EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

Integrated Briefing High-Level Concept Document

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Abstract

This report sets out the business environment for an Integrated Briefing project. It demonstrates the Integrated Briefing philosophy, the means by which it may be achieved and the cost and resource savings that may be expected.

Keywords

Briefing PIB

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0.8	28th August 2002	Incorporation of comments from the Concept Workshop.	All

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EXECUTIVE SUMMARY

This document sets out the business environment for an Integrated Briefing project. Its scope is limited to that of of pre-flight briefing and will not result in the generation of a system. It demonstrates the Integrated Briefing philosophy, the means by which it may be achieved, potential benefits that may be expected and the cost and resource savings that may be expected as well as the main current implementation barriers.

Users:

The user groups in each State vary considerably. In some, the main users are likely to be the General Aviation and Business Aviation community whilst in other States the Commercial Air Transport companies are likely to be the main users. Additonally, ground based users, such as Air Traffic Service (ATS) providers make use of briefing facilities.

Levels Of Integration:

The way in which AIS[1], MET, ARO and ATFM interact to provide a briefing facility may be described in terms of 6 levels of integration ranging from separate, distributed facilities (level 1) to a fully integrated system based on knowledge sharing and supporting fast decision making (level 6).

As the level of integration increases, so the potential benefits increase. A level 6 integrated briefing would provide, through a “one-stop-shop” solution, a single briefing source that would offer the relevant information required for a flight in a single visit or via a single system interface.

Potential Benefits:

Economic benefits would be achieved through:

- Reduction Of Resource Duplication – a single office for briefing would reduce the amount of equipment required. By providing integrated services and supplementing with self-briefing facilities, the number of human resources required will be reduced while the service for clients will be maintained and, in most cases, be increased.

- User Time Saving – by providing a single service/system for briefing, it can be assumed that approximately 50% of the time required to obtain a briefing will be saved by the user. Moreover, an Integrated Briefing facility in its ideal form would enable a high level of customisation and flexibility and would significantly simplify the interpretation of the briefing information obtained.

Safety Benefits

By providing accurate, timely, complete and relevant information, Integrated Briefing would contribute to the overall safety of a flight by assisting pilots to avoid potentially dangerous situations.

[1] A list of abbreviations used in this document is provided in Appendix I.

Institutional Issues:

A general “natural, human constraint” exists which results in defence of a number of kingdoms. Therefore, integration initiatives are often seen as solely a means for rationalisation. It must be accepted that the world is changing, the jump in technology also implies a significant change in user habits. Service providers must also react to those changing user needs.

ECIP Objectives:

To promote this integration process, a new objective (INF04) will be proposed to the ATM/CNS consultation group for inclusion into the European Convergence and Implementation Plan (ECIP).

Regulatory aspects:

The briefing process and, to a greater extent, integrated briefing, is not sufficiently covered by ICAO Standards and Recommended Practices (SARPS). Therefore such service is addressed heterogeneously in many States which is therefore lacking standardisation in presentation and provision of information to the user. Standardisation could lead to reduced costs.

For that reason, the Integrated Briefing Process defined in Europe will be proposed to ICAO as the basis for supplementing existing guidance material and, if necessary, amendments of relevant SARPs.

Role of EAD:

Integrated Briefing may interface with EAD, using the latter as one of the sources of information from which briefings are generated. Future enhancements of the EAD will benefit from the work performed for the Integrated Briefing project.

Operational Issues:

A flexible, customisable and tailorable Integrated Briefing facility is required. This facility must provide access to all of the information that a pilot requires for a safe flight encompassing the filing of a flight plan up to the provision of update information related to the initial brief.

Technical Issues:

An Integrated Briefing facility must be attractive to use for the whole spectrum of potential users (i.e. from those that work occasionally with a PC to advanced computer users regularly working with online applications) be it used on site in the briefing office or remote via self briefing facilities.

1. INTRODUCTION

1.1 Project Objective

The objective of the Integrated Briefing project, established as part of the AIS AHEAD programme, is to assist in the future development of briefing facilities, such that access to the necessary information, irrespective of source, is improved.

This objective will be achieved through development of a harmonised concept and an associated set of high-level guidelines to standardise the accessibility during the pre-flight phase to all of the relevant aeronautical data required during the planning and execution of a flight.

1.2 Project Scope

Although main attention will be addressed to the pre-flight phase, the continuity requirement for information provision into other phases of flight will be taken into account. The project will focus on information components such as AIS/MAP, ATFM, MET, ARO including military information, if publicly available.

In this regard, the classical scope of the related services needs to be considered and, in addition, the EUROCONTROL concept “System Wide Information Management (SWIM)” will be taken into account.

This project will not design or create a system. It shall provide consolidated information to enable system development or service improvement or facilitate adaptation of existing services or systems. In its current scope, this project does not include functionality defining dispatch services or systems.

It must be noted that an Integrated Briefing facility does not necessarily have to involve an automated system. It could be a paper-based process with a member of staff providing a personal integrated pre-flight briefing (e.g. via a call centre).

Furthermore, the Integrated Briefing project does not address the quality of the source data. It is assumed that other projects and procedures will ensure the provision of the quality-controlled data essential to the briefing process.

1.3 Survey Phase

In order to establish the current status of briefing facilities within ECAC, an initial survey phase was undertaken. This examined the briefing services available from State administrations and the products commercially available to provide these services. This information was then reported in a User Consultation workshop (see below).

Full details of this survey phase may be found in the Survey Phase Final Report (AIM/AEP/BRIEF/0019). This document may be obtained by visiting the EUROCONTROL web site (www.eurocontrol.int/ais).

1.4 Recent User Consultation

User consultation by means of a workshop was performed in May 2001. Users present ranged from airspace users (general aviation, business aviation, commercial air transport, military users) via service provider experts (AIS, ARO, MET) to industry representatives.

The result was strong support for the basic need for the integrated provision of seamless, customisable information (in its ideal form a location-independent service) that would not be jeopardised by organisational or institutional limitations.

Note: The source of this information is the technical workshop report BRIEF/0014. This document may be obtained by visiting the EUROCONTROL web site (www.eurocontrol.int/ais).

1.4.1 The Problem

In order to obtain the required pre-flight information, the user has to address different services (e.g. AIS, MET, ARO, ATFM) using various data/information sources (e.g. AIP, NOTAM, MET, ARO, ATFM) to obtain an output. The process is, to a certain extent, not tailored to the specific needs of the flight nor are the relationships of the elements considered. This is neither user friendly nor efficient or flexible.

For this reason the Integrated Briefing Project was conceived, based upon the previously identified User Requirements (ATM URD - Air Traffic Management User Requirements Document Vol. 2 Ed. 2.0; AIS URD – Aeronautical Information Services User Requirement Document Edition 0.6). Furthermore, the project is also based upon the ICAO EUR DOC010 "Harmonised access to AIS and MET Services relating to pre-flight planning".

In summary, the following main user requirements are drivers for the project:

- AIS/MET self-briefing facilities.
- AIS, MET, ARO and flight planning functionality should be integrated.
- Pre-flight information should be easily accessible.
- Corresponding traffic congestion forecasts and flow restrictions should be provided.
- Improved planning procedures and information management should be addressed.

1.5 Purpose of this Document

The implementation of Integrated Briefing services within a State has, as with any project, a cost associated with it. No project should be undertaken if the cost of implementation is not, at the very least, matched by clear benefits.

The benefits are not purely financial; additionally there are environmental, safety factors and service improvements to be taken into account.

Furthermore, the costs and savings will not all be incurred directly by the provider of the service. The user will save time and money through the use of Integrated Briefing, as access to information will be faster and allow more flexibility.

To this end the aviation community should be viewed as a whole: Integrated Briefing starting with the providers of the raw information (e.g. NOTAM and MET information), through the service providers, airports, flight support and dispatch agents and ultimately the end users, the pilots.

This report sets out the business environment for an Integrated Briefing project. It will demonstrate the Integrated Briefing philosophy, the means by which it may be achieved and will subsequently help a State to identify a means defining it's own business case.

Six Member States have already started integrating their briefing facilities. No extensive business cases were produced by these States, as the potential benefits seemed obvious to them. See research report BRIEF/0005 for more details.

1.6 Relationship To Other Studies

A relationship exists between this document and the following studies performed for the EC in the mid 90's:

- Peter Pan Study,
- Small AIS Study.

This relationship will be described in further detail in the Technical Concept Document.

1.7 References

Reference	Title	Number
1.	State and Industry Research Report.	AIM/AEP/BRIEF/0005
2.	Report on Standards, Regulations and User Requirements.	AIM/AEP/BRIEF/0007
3.	Report on Industry Site Visits.	AIM/AEP/BRIEF/0010
4.	Report on State Site Visits.	AIM/AEP/BRIEF/0012
5.	ATM User Requirements.	FCO.ET1.ST04.DEL01
6.	AIS User Requirements.	ET1.ST01.1000.DEL-01
7.	International Standards and Recommended Practices – Aeronautical Information Services.	ICAO Annex 15
8.	AIS Manual.	ICAO Doc 8126
9.	Integrated Briefing User Requirements Document.	AIM-AEP-BRIEF-0021
10.	Harmonised access to AIS and MET Services relating to pre-flight planning	ICAO EUR Doc 010
11.	EUROCONTROL Air Traffic Management Strategy for 2000+" Vol 1 & 2 edition Nov 1998	No number available
12.	Aeronautical Information Management Strategy for the years 2000+" Vol 1 edition Mar 2002	No number available
13.	International Standards and Recommended Practices – Meteorological Service For International Air Navigation.	ICAO Annex 3
14.	Integrated Briefing Technical Concept Document	AIM-AEP-BRIEF/0025

Refer to Appendix A for a list of Air Traffic Incident Reports and Reports Of Air Safety Organisations that were referred to in the generation of this document.

2. GENERAL

2.1 Changing Needs

Technological changes are having an increasing impact on the aviation world and the provision of briefing information/data.

Furthermore, today's users are looking to receive a more efficient service that in turn allows them to perform better the task for which they are responsible. For example, the entry of flight plan related data into several different systems is no longer acceptable to users and, in addition, many pilots want to receive the briefing output at a "one-stop-shop" or in their own location through "location independent briefing". This location may be their business centre or, especially for GA, their home.

These changing user requirements have resulted in the need to improve the briefing service, which in turn has resulted in the inception of the Integrated Briefing project.

For example, for AIS information ICAO Annex 15 provides the obligation of what information must be provided as a briefing, but ICAO Doc 8126 provides some guidance on how this information should be provided. ICAO Doc 8126 also starts to address more advanced services such as 'self-briefing' facilities but it has not been updated to take into account the technologies or user aspirations of today.

Is spite of the desire for automation, there is still a requirement for a single point of contact with a person, who can provide a complete integrated briefing.

2.2 What is Integrated Briefing?

A briefing is the process during which a user, depending on a flight intent or an ad-hoc need, is supplied or supplies himself with all relevant aeronautical information (AI) in order to plan or to execute a flight, or to obtain generic information related to flights. The process shall provide knowledge to support the decision-making if a flight or flight related action can be safely and efficiently performed.

Integrated Briefing is a system or service meeting and fulfilling the generic Briefing process and enhancing it by integrating access to and provision of additional data elements such as AIS, ARO, MET, ATFM or other information, as required.

Note: By providing Integrated Briefing the process will appear to the end user to function as "single entity".

The data elements integrated are:

- AIS (NOTAM, SNOWTAM, ASHTAM, BIRDTAM, Static data elements of AIP etc.,
- ARO (flight plan and all related entities)
- MET (SIGMET, METAR, SPECI, TAF, Upper Wind and temperature, etc.),
- ATFM (entities related to flight plan such as AIM, ANM, CRAM or flightplan updates influencing the flight intention)
- Other information such as GPS availability (e.g. RAIM messages)

2.3 Scenarios

Although the concept of Integrated Briefing is a simple one (i.e. the provision of the data existing in the ATM environment required for a flight during pre-flight phase), there are many ways and levels at which this may be achieved. The main elements are:

1. Service integration – where the user has a single point of contact (the “one-stop-shop”) for all data and the service combines the different information sources.

2. System integration – where a system or systems provides a single source of all relevant information.

Other hybrid solutions exist where integrated services and systems are combined. Furthermore, there is the ability to integrate only some of the services whilst other elements remain non-integrated, for example, flight planning may be integrated, or not.

In addition to this, the presentation and provision of information, mainly as PIB, must be standardised as this business process is provided openly to all airspace users.

3. USER SEGMENTATION

This section describes the potential users of an Integrated Briefing facility. It focuses on airspace users, as this group will be the main user of such a facility.

3.1 Hierarchy of Users

The following diagram identifies the hierarchy of the Integrated Briefing Users. For completeness it includes potential ground based users. A description of each of the airspace users/user groups identified in the user hierarchy may be found in the Integrated Briefing User Requirements Document, AIM-AEP-BRIEF-0021.

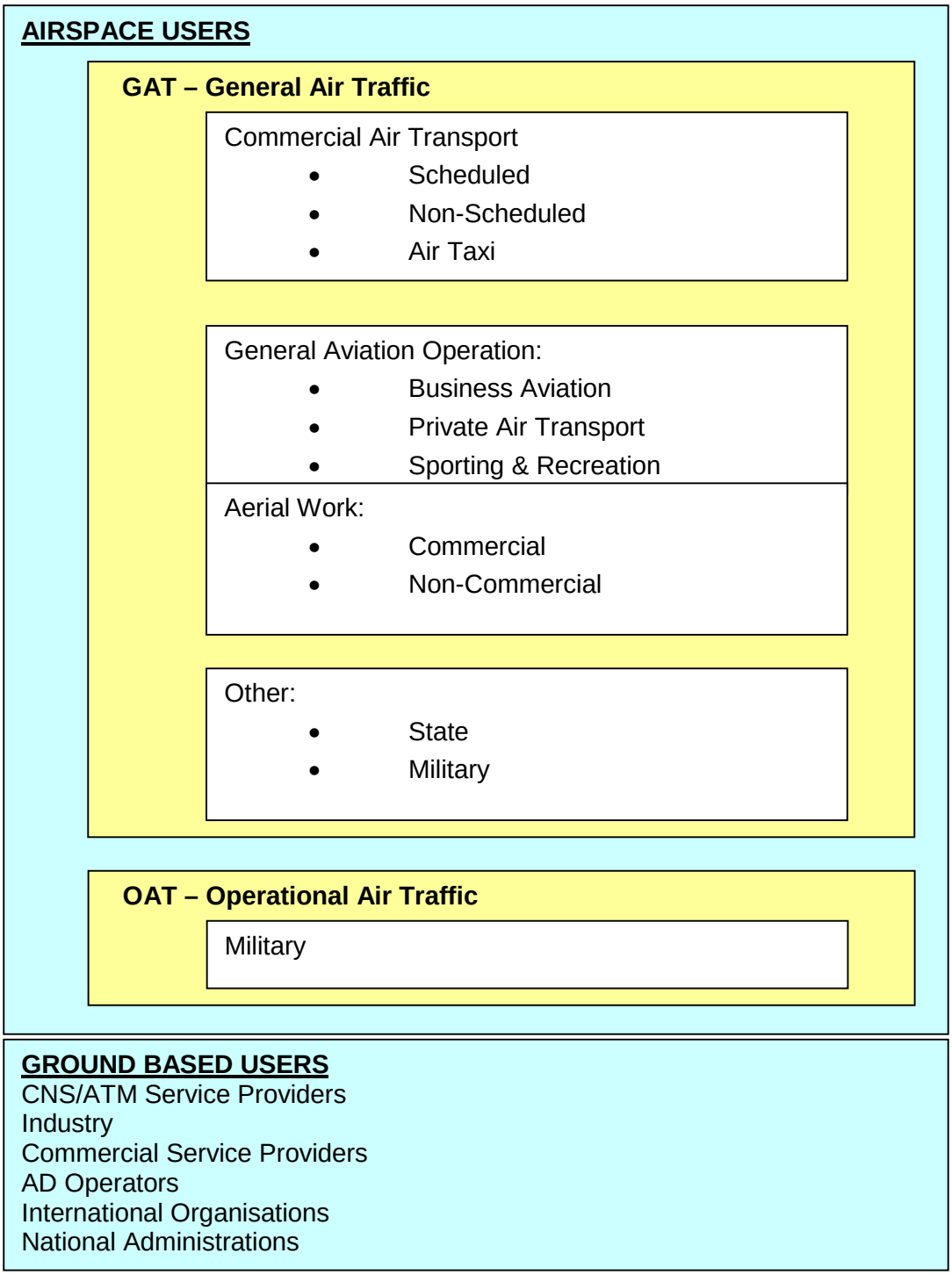


Figure 1

3.2 Main User Groups of Integrated Briefing

The way in which pre-flight briefing information is currently obtained is influenced by many factors. The type of user and the facilities available at the aerodrome are the main influences.

3.2.1 Commercial Air Transport

A commercial air transport operation is an aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire.

The larger airlines do not usually use the pre-flight briefing facilities provided by States, preferring instead to organise their own company-wide briefing facilities, and/or use the services of companies such as Lido or Jeppesen.

From the pilot's point of view, this is a very efficient method, as the dispatcher generally supplies the pre-flight briefing information to him, along with other airline operational information.

However, some airlines distinguish between long-haul and short-haul flights. These companies usually use their own facilities (as described above) for long-haul flights. Some companies use the public facilities[2] normally available at the aerodrome for short-haul flights.

At some aerodromes, an airline will not have their own handling facilities. In that case the airline would either have a reciprocal agreement with an airline that does have facilities at that aerodrome, use the services of a company, or will use the public facilities.

Due to the recent economic crisis, larger carriers are shedding the less profitable flights. These flights may be taken over by some of the smaller carriers. The smaller companies, who often operate at low cost, are less likely to have their own briefing facilities, and may, therefore, use the public facilities. Note: This depends on legal limitations – for example, European carriers have to show compliance with JAR-OPS regulations.

Due to the way in which briefing is financed, this group of users would contribute more to Integrated Briefing than any other group of users. This is because they use controlled airspace and are, therefore, subject to route charges.

3.2.2 General Aviation and Aerial Work

A general aviation operation is an aircraft operation other than a commercial air transport operation or an aerial work operation.

Aerial work is an aircraft operation in which an aircraft is used for specialised services such as agriculture, construction, photography, surveying, observation and patrol, search and rescue, aerial advertisement, etc.

Pilots flying short trips that, in the case of General Aviation, often avoid controlled airspace, are likely to use the public facilities to obtain pre-flight briefing information. If flying outside of controlled airspace, a pilot need not to file a flight plan, unless they wish to receive an Alerting Service. In such cases where no flight-plan is required the pilot would (currently) receive the service free of ATM Charges. In some cases an additional, payment may be made, e.g. through fuel taxation, which

[2] Public facilities within this document refers to those available to all aviation users.

though not necessarily payed to the ATS directly, may be used to fund ATS services including briefing.

The pilots of medium/longer flights (for example, NetJets) are likely to wish to use airways, and will, therefore, need to fly in controlled airspace. These pilots would obtain pre-flight briefing information using the public facilities, but would also need to file a flight plan. This means that they would incur charges and therefore contribute to the cost of the service.

Commercial and non-commercial operators of business aircraft and jets require greater flexibility of operations. This often demands last minute planning taking place away from their home base.

3.2.3 Military

Military aerodromes usually have their own Flight Planning sections for general information, however they receive civil aeronautical information, such as NOTAM.

Most military aerodromes have resident MET forecasters (in the UK, the Royal Air Force use civil MET forecasters and the Royal Navy use RN MET Offices) and are able to receive their own weather satellite information. They are still likely to request the services of a World Area Forecast Centre.

The pilots of military flights operating from civil aerodromes use the public facilities, if required. It should also be noted that the pilots of civil flights operating from military aerodromes would use the military station briefing facilities to obtain briefing information. The civil co-use of military aerodromes is steadily increasing in some countries.

3.2.4 Ground Based-Users

As Figure 1 shows, there are a number of potential ground based users, the largest of these is likely to be the CNS/ATM service providers. This group comprises all those who are engaged in the planning and provision of CNS/ATM Services. Examples of this group are: controllers, control centres, public and privatised national ATS providers, ground and space based communication navigation and surveillance systems and their operators (e.g. INMARSAT, SITA), corresponding associations, EUROCONTROL, ECAC, etc.Example of the Current Use of Briefing Facilities

3.2.5 User Groups in some States

The following table is taken from the results of questionnaires received from States (available on request) and incorporates the 17 replies received from the 38 ECAC States. It indicates the percentage of user groups for each State that are clients of the existing briefing facilities.

Country	User Type (percent)					
	GA, Aerial Work	Business Aviation	CAT (scheduled)	CAT (non-scheduled)	Military	Other
Belgium Military	0	0	0	0	100	0
Czech Republic	3	3	67	6	2	19
Estonia	2	8	40	40	10	0
Finland	10	10	60	10	10	0
German Military	0	0	0	0	100	0
Latvia	10	10	20	50	10	0
Lithuania	50	30	0	10	10	0
Norway	15	5	50	10	20	0
Portugal	10	5	70	10	5	0
Romania	1	5	73	10	10	1
Slovenia	15	5	50	10	20	0
Slovak Republic	25	30	10	25	5	5
Sweden	20	30	25	20	5	0
The Netherlands	10	20	40	10	10	10
The Netherlands Military	0	0	0	0	100	0
Turkey	15	15	10	25	25	10
United Kingdom	N/a	N/a	N/a	N/a	N/a	N/a
Average	12	11	32	15	28	3

Figure 2

The following pie-chart shows the average breakdown of users.

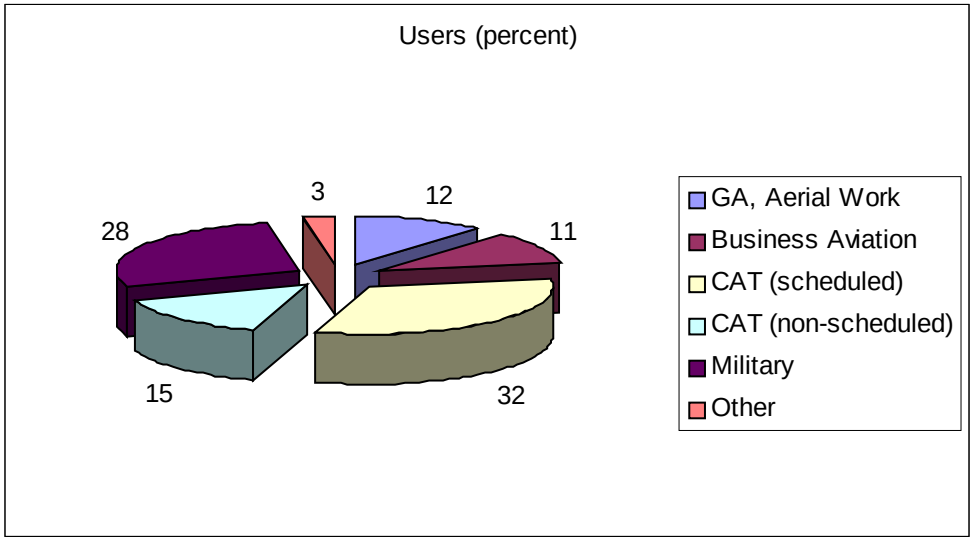


Figure 3

3.2.6 Output To User Groups - Examples

The following table is taken from the results of questionnaires (available on request) received from member States and incorporates the 17 replies received from the 38 ECAC States. It indicates the number of PIBs provided by each State in a year and a breakdown of the recipients.

Country	PIB Recipients (number of PIBs issued)						Total Number of PIBs provided in the year 2000
	GA and Aerial Work	Business Aviation	CAT - scheduled	CAT – non-scheduled	Military	Others	
Belgium Military	0	0	0	0	10,800	0	10,800
Czech Republic	1,395	1,395	31,155	2,790	930	8,835	46,500
Estonia	180	720	3,600	3,600	900	0	9000
Finland	15,000	15,000	90,000	15,000	15,000		150,000
German Military	0	0	0	0	60,000	0	60,000
Latvia	360	360	720	1,800	360		3,600
Lithuania	3,000	1,800	0	600	600	0	6,000
Norway	54,000	18,000	180,000	36,000	72,000	0	360,000
Portugal	2,400	1,200	14,700	2,400	1,200	0	24,000
Romania	216	1,080	15,768	2,160	2,160	216	21,600
Slovenia	6,450	2,150	21,500	4,300	8,600	0	43,000
Slovak Republic	1,200	1440	480	1,200	240	240	4,800
Sweden	58,400	87,600	73,000	58,400	14,600	0	292,000
The Netherlands	10,800	21,600	43,200	10,800	10,800	10,800	108,000
The Netherlands Military	0	0	0	0	624	0	624
Turkey	270	270	180	450	450	180	1800
United Kingdom	N/a	N/a	N/a	N/a	N/a	N/a	N/a

Figure 5

It should be noted that States, after introducing Integrated Briefing, encountered a remarkable increase of queries by clients due to the improved service. This shows that the better the service, the more people will use it.

The Netherlands and Sweden already provide Integrated Briefing services at a certain level. This is probably the reason for the significantly higher output provided by their briefing services. In order to confirm this, further investigations would have to be made as the table only provides a simplistic view.

4. LEVELS OF INTEGRATION - SOLUTIONS

4.1 General

In order to assist in classifying how a particular briefing service has been integrated and hence provide a measure by which States or Service Providers may measure themselves, a quantitative means of measuring the level of integration has been developed.

This works by describing the situation for each of six levels, one through to six, the latter being the most sophisticated level of integration.

Each of the levels demonstrate how the AIS, MET, ARO and ATFM functions may be integrated. It is however fully understood that integration is not an insignificant task and therefore the situation in each State should be examined and an assessment made as to the best order in which to integrate the individual services.

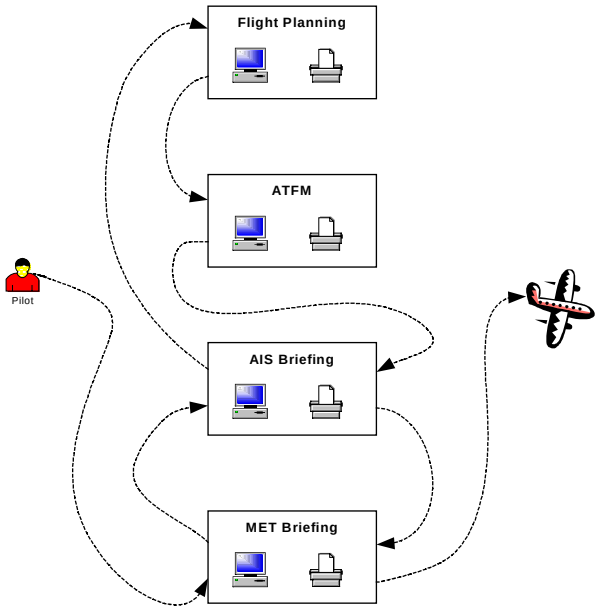
It is envisaged that a minimum level will be specified as the aim for all ECAC States to achieve and that, over the next few years, the States will measure their own progress towards this goal.

Although in an ideal world each provider would clearly fall within one level, the reality will often be that some elements of their facility will fall in one level whilst other parts are at a different level.

Where this is the case, the State may report the level for each component, but its overall achievement will be considered the lowest level reported.

The following section gives a brief overview of each of the six levels.

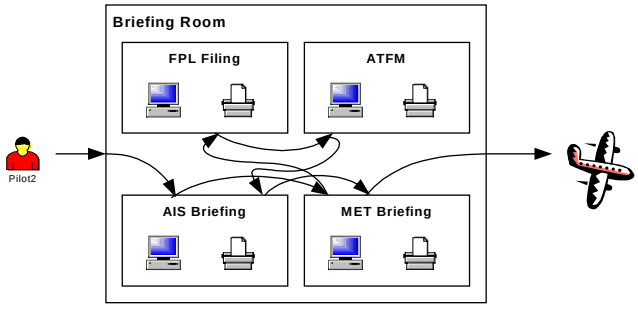
4.1.1 Level 1: Distributed



- Facilities / services in different locations
- Each facility visited at least once
- Time taken to visit each facility may be extensive
- Multiple entry of flight details may lead to errors
- Multiple briefing reports

Figure 6

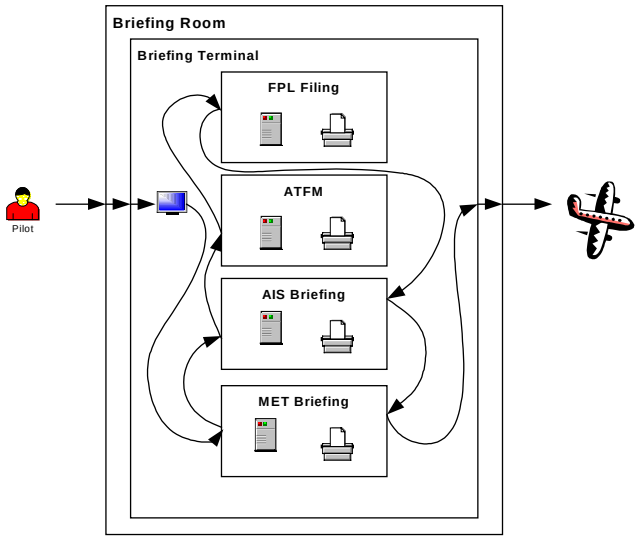
4.1.2 Level 2: Co-Located



- Facilities / services in one location
- Separate terminals for each facility / service
- Each terminal visited at least once
- Time taken to visit each facility reduced
- Multiple entry of flight details may lead to errors
- Multiple briefing reports

Figure 7

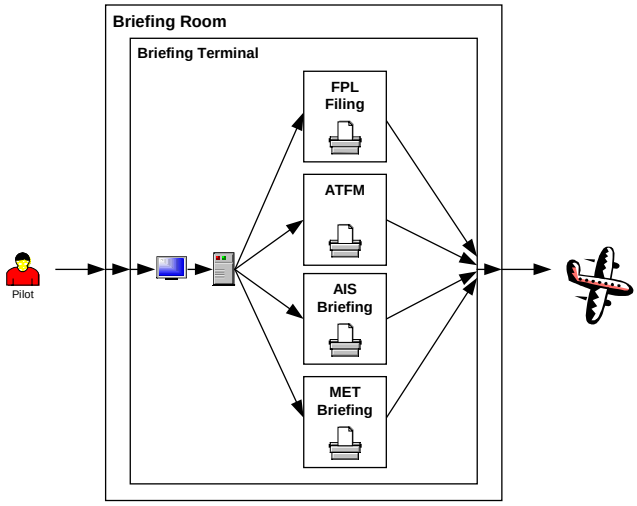
4.1.3 Level 3: Terminal Integration



- Facilities / services at one terminal
- Separate applications for each facility / service
- Only one terminal visited
- Time taken for briefing reduced.
- Multiple entry of flight details may lead to errors
- Multiple briefing reports

Figure 8

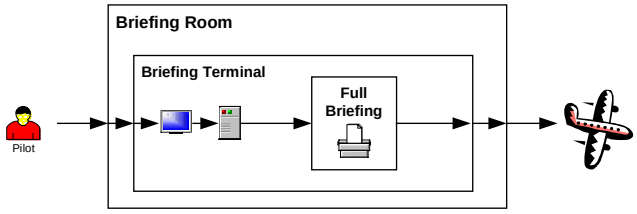
4.1.4 Level 4: Application Integration



- Facilities / services with one application at one terminal
- Time taken for briefing reduced further.
- Single entry of flight details reducing the possibility of errors
- Multiple briefing reports

Figure 9

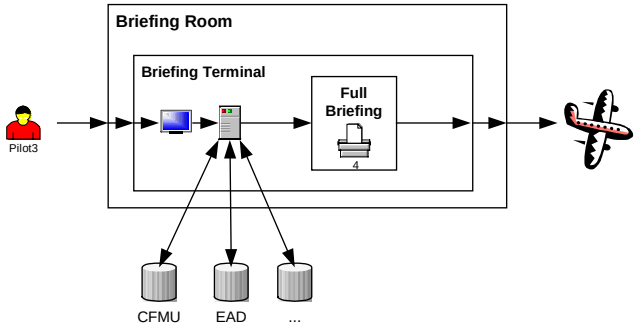
4.1.5 Level 5: Full Integrated



- Facilities / services with one application at one terminal
- Single entry of flight details reducing the possibility of errors
- Single, tailored briefing reports

Figure 10

4.1.6 Level 6: Knowledge Sharing (SWIM)



- Facilities / services with one application at one terminal
- Single entry of flight details reducing the possibility of errors
- Single, tailored briefing reports
- Collaboration with other relevant services

Figure 11

4.2 Self Briefing

The term “Self Briefing” refers to the ability for a pilot to make use of briefing equipment by himself/herself, entering the required information and obtaining the brief.

“Self Briefing” is not intended to indicate the location of the briefing equipment. Whether the pilot uses equipment at a major airport, at a local airfield or uses the Internet to obtain the briefing can all be instances of “Self Briefing”.

Depending upon the manner in which the “Self Briefing” terminal integrates the various elements, it may operate at any level between three and six. E.g. if the terminal provides one common interface to enter flight plan details but produces separate outputs it should be considered at level three.

4.3 Value Added Services

4.3.1 General

Value added services are those facilities that exceed the basic requirements laid down by regulatory bodies. In the case of Integrated Briefing the requirements are identified within ICAO documentation.

The Integrated Briefing project is not proposing a change to the information provided. For example, no new messages have been added. Where the project introduces added value is with the methods of service delivery and the ability to tailor the products to better suit the needs of the user.

Within the current regime, route charges are, in most cases, used to pay for the briefing service provided at most airports. Most users, therefore, see these facilities as being an “included service” for which no further payment is due.

Although beyond the mandate of this document, a service provider may wish to make an additional charge for the development and provision of these value-added services.

4.3.2 Internet Briefing[3]

The development of the Internet has brought a new means of delivery for many services. It has become a widely available and cheap way of providing access to a vast array of data to the millions of users throughout the world.

The Internet provides a means of delivering briefing material directly to a wider user base. Two main benefits may be seen:

1. Many small airports currently have no briefing facilities. Instead, these services are provided through use of telephone and fax machines connected to the nearest airport that has these services. The addition of a small, low specification, computer and Internet access at such airports would allow the pilots to request briefing material directly, tailoring the request to suit their own needs.

2. An increasing number of pilots have their own computer equipment at home and as such may be able to assess the briefing material for a flight before leaving to

[3] In this instance, the Internet means the use of the World Wide Web, supplemented where necessary by the use of private Internet Protocol(s).

travel to the airport. Indeed, should the weather be such that their flight is not possible they would not even need to leave home. The use of Wireless Application Protocol (WAP) would allow a pilot to obtain a pre-flight briefing via a mobile telephone.

At its current stage of development, the Internet is often not seen as a reliable means of communicating critical information. Whilst the availability has in the past been questionable, as the number of users connected increases so does its availability. Furthermore, if such facilities were not available the impact should be considered low, as, in most cases, the conventional means of obtaining the necessary information will still exist (albeit in a less convenient manner and at the possible risk of overworking the support service). However, it provides a readily available method of easily accessing briefing information.

The manner in which the service is provided using the Internet will have an impact on the Integration Level at which it may be considered. To give examples:

1. If multiple web sites were provided at which the user entered all required details repetatively, this would equate to level three.

2. If a single site allowed the flight plan to be entered and a single combined pre-flight brief could be printed this would equate to level five.

The ICAO view of the use of the Internet is summarised in the following statement received from the ICAO EUR/NAT Office in co-ordination with the ICAO HQ Montreal in June 2002:

> "Internet is not a communication means recognized by ICAO for operational purposes due to the uncontrolled nature. AFS and ATN are the only recognized ICAO communication systems for this purpose."

ICAO maintains that the public line is not considered as the SECURE line for sending and exchanging safety critical information. The use of the Internet as a secondary means of communication is considered acceptable. The ATN uses Internet technology but is implemented using dedicated (private) lines for data exchange.

However, the view of the user community is that the very nature of the Internet makes it a very reliable means of communication, and that dialog is required in order to instigate changes to the ICAO view.

An official ICAO policy on the use of the Internet is under development by the ICAO Secretariat.

4.3.3 Telephone Briefing

An Integrated Briefing facility would make briefing by telephone much easier. Users would have only one office (call centre)to telephone rather than several. The State providing Integrated Briefing must be prepared to resource this facility.

4.3.4 Electronic AIP

The ability to view AIP components electronically is becoming increasingly available, especially as the use of the Internet increases. This avoids the necessity to maintain and distribute paper copies. It also allows the user to perform electronic searches for the information of particular interest.

4.3.5 Update Briefing

A pre-flight brief, as with any printed report, is only valid for a certain period of time and, from the moment it is created, the information contained within it may be changing. Obviously, the longer the period between a pilot obtaining a briefing and the take-off time of the flight the greater the chances of change taking place.

Whilst it may be possible for a pilot to request a briefing just prior to take-off (indeed, ICAO Annex 2 mandates that a briefing is obtained before a flight), he or she will not wish to spend time identifying the (potential) differences between the two briefs.

To overcome this “Update Briefings” may be offered. This provides a special means of acquiring just the differences between a previously generated bulletin (the master bulletin) and the equivalent bulletin that would be created if the same request were made now (the update bulletin). This allows the user to quickly view the amendments and act accordingly.

Note: While briefing is to be seen as a Standard Service according Annexes 2, 3 and 15 and therefore has to be provided, update briefing may be understood as value added service. For example, update MET briefing to "operators" for "pre-flight planning and in-flight re-planning" is a recommended practice (Annex 3 Chapter 9.2.7) and probably not generally implemented yet and could therefore be considered as a value added service.

Service providers may, therefore, apply specific regulation with it as the system implementation implies higher costs, but this is not necessarily a prerequisite. Update Briefing functionality will be particularly needed if in-flight provision of information is in place.

4.3.6 Update Notification Following a Brief

Optionally, and following the initial briefing, the user may request the notification of updates to the briefing. It will be possible to specify criteria for the notification, including the transmission means (for example: e-mail, Fax, SMS text message), during the initial briefing.

The user will also be able to specify the type of information for which notification will be provided. For example, the user could select to be notified of receipt of SIGMETs, AIRMETs and amended aerodrome forecasts that relate to the intended flight.

5. BENEFIT ANALYSIS

This section describes the benefits to be obtained from an Integrated Briefing facility. It discusses the benefits both in terms of potential safety improvements and in terms of the savings in time that may be achieved by the use of an Integrated Briefing facility.

A proven business principal will apply: A highly flexible, customisable and responsive service and/or system will attract more users than the opposite.

5.1 Economic

5.1.1 Resource Duplication

5.1.1.1 General

The provision of separate facilities for the provision of the various flight planning and briefing services does not provide the most efficient use of human, computer and financial resources. The integration of these services offers opportunities to make cost savings in each of these areas as detailed below.

5.1.1.2 Human Resources

Through the introduction of Integrated Briefing many users will make use of “Self Briefing” facilities, partly removing the need for manual intervention and/or personal assistance. This will allow staff to concentrate on the management of the information necessary to provide the briefing. Despite this, no matter how easy to use or how automated the briefing facility is, there will of course be the necessity for pilots to occasionally contact a ‘human’ briefing service for expert technical advice.

It will be necessary to train staff in the use of new equipment, procedures and the necessary skills. This will represent a cost that will reduce the potential savings to be made.

5.1.1.3 Computer Resources

By combining the services into a single briefing room improved use of computer resources may be made. For example:

- fewer computers may be required as those needed for each of the briefing facilities may be combined reducing the overall requirement,
- the same number of terminals could be used to provide an increased service capability.

5.1.1.4 Financial Resources

Both of the above resource savings will have an impact on cost and allow a saving to be made. However, further opportunities exist to make financial savings.

Most briefing offices are, by necessity, located at airports where the value of the ‘land’ occupied is typically high. By co-locating the facilities in a single central office at the airport cost savings may be made. Furthermore, the technical drivers for the facility (both computing and human) need not necessarily be located at the airport at all.

5.1.2 User Time Saving

With the current pre-flight briefing facilities provided at airfields, the pilot has to visit the individual offices (MET, AIS, ARO) to obtain all of the information required. Depending on the current implementation level, the details of the intended flight must be provided or entered repetitively into a system. It is possible that locations may have to be visited more than once in the light of the information obtained. For example, after receiving the weather information from the MET office, the pilot may then visit the AIS office to discover that the chosen destination airport will be closed at the time of arrival. An alternative destination may then have to be chosen and the pilot would have to re-visit the AIS and MET offices to obtain the briefing information for the new destination.

In a number of aerodromes the duplication of “information obtaining effort” is high due to less customised or non-integrated services. This may be one of the reasons that in some cases pilots do not consider the briefing package in all details and may also be the reason that airlines have built up their own service.

The use of a common user interface for all locations would reduce the familiarisation time required when obtaining a briefing. The user interface is discussed further in [14].

5.1.2.1 Non-ideal Scenario

In such a non-ideal scenario the sequence of offices/services visited could be:

- MET office
- ARO office
- AIS office
- MET office

Note: A number of other combinations are possible depending on the flight requirements and environmental conditions.

In the above case, 4 offices have been visited compared with a single visit required to an Integrated Briefing office considering still an on-site service dependency. Assuming that it takes 7-10 minutes for each visit (including walking between offices, logging on, entering flight details etc.), this adds up to 28-40 minutes spent obtaining the pre-flight information including the filing of the flight plan. Note: Those times are estimates derived from interviews with briefing users and experts from briefing offices.

5.1.2.2 Current Practice Scenario

In many cases, the current practice requires 2 offices (MET & AIS/ARO) being consulted, requiring 14 to 20 minutes to obtain a briefing (including the filing of the flight plan).

5.1.2.3 Ideal Scenario

The ideal form, the “one stop shop” and/or the location independent Integrated Briefing (in this case system and service integration) allows customised, flexible information usage. As a consequence, a fully customised input allows further significant time savings by avoiding duplicated input and also avoiding input errors. The time required can be significantly reduced.

An element in the briefing process often not considered, is the interpretation of the information. Single “piece by piece screening” is very time consuming, not user friendly and might be a cause of error or misinterpretation. It may lead to “taking away” information in order to analyse it later in the cockpit during departure check, or in exceptional cases, even during in flight.

Time savings may be made through the reuse of previously entered tailoring and customisation settings. Further savings may be made by the use of Update Briefings.

5.1.2.4 Example of Potential Time Savings

The following diagram illustrates the time savings that may be achieved by a user through the use of an Integrated Briefing facility by comparing the three scenarios described above.

In this diagram the following have been assumed:

- The walking time between each office = 3 minutes
- The time taken to obtain a briefing in each office = 7 minutes on average
- The time taken to screen a report in each office = 6 minutes
- The time taken to screen a report obtained from an integrated briefing office = 10 minutes

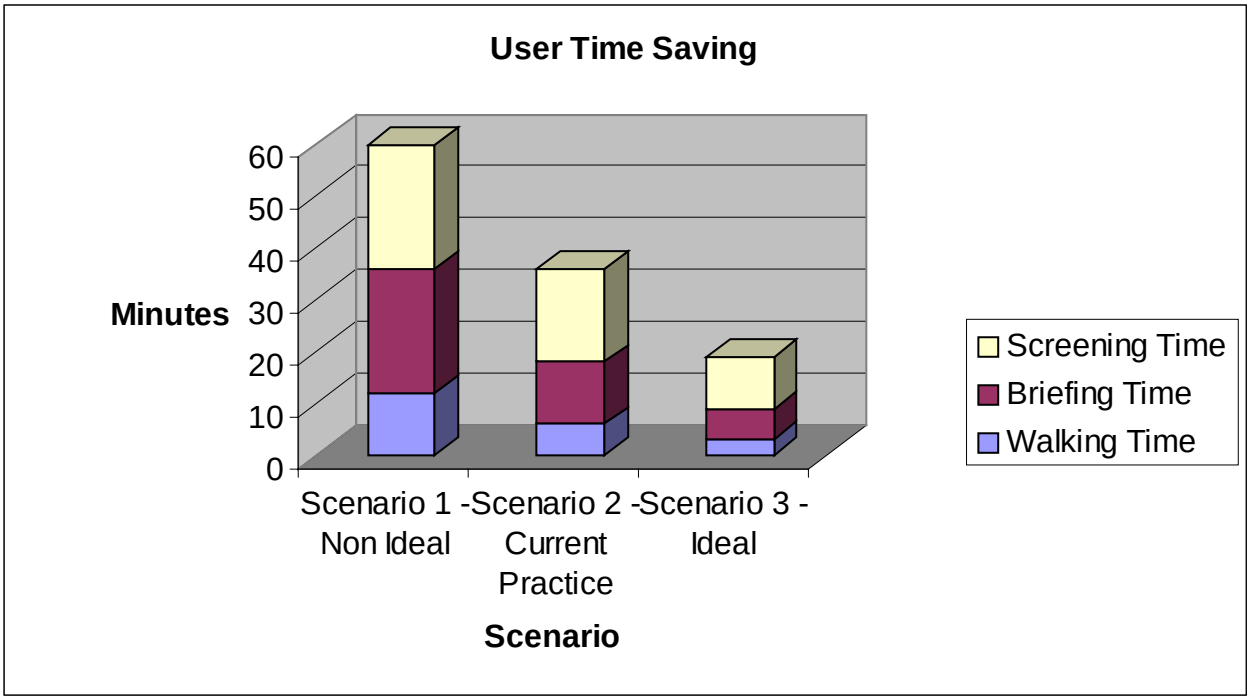


Figure 12

An individual State may calulate the actual time saving that they may expect to achieve using the model provided in Appendix G.

5.1.3 Integrated Briefing - The Swedish Case

The information in this section was kindly provided by Luftfartsverket (LFV)

5.1.3.1 Effects Of Integration

In 1990 LFV introduced the NOF and NOTAM bulletin system named ODIN which is still in operation today. Since then Fax has been more and more introduced as the main delivery system (before this, briefing information has been send via AFTN).

LFV finalised the integration of AIS and MET at the beginning of 1990 when service was still provided from a number of distributed briefing offices. From then on, AIS & MET data and both pre-flight information bulletins and briefing over the phone were integrated. The Swedish Meteorological and Hydrological Institute (SMHI) continued to provide information, based on special agreement with the production of about 15% of bulletins (of total briefing output) and was paid for this service by LFV. This has been required due to, at this time non-ideal system performance of LFV's system.

LFV went into operations with their own new MET-system in 1996 and one year later the Met bulletin production moved completely from SMHI to this new system.

It could be estimated that the production was more than doubled after LFV started the integrated service (AIS; ARO; MET). But this doubling of production was not only a result of integration. At that time more and more customers realised that they could receive a broader scope of products and information over an increased variety of output devices and not only phone or Fax.

The service integration was later supplemented by centralisation in 1999/2000 and the introduction of call center functionality followed by system improvements, which are still ongoing. The last important step toward increased system integration was the implementation of an online tool called "SWIFT" (2001) which is currently operated in Swedish language only.

5.1.3.2 Resource Reduction

In 1990, before integration, Sweden employed 51-53 briefing officers in 4 offices. This rose to 56 briefing officers in 1995.

In 2002, after centralisation, Stockholm FPC employs 32 briefing officers and 6 supervisors. LFV have, therefore, reduced staffing levels by 18. They have also reduced the number of offices and management staff. At the same time they have coped with an increased level of output (i.e. the number of PIB supplied has increased).

5.1.3.3 Conclusion

LFV started with briefing related Key Performance Indicators in 1997 and, therefore no actual figures are available to directly compare the situation before and after full service integration. However, estimates range generally between 20-60% increase in briefing output.

Note: This estimate can of course not directly be transferred into the environments of other States' and needs to be assessed in each individual case.

It is important not to be biased by the quantitative element alone. Integration in Sweden also brought along significant quality improvements, eased service coordination. It ensures a better basis for a flexible and responsive service and forms a cornerstone for any further enhancements. Particularly this concerns information sharing with ATS and ATC.

5.1.4 Relation between Cost/Saving/Benefit

The following hypothetical graph is a model to visualise the optimum levels of integration. It shows the relation between costs, savings and (operational) benefits on the service provider and on the User side.

Note: This model is based on assumptions and the optimum levels shown will be based on a States own figures.

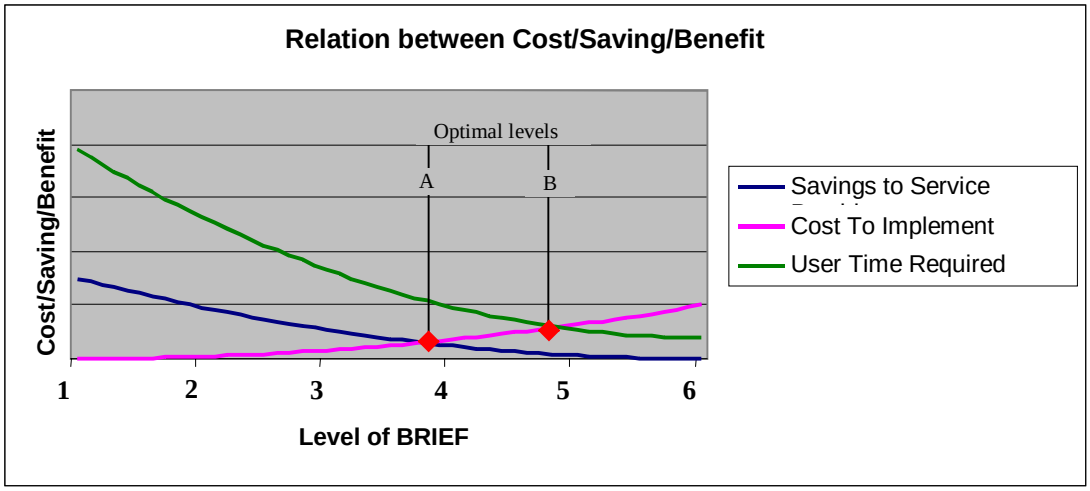


Figure 13

The graph shows:

- "Savings to Service Providers" (blue line) that may be achieved by the introduction of Integrated Briefing showing the increased service savings on moving to higher levels of system integration.

- "Cost to implement" (magenta line) an Integrated Briefing system showing the increased costs on moving to higher levels of integration.

- "User Time Required" (green line) is the time required by users to obtain their brief which will be gained through easy, flexible and customised access, resulting in less time by avoiding repetitive actions and deep, complex menu

structures. This is shown as a curve with decreasing time needed on moving to higher levels of integration.

The graph also shows the two realistic, optimal levels of integration:

- Level A: This is where the maximum savings for the service provider may be obtained for a minimum initial cost.
- Level B: This is where the maximum operational benefit is gained for the user for an “acceptable level” of investment of the service provider.

5.1.5 Conclusion

An Integrated Briefing facility will provide users with an improved service.

It has been shown that States that have implemented an Integrated Briefing facility have experienced an increase in the number of users using their facilities.

We are not providing a business case for Integrated Briefing as a whole. Rather, it is expected that each individual State will provide their own business case. The user time saving that an individual State may expect to achieve through the implementation of an integrated briefing facility may be calculated using the model provided in Appendix G.

As each State's situation will be different in terms of the costs associated with the provision of Integrated Briefing this report has not been able to provide details which may be directly applied by a State. Rather a business model has been developed which allows a State to enter its own envisaged costs and the savings anticipated - the resulting figure derived being the number of years over which the investment will be repaid.

The model is provided at the rear of the document as Appendix H.

It should be noted that the figures derived do not include the cost of borrowing money to finance the project, again this is deemed to differ significantly from State to State.

5.2 Safety

5.2.1 General

In order to ensure the maximum safety of a flight, the pilot must be aware of the expected conditions affecting flight at the departure, arrival and alternate aerodromes, and along the routes flown between them.

The information of interest includes the meteorological, navigational and operational conditions at all points along the route at the time at which the pilot intends to be at those points plus an operational margin before and after such points.

If the forecast meteorological conditions included warnings of poor visibility en-route, especially important to pilots of VFR flights, the pilot may have to consider alternative routes. A prediction of a thunderstorm at the destination aerodrome at the time of arrival may lead to the pilot reconsidering the choice of destination aerodromes. The decision will be influenced by such factors as the aircraft type, pilot rating, area of flight operation etc.

The pilot needs to be aware of any aeronautical conditions that are relevant. For example, if a runway is closed, the pilot may have to choose an alternative destination.

Ideally the pilot would be made aware of the expected conditions for the time of flight during the planning phase. Those conditions would then be taken into account during flight planning. Although the provision and obtaining this information is mandatory, it does not always happen. This is most likely for the reasons given in paragraph 1.4.1. For further details refer to Appendix B.

Conditions affecting flight can change quickly. For example: a rapid deterioration in weather can make some routes unflyable; an accident at an aerodrome can lead to

instant closure of the runway. The pilot needs to be supplied with the most up to date information available. He also needs to be informed of any changes to that information as soon as possible, ideally before take-off as this would enable the flight to be postponed/cancelled if necessary. Pilots flying under ATC control would then be notified immediately (or on request) of any changes to relevant information for the duration of the flight through the control unit responsible for the flight. Pilots not flying under ATC control would benefit enormously from updates to in flight updates to briefings.

5.2.2 Safety Improvement

The cost to the aviation society as a whole of a crash of even a small aircraft is high, each State suffering a number of such accidents each year. In many cases subsequent reports show that VFR pilots have encountered IMC and, as a result, lost spatial awareness. Whilst improved briefing facilities will not eradicate this type of accident, they may assist the pilot at a time of stress, by ensuring all necessary information is present within the brief in a clear and consistent manner, providing the pilot with a less stressful situation in which to assess alternative options.

5.2.3 Safety Study

In order to determine the effect an Integrated Briefing facility would have on safety, a study of air traffic incidents was carried out by examining Air Traffic Incident Reports. Appendix A provides a list of web sites containing Air Traffic Incident Reports that were visited.

A study was also undertaken of the safety reports available within EUROCONTROL. These consisted of both Agency and State reports generated as a result of safety-related working arrangements.

The Internet was also used to study reports of air safety organisations. Appendix A also contains a list of the reports examined, and the web sites from which they were obtained.

5.2.4 Safety Results

The results of the Safety Study are included as Appendix B.

It was found that some air incidents could be attributed to encounters with bad weather. This was sometimes due to “attempted VFR flights into IMC”.

Possible factors contributing to “attempted VFR flights into IMC” were found to be:

- Pilots not obtaining a pre-flight briefing
- Flight plans not being filed
- Inaccurate briefing information
- Too much information supplied, some of it not relevant to flight
- Not all relevant information was available
- Ambiguous, contradictory information supplied from different sources
- Weather predictions changing during flight

5.2.5 Conclusion

An Integrated Briefing facility will make more accurate, complete and relevant information easily available in a timely manner, and is therefore likely to contribute to flight safety. In addition, the provision of update briefing (a value added service that is especially important for VFR flights) shall enable a minimisation of risks once the user has left the briefing area.

However, an Integrated Briefing facility is unlikely to have any obviously visible impact on safety.

Expanding Integrated Briefing to encompass in-flight briefing would further improve flight safety if the Gate-To-Gate provision of information is considered.

5.3 User Perception

5.3.1 Current Situation

With the current facilities offered, many pilots have started to make use of the commercial facilities that are available. These providers supply a product that is in demand - an integrated and tailored briefing package.

However, whether this be from a large system providing support to a major airline or a web-based solution offering one-off briefings for a pilot who flies as a hobby, one finding appears common - a perception, by the pilots, that the information obtained is inferior to that obtained from an ‘official State run source’. How this perception originated is not clear - whether it is purely caused by the issuing body not being the 'ICAO' recognised publisher or whether errors have occurred in the past.

5.3.2 Official Source

Most users see only the information issued by the State authority as being the official and correct data. Indeed many commercial providers even put disclaimers on their products implying that they may not be correct. Some ATM/CNS service providers start to do the same if they provide information via the Internet.

Integrated Briefing allows this issue to be addressed in two ways:

Firstly the products offered should be sufficiently tailorable and customisable that the user is not dependant on commercial agencies to obtain their briefing. Pilots will therefore obtain their information from the official source.

Secondly, with more sophisticated Integrated Briefing services, the information could be made automatically available by the State Authority, on a more formal basis, also to the commercial bodies who provide further value added services. By removing the need for a commercial provider to re-enter or recreate data the user perception may well be improved. Indeed, in time, commercial services could become approved and their products be understood as “State Authorised”. Furthermore, by making the information readily available to commercial providers, the State administration may be able to charge for its use - helping to offset the cost of providing the Integrated Briefing system.

6. INSTITUTIONAL ISSUES

6.1 AIS v Meteorological Services (Ownership of Products)

For a flight to take place (assuming a flight plan and any required slots have been obtained) two key data sets are required, namely AIS and MET briefings. Traditionally these two services have been offered by different entities and, within many States, Met services are provided by a body external to the State ATM/CNS service provider. ARO, being the function where flight plans etc. are handled very often belong to another, third organizational element. Each of these entities collect and distribute their own information. They are the owners of their information.

Tables showing the organisations / departments responsible for providing the various briefing services in each State are provided in Appendix E.

For the concept of Integrated Briefing to be successful, the delivery of these services must be brought together into a central facility. This does not, and should not, be taken to imply that the services must be combined. Integrated Briefing will provide a portal that enables users to view the information provided by the individual services. Unfortunately this amalgamation could be the cause of resistance to change, as each provider may be reluctant to "give up" there current responsibility (ownership), instead preferring to maintain their current kingdoms.

6.2 Funding

At the current time both AIS and MET providers have products which may be "sold". Whilst an AIS is often not permitted to make a profit, MET providers do not have such constraints and are sometimes permitted to charge according to the market need.

Given this, neither group will really want to be providing its services to the other free of charge as each will be concerned about the potential loss of influence and business and hence income.

Furthermore, there is a financial issue to be addressed in combining the delivery of these services. Currently AIS receives a portion of the route charges to fund its element of briefing and the MET service receives a separate portion (or is funded by different means). If a single body was to act as the delivery mechanism this balance must be addressed. Both would still need money allocated for the development of their products where the delivery service (briefing) will be receiving a portion to fund this service.

6.3 Current Market Situation for Users

With the development of automated systems the requirement for flexible, accurate and timely information is increasing exponentially as the number of flights is increasing. In addition, ground based equipment is becoming more sophisticated and aircraft more dependant upon it.

The pilot’s reliance on having clear, unambiguous information regarding the situation affecting their flight is greater now than ever before. At the same time, commercial pressures on pilots and their associated airlines is increasing with global market forces coming to bear. Recent events have shown that the future of even major airlines is not guaranteed and that efficiency of operation is crucial.

The biggest, most recent potential financial beneficiary of Integrated Briefing are smaller, low cost operators (scheduled and non-scheduled) whose profit margins are very small.

Given the current situation, major airlines make little or no use of airport briefing facilities. However, it has been seen that smaller airlines play an essential role, acting as feeders for the large airlines.

Tables indicating the level of integration currently to be found in the systems and services for each State are provided at Appendix F.

6.4 Institutional Issues

A natural “human reluctance for change” results in the defence of a number of service kingdoms and responsibilities. The current organisation of the relevant services and its embodiment into organisational structures is the result of many years of evolution. Integration initiatives are often seen solely as a means for rationalisation.

A table showing the barriers to achieving integrated access to AIS, ARO, MET and ATFM that are likely to be encountered in each State are given in Appendix C. This table shows that institutional issues are likely to be a barrier to Integrated Briefing.

It must be accepted that the world is changing; the jump in technology implies a significant change of user habits. Service providers must keep pace and react to changing user needs.

6.5 Privatisation of Air Traffic Services

Over time there has been an increasing move for Air Traffic Service providers to either become private companies or be run as a “State enterprise” – operating as a private company whilst remaining under State ownership. This brings new challenges to the implementation of running customer services, representing both potential benefits and pit-falls.

On the whole a private company exists to fulfil one overriding pressure, that of satisfying the commercial needs of its owners, the shareholders. Other factors, such as safety, political and customer relations, will still be taken into consideration in the pursuance of this aim.

This pressure to satisfy shareholders can act as both a driver and an inhibitor to progress. Whilst not suggesting that a traditionally run organisation does not take cost and the returns into account, such considerations are paramount for private companies. Before any project is undertaken, it will be justified in terms of cost to implement against the return to be gained.

This can lead to a swift implementation of projects for which a rapid and substantial return on investment is foreseen. However the opposite is true where investment will only be recouped over a number of years, if ever. At this stage a company may be against making the investment necessary if the benefit to be gained is not considered worthwhile.

6.6 Staff Training and Expertise

Currently, staffed at a briefing office are trained only in their particular specialisation. For example, MET staff are only trained to provide MET information, AIS staff are only trained to provide AIS information.

With an Integrated Briefing facility, it will be necessary to train staff to provide assistance in all disciplines. A single member of staff will be expected to provide a complete (i.e. integrated) briefing. Although this introduces a greater need for training the resulting staff will be provide for more flexible staffing arrangements.

6.7 ECIP Objective

To promote this integration process, a new objective (INF04) is contained in the ECIP Level 1 and 2 document for years 2003 to 2007 with a status of “Tentative” and it is intended to be raised to status “Agreed” for the issue 2004 to 2002.

Further details of the ECIP INF04 amy be found at the EUROCONTROL webs site:

http://www.eurocontrol.int/ecip

In addition, Integrated Briefing may also impact the following ECIP objective:

- FCM03 Implement collaborative flight planning

EUROCONTROL require that Service Co-location (Level 4) be considered the minimum acceptable level of Integration for pre-flight briefing.

6.8 Regulatory Aspects

The briefing process in not sufficiently covered by ICAO documentation. Incremental specifications exist in Standards and recommended practices like:

- Annex 15 addresses the integrated aeronautical information package and states PIB in this regard but does not provide detail for the provision of such elements. Annex 15 also contains provisions for combined AIS/MET automated information systems.
- ICAO Doc 8126 mentions Self-Briefing functionality but in a limited scope of AIS only.
- Annex 3 specifies MET related briefing issues for its domain.
- ICAO Doc 4444 identifies the function of ARO but does not particularly address the relation of the briefing component with flight planning activities.
- ATFM Handbook contains a number of specifications concerning slot messages and flow messages. It does not address the Integrated Briefing component.
- ICAO EUR Doc 010, published recently, states the first time such an integration process but did not include the aspect of FPL (and all related messages) as this was out of scope at the time the document was created.
- ICAO Global Plan for CNS/ATM Doc 9750 specifies the “development of common points of access to AIS, MET and FPL” pre-flight and in-flight briefing facilities is stated as one of systems that should be introduced.
- ICAO EUR ANP (FASID) chapter VIII addresses the use of “multi-access terminals” while specifying that they should be capable of providing MET and FPL as well.

For all these reasons the briefing service is addressed heterogeneously in many States. This results in a lack of standardisation in presentation and provision of information to the user. The institutional barrier was identified as a significant cause of not providing such a function.

Improved standardisation would:

- allow pilots to obtain information in different States using the same processes.
- allow an increased number of suppliers to compete for the supply of Integrated Briefing systems and services. This in turn would reduce equipment costs.
- allow systems, services and processes developed in one State to be used in others.

To promote this integration process a new ECIP objective INF04 “Implement Integrated Briefing” will be proposed in a few weeks for inclusion into the ECIP Level 1 and 2, version 2003-2007.

Furthermore the Integrated Briefing Process will need to be defined and to be proposed to ICAO for implementation as a global standard.

6.9 Mandatory Need For Briefing As Specified By ICAO

The minimum Standards concerning Briefing are stated by ICAO as following:

1. ICAO Annex 2 Chapter 2 (2.3.2) defines the obligation of Airspace User concerning briefing before performing a flight.

   > "2.3.2 Pre-flight action
   >
   > Before beginning a flight, the pilot-in-command of an aircraft shall become familiar with all available information appropriate to the intended operation. Pre-flight action for flights away from the vicinity of an aerodrome, and for all IFR flights, shall include a careful study of available current weather reports and forecasts, taking into consideration fuel requirements and an alternative course of action if the flight cannot be completed as planned."

2. Annex 15 Chapter 8 specifies the pre-flight and post flight AIS information to be provided by a state.
3. ICAO Doc 8126 Chapter 5 specifies in detail the pre-flight and post flight AIS service to be provided by a state. Note: It does not include the provision of meteorological information.
4. ICAO Doc 8126 Appendix B contains sample bulletins, a sample navigation warning display and a briefing checklist.
5. Annex 3 Chapter 9 specifies in detail the provision of a meteorological service to operators and flight crew and the information that should be provided by that service. It includes pre-flight and in-flight procedures.

   Section 9.9 specifically talks about automated pre-flight information systems.
6. ICAO EUR DOC 010 (Chapter 2-5) provides a description of provision of a harmonised AIS and MET services for pre-flight planning. Note: This does not cover aspects of flightplan and related messages.

Note: All these references quoted above except point 1 (Annex 2) are addressed in the deliverable AIM/AEP/BRIEF/0007.

7. ROLE OF EAD

7.1 What is the EAD?

The European AIS Database (EAD) will be a EUROCONTROL service. It will provide a unique reference database of aeronautical information on behalf of the States of the European Civil Aviation Conference (ECAC) – the participating States.

Two major functions are integrated in the EAD, Static Data Operation (SDO) and International NOTAM Operation (INO).

The SDO will make available a unique common reference database of complete, accurate and up-to-date aeronautical information.

The INO will be a function which receives, processes and distributes Aeronautical messages and maintains a world-wide database of NOTAM.

The EAD thus provides an integrated environment for the INO and SDO functions, a database used by both functions and facilities for clients to obtain information according to their needs (for example: AIP/NOTAM consultation, PIB, Bulk data download, etc.).

7.2 How Will EAD Provide Briefing?

The EAD allows two forms of client access, through use of dedicated EAD Client Interface Terminals (ECIT) and through a system-to-system connection (ESI). Through either of these means, the users of the EAD will be able to view AIP pages, NOTAM (all variants) and other aeronautical messages. Furthermore, they may request the generation of a PIB in one of three styles:

- Area – for specified FIR(s).
- Route – for a described flight route. Both normal and narrow route are available.
- Aerodrome – for specified aerodrome(s).

These products may either be used directly (i.e. as returned to an ECIT) or further processed by a receiving system. This could permit further data (e.g. MET) to be combined, or for the briefings to be tailored even further.

7.2.1 What EAD Does Not Provide To Meet Full Integration

EAD does not hold MET, flight plan and flight-plan related messages (except AMN, AIM and CRAM) and therefore is unable to provide an Integrated Briefing as understood in the scope of this project.

Although the EAD is able to store user defined routes, there is no automatic co-ordination with filed flights-plans and the changes applied to these. Hence the consistency between narrow-route bulletins produced and the actual flight performed is not guaranteed.

However, the Integrated Briefing project will prepare the institutional grounds for later system/service enhancements.

8. OPERATIONAL ISSUES

8.1 Basic User Needs

The basic user objectives that an Integrated Briefing facility must be based on are to improve the safety with which flights may be conducted and to reduce the cost associated with obtaining a pre-flight briefing.

In order to meet these basic objectives, an Integrated Briefing facility must:

- Allow a standard product to be produced as a minimum.
- Provide all of the pre-flight information that is relevant to a flight and the user.
- Provide only the information that is relevant to a flight and the user.
- Reduce the amount of time taken to obtain a briefing.
- Improve the ease with which briefings may be conducted.
- Provide this information at any location the pilot wishes.
- Enable the pilot to obtain a brief that is structured to suit their particular need.
- Provide easy access to information that is updated after obtaining a brief.

These needs lead to the requirement for a flexible, customisable and tailorable briefing and will result in a high quality briefing service.

8.2 Data and Information Components Required

In order to meet the basic user needs, an Integrated Briefing facility must provide access to:

- Static AIS information.
- Dynamic AIS information.
- Meteorological information.
- Flight planning information.
- Flow management information.

This information must be available for the departure, arrival and alternate airfields, and for the routes between them.

Further details will be provided in the Technical Concept Document.

8.3 Work Flow

The way in which a user would obtain a pre-flight briefing varies in detail depending on the level of integration attained.

The work flow diagrams shown in Figure 14 describes the process required to obtain a pre-flight briefing without an Integrated Briefing facility.

It shows that the pilot must visit separate offices to file a flight plan, obtain an ATFM slot and obtain AIS and MET briefings. This results in a large amount of paperwork that must be screened before the flight can proceed.

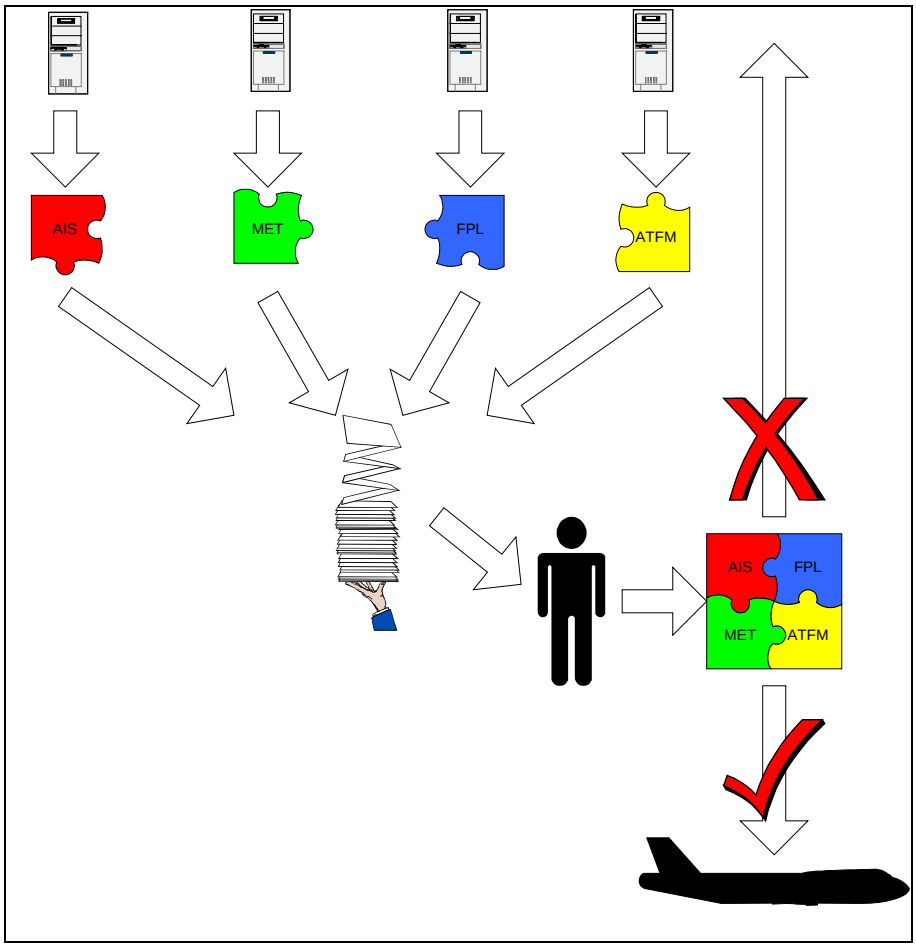


Figure 14

The work flow diagrams shown in Figure 15 describes the process required to obtain a pre-flight briefing with an Integrated Briefing facility.

It shows that a flight can be planned and prepared with one visit to a briefing office. The reduced amount of paperwork allows the briefing to be assimilated much easier.

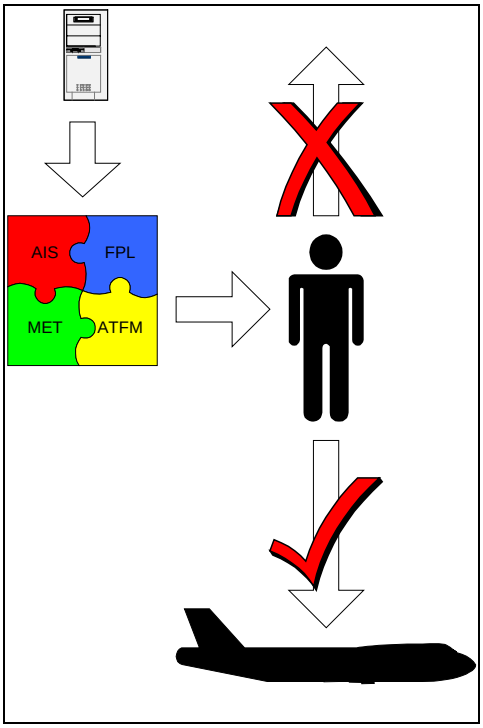


Figure 15

Initially, a preliminary briefing will be obtained. The exact details supplied in the preliminary briefing will depend on the users needs at the time. An example would be that, for a VFR flight, the pilot might need to know if the weather conditions in the locality of the flight would permit flight at all. In this case, a weather forecast for the relevant area and the estimated time of flight would be obtained.

If the results of the briefing show that flight under these conditions is not possible, the flight parameters must be changed. In the example above, the pilot may decide to fly IFR instead, use alternative aerodromes/route, or even cancel the flight altogether.

Once an acceptable preliminary briefing is obtained, a detailed briefing is requested. This will include all of the information that the pilot has requested during tailoring.

Once again, the pilot would use the supplied information to access if the details warrant any further change of flight parameters. The pilot will be able to adjust the flight parameters as many times as necessary until they are satisfied that the best conditions have been selected.

The pilot will, at this stage, be able to select any addition information that they may feel is relevant to the flight.

8.4 Profiling and Customising

Many users are currently supplied with a large amount of information. The envisaged Integrated Briefing facility would be capable of providing even more information.

It is essential, therefore, to avoid overloading users by providing a means whereby they may select the type of information they receive in response to requests. For example, high-level wind information is not likely to be of any interest to a pilot flying VFR, whereas visibility condition information is essential. Once set-up by a user, these settings should be maintained as part of the user's profile so that this user can use them again on the next visit to this facility.

9. FUTURE ROLE OF BRIEFING

Currently, the aims of an Integrated Briefing facility have been limited to providing a ground-based pre-flight briefing service.

In the future it is envisaged that pre-flight briefing will be extended to the provision of pre-flight briefings directly to the flight deck of aircraft. This would enable the pilot to be provided with briefing information throughout the gate-to-gate operation of a flight.

It would then be a natural progression to further extend this facility to include in-flight updates of aeronautical and meteorological information on the flight deck.

At this stage Integrated Briefing could be considered as playing a major part in improving the safety of all phases of flight.

In order to provide a complete Integrated Briefing service that assists the user in efficiently using the vast amounts of information that will be available, the knowledge itself must be managed. Integrated Briefing will achieve this by providing a portal into a network of knowledge that will enable users to view the information belonging to other people.

Users have expressed the desire to have a Europe wide service where briefing information for the whole of Europe is stored in a central repository. In particular, it is felt that a centralised MET facility should be added to the facilities to be offered by the EAD. It is also felt that that a Europe wide service would provide the benefits of a common user interface, including the use of a single username and password per user, anywhere in Europe.

10. CONCLUSIONS

There is a great potential in Integrated Briefing. The AIS community has an opportunity to promote itself within the overall Air Traffic Management domain by assuming the role of Information broker for the aviation world, by improving the service to its users and by taking a proactive lead in the support role for increased safety.

The ideal Integrated Briefing solution would provide users with a portal into the vast amount of information available to them, in a controlled and customisable manner.

It has been shown that savings may be achieved whilst improving the quality of service provided.

Each State may be considered to have implemented an Integrated Briefing service if they have achieved Level 2 – co-location of facilities. Whilst this level introduces a user time saving, it does not bring about a significant improvement in the integrity of the product produced. Ideally therefore a higher level of integration should be sought.

From a user perspective, the provision of a Level 6 Integrated Briefing facility offers the best service, but at a cost to the service provider. It is therefore recommended that ECAC States should plan for the provision of a Level 4 facility as a minimum. This level is seen as offering the best compromise between service to the user at a reasonable cost to the service provider.

In order to achieve the above, the stated requirements need to be addressed and the business environment must be adjusted in order to meet the users expectations. This process should not be jeopardised or hindered by “institutional barriers”.

Appendix A Safety Reports

The Internet was used to study Air Traffic Incident Reports and the reports of air safety organisations. This Appendix provides a list of the reports examined, and the web sites from which they were obtained.

A.1 Air Traffic Incident Reports

The Internet was used to study the air traffic incident reports of the following countries:

- United Kingdom (Air Accident Investigation Board)

  http://www.aaib.dtlr.gov.uk/

- United States Of America (National Transport Safety Board)

  http://www.ntsb.gov/

- France (General Civil Aviation Directorate)

  http://www.dgac.fr/index_gb.htm

- Ireland (Air Accident Investigation Unit)

  http://www.irlgov.ie/tec/aaiu/default.htm

- Canada (Transportation Safety Board)

  http://www.tsb.gc.ca/ENG/

The reports that referred to pre-flight briefing were highlighted for further analysis. The results of this analysis are given in Appendix B.

A.2 Reports Of Air Safety Organisations

The Internet was also used to study reports of air safety organisations. The following reports were studied:

- The Aircraft Owners and Pilots Association (AOPA) 2000 Nall Report, AOPA Air Safety Foundation.

  http://www.aopa.org/asf/publications/

- The National Transportation Safety Board (NTSB) Annual Review of Aircraft Accident Data for Calendar Year 1997.

  http://www.ntsb.gov/publictn/2000/arg0001.htm

Appendix B Results of Safety Study

B.1 Encounters With Bad Weather

According to the US National Transportation Safety Board (NTSB) Annual Review of Aircraft Accident Data for Calendar Year 1997, there were a total of 66 accidents, of which 37 included fatalities, in the year 1997 which were attributed (as a first occurrence) to an "encounter with bad weather".

The situation improved during the year 2000, with the AOPA Air Safety Foundation's 2000 Nall Report reporting a total of 36 accidents, of which 27 included fatalities, which *"involved weather as a contributing factor*". It continues:

> *'Twenty-one of the 27 fatal weather-related accidents (77.8 percent) were caused by "attempted VFR flight into IMC." Thirteen of these were in single-engine fixed-gear aircraft, accounting for all of the fatal weather-related accidents in those aircraft. Five of eight (62.5 percent) fatal weather-related accidents in retractable-gear single-engine air-planes were due to this cause. Three of the six fatal accidents in multiengine airplanes were also due to VFR into IMC.'*

Many of the air accident reports also refer to "*attempted VFR flight into IMC*". The reason for this in some cases was due to encountering unexpected weather conditions. In some cases, pilots had not obtained a pre-flight briefing. In others, the actual weather encountered was not predicted in the weather information received in the briefing.

The question of why a pilot would fly VFR without first obtaining a weather briefing must be asked. Or as the AOPA Air Safety Foundation write in their NALL 2000 report:

> *'While weather-related accidents often are related to errors in planning, information gathering, and in-flight decision making, many of these maneuvering accidents are the result of reckless disregard of safe operating practices. The actions that precede these accidents are not usually mistakes in judgment—they are deliberate.'*

While it is not possible to force a pilot to obtain a pre-flight briefing, they are more likely to do so if it can be done easily and quickly. An Integrated Briefing facility would improve both the ease and speed with which pre-flight information could be obtained.

B.2 Correct Flight Plan Not Filed

Although not contributing to any of the accidents included in the accident reports included in the study, the reports did highlight that some pilots, or their companies/handling agents, had not filed a correct flight plan. In some cases this did not come to light until the pilot asked for start and push back clearance. This can cause delays, resulting in any pre-flight briefing information being out of date. In one case, a lack of flight plan was not detected until the aircraft had entered the arrival FIR.

Once again the question must be asked, "Why?" A flight plan is more likely to be filed correctly if it can be done easily and quickly: if it can be done at the same time and location as obtaining the pre-flight briefing, so much the better.

B.3 Information Overload

The air accident reports also showed that even when pre-flight briefing information was obtained, it was not always fully used. Pilots are sometimes supplied with so much information that it is not always apparent to them which parts of it are either important or relevant to their flight. An Integrated Briefing facility would provide only the information of relevance to the flight that the pilot intends to make. This should take into account such factors as the flight rules to be followed (VFR flights need a separate set of information to IFR flights), aircraft performance (a small AZTEC aircraft limited to a maximum of 10,000 feet will not need high altitude wind information). Providing only relevant information would ensure that important details were not missed.

B.4 Missing Information

A contributory factor to some accidents was the fact that relevant information was not always available. For example, in one instance a pilot had obtained weather information for both departure and destination aerodromes but they could not obtain details for some of the route between, as they were not available. The envisaged Integrated Briefing facility could not avoid this problem as it is only dealing with the supply of information from existing sources – if the information is not available, it cannot be supplied. However, the use of an Integrated Briefing facility may highlight the lack of information enabling due action to be taken, both in endeavouring to secure a suitable source in the future and perhaps considering an alternative route.

B.5 Ambiguous, Contradictory Information

Ambiguous information, contradictory information from different sources and the incorrect distribution of information has all contributed to incidents. All three were noted in report F-FV991112a from the French General Civil Aviation Directorate (BEA). This report details the investigation into the collision of Flight 3275 with high ground where 24 passengers and crew perished. An Integrated Briefing facility could ensure that information was not ambiguous or contradictory and that all information was correctly distributed. The success with which it could do this would depend on the level of integration available.

B.6 Changing Weather Conditions

Often it was read that a situation had changed between the pilot obtaining a pre-flight briefing and reaching the location concerned. The deterioration of weather at the destination aerodrome could particularly affect VFR flights. If Integrated Briefing were expanded to encompass in-flight updates to briefing information, the pilot would be in a better position to safely choose to land at an alternate aerodrome.

B.7 Consequences of Poor Pre-flight Briefing

It became apparent from the air accident reports that many of the consequences of a lack of pre-flight briefing information are relatively minor and do not result in injury.

An incident has also been reported where pilots have become involved in a confrontation at a briefing office. It is essential for safe flight that a pilot is in a suitable frame of mind during that flight. In order to preserve a calm atmosphere in a briefing office, access to the required information must be made easy. An Integrated Briefing facility would improve the ease with which information could be obtained by making all of the required information available to the pilot in a single visit.

Appendix C Possible Barriers To Integrated Briefing

The following table is taken from the results of the questionnaires (available on request) received from Member States and incorporates the 17 replies received from the 38 ECAC States. It indicates the barriers to achieving integrated access to AIS, ARO, MET and ATFM likely to be encountered in each state.

	Barrier To Integrated Briefing			
Country	Institutional	Lack Of Concept or Specification	Not Considered a Useful Operational Improvement	Other
Belgium Military	✓			
Czech Republic	✓			
Estonia				
Finland		✓		
German Military		✓		✓
Latvia	✓			
Lithuania	✓			
Norway	✓			
Portugal	✓			
Romania	✓	✓		
Slovenia	✓			
Slovak Republic				
Sweden				N/a
The Netherlands	✓	✓		
The Netherlands Military	✓	✓		
Turkey	✓			
United Kingdom	✓			

Figure 16

Note: Sweden have already integrated their briefing facilities.

Appendix D Numbers of Briefing Offices Currently In Place

The following table is taken from the results of the questionnaires (available on request) received from Member States and incorporates the 17 replies received from the 38 ECAC States. It indicates the number of briefing offices currently to be found in each state.

	Service				
Country	AIS	ARO	MET	ATFM	Integrated
Belgium Military					**8**
Czech Republic		**4**	**3**		**1+2+1** See note 1
Estonia					**5**
Finland See note 2	**8 (29)**	**29**	**25**		
Germany Military	**38**		**12**		
Latvia	**1**	**2**	**1**	**1**	**1**
Lithuania	**1**	**4**	**4**		**1**
Norway	**6**	**6**	**11**	**0**	**0**
Portugal	**5**	**5**	**8**	**5**	**0**
Romania	**4**	**17**	**17**	**17**	**1**
Slovenia	**3**	**3**	**3**		
Slovak Republic		**6**			
Sweden					**1**
The Netherlands	**12 (SB)**	**5(SB)**		**5(SB)**	**1**
The Netherlands Military	**1**	**9**	**9**	**1**	**1**
Turkey	**11**	**2 (FIC)**			
United Kingdom		**150**			

Figure 17

SB indicates Self Briefing facilities.

Note 1: AIS, ARO, MET and ATFM are integrated at Praha International Airport, AIS/ARO/MET are integrated at Brno and Karlovy Vary International Airport, AIS/ARO are integrated at international airport Ostrava.

Note 2: Separate AIS/ARO units at 8 airports, at other 21 airports combined with TWR of AFIS.
Of total of 29 airports, MET briefing available at 25 – combined with AIS/ARO or TWR.

Appendix E Organisations Providing Briefing Services

The following tables are taken from the results of the questionnaires (available on request) received from Member States and incorporates the 17 replies received from the 38 ECAC States. They indicate the organisations / departments responsible for providing the various briefing services in each state.

Czech Republic	
Service	Organisation / Department
AIS	ANS/AIS (data) ANS/Air Telecom Services (HW, SW)
ARO	ANS/ARO (data) Air Telecom Services (HW, SW)
MET	Czech Hydrometeorological Institute
ATFM	ANS/ARO (data) Air Telecom Services (HW, SW)
Integrated Solution	N/a

Figure 18

Netherlands	
Service	Organisation / Department
AIS	ATC The Netherlands
ARO	ATC The Netherlands
MET	KNMI (Royal Dutch Meteorological Institute)
ATFM	ATC The Netherlands
Integrated Solution	N/a

Figure 19

Romania	
Service	Organisation / Department
AIS	AIS/ROMATSA
ARO	AIS/ROMATSA
MET	MET/ROMATSA
ATFM	AIS/ROMATSA
Integrated Solution	ROMATSA

Figure 20

Sweden	
Service	Organisation / Department
AIS	N/a
ARO	N/a
MET	N/a
ATFM	N/a
Integrated Solution	Flight Planning Centre, Air Navigation Division, Luftfartsverket.

Figure 21

Appendix F Briefing Services Currently Integrated

F.1. Integrated Briefing Service

The following table is taken from the results of the questionnaires (available on request) received from Member States and incorporates the 17 replies received from the 38 ECAC States. It indicates the level of service integration currently to be found in each state.

	Services Integrated					
Country	None	AIS and ARO	AIS, ARO and MET	AIS, MET	AIS, ARO, MET, ATFM (if applicable)	Other
Belgium Military			✓			
Czech Republic		✓ see note 1	✓ see note 2		✓ see note 3	
Estonia					✓	
Finland		✓	✓			✓
German Military		✓				
Latvia					✓	
Lithuania			✓			
Norway		✓				
Portugal						✓
Romania					✓	
Slovenia		✓				
Slovak Republic						✓
Sweden					✓	
The Netherlands					✓	
The Netherlands Military						✓
Turkey	✓					
United Kingdom	✓					✓

Figure 22

Note 1: AIS/ARO are integrated at international airport Ostrava.

Note 2: AIS/ARO/MET are integrated at Brno and Karlovy Vary International Airport.

Note 3: AIS, ARO, MET and ATFM will be integrated at Praha International Airport from the end of November 2001.

F.2. Integrated Briefing System

The following tables are taken from the results of the questionnaires (available on request) received from Member States and incorporates the 17 replies received from the 38 ECAC States. They indicate the level of service integration currently to be found in each state.

	Classical Systems Integrated					
Country	None	AIS and ARO	AIS, ARO and MET	AIS, MET	AIS, ARO, MET, ATFM (if applicable)	Other
Belgium Military		✓				
Czech Republic	✓					
Estonia					✓	
Finland	✓					
Germany		✓				
Latvia					✓	
Lithuania			✓			
Norway					✓	
Portugal	✓					
Romania					✓	
Slovenia		✓				
Slovak Republic						✓
Sweden see note	✓				✓	
The Netherlands	✓					
The Netherlands Military	✓					
Turkey	✓					
United Kingdom	✓					✓

Figure 23

Note: Separate systems using integrated bulletin output.

	Web Based Systems Integrated					
Country	None	AIS and ARO	AIS, ARO and MET	AIS, MET	AIS, ARO, MET, ATFM (if applicable)	Other
Belgium Military						
Czech Republic				✓		
Estonia					✓	
Finland				✓		
German Military						✓
Latvia						
Lithuania						
Norway			✓			
Portugal						
Romania					✓	
Slovenia						✓
Slovak Republic						
Sweden			✓			
The Netherlands						
The Netherlands Military						
Turkey	✓					
United Kingdom	✓					✓

Figure 24

Appendix G Time Saving Model

The following model provides the means for an individual State to calculate the user time savings that they may expect through the implementation of an Integrated Briefing facility.

In order to use the model, the user should enter the following data

Walking Time	(1) Minutes
Briefing Time	(2) Minutes
Screening Time - Individual Briefs	(3) Minutes
Screening Time - Integrated Brief	(4) Minutes
Number of offices to be visited currently	(5)

	Current Situation			**Integrated Briefing**		
	Offices / Briefings	Time	Total	Offices / Briefings	Time	Total
Walking Time	(5)	(1)	(5) x (1) = (6)	1	(1)	1 x (1) = (9)
Briefing Time	(5)	(2)	(5) x (2) = (7)	1	(2)	1 x (2) = (10)
Screening Time	(5)	(3)	(5) x (3) = (8)	1	(4)	1 x (4) = (11)
Total Time for briefing			(6) + (7) + (8)			(9) + (10) + (11)

For example, to calculate the time spent walking between offices, insert the number of minutes on average spent walking between offices as item (1) and the number of offices as item (5). The result of the calculation is then given as item (6).

By entering all of the data indicated in the table, and completing all of the calculations therein, the total time taken to obtain a briefing now, and after the implementation of an integrated briefing facility may be calculated. Hence the user time saving may be obtained.

Appendix H Business Model

Current Service

Cost of Service

Office Costs	(1)	
Staff	(2)	
Training	(3)	
Equipment Charges	(4)	
System Maintenance	(5)	
Consumables	(6)	
Other costs	(7)	
Total Cost	(1)+(2)+(3)+(4)+(5)+(6)+(7) = (8)	
Net cost of current service	(8) + (12) = (13)	

Income from Service

Route Charges	(9)	
Airport Charges	(10)	
Other charges	(11)	
Total Income	(9)+(10)+(11) = (12)	

Integrated Service

Cost of Service

Office Costs	(14)	
Staff	(15)	
Training	(16)	
Equipment Charges	(17)	
System Maintenance	(18)	
Consumables	(19)	
Other costs	(20)	
Total Cost	(14)+(15)+(16)+(17)+(18)+(19)+(20) = (21)	
Net cost of current service	(21)–(25) = (26)	
Year-on-year saving	(13)–(26) = (27)	

Income from Service

Route Charges	(22)	
Airport Charges	(23)	
Other charges	(24)	
Total Income	(22)+(23)+(24) = (25)	

Return On Investment

Cost to implement Integrated Briefing System

System procurement	(28)	
Training	(29)	
Relocation Costs	(30)	
Downsize costs	(31)	
Other Costs	(32)	
Total Cost	(28)+(29)+(30)+(31)+(32) = (33)	
Return on investment	(33) / (27)	Years

Appendix I Abbreviations

AD	Aerodrome
AFTN	Aeronautical Fixed Telecommunication Network
AHEAD	Automation & Harmonisation of European Aeronautical Data
AI	Aeronautical Information
AIM	ATFM Information Message
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
AOPA	Aircraft Owners and Pilots Association
ARO	Air Traffic Services Reporting Office
ASHTAM	Special Series NOTAM relating to volcanic activity
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
BIRDTAM	Special Series NOTAM relating to bird activity
CAT	Commercial Air Transport
CD-ROM	Compact Disc – Read Only Memory
CFMU	Central Flow Management Unit
CNS	Communication, Navigation and Surveillance
CRAM	Conditional Route Availability Message
CRCO	Central Route Charges Office
EAD	European AIS Database
ECAC	European Civil Aviation Conference
ECIP	European Convergence and Implementation Plan
ECIT	EAD Client Interface Terminal
ESI	EAD System Interface
EUR	Euro
EUROCONTROL	European Organisation for the Safety of Air Navigation
FIR	Flight Information Region
FPC	Flight Planning Centre
FPL	Flight Plan
GA	General Aviation
GAT	General Air Transport
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IMC	IFR Meteorological Conditions
INO	International NOTAM Operation
MET	Meteorological
NOTAM	Notice To Airmen
NTSB	National Transport and Safety Board
OAT	Operational Air Traffic
PIB	Pre-flight Information Bulletin
RN	Royal Navy
SARPS	Standards And Recommended Practices
SDO	Static Data operation
SMHI	Swedish Meteorological and Hydrological Institute
SNOWTAM	Special Series NOTAM relating to snow and ice
SWIM	System Wide Information Management
URD	User Requirements Document
VFR	Visual Flight Rules
WMO	World Meteorological Office

End of Document