Directorate of Airspace Policy

Civil Aviation Authority

CAP 785

Approval Requirements for Instrument Flight Procedures for Use in UK Airspace

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Doc 8168	Procedures for Air Navigation Services Aircraft Operations – Vol I and II
Doc 8697	Aeronautical Chart Manual
Doc 9137	Airport Services Manual Part 6 – Control of Obstacles
Doc 9150	STOLPORT Manual
Doc 9274	Manual on the Use of the Collision Risk Model (CRM) for ILS Operations
Doc 9365	Manual of All-Weather Operations
Doc 9368	Instrument Flight Procedures Construction Manual
Doc 9371	Template Manual for Holding, Reversal and Racetrack Procedures
Doc 9426	Air Traffic Services Planning Manual
Doc 9573	RNAV Operations
Doc 9613	Manual on Required Navigation Performance (RNP)
Doc 9674	World Geodetic System 1984 (WGS 84) Manual
EuroControl	
	Guidance Material for the Design of Terminal Procedures for Area Navigation (DMD/DME, B-GNSS, Baro-VNAV and RNP-RNAV)
RTCA DO-201A / EUROCAE ED-77	Industry Requirements for Aeronautical Information.
	JAR-OPS 1 Subpart E
	Guidance Material for the Flight Inspection of RNAV Procedures

UK

	Guidance to the CAA on Environmental Objectives Relating to the Exercise of its Air Navigation Functions (DTLR January 2002)
CAP 32	UK Integrated Aeronautical Information Package
CAP 168	Licensing of Aerodromes
CAP 232	Aerodrome Survey Information
CAP 393	Air Navigation; The Order and the Regulations
CAP 493	Manual of Air Traffic Services Part I
CAP 655	Aeronautical Ground Lighting
CAP 670	ATS Safety Requirements
CAP 724	Airspace Charter
CAP 725	Airspace Change Process Guidance
CAP 738	Safeguarding of Aerodromes
CAP 778	Policy and Guidance for the Design and Operation of Instrument Departure Procedures in UK Airspace

Abbreviations

aal	–	above aerodrome level
AD	–	Aerodrome
AIP	–	Aeronautical Information Publication
ANO	–	CAP 393 Air Navigation Order
ANSP	–	Air Navigation Service Provider
APD	–	Approved Procedure Designer
ASD	–	Aerodrome Standards Department
ATM	–	Air Traffic Management
ATS	–	Air Traffic Service
ATSD	–	Air Traffic Standards Department
ATZ	–	Aerodrome traffic Zone
CAA	–	Civil Aviation Authority
CAD	–	Computer Aided Drawing
CAP	–	Civil Aviation Publication
CRC	–	Cyclic Redundancy Check
CRM	–	Collision Risk Model
CTA	–	Control Area
CTR	–	Control zone
DAP	–	Directorate of Airspace Policy
DER	–	Departure End of Runway
DfT	–	Department for Transport
DOC	–	Designated Operational Coverage
HOO	–	Hours of Operation
IAP	–	Instrument Approach Procedure
ICAO	–	International Civil Aviation Organisation
IFP	–	Instrument Flight Procedure
IFR	–	Instrument Flight Rules
MOC	–	Minimum Obstacle Clearance
OAS	–	Obstacle Assessment Surface
OCA	–	Obstacle Clearance Altitude
OCH	–	Obstacle Clearance Height
OLS	–	Obstacle Limitation Surface
PANS-OPS	–	ICAO Doc. 8168, Procedures for Air Navigation Services Aircraft Operations – Volume II Construction of Visual and Instrument Flight Procedures

PDG	–	Procedure Design Gradient
QMS	–	Quality Management System
RNP	–	Required Navigation Performance
SES	–	Single European Sky
SDF	–	Step Down Fix
SID	–	Standard Instrument Departure
SOC	–	Start of Climb
SRG	–	Safety Regulation Group
STAR	–	Standard Instrument Arrival
TAS	–	True Air Speed

NOTE: Reference to PANS-OPS is used for convenience throughout this document and refers generically to ICAO Document 8168, Volume II or the criteria contained therein.

Glossary of Terms

Instrument Flight Procedures Designer (IFPD) – For the purposes of this document an Instrument Flight Procedures Designer shall be considered to be either:

- An organisation employing one or more suitably qualified individuals.
- A suitably qualified individual.

Approved Procedure Designer (APD) – An APD is an instrument flight procedures designer who has met the competency requirements laid down by the CAA and holds an approval for the design of instrument flight procedures for aerodromes or heliports, which are under the jurisdiction of the CAA. (CAA)

'Flyability' of an IFP – An assessment that the IFP is flyable by the anticipated range of aircraft types in various weight, speed and centre of gravity configurations, and in various weather conditions (temperature, wind effects and visibility). It is also designed to assess that the required aircraft manoeuvring is consistent with safe operating practices, and that flight crew workload is acceptable. (CAA)

Independent Approved Procedure Designer (IAPD) – An APD who has not been involved in the design of the IFP which is being validated, but can be part of the same organisation. (CAA).

Instrument Approach Procedure (IAP) – A series of predetermined manoeuvres by reference to flight instruments, with specified protection from obstacles, from a specified point to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or other obstacle clearance criteria apply. (CAA)

Instrument Flight Procedure (IFP) – A standard instrument arrival, an instrument approach procedure, or a standard instrument departure. (CAA)

Sponsor – Aerodrome licence holder or representative from an Aerodrome acting on the Licence holder's behalf, or an ANSP, who proposes a new design, changes to, or withdrawal of an IFP. (CAA)

Standard Instrument Arrival (STAR) – A designated IFR arrival route linking a significant point, normally on an ATS route, with a point from which a published IAP can be commenced. (ICAO)

Standard Instrument Departure (SID) – A designated IFR departure route linking the aerodrome or a specified runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences. (ICAO)

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Section 1 Regulatory Material

Chapter 1 Introduction

1 Background

1.1 Single European Sky (SES) legislation came into force in April 2004 and requires a formal, functional split between the Regulation and service provision of air navigation functions. This separation is intended to improve the clarity of focus and effectiveness of both the Regulator and the provider of the service.

1.2 Instrument Flight Procedure (IFP) design is regarded as a function of service provision and as such, the Civil Aviation Authority (CAA) is required to take steps to separate this activity from its regulatory functions. Notwithstanding the SES requirements, the CAA considers such a split to be necessary and appropriate.

1.3 In order to manage a transition of the functions from the CAA to industry, a two-year transitional period has been planned from 1 April 2010 to 31 March 2012.

2 Purpose

2.1 This document has three purposes:

- to give guidance to applicants and procedure designer(s)/organisations on the procedure for the issue, with any applicable conditions, and continuation of an approval to design and provide instrument flight procedures for use in UK airspace issued under Article 176 of *Air Navigation Order 2009* (as amended) (ANO) and to indicate the approval requirements that are used for assessing an application;
- to give guidance on the procedure for the approval of instrument flight procedures produced by the approved procedure designers; and,
- to describe how the responsibilities and accountabilities may be borne throughout the design process between the procedure designer, the sponsor and the CAA.

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Chapter 2 Regulatory Framework

1 The Regulatory Framework

1.1 The *Civil Aviation Act (1982)* established the CAA and provides the framework for its regulatory powers. Furthermore, the *Air Navigation Directions 2001* require that the CAA develop national policy for design criteria, rules and guidelines in relation to the supporting infrastructure for air navigation.

1.2 The Act enables further legislation, the ANO and General Regulations to be made in order to permit the CAA to fulfil its regulatory obligations.

1.3 The ANO contains articles, each dealing with a particular subject.

1.4 The CAA publishes Civil Aviation Publications (CAP), which provide details of means of compliance that are acceptable to the CAA.

1.5 The Controlled Airspace Section, Directorate of Airspace Policy, within the CAA is responsible for the formulation of policy relating to the design of IFPs. The responsibility includes regulatory oversight of external agencies engaged in the design of IFPs for subsequent use in the UK FIR and at UK civil airports. Regulation is achieved, as appropriate, through the application of requirements as laid out in the relevant articles to the ANO by the CAA.

1.6 The aim of CAA regulation is to ensure that IFPs:

- are designed to the required standard as stipulated in Section 3, Chapter 1, paragraph 2;
- are safe and flyable;
- meet Air Traffic Management requirements; and
- are environmentally acceptable.

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Chapter 3 Regulatory Process

1 General Guidelines

1.1 The Regulatory Process is based upon:

- CAA approval of procedure designers through evaluation of their training, experience, procedures and working practices;
- CAA regular periodic audit of procedure designers, not exceeding 18 months; and
- CAA evaluation and approval of completed IFP designs.

1.2 The CAA will only accept IFP design submissions from CAA Approved Procedure Designers (APDs).

1.3 A list of APDs will be maintained on the CAA Internet site. The publication of this list does not absolve sponsors from carrying out whatever checks they might consider necessary to satisfy their own requirements.

1.4 CAA approval, once issued, will be non-transferable. All applications for recognition as a CAA APD will be judged solely on merit and compliance with the requirements detailed in Section 2, Chapter 1. Where approval is withheld, the CAA will notify the applicant and provide a full explanation for the decision.

1.5 An approval certificate will be issued to successful applicants.

2 Environmental Considerations

Generic guidance is given by the Department for Transport in Guidance to the CAA on Environmental Objectives Relating to the Exercise of its Air Navigation Functions (DTLR January 2002), which can be found online at:

http://www.caa.co.uk/docs/7/DTLREnvironmentalGuidance.pdf

Detailed guidance is also given in CAP 725 available on the CAA website at

http://www.caa.co.uk/CAP725

Practically, the policy is to contain rather than spread noise with tracks being routed away from centres of population where safety and operational considerations permit.

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Section 2 Designer Approval

Chapter 1 Regulatory Process

1 Overview

The CAA considers that a combination of specialist knowledge and experience provides the basis for an effective and safe IFP designer which, when coupled to an effective management and documentation system, should ensure the output of a quality product that can be subjected to regulatory oversight.

2 Criteria for the Approval of IFP Designers

2.1 Procedure Designers seeking approval to design IFPs for use in UK airspace must provide evidence of the following:

- Specialist PANS-OPS/IFP design training;
- Practical Application of Theoretical Knowledge;
- References;
- Aviation Experience; and
- Quality Management System (QMS).

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

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

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

b) **Aviation Experience**: It is generally accepted that a high level of aviation experience is an important attribute for successful IFP design, ideally as aircrew or air traffic controller. It is not considered essential to hold a current licence nor to distinguish between a civil or military background. Procedure Designers who have undergone an "apprenticeship', in lieu of aviation experience, should provide evidence that supports a minimum of three years PANS-OPS, on-the-job design training;

c) **References**: Applicants should be prepared to provide details of previous sponsors/employers; and

d) **Quality Management System**

Applicants shall demonstrate that they have established and are able to maintain a documented quality system. This quality system shall be such that it enables the organisation to ensure that each design or any advice given with respect to any IFP issue conforms to international or national requirements and thus exercise the privileges as granted by their Approval. The quality system shall be described in a quality manual that includes control procedures for:

i) Management responsibility;

ii) A Quality System including:

- Controlled documentation of the design process;
- Record control system of design drawings and worksheets;
- Record control system of input data including items such as: survey data and charting;
- Record control system of regulatory documents and reference material;
- Control procedures for validation of software tools;
- Control of non-conforming design;
- Records of personnel competence and qualifications;
- Training of personnel;
- Internal quality audits and corrective actions;
- Subcontractor assessment audit and control; and,
- Co-ordination throughout the process from design to notification with the sponsor for, or holder of, the design.

3 Application for CAA Approval to Design IFPs

3.1 Applications for CAA approval to design IFPs for use in UK airspace shall be submitted using the application form on the CAA website at:

www.caa.co.uk/DAP1914 for an individual;

www.caa.co.uk/DAP1915 for a company.

3.2 Submissions may be presented in a bound form or electronic format accompanied by the full Approval fee. Unless the applicant considers it essential, original documents should not be forwarded to the CAA. Where original documents are included, the CAA accepts no liability for any consequential loss.

3.3 Applications for Approval to Design will be acknowledged within 5 workings days of receipt. Subject to a satisfactory submission of application material, arrangements for an initial audit visit will be agreed.

3.4 In considering the application, the CAA may call upon the applicant to provide clarification or expansion of the information provided.

3.5 Applications shall be sent to the address shown below:

Head of Business Management
Directorate of Airspace Policy
Civil Aviation Authority
CAA House K6
45-59 Kingsway
London WC2B 6TE
United Kingdom

3.6 All submissions must be in English.

4 Design Privileges

4.1 The holder of a design approval certificate shall be entitled to design IFPs within the scope of the Approval.

4.2 Other privileges may include;

a) Approval to submit IFP changes on F933 on behalf of the sponsor of an IFP;

b) Approval to submit F933 for new procedures.

5 Issue of Approval

A designer or organisation shall be entitled to have a design approval issued by the CAA when it has demonstrated compliance with the applicable requirements.

6 Duration and continued validity

6.1 A design approval shall be issued for an unlimited duration. It shall remain valid unless:

a) the designer fails to demonstrate compliance with the applicable requirements; or

b) the CAA is prevented by the designer, or any of its partners or subcontractors, from performing its investigations; or

c) the designer no longer meets the eligibility requirements for this approval; or

d) the certificate has been surrendered or revoked.

6.2 Upon surrender or revocation, the certificate shall be returned to the CAA.

7 Audits

7.1 The CAA shall carry out regular audits of APDs.

7.2 When objective evidence is found showing non-compliance of the holder of a Certificate of Approval with the requirements, the finding shall be set out as follows:

a) A level one finding is any non-compliance with these Requirements, which could lead to uncontrolled non-compliances with applicable requirements and could affect the safety of aircraft.

b) A level two finding is any non-compliance with these Requirements, which is not classified as level one.

7.3 After a receipt of notification of findings:

a) A level one finding must be rectified immediately or within the short timescale specified;

b) In case of level two findings, the corrective action period granted by the CAA shall be appropriate to the nature of the finding but in any case shall not be more than six months. In certain circumstances the CAA may extend the six-month period subject to a satisfactory corrective action plan.

7.4 In the case of level one or level two findings, the Certificate of Approval may be subject to a partial or full suspension or revocation. The holder of the approval shall provide confirmation of receipt of the notice of suspension or revocation of the approval in a timely manner.

8 Transferability

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

Chapter 2 Fees

1 Approval Fees

Fees associated with obtaining CAA approval to design IFPs for use in UK airspace are available from the CAA website at:

www.caa.co.uk/ors5

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Section 3 IFP Approval

Chapter 1 Process and Criteria for the Submission of IFP Designs for Approval

1 Design Process

1.1 The design process is initiated by a Sponsor's requirement for a new or change to an existing IFP. The Sponsor shall notify the CAA of his intention to establish or amend an IFP using the form available from the CAA website at:

http://www.caa.co.uk/default.aspx?catid=7&pagetype=90&pageid=2368

1.2 Formal notification to the CAA, once completed, shall be sent to:

Head of Controlled Airspace Section
Directorate of Airspace Policy
Civil Aviation Authority
CAA House K6
45-59 Kingsway
London
WC2B 6TE
United Kingdom

1.3 Following receipt of the form, an acknowledgement will be sent to the Sponsor within 5 working days, naming the DAP case officer, who will act as the point of contact for the project.

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

- Design period (Negotiated between Sponsor and Designer);
- Associated regulatory activity by CAA staff including allowance for amendments and corrections to original submission (Approx 1-2 Months);
- Production of a chart suitable to allow AIS to produce a chart for the AIP;
- Flight calibration of navigation aids if required;
- Ground/flight/simulator/navigation database validation, as required; and
- AIRAC promulgation (Approximately 3 months from submission of charts to AIS to effective date of procedure).

2 Design Criteria

2.1 The criterion for IFP design in UK airspace is based on the following document:

ICAO Doc 8168-OPS/611, Procedures for Air Navigation Services – Aircraft Operations Volume II, Construction of Visual and Instrument Flight Procedures (PANS-OPS Vol II)

2.2 In accordance with the latest ICAO policy, significant national differences to Doc 8168 are notified in the UK AIP. Where further guidance is required, the DAP case officer should be approached for clarification.

3 Design Submission – Format and Content

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

- A complete record of the design process including copies of all source data, information, calculations and drawings used in the project;
- A record of Quality Assurance and Quality Control;
- A statement of compliance with PANS-OPS from an IAPD;
- A report demonstrating how the original requirement has been satisfied;
- A narrative, which unambiguously describes the procedure in textual format and table showing all tracks in degrees True to 1/100th degree;
- A graphical representation which accurately reflects the content of the narrative provided;
- Relevant signed Validation reports;
- A comprehensive design rationale in text format, including references to PANS-OPS Volume II and UK policy where a deviation from the standard criteria or policy has been employed; and
- The Approval fee as promulgated on the CAA website.

4 External Data and Information

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

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

4.3 IAPs will only be included in the UK AIP where the runway served by the procedure has been assigned an instrument runway designation in accordance with CAP 168 Licensing of Aerodromes.

4.4 Current survey data and information are crucial to the design of safe IFPs. CAP 232 Aerodrome Survey Information details the survey requirements and presentation required by the CAA for obstacle and aerodrome data. Aerodrome surveys used for IFP design purposes must comply with CAP 232. Any change to the survey will require an assessment as to the impact upon current IFPs.

4.5 Sponsors are responsible for ensuring that the survey and subsequent IFP activities are controlled and monitored to an appropriate standard. Quality assurance and quality control processes set out in *ISO 9001:2008* aimed at service provision are a recommended benchmark.

5 Drawings

5.1 CAD is not a prerequisite for design submission. However, if CAD is employed any appropriate tool can be used as required by the sponsor and the designer. When CAD drawings are submitted to the CAA they should be in a generic format (e.g. *.dwg or *.dxf).

6 Calculations

6.1 The results and calculations shall be presented in a manner that enables the Regulator to follow and trace the logic and resultant output including:

- A record of all relevant calculations kept in order to prove compliance with or variation from the criteria;
- Formulae used during calculation should be the standard formulae as declared in *PANS-OPS* and related ICAO publications; and
- Units of measurement and conversion factors must be in accordance with *ICAO Annex 5* taking into account any applicable UK differences.

7 Submissions

7.1 All completed submissions shall be sent to:

CAS ATM Technical Assistant
Directorate of Airspace Policy
Civil Aviation Authority
CAA House
45-59 Kingsway
London WC2B 6TE

CAS.Mailbox@caa.co.uk

7.2 Submissions will be acknowledged within 5 working days of receipt.

8 Rejected Submissions

8.1 Where the CAA is unable to approve an IFP design, consultation between the CAA, aerodrome and designer will be encouraged to explore all possible solutions.

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Section 4 IFP Governance

Chapter 1 IFP Roles and Responsibilities

1 Responsibilities

For the purposes of this document, the CAA considers that responsibility for IFPs is held as follows:

- IAPs and SIDs are managed by the aerodrome licence holder; and
- STARs are managed by the en-route ANSP.

The CAA is responsible for overall regulatory oversight of IFPs. Individual responsibilities are detailed below.

1.1 IFP Sponsor

The Sponsor of an IFP is either the aerodrome licence holder or their nominated representative or an ANSP; the sponsor is responsible for:

a) maintenance of an IFP;

b) initiating any new design or change to an IFP;

c) ensuring that any new design or change to an IFP is undertaken by an APD;

d) ensuring the validation as required of any new/changed IFP;

e) ensuring that the F933 is submitted; and

f) ensuring compliance with CAP 725 when consultation is required.

1.2 Approved Procedure Designer

The APD is responsible for:

a) providing a statement of compliance;

b) documenting the rationale for any non-compliance;

c) adherence to UK design policy;

d) ensuring that the design is documented against declared QMS;

e) ensuring that the design meets the requirements of the Sponsor; and

f) providing advice to the sponsor on all aspects of IFP design.

1.3 Directorate of Airspace Policy

DAP is responsible for:

a) ensuring the provision of IAPs as appropriate;

b) granting approval to design;

c) granting approval to IFP designs; and,

d) providing guidance to Sponsors and APDs as appropriate in developing IFPs.

1.4 DAP Case Officer

The DAP Case Officer is responsible for:

a) acting as the main point of contact for the Sponsor and APD;

b) compiling all elements of the regulatory assessment; and,

c) ensuring guidance is provided to Sponsors and APDs regarding any IFP queries.

Chapter 2 Maintenance, Review and Safeguarding

1 Maintenance

1.1 Maintenance of the procedures includes updates due to:

- magnetic variation changes;
- new survey information; and
- changes to airspace structure.

1.2 A full review of the procedures is required on a 5 yearly basis.

1.3 Changes to SIDs at the three designated[1] London airports Heathrow, Gatwick and Stansted shall be agreed with DfT prior to promulgation, and DfT should be informed of updates due to changes in magnetic variation.

1.4 Records supporting the design of the IFP(s) shall be kept throughout the lifetime of the IFP and for five years after any change or withdrawal.

2 Safeguarding of IFPs

2.1 The assessment of the impact a proposed development or construction, or planned temporary obstacle, might have on an aerodrome's operation is known as safeguarding. (See CAP 738 – Safeguarding of Aerodromes.) The assessment should include the impact on an aerodrome's IFPs. The aerodrome licence holder is responsible for having the safeguarding assessment carried out.

2.2 The aerodrome licence holder / sponsor is responsible following a safeguarding assessment for any NOTAM action required for temporary obstructions.

1. These are the three airports presently designated under section 80 of the Civil Aviation Act 1982 for the purposes of section 78 of that Act, giving rise to the descriptor "designated airports". Section 78 empowers the Secretary of State (and, in Scotland, the Scottish Ministers) to regulate noise and vibration connected with aircraft taking off or landing at designated airports.

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Appendix A IFP Project Flowchart

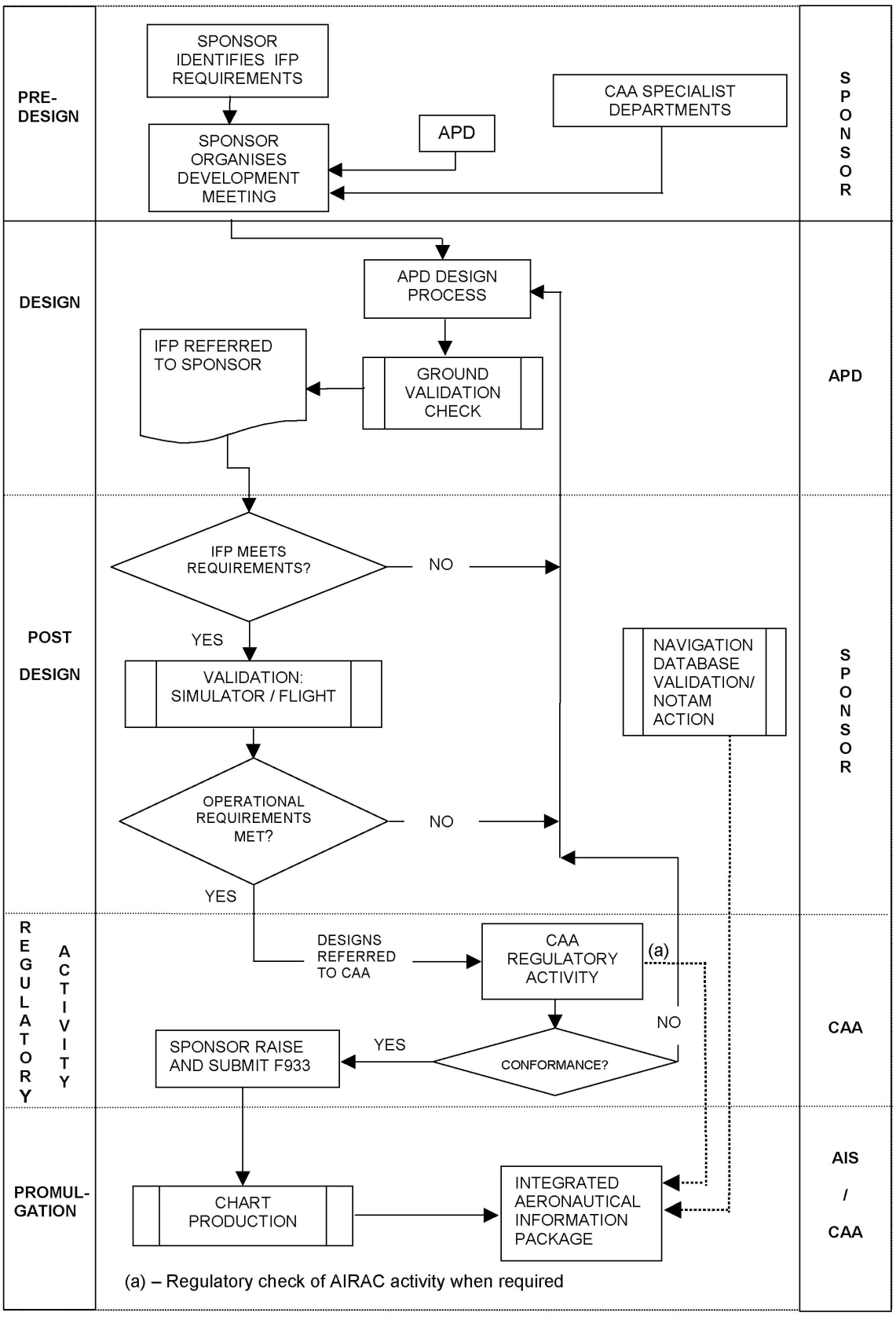

Figure 1 IFP Project Flowchart

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