International Civil Aviation Organization

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Bangkok, Thailand, 07 – 10 May 2024

Agenda Item 4: Asia/Pacific and inter-regional SAR planning, coordination and cooperation

ANTARCTIC SEARCH AND RESCUE FLIGHT TRIAL

(Presented by Australia)

SUMMARY

This paper presents information about a trial flight by one of Australia's Challenger CL-604 search and rescue (SAR) aircraft to execute an in-flight SAR stores delivery to the French Antarctic Station at Dumont d'Urville from Hobart, Tasmania, Australia. The flight mission marked the inaugural implementation of high-level depressurised operational procedures developed to permit the Challenger to safely extend its normal operating range.

1. INTRODUCTION

1.1 Australia currently has various aviation SAR unit and SAR stores options available for SAR response within the Antarctic area of Australia's SAR Region (SRR). This broadly includes arrangements for the use of fixed-wing and helicopter assets stationed within Antarctica as part of Australia's Antarctic programs, including shipborne helicopters, and long-range aviation assets deployed from mainland Australia or other States.

1.2 The Australian Antarctic Division (AAD) supports its program with an air transport system, both for transport to and from Antarctica, and for transport within the Antarctic continent using aircraft operated under contract from commercial operators. An Australian operator provides services from mainland Australia to an ice runway at Wilkins, near Casey research station, Antarctica using an Airbus A319. Fixed-wing operations within Antarctica are provided by a Canadian operator using Basler BT-67 and DHC-6 Twin Otter aircraft, and helicopter services are provided by an Australian operator using two BK117 aircraft.

1.3 The Australian Maritime Safety Authority (AMSA), which is responsible for providing Australia's aviation and maritime SAR service, has a Memorandum of Understanding with the AAD for cooperative SAR efforts in the event of a SAR incident within the Antarctic area. As part of this arrangement, AMSA provides support and additional capability to the AAD's aviation program with the provision of specialist SAR training for AAD's contracted fixed-wing aircraft operator, which includes training in SAR operations and air drop of SAR stores.

1.4 In day-to-day operations, AMSA's four Challenger CL-604 SAR aircraft, which are based in mainland Australia, are not able to conduct missions to Antarctica and return in a single flight due to operational limitations. In order to enhance Australia's current Antarctic aviation SAR capability, AMSA requested its CL-604 contractor, Leidos Airborne Solutions, to investigate the possibility of extending the normal operational radius of the aircraft to allow the fleet to operate safely into the Antarctic region.

2. DISCUSSION

Australia's SAR Region (SRR) and Antarctica

2.1 The Australian SRR is nearly 53 million square kilometres which covers about 11% of the Earth's surface including a large and very remote Antarctic area – see Figures 1 and 2.

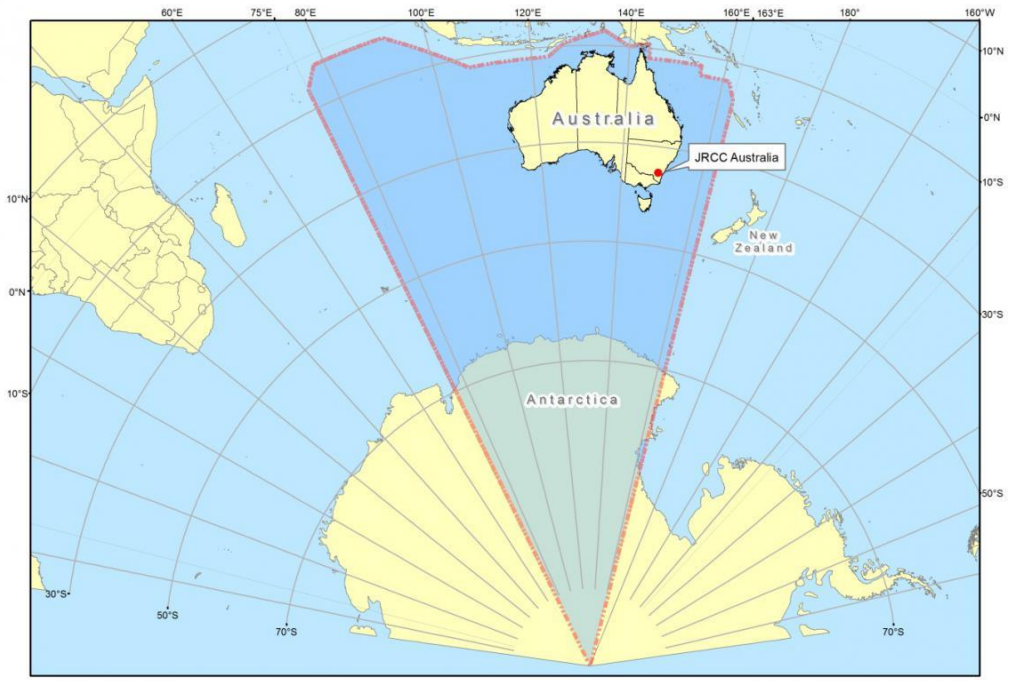

Figure 1: Map of Australia's aeronautical SRR.

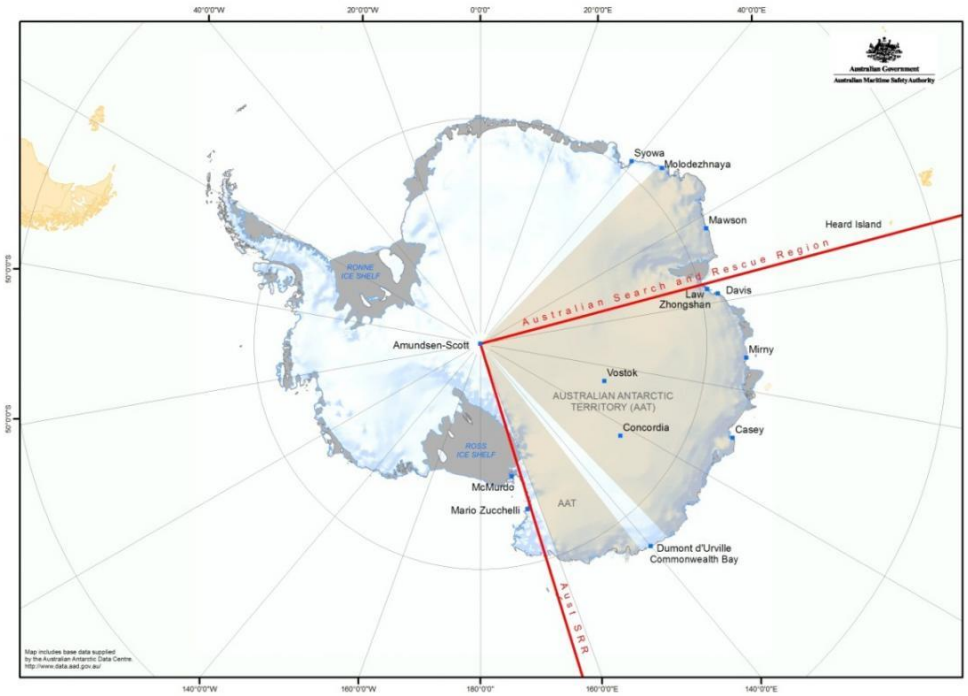

Figure 2: Map of Australia's aeronautical SRR – Antarctic area.

2.2 There has been significant growth in activity and number of people visiting the Antarctic region in recent years, which is expected to continue to increase, resulting in the potential for increased need for SAR response in that region.

2.3 To enhance Australia's existing SAR response capabilities in the Antarctic region, a project was established to extend the range of operations of AMSA's CL-604 SAR aircraft to allow the conduct of SAR stores dropping by that aircraft within the Antarctic area and open opportunities for landings at Antarctic ice runways such as those at Australia's Wilkins and the USA's McMurdo aerodromes.

AMSA's CL-604 and SAR Stores Dropping Operations

2.4 AMSA has four Bombardier CL-604 aircraft which have been modified and equipped for specialized SAR operations, including a custom-designed inflight opening door at the rear of the aircraft for the dispatch of SAR stores. These aircraft and crew are provided under contract to AMSA, operating from three bases in Australia.

2.5 The CL-604s normally transit to SAR missions pressurised which allows flight at more fuel-efficient higher altitudes and therefore extends its operational range beyond what would be achieved unpressurised at lower altitudes where the aircraft burns more fuel.

2.6 For a stores delivery operation, with the aircraft depressurised, the crew manually open the rear door for the dispatch of SAR stores. Upon completion of the drop operation, the crew manually close the rear door which allows the aircraft to repressurise for high-level transit to its destination.

2.7 However, for any drop operation, the pilots must plan the flight for a situation where the aircraft cannot be repressurised because the rear door cannot be reclosed, for example, if the door mechanism was damaged during the drop operation or other reason. Such a situation would restrict the aircraft flying to its destination or alternate unpressurised at 10,000 feet or below, unless sufficient supplemental oxygen was available for the aircraft crew, resulting in a higher fuel burn which therefore restricts the permitted flight distance the pilots can plan for.

Extending the CL-604s available range for SAR stores dropping operations

2.8 To overcome the flight planning restriction described in paragraph 2.7, and to allow the aircraft to safely operate at extended range, High-Level Depressurised Operational procedures have been developed and tested. This innovative approach involves several measures, which in summary includes:

a) Fitment of additional crew oxygen system,

b) Supply of additional crew protective clothing suitable for polar operations,

c) Reconfiguration of the aircraft from its standard SAR configuration to an extended range configuration by removing all non-essential SAR stores and equipment to allow for the fitment of the additional crew oxygen packs and uplift of maximum fuel available,

d) Reduction of the standard crew compliment from 5 to 4 (2 pilots, 2 mission crew instead of the usual 3),

e) Precise matching of aircraft performance with flight planning calculations,

f) Adherence to documented aircraft performance figures, and

g) Operating at the very limit of crew Fatigue Risk Management System allowances, assuming a flight duration of not less than eight hours, time to configure the aircraft pre-flight and time for post-flight debrief and administration.

Trial flight to French Antarctic Station, Dumont d'Urville

2.9 On January 24, 2024, one of AMSA's CL-604s, callsign RESCUE660, executed a successful non-stop extended range trial flight departing from Hobart, Tasmania to the French Antarctic Station at Dumont d'Urville where a SAR stores delivery was carried out before the aircraft returned to Hobart. This is a round trip distance of around 2900 nautical miles (5370 kilometres).

2.10 The mission was planned and coordinated with the French at Dumont d'Urville who provided good support for the operation.

2.11 This inaugural flight was a noteworthy achievement by the operator and crew which saw the successful implementation of the High-Level Depressurised Operational procedures. Some key findings and opportunities for improvement were identified to enhance this type of operation, and the success of the trial presents an opportunity to explore operations by AMSA's CL-604 fleet to ice runways in Antarctica plus additional extended range coverage in other remote areas of the Australian SRR.

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

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