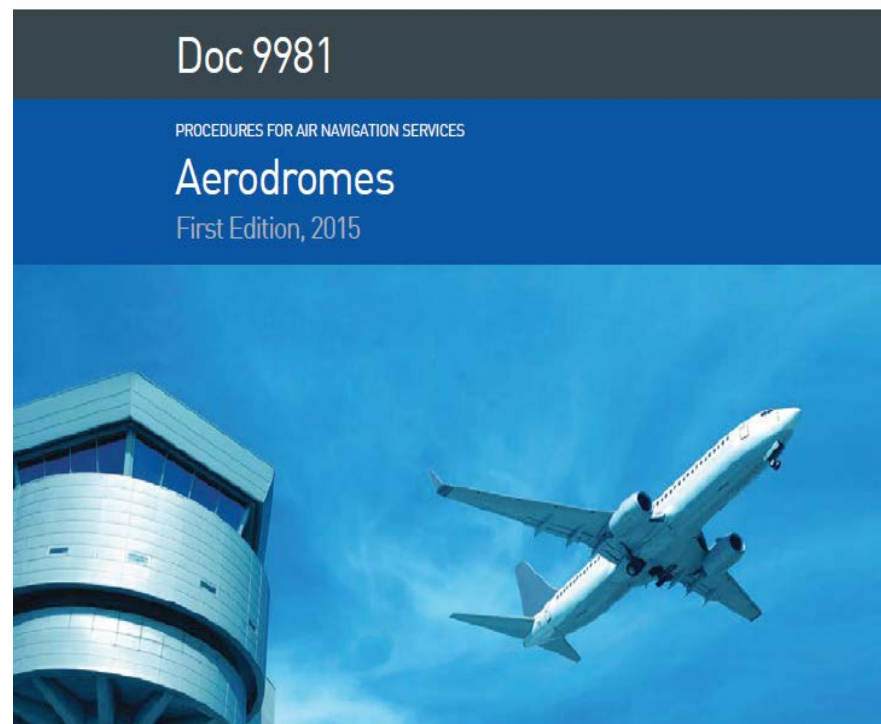


Procedures for Air Navigation Services — Aerodromes (PANS-AGA)

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Doc 9981

PROCEDURES FOR AIR NAVIGATION SERVICES

Aerodromes

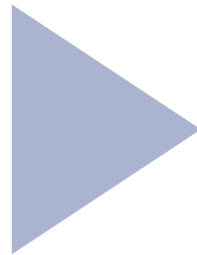
First Edition, 2015

This first edition of Doc 9981 was approved by the President of the Council on behalf of the Council on 20 October 2014 and becomes applicable on 10 November 2016.



Approval and applicability

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The document becomes applicable 10 November 2016
<http://portal.icao.int>

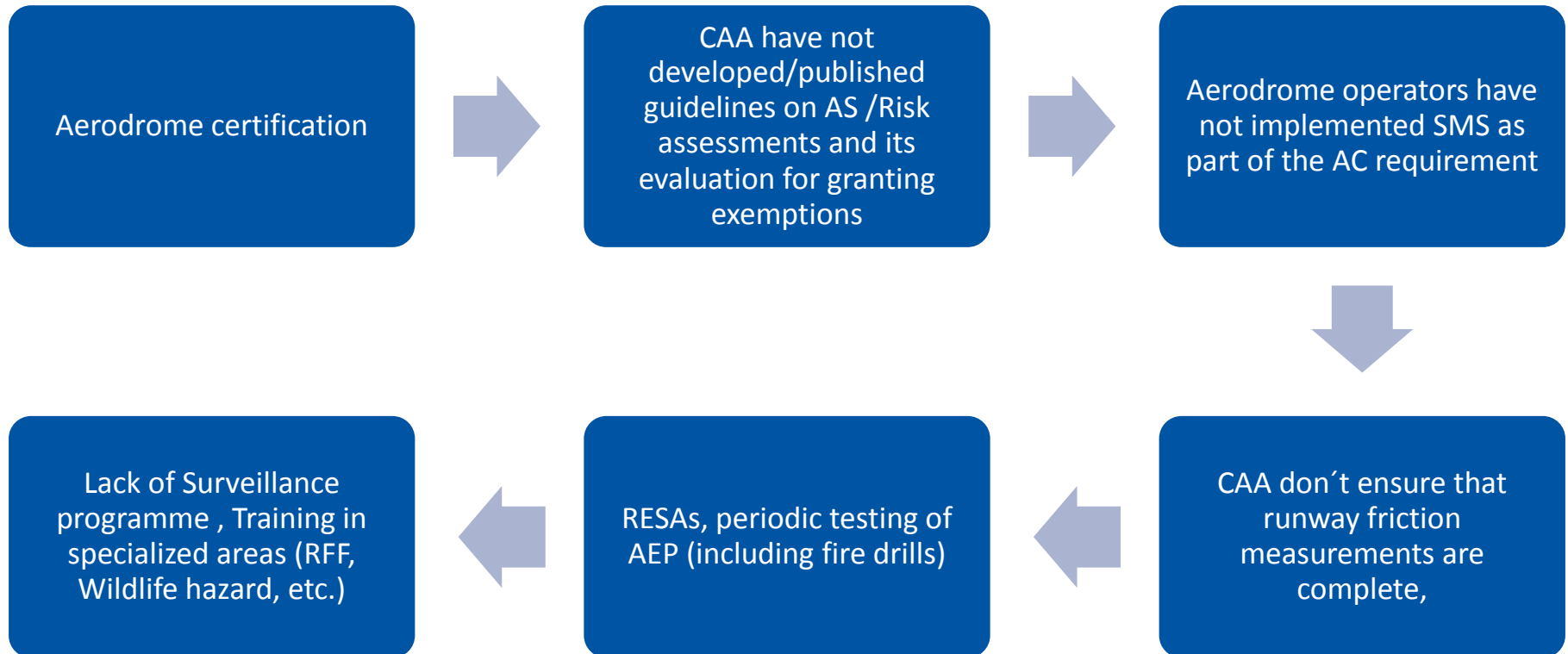
SCOPE AND PURPOSE

- The PANS-AGA are complementary to the SARPs in Annex 14, Volume I.
- PANS-AGA specify procedures to be applied by both aerodrome regulators and operators for:
 - initial aerodrome certification
 - aerodrome compatibility studies

Status

- The PANS-Aerodromes do not substitute nor circumvent the provisions contained in Annex 14, Volume I.
- PANS-AGA is designed for the use of the procedures and methodologies to assess the operational issues faced by existing aerodromes
- Do not have the same status as SARPs.

Priority areas identified by the ICAO Universal Safety Oversight Audit Programme. Among top non-satisfactory areas:



Implementation

- The implementation of procedures is the responsibility of CAAs;
- The PANS AGA do not fall under the obligation imposed by Article 38 of the Convention **to notify differences** in the event of non-implementation.
- However, there is a provision in Annex 15 — *A/S*, related to the publication in State's AIP of **lists of significant differences**.

Contents of the 1st edition

- Chapter 1 — Definitions
- Chapter 2 — Certification of aerodromes
- Chapter 3 — Safety assessments for aerodromes
- Chapter 4 — Aerodrome compatibility

Chapter 1 - Definitions

- ***Compatibility study.*** A study undertaken by the aerodrome operator to address the impact of introducing an aeroplane type/model new to the aerodrome, and may include one or several safety assessments.
- ***Critical aeroplane.*** The type of aeroplane which is the most demanding for the relevant elements of the physical infrastructure and the facilities for which the aerodrome is intended.
- ***Safety manager.*** The responsible individual and focal point for the implementation and maintenance of an effective SMS. The safety manager directly reports to the accountable executive.

Chapter 2 - CERTIFICATION OF AERODROMES

The scope of certification includes at least the subjects below:

- a) ***Compliance of the aerodrome infrastructure*** with the applicable regulations for the operations of the aerodrome;
- b) ***The operational procedures*** and their day-to-day application, concerning:
 - 1) aerodrome data and reporting;
 - 2) access to the movement area;
 - 3) aerodrome emergency plan;
 - 4) rescue and fire fighting (RFF);
 - 5) inspection of the movement area;
 - 6) maintenance of the movement area;

Chapter 2 - CERTIFICATION OF AERODROMES

- 8) visual aids and aerodrome electrical systems;
- 9) safety during aerodrome works;
- 10) apron management;
- 11) apron safety;
- 12) vehicles on the movement area;
- 13) wildlife hazard management;
- 14) obstacles;
- 15) removal of a disabled aeroplane;
- 16) low visibility operations; and
- 17) compliance of the SMS with applicable regulations.

INITIAL CERTIFICATION

Compliance of the aerodrome is assessed through:

- a) technical inspections of the infrastructure and its equipment;
- b) review of the aerodrome manual and supporting documentation and acceptance of its relevant safety parts; and
- c) on-site verification of the aerodrome operator's procedures, its organization and its SMS based upon the contents of the aerodrome manual.

Aerodrome technical inspections

The technical inspections of the aerodrome should include, as a minimum:

- a) an inspection of the infrastructure, obstacle limitation surfaces (OLS), visual and non-visual aids and aerodrome & equipment for the use of aeroplanes;
- b) an inspection of the RFF services; and
- c) an inspection of wildlife hazard management.

Several options to carry out these inspections

- ***Option 1: full inspections by the CAA***
- At aerodromes where an *SMS is not fully operational*, full inspections should be conducted by the CAA
- If technical inspections have previously been conducted, the CAA can undertake a follow-up inspection

Several options to carry out these inspections

Option 2: demonstration of compliance by the AD

- At AD where an *SMS has been fully implemented*, the AD should ensure that the requirements in the checklists provided by the CAA have been complied with.
- The CAA should then analyze the documents completed by the applicant and ***conduct sample on-site checks*** according to this analysis

CHAPTER 3 - SAFETY ASSESSMENTS FOR AERODROMES

A certified aerodrome operator implements an SMS acceptable to the State that, as a minimum.

- a) identifies safety hazards;
- b) ensures that remedial action necessary to maintain safety is implemented;
- c) provides for continuous monitoring and regular assessment of the achieved safety; and
- d) aims to make continuous improvement to the overall safety of the aerodrome.

SAFETY ASSESSMENT PROCESS

- A safety assessment is initially composed of 4 basic steps:
- a) definition of a safety concern and identification of the regulatory compliance;
 - b) hazard identification and analysis;
 - c) risk assessment and development of mitigation measures; and
 - d) development of an implementation plan for the mitigation measures and conclusion of the assessment.

PROMULGATION OF SAFETY INFORMATION

- Adequate dissemination of information to interested parties, information that affects the current integrated aeronautical information package (IAIP) or other relevant safety information is:
 - a) promulgated in the relevant section of the IAIP or automatic terminal information service (ATIS); and
 - b) published in the relevant aerodrome information communications through appropriate means.

Chapter 4 - AERODROME COMPATIBILITY

- Outlines a methodology and procedure to assess the compatibility between aeroplane operations and aerodrome infrastructure and operations when an aerodrome accommodates an aeroplane that exceeds the certificated characteristics of the aerodrome

Chapter 4 - AERODROME COMPATIBILITY (Cont.)

- Addresses situations where compliance with the design provisions stipulated in Annex 14, is either impractical or physically impossible.
- Where alternative measures, operational procedures and operating restrictions have been developed, these should be reviewed periodically to assess their continued validity.

Chapter 4 - AERODROME COMPATIBILITY (Cont.)

- a) the aeroplane operator submits a request to the aerodrome operator;
- b) the aerodrome operator identifies possible means of accommodating the aeroplane type/subtype including access to movement areas and, if necessary, considers the feasibility and economic viability of upgrading the aerodrome infrastructure; and
- c) Both discuss the aerodrome operator's assessment.

Examples - RUNWAY END SAFETY AREA (RESA)

- The following aspects have to be taken into account:
 - a) the nature and location of any hazard beyond the runway end;
 - b) the topography and obstruction environment beyond the RESA;
 - c) the type of aeroplanes and level of traffic at the aerodrome and actual or proposed changes to either;
 - d) overrun/undershoot causal factors;
 - e) friction and drainage characteristics of the runway which have an impact on runway susceptibility to surface contamination and aeroplane braking action;

RUNWAY END SAFETY AREA (RESA)

- f) navigation and visual aids available;
- g) type of approach;
- h) runway length and slope, in particular, the general operating length required for take-off and landing versus the runway distances available, including the excess of available length over that required;
- i) the location of the taxiways and runways;
- j) aerodrome climatology, including predominant wind speed and direction and likelihood of wind shear; and
- k) aerodrome overrun/undershoot and veer-off history.

Potential solutions

- a) restricting the operations during adverse hazardous meteorological conditions (such as thunderstorms);
- b) defining, in cooperation with airlines, hazardous meteorological conditions and publishing such information appropriately;
- c) improving an aerodrome's database of operational data, detection of wind data, including wind shear and other relevant meteorological information;
- d) ensuring that accurate and up-to-date meteorological information, current runway conditions and other characteristics are detected and notified to flight crews in time;

Potential solutions (Cont.)

- e) improving runway surfaces in a timely manner (e.g. friction measurement and drainage system), particularly when the runway is contaminated;
- f) removing rubber build-up on runways;
- g) repainting faded runway markings and replacing inoperative runway surface lighting;
- h) upgrading visual and instrument landing aids to improve the accuracy of aeroplane delivery at the correct landing position on runways (including the provision of ILSs);
- i) **reducing declared runway distances in order to provide the necessary RESA;**
- j) installing suitably positioned and designed arresting systems EMAS;
- k) increasing the length of a RESA and/or minimizing the potential obstruction in the area beyond the RESA; and
- l) publishing provisions, including the provision of an arresting system, in the AIP.

RUNWAY AND TAXIWAY MINIMUM SEPARATION DISTANCES

Challenges

- a) the possible collision between an aeroplane running off a taxiway and an object (fixed or mobile) on the aerodrome;
- b) the possible collision between an aeroplane leaving the runway and an object (fixed or mobile) on the aerodrome or the risk of a collision of an aeroplane on the taxiway that infringes on the runway strip; and
- c) possible ILS signal interference due to a taxiing or stopped aeroplane.

RUNWAY AND TAXIWAY MINIMUM SEPARATION DISTANCES

Causes and accident factors can include:

- a) Human Factors (crew, ATS);
- b) hazardous meteorological conditions (such as thunderstorms and wind shear);
- c) aeroplane mechanical failure (such as engine, hydraulic system, flight instruments, control surfaces and autopilot);
- d) surface conditions (standing water, loss of control on ice-covered surfaces, friction coefficient);
- e) lateral veer-off distance;
- f) aeroplane position relative to navigation aids, especially ILS; g) aeroplane size and characteristics (especially wingspan).

Potential solutions

Potential solutions:

- a) place a restriction on the wingspan of aeroplanes using the parallel taxiway or on the runway, if continued unrestricted taxiway or runway operation is desired;
- b) consider the most demanding length of aeroplane that can have an impact on runway/taxiway separation and the location of holding positions (ILS);
- c) change taxiway routing so that the required runway airspace is free of taxiing aeroplanes; and
- d) employ tactical control of aerodrome movements.

Amendment 1 to PANS-Aerodromes and future work programme

Amendment 1 to PANS-Aerodromes

- Approved on 20 April 2016 by the President of the Council on behalf of the Council in accordance with established procedure
- The amendment introduces the division of the PANS-Aerodromes into two parts for better readability:
 - Part I — Aerodrome certification, safety assessments and aerodrome compatibility
 - Part II — Aerodrome operational management
- The bulk of the amendment is on procedures for the use of a global reporting format for assessing and reporting runway surface conditions
- Applicability date of 5 November 2020
- State letter AN 4/27-16/28

Amendment 1 to PANS-Aerodromes (cont'd)

- Separate regional workshops on implementation of the global reporting format will be organized in due course
- ICAO training package is being developed



Table 3 – Assigning a runway condition code (RWYCC)

Runway condition description	Runway condition code (RWYCC)
DRY	6
FROST WET (The runway surface is covered by any visible dampness or water up to and including 3 mm deep.) SLUSH (up to and including 3 mm depth) DRY SNOW (up to and including 3 mm depth) WET SNOW (up to and including 3 mm depth)	5
COMPACTED SNOW (Outside air temperature minus 15 degrees Celsius and below)	4
WET (“Slippery wet” runway) DRY SNOW (more than 3 mm depth) WET SNOW (more than 3 mm depth) DRY SNOW ON TOP OF COMPACTED SNOW (Any depth) WET SNOW ON TOP OF COMPACTED SNOW (Any depth) COMPACTED SNOW (Outside air temperature above minus 15 degrees Celsius)	3
STANDING WATER (more than 3 mm depth) SLUSH (more than 3 mm depth)	2
ICE	1
WET ICE WATER ON TOP OF COMPACTED SNOW DRY SNOW OR WET SNOW ON TOP OF ICE	0

Table 4 – Correlation of runway condition code and pilot reports of runway braking action

Pilot report of runway braking action	Description	Runway condition code (RWYCC)
N/A		6
GOOD	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal	5
GOOD TO MEDIUM	Braking deceleration OR directional control is between good and medium	4
MEDIUM	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced	3
MEDIUM TO POOR	Braking deceleration OR directional control is between medium and poor	2
POOR	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced	1
LESS THAN POOR	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain	0



Table 5 – Runway condition assessment matrix (RCAM)

Runway condition assessment matrix (RCAM)				
Runway condition code	Assessment criteria		Downgrade assessment criteria	
	Runway surface description	Aeroplane deceleration or directional control observation	Pilot report of runway braking action	
6	<ul style="list-style-type: none"> • DRY 	---	---	
5	<ul style="list-style-type: none"> • FROST • WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth) <p><i>Up to and including 3 mm depth:</i></p> <ul style="list-style-type: none"> • SLUSH • DRY SNOW • WET SNOW 	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	GOOD	
4	<p><i>-15°C and Lower outside air temperature:</i></p> <ul style="list-style-type: none"> • COMPACTED SNOW 	Braking deceleration OR directional control is between Good and Medium.	GOOD TO MEDIUM	
3	<ul style="list-style-type: none"> • WET ("Slippery wet" runway) • DRY SNOW or WET SNOW (Any depth) ON TOP OF COMPACTED SNOW <p><i>More than 3 mm depth:</i></p> <ul style="list-style-type: none"> • DRY SNOW • WET SNOW <p><i>Higher than -15°C outside air temperature¹:</i></p> <ul style="list-style-type: none"> • COMPACTED SNOW 	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	MEDIUM	
2	<p><i>More than 3 mm depth of water or slush:</i></p> <ul style="list-style-type: none"> • STANDING WATER • SLUSH 	Braking deceleration OR directional control is between Medium and Poor.	MEDIUM TO POOR	
1	<ul style="list-style-type: none"> • ICE ² 	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	POOR	
0	<ul style="list-style-type: none"> • WET ICE ² • WATER ON TOP OF COMPACTED SNOW ² • DRY SNOW or WET SNOW ON TOP OF ICE ² 	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	LESS THAN POOR	

¹ Runway surface temperature should preferably be used where available.

² The aerodrome operator may assign a higher runway condition code (but no higher than code 3) for each third of the runway, provided the procedure in paragraph 1.1.3.15 is followed.

Future work Programme of the PANS- Aerodromes

- Second edition (planned to be published in 2018)
- Future editions

Chapters of the second edition

- **Global Reporting Format (GRF)** - Procedures for runway surface condition assessment and reporting (Amendment 1)
- **Training** - Aerodrome personnel safety induction training, specific safety training requirements
- **Inspections of the movement area** - Inspection of runways/taxiways/aprons, visual aids and electrical systems
- **Work In Progress at Aerodromes** - Planning and coordination, Identification of impacts on aerodrome operations, promulgation of information, coordination with other stakeholders, safety procedures

Chapters of the second edition (cont'd)

- **Foreign Object Debris (FOD) control** - FOD prevention programme, FOD detection and removal
- **Wildlife Hazard (WLH) management** - Wildlife hazard assessment, mitigation measures, management procedures, hazard information, collection and reporting, coordination with stakeholders
- **Apron safety** - Apron safety procedures, apron cleaning, coordination with third parties, monitoring of third parties, fuelling operations, passenger safety on the apron, marshalling, push-back Procedures
- **Runway safety** - Runway safety oversight and management, runway incursion prevention, runway excursion prevention, suspension of RWY operations

Chapters of the second edition (cont'd)

- **Obstacle control and management** - Criteria for Identification of obstacles, procedures for controlling obstacles, coordination with stakeholders, promulgation of obstacle information (TBD)
- **Aerodrome vehicles and drivers** - Driving on the aprons, driving on the manoeuvring area, vehicles requirements, driver training, competency and permit programmes, follow-me vehicles, vehicle traffic markings and signage requirements
- **Aerodrome movement area maintenance** - Aerodrome maintenance programme, maintenance of paved surfaces, maintenance of unpaved surfaces, visual aids and of other aerodrome systems (TBD)

Planned chapters for future editions of the PANS-Aerodromes

- Aerodrome emergency preparedness and contingency planning
 - Purpose and responsibilities, coordination of Agencies, emergency plan documentation, Emergency procedures, emergency exercises
- Rescue and Fire Fighting
 - Determination of RFF category, services and personnel, operational requirements, procedures and training

Planned chapters for future editions of the PANS-Aerodromes (cont'd)

- **Disabled aircraft removal**
 - Disabled aircraft removal planning, Coordination with stakeholders, Removal of disabled aircraft procedures
- **Apron Management Service**
 - Scope of Apron Management Service, Agencies involved, procedures for apron management, training and competency

Planned chapters for future editions of the PANS-Aerodromes (cont'd)

- **Aerodrome accident/incident safety occurrence reporting**
 - Criteria for safety occurrence reporting, Agencies involved, Investigation, follow-up, publication of reports
- **Aircraft arresting systems**
 - Provisions for the installation of an arresting system

Planned chapters for future editions of the PANS-Aerodromes (cont'd)

- **Ground handling**
 - Procedures for safe and efficient ground handling services at aerodromes
- **Airfield Pavement Management**
 - Procedures for permitting overloading operations on runways and movement areas

Planned chapters for future editions of the PANS-Aerodromes (cont'd)

- **Heliport Design and Operations**
 - Provisions on the certification of heliports, including implementation of SMS
- **Visual aids for day/night and all weather operations**
 - provisions for visual aids for day/night and all weather operations protection

Planned chapters for future editions of the PANS-Aerodromes (cont'd)

- **Airport planning**
 - Develop, if necessary, procedures for airport planning requirements to support airport capacity enhancements
- **A-CDM**
 - Develop, if necessary, procedures for global implementation of A-CDM, in order to utilize current airport's capacity more effectively

Planned chapters for future editions of the PANS-Aerodromes (cont'd)

- Aerodrome Reference Code design method and governing parameters
 - Review the aerodrome reference code design, and the basis and the adoption of an operationally-based approach for the development of aerodrome design SARPs on physical characteristics



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