Brunei Department of Civil Aviation

Negara Brunei Darussalam

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Brunei Aviation Requirements

BAR 20

Approval Requirements

for

Flight Procedure Design

Amendments

Amendment	Version	Date of Issue	Remarks

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PART A – PREFACE

A.1 Introduction

1) Pursuant to Civil Aviation Order 2006 and the Civil Aviation Regulations 2006 and their subsequent amendments, the following requirements are hereby established for compliance by Instrument Flight Procedure (IFP) provider, the Director of Civil Aviation is empowered to issue Brunei Aviation Requirements (BARs). In accordance herewith, the following requirements are hereby established for compliance by IFP provider. These requirements shall be known as BAR 20 – Approval Requirements for Flight Procedure Design (AFPD) and any reference to this title shall mean referring to the requirements to be met for the provision of PANS-OPS.

2) Any IFP provider who contravenes any provision in these Requirements is guilty of an offence and liable on conviction under Part X of the CAO 2006 and Regulation 87 of the CAR 2006.

A.2 Authority for this Requirement

This BAR 20 – Approval Requirements for Flight Procedure Design is issued under the authority of the Director of Civil Aviation.

A.3 Applicability

This BAR 20 – Approval Requirements for Flight Procedure Design is applicable to any IFP provider in Brunei Darussalam.

A.4 Scope

BAR 20 – Approval Requirements for Flight Procedure Design contains the requirements for the provision of PANS-OPS.

PART B – ANS SAFETY OVERSIGHT REQUIREMENTS

B.1 Competent Authority for Safety Oversight

For the purpose of this requirement, ANS Standard Section, Regulatory Division, Brunei DCA shall be the competent authority for safety oversight of all Air Navigation Services (ANS) Providers in Brunei Darussalam. Seven fields of Air Navigation Services (ANS) are:

1. Air Traffic Management (ATM),
2. Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS),
3. Aeronautical Information Services (AIS),
4. Aeronautical Charts (Chart),
5. Communications, Navigation and Surveillance (CNS),
6. Aeronautical Meteorology (MET), and
7. Search and Rescue (SAR).

B.2 Safety Oversight Function

The ANS Standard Section, Regulatory Division, Brunei DCA shall exercise safety oversight as part of their supervision of requirements applicable to ANS providers in order to ensure the safe provision of this activity, and to verify that the applicable safety regulatory requirements and their implementing arrangements are met by ANS provider.

B.3 Safety Regulatory Audits

1) The ANS Standard Section, Regulatory Division, Brunei DCA, or qualified entities as delegated by them, shall conduct safety regulatory audits.

2) The safety regulatory audits shall:

   a) be conducted by ANS Inspectors qualified in accordance with the established requirements.

   b) determine whether ANS provider comply with the established requirements; and

   c) lead to the resolution of any deficiencies identified during the audit / inspection.

3) Within the ANS surveillance programme, the ANS Standard Section, Regulatory Division, Brunei DCA shall establish a programme of safety regulatory audits in order to:

a) cover all ANS providers;

b) ensure that sufficient audits are conducted over a period of 2 years for compliance by all ANS providers with the established regulatory requirements; and

c) ensure follow up of the implementation of corrective action plans (CAPs).

4) In addition to scheduled audits, the ANS Standard Section, Regulatory Division, Brunei DCA shall conduct random inspection for which no prior notification is given to the ANS provider, whenever the need arises.

5) All audits and/or inspections shall be documented. Findings (non-compliance) shall be given to ANS provider in the event that sufficient evidence is not presented to ANS inspector.

6) An audit / inspection report shall be prepared and given to ANS provider in accordance with established audits / inspection procedures.

B.4 Corrective Action Plans (CAPs)

1) The ANS Standard Section, Regulatory Division, Brunei DCA shall communicate the audit / inspection findings to the audited ANS provider and shall request CAPs to address the deficiencies.

2) Audited ANS provider shall provide CAPs detailing the proposed actions, action office and estimated implementation date.

3) The ANS Standard Section, Regulatory Division, Brunei DCA shall assess the CAPs to determine whether the audited ANS provider has sufficiently addressed the identified deficiencies.

4) A subsequent follow up audit shall be conducted within a time period determined by the ANS Standard Section, Regulatory Division, Brunei DCA.

B.5 Qualified Entities

1) When the ANS Standard Section, Regulatory Division, Brunei DCA decides to delegate to a qualified entity the conduct of safety regulatory audits, it shall

ensure that the criteria used to select an entity amongst those qualified include the following:

a) the qualified entity has prior experience in assessing ANS providers;

b) the qualified entity is not simultaneously involved in the provision of ANS in the same field; and

c) all personnel concerned with the conduct of safety regulatory audits are suitably trained and qualified in accordance with established minimum requirements and experience as determined by Director of Civil Aviation.

2) The ANS Standard Section, Regulatory Division, Brunei DCA shall maintain a record of the qualified entities commissioned to conduct on their behalf.

B.6 Safety Oversight Capabilities

Head of the ANS Standard Section, Regulatory Division, Brunei DCA shall ensure that all ANS inspectors are competent to perform the required function. In this regard the following shall be specified for all ANS inspectors (ATM, PANS-OPS, AIS, CHART, CNS, MET and SAR):

(a) Function and responsibilities
(b) Job description
(c) Minimum qualifications and experience
(d) Methodology to determine the no. of inspectors
(e) Training programme (Initial, On-the job training (OJT), Recurrent and Specialised)
(f) Periodic Training Plan
(g) Proper Implementation of Training Plan
(h) On-the job training (OJT) OJT Process
(i) Maintenance of Training Records

B.7 Safety Oversight Records

The ANS Standard Section, Regulatory Division, Brunei DCA shall keep and maintain access to the appropriate records related to their safety oversight processes, including the reports of all safety regulatory audits and other safety-related records, for a period of 5 years.

PART C – REQUIREMENTS

DEFINITIONS

Approved Flight Procedure Designer (AFPD)

An Approved Flight Procedures Designer is a person who has met the competency requirements laid down by the Brunei DCA and holds an approval for the design of instrument flight procedures for aerodromes or heliports, which are under the jurisdiction of the Brunei DCA.

Approved Flight Procedure Design Organization (AFPDO)

An Approved Flight Procedures Designer Organization is an organization who has met the competency requirements laid down by the Brunei DCA and holds an approval for the design of instrument flight procedures for aerodromes or heliports, which are under the jurisdiction of the Brunei DCA.

Flight inspection

The operation of a suitably equipped aircraft for the purpose of calibrating ground-based NAVAIDS or monitoring/evaluating the performance of the global navigation satellite system (GNSS)

Flight procedure designer

A person responsible for flight procedure design who meets the competency requirements as laid down by the State.

Flight Validation Pilot (FVP)

A person performing flight validation flights or simulated flights who meet the competency requirements as stated down by Brunei DCA. (DCA)

Flyability

The ability to keep an aircraft within predefined tolerances of designed lateral and vertical flight track. *(ICAO)*

Instrument Approach Procedure (IAP)

A series of predetermined maneuvers by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route

obstacle clearance criteria apply. Instrument approach procedures are classified as follows; (ICAO)

Non-precision approach (NPA) procedure
An instrument approach procedure design for 2D instrument approach operation Type A.(ICAO)

Approach procedure with vertical guidance (APV)
A performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach Type A. (ICAO)

Precision approach (PA) procedure
An instrument approach procedure based on navigation systems. (ILS,MLS, GLS,SBAS Cat I) designed for 3D instrument approach operations Type A and B.

Instrument flight procedure (IFP)

A published procedure used by aircraft flying in accordance with the instrument flight rules which is designed to achieve and maintain an acceptable level of safety in operations and includes an instrument approach procedure, a standard instrument departure, a planned departure route and a standard instrument arrival. *(ICAO)*

Initiator

An aerodrome operator, aircraft operator, Air Navigation Service Provider (ANSP) or other relevant entity, who proposes a new design, changes to, or withdrawal of an IFP.

Standard Instrument Departure (SID)

A designated instrument flight rule (IFR) departure route linking the aerodrome or a specific runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences. *(ICAO)*

Planned departure route

A notified instrument flight rule departure (IFR) route linking the aerodrome or a specific runway of the aerodrome with a specified significant point, normally on the boundary of controlled airspace associated with the aerodrome. (ICAO)

Standard Instrument Arrival (STAR)

A designated instrument flight rule (IFR) arrival route linking a significant point, normally on an ATS route, with a point from which a published instrument approach procedure can be commenced. (ICAO)

ABBREVIATIONS

AD	Aerodrome
AFPD	Approved Flight Procedure Designer
AFPDO	Approved Flight Procedure Designer Organization
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Air Traffic Services
CAD	Computer Aided Drawing
CRM	Collision Risk Model
DCA	Department of Civil Aviation
FIR	Flight Information Region
FVP	Flight Validation Pilots
ICAO	International Civil Aviation Organisation
IAP	Instrument Approach Procedures
IFP	Instrument Flight Procedure
IFR	Instrument Flight Rules
MOC	Minimum Obstacle Clearance
OAS	Obstacle Assessment Surface
OCA	Obstacle Clearance Altitude

OCH	Obstacle Clearance Height
OJT	On-the-Job Training
OLS	Obstacle Limitation Surface
PANS-OPS	Procedure for Air Navigation Services – Aircraft Operations
PBN	Performance Based Navigation
RNAV	Area Navigation
SARP	Standards and Recommended Practices
SID	Standard Instrument Departure
STAR	Standard Instrument Arrival
TAS	True Air Speed

CHAPTER 1 - INTRODUCTION

1.1 General

1.1.1 BAR 20 – Approval Requirements for Flight Procedure Design provides standards and requirements for the design and maintenance of instrument flight procedures (IFP). This is to ensure that all published IFP intended for use by aircraft operating under instrument flight rules (IFR) in Brunei airspace meets ICAO requirements for instrument flight procedures.

1.1.2 This BAR also provides a means for Brunei DCA to authorise PANS-OPS service providers (Flight Procedure Design Organisations and/or Flight Procedure Designers) to provide procedure design services within Brunei Airspace.

1.1.3 The purposes of this BAR are to:

a) establish requirements for applicants and procedure designer(s)/organisations on the procedure for the issue, with any applicable conditions, and continuation of an approval to design and provide instrument flight procedures for use in Brunei airspace and to indicate the approval requirements that are used for assessing an application;

b) establish requirements on the procedure for the approval of IFP produced by the approved procedure designers; and

c) describe how the responsibilities and accountabilities may be borne throughout the design process between the procedure designer, the Initiator and the Brunei DCA.

1.2 Approval Requirements for Flight Procedure Design

1.2.1. This BAR shall be read in conjunction with:

a) *Doc 9906 Vol 1 – Quality Assurance Manual for Flight Procedure Design Quality Assurance System;*

b) *Doc 9906 Vol 2 – Quality Assurance Manual for Flight Procedure Designer Training;*

c) *Doc 9906 Vol 3 – Quality Assurance Manual for Flight Procedure Design Software Validation;*

d) *Doc 9906 Vol 4 – Quality Assurance Manual for Flight Procedure Design Construction (to be incorporated later by ICAO);*

e) *Doc 9906 Vol 5 – Quality Assurance Manual for Validation of Instrument Flight Procedures;*

f) *Doc 9906 Vol 6 – Quality Assurance Manual for Flight Validation Pilot Training and Evaluation;*

g) *ICAO Doc 9905–AN/ - RNP-AR Flight Procedure Design;*

h) *ICAO Doc 9724 – AN/904-Manual on the Use of the Collision Risk Model (CRM) for ILS Operations;*

i) *ICAO Doc 9674–World Geodetic System 1984 (WGS 84) Manual;*

j) *ICAO Doc 9613 – Performance Based Manual ;*

k) *ICAO Doc 9371 – Template Manual;*

l) *ICAO Doc 9368 – IFP Construction Manual;*

m) *ICAO Doc 9365 – All Weather Operation manual;*

n) *ICAO Doc 8697 – Aeronautical Chart Manual;*

o) *ICAO Doc 8168 Vol I and II –Procedures for Air Navigation Services Aircraft Operations (PANS-OPS);*

p) *ICAO Doc 4444 PANS-ATM;*

q) *ICAO Annex 4 – Aeronautical Charts*

r) *ICAO Annex 5 –Units of Measurement;*

s) *ICAO Annex 6 – Aircraft Operations;*

t) *Annex 10 – Aeronautical Telecommunications Volume I Radio Navigational Aids;*

u) *ICAO Annex 14 Vol. I – Aerodromes;*

v) *ICAO Annex 14 Vol. II – Heliports; and*

w) *ICAO Annex 15 – Aeronautical Information Services;*

1.2.2 Where there is a difference between a standard in this BAR and that of the above-mentioned ICAO documents, the standard in this BAR shall prevail.

1.2.3 The AFPDO and/or AFPD shall comply with all standards at all times.

1.2.4 When the AFPDO/AFPD is not able to comply with any standards specified or referenced in this BAR, the AFPDO/AFPD shall apply to the Director of Civil Aviation for exemption or deviation from the relevant standards. Applications shall be supported in writing with the reasons for such exemption or deviation including any safety assessment or other studies undertaken and where appropriate, an indication of when compliance with the current standards can be expected.

1.2.5 Any exemption or deviation granted to the AFPDO/AFPD shall also be recorded in the operation manual of the AFPDO/AFPD. The operation manual shall also contain the details of the exemption or deviation, such as the reason that the exemption or deviation was requested and any resultant limitations or conditions imposed.

1.2.6 The AFPDO/AFPD shall ensure that the units of measurement as specified in the BAR 5 – *Units of Measurement to be used in Air and Ground Operations* are used in the design of instrument flight procedures where applicable.

CHAPTER 2 - FLIGHT PROCEDURE DESIGN ORGANISATION

2.1 Flight Procedure Design Organisation *(PANS-OPS Service Providers)*

2.1.1 The Flight Procedure Design Organisation shall ensure that the designs of instrument flight procedure are in accordance with:

(a) applicable standards set out or referred to in ICAO Doc 8168 Vol II and associated guidance materials;

(b) ICAO Doc 9905 - Required Navigation Performance Authorisation Required (RNP-AR) Procedure Design Manual; and

(c) applicable standards as set out in this BAR.

2.1.2 The Flight Procedure Design Organisation shall make provisions for each IFP design to be checked and verified by another APD who is not involved in the designing process.

2.1.3 The Flight Procedure Design Organisation shall publish obstacle clearance altitude/height in all instrument approach flight procedures.

2.2 Flight Procedure Design Organisation Operations Manual

2.2.1 The Flight Procedure Design Organisation shall develop and maintain an operation manual which serves to demonstrate how the service provider complies with the requirements set out in this BAR.

2.2.2 The contents of the operation manual shall include but not limited to the following:

(a) the administrative information required of the Flight Procedure Design Organisation; and

(b) a job description of the Flight Procedure Design Organisation that shows the role, responsibilities and job functions for Flight Procedure Designer personnel *(PANS-OPS technical staff)* who are responsible for ensuring the compliance of the organisation with the requirements in this BAR.

2.2.3 The Flight Procedure Design Organisation shall:

(a) keep the operation manual in a readily accessible form;

(b) ensure that the operation manual is readily available to all Flight Procedure Designer personnel; and

(c) amend the operation manual whenever necessary to keep its contents up to date.

2.2.4 The Flight Procedure Design Organisation shall submit a copy of the most current operation manual to the Director of Civil Aviation (Attention to: Deputy Director (Regulatory)).

2.3 Flight Procedure Designer Training

2.3.1 The Flight Procedure Design Organisation shall ensure that a person designing or amending a flight instrument procedure demonstrates required competency level for flight procedure design.

2.3.2 The Flight Procedure Design Organisation shall develop training programme and maintain training record for all its Flight Procedure Designers. The training for Flight Procedure Designer shall include an initial training and recurrent training at periodic intervals. The appropriate interval for recurrent training is conducted on a regular basis.

a) Initial training shall ensure that the flight procedure designer is able to demonstrate a basic level of competency that includes at least the following elements:

i) knowledge of information contained in the PANS-OPS Doc 8168, Volumes I and II and other related ICAO provisions relevant to Brunei DCA; and

ii) skills in the design of procedures.

b) Recurrent training shall ensure that the flight procedure designer is able to demonstrate a basic level of competency that includes at least the following elements:

i) knowledge about updates in ICAO provisions and other provisions pertaining to procedure design; and

ii) maintenance and enhancement of knowledge and skills in the design of procedures.

2.3.5 Flight procedure designers shall undergo an adequate, supervised OJT.

2.3.6 Competency of the flight procedure designer shall be evaluated at regular intervals by ANS Standard Section of Brunei DCA.

2.3.7 Guidance material for planning, implementing and evaluating flight procedure designer training is provided in the Quality Assurance Manual for Flight Procedure Design, Volume 2 — Flight Procedure Designer Training (Doc 9906).

CHAPTER 3 - INSTRUMENT FLIGHT PROCEDURE DESIGN PROCESS

3.1 Introduction

3.1.1 The Instrument Flight Procedure (IFP) Design process (see Appendix 1) encompasses the acquisition of data, design and promulgation of procedures. It starts with compilation and verification of the many inputs and ends with ground and/or flight validation of the finished product, and documentation for publication.

3.1.2 IFP shall be accompanied by a narrative, which describes the procedure in textual format.

3.2 Procedure Design Information Acquisition

3.2.1 Current and complete survey data and information is crucial to the design of a safe IFP. The APDO shall ensure that the survey and subsequent IFP design activities are controlled and monitored by a person(s) trained in procedure design.

3.2.2 In the obstacle survey for procedure design, the APD shall consider that:

(a) all obstacles be accounted for Items, such as trees and heights of tall buildings shall be accounted for either by physical examination of the site or by addition of a suitable margin above terrain contours; and

(b) the accuracy of the vertical and horizontal data obtained may be adjusted by adding an amount equal to the specified survey error to the height of all measured obstructions and by making a corresponding adjustment for specified horizontal error.

3.2.3 The procedure design information shall be coordinated with all relevant stakeholders. As input for the procedure design process the following aspects need to be assessed:

(a) airport, navigation aid, obstacle, terrain coordinate and elevation data, based on verified surveys and complying with BARs 11, 14 and 15;
(b) airspace requirements;
(c) user requirements – the needs of Air Traffic Service provider and operators who will use this procedure;
(d) airport infrastructure such as runway classification, lighting, communications, runway markings, and availability of local altimeter setting;
(e) environmental considerations; and
(f) any other potential issue associated with the procedure.

3.3 Procedure Design

3.3.1 Procedures shall be designed according to ICAO Doc 8168 – PANS-OPS criteria. Coordination with all concerned parties shall continue throughout the procedure design and validation process to ensure that the procedure meets the needs of the user and the community.

3.3.2 Each new or revised procedure shall be verified by an APD other than the one who designed the procedure, to ensure compliance with applicable criteria.

3.3.3 Published procedures shall be subject to periodic review to ensure that they continue to comply with changing criteria, and meets user requirements. The maximum interval for this review is five years.

3.4 Procedure Design Documentation

3.4.1 The documentation provided by the APD is divided into three categories and includes:

(a) documentation required for publication in the Brunei Darussalam AIP in accordance with BARs 4 and 15;

(b) documentation required to maintain transparency concerning the details and assumptions used by the APD, which should include supporting information/data used in the design, such as:

i. controlling obstacle for each segment of the procedure;
ii. effect of environmental considerations on the design of the procedure;
iii. infrastructure assessment;
iv. airspace constraints;
v. ATM operations requirement.

vi. for modifications or amendments to existing procedures, the reasons for any changes; and

vii. for any deviation from existing standards, the reasons for such a deviation and details of the mitigations applied to assure continued safe operations.

(c) additional documentation required to facilitate ground and flight validation of the procedure.

3.4.2 All calculations and results of calculations shall be presented in a manner that enables the reader to follow and trace the logic and resultant output. A record of all calculations shall be kept in order to prove compliance to or variation from the standard criteria.

3.4.3 Formulae used during calculation shall be the standard formulae as stated in ICAO Doc 8168 and related ICAO publications. Units of measurement and conversion factors between such units shall be in accordance to BAR 4, 5 and 6.

3.4.5 Rounding of results shall follow the standard guidelines in ICAO Doc 8168 and related ICAO publications. Rounding shall only be made at the publication stage to facilitate usable figures on maps and charts. Where rounding is required at earlier stages rounding shall be made to the pessimistic consideration, i.e. obstacles heights rounded up, speeds rounded up, turn altitudes rounded down etc.

3.4.6 All documentation shall undergo a final verification for accuracy and completeness prior to validation and publication.

3.4.7 All documentation shall be retained to assist in recreating the procedure in the future in the case of incidents and for periodic review and maintenance. The periodic retention shall not be less than the operational life time of the procedure.

3.5 Ground Validation, Flight Validation and Flight Inspection

3.5.1 Validation

3.5.1.1 Validation is the necessary final quality assurance step in the procedure design process, prior to publication. The purposes of validation are the verification of all obstacle, terrain and navigation data, and provide an assessment of flyability of the procedure. Validation includes ground validation and flight validation as stipulated in ICAO Doc 9906 Volume 5.

3.5.1.2 Ground validation consists of an independent IFP design review and a pre-flight validation. Flight validation consists of a flight simulator evaluation and/or an evaluation flown in an aircraft.

3.5.1.3 When ground validation can verify the accuracy and completeness of all obstacle and navigation data considered in the procedure design, and any other factors normally considered in the flight validation, then the flight validation requirement may be dispensed with.

3.5.2 Ground Validation

3.5.1 Ground validation is a review of the entire instrument flight procedure package by a person(s) trained in procedure design and with appropriate knowledge of flight validation issues. It is meant to arrest errors in criteria and documentation, and evaluate on the ground, to the extent possible, those elements that will be evaluated in a flight validation. Issues identified in the ground validation should be addressed prior to any flight validation.

3.5.2 The ground validation would also determine if flight validation is

needed for modifications and amendments to previously published procedures.

3.5.3 Flight Validation

3.5.3.1 Flight validation of instrument flight procedures should be carried out as part of the initial record and should also be included as part of the periodic quality assurance programme. It shall be accomplished by a qualified and experienced FVP.

3.5.3.2 The objectives of the flight validation of instrument flight procedures are to:

(a) provide assurance that adequate obstacle clearance has been provided;

(b) verify that the navigation data to be published, as well as that used in the design of the procedure, is correct;

(c) verify that all required infrastructure, such as runway markings, lighting, and communications and navigation sources, are in place and operative;

(d) conduct an assessment of flyability to determine that the procedure can be safely flown; and

(e) evaluate the charting, required infrastructure, visibility and other operational factors.

3.5.3.4 The APD shall be the originator of all data applicable to conduct a flight validation. The APD should be prepared to provide briefings to the FVP in those cases where flight procedures have unique application or special features.

3.5.3.5 The APD may participate in the initial validation flight to assist in its evaluation and obtain direct knowledge of issues related to the procedure's design from the FVP.

3.5.3.6 All completed flight validation report must be submitted to Brunei DCA using validation templates as in the Appendix C or D Doc 9906 Vol. 5 as appropriate.

3.5.4 Flight Inspection

3.5.4.1 Flight validation should not be confused with flight inspection. Flight inspection of instrument flight procedures is required to assure that the appropriate radio navigation aids adequately support the procedure. This is carried out as part of a formal flight inspection programme and is performed by a qualified flight inspector using an appropriately equipped aircraft.

3.5.4.2 The initial theoretical viability check should be subsequently confirmed by flight inspection. The flight inspection organization should be provided with full details of the pre-design checks, including details of any critical DMEs.

3.5.4.3 The pre-promulgation flight check should include an analysis of the update history (use of DME stations for update). If the RNAV system uses DME stations outside their promulgated radio range, an additional check on the effect of the use of those stations should be made

3.6 Instrument Flight Procedure Periodic Review and Maintenance

3.6.1 Periodic Review

3.6.1.1 Published flight procedures shall be subjected to a periodic review by the designated Flight Procedure Design Organisation, including validation to ensure that they continue to comply with changing criteria, to confirm continued adequate obstacle clearance and that they meet user requirements. The maximum interval for review is **five years**.

3.6.2 Maintenance

3.6.2.1 Maintenance of the flight procedures includes updates due to:

a) magnetic variation changes;
b) new survey information; and
c) changes to airspace structure.

3.6.3 Documents and Records Control System

3.6.3.1 The APDO shall establish and put into effect, a system for controlling documents and records relating to the instrument flight procedures on which the APD carries on design work, including the policies and procedures for making, amending, preserving and disposing of those documents and records.

3.6.3.2 Records supporting the design of the IFP(s) shall be kept by the designated Flight Procedure Design Organisation throughout the lifetime of the IFP and for five years after any change or withdrawal.

3.6.3.3 The APDO shall make the documents and records, or copies of them or extracts from them, available for inspection by ANS Standard Section of Brunei DCA.

3.7 Safeguarding of Instrument Flight Procedures

3.7.1 The assessment of the impact a proposed development or construction, or planned temporary obstacle, might have on an aerodrome's operation is known as safeguarding. The assessment should include the impact on an aerodrome's IFPs. The aerodrome licensed holder is responsible for having the safeguarding assessment carried out.

3.7.2 The aerodrome operator is responsible for initiating any NOTAM action required following a safeguarding assessment on temporary obstructions.

3.8 Safety Assessment

3.8.1 The APDO shall carry out a safety assessment in respect of proposals for new flight procedure designs or any significant changes in a revised procedure. Proposals shall be implemented only when the assessment has shown that an acceptable level of safety will be met.

3.8.2 The safety assessment shall consider relevant factors determined to be safety-significant, including but not limited to:

(a) types of aircraft and their performance characteristics, including navigation capabilities and navigation performance;

(b) traffic density and distribution;

(c) airspace complexity, ATS route structure and classification of the airspace;

(d) aerodrome layout;

(e) type and capabilities of ground navigation systems; and

(f) any significant local or regional data (e.g. obstacles, infrastructures, operational factors, etc).

3.8.3 Safety risk control/mitigation process shall include hazard/consequence identification and safety risk assessment. Once hazards and consequences have been identified and safety risks assessed, the effectiveness and efficiency of existing aviation system defences relative to the hazards and consequences should be evaluated. As a consequence of this evaluation, existing defences shall be reinforced, new ones introduced, or both.

3.8.4 As part of the safety assurance, the risk control/ mitigation process shall include a system of feedback. This is to ensure integrity, efficiency and effectiveness of the defences under the new operational conditions.

3.8.5 The APDO shall ensure that the results and conclusions of the safety assessment and mitigation process of a new or changed procedure are specifically documented, and that this documentation is maintained throughout the life of the IFP.

3.9 Procedural Design Automation

3.9.1 Procedure design automation tools have the potential to reduce errors

in the procedure design process, as well as to standardise the application of the PANS-OPS criteria.

3.9.2 ICAO produces several tools automating elementary portions of the procedure design criteria, where the consequences of error are particularly significant to safety. Included in these tools are the PANS-OPS Obstacle Assessment Surface (OAS) Software and the PANS-OPS Software (CD-101), providing a means to evaluate the total risk of impact with an obstacle or the ground on precision approach.

3.9.3 The APDO shall ensure that the software packages used in the design of procedures have been validated. A description of the procedures to be used to ensure that all equipment, including software is operated in accordance with the manufacturer's operating instructions and manuals, shall be made readily available to the APD.

CHAPTER 4 - INSTRUMENT FLIGHT PROCEDURE APPROVALS

4.1 Design Initiator

4.1.1 The Initiator shall notify the Director, Department of Civil Aviation, Brunei Darussalam in writing of his intention to establish or amend an IFP.

4.1.2 Formal notification to the Director, Department of Civil Aviation, Brunei Darussalam shall be sent to:

Director
Department of Civil Aviation
Bandar Seri Begawan
BB 2513
Brunei Darussalam

Attention to: Deputy Director (Regulatory)

4.1.3 Following receipt of the form, an acknowledgement will be sent to the Initiator within 10 working days.

4.1.4 Initiators applying for new procedures must consider the processes involved when establishing realistic implementation dates (See flowchart at Appendix A). These considerations include the following:

a) design period (negotiated between Initiator and Designer);

b) associated regulatory activity by Brunei DCA office including allowance for amendments and corrections to original submission (approximately 2 months);

c) production of a chart suitable to allow AIS to produce a chart for the AIP;

d) flight calibration of navigation aids if required;

e) ground/flight/simulator/navigation database validation, as required; and

f) AIRAC promulgation (approximately 3 months from submission of charts to AIS to effective date of procedure).

4.2 Design Submission - Format and Content

4.2.1 IFP designs submitted for evaluation and approval by the regulator are to provide:

a) a complete record of the design process including copies of all source data, information, calculations and drawings used in the project;

b) a record of Quality Assurance and Quality Control;

c) a statement of compliance with PANS-OPS and BAR 4 requirements;

d) a report demonstrating how the original requirement has been satisfied;

e) a narrative, which unambiguously describes the procedure in textual format and table showing all tracks and any additional database procedure coding;

f) a graphical representation which accurately reflects the content of the narrative provided;

g) relevant signed validation reports; and

h) a comprehensive design rationale in text format, including references to PANS-OPS Volume II and Brunei DCA policy where a deviation from the standard criteria has been employed.

4.3 External Data and Information

4.3.1 External data used in the design process must be submitted in source format as well as any modified formats created by the designer. The data handling process used by the designer must be documented, including all quality management processes and procedures to provide demonstrable proof of data quality and integrity. A full reference to any maps or charts is required. Copies of paper maps used will be required unless electronic versions are available.

4.3.2 Where any maps or charts have been scanned or digitised, such scans or digitised drawings must be included in the submission, subject to copyright.

4.3.3 IAPs will only be included in the Brunei Darussalam AIP where the runway served by the procedure has been assigned an instrument runway certified by Brunei DCA.

4.3.4 Current survey data and information are crucial to the design of safe IFPs. All data shall comply with quality requirements as specified in BAR 14 / BAR 15. Aerodrome surveys used for IFP design purposes shall be acquired from a Survey Department, Brunei Darussalam or licensed surveyor, Brunei Darussalam. Any change to the survey will require an assessment as to the impact upon current IFPs.

4.3.5 Initiators are responsible for ensuring that the survey and subsequent IFP activities are controlled and monitored to an appropriate quality standard.

4.4 Drawings

Computer Aided Drawing (CAD) is a prerequisite for design submission and drawings shall be submitted to Brunei DCA in a generic format (e.g. *.dwg , *.dgn , or *.dxf).

4.5 Calculations

The results and calculations shall be presented in a manner that enables the Director of Civil Aviation, Brunei DCA to follow and trace the logic and resultant output including:

a) a record of all relevant calculations kept in order to prove compliance with or variation from the criteria;

b) formulae used during calculation should be the standard formulae as declared in PANS-OPS and related ICAO publications; and

c) units of measurement and conversion factors must be in accordance with BAR 5.

4.6 Publication of Instrument Flight Procedures

4.6.1 The APDO shall ensure that IFPs designs/charts, are provided to the Aeronautical Information Service (AIS) provider for publication in Brunei Darussalam AIP.

4.6.2 The intended effective date for operational use of the IFP shall be included in the document narrative.

4.6.3 The designs/charts published in the Brunei Darussalam AIP shall be produced in accordance with the provisions contained in the documents listed below:

(a) BAR 4 – Aeronautical Charts
(b) ICAO Doc 8168 Volumes I and II - Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS)
(c) ICAO Doc 8697 – Aeronautical Chart Manual
(d) ICAO Doc 8126 AN/872 Aeronautical Information Services Manual

4.6.4 The aeronautical charts included in the Brunei Darussalam AIP shall be kept up-to-date by means of replacement sheets where necessary. Significant amendments or revisions in the IFP shall be clearly indicated in the revised charts.

CHAPTER 5 - CRITERIA FOR THE APPROVAL OF FLIGHT PROCEDURE DESIGN ORGANISATION AND FLIGHT PROCEDURE DESIGNER

5.1 Approved Flight Procedure Design Organisation (AFPDO)

5.1.1 For a design organisation to be approved, the organisation shall have in it employment at least two (2) APDs.

5.1.2 The Applicants shall demonstrate that they have an established organisation to ensure that each design or any advice given with respect to any IFP issue conforms to this BAR and related ICAO Docs, thus exercise the privileges as granted by their Approval.

5.1.3 The Flight Procedure Design Organisation shall provide and maintain facilities for the design work on instrument flight procedures. This would include:

(a) having available equipment appropriate for the design, design verification, flight validation, and maintenance of the types of instrument flight procedures;

(b) access to relevant and current data including, but not limited to, aeronautical data, land contour data, and obstacle data for the design, design verification, flight verification, and maintenance of the instrument flight procedures; and

(c) ready access to copies of relevant documentation comprising technical standards, practices, and instructions, and any other documentation that may be necessary for the design, design verification, flight validation, and maintenance of the types of instrument flight procedure.

5.1.4 If an aeronautical database and aeronautical data is required for designing an instrument flight procedure, the Flight Procedure Design Organisation shall ensure the integrity of the database and the data. The data used shall be current, traceable, and meets the required level of verifiable accuracy for the design.

5.2 **Approved Flight Procedure Designer (AFPD)**

5.2.1 Flight Procedure Designers seeking approval to design IFPs for use in Brunei airspace must provide evidence of the following:

a) Minimum qualification Basic PANS-OPS course;
b) Demonstrates required competency level for flight procedure design.
c) FPD shall acquire and maintain this competency level through training and supervised on-the-job training (OJT). This is to ensure that the quality assurance in the procedure design process and its output, including the quality of aeronautical information/data, meets the requirements of BAR 4 – Aeronautical Charts and BAR 15 – Aeronautical Information Services.

5.2.2 The Training Programme for FPD shall include an initial training and recurrent training at periodic intervals. The FPD shall be able to demonstrate a basic level of competency through initial training that includes at least the following elements:

(a) overview of ICAO Standards and Recommended Practices (SARPs) relating to IFP design and promulgation;
(b) knowledge of information contained in ICAO Doc 8168 – PANS-OPS, and other related ICAO provisions relevant to procedure designs;
(c) general criteria in IFP designing;
(d) non-precision approach design;
(e) precision approach design;
(f) instrument departure designs;
(g) criteria for RNAV, GNSS and RNP; and
(h) practical exercises in the design of procedures.

5.2.3 **Specialist Training:** Proof of attendance and successful completion of a PANS-OPS training course based upon *ICAO PANS OPS Doc 8168*. A typical PANS-OPS course is based on 4 to 8 weeks training, or equivalent part-time basis, given by an experienced lecturer, who is well grounded in procedure design and all aspects of PANS-OPS. However, where no formal training course has been completed, it may be acceptable to the Brunei DCA to provide evidence of a comprehensive "apprenticeship" under the supervision and training of an approved designer.

5.2.4 **Practical Application of Theoretical Knowledge:** The ability of an applicant to demonstrate practical application of theoretical knowledge is required. Applicants are expected to provide:

a) **Proof of recent IFP design work:** this should include details of specific designs that have been completed and over what period of time. Where possible, examples of the design process should be provided.

b) **Aviation Experience:** It is generally accepted that a high level of aviation experience is an important attribute for successful IFP design, ideally as aircrew or air traffic controller. It is not considered essential to hold a current licence nor to distinguish between a civil or military background. Procedure

Designers who have undergone an "apprenticeship', in lieu of aviation experience, should provide evidence that supports a minimum of three years PANS-OPS, on-the-job design training; and

c) **References:** Applicants should be prepared to provide details of previous initiators/employers.

5.2.5 **Maintenance of Training records:** IFP providers shall maintain individual training records for each staff, which shall include a training plan detailing the

courses completed by each staff. Training records shall be systematically maintained and kept up-to-date on a timely basis.

5.3 Endorsement of Foreign Designer Approval / Certificate

5.3.1 An endorsement may be issued to an individual or organisation who meets requirements:

a) able to provide to the Director of Civil Aviation, Brunei DCA evidence of authorisation provided by another state; and
b) submit a referral letter from the state of issuance.

5.3.2 The Deputy Director (Regulatory) may request for additional evidence if required.

5.4 Validity Period

5.4.1 An APD and APDO approval shall be issued for the duration of the project or a maximum of 3 years. It shall remain valid unless:

a) the APD or APDO fails to demonstrate compliance with the applicable requirements; or
b) the ANS Standard Section is prevented by the APD or APDO, from performing its investigations, inspections or audits; or
c) the APD no longer meets the eligibility requirements for this approval; or
d) the certificate has been surrendered or revoked.

5.4.2 Upon surrender or revocation, the certificate shall be returned to Brunei DCA.

5.5 Issue of Approval

5.5.1 A designer or organization shall be entitled to have a design approval issued by Brunei DCA when it has demonstrated compliance with the applicable requirements

5.5.2 Application for approval of an individual as an instrument procedure designer should be made in the form IFP01.

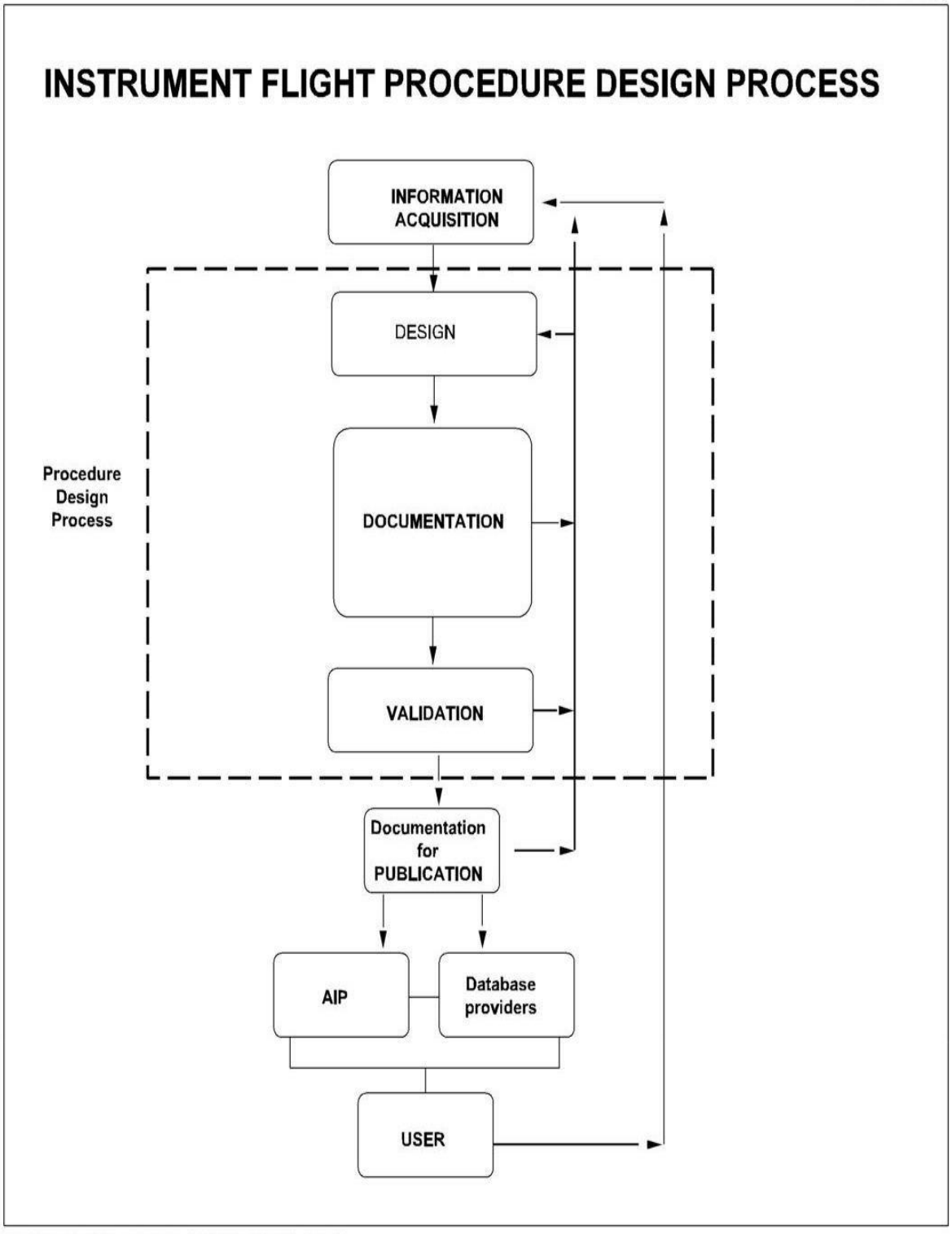
5.5.3 Application for approval of a company as an instrument procedure design organization should be made in the form IFP02.

5.6 Transferability

A Certificate of Approval granted in accordance with the requirements, as set out in this document is not transferable.

FLOWCHART

APPENDIX 1



ANS Standard Section
Regulatory Division
Tel : 2330142 / Fax : 2345345
Website : www.mtic.gov.bn/dca

Department of Civil Aviation
Ministry of Transport and Infocommunications
Brunei International Airport
Bandar Seri Begawan, BB2513
Brunei Darussalam

FORM FPD-01
APPLICATION FOR APPROVED FLIGHT PROCEDURE DESIGNER (AFPD) IN ACCORDANCE WITH BAR 20

Please complete this form online or in BLOCK CAPITALS using black or dark blue ink; print, sign; and submit as instructed.

SECTION 1 : APPLICANT(S)		
Full Name:		
Passport / IC Number:		
Office Address:		Postcode:
Tel. Number:		
Email:		
Website address:		
SECTION 2 : DECLARATION(S)		
I apply for the approval specified and agree to comply with all requirements and standard		
Name :		
Signed:		Date:
SECTION 3 : COMPLETENESS		
Work will not start until this form has been completed, signed and approved.		
SECTION 4 : SUBMISSION INSTRUCTIONS		
Director **Department of Civil Aviation** **Bandar Seri Begawan** **BB 2513** **Brunei Darussalam** **Attention to: Deputy Director (Regulatory)**		

ANS Standard Section
Regulatory Division
Tel : 2330142 / Fax : 2345345
Website : www.mtic.gov.bn/dca

Department of Civil Aviation
Ministry of Transport and Infocommunications
Brunei International Airport
Bandar Seri Begawan, BB2513
Brunei Darussalam

SECTION 5 : PROFESSIONAL DETAILS			
Basic PANS-OPS Training Provider:			
Date attended:		Tutor:	
Advanced PANS-OPS Training Provider:			
Date attended:		Tutor:	
Other relevant training (continue on separate sheet if required)			
1.			
2.			
3.			
4.			
5.			
Aviation Experience (If Any)			
Qualification:			
Date gained:			
SECTION 6 : ACCOMPANYING DOCUMENTATION (Please tick)			
Foreign APD Certificate (if applicable)			
Referral letter (if applicable)			
Proof of Qualifications (Certificates etc.)			
Evidence of recent designs:			
List of reference			

ANS Standard Section
Regulatory Division
Tel : 2330142 / Fax : 2345345
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Department of Civil Aviation
Ministry of Transport and Infocommunications
Brunei International Airport
Bandar Seri Begawan, BB2513
Brunei Darussalam

FORM FPD-02
APPLICATION FOR APPROVED FLIGHT PROCEDURE DESIGNER ORGANISATION (AFPDO) IN ACCORDANCE WITH BAR 20

Please complete this form online or in BLOCK CAPITALS using black or dark blue ink; print, sign; and submit as instructed.

SECTION 1 : APPLICANT(S)		
Full Name:		
Registered Company Name:		
Office Address:		Postcode:
Tel. Number:		Fax No:
Email:		
Website address:		
SECTION 2 : DECLARATION(S)		
I apply for the approval specified and agree to comply with all requirements and standard		
Name :		
Signed:		Date:
SECTION 3 : COMPLETENESS		
Work will not start until this form has been completed, signed and approved.		
SECTION 4 : SUBMISSION INSTRUCTIONS		
Director **Department of Civil Aviation** **Bandar Seri Begawan** **BB 2513** **Brunei Darussalam** **Attention to: Deputy Director (Regulatory)**		

ANS Standard Section
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Tel : 2330142 / Fax : 2345345
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Department of Civil Aviation
Ministry of Transport and Infocommunications
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Bandar Seri Begawan, BB2513
Brunei Darussalam

SECTION 5 : LIST OF PROCEDURE DESIGNER & PROFESSIONAL DETAILS	
Name List and Professional Details (use separate sheet if required)	
1.	
2.	
3.	
4.	
5.	
SECTION 6 : ACCOMPANYING DOCUMENTATION (Please tick)	
Foreign APD Certificate (if applicable)	
Referral letter (if applicable)	
Proof of Qualifications (Certificates etc.)	
Evidence of recent designs:	
List of reference	