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GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

OPERATIONS CIRCULAR

**Subject: Automatic Dependent Surveillance-Broadcast (ADS-B)
Operations and Operational Authorization**

1. INTRODUCTION

The intent of this operations circular (OC) is to facilitate operations using Automatic Dependent Surveillance-Broadcast (ADS-B) technology. This OC applies to all Indian aircraft and operators intending to use ADS-B. India does not mandate ADS-B equipage at this time, however ADS-B ground infrastructure has been set up for implementation of ADS-B operations in Indian airspace. India plans to introduce ADS-B for the provision of Air Traffic Services, including 'radar-like' separation in a phased manner. The Automatic Dependent Surveillance Broadcast "(ADS-B) OUT" transmissions on 1090MHz Extended Squitter (1090ES) data link will be used for provision of ATS surveillance services to eligible aircraft within notified portions of Indian airspace(s). This OC provides the means to obtain operational authorization for aircraft and operators intending to use ADS-B in airspace notified for ADS-B operations.

2. OVERVIEW

ADS-B provides air traffic control (ATC) with a means of surveillance in designated airspace, which allows application of reduced separation standards for more efficient use of the airspace. Currently, ADS-B provides surveillance coverage in several regions of the world, including portions of Australia, Canada, and in the Asia-Pacific region. Additional International Civil Aviation Organization (ICAO) regions and

Member States are expected to implement ADS-B in their airspace and/or on specific airways and routes in the future.

3. CERTIFICATION AND INSTALLATION OF ADS-B OUT EQUIPMENT

ADS-B OUT transmitting equipment should be of an approved type meeting the specifications contained in Annex 10 (Volume IV) to the convention on International Civil Aviation or that has been certified as meeting;

- a) The current version of FAA AC No. 20-165 – Airworthiness Approval of ADS-B OUT Equipment for Operation in the National Airspace System (NAS)
- b) EASA AMC 20-24 Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090 MHz Extended Squitter dated 05 February 2008, or
- c) The equipment configuration standards in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia dated 23rd August 2012 and any amendment thereof.

4. ADS-B SYSTEM DESCRIPTION

4.1 ADS-B System Architecture.

The ADS-B system architecture is composed of aircraft avionics and a ground infrastructure. Onboard avionics determine the position of the aircraft, typically by using the Global Navigation Satellite Systems (GNSS) and transmitting this and additional information about the aircraft to ground stations for use by ATC; to ADS-B-equipped aircraft; and to other aviation service providers.

4.2 ADS-B Operating Frequencies.

The ADS-B system operates on two frequencies: 1090 or 978 megahertz (MHz).

- **1090 MHz Frequency.** The 1090 MHz frequency is associated with current Mode A, C, and S transponder operations. ADS-B information is included in Mode S transponders' Extended Squitter (ES) transmit messages, and referred to as 1090ES in this OC.
- **978 MHz Frequency.** ADS-B equipment operating on 978 MHz are referred to as Universal Access Transceivers (UAT) in this OC.

4.3 ADS-B Avionics Operating Modes.

ADS-B avionics can have the ability to both transmit and receive information.

- **ADS-B OUT.** The transmission of ADS-B information from aircraft is known as ADS-B OUT.
- **ADS-B IN.** The receipt of ADS-B information by an aircraft is known as ADS-B IN.

5. OPERATING PROCEDURES

5.1 System Operation Familiarity.

All operators should use the applicable Airplane Flight Manual (AFM), Airplane Flight Manual Supplement (AFMS), Rotorcraft Flight Manual (RFM), Rotorcraft Flight Manual Supplement (RFMS), pilot's operating handbook (POH), or other required operating handbooks or manuals, to become familiar with the proper operation of the installed ADS-B system and any procedures expected of the user for indications of reduced performance or failures within the system.

5.2 Understanding Failure Indicators within the System.

Because many ADS-B system installations will be upgrades to existing transponders (Mode S), there may be limited ability to indicate ADS-B failures. Mode S transponders with ADS-B functionality may indicate a device failure (loss of transponder/ADS-B) and input failures (loss of position source, such as GNSS) with the same indicator light. Operators should refer to their AFM, AFMS, RFM, RFMS, POH, and other handbooks and manuals for information on the differences between device failures and function failures, and the implications and procedures associated with each failure type.

5.3 Transponder Operation and ADS-B Transmissions.

For ADS-B system installations integrated within a transponder that share control features, operators should be aware that disabling the transponder may also disable ADS-B transmissions, resulting in a loss of Secondary Surveillance Radar (SSR) services and Traffic Alert and Collision Avoidance System (TCAS)/TCAS II operation, if so equipped.

6. OPERATIONAL AUTHORIZATION TO CONDUCT ADS-B OPERATIONS

DGCA authorization is required for all Indian aircraft and operators to conduct ADS-B OUT operations in airspace designated for ADS-B operation. Commercial operators will be issued an Operations Specification (OpSpec) and general aviation a "letter of authorization" (LOA) for ADS-B operational approval.

6.1 Initial Request for Authorization.

6.1.1 Indian operators seeking to conduct ADS-B OUT operations in ADS-B designated airspace must first contact the Regional DGCA office to indicate their intent. When making the initial request, the operator should be prepared to provide the following:

- a) Documented compliance of applicable requirements;
- b) The proposed plan to conduct operations under the authorization; and
- c) The identification of the appropriate point(s) of contact (POC) for coordination during the DGCA authorization process.

6.1.2 At the time of the operator's initial request, the DGCA will provide the operator with information for obtaining relevant guidance and documents, as well as the proper content and format of the documentation required when submitting the formal request.

6.2 Required Documentation for Submission of Formal Request.

6.2.2 Documentation Guidance.

The following paragraph provides general guidance on the documentation required for submission of a formal request for issuance of this authorization. At the discretion of FSD, DGCA, additional information may be required based on any unique aspects of specific operations.

6.2.3 Letter of Request for Issuance of Authorization.

The operator must submit a letter of request to the Regional Office of DGCA requesting issuance of the authorization. The letter of request should include statements indicating the following:

- a) Area(s) of intended operation;
- b) Type of aircraft (make, model, and series (M/M/S)) to be used in the operations, aircraft registration number/mark, serial number;
- c) Description of ADS-B OUT equipment to be used. Make, model, and part number of ADS-B transmitter and positioning source(s);
- d) Revision of aircraft qualification documents (Airplane Flight Manual (AFM), pilot's operating handbook (POH), etc.);

- e) Establishment of applicable operational procedures and practices;
- f) Revision of applicable operations manuals and checklists;
- g) Revision of ADS-B OUT system maintenance procedures;
- h) Establishment of periodic maintenance for the ADS-B OUT system;
- i) Revision of minimum equipment list (MEL), if applicable;
- j) Revision of pilot training; and
- k) Revision of dispatcher training, if applicable.

6.3 Compliance Documentation.

Operators must submit documentation that demonstrates compliance with European Aviation Safety Agency (EASA) Acceptable Means of Compliance (AMC) 20-24, Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090 MHz Extended Squitter, dated February 5, 2008, or documents as in Para 3 above. Documentation should include:

6.3.1 Aircraft Qualification Documentation. Documentation from the aircraft manufacturer stating in the AFM/AFMS, POH that the proposed aircraft complies with EASA AMC 20-24 (or applicable documents in Para 3) Deviations, as stated in EASA AMC 20-24, must be included or referenced.

6.3.2 Operational Procedures and Practices. As applicable, company manuals must address the special characteristics of the proposed area(s) of operation.

6.3.3 Operations Manuals and Checklists. The AFM, Airplane Flight Manual Supplement (AFMS), Aircraft Operating Manual (AOM), Flight Operations Manual (FOM), POH, and associated checklists, as applicable to the specific operator, must include information to be used for the specific operation requested and be carried on the aircraft. The operations manual (or equivalent) should include a system description, operational and contingency procedures, and training elements for use of the ADS-B NRA application. Operations manuals should indicate that Direct Controller Pilot Communications (DCPC) must be available at all times (e.g., very high frequency (VHF), Controller-Pilot Data Link Communication (CPDLC), etc.). Operations manuals and checklists should indicate that when there is not an independent flight deck control selection between the ADS-B OUT on/off function and the ATC transponder on/off function, the crew must be fully aware that disabling the ADS-B function will also disable transponder and Traffic Alert and Collision Avoidance System (TCAS) functions.

6.3.4 Maintenance Procedures. The operator must submit documentation indicating the proposed maintenance procedures that address the instructions for continued

airworthiness (ICA) provided by the manufacturer of the installed ADS-B equipment. Maintenance procedures must include a periodic verification check of aircraft-derived data used by the ADS-B system. Maintenance procedures must also include periodic verification (using suitable ramp test equipment or other acceptable means) that the correct ICAO 24-bit address assigned to each aircraft is being transmitted by the ADS-B system.

6.3.5 Establishment of Periodic Checks of the ADS-B OUT System. The operator should provide documentation that indicates that periodic checks for the installed ADS-B OUT system are established.

6.3.6 Revision of MEL. The operator must submit documentation for proposed MEL (if used) revisions that address appropriate dispatch procedures of the aircraft with the ADS-B OUT system inoperative or partially inoperative.

6.3.7 Flight Crew Training. Pilots conducting operations under this authorization must be trained in the use and limitations of the installed ADS-B system, unless one of the crewmembers is an ADS-B-trained trainer, as appropriate. Operators must submit documentation that details the method and content of the pilot training to be conducted. Pilot training must address the following:

- a) ADS-B operating procedures;
- b) Flight planning;
- c) MEL procedures;
- d) Human factors;
- e) ADS-B phraseology applicable to specific regions of operation;
- f) ADS-B system operation, including normal/abnormal procedures;
- g) Correct entry of ICAO aircraft ID as applicable to the flight;
- h) Operational procedures regarding the transmission of the generic emergency code (i.e., 7700) in cases when the flight crew actually selected a discrete emergency code (e.g., 7500, 7600);
- i) Handling of data source errors (e.g., discrepancies between navigation data sources); and
- j) Incident reporting procedures.

Note: General aviation operators must submit a statement that the operator's pilots have knowledge of current air traffic ADS-B directives for the intended areas

of en route operation and will comply with applicable regulations.

6.3.8 Dispatcher/Flight Follower Training. Operators must submit a detailed description of the proposed dispatcher/flight follower (if required/used) training to be conducted. Dispatcher/flight follower training must address the following:

- a) Dispatch of aircraft with the ADS-B system unserviceable or partially unserviceable.
- b) Flight planning, fuel loading, and route change procedures associated with ADS-B operations.
- c) ADS-B ICAO region-specific requirements.

7. Canada-Specific Requirements.

7.1 Transport Canada Requirements.

See the current edition of Transport Canada AC 700-009, Automatic Dependent Surveillance-Broadcast, Paragraph 6.2, Foreign Air Operators, for information related to the ADS-B requirements of foreign operators.

7.2 NAV CANADA Requirements.

See the current edition of Aeronautical Information Circular (AIC) 21/09, Air Traffic Flow Management in the Vicinity of Hudson Bay as a Result of Automatic Dependent Surveillance-Broadcast OUT Implementation, for information related to NAV CANADA ATC services supported by ADS-B.

8. Australia-Specific Requirements.

See the current editions of Australia AIC H09/11, Transition to Satellite Technology for Navigation and Surveillance; Australia Civil Aviation Safety Authority (CASA) Civil Aviation Order (CAO) 20.18, Aircraft Equipment—Basic Operational Requirements, regarding avionics requirements; and CAO 82.5, Condition on Air Operators' Certificates Authorising Regular Public Transport Operations in High Capacity Aircraft, for information related to the ADS-B requirements of certificated foreign operators.

9. Asia-Pacific-Specific Requirement. Singapore issued AIC 14/10, Introduction to Automatic Dependent Surveillance Broadcast (ADS-B) OUT Service within Parts of the Singapore FIR, dated December 28, 2010, informing aircraft operators regarding the Civil Aviation Authority of Singapore's (CAAS) plan to implement ADS-B operations after 2013 within portions of the Singapore flight information region (FIR). See CAAS AIC 14/10 for specific airways that will require ADS-B within Singapore's FIR.

10. Related Documents.

ICAO Regional Guidance. Regulatory guidance and general information for ADS-B OUT operations for specific ICAO regions can be found in the following publications:

- a) FAA Order 8900.1, Flight Standards Information Management Systems (FSIMS), Volume 3, Chapter 18, Section 3, Part A Operations Specifications—General, Operations Specifications/Management Specifications/Letter of Authorization A353, Automatic Dependent Surveillance-Broadcast (ADS-B) Operations Outside of U.S.-Designated Airspace, current edition;
- b) FAA Notice 8900.269 OpSpec/MSpec/LOA A153 ADS-OUT Operations Outside of U.S.- Designated Airspace.
- c) EASA AMC 20-24, Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090 MHZ Extended Squitter, dated February 5, 2008;
- d) TCCA AC 700-009, Automatic Dependent Surveillance-Broadcast, current edition;
- e) NAV CANADA AIC 21/09, Air Traffic Flow Management in the Vicinity of Hudson Bay as a Result of Automatic Dependent Surveillance-Broadcast OUT Implementation, current edition;
- f) CASA CAO 20.18, Aircraft Equipment—Basic Operational Requirements, current edition;
- g) CASA CAO 82.5, Condition on Air Operators' Certificates Authorising Regular Public Transport Operations in High Capacity Aircraft, current edition; and
- h) CAAS AIC 14/10, Introduction to Automatic Dependent Surveillance Broadcast (ADS-B) OUT Service within Parts of the Singapore FIR, current edition.

(Capt Ajay Singh)
Chief Flight Operations Inspector
For Director General of Civil Aviation