

TWENTY-FOURTH "C" SCHEDULE

(Regulations 215, 226-227)

INSTRUMENT FLIGHT PROCEDURE DESIGN & FLIGHT INSPECTION

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SUBPART A: GENERAL

24.301 Applicability

- (a) The requirements of this Schedule applies to all persons providing Instrument Flight Procedure Design (IFPD) and flight inspection services, including any organization and any of its sub-contractors that currently provides or has submitted an application to the Authority to add IFPD Operations Specifications to a current and valid Air Navigation Service (ANS) certificate.
- (b) The Requirements of this Schedule covers:
 - (1) the granting of IFPD Operations Specifications to an organization (termed the 'Design Organization') for the design of Instrument Flight Procedures (IFP); and
 - (2) the approval of IFPs for publication; and
 - (3) Approval requirements for flight inspection organizations
- (c) The applicant(s) may use another party for meeting the Requirements of this Schedule. In such cases it becomes a legal obligation upon the applicant to satisfy himself as to compliance with the Requirements of this schedule, subject to acceptance by the Authority. As part of this process, third parties used to meet the Requirements of this Schedule are subject to audit and acceptance by the Authority.
- (d) The issue of Design Organization Operations Specifications or flight inspection organization approval indicates only that the organization is considered competent to design an IFP or conduct flight inspections in accordance with the any conditions prescribed by the Authority.

(Note: An applicant for IFP design Operations Specifications shall comply with the Requirements of this Schedule. The applicant is responsible for ensuring and demonstrating compliance to the

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Authority of any third parties with the Requirements of this Schedule. Similarly, in seeking instrument flight procedure Operations Specifications, an applicant is responsible for demonstrating to the Authority compliance of any third parties with the Requirements of this Schedule.)

- (e) The failure of the Design Organization or the flight inspection organization to comply with any of the requirements of these regulations or provisions of any applicable Manual of Standard issued thereunder may:
- (1) Constitute a breach of the Civil Aviation Regulations of Jamaica; and
 - (2) Result in proceedings for any such breaches; or
 - (3) Result in the refusal of an application for renewal of IFPD Operations Specifications or flight inspection organization approval; or
 - (4) Result in action to suspend, revoke or impose conditions in respect of the provider's Operations Specifications or approval.
- (f) The issue of Operations Specifications or an approval does not relieve any applicant or the pilot-in-command of a flight-check aircraft, from the responsibility for compliance with the Civil Aviation Regulations of Jamaica and any other legislation in force.
- (g) Any reference in this Schedule to an Annex to the Convention includes the differences notified to ICAO by Jamaica in respect of the Standards specified in that Annex and published in the AIP of Jamaica.

24.303 Use of English

All documentation, written communications and data (electronic or otherwise) for submission to the Authority in support of an application for approval shall be provided in English.

24.305 Laws, requirements and procedures

The IFPD provider and any flight inspection organization shall take reasonable care to ensure that all persons employed, engaged, or contracted by any such person or organization to perform procedure design, validation, publication or maintenance activities or flight inspection services, as may be applicable under their Operations Specifications or approval, are familiar with the appropriate sections of the Civil Aviation Regulations of Jamaica, any applicable conditions to the provider's Operations Specifications and the procedures specified in the approval holder's safety assurance documentation/plan.

24.307 Procedure compliance

Each person performing duties in relation to the design and use of an IFP shall conform to the requirements of this Schedule and any conditions of Operations Specifications or approval, as appropriate, issued by the Authority.

24.309 Power to inspect

Each holder of IFPD Operations Specifications or flight inspection organization approval shall ensure that any person authorized by the Authority shall have uninterrupted access to any documentation relating to the design, validation, publication or maintenance activities for IFPs or any document relating to the flight inspection organization as appropriate to the operation. The holder of IFPD Operations Specifications or flight inspection organization approval shall be responsible for ensuring that, if requested to do so by an Inspector, documentation is produced within a reasonable period of time or any other time specified by the Inspector.

24.311 Definitions

- (a) The definitions used throughout this Schedule are in accordance with the First and Twenty Fourth "A" and "B" schedules.
- (b) Every other term shall have the same meaning as contained in the Chicago Convention or ICAO Document 9713, "International Civil Aviation Vocabulary."

TWENTY-FOURTH "C" SCHEDULE, *contd.***24.313 Exceptions**

The specifications identified in this Schedule shall not apply to military aerodromes but shall apply to all other aerodromes, including water aerodromes.

SUBPART B: INSTRUMENT FLIGHT PROCEDURE (IFP) DESIGN ORGANIZATION OPERATIONS SPECIFICATIONS**24.315 Applicability**

This Subpart applies to all Instrument Flight Procedure Design organizations that currently provide or have submitted a request to the Authority to provide IFPD services in respect of the Sovereign airspace of Jamaica or other territory for which Jamaica has assumed responsibility for the provision of Air Traffic Services on the basis of Regional Air Navigation agreements.

24.317 Application for Operations Specifications

- (a) An applicant for IFPD Operations Specifications or flight inspection organization approval shall apply to the Authority in the manner required supplying:
 - (1) the applicant's name and address; and
 - (2) payment of any applicable fees as required.
- (b) The applicant shall also provide to the Authority in the manner required either:
 - (1) A Master Plan or exposition, as appropriate, specified in paragraphs 24.321 and 24.373; or
 - (2) an IFP design report as specified in paragraph 24.339 for each IFPD for approval by the Authority.

24.319 Issue of Operations Specifications

- (a) IFPD Operations Specifications will be granted when the applicant's plan, required by paragraph 24.321, provides sufficient evidence to satisfy the Authority that:
 - (1) the applicant has an appropriate and adequate management structure with detailed accountabilities and competencies for the safe design of IFPs as required by paragraph 24.325; and
 - (2) the applicant has appropriate and adequate quality management systems in operation to preserve the integrity of designed IFPs as required by paragraph 24.327; and
 - (3) the applicant has appropriate and adequate safety management systems in place as required by paragraph 24.329; and
 - (4) the applicant's use of any third parties is sufficiently controlled according to the quality and safety management systems as specified above in accordance with the requirements of paragraph 24.335; and
 - (5) the granting of the Operations Specifications is not contrary to the interests of aviation safety.
- (b) An applicant shall be granted an approval of an IFP if the Authority is satisfied that:
 - (1) the IFP has been designed by a Design Organization holding a current approval under Subpart B; and
 - (2) the applicant sufficiently demonstrates in the IFP design report that:
 - (i) the IFP has been designed according to the requirements of paragraph 24.343; and

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- (ii) the IFP has been flight inspected according to the requirements of paragraph 24.347; and
- (iii) the IFP charts and description have been disseminated in accordance with paragraph 24.353.

24.321 Privileges of Operations Specifications

- (a) IFPD Operations Specifications shall specify those areas in which IFP design services may be provided subject to the provisions of this Schedule.
- (b) Approval of the IFP design report authorizes the publication of the IFP subject to the conditions for such use.
- (c) An approval shall include such conditions as the Authority may consider appropriate.

24.323 Design Organization approval

- (a) An approved Design Organization shall comply with the requirements of this Subpart at all times.
- (b) An approved Design Organization shall ensure the compliance of any third parties used while satisfying the requirements of this Subpart.

24.325 Master Plan

The applicant shall provide the Authority with a plan containing:

- (a) A policy statement signed by the person identified at paragraph 24.325(a)(1) attesting that:
 - (1) the plan demonstrates compliance with this Schedule; and
 - (2) the organization will comply with this Schedule at all times; and
- (b) the titles and names of the senior person or persons required under paragraphs 24.325(a)(1) and 24.325(a)(2) and 24.325(a)(3) and 24.325(a)(4); and
- (c) the duties and responsibilities of the senior person or persons in paragraphs 24.325(a)(1) and 24.325(a)(2) and 24.325(a)(3) and 24.325(a)(4), including matters for which they have responsibility to deal directly with the Authority on behalf of the organization; and
- (d) an organizational chart showing lines of responsibility between the persons specified in paragraph 24.325 (a); and
- (e) details of the organization's staffing structure including job descriptions and safety responsibilities; and
- (f) policy, procedures, evidence or references supporting the following requirements:
 - (1) paragraph 24.325 regarding the integrity of the organization; and
 - (2) paragraph 24.327 regarding the implementation of quality management systems; and
 - (3) paragraph 24.329 regarding the implementation of safety management systems; and
 - (4) paragraph 24.331 regarding the implementation of in house training mechanisms to maintain quality; and
 - (5) paragraph 24.335 regarding the subcontracting of third parties if applicable.
- (g) a description of the entire operation; and
- (h) evidence of the practical application of theoretical knowledge of ICAO Doc 8168 (Procedures for Air Navigation Services – Aircraft Operations) including samples of recent IFP design.

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24.327 Duration of Operations Specifications

- (a) IFPD Operations Specifications shall be valid for a maximum period of 5 years, unless it is previously suspended or revoked, and will be subject to such conditions as the Authority sees fit.
- (b) The holder of IFPD Operations Specifications that have been suspended or revoked shall immediately surrender the Air Navigation Service certificate and associated Operations Specifications to the Authority.

24.329 Organization requirements

- (a) The applicant shall nominate:
 - (1) a senior person identified as the Accountable Manager who has the Authority within the Design organization to ensure:
 - (i) the organization can be adequately funded and resourced; and
 - (ii) that safety is given the highest priority when assessing the commercial, operational, environmental or social pressures; and
 - (iii) compliance is achieved and maintained with the requirements of this Schedule; and
 - (iv) an IFP designer or other post is appointed with sufficient Authority to be clearly accountable for the contents of any published IFP chart.
 - (2) a key person or persons responsible for ensuring the compliance of the IFPD organization with the quality management requirements of this Subpart; and
 - (3) a senior person or persons responsible for ensuring the compliance of the IFPD organization with the safety management requirements of this Subpart; and
 - (4) a senior person or persons responsible for ensuring the compliance of the Design organization with the training requirements of this Schedule.

(Note: See Appendix 1 to 24.329 for the Duties and Responsibilities of the Accountable Manager)

24.331 Quality management system

- (a) The applicant shall establish a documented quality management system compliant with ICAO Doc 9906 (Quality Assurance Manual for Flight Procedure Design) Volume 1 (Flight Procedure Design Quality Assurance System). The quality management system shall specify quality assurance processes to:
 - (1) identify applicable requirements, regulations and standards and demonstrate compliance with them; and
 - (2) ensure technical manuals, checklists and other documentation are appropriately maintained and incorporate the latest amendments; and
 - (3) ensure that training programmes as specified in paragraph 24.331 maintain staff proficiency and competency.
- (b) The documented quality management system specified in 24.327 (a) shall include:
 - (1) identification of data transfer methods used for each IFP design in respect of manual or electronic means; and
 - (2) steps taken to preserve the accuracy, resolution and integrity of data elements whenever data is transferred; and

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- (3) the extent to which software tools are used in the handling and manipulation of data elements; and
- (4) procedures for the validation and maintenance of software tools in accordance with the requirements of paragraph 24.333; and
- (5) procedures for the engagement and management of third parties to meet the requirements of this Subpart whilst complying with the requirements of paragraph 24.335.

24.333**Safety management system**

- (a) The applicant shall establish a documented safety management system appropriate to the size and complexity of the operation, for the proactive management of safety, that:
 - (1) integrates the management of operations and technical systems with financial and human resource management and that reflects quality assurance principles; and
 - (2) includes policy and objectives for continuous improvement to the organization's overall safety performance; and
 - (3) defines clear lines of safety accountability throughout the operator's organization, including direct accountability for safety on the part of senior management.
- (b) The documented safety management system specified in 24.329 (a) shall include:
 - (1) processes to identify actual and potential safety hazards and assess the associated risks; and
 - (2) processes to develop and implement remedial action necessary to maintain agreed safety performance; and
 - (3) provision for continuous monitoring and regular assessment of the appropriateness and effectiveness of the safety performance; and
 - (4) recurring processes for continuous improvement of the performance of the safety management system.

24.335**Personnel training**

- (a) The applicant shall ensure that IFP designers maintain competence through formal training courses and on the job training.
- (b) On the job training shall be compliant with the guidance and formats contained with ICAO Doc 9906 (Quality Assurance Manual for Flight Procedure Design) Volume 2 (Flight Procedure Designer Training).
- (c) The applicant shall ensure that all IFP designers have successfully completed formal PAN-OPS training approved by the Authority prior to commencing any IFP design related activity.
- (d) Specialist courses related to PBN operations as defined by ICAO Doc 9613 (Performance Based Navigation (PBN) Manual) shall be completed prior to commencing the design of any RNAV or RNP instrument flight procedure, if such training is not already part of the formal PANS-OPS course.
- (e) The applicant shall ensure that written records and procedures are established to:
 - (1) assess the competence of the authorized procedure designers; and
 - (2) maintain the competence of the authorized procedure designers; and
 - (3) establish a means to provide their procedure designers with signed written evidence of the scope of their authorization; and
 - (4) establish the job descriptions containing safety responsibilities.

TWENTY-FOURTH "C" SCHEDULE, *contd.*

- (f) IFP designers shall, unless otherwise approved by the Authority, attend appropriate recurrent training courses suitable to the services being provided at least every 24 months.

24.337 IFP design tools verification/validation

- (a) Automation in Instrument Flight Procedure design shall be introduced with the objective of improving the, quality, efficiency and cost-effectiveness of service provision.
- (b) RNAV and RNP instrument flight procedures shall only be developed using expert procedure design tools or dedicated software packages with levels of automation that is acceptable to the Authority and validated in accordance with the requirements of sub-paragraph (e). The expert procedure design tools required under this sub-paragraph shall feature but is not limited to the following attributes:
- (1) Interoperability with Aerodrome Mapping and Aeronautical Information Service databases.
 - (2) a Cyclic Redundancy Check (CRC) tool;
 - (3) datum transformation and map projections;
 - (4) geodetic computations to include distance and azimuth direct and inverse calculations, long line intersections between geodesics and geodetic and small circles, and slant ranges;
 - (5) collinearity checks;
 - (6) location checks within a geographic area;
 - (7) a convenient method of storing, tracking and retrieving data files; and
 - (8) user manual, data integrity guidance material, user training and software programme updates.
- (c) All software that is used in the calculation of waypoints, coordinates and obstacle surfaces as part of an IFP shall be validated prior to use. According to the extent of the concerned procedure design tool's functions the following steps required for validation shall be included within the Design organization's quality management system:
- (1) the test procedures required to validate and check correct calculations from the software; and
 - (2) the maintenance procedures for patching and updating the software.
- (d) The software tool shall not be considered validated following the application of a patch or software update until revalidated as stated above.
- (e) Test and validation procedures for software tools shall comply with ICAO Doc 9906 (Quality Assurance Manual for Flight Procedure Design) Volume 3 (Flight Procedure Design Software Validation) or equivalent.

24.339 Use of third parties

- (a) Where third parties are used the applicant shall:
- (1) identify the third party; and
 - (2) detail those requirements that will be satisfied by the third party; and
 - (3) remain responsible for ensuring third party compliance with the requirements of this Schedule; and
 - (4) notify the Authority of any change to the third party.

TWENTY-FOURTH "C" SCHEDULE, *contd.***SUBPART C : INSTRUMENT FLIGHT PROCEDURE (IFP) APPROVAL****24.341 Instrument flight procedure approval**

- (a) A Design organization approved to publish an IFP shall comply with the requirements of this Subpart at all times.
- (b) A Design organization shall ensure the compliance of any third parties used while satisfying the requirements of this Subpart.
- (c) On approval of the IFP design report:
 - (1) the IFP shall be published in the AIP Jamaica in accordance with paragraph 24.353 and any conditions that the Authority may prescribe; and
 - (2) the applicant shall assume continuous ownership and responsibility for the IFP, including data management according to paragraph 24.345; and
 - (3) the applicant shall be responsible for safeguarding the procedure and the assessment of new obstacles that require a revalidation of the IFP according to paragraph 24.341(b)(4).

24.343 Approval submission

- (a) An IFP design report shall be provided to the Authority containing the evidence that the IFP has been constructed, designed, and will be maintained, in accordance with the requirements of this Subpart.
- (b) The IFP design report shall contain the following documentary evidence:
 - (1) Details of the design criteria used in the construction of the IFP, including:
 - (i) a statement of the procedure's compliance with respect to the requirements of paragraph 24.343; and
 - (ii) a comprehensive design rationale in text format; and
 - (iii) references to those parts of Doc 8168 (Procedures for Air Navigation Services – Aircraft Operations) Volume 2 where a deviation from the standard criteria or policy has been employed.
 - (2) A description of the procedure, including:
 - (i) signatures of the procedure designer and nominated checker as designated respectively; and
 - (ii) waypoint names, type and coordinates; and
 - (iii) obstacles assessed in the construction of the procedure including height and position coordinates; and
 - (iv) description of the source of obstacle, terrain and aerodrome data used as applicable in the design of the IFP, as complying with the requirements of paragraph 24.345; and
 - (v) a diagram detailing the obstacle surfaces used in plan and profile to aid safeguarding assessment as described in paragraph 24.353 (b)(2); and
 - (vi) a procedure chart compliant with the requirements of paragraph 24.353 (b)(1); and
 - (vii) a textual narrative that describes in an unambiguous manner the flight procedure.
 - (3) A description of the flight test procedure, including:

 TWENTY-FOURTH "C" SCHEDULE, *contd*

- (i) evidence of aircraft used as required by paragraph 24.349; and
- (ii) flight crew and certification approvals as required by paragraph 24.351; and
- (iii) the flight test report in accordance with the requirements of paragraph 24.347 (g).

24.345 IFP design safety requirements

- (a) The applicant shall ensure that the IFP design construction is:
 - (1) compliant with paragraph 24.343; and,
 - (2) completed by a Design Organization in possession of IFPD Operations Specifications and is compliant with the requirements of Subpart B; and
 - (3) undertaken with sufficient documented coordination between ATC, the aerodrome certificate holder, Air Traffic Engineering and the Design Organization where applicable. This shall include:
 - (i) a review of the obstacles applicable to the procedure with the aerodrome certificate holder prior to any design work; and
 - (ii) development of the flight check plan, as described in paragraph 24.347, taking into account the requirement for operational ground navigation aids as necessary; and
 - (iii) validation of both the operational and certification status of all applicable navigation aids.
- (b) The applicant shall establish formal records and procedures to ensure that:
 - (1) there are sufficient cross checks to detect erroneous calculations; and
 - (2) required separations in the proximity of adjacent air traffic routings are maintained; and
 - (3) potential navigation database limitations are addressed before the procedure is coded and approved; and
 - (4) the Authority is informed and a reassessment of the IFP minimum altitudes undertaken when:
 - (i) there is a potential obstacle infringement of the IFP protected surfaces; or
 - (ii) there is a potential breach of aerodrome protected surfaces stipulated through aerodrome safeguarding.
- (c) a NOTAM to suspend the IFP is promulgated when a potential infringement or breach as specified by sub-paragraph (b)(4) is confirmed.

24.347 IFP design procedures

- (a) All IFPs shall be designed adhering to the methodology and design criteria specified in ICAO Doc 8168 (Procedures for Air Navigation Services – Aircraft Operations) Volume 2 ensuring in particular that required obstacle clearances are achieved.
- (b) When the IFP being developed is an RNAV based procedure, then the additional requirements from ICAO Doc 9613 (Performance Based Navigation (PBN) Manual) Volumes 1 and 2 shall also apply.
- (c) As applicable, the provisions from ICAO Doc 9906 (The Quality Assurance Manual for Flight Procedure Design) in the construction of flight procedures shall apply.

TWENTY-FOURTH "C" SCHEDULE, *contd.***24.349****IFP Source Data**

- (a) Source data used in the development of IFP procedures shall include, as applicable, all aerodrome, navigation aid, obstacle and terrain data as specified in ICAO Annex 14 Vol. I and the Manual of Standards – Aeronautical Information Services.
- (b) All data used as the basis for IFP design shall be traceable to the origin and shall have as a minimum the following metadata available:
- (1) the name of the source or entity originating the data; and
 - (2) the function performed by the source or entity; and
 - (3) the date at which the function was performed.
- (c) The requirements for survey frequency are as follows:
- (1) A geodetic survey sufficient to meet the requirements of ICAO Annex 14, Vol. I and the Manual of Standards - Aeronautical Information Services shall be undertaken for all aerodromes with instrument procedures:
 - (i) at the time of the initial aerodrome survey; and
 - (ii) when a more accurate reference frame for WGS-84 becomes available.
 - (2) A full survey sufficient to meet the requirements of ICAO Annex 14, Vol. I and the Manual of Standards – Aeronautical Information Services shall be undertaken for all aerodromes:
 - (i) at the time of the initial aerodrome survey; and
 - (ii) if a check survey is not carried out annually; and
 - (iii) if any doubt exists as to the validity of the previous survey.
- (d) A check survey shall be undertaken for all aerodromes on an annual basis following the initial survey to identify any changes, including significant tree growth or reduction, since the previous survey. Any change shall be surveyed to meet the requirements of ICAO Annex 14, Vol. I and the Manual of Standards - Aeronautical Information Services.
- (e) All source data shall only be considered valid for use when the data is traceable according to the requirements of sub-paragraph (b) above and the period of last survey complies with the requirements of sub-paragraph (c) above.
- (f) All source data shall be in WGS-84 format as specified in ICAO Doc 9674 (World Geodetic System – 1984 (WGS-84) Manual) and compliant with the requirements of ICAO Doc 9613 (Performance Based Navigation (PBN) Manual) Volume 1 Attachment 2. If source data is unavailable in WGS-84 format, then it shall be converted to WGS-84 prior to use. The source data and converted data shall be made available as required in paragraph 24.339 (b)(2).
- (g) Source data shall be provided by the relevant aerodrome certificate holder. Where valid source data according to paragraph sub-paragraph (d) is unavailable, the applicant shall conduct a survey to provide baseline data for the purposes of IFP design to meet these requirements.
- (h) Where a third party is contracted for the purpose of the survey, the applicant shall ensure that the data is consistent with the requirements of ICAO Annex 14 Vol. 1, Appendix 5 and Volume 2 Appendix 1, ICAO Annex 11 (Air Traffic Services) Appendix 5 and the Manual of Standards – Aeronautical Information Services.

24.351**IFP Flight inspection requirements**

- (a) All IFPs shall be subject to flight check unless specifically permitted otherwise by the Authority.

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- (b) All IFPs shall be subject to periodic flight check utilizing aircraft and aircrew compliant with the requirements of paragraph 24.349 and paragraph 24.351.
- (c) The flight check shall be in accordance with ICAO Doc 9613 (Performance Based Navigation (PBN) Manual) Volume 1, Part B Chapter 1 and Doc 8071 (Manual on Testing of Radio Navigation Aids) Volume 2 (Testing of Satellite-based Radio Navigation Systems) Chapter 5 noting that the purpose of the flight inspection shall be:
- (1) to validate the obstacles as shown on the chart and used as the basis for computing minimum altitude; and
 - (2) to ensure, in particular, the flyability of the procedure in maintaining safe operations for each category of aircraft; and
 - (3) to review the IFP for complexity of workload, correctness of information and ease of interpretation.
- (d) The Design Organization shall prepare a flight inspection plan prior to the flight inspection to accompany the flight inspection report detailing how the flight inspection will:
- (1) provide assurance that adequate obstacle clearance has been provided; and
 - (2) verify that the navigation data to be published, as well as that used in the design of the procedure, are correct; and
 - (3) verify that all required infrastructure, such as runway markings, lighting and communications and navigation sources are in place and operative; and
 - (4) conduct an assessment of flyability to determine that the procedure can be safely flown; and
 - (5) evaluate the charting, required infrastructure, visibility and other operational factors.
- (e) The flight inspection plan shall comply with the guidance and recommendations given in ICAO Doc 8071 (Manual on Testing of Radio Navigation Aids) and ICAO Doc 9906 (The Quality Assurance Manual for Flight Procedure Design).
- (f) The Design Organization shall ensure that the flight inspection report is issued as soon as possible following the flight inspection.
- (g) The flight inspection report shall be completed according to the templates shown in this Schedule to this Schedule or as stipulated in ICAO Doc 9906 (Quality Assurance Manual for Flight Procedure Design).

(See Appendix 1 to 24.351 regarding sample IFPD flight inspection report)

24.353**Aircraft requirements**

- (a) The aircraft used to conduct a flight inspection in accordance with paragraph 24.347 shall meet the following minimum requirements:
- (1) the aircraft shall be multi-engined and capable of safe flight within the intended operational envelope with a single engine operative; and
 - (2) the aircraft shall be fully instrument equipped according to requirements for night and instrument flight rules; and
 - (3) the aircraft shall be capable of being flown at speeds equivalent to categories of aircraft for which the IFP was designed.
- (b) As applicable, the aircraft used shall comply with the requirements of ICAO Doc 8071 (Manual on Testing of Radio Navigation Aids) Volume 1 (Testing of Ground Based Navigation Aids) Attachment 1 to Chapter 1.
- (c) Evidence of the aircraft's applicable certifications shall be presented to the Authority

TWENTY-FOURTH "C" SCHEDULE, *contd.***24.355 Aircrew requirements****(a) Flight validation aircrew:**

- (1) shall have received suitable training in accordance with ICAO Doc 9906 and relevant to the IFP for which the check is being completed; and
- (2) shall be familiar with the test and inspection particular to the type of IFP being checked as detailed within ICAO Doc 8071 (Manual on Testing of Radio Navigation Aids); and
- (3) shall be sufficiently trained to be able to recognize anomalous output from aircraft instruments that would require more detailed inspection with a more fully equipped aircraft and crew; and
- (4) may be single pilot only when it can be demonstrated to the Authority that flight can be conducted safely and that flight workload is acceptable; and
- (5) shall include, where appropriate for the flight inspection, engineers or technicians able to demonstrate sound knowledge and experience in flight testing and inspection procedures and requirements.

24.357 IFP dissemination

- (a) The applicant shall be responsible for dissemination of the IFP and associated documentation to the designated AIS provider for publication following approval of the procedure by the Authority.
- (b) The applicant shall ensure that:
 - (1) the design and format of the IFP charts are in a standardized format in accordance with the requirements of the Manual of Standards – Aeronautical Information Services, ICAO Doc 8697 (Aeronautical Chart Manual) and ICAO Doc 8168 (Procedures for Air Navigation Services – Aircraft Operations) Volume 2; and
 - (2) the applicable aerodrome operator shall be provided with charts detailing the obstacle surfaces used in plan and profile to aid safeguarding assessment; and
 - (3) where the IFP is an RNAV procedure, it is described in a clear and unambiguous fashion as detailed in ICAO Doc 8168 (Procedures for Air Navigation Services – Aircraft Operations) Volume 2 and ICAO Annex 15 (Aeronautical Information Services); and
 - (4) where the IFP is an RNAV procedure, prior to publication, it is validated to ensure that the dataset is complete, coherent and correct; and
 - (5) the Design Organization specified by 24.341(a)(2) performs a final check of the published data in the AIP/chart amendment when issued to ensure that no errors have been introduced during the data transfer process.

24.359 Human Factors

- (a) The IFPD design organization shall ensure that Human Factors (HF) aspects are taken into account in the provision of ATS.
- (b) Areas to be considered include organizational issues, safety management concepts and learning from incident data.

TWENTY-FOURTH "C" SCHEDULE, *contd.***SUBPART D: FLIGHT INSPECTION ORGANIZATION APPROVAL****24.361 Applicability**

This Subpart applies to all flight inspection organizations that currently provide or have submitted a request to the Authority to provide flight inspection services within the Sovereign Airspace of Jamaica or other territory for which Jamaica has assumed responsibility for on the basis of Regional Air Navigation agreements.

24.367 Application for approval

- (a) An applicant for a flight inspection service organization approval shall apply to the Authority with:
 - (1) An exposition; and
 - (2) any required payment.
- (b) Unless the Authority is satisfied that the exposition contains adequate evidence that the organization has been approved to conduct flight inspection in another State, the applicant shall:
 - (1) demonstrate position fixing accuracy using a process agreed by the Authority; and
 - (2) demonstrate overall system performance by making a trial commissioning inspection of a navigational aid using a process agreed by the Authority.
 - (3) Trial results shall be included in the exposition.
- (c) The Authority reserves the right to require a practical demonstration to provide evidence of compliance with this Schedule.

24.369 Privileges of an approval holder

- (a) A flight inspection organization approval may include any conditions that the Authority may consider appropriate.
- (b) The applicant shall submit any proposed changes to the flight inspection system, operation or organization to the Authority, at least 30 days prior to the effective date, for approval before further flight inspections are conducted

24.371 Duration of approval

- (a) The approval remains in force unless it is suspended or revoked.
- (b) The flight inspection organization shall surrender an approval certificate that is suspended or revoked.

24.373 Organization Exposition

The applicant shall provide the Authority with an exposition containing:

- (a) a policy statement signed by the person identified at paragraph 24.375(a)(1) attesting that:
 - (1) the exposition demonstrates compliance with this Schedule; and

TWENTY-FOURTH "C" SCHEDULE, *contd*

- (2) the organization will comply with this Schedule at all times; and
- (b) the titles and names of the senior person or persons required under paragraphs 24.375; and
- (c) the duties and responsibilities of the senior person or persons in paragraph 24.375, including matters for which they have responsibility to deal directly with the Authority on behalf of the organization; and
- (d) an organizational chart showing lines of responsibility between the persons specified in paragraph 24.375; and
- (e) details of the organization's staffing structure including job descriptions and safety responsibilities; and
- (f) policy, procedures, evidence or references supporting the following requirements:
 - (1) paragraph 24.375 regarding the integrity of the organization; and
 - (2) paragraph 24.377 regarding the technical requirements for the flight inspection system; and
 - (3) paragraph 24.379 regarding ground and flight inspection periodicity; and
 - (4) paragraph 24.379 regarding maintenance of the flight inspection system; and
 - (5) paragraph 24.381 regarding evidence as to meeting measurement uncertainty requirements; and
 - (6) paragraph 24.383 regarding flight inspection system aerials; and
 - (7) paragraph 24.385 regarding the suitability of the aircraft and aircraft operator for the purpose of flight inspection; and
 - (8) paragraph 24.387 regarding the use of aeronautical radio frequencies for the purpose of flight inspection; and
 - (9) paragraph 24.389 regarding the operational implementation of the flight inspection system; and
 - (10) paragraph 24.391 regarding the implementation of quality management procedures.
- (g) a description of the entire operation.

24.375**Organization**

- (a) The applicant shall nominate:
 - (1) a senior person identified as the Accountable Manager who has the authority within the applicant's organization to ensure:
 - (i) the organization can be adequately financed and resourced; and
 - (ii) that safety is given the highest priority when assessing commercial, operational, environmental or social pressures; and
 - (iii) compliance is achieved and maintained with the requirements of this Schedule; and
 - (iv) a navigation aid inspector or other post is appointed with sufficient authority to be clearly accountable for the contents of flight inspection reports; and

TWENTY-FOURTH "C" SCHEDULE, *contd.*

- (2) a senior person or persons who are responsible for ensuring that the applicant's organization complies with the requirements of this Schedule. Such nominated person or persons shall be ultimately responsible to the Accountable Manager; and
 - (3) sufficient, competent, qualified and trained personnel.
- (b) Written records and procedures shall be established, to:
- (1) assess the competence of those authorized personnel; and
 - (2) maintain the competence of those authorized personnel; and
 - (3) establish a means to provide those personnel with signed written evidence of the scope of their authorization; and
 - (4) establish the job descriptions containing safety responsibilities.

24.377 General technical requirements

- (a) The applicant shall provide the Authority with:
- (1) evidence that the flight inspection equipment can measure the parameters required for the navigation aid being inspected; and
 - (2) functional and technical descriptions, technical specifications and manufacturer's type number for all major items of the flight inspection equipment; and
 - (3) functional and technical descriptions, technical specifications and manufacturer's type number for equipment used to calibrate the items referred in 24.377(a)(2); and
 - (4) build state documentation for all measuring equipment; and
 - (5) the name of the design authority for all major items referred in 24.377(a)(2) and (3); and
 - (6) the location, characteristic and type of all fixed or temporary measurement aerials on the aircraft; and
 - (7) the procedures used for the inspection of the equipment referred in 24.377(a)(3); and
 - (8) details the function and support of all software and firmware used in the measurement system; and
- (b) The equipment referred to in paragraph 24.377(a)(2) shall not interfere with the aircraft systems or normal navigation and general avionics equipment.
- (c) Identity transmissions should be verified throughout a flight inspection.
- (d) The flight inspection system shall include an independent system that can continuously determine and record the horizontal position in space of a known reference point on the aircraft. The uncertainty of this position shall be no more than the uncertainty requirement for the parameter being measured.
- (e) The applicant shall notify the Authority of all proposed equipment changes, modifications or change of aircraft.
- (f) The flight inspection organization shall comply with the guidance and recommendations given in ICAO Doc 8071, Manual on Testing of Radio Navigation Aids and inspect navigational aids against the Standards and, when applicable or otherwise specified, the Recommended practices of ICAO Annex 10.

TWENTY-FOURTH "C" SCHEDULE, *contd.***24.379 Ground and Flight Inspection Periodicity**

- (a) As a condition to any approval granted by the Authority, any flight inspection organization approved by the Authority shall supply the Authority with a proposed flight inspection schedule that specifies the arrangements to conduct inspections of Jamaica's Navigational Aids and surveillance equipment or any other NAVAIDs or surveillance equipment for which Jamaica has responsibility. The proposed flight inspection schedule shall correspond, at least, to the minimum periodicity specified in manuals produced by the applicable equipment manufacturer.
- (b) The final inspection schedule shall be signed by the accountable manager and approved by the Authority prior to the effective date. The flight inspection organization shall provide the service in accordance with that schedule unless otherwise specified by the Authority.
- (c) The periodicity specified in the final schedule under sub-paragraph (b) above shall not be extended without approval by the Authority.
- (d) The Authority may direct the flight inspection organization to amend the inspection schedule required under sub-paragraph (b) where a quantitative or qualitative analysis of NAVAID or surveillance performance reveals that the interval specified in sub-paragraph (b) is not sufficient.

(Note. – The flight inspection organization shall take into account local factors when developing an inspection schedule and where necessary, consult the manufacturer when there is an observed variance between the local conditions and the optimal conditions upon which manufacturer periodicity is based.)

24.381 Maintenance

The applicant shall provide to the Authority details of:

- (a) procedures for managing spares in relation to the flight inspection equipment; and
- (b) procedures for recording faults and taking subsequent action; and
- (c) procedures for planned maintenance of the flight inspection equipment.

24.383 Measurement uncertainty

- (a) A minimum measurement uncertainty of 95% probability shall be achieved by each parameter to be measured by the equipment.
- (b) Uncertainty calculations shall be recorded in the exposition and shall account for all errors in the measurement and recording system and shall be combined using RSS (the square root of the sum of the squares).
- (c) Uncertainty calculations shall account for environmental conditions such as expected temperature and humidity range. Manufacturer's data shall be submitted if used as evidence of compliance.
- (d) When modifications are made which affect the uncertainty of measurements the applicant shall submit new calculations in the exposition.

24.385 Aerials

Any aerial used for the purpose of flight inspection shall be:

- (a) positioned so that it is not obscured from the navigation aid signal during all anticipated flying manoeuvres; and

TWENTY-FOURTH "C" SCHEDULE, *contd.*

- (b) positioned so that the distance between its phase centre and the reference point of the independent positioning system (see paragraph 24.377(d)) is accounted for when determining measurement uncertainty and crosswind limitations.
- (c) positioned so that propeller modulation is demonstrated to be reduced to an acceptably low level:

24.387 Aircraft and aircraft operator

Aircraft used for the purpose of the flight inspection shall be:

- (a) capable of safely flying the flight inspection profile; and
- (b) operated under a certificate acceptable to the Authority; and
- (c) compatible with inspection equipment; and
- (d) adequately crewed (both flight crew and equipment engineer/operator) to conduct the inspection safely.

24.389 Use of radio

The applicant, for the purpose of RTF used during trials, shall hold relevant approval and licences.

24.391 Flight inspection system

The applicant shall provide the Authority with:

- (a) a list of navigation aids that can be calibrated by the flight inspection organization in compliance with this Schedule; and
- (b) a sample flight inspection report containing at least those items of information prescribed under this Schedule; and
- (c) a sample structure measurement for applicable navigation aids; and
- (d) a procedure to ensure communication with the navigation aid providing organization of immediately notifiable deficiencies.
- (e) the flight inspection operating instructions for the inspector and flight crew including reference to:
 - (1) the flight profile to be used for individual measurements; and
 - (2) pre-flight inspection of measuring equipment; and
 - (3) siting of any necessary ground tracking or position fixing equipment; and
 - (4) operation of measuring equipment; and
 - (5) production of the flight inspection report; and
 - (6) the production of records and graphs in compliance with the requirements of this Schedule; and
 - (7) production of a certificate attesting the result of a flight inspection; and
 - (8) the method used to calculate results which are not output directly by the measuring equipment.

TWENTY-FOURTH "C" SCHEDULE, *contd*

(Note 1. - See Appendix 1 to 24.391 for the minimum information to be provided in flight inspection reports)

Note 2. - See Appendix 2 to 24.391 for information regarding records and graphs)

24.391 Quality procedures

The applicant shall establish a quality management system that is acceptable to the Authority.

24.393 Incidents of Interference

The flight checking organization shall establish procedures to report all known or suspected instances of radio frequency interference to the Authority and the Spectrum Management Authority. Procedures shall also be established to report to the Authority and the applicable Communication Navigation and Surveillance organization, all other incidents involving interference of any other Air Navigation facility.

TWENTY-FOURTH "C" SCHEDULE, *contd.*

Appendix 1 to 24.329: Duties and Responsibilities of Key Personnel

- (a) The holder of IFPD Operations Specifications shall make arrangements to ensure continuity of supervision if operations are conducted in the absence of any required management personnel.
- (b) Required management personnel shall be contracted to work sufficient hours such that the management functions are fulfilled.
- (c) A person serving in a required management position for a Design Organization may not serve in a similar position for any other Design Organization, unless a deviation is issued by the Authority
- (d) Qualifications and Responsibilities of key personnel.
 - (1) Director of Operations
 - (i) Qualifications: The **Director of Operations** shall have or possess—
 - (a) University degree or equivalent qualifications and experience in the air navigation.
 - (b) Minimum ten (10) years' experience at increasing levels of responsibility and leading to supervisory level in Air Navigation Services (ANS) and flight procedure design in large government, in an international organization or in aviation industry.
 - (c) Experience in aviation operations as a pilot, navigator or air traffic controller.
 - (d) Satisfactory completion of an approved PANS OPS flight procedures design courses and an advanced courses on PANS OPS flight procedures design (PBN, RNAV, SBAS, GBAS, etc.) at a specialized international school.
 - (e) Knowledge in the aeronautical information conceptual and exchange model (AICM/AIXM), automation, digital terrain model (DTM), geographic information systems and cartography.
 - (f) Experience in the use of flight procedure designer software during the flight procedure design process.
 - (g) Experience in providing flight procedures design training.
 - (h) Knowledge in quality systems and flight procedure design software.
 - (i) Knowledge of and practical experience with International Organization for Standardization (ISO) and quality assurance procedures and systems.
 - (j) Thorough knowledge of Civil Aviation Legislation, ICAO Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS).
 - (1) The duties and responsibilities of the **Director of Operations** shall include but are not limited to :
 - (a) control of operations and operational standards of all services provided;
 - (b) The production and amendment of the Organizational Plan
 - (c) Maintain oversight of the following –
 - (i) Instrument Flight Procedure Design operations
 - (ii) staff scheduling and rostering; and
 - (iii) training programmes;
 - (d) the contents of the of Operations Manuals and other associated manuals;
 - (e) the supervision of and the production and amendment of operations manuals;
 - (f) liaison with the Authority on all matters concerning IFPD and flight inspection, including any amendments to the IFPD approval;
 - (g) liaison with any external agencies which may affect operations;
 - (h) ensuring that operations are conducted in accordance with current regulations, directives or other requirements, and organizational policy;
 - (i) the receipt and implementation of action in response to any aeronautical information affecting the safety of operations;
 - (j) the dissemination of safety information, both internal and external;
 - (k) qualifications of IFPD and flight inspection personnel; and
 - (l) maintenance of a current operations library.

TWENTY-FOURTH "C" SCHEDULE, *contd*

- (m) Design and validate the flight procedures of all airports and ATS routes in the country, according to ICAO specifications.
- (n) Review, verify, maintain and make sure that the flight procedure is ready for the final approval.
- (o) Guarantee a quality assurance in the flight procedure design.
- (p) Provide training of the flight procedure designer staff and elaborate all necessary documentation and guidance materials.
- (q) Maintain a well-structured database for obstacles assessment.
- (r) Provide on-the-job training.

Appendix 1 to 24.347: Sample Forms

Flight inspection forms

The following checklist and report templates as shall be completed during the flight validation as required by paragraph 24.347(g) applicable. If certain items are not applicable to the intended-IFP these shall be identified by strikethrough or the term "n/a".

(a) Pre-flight validation

PRE-FLIGHT IFP VALIDATION CHECKLIST FIXED WING		
REPORT HEADER		
Date:	Validation Type (New/amended procedure):	
Organization:		
Procedure Title:		
Location:		
Airport:	Runway:	
Evaluator Name/ Phone:		
PBN Navigation Specification:		
PRE-FLIGHT VALIDATION		
	PASS	FAIL
IFP package forms, charts, and maps		
Data verification (aerodrome/heliport, aeronautical, obstacle, ARINC coding)		
Review obstacle data and application		
Graphical depiction (Chart) correctness and complexity		
Intended use and special requirements		
Overall design is practical, complete, clear and safe		
Consider 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 (when applicable)		
ESV Requirements for Ground NAVAID Support		

TWENTY-FOURTH "C" SCHEDULE, *contd.*

Remarks:				
PROCEDURE	PASS		FAIL	
EVALUATOR SIGNATURE:				

(b) Simulator validation checklist - fixed wing

SIMULATOR EVALUATION		
REPORT HEADER		
Date:	Validation Type (New/amended procedure):	
Organization:		
Procedure Title:		
Location:		
Airport:	Runway:	
Evaluator Name/ Phone:		
PBN Navigation Specification:		
	PASS	FAIL
Comparison of FMS navigation database and source documents, including proper ARINC 424 Coding		
Document simulator aircraft information 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		
	DONE	
Document the following information as satisfactory or not for each procedure segment as appropriate: Heading/Track, Distance, GPWS 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		

 TWENTY-FOURTH "C" SCHEDULE, *contd.*

Remarks:				
PROCEDURE	PASS		FAIL	
EVALUATOR SIGNATURE:				

Appendix 1 to 24.391: Minimum Information – Flight Inspection Report

All flight inspection results shall be documented to a report format agreed with the Authority. The minimum information to be provided on the report shall be:

- (a) station name and facility designation; and
- (b) category of operation; and
- (c) date of inspection; and
- (d) unique serial number of report; and
- (e) type of inspection; and
- (f) aircraft registration; and
- (g) manufacturer's type of system being inspected; and
- (h) names and functions of all personnel involved in the inspection; and
- (i) results of all measurements made; and
- (j) method of making each measurement; and
- (k) details of associated attachments (recordings, etc.); and

TWENTY-FOURTH "C" SCHEDULE, *contd.*

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, Airport Authority		
Necessary equipment and media for electronic record of validation flight		
GENERAL		
	PASS	FAIL
IFP graphic (Chart) is complete and correct		
Check for interference: document all details related to detected RFI		
Satisfactory radio communication (as a minimum, air traffic communication at the IAF minimum altitude and at the missed approach altitude and holding fix)		
Required RADAR coverage is satisfactory		
Verify proper runway markings, lighting and VGSI		
Altimeter source(s)		
OBSTACLE ASSESSMENT		
	PASS	FAIL
Verified controlling obstacle in each segment (including circling and missed approach); if any obstacles are missing or any new obstacles are observed, record the lat/long		
Where necessary, flown at lateral limits of the obstacle assessment area; most appropriate for procedures designed in challenging terrain, or when there are questionable obstacles.		

Extra consideration should be given to non-surveyed areas		
For approach procedures with circling minima, verify controlling obstacle for each circling category		
FLYABILITY		
	PASS	FAIL
Comparison of FMS navigation database and source documents, including proper ARINC 424 Coding		
Human Factors and general workload satisfactory		
Note any loss of RAIM		
Note any loss of required RNP navigation performance		
Missed approach procedure		
Descent/ Climb gradients		
Use of autopilot satisfactory		
Segment length, turns and bank angles, speed restrictions and deceleration allowance		
GPWS		
INSTRUMENT APPROACH PROCEDURE		
	PASS	FAIL
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		

TWENTY-FOURTH "C" SCHEDULE, *contd.*

Course Alignment					
Along Track Alignment					
FAS Datablock					
Remarks:					
PROCEDURE	PASS		FAIL		
EVALUATOR SIGNATURE:					

(c) Post-flight validation checklist - fixed wing

FLIGHT VALIDATION CHECKLIST - FIXED WING		
REPORT HEADER		
Date:	Validation Type (New/amended procedure):	
Organization:		
Procedure Title:		
Location:		
Airport:	Runway:	
Evaluator Name/ Phone:		
PBN Navigation Specification:		
POST FLIGHT		
	PASS	FAIL
Evaluate collected data		
Submit flight validation report with recorded electronic flight data for archive		
Request NOTAM action (if appropriate)		
Sign and submit the instrument flight procedure submission documentation		

 TWENTY-FOURTH "C" SCHEDULE, *contd.*

Remarks:				
PROCEDURE	PASS		FAIL	
EVALUATOR SIGNATURE:				

Appendix 1 to 24.391: Minimum Information – Flight Inspection Report

All flight inspection results shall be documented to a report format agreed with the Authority. The minimum information to be provided on the report shall be:

- (a) station name and facility designation; and
- (b) category of operation; and
- (c) date of inspection; and
- (d) unique serial number of report; and
- (e) type of inspection; and
- (f) aircraft registration; and
- (g) manufacturer's type of system being inspected; and
- (h) names and functions of all personnel involved in the inspection; and
- (i) results of all measurements made; and
- (j) method of making each measurement; and
- (k) details of associated attachments (recordings, etc.); and

TWENTY-FOURTH "C" SCHEDULE, *contd.*

- (l) details of extra flights made necessary by system adjustments; and
- (m) assessment by the aircraft captain on the navigational aid performance; and
- (n) comments by the navigation aid inspector operator in the navigation aid performance; and
- (o) details of any immediately notifiable deficiencies; and
- (p) statement of conformance/non-conformance; and
- (q) navigation aid inspector's signature; and
- (r) captain's signature; and
- (s) signature of the accountable manager or other individual delegated by the accountable manager to sign on his behalf.

Appendix 2 to 24.391: Records and Graphs

The following shall apply to all records and graphs:

- (a) 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.
- (b) 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.
- (c) Recordings shall be marked so that they can be correlated with the aircraft's position at the time of the measurement.
- (d) The minimum identification on each record and graph shall be:
 - (1) serial number; and
 - (2) date; and
 - (3) description of type of flight; and
 - (4) name of airport; and
 - (5) designation of facility being inspected.