

**Twenty Third Meeting of the  
Informal South Pacific ATS Co-ordinating Group (ISPACG/23)**

**FANS Interoperability Team Meeting (FIT/16)  
Santiago, Chile, 24-25 March 2008**

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**Agenda Item 5: Update on Aircraft Operational Issues**

**FMS WAYPOINTS INSERTION**

(Presented by Airbus)

**SUMMARY**

A DARP exercise with an A380 failed due to the limitation of the FMS to cope with a number of Lat/Long re-route waypoints in excess of 20. This paper presents the current FMS design existing on the various Airbus aircraft.

**1. INTRODUCTION**

- 1.1 As a DARP was attempted, an A380 crew could not upload the re-route in the FMS as the new route was made of a significant number of Lat / Long defined waypoints.

**2. EXPLANATION**

- 2.1 On all Airbus FMS, two types of waypoints may be used:
- Waypoints encoded in the Nav Data Base (Fix names, Arinc 424)
  - Pilot Defined Waypoints: Latitude / Longitude, Place-Bearing / Place-Bearing (P-B / P-B) or Place-Bearing-Distance (P-B-D) according to the ED100A.
- 2.2 On Airbus FMS, up to 200 Nav Data Base waypoints can be part of a flight plan whereas only 20 of Pilot Defined Waypoint" (PDW) can be supported. Any new L / L, P-B / P-B or P-B-D waypoint in excess of 20 will be rejected by the FMS.
- 2.3 Pilot Defined Waypoints can be deleted either manually at any time or automatically after each flight (as an option via AMI). Manual de-selection is possible on a one by one case or globally ("DELETE ALL" function).
- 2.4 The number of Pilot Defined stored Waypoints can be viewed on the FMS aircraft status page at anytime. Normal practice is to delete any created waypoints from a previous flight (especially if the optional automatic erasure is not exercised) when initialising the FMS for the flight.

### 3. DISCUSSION

- 3.1 UPR routes are usually built upon Lat / Long waypoints which are not part of the FMS Nav Data Base (NDB), and as such are stored in the pilot defined waypoints list. This list is limited to 20.
- 3.2 Dynamic Re-route procedures (DARP) are also usually made of Lat / Long waypoints which are not part of the FMS Nav Data Base (NDB). A re-route clearance will be successfully up-linked through CPDLC provided it is made of less than 20 of such waypoints, and provided that no PDW are already used by the FMS.
- 3.3 In case a DARP is exercised on a UPR route, the above limit is even more critical as the number of PDW may rapidly go beyond 20. As an example, if the crew uplinks an initial UPR which is made of 15 Lat / Long, then these 15 waypoints will be loaded and stored as PDW. When a subsequent uplink is received for the DARP, the new Lat /Longs will cause the 20 limit to be exceeded.

Once the crew wants to load the DARP route clearance, any new waypoint in excess of the 20 stored will be rejected. In our above example, the first 5 ones of the new re-route will be loaded and all others will be rejected. A “LOAD PARTIAL” message will be triggered to warn the crew of the impossibility to load the complete new route.

If some of the new DARP Lat / Long waypoints are common to the original route they will be however accepted.

- 3.4 In the next A380 FMS standard (in service in 2010), the number of Pilot Defined Waypoints will be extended from 20 to 50. Further increase is being reviewed. For other aircraft, such an increase is also considered for future standards.
- 3.5 To cope with the current limit of 20 PDW Airbus makes the following suggestions:
- Airlines are invited to use as much as possible Nav Database waypoints when defining a route in the contemplated area of operation.
  - Airlines and ATSUs are as far as possible, invited to design routes or re-routes made of less than 20 Lat / Long waypoints.
  - Airlines are invited to inform their Airbus crews of the current PDW limit list, and of the ways to handle it.

### 4. ACTION BY THE MEETING

The meeting is invited to take the above information into account and to consider the operational conditions that may be envisaged in the South Pacific