maximum stress should be put on the flexibility offered by Article 28 of the Chicago Convention, ICAO Assembly resolutions and other internationally agreed practices that allow delegation of the offer and operation of service from the State to other entities, creation of joint operating entities, and the conclusion of bilateral and multilateral agreements, including the establishment of multi-national facilities. In addition in the future, advantage could be taken of the provision introduced in Article 53 of the Montreal Convention, enabling the Convention to be open for signature by Regional Economic Integration Organisations²⁷

A general market re-organisation would require State laws to be changed²⁸ unless the changes can be implemented on the basis of Community legislation. There is, however, unlikely to be unanimous agreement on a single, best way to structure the market.

⇒ Consensus should be pursued with States through a continuation and reinforcement of the High Level Group process to maximise buy-in and identify widely-accepted solutions

On the greater European level, there may be some mismatch between the legal status of rules in EU and non-EU States. The situation must be avoided that some rules are enshrined in law in EU States but remain voluntary and un-enforced in non-EU States.

⇒ EUROCONTROL mechanisms, where efficient, could be used to ensure that the regulatory framework, rules and standards are uniformly applied throughout the ECAC area lying outside of the European Union, Norway and Switzerland. However, it is likely that the role of EUROCONTROL will be limited in this respect because of the lack of

²⁷ Article 53 – *Signature, ratification and entry into force*, Convention for the Unification of certain Rules for International Carriage by Air, Montreal, 1999

²⁸ In the specific case of Germany a constitutional amendment might be needed

regulatory instruments available to it²⁹, the need for each non-EU State to implement the rule, standard, etc. individually and the lack of enforcement mechanisms.

3.7.2 Social

It is generally acknowledged that the principal (although not the only) objective of the provision of air navigation services is to maintain safety. This raises several points:

- safety is viewed as a public service obligation/State responsibility. Therefore it is argued that a service that has safety as its principal objective should remain in public hands and is not suitable for privatisation
 - there is perceived, by many stakeholders, to be a significant conflict of interest in instilling a commercial or even profit-driven motivation in businesses/services that are driven by safety
 - there is disagreement amongst stakeholders concerning the acceptability of running public service, safety-driven organisations following private sector practices
- ⇒ The regulatory framework must reinforce safety as the principal objective of ATM. Safety regulation must be independent from and take precedence over the other issues considered, including performance, economics, etc.

A second set of points that must be considered when proposing extensive restructuring of the ATM industry is the impact that the changes will have on the employees, including remuneration, rewards, location, mobility requirements, etc:

- imposition of private sector working practices and requirements for increased productivity may drive down wages/salaries resulting in an erosion of working conditions, exit from the industry of current workers and reduce the number of potential future employment candidates
 - consolidation of service, for example across borders, may reduce the number of air traffic control centres and level of supporting infrastructure required. This in turn may impact on the number of traditional ATM-related jobs available and could also require relocation of existing staff
 - human resources shortfalls, particularly relating to the number of skilled staff required to operate and regulate the services must be overcome, especially during transition periods where double-manning/parallel operations will be required.
- ⇒ It is not appropriate for the regulatory framework to intervene directly concerning social provisions because these are covered by other instruments (e.g. the Charter of Fundamental Rights of the European Rights, the Social Charter and the *Acquired Rights Directive* - Directive 98/50/EC³⁰). However, the regulatory framework should promote (or possibly mandate) social dialogue, consultation between employees and employers and collective agreements, if appropriate.

²⁹ Instruments available to EUROCONTROL are limited to EUROCONTROL standards, the application of which is mandatory, and specifications, which are voluntary

³⁰ Council Directive 98/50/EC of 29 June 1998 amending Directive 77/187/EC on the approximation of the laws of Member States relating to the safeguarding of employee's rights in the event of transfers of undertakings, business or parts of businesses

3.7.3 Operational

ATM is coordinated globally according to ICAO standards and recommended practices (SARPS), although a degree of flexibility is achieved through the regional planning groups. This approach is essential to ensure continued international interoperability.

⇒ The regulatory framework must support compliance with ICAO SARPS and other internationally agreed practices as far as is practicable

The current approach to ATM, although it results in proliferation of systems and infrastructure, results in a high level of redundancy and contingency in the case of local failures. This contingency is present internally to the State and should be developed internationally. Unbundling of services, provision of trans-national services and rationalisation of infrastructure could result in the reduction of contingency and a deterioration of the overall robustness of the European ATM system.

⇒ The regulatory framework must ensure that service providers are obliged to provide a degree of contingency for each other, not only within single States but also internationally

Air traffic control is a natural monopoly for a given volume of airspace and, despite technological advances, is likely to remain so in the medium term. Furthermore, the users have very little choice in selecting providers and providers are prohibited from attracting users through incentives. The route between city-pairs generally drives the provider-customer selection:

- routes are generally based on great circles and the weather situation, although minor deviations are sometimes requested by users if the benefits of the deviation outweigh the disadvantages of following the shortest route
- air traffic flow management has a regulatory element, which controls the flow of traffic and further diminishes the scope for the customer to select a preferred provider based on normal market principles.

⇒ The regulatory framework must acknowledge the monopoly nature (at the point of service delivery) for air traffic control services, at least in the short term, whilst not impeding future developments. This means that the necessary economic regulation must be put in place

⇒ The regulatory framework must also acknowledge that one of the principal characteristics of the ATM market is that today the end-customer has no real choice of service provider. The regulatory regime must, therefore, prevent abuse of this dominant position.

During any transition period, additional resources will be required. It will not be possible to move directly from the current situation to the future regime. There will be a large amount of parallel running of systems, validation of new procedures and airspace structures, etc. Given the current shortage of operational ATM staff, it is unlikely that there will be sufficient human resources available to support the transition. Similarly, there will be an additional requirement for human resources to support the development, implementation and operation of the regulatory framework, which is considerably heavier than that currently in place.

⇒ The regulatory framework must address the need for investment in human resources to support the transition and regulatory processes.

3.7.4 Financial and economic

There are a number of financial and economic barriers to market re-organisation.

In the short-term, services are provided by organisations with a diversity of legal personality, ranging from government department to public-private partnership. This means that different rules apply to raising finance, e.g. access to debt and equity, subsidy, imposition of public sector borrowing rules, etc. The potential players in the market re-organisation are therefore starting from different points, which might result in significant market distortion.

⇒ The regulatory framework must acknowledge the different starting points and promote convergence. This can be achieved by ensuring that the initial legislative actions promote institutional and regulatory convergence across the Community.

Economic regulation regimes can result in reductions in service levels or performance as the service provider attempts to reduce costs in order to maintain rates of return.

⇒ Strong regulation is required to ensure that safety, performance and service levels are maintained and improved, as well as promoting efficiency and reducing costs.

If the service provider is not permitted to compromise performance in order to reduce costs, then there is likely to be strong pressure to increase productivity and to reduce pay levels

⇒ The regulatory framework must promote social dialogue as part of the consultative process to ensure adequate consideration is made of the concerns of the employees.

Conventional low annual rates of return on investment may be insufficient to attract private sector investment, through either debt or equity, thereby heightening the risk that investment will not be available for essential infrastructure developments. Furthermore, the length of the licence and the correlation between the investment and licence lifecycles will be critical for promoting investment – service providers are unlikely to be enthusiastic about investment if they are only granted short licences or near to the end of their licence period.

⇒ The regulatory framework must allow expansion of the mechanisms available for raising finance beyond those traditionally available, e.g. through bond issues, it must define economically viable licence periods and, also, cater for the transfer of assets at the end of licence periods.

It will not be acceptable for any service provider to go bankrupt because of the critical nature of continuity of the service (safety and as a key contributor to economic growth). Conversely, the service providers will be expected to offer high quality services at low cost.

⇒ The licensing process must include a formal assessment of the financial viability and long-term sustainability of any potential service provider, including due diligence audits of business plans.

Finally, rationalisation of infrastructure might require the writing-off of some sunk costs before the associated systems/equipment has been fully amortised or depreciated. Such a rationalisation might be necessary under new organisational arrangements, where it will not be possible for joint service providers to retain all of the current assets used to provide current services because that will result in inflation of the overall regulatory cost base. An example of this could be a potential reduction in the number of radar stations in a network, enabled by horizontal integration of service providers (see for example Section 4.6.2). This implies that some States will lose the retained value of some of their assets – hence the value of their service providers will be less than at present. This could present a significant disincentive to re-organise.

⇒ The regulatory regime must determine the optimum level of infrastructure necessary to meet the requirements of the ATM service, in order that the regulatory cost base is not inflated and user charges set at too-high a value. This activity is part of the economic regulatory regime

⇒ The economic regulatory regime must acknowledge the loss of some assets and determine the necessity, levels and mechanism for award of compensation, in order to address any disincentive for restructuring. Compensatory schemes could depend on the licensing regime put in place and the mechanism selected for award of licence.

Compensation schemes could include:

- the use of TENs funding, although it has to be verified whether such funding can legitimately be used to support the rationalisation rather than the development of infrastructure
- through bond issues, to be repaid over a long period of time by service providers, in effect increasing the amortisation period of the defunct infrastructure and reducing user charges
- by maintaining the sunk costs in the charging base over the conventional amortisation period and effectively deferring any immediate benefits of rationalisation.

3.7.5 Defence

Defence interests present a number of impediments to the re-organisation of the ATM services market:

- there may be an incompatibility between national defence priorities and trans-national corporatised/privatised ATM service providers
- there may be a reluctance to allow the organisation of defence interests on a regional basis, especially if some States are required to re-organise their defence-related operations, e.g. there may be strong resistance to the prohibition of training exercises in the Core Area
- States may require to maintain a (high) degree of control over ATM infrastructure, which is dual-use and, conversely, may be reluctant to allow non-national ATM service providers access to information from defence-focussed infrastructure.

⇒ Exclusively military and defence issues should be approached through the appropriate mechanisms with the particular objective of harmonising defence requirements related to ATM throughout the Community.

3.7.6 Technical

Principal technical impediments to the re-organisation of the ATM sector include:

- extremely long international technology standardisation procedures
- ⇒ best use should be made of Community instruments, including the consultation process, to minimise the standardisation delay.
- development of a widely-accepted safety assurance system, based on safety cases and safety management and covering all airspace organisation, systems, equipment and operations. There is no such single approach currently applied
- ⇒ safety management requirements should be defined during the safety regulatory process by EUROCONTROL SRC and, ultimately, EASA.
- the need to synchronise disparate technology development cycles, perhaps writing off large amounts of sunk investment before full amortisation/depreciation.

⇒ Community instruments such as the TENS Programme should be used to promote synchronisation of technology and system lifecycles.

3.8 CONCLUSIONS

This section has reviewed the characteristics of the market in which ATM services are provided. Currently the service, vertically integrated, is offered as a natural monopoly basis. There is no scope for multiple providers of air traffic control services in a given block of airspace nor is there any significant scope for customers, i.e. aircraft operators, to choose alternative providers by changing routes. Without significant technological advances, there is little scope for introduction of competition in the market, particularly relating to air traffic control.

ATM providers fulfil a number of public service obligations as part of their statutory requirements. These obligations include:

- provision of services, free of charge, to State aircraft
- provision of services in remote/low density regions, which cannot be self-supporting financially
- provision of navigation, communications, advisory and information services outside of controlled airspace, free of direct user charges, usually to general aviation and aerial work
- protection of the environment
- contribution to the implementation of the ATM TEN.

Some services are not financially viable and may be supported through cross-subsidy from other services. Because of the limited accounting systems used, this cross-subsidy is not transparent, nor is allocation of costs to services.

In order to provide ATM services and fulfil their obligations, the ATM providers are granted access to, usually on a predominantly exclusive basis, airspace and frequency spectrum. Airspace is allocated free of charge but, depending on the particular State in which service are provided, access to spectrum can be subject to a licence fee, albeit at costs much below commercial rates.

There is a considerable amount of interaction between ATM service providers, regulator and the military. This interaction, which is organised on a State-by-State basis, covers issues including:

- organisation of airspace, including the flexible use of airspace (FUA)
- coordination of military operational air traffic and civil air traffic
- two-way exchange of data between civil and military ATM providers
- dual use of civil and military facilities, especially DME and TACAN
- national and regional consultation, using the EUROCONTROL Military Expert Unit (EMEU).

A number of potential impediments to ATM market restructuring have been identified under a number of categories:

- legal and political
- social
- operational
- financial and economic
- defence

- technical.

Solutions to these impediments have been identified and will drive the provisions to be included in the Community Regulatory Framework.

4 POTENTIAL FOR MARKET RE-ORGANISATION

4.1 INTRODUCTION

This section investigates the potential for market re-organisation taking into account the discussion of market characteristics and constraints described in Section 3. The High Level Group has considered ATM market reorganisation in detail and its conclusions, précised in Section 4.2, form the basis of the analysis.

Sections 4.3 and 4.4 continues with an investigation of the lessons learned (positive and negative) from restructuring in the ATM sector elsewhere in the world and previous reorganisations in other sectors. Following this, Section 4.5 considers the scope for the unbundling of ATM services whereas Section 4.6 discusses the potential for the bundling of services, in terms of horizontal and vertical integration.

Section 4.7 investigates the implications of potential market restructuring on the stakeholders involved and the processes currently employed in the industry. Section 4.8 summarises the conclusions drawn from the analysis.

4.2 CONCLUSIONS OF THE HIGH LEVEL GROUP

Considering the potential service providers and scope for re-organisation of the market, the High Level Group Report raises a number of issues that must be considered when assessing the scope for market re-organisation:

- the safety culture must be preserved and reinforced and safety regulation must take precedence over all other types of regulation
- it is not clear how far the trend towards commercialisation can be extended
- regulation and service provision must be separate from each other, at least at the functional level
- air traffic control in a given volume of airspace is a natural monopoly under current and medium-term technical and operational conditions, although there may be scope for provision of some elements of the ATM service bundle on a competitive basis
- the system must be optimised as a whole and service providers must not be allowed to pursue their own interests to the detriment of the overall system
- service providers must be subject to a system of authorisation that defines their rights and obligations
- the structure for social dialogue must be strengthened to include all affected staff in the reform process
- the approach taken to human resource management and planning must be improved, ensuring that staffing requirements (both air traffic control and regulatory) are met, that training procedures are harmonised and that agreement of a common European licence for ATM staff to standard qualification levels is facilitated.

4.3 LESSONS LEARNED WITHIN THE ATM SECTOR

4.3.1 Introduction

This section reviews the reforms undertaken in the ATM sector in Australia, Canada and New Zealand. In each of these States, commercialisation of the ATM provider has been undertaken and an associated regulatory regime has been created.

In these States, ATM services are provided on a national basis. There is some delegation of control of airspace but there has been no cross-border integration or creation of trans-national blocks of airspace. Lessons that can be learned from investigating these case studies will, therefore, be limited to the requirements for, and functioning of, the restructured regulatory and service provision regimes in each particular State – they do not address the requirements for creating the Single European Sky. However, as the restructuring has been performed according to slightly different models, it may be possible to draw some conclusions concerning the best practice for service provision and regulation.

4.3.2 Australia

4.3.2.1 Institutional arrangements

The institutional framework for air traffic management in Australia is as follows:

- responsibility for air traffic management services lies with Airservices Australia, which is now a Government-owned Authority. It is not yet corporatised, although plans for this are being considered. Reporting and accountability arrangements are governed by the *Air Services Act and Commonwealth Authorities and Companies Act* (CAC Act). Airservices Australia is governed by a Board of Directors appointed by the Minister for Transport and Regional Services
- safety regulation is the responsibility of the Civil Aviation Safety Agency (CASA), which is a government agency operating under an independent board of directors
- ancillary services, such as network services, are subject to approval or licensing by CASA as well as approval by Airservices Australia
- civil-military coordination is organised through a Coordinating Committee including the chief executive officer (CEO) of Airservices Australia and the Chief of the Royal Australian Air Force. The Committee meets regularly to address issues including airspace and air traffic services
- the Department of Transport and Regional Services oversees aviation legislation and regulation, provides policy advice on domestic and international aviation issues to the government and administers domestic and international air service agreements
- accident investigation is performed by the Air Accident Investigation Bureau
- Airservices Australia is subject to economic regulation by the Australian Competition and Consumer Commission concerning charges for terminal, en-route and aviation rescue and fire-fighting services. Airservices Australia is also subject to the general provisions of the Trade Practices Act 1974 which prohibits misleading or deceptive conduct and anti-competitive behaviour in trade and commerce
- strategic planning is performed through the Australian ATM Strategic Plan initiative, which is a cooperative approach involving all stakeholders.

4.3.2.2 Lessons learned

Airservices Australia is required to provide services throughout the State, including the dense traffic regions in the South East and the much more sparsely populated areas elsewhere. Airservices Australia is required to operate commercially and to fulfil its public service obligations. To address this, government subsidy is currently available to support the operation of several regional air traffic control towers and there are plans to move to a "*location specific*" pricing regime for tower services.

The corporatisation planning process is considering the public service obligations and the strategic nature of the air traffic management system. It is reported that:

- there are no plans for privatisation and the government will always retain some degree of control over Airservices Australia's operations
- public service obligations and levels of performance might be enshrined in legislation
- the national system will remain a strategic resource and will not be exposed to competition, although some elements, for example, airport control (tower and approach) may be opened to competition.

4.3.3 Canada

4.3.3.1 Institutional arrangements

Canada uses a mix of direct government regulation for safety together with self-regulation augmented by general transport and competition authorities for economic regulation. The institutional framework is as follows:

- air traffic management services are now provided by Nav Canada, which is a private, non-share capital corporation and is a not-for-profit trust. Nav Canada is governed by a 15-member Board of Directors, 10 of whom are nominated by stakeholders representing aviation users, unions, and the Canadian government. There are also four independent directors plus Nav Canada's President and Chief Executive Officer. All other bodies (with the exception of the Department of Defence) are prevented from providing ATC, AIS and certain FIS within Canadian airspace without Nav Canada's consent
- MET and AIS services have been commercialised but Nav Canada retains responsibility for elements of these services
- the Civil Air Navigation Services Commercialisation Act specifies the terms with which Nav Canada must comply to withdraw or reduce any service designated services in the North or remote regions and makes provision for the government to direct Nav Canada to provide these services
- Nav Canada has been awarded an air traffic services operational certificate (licence) for an unlimited time period
- Nav Canada is required to have insurance for its service provision activities
- the 26 "*essential airports*" identified within the National Airport System (NAS) are leased to Canadian Airport Authorities
- the federal transport ministry, Transport Canada, is responsible for all safety regulation with Nav Canada fulfilling its safety obligations through a comprehensive safety management programme

- accident investigation is conducted by the Transportation Safety Board which is responsible for transport accident investigation generally and reports to parliament. There is also a Central Aviation Advisory Council
- Nav Canada is self-regulating from the economic perspective through the legislated charging principles and user representation on the Board of Directors
- the Canadian Transportation Agency (CTA), which began in 1997, is the appeal body for Nav Canada's air navigation charges and is the economic regulator for transport. It advises on aviation policy, issues licences and permits, and participates in air service negotiations under the Chief Air Negotiator Air Navigation Charges. It also investigates fares and rates on single-carrier domestic routes and international routes and protects consumer interests generally
- the Civil Aviation Tribunal (1985) hears appeals against certain actions of the Minister of Transport
- the Canadian Competition Bureau is the general competition regulator within the Federal Industry Department. It has powers under the Competition Act to deal with anti-competitive behaviour
- the relationship with the Department of Defence is governed by approximately eighty detailed agreements related to:
 - the joint operation and use of airspace and the reciprocal exchange of air traffic control services
 - the joint use of primary and secondary radar data and associated services
 - radio communications
 - flight inspection services
 - voice and data communications circuits.

Nav Canada does not charge Canadian military aircraft for the use of its services and the Department of Defence does not charge civilian aircraft for services supplied by the military.

4.3.3.2 Lessons learned

The Canadian system is often used as an example of the introduction of commercialisation into a public service domain whilst avoiding the potential pitfalls and conflicts that are sometimes associated with profit-driven motivations. However, the principal disadvantages identified in the Canadian system are:

- as a not-for-profit trust, Nav Canada lacks strong efficiency incentives
- light regulation has led to weak airline competition, excessive airline consolidation and concern about local monopolies.

The principal advantages of the Canadian system are:

- the trust status of and airline input into the management of Nav Canada reduces the need to regulate it as a dominant monopoly
- the leasing of the NAS airports should give them greater commercial focus
- there is very good and clear separation of regulatory functions and transparent processes.

4.3.4 New Zealand

4.3.4.1 Institutional arrangements

The institutional arrangements in place in New Zealand are as follows:

- air navigation services are provided by the Airways Corporation, New Zealand, a corporation founded in 1987. Airways Corporation is owned jointly by the Ministry of Finance and the Ministry for State-Owned Industries
- the Civil Aviation Authority regulates safety and investigates accidents
- Airways Corporation provides all military ATM services under contract to the government
- airline policy is liberal and there is effectively a free market
- the Airports Act 1986 created the formation of airport companies and empowered them to set and charge fees. The government is withdrawing from airport ownership
- the general regulator, the New Zealand Commerce Commission, is the economic regulator. However, in the 1990s, the government expected regulation to be merely a backstop and, in the case of airports and air navigation services, it relied on informed negotiations and the users' countervailing power to keep formal regulation "light handed".

4.3.4.2 Lessons learned

New Zealand is a clear example of an attempt to rely on market forces and minimise specialist aviation regulation. The free market has not worked as smoothly as first envisaged. The government has not changed the structure of regulation but it has intervened as follows:

- A dispute between Wellington airport and its users on charges led the Government to amend the Airports Act to require more consultation and disclosure of information
- The Ministry of Commerce has asked the Commerce Commission to advise on whether price control should be applied to airfield activities at Auckland, Wellington and Christchurch.

In October 2000 the Government launched a Consultation on Air Traffic Services and Airspace Policy. The main concern is that the CAA is responsible for ensuring, but no longer has the power, that the system is sufficient and meets ICAO requirements. One suggestion is a formal agreement between the regulator and the service provider.

The disadvantages of the New Zealand system are:

- very light regulation has led to airport/airline disputes and need for government intervention to require consultation and disclosure
- concern about airport charges has led to a review of whether they should be regulated
- legislation may be needed to give the CAA power to ensure that the air traffic control system is sufficient and meets ICAO Requirements.

The advantages associated with the system are:

- corporatisation of Airways Corporation has led to greater efficiency and commercial focus
- clear separation of powers and transparency of regulation have been achieved.

4.4 LESSONS LEARNED FROM OTHER INDUSTRIES

4.4.1 Introduction

The usefulness of comparing lessons learned from restructuring in other industries depends on finding industries with similar structures where the regulatory objectives are similar to those in the ATM environment.

There is a crucial difference between regulatory systems that aim to encourage competition, and those that are more focused on regulating a monopoly. In this sense, in the short- to medium-term, the regulatory environment in ATM is likely to have a mix of these two objectives:

- for Direct Core Services, the objective is to regulate the monopoly service
- for Direct Non-Core Services and Ancillary Services, the regulatory regime may encourage competition but may be required to regulate the monopoly environment, at least initially.

Of the other sectors investigated during the study, the water and rail sectors are good comparators for the monopoly situation of Direct Core ATM Services, whereas the electricity and telecommunications sectors are more appropriate for comparison with Direct Non-Core and Ancillary Services.

4.4.2 Direct Services

4.4.2.1 Rail sector

There are a number of detailed lessons that have been learned from the restructuring of the **rail industry**, principally in the UK, that are of direct relevance to the provision of Direct Services in the ATM environment:

- the regime to incentivise performance³¹ has been overly complex to administer and has sometimes resulted in behaviour on the part of the involved actors that has not brought benefits to the end customer. Furthermore, even though the incentive regime promotes the avoidance of poor performance, it does not drive continuous investment
- the same analysis has concluded that the regulatory regime has failed to deal with system-wide issues, particularly relating to growth and investment
- the rail industry in the UK was forcibly unbundled, resulting in the emergence of numerous players, complex interfaces and boundaries³². This has resulted in perceived dysfunctionality and inefficiencies in the overall system. Early in the restructuring process, mergers, takeovers and industry consolidation (i.e. horizontal and vertical integration) were carefully controlled on the premise of promoting and maintaining competition. However, subsequently there has been a process of significant consolidation and restructuring
- in its restructured state, it has been acknowledged³³ by the Chairman of the UK's Strategic Rail Authority that the *'structure was not optimised for the purpose of safe provision of a larger capacity, better quality network'*. Additionally he states that *'the*

³¹ "SSRA Review of Performance Regimes – Abridged Report", Report by AEA Technology for Shadow Strategic Rail Authority, December 1999 section 3

³² "Competition in the Rail Industry", John Swift QC, ex Rail Regulator UK

³³ *Railway Gazette International* December 1999 "Debugging Britain's unique privatisation Model" Quote from Sir Alastair Morton, Chairman of the UK Strategic Rail Authority

priority is to rearrange the relationship of the players to generate investment '. One possible lesson to be learned from this is the need for a strong, independent safety regulator, whereas in the current UK environment, Railtrack is essentially self-regulating in the safety domain.

At the European level, one of the greatest barriers to a single market in railway services is the different national standards and the poor interoperability. Decision 1992/96 on Trans-European Networks (TENs) recognises the importance of fostering interoperability on TENs. There are also supplementary measures, such as the identification of a standard railway communication system, GSM-R and the European Rail Traffic Management System (ERTMS). However the implementation of these systems is exceedingly costly and is only likely to be introduced in areas where renewal is taking place. Another step in completing the Single European Market was Directive 95/18, requiring that all railway undertakings be licensed in respect of their competence to operate. This has been implemented at national level. At international level, this approach has had little effect other than ensuring access to infrastructure by single State international services, there are only a limited number of international alliances, examples being:

- Eurostar - a collaboration between SNCB/NMBS in Belgium, SNCF in France and Eurostar UK Ltd
- Thalys – a collaboration between SNCB/NMBS in Belgium, SNCF in France and NS in the Netherlands with an agreement with DB from Germany
- an alliance between DB Cargo in Germany and NS Cargo in the Netherlands.

The licensing regime does not facilitate the operation of such alliances, which require multiple licences to be granted in the States of incorporation of the participating railway undertakings.

In 2000, in order further to promote the Single European Market, among other reasons, the Commission has presented to the Council and Parliament a proposal for a Regulation (2000/0212). It deals with the award of Public Service Contracts (PSC) in publicly supported transport of all modes, including urban, suburban and regional services. The Regulation will require that, where authorities give directed aid or exclusivity to a public transport operator, it should always do so via an explicit PSC. PSCs should not normally last longer than five years. PSCs should normally be awarded following competitive tender. A key aim is to enable inter-state trade in the offering of transport services whilst maintaining the benefits of exclusive PSCs and subsidised operation.

4.4.2.2 Water sector

Given its very localised nature, the water industry is of relatively low direct relevance as a comparator to ATM. However, analysis of experiences in restructuring the **water sector**, allows some additional generic conclusions to be drawn:

- there is no general consensus as to whether it is advantageous to contract out operations but that commercialisation can add-value through the introduction of management best-practice, particularly relating to cost of construction, rather than asset ownership³⁴
- contracting out operations can result in the responsibility for operations being concentrated in a small number of entities

³⁴ Ed Marcus of Black & Veatch

4.4.3 Direct Non-Core and Ancillary Services

4.4.3.1 Electricity Sector

The main concern of European regulation in the **electricity sector** has been to develop an internal market for electricity. Directive 96/92/EC affects all levels of the electricity market quite fundamentally for the majority of countries that had not already made some progress to liberalising their electricity market. The following are its key provisions:

- **Accounting separation:** integrated electricity companies must implement accounting separation between generation, transmission and distribution
- **System controller:** there must be a system controller who despatches the system, i.e., who matches demand and supply, and allocates transmission capacity in real time. It must be operationally separate from any generation or distribution activity
- **Entry to the generation market:** States must either allow free entry into electricity generation by qualified operators, or else operate a tendering system based on transparent, objective and non-discriminatory criteria
- **Access to the system:** access to the system for common carriage must be available on transparent, objective and non-discriminatory terms, including cross-border trades. States may continue to operate “single buyer” systems, but in this case the “single buyer” must in effect buy the electricity which a producer has contracted, in principle, to sell to a customer, and charge for carriage according to a published tariff
- **Possibility of by-pass:** producers and consumers must be permitted to connect directly by private line and so operate outside the official system
- **Competition enforcement:** provision for enforcement of competition law should exist at a national level.

One aim of this directive is to distinguish between areas of the electricity markets where there is potential for trade and competition, and those which are essentially monopolistic, given current technology. In this sense, “monopoly” means that the consumer is unlikely to have a choice of supplier, though the government may have a choice of entities to which it may give the opportunity to operate the service – i.e. there can be competition for the market but not in the market.

The areas of the electricity market where there is potential for trade and competition are:

- generation
- supply – the retail of electricity to customers by a supplier who buys capacity in bulk from the other players
- construction
- equipment

The monopoly areas, at present, are

- transmission
- distribution
- system despatch.

As with other restructuring, the Directive has resulted in the creation of national markets for electricity. It has not, however, as yet created a European single market for electricity, although there is some cross-border trading.

The lessons learned from the restructuring of the European electricity industry are not particularly transferable to the ATM sector but are of a more generic nature:

- introduction of competition into the market has created opportunities for new entrants and has also created new roles in the market structure, e.g. the system controller and central electricity market. It may be that introduction of competition into the market for ATM Ancillary Services could have a similar result
- concentration of generators and lack of capacity cause distortions to the market. Parallels could be drawn here with ATM where the number of Ancillary Service Providers could be limited and the infrastructure, as it stands, could be of insufficient capacity to support future growth and/or peak periods
- the customer's guarantee of fair price is provided by the ability to choose supplier. However, this access to multiple suppliers and disincentives to change suppliers can *de facto* restrict competition. This situation could be mirrored in a future ATM market for Ancillary Services.

4.4.3.2 Telecommunications Sector

Restructuring and regulation of the **telecommunications sector** has been a priority for the European Community since 1987. In 1988, a Directive opened the telecommunications terminals markets up to competition. In the second phase of this development, a Directive adopted in 1990 liberalised telecommunications services other than voice telephony. It was extended in 1994 to satellite communications and broadcasting services and then, in 1996, to cable television networks and mobile communications. At the same time, an open telecommunications infrastructure and services network (ONP) was put in place. The adoption of common rules allowed the conditions of access to the market for new operators to be harmonised. Also in 1990, a Directive liberalised procedures for the award of contracts in water, energy and telecommunications.

In 1993, the Council decided to fully liberalise voice telephony services by 1 January 1998. An extension was given to Spain, Ireland, Greece and Portugal until 2003. At the same time, a Commission Communication defined the concept of universal service, detailing the provision and quality of the service, the charging principles and the dispute settlement procedures.

In order to facilitate the creation of a genuine European telecommunications market, various initiatives were adopted on the harmonisation of mobile (single European GSM standard) and satellite communications standards, and the integrated services digital network (ISDN). The European legal framework is framed around two main axes:

- the competition rules as stipulated in the EC Treaty, Article 86, which annulled national monopolies in 1998
- the harmonisation rules with regard to the economic regulation, in Article 95 of the Treaty, aiming at reducing the gap between national regulation systems.

Although, significant progress has been made in the liberalisation of and establishment of a regulatory regime for the telecommunications sector, there are still some shortcomings in terms of the functioning of a single European market, principally related to the national nature of the regulation:

- licences are issued on a national basis by national regulators, using different processes and conditions. For example, some of the UMTS licences awarded recently were the subject of financial bids whereas others were the subject of beauty contests
- there is no common European licence authorising the establishment and operations of systems throughout the Community
- there is no opportunity to provide a trans-national service
- number allocation and portability is not fully addressed, causing a barrier to entry by new actors and raising complex issues in determining the additional costs incurred by incumbent operators when portability is required.

In order to address some of these issues, work has been performed to assess the feasibility of creating a European Regulatory Authority for telecommunications³⁵. The major conclusions of this study were:

- there is relatively strong support from the industry for the creation of a European Regulatory Authority as it would be expected to bring some benefits, e.g. single European licences, facilitate creation of a single market, etc.
- it is not clear whether an appropriate regulatory body could be created without a Treaty amendment (this depends on whether the function of the body would include policy functions or be restricted to purely managerial or operational roles)
- there are a number of resourcing issues to be addressed in creating a regulatory body, including: resourcing/staffing levels, and the availability of the appropriate skill base.

4.5 UNBUNDLING OF SERVICES

4.5.1 Introduction

Following previous analysis of the monopolistic nature of services, this section describes the prospects for unbundling ATM services. At present the nature of ATM service provision details that services are bundled in relation to 'national skies'. Even where service providers have been commercialised, their arrangements, so far, have not created the incentive to unbundle ATM services to any significant extent. This is because of the historic nature of service provision and a perceived lack of competitive advantage in unbundling. The prospects for enabling competitive alternatives are reviewed below.

4.5.2 Scope for unbundling services

In determining the prospects for unbundling ATM services, there are two fundamental questions that have to be answered - is the unbundling justified on safety and economic efficiencies? The answers are dependent on the individual application concerned and have to be assessed by the regulators³⁶ of the services.

From the financial perspective there are several factors to be considered before unbundling ATM services:

- any service provider must have assured long term financial viability and sustainability. Due to their strategic nature and economic importance, it is not acceptable for there to be any risk that a service provider in the ATM market will become bankrupt

³⁵ "Issues associated with the creation of a European Regulatory Authority for Telecommunications", National Economic Research Associates, study for European Commission DGXIII, 1997

³⁶ At this stage no assumption has been made concerning the scope of the regulator(s), e.g. regional, national or a mixture

- in principle, all ATM services should be financially self-sustaining – that is enough revenue should be generated to cover operating and investment costs necessary to guarantee the required level of service. If this is not the case, there is a severe restriction on the ability to unbundle the service
- unbundling of any services should not overly impact on the regulatory requirements and should provide assurance that an efficiency saving is justifiable.

From the safety perspective, the key issues relate to the ability to maintain effective safety regulation of the services and ensure State obligations are duly met.

Essentially MET, AIS, CNS, Area Control, Approach Control and Aerodrome Control can all be unbundled³⁷, depending on the particular airspace configuration. However, maximum benefits from unbundling services will only be gained if services can be created irrespective of national borders. This can be facilitated through a series of promoting measures as described below.

4.5.2.1 Training

The first step in promoting the unbundling of services is to create a generic and mobile skill base for the basic ATC service. To achieve this there is a need to establish a common training forum that can be used on a Community level. Such a forum would negate the disadvantages of nationally fragmented controller training and establish the basis of issuing a portable license for use throughout the Community.

As there will always be variations on airspace design and operation throughout any region, the ATC license will have to be approved for any specific application within a particular airspace. However, this variation in application will be defined by the nature of the airspace irrespective of the State within which the airspace resides or covers.

4.5.2.2 CNS/FDP

The second stage in promoting the unbundling of services is to create the ability to set-up specific specialised strategic business units or independent companies for the provision of Direct Non-Core and Ancillary Services infrastructure. This will create competition for the market by allowing service providers to spin-off, outsource or bid for infrastructure services irrespective of national boundaries.

This is particularly applicable for CNS and FDP services, where service providers should be allowed to compete irrespective of national boundaries.

4.5.2.3 Air traffic control

The final stage is to allow, for any given volume of airspace, the optimisation of operational sectors and interfaces with adjacent service providers. This can lead to a level of competition for the market through provision of En route, Approach and Aerodrome Services by combinations of service providers which can best meet the requirements of the individual airspace volume concerned. The overall process is depicted in Figure 4-1.

³⁷ Note that some services, e.g. alerting services and flight information services, are closely linked to air traffic control and are unlikely to be easily separated

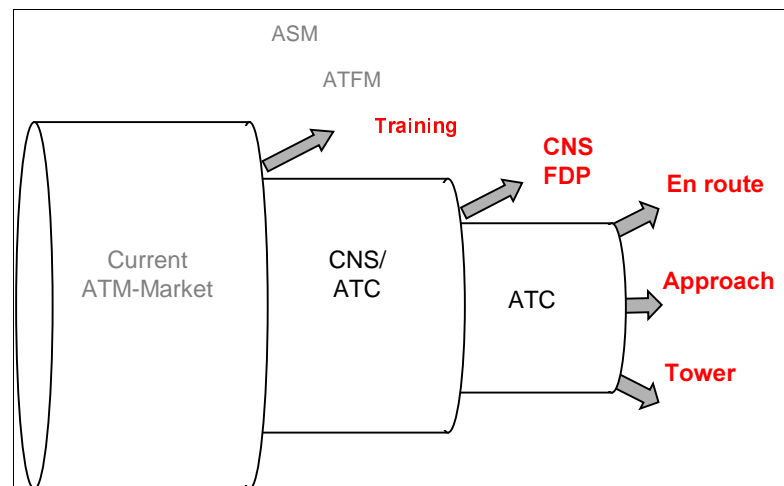


Figure 4-1: Unbundling of Services

4.5.2.4 Future prospects

In the future it is expected that technological developments will enable a further unbundling or restructuring of the market as free flight and free routes are enabled. In this case:

- in some blocks of free flight airspace, responsibility for separation assurance could be redistributed from the air traffic controller to the pilot. Here the ATM service provider would become more of an airspace manager
- in other blocks of free route airspace conventional ATM processes would continue and the ATM service provider would continue to act as a traffic manager

The services could be further unbundled to cater for these two different approaches to management, as illustrated in Figure 4-2.

This unbundling is not likely to be feasible in the near- to medium-term and is not considered in detail in this report.

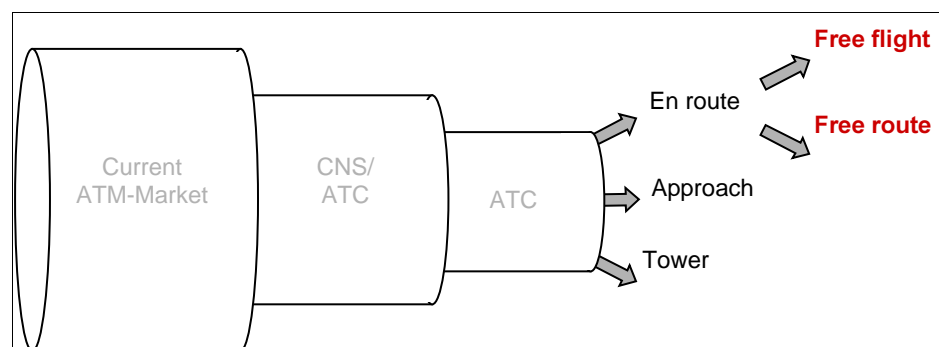


Figure 4-2: Unbundling of free flight and free route services

4.5.2.5 Facilitation of unbundling

Like the unbundling of the Ancillary Services, the requirement to ensure the financial validity and maintenance of safety assurances will determine the extent and rationale for any unbundling of ATC services. The service providers themselves should determine the degree to which services should be unbundled in conformity with the regulatory regime and licences as determined by the regulator. The regulator should not interfere beyond determining and enforcing the regulatory and licensing conditions.

To facilitate unbundling the regulatory framework must:

- as far as practical, apply licences to services on a service-by-service basis irrespective of whether they are provided in an integrated or unbundled form so as not to prejudice the service offering of a particular provider
- ensure the level of transparency in the provision of services is sufficient to determine the validity and effectiveness of any unbundling
- ensure that reporting and accounting processes are separate and distinct for each service irrespective of whether they are provided in an integrated or unbundled form. Standard processes, such as activity based costing (ABC) could be required to ensure the required level of transparency is achieved
- apply performance requirements to services on a service-by-service basis irrespective of whether they are provided in an integrated or unbundled form
- where services are provided on an integrated basis, require the services to be provided by independent cost centres within the service provider organisation, with the appropriate service level agreements and internal cash flows governing the relationship between cost centres
- where services are provided in an integrated form, ensure that standard and transparent cost allocation procedures are applied to determine how costs of shared support functions within an organisation (e.g. finance, human resources, legal services, etc.) are allocated to individual service lines.

The objective of these requirements is to ensure that there is a level playing field for provision of services, in either integrated or unbundled forms.

4.6 BUNDLING OF SERVICES

4.6.1 Introduction

The High Level Group report identifies co-operation between service providers³⁸ as a useful way to ensure the integration of the management of airspace at the regional level and to provide services in volumes of airspace regardless of national boundaries. Such co-operation can occur in a number of ways, depending on the legal personality of the actors involved.

4.6.2 Horizontal integration

Following on from the enabling process towards the unbundling of services, further optimisation can be promoted through the creation of alliances and co-operative agreements for specialised strategic business units, independent companies or organisations. This forms the basis of re-bundling services through horizontal integration.

The ability to re-bundle services, like the ability to unbundle services, is based on the need to create greater efficiency and flexibility by achieving economies of scale and scope. As such, the creation of alliances and co-operative agreements should be enabled at both the Direct Service and Ancillary Service levels. This enables two separate paths towards creating the Single European Sky:

- provision of the direct ATC service as joint operating agencies for trans-national blocks of airspace, where determined advantageous from both financial and operational perspectives

³⁸ "Single European Sky", Report of the High Level Group, European Commission Directorate General for Energy and Transport, November 2000, paragraph 87

- the operation of supporting infrastructure and services for trans-national blocks of airspace, but not unnecessarily contiguous or restricted to the formation of the ATC service providers.

Similar to issues raised under the transfer of licenses for ATM service provision, whilst enabling alliances and co-operative agreements, the regulatory framework must promote social dialogue and inclusivity in the change process.

4.6.3 Vertical integration

In the same way that horizontal integration can improve efficiency and flexibility, depending on the nature of the airspace and services concerned, vertical integration could also be advantageous in certain circumstances. A Direct Service or Ancillary Service provider should be enabled by the Community framework to form alliances or co-operative agreements with other players in the air transport market. These can include:

- airports
- airlines
- system suppliers
- non aviation specific service providers (telecommunications operators)

In all cases measures should be taken to ensure the creation of vertical alliances with other players does not contravene the Treaty provisions under competition and discrimination.

4.7 IMPLICATIONS OF MARKET RE-ORGANISATION

4.7.1 Impact on human resources

Restructuring the market for ATM service provision is likely to have the following impacts on staff working in the sector:

- the specialist skill base will be more mobile throughout the Community through implementation of a common mechanism for the training, qualification and issue of licences for Air Traffic Controllers
- a progressive consolidation of services and associated infrastructure may lead to a reduction in the number of ATM-related jobs, but this will be counteracted by the creation of a more generically skilled mobile work force and will ameliorate the severe staff shortages currently being experienced
- extensive social dialogue and partnerships with the work force must be established in order to define and agree modified working practices in a more commercial environment, whilst maintaining and improving safety
- there will also be a transfer of some of the skill base from service provision activities to regulatory activities to ensure adequate resourcing and knowledge within the regulatory regime.

4.7.2 Rights and obligations of service providers

The following issues will affect the rights and obligations of the service providers through the re-organisation of the market:

- existing national service providers will no longer be assured of the monopoly right to provide ATM services within any State. The roles, rights and obligations of service

providers will have to be changed in each State's law³⁹ unless the changes can be implemented on the basis of Community legislation. The rights and obligations of the services providers will then be defined in accordance to the terms of an appropriate authorising licence

- through the definition of various regulatory requirements, providers will have to adapt to more generic processes and tools in order to provide consistent, more efficient services and ensure safety targets are maintained
- through a licensing and regulatory incentives process, service providers will be encouraged to find methods by which to best meet the requirements for a given airspace including unbundling services, outsourcing services, or setting up alliances and co-operative agreements with other service providers
- the incentives to optimise service provision for a given airspace will be complemented by a rationalisation of airspace configuration and supporting infrastructure on a trans-national basis, if service providers work together to bid for upcoming licences
- the service providers will be required to provide services on a non-discriminatory basis and conduct operations with a required level of information exchange, whilst implementing accounting processes which ensure sufficient transparency to conduct effective regulation.

4.7.3 Regulatory requirements

Market reorganisation will impact significantly on regulatory requirements:

- there will be a need to separate from the service provider, at least from an functional and preferably from the organisational perspective, the roles imposed on the State for safety and other types of regulation in order to ensure there is no conflict of interest
- as the re-organisation of the market is progressed, the national safety regulatory role will be transferred to a Community based body (EASA), based on measures initially co-ordinated by the SRC (assuming the Community accession to EUROCONTROL)
- a common performance regime should be developed and enforced by an appropriate body, with the PRC playing a monitoring role
- the requirements for economic regulation will be determined as part of the Economic Regulation Study
- the requirements for airspace regulation will be determined as part of the Airspace Management and Design Study
- in order to avoid generating a conflict of interest within EUROCONTROL, the current service provision functions within the Agency may have to be reviewed, in particular the Maastricht UAC and the service provision elements of CFMU and CRCO.

4.7.4 Competition issues

The issues generated through the creation of a level of competition for the market, as is envisaged in the near to mid terms, include:

- a gradual rationalisation of service providers, progressed during the competitive tendering for licenses, will that mean smaller or less efficient inflexible players may not be able to compete effectively for the market

³⁹ In the specific case of Germany a constitutional amendment might be needed

- although there will be the creation of an open standardisation process, there may only be a limited number of equipment suppliers capable of tendering for generic contracts within the Community.

4.7.5 Disputes and appeals

The introduction of competition for the market creates the need for a mechanism through which any stakeholder (regulators, service providers, users, suppliers, employees, etc.) can appeal against a decision or resolution and through which disputes between actors can be arbitrated in an efficient and timely manner. The definition of this mechanism is outside the scope of this study.

4.7.6 Accident investigation

The increasing application of trans-national services will also raise the need for the creation of a more regionally based accident investigation forum. Once again the definition of this element is outside the scope of this study.

4.7.7 Military issues

Military issues are discussed in detail in Section 3.5. Efficient use of airspace requires there to be greater flexibility and transparency between civil and military operations. The ability to transfer licences between successive service providers can be achieved through provisions in the licence that require the definition of service level agreements between the service provider and the military authorities of the States in which the service is provided

However, some States may be unwilling to compromise perceived national defence interests and restrict any attempt to consolidate airspace or allow non-national service providers to operate in their sovereign airspace.

4.8 CONCLUSIONS

This section has reviewed the potential for market re-organisation. The analysis is based on the output of the High Level Group. This raises a number of issues that must be considered, including those related to:

- preservation and precedence of the safety culture
- separation of regulation and service provision
- the monopolistic nature of air traffic control in a given volume of airspace at least in the current and medium-terms and the scope for unbundling or bundling services
- the need to optimise the ATM system as a whole
- the need for an appropriate system of granting authorisations for service provision
- the inclusion of all affected staff in the reform process
- harmonised training procedures and agreement of a common European licence to standard qualification.

Examination of the situation that has arisen following the restructuring of the regulatory and service provision regimes for ATM in Australia, Canada and New Zealand, points to several conclusions:

- following the restructuring process as undertaken in these States will not result in the creation of a Single European Sky because the single nation solutions reached have only addressed concerns of efficiency, etc. and has not considered regional integration

- despite commercialisation of service providers and implementation of some supporting regulatory measures, there has only been a very limited unbundling of services. This implies that such unbundling is only likely to take place if the regulatory regime actively supports it
- in each case, a strong safety regulation regime, independent from service provision, has been put in place
- in some cases, light regulation concerning charging and competition has resulted in concerns about abuse of monopoly position and disputes concerning levels of charges. This implies that the appropriate depth of regulation and associated transparency in process are required of a successful regulatory regime
- provisions are made in the law establishing the service provider or the licence governing its operation to ensure that public service obligations are fulfilled. Licences for service providers should specify the public service obligations to be imposed.

Analysis of restructuring in other sectors – rail, electricity, water and telecommunications allows additional lessons to be learned, noting that some regulatory systems are designed to encourage competition (electricity, telecommunications) whereas others are designed to regulate monopoly services (rail and water). The latter are most relevant for comparison with Direct Core Services in ATM whereas the former are most relevant for comparison with Direct Non-Core and Ancillary Services.

For Direct Services (i.e. the monopoly situation), the following conclusions can be drawn:

- the regulatory framework must view the whole European ATM system in its entirety, concerning seamless interoperability, capacity, investment and other system-wide issues
- separation of regulatory and operational functions is essential for development of safe, efficient and cost-effective networks
- forced unbundling can result in over complexity and inefficiency. Therefore, unbundling should be facilitated but not be mandatory
- conversely, prevention of bundling of services or operators (horizontal and vertical integration) on competition grounds can perpetuate complexity and inefficiency. Therefore, integration should be allowed but should be subject to the normal controls relating to competition, discrimination, access, etc.
- licensing at national level, with the requirement for multiple licences for international alliances, does not encourage and might actually discourage the setting up of international alliances. Therefore the licensing regime should be set up so that multiple licences are not required
- poorly thought-out performance regimes can promote perverse behaviour on the part of service providers, that is not in the best interest of the users. Therefore, in order to avoid this, the ATM performance regime must be carefully designed and tested.

Analysis of the electricity and telecommunications sectors (most relevant to Direct Non-Core and Ancillary Services) indicates that the creation of the Single European Sky will need more than application of competition rules and harmonisation of national approaches. It appears that a European licence would be a principal enabler of trans-national service provision (this conclusion is equally valid for Direct Services). The principal conclusion relevant to ATM is, therefore, that European licences will be required to promote the creation of the Single European Sky.

In addition, some generic lessons concerning restructuring of regulatory environments can also be learned:

- risks will be re-allocated from the State or Community level, which will have a regulatory role, to the service provider, which will have a managerial and operational role. This implies that service providers must take measures to control and mitigate such risk through, for example, implementation of safety and risk management regimes and insurance schemes
- the economic regulatory regime must assess the overall system for disincentives to investment, e.g. near to the end of licensing periods or when the investment is disproportionate to the level of return that could be expected. This could apply in the ATM environment for major investments, such as air traffic control centres
- restructuring often results in the actors in the industry re-thinking their approach to their business strategies. The players may become more broad, e.g. ATM service providers could diversify into new markets, or they may become niche, e.g. a provider that currently provides the whole range of services could specialise in one or two unbundled services
- there may be resistance to change from a wide variety of actors in the sector that wish to preserve the status quo. Therefore, the restructuring of the regulatory environment should include all stakeholders in the process as far as possible to encourage feedback, buy-in and sense of ownership. This is currently being achieved through the Industry and Social Group process
- change will require strong political leadership, supported by strong administrative competence. Political buy-in and support from the Member States, aided by leadership from the Commission, will be essential to ensure the timeliness and success of the Single Sky programme. The High Level Group process is addressing this issue
- however, political interference and extensive compromise can result in dysfunctional or inefficient systems. Therefore, the Commission should drive the Single Sky activities to ensure that the best overall solution is reached rather than a set of compromises and trade-offs
- rapid implementation of new regimes with subsequent adaptation and fault rectification has generally been found to produce more effective results than a lengthy process to address all issues and options in depth. It appears likely, therefore, that the process to facilitate the creation of the Single European Sky should proceed as rapidly as possible but should have built in flexibility so that fine-tuning can occur at a later date.

One of the key enablers in re-organising the market for ATM is related to the potential for unbundling and bundling services. The decisions concerning bundling and unbundling services should be left to the service providers themselves, in conformity with the regulatory regime in place. The regulator should not interfere beyond determining the regulatory and licensing requirements.

The regulatory regime itself should create structures for service provision that promote the service providers to bundle or unbundle services based on rational safety and efficiency criteria. There should, therefore, be no in-built bias that favours either bundled or unbundled services. To achieve this, irrespective of whether the services are provided in an integrated or unbundled form, the regulatory framework should:

- apply licences to services on a service-by-service basis
- ensure the level of transparency in the provision of services is sufficient to determine the validity and effectiveness of any unbundling
- ensure that reporting and accounting processes are separate and distinct for each service

- apply performance requirements to services on a service-by-service basis

When services are provided on an integrated basis, the regulatory framework should

- require the services to be provided by independent cost centres within the service provider organisation, with the appropriate service level agreements and internal cash flows governing the relationship between cost centres
- ensure that standard and transparent cost allocation procedures are applied to determine how costs of shared functions are allocated to individual service lines.

The first stage of promoting the unbundling process is to create a generic and mobile skill base through the issue of a common European personnel licence. This would be complemented by the promotion of specialised business units or independent companies for the provision of Ancillary Services such as CNS or FDP services. The process would create competition for the market by allowing service providers to spin-off, outsource or bid for infrastructure services irrespective of national boundaries.

A final stage in unbundling services would be to promote, for any given volume of airspace, the optimisation of operational sectors and interfaces with adjacent service providers. This is intended to create additional competition for the market through the provision of En route, Approach and Aerodrome services by combinations of service providers which can best meet the requirements of the airspace.

In parallel with the promotion of unbundling services, the promotion of bundling services, through horizontal or vertical integration, should ensure the system is optimised as a whole. Market forces will lead the unbundling or bundling of services as service providers search to find the most effective way of meeting the needs of any particular airspace, if bidding for licences to operate the services.

Restructuring of the ATM market will also have significant impacts on human resources, the rights and obligations of service providers, regulatory requirements, issues of competition and military applications. Re-organisation of the market will also create the need to introduce new mechanisms including the ability to resolve disputes or raise appeals and accident investigation for trans-national applications.

5 SCOPE FOR REGULATION

5.1 INTRODUCTION

This section establishes the areas to be covered in the Community Regulatory Framework to establish the Single European Sky. This definition of the Community Regulatory Framework is based on a number of assumptions:

- although the complete and exclusive sovereignty of the State over its airspace is recognised in the Chicago Convention, pooling or joint management of this sovereignty could be used to enable actions to be taken at Community level to create the Single European Sky
- trans-national service provision is addressed from a regulatory perspective at Community level, although Single State service provision remains the regulatory responsibility of the State concerned
- competition, environmental issues and social provisions will be dealt with through the normal channels meaning that they are excluded from the ATM Regulatory framework.

This section establishes the competence of the Community to be involved in ATM matters, together with an outline of the issues to be addressed in the Framework and describes some of the critical issues:

- Community competence
- exercise of regulatory powers
- service provision
- social provisions
- licensing
- consultation
- transparency.

5.2 COMMUNITY COMPETENCE

There are a number of instruments that establish the competence of the Community in issues relating to air traffic management:

- Article 80(2) EC allows for the Council, by a qualified majority vote, to decide whether, to what extent and through which procedures to apply Treaty Provisions and the Common Transport Policy (CTP) framework to air transport, thereby providing a broad legal basis for the implementation of Treaty objectives. The Regulation establishing the European Aviation Safety Agency (EASA) has set a precedent in this area
- Article 155 EC allows the Community to act to promote economic and social cohesion through the creation of Trans-European Networks (TENs) including, *inter alia*, transport networks. Decision⁴⁰ no 1692/96/EC refers to the Trans-European Air Traffic Management Network and, elsewhere, to the Airports Network
- Articles 155 and 156EC are concerned with the implementation of the TENS
- as a last resort Article 308 EC could be invoked in the situation where no other Treaty article provides a suitable legal basis for action.

⁴⁰ "Community guidelines for the development of the Trans-European Transport Network", Decision of the European Parliament and the Council, 1692/96/EC, 23 July 1996

The principle of subsidiarity requires that the Community only take actions where objectives cannot be achieved by actions at the national level alone. Clearly the case of ATM is best addressed at the European level because:

- the establishment of a Single European Sky requires action at Community level in order to create a uniform regulatory regime, promote cohesion, avoid continued fragmentation and avoid the creation of a set of slightly disjointed national regulatory regimes
- it will be very difficult to define, implement and enforce common rules in a uniform manner at national level partly because insufficient resources are available at individual State level to support regulatory reform
- the Community approach will promote efficiency and cost effectiveness and ensure that best use is made of scarce human resources, particularly to fulfil regulatory functions
- the Community approach will support other Community level objectives, such as harmonisation of conditions of competition, mobility, etc.

However, some actions could also be pursued at national level but within the Regulatory Framework established at Community level. There are significant parallels with the European Aviation Safety Agency (EASA), which is in the process of being created as a Community Agency by means of a Regulation⁴¹.

5.3 EXERCISE OF REGULATORY POWERS

5.3.1 Evolution of regulatory responsibilities

The work performed in this study, together with High Level Group Report and other complementary sources has identified the need for a European Regulator to be created in the framework of the European Institutions in order to ensure that it has the appropriate decision and rule-making authority. It is clear that the existing and proposed State regulators, whatever, their form, will be required to pool some of their responsibilities under the European regulatory regime. Two extreme cases can be envisaged:

- the State transfers all or some of its rights and obligations under the Chicago Convention to the Community, with the result that its internal regulatory responsibilities are minimal, probably restricted to a monitoring role. In this case the Community would take over all responsibility for compliance with Article 28 of the Chicago Convention on behalf of the Member States
- the State retains its rights and obligations and is responsible for implementing the decisions of the European Regulator within its own regulatory framework. In this case the State would be responsible for its own compliance with Article 28 within the framework set by the Community.

In reality, taking into consideration the Community-wide interest and competence in establishing the Single European Sky but acknowledging the principle of subsidiarity, the approach taken will probably be a mixture of the two cases whereby the responsibility for trans-national services is delegated in some way and the national regulators take responsibility for services restricted to their own particular States

Figure 5-1 provides an illustration of the transition from the starting point to the final regulatory framework. There are four steps to the evolution of this regulatory regime:

⁴¹ Proposal for a Regulation of the European Parliament and of the Council on establishing common rules in the field of civil aviation and creating a European Aviation Safety Agency. COM (2000) 595 final, 27 September 2000

- at the starting point, regulation and service provision are performed on a predominantly national basis as at present noting, however, that regulatory and operational functions have been separated (as described in Section 5.4.1). At this stage, the national regulator will be responsible for all elements of regulation (see Section 5.3.2) and licensing (see Section 5.6)
- moving to the first step, some services will be provided in trans-national airspace either by delegation of service provision by groups of States to trans-national or joint service providers. Regulation and licensing of the joint/delegated services is likely to be arranged through plurilateral agreements between the groups of States concerned. This could be achieved by issuing multiple licences or preferably by mutual recognition of a single licence issued by one regulator⁴² with mandated authority from the other concerned regulators/States. This first step is likely to form the **pragmatic solution** to licensing
- a mixed environment will exist in the second, transition step, where a European Regulatory Authority is created. Some of the regulatory and licensing authority vested in the plurilateral agreements will be delegated to the European Regulatory Authority. At the ATM service provision level, this will enable partial organisation of the market by the service providers for those blocks of airspace covered by the European Regulatory Authority. The other trans-national blocks of airspace will remain under the regulatory authority created by the plurilateral agreements, with service provision in these blocks of airspace continuing through joint or delegated providers
- in the final stage, the regulatory authority of the remaining plurilateral agreements will be transferred to the European Regulatory Authority. The plurilateral agreement approach to regulation will terminate. There will no longer be joint or delegated services and the service providers will be able to organise the market to best meet requirements. This includes the national level where service providers will now be appointed according to the standardised licensing regime. This final stage represents the **idealistic solution** and may not be achievable in the short-term.

It is very likely that the regulatory regime used to re-organise the market for ATM services will be based on the pragmatic solution afforded by the first step of revised regulatory framework.

⁴² Note – this regulator does not necessarily have to be the national regulator of one of the States concerned. The regulator could be the national regulator from a third party State or a specialist organisation authorised to undertake such tasks, c.f. Classification Societies in the maritime sector

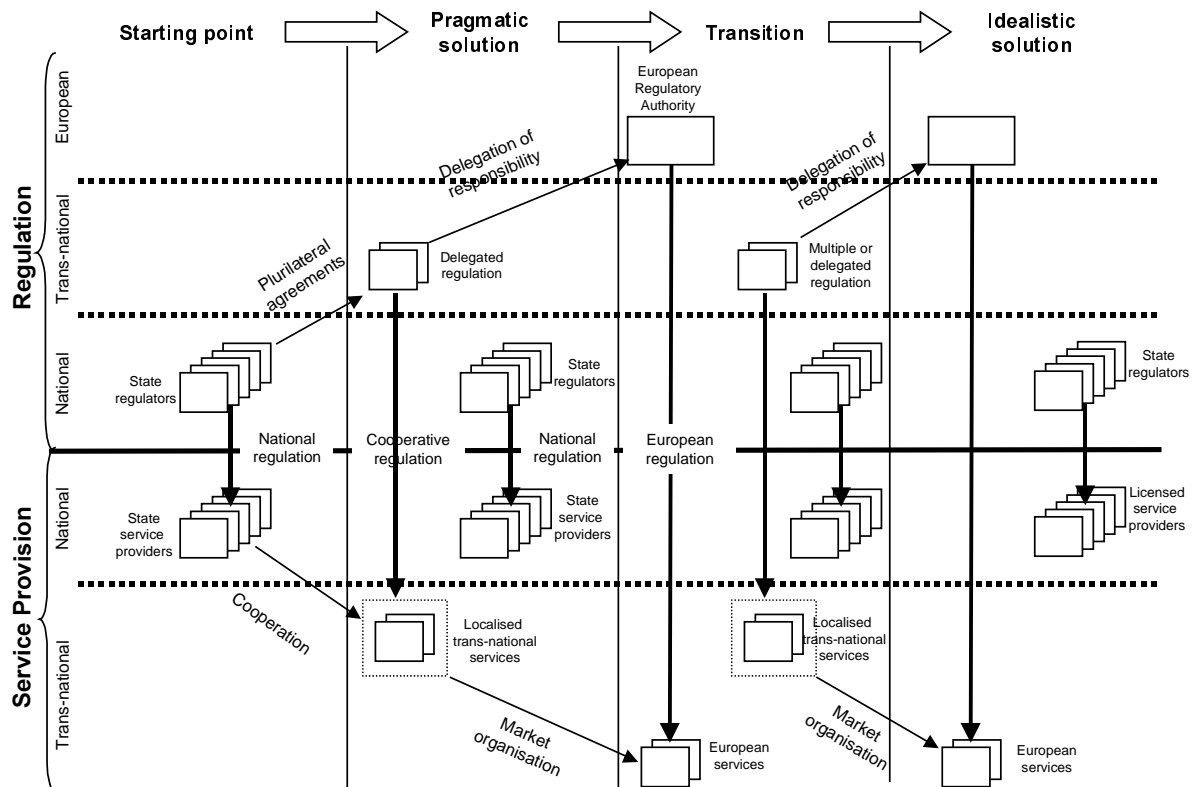


Figure 5-1: Evolution of the regulatory framework

5.3.2 Regulatory areas covered

The principal regulatory areas to be covered at the Community level are:

- **Safety regulation:** ensures compliance with international safety targets, standards, management processes and procedures – in the long term, this is the principal role of the European Aviation Safety Agency (EASA). In the shorter term and as an interim measure, this role could be fulfilled by the EUROCONTROL Safety Regulation Commission (SRC). The Community Regulatory Framework should be established such that safety regulation is independent from the other regulatory regimes and, acknowledging the overarching importance of safety, the safety regulation regime should take absolute precedence over the other regulatory areas. This is a critical issue as it is clearly not acceptable for efficiency and performance to be improved to the detriment of the safety built into the system.
- **Economic regulation:** is required to protect the interests of the consumer, to ensure monopoly services meet service provision objectives, to improve productivity, reduce costs and prevent ATM providers in monopoly or quasi-monopoly positions abusing their positions. Furthermore, the economic regulation regime should provide incentives for efficiency and productivity savings. Investment should also be covered in Community legislation. This is because a provider will rarely make large investments at its own cost, because of the risk that *ex post* the regulator will not allow the cost. So an investment programme is required to be agreed and costed. Typically it is specified in output terms, though inputs may also form part of the specification. *Ex post*, the regulator must check that the investments have been made, and penalise where they have not been made. The economic regulatory regime is being defined by the Economic Regulation Study that is one of the three Single European Sky projects (see Section 1.2).
- **Performance regulation:** is needed to ensure that efficiency gains are not made at the expense of service quality. The performance regulator is also needed to define a uniform

performance regime, performance indicators and reporting requirements. The performance regulator should also be responsible for performance monitoring and the imposition of punitive measures and incentives. Performance regulation and economic regulation are closely linked and are being addressed by the Economic Regulation Study

- **Airspace regulation:** needed to promote the integration of European airspace, to optimise the sharing of airspace between civil and military, to undertake European-wide capacity planning and, potentially to coordinate frequency allocation at the European level. Airspace regulation should also address the regulatory aspects of flow management. At present there is no entity in existence that could address airspace regulation at the European level. Airspace regulation, including civil-military interaction and flow management, is being addressed by the Airspace Regulation Study, which is one of the three Single European Sky projects (see Section 1.2)
- **Compliance and audit:** regulation is needed here to ensure network-wide efficiency rather than allowing service providers to pursue their own particular aims at national level. This requires the formulation, implementation and enforcement of technical and operational standards, procedures and processes
- **Training and qualification:** regulation is needed to create as uniform as possible a training regime for ATM operational staff throughout Europe. This should include a qualification that is recognised and accepted throughout Europe, acknowledging that additional training and specialised qualifications will be needed to deal with local specificities. Defining the requirement for and certification of the training programme are regulatory activities but performing the training itself is a service provision activity
- **Licensing:** in order to promote a harmonised environment, avoid market distortions and ensure a level playing field for service provision at the European level, it is necessary to define a uniform framework for a licence for ATM service provision and common criteria for assessment of potential service providers (see Section 5.6).

5.3.3 Establishment of principles for regulation

At the Community level, the European Institutions will be responsible for establishing the overall European Regulatory Framework in the normal way, probably using Article 80(2) EC as the legal basis. The basic principles for regulation and the associated requirements should, therefore, be set by the Council and the Parliament.

5.3.4 Development of rules

Given the need for the creation of the Single European Sky within a harmonised, common regulatory framework, it is likely that a Regulation will be used as the legal instrument. The rationale for this can be justified by examination of other fields, such as telecommunications and rail, where use of Directives as the legal instrument has not resulted in the development of a uniform, common regulatory framework across the Member States. The Regulation should be developed by the Commission and proposed to the Council and Parliament in the normal way. In order to make best use of the available technical and operational experience, the Commission could use EUROCONTROL expertise as much as possible in the development of rules.

Subsequent to the adoption of the Regulation, it may be necessary to develop additional supporting legislation. This legislation would be proposed by the Commission.

5.3.5 Implementation of rules and granting of licences

5.3.5.1 Idealistic solution

The evolution of the regulatory and licensing regime from the current situation to an idealistic solution is shown in Figure 5-1 and described in Section 5.3.1.

The control of implementation of rules and regulations is the responsibility of the Commission. However, these tasks can be delegated to other bodies as long as the delegation is limited to technical assessments within the competence of the body concerned. This implies that creation of a European Regulatory Authority is feasible.

Within the idealistic situation of the European Regulatory Framework (see Figure 5-1):

- a European Regulator⁴³ should be responsible for all implementation of all rules and granting of licences that are of a trans-national nature, are integral to the creation of the Single European Sky or apply to more than a single State, *inter alia*, defining blocks of airspace, defining standard licences⁴⁴ and issuing licences for service provision for those blocks of airspace that cross national boundaries
- the State regulator would retain responsibility for granting licences for local, single State service provision using the mechanisms defined by the European Regulatory Framework
- implementation of the rules within ECAC but outside of the European Union could be facilitated by the participation of EUROCONTROL.

However, learning lessons from other industries, particularly telecommunications, it is unlikely that the idealistic solution of a pan-European Regulator will be achievable at least in the short-term. Therefore, a more pragmatic short-term solution must be sought.

5.3.5.2 Pragmatic solution

In the absence of a pan-European regulator and respecting the rights of States to sovereignty of their airspace (Chicago Convention Article 1), there are a number of options for award of licence:

- if control of airspace is delegated, the authority that awards the licence would be the State that delegates control of its airspace. In this case the service provider would be awarded multiple licences. This is not a preferable solution from the point of view of service providers or efficiency
- if regulatory authority is shared, a single licence authorised by all of the regulators could be awarded, i.e. the licence will be signed and authorised by all regulators. Such multiple authorisations may be difficult to achieve and the process could be inefficient
- if control of airspace is shared, a single licence could be awarded by one regulator under a mandate provided by the other regulators, i.e. the licence will be authorised by a single regulator and recognised by the other regulators/States. From the efficiency perspective, this approach appears to be preferable

In this regime, the roles of the State regulators and EUROCONTROL remain as described in Section 5.3.5.1 above. There will remain a need to define a standard licence. This task could be undertaken by the Commission supported by the appropriate experts.

⁴³ So far no assumption has been made concerning the status of the European Regulator. It could, for example, be approached through the comitology process or, at the other extreme, be the responsibility of a European agency

⁴⁴ See Section 5.6 for a discussion of the licensing process

5.3.6 Monitoring and audit of application of rules

The Commission should be responsible for monitoring and auditing the application of rules. This process can be supported by the European Regulator in due course should such an entity come into being.

In this role the Commission and national regulatory authorities could be supported by specialist expert bodies, licensed or authorised for such tasks. The use of Classification Societies (e.g. Bureau Veritas, Det Norske Veritas, Lloyds Register, etc.) as certification agencies in the maritime environment give an indication of how such an approach might work.

5.3.7 Judicial control mechanisms

The proposal for a Regulation to create the European Aviation Safety Agency has identified the benefit of creating a first instance specialised board of appeal in order to avoid presentation of numerous technical cases to the Court of Justice.

Such an approach could also be considered for the Regulatory Framework used to create the Single European Sky.

5.3.8 Overview of regulatory process

A potential overall European Regulatory Network is illustrated in Figure 5-2, including the consultation process.

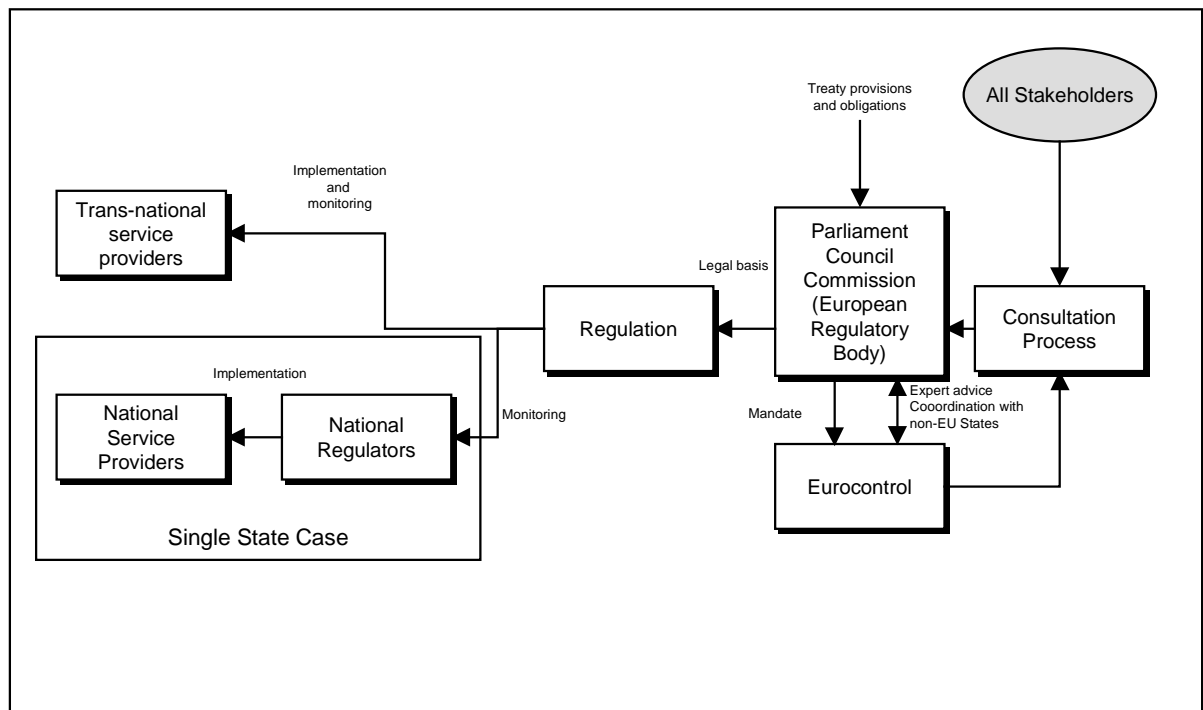


Figure 5-2: Potential European Regulatory Network

The roles of the actors shown in Figure 5-2 are as follows:

- the European Institutions develop the regulations in the normal way
- EUROCONTROL provides resources for the technical and operational support needed to develop the regulations

- the stakeholders are involved through a single, comprehensive consultative process, under the European Commission with EUROCONTROL facilitating the participation of non-EU States
- the Community is responsible for implementing the regulation, except for some specific local cases (see below), issuing licences to service providers and monitoring and enforcing the implementation of the regulation
- the national regulators are responsible for implementing the regulatory framework and issuing licences for specific, local situations within their State.

5.4 SERVICE PROVISION

5.4.1 Overarching principles

The Community Regulatory Framework must address a number of issues relating to service provision:

- the organisational separation of service provision and regulation must be mandated
- the management and financial autonomy of the service provider must be mandated but no pre-supposition should be made on the legal status of the service provider, e.g. special operating agency, national corporation, non-share capital not-for-profit organisation, public private partnership, etc.

Analysis of the *Conventional Integration Model* of service provision has shown that there are significant shortcomings caused by:

- the resulting fragmentation resulting in inefficiency, duplication, proliferation, high interface costs, etc.
- high costs associated with the vertical integration of the monolithic structure of the organisation.

The Community Regulatory Framework must, therefore, allow the efficient restructuring of the service provision framework.

5.4.2 Separation of regulation and service provision

One of the main principles of the restructuring of ATM within Europe is the separation of regulation and service provision. In many industries throughout the world, it is acknowledged best practice that this separation should occur at the organisational level, i.e. it is not sufficient for functional separation with distinct reporting lines within a single organisation. The principal reason for this conclusion is to avoid conflict of interest at the organisational level.

Furthermore, autonomy of service provision and regulation from political influence is also often stated as desirable. This ensures continuity during times of political change, avoidance of short-term changes of policy to support political objectives and financial independence.

The current state of separation of service provision and regulation varies from State-to-State throughout Europe, as indicated in Table 2-2. Figure 5-3 illustrates potential evolutionary steps to reach organisational separation of regulation and service provision in the ATM environment, indicating the current status in each of the European States at present (note the figure does not consider safety regulation, which is being addressed through EASA and the EUROCONTROL SRC).

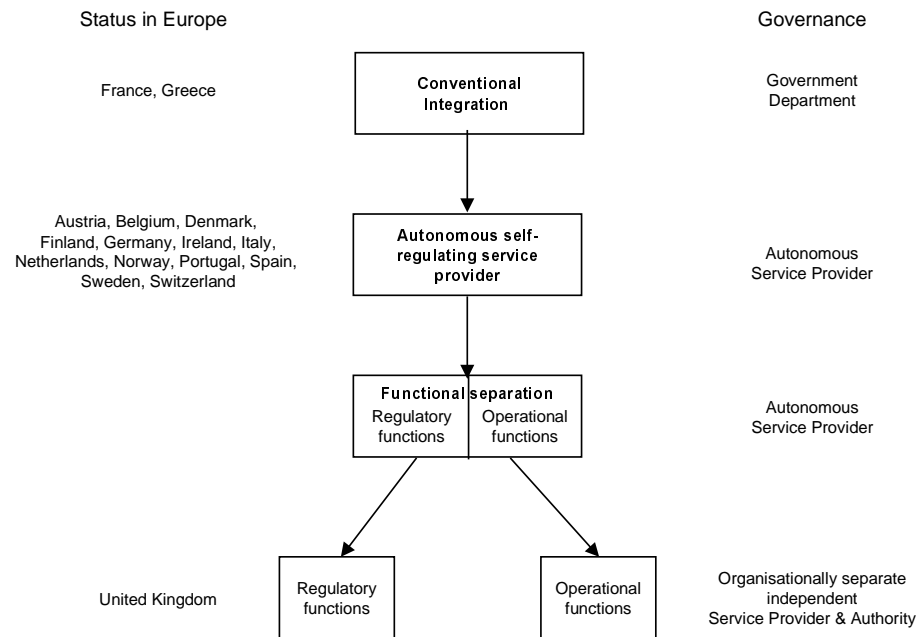


Figure 5-3: Evolutionary approach to achieving organisational separation of regulation and service provision

There are three steps in the evolutionary process:

- creation of an autonomous self-regulating service provider from the conventional integration model
- functional separation of regulatory and operational activities within the autonomous service provider (note this can have already been undertaken in the Conventional Integration Model, e.g. as in the case of France)
- organisational separation of regulation and service provision, probably through the creation of an independent regulator.

Figure 5-3 shows that in Europe considerable effort will need to be expended to reach the final step. Most States are currently at the first stage of restructuring. Implementation of the Community Regulatory Framework should acknowledge the different starting points and specify a timescale for all States to reach the same organisational status.

5.4.3 Trans-national services

To overcome the shortcomings associated with excessive fragmentation of service provision, the Community Regulatory Framework should promote and facilitate the co-operation between service providers, particularly at a regional level through the creation of joint ventures and alliances to enhance the integrated management of airspace and the operation of airspace blocks regardless of national boundaries. This approach relates to en-route airspace (approach services are addressed in Section 5.4.4 below) and is expected to be more efficient than the cumbersome structures established through the creation of multi-national facilities.

Initially, priority should be set on upper airspace because of the precedents set by the Maastricht UAC, the Nordic Centre and the CEATS concept. However, as a large amount of short-haul European traffic operates in lower airspace, this approach should also be extended to lower airspace. Incentives for the creation of alliances could be provided through the economic and performance regulatory regimes, which could provide bonuses for increased performance, efficiency and cost effectiveness.

The Community Regulatory Framework should also ensure that joint ventures, alliances and mergers do not generate monopolistic conditions for the provision of any service and that adequate allowance is maintained to facilitate new market entrants. It should also ensure competition is enabled within markets primarily controlled by existing service providers such as ARINC and SITA.

5.4.4 Promotion of unbundling

The second shortcoming can be addressed through the unbundling of services, which should be facilitated by the Community Regulatory Framework. However, as there is no clear conclusion as to whether wide-scale unbundling is efficient or whether it creates additional problems, e.g. through increased fragmentation, the Community Regulatory Framework should not mandate unbundling – this decision should be left to the service providers themselves. Incentives for change could be provided through the economic and performance regulatory regimes, however, the Community Regulatory Framework should create an environment to create the correct conditions for unbundling of services. Bundled and unbundled services should be treated in precisely the same way to ensure equality of opportunity (see Section 4.5.2.5). This requires the relationship between services to be treated in exactly the same way irrespective of whether they are provided by the same or different entities.

A further step to promote unbundling could be to require some form of financial justification or market testing in the licence awarded for provision of Direct Services to ensure, for example, that the most cost effective set of Ancillary Services are used to support the Direct Service.

5.4.5 Re-bundling

Following the unbundling of services, it may be advantageous to provide some of the services on a trans-national basis, i.e. the unbundled services could be re-bundled or horizontally integrated, e.g.:

- trans-national or regional provision of Ancillary Services, such as surveillance, navigation, communications (including networks), flight data processing
- bundling of, for example, approach services to serve clusters of airports where such an approach can be shown to be more operationally efficient from the ATM system perspective than individual operations. Examples of this approach, albeit within a single State include the London airports and the New York airports. A potential European example of this could provide an integrated approach service to a cluster of airports perhaps including Brussels, Charleroi, Schiphol, Maastricht and Cologne-Bonn.

To facilitate the provision of these services, the European Regulatory Framework should facilitate the establishment and market-entry of suitable organisations. Such organisations will include including

- existing service providers
- private sector companies
- alliances and joint ventures.

Mechanisms that should be used to achieve this objective are required to:

- ensure non-discriminatory access to data needed by service providers in order to operate their services

- prevent the abuse of dominant position by horizontally integrated Ancillary Service providers that are essentially the single source of data or information needed by other service providers in order to function. Examples of this could include the European AIS Database (EAD), the European Aeronautical Network, EGNOS, etc.
- to protect the data from abuse with respect to privacy and the commercial interests of the providers.

The creation of alliances and joint ventures is expected to be a natural response to the licensing regime as service providers and, possibly, new entrants pool resources and competences in order to maximise their opportunity to qualify for licences. This behaviour has been observed in the UK NATS situation, where the successful bidder is a large consortium containing airlines and European service providers, indicating both vertical and horizontal integration.

5.4.6 Incentives

The proposed licensing regime has been designed to ensure that there is no advantage in offering bundled or individual services. It is important, however, that the licences are awarded to ensure the optimum overall service in terms of the key service parameters, including safety, availability, continuity, contingency, efficiency, cost-effectiveness, etc. The award of licences and ensuing economic regulatory regime should reflect these criteria and hence incentivise service providers to organise themselves in the optimum manner. Depending on the specific circumstance, this might involve creation of alliances, joint ventures or even mergers in some cases to provide comprehensive bundles of services or provision of specific, niche single services in other cases. The decision how best to provide services should be left to the service providers themselves.

5.4.7 Interconnection

As highlighted above, interconnection between systems and non-discriminatory access to and exchange of data is key to facilitating the unbundling of services. Interconnection covers a number of areas, including both technical/operational and legal:

- message format and content
- interface standards
- confidentiality/privacy
- security and integrity
- ownership
- access and pricing.

The Community Regulatory Framework must address all of these issues:

- the Framework should mandate the use of existing aviation-specific standards for current applications. In particular all services must comply with the relevant ICAO Standards and Recommended Practices (SARPS) and additional mandatory or widely accepted standards such as OLDI, ADEXP and ASTERIX
- the development of future applications should be encouraged to use, to the maximum extent possible, open and widely used standards, such as transmission control protocol/internet protocol (TCP/IP) for interconnection and data exchange. The Community Regulatory Framework should prohibit restriction of access to or distortion of the market through use of proprietary standards and interfaces
- some data will require the application of measures to protect confidentiality. However, other data will not need the same degree of protection. The Community Regulatory Framework should require service providers to identify and apply the level of confidentiality appropriate to each type of data. Confidentiality could be ensured through

contractual means – i.e. service level agreements between service providers. The service level agreement should specify the purpose to which the data will be put and any associated restrictions, whereby access to data is contingent on the recipient gaining authorisation for access through its licence. Furthermore, the licence could also restrict onward distribution of the data to non-authorised parties

- data providers and forwarders must comply with the security and integrity standards applied to air traffic services. In the future, development of new applications will require development of additional security and integrity standards
- data has some associated value. Through their processes, service providers also create additional value and users could derive commercial benefit from use and further processing of some of the data. The ownership of data is, therefore, important and could be addressed through intellectual property or copyright procedures
- access to data is critical to ensure the correct functioning of the ATM system. As stated above, data has an associated value. Therefore data providers should be prevented from charging prohibitive prices to ATM service providers and other users. This should be addressed through the economic regulation regime. However, subject to meeting confidentiality criteria, the data providers should not be prevented from providing data to other users on a commercial basis.

5.5 SOCIAL PROVISIONS

Restructuring of the market for ATM service provision will have a number of social impacts that must be addressed by the Community Regulatory Framework. It must be recognised that ATM supports an important social function in facilitating the safe mobility of citizens, it also contributes significantly to the economic activity and well-being of the Community.

ATM is critically dependent on employees who form the core of the system. These employees include staff directly involved in the provision of air traffic control, engineering staff that provide support to systems and equipment and air crew, who are expected to take on responsibility for an increased share of ATM in the future.

Although it is not appropriate for the Community Regulatory Framework to intervene directly concerning social provisions as these are covered by other instruments (e.g. Charter of Fundamental Rights of the European Rights, the Social Charter and the Acquired Rights Directive), it must include a number of vital social provisions:

- promote (or possibly mandate) social dialogue, consultation between employees and employers and collective agreements as appropriate
- establishment of harmonised European training scheme and qualifications resulting in the creation of portable licences (see Section 5.3)
- definition of mandatory public service obligations for service providers, including provision of services outside of controlled airspace, e.g. to general aviation, services in remote or low traffic regions and the provision of a degree of contingency to enable provision of basic services in the case of system failure and ensuring that these public service obligations are transparent
- establishment of an independent appeals, dispute resolution and arbitration process. This could be achieved through the existing legal mechanisms at national and European level. However, at the other extreme a European Aviation Ombudsman scheme could be established. In either case, the process should cover disputes between any or all of the actors involved in ATM.

5.6 LICENSING

5.6.1 Principles

In the *Conventional Integration Model* of ATM service provision the terms and conditions, and rights and obligations of the ATM service providers are either well defined or implicitly understood. National law is used to define which organisation is responsible for particular activities – these organisations are either part of the government or have evolved from such. There is only limited scope for change of service provider in some special cases. In this situation, there is little need for the licensing of the service provider.

However, in the future, as the ATM sector restructures, there will be a need for regulatory authorities to authorise entities to provide services and to define formally the rights and obligations associated with service provision. One of the most likely methods for achieving this is through issuing licences for services. These authorisations or '*cahiers de charge*' provide a means of control over the service provider. This method is used routinely and successfully in many industries with important safety or social functions whether or not competition takes place. However, it is not in universal usage in the ATM sector.

Therefore, one of the first objectives of the Community Regulatory Framework should be to establish the **principle of licensing** as a cornerstone of the future arrangements for ATM service provision. This should include both the provision of Direct Services and Ancillary Services. In the short-term the Community Regulatory Framework should promote licensing and enable States to have the freedom to appoint qualified service providers to manage portions of their airspace. In the long term, licensing of service providers should be mandated using a standard framework licence (adapted to local conditions) to ensure that uniform terms and conditions are applied to all service providers, to:

- avoid distortions in the market, i.e. create a *level playing field*
- act as a regulatory tool for monopoly services
- facilitate competition for the market in the case of natural monopoly services
- promote competition in the market in other areas, e.g. Ancillary Services
- facilitate access of new entrants to the market
- enable cross-border service provision avoiding complex multilateral agreements
- facilitate unbundling of services.

5.6.2 Types of licence

Licences for Direct and Ancillary Services might be slightly different.

The licence for the Direct Service (both Core and Non-Core) could contain two parts:

- an **authorisation** certifying that the service provider is *fit and suitable* to provide the particular Direct Service in question and complies with terms under which the licence is issued, confirmation of the relationship between the licensee and the regulator and the governing legislation. This part of the licence gives authority to provide the service without actually giving the provider the right to provide the service, i.e. it determines that the provider is *fit* to operate. This criteria to be applied to this part of the licence are listed in Section 5.6.5
- a definition of the **services provided**, including service levels to be achieved and any other mandatory operating conditions and restrictions under which the licensee may operate. This part of the licence can be viewed as a concession/franchise that *allows* the provider to operate and defines the *obligations and requirements* if its operation.

The licence for Ancillary Services could be restricted to the **authorisation** part alone. This authorisation could be linked to a geographic volume (i.e. area and range of flight levels) and

allow the service provider to offer services to Direct Service providers covering numerous blocks of airspace throughout Europe (as long as the necessary infrastructure is available). The rationale for this is that Ancillary Services will not be provided in isolation but as part of a service package with other Ancillary Services and a Direct Service. The performance requirements for the Ancillary Service will be defined through a **service level agreement** (SLA) between the Direct and Ancillary Service providers. This approach could facilitate competition between licensed Ancillary Service providers, who could make proposals

All services will require licences irrespective of whether they are provided individually or as part of an integrated bundle.

5.6.3 Licensing regimes

There are a number of different types of licensing regime available:

- ***Fixed-term licences for management:*** this is a licence given over a fixed period to the appointed management of the service provider. This type of licence does facilitate some competition for service provision, if due allowance is given for service management entities from outside the State to compete
- ***Fixed-term licences for service providers:*** this is a licence given to a service provider to service a given airspace over a fixed period of time. Under this type of licence there is a need to ensure licensees duly cater for the long-term development needs for the airspace concerned. If such provision is not made, it does not allow for the transfer of licences between providers and creates a *de facto* authorisation to provide services for an unlimited term
- ***Sunset clauses across the Community:*** this is a method to organise a level of competition for the market by regulating the licence period for service provision across the Community and thereby facilitating the provision of services by those best fit for the airspace concerned. However, this type of regulation across the Community could also have a negative effect in the longer term in that the smaller service providers would be unable to compete against the bigger players – thereby creating super monopolies
- ***Operate-maintain concessions:*** Here a concessionaire is selected to take over the assets, operate them and maintain them for a period. The concessionaire might then be replaced by another company. The advantage is that the State retains ownership of strategic assets; the disadvantage is that the concessionaire has no incentive to make strategic investments.

There is no overall stakeholder agreement on which licensing regime is most applicable. Determination of the most widely acceptable solution should be part of the inclusive consultative process (see Section 5.7) concerned with rulemaking.

5.6.4 Standard licence

Following the determination of the most appropriate format for a licensing regime, the Community should formulate the framework of a standard licence to ensure uniform application of the regime across the Community. Typically, this type of licence should include but not be restricted to:

- the scope of services to be provided, including public service obligations
- reporting requirements to the licensing authority
- the period of the licence and the notice period for termination
- the economic regulatory regime

- the rights and obligations imposed on the service provider, including access to airspace and spectrum, the requirement to provide data to other service providers, non-discrimination, etc.
- disposal of assets
- regulatory accounting requirements, including business and investment planning
- prohibition or reporting of cross-subsidies
- arrangements for external subsidy, if necessary
- performance requirements
- interfaces to, obligations regarding and exchange of data with the military
- obligations to comply with European technical, operational and other standards.
- business and asset management.

Example standard licences for Direct and Ancillary Services are provided in Appendix A.

5.6.5 Awarding authority

5.6.5.1 Criteria for award

The licensing regime should define the basic criteria to be applied for the award of licences, i.e. define the criteria used to determine the fitness of the potential service provider to provide ATM services. Criteria, judged at strategic, operational and individual levels, for making such an assessment will include⁴⁵:

- past experience and credibility
- safety management systems and processes
- quality management systems and processes
- financial health, long-term viability and sustainability
- human resource policies, evidence of their implementation and staff views
- customer focus (cost, performance, etc.)

5.6.5.2 Pragmatic approach

In the short term, prior to the possible creation of a European Regulatory Authority, the preferred approach to award of trans-national licenses is through the award of a single licence by a single national regulator mandated and recognised by the other concerned regulators/States (see Section 5.3.1).

Each individual case will require the conclusion of a plurilateral agreement between the States involved that will identify and mandate the appropriate regulator and define the terms of the mutual recognition of the licence.

Licences for services that serve only a single State should remain the responsibility of the State concerned within the overall regulatory and standardised licensing framework, thereby distinguishing between situations that have a Community dimension and those that do not.

5.6.5.3 Idealistic approach

The creation of a European Regulatory Authority will supersede the need for inter-State agreements and implies the pooling or joint management of the sovereign obligation to

⁴⁵ These criteria are elaborated in Appendix A

provide air navigation facilities (Chicago Convention Article 28 and Annex 11) at the Community level.

As already established, Community competence in ATM can be justified through Article 80(2) EC. As the regulatory process will require operational and technical expertise, the Commission could delegate some responsibilities to a European Regulatory Authority, c.f. EASA for example. This delegation would, however, be restricted to technical issues within the sphere of competence of the Authority, which would not be able to define policy without amendment of the Treaty. Legal examination of a similar Authority⁴⁶, albeit in the telecommunications domain, reached the following conclusions:

- the Authority can only be set up to operate within a limited margin of discretion (including, in this case, licensing trans-national services and also noting that one of EASA's activities will be certification, which in itself is a type of licensing)
- powers delegated from the Commission are clearly defined and subject to strict review
- the Authority is subject to the same procedural safeguards as the Commission
- the Commission only delegates powers that it has received under the EC Treaty
- the delegation of powers is clearly justified under the principles of subsidiarity and proportionality
- the Authority is created in a non-discriminatory way.

From the ICAO perspective, Article 1 of the Chicago Convention "*recognises*" the right of the State to the sovereignty of its airspace – it does not mandate sovereignty or preclude its transfer. Article 28 requires States to provide, *inter alia*, air navigation facilities in its territory "*as far as is practicable*". Annex 11 of the Chicago Convention on air traffic services states "*Contracting States....shall.. arrange for such services to be established and provided...*" and "*by mutual agreement a State may delegate to another State the responsibility for establishing and providing air traffic services...without derogation of its national sovereignty*". Following this approach, it may be possible for the Member States to delegate their individual responsibility for establishing and providing air traffic services to the Community as long as the States have a mechanism to ensure that their obligations are met, e.g. through the Council. As mentioned previously, the Montreal Convention of 1999 has made provision for Regional Economic Integration Organisations to ratify the Treaty on the part of their Members, subject to authorisation from the Members. Therefore ICAO appears to be moving toward acknowledgement of joint management of sovereignty.

5.6.5.4 Concluding remarks

It appears possible for the Community Regulatory Framework to supersede plurilateral inter-State agreements. A European Regulatory Authority with powers delegated by the Commission can, in principle, be established to operate the regulatory framework and licensing process. This will be subject, however, to political agreement from the Council and Parliament.

However, the process required to establish the European Regulatory Authority is likely to be lengthy and will not be practical in the short-term. It is concluded, therefore, that the **pragmatic approach** to licensing as described in Section 5.6.5.3 is used to facilitate the reorganisation of the market for ATM services.

⁴⁶ "Issues associated with the creation of a European Regulatory Authority for telecommunications", report for DGXIII, NERA and Denton Hall, ECSC-EC-EAEC, March 1997

5.6.6 Data exchange and interconnection

The continuous availability and interchange of data is critical to ensure the correct and proper functioning of the ATM system. As discussed in Section 5.4.7, the licence should address:

- message format and content
- interface standards
- confidentiality/privacy
- security and integrity
- ownership
- access and pricing.

The license will also need to cover requirements for sharing of data with military service providers.

5.7 CONSULTATIVE PROCESS

The Community Regulatory Framework must also define and formalise the public consultation process in order to:

- ensure that the proposed changes are acceptable to the maximum degree possible to all of the stakeholders and promote consensus
- obtain feedback on the proposed changes
- increase public access and participation in the rulemaking process; to discuss and debate issues from various viewpoints; to bring the various rulemaking proposals to the notice of decision makers at an early stage; and to facilitate harmonisation with other national aviation jurisdictions
- to ensure that the views of regulators, service providers, users, industry, operational staff (controllers, engineers, air crew, etc.) and passenger representatives are taken into consideration in the requirements definition and technology development process
- ensure adequate data is available for needs of regional co-ordination and optimisation of service provision, while facilitating the exchange of data and operational information with other bodies

Active consultation should be sought with all stakeholders including representatives from the air transport community, general aviation, the military, the service providers, regulators, governments, employees and Unions and other interested parties including passenger representatives. Consultation with the public more generally should not be precluded.

The consultation process should become a statutory requirement as part of the Community Regulatory Framework, noting the obligation that this imposes on all parties to participate. Participation by all stakeholders in a permanent consultative body should be mandated as far as possible.

Consultation should cover both the formal rulemaking process, including safety, performance, economic and airspace regulation and standardisation, and more technical and operationally focussed activities, such as requirements definition, and the design of systems, procedures and airspace.

5.8 TRANSPARENCY

Transparency is key to the successful operation of the restructured ATM environment and generating high levels of public confidence. Transparency must occur at both the regulatory and service provision levels.

In order to promote transparency, the Community Regulatory framework must cover issues such as:

- accounting standards and financial reporting requirements to facilitate the efficient economic regulation of the providers and to facilitate unbundling where appropriate
- definition of performance indicators, their monitoring, statistical analysis, and publication
- safety monitoring and reporting.

5.9 COORDINATION WITH THE MILITARY

Coordination with the military is required at several levels, as described in Section 3.5. Operationally, civil service providers will need to interface with military providers to facilitate the air traffic control interface, exchange of data, coordination of common facilities, operational of regional facilities, etc. This operational interface will take place between a civil provider and a military provider on a bilateral basis and can be dealt with through the licensing process. A Community framework could organise the commercialisation of ATM services by requiring the development of service level agreements for civil-military co-ordination.

At a more strategic level, it is necessary to:

- define and agree a uniform set of military requirements, especially concerning the use of and access to airspace, on a European basis and integrate these requirements with civil requirements as a coherent and comprehensive whole
- establish rules for the optimum sharing of airspace, which may require exclusion of military operations from some key areas.

These objectives must be addressed through the appropriate mechanisms, which are, therefore, probably outside the scope of a Community Regulatory Framework. These issues are being addressed by the Airspace Regulation Study.

6 PROPOSED COMMUNITY REGULATORY FRAMEWORK

6.1 INTRODUCTION

This section describes the elements of a proposed Community Regulatory Framework necessary to enable and facilitate the restructuring of the market for ATM services. It is expected that these elements will be integrated with the corresponding output from the Economic and Airspace Regulation Studies to create an overall piece of European legislation. Therefore, elements relating to economic and airspace regulation are not considered in this section but will be incorporated in the final Regulation.

The section is structured as follows:

- Section 6.2 outlines the substantive requirements, including basic principles, scope, objectives, applicability and definitions
- Section 6.3 describes the requirements for service provision
- Section 6.4 describes the modalities of service provision
- Section 6.5 outlines the relations between the stakeholders in the ATM domain
- Section 6.6 addresses incentives to promote the restructuring of the ATM market
- Section 6.7 describes the process for exercising regulatory powers.

Subsidiarity and proportionality: Due to its scope and regional nature, development of a Single European Sky is clearly best addressed at Community level, possibly using Article 80(2) as the legal basis. This requires a decision by a qualified majority on the part of the Council. Principles that justify addressing the regulatory framework at Community level have been described in the High Level Group Report:

- airspace should be managed at European level in the common interest acknowledging the local specific characteristics justifying measures adapted at this level
- the European Union has at its disposal a wide-range of instruments to enable the efficient development of the Single European Sky, including regulatory powers, training and assistance instruments, dialogue and control mechanisms and the new competence in the defence domain. These instruments are not available in any of the potential alternative approaches.

Given the need for the creation of the Single European Sky within a harmonised, common regulatory framework, it is likely that a Regulation will be used as the legal instrument. The rationale for this can be justified by examination of other fields, such as telecommunications and rail, where use of Directives as the legal instrument has not resulted in the development of a uniform, common regulatory framework across the Member States.

6.2 SUBSTANTIVE REQUIREMENTS

The section on substantive requirements determines the basic principles of regulation, including some that are horizontal across the three domains being considered under the Single Sky initiative – namely restructuring the ATM market, economic regulation and airspace regulation.

6.2.1 Scope of regulation

This article should define all elements of the civil Air Traffic Management services as described in this report, whether supplied as Direct Services or Ancillary Services as summarised in the following table (see Section 1.3 for a description).

	Direct Service	Ancillary Service
Non-Core	<ul style="list-style-type: none"> • Meteorological information 	<ul style="list-style-type: none"> • Communications <ul style="list-style-type: none"> - Aeronautical fixed services - Aeronautical mobile services
	<ul style="list-style-type: none"> • Aeronautical information 	<ul style="list-style-type: none"> • Navigation
Core	<ul style="list-style-type: none"> • Airspace management 	<ul style="list-style-type: none"> • Surveillance <ul style="list-style-type: none"> - Surveillance - Surveillance data processing
	<ul style="list-style-type: none"> • Air traffic flow management 	<ul style="list-style-type: none"> • Flight data processing⁴⁷
	<ul style="list-style-type: none"> • Flight information services 	
	<ul style="list-style-type: none"> • Air traffic control <ul style="list-style-type: none"> - Area control - Approach control - Aerodrome control 	
	<ul style="list-style-type: none"> • Alerting Service 	

Table 6-1: Scope of services considered

Reference should be made to the relevant supporting documentation, including ICAO Annex 11, for comprehensive definitions of the services.

6.2.2 Objective of regulation

This section defines the purpose of the regulation, which is to facilitate the creation of a Single European Sky. Regardless of the nature of the supplier, the regulation aims to ensure that air traffic management services in the Community:

- meet the appropriate safety requirements
- are seamlessly interoperable
- provide adequate levels of performance
- are independent
- are open to scrutiny
- are available continuously to users
- comply with the relevant Community objectives
- fulfil the obligations of the Member States with respect to the Chicago Convention.

6.2.3 Basic principles

This section of articles sets out the key principles by which the regulation is guided. The regulatory framework will be accepted and understood more readily across the Community if it is built on sound foundations, which could be seen as the following key principles:

- compliance with ICAO principles should be guaranteed
- safety regulation takes precedence over all other regulatory regimes
- regulation and service provision are separate (see Section 5.4.2)

⁴⁷ Flight data processing is not normally considered as an independent function but, because it can be factored out as a self-contained element, it is considered as a self-standing segment of the ancillary services (see for example Section 4.5.2.2 on unbundling of services)

- the regulator is independent and follows transparent processes
- standard licences are used to govern ATM service provision in a uniform way throughout the Community
- access to ATM services should be open and non-discriminatory
- the service provision process is transparent
- ATM services should meet certain minimum standards including performance, availability and continuity
- services should, so far as practicable, contribute to the protection of the environment

6.2.3.1 Precedence of safety regulation:

This article sets out the position of safety regulation in the regulatory framework. Maintenance and improvement of safety is the principal objective of both the regulatory and service provision elements of the ATM system. In order to ensure that conflicts of interest do not occur, the safety regulation system must be:

- recognised as overriding other regulatory elements (e.g. performance)
- separate and independent from the other regulatory elements.

In order to ensure that safety regulation overrides other regulatory functions the regulator must split the function of safety regulation from the other regulatory elements of ATM.

There can be different interpretations of what is meant by separation, for example there could be a difference between functional and organisational split. An organisation could be split into two or more parts functionally as well as organisationally, in that it may have separate staff carrying out separate functions, in separate locations. An alternative could be to ensure that the organisational split provides for separate reporting lines and overall responsibility but that the functions beneath this are combined, being performed in the same location by the same staff. The importance of insulating the safety regulation from external and internal pressures means that this article should require an organisational separation of the safety regulator from the other regulatory regimes.

The article could establish EASA as the safety regulator for ATM with the other regulatory functions being performed by other (non-safety) regulators.

6.2.3.2 Separation of regulation and service provision

This article clarifies the principle that separates regulatory function from operational function within the ATM system, in order to ensure that there are no conflicts of interest. No organisation providing a service must be responsible for regulation, either of itself or of any other body providing services. The article should, therefore, mandate the creation of national regulatory authorities to address issues that are not addressed at the Community level.

The final degree of separation between regulatory and operational functions should be organisational, i.e. the governance of bodies responsible for regulation and operation should be separate and distinct from each other. However, the article should allow an evolutionary approach to restructuring, as indicated in Section 5.4.2. A number of stages could be envisaged for this approach:

- a requirement for the functional separation of regulation and operations
- followed by the creation of two separate entities, i.e. organisational separation, responsible for regulation and operations.

The article must also state that, where one service provider is providing a service to another, as in the case of the relationship between Direct Service providers and Ancillary Service providers, both parties must be licensed to provide their respective services. The regulatory function can be provided by the regulator who has originally issued the licence.

6.2.3.3 Independence of the regulator

This article declares the independence of the regulator. The regulator should be independent from (see Section 5.4.2):

- service providers, to prevent any conflict of interest
- national governments, to avoid any national bias in the regulatory process
- direct influence by the Council and the Parliament, to ensure continuity during times of political change, and to remove any involvement in the political process
- users, to avoid any discrimination or abuse of dominant market positions.

This requires that the regulator is organisationally and institutionally separate from national and European government. The regulator must be autonomous and have its own governance structure together with financial and management independence.

6.2.3.4 Transparency in the regulatory process

The regulator must be recognised as independent, this article requires the regulatory process to be transparent. It must be clear

- why regulations are developed and imposed
- how the regulator arrives at decisions on issuing licences
- what actions the regulator has taken
- what costs are incurred by the regulator.

Therefore, this article of the regulation should set out the requirement of the regulator to publish accounts and annual reports to a standard format.

6.2.3.5 Technical, operational, procedural standards

This article should set out the standards for technical, operational and procedural aspects of the overall ATM system as required. The article should allow for changes to these standards to be implemented as ATM organisations and technology evolve. In particular standards should be directed at:

- convergence of the system/investment lifecycle across ECAC
- convergence of system functional capability across ECAC
- convergence of operational procedures as far as is practicable
- inclusion of stakeholders in the technology/system development process

The article should refer to the relevant supporting legislation.

6.2.4 Area of applicability

This article should define area of applicability of the regulation, which should include the Community, Norway and Switzerland. The article should determine the airspace volumes that are covered by the regulation.

6.2.5 Definitions

This article sets out a comprehensive set of definitions to be included in order to ensure that there is a common understanding of the terminology used.

These definitions should be based on the ICAO definitions but should leave no room for ambiguity or misunderstanding. The various elements, services, current providers, governing legislation and other terms used in the provision of ATM are all to be covered.

6.3 REQUIREMENTS FOR SERVICE PROVISION

6.3.1 Issuing of licences

This article sets out the authority of the regulator to issue licences for services in Air Traffic Management, as described in Section 5.6. The regulator is authorised to issue and revoke licences and to regulate the performance and management of service providers in accordance with the terms of the licence (see Section 5.6.5).

Following the pragmatic approach, there are two levels of regulator:

- the national regulator, responsible for licensing of local, single State services
- a regulator, mandated by a grouping of States, responsible for issuing licences for trans-national services covering those States.

The article dictates that individual licences are to be issued for each block of airspace identified in the Airspace Regulation Study and for each individual Direct Service provided in that block of airspace. Licences for Ancillary Services should be associated with geographic coverage that may span fractions of or multiple blocks of airspace.

The licence for Direct Services should contain two parts: an authorisation part indicating fitness to operate and a concession part allowing operation to a set of specified performance parameters (see Section 5.6.2). The licence for Ancillary Services should contain only an authorisation, specifying minimum performance standards. In order to operate, the Ancillary Service provider would have to conclude a service level agreement with a Direct Service provider.

The article should ensure that licences for each service are standardised across the Community. Illustrative examples of standard licences are provided in Appendix A.

The article ensures that licences are issued on a non-discriminatory basis, e.g. a service provider offering one element of ATM should not be at a disadvantage in the licensing process in comparison with a provider offering a complete bundle of services (see Section 4.5.2.5). Furthermore, discrimination on the basis of nationality should be prohibited.

The article prevents the abuse of a dominant position by any service provider.

6.3.2 Acceptance of licences.

This article ensures that where issued by a recognised regulator, licences shall be accepted by all members of the Community. Conversely, potential service providers that have not been awarded licences should be prevented from providing services.

6.3.3 Establishment of rights and obligations

This article sets out the principle that the rights and obligations of the service provider are those described in its licence (see Sections 3.3 and 3.6 for discussion on public service obligations and special or exclusive rights).

Through common licences (see Appendix A for an illustrative example), the regulatory framework must establish a common set of rights and obligations to be imposed on service providers. Rights should include access to airspace and frequency spectrum, whereas obligations should include non-discrimination, access to information and data.

It is essential that this authorisation is based on uniform criteria throughout the Community in order to avoid distortion of service and ensure fairness.

The obligations of service providers are addressed in more detail below in Appendix A of this report, licensing, as are the suitability of service providers, the terms of a potential licence and the requirements for the organisational structure of a licensee as well as some of the reporting requirements.

6.3.4 Liability and insurance

This article specifies the liability regime under which services are to be provided.

This article also specifies that a licensee must ensure that it is adequately insured against any damages resulting from its role in the provision of services to ATM, and for which it is deemed to be liable following the exercise of normal Community legal processes.

6.3.5 Reporting Requirements of Incidents

This article reinforces the licensee's obligation to report any incidents pertaining to safety to the regulator as a priority. The terms of the Licence will include the detailed reporting requirements.

6.4 MODALITIES OF SERVICE PROVISION

Across the community it is likely that different levels of bundling and unbundling of services will be required, depending on various factors including local infrastructure, technology and existing service provider strengths and weaknesses. However, it is essential for the regulatory framework to function evenly across different levels of bundling so that comparisons in performance can be made.

6.4.1 Bundling and unbundling of services

This article should declare the requirement that the regulator should require the service provider to divide the constituent parts of any ATM bundle into separate services (see Sections 5.4.4 and 5.4.5).

Although it is not to be mandated that services must be provided by separate suppliers for each block of airspace, each service must be separately licensed to allow for transparency of accounting and performance (see transparency in service provision process below).

6.4.2 Freedom to appoint service providers

This article ensures that the regulator may appoint any qualified service provider to manage portions of airspace or provide Ancillary Services to volumes of airspace on a licensing basis. The licence for each service should be awarded on a case-by-case basis, assessed against a specified, transparent set of criteria, irrespective of whether the service is offered individually or as part of a bundle. The regulator should be free to licence parts of a service bundle if appropriate.

Service providers must not be restricted from managing blocks of trans-national airspace or providing Ancillary Services on a trans-national basis.

6.4.3 Transparency in service provision process

The next article of the regulation must ensure that there is full transparency in the service provision process, for safety and for performance reporting (see Sections 4.5.2.5 and 5.8).

The article must demand that the structure of an organisation providing a service must reflect that of the licensing system. Each separately licensed element of the service bundle must be structured in such a way that its performance and accounting procedures are treated as independent from every other part of the bundle even if part of the same overall organisation.

6.4.4 Accounting systems of the service provider.

To assist in the development of such a structure of independence, the next article of the regulation should ensure that the accounting systems employed by service providers are comprehensive, robust and open to the scrutiny of the regulator. Thus the article must require separate accounts to be reported for each separately licensed service.

A method of allocating costs clearly and logically to each element of the ATM bundle must be employed and made explicit, in order to define charging regimes, regardless of whether the service is being provided as part of an integrated bundle by the same supplier or by separate organisations. The method so employed must

- be acceptable as a standard across the Community
- be sufficiently detailed to enable a comprehensive audit.

One potential method to achieve a standard allocation of costs could be Activity Based Costing, where the services provided are broken down into the lowest individual levels of activity in each service and costs allocated to these based on time and resources consumed in each individual activity.

The article should require a common method of allocating costs to services to be employed across all the licensed services in the Community.

6.4.5 Management and financial autonomy for the service provider

The article of the regulation must declare the independence of the service provider, subject to the terms of the licence under which it operates. The management of the service provider must be free from direct interference from government or the regulator. The service provider should also be financially autonomous to the maximum degree possible, acknowledging that certain activities may require subsidy to be viable.

The article should therefore require the assets, budgets and accounts of the service provider to be separate from those of the State.

The article should ensure that the process for payment or acceptance of subsidy of any kind, whether from an external source to a licensed service provider, or between affiliated licensed service providers, is visible and accounted for clearly.

6.4.6 Public Service Obligations

As the nature of service provision changes and providers begin to include private enterprises, the regulatory framework must continue to support the public service obligations of the licensee.

The article should define the general public service obligations to be fulfilled, which should include:

- services to general aviation
- provision of services in remote regions
- provision of a degree of contingency to provide back-up in the case of system failures.

6.5 RELATIONS BETWEEN STAKEHOLDERS

The regulatory framework must ensure that the different Stakeholders in ATM work to ensure that the system provides for an integrated and continuous service.

6.5.1 Access to services by users

This article should declare the requirement for services to be provided on a non-discriminatory basis. Access to airspace and the associated services should be consistent with the provisions of the Chicago Convention, principally Articles 5, 6 and 11.

It is expected that services will continue to be provided and charged based on filed flight plans, in line with current practice. However, the article should allow sufficient flexibility to account for possible future developments, such as the conclusion of service level agreements between service providers and users.

6.5.2 Access to and protection of data

This article should define the freedom of access to data and information and also the obligations for the protection of that data, particularly with respect to privacy (confidentiality) and commercial (ownership) considerations (see Section 5.4.7). The terms and conditions of access to the data should also be defined. The article of the regulation must provide for data to be

- granted on a non-discriminatory basis
- accessed by all licensed entities, with provisions for it to be withheld from non-licensed entities
- facilitated by standard contracts between service providers, which define the rights and obligations of both parties.

The article must also address the need for standardisation in message content and interfaces, specifying standards to be applied where they exist, e.g. ASTERIX for transfer of surveillance data. The article should avoid the prescriptive approach of defining standards itself but should set the appropriate framework for their development.

Where standards do not exist, data vendors should be required to produce the appropriate interfaces at the request of the purchaser in a reasonable amount of time. The purchaser should bear the out-of-pocket cost of this development.

Furthermore, the article should make provisions to prevent the abuse of dominant position in the case that essential data is only available from a single service provider (an example of this could be the European AIS Database (EAD)).

Access must be ensured:

- horizontally in real-time between service providers, e.g. from one ATC provider to another
- vertically in real-time, e.g. between trans-national Ancillary Service providers and ATC providers (and vice versa)

- retrospectively from service providers to regulators, auditors, accident investigators, etc. with a legitimate interest in such access.

6.5.3 Human resources issues

The regulatory framework must address the human resource issues that are a major concern in the ATM system at present.

This article of the regulation should encourage the development of a generic and mobile skill base for ATM by requiring the establishment across the community of:

- a standard system of training
- common qualifications
- a common portable European controller licence.

Furthermore, the article should make provision for transfer of expertise from the service provision domain to the regulatory domain by enabling:

- the regulator to employ staff either on a permanent or temporary basis
- the transfer of staff from service providers to the regulator on a temporary
- the establishment of groups of experts to provide advice to the regulator on a regular or ad-hoc basis.

6.5.4 Promotion of Social Dialogue

Consultation is essential to ensure that all stakeholders are included during any changes to the organisational nature of ATM. ATM is a highly labour intensive activity and will remain so for the foreseeable future. It depends critically on the participation and cooperation of a highly skilled, specialised workforce. Training lead times are long. Stakeholders, principally representing workers in the ATM industry, have stressed the importance of social dialogue in achieving and operating a restructured ATM environment.

This article requires that a consultation process be established to cover the rulemaking process and the creation of an industry consultation body.

The article also recognises the requirement of service providers to:

- take account of existing collective agreements during any changes to the organisational nature of ATM (within the context of current Community legislation)
- maintain or establish a forum for regular consultation with staff in line with current best practice in the industry.

6.5.5 Relations with military service providers

This article requires the provider of civil ATM services to agree a Service Level Agreement (see Sections 3.5 and 5.8) with any states covered by all or parts of the block of airspace (in the case of Direct Services) or geographic extent of the Ancillary Service in order to define the obligations of the civil service providers with respect to the military. Where the military provides services for use in civil ATM, a reciprocal SLA should also be concluded. This SLA should:

- ensure the continuity of military service provision in the event of a change of licensee.
- cover the rights and obligations of each party in the use of dual facilities

- set out scope and procedures for exchanging data
- describe the procedures for transfer of control during times of crisis or transition to war.

6.6 INCENTIVES

This article allows for incentives of a temporary nature to smooth the transition from the current situation to the new regulatory environment. Measures that could be considered include:

- options for short term subsidy from the Community to cover costs during transition periods
- the availability of compensation to cover loss of asset value or write-off of assets during any rationalisation that might occur. This compensation could be raised in a number of ways, for example through a bond issue, through TENs projects or by continuation of amortisation of the sunk costs through service charges (see Section 3.7.4)
- design of the economic regulatory regime to reward the providers that optimise the key service parameters (safety, efficiency, etc.)

6.7 RULING ARRANGEMENTS

6.7.1 Rulemaking

This article specifies the responsibilities of the institutions and defines the rulemaking process, as laid out in Section 5.3.

6.7.2 Implementation of rules and granting of licences

This article specifies the responsibility for implementation of rules and granting of licences:

- licences that are of a trans-national nature should be granted through a regulator mandated by the States covered by the service, noting that it is not necessary for such a regulator to be the national regulator of one of the States – it could be the national regulator of a third party State or a specialist body set-up and authorised for this specific task. The licence must be mutually recognised by the States
- a State regulator would retain responsibility for granting licences for local, single State service provision using the mechanisms defined by the European Regulatory Framework
- implementation of the rules within ECAC but outside of the European Union could be facilitated by the participation of EUROCONTROL.

6.7.3 Monitoring and enforcement

This article specifies that the Commission should be responsible for monitoring and enforcing the application of rules. However, the Commission can be supported by the appropriate expert bodies in this task and can delegate technical activities to such bodies

6.7.4 Appeals, dispute resolution and arbitration process

This article makes provision for a dispute resolution mechanism that avoids lengthy legal processes as far as possible. This mechanism should cover disputes between any combination of the actors involved in the ATM market.

7 A PHASED APPROACH

7.1 INTRODUCTION

Given the phased approach to restructuring the ATM sector proposed by the High Level Group Report, the Community Regulatory Framework should be established in a series of steps, concentrating on *quick wins* in the short term and more strategic and fundamental restructuring in the longer term.

In addition, due to the complex nature of the legislation needed to support the restructuring, multiple instruments of varying types (e.g. Regulation, Directive, Decision), will be needed.

Therefore a package-based approach is proposed, comprising of three packages of measures to be implemented over the three time periods:

- from 2001 to 2002
- from 2003 to 2004
- post-2004.

The proposed contents of each of these phases are described below and illustrated in Figure 7-.

7.2 PHASE 1 – PERIOD FROM 2001 TO 2002

The initial package, covering the period from 2001 to 2002 and aimed at establishing the overall principles of the restructuring, has the following elements:

- **Establishment of an overall framework:** The overall Community Regulatory Framework should be established, identifying the individual elements (safety, airspace, economic, performance, etc.) and their order of precedence – safety should be at the apex. The roles of the various actors, Community institutions, EUROCONTROL, national administrations, etc. should also be described together with the process envisaged for the regulation
- **Establishment of a common set of definitions:** This is essential in order to avoid misunderstandings and misinterpretations in the application of the programme of reform. Definitions should be provided for all of the relevant terms, with scope for future updates to keep pace with the evolving programme of reform. The definitions could be adopted as a mandatory standard

Element of Regulation	Phase 1 2001-2002	Phase 2 2003-2004	Phase 3 2005 onwards
Institutional reform	<ul style="list-style-type: none"> Establish overall framework Separation of regulation and service provision Establish autonomy for service providers Define interface between providers and the military Define standard licences 	<ul style="list-style-type: none"> Promote licensing of service providers Facilitate creation of alliances Develop criteria for certification of providers Develop framework licence Facilitate unbundling of services Implement licencing regime 	<ul style="list-style-type: none"> Ongoing licensing process
Social Aspects	<ul style="list-style-type: none"> Define service provider rights and obligations Preliminary work on common training/qualifications Define common public service obligations 	<ul style="list-style-type: none"> Promote social dialogue Establish common European ATC licence Define dispute resolution and appeals procedures 	
Safety Regulation	<ul style="list-style-type: none"> Establish precedence of safety regulation Safety regulation coordinated through SRC 	<ul style="list-style-type: none"> Safety regulation performed by EASA 	<ul style="list-style-type: none"> Ongoing safety regulatory process
Economic and Performance Regulation	<ul style="list-style-type: none"> Establish economic regulatory framework Define accounting scheme for providers Identify interim economic regulator Establish performance regulatory framework 	<ul style="list-style-type: none"> Implement economic regulation regime Implement performance regulation regime Define data access and protection regime 	<ul style="list-style-type: none"> Ongoing economic and performance regulatory process
Airspace Regulation	<ul style="list-style-type: none"> Establish airspace regulatory framework Establish interim airspace regulator Establish mechanism for civil-military coordination 	<ul style="list-style-type: none"> Implement airspace regulation regime Establish optimum blocks of airspace 	<ul style="list-style-type: none"> Ongoing airspace regulatory process
Consultative Process	<ul style="list-style-type: none"> Establish industry/social consultative body Define consultation process for rulemaking Define mechanism for including stakeholders in the technology development process 	<ul style="list-style-type: none"> Ongoing consultation process 	<ul style="list-style-type: none"> Ongoing consultation process
Transparency	<ul style="list-style-type: none"> Define transparency requirements for services Define transparency requirements for regulation 		
Standards	<ul style="list-style-type: none"> Establish common set of definitions Support to EUROCONTROL and European bodies standardisation work Plan overall European system 	<ul style="list-style-type: none"> Support technology and lifecycle convergence through TENS programme Mandate technical and operational standards and procedures 	<ul style="list-style-type: none"> Ongoing standardisation process

Figure 7-1: Illustration of the activities to be performed in the Phased approach to development of the Community Regulatory Framework

- **Measures to restructure service providers:** The first package should also include a number of measures to restructure the framework for ATM service provision, including the following:
 - **Separation of regulation and service provision:** This is also one of the key pillars of the restructured ATM environment. The legislation could be structured to allow functional separation in the short term and organisational separation in the longer term, specifying the deadline. This separation should also apply to EUROCONTROL, in particular Maastricht UAC, the service provision elements of CFMU and CRCO, as well as the State service providers
 - **Autonomy for service providers:** The legislation should also establish and mandate the principle of management and financial autonomy for service providers
 - **Define rights and obligations:** A framework for the rights and obligations associated with service provision should be defined. This will include access to airspace and frequency spectrum together with the terms and conditions associated with this access. These rights and obligations should be incorporated into the licence
 - **Define public service obligations:** The framework should also define in generic terms the public service obligations associated with the provision of ATM services
 - **Define transparency requirements for service providers:** The legislation should define the transparency requirements for the service providers, including safety, financial, accounting and performance obligations, noting the requirements invoked through the safety, economic and performance regulatory regimes
 - **Define standard licences:** This activity should define the standard licence for Direct and Ancillary Services, including format and contents. This should include the terms and criteria for award of licence, authorisation and service requirements. The licensing regime should also be defined, making use of the consultative process
- **Training:** Preliminary work should be performed to establish a common European approach to training, qualification and licensing for ATM staff. This work could be performed through the EUROCONTROL Institute of Air Navigation Services (IANS)
- **Performance regulation:** Preliminary work should be undertaken to establish the framework for performance regulation
- **Economic regulation:** The scheme for economic regulation should be established, based on the work performed in the Economic Regulation Study
- **Airspace regulation:** The scheme for airspace regulation should be established, based on the work performed in the Airspace Regulation Study
- **Consultative process:** An inclusive consultative process should be established. This should include the creation of a formal consultative body involving all stakeholders. The rights and status of this body should be defined. The process for rulemaking should be fully specified and the inclusion of stakeholders in the development of requirements, technology, systems and airspace design should be specified
- **Transparency:** The transparency requirements to be imposed on service providers and regulators should be specified.

7.3 PHASE 2 – PERIOD FROM 2003 TO 2004

The second package, to be implemented over the period from 2003 to 2004 has the objective of consolidating and extending the measures put in place in the first package. The second package has the following elements:

- **Social provisions:** In anticipation of further developments in the service provision framework social dialogue should be promoted. Furthermore, an appeals, dispute resolution and arbitration process should be established. The common approach to the European ATC qualification/licence should also be finalised
- **Implementation of the licensing regime:** The licensing regime should be implemented
- **Regulatory regime:** The full regulatory regime should be implemented and applied including safety regulation (with responsibility being transferred to EASA), economic, performance and airspace regulation
- **Service provision:** The legislation pertaining to service provision should be extended to promote the creation of alliances and unbundling of services, using the regulatory incentives established in the economic and performance regulation regimes. The data access and protection regime should be established. The formation of alliances will be further facilitated by the licensing process, which will enable trans-national service provision
- **Standardisation and convergence:** Technology and system lifecycle convergence should be enabled, perhaps using the TENS programme as a facilitator/funding mechanism. Common technical and operational standards should be established through the rulemaking process to facilitate convergence to a Single European Sky.

7.4 PHASE 3 – PERIOD BEYOND 2004

The implementation of the third package will complete the restructuring process. This package will mandate the use of the licensing approach, using the common rules for licensing, established in the second package.

This final step will enable the functioning of the market as the autonomous service providers will be in a position to make choices based on their own criteria outside of government influence. The mandating of the licensing approach will mean that licences will have to be renewed periodically and non-incumbent service providers will be able to determine whether to compete for these licences, either individually or as part of an alliance.

A ILLUSTRATIVE STANDARD LICENCE

A.1 INTRODUCTION

A key driver in the implementation of a regulatory framework for Air Traffic Management is the development of the principle of licensing (as discussed in Section 5.6). This outline licence gives some recommendations as to the scope and content of such licences

The section is divided between licenses for Direct Services and Ancillary Services. It is envisaged that there will be some similarities between the different licences.

A.1.1 Regulation and freedom to operate

In the preparation of this outline licence, the depth of the recommendations provides for a suitable balance between regulation and flexibility, giving the regulator sufficient control and the licensee a reasonable level of autonomy, both financial and managerial.

Regulation must avoid restricting the activities of the service provider to such an extent that it reduces opportunities for investment and innovation, for becoming more efficient or for encouraging flexibility in working practices and employment.

However, light regulation must not allow the introduction of an element of risk, most importantly in the areas of safety and performance standards, but also in the area of financial security and continuity where uncertainty and its concomitant managerial distraction could result in possibility of an unreliable or interrupted service.

A.2 DIRECT SERVICES LICENCE

A.2.1 Introduction

This section describes the scope and content of a recommended licence to provide Direct Services. A Direct Service is defined as one which is supplied directly to the user, i.e. aircraft operator, either as information or as instructions from air traffic control (see Section 1.1 above).

A separate licence should be issued for each Direct Services bundle noting that the number or combination of services contained in each bundle should not be prejudicial to assessment of the suitability for award of licence. This approach should take into consideration that some services are necessarily linked, e.g. Flight Information Services, Alerting Services and Air Traffic Control, and cannot sensibly be separated. The separate services requiring licences, as defined in Section 1.1, are listed below.

Airspace Management	Air Traffic Control, including
Air Traffic Flow Management	▪ Area Control, Flight Information Services and Alerting Services
Aeronautical Information Services	▪ Approach Control
Meteorological information	▪ Aerodrome Control
Search and Rescue	

Table A-1: Direct Services

Licences for Direct Services should be made up of two parts:

- **Authorisation**, including: confirmation of the licensee's suitability, terms under which the Licence is issued, confirmation of the relationship between the licensee and the regulator and the governing legislation.
- **Services Provided**, including: detailed descriptions of the services to be provided, service levels to be achieved and any other mandatory operating conditions and restrictions under which the licensee may operate.

A.3 PART I - AUTHORISATION

A.3.1 Terms of the licence

The licence must set out the basic details of the parties involved and the scope of its authority including some

A.3.1.1 General Provisions

The general provisions of the licence should cover a variety of points:

- stating to whom the licence is granted
- a general description of the purpose of the licence, including an acknowledgement of the public service obligations (exact requirements of service provision should be described in detail in the body of the licence)
- confirmation of the authority of the issuing body to issue the licence
- comprehensive references to the governing legislation under which the licence is issued and under which it will operate
- a clear specification of the period for which the licence is to run

- the notice period required for the licensee to surrender the licence or for the regulator to revoke the licence
- a definition of terms referred to in the licence.

A.3.1.2 Financial Health

The continuing financial health of the licensee is essential in supporting the provision of Direct Services and, as a result, some restrictions to the financial operation of the licensee should be imposed, notwithstanding the need for the licensee to be financially autonomous to the maximum degree possible, so as to promote efficient development and innovation.

A.3.1.2.1 Ring- Fencing

In order not to expose the licensee to unnecessary financial risk, they should be restricted to the operation of businesses which exist to provide ATM services and for which they are licensed.

The licensee should be restricted in its investments in that it should take no stake in any other enterprise without the permission of the regulator.

A.3.1.2.2 Cross Subsidy

In some cases cross subsidy may prove to be necessary to enable advantageous unbundling of the ATM market. However, it is essential that the licensee should ensure that none of its separate business parts gives or receives any cross-subsidy to any other parts where such a cross-subsidy has the effect of preventing or restricting competition in the market, in accordance with existing legislation.

Transparency in the accounting procedures and management of the licensee will facilitate the regulation of any necessary and permissible cross subsidy.

A.3.1.2.3 Business Plans and Reports

In order for the regulator to be satisfied that the licensee has an established strategy to contribute to the improvement and efficiency in providing the licensed service, the licensee should produce regular business plans. Information provided should demonstrate, that the licensee has sufficient financial and management resources to provide the services; how the actions planned will contribute to the provision of the licensed service; any implications for user charges as a result of their implementation.

The business plans should include:

- forecast of service level demands
- forecast standards of service to be achieved
- capital investment
- human resource plans and associated expenditure
- forecasts of financial results.

A.3.1.2.4 Management of Assets

In order to avoid any interruptions to services and to maintain the required standards of service during the term of a Licence, or in the event of a change of service provider, some restrictions on the management of assets utilised by the Direct Service provider should be included. Unless specifically authorised by the regulator the licensee should be prevented from:

- disposing of any assets relevant to the provision of the licensed service
- relinquishing control of any of such assets in any other way

- utilising the assets as security for any loans, charges etc., and allowing them to become liable to claim from third parties.

A.3.1.3 Non-discrimination

It is a central requirement of the licence that the licensee must provide services to users on an equal basis. The licence should demand that the licensee does not discriminate between users so as to give a competitive advantage to any user or to an affiliate of the licensee.

A.3.1.4 Access

The licensee providing Direct air traffic services carries certain responsibilities to the wider society as well as to the Direct Users. In such a context the licence should ensure that access to services is not restricted by refusal to provide the services or levying of extra charges on any discriminatory grounds including:

- type of user (e.g. general aviation or commercial airline)
- geography (e.g. remote areas or busy commercial air space).

A.3.2 Suitability of licence holder

The licence for the provision Direct Services should define the criteria under which it has been issued. Although service providers will have demonstrated their suitability in the selection process laid down by the regulator, the criteria should be reiterated in the licence so that maintaining or improving upon the original standards becomes part of the conditions of the licence.

In essence, the characteristics necessary to be considered a suitable licence holder should be that they are of good repute and financial standing and are professionally competent.

A.3.2.1 Safety management systems and processes

The licensee is required to provide details of safety systems and processes which demonstrate its commitment to, and understanding of, the principle that the safe operation of ATM is the prime responsibility of the providers of Direct Services.

A.3.2.2 Past experience and credibility

The licensee must demonstrate to the regulator that it has sufficient specific and general experience to provide the services for which it has been licensed. The demonstration of this ability as measured against performance standards will be essential in maintaining the confidence of Users and thus encourage good working relationships with them. The licensee should provide details of:

- the experience of its key personnel
- the organisation's recent experience of ATM services provided.

Any changes during the period of the licence to key personnel, e.g. directors of a company licensed, must be notified to the regulator as soon as they occur.

A.3.2.3 Quality management systems and processes

The licensee must employ a recognised system of quality management, such as ISO 9000 or its equivalents. This must be maintained throughout the period of the licence. Substitutions of, or amendments to, this management system during the period of the licence should be notified in advance to the regulator and evidence of continued adherence to the standard must be presented on a regular basis.

The quality management system should include an element of continuity planning to take account of unforeseen events and disasters which may disrupt service provision. The licence should demand that these continuity plans are in place and regularly updated.

A.3.2.4 Human resource policies

Licensees must demonstrate evidence that their human resource policies take account of the views of their staff and are directed towards the continuous and effective operation of the service provided in compliance with other appropriate European requirements. Evidence of continued adherence to these policies must be presented on a regular basis to the regulator.

A.3.3 Organisational structure of the licence holder

A standard organisational structure for a licensee should be encouraged across the Community. This will have several benefits including:

- enabling the application of the standard licence
- encouraging the development and flexibility of the skill base
- providing transparency of financial activity and accounting procedures (as defined in the results of the Economic Regulation Study)
- providing comparison of service standards and an identification of best practice across different service providers
- facilitating the supervision of licensees that provide services horizontally across multiple blocks of air space.

A standard structure becomes particularly important where a licensee provides more than one element of the ATM service bundle, and therefore holds more than one licence. The structure should ensure that each individual licensee, even if it forms part of the same organisation or enterprise, should interact with other parts of the organisation or enterprise as though it were providing services to a third party.

A.4 PART II PROVISION OF SERVICES

This section should detail the specific services to be provided under the licence.

A.4.1 Interpretation and construction

It is necessary to define clearly the terms used in the licence, both general and technical. It is desirable that, as far as possible, the same terms are used across the Community to aid common understanding.

A.4.2 Services to be provided by the licensee

The description of the services to be provided will vary in content depending upon which element of the ATM bundle is to be licensed. However, it should contain some universal articles applicable to all services, these will include the detail of the services to be provided and the relationship with between service provider and service user.

The detail of services should:

- list whichever service from the Direct Services list (see Table A-1 above) is being provided
- include all necessary technical detail.

For the avoidance of dispute, the licence should set out for which of these services the licensee is entitled to make a charge to Users.

The relationship with Users should state:

- to whom the licensee is charged with providing the service (Users)
- the definition of a User (including aircraft operators and other service providers)
- what constitutes a reasonable request for the service from a User
- what constitutes an acceptable channel through which the request should be made
- any exceptional circumstances where a licensee may not reasonably be expected to provide the service.

A.4.2.1 Modification to Services Provided

Market changes and technological development events may result in changes to the environment in which the licensee is operating or the requirements of Users. In order to allow the licensee to innovate and react to market changes in a flexible manner, the License should allow room for amendments to the services to provided. However, any changes must be part of a process which:

- results in formal permission being granted by the regulator
- ensures that the regulator has sufficient time to consider the impact of changes
- allows for consultation with other service providers operating under the same Licence across the Community (this helps to understand the implications for varying the standard in different areas)
- includes consultation with Users to ensure that their requirements are still met.

A.4.3 Performance standards management

Service standards agreed with the licensee will form the basis of the measurement of their performance by the regulator. This performance will be of great interest also to States and Users and consideration should be given to the wider publication of the results, in line with reporting requirements specified in the performance regulation regime.

Three components of performance management are required: measures, indicators of measurement and the levels of services to be met.

- The services provided for within each licence will, in all likelihood, be broken down into a several activities. The regulator will need to establish which of these should be measured and are critical to the assessment of performance. These may include elements such as delays caused to users by air traffic control, service interruptions etc., as defined within the performance regulation regime
- Indicators of measurement and the scale to be employed will be required for each activity. This process will require consultation with existing service providers across the Community where activities have never have been measured before
- The standards the licensee is expected to maintain will form part of the licence and should be clearly defined.

Measures and the indicators used should be applicable across the Community to enable comparison of performance between licensees.

A.4.3.1 Penalties and rewards

The system of penalties and rewards dependent on a licensee's performance should be implemented, based on requirements identified in the report on economic regulation.

A.4.4 Other mandatory requirements of the licence**A.4.4.1 Cooperation and interaction with other service providers**

The licence holder is performing a service that is part of an integrated network of service providers. As such and in order to contribute to maintaining the highest standards of safety and operational efficiency the licence should mandate the holder to consult with, and provide information to various bodies. The licensee should provide the legislator with procedures and records of regular communication with these other parties including:

- other specific, licensed service providers in the supply chain as identified by the regulator
- specific military ATM providers as necessary and where required by individual state legislation
- states whose airspace is covered by the licence
- the regulator.

The licensee should also be obliged to take part in any international consultative forum the regulator decides is relevant to maintaining a safe, efficient and integrated ATM in the Community.

A.4.4.2 Consultation and complaint handling

Should disputes arise between the licensee and the Users or other service providers it is essential that they should be resolved quickly in the interests of maintaining the good working relationships and communication which will help to develop an integrated system of ATM.

The licensee should be obliged to the regulator with details of its methods and procedures for:

- consulting users
- handling and responding to complaints

A.4.4.3 Regulatory accounting requirements

To assist in the construction of a system which is transparent and fair licensees should ensure that their accounts are published to a common standard and format.

The licence should prescribe this standard, which itself should:

- be of an agreed standard
- enable the regulator to assess the financial performance of each separate element of the licensee's business
- enable the regulator to assess the financial position of the licensee as a whole
- allow a comparison with other licensees who are providing the same services. This information must be produced on consistent basis to enable direct comparisons.

A.4.4.4 Restriction on use of business information

The licensee will be in a possession of information which could be advantageous for others bidding for other licenses or engaged in outside enterprises. Therefore, they should be obliged in the licence to prevent the disclosure of such information if doing so could result in the recipient gaining a competitive advantage.

A.4.4.5 Payment of fees

The licence should set out clearly the arrangements for fees to be paid by the licensee including:

- to whom the fees should be paid
- time scales for payment.

A.5 ANCILLARY SERVICES LICENCE

A.5.1 Introduction

This section describes the scope and content of a recommended licence to provide Ancillary Services to suppliers of Direct Services. This licence has many areas in common with the Direct Services Licence, described above, but it is listed in full for completeness. An Ancillary or Supporting service is one which is not, generally, used by the aircraft operator, but is used to support the operation of the Direct Services (see Section 1.1).

As with Direct Licenses, a separate licence should be issued for each element of the Ancillary Services bundle. The separate services for which licences are required, as defined in Section 1.1, are listed below.

Communications

- Aeronautical fixed services
- Aeronautical mobile services

Navigation

Surveillance

- Surveillance
- Surveillance data processing

Flight data processing

A.5.2 Support to Direct Licensees

Licenses for Ancillary Services will contain many of the elements of the Direct Services Licence, these being mainly from the Authorisation section. The major difference lies in the Services Provided section. Whereas, it is necessary to define closely which Direct Services should be provided, since the consequences of these not being available would be extremely serious, it is likely that the consequences of similar events in Ancillary Services would have a less dramatic effect on Air Traffic Management provision since Ancillary Service licensees may be more easily substituted with other suppliers.

Given this circumstance, it is envisaged that the specific services to be provided by an Ancillary licensee should be the subject of a Service Level Agreement (SLA) between Direct and Ancillary Service provider rather than being dictated in the conditions of the licence. Wherever possible the SLA should be standardised across the community.

A.6 PART I - AUTHORISATION

A.6.1 Terms of licence

A.6.1.1 General Provisions

The general provisions of the licence should cover a variety of points:

- stating to whom the licence is granted
- a general description of the purpose of the licence, including an acknowledgement of the public service obligations
- confirmation of the authority of the issuing body to issue the licence
- comprehensive references to the governing legislation under which the licence is issued and under which it will operate
- a clear specification of the geographic volume over which the licence applies

- a clear specification of the period for which the licence is to run
- the notice period required for the licensee to surrender the licence or for the regulator to revoke the licence
- a definition of terms referred to in the licence.

A.6.1.2 Financial Health

Although the level of risk should an Ancillary Services licensee fail is lower than those for a Direct Service provider, the licence should make some provisions to ensure the financial health of the service provider.

A.6.1.2.1 Ring- Fencing

In order not to expose the licensee to unnecessary financial risk, they should be restricted to the operation of businesses which exist to provide ATM services and for which they are licensed.

The licensee should be restricted in its investments in that it should take no stake in any other enterprise without the permission of the regulator.

A.6.1.2.2 Cross Subsidy

In some cases cross subsidy may prove to be a requirement of enabling advantageous unbundling of the ATM market. However, it is essential that the licensee should ensure that none of its separate business parts gives or receives any cross-subsidy to any other parts where such a cross-subsidy has the effect of preventing or restricting competition in the market, in accordance with existing legislation.

Transparency in the accounting procedures and management of the licensee will facilitate the regulation of any necessary and permissible cross subsidy.

A.6.1.2.3 Business Plans and Reports

In order for the regulator to be satisfied that the licensee has an established strategy to contribute to the improvement and efficiency in providing the licensed service, the licensee should produce regular business plans. Information provided should demonstrate, that the licensee has sufficient financial and management resources to provide the services; how the actions planned will contribute to the provision of the licensed service; any implications for User charges as a result of their implementation.

The business plans should include:

- forecast of service level demands
- forecast standards of service to be achieved
- capital investment
- human resource plans and associated expenditure
- forecasts of financial results.

A.6.1.2.4 Management of Assets

In order to avoid any interruptions to services and to maintain the required standards of service during the term of a Licence, or in the event of a change of service provider, some restrictions on the management of assets utilised by the service provider should be included. Unless specifically authorised by the regulator the licensee should be prevented from:

- disposing of any assets relevant to the provision of the licensed service
- relinquishing control of any of such assets in any other way
- utilising the assets as security for any loans, charges etc., and allowing them to become liable to claim from third parties.

A.6.1.3 Non-discrimination

It is a central requirement of the licence that the licensee must provide services to users on an equal basis. The licence should demand that the licensee does not discriminate between users so as to give a competitive advantage to any user or to an affiliate of the licensee.

A.6.2 Suitability of Licence Holder

The licence for Ancillary Services should define the criteria under which it has been issued. Although service providers will have demonstrated their suitability in the selection process laid down by the regulator, the criteria should be reiterated in the licence so that maintaining or improving upon the original standards becomes part of the conditions of the licence.

In essence, the characteristics necessary to be considered a suitable licence holder should be that they are of good repute and financial standing and are professionally competent.

A.6.2.1 Safety management systems and processes

The licensee is required to provide details of safety systems and processes which demonstrate its commitment to, and understanding of, the principle that the safe operation of ATM is the prime responsibility of the licensee.

A.6.2.2 Past experience and credibility

The licensee must demonstrate to the regulator that it has sufficient specific and general experience to provide the services for which it has been licensed. The licensee should provide details of:

- the experience of its key personnel
- the organisation's recent experience of ATM services provided.

Any changes during the period of the licence to key personnel, e.g. directors of a company licensed, must be notified to the regulator as soon as they occur.

A.6.2.3 Quality management systems and processes

The licensee must employ a recognised system of quality management, such as ISO9000 or its equivalent. This must be maintained throughout the period of the licence. Substitutions of, or amendments to, this management system during the period of the licence should be notified in advance to the regulator and evidence of continued adherence to the standard must be presented on a regular basis.

The quality management system should include an element of continuity planning to take account of unforeseen events and disasters which may disrupt service provision. The licence should demand that these continuity plans are in place and regularly updated.

A.6.2.4 Human resource policies

Licensees must demonstrate evidence that their human resource policies take account of the views of their staff and are directed towards the continuous and effective operation of the service provided in compliance with other European requirements. Evidence of continued adherence to these policies must be presented on a regular basis to the regulator.

A.6.3 Organisational structure of the licence holder

A standard organisational structure for a licensee should be encouraged across the Community. This will have several benefits including:

- enabling the application of the standard licence
- encouraging the development and flexibility of the skill base
- providing transparency of financial activity and accounting procedures in accordance with the conclusions of the findings of the Economic Regulation Study
- providing comparison of service standards and an identification of best practice across different service providers
- facilitating the supervision of licensees who provide services horizontally across multiple blocks of air space.

A standard structure becomes particularly important where a licensee provides more than one element of the ATM service bundle, and therefore holds more than one licence. The structure should ensure that each individual licensee, even if it forms part of the same organisation or enterprise, should interact with other parts of the organisation or enterprise as though it were providing services to a third party.

A.7 OTHER MANDATORY REQUIREMENTS

A.7.1 Service level agreement

The Ancillary Services provided by the licensee should be detailed in a Service Level Agreement between the Direct Service providers and the licensee. The Service Level Agreements should be:

- for use between licensed providers of air traffic management services only
- standardised as far as possible across the Community
- be approved by the regulator for inclusion in this licence.

A.7.2 Interconnection obligations

The Ancillary Service(s) provided by the licensee must be made available to other service providers should they require the output of the licensee's service in order to undertake their operations. This access must be on an open, fair, equitable and non-discriminatory basis.

A.7.3 Cooperation and interaction with other service providers

The licensee should provide the legislator with procedures and records of regular communication with these other parties including:

- other specific, licensed service providers in the supply chain as identified by the regulator
- specific military ATM providers as necessary and where required by individual state legislation
- states whose airspace is covered by the licence
- the regulator.

The licensee should also be obliged to take part in any international consultative forum the regulator decides is relevant to maintaining a safe, efficient and integrated ATM in the Community.

A.7.4 Consultation and complaint handling

The licensee should be obliged to the regulator with details of its methods and procedures for:

- consulting Direct Service providers
- handling and responding to complaints

A.7.5 Regulatory accounting requirements

To assist in the construction of a system which is transparent and fair licensees should ensure that their accounts are published to a common standard and format.

The licence should prescribe this standard, which itself should:

- be of an agreed standard in accordance
- enable the regulator to assess the financial performance of each separate element of the licensee's business
- enable the regulator to assess the financial position of the licensee as a whole
- allow a comparison with other licensees who are providing the same services. This information must be produced on consistent basis to enable direct comparisons

A.7.6 Restriction on use of business information

The licensee will be in a possession of information which could be advantageous for others bidding for other licenses or engaged in outside enterprises. Therefore, they should be obliged in the licence to prevent the disclosure of such information if doing so could result in the recipient gaining a competitive advantage.

A.7.7 Payment of fees

The licence should set out clearly the arrangements for fees to be paid by the licensee including:

- to whom the fees should be paid
- time scales for payment.