สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

Manual of Standards
Flight Inspection Service

Issue: 01

Revision: 00

Date 14 August 2025

Approved By

Air Chief Marshal

Manat Chavanaprayoon

Director General

THIS PAGE INTENTIONALLY LEFT BLANK

FOREWORD

The Director General of Civil Aviation Authority of Thailand is responsible under Section 15/10 (5) of the Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562 for establishing measures or operations that are necessary for the oversight of civil aviation on the matter of testing, checking and inspection of aircraft, engine or equipment used for, or in, civil aviation business, aerodromes, temporary takeoff and landing areas for aircraft, or workplaces or facilities that use, or are used for, civil aviation operations and aircraft operations including for testing and checking personnel, aircrew, or other persons who are involved with civil aviation.

The Manual of Standards (hereinafter 'MOS') is the means CAAT uses to meet its responsibilities under Section 15/10 (5) of the Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562, Rule of CAAT on Flight Inspection B.E. 2564 for promulgating standards for Flight Inspection Service. The MOS prescribes the detailed technical material (aviation safety standards) that is determined to be necessary for the safety of air navigation.

The MOS is referenced in the particular regulation. You should refer to the applicable provisions of the Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562 and CAAT Regulation, Requirement and Rules together with this MOS, to ascertain the requirements of, and the obligations imposed by or under the civil aviation legislation.

Readers should forward advice of errors, inconsistencies or suggestions for improvement to this manual to the Manager, Air Navigation Services Standards Department (please see in subsection 1.1.6.3).

The MOS is issued and amended under the authority of the Director General of Civil Aviation Authority of Thailand.

Air Chief Marshal Manat Chavanaprayoon
Director General
The Civil Aviation Authority of Thailand

Record of Revision

Issue Number	Revision Number	Effective Date	Revised By	Section Affected
01	00	14 August 2025		ANS

List of Effective Pages

Page	Revision	Date
1	00	14 Aug 2025
2	00	14 Aug 2025
3	00	14 Aug 2025
4	00	14 Aug 2025
5	00	14 Aug 2025
6	00	14 Aug 2025
7	00	14 Aug 2025
8	00	14 Aug 2025
9	00	14 Aug 2025
10	00	14 Aug 2025
11	00	14 Aug 2025
12	00	14 Aug 2025
13	00	14 Aug 2025
14	00	14 Aug 2025
15	00	14 Aug 2025
16	00	14 Aug 2025
17	00	14 Aug 2025
18	00	14 Aug 2025
19	00	14 Aug 2025
20	00	14 Aug 2025
21	00	14 Aug 2025
22	00	14 Aug 2025
45	00	14 Aug 2025
46	00	14 Aug 2025
47	00	14 Aug 2025

Page	Revision	Date
23	00	14 Aug 2025
24	00	14 Aug 2025
25	00	14 Aug 2025
26	00	14 Aug 2025
27	00	14 Aug 2025
28	00	14 Aug 2025
29	00	14 Aug 2025
30	00	14 Aug 2025
31	00	14 Aug 2025
32	00	14 Aug 2025
33	00	14 Aug 2025
34	00	14 Aug 2025
35	00	14 Aug 2025
36	00	14 Aug 2025
37	00	14 Aug 2025
38	00	14 Aug 2025
39	00	14 Aug 2025
40	00	14 Aug 2025
41	00	14 Aug 2025
42	00	14 Aug 2025
43	00	14 Aug 2025
44	00	14 Aug 2025
67	00	14 Aug 2025
68	00	14 Aug 2025
69	00	14 Aug 2025

Page	Revision	Date
48	00	13 Aug 2025
49	00	13 Aug 2025
50	00	13 Aug 2025
51	00	13 Aug 2025
52	00	13 Aug 2025
53	00	13 Aug 2025
54	00	13 Aug 2025
55	00	13 Aug 2025
56	00	13 Aug 2025
57	00	13 Aug 2025
58	00	13 Aug 2025
59	00	13 Aug 2025
60	00	13 Aug 2025
61	00	13 Aug 2025
62	00	13 Aug 2025
63	00	13 Aug 2025
64	00	13 Aug 2025
65	00	13 Aug 2025
66	00	13 Aug 2025

Page	Revision	Date
70	00	13 Aug 2025
71	00	13 Aug 2025
72	00	13 Aug 2025
73	00	13 Aug 2025
74	00	13 Aug 2025
75	00	13 Aug 2025
76	00	13 Aug 2025
77	00	13 Aug 2025
78	00	13 Aug 2025

Table of Content

Chapter 1 Introduction 7

1.1 General 7

1.2 Definitions and Abbreviations 10

Chapter 2 Operations Manual 13

2.1 Operations Manual 13

Chapter 3 General Provision for Flight inspection Services 15

3.1 General 15

Chapter 4 Personnel 17

4.1 General 17

Chapter 5 Facilities and Equipment 19

5.1 General 19

5.2 Aircraft 19

5.3 Aircraft Instrumentation 20

5.4 Flight Inspection System 20

5.5 Remotely Piloted Aircraft Systems 28

Chapter 6 Documentation and Records 31

6.1 Documentations 31

6.2 Records 31

6.3 Retention period 33

Chapter 7 Flight Inspection Service Administration 35

7.1 General 35

7.2 Flight inspection plans 35

7.3 Electromagnetic interference 35

7.4 Notify of immediate deficiencies 35

7.5 Flight inspection scenarios 35

7.6 Flight inspection intervals 36

7.7 Flight inspection report ... 36

Chapter 8 Flight Validation of Instrument Flight Procedures ... 38

8.1 The Need for Validation of Instrument Flight Procedures ... 38

8.2 The Validation Process ... 38

8.3 Preflight Validation ... 38

8.4 Simulator Evaluation ... 43

8.5 Flight Evaluation ... 46

8.6 Produce Validation Report ... 52

Appendix A Flight Inspection Report ... 55

Appendix B Schedule for Periodic Flight Inspection ... 58

Appendix C Training Manual ... 60

Appendix D Validation Templates for Fixed-Wing Aircraft ... 62

Appendix E Validation Templates for Helicopters ... 69

Appendix F Obstacle Assessment ... 75

Chapter 1 Introduction

1.1 General

1.1.1 Background

This MOS is made under the Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562. CAAT Regulation, Requirement and Rules refer to the standards and methods to be used in regulating:

a.) the standards for compliance, including:

1) The Operations Manual;

2) The provider's organization, facilities and equipment, training system, management system and records; and

b.) Discontinuance of the service.

1.1.2 Document set

1.1.2.1 The document hierarchy consists of:

a) The Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562 (the Act) and the Civil Aviation Emergency Decree B.E.2558 (the Decree); and
b) The Civil Aviation Authority of Thailand Regulation, Requirement and Rules (the CAAT Regulation, Requirement and Rules); and
c) Manual of Standards (MOS); and
d) Advisory Circulars (ACs)

1.1.2.2 The Decree establishes the Civil Aviation Authority of Thailand (CAAT) with functions relating to civil aviation, in particular the safety of civil aviation, and related purposes.

1.1.2.3 The CAAT regulation and requirement establish the regulatory framework (Regulations) within which all service providers shall operate.

1.1.2.4 The MOS comprises specifications (Standards) prescribed by CAAT, of uniform application, determined to be necessary for the safety of air navigation. In those parts of the MOS where it is necessary to establish the context of standards to assist in their comprehension, the sense of parent regulations has been reiterated.

1.1.2.5 Readers should understand that in the circumstance of any perceived disparity of meaning between MOS and CAAT regulations/requirements, the primacy of intent rests with the regulations/ requirements. Where there is any inconsistency between the regulations/requirements and the MOS, the regulations/requirements prevail.

1.1.2.6 Service providers must document internal actions (Rules) in their own operational manuals, to ensure the maintenance of and compliance with standards.

1.1.2.7 ACs are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means of complying with the regulation and requirement. ACs may explain certain regulatory requirements by providing interpretive and explanatory materials. It is expected that service providers will document internal actions in their own operational manuals, to put into effect those, or similarly adequate, practices.

1.1.2.8 Where the Flight Inspection Service Provider is unable to comply with any provision in any of this MOS, the Flight Inspection Service Provider shall inform the CAAT within a reasonable period of time and in writing. The Flight Inspection Service Provider shall explain the basis for its non-compliance and propose alternative steps to ensure that an equivalent level of safety is established. The CAAT will review the Flight Inspection Service Provider proposal in a timely fashion and approve the proposal, subject to such other conditions it may impose. The Flight Inspection Service Provider is required to follow-up diligently and thereafter report to CAAT within a reasonable period.

1.1.2.9 Where the CAAT has approved the Flight Inspection Service Provider's proposal in subsection 1.1.2.8, the Flight Inspection Service Provider shall record the approved alternative steps to be taken in the Flight Inspection Service Provider's operations manuals. The operations manuals shall also contain the details of and rationale for the alternative steps, and any result limitations or conditions imposed.

1.1.3 Editorial Practices

To avoid any misunderstanding within the MOS, the words 'shall' as used within the requirements indicate that compliance is compulsory, while 'should' means that it is strongly advisable that an instruction is carried out; it is recommended or discretionary.

1.1.4 Differences between ICAO Standards and those in MOS

Notwithstanding the above, where there is a difference between a standard prescribed in ICAO documents and the Manual of Standards (MOS), the MOS standard shall prevail.

1.1.5 Differences Published in AIP

Differences from ICAO Standards, Recommended Practices and Procedures are published in AIP GEN 1.7

1.1.6 MOS Documentation change management

1.1.6.1 The Air Navigation Services Standards Department (ANS) has responsibility for the technical content of this MOS.

1.1.6.2 This MOS is issued, and may only be amended, under the authority of the DGCA.

1.1.6.3 Suggested changes to this MOS may be provided to the Manager, Air Navigation Services Standards Department of CAAT by:

Email: ans@caat.or.th

1.1.6.4 Requests for any change to the content of this MOS may come from:

a) technical areas within CAAT; or
b) aviation industry service providers or operators; or
c) Individuals or authorization holders.

1.1.6.5 The need to change standards in this MOS may arise for any of the following reasons:

a) to ensure safety;
b) to ensure standardization;
c) to respond to changed CAAT standards;
d) to respond to ICAO prescription;
e) to accommodate proposed initiatives or new technologies.

1.1.6.6 CAAT may approve trials of new procedures or technologies to develop appropriate standards.

1.1.7 Related document

These standards should be read in conjunction with:

a) Civil Aviation Authority of Thailand Regulations and Requirements;
b) ICAO Annex 10 – Aeronautical Telecommunications;
c) ICAO Annex 14 - Aerodrome;
d) Manual on Testing of Radio Navigation Aids (Doc 8071);
e) Aerodrome Design Manual (Doc 9157);
f) ICAO Required Navigation Performance Authorization Required Procedure Design Manual, Doc 9905-AN/471
g) ICAO Doc 9906, Quality Assurance Manual for Flight Procedure Design
h) ICAO Procedures for Air Navigation — Aircraft Operations, Doc 8168-OPS/611, Volume II — Construction of Visual and Instrument Flight Procedures;
i) Other standards related to flight inspection.

1.2 Definitions and Abbreviations

1.2.1 Definitions

The following terminology is specific other flight inspection manual of standard:

Definitions

Unless otherwise stated, words in this Manual of Standard have the meanings as follows:

Definition	Meaning
Flight Testing	The operation of a suitable equipped aircraft for the purpose of calibrating Air Navigation Facilities.
Flight Validation	Flight assessment of a new or revised instrument flight procedure to confirm that the procedure is operationally acceptable for safety, flyability and design accuracy, including obstacle assessment and database verification, with all supporting documentation. Includes flights performed with simulators (except desktop software simulators).
Flight procedure designer	A person responsible for flight procedure design who meets the competency requirements as laid down by CAAT.
Flight validation pilot	A person performing flight validation who meets the competency requirements as laid down by CAAT.
Flyability	The ability to keep an aircraft within the predefined tolerances of the designed lateral and vertical flight track.
Instrument flight procedure	A description of a series of predetermined flight maneuvers by reference to flight instruments, published by electronic and/or printed means.

Definition	Meaning
Instrument flight procedure process	The overarching process from data origination to the publication of an instrument flight procedure.
Obstacle	All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that: a) are located on an area intended for the surface movement of aircraft; or b) extend above a defined surface intended to protect aircraft in flight; or c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.
Validation	Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled. This activity consists of ground and flight validation.
Verification	Confirmation, through the provision of objective evidence, that specified requirements have been fulfilled.

1.2.2 Abbreviations

Unless otherwise stated, abbreviations in this MOS have the meanings given as follows:

Abbreviations	Full Name
AGC	Automatic gain control
AIP	Aeronautical Information Publication
ATIS	Automatic terminal information service
CAAT	The Civil Aviation Authority of Thailand
CF	Course to a fix
CRC	Cyclic redundancy check
DME	Distance measuring equipment
EMC	Electromagnetic Compatibility
FAS	Final approach segment
FIS	Flight Inspection System
FM	Frequency modulation
FMS	Flight management system
FPA	Flight path angle
FPAP	Flight path alignment point
FRMS	Fatigue Risk Management System
FVP	Flight Validation Pilot

Abbreviations	Full Name
GNSS	Global navigation satellite system
HA	Holding/racetrack to an altitude
HDOP	Horizontal dilution of precision
HF	Holding/racetrack to a fix
HM	Holding/racetrack to a manual termination
HPL	Horizontal protection level
ICAO	International Civil Aviation Organization
IFP	Instrument flight procedure
IFR	Instrument flight rules
ILS	Instrument landing system
LF/MH/HF	Low/medium/high frequency
LNAV	Lateral navigation
LOC	Localizer
LTP	Landing threshold point
NAVAID	Navigation aid
NDB	Non directional beacon
OJT	On-the-Job Training
PBN	Performance-based navigation
PDOP	Position dilution of precision
PinS	Point-in-space
RAIM	Receiver autonomous integrity monitoring
RDH	Reference datum height
RF	Radio frequency
RNP	Required navigation performance
RNP AR	Required navigation performance authorization required
SBAS	Satellite-based augmentation system
SID	Standard instrument departure
SOP	Standard operating procedure
TAWS	Terrain awareness warning system
VASIS	Visual approach slope indicator system
VMC	Visual meteorological conditions
VNAV	Vertical navigation
VOR	Very High Frequency Omnidirectional Radio Range
VPL	Vertical protection level

Chapter 2 Operations Manual

2.1 Operations Manual

2.1.1 A flight inspection service provider shall ensure the operations manuals contain the instructions and information required by the operations personnel to perform their duties;

2.1.2 A flight inspection service provider shall:

a.) provide and keep up to date its operations manual relating to the provision of its services for the use and guidance of operations personnel.

b.) ensure that anyone who performs functions in connection with any Flight inspection service that it provides has ready access to the manual.

c.) ensure that the operations personnel are informed of amendments to the operations manual applying to their duties in a manner that enables their application as of their entry into force.

2.1.3 A flight inspection service provider shall submit an operations manual to CAAT for an approval. If the flight inspection service provider is given a direction by CAAT to amend the manual, the provider shall comply with the direction.

2.1.4 A flight inspection service provider shall ensure:

a.) that all the amendments are incorporated in all copies of the manual kept by the operator; and

b) that copies of the amendments are given to CAAT

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 3 General Provision for Flight inspection Services

3.1 General

3.1.1 In Thailand's context, flight inspection services shall be divided into 2 categories: 1) flight testing and 2) flight validation.

3.1.2 Flight testing is conducted with the purpose of confirming the ability of the navigation aid(s)/system and visual aids/system upon which the procedure is based, to support the procedure, in accordance with the standards in Annex 10 — Aeronautical Telecommunications, Annex 14 Aerodrome, guidance in the Manual on the Testing of Radio Navigation Aids (Doc 8071) and Aerodrome Design Manual (Doc 9157).

3.1.3 Flight validation is concerned with factors other than the performance of the navigation aid or system that may affect the suitability of the procedure for publication, as detailed in PANS -OPS, Volume II, Part I, Section 2, Chapter 4, Quality Assurance.

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 4 Personnel

4.1 General

4.1.1 This Chapter sets out the standards, requirements and procedures pertaining to flight inspection operator certificate and training course.

4.1.2 A flight inspection services provider shall ensure that it has enough suitably qualified and trained personnel in accordance with CAAT regulations/requirements.

4.1.3 The flight inspection crew normally consists of two pilots and one or two flight inspection operator. It is important that members of the flight inspection crew be experts in their individual fields, have sound knowledge and experience in flight testing/inspection procedures and requirements, and be capable of working as a team.

4.1.4 The training course for flight inspection operator personnel shall be approved by CAAT.

4.1.5 The flight inspection operator personnel, except flight validation pilot, shall be certified by CAAT.

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 5 Facilities and Equipment

5.1 General

5.1.1 A flight inspection service provider shall have the facilities and equipment that are necessary for providing its flight inspection operations, including appropriate premises and equipment to allow its operational personnel to perform their duties.

5.2 Aircraft

5.2.1 The flight inspection aircraft shall be airworthy and approved by the airworthiness authorities for the intended operation in the area it operates.

5.2.2 Aircraft type-preference should be given to multi-engine turbine aircraft for their reliability and performance.

5.2.3 Pressurization and air conditioning should be available as a means to reduce crew workload, increase safety and keep the flight inspection system equipment within the technical specification.

5.2.4 Standard avionics must match the airspace requirements.

5.2.5 The following desirable characteristics should be found in a flight inspection aircraft:

a.) reliable, efficient type equipped and certified for IFR operations;

b.) sufficient carrying capacity for the flight crew, as well as all necessary electronic and recording equipment and spares. It may also be necessary to have additional capacity to transport ground personnel and equipment;

c.) sufficient range and endurance to complete a normal mission without reservicing;

d.) aerodynamically stable throughout its speed range, but particularly at speeds encountered during flight inspection;

e.) low noise and vibration levels;

f.) low electrical noise characteristics to minimize interference with received signals; e.g. propeller modulation of the received signal must be as low as possible;

g.) stable electrical system of adequate capacity to operate the required electronic equipment in addition to the aircraft equipment;

h.) reasonably wide speed and altitude range to enable flight inspection to be conducted, where possible, under the conditions encountered by users. Good low-speed characteristics are essential where theodolite tracking by flight inspection operator is carried out;

i.) suitable for future modifications or expansion of equipment to allow for inspection of additional aids or to increase accuracy or processing speed on existing facilities;

j.) aircraft cabin environmental control equipment that minimizes the adverse effects of temperature and humidity on the sensitive test equipment used in flight inspection systems and maintains a comfortable environment for the crew; and

k.) equipped with an autopilot to reduce crew workload.

5.3 Aircraft Instrumentation

5.3.1 The flight inspection aircraft contains a full range of navigation equipment as required for instrument flying.

5.3.2 The navigation receivers may be used for both navigation and flight inspection. Special flight inspection receivers installed in addition to those used for navigation are preferable because of their special accuracy requirements.

5.3.3 When navigation receivers are shared between the pilot and flight inspection operator, the control of the receiver during flight inspection should be with the flight inspection operator.

5.4 Flight Inspection System

5.4.1 Approval of the flight inspection system

5.4.1.1 The flight inspection system must obtain approval from the Civil Aviation Authority of Thailand (CAAT) prior to operation.

5.4.1.2 Modifications, upgrades, repairs, configurations, or other actions that affect the performance, safety, or integrity of the system must be submitted to CAAT for prior written approval before implementation.

5.4.1.3. Modifications, upgrades, repairs, configurations, or other actions that do not affect the performance, safety, or integrity of the system shall be reported to CAAT as soon as possible.

5.4.2 Build state and modification control

The build state of all equipment, including test equipment, should be recorded and the records should be updated whenever modifications or changes are made. All modifications should be accurately documented and cross- referenced to modification strikes or numbers on the equipment. After making any modification, tests and analyses should ensure that the modification fulfils its intended purpose and that it has no undesired side effects.

5.4.3 Calibration of flight test equipment

5.4.3.1 All test equipment used for calibration, test or maintenance of an aeronautical navigation aid should be listed and subject to regular calibration checks. Each item of test equipment should have a documented calibration procedure and calibration records. Test equipment should be calibrated at the manufacturer's recommended intervals, unless otherwise indicated by objective evidence or operational conditions.

5.4.3.2 The conditions of use of individual items of test equipment should be fully considered and the manufacturer's recommended interval should be queried if the utilization profile may be outside of the specified environmental conditions.

5.4.3.3 Regular calibration of the flight inspection receivers and position-reference system is to be performed in order to ensure a back tracing of data to international or national standards. The calibration may be performed either on board the flight inspection aircraft or in a laboratory. In both cases, a test transmitter is connected to the radio frequency (RF) input of the receiver in order to input simulated signals. The receiver output is compared with the nominal signals; deviations are recorded either in a test protocol or by computer. Calibration data are applied either online by the computer or during offline data evaluation.

5.4.4 Control of spares

5.4.4.1 Equipment spares should be stored under suitable environmental conditions. Spares having a limited lifetime, or requiring regular maintenance or calibration, should be suitably identified to that effect. Procedures should exist for the control, repair, and return-to-service of equipment or modules. The procedures should show which modules may be repaired on-site and which should be returned to the manufacturer or recognized repair facility.

5.4.5 System block diagram and description

5.4.5.1 The flight inspection equipment as shown in Figure 7-1 comprises:

a.) flight inspection receivers with associated antennas;

b.) position-reference system;

c.) equipment for data display and processing; and

d.) equipment for data recording.

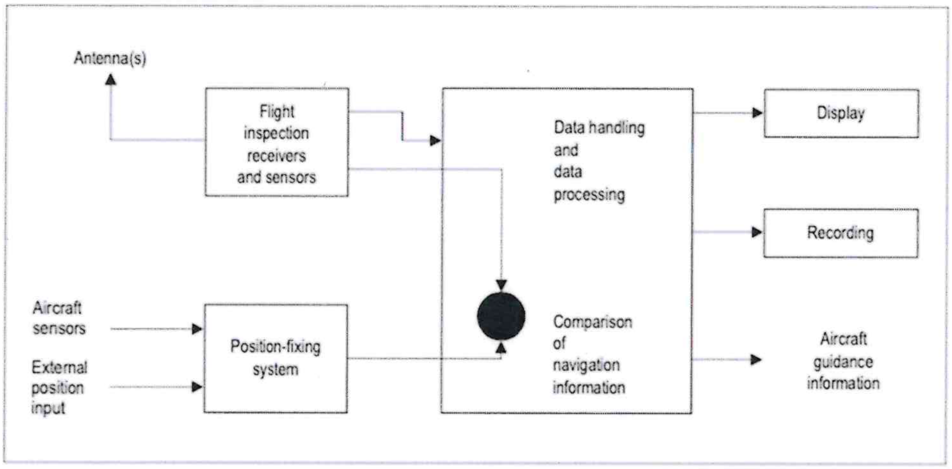

Figure 7-1 Block diagram for flight inspection equipment

5.4.5.2 Flight inspection receivers provide both navigation information as in standard aircraft equipment and flight inspection information. Special care has to be taken concerning the location of antennas of the flight inspection receivers in order to avoid interference problems and to minimize the error contribution of the test equipment.

5.4.5.3 The position-reference system provides reference position (navigation) information in order to determine the navigation accuracy of the facility. Parts of the position-reference system may be shared with standard aircraft equipment.

5.4.5.4 Data generated from the flight inspection receivers and the position-reference system are to be displayed and processed. The processing may be performed either online or after completion of an inspection. One important element of data processing is the comparison of ground facility navigation and reference position (navigation) information.

5.4.5.5 A recording medium is required for documentation of raw data and inspection results.

5.4.5.6 Calibration equipment may be connected to the flight inspection equipment.

5.4.6 Antennas

5.4.6.1 Calibration and extensive testing to verify performance are normally required for antennas used to inspect navigation aid coverage.

5.4.6.2 Calibration of the antenna system gain is required for antennas used to measure field strength and should be considered early in the installation planning stage. Antenna system gain characteristics (including all feed cables, switches and power splitters) must be determined in order to measure the field strength with reasonable accuracy. The characteristics must be measured over the range of frequencies to be used and at the aircraft orientations experienced during the measurement procedures. These antenna gain characteristics must then be applied either in real-time as data is input and displayed, or post-processed to generate the final report data.

5.4.6.3 The above methods may be used to correct absolute or relative field strength measurements, however, there are some flight inspection applications for which gain errors cannot be corrected. These place additional constraints on the achieved airborne antenna patterns. An example is course structure measurements for localizer, glide path, and VOR, for which the contributing multipath errors may propagate to the aircraft from a widely different azimuth than the desired direct signal. In this case, variations in gain from an omnidirectional pattern will affect the measured amplitude of the course structure, with or without aircraft attitude variations, and flight measurements, by differing aircraft types, will vary. Flight inspection organizations should make every reasonable effort to achieve antenna patterns that represent the antennas used by the fleet operating on the airport — this is particularly important for Category II and III measurements.

5.4.6.4 Antenna measurement techniques

5.4.5.4.1 Many techniques, including mathematical modelling, reduced-scale modelling, full-scale ground testing and flight testing, are available for optimizing the location of antennas and characterizing their gain in a given location on an aircraft. The complexity and cost are generally proportional to the number of azimuth and elevation angles to be measured as well as the accuracy required of the measurements. The overall cost is reduced if a combination of modelling and ground testing is used to establish expected performance; flight testing would then be used as the final confirmation stage.

5.4.5.4.2 Flight test techniques capable of full azimuth or lower hemisphere characterization with high accuracy are now available through many flight test ranges, these should be the preferred methods used to provide confirmation of antenna patterns. Procedures that provide ongoing confirmation of antenna performance are still required and some form of ramp-based check should be established.

5.4.5.4.3 Consideration should also be given to characterizing the localizer antenna pattern over the FM broadcast band (88–107.9 MHz), if the aircraft is to be used in resolving electromagnetic compatibility (EMC) problems from FM broadcast stations. A separate broadband antenna may be fitted if the aircraft is to be used for general interference investigation.

5.4.6.5 Installation considerations

5.4.5.5.1 Antenna installation can affect the flight inspection measurements and the operational use of the aircraft in many ways. The following are a few examples:

a.) Propeller modulation effects can interfere with the received ILS localizer signal over a range of engine power settings. This can severely limit the use of the aircraft for flight inspection. Improving the antenna location is the best solution to this problem, followed by the modification of the propeller frequency. The formula below shows the propeller modulation frequency.

Propeller Modulation Frequency (Hz) = Shaft Rotation Speed (RPM) x Number of Propeller Blades/60

Examples:

3-blade propeller at 1800 RPM: 1800 x 3 / 60 = 90 Hz > BAD for ILS 4-blade propeller at 1800 RPM: 1800 x 4 / 60 = 120 Hz > OK for ILS b.) Physical movement of other antennas, such as the weather radar, may affect the signal received from a glide path antenna located nearby. The weather radar may have to be parked in a known orientation to obtain stable glide path signals.

c.) Cross-coupling between aircraft transmitter antennas and receiving antennas can easily occur. Care must be taken to ensure adequate separation between potential interfering sources, such as VHF communications antennas and VOR/ILS localizer antennas.

d.) Aircraft structures must be taken into account when selecting antenna locations. The mounting of antennas near discontinuities in material types should be avoided if a good ground plane is required. Metallic support rods stowed inside a composite material nose cone can act as re-radiators affecting the performance of a nearby antenna.

e.) When one antenna is used to feed two or more receivers there is potential for receiver interaction resulting in an uncalibrated change to the antenna system gain. It is recommended that separate antennas be provided for the flight inspection receivers. Testing is recommended when a shared antenna must be used to ensure that tuning the second receiver over the band does not affect the signal level reaching the receiver used for coverage measurements.

f.) Changes in aircraft attitude will affect the relative positions of the antenna and tracking reference point if the aircraft measuring antennas are not located at the same point as the reference for the tracking system as seen from the ground. Certain flight inspection systems correct this by using software and inputs from the aircraft navigation sensors.

g.) The position of the phase centre for some types of antennas will vary according to the direction of arrival of the signals. Measurements have shown that the effective phase centre may move outside the physical area of the antenna. This change in position of the phase centre should be included in any correction algorithms which may be used.

5.4.7 Flight inspection receivers and radio communication equipment

5.4.7.1 Flight inspection receivers are to be of the highest quality in order to obtain the accuracy required for flight inspection purposes and should provide additional measurement outputs specific to flight inspection. A dual set of receivers is preferable to reduce statistical errors.

5.4.7.2 Flight inspection receivers include an AGC measurement. The AGC information allows the determination of the field strength if the receiver and antenna characteristic is taken into account. Further components have to be added like a temperature control for the receiver or a further dedicated receiver if the stability of the flight inspection receiver AGC output is not sufficient.

5.4.7.3 Flight inspection receivers used for the calibration of pulsed navigation facilities, such as DME and radars, provide the video signal of these facilities.

5.4.7.4 A radio is included in the flight inspection equipment in order to allow independent communication between the flight inspector and the ground crew, without affecting the pilot.

5.4.8 Data processing, display and recording

5.4.8.1 Modern flight inspection equipment includes a computer, which is used to read the data from the position-reference system and from the flight inspection receivers. The computer processes data in order to compare the facility navigation information and the position reference information. The computer has the capability of determining facility parameters, e.g. ILS localizer course width, alignment, etc.

5.4.8.2The comparison of facility navigation information and position-reference point information may be performed with an analog solution, if the flight inspection system does not include a computer for calculating the results. The facility parameters have to be calculated manually in this case.

5.4.8.3 All relevant information like facility navigation information, reference information, facility error and additional receiver information, such as field strength, is displayed on board the flight inspection aircraft for the operator. Data may be displayed on analog or digital instruments as well as on computer screens.

5.4.8.4 Chart recorders or printers can be used for the documentation of flight inspection results. All data are annotated properly either by the operator or automatically by the data-processing system.

5.4.8.5 All raw data and computed data are recorded in electronic format on tapes or disks, if possible. This enables a later post-processing, if a specific investigation is required.

5.4.9 Regulatory aspects

5.4.9.1 Integration of the systems in the aircraft must not affect the Airworthiness Certificate of the aircraft. Every modification has to be recorded in the technical documentation of the aircraft, along with the approvals of the manufacturer and of the certification authority concerned.

5.4.9.2 Particular operating instructions should be registered in flight and exploitation manuals. If this integration entails any performance limitations or operational restrictions for the aircraft, they should appear clearly in the corresponding documents.

5.4.9.3 The integration of a flight inspection system results from the best compromise taking into account airworthiness constraints.

5.5 Remotely Piloted Aircraft Systems

5.5.1 A basic principle of flight inspection to assess compliance with Annex 10 Standards is to use representative avionics at normal aircraft speeds. While flight inspection aircraft and their avionics are not representative of all aircraft and avionics, they nonetheless facilitate making judgements on the operational relevance of signal anomalies. This principle does not prevent the use of more advanced measurement capabilities both in ground and flight testing; however, it requires that good correlation (impact of filtering, etc.) needs to be established.

5.5.2 The use of Remotely Piloted Aircraft Systems (RPAS) or Unmanned Aircraft Systems (UAS) for the conduct of complete flight inspections should be evaluated to ensure that they possess the necessary payload capacity, speed, and range to perform flight inspection operations in accordance with CAAT regulations and the provisions of Doc 8071.

5.5.3 Remotely Piloted Aircraft Systems (RPAS) or Unmanned Aircraft Systems (UAS) may also be utilized to conduct supplementary measurements at increased frequencies, thereby contributing to the reduction of the number of complete flight inspections required to be performed by conventional flight inspection aircraft.

5.5.4 The application of Remotely Piloted Aircraft Systems (RPAS) or Unmanned Aircraft Systems (UAS) for the purposes specified in 4.5.2 and 4.5.3 shall be subject to approval by CAAT.

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 6 Documentation and Records

6.1 Documentations

6.1.1 Flight inspection service provider shall hold copies of the relevant system manuals, technical standards and MOS.

6.1.2 The provider shall establish a procedure to control all the documentation to ensure that

a.) All incoming documentation is reviewed, and directed as required, by authorized personnel;

b.) All documentation is reviewed by appropriate personnel;

c.) Current of the relevant documentation are available to personnel at all locations where they need access to such documentation;

d.) All obsolete documentation is promptly removed from all points of issue or use;

e.) Any obsolete documents retained as archives are suitably identified as obsolete;

f.) Changes to documentation are reviewed and approved by appropriate personnel who shall have access to pertinent background information upon which to base their review and approval;

g.) The current version of each item of documentation can be identified to preclude the use of out-of-date editions

6.2 Records

6.2.1 The flight inspection service provider shall establish procedures to store, maintain and dispose of flight inspection reports and relevant data from the flight inspection system.

6.2.2 The flight inspection service provider shall establish procedures to store, maintain and dispose of records for each Flight Inspection Operator. The record shall include details of their experience, qualifications, training, competence assessments and current certifications.

6.2.3 The flight inspection service provider shall establish procedures to identify, collect, index, store, maintain and dispose of, in a manner to facilitate:

a.) safe provision and operation of the flight inspection system listed in their exposition;

b.) assistance with any accident or incident investigation;

6.2.4 Flight inspection reports, records and graph have minimum requirements as stated in Appendix A.

6.2.5 The procedures shall ensure that a record is kept for each flight inspection system in order to

a.) Provide the date of installation;

b.) Document the performance of the flight inspection system; and

c.) Provide a history of its maintenance and the periodic tests. The history shall be traceable to the person or persons responsible for each of the recorded activities.

6.2.6 A record for each item of test equipment required for the measurement of critical performance parameters. The record shall provide a traceable history of the location, maintenance, and the calibration checks for such test equipment.

6.2.7 A record of each flight inspection system malfunction recorded and investigated. The record shall detail the nature of the malfunction, the findings of the investigation, the follow up corrective actions, or where applicable include a copy of the report forwarded to the accountable manager.

6.2.8 A record for each person who is authorized by the provider to place flight inspection system into operational service. The record shall include details of their experience, qualifications, training, competence assessments and current authorizations.

6.2.9 The record can be either hardcopy or softcopy or any combination of both and shall be stored in a safe way with regards to fire, flood and theft.

6.2.10 The hardcopy records shall use robust material which can withstand normal handling and filling. The record shall legible throughout the required retention period.

6.2.11 The softcopy records used for maintenance records shall have at least one backup system which shall be updated regularly.

6.2.12 Each terminal is required to contain program safeguards against the ability of authorized personnel to alter the data base.

6.2.13 The maintenance record shall be inspected and stored.

6.2.14 The flight inspection service provider shall facilitate records for inspections and audits carried out by CAAT

6.3 Retention period

6.3.1 Records of flight inspection reports from the FIS shall be retained for the period that the Navaid, or the IFP is available for use. Flight inspection report records from the FIS shall be retained for the entire period during which the Navaid, visual aid, or Instrument Flight Procedure (IFP) remain operational and available for use.

6.3.2 Unless otherwise specified by CAAT, all flight inspection system records are retained for a period of at least 3 years

6.3.3. Staff records shall be retained for the duration of their employment.

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 7 Flight Inspection Service Administration

7.1 General

The flight inspection services provider shall comply with Standard and Recommended Practices of ICAO Annex 10, Annex 14, and should comply with Doc 8071, Doc 9157, Doc 9906 and other standards related to flight inspection.

7.2 Flight inspection plans

The flight inspection service provider shall submit comprehensive annual and monthly flight inspection plans to CAAT.

7.3 Electromagnetic interference

If there is electromagnetic interference. All reports of suspected interference shall be notified the CNS service provider responsible of the facility.

7.4 Notify of immediate deficiencies

The provider shall establish procedures to ensure communication with the provider of the radio navigation aid and/or the visual aid to notify immediately notifiable deficiencies.

7.5 Flight inspection scenarios

7.5.1 The provider shall establish pre-flight and post-flight procedures for the following scenarios:

7.5.1.1 Site proving: In the case where a portable ground installation is used, a flight test is conducted at the proposed site at the option of the responsible authority to determine the effects of the environment on the performance of the planned radio navigation aid.

7.5.1.2 Commissioning: An extensive flight inspection following ground proof-of-performance inspection to establish the validity of the signals-in-space. The results of this inspection should be correlated with the results of the ground inspection. Together they form the basis for certification of the facility.

7.5.1.3 Periodic: Flight inspections to confirm the validity of the signals-in-space on a regular basis or after major scheduled facility maintenance.

7.5.1.4 Special: Flight inspections required as a result of certain corrective maintenance activities, reported or suspected degradation of signal-in-space performance, aircraft accidents, etc. Typically, it is necessary to test only those parameters which have or might have an effect on facility performance. However, it may be economically advantageous in many cases to complete the requirements for a periodic inspection.

7.6 Flight inspection intervals

7.6.1 Unless otherwise approved by CAAT, Flight inspection intervals of each navigation aid and visual aid shall be comply with the table in Appendix B.

7.6.2 Operator may extend a flight inspection interval for not more than 30 days from the table in Appendix B based on the following considerations:

7.6.2.1 An initial demonstration of stability over four consecutive periodic flight inspections with Instrument Landing System (ILS) and/or two consecutive periodic flight inspections for other navigation aids and visual aids with no transmitter adjustments.

7.6.2.2 The good correlation between concurrent ground and airborne results.

7.6.2.3 The facility is adequately safeguarded against changes in the operational environment.

7.7 Flight inspection report

7.7.1 Flight inspection reports, records and graphs shall have the minimum content as stated in Appendix A.

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 8 Flight Validation of Instrument Flight Procedures

8.1 The Need for Validation of Instrument Flight Procedures

8.1.1 The purpose of validation is to obtain a qualitative assessment of the procedure design including obstacle, terrain and navigation data, and provide an assessment of the flyability of the procedure.

8.1.2 Validation is the final quality assurance step in the procedure design process for instrument flight procedures (IFP) and is essential before the procedure design documentation is issued as part of the integrated aeronautical information package.

8.2 The Validation Process

8.2.1 The full validation process includes ground validation and flight validation.

8.2.2 Flight validation consists of flight simulator evaluation and/or evaluation flown in an aircraft.

8.2.3 Flight validation is required under the following conditions:

a.) the flyability of a procedure cannot be determined by other means;

b.) the procedure requires mitigation for deviations from design criteria;

c.) the accuracy and/or integrity of obstacle and terrain data cannot be determined by other means;

d.) new procedures differ significantly from existing procedures; and

e.) for helicopter PinS procedures.

8.3 Preflight Validation

Preflight validation must be conducted by persons trained in flight procedure design and with appropriate knowledge of flight validation issues. This may be a joint activity by flight procedure designers and pilots. The required qualification for pilots involved in the preflight validation step must be determined by State policy. Preflight validation should identify the impact of a flight procedure on flight operations, and any issues identified should be addressed prior to flight validation. Preflight validation determines the subsequent steps in the validation process.

Note.— Several States define the qualification for pilots involved in the preflight validation step according to PANS-OPS, Volume II, Part I, Section 2, Chapter 4, 4.6.6, and Doc 9906, Volume 6.

8.3.1 Conduct inventory and review of the IFP package

Persons performing preflight validation must ensure that the IFP documentation is complete and that all necessary charts, data and forms are available. As a minimum, the following tasks must be performed:

a.) Ensure the completeness of the IFP package (i.e. that all forms, files and data are included) as described in Chapter 1, 1.5.1, of this manual.

b.) Ensure that charts and maps are available in sufficient detail for assessment of the IFP during the FV.

c.) Familiarize with the target population of the procedure (e.g. aircraft categories, type of operation).

d.) Discuss the IFP package with the procedure designer, as necessary.

e.) Verify that the IFP procedure graphics and data match.

f.) Compare the IFP design, coding and relevant charting information against the navigation database used for flight validation.

g.) Verify that controlling obstacles and obstacles otherwise influencing the design of the procedure are properly identified.

h.) Review the airport infrastructure and special airport regulations.

i.) Review the navigation infrastructure used by the procedure.

j.) Review pertinent flight inspection documentation, if required.

8.3.2 Evaluate data and coding

8.3.2.1 For an IFP based on area navigation, the true course to the next waypoint, distances and altitudes that reflect the flight procedure design must be verified. Leg segment data accuracy must be evaluated by comparison of the procedural waypoint data to the flight plan waypoint data.

8.3.2.2 When evaluating CF legs or holding legs (HM, HF, HA), aircraft navigation performance with the instrument procedure design must be compared. Any tolerance to course-to-fix values cannot be applied. Confirmation of proper ARINC coding must be accomplished with either an appropriately equipped aircraft or by a desktop evaluation of the current navigation database.

8.3.2.3 Out-of-tolerance values or questionable ARINC 424 coding must be resolved.

8.3.2.4For an IFP based on ground-based navigation aids, the course, distances and the FPA indicated on the IFP depiction and submission form of the procedure design should be verified. Where positive course guidance is required by the IFP design, it must be confirmed that the performance of navigation aids meets all required flight inspection tolerances in conjunction with the flight validation.

8.3.2.5 The following are the steps to evaluate data and coding:

a.) Prepare loadable data and coding.

b.) Compare true courses and distances for segments between the data file and the procedural data.

c.) Compare ARINC 424 coding for legs and path terminators between the data file and the procedural data.

8.3.2.6 When the flight procedure design involves a complex new procedure or a significant change to existing procedures/routes in a complex airspace, the State must liaise with the major commercial navigation data houses prior to promulgation. This liaison should provide the data houses with additional advance notice of the proposed changes and should allow them to review the proposed procedures, clarify any outstanding questions and advise the State of any technical issues that may be identified. Advance notification of procedures should contain the following elements:

a.) graphical layout of the procedure;

b.) a textual description of the procedure;

c.) coding advice, when applicable; and

d.) coordinates of fixes used in the procedure.

8.3.3 Review special operational and training requirements

8.3.3.1 Review deviations from criteria and ensure that an equivalent level of safety is provided by waivers/mitigations.

8.3.3.2 Review the safety case supporting the waiver/mitigation.

8.3.3.3 Assess restricted procedures for special training and equipment requirements.

8.3.4 Document the results of preflight validation

8.3.4.1 Determine if a flight inspection is necessary.

8.3.4.2 Determine the need for flight simulator evaluation, especially where there are special or unique design considerations.

8.3.4.3 Determine the need for flight evaluation in the aircraft, especially where there are special or unique design considerations or when the accuracy/integrity of the data used in the IFP design and/or the aerodrome environment is not assured.

8.3.4.4 Record specific additional actions required in a flight validation (if required).

8.3.4.5 Provide a detailed written report of the results of preflight validation. (See Appendix D for fixed-wing sample report forms. See Appendix E for helicopter sample report forms.)

8.3.4.6 Flight evaluation using aircraft is required in the following cases:

a.) for procedures where runway or landing location infrastructure has not been previously assessed in flight for instrument operations; and

b.) as determined by CAAT.

8.3.5 Coordinate operational issues (if flight evaluation is required)

a.) Consider temperature and wind limitations, air speeds, bank, angles, climb/descent gradients, etc.

b.) Determine the aircraft and equipment required to complete flight validation of the IFP.

c.) Determine airport infrastructure and navigation aid/sensor availability.

d.) Check weather minima and visibility required for flight validation. Conduct the initial assessment in daylight conditions in VMC in each segment with visibility requirements sufficient to perform obstacle assessment.

e.) Assess the need for a night evaluation in the case of at least one of the following circumstances:

1) an IFP developed for an airport with no prior IFR procedures;
2) an IFP to newly constructed runways or to runways lengthened or shortened;
3) addition of lights to, or reconfiguration of lights in, an existing system already approved for IFR operations; and
4) circling procedures intended for night use.

8.3.6 Coordinate with the ATS service provider and other stakeholders in accordance with the instrument flight procedure process documented in Volume 1 of Doc 9906.

8.4 Simulator Evaluation

8.4.1 General

8.4.1.1 Simulator evaluation must be accomplished by a qualified and experienced FVP, certified by CAAT.

8.4.1.2 To provide an initial evaluation of database coding, flyability and to provide feedback to the procedure designers, simulator assessment might be necessary. Simulator evaluation must not be used for obstacle assessment. Preparation for simulator evaluation should include a comprehensive plan with a description of the conditions to be evaluated, profiles to be flown and objectives to be achieved. A review of the results of simulator evaluation should be completed before flight evaluation.

8.4.1.3 The simulator used should be suitable for the validation tasks to be performed. For complex or special procedures where simulator evaluation is desired, the evaluation should be flown in a simulator which matches the procedure requirements. When the procedure is designed for a specific aircraft model or series and specific FMS and software, simulator evaluation should be flown in a simulator with the same configuration used by the operator in daily operations.

8.4.1.4 Required navigation performance authorization required (RNP AR) IFP(s) must always undergo simulator evaluation.

8.4.1.5 The following steps should be taken when conducting simulator evaluation: simulator equipment in terms of:

a.) Evaluate the suitability of the

1) FMS and avionics;

2) simulator type and/or category.

b.) Conduct simulator evaluation:

1) Evaluate flyability.

2) Evaluate database coding and accuracy.

3) Verify that waivers/mitigations for deviations from design criteria do not compromise safety.

4) Where permitted by the simulator, evaluate any other factors (such as wind, temperature and barometric pressure) that may be pertinent to the safety of the procedure.

c.) Document the results of simulator evaluation:

1) Assess whether the IFP is ready for further processing in the validation process.

2) Provide a detailed written report of the results of simulator evaluation.

8.4.2 Assess flyability and Human Factors issues

8.4.2.1 To assess flyability and Human Factors issues, at least one on-course/on-path assessment of the proposed procedure should be flown in an appropriate aircraft capable of conducting the procedure. If different minima are provided for the same final segment (e.g. LNAV, LNAV/VNAV, LPV), the evaluation of the final segment must be accomplished on separate runs. See Appendix B for more detailed Human Factors information.

8.4.2.2 The objectives of a flyability assessment of instrument flight procedures are to:

a.) evaluate aircraft manoeuvring areas for safe operations for each category of aircraft for which the procedure is intended; and

b.) review the flyability of the instrument procedure as follows:

1) fly each segment of the IFP on-course and on-path;

2) validate the intended use of the IFP as defined by stakeholders and described in the conceptual design;

3) evaluate other operational factors, such as charting, required infrastructure, visibility and intended aircraft categories;

4) evaluate the aircraft manoeuvring area for safe operations for each category of aircraft to use the IFP;

5) evaluate turn anticipation and the relationship to standard rate turns and bank angle limits;

6) evaluate the IFP complexity, required cockpit workload and any unique requirements;

7) check that waypoint spacing and segment length are suitable for aircraft performance;

8) check the distance to runway at decision altitude/height or minimum descent altitude/height that is likely to be applied by operators and evaluate the ability to execute a landing with normal manoeuvring;

9) evaluate required climb or descent gradients, if any;

10) evaluate the proposed charting for correctness, clarity and ease of interpretation;

11) evaluate TAWS warnings.

8.4.2.3 The flyability assessment must be flown at speeds and aircraft configurations consistent with normal IFR operations and meet the design intent (aircraft category). The final approach fix to threshold of an instrument approach procedure must be flown in the landing configuration, on profile, on speed and with the TAWS active. Flyability should be evaluated with the simulator/aircraft coupled to the autopilot (to the extent allowed by the aircraft flight manual or SOPs) and may require additional evaluation by hand flying.

8.4.2.4 Aircraft category restrictions might be published and must be confirmed acceptable. In every case, the pilot is required to pay particular attention to the general safe conduct of the procedure and efficiency of the flight for the intended aircraft category.
Note.— It is recommended that if different minima are provided for the same final segment (e.g. LNAV, LNAV/VNAV, LPV), that evaluation of the final segment be accomplished on separate runs.

8.4.3 Document the results of flight simulator evaluation
A detailed written report of the results of flight simulator evaluation needs to be provided. (See Appendix D for fixed-wing sample report forms. See Appendix E for helicopter sample report forms.)

8.5 Flight Evaluation

8.5.1 General

8.5.1.1 Flight evaluation must be accomplished by a qualified and experienced FVP.

8.5.1.2 The objectives of flight evaluation are to validate the intended use of the IFP as defined by stakeholders and described in the conceptual design and to evaluate other operational factors, such as charting, required infrastructure, visibility and intended aircraft category.

8.5.1.3 The FVP must occupy a seat in the cockpit with visibility adequate to conduct the flight validation, and additional crew members must be briefed on FV requirements. Only task-related persons should normally be allowed on such flights.

8.5.1.4 Ground track path error performance varies with mode of flight guidance system coupling. New procedures should be evaluated coupled to the flight director and autopilot (when not prohibited). Lateral and vertical disconnects from the autopilot/flight director should be evaluated.

8.5.1.5 Procedure design is based on true altitudes. Flight evaluation should be conducted at true altitudes with consideration for temperature variations from standard day. Lateral and vertical transitions from departure, en route, descent and approach must produce a seamless path that ensures flyability in a consistent, smooth, predictable and repeatable manner.

8.5.1.6 The procedure must be flown in the navigation mode using the correct sensor, or with navigation equipment that permits the flight to be conducted at an equivalent level of performance, as required by the design. For example, for IFP based on GNSS, it needs to be ensured that only the GNSS sensor is utilized during the FV. All the following required steps should be adapted to the specifics of each design and IFP:

a.) Conduct an assessment of flyability to determine that the procedure can be safely flown.

b.) Provide the final assurance that adequate terrain and obstacle clearance have been provided.

c.) Verify that the navigation data to be published are correct.

d.) Verify that all required infrastructure, such as runway markings, lighting, and communications and navigation sources are in place and operative.

e.) Ensure the navigation system's documentation confirms that the applicable navigation systems (navigation aid/sensor, GNSS, radar, etc.) support the procedure.

f.) Evaluate other operational factors, such as charting, required infrastructure, visibility and intended aircraft category.

g.) Verify that waivers/mitigations for deviations from design criteria do not compromise safety.

Note.— Where applicable, credit for the results of simulator evaluation can be given.

8.5.1.7 For complex procedures including helicopter PinS and RNP AR, additional flyability checks are required in the proponent's aircraft or simulator.

8.5.1.8 IFPs based on SBAS or GBAS require analysis of additional parameters contained in the FAS data block and data link (GBAS). These parameters include:

a.) glide path angle;

b.) threshold crossing height (LTP or FTP);

c.) LTP coordinates or FTP; and

d.) FPAP coordinates.

8.5.1.9 Verification of the spatial data contained in the final approach segment definition is required. Any error in the coded data with respect to the proper reference datum may result in improper final approach guidance to the pilot. The FAS data evaluation system must be capable of performing the necessary analysis in a documented, quantitative process as described in 7.5.2.3

Note.— For GBAS, additional inspection requirements are specified in Doc 8071, Volume II, Chapter 4.

8.5.2 Verify data

8.5.2.1It is essential that the data used in the procedure design are consistent in the charts, FMS data or suitable navigation system data. The validation flights (simulator or aircraft) should be recorded with a collection/recording device that archives the procedure and aircraft positioning data (see 2.4.7). The procedure development package, charts and airport data must match. It is recommended that PBN procedures are packed and loaded electronically into the FMS or suitable navigation system without manually coding the ARINC 424 path/terminator data. Integrity measures such as a cyclic redundancy check (CRC) should be used to ensure that data are not corrupted. This allows evaluation of the data as designed, without manipulation. If the procedure waypoint data are manually entered into the FMS, they must be independently compared to the procedure data to ensure they match.

8.5.2.2 The following steps should be taken to verify data:

a.) Ensure that the data from the flight validation database match the data used in the procedure design.

b.) Ensure that the data produce the desired flight track.

c.) Ensure that the final approach course glide path delivers the aircraft to the desired point-in-space.

8.5.2.3 SBAS/GBAS FAS data requirements

For SBAS and GBAS FAS data, the LTP/FTP latitude and longitude, the LTP/FTP ellipsoid height and the FPAP latitude and longitude contribute directly to the final approach alignment and angle. Corrupted data may skew lateral, vertical and along-track alignment from the intended design. A direct assessment should be made of the LTP latitude/longitude, LTP ellipsoid height, and FPAP latitude/longitude coordinates used in the procedure design. This may be accomplished using a survey grade GNSS receiver on the runway threshold while making a comparison with the actual final approach segment data to be published. Another indirect method is to evaluate the following IFP characteristics as a means of validating the FAS data:

a.) horizontal course characteristics:

1) misalignment type, linear or angular; and

2) measured angular alignment error in degrees (when applicable) and linear course error/offset at the physical runway threshold or decision altitude point.

b.) vertical path characteristics:

1) achieved/measured TCH/RDH; and

2) glide path angle.

8.5.3 Assess obstacles

Detailed guidance regarding obstacle assessment can be found in Appendix F. In general, obstacles should be visually assessed to the lateral limits of the procedure design segment. The aircraft should be positioned in a manner that provides a good view of the obstacle environment that is under consideration. This may require flying the lateral limits of the procedure protection areas in order to detect if unaccounted obstacles exist. The controlling obstacle should be verified for each segment of the IFP. Should unaccounted obstacles be observed, further investigation by the FVP is required.

8.5.4 Assess flyability and Human Factors issues. The same provisions as in 7.4.2 apply.

8.5.5 Conduct associated validation tasks

8.5.5.1 The following associated validation tasks should be performed in conjunction with the obstacle or flyability assessment as appropriate:

a.) Verify that all required runway markings, lighting and communications are in place and operative.

b.) Verify that any required navigation aids/sensors have been satisfactorily flight inspected to determine that they support the procedure design.

c.) Ensure that the components of the VASIS angles appear as intended or charted when evaluating vertically guided procedures.

d.) Ensure that adequate ATS communications, according to State regulations, are available.

e.) Where required, ensure that radar coverage is available for all portions of the procedure.

f.) Indicate any TAWS warnings or alerts. Record details of the alert to include latitude/longitude, aircraft configuration, speed and altitude.

g.) If night evaluation is required, determine the adequacy of airport lighting systems prior to authorizing night operations. Conduct night evaluations during VMC following appropriate daytime evaluation.

8.5.5.2 The lighting system needs to be evaluated for:

a.) correct lighting facilities (particularly if pilot activated) and lighting patterns as charted; and

b.) local lighting patterns in the area surrounding the airport to ensure they do not distract, confuse or incorrectly identify the runway environment.

8.5.5.3 It needs to be verified that waivers/mitigations for deviations from design criteria do not compromise safety.

8.5.6 Verify chart depiction and details

a.) Ensure that the chart has sufficient detail for significant terrain or obstacles to be safely navigated and identified.

b.) Ensure all required notes are included (e.g. DME required, do not confuse RWY 14 with RWY 16, non- standard approach angle).

c.) Ensure that the chart accurately portrays the procedure in both plan and profile view and is easily interpreted. Ensure that the flight track matches the chart and takes aircraft to the designed point.

d.) Verify that the true and magnetic course to the next waypoint indicated on the FMS or GNSS receiver accurately reflects the procedure design. (Magnetic courses displayed by the FMS/GNSS navigator may be dependent upon the manufacturer's software processing of magnetic variation.)

e.) Verify that segment distances indicated by the aircraft navigation system accurately reflect the procedure design.

f.) Verify that the FPA indicated on the FMS or GNSS receiver accurately reflects the procedure design.

g.) Check that waypoint spacing and segment length are sufficient to allow the aircraft to decelerate or change altitude on each leg without bypassing.

8.5.7 Record flight validation

8.5.7.1 A recording device should be used that is capable of the following: IFP storage, time and three- dimensional position in space with an acceptable sampling rate (not less than 1 Hz) and the ability to post-process recorded data.

8.5.7.2Record and save the following flight data as a minimum;

a.) processing date and time;

b.) number of satellites in view;

c.) minimum number of satellites;

d.) average PDOP;

e.) maximum observed HDOP (SBAS procedures only);

f.) VPL (SBAS/GBAS procedures only);

g.) HPL (SBAS/GBAS procedures only);

h.)maximum observed VDOP (SBAS procedures only);

i.) for each segment, the maximum and minimum altitude, ground speed, climb rate and climb gradient; and

j.) printed graphic or an electronic file of sufficient detail that depicts the horizontal (and the vertical for VNAV procedures) flight track flown, referenced to the desired track of the approach procedure, including procedure fixes.

Note.— The recording of HDOP, PDOP, VDOP, HPL and VPL is a collection of data in a limited time frame and its purpose is to document the actual situation at the time of the validation flight.

8.5.7.3 SBAS and GBAS IFPs require analysis of additional parameters contained in the FAS data block. FAS data block validation requires verification of the coordinates and heights used in the FAS or by indirect flight inspection system analysis of the IFP characteristics described in 7.5.2.3

8.6 Produce Validation Report

8.6.1 Assess the results of the validation process as follows:

a.) Review all aspects of the validation process to complete the assessment.

b.) Make a determination of satisfactory or unsatisfactory results, based on criteria established by the State.

8.6.2 For satisfactory validation, complete the IFP processing as follows:

a.) Ensure the completeness and correctness of the IFP package to be forwarded.

b.) Propose suggestions for improved operation of the procedure when such factors are outside the scope of the procedure design (e.g. ATC issues).

8.6.3 For unsatisfactory validation, return the IFP to the procedure designer for corrections:

a.) Provide detailed feedback to the procedure designer and other stakeholders.

b.) Suggest mitigation and/or corrections for unsatisfactory results.

8.6.4 Document the results of the validation process as follows:

a.) Complete a detailed written report of the results of the validation process including justification for any steps in the validation process deemed not required. This involves a compilation of reports provided by the individual steps in the validation process.

b.) Ensure that any findings and operational mitigations are documented.

c.) Forward uncharted controlling obstacle position and elevation data to the procedure designer.

d.) Ensure that recorded data are processed and archived together with the IFP and validation documentation.

Note.— Templates of checklists and reports are contained in Appendix D (fixed wing) and Appendix E (helicopters).

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix A Flight Inspection Report

All flight inspection results shall be documented to a report format agreed with CAAT. Moreover, the description for each item in the report shall be given in the operations manual. The minimum information to be provided on the report shall be:

- station name and facility designation
- category of operation
- date(s) of inspection
- serial number of report / unique identifier
- type of inspection
- aircraft registration
- manufacturer and type of system being inspected
- wind condition, to allow cross-wind to be established (if necessary)
- names and functions of all personnel involved in the inspection
- details of associated attachments
- details of extra flights made necessary by system adjustments
- an assessment by the flight crew of the navigation facility performance
- comments by the flight inspector operator personnel
- details of any immediately notifiable deficiencies
- results and tolerances
- signatures of flight inspection operator personnel

Records and Graphs

If recordings or graphs are used to present results for the flight inspection report, the scales shall be chosen so that it can be determined if the measurement is within the uncertainty parameters.

The raw data from which the records and graphs are produced shall be retained and archived in a form where it can be re-processed if necessary.

Recordings shall be marked so that they can be correlated with the aircraft's position at the time of the measurement.

The minimum identification on each record and graph shall be:

- Serial number;
- Date;
- Description of type of flight;
- Name of airport;
- Designation of facility being inspected;
- Graphs;
- Signatures of flight inspection operator personnel

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix B Schedule for Periodic Flight Inspection

Facility	Interval (days)
ILS , LOC	180
RADAR	365
NDB	365
VOR	365
VGSI	365
DME, NDB facilities associated with an Instrument Approach Procedure, Marker Beacons, Communications, and Approach Lighting Systems	Inspect these facilities at the same interval as the system or procedure they support.

Notes;

Inspect these facilities at the same interval as the system or procedure they support.

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix C Training Manual

Contents in training manual shall contain at least of the following:

- General
- Organization name, document title, reference number
- Amendment status, issue number, date, amendment record
- Approval by appropriate manager
- Operating manual administrator
- Distribution list
- Contents list
- Purpose of document
- Definition
- Training procedure
- Training program for each type of operators
- Pilot
- Pilot Instructor
- Panel Operator
- Theodolite Operator
- Etc.
- Training courses of each programs
- Any forms that related to training with description
- Course description
- Objectives
- Prerequisite
- Instructor qualification
- Delivery method
- Training aids
- Course syllabus
- Examination method
- Pass criteria
- Additional training

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix D Validation Templates for Fixed-Wing Aircraft

The following sample checklist and report templates contain suggested minimum data and information required to be recorded during the validation process. If certain items are not applicable to the intended IAP, identify those items by striking them out or using the term "N/A". These forms must be signed.

D.1 Preflight Validation Checklist — Fixed Wing

PREFLIGHT VALIDATION CHECKLIST — FIXED WING	
REPORT HEADER	
Date:	Validation type (new/amended procedure):
Organization:	
Procedure title:	
Location:	
Airport:	Runway:
Evaluator's name/telephone no.:	
PBN navigation specification:	

PREFLIGHT VALIDATION		
	SATISFACTORY	
	YES	**NO**
IFP package forms, charts and maps		
Data verification (e.g. aerodrome/heliport, aeronautical, obstacle, ARINC coding)		
Location of the controlling obstacles		
Correctness and complexity of the graphical depiction (chart)		
Intended use and special requirements		
Overall design (i.e. practical, complete, clear and safe)		
Impact on the procedure of waivers to standard design criteria		
Segment lengths and descent gradients allow for deceleration/configuration		
Comparison of FMS navigation database with the IFP design, coding and relevant charting information		
Charting of notification of cold/warm temperature limits		
Flight inspection reports available		

REMARKS				
Simulator evaluation needed			**YES**	**NO**
Flight evaluation needed			**YES**	**NO**
PROCEDURE	**PASS**		**FAIL**	
EVALUATOR'S SIGNATURE: Date:				

D.2 Simulator Evaluation Checklist — Fixed Wing

SIMULATOR EVALUATION CHECKLIST — FIXED WING		
REPORT HEADER		
Date:	Validation type (new/amended procedure):	
Organization:		
Procedure title:		
Location:		
Airport:	Runway:	
Evaluator's name/telephone no.:		
PBN navigation specification:		

	SATISFACTORY	
	YES	**NO**
Comparison of FMS navigation database and source documents, including proper ARINC 424 coding		
Provide simulator documentation, including FMS software		
Assessed faster and/or slower than charted		
Assessed at allowed temperature limits		
Assessed with adverse wind components		
Flight track matches procedure design		
Flyability		
Human Factors assessment		
ADDITIONAL REQUIREMENTS FOR SIMULATOR ACTIVITIES		
	COMPLETED	
Document the following information as satisfactory or not for each procedure segment as appropriate: heading/track, distance, TAWS alerts, flight path angle (for final segment only) and note the wind component and temperature conditions		
Note the maximum bank angle achieved during any RF segments		
Record simulation data (if applicable)		

REMARKS				
PROCEDURE	**PASS**		**FAIL**	

EVALUATOR'S SIGNATURE:

Date:

D.3 Flight Evaluation Checklist — Fixed Wing

FLIGHT EVALUATION CHECKLIST — FIXED WING	
REPORT HEADER	
Date:	Validation type (new/amended procedure):
Organization:	
Procedure title:	
Location:	
Airport:	Runway:
Evaluator's name/telephone no.:	
PBN navigation specification:	

PLANNING	
	COMPLETED
Check that all the necessary items from the IFP package are available, including: graphics, text, maps, submission form	
Check that the necessary flight validation forms are available	
Check that the aircraft and avionics are appropriate for the IFP being evaluated	
Does the procedure require use of autopilot or flight director?	

PREFLIGHT	
	COMPLETED
Review preflight validation assessment	
Review simulator evaluation assessment (if applicable)	
Obstacle assessment planning: areas of concern; ability to identify and fly lateral limits of obstacle assessment area (if required)	
Verify source of IFP data for aircraft FMS (electronic or manual creation)	
Evaluate navigation system status at time of flight (NOTAM, RAIM, outages)	
Weather requirements	
Night evaluation requirement (if applicable)	
Required navigation (NAVAID) support (if applicable)	
Combination of multiple IFP evaluations	
Estimated flight time	
Coordination (as required) with ATS, procedure designer, airport authority	
Necessary equipment and media for electronic record of validation flight	

GENERAL		
	SATISFACTORY	
	YES	**NO**
IFP graphic (chart) is complete and correct		
Check for interference: document all details related to detected RFI		
Satisfactory radio communication		
Required radar coverage is satisfactory		
Verify proper runway markings, lighting and VASIS		
Altimeter sources		
Extra consideration given to non-surveyed areas		
For approach procedures with circling minima, verify controlling obstacle for each circling category		

FLYABILITY		
	SATISFACTORY	
	YES	NO
Comparison of FMS navigation database and source documents, including proper ARINC 424 coding. *Note.— If manual entry is used, this field is marked "N/A", and a note must be inserted in the remarks section to alert the approving authority of the procedure that a table top review of the coded procedure, or an operational assessment by a company pilot, should be completed prior to operational approval being granted.*		
Human Factors and general workload are satisfactory		
Was there any loss of RAIM?		
Was there any loss of required RNP (where applicable)?		
Missed approach procedure		
Descent/climb gradients		
Procedure flown auto-coupled		
Segment length, turns and bank angles, speed restrictions and deceleration allowance		
TAWS		
INSTRUMENT APPROACH PROCEDURE		
	SATISFACTORY	
	YES	NO
Segment lengths, headings/tracks and waypoint locations match procedure design		
Final segment vertical glide path angle (if applicable)		
Threshold crossing height (LTP or FTP), if applicable.		
Course alignment		
Along-track alignment		
FAS data block		

REMARKS				
PROCEDURE	**PASS**		**FAIL**	
EVALUATOR'S SIGNATURE: Date:				

D.4 Validation Report Checklist — Fixed Wing

VALIDATION REPORT CHECKLIST — FIXED WING	
REPORT HEADER	
Date:	Validation type (new/amended procedure):
Organization:	
Procedure title:	
Location:	
Airport:	Runway:
Evaluator's name/telephone no.:	
PBN navigation specification:	

POST FLIGHT	
	COMPLETED
Evaluate collected data	
Submit flight validation report with recorded electronic flight data for archives	
Request NOTAM action (if appropriate)	
Sign and submit the IFP submission documentation	

REMARKS				
PROCEDURE	**PASS**		**FAIL**	
EVALUATOR'S SIGNATURE: Date:				

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix E Validation Templates for Helicopters

The following sample checklist and report templates contain suggested minimum data and information required to be recorded during the flight validation process of an RNAV IAP including SBAS. If certain items are not applicable to the intended IAP, identify those items by striking them out or using the term "N/A". These forms must be signed.

E.1 Preflight Validation Checklist — Helicopters

PREFLIGHT VALIDATION CHECKLIST — HELICOPTER	
REPORT HEADER	
Date:	Validation type (new/amended procedure):
Organization:	
Procedure title:	
Location:	
Heliport:	Heliport:
Evaluator's name/telephone no.:	
PBN navigation specification:	

PREFLIGHT VALIDATION		
	SATISFACTORY	
	YES	**NO**
IFP package forms, charts and maps		
Data verification (e.g. aerodrome/heliport, aeronautical, obstacle, ARINC coding)		
Location of the controlling obstacles		
Correctness and complexity of the graphical depiction (chart)		
Intended use and special requirements		
Overall design (i.e. practical, complete, clear and safe)		
Impact on the procedure of deviations from design criteria		
Segment lengths and descent gradients allow for deceleration/configuration		
Flight inspection reports available		

REMARKS				
Simulator evaluation needed			**YES**	**NO**
Flight evaluation needed			**YES**	**NO**
PROCEDURE	**PASS**		**FAIL**	
EVALUATOR'S SIGNATURE: Date:				

E.2 Simulator Evaluation Checklist — Helicopters

SIMULATOR EVALUATION CHECKLIST — HELICOPTER		
REPORT HEADER		
Date:	Validation type (new/amended procedure):	
Organization:		
Procedure title:		
Location:		
Heliport:	Heliport:	
Evaluator's name/telephone no.:		
PBN navigation specification:		
	SATISFACTORY	
	YES	**NO**
Comparison of FMS navigation database and source documents, including proper ARINC 424 coding		
Provide simulator documents, including FMS software		
Assessed faster and/or slower than charted		
Assessed with adverse wind components		
Flight track matches procedure design		
Flyability		
Human Factors assessment		
ADDITIONAL REQUIREMENTS FOR SIMULATOR ACTIVITIES		
	COMPLETED	
Document the following information as satisfactory or not for each procedure segment as appropriate: heading/track, distance, TAWS alerts, flight path angle (for final segment only) and note the wind component and temperature conditions		
Note the maximum bank angle achieved during any RF segments		
Record simulation data (if applicable)		

REMARKS				
PROCEDURE	**PASS**		**FAIL**	
EVALUATOR'S SIGNATURE: Date:				

E.3 Flight Evaluation Checklist — Helicopters

FLIGHT EVALUATION CHECKLIST — HELICOPTER		
REPORT HEADER		
Date:	Validation type (new/amended procedure):	
Organization:		
Procedure title:		
Location:		
Heliport:	Heliport:	
Evaluator's name/telephone no.:		
PBN navigation specification:		
PLANNING		
	COMPLETED	
Check that all the necessary items from the IFP package are available, including: graphics, text, maps, submission form		
Check that the necessary flight validation forms are available		
Check that the aircraft and avionics are appropriate for the IFP being evaluated		
Does the procedure require use of autopilot or flight director?		
PREFLIGHT		
	COMPLETED	
Review preflight validation assessment		
Review simulator evaluation assessment (if applicable)		
Obstacle assessment planning: areas of concern; ability to identify and fly lateral limits of obstacle assessment area (if required)		
Verify source of IFP data for aircraft GPS/GNSS/FMS (electronic or manual creation)		
Evaluate navigation system status at time of flight (NOTAM, RAIM, outages)		
Weather requirements		
Night evaluation requirement (if applicable)		
Required navigation (NAVAID) support (if applicable)		
Combination of multiple IFP evaluations		
Estimated flight time		
Coordination (as required) with ATS, designer, relevant authority		
Necessary equipment and media for electronic record of validation flight		
GENERAL		
	SATISFACTORY	
	YES	**NO**
IFP graphic (chart) is complete and correct		
Check for interference: document all details related to detected RFI		
Satisfactory radio communication		
Required radar coverage is satisfactory (if radar is required)		
Verify proper heliport markings, lighting and VASIS (if installed)		
Altimeter sources		

OBSTACLE ASSESSMENT		
	SATISFACTORY	
	YES	NO
Verify the controlling obstacle in each segment (including, as appropriate, VFR, direct visual segment, or manoeuvring visual segment areas, missed approach); if any obstacles are missing or any new obstacles are observed, record the latitude/longitude and elevation of the obstacles observed		
Where necessary, fly the lateral limits of the obstacle assessment area; most appropriate for procedures designed in challenging terrain or when there are questionable obstacles *Note.— Extra consideration should be given to non-surveyed areas.*		
FLYABILITY		
	SATISFACTORY	
	YES	NO
Comparison of GPS/GNSS/FMS navigation databases and source documents, including proper ARINC 424 coding *Note.— If manual entry is used, this field is marked "N/A", and a note must be inserted in the remarks section to alert the approving authority of the procedure that a table top review of the coded procedure, or an operational assessment by a company pilot, should be completed prior to operational approval being granted.*		
Human Factors and general workload satisfactory		
Was there any loss of RAIM?		
Was there any loss of RNP (where applicable)?		
Missed approach procedure		
Descent/climb gradients		
Procedure flown auto-coupled		
Segment length, turns and bank angles, speed restrictions and deceleration allowance		
TAWS		
INSTRUMENT APPROACH PROCEDURE		
	SATISFACTORY	
	YES	NO
Segment lengths, headings/tracks and waypoint locations match procedure design		
Final segment vertical glide path angle (if applicable)		
Heliport crossing height (HRP), if applicable		
Course alignment		
Along-track alignment		
FAS data block (for SBAS APV procedures)		

REMARKS				
PROCEDURE	**PASS**		**FAIL**	
EVALUATOR'S SIGNATURE: Date:				

E.4 Validation Report Checklist — Helicopters

VALIDATION REPORT CHECKLIST — HELICOPTER	
REPORT HEADER	
Date:	Validation type (new/amended procedure):
Organization:	
Procedure title:	
Location:	
Heliport:	Heliport:
Evaluator name/phone:	
PBN navigation specification:	

POST-FLIGHT		
	SATISFACTORY	
	YES	**NO**
Evaluate collected data		
Submit flight validation report with recorded electronic flight data for archive		
Request NOTAM action (if appropriate)		
Sign and submit the IFP submission documentation		

REMARKS				
PROCEDURE	**PASS**		**FAIL**	
EVALUATOR'S SIGNATURE: Date:				

Appendix F Obstacle Assessment

1. VERIFICATION OF MINIMUM OBSTACLE CLEARANCE (MOC)

Controlling obstacles in each segment must be confirmed during the initial certification and cyclic review of flight procedures. If unable to confirm that the declared controlling obstacle of the respective segment is correctly identified, then list the location, type and approximate elevation of the obstacles the FVP desires the designer to consider. The FVP will place special emphasis on newly discovered obstacles. If the controlling obstacle is listed as terrain/trees or adverse assumption obstacles (e.g. vegetation tolerance, ships, tolerance for potential unreported structures as defined by the State), it is not necessary to verify the actual height of the controlling obstacle, only that no higher obstacle is present in the protected airspace. If the FVP observes that the documented controlling obstacle is not present, the FVP must indicate this information in the report.

2. IDENTIFICATION OF NEW OBSTACLES

2.1 In most instances, accurate information concerning the location, description and heights of tall towers and other obstacles is available from the database and/or other government sources. When new, potentially controlling obstacles not identified in the procedure package are discovered, the procedure’s initial certification will be assessed as failed until the designer can analyse the impact of the obstacle on the overall procedure. Particular emphasis is given to power lines, man-made structures, wind farms and chimneys with high velocity exhaust gases, which may not be populated in the database.

2.2 Obstacle locations must be noted with latitude/longitude or radial/bearing and distance from a known navigation aid or waypoint. If these methods are not available, an accurate description on the flight validation map may be used and a digital picture taken if possible.

2.3 Obstacle heights measured in flight are not considered accurate and should not be used unless the actual height of the obstacle cannot be determined by other means. GNSS is the preferred measurement tool; however, if barometric height determination is required, accurate altimeter settings and altitude references must be used to obtain reasonable results. The flight validation report will reflect the documentation for the method of height determination including altimeter corrections applied for low temperature, mountain wave, etc. The GNSS altitude must also be noted.

2.4 Obstacle assessment for multiple approaches to the same runway may be completed during a single evaluation to meet periodic requirements.

2.5 While the challenging nature of this task is acknowledged, its basic purpose is to confirm that at no time during the approach was the aircraft ever brought into close proximity

— laterally or vertically — to any obstacles. It is not intended to imply an exhaustive survey of every obstacle in the area.

3. TERRAIN AWARENESS WARNING SYSTEM (TAWS) ALERTS

TAWS alerts may be generated while flying over irregular or rapidly rising terrain at altitudes providing standard obstacle clearance. If TAWS alerts are received while validating a procedure, repeat the manoeuvre, ensuring flight at the designed true altitude using temperature compensation at the maximum design speed for the procedure. If the alert is repeatable, notify the information in the report, including sufficient details for resolution by the designer. The FVP should not hesitate to provide potential operational solutions such as speed restrictions, altitude restrictions or waypoint relocation. A TAWS alert may be generated when approaching an airport runway that is not in the TAWS database. The TAWS check should be performed with proper aircraft configuration in the respective phase of flight.