

Integrated Briefing Technical Concept Document



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Abstract

This report presents a technical view of the concept of an Integrated Briefing facility. It describes the types of information to be provided to the user and describes a process through which the user may obtain that information.

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EXECUTIVE SUMMARY	1
1. INTRODUCTION	3
1.1 Project Objective	3
1.2 Project Scope.....	3
1.3 Survey Phase	3
1.4 Recent User Consultation	3
1.5 Purpose Of This Document.....	4
1.6 Relationship To Other Studies.....	4
1.7 References	5
2. GENERAL	6
2.1 Changing Needs	6
2.2 What is Integrated Briefing?	6
2.3 Scenarios	7
3. USER SEGMENTATION	8
3.1 Hierarchy Of Users	8
3.2 Main User Groups Of Integrated Briefing.....	9
4. INTEGRATED BRIEFING - SOLUTIONS.....	11
4.1 Levels of Integration.....	11
4.2 Self Briefing	17
4.3 Value Added Services	17
5. TECHNICAL ISSUES	19
5.1 Data Sources, Format and Availability	19
5.2 Users	19
5.3 The User Interface	20
5.4 Client Devices	23
5.5 Message Processing	24
5.6 Quality	24
5.7 Timeliness	24
5.8 System Integration	24
5.9 Data Archive.....	24
6. OPERATIONAL ISSUES.....	25
6.1 Basic User Needs	25
6.2 Integrated Briefing Requirements	26
6.3 Data and Information Components Required	26
6.4 Content of a Pre-flight Briefing.....	31
6.5 Work Flow	33
7. FUTURE ROLE OF BRIEFING	45
7.1 In-Flight	45
7.2 Post-Flight.....	45

7.3	ATN / Data-link.....	46
7.4	Technical Devices.....	47
8.	CONCLUSION	48
APPENDIX A	ABBREVIATIONS	49

EXECUTIVE SUMMARY

This report presents a technical view of the concept of an Integrated Briefing facility. It describes the types of information to be provided to the user and describes a process through which the user may obtain that information. It is based on the High-Level Concept Document.

Users:

Although the main users are likely to be the General Aviation and Business Aviation community, it is envisaged that the smaller Commercial Air Transport users in particular will also rely on Integrated Briefing facilities, as provided by States, under numerous circumstances.

Levels Of Integration:

The way in which AIS¹, 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 facility 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.

Operational Issues:

The basic user needs would be satisfied by:

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

Technical Issues:

The technical issues raised in this document include:

- The Integrated Briefing data sources, their format and availability.
- The range of experience of the expected users of Integrated Briefing.
- The user interface, including profiling, customisation and the use of graphical interfaces.
- The interface devices that an Integrated Briefing facility will have to interface to.

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

- Message Processing.
- Quality.
- Timeliness.
- Systems Integration.

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, so 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 for 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 for 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.

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.

This resulted in 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) 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

This report presents a technical view of the concept of an Integrated Briefing facility. It describes the types of information to be provided to the user and describes a process through which the user may obtain that information. It is based upon the High Level Concept Document. The High-Level Concept Document (AIM/AEP/BRIEF/0024) 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

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. This study examined the user needs for harmonised access to AIS and MET services.
- Small AIS Study. This study involved surveys to establish the user requirements for AIS/MET/FPL systems.

1.7 References

<u>Reference</u>	<u>Title</u>	<u>Number</u>
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.	Manual of Aeronautical Meteorological Practice	ICAO Doc 8896
11.	Basic CFMU Handbook	N/a
12.	Rules of the Air and Air Traffic Services	ICAO Doc 4444
13.	Harmonized Access to AIS and MET Services Relating to Pre-flight Planning	ICAO EUR Doc 010
14.	Integrated Briefing - High-Level Concept Document	AIM/AEP/BRIEF/0024
15.	International Standards and Recommended Practices - Meteorological Service For International Air Navigation.	ICAO Annex 3

2. GENERAL

2.1 Changing Needs

Technological changes are having an increasing impact in 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.

ICAO Annex 15 provides a list of information that must be provided at a briefing and ICAO Doc 8126 provides some guidance on how this information should be provided for the scope of AIS. 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.

It should be noted that Integrated Briefing provides a means of accessing and presenting information that is already available; a portal into the aeronautical and meteorological information that exists today. It does not itself generate any aeronautical or meteorological information.

In 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 fulfilling the generic Briefing process and enhancing it by integrating access to and provision of additional data elements such as AIS, ARO, MET, Flow information or other information, as required.

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

The data elements integrated are:

- AIS (NOTAM, SNOWTAM, ASHTAM, BIRDTAM, Static data elements of AIP etc.),
- ARO (flightplan and all related entities)
- MET (all MET entities),
- Flow information (entities related to Flightplan such as AI, ANM, CRAM or flightplan updates influencing the flight intention)

- Other information such as RAIM (GPS availability)

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 provide(s) a single source of all relevant information

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.

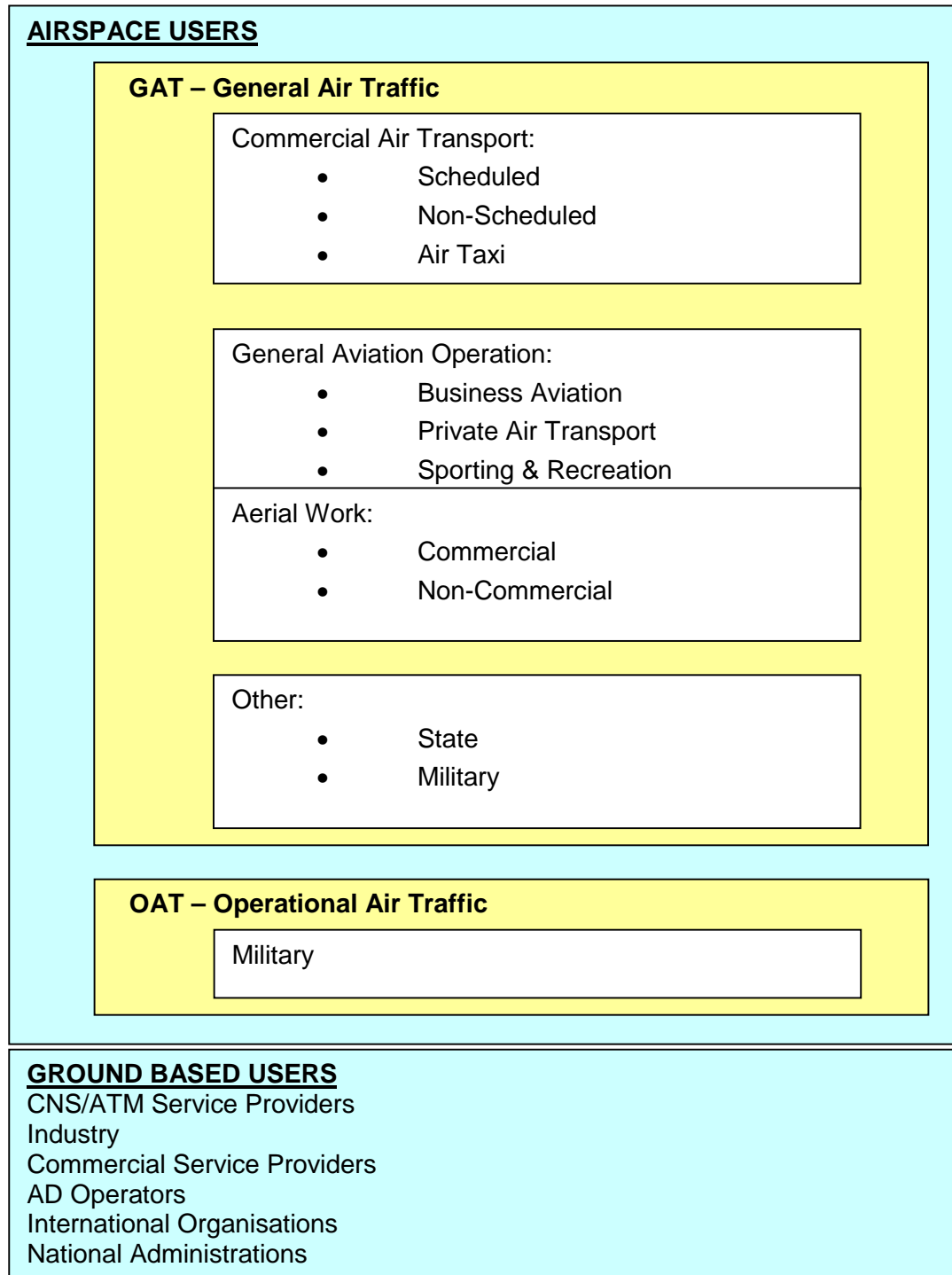


Figure 1

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, generally using 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, 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 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.

This group is considered to be the main user of State pre-flight briefing facilities, whether at aerodromes, via the Internet or by other means.

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. However, because they fly outside of controlled airspace, they would not need to file a flight plan and they would also (currently) receive the service free of charge.

The pilots of medium/longer flights 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.

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.

4. INTEGRATED BRIEFING - SOLUTIONS

4.1 Levels of Integration

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 priority should be given to the integration of the AIS and MET briefing first.

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 sections give a detailed description of each of the six levels.

4.1.1 Level 1: Distributed

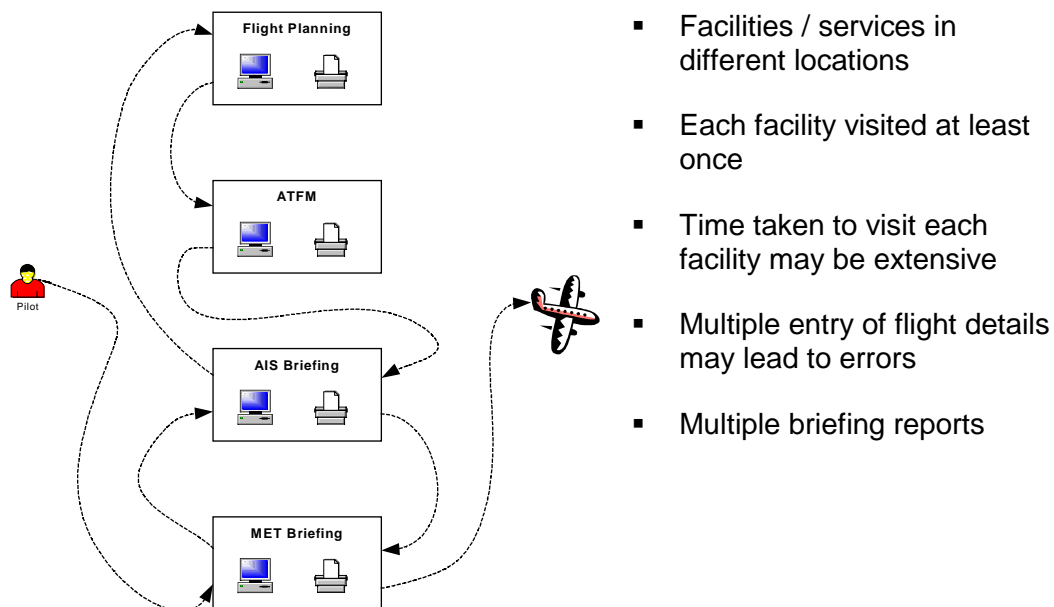


Figure 2

INTEGRATION				
Service	System	User Input	User Output	Easy Decision Making
-	-	-	-	-

This level indicates a service provider that has no form of integration.

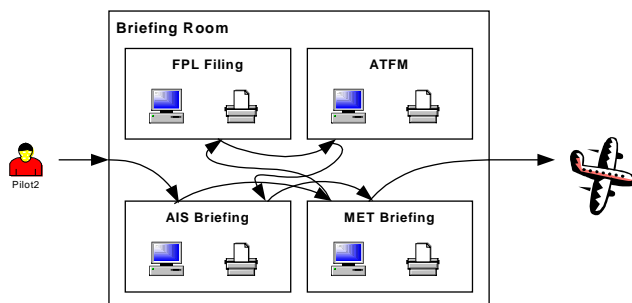
Typically at level 1, the various facilities / services that must be accessed by the pilot, in order to plan and execute a flight, exist in different locations, be it within a single building or not.

A pilot, in order to plan a flight and prepare for it, will often have to visit each of the facilities, sometimes visiting some more than once. For example, before selecting a route both Met and ARO briefings may be required, once the preferred route has been selected then the flight plan may be filed and, if required, a slot obtained. Prior to the flight the pilot will visit in turn the Met and ARO briefing offices again to obtain the latest information.

The time taken (travelling time) to visit each of these facilities may be extensive and involve a significant amount of distance to be travelled. Furthermore, and potentially even more significantly, the pilot will have to enter the flight plan on several occasions, increasing the risk of human error.

Furthermore, the pilot will be presented with a series of briefings (AIS, MET etc.) with no cross-reference between them and no logical order in which they are presented. As a result, the pilot may be forced to 'shuffle papers' to obtain the required information – possibly at a time of difficulty, for example, when the weather on the chosen route has deteriorated.

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 3

INTEGRATION				
Service	System	User Input	User Output	Easy Decision Making
✓	-	-	-	-

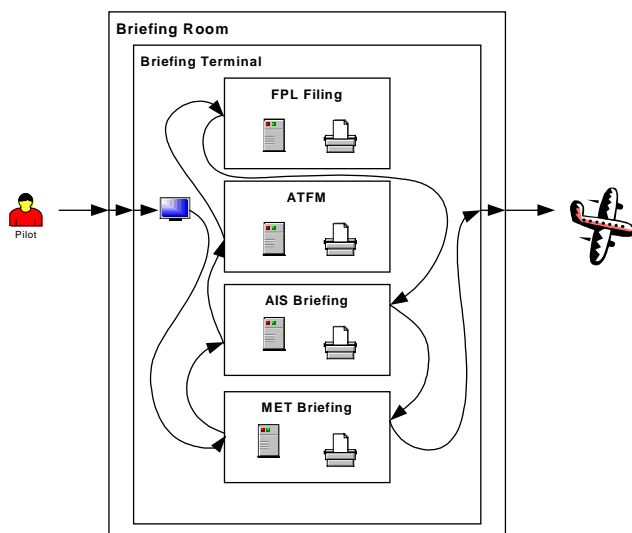
This level indicates that the service provider has integrated the services into a single facility but that each of the actual terminals required for flight planning and briefing remains separated.

As before, the pilot will have to make use of each of the various facilities, and once again, use some facilities more than once.

The time taken to access each of the facilities will be significantly reduced and the distance to be travelled will become negligible. However, the pilot will still have to enter the flight plan on several occasions, the risk of human error remaining unchanged.

Separate briefing reports are still produced and, as before, the pilot will need to sort through the papers to obtain the correct information.

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 4

INTEGRATION				
Service	System	User Input	User Output	Easy Decision Making
✓	-	-/✓	-	-

At level three, the service provider has provided a common system interface to the briefing facilities. The applications remain separate but are hosted such that the use of a single terminal allows the pilot to access all necessary information.

At this level, the need to walk between rooms and indeed even between computers has been removed, travelling time has now been reduced to the minimum using a conventional briefing room. No longer does the pilot even have to walk between the different briefing terminals – one will provide for all of his/her needs.

Although improvement in access to the briefing systems has been offered, the pilot will still be required to enter the flight plan into each system and to access each of the applications on more than one occasion. However, as the pilot will be seated at a terminal throughout the planning/briefing session, the need to re-enter the flight plan into the same application more than once may be removed as only minor amendments may be needed. Furthermore, facilities such as cut/paste may be available to aid completion of some elements of the flight plan (for example field 15). Whilst this will assist in the prevention of human error through the incorrect entry of flight plan requirements, the risk is not entirely removed.

Separate briefing reports will still be produced for each of the areas (MET, AIS etc.) and as in the previous levels the pilot will still potentially have to sort through the papers during flight.

4.1.4 Level 4: Application Integration

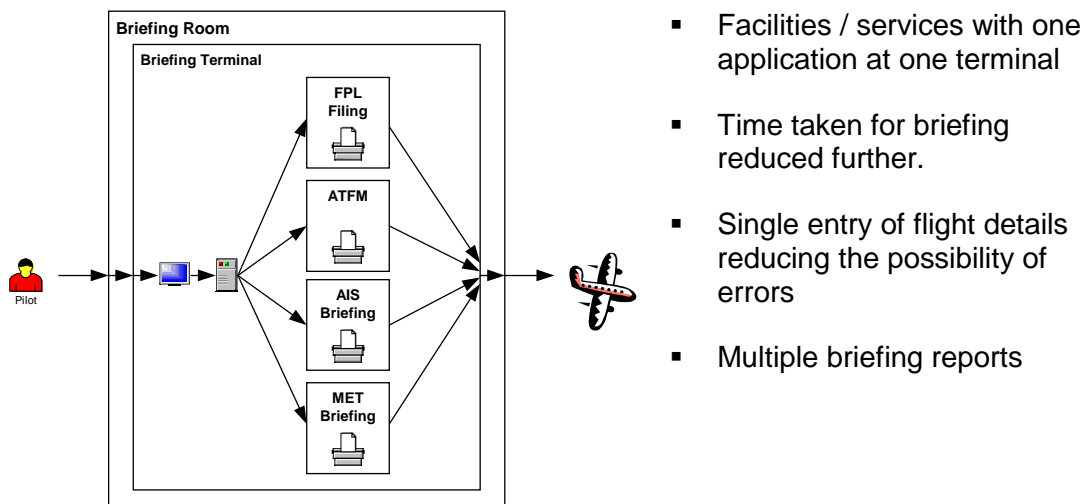


Figure 5

INTEGRATION				
Service	System	User Input	User Output	Easy Decision Making
✓	✓	✓	-	-/✓

Level four starts to bring the true benefits of Integrated Briefing – the ability to plan a flight and obtain a briefing without the necessity to enter the flight plan on more than one occasion. The “human error” factor is minimised as much as is possible through the single entry of a flight plan, ensuring that the briefing material prepared is consistent.

Furthermore, through the use of a front-end application that allows a user to enter and maintain customisation data which they may recall at any stage, commonly flown routes / briefing formats may quickly be recalled and used.

All applications are brought together, from a user perspective, as a single application, through access to a common front-end application. Behind this, separate applications still exist, but instead of being driven directly by the user they have their data supplied by the front-end application.

At this level the applications still prepare separate briefing reports which, once again, the pilot will need to sort through to find the correct information.

4.1.5 Level 5: Fully Integrated

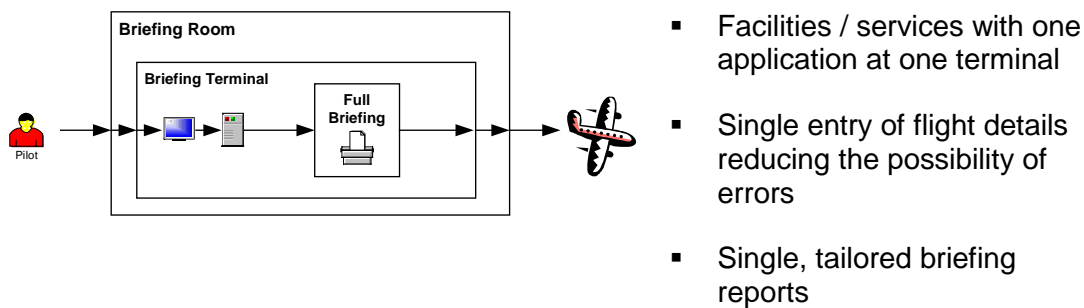


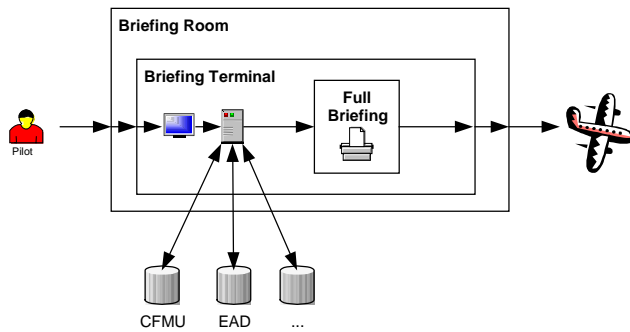
Figure 6

INTEGRATION				
Service	System	User Input	User Output	Easy Decision Making
✓	✓	✓	✓	✓

At level five, full integration is achieved. A single front-end application is used to access the briefing services. Once again, these may still be separate background applications hidden from the user. The opportunities for human error are once again minimised.

As with level four, a single flight-plan entry is required from which all briefing material is prepared. However, where level five brings benefit over level four is with respect to the delivery of briefing material. Level five allows the various briefing products (MET, AIS etc.) to be combined into a single output which may be tailored as requested by the pilot. For example, he/she may request all information (AIS and MET) for their departure and destination aerodrome followed by those for the en-route segment of the flight. This allows the pilot to address just the information required for the specific stage of the flight in which he/she is operating.

4.1.6 Level 6: Knowledge Sharing



- 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 7

INTEGRATION				
Service	System	User Input	User Output	Easy Decision Making
✓	✓	✓	✓	✓

Level six is the highest level and provides the most sophisticated level of integration.

All the benefits of level five are included with the added feature of full collaboration with other relevant services allowing information and knowledge to be shared.

The use of added knowledge through collaboration between services would allow the briefing products to be customised and therefore better tailored for specific users. The preferences of a user not only being reflected in the briefing service but in other related services.

For example, the flight planning system used could communicate directly with the CFMU to allow the pilot to select and accept a route, possibly based on previously selected preferences, and to agree slot allocation. This in turn could be used to extract the material needed for the NOTAM briefing directly from the EAD system and any equivalent MET system that may be introduced in the future.

At this stage, all information is shared and is entered only once, further reducing the risk of human error. NOTAM are entered by a State, validated and stored within the EAD. This is then reported, verbatim, within the briefing. The flight plan is entered once or, providing an even safer system, offered by the CFMU from a list of valid known routes. All briefing information provided is then based directly upon this route providing complete integrity in the flight.

In order for level six systems to operate correctly, open system interfaces are required between both future briefing systems and services with which they may wish to operate.

The use of such open interfaces would also allow the provision of data by the briefing facility to other, external, systems. The provision of such information could act as an enabler for larger airlines who have developed their own dispatch systems to become users of the briefing facilities.

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

ICAO defines the basic requirements of a pre-flight briefing service in ref [7]. Value added services are those facilities that exceed those basic requirements

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 provision of these value added services.

4.3.2 Internet Briefing²

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 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

² In this instance, the Internet means the use of the World Wide Web, supplemented where necessary by the use of private Internet Protocol(s).

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. 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 repetitively, 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.

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, 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 simple means of acquiring just the differences between a previously generated bulletin and the equivalent bulletin that would be created if the same request were made now. This allows the user to quickly view the amendments and act accordingly. Paragraph 5.3.2.1.5 describes the facilities that may be offered to a user.

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 received that relate to the intended flight.

5. TECHNICAL ISSUES

5.1 Data Sources, Format and Availability

5.1.1 Static AIS Information

This includes AIPs, AICs and AIP Supplements and Amendments.

It is the responsibility of the States to which the information pertains (or their delegated authority) to supply this information. The documents containing this information have a common internal structure (as specified by ICAO in ref [7]).

The format of the documents themselves (word format, acrobat format, etc.) and availability of this information varies from state to state.

The documents are currently provided on many media, including paper and CD-ROM (transmitted by conventional mail) and electronically. Once again, the media used depends on the individual State.

When the EAD becomes available, it will be possible to use it as a source of static aeronautical information.

5.1.2 Dynamic AIS Information

This covers NOTAMs and NOTAM derivatives such as SNOWTAMs, BIRDTAMs and ASHTAMs.

It is the responsibility of the States to which the information pertains (or their delegated authority) to supply this information. The messages containing this information have a common internal structure (as specified by ICAO in ref [7] and refined by OPADD).

The messages are normally distributed electronically via the AFTN.

When the EAD becomes available, it will be possible to use it as a source of dynamic aeronautical information.

5.1.3 Meteorological Information

This includes the current weather conditions and those forecast around the time of the flight.

It is the responsibility of the States to which the information pertains to supply this information. The WMO specify many types of message that may be used for the distribution of meteorological information. Some States also use their own standard messages for providing information from local weather stations.

The messages are normally distributed electronically via the AFTN.

The EAD will not provide meteorological information.

5.2 Users

Users with a broad range of experience of using computer equipment may be expected to use an Integrated Briefing facility. These users will range from those who only occasionally use a word processing package or the Internet, to those who use a package such as Microsoft® Office as part of their full time job.

A successful Integrated Briefing facility must be attractive to use for the whole range of potential users.

5.2.1 Technical Qualification

Because the majority of potential users of this equipment will have no qualifications in the use of computer equipment, an Integrated Briefing facility should be easy to use for anyone to use. Many pilots will have neither the time nor the finances to obtain formal training in this area, although in time it could become part of the pilot's standard training, in much the same way as obtaining a pre-flight briefing is today.

5.2.2 On-line Help

Some users will have had little, or no, previous experience of using computer equipment. For these users, it will be necessary to provide on-line help, and possibly make help-desk staff available. On-line tutorials are often useful in this situation.

However, a good on-line help facility should also aim to cater for the more experienced user. Providing search facilities would enable an experienced user to go directly to the area of interest rather than work through topics with which they are already familiar.

5.2.3 Ease of Access

The Integrated Briefing facility should be easy to access. An Internet connection would permit users to access information from home.

Access to information should also be rapid. If users are made to wait too long for information, they will look elsewhere for it or may not attempt to obtain the information at all. This may require a sufficient number of terminals to avoid queuing at briefing offices and also high performance equipment to reduce response times.

5.3 The User Interface

5.3.1 Intuitive User Interface

Some users will have obtained a great deal of experience of using packages such as Microsoft® Office. For these users it helps a great deal if the software is designed in such a way that its use is intuitive. In other words, it works in the way that you would expect it to work without the need to resort to manuals. This enables users with some previous experience to transfer that experience to the new package. An example of this would be the "look and feel" of the software. A large amount of software is now designed with the same "look and feel" as Microsoft® Office so that its large base of users can easily use the new software.

5.3.2 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. Reducing the user's workload may be achieved 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.

The user must also be able to limit the geographical area for which information is provided. An Integrated Briefing facility could link the aerodromes and routes for which information is provided to a flight plan, ensuring that only relevant information is provided. Additional customisation would be necessary to enable the user to expand or contract the geographical area as required. This would enable the user to obtain information about alternative routes that were not yet specified on the flight plan if required.

5.3.2.1 Profiling

5.3.2.1.1 Personal Information

The user will be required to supply information about themselves. The following is a list of items that could be maintained as part of the user profile:

- Name
- User Identifier
- Address
- Terrestrial Telephone Number
- Fax Number
- Mobile Telephone Number
- Email address
- Business Name
- Business Type

5.3.2.1.2 Product Required

The user will be able to configure the type of briefing required:

- Area PIB
- Route PIB (Narrow Route or Area-Type)
- Aerodrome type bulletins
- Immediate automatic notification of items of urgent operational significance
- Administrative bulletins

A description of each of these types of bulletin is given in paragraph 6.4.

5.3.2.1.3 Filters Required

The user will be able to specify the information to be included in the bulletin. The actual information that could be included will depend on the actual needs for the flight or planning/preparation stage but may also depend on the information to which the Integrated Briefing facility allows access. For some user types the delivery of certain information may be mandatory, for example a Pilot may receive SIGMET by default and be unable to disable its provision. As an example, the user may be able to select from the following:

- Weather Briefing:
 - ◊ METAR
 - ◊ TAF
 - ◊ SIGMET

- ◇ High level wind and temperature charts
- ◇ SIGWX charts
- ◇ Low level forecast
- FPL:
 - ◇ FPL (View & File)
 - ◇ FPL associated messages (DLA, CHG, ARR etc.)
 - ◇ ORM (IFPS operational reply messages) & Slot messages for IFR
- AIS Briefing:
 - ◇ Static AIS data (if provided)
 - ◆ AIP Viewing
 - ◆ Supplements and AICs
 - ◆ Charts/Maps
 - ◇ Dynamic AIS data:
 - ◆ NOTAM
 - ◆ SNOWTAM
 - ◆ ASHTAM
 - ◆ BIRDTAM (military)
- ATFM message briefing:
 - ◇ ANM (ATFM notification messages)
 - ◇ AIM (ATFM information messages)
 - ◇ CRAM messages
- Period to be used for message validity times

5.3.2.1.4 Display Format Required

The user will be able to specify if the information is to be presented in graphical (where available) form or textual form only. Textual form would especially be of use where a user is accessing the information via a dial-up Internet link.

The user will also be able to specify the order in which information is displayed. For example, some users prefer to see the information of the arrival aerodrome first, followed by the departure aerodrome and then the en-route information, whilst some users prefer to see all of the meteorological information first, followed by dynamic AIS, etc.

5.3.2.1.5 Update Bulletin Required

The user will be able to specify if update bulletins are required and the comparison rules to be used in determining the update. The suggested choices of comparison rule are:

- Always compare with the original report
- Always compare with latest report
- Always prompt the user for the comparison to be used.

The user will be able to request automatic notification of update via email or SMS text message. If either of the options are selected the user will be prompted to supply an e-mail address or telephone number respectively.

The user will also be able to specify the frequency of update. This suggested choices are:

- Whenever available (i.e. an update bulletin is generated every time information changes)
- At a specified time interval (i.e. an update will be sent every 'n' hours even if this reports that there have been no changes.

The user will also be able to specify the time at which update bulletins will cease to be provided.

5.3.2.1.6 Immediate Notification

The user will be able to specify if immediate notification of significant occurrences affecting flight is required. If immediate notification is required, the user will be able to select if this notification is to be sent by e-mail, SMS text messages or both.

5.3.3 Graphical Interface

An Integrated Briefing facility will provide a graphical interface wherever possible. This paragraph offers some suggestions as to where this may be applied.

When route planning, a map showing aerodromes, waypoints and routes should be displayed. It will then be possible for the user to click on an aerodrome and select it as the nominated departure, arrival or alternative aerodromes. Alternatively, the user could click on a route, or route segment to include it in the flight plan. This would mean that the user no longer needed to worry about the names of individual waypoints whilst planning the route. A route could also be described by the multiple selection of waypoints.

A similar arrangement could be used to verify the routes entered into a flight plan. The user will have immediate visual confirmation that the entered route is correct.

Weather information could be overlayed onto the route planning map. The user would then be able to plan a route to avoid bad weather. It should also be possible to provided a "sequenced" weather display. This should sequence through the forecast weather conditions for various times during the intended duration of flight.

A map could also be used to indicate aerodromes, nav aids, etc. to which extant NOTAMs relate. The user could then, for example, double click on an aerodrome to read the NOTAM(s). This could be filtered so that only those locations relevant to a flight plan were displayed. The user would then be able to select request that selected NOTAMs were included in the PIB.

5.4 Client Devices

An Integrated Briefing facility will interface to the following client devices:

- Terminals situated in the Integrated Briefing office.
- Personal computers situated either at home or in an office. These will be connected to the Integrated Briefing facility via the Internet.

- Mobile phones. SMS messages will be sent by the Integrated Briefing facility to inform users that an update briefing is available or to provide immediate notification of significant occurrences affecting flight.

5.5 Message Processing

As an Integrated Briefing facility is a portal into existing information systems, it will not process any messages as such. Rather, it will reflect to the user the information it receives.

An exception of this is in the filing of a flight plan where it will be necessary to generate messages to send flight plan information to the CFMU.

5.6 Quality

An Integrated Briefing facility will not degrade the quality of any information it receives.

5.7 Timeliness

The timely provision of information for a flight is essential to safety and efficiency. An Integrated Briefing facility will, therefore, not introduce any significant delays into the provision of information to a user.

5.8 System Integration

Previous sections have provided details of what information is required, how it should be filtered and how it should be presented. Readers of this document may be expecting to see how the integration of the available data should be achieved, this information will, however, not be presented.

How such integration should be undertaken will be dependent upon the systems design, the source of the data and the administrations preferred system architecture. For example, EAD may act as a source of information but the chosen architecture may differ depending on whether it is used purely as a source of NOTAM or as the provider of PIB. If the former is chosen, does the system use an EAD System Interface (ESI) to obtain NOTAM information or subscribe to receive them by AFTN? Increase the number of interfaces and the number of questions increases dramatically.

Furthermore, the level of integration to be implemented will have another significant impact on the means used.

For these reasons the actual method of integration adopted will be left for the individual States and their system implementers.

5.9 Data Archive

International regulations exist mandating the need for audit trails. There are also national regulations that are often more stringent than the international ones.

In order to satisfy the regulations covering audit trails, it will be necessary for an Integrated Briefing facility to provide the means of archiving data that is supplied to users for a suitable period of time.

6. OPERATIONAL ISSUES

6.1 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.

Paragraph 2.4 of ref [13] describes the limitations of the present systems and lists the problems arising.

In order to meet the above basic objectives, avoid the problems listed in ref [13] and provide a high quality service, an Integrated Briefing facility must:

6.1.1 Allow a standard product to be produced as a minimum.

A pilot must be able to follow the same procedure to obtain a pre-flight briefing regardless of location. A web-based facility should allow the same procedures to be followed as those used when visiting a briefing office in person. The look and feel of the user interface should be identical regardless of location. Ideally, it will be possible for a user to customise the look and feel to suit their own taste.

6.1.2 Provide all the pre-flight information that is relevant to a flight and the user.

The pilot must be provided with accurate, up to date information for all aspects of the flight, from departure gate to arrival gate. However, the information provided by an Integrated Briefing facility can only be as accurate and as up to date as the information supplied to it. Care must be taken, therefore, that the best sources of information are used at a particular location. It may be considered prudent to use more than one source for a particular type of information so that the most accurate, or most up to date source can be used. By providing all of the information from a single source, the Integrated Briefing facility will avoid the duplication of administrative work, as only one source of user information will have to be maintained.

6.1.3 Provide only the information that is relevant to a flight and the user.

By removing the information that is not relevant to a particular flight (not relevant to the intended route, aircraft type or flight rules, for example), the information that is relevant will be more immediately accessible to the pilot. The pilot will, therefore, be more likely to use it. The use of filters based on settings in the user profile will enable information that is not relevant to be removed. Care must also be taken to prevent duplicated information from being included in the report.

6.1.4 Reduce the amount of time taken to obtain a briefing.

This may be achieved by reducing the amount of information to be entered by the user. For example, only requiring the user to enter a flight plan once will reduce the time taken to obtain a brief, as will allowing a user to use an existing flight plan as the basis for a new flight plan. In addition, providing sufficient equipment so that the user does not have to queue for a terminal will help achieve this. Equipment with sufficient bandwidth will also speed up the process.

6.1.5 Improve the ease with which briefings may be conducted.

Using an easy to understand menu structure, an intuitive user interface and by providing sufficient on-line help facilities will make the Integrated Briefing facility easy to use. By allowing the user to define (and pre-define) the type of information

to be included in a briefing (or briefings) and then providing all of that information in a single report, the access to briefing information will be made easier.

6.1.6 Provide this information at any location the pilot wishes.

Allowing access to an Integrated Briefing facility via the Internet will enable the pilot to access information from anywhere there is a telephone connection.

6.1.7 Enable the pilot to obtain a brief that is structured to suit their particular need.

This may be achieved with user profiles. User profiles are covered in more detail in paragraph 5.3.2.

6.1.8 Provide easy access to information that is updated after obtaining a brief.

This may be achieved by providing the user with facilities for obtaining update briefs. It will be possible to base the update report on any of the reports that have already been made. The user should be able to specify which of these reports the update is to be based on. One user may prefer to obtain all updates to the original briefing report, whereas a second may prefer only the changes to the previous update brief obtained.

The needs described above lead to the requirement for a flexible, customisable and tailorable briefing.

6.2 Integrated Briefing Requirements

High-level User Requirements and high-level Operational Requirements are specified in paragraphs 3.2 and 5.3 respectively of ref [13]. In addition to those requirements, this document adds the need to standardise the briefing process and to provide easy access to updated information

6.3 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 plan and related information
- Flow management information

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

6.3.1 Static AIS Information

Paragraph 8.1.2 of ref [7] lists the static AIS data to be provided as part of a pre-flight briefing as:

- Elements of the Integrated AIP
- Maps and charts

Access must be provided to this information for all ICAO States (either direct or indirect access).

Ref [8] lists in detail a guide to the types of information to be provided for each coverage zone (see paragraph 5.3 of ref [8] for a definition of coverage zone). The Static AIS aspects of that list are reproduced below:

- a. air routes
- b. regulations concerning entry and transit of civil aircraft on international flights
- c. aerodromes/heliports available to international aviation
- d. air navigation aids and mobile communication facilities
- e. meteorological facilities (see paragraph 5.1.3)
- f. rules of the air and air traffic service procedures
- g. controlled and restricted airspace
- h. hazards to air navigation
- i. search and rescue facilities
- j. survival information
- k. appropriate maps and charts
 - 1. World Aeronautical Charts ICAO 1:1 000 000 or aeronautical charts of similar scale for areas where ICAO charts are not available
 - 2. available chart series of a scale larger than 1:1 000 000, e.g. 1:500 000 and 1:250 000 scale
 - 3. small scale Planning Chart(s), preferably covering the entire coverage zone on one or two sheets
 - 4. one or more series of 1:2 000 000 or smaller scale Plotting Charts
 - 5. any available charts for use with electronic aids to navigation
 - 6. Approach and Aerodrome Charts for all aerodromes normally used for international operations
 - 7. En-route Charts

6.3.2 Dynamic AIS Information

Ref [8] lists in detail a guide to the types of information to be provided for each coverage zone (see paragraph 5.3 of ref [8] for a definition of coverage zone). The Dynamic AIS aspects of that list are reproduced below:

A recapitulation of current NOTAM and other information of an urgent character, not contained in NOTAM, on aerodrome conditions, including the serviceability and operational status of visual ground aids, non-visual aids, and the manoeuvring area. For example:

- 1. construction or maintenance work on or immediately adjacent to the manoeuvring area
- 2. rough portions of any part of the manoeuvring area, whether marked or not, e.g. broken parts of the surface of runways and taxiways
- 3. presence and depth of snow, ice or water on runways and taxiways, including their effect on braking action
- 4. snow drifted or piled on or adjacent to runways or taxiways

5. parked aircraft or other objects on or immediately adjacent to taxiways
6. presence of other temporary hazards including those created by birds
7. failure or irregular operation of part or all of the aerodrome/heliport lighting system including approach, threshold, runway, taxiway, obstacle and manoeuvring area lights and aerodrome/heliport power supply
8. failure, irregular operation and changes in the operational status of ILS (including markers), SRE, PAR, DME, SSR, VOR, NDB, VHF aeromobile channels, RVR observing system, and secondary power supply

Ref [13] states that Pre-flight Information Bulletins (PIB) should be compiled from NOTAMS, sorted into various categories and supplied to the user. The categories of PIB required are specified in the Annex to chapter 5 of ref [13]:

Ref [13] also states the following NOTAM related messages are supplied:

- ASHTAM
- SNOWTAM

6.3.3 Meteorological Information

Paragraph 5.2 of ref [10] lists the information to be provided at a pre-flight briefing. This information is to be provided as applicable to the route, and as available at the meteorological office. The list is reproduced below:

- a. Upper winds and upper air temperatures
- b. Significant en-route weather phenomena
- c. Aerodrome forecasts
- d. Aerodrome reports
- e. Take-off forecasts
- f. Landing forecasts
- g. SIGMET information
- h. Air-reports

Tables 3 and 4 of the Annex to chapter 5 of ref [13] provides more detailed information on the meteorological information to be provided at a pre-flight briefing. These tables are reproduced below.

REQUIREMENTS FOR MET INFORMATION - Minimum MET information

TYPE OF INFORMATION	TYPE OF OPERATION/USER ¹⁾		
	VFR	IFR-LOW	IFR MED/HIGH END-USERS
SIGWX L	(X)	(X)	
SIGWX M	(X)	(X)	X
SIGWX H			X
LOW LEVEL FORECAST (A/N)	X	X	
GAMET	(X)	(X)	
UPPER AIR W/T CHARTS	X	X	X
UPPER AIR W/T (A/N)	(X)	(X)	(X)
SIGMETs ²⁾	X	X	X
AIREP SPECIAL	X	X	X
AIRMET	(X)	(X)	
Advisories on tropical cyclone & volcanic ash	X	X	X
METARs ³⁾	(X)	X	X
SPECI ³⁾	(X)	X	X
TAFs (DEP, ALT, DEST)	(X)	(X)	X
Forecasts for take-off	(X)	(X)	(X)
AMENDMENTS FOR WAFS PRODUCTS	X	X	X
NOTE : 1) Within brackets means optional i.e. if information is available 2) Including SIGMETs for volcanic ash and tropical cyclones 3) + TREND when available			

REQUIREMENTS FOR MET INFORMATION - Supplementary MET information

Products for International Aviation	Products for Domestic Aviation	Products for specific user categories
<ul style="list-style-type: none"> - Current synoptic and prognostic charts - Satellite images - Weather radar images - ROFOR and GAFOR 	<ul style="list-style-type: none"> - Cross sections - Lightning activity charts - Forecasts for specific VFR users (gliders, ultra-lights, balloons) - Vertical soundings 	<ul style="list-style-type: none"> - Basic data for intermediate user - Upper air data in grid point format - Special forecasts for helicopter operations - Wind components en route in the resolution required for the operation

6.3.4 Flight Plan and Related Information

IFPS (Integrated Initial Flight Plan processing System) provides a centralised flight planning system for the States within the CFMU area.

Ref [12] lists the information that must be supplied on a flight plan. This includes:

- Aircraft identification
- Flight rules to be used (IFR, VFR or a combination of both)
- Type of flight (scheduled air service, non-scheduled transport operation, general aviation, military or “other”)
- Number of aircraft (in a formation)
- Type of aircraft
- Wake Turbulence Category
- Radio communication, navigation and approach aid equipment carried
- Departure aerodrome and time of departure
- Cruising speed and level
- Route (including changes of speed, level and flight rules)
- Destination aerodrome, estimated total elapsed time and alternate aerodrome(s)
- Other information (see Ref [12] for further information)
- Endurance
- Number of persons on board
- Emergency and survival equipment

Ref [11] describes the communications between the IFPS and the user in order to file a flight plan.

The messages used are:

- FPL – Flight Plan Message
- CHG – Modification Message
- DLA – Delay Message
- DEP - Departure Message
- ARR – Arrival Message
- CNL - Cancel

6.3.5 Flow Management Information

The CFMU provides Air Traffic Services with the best utilisation of available capacities, the smoothing of traffic flows and protection against overloads. This in turn provides aircraft operators with reductions in delays. It does this by allocating a take-off slot to each flight.

Ref [11] describes the communications between the CFMU and the user in order to agree slot allocation.

The messages originated by the CFMU are:

- SAM – Slot Allocation Message

- SRM – Slot Revision Message
- SLC – Slot Requirement Cancellation Message
- SIP – Slot Improvement Proposal
- FLS – Flight Suspension Message
- DES – De-Suspension/De-Shift Message
- FSH – Flight Shift Message
- RRP – Rerouteing Proposal Message
- RRN – Rerouteing Notification Message
- ERR – Error Message

The messages originated by AOs and ATS are:

- SRR – Slot Revision Request Message
- SMM – Slot Missed Message
- SPA – Slot Improvement Proposal Message
- SRJ - Slot Proposal Rejection Message
- RFI – Request For (direct) Improvement Message
- SWM – SIP Wanted Message
- REA – Ready To Depart Message
- FCM – Flight Confirmation Message
- RJT – Rerouteing Rejection Message
- FSA – First System Activation Message

6.4 Content of a Pre-flight Briefing

Bulletin types:

- Area type bulletin
- Route type bulletin (Basic and Narrow)
- Aerodrome type bulletin
- Immediate automatic notification of items of urgent operational significance
- Administrative bulletins.

A description of each of these types of bulletin is given in ref [8].

The Integrated Briefing facility will allow the user to select which of these bulletin types are to be used. The actual content of a briefing supplied by the Integrated Briefing facility is based on setting selected in the user profile and information supplied in the selected flight plan (or flight details if no flight plan is selected).

6.4.1 Area Type Bulletin

It should be possible to provide this type of bulletin for a FIR, groups of FIRs and countries.

ICAO Doc 8126 describes the sub-types of area bulletin that can be provided. They are:

- a. all PIB information
- b. IFR PIB information
- c. VFR PIB information
- d. OPSIG information
- e. IMMEDIATE NOTIFICATION information
- f. only en-route information (IFR, VFR, OPSIG, IMMEDIATE NOTIFICATION, LOWER/UPPER)
- g. selected lists by aerodrome location indicators (e.g. AD 1.4)
- h. any combination of the above

An Integrated Briefing facility should allow the information to be provided in an area type bulletin to be selecting using the user profile.

6.4.2 Route Type Bulletin

Route bulletins can provide information for:

- FIRs crossed by the route and containing departure, destination and alternative aerodromes. This type of bulletin is called a “FIR route specific” bulletin.
- A strip defined geographically about the route and departure, destination and alternative aerodromes. This type of bulletin is called a “narrow path route specific” bulletin.

An Integrated Briefing facility should allow the information to be provided in a route type bulletin to be selected using the user profile.

6.4.3 Aerodrome Type Bulletin

It should be possible to provide this type of bulletin for aerodromes within a FIR, groups of FIRs, sectors, and for specified aerodromes.

An Integrated Briefing facility should allow the information to be provided in an aerodrome type bulletin to be selecting using the user profile.

6.4.4 Immediate automatic notification of items of urgent operational significance

Users will be informed of items of urgent operational significance by email if this is selected in the user profile.

6.4.5 Administrative bulletins

These bulletins provide a list of extant NOTAM. It should be possible to provide this type of bulletin for one or more countries, FIR and/or aerodromes. Filtering on date, time and NOTAM series should also be provided.

An Integrated Briefing facility should allow the information to be provided in an administrative bulletin to be selecting using the user profile.

6.5 Work Flow

This section describes a typical work flow for users of an Integrated Briefing facility and shows the possible approaches for obtaining the required information, depending on the current briefing stage and the needs of a flight. It does not concern itself with how information is obtained or stored.

The approach taken in specifying a possible work flow to be followed when using an Integrated Briefing facility had to take into account the following:

- A user may wish to plan a flight over several visits to the briefing office/facility. An initial visit may be just to ascertain if a particular flight is feasible on the chosen day. A second visit may be to make a second attempt or, having confirmed with a third party that the flight is to proceed, get more detailed information. A subsequent visit may be to find out if any details have changed. In order to satisfy this need, the work flow has been presented in the form of a tree structure, where the user can, for example, obtain a detailed brief without first having to enter a flight plan (this having been done on a previous visit, or not required).
- The user may wish to visit the briefing office via the Internet. They may follow the work flow presented here for visits to both the real (physical) Integrated Briefing office and the virtual (via the Internet) Integrated Briefing office/facility.
- The levels of integration may be different in different States. The work flow presented here assumes an integration level of 4 or higher. This is necessary in order to achieve the single entry of a flight plan. The retention of user knowledge between sessions and a single report output would apply to level 5, whereas multiple reports would apply to level 4.
- Security is of paramount importance. If, for example, a user's flight plan was changed without their knowledge, flight safety could be impacted, as the briefing would not match the intended flight. The work flow described here requires the user to log on as a known user (or as a guest). The user will only be able to access flight plans and user profiles that they have created themselves. A guest would be able to access briefing information, but would only be able to access flight plans and user profiles that they had entered during the current session (i.e. since they last logged on).
- The individual work flow will strongly depend on flight rules (VFR or IFR) the current stage of flight (planning, preparation, execution) but also the type of user (Commercial, Business, Private etc.).

6.5.1 Flow Diagram Symbolology

Figure 8 defines the symbology used in the work flow diagrams.

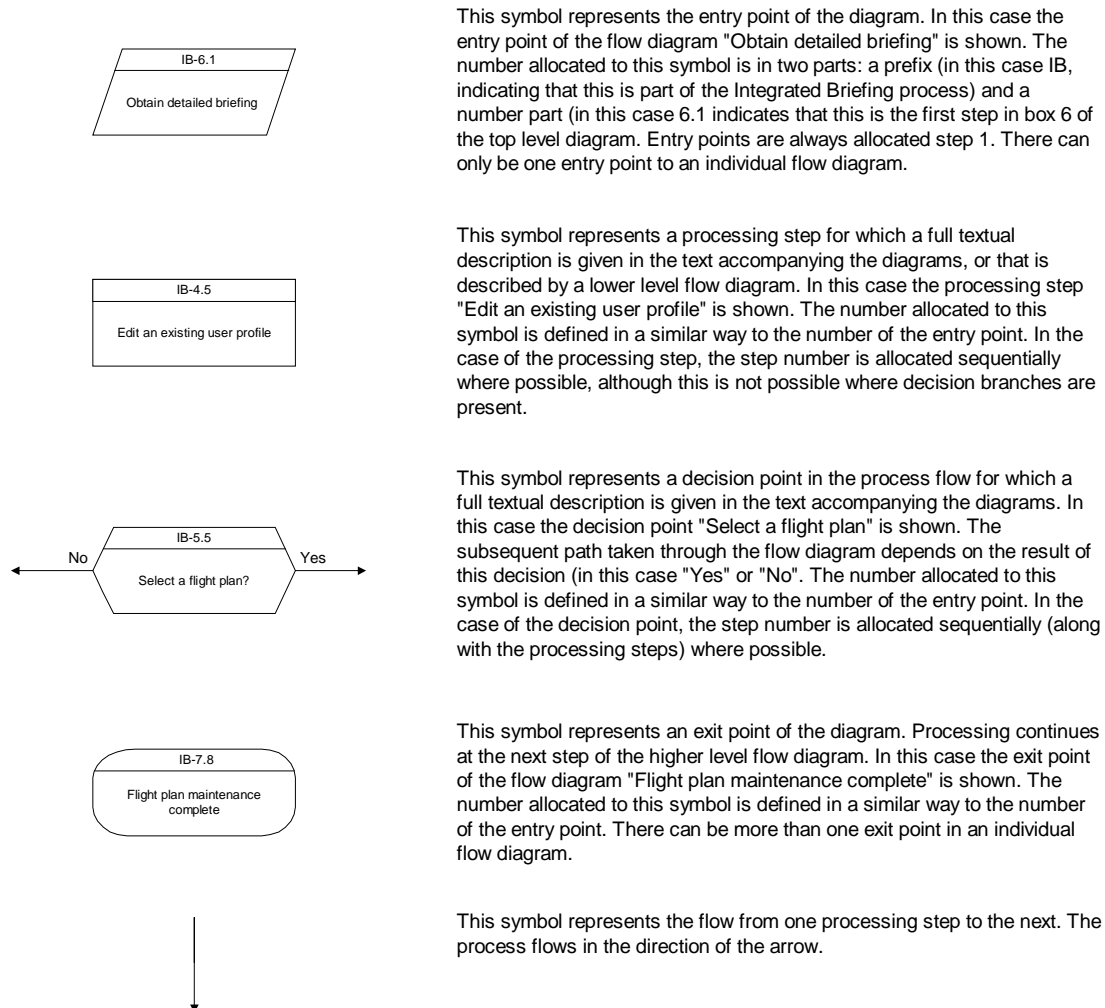


Figure 8

6.5.2 The Integrated Briefing Process

The work flow diagrams below describe, in a high-level manner, how to obtain a pre-flight briefing using an Integrated Briefing facility. The subsequent paragraphs describe each step in detail.

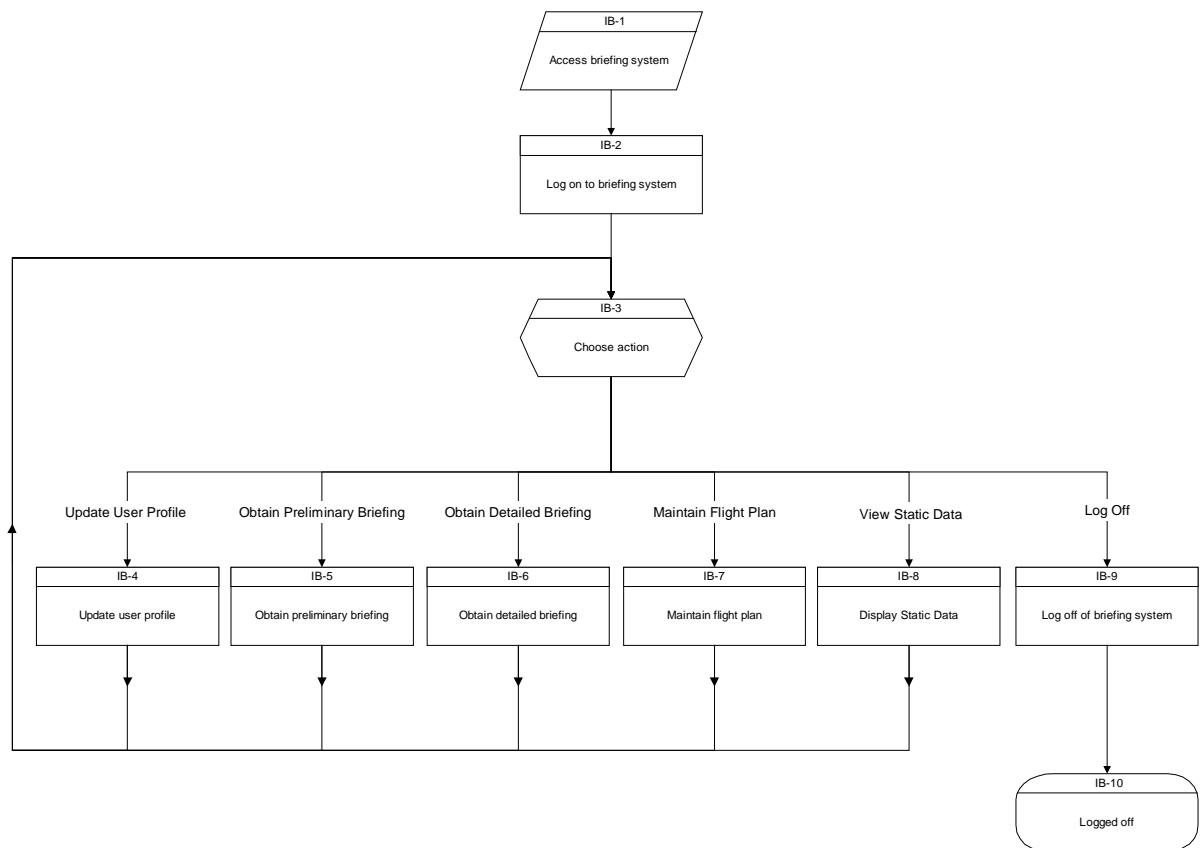


Figure 9

6.5.2.1 Log on to briefing system (IB-2)

In order to preserve knowledge about a user and their flights, it will be necessary to allocate each user a user ID. The user must select a password to preserve his privacy. It will be possible to log on as a guest, but knowledge about a guest cannot be maintained between visits. In such cases a system default may be used.

Use of user ID and an associated passwords will also protect a user's information from being viewed or amended by unauthorised personnel.

If a physical Integrated Briefing facility is being used, this will entail walking into the briefing office, selecting a free terminal and logging in with the user ID and password mentioned above.

If a virtual Integrated Briefing facility is being used, the user will visit the facility web site to log on.

6.5.2.2 Choose action (IB-3)

The user will be able to select one of the following actions:

- Update User Profile (see paragraph 6.5.2.3)
- Obtain Preliminary Briefing (see paragraph 6.5.2.4)

- Obtain Detailed Briefing (see paragraph 6.5.2.5)
- Maintain Flight Plan (see paragraph 6.5.2.6)
- Display Static Data (see paragraph 6.5.2.7)
- Log Off (see paragraph 6.5.2.8)

6.5.2.3 *Update user profile (IB-4)*

A user profile contains information about the user and specifies how they wish to use the briefing functions. It includes the predefinition of one or more products or services. In particular, this concerns predefined flight plans, predefined PIB (types of messages to be included, filters, form of presentation, the output media, update service etc.). It also provides for the predefinition of individual queries or special briefings (special area PIB, regular/automatic output etc.).

Each user regularly consulting Integrated Briefing will require at least one personal profile to fully exploit the service. It will be possible to individually define a personalised entry for each of the “products/services” required in order to satisfy a user’s requirements. The briefing system must provide the user with all functions for his profile.

User profiles are discussed further in paragraph 5.3.2.1.

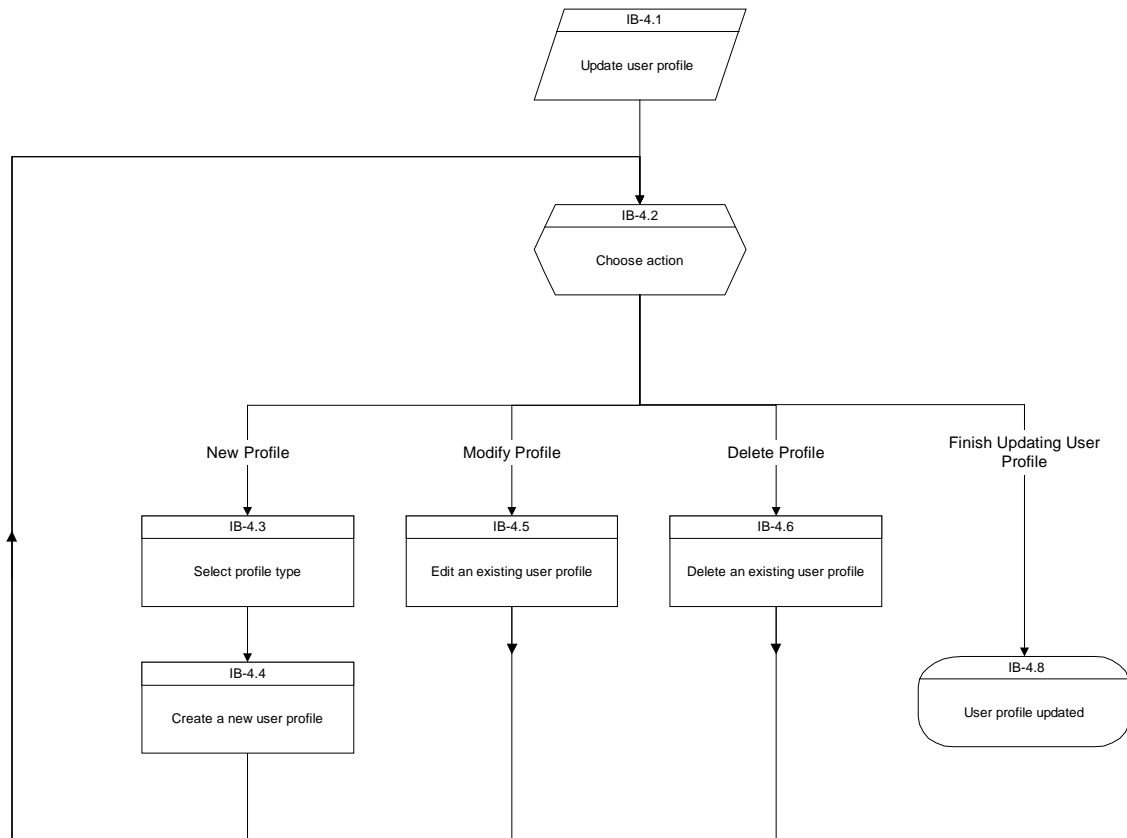


Figure 10

6.5.2.3.1 Choose action (IB-4.2)

The user will be able to select one of the following actions:

- Create New Profile
- Modify Profile
- Delete Profile
- Finish Updating the Profile

6.5.2.3.2 Select profile type (IB-4.3)

The user will be able to select if the profile being created is for a preliminary report or a detailed report. Any number of profiles of either type may be created.

6.5.2.3.3 Create a new user profile (IB-4.4)

The user will be able to specify the type of information to be included in any reports generated whilst this profile is selected.

For further information on User Profiles, refer to paragraph 5.3.2.

The user will be able to allocate a name to each profile created.

As an alternative to creating a new user profile, a user can copy an existing profile. The user will be required to specify a name for the new profile.

6.5.2.3.4 Edit an existing user profile (IB-4.5)

The user will be able to modify any of the settings set for the currently selected user profile. If no user profile is currently selected, the user will be able to select the one to be modified.

For further information on User Profiles, refer to 5.3.2.

6.5.2.3.5 Delete an existing user profile (IB-4.6)

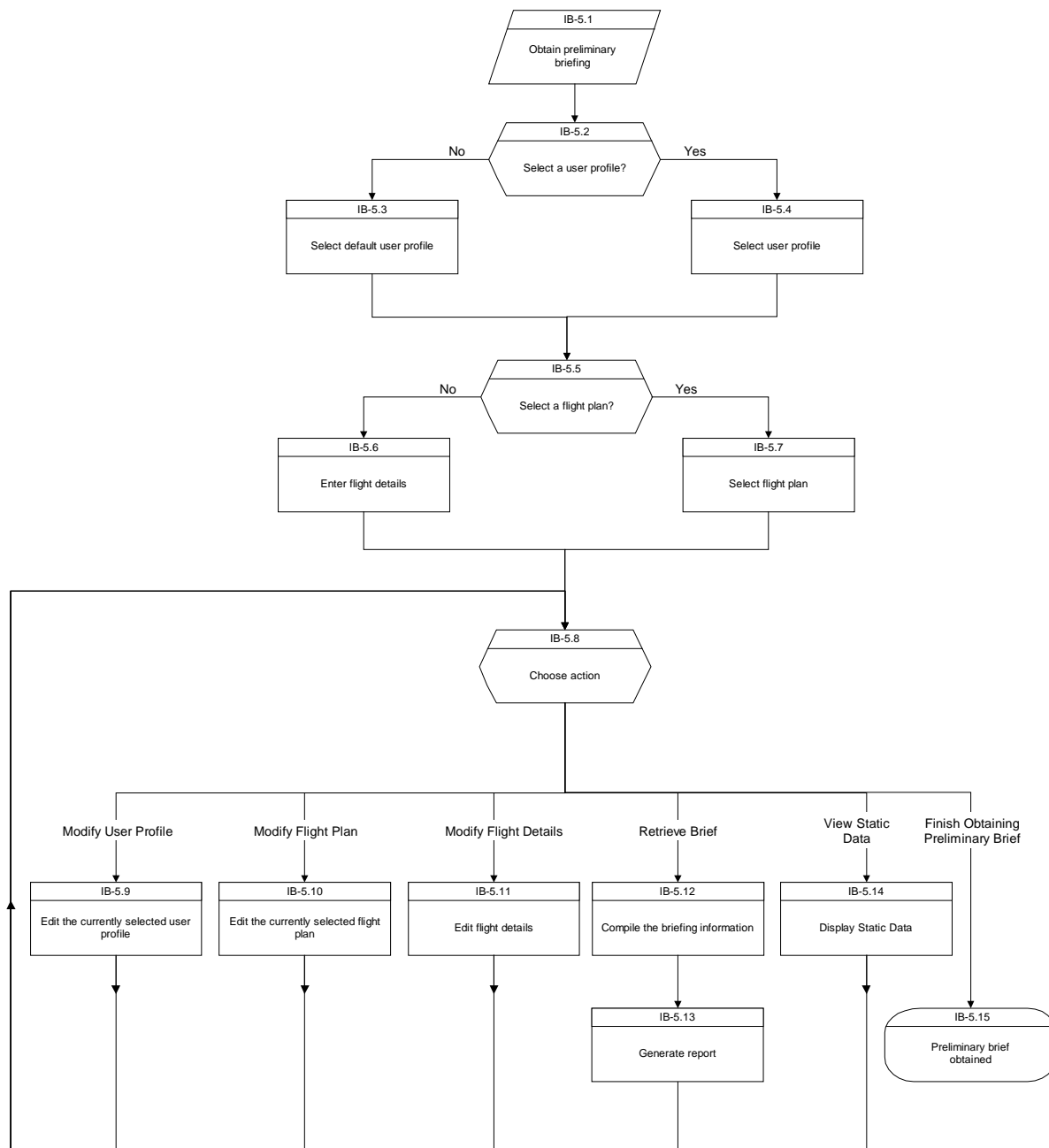
The user will be able to delete any existing user profile to which they have access.

6.5.2.4 Obtain preliminary briefing (IB-5)

A user's first visit to an Integrated Briefing facility for a particular flight is likely to be to ascertain the viability of a particular flight on a particular day.

For example, a pilot flying VFR will initially be interested in knowing if flight is possible on a particular day. They will, therefore, initially only require weather information for the area of flight.

The preliminary briefing will be provided for a selected flight plan (or, if no flight plan is to be used, specified flight details) and will contain the type of information specified in a selected user profile.

**Figure 11**

6.5.2.4.1 Select a user profile? (IB-5.2)

The user will be able to select one of the following actions:

- Select an existing user profile
- Select the default user profile

If the latter option is selected, the user will be given the opportunity to modify the user profile later in the work flow (see paragraph 6.5.2.4.8).

It should be noted that “guest” users will not be able to select an existing profile unless they have created one during the current session. This is because the system does not retain knowledge of “guest” users between sessions.

6.5.2.4.2 Select default user profile (IB-5.3)

The system default user profile has been selected as the user profile to be used. An administrator would have set up the actual profile.

6.5.2.4.3 Select user profile (IB-5.4)

The user will be able to select a user profile that they have previously created, either in this session or in previous sessions.

6.5.2.4.4 Select a flight plan? (IB-5.5)

The user will be able to select one of the following actions:

- Select an existing flight plan
- Enter details of the intended flight

Any flight plan that exists in the system for the current user may be used as a template and then modified as necessary. It will then be saved as a new flight plan.

It should be noted that “guest” users will not be able to select an existing flight plan unless they have created one during the current session. This is because the system will not retain knowledge of “guest” users between sessions.

6.5.2.4.5 Enter flight details (IB-5.6)

The user will be required to enter sufficient details of the flight in order to specify the information required. For example, if weather forecast information for departure and destination aerodromes is required, as a minimum the location identifiers for these aerodromes and the times for which the information is required will have to be entered.

The more detailed the briefing information required, the more detailed the flight details entered will have to be.

6.5.2.4.6 Select flight plan (IB-5.7)

The user will be able to select a flight plan that they have previously created, either in this session or in previous sessions.

6.5.2.4.7 Choose action (IB-5.8)

The user will be able to select one of the following actions:

- Modify User Profile
- Modify Flight Plan
- Modify Flight Details
- Obtain Brief
- View Static Data
- Finish Obtaining Preliminary Brief

6.5.2.4.8 Edit the currently selected user profile (IB-5.9)

The user will be able to modify any of the settings set for the currently selected user profile. If no user profile is currently selected, the user will be able to select the one

to be modified. See paragraph 5.3.2. for details of the type of information included in the user profile.

This will allow the user to modify an existing user profile for use in the current briefing only.

The user will then be given the opportunity to save the changes for use during the remainder of the session only, or to save them for use during future sessions.

6.5.2.4.9 Edit the currently selected flight plan (IB-5.10)

The user will be able to modify any of the settings for the currently selected flight plan. If no flight plan is currently selected, the user will be able to select the one to be modified. See paragraph 5.3.2. for details of the type of information included in the flight plan.

6.5.2.4.10 Edit flight details (IB-5.11)

If a flight plan is not selected, the user will be able to modify the previously entered flight details. If a flight plan is selected, the user will not be able to modify the flight details in this way.

6.5.2.4.11 Compile the briefing information (IB-5.12)

The system will gather together all of the information for the currently selected flight plan. The information included will be as specified in the currently selected user profile.

For example, the following information will be extracted from the flight plan:

- Flight rules
- Flight level
- Route (for route PIB)

See paragraph 5.3.2. for details of the type of information extracted from the user profile.

The information will be gathered from all available sources, including the EAD if this is accessible from the Integrated Briefing facility being used.

6.5.2.4.12 Generate Report (IB-5.13)

The compiled briefing information (see paragraph 6.5.2.4.11) will be displayed on the user's display. The user will be able to request a hard copy of the report.

6.5.2.4.13 Display Static Data (IB-5.14)

See paragraph 6.5.2.7.

6.5.2.5 Obtain detailed briefing (IB-6)

Before a flight, a pilot will require detailed information concerning the flight. The lead-time will depend on the flight rules and operational requirements of the intended flight.

The detailed briefing will be provided for a selected flight plan or entered flight details and will contain the type of information specified in a selected user profile.

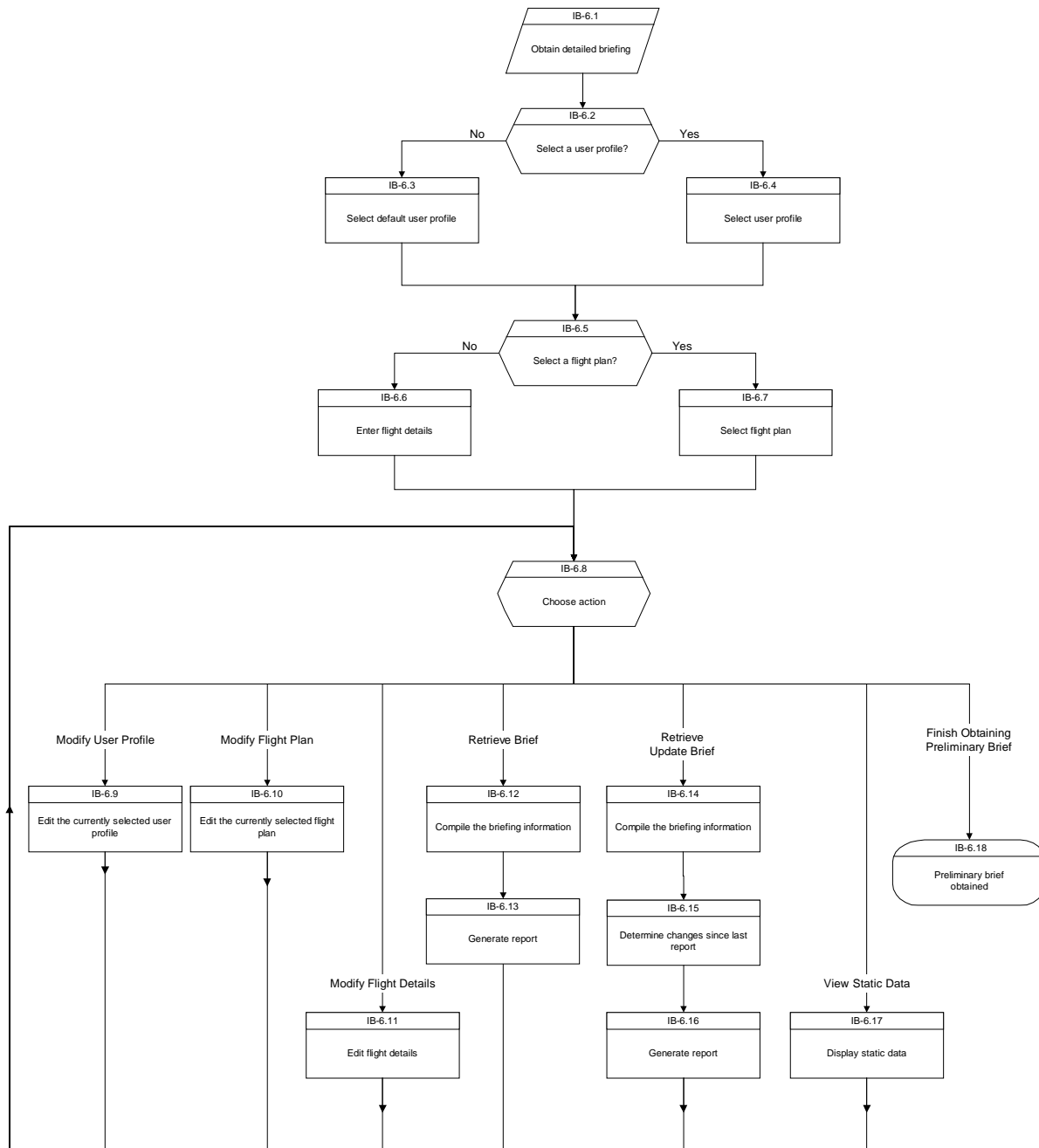


Figure 12

6.5.2.5.1 Select a user profile? (IB-6.2)

See paragraph 6.5.2.4.1.

6.5.2.5.2 Select default user profile (IB-6.3)

The system default user profile has been selected as the user profile to be used. An administrator would have set up the actual profile.

6.5.2.5.3 Select user profile (IB-6.4)

The user will be able to select a user profile that they have previously created, either in this session or in previous sessions. The user will also be able to elect to use the currently selected user profile, if one is selected.

6.5.2.5.4 Select a flight plan? (IB-6.5)

See paragraph 6.5.2.4.4.

6.5.2.5.5 Enter flight details (IB-6.6)

See paragraph 6.5.2.4.5.

6.5.2.5.6 Select flight plan (IB-6.7)

The user will be able to select a flight plan that they have previously created, either in this session or in previous sessions. The user will also be able to elect to use the currently selected flight plan, if one is selected.

6.5.2.5.7 Choose action (IB-6.8)

The user will be able to select one of the following actions:

- Modify User Profile
- Modify Flight Plan
- Modify Flight Details
- Obtain Brief
- Obtain Update Brief
- View Static Data
- Finish obtaining a detailed briefing

6.5.2.5.8 Edit the currently selected user profile (IB-6.9)

See paragraph 6.5.2.4.8.

6.5.2.5.9 Edit the currently selected flight plan (IB-6.10)

See paragraph 6.5.2.4.9.

6.5.2.5.10 Edit flight details (IB-6.11)

See paragraph 6.5.2.4.10.

6.5.2.5.11 Compile the briefing information (IB-6.12)

See paragraph 6.5.2.4.11.

6.5.2.5.12 Generate Report (IB-6.13)

See paragraph 6.5.2.4.12.

6.5.2.5.13 Compile the briefing information (IB-6.14)

See paragraph 6.5.2.4.11.

6.5.2.5.14 Determine the changes since last report (IB-6.15)

The system will compare the data information gathered during step 6.14 (see paragraph 6.5.2.5.13), and the information already provided in a manner determined by settings in the user profile. See paragraph 5.3.2. for details of the comparison

options available. It should be noted that deletions will be reported as a change, as well as additions. For example, any NOTAMs that have expired, or that have been cancelled, since the report used in the comparison, will be included.

6.5.2.5.15 Generate Report (IB-6.16)

The compiled (see paragraph 6.5.2.5.13) and filtered (see paragraph 6.5.2.5.14) briefing information will be displayed on the user's display. The user will be able to request a hard copy of the report.

6.5.2.5.16 Display Static Data (IB-6.17)

See paragraph 6.5.2.7.

6.5.2.6 *Maintain Flight Plan (IB-7)*

A flight plan defines the flight parameters to be used for a particular flight (or flights). In the case of Integrated Briefing, it defines the geographical locations for which information is required.

There will be no limit to the number of flight plans that may be held for a single user.

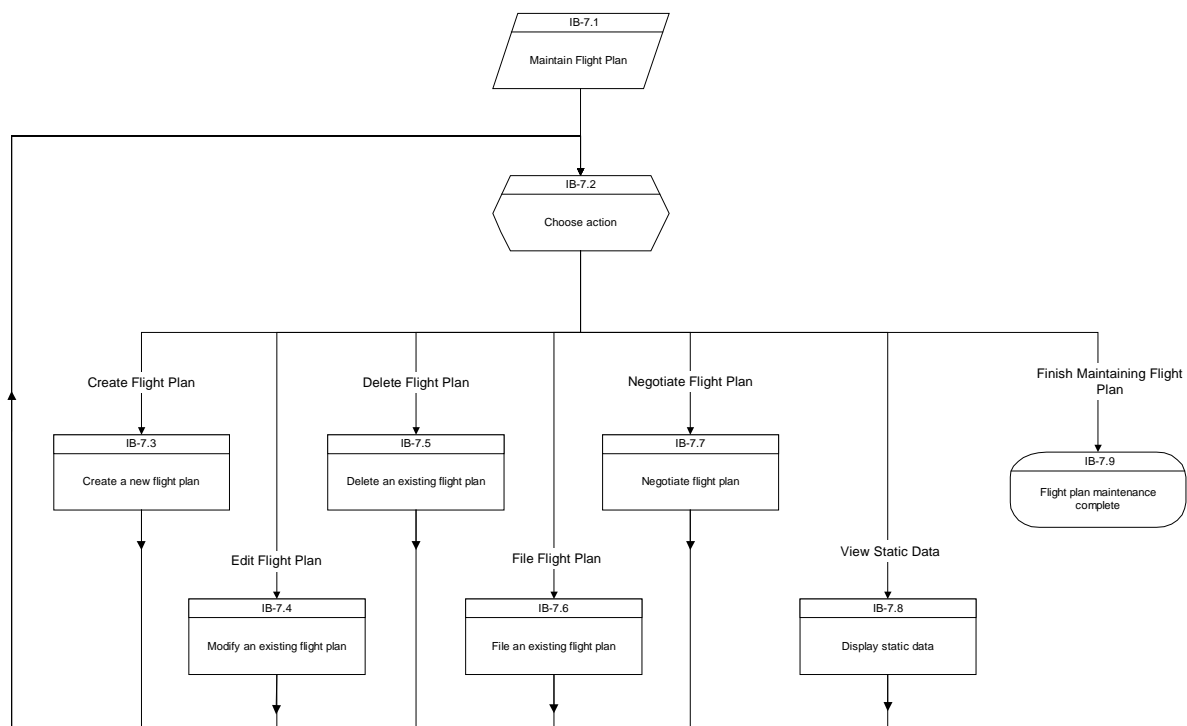


Figure 13

6.5.2.6.1 Choose action (IB-7.2)

The user will be able to select one of the following actions:

- Create Flight Plan
- Edit Flight Plan
- Delete Flight Plan
- File Flight Plan
- Negotiate Flight Plan

- View Static Data
- Finish Maintaining Flight Plan

6.5.2.6.2 Create a new flight plan (IB-7.3)

The user will be able to enter flight plan details. The information required is listed in ref [12]. The user will not file the flight plan at this stage, as it will be necessary to check its viability by obtaining a preliminary briefing.

6.5.2.6.3 Modify an existing flight plan (IB-7.4)

The user will be able to modify any of the details of the currently selected flight plan. If no flight plan is currently selected the user will be able to select the one to be modified. See paragraph 6.5.2.6.2 for the details to be included in the flight plan. If the flight plan has been filed (see paragraph 6.5.2.6.5), the user will be prompted to send a change (CHG) or delay (DLA) message to the Flight Plan Processing Centre.

6.5.2.6.4 Delete a flight plan (IB-7.5)

The user will be able to delete any existing flight plan to which they have access. If the flight plan has been filed (see paragraph 6.5.2.6.5), the user will be prompted to send a cancel (CNL) message to the Flight Plan Processing Centre.

6.5.2.6.5 File an existing flight plan (IB-7.6)

The flight plan will be sent to the Flight Plan Processing Centre (CMFU for Europe) so that a flight's slot can be allocated to the flight plan.

The exact response depends on the flight rules. A VFR flight plan will be distributed directly either via the AFTN or via a national processing system. IFR flight plans (except for exempted flights) will be sent to CFMU. The processing performed by CFMU is described in ref [11].

6.5.2.6.6 Negotiate flight plan (IB-7.7)

The user will be able to view messages received from the Flight Plan Processing Centre, and respond accordingly.

6.5.2.6.7 Display Static Data (IB-6.17)

See paragraph 6.5.2.7.

6.5.2.7 *Display static data (IB-8)*

The user will be able to view AIPs, AIP Amendments, AIP Supplements and AICs for the States through which they will be flying in order to assist in the planning of the flight.

6.5.2.8 *Log off of briefing system (IB-9)*

This will end the users current session.

If a physical Integrated Briefing facility is being used, the terminal will now be free for the next user to use.

If a virtual Integrated Briefing facility is being used, the user may now continue to use the machine to run other applications, or visit other web sites.

7. FUTURE ROLE OF BRIEFING

Currently, the aims of an Integrated Briefing facility have been limited to providing a ground-based, office-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.

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.

7.1 In-Flight

From the time that a pilot retrieves the last PIB before boarding a plane the information is ageing and may, in some cases, no longer be correct. Whilst this may initially appear to be problem, in practice it is not the case as the necessary information will be provided to the pilot in a number of forms.

Where, however, a potential issue is to be found is in the various means by which the provision of updated information is achieved. Some is provided to the pilot directly on paper, some by ATC messages whilst, for some other information, the pilot must call up information channels.

Making this an even more complex situation, some pilots will need to make notes (especially where paper copies are not provided). All this must be achieved whilst flying the aircraft!

In an ideal world, this updated information will be presented to the pilot in the same format, and be filtered in the same manner, used to obtain the original briefing, directly to the cockpit without the need for pilot interaction. Furthermore, additional filtering should be possible based on the phase of flight. For example, once a flight has departed and has travelled a sufficient distance from the departure aerodrome, it is questionable whether NOTAM for that aerodrome are necessary. They are probably not and could be filtered out so as not to over-burden the pilot with now irrelevant information.

Through the provision of in-flight briefing in an integrated and coherent manner, further pilot workload reduction may be offered – once again helping to alleviate stress at time of difficulty, reducing risk to the passengers, crew and aircraft.

7.2 Post-Flight

Today there is an increasing pressure to provide better quality service. Indeed, ICAO has mandated that AIS organisations adopt a formal Quality Management methodology, ISO 9000 being recommended. Equivalent ICAO requirements in the form of recommended practices have been applicable since November 2001. Annex 15 Para 3.2 states:

“Each contracting State shall take all necessary measures to introduce a properly organised quality system containing procedures, processes and resources necessary to implement quality management at each function stage. The execution of such quality management shall be made demonstrable for each function stage, when required.

Recommendation: The quality system established in accordance with above should be in conformity with the International Organisation for Standardisation (ISO) 9000 series of quality assurance standards, and certified by an approved organisation.”

One essential element for a quality system is feedback. At the current time, no formal post-flight briefing (other than with an airline) exists. In order for quality to be improved it is essential that, in the future, a post-flight briefing is fed back to the originators of the information. Such feedback will provide two main benefits:

- Firstly, air safety will be improved. Currently, a pilot who establishes that the information provided was incorrect or not present may not pass this knowledge back. Pilots on following flights will be left to discover the omission or error for themselves.
- Secondly, through post-flight briefing, the providers of briefing services will be able to gain a measure of the acceptance of their products. In addition to establishing the quality of the information provided, the post-flight briefing may also be used to obtain details of the pilot's opinion of the material provided. This may provide a means of identifying and introducing product improvements.

7.3 ATN / Data-link

Data-links provide a means by which in-flight briefing can be implemented. A form of data-link currently being developed is ATN.

The ATN represents the internetworking infrastructure for the global aviation telecommunications network. The ATN uses a set of data communications protocols based on the ISO OSI reference model, and will link the various air-ground and ground-ground data systems together. The design allows communications services for different user groups and will eventually operate globally encompassing all aeronautical data communication service users associated with the international aviation environment.

The ATN integrates existing aeronautical networks in a seamless and interoperable network providing a confirmed, reliable end-to-end communication service. With the ATN, aircraft operators will be in a position to use the same infrastructure for all their types of communications. Another feature of the ATN is that it compresses data for transmission via mobile datalinks.

By means of dynamic routing protocols between ATN Routers, the infrastructure always “knows” how to route a message to its destination. The routing of a message can be made dependent on the type of message (e.g. Safety critical or non-safety critical) and its related performance requirements.

The creation of a common network enables the users (e.g. aircraft operators) to switch between service providers without affecting the applications and communication systems. The ATN is designed to allow new communication technology to be integrated as it becomes available.

7.4 Technical Devices

There is likely to be rapid growth in the use of portable devices that are capable of accessing the Internet, and hence provide the user with the ability to contact an Integrated Briefing office. Such devices include handheld computers, PDAs, WAP phones and pocket PCs.

As such developments today should take into account the anticipated trend whereby users will expect to be able to make use of such technologies to obtain briefings.

8. CONCLUSION

This document has examined the potential users of an Integrated Briefing facility, and the various levels at which Integration may be achieved, from a distributed facility to a fully integrated knowledge based facility. The services that may be provided by an Integrated Briefing facility now, and in the future, have also been examined.

It may be concluded that although an Integrated Briefing facility will not itself generate briefing data, it must provide access to all of the briefing information required for a flight on a single visit to a single site (the “one stop shop”).

The service must be easy to use and efficient. The use of graphical means of representing data must be considered. The provision of fully trained staff to assist when required is considered essential.

In order to provide an efficient service, an Integrated Briefing facility must allow users to personalise their accounts (by profiling and customisation) to suit their type of flight, ensuring that they receive only the information they need and all the information they need when they need it.

The provision of Update Briefings and Update Notification are also considered essential services to be provided by an Integrated Briefing facility.

It must be possible to contact the Integrated Briefing facility from any location. The use of the Internet and the telephone are possible means of achieving this.

To be successful in satisfying user needs, an Integrated Briefing facility must make full use of the Internet, even though to do so may require changes to existing ICAO regulations.

It is considered that, in the future, Integrated Briefing could be expanded to provide in-flight briefings, and updates to those briefings, directly to the flight deck. In addition, the introduction of post-flight feedback would improve the quality of both the service and the information provided.

Appendix A Abbreviations

AD	Aerodrome
AFTN	Aeronautical Fixed Telecommunication Network
AHEAD	Automation & Harmonisation of European Aeronautical Data
AI	Aeronautical Information
AIC	Aeronautical Information Circular
AIM	ATFM Information Message
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
ANM	ATFM Notification Message
ARO	Aeronautical Reporting Office
ARR	Arrival Message
ASHTAM	Special Series NOTAM relating to volcanic activity
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
BIRDTAM	Special Series NOTAM relating to bird activity
CD-ROM	Compact Disc – Read Only Memory
CFMU	Central Flow Management Unit
CHG	Change Message
CNL	Cancel
CNS	Communication, Navigation and Surveillance
CRAM	Conditional Route Availability Message
DLA	Delay Message
ECAC	European Civil Aviation Conference
EUROCONTROL	European Organisation for the Safety of Air Navigation
FPL	Flight Plan
GA	General Aviation
GAT	General Air Transport
ICAO	International Civil Aviation Organisation
ID	Identifier
IFPS	Integrated Initial Flight Planning System
IFR	Instrument Flight Rules
ISO	International Organisation for Standardisation
MET	Meteorological
METAR	Aviation Routine Weather Report
NOTAM	Notice To Airmen
OAT	Operational Air Transport
OPADD	Operating Procedures for AIS Dynamic Data
OPSIG	Operationally Significant
ORM	Operational Reply Message
OSI	Open Systems Interconnection
PDA	Personal Data Accessory
PIB	Pre-flight Information Bulletin
RN	Royal Navy
SIGMET	Significant Meteorological report
SMS	Short Message Service
SNOWTAM	Special Series NOTAM relating to snow and ice
SWIM	System Wide Information Management
TAF	Terminal Area Forecast
URD	User Requirements Document
VFR	Visual Flight Rules
WMO	World Meteorological Office

End of Document