

PAPUA NEW GUINEA

AERONAUTICAL INFORMATION SERVICE

AIP SUPPLEMENT

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File:

IMPLEMENTATION OF GNSS IN DOMESTIC AIRSPACE

1. PURPOSE

- 1.1 This AIP Supplement outlines the Civil Aviation Authority's intention to implement a full GNSS environment with the AYPY FIR.
- 1.2 This Supplement details provisions related to equipment and installation requirements, together with a time-line for the phase withdrawal of terrestrial navigation aids. Navigation aids at AYPY will be retained, to meet current obligations relating to international air navigation.
- 1.3 Subject to compliance with the specifications herein, GPS equipment that is certified under TSO C145a (or CAA-approved equivalent) may be used as a "sole means" navigation system.

2. BACKGROUND

- 2.1 GPS approaches have been flown using TSO C129 GPS receivers in the AYPY FIR since 2001. The level of safety and reliability that has been achieved to date exceeds the most optimistic predictions of the Voep Centre's study of satellite geometry and RAIM availability, which was conducted in 2001.

3. BENEFITS OF GNSS-BASED NAVIGATION

- 3.1 The benefits to be gained by adoption of GNSS-based navigation include:

- *Reduced reliance on ground-based navigation aids;
- *Consistent level of navigation service;
- *Use of GNSS-based ATC standards;
- *Improved enroute and terminal operations;
- *Improved industry/ATS efficiency;
- *Reduced training and checking requirements;
- *Reduced delays, flight cancellations and diversions; and
- *Reduced user fees and costs.

- 3.2 These benefits are made possible by the higher standards of TSO 145A and 146a, compared to those for TSO 129 equipment. Not only do the new generation of GPS receivers provide Fault Detection and Exclusion and better RAIM algorithms, they can also take advantage of WAAS signals and signals from GPS-equipment satellites launched under programs such as WAAS, EGNOS, MASA, Galileo and the like will further enhance under programs such as New Guinea is well situated to receive the signals from those systems.

- 3.3 Additionally, a new generation of GPS satellite is expected to provide even better safety and reliability in the future.

4. GNSS EQUIPMENT REQUIREMENTS

- 4.1 For RPT and CHTR operations, two (2) GPS receivers certified under either TSO C145a or TSO C146a are required.
- 4.2 For AWK and PVT operations, one (1) GPS receiver certified under either TSO C145a or TSO C146a is required.
- 4.3 TSO C145a/C146a GOS receivers are to be installed in accordance with CAAP 35-1, issued by the Australian regulator, CASA.
- 4.4 The equipment requirements specified in paras 4.1 and 4.2 may be applied in lieu of CAO 20.8, Appendix 2.

5. OTHER INITIATIVES

- 5.1 Work has commenced on a range of supporting GNSS initiatives including GNSS route design, ATS separation standards, substitution of GPS distance in lieu of DME distance in instrument approach procedures and additional approach designs.
- 5.2 These will be progressively implemented

6. PILOT QUALIFICATION

- 6.1 The pilot qualification, recency and renewal requirements relating to GPS, as specified in CAO 40.1.6, continue to apply

7. OPERATIONAL REQUIREMENTS

- 7.1 The following operational requirements apply to the GPS equipment described in paras 4.1 AND 4.2:-
- a. Operating instructions for the GPS navigation equipment fitted to the aircraft shall be carried on board the aircraft. For aircraft engaged in "commercial operations", they shall be incorporated into the Company Operations Manual.
 - b. GPS navigation equipment must be operated in accordance with the operating instruction, and any additional requirements specified in the approved aircraft flight manual or flight supplement.
 - c. The pilot-in-command must be in possession of a RAIM Forecast which indicates that RAIM will exist within thirty (30) minutes of ETA, if the forecast weather conditions indicate that a GPS approach will be required.
 - d. The radio navigation aid requirements specified in RAC- TS1-9.3.3.3 are considered to be met when the equipment described in para 4.1 and 4.2 is carried and serviceable, if a GPS approach procedure is available. Whenever an alternate airport is required, the nominated alternate itself shall not require and alternate. The nominated alternate airport must meet the requirements of RAC-1-11.4 and may be served by GPS approach.

- 7.2 The operational requirements related to a loss of RAIM or a RAIM warning when using TSO C129 GPS equipment, as detailed in AIP/SUP 3/2001, apply equally to the GNSS equipment described in this SUP.

8. AIRWORTHINESS REQUIREMENTS

- 8.1 The following airworthiness requirements must be satisfied:-

- a. GPS navigation equipment must have US FAA Technical Standard Order (TSO) C145a, C146a (or CAA CAAP 35-1; and
 - b. The GPS receivers specified in sub-para (a) must be installed in PNG civil registered aircraft in accordance with Australian CASA CAAP 35-1; and
 - c. Automatic barometric aiding function must be connected and functioning.
- 8.2 As indicated in CAAP 35-1, operators should ensure that the equipment is fitted in a position that allows easy access and good receiver visibility for operation during the approach mode.

Note 1: *For the purpose of this requirement an aircraft to be operated in a two pilot environment may have the primary displays and control boxes fitted in a centre console with track guidance repeated to each HSI/CDI.*

Note 2: *An aircraft to operated by a single pilot is to have the primary display and control box mounted on the instrument panel within the pilot's primary reference area.*

- 8.3 The installation of different software versions into the same model of receiver can result in substantially different functionality, including the operation of displays and controls. Pilots should ensure that they are familiar with the software version installed in the equipment to be used. The receiver's operating instructions can be used to verify the software version.

9. TIME LINES

- 9.1 With effect from 1 January, 2004, no new or replacement radionavigation aids will be installed or acquired. It should be note that radionavigation aids that have been subject to vandalism prior to this date will not be replaced.
- 9.2 With effect from January, 2005, aircraft to be replaced on the PNG Aircraft Register and certified for IFR operations are required to be fitted with GPS equipment specified in para 4.1 and 4.2, as applicable.

10. FLIGHT PLAN NOTIFICATION

- 10.1 Pilots of aircraft equipped with GPS systems that comply with the requirements of this Supplement, should insert the following:

- a. Domestic IFR Flight Plan:
G in the Equipment section (field 10), and NAV/GPSRNAV in field 18(b).
- b. ICAO Flight Plan:
Z in 10, and NAV/GPSRNAV in field 18 field (b)

11. REPORTING

- 11.1 Pilots and operators are requested to forward any comments on interference and charting, as well as chart and database errors to:-

Aviation Safety Regulation Directorate
Civil Aviation Authority of Papua New Guinea
Attention: FOI (Airways Survey)

Mail- P.O. Box 684
Boroko NCD 111

Phone: +675 3244488
Fax: +675 3244485 or +675 3244409
E-mail: les@daltron.com.pg

- 11.2 Reports on GPS equipment problems, regardless of cause or duration, are to be submitted on a monthly basis from operators, in respect of each aircraft that is fitted with TSO C145a or C146a (CAA- approved equivalent) receivers. Collection of this data is essential to the continued development of safe standards for the use of the equipment.
- 11.3 In the event that no problems or faults occur in any particular month, submission of the report is still necessary. Section 1 of the attached report form is to be completed, with the word "Nil" endorsed in, or across, the log of occurrences in Section 2.
- 11.4 Reports are required for a period of twelve (12) months from the date of the first IFR operation where TSO C145a or C146a receivers are used.
- 11.5 A report form is attached at Appendix A of this SUP and a further supply of the forms will be available, free of charge, from the Aeronautical Information Service. This form differs from that used for reporting on TSO C129 equipment because the nature of the reporting is different.

12. CANCELLATION

- 12.1 This Supplement will remain current until its provisions are incorporated into the Civil Aviation Regulations.

13. DISTRIBUTION

- 13.1 Normal

14. CURRENT AIP SUPPLEMENT

- 14.1 1996: 2
1997: 1, 2, 3, 4.
1998: 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 23, 24, 25, 26, 27, 30, 31, 33, 35
1999: 2.
2001: 1, 2, 3.
2002: 1, 2.
2003: 1,

