

Advisory Circular

POLAR ROUTE OPERATIONS

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GENERAL

Advisory Circulars (ACs) are issued by the Director-General of Civil Aviation (DGCA) from time to time to provide practical guidance or certainty in respect of the statutory requirements for aviation safety. ACs contain information about standards, practices and procedures acceptable to CAAS. An AC may be used, in accordance with section 3C of the Air Navigation Act (Cap. 6) (ANA), to demonstrate compliance with a statutory requirement. The revision number of the AC is indicated in parenthesis in the suffix of the AC number.

PURPOSE

This AC provides guidance to demonstrate compliance with the requirements regarding, and information related to an application for, an approval for Polar Route Operations in accordance to ANR-98.

APPLICABILITY

This AC is applicable to an operator seeking an approval for polar operations.

RELATED REGULATIONS

This AC relates specifically to Division 9 in Part 2 of ANR-98.

RELATED ADVISORY CIRCULARS

- AC 98-1-1 Application for an Approval to Conduct a Special Operation

CANCELLATION

This AC supersedes AC AOC-19.

EFFECTIVE DATE

This AC is effective from 1 October 2018.

OTHER REFERENCES

- FAA Order 8900.1 Flight Standard Information Management System (FSIMS)
- FAA AC 120-61B In-Flight Radiation Exposure
- Boeing AERO series Publication on Polar Route Navigation

1 INTRODUCTION

- 1.1 The Polar Regions have some of the harshest landscapes and atmospheric environments with challenges that require special considerations. This AC provides guidance on considerations and acceptable means of compliance for seeking an approval provided in Division 9 in Part 2 of ANR- 98.

2 FUEL FREEZE STRATEGY AND MONITORING

- 2.1 The operator should develop a fuel freeze strategy and monitoring programme to be used in lieu of the standard minimum fuel freeze temperatures. This fuel freeze analysis and monitoring programme for the aeroplane fuel load is to be submitted as part of the approval application and is subjected to CAAS' approval.
- 2.2 The fuel freeze strategy and monitoring programme should include procedures for the coordination between maintenance, dispatch and assigned flight crew to convey the determined fuel freeze temperature of the fuel load on board the aeroplane.

3 COLD FUEL MANAGEMENT PROCEDURE

- 3.1 During long flight duration in very cold air mass, the fuel temperature could potentially approach freezing point. It is imperative that a cold fuel management procedure be developed for dispatch and in-flight use.

4 NAVIGATION

- 4.1 The operator should provide information and procedures with regard to the use of Magnetic and True directional references for navigation through the area of magnetic unreliability (AMU) and near or over the True Geographical Pole.

5 COMMUNICATION

- 5.1 Effective voice communications and/or data-link capability must be available for all portions of the flight route. There must be an established communication plan which may include HF voice, HF data-link, SATCOM voice or SATCOM data-link communications.
- 5.2 Solar flare activity prediction and its effects has to be taken into consideration when dispatching a flight using polar route/s.

Note 1: It is recognised that SATCOM may not be available for short periods during flights over the poles.

Note 2: Communication capability with HF radios may also be affected during periods of solar flare activity.

6 RADIATION

- 6.1 The operator should regularly monitor space weather activity and provide Solar Radiation, Geomagnetic Storm and Radio Blackout forecasts to the crew.
- 6.2 A clear dispatch policy guideline on Solar Radiation, Geomagnetic Storm and Radio Blackout should also be in place.

Note: Refer to the following for further information on radiation.

- FAA AC 120-61B – In-Flight Radiation Exposure.

7 IN-FLIGHT DIVERSION

- 7.1 Apart from engine failure, an in-flight decision to divert could be caused by events including but not confined to:
 - (a) medical alerts;
 - (b) depressurisation;
 - (c) hydraulic failure; and
 - (d) smoke warning in cargo-hold, in-flight entertainment system or Avionics.
- 7.2 An in-flight diversion within the Polar Region should take into account remoteness of the region, weather conditions as well as limited supporting facilities. In this regard the operator should develop appropriate procedures and processes to facilitate decision-making for in-flight diversion.
- 7.3 Guidelines on medical emergencies, especially when no medical personnel are found on board, has to be provided.

8 DESIGNATION OF EN-ROUTE ALTERNATE AIRPORTS

- 8.1 The operator should designate a set of alternate airports, regardless of their distance from the planned route, such that one or more can reasonably be expected to be available in a variety of weather conditions, to support a diversion.
- 8.2 The aeroplane must be able to make a safe landing at the selected diversion airport and it should be able to manoeuvre off the runway after landing. The operating crew should be made aware of the need, conditions permitting, to vacate the runway after landing. The airport should also have the capability to remove the aeroplane from the runway should it be unable to vacate the runway, so as not to block the operation of a recovery aircraft.
- 8.3 In addition, these designated airports should be capable of protecting the safety of all personnel by being able to:
 - (a) deplane the passengers and crew in a safe manner during possible adverse weather conditions;
 - (b) provide for the physiological needs of passengers and crew for the duration of the stay until safely evacuated, and
 - (c) safely and expeditiously extract passengers and crew.

Note: A time frame of 12 to 48 hours for execution and completion of a recovery is considered acceptable.

9 RECOVERY PLAN

- 9.1 A very important aspect of an unplanned diversion in the Polar Regions is the recovery plan. The operator:
- (a) should demonstrate his ability to launch and conduct the recovery plan during initial application for Polar route approval; and
 - (b) must conduct annual audit of his recovery plan for accuracy and completeness

10 EQUIPMENT TO BE CARRIED

- 10.1 The operator should consider the circumstances described in the above paragraphs in his safety risk assessment (required in Regulation 5(2)(a)(ii) of ANR-98), and determine an appropriate list of equipment to be carried.
- 10.2 CAAS expects at least 2 cold weather anti-exposure suits to be carried in order for the crew members to carry out activities at an aerodrome during severe climatic conditions in a polar area.

11 TRAINING

- 11.1 The operator should address the following training requirements in his training programmes:
- (a) QFE/ QNH and meter/feet conversions (required for flight crew and dispatch);
 - (b) Fuel freeze (training for maintenance, dispatch, and flight crew);
 - (c) Route-specific training on weather patterns;
 - (d) Relevant aircraft system limitations e.g. fuel temperature limits;
 - (e) Maintenance control role in providing aeroplane systems capability information to dispatch and flight crew, to aid pilot-in-command in diversion decision-making;
 - (f) Crew training on the use of cold weather anti-exposure suits;
 - (g) Dispatch and crew considerations during Solar flare activity; and
 - (h) Training of flight crew and dispatcher for role in the operator's passenger recovery plan.
- 11.2 As required in Regulation 50 of ANR-98, the operator must complete a successful CAAS-observed validation flight which should include demonstration of its reaction and recovery plan in the event of a diversion to one of its designated en-route alternate aerodrome. For this demonstration, the operator should place emphasis on:
- (a) Communications;
 - (b) Coordination;
 - (c) Facilities;
 - (d) Accuracy of NOTAM and weather information; and
 - (e) Operability of ground equipment during the simulated diversion.
- 11.3 The operator may wish to conduct a table-top exercise on the polar recovery plan prior to the validation flight.