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Ref.: AN 11/1.1.29-16/62

22 July 2016

Subject: Proposal for the amendment of Annex 6,
Part I, regarding normal aircraft tracking

Action required: Comments to reach Montréal by
22 October 2016

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission, at the sixth meeting of its 202nd Session held on 17 May 2016, considered a proposal developed by the Secretariat with the assistance of the Normal Aircraft Tracking Initiative/2 (NATII/2) to amend the Standards and Recommended Practices (SARPs) in Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplane*, which complement the normal aircraft tracking requirements. The Commission authorized their transmission to Member States and appropriate international organizations for comments.
2. Background information on the aforementioned amendment proposal, draft related guidance material as well as ICAO-led normal aircraft tracking activities has been included in Attachment A. The amendment proposal to Annex 6, Part I introduces an additional SARP to facilitate the practical implementation of normal tracking provisions and is contained in Attachment B. The rationale has been provided in a text box immediately following the proposal. It should be noted that minimal financial impact is anticipated from the proposed changes.
3. In examining the proposed amendment, you should not feel obliged to comment on editorial aspects as such matters will be addressed by the Air Navigation Commission during its final review of the draft amendment. Additionally, there is no need to comment on the draft guidance material provided for information in Attachment C as it will be finalized based on the outcome of the consultation on the proposed amendment.

4. May I request that any comments you wish to make on the amendment proposals be dispatched to reach me not later than 22 October 2016. The Air Navigation Commission has asked me to specifically indicate that comments received after the due date may not be considered by the Commission and the Council. In this connection, should you anticipate a delay in the receipt of your reply, please let me know in advance of the due date.

5. For your information, the proposed amendment to Annex 6, Part I is envisaged for applicability on 8 November 2018. Any comments you may have thereon would be appreciated.

6. The subsequent work of the Air Navigation Commission and the Council would be greatly facilitated by specific statements on the acceptability or otherwise of the proposals. Please note that for the review of your comments by the Air Navigation Commission and the Council, replies are normally classified as “agreement with or without comments”, “disagreement with or without comments” or “no indication of position”. If in your reply the expressions “no objections” or “no comments” are used, they will be taken to mean “agreement without comment” and “no indication of position”, respectively. In order to facilitate proper classification of your response, a form has been included in Attachment D which may be completed and returned together with your comments, if any, on the proposals in Attachment B.

Accept, Sir/Madam, the assurances of my highest consideration.



Fang Liu
Secretary General

Enclosures:

- A — Background information
- B — Proposed amendment to Annex 6, Part I
- C — Draft guidance material: Aircraft Tracking
Implementation Circular (Chapters 1 and 3 only,
English only)
- D — Response form

BACKGROUND INFORMATION

Following the disappearance of Malaysia Airlines flight MH370, a special multidisciplinary meeting regarding global flight tracking (MMGFT) convened by ICAO concluded that global tracking of airline flights should be pursued as a matter of priority to provide early notice of, and response to, abnormal flight behaviour. Further to the MMGFT's conclusions, the Global Aeronautical Distress and Safety System (GADSS) concept of operations was developed, establishing the objectives of flight tracking. The Second High-level Safety Conference (HLSC 2015), held from 2 to 5 February 2015 at ICAO Headquarters, endorsed the prompt implementation of the GADSS, including normal tracking every fifteen minutes and distress tracking every minute. The HLSC called upon ICAO to finalize flight tracking Standards and Recommended Practices (SARPs) and develop related guidance material.

The Normal Aircraft Tracking Implementation Initiative (NATII) was formed by ICAO on 19 February 2015. The NATII was tasked to lead an implementation initiative in a multinational context designed to demonstrate best use of equipment in use today and integrate the outcome into guidance material. The initiative included but was not limited to operator flight monitoring; air traffic services (ATS); search and rescue; and civil/military cooperation. The outcome of the initiative was delivered to ICAO on 31 August 2015, and was considered by the Air Navigation Commission (ANC) during the final review of the proposed normal aircraft tracking provisions. On 10 November 2015, the ICAO Council adopted Amendment 39 to Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes* which included the normal aircraft tracking SARPs. These SARPs became effective on 20 March 2016 and will be applicable on 8 November 2018.

During the final review, the ANC affirmed the need for additional complementary work to facilitate the practical implementation of these provisions. The complementary work would consist of additional provisions and guidance material to address issues raised by States and the NATII during consultation on normal aircraft tracking. The ANC further agreed that the complementary SARPs should address the need for risk-based variations to automated reporting intervals, acceptable to the State of the operator, which would allow flights lacking a normal aircraft tracking capability to commence under certain circumstances.

To assist the Secretariat in developing the necessary complementary SARPs and associated guidance material, the Normal Aircraft Tracking Implementation Initiative/2 (NATII/2) was established. As a result of this initiative, an amendment proposal to Annex 6, Part I was subsequently submitted by the Secretariat for consideration by the ANC. The proposal consists of a single Standard which includes the relevant elements to be considered in a robust, regulator-approved risk assessment process, which would allow variations to the automated reporting interval under certain circumstances. The NATII/2 is completing work on guidance material to support the implementation of this complementary Standard. The Global Aeronautical Distress and Safety System Advisory Group (GADSS-AG) has begun the process of reviewing the GADSS in light of the information obtained from the NATII/2. The target effective date for the proposed complementary Standard is 2017. The Standard has an applicability date of 8 November 2018.

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ATTACHMENT B to State letter AN 11/1.1.29-16/62

PROPOSED AMENDMENT TO ANNEX 6, PART I

NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

~~Text to be deleted is shown with a line through it.~~

text to be deleted

New text to be inserted is highlighted with grey shading.

new text to be inserted

~~Text to be deleted is shown with a line through it~~ followed by
the replacement text which is highlighted with grey shading.

new text to replace existing text

**PROPOSED AMENDMENT TO
INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

OPERATION OF AIRCRAFT

**ANNEX 6
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

**PART I
(INTERNATIONAL COMMERCIAL AIR TRANSPORT – AEROPLANES)**

CHAPTER 3. GENERAL

3.3 Aircraft Tracking

...

Insert new paragraph 3.3.4 as follows and renumber subsequent paragraphs accordingly.

3.3.4 Notwithstanding the provisions in 3.3.2 and 3.3.3, the State of the operator may, based on the results of an approved risk assessment process implemented by the operator, allow for variations to automated reporting intervals. The process shall demonstrate how operational risks specifically associated with such variations can be managed and shall include at least the following:

- a) capability of the operator's systems and processes;
- b) overall capability of the aeroplane and its systems;
- c) available means to determine the position of and communicate with the aeroplane;
- d) frequency and duration of gaps in automated reporting;
- e) operator's processes for contacting ATS units;
- f) human factors consequences resulting from changes to flight crew procedures; and
- g) specific mitigation measures and contingency procedures.

Note. — Guidance on development, implementation and approval of the risk assessment process, including variation examples, is contained in the Normal Aircraft Tracking Implementation Guidelines (Cir 347).

End of new text.

...

<i>Origin:</i>	<i>Rationale:</i>
Secretariat	Amendment 39 to Annex 6, Part I introduced a requirement for normal aircraft tracking in 3.3.3. (note that the aircraft tracking provisions will be re-numbered in the 10th edition of Annex 6). The present proposal is based on the compelling need for provisions that address the need for risk-based variations to the automated reporting intervals, acceptable to the State of the operator, which would allow flights lacking a normal aircraft tracking capability to commence under certain circumstances. Without the proposed Standard, the prescriptive nature of normal aircraft tracking SARPs would impose a disproportionate operational burden across industry stakeholders, resulting in a number of unintended consequences to operations especially when elements required for normal aircraft tracking become unavailable.

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ATTACHMENT C to State letter AN 11/1.1.29-16/62

DRAFT GUIDANCE MATERIAL

AIRCRAFT TRACKING IMPLEMENTATION CIRCULAR
(English only)

Note.— Only Chapters 1 and 3 are circulated with this State letter.



Aircraft Tracking Implementation Circular

Implementation Guidance for Operators and ATS units

Disclaimer

This document is an unedited version of an ICAO publication and has not yet been approved in final form. As its content may still be supplemented, removed, or otherwise modified during the editing process, ICAO shall not be responsible whatsoever for any costs or liabilities incurred as a result of its use.

TABLE OF CONTENTS

Acronyms and Abbreviations

Definitions

Introduction and Background

Chapter 1 – Normal Aircraft Tracking Requirements

- 1.1 Normal Aircraft Tracking Defined
- 1.2 Understanding the Normal Aircraft Tracking SARPs
 - 1.2.1 Annex 6, Part 1, 3.3.1
 - 1.2.2 Annex 6, Part 1, 3.3.2
 - 1.2.3 Annex 6, Part 1, 3.3.3
 - 1.2.4 Annex 6, Part 1, 3.3.4
 - 1.2.5 Annex 6, Part 1, 3.3.5
 - 1.2.6 Annex 6, Part 1, 4.6.1
- 1.3 Areas of Operation
- 1.4 Normal Aircraft Tracking Implementation Timeline

Chapter 2 – Pre-Implementation Analysis (under development)

- 2.1 Operator Capability Assessment, Gap Analysis and Risk Assessment
- 2.2 Evaluation of Existing Aircraft Tracking Technologies and Services
- 2.3 Operator Implementation Timeline and Milestones

Chapter 3 – Operator Normal Aircraft Tracking Policy, Process and Procedure

- 3.1 Development of Operator Policy, Process and Procedure
 - 3.1.1 Operator Normal Aircraft Tracking Policy
 - 3.1.2 Normal Aircraft Tracking (4D/15 Tracking) in All Areas of Operation
 - 3.1.3 Normal Aircraft Tracking (4D/15 Tracking) in Oceanic Areas
 - 3.1.4 Operator Normal Aircraft Tracking Responsibilities
 - 3.1.5 Development of Area Specific Guidance
- 3.2 Risk-Based Normal Aircraft Tracking
 - 3.2.1 Understanding Risk in the Context of Normal Aircraft Tracking
 - 3.2.2 Risk Assessment Process Considerations
 - 3.2.2.1 Capability of the operator's ground-based systems and processes
 - 3.2.2.2 Overall capability of the aeroplane and its systems
 - 3.2.2.3 Available means to determine the position of and communicate with the aircraft
 - 3.2.2.4 Frequency and duration of gaps in automated reporting
 - 3.2.2.5 Human factors consequences resulting from changes to flight crew procedures
 - 3.2.2.6 Specific mitigation measures and contingency procedures

Chapter 4 – Pre-flight Planning and Flight Commencement (under development)

- 4.1 (4D/15 Tracking) Pre-flight Planning and Flight Commencement Considerations
- 4.1.1 Pre-flight determination of 4D/15 Service Availability and 4D/15 Tracking Responsibilities
- 4.1.2 Normal Aircraft Tracking Planning Assumptions
- 4.2 (4D/15) Flight Commencement/Continuation Considerations (Based on Areas of Operation)
- 4.3 (4D/15) Inflight Considerations – Operator

Chapter 5 – Operator Monitoring - Policy, Process and Procedure (under development)

- 5.1 Monitoring and Support of ATS unit alerting
- 5.1.1 Responsibilities, duties and tasks of personnel in Operational control systems with/without a flight operations officer (FOO)
- 5.1.2 Missed Report Procedures
- 5.1.2.1 Verification of System Integrity
- 5.1.2.2 Attempt to re-establish communication
- 5.1.2.3 Contact ATS Unit (missed report form example in Appendix C)
- 5.1.2.4 Resetting 4D/15 after a missed report

Chapter 6 Additional Pre/Post Implementation Activities (under development)

- 6.1 Training of Ground Personnel and Flight Crew
- 6.2 Normal Aircraft Tracking Exercises and Trials
- 6.3 Data Collection and Retention
- 6.4 Continuous Improvement

Chapter 7 – ATS Unit Response to Operator Missed Reports Notification (under development)

- 7.1 Missed Report Processing
- 7.2 Emergency Phase Declarations

Appendix A – Dedicated Aircraft Tracking Solutions (under development)

Appendix B – Operator 4D/15 Tracking Process Flow Chart (under development)

Appendix C – Aircraft Tracking Risk Assessment Template (under development)

Appendix D – Missed Report Form Example (under development)

Reference (under development)

113 ACRONYMS AND ABBREVIATIONS

114		
115	ACARS	Aircraft Communications Addressing and Reporting System
116	ADS	Automatic dependent surveillance
117	ADS-B	Automatic dependent surveillance – Broadcast
118	ADS-C	Automatic dependent surveillance – Contract
119	ANSP	Air Navigation Service Provider
120	ATC	Air Traffic Control
121	ATM	Air traffic management
122	ATS unit	Air traffic services unit
123	AOC	Air Operator Certificate
124	FOO	Flight Operations Officer
125	GADSS	Global Aeronautical Distress Safety System
126	LRCS	Long Range Communication System (LRCS)
127	OFP	Operational Flight Plan
128	RCC	Rescue Coordination Centre
129	SAR	Search and Rescue
130	SARPs	Standards and Recommended Practices (ICAO)
131	SATCOM	Satellite Communications
132	SELCAL	Selective Calling System
133	SMS	Safety Management System
134	SOP	Standard Operating Procedure

DEFINITIONS

Aircraft Tracking. A process, established by the operator, that maintains and updates, at standardized intervals, a ground-based record of the four dimensional position of individual aircraft in flight.

4D/15 Service. In the provision of air traffic services an ATS unit receives four dimensional (latitude, longitude, altitude, time) position information at 15 minutes intervals or less from suitably equipped aircraft.

4D/15 Tracking. The operator obtains four dimensional (latitude, longitude, altitude, time) aircraft position information at 15 minutes intervals or less.

Flight operations officer/flight dispatcher. A person designated by the operator to engage in the control and supervision of flight operations, whether licensed or not, suitably qualified in accordance with Annex 1 — Personnel Licensing, who supports, briefs and/or assists the pilot-in-command in the safe conduct of the flight.

Oceanic Area. Airspace which overlies waters outside the territory of a State.

Note. — Information relevant to determining the extent that waters form part of the territorial sea may be found in the U.N. Convention on the Law of the Sea.

INTRODUCTION AND BACKGROUND

Following the loss of Malaysian Airlines flight MH370, ICAO convened a special Multidisciplinary Meeting on Global Flight Tracking (MMGFT) at ICAO Headquarters from 12 to 13 May 2014. Participants at this meeting included States represented on the ICAO Council and States having nominated members to the Air Navigation Commission, as well as representatives from the Industry and ICAO panels. The participants in the meeting were invited to explore, among other things, the:

- need and means available to track all airline flights;
- need for ICAO guidance on global flight tracking; and
- potential for strengthening ICAO provisions.

Upon completion of this special meeting, consensus was reached among Member States and representatives of the international air transport industry on a near-term strategy to track flights, regardless of their location or destination. In this regard, the meeting also established a Global Aeronautical Distress and Safety System (GADSS) framework for future medium- and long-term efforts.

Subsequent to the special meeting, a concept of operations on aircraft flight tracking was drafted that defined roles and responsibilities of all stakeholders as well as the objectives of flight tracking in order to ensure the timely provision of information to the appropriate personnel to support search and rescue, recovery and accident investigation activities. Additionally, a final high-level concept of operations was delivered to the second ICAO High-level Safety Conference (HLSC 2015, February, Montréal).

Several recommendations emerged from HLSC 2015 with respect to finalizing flight tracking Standards and Recommended Practices (SARPS) and related guidance material. ICAO, recognizing the compelling need for a routine aircraft tracking solution in the short-term, as determined by the MMGFT and supported by the HLSC 2015, proposed the expeditious implementation of routine aircraft tracking.

To achieve this, the Normal Aircraft Tracking Implementation Initiative (NATII) was formed on 19 February 2015. The NATII was tasked to lead an implementation initiative in a multinational context designed to demonstrate best use of equipment in use today and integrate the outcome into guidance material. The initiative would include but not be limited to operator flight monitoring; air traffic services (ATS); search and rescue; and civil/military cooperation. Additionally, the HLSC 2015 agreed that planning of the activities should begin shortly after the conference and conclude by 31 August 2015 in order to enhance guidance material used to advance normal tracking procedures.

The SARPs detailed in this circular were adopted by the ICAO Council to expedite the implementation of a near term and routine aircraft tracking solution. This circular was developed as part of the NATII and is intended to support the consistent implementation of the Normal Aircraft Tracking SARPS that will become applicable on 8 November 2018.

Chapter 1 – Normal Aircraft Tracking Requirements

1.1 Normal Aircraft Tracking Defined

Normal aircraft tracking is a core component of the Global Aeronautical Distress and Safety System (GADSS). The GADSS was reviewed and endorsed by States at the High-level Safety Conference in February 2015. ICAO is in the process of updating the GADSS as a result of State letters addressing related initiatives.

The GADSS addresses key components of the system and normal aircraft tracking is a near-term objective of the GADSS. It is the first step necessary to move from today's system towards the GADSS target concept which addresses the growing consensus in the global aviation community that the location of an aircraft should always be known. Normal aircraft tracking is a near-term solution intended to leverage existing technologies to:

- assist in the timely identification and location of aircraft;
- reduce the reliance on procedural methods used for determining aircraft position;
- help ensure the availability and sharing of accurate aircraft position data (with the relevant entities); and
- help to improve the effectiveness, efficiency and performance of air traffic services (ATS) unit alerting and support search and rescue (SAR).

To achieve these aims, one objective of the normal aircraft tracking SARPs is to set an automated four dimensional position reporting interval of 15 minutes or less (recommended in all areas of operation and required in oceanic areas). This reporting interval is intended to ultimately reduce the time necessary to resolve the status of an aircraft or when necessary, help to locate an aircraft.

The normal aircraft tracking SARPs also allow stakeholders to meet the requirement using available and planned technologies and procedures as deemed necessary.

In general the SARPs:

- did not introduce changes to current air traffic control (ATC) procedures;
- established operator responsibilities for tracking based on areas of operation;
- are not technology-specific; and
- established communication protocols between operator and ATC.

1.2 Understanding the Normal Aircraft Tracking SARPs

The SARPs introduced in Annex 6, Part 1, Amendment 39 define normal aircraft tracking provisions that encompass operator responsibilities related to:

- ground-based or “core” capabilities that underlie all normal aircraft tracking SARPs (Annex 6, Part 1, 3.3.1);
- automated aircraft position determination and normal aircraft tracking interval recommended in all areas of operation (Annex 6, Part 1, 3.3.2);
- automated aircraft position determination and normal aircraft tracking interval required in oceanic areas (Annex 6, Part 1, 3.3.3);
- tracking data retention requirements (Annex 6, Part 1, 3.3.4);
- risk assessment process required when a flight or series of flights will commence when a recommended or required automated reporting interval is unachievable (Annex 6, Part 1, 3.3.5); and
- ground-based flight monitoring and ATS unit notification requirements (Annex 6, Part 1, 4.6.1).

Note.— Refer to the Definitions section for the definitions of the terms 4D/15 Service and 4D/15 Tracking, which are used extensively throughout this circular.

The balance of this chapter is devoted to explaining the SARPs in general terms to assist operators and ATS units achieve a basic understanding of normal aircraft tracking. Such an understanding is necessary in order to establish the operational foundation for all aircraft tracking activities. It will also assist in the practical application of the SARPs which is addressed in greater detail in Chapters 3 and 4 of this circular.

1.2.1 Annex 6, Part 1, 3.3.1 states: *The operator shall establish an aircraft tracking capability to track aeroplanes throughout its area of operations.*

The principle intent of this SARP is to ensure operators develop and implement the operational capability to track their aeroplanes throughout the area(s) of operations defined in the Air Operator Certificate (AOC) and related operations specifications. This “core” tracking capability is applicable in all areas of operation and refers to a process that maintains and updates, at standardized intervals, a ground-based record of the four dimensional position of individual aircraft in flight.

It is important to note, however, that a specific tracking interval is not defined by 3.3.1. This SARP simply establishes the foundation that will support the implementation of the normal aircraft tracking provisions that follow. Equally important to note is that the complexity of this core aircraft tracking capability would be commensurate with the complexity, breadth and scope of the operations conducted by the operator.

Note.— Annex 6, Part 1, 3.3.1 does not specifically refer to a “ground-based record” or “four dimensional position data.” These elements are derived by inference based on the Annex 6, Part 1, Chapter 1 definition of aircraft tracking as defined in the Definitions section.

1.2.2 Annex 6, Part 1, 3.3.2 states: *Recommendation.*— The operator should track the position of an aeroplane through automated reporting at least every 15 minutes for the portion(s) of the inflight operation(s) under the following conditions:

- a) the aeroplane has a maximum certificated take-off mass of over 27 000 kg and a seating capacity greater than 19; and*
- b) where an ATS unit obtains aeroplane position information at greater than 15 minute intervals.*

Note.— See Annex 11 — Air Traffic Services, Chapter 2 for coordination between the operator and air traffic services provisions regarding position report messages.

This is a recommended practice that encourages operators to always obtain aircraft position data under the conditions stipulated. Simply stated, it recommends that aeroplane four dimensional (4D) position information be obtained using automated reporting means at 15 minute intervals or less. It is important to note that this is a recommended practice applicable in all areas of operations defined in the Air Operator Certificate (AOC) and related operations specifications. This recommended practice is also applicable to a wide range of aircraft given the low take-off mass threshold.

This recommended practice expands the normal aircraft tracking capability defined by 3.3.1 as it specifies a (standardized) automated reporting interval. It encompasses areas that are not addressed by the requirements of 3.3.3. Like 3.3.3, it relies on aircraft position data being obtained (by the operator) through automated reporting. This is intended specifically to preclude a negative impact (from a human factors perspective) on flight crew member workload.

The interval and position specifications of 3.3.2 (and 3.3.3) comprise a “4D/15 Service” when an aircraft is in an area where position information is received by an ATS unit and a “4D/15 Tracking” capability when such information is obtained by the operator. The premise is that automatically capturing aircraft position data, either by an ATS unit or the operator, can be used to fulfil normal aircraft tracking recommendations or requirements.

Although 3.3.2 is a recommended practice, to avoid duplication, much of the guidance material with respect to an operator’s responsibility to obtain aircraft position information is identical to the guidance provided for 3.3.3. Additionally, and similar to 3.3.3, an operator’s responsibility to track the position of its aircraft in accordance with this recommended practice is applicable in areas where a 4D/15 Service is unavailable. An operator may suspend its own tracking in areas where 4D/15 Service is available.

Note.— The terms 4D/15 Service and 4D/15 Tracking are used extensively in guidance material as a form of shorthand to identify the entity responsible for receiving or obtaining four dimensional aircraft position data at the minimum interval recommended or required by the annex.

1.2.3 Annex 6, Part 1, 3.3.3 states: *The operator shall track the position of an aeroplane through automated reporting at least every 15 minutes for the portion(s) of the inflight operation(s) that is planned in an oceanic area(s) under the following conditions:*

- a) the aeroplane has a maximum certificated take-off mass of over 45 500 kg and a seating capacity greater than 19; and*
- b) where an ATS unit obtains aeroplane position information at greater than 15 minute intervals.*

Note 1.— Oceanic Area - for the purpose of aircraft tracking is the airspace which overlies waters outside the territory of a State.

Note 2.— See Annex 11, Chapter 2 for coordination between the operator and air traffic services provisions regarding position report messages.

In contrast to the recommendation in 3.3.2, 3.3.3 clearly establishes an automated reporting interval applicable to aeroplanes that is to be maintained in oceanic areas by either the operator or by the relevant ATS unit. It is important to note here that 4D/15 Tracking in accordance with 3.3.3 is required in areas where a 4D/15 Service is unavailable (e.g. aircraft is not suitably equipped to allow an ATS unit to receive its position data).

Conformance with this SARP would require the operator to determine, prior to flight commencement, whether an aircraft can participate in an available 4D/15 Service or 4D/15 Tracking will be required (note the use of word “planned” in 3.3.3 above). Practically speaking, this means the operator would have a reasonable certainty of being able to meet normal aircraft tracking requirements by the completion of the planning stage.

Conversely, if a 4D/15 Service or 4D/15 Tracking becomes unavailable after flight commencement, there is no implied requirement for the operator to take on the tracking responsibility or have a back-up means. Additionally, once airborne, if the aircraft operates outside of the planned route or area (e.g. unplanned diversion) and is unable to maintain a 4D/15 Service or undertake 4D/15 Tracking, the operation may continue.

Note.— Refer to the Definitions section for definitions of Oceanic Areas, 4D/15 Service and 4D/15 Tracking.

1.2.4 **Annex 6, Part 1, 3.3.4 states:** *The operator shall establish procedures, approved by the State of the Operator, for the retention of aircraft tracking data to assist SAR in determining the last known position of the aircraft.*

Note. — *Refer to 4.2.1.3.1 for operator responsibilities when using third parties for the conduct of aircraft tracking under 3.3.1.*

This SARP establishes an operator's aircraft tracking data retention responsibility. The principle intent of the SARP is to ensure the retention of the aircraft tracking data that would assist SAR in locating an aircraft.

Note. — *Data retention is applicable to the operator's aircraft 4D/15 Tracking data that would aid in the determination of an aircraft's position in the event of an accident.*

1.2.5 **Annex 6, Part 1, 3.3.5 states:** Notwithstanding the provisions in 3.3.2 and 3.3.3, the State of the operator may, based on the results of an approved risk assessment process implemented by the operator, allow for variations to automated reporting intervals. The process shall demonstrate how operational risks specifically associated with such variations can be managed and shall include at least the following:

- a) capability of the operator's systems and processes;
- b) overall capability of the aeroplane and its systems;
- c) available means to determine the position of and communicate with the aeroplane;
- d) frequency and duration of gaps in automated reporting;
- e) operator's processes for contacting ATS units;
- f) human factors consequences resulting from changes to flight crew procedures; and
- g) specific mitigation measures and contingency procedures.

Note. — *Guidance on development, implementation and approval of the risk assessment process, including variation examples, is contained in the Normal Aircraft Tracking Implementation Guidelines (Cir 347).*

The intent of this SARP is to define the criteria that would allow operators under specific circumstances, to vary from the automated reporting interval(s) specified in Annex 6, Part 1, 3.3.2 and/or 3.3.3. The SARP should only be used as a means to cover situations where, based on the results of a specific risk assessment process, the technical challenges or the level of exposure may not warrant 4D/15 Tracking. The SARP is not an alternative to compliance with normal aircraft tracking provisions nor does it relieve operators of the responsibility to track their aircraft. It simply defines a risk-based methodology that allows for the commencement of a flight or series of flights when the recommended or required automated reporting interval is not achievable in accordance with either 3.3.2 or 3.3.3.

Some of the circumstances when this SARP was envisaged to be applicable include the following singular (i.e. one-off) or long-term (i.e. continual) scenarios:

- aircraft equipment failure prior to dispatch (commencement) rendering 4D/15 Tracking unserviceable;
- systemic (non-aircraft dependent) failure rendering 4D/15 Tracking unachievable;
- regular short exposure to lack of 4D/15 coverage (e.g. short A to B flights);
- temporary airspace closures that may force unequipped aircraft onto routes that would typically require 4D/15 Tracking;
- technology challenging areas (e.g. Polar Routes); and
- other scenarios where, subject to risk assessment results, the technical challenges or the level of exposure may not warrant (justify) 4D/15 Tracking.

It is important to note that State approval in the context of this SARP refers to the risk assessment process used to identify risks and formulate mitigations. It is not intended that the State would have to review and approve each individual occasion when the risk assessment process was applied or a risk assessment conducted.

Additionally, the risk assessment process described by the SARP is intended to be strategic in nature and scope. It is not intended, for example, that a specific risk assessment be conducted on a tactical basis by operational personnel and/or the flight crew. Rather, the risk assessment process would be used by the operator to develop mitigations that would be imbedded in policy and procedure that would in turn allow for flight commencement (dispatch) in accordance with the outcome of the process.

Note.— The risk assessment process and related considerations are dealt with in detail in Chapter 3.

1.2.6 Annex 6, Part 1, 4.6.1 states, among other things: *A flight operations officer/flight dispatcher in conjunction with a method of control and supervision of flight operations in accordance with 4.2.1.3 shall:*

...

d) notify the appropriate ATS unit when the position of the aeroplane cannot be determined by an aircraft tracking capability and attempts to establish communication are unsuccessful.

This SARP is applicable to operators that utilize a flight operations officer (FOO) in conjunction with a method of control and supervision of flight operations. It establishes the requirement for an FOO to notify the applicable ATS unit in the event of a missed position report from an aircraft that cannot be resolved due to the (FOO's) inability to communicate with that aircraft.

Note.— Responsibilities for all operators, including those that do not use FOOs, are addressed in Chapter 4 of this Circular.

1.3 Areas of Operation

Annex 6, Part 1, 3.3.1 specifies that an operator shall establish an aircraft tracking capability to track aeroplanes throughout its area of operations (as defined in the operator's AOC). To achieve this, the operator would first define the scope of its operations to be encompassed by its core (ground-based) aircraft tracking processes.

To assist in the development of operator policy, process and procedures, it would first be prudent to sub-divide or classify its operations according to geographic areas. This in turn, facilitates the development of area specific guidance for a host of operational issues which include aircraft tracking. In defining such areas, the level of detail is up to each operator but is typically driven by differences in the operating requirements within each area. Additionally, areas that encompass different types of airspace with differing operating requirements may be further subdivided. In developing area specific guidance, it may also be prudent to identify procedural elements common to all areas of operation.

The map in Figure 1 is a typical representation of how an operator might choose to identify its area(s) of operations for the purpose of establishing the scope of its core aircraft tracking capability and developing guidance material for operational control personnel as well as flight crew. Such a representation could also be helpful in identifying those areas where an ATS unit does not, or cannot, meet the aircraft tracking criteria of Annex 6, Part 1, 3.3.2 and/or 3.3.3. Once all such areas are defined, the idiosyncrasies with respect to aircraft tracking in each area can be identified, collated and addressed.

Note.— The concept of area specific guidance related to flight tracking is explored further in Chapter 3.

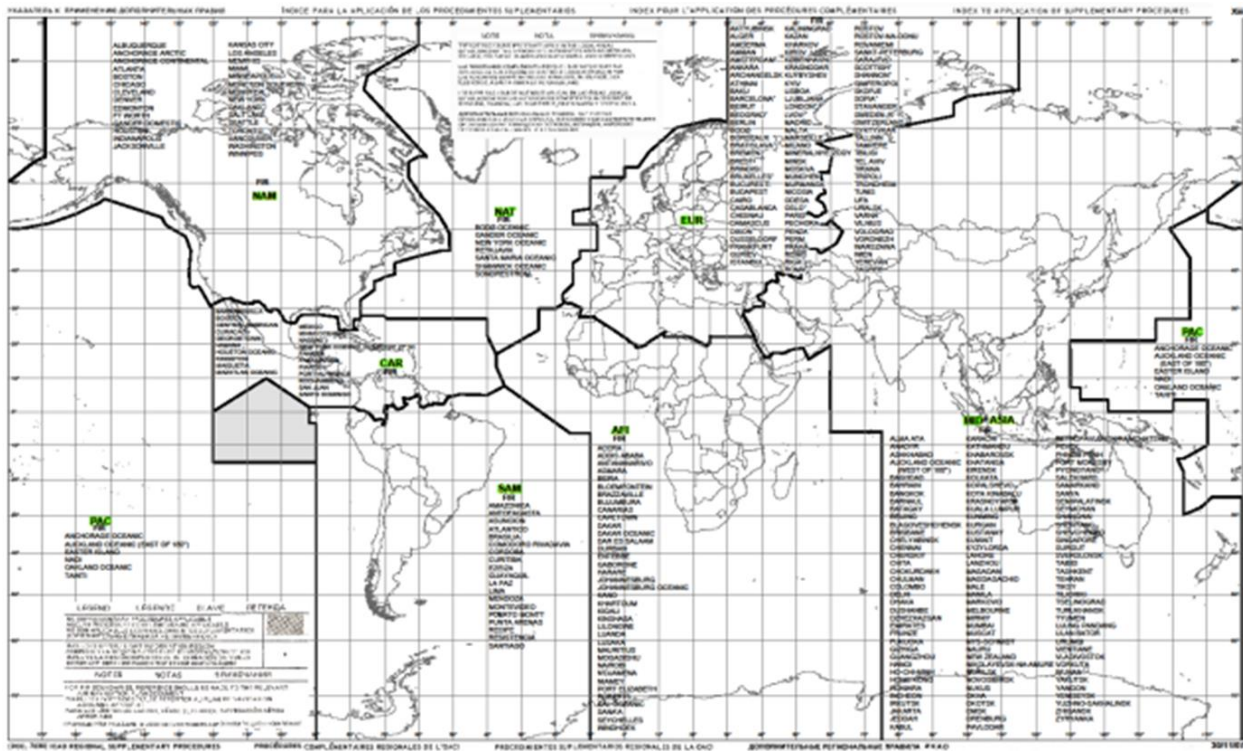


Figure 1 (excerpted from the *Regional Supplementary Procedures* (ICAO Doc 7030))

1.4 Normal Aircraft Tracking Implementation Timeline

ICAO uses basically three terms to describe the implementation process of International Standards: adoption date, effective date and applicability date. A description of these terms are:

- Adoption date. This is the date that the ICAO Council “approves” on behalf of Member States the proposed International Standard.
- Effective date. After the ICAO Council adopts the International Standard, a State letter is circulated, this is often called the “Green cover”. If the majority of Member States do not issue a “disapproval” to the proposed International Standard in the four months following the adoption date, the Standard becomes effective. The effective date gives States assurance of the content of the final version of the International Standard.
- Applicability date. This is the date that ICAO expects the International Standard to be implemented by Member States. From this date on, the International Standard may form part of the protocol questions of the ICAO Universal Safety Oversight Audit System Programme (USOAP). States have one month prior to the applicability date to file a difference to an International Standard.

Some International Standards are published with an embedded applicability date. This is common when a transition period is envisaged. It gives States certainty of what the requirements will be and time for implementation of the Standard.

The following table illustrates the adoption, effective and applicability dates for the provisions regarding normal aircraft tracking requirements, as well as for the complementary SARP developed to allow risk-based variations to the automated reporting interval.

Timeline for the implementation of Normal Aircraft Tracking and complementary SARPs

	Adoption date	Effective date	Applicability date
Normal Aircraft Tracking SARPs	10 November 2015	20 March 2016	8 November 2018
Complementary SARP	2017*	2017*	8 November 2018*

*Expected dates.

It is important to note that the implementation guidance provided in this circular is intended to support the development of (operator) normal aircraft tracking capabilities including the development of supporting policy, process and procedures. The material contained herein is based on current industry best practices as well as the use of readily available and/or emerging technologies. It is presented in a manner to support the implementation of the Annex 6, Part 1 SARPs described in this section and in accordance with the recommendations of the second ICAO High-level Safety Conference (HLSC 2015).

479 **Chapter 2 – Pre-Implementation Analysis**

480 (under development)

481 -----

DRAFT

Chapter 3 – Operator Normal Aircraft Tracking Policy, Process and Procedure

3.1 Development of Operator Policy, Process and Procedure

Before any normal aircraft tracking activities can begin, operators must be confident that they can exert sufficient organizational control over operations and personnel in order to achieve stated operational objectives. This is important to ensure repeatable conformance with operational requirements as well as to control outcomes associated with any operational activity. Developing and documenting organizational and operational policies, processes and procedures is therefore the first or foundational step in maintaining such organizational control. If done properly it will also assist in the effective assessment of the type of risks associated with operational activities to include those that may be associated with aircraft tracking and related activities.

To achieve the aforementioned aims with respect to the organizational control and risk assessment of normal aircraft tracking and related activities, any operator would:

- establish an overall aircraft tracking policy (intention to track, operations affected, precision required, exceptions, contingencies, etc.);
- address both ground-based and airborne tracking requirements and capabilities;
- establish and document all applicable policies, processes and procedures;
- allocate appropriate resources;
- establish appropriate tasking of operational personnel;
- establish standard operating procedures (SOPs) and provide the guidance, information and instructions necessary for operational personnel to fulfil duties and responsibilities;
- train and supervise all applicable personnel; and
- ensure operational personnel adhere to the SOPs.

The ensuing sections of this chapter provide additional guidance material for use by operators to develop the organizational framework necessary to support the effective implementation and maintenance of an aircraft tracking capability. Such guidance material is specifically applicable to operators unless otherwise annotated.

Note.— Risk assessment activities are part of the process defined by Annex 6, 3.3.5 that would, under specified conditions, allow for the commencement of a flight or series of flights when a 4D/15 Service or Tracking deficiency is known (by the operator) at the planning stage.

3.1.1 Operator Normal Aircraft Tracking Policy

As described in Chapter 1 and the previous sections of this chapter, 4D/15 Tracking is recommended in all areas of operation and required in oceanic areas when a 4D/15 Service is unavailable. It should

therefore be reflected in operator policy that it is incumbent on the operator to make the determination, at the planning stage, which routes or route segments will be reliant on participation in a 4D/15 Service and if applicable, which will require 4D/15 Tracking.

It should also be reflected in operator policy that if the operator determines (at the planning stage) that a flight or series of flights will not meet (Oceanic Area) 4D/15 requirements by either means, such flight(s), must have been subjected to a risk assessment process to determine if mitigation measures are necessary in accordance with Annex 6 Part 1, 3.3.5.

Note.— Refer to Chapter 1 for a discussion of 4D/15 Service, and 4D/15 Tracking.

3.1.2 Normal Aircraft Tracking (4D/15 Tracking) in All Areas of Operation

In contrast to the oceanic area tracking requirements of Annex 6, Part 1, 3.3.3, Annex 6, Part 1, 3.3.2 addresses recommended tracking in all areas of operation. Annex 6, Part 1, 3.3.2 specifies that operators should plan to track the (four dimensional) position of aircraft through automated reporting when all of the following conditions are satisfied:

- the aircraft used on a nominated route or route segment has a maximum certificated take-off mass of over 27 000 kg and a seating capacity greater than 19; and
- an applicable ATS unit receives aircraft position information at greater than 15 minute intervals.

There are several key points to emphasize for recommended 4D/15 Tracking to ensure they are appropriately reflected in operator policy, process and procedure. Points to consider include but are not limited to:

- the operator's 4D/15 Tracking policy in all areas of operations as specified in the AOC not already addressed by Oceanic Area 4D/15 Tracking, as applicable. (i.e., where, in the area of operations, the operator will meet the tracking specifications of Annex 6, Part 1, 3.3.2);
- differences, if any, from oceanic area policy, process and procedure; and
- the (additional) aircraft to be tracked (i.e., aircraft not already encompassed by Oceanic Area 4D/15 Tracking, as applicable).

Note 1.— All operations are encompassed by the tracking capability specified in Annex 6, Part 1, 3.3.1. The interval recommended or required for such capability is defined by Annex 6, Part 1, 3.3.2 and 3.3.3 respectively.

Note 2.— The risk based provisions of Annex 6, Part 1, 3.3.5 also apply to the recommended 4D/15 Tracking interval in situations where an operator chooses to implement the recommendations of Annex 6, Part 1, 3.3.2 or a State requires the additional application of such recommendations.

3.1.3 Normal Aircraft Tracking (4D/15 Tracking) in Oceanic Areas

It is important to re-emphasize several key points with respect to operator 4D/15 Tracking required in oceanic areas of operation to ensure they are appropriately reflected in operator policy, process and procedure. Annex 6, Part 1, 3.3.3 specifies that operators shall track through automated reporting, the (four dimensional) position of an aircraft when all of the following conditions are satisfied:

- the route or route segments are planned in an oceanic area(s);
- the aircraft used on a nominated route or route segment has a maximum certificated take-off mass of over 45 500 kg and a seating capacity greater than 19; and
- the applicable ATS unit receives aircraft position information at greater than 15 minute intervals.

Additional points to consider in oceanic area policy, process and procedure include but are not limited to:

- the point at which the operator's responsibility to track begins is the point, relevant to the nominated route or route segment in an oceanic area, where a 4D/15 Service is no longer available;
- the availability of 4D/15 Service and/or the achievability of 4D/15 Tracking would be considered at the planning stage. After flight commencement, an unanticipated loss of 4D/15 Service or Tracking capability does not prevent continuation of the flight, even for those portions of the route where 4D/15 Tracking was previously determined to be required; and
- operators wishing to commence a flight or series of flights when a required 4D/15 Service or 4D/15 Tracking is determined to be unachievable (at the planning stage) must ensure such operations have been subjected to the risk assessment process defined by Annex 6, Part 1, 3.3.5 prior to flight commencement.

Note.— Refer to the Definitions section for the definition of Oceanic Areas.

3.1.4 Operator Normal Aircraft Tracking Responsibilities

In order to practically and routinely fulfil its normal aircraft tracking responsibilities, an operator would need to analyse its routes to determine the areas of operation wherein ATS units do not provide 4D/15 Service (as applicable to the areas where the 4D/15 Tracking responsibility would be undertaken by the operator). It is important to note here that in addition to the analysis conducted during initial implementation, such analyses are ongoing operational activities. This is necessary to ensure operator policy, process and procedure is continually updated with respect to the necessity to obtain aircraft position data through automatic reporting as well as to address related aircraft tracking responsibilities.

Considering the aforementioned objectives and in order to also ensure 4D/15 Aircraft Tracking is accomplished when necessary or desired, operators should have specific policies and procedures in addition to those in 3.1 of this chapter that:

- identify the duties, tasks and actions (and interactions) necessary to track a specific flight;
- ensure the duties, tasks and actions related to the tracking of each flight are assigned to the appropriate personnel;
- ensure planned routes are reviewed, using whatever means available at the flight planning stage, to determine whether or not a 4D/15 Service is available along an intended route;
- ensure aircraft equipage matches the 4D/15 Service in use;
- identify the areas, routes or route segments where 4D/15 Tracking is recommended and would be undertaken by the operator;
- identify the areas, routes or route segments when 4D/15 Tracking is required and must be undertaken by the operator; and
- identify when 4D/15 Tracking is no longer required (e.g., flight re-enters surveillance airspace or 4D/15 Service is otherwise available).

Note 1.— Refer to Appendix A for a flowchart depicting the steps in a typical flight planning exercise to evaluate the availability of a 4D/15 Service and when 4D/15 Tracking is to be accomplished by an operator.

Note 2.— ICAO has encouraged air navigation services providers (ANSPs) to publish, in the Aeronautical Information Publication (AIP) current information on all system(s) used by ATS units to receive aircraft position information (e.g. ADS-C, MLAT), their associated coverage area(s) and for non-surveillance systems, the periodic reporting intervals (time).

3.1.5 Development of Area Specific Guidance

As described in the previous section, the pre-flight determination of the normal aircraft tracking responsibilities required by the Annex, is a basic and ongoing operator activity. This is necessary as the absence of a 4D/15 Service along an intended route is the triggering event for a host of normal aircraft tracking activities. The appropriate development of operator policy, process and procedure is therefore crucial in order to ensure all such “triggered” activities occur when required and are consistent and repeatable. This includes infrequent activities that must be carried out by relevant personnel (e.g. actions to be taken when 4D/15 Tracking is unachievable, resolving missed reports, ATS unit notifications, etc.).

To help achieve this end, and for the benefit of all personnel involved in normal aircraft tracking activities, it may be useful for an operator to define the baseline with respect to the available 4D/15

Services relevant to operator's routes. It would also be helpful to categorize aircraft tracking guidance according to areas of operation.

One way for operators to achieve this aim would be to develop area specific guidance derived from Aeronautical Information Publications (AIPs) published by States in accordance with Annex 15 — *Aeronautical Information Services*, Appendix 1. As previously stated, such information should become more readily available and be provided in a format that is usable (by operators) to address normal aircraft tracking requirements.

Considering the areas of operation described in Chapter 1, an example of a basic table that illustrates the AIP material to address normal aircraft tracking requirements is presented in Table 2. The table is merely an outline, provided for illustrative purposes, that is based on an example operator with operations across all ICAO Regions. As such, the table represents one method to organize operational guidance according to each region and route as transcribed (or referenced) in the table.

Region and Route Specific Guidance				
Subject				
i) Introduction General regional guidance (common to all regions outside of home region)				
ii) Areas of Operation:	4D/15 Service Normally Available in FIRs Listed	4D/15 Service Unavailable-Operator Shall Track in FIRs Listed	4D/15 Service Unavailable-Operator Should track in FIRs Listed	Routes or Route Segments affected
a. Pacific (PAC)	XXX FIR	YYY FIR	ZZZ FIR	
b. North American (NAM)	XXX FIR	YYY FIR	ZZZ FIR	
c. North Atlantic NAT (NAT)	XXX FIR	YYY FIR	ZZZ FIR	
d. Caribbean (CAR)	XXX FIR	YYY FIR	ZZZ FIR	
e. South American (SAM)	XXX FIR	YYY FIR	ZZZ FIR	
f. Europe (EUR)	XXX FIR	YYY FIR	ZZZ FIR	
g. Middle East/Asia(MID/ASIA)	XXX FIR	YYY FIR	ZZZ FIR	
h. Africa (AFI)	XXX FIR	YYY FIR	ZZZ FIR	
i. Polar*	XXX FIR	YYY FIR	ZZZ FIR	
*Note: A 4D/15 Service may be unavailable and 4D/15 Tracking unachievable on certain polar routes or route segments depending on aircraft equipage. Such (Oceanic) operations are typically subjected to a specific risk assessment process prior to commencement in accordance with ICAO Annex 6, 3.3.5.				

However it is accomplished, the collation and dissemination of relevant (to the operator) and current regional information is important in order for normal aircraft tracking capabilities to be properly developed and implemented. Additionally, operational personnel require clear and concise guidance with respect to any applicable normal aircraft tracking duties, responsibilities or tasks. It is equally important to note that the scale and complexity of any such guidance material would be commensurate with the scale and complexity of an operator's route structure.

3.2 Risk-Based Normal Aircraft Tracking

Annex 6, Part 1, 3.3.5 allows for the eventuality that for a given flight or series of flights, a 4D/15 Service is not available and the recommended or required automated reporting interval is unachievable. It also accounts for those specific circumstances when such an interval may not be warranted given the technical challenges faced in achieving such capability or the duration and frequency of the gaps in reporting. In these cases, the SARP provides the framework for the establishment of a risk assessment process that would allow for flight commencement when 4D/15 Tracking would otherwise be required.

It is also important to consider that the inability to achieve any automated reporting interval may be outside of the control of the operator. The vast majority of aircraft operating in oceanic areas, for example, are already equipped with the FANS 1/A avionics package which includes ADS-C capability. Most operators, therefore will exploit this capability in order to participate in a 4D/15 Service or accomplish 4D/15 Tracking. A systemic ADS-C outage would, however, render automated 4D/15 Tracking unachievable. Without the risk assessment process defined by 3.3.5, operators would not have the methodology to support continued operations.

It is the risk assessment process and resultant mitigations therefore that provide the justification to allow for short- or long-term variations from the automated reporting intervals specified in Annex 6, Part 1, 3.3.2 or 3.3.3. The criteria, which must be considered in the risk assessment process provide the controls to ensure assessments are robust enough to consider the individual capabilities that make up an operator's overall normal aircraft tracking capability. In fact, the robustness of the operator's overall core tracking capability would be a key consideration during risk assessment activities.

The risk assessment process defined by Annex 6, 3.3.5 should be strategic in nature based on the scope and complexity of the operations of the operator. It should be embedded in aircraft tracking policy, process and procedure rather than applied at the planning stage when a normal aircraft tracking deficiency first becomes known to the operator. The preferred method is to use the risk assessment process to generate mitigations as necessary that are mostly transparent to flight crew and imbedded in policy, process and procedure.

Considering the aforementioned objectives and in order to also ensure risk assessment activities occur and mitigations applied when necessary, operators would have specific policies and procedures in addition to those in 3.1 of this chapter that:

- establish and document the process to assess the risks of commencing planned operations with a known automated reporting interval deficiency;
- establish appropriate tasking of personnel with the requisite knowledge, skills and subject matter expertise to participate in risk assessment activities;
- clearly define the triggering event for risk assessment activities;
- identify the factors that must be considered during risk assessment activities in accordance with Annex 6, Part 1, 3.3.5;
- identify how and when risk assessment activities will occur (strategically with mitigations imbedded in operator policy and procedure or tactically prior to departure);
- determine the means to implement mitigations (Systemic, MEL, Area Specific Guidance, SOP, etc.); and
- ensure there is sufficient guidance in operator documents (MEL, Area Specific Guidance, SOP, etc.) to ensure mitigation measures, if applicable, are applied prior to flight commencement in accordance with Annex 6, 3.3.5.

Note.— Although there are many examples, polar operations in particular, lend themselves to a risk-based approach, which allows for variations to automated reporting intervals. This is due largely to the unique operational challenges faced in operations. Such challenges include but are not limited to space weather as well as limited navigation and communications infrastructure.

Additionally, operators that conduct polar operations are heavily invested in existing technologies that may or may not provide for automated interval reporting in accordance with Annex 6, Part 1, 3.3.2 or 3.3.3 on all polar routes. There are also trade-offs to consider with respect to existing technologies and methods that may facilitate tracking but may pose other less acceptable and operational risks.

3.2.1 Understanding Risk in the Context of Normal Aircraft Tracking

Hazard identification is the first step in any risk assessment process. The corresponding risks are then assessed within the context of the potentially damaging consequences related to the hazard. Where the risks are assessed to be unacceptable, additional risk controls and mitigations must be built into the system.

There are three principle methodologies for identifying hazards and ultimately classifying risks:

- **Reactive.** This methodology involves analysis of past outcomes or events. Hazards are identified through investigation of undesirable occurrences. Such occurrences can be clear indicators of system deficiencies which can later be used to determine the hazards that either contributed to the event or are latent.
- **Proactive.** This methodology involves analysis of existing or real-time situations, which is the primary job of operator activities such as audits, evaluations, employee reporting, and associated analysis and assessment processes. This involves actively seeking hazards in the existing processes.
- **Predictive.** This methodology involves data gathering in order to identify possible negative future outcomes or events, analysing system processes and the environment to identify potential future hazards and initiating mitigating actions.

Reactive risk management occurs after an undesirable occurrence(s) or outcome(s) while proactive risk management is real-time and seeks to minimize undesirable outcomes associated with current operations. Modern and mature aviation safety risk management strategies rely on a combination of such methods to prevent and control the latent and real-time risks of undesired or harmful events.

This is typically achieved by operators in cooperation with the applicable authority. The primary focus for most operators is on identifying and mitigating the proactive (safety) risks with the potential to influence the safe completion of daily operations. Authorities, while keenly focused on operational safety, must also consider the broader implications of all types of risks and their potential impact on the aviation system as a whole.

Known deficiencies with respect to a required 4D/15 Service or 4D/15 Tracking capability should be identified as a hazard in operator risk assessment activities. This is necessary as there may be consequences related to such lapses that are unacceptable to operators and regulators alike. It is important, however, that such risks be given the appropriate context and weight in risk assessment activities. Equally important is the notion that operational safety is not compromised as a result any (reactive) risk mitigations.

With respect to further developing the context for risk assessment activities it would also be helpful for operators and authorities to fully understand and appreciate the intent of the Normal Aircraft Tracking SARPs. They were developed in part to address a GADSS objective that the time necessary to determine the operational status of and locate an aircraft should be reduced (see Chapter 1.1).

In this context it should be easy for operators and authorities to conclude that if the position of the majority of oceanic flights (over time) can be determined with 4D/15 precision, then the likelihood (over time) that an individual flight will experience a harmful event and lack the capability to have its position accurately determined would be quite low. Additionally, operators should be able to determine the effect on this likelihood when a flight or series of flights lacks a recommended or required automated interval reporting capability.

There is the potential, however, for systemic (4D/15) outages that affect the position determination accuracy of a larger number of aircraft and/or flight. There is also the real potential for the introduction of operational safety risks due to mitigation strategies implemented by operators to address the (reactive) risks associated with aircraft tracking. These possibilities must also be considered during risk assessment activities.

Annex 6, Part 1, 3.3.5 was specifically crafted with the aforementioned precepts in mind. The SARP assigns the responsibility to the operator, with the approval of the State, to assess and mitigate the risks, associated with gaps or lapses in 4D/15 Tracking. It also addresses the principle that mitigation strategies cannot introduce operational safety risks. Finally, it provides the framework for operators to consider and critically assess all of the components that make up their core aircraft tracking capability to determine the measure of risk mitigation that capability provides (in the absence of automated 4D/15 Tracking).

3.2.2 Risk Assessment Process and Considerations

The specific operator process that allows for commencement of a flight(s) lacking a recommended or required automated (15 minute) interval reporting capability would be documented and include a risk assessment component. Hazards should be identified and risks assessed according to probability and the severity of the consequences. Risk probability is defined as the likelihood that an undesirable consequence or outcome might occur. The risk assessment process would address the following considerations of Annex 6, Part 1, 3.3.5:

- a) capability of the operator's ground-based systems and processes;
- b) overall capability of the aeroplane and its systems;
- c) available means to determine the position of and communicate with the aircraft;
- d) frequency and duration of gaps in automated reporting;
- e) human factors consequences resulting from changes to flight crew procedures; and
- f) specific mitigation measures and contingency procedures.

The aforementioned considerations ensure risk assessment activities are sufficiently robust to quantify the risks associated with using other than the automated interval reporting specified in the Annex. They also ensure an operator's core aircraft tracking capability can be critically assessed to determine if existing risk controls and mitigations are sufficient or if additional mitigation is required. As with all risk management activities, the level of detail and complexity of risk assessments related to normal aircraft tracking should be adapted to and commensurate with the particular needs of each operator and complexities of each operation.

Annex 6, Part 1, 3.3.5 allows for variations to automated reporting intervals based on the results of an "approved risk assessment process implemented by the operator". It is important to note that such a process may be stand-alone or a sub-component of an existing and approved systemic method for managing risk (i.e., safety management system (SMS)) In all cases, however, such a

process would be tailored to manage the specific risks associated with using reporting intervals other than those specified in Annex 6, Part 1, 3.3.2 or 3.3.3 to satisfy normal aircraft tracking requirements.

Note.— Refer to Annex 19 — Safety Management and Doc 9859, Safety Management Manual (SMM), for information related to the conduct of risk assessments.

3.2.2.1 Capability of the operator's ground-based systems and processes

When addressing the components of the specific risk assessment process in accordance with Annex 6, Part 1, 3.3.5 a), it should be understood that the "Capability of the operator's ground-based systems and processes" refers to:

- the demonstrable tracking capabilities of the operator's ground-based systems and processes used to determine the position of an aircraft based on any available data and/or telemetry from the aircraft or other sources;
- the demonstrable flight monitoring capabilities of the operator's ground-based systems and processes that detect when a required position report is missed and resolve missed reports;
- the demonstrable capabilities of ground-based tracking and monitoring capabilities to adapt to a lack of automated 4D/15 Tracking;
- the appropriate training of relevant personnel to cope with lapses in 4D/15 Tracking;
- the demonstrable capability of an operator to share any available tracking data with relevant parties when necessary; and
- any other ground-based system or process that increases the accuracy of aircraft position data or aids in the timely resolution of missed reports.

3.2.2.2 Overall capability of the aeroplane and its systems

When addressing the components of the specific risk assessment process in accordance with Annex 6, Part 1, 3.3.5 b), it should be understood that the "Overall capability of the aeroplane and its systems" refers to:

- the tracking capability afforded by available (remaining) aeroplane technologies that support automated aircraft position reporting (e.g. engine condition monitoring systems, satellite-based inflight entertainment systems (IFE, ADS-B, ADS-C, etc.);
- the tracking capability afforded by available (remaining) aeroplane technologies that support automated WPR and manual WPR (via ACARS or Voice via SATCOM/HF/VHF);
- the capabilities afforded by serviceable aeroplane location technologies (e.g. ELTs, ULDs, Distress trackers, EPIRBs, etc.) on board the aircraft in the context of planned area(s) of operation;

- the serviceable communication technologies (e.g. VHF, HF, SATCOM, SATVOICE, SAT-Phone, etc.) on board the aircraft and communication capability afforded by such equipment considered in the context of the planned area(s) of operation; and
- communication system redundancies.

Note.— Unserviceable aircraft system(s) with aircraft tracking implications may not be immediately obvious (e.g. ELT inoperative) and should be identified in the MEL or other operational documentation.

3.2.2.3 Available means to determine the position of and communicate with the aircraft

When addressing the components of the specific risk assessment process in accordance with Annex 6, Part 1, 3.3.5 c), it should be understood that the “Available means to determine the position of and communicate with the aircraft” refers to:

- the demonstrable capability of an operator to rapidly and reliably communicate with an aircraft;
- the quality, sophistication and reliability of the surveillance and communication capabilities available to support aircraft/operator/ATS communications and surveillance, as necessary, to determine/refine aircraft position (e.g. to support/update ground-based tracking, resolve missed position reports, determine flight status, etc.);
- ANSP access to surveillance information beyond the range of VHF communications which could be used to monitor flights; and
- operator access to and availability of third party communication providers.

3.2.2.4 Frequency and duration of gaps in automated reporting

When addressing the components of the specific risk assessment process in accordance with Annex 6, Part 1, 3.3.5 d), it should be understood that the “Frequency and duration of gaps in automated reporting” refers to:

- the exposure of a given operation or series of operations to gaps in 4D/15 Service or 4D/15 Tracking, and;
- the likelihood that an undesirable consequence or outcome might occur (probability) during such gaps in coverage considering the number of planned flights, the length of each flight and the duration of the gap(s) in coverage on each flight.

Practically speaking, this consideration relates to the total probability of an undesirable consequence or outcome involving a flight whilst it was operating without a 4D/15 Tracking capability. For example, it may be acceptable, from a risk management perspective, for longer flights to operate without 4D/15 Tracking for the entire duration of the oceanic portion (of a flight) if the number of such flights is limited. On the other hand, it might also be acceptable for other flights to depart

regularly without a required 4D/15 Tracking capability if the length of the segment where 4D/15 Tracking would be required is relatively short.

3.2.2.5 Human factors consequences resulting from changes to flight crew procedures

When addressing the components of the specific risk assessment process in accordance with Annex 6, Part 1, 3.3.5 e), it should be understood that the “Human factors consequences resulting from changes to flight crew procedures” refers to:

- the impact on flight crew workload (from a human factors perspective) of any existing or proposed procedures implemented to mitigate the risk(s) associated with gaps in 4D/15 Service or 4D/15 Tracking.

Note.— The NATII discussed the challenges of making manual 4D/15 position reports (HF, VHF, ACARS, etc.). HF voice position reporting in particular was evaluated during the NATII TTX. The NATII concluded, based on table top exercises and internal deliberations that the additional workload required to meet 4D/15 Tracking requirements would distract the flight crew from other operational duties and have a negative impact on the safety of the operation. Additionally, manual position reporting could introduce a level of uncertainty regarding accuracy (i.e. introduce the potential for error).

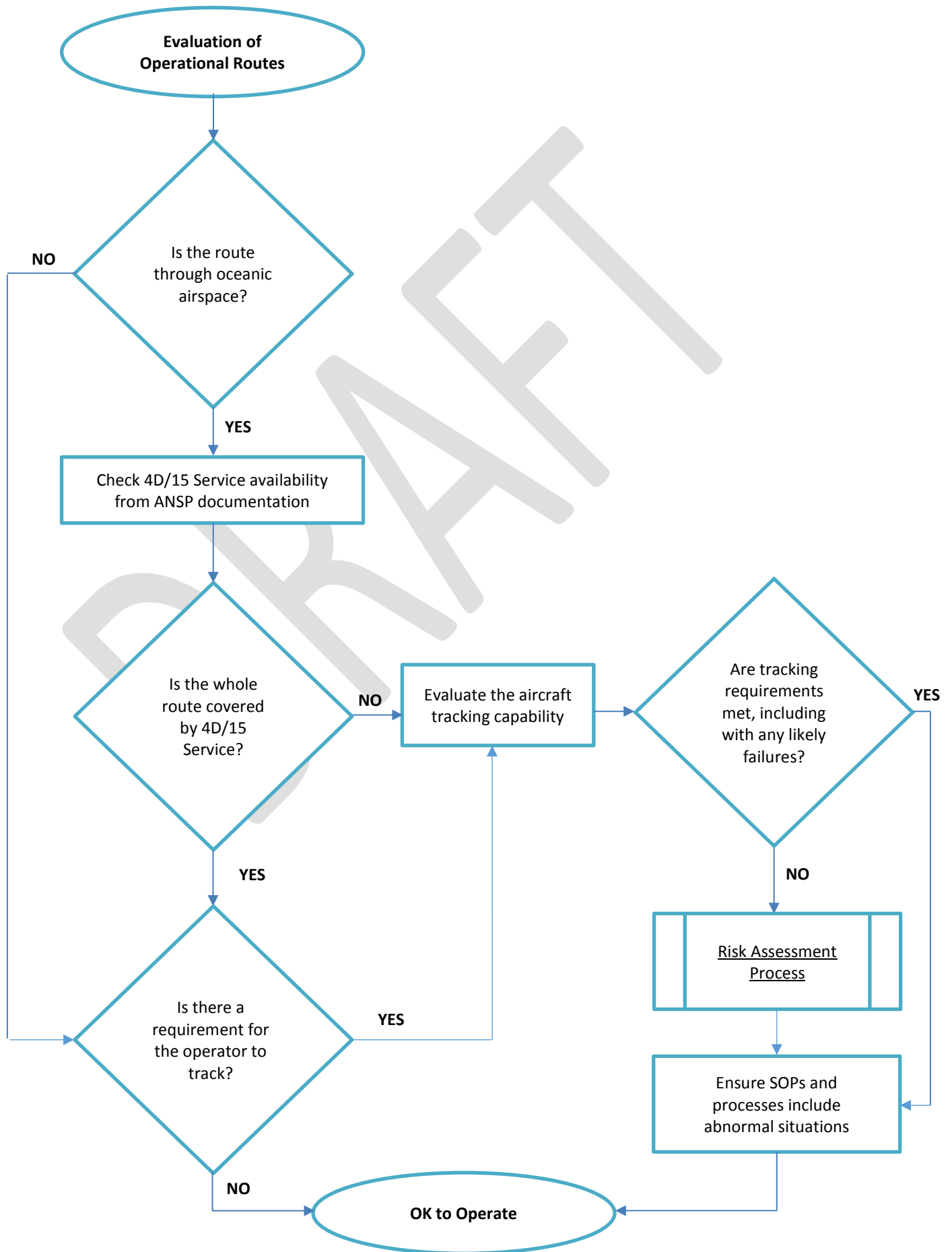
3.2.2.6 Specific mitigation measures and contingency procedures

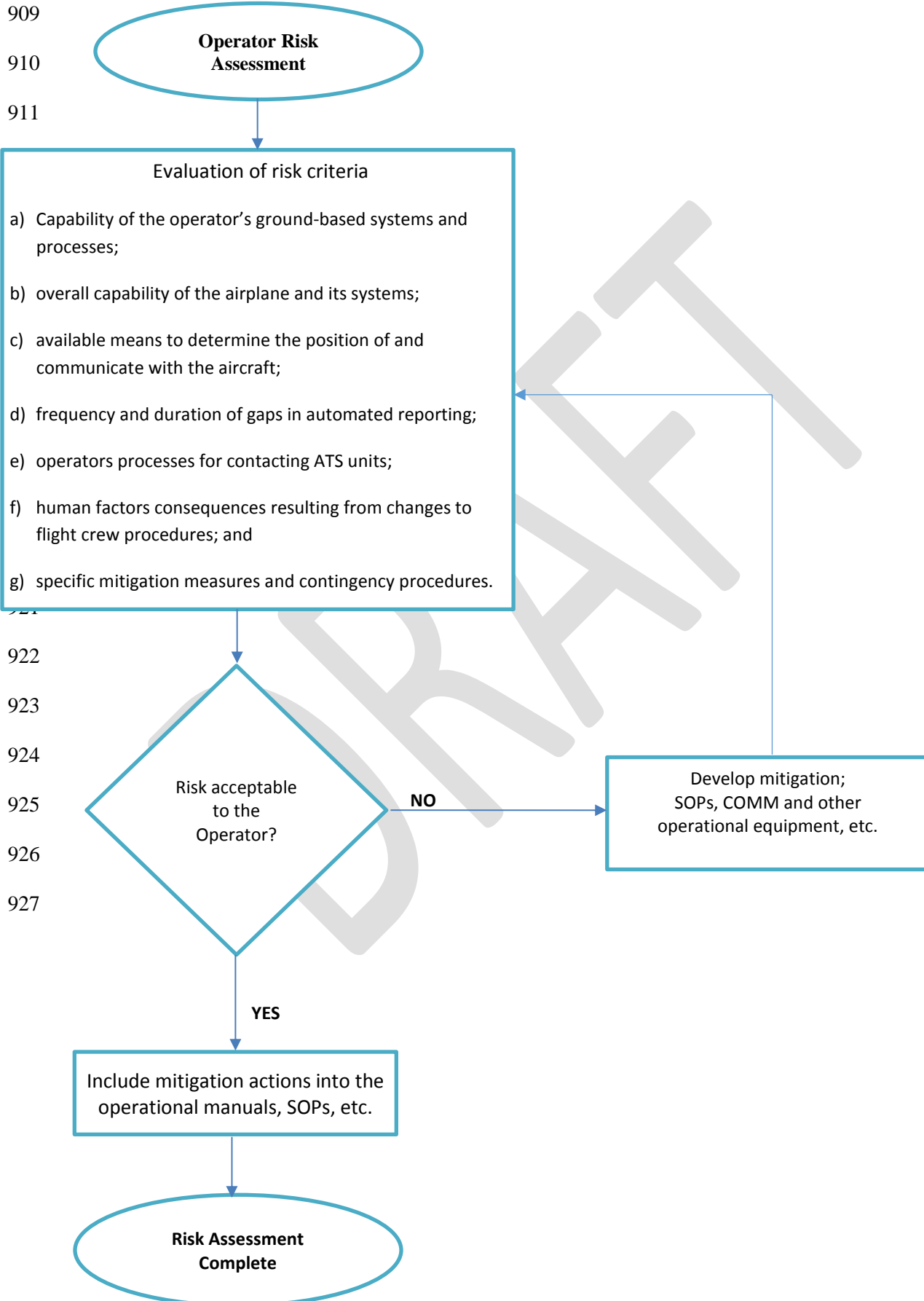
When addressing the components of the specific risk assessment process in accordance with Annex 6, Part 1, 3.3.5 f), it should be understood that the “Specific mitigation measures and contingency procedures” refers to:

- the risk management mitigation strategies based on an assessment of relevant hazards, their probability and the severity of the consequences that may adversely affect a planned operation or series of operations; and
- the contingency procedures for use by operational personnel and flight crew that address gaps in 4D/15 Service or 4D/15 Tracking and that maximize (remaining) operator aircraft tracking capabilities;

Note.— Mitigation measures must be evaluated to ensure they do not introduce any proactive (safety) risks.

Note.— Refer to Appendix C for a risk assessment template that incorporates the considerations of Annex 6, Part 1, 3.3.5.





928 **Chapter 4 – Pre-flight Planning and Flight Commencement**

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933 **Chapter 5 – Operator Monitoring - Policy, Process and Procedure**

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935 (under development)

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939 **Chapter 6 – Additional Pre/Post Implementation Activities**

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941 (under development)

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945 **Chapter 7 – ATS Unit Response to Operator Missed Reports Notification**

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949 **Appendix A – Dedicated Aircraft Tracking Solutions**

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953 **Appendix B - Operator 4D/15 Tracking Process Flow Chart**

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957 **Appendix C – Aircraft Tracking Risk Assessment Template**

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961 **Appendix D - Missed Report Form Example**

962 (under development)

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966 **Reference**
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968 (under development)

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ATTACHMENT D to State letter AN 11/1.1.29-16/62

**RESPONSE FORM TO BE COMPLETED AND RETURNED TO ICAO TOGETHER
WITH ANY COMMENTS YOU MAY HAVE ON THE PROPOSED AMENDMENTS**

To: The Secretary General
International Civil Aviation Organization
999 Robert-Bourassa Boulevard
Montréal, Québec
Canada, H3C 5H7

(State) _____

Please make a checkmark (✓) against one option for each amendment. If you choose options “agreement with comments” or “disagreement with comments”, **please provide your comments on separate sheets.**

	<i>Agreement without comments</i>	<i>Agreement with comments*</i>	<i>Disagreement without comments</i>	<i>Disagreement with comments</i>	<i>No position</i>
Amendment to Annex 6 — <i>Operation of Aircraft</i> , Part I — <i>International Commercial Air Transport</i> — <i>Aeroplanes</i> (Attachment B refers)					

*“Agreement with comments” indicates that your State or organization agrees with the intent and overall thrust of the amendment proposal; the comments themselves may include, as necessary, your reservations concerning certain parts of the proposal and/or offer an alternative proposal in this regard.

Signature: _____ Date: _____

— END —