Agenda Item 1: Analysis of flight plan availability in the SAM Region

ANALYSIS OF FLIGHT PLAN AVAILABILITY

(Presented by the Secretariat)

SUMMARY

This working paper presents information on the status of implementation of AMHS/AFTN terminals and FDP automation for the generation and processing of flight plans in accordance with Amendment 1 to Edition 15 of ICAO Doc 4444, and on errors and duplication in flight plans and how these affect AIDC performance.

REFERENCES:

- Amendment 1 to the *Procedures for air navigation services – Air traffic management (PANS-ATM)*, 15th Edition, ICAO Doc 4444.
- Report of the First meeting on AIDC implementation (Lima, Peru, 28-30 March 2016)
- Seventeenth SAM workshop/implementation meeting (SAM/IG/17 Lima, Peru, 9-13 May 2016)
- AIDC implementation follow-up teleconferences (May to September 2016)

ICAO strategic objectives:	*A – Safety* *C – Environmental protection and sustainable development of air transport*

1. Introduction

1.1 Upon reviewing the availability of flight plans in the SAM Region, the First meeting on AIDC implementation (AIDC/1) updated the status of implementation of automation in flight data processing (FDP), and of templates at AMHS/AFTN terminals, in compliance with the amendment to the flight plan format FPL/12. It also analysed the way in which the flight plan is generated and processed.

1.2 The AIDC/1 meeting urged SAM States that had not completed the FDP automation process or the implementation of templates at AMHS/AFTN terminals to adopt and implement the FPL/12 as soon as possible, in order to mitigate errors in the generation and processing of flight plans.

1.3 The AIDC/1 meeting took note that some SAM States, although they have installed the FPL template in AMHS terminals allowing for initial control of flight plan filing, they complete the flight plan in free-text format, possibly introducing errors in its content. In this sense, the Meeting urged States to discard the use of free text when generating the flight plan.

1.4 Likewise, in order to complete the analysis aimed at mitigating errors in the flight plan content, and flight plan duality/multiplicity, the AIDC/1 meeting created an *ad-hoc* group made up by Argentina, Colombia, and Venezuela.

1.5 The *ad-hoc* group felt that a study should be conducted on the feasibility of implementing automated systems for filing FPLs and transmitting them *via* AMHS, AFTN and/or the internet, interconnected with ATC automated systems, in compliance with the regulatory framework established by each State. The purpose is an efficient management of FPLs in all flight phases, permitting the implementation and efficient operation of AIDC in the SAM Region.

1.6 Accordingly, the AIDC/1 meeting formulated Conclusion AIDC/1-3 *Actions to mitigate errors in flight plan filing and processing.*

1.7 Upon assessing the progress made in the analysis of flight plan availability, the SAM/IG/17 meeting considered that the AIDC group should continue studying actions to mitigate the errors and the duality/multiplicity of the flight plan. It should also continue studying the feasibility of including automated FPL filing systems interconnected with ATC automation systems within the regulatory framework of each State, and submit the results at this second AIDC implementation meeting.

2. Analysis

2.1 As a follow-up to Conclusion AIDC/1-3 *Actions to mitigate errors in flight plan filing and processing*, information is presented below on the status of implementation of FPL 2012 and on actions to mitigate flight plan errors and duplicity/multiplicity. It is expected that States will present updated information at the meeting.

Status of implementation of FPL 2012

2.2 Regarding the status of implementation of automated systems in the Region, in compliance with Amendment 1 to Doc 4444 (FPL/12), **Appendix A** to this working paper contains a table that shows the current status, as reported by the States that participated in the teleconference held on 6 September 2016.

2.3 The following conclusions are derived from the information contained in Appendix A:

- Out of all the ACCs in the SAM Region, 65% have updated the FDPs to accept the FPL 12, 23% have implemented converters, and the remainder continues with the manual solution.

- Regarding the transcription of the flight plan from AMHS/AFTN terminals using templates capable of detecting errors, 85% of States already have it available.

2.4 Regarding the situation of the FDPs that accept FPL 2012, there has been an increase of 19% with respect to the figure reported at the AIDC/1 meeting (46% implementation) due to the implementation of new automated systems at the Comodoro Rivadavia, Mendoza, Resistencia, and Punta Arenas ACCs, which have FDP systems that accept FPL 2012. There were no changes in those States that had installed the converter and the template in AMHS/AFTN terminals to transcribe the flight plan.

Actions to mitigate errors and duplicity/multiplicity of flight plans

2.5 During the teleconference held on 6 September 2016, Brazil provided information on the progress made in the operational implementation of the centralised automated system that processes flight plans, called SIGMA, which is expected to become operational in November of this year. It also reported on the automated flight plan integration between control towers and their respective ACCs.

2.6 Also during the teleconference held on 6 September, Ecuador stated that it had developed a guide for avoiding errors in FPLs and associated ATS messages, which is shown in **Appendix B** to this working paper. In this regard, the teleconference considered that the guide should be analysed for possible adoption as reference in the Region. States are expected to make comments in this regard during the meeting.

3. Suggested action

3.1 The Meeting is invited to:

a) Take note of the information presented herein;

b) analyse the action described in Section 2 of this working paper and in Appendices A and B; and

c) discuss any other matter it may deem appropriate.

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APPENDIX A / APENDICE A

STATUS OF THE AUTOMATION IMPLEMENTATION TO GIVE EFFECT TO THE AMENDMENT TO THE FLIGHT PLAN FORMAT/

ESTADO DE IMPLANTACION DE LA AUTOMATIZACIÓN PARA DAR CUMPLIMIENTO DE LA ENMIENDA EN EL FORMATO DEL PLAN DE VUELO

STATE/ ESTADO	ACC	AFTN/AMHS	FDP
Argentina	Comodoro Rivadavia	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated/Automatización Implemented June 2016/Implementado Junio 2016
	Cordoba	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated / Automatizado
	Ezeiza	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated / Automatizado
	Mendoza	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated/Automatización Implemented June 2016/Implementado Junio 2016
	Resistencia	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated/Automatización Implemented June 2016/Implementado Junio 2016

STATE/ ESTADO	ACC	AFTN/AMHS	FDP
Bolivia	La Paz	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Manual It is foreseen by third quarter 2016 an ATM automated system with AIDC in the La Paz ACC/ Se tiene previsto para finales del tercer trimestre de 2016 un sistema automatizado ATM en el ACC de La Paz con AIDC.
Brazil / Brasil	Amazónico	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated /Automatizado (use of converter) / (uso de convertidor centralizado) An update in Sagitario ATM automated system (from ATECH Brazil) which includes the new FPL/12 flight plan format to deactivate the centralized inverter is scheduled for November 2016 in the AAC Amazonico, Atlantico, Brasilia, Curitiba and Recife./ Para noviembre 2016 está prevista una actualización en Sagitario (sistema automatizado ATM de Brasil de la empresa ATECH) que incluye el nuevo formato de plan de vuelo FPL/12 y desactivar el convertidor centralizado.
	Atlántico	Implemented (AMHS terminal) / Implantado (terminal AMHS)	
	Brasilia	Implemented (AMHS terminal) / Implantado (terminal AMHS)	
	Curitiba	Implemented (AMHS terminal) / Implantado (terminal AMHS)	
	Recife	Implemented (AMHS terminal) / Implantado (terminal AMHS)	

STATE/ ESTADO	ACC	AFTN/AMHS	FDP
Chile	Iquique	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated /Automatizado
	Punta Arena	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automatizado / May 2016 Automated May 2016
	Puerto Montt	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated /Automatizado
	Santiago	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated/Automatizado
Colombia	Barranquilla	Not implemented (AMHS terminal) No implantado (terminal AMHS)	Automated /Automatizado
	Bogotá	Not implemented (AMHS terminal) No implantado (terminal AMHS)	Automated /Automatizado
Ecuador	Guayaquil	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated /Automatizado
French Guiana (France) Guyana Francesa (Francia)	Rochambeau	No Implemented (AMHS terminal) / No Implantado (terminal AMHS)	Automated / Automatizado
Guyana	Timehri	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated / Automatizado
Panama	Panama	Implemented / implantado (AMHS terminal))	Automated /Automatizado
Paraguay	Asunción	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Manual
Peru	Lima	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated Automatizado
Surinam	Paramaribo	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated (out of service, working manually) / Automatizado (fuera de servicio, trabajando manualmente)

STATE/ ESTADO	ACC	AFTN/AMHS	FDP
Uruguay	Montevideo	Not implemented / No implantado	Automated / Automatizado
Venezuela	Maiquetia	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated /Automatizado (use of converter) / (uso de convertidor)

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APPENDIX B

GUIDE TO AVOID ERRORS IN FPLs AND ASSOCIATED ATS MESSAGES

1. EFFECTIVE FILING OF FPLs

1.1 An effective and homogeneous air traffic flow through FIR boundaries is achieved, in part, by securing the flight plans, and transmitting, processing, and transferring the associated messages between FIRs in a homogeneous, efficient, and consistent manner.

1.2 The methods and procedures used for filing and/or originating flight plans have a residual effect on the quality of the air traffic services provided. The introduction of duplicated or multiple flight plans, or of flight plans containing erroneous information has a direct impact on flight safety and efficiency within the global airspace system.

1.3 The sources of flight plan errors that have been identified include:

- Lack of quality and consistency in the filing of flight plans
- Use of repetitive flight plans (RPLs)
- Conversion due to non-compliance of flight plans with the ICAO 2012 flight plan format.
- Manual entry and processing of FPLs and associated messages

2. DIRECT DELIVERY OF FLIGHT PLAN MESSAGES

2.1. In order to reduce the risk of manual errors, the ANSP, pursuant to Doc 4444, paragraph 11.2.1.1.1, can implement local arrangements to delegate to the operators the responsibility for direct transmission of movement messages *via* the Aeronautical fixed telecommunication network (AFTN) or the air traffic service message handling system (ATS AMHS). Movement messages include FPLs, modification (CHG), delay (DLA), and cancellation of the flight plan.

2.2. If ANSPs have delegated to the airlines the responsibility of originating flight plan messages, then, in accordance with Doc 4444 Appendix 2, page A2-3, part 2.1, airlines will have the responsibility of correctly transmitting the initial FPL, as well as the associated messages to all the ATS units involved, in accordance with Doc 4444, 11.2.1.1.3.

2.3. Before delegating the responsibility for direct filing of flight plan messages, ANSPs must consider conducting a test with new operators, using a central AFTN/AMHS address to receive the messages for an initial manual validation.

2.4. The ANSPs must also specify in local arrangements or in the AIP the deadlines for completing the delivery of movement messages (DLA and CHG) for individual flights, for example, using a time parameter before the estimated off-block time (EOBT).

2.5. It is better to use a CNL and file the FPL again as an alternative to the delivery of multiple modification messages concerning the same FPL or several modifications within the same message.

3. SIMILAR AND MULTIPLE FLIGHT PLAN ERRORS

Similar errors

3.1 Inadequate completion procedures, sending the modified plan to the originator instead of using CHG or DLA, generate similar flight plans for the same flight. This creates confusion among the different ATS units, which will have to select the flight plan (not necessarily the last one considered valid by the airline) to update it with the surveillance information and/or in flight transfer processes.

Multiple errors

3.2 Multiple FPLs are a cause of error when there are 2 different originators of the FPL (whether airlines or ANSPs).

3.3 In order to avoid multiple FPLs in the AFTN/AMHS, airlines will only originate and transmit the FPL if the ANSP has delegated this responsibility in accordance with chapter 2 of this guide.

4. DELAY MESSAGES (DLA)

4.1. The originator will only consider sending the DLA message if the flight is expected to be delayed by more than 30 minutes after the EOBT contained in the previous FPL (refer to Doc 4444, 11.4.2.2.3).

4.2. If the originator does not send a DLA message 30 minutes after the EOBT specified in the FPL, then the FPL will be automatically cancelled.

5. MODIFICTION MESSAGES (CHG)

5.1. If the originator is an airline and needs to send a CHG in less time than that specified in item 2.3 of this guide, then it shall first contact the TWR or the designated ATS unit that will coordinate the proposed changes with the TWR involved.

5.2. Modifications concerning aircraft type and wake turbulence category, cruising speed and/or level shall be notified for each individual flight as soon as possible and no later than 30 minutes after take-off to:

a) the air traffic services reporting office of the departure aerodrome, and

b) only if the responsibility for originating the FPL has been delegated as mentioned in paragraph 2.1, the originator of the FPL shall also send the CHG message to the other ATS units considered in the initial FPL.

5.3. If the originator of the FPL wishes to modify the ATS route or the flight level en route, then the CHG message shall contain the whole portion of the route and the different FLs.

5.4. CHG messages shall include a completed field 15, containing the information of the FPL that changes to avoid an incorrect modification.

5.5. If the CHG message has a new ATS route with FIRs that were not considered in the original FPL, then the FPL shall be cancelled with a CNL message and a new FPL sent.

6. AFTN ADDRESSES

6.1 In order to reduce FPL filing discrepancies resulting from incorrect addressing of aeronautical messages, ANSPs must list their AFTN addressing requirements in their aeronautical information publication (AIP). Guidance on the addressing of AFTN messages can also be found in ICAO Annex 10, Volume II, chapter 4, in ICAO Docs 7910 and 8585, and in ICAO regional AFTN routing directories.

7. CENTRAL FLIGHT PLAN PROCESSING UNIT

7.1 ANSPs with multiple ATS centres may consider the installation of a central flight-planning unit for the processing and initial distribution of FPLs. An example of central flight planning is provided in the specifications of the Initial Flight Plan of EUROCONTROL.

7.2 Studies conducted by EUROCONTROL and the European Commission determined that inconsistencies in flight data content in hands of different parties for the processing of the same flight have a negative impact on the efficiency of operations within the European air traffic management system.

7.3 According to the EUROCONTROL website (see the References section), the IFPL specification defines the procedures and requirements for the provision, processing, and distribution of flight plans in the pre-flight phase. Improved consistency in flight plan data has enabled more homogeneous operations, enhanced safety, and has also permitted the definition of the new operational concepts for air traffic flow management (AFTM).

8. PROCEDURES FOR MITIGATING ERRORS

8.1 Appropriate procedures are required for resolving issues derived from messages that are not received. Part of the solution involves ensuring that duplicated or erroneous messages are not fed into the system. For example, if a movement message is received for an unknown FPL, the receiving unit must use the flight plan request message (RQP) to request the FPL from the sending unit instead of creating its own FPL.

8.2 Where the ANSPs provide the possibility of filing FPLs through the Internet, a validation process should be established to prevent the introduction of wrong data from movement messages. NAV CANADA is an example of web-based flight plan filing, using its Collaborative Flight Planning System (CFPA). The application permits direct filing of the flight plan by pilots and/or flight plan filing agencies, and is in full compliance with Flight Plan 2012, verifying errors in full as required by FPL filers in order to correct discrepancies before the flight plan is accepted for processing.

9. REVISION OF STATE REGULATIONS

9.1 The ANSPs are encouraged to cooperate with State regulators in the revision and alignment of existing regulations with emerging technologies. In those cases in which State regulations require that the FPL be delivered personally, together with the electronic FPL, the modification of such regulations may reduce man-induced discrepancies in the filing process.

9.2 If after a revision, State regulations still require operators to personally deliver the filed flight plans, the ANSPs must introduce appropriate quality control measures to reduce the possibility of disparity between electronic and personally delivered FLPs.

10. REPETITIVE FLIGHT PLANS (RPLs)

10.1 The use of the RPL is known to be an important contributor to duplicated flight plans and may result in the provision of less-than-optimal services and erroneous separation by the ANSP.

10.2 The flight plan information contained in the RPL may differ from the actual details considered by the operator for a given day, for example, the type of aircraft to be flown. This type of changes may have an impact on the services provided and on the integrity of the separation or wake turbulence standards applied.

10.3 Consequently, the direct filing of flight plan messages through the AFTN/AMHS must be the method of choice of the operators for filing the flight plan.

11. ALTERNATE AERODROMES

11.1 Some automated ground systems will reject flight plans that do not contain an alternate aerodrome as destination, even if an alternate does not need to be filed for the specific destination. Consequently, some operators file alternate aerodromes where an alternate is not required in order to avoid the rejection of the flight plan, which results in a financial burden, since additional and unnecessary fuel must be carried on board.

11.2 *ICAO Annex 6, Operation of aircraft, Part 2* establishes exceptions to the requirement of filing an alternate aerodrome. The ANSP should make sure that the alternate field is not a mandatory field for automated flight plan processing, especially for flights in transit to a destination in another FIR.

12. DESIGNATION OF DEPARTURE/ARRIVAL PROCEDURES

12.1 The ANSPs should make sure that the name of any published standard instrument departure (SID) or standard instrument arrival (STAR) procedure filed in the flight plan meets the designation requirements of *ICAO Annex 11, Air Traffic Services, Appendix 3*, in order to reduce the number of rejected flight plans.

12.2 The ANSPs should make sure that ATM systems are capable of duly processing filed flight plans that include SIDs and STARs as part of the route.

13. SUPPLEMENTARY FLIGHT PLAN INFORMATION (FPL ITEM 19)

13.1. Supplementary flight plan information should not be considered for transmission for each FPL.

13.2. If, for SAR reasons, this information is required by any ANSP (in accordance with Annex 11, part 5.2.2.1), the sequence for acquiring the information would be as follows:

a) *via VHF*, requested from the flight crew, if the event is considered by ATC as an appropriate action; or
b) *by telephone*, contacting the designated 24/7 flight operation/dispatch unit of the airline (specified in the FLP delegation agreement); or
c) *via the AFTN/AMHS*, from the designated 24/7 flight operation/dispatch unit of the airline (specified in the FLP delegation agreement)

14. CONVERSIONS OF THE ICAO FPL 2012 FORMAT

14.1 During the transition to the ICAO FPL 2012 format, some ANSPs used converters to convert the existing flight plans to the new format.

14.2 The following issues were associated to the continuous use of converters:

a) The benefits of Amendment 1 are not fully realised; especially, it reduces separation standards associated to performance-based navigation (PBN), and the provision of ADS-B services;

b) Interoperability in the delivery of AIDC messages would be restricted when using the converter solution.

14.3 Other known issues related to the ICAO FPL 2012 include:

a) The RVR/ indicator in FPL box 18. This indicator must be either accepted without processing, or eliminated without rejection by ATM systems;

b) FPL rejects occur when RMK/unexpected information is entered in box 18.

14.4 In order to reduce the origin of erroneous messages and maximise the benefits of the new flight plan format, the ANSPs must fully comply with the provisions of ICAO FPL 2012 concerning automation and support systems.

15. FEEDBACK TO THE OPERATOR

15.1 The ANSPs shall consider establishing a reporting mechanism to provide constant feedback to the operators as to the number and causes of rejects and flight plan errors.

15.2 Furthermore, the ANSPs must consider holding periodic user/operator forums to discuss recurrent discrepancies.

16. REFERENCES

- ICAO Annex 6, Operation of aircraft, Part 2 (paragraph 2.2.2.3.5)
- ICAO Annex 10, Aeronautical telecommunications, Volume II, Chapter 4
- ICAO Annex 11, Air traffic services, Chapter 2, Appendix 3 and Appendix 4
- ICAO location indicators (Doc 7910)
- Designators for aircraft operating agencies (Doc 8585)
- ICAO AFTN routing guide, Asia/Pacific Regions, 27th Edition, August 2007
- ICAO PANS ATM (Doc 4444) (paragraph 11.2.1.1.1)

EUROCONTROL IFPL specification:

- https://www.eurocontrol.int/articles/initial-flight-plan-ifpl-specification
- http://www.acac.org.ma/ar/Workshop%20Presentation/IFPS%20in%20Flight%20PlanningV4.pdf

17. List of acronyms

Abbreviations

ACI	Airports Council International
ADS	Automatic dependent surveillance
ADS-B	Automatic dependent surveillance – Broadcast
ADS-C	Automatic dependent surveillance – Contract
AFTN	Aeronautical fixed telecommunication network
AIDC	ATS interfacility data communication
AIP	Aeronautical information publication
ANSP	Air navigation service provider
AMHS	Air traffic services (ATS) message handling system
APAC	Asia/Pacific
APANPIRG	Asia/Pacific air navigation planning and implementation regional group
ASBU	Aviation system block upgrades
ASIOACG	Arabian Sea/Indian Ocean ATS coordination group
ATFM	Air traffic flow management
ATM	Air traffic management
ATS	Air traffic service(s)
AUSEP	Australian air navigation operations
CHG	Modification
CNL	Flight plan cancellation message
CPDLC	Controller-pilot data link communications
CPL	Current flight plan
DARP	Dynamic air route planning
DLA	Delay message
EOBT	Estimated off-block time
FAA	Unites States Federal Aviation Administration
FIR	Flight information region
FIRBX	FIR boundary crossing
FPL	Filed flight plan
GANP	Global air navigation plan
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IFPL	Specification for the initial flight plan (EUROCONTROL)
ISPACG	Informal South Pacific Air Traffic Services Co-ordinating Group
LOA	Letter of agreement
RPL	Repetitive flight plan
RQP	Request flight plan
SID	Standard instrument departure
SMS	Safety management system
STAR	Standard instrument arrival
UPR	User preferred route

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