



**WORKING PAPER**

**ICAO/IMO JOINT WORKING GROUP  
ON HARMONIZATION OF AERONAUTICAL  
AND MARITIME SEARCH AND RESCUE (ICAO/IMO JWG-SAR)**

**FOURTEENTH MEETING**

**Saint Gilles, La Réunion, 10 to 14 September 2007**

**Agenda Item 4: SAR operational principles, procedures and techniques:**

**THE FUTURE FLIGHT PLAN CONCEPT**

(Presented by the ICAO Secretariat)

**SUMMARY**

This paper presents a high-level concept for the future flight plan as envisaged by the ICAO Flight Plan Study Group (FPLSG). It has been developed with particular attention to the objective of achieving the future vision outlined in the *Global Air Traffic Management Operational Concept* (Doc 9854) with requirements outlined in the ATM System Requirements Supporting the Global Air Traffic Management Operational Concept. The attention of the JWG is directed, particularly, to paragraphs 4 and 5 that discuss aspects of direct consequence to the provision of SAR services.

Action by the ICAO/IMO JWG is in paragraph 5.

**REFERENCES**

- \* Annex 11 — *Air Traffic Services*
- \* *Global Air Traffic Management Operational Concept* (Doc 9854)

**1. INTRODUCTION**

1.1 The current ICAO flight planning provisions were last updated over twenty years ago. These were developed on the basis of a manual, paper-based, teletype communications system. Since then, advances in concepts, technology and automation for air traffic services (ATS) have occurred that are not accommodated by the current provisions. Looking forward to the *Global Air Traffic Management Operational Concept* (Doc 9854), additional changes to the flight planning provisions will have to be developed to accommodate the ensuing changes such as: increased collaborative decision making, aircraft performance consideration and trajectory orientation.

1.2 In an effort to address the above, a study group was established and tasked with a review of the ICAO flight plan provisions, including the flight plan form and associated operating practices. These were to be revised to meet future needs of aircraft with advanced capabilities and automated ATM systems while taking into account compatibility with existing systems. Additional points for consideration have been emphasized by the Air Navigation Commission:

- a) the economic impact on aircraft operators;
- b) transition from the current to a future system, including training needs; and
- c) human factors aspects

## 2. DISCUSSION

2.1 As air traffic services have evolved, several limitations to the flight planning provisions have become apparent. These limitations vary in scope from short-term issues that can be accommodated within the existing Flight Planning provisions, to some long-term issues that require a broader revision. Some of these limitations are described below.

2.2 **Use of Field 18** – Attempts to accommodate changing information needs have led Air Navigation Service Providers (ANSP) to adopt conventions for additional indicators within ICAO Flight Plan Field 18, *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444). However, these are not reflected within Doc 4444 and can cause problems for some receiving automation systems. Additionally, the inclusion of control data items in free-text format presents potential safety implications as the flight transits across global service providers. Indicators contained within Field 18 are sometimes repeated with no established procedures for response defined within Doc 4444.

2.3 **Content and Format** – Certain data elements require changes to the format and specification of new content within the flight plan. These include changes to support existing data that have exceeded specified field lengths, or new information not anticipated when the existing flight plan was developed. For example, certain ANSPs locally include additional data not found in the current flight plan such as delay at a point and block altitude.

2.4 **Operational Limitations** – The flight plan must accommodate changes ensuing from transition to the Global ATM Operational Concept and changes already underway. Failure to accommodate these changes imposes unnecessary constraints and costs on operations – even for mature, standard avionics capabilities, included as part of current airframes. Examples include:

- a) Required Navigation Performance (RNP) levels by phase of flight;
- b) alternate routes and user preferences as ATM moves towards greater collaborative decision making;
- c) new technologies and ability to perform procedures enabled by these: e.g., Global Navigation Satellite System (GNSS), Automatic Dependent Surveillance – Broadcast (ADS-B), Automatic Dependent Surveillance – Contract (ADS-C), Controller-Pilot Datalink Communication (CPDLC), Airborne Separation Assistance System (ASAS);

- d) four-dimensional trajectory information, including multiple options;
- e) additional information for formation flight joining and splitting;
- f) additional information potentially necessary for improved management by trajectory; and.
- g) increased collaborative decision making.

2.5 **Lack of Flexibility** – The specification of new data elements in the existing inflexible flight plan standard does not anticipate changes to the future ATS System. As new information is required, these will continue to be incorporated into a generic data field (e.g. Field 18) unless flexibility can be incorporated into the flight planning provisions. However, this flexibility must also recognize the need for globally harmonized standards. It is understood that a poor implementation providing flexibility may have cost consequences to users and providers of flight plan information. In addition to flexibility in message structure and content, flexibility in infrastructure is important and described later.

2.6 **Information Security** – There is a need to increase information security as future information may incorporate information of a sensitive nature; either commercially or for aviation security purposes.

2.7 **Infrastructure** – The current global flight planning process is largely conducted through a system of peer-to-peer communications using protocols developed for teletype machines. An example of this is the Aeronautical Fixed Telecommunications Network (AFTN). Accommodating changes to the flight plan, including message format, requires the update of each system along the chain of systems submitting, receiving and interpreting flight plan messages. Information technology has developed to the point where information infrastructures are available that more readily accommodate the *Global Air Traffic Management Operational Concept* (Doc 9854).

2.8 **Derivable Information** – The Global ATM Operational Concept articulates a vision for an information management system that ensures not only the integrity and consistency of information, but eliminates the need for re-entry if the data is already available to the ATM System. The current flight plan contains multiple instances of information that can be derived from other information elements. Flight Plan originators have to provide elements that could be obtained elsewhere. When information is derived by different ANSP, such as trajectories used by automation, there is no process to guarantee the consistency of this derived information.

2.9 **Lack of Support for Future Operational Concept** – The Global ATM Operational Concept describes a collection of planned operational changes. In its current form, the flight plan does not allow these changes to be accommodated. For example, the amount and quality of early intent data is not consistent with the envisaged operational environment.

2.10 **Lack of Automation Support** – The increased use of automation in the acquisition, processing and distribution of flight plans and associate data requires a flight plan that is fit-for-purpose. The flight plan must improve machine-readability, and ensure that systems can unambiguously obtain required information.

### 3. FUTURE FLIGHT PLANNING PRINCIPLES

3.1 The future flight plan is guided by the requirement to eliminate or reduce the limitations of the current flight plan, and to accommodate the future detailed in the *Global Air Traffic Management Operational Concept* (Doc 9854).

3.2 Principles of this future flight plan can be summarized as follows:

- a) provide a flexible concept that allows new technologies and procedures to be incorporated as necessary in a planned manner. These include changing information and communication standards;
- b) allow aircraft to indicate their detailed performance capabilities such as RNP level;
- c) allow for an early indication of intent;
- d) incorporate information for increased collaborative decision making;
- e) avoid unnecessary limitations on information;
- f) support four-dimensional management by trajectory;
- g) avoid the filing of unnecessary and unambiguously derivable information. Adopt a “file-by-exception” philosophy when information can be standardized;
- h) allow for the provision of information security requirements;
- i) consider the cost impact on providers and consumers of flight plan information;
- j) ensure flight-plans are machine readable and limit the need for free-text information; and
- k) ensure that definitions of information elements within the flight plan are globally standardized.

### 4. IMPACT ON SEARCH AND RESCUE (SAR) SERVICES

4.1 Although the on-going work on the future flight plan is not driven by SAR-related objectives, it may have a direct impact on SAR activities.

4.2 It is therefore suggested that the ICAO/IMO JWG provide indicative elements to the ICAO Flight Plan Study Group (FPLSG) with a view to:

- Ensuring that information contained in current flight plans that are of direct relevance to SAR operations remain available in future flight plans; and
- Inviting the FPLSG to consider the addition of new information in future flight plans that would be of direct operational interest to SAR operators, and that are not included in current flight plans.

**5. ACTION BY THE ICAO/IMO JWG**

5.1 The ICAO/IMO JWG is invited to:

- a) note the information presented in this working paper; and
- b) indicate the type of information that SAR operators would like to have included in future SAR plans. e choice of the Chapter this addition would be inserted in.

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