



Australian Government

Australian Transport Safety Bureau

Aircraft preparation event involving Airbus A330, VH-QPC

Brisbane Airport, Queensland, 4 August 2016

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2016-092
Final – 22 November 2016

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

Published by: Australian Transport Safety Bureau
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Addendum

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Aircraft preparation event involving Airbus A330, VH-QPC

What happened

On the morning of 4 August 2016, Qantas Flight QF61, an Airbus A330 aircraft, registered VH-QPC, was prepared for departure from Brisbane Airport, Queensland, for a flight to Narita Airport, Tokyo, Japan.

The flight dispatcher, responsible for flight planning, started building the flight plan for QF61 at about 0800 Eastern Standard Time (EST) at the company integrated operations centre (IOC). In addition to the destination of Narita Airport, the flight plan included two destination alternate¹ airports, Haneda Airport, Tokyo, Japan and Saipan International Airport, Saipan (Figure 1). Saipan Airport was also the extended diversion time operations (EDTO)² alternate airport (see *Extended diversion time operations*).

During the process of building the flight plan, the flight dispatcher noticed one of the aircraft's two global positioning system (GPS) navigation units was recorded as an unserviceable item on the aircraft minimum equipment list (MEL).³ The flight dispatcher also identified that two serviceable GPS units were required at dispatch, due to the forecast westerly winds, to allow the use of Saipan Airport runway 25 GPS approach as an alternate airport for destination and EDTO purposes. Therefore, they contacted the section of the IOC responsible for aircraft maintenance (maintenance watch) to check if the unserviceable MEL item (GPS 2) would be cleared before the aircraft's departure.

Maintenance watch indicated that the unit would be fixed and the unserviceability removed before the aircraft departed.⁴ The flight dispatcher completed the flight planning documents with the GPS 2 unit listed as an unserviceable MEL⁵ item – with the expectation that this would be removed before departure. However, the dispatcher did not make a note in the flight planning documents to advise the flight crew that this MEL item should be cleared before the flight departed. They then sent the documents to the flight crew about 85 minutes prior to the scheduled departure time.⁶

The captain for QF61 signed on for work at Brisbane Airport at 0945, after receiving an electronic copy of the flight plan and briefing package. After reviewing the package, the captain requested an additional 1,700 kg of fuel to allow for a second mainland Japan destination alternate airport (Nagoya in addition to Haneda) (Figure 1). They then discussed the implications of the unserviceable GPS 2 unit with the other two flight crewmembers.

¹ Alternate airport is the airport chosen in advance which the aircraft can divert to in the case that the destination airport has weather below the minimum conditions allowable for landing.

² EDTO was previously called extended operations (ETOPS). For the purpose of this report EDTO will be used.

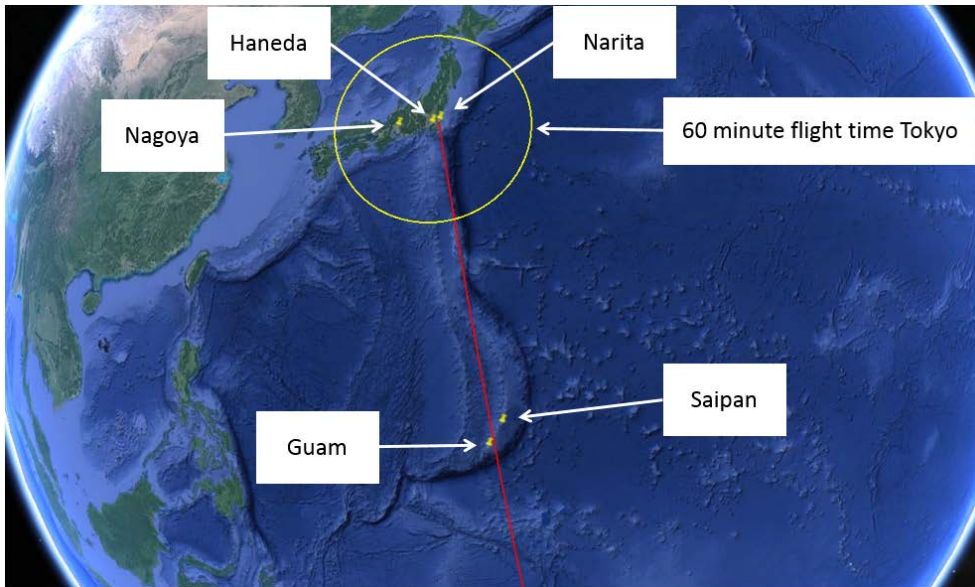
³ The MEL is a list of aircraft systems which are approved to be inoperative when the aircraft is dispatched.

⁴ The investigation was unable to determine who the flight dispatcher spoke to from the maintenance watch section.

⁵ The hardcopy Technical Log on board the aircraft is the legal document for raising and clearing MEL items and therefore an unserviceability may be cleared by maintenance after flight planning is completed.

⁶ The flight planning documents included a nine page flight plan and 32 page briefing package with weather, notice to airmen (NOTAM) and MEL report.

Figure 1: QF61 Destination and EDTO alternates



Source: Google earth, annotated by ATSB

The captain initially thought that two GPS units were required at dispatch because the Saipan Airport runway 25 approach procedure required GPS. However, after further discussion they decided that they were mistaken as maintenance and flight dispatch were aware one GPS was unserviceable and the captain had very few past experiences of an incorrect serviceability requirement at dispatch. One flight crew member then mentioned that the flight crew operating manual indicated one GPS unit was required.⁷

The captain referred to the MEL. The MEL includes the MEL items and their associated operational procedures. The operational procedures may impose additional operational requirements to what is documented in the MEL items. The MEL item for the aircraft GPS function indicated only one GPS unit was required at dispatch. However, the associated operational procedures indicated that ‘primary means GNSS approval’⁸ was required at dispatch if the alternate airport arrival procedure requires GPS navigation. ‘Primary means GNSS approval’ indicated the requirement for two operational GPS units. When the captain reviewed the MEL operational procedures they considered the reference to ‘alternate’ to be a reference to destination alternate airport and not to an EDTO alternate airport. They planned to use Saipan as an EDTO alternate airport and not a destination alternate airport, having already decided to add a second mainland Japan destination alternate airport. This fitted with their expectation that the unserviceable GPS 2 MEL item was acceptable for their flight.

The flight departed from Brisbane with 12 crew and 231 passengers on board and proceeded in accordance with the flight plan. As QF61 travelled north along the east coast of Australia, the captain was uncomfortable with their decision to accept the aircraft with GPS 2 listed as unserviceable.⁹ Therefore, the captain reviewed the flight plan and the publications. They concluded they had misinterpreted the MEL operational procedures reference to alternate airport requirements and that their flight plan required two serviceable GPS units to use the Saipan Airport runway 25 GPS approach for destination or EDTO alternate airport purposes.

The captain identified Guam Airport (runway 24R VOR/DME¹⁰) as a suitable airport to plan to use instead of Saipan Airport for their EDTO alternate airport and briefed the other two flight crew

⁷ This was an inflight requirement as opposed to a dispatch requirement. The dispatch requirement includes system redundancies to account for unforeseen failures.

⁸ Global navigation satellite system (GNSS) supports the aircraft GPS unit.

⁹ GPS 2 operated throughout the flight without fault.

¹⁰ Ground based radio navigation aid using VOR for steering guidance with DME distance information.

members. However, one flight crew member queried if Guam could be used for replanning in lieu of Saipan without two serviceable GPS units. The attention of this flight crewmember was drawn to a note on one of the Guam terminal plate pages (Figure 2), which indicated runway 24R required 'primary means GNSS approval' for use as an alternate airport. However, the captain considered that this was a reference to the destination alternate (which required two separate approaches) and that the runway 24R VOR/DME approach could be used for EDTO alternate purposes (see *Use of Guam Airport as an adequate aerodrome*).

The captain entered a new critical point¹¹ between Tokyo and Guam (in lieu of Saipan) into the aircraft flight management and guidance computer. The computer calculated that an extra 800 kg of fuel was required, which was within the limits of the extra fuel the captain requested before departure. The flight continued to Narita Airport and landed without further incident.

The GPS 2 unit was observed by the crew to be serviceable throughout the flight. It was tested by maintenance at Narita Airport, found to be serviceable, and then removed from the MEL unserviceability list before the next flight.

Extended diversion time operations

For the A330, extended diversion time operations (EDTO) apply at any stage of the flight where the flight time to an adequate aerodrome (EDTO alternate), at the one engine inoperative cruise speed, is greater than 60 minutes. The EDTO limit for the A330 is 180 minutes.

For further information on EDTO requirements refer to [Civil Aviation Advisory Publication 82-1\(1\): Extended diversion time operations \(EDTO\)](#)

Use of Guam Airport as an adequate aerodrome

In accordance with Civil Aviation Order 82.0 paragraph 2.1, an EDTO alternate aerodrome requires at least one suitable authorised instrument approach procedure. Therefore, the Guam Airport runway 24R VOR/DME approach could be used by flight QF61 for this purpose.

If Guam Airport runway 24R had been used as a destination alternate airport, then two instrument approach procedures, which do not use a common ground based radio navigation aid, would have been required. In this case, the runway 24R GPS approach would have been required as the second approach and therefore two serviceable GPS units would have been required at dispatch. Hence the reference to 'primary means GNSS approval' for runway 24R on the Guam terminal plate page, which caught the attention of one of the flight crew members (Figure 2).

For further information about alternate requirements for international IFR¹² operations outside Australia, refer to Civil Aviation Safety Authority [Manual of Standards 173 paragraph 8.1.11](#).

¹¹ The flight plan critical point is the point between two airports, which are equi-distant in time and fuel. The critical point is used to aid decision making between continuing to a destination and diverting to an alternate if a problem occurs in flight. The critical point for QF61 was based on the critical flight condition of one engine inoperative and the cabin depressurised.

¹² Instrument flight rules (IFR): a set of regulations that permit the pilot to operate an aircraft to operate in instrument meteorological conditions (IMC), which have much lower weather minimums than visual flight rules (VFR). Procedures and training are significantly more complex as a pilot must demonstrate competency in IMC conditions while controlling the aircraft solely by reference to instruments. IFR-capable aircraft have greater equipment and maintenance requirements.

Figure 2: Guam terminal procedures note for Qantas operations

FOR FILING AS ALTERNATE						
	Precision	Non-Precision				
	Rwys 6L/R	2 Rwys 6L/R	3 or 4 Rwys 6L/R	1 Rwy 6R	1 Rwy 24L	1 Rwy 24R
C	1200-3	1200-3	1200-3½	800-3	1000-4¼	1000-4
D	1 Requires Primary Means GNSS Approval. 2 Requires Rwy 6R with its LOC and Rwy 6L with its VOR. 3 Requires both Rwys & LOCs. 4 Rwy 6L: Requires its LOC & VOR.					
DEFAULT: 2800'-4 1/4 SM. BASED ON 2600' MSA.					NOISE PAGE: NO	

Source: Aircraft captain, annotated by ATSB

Global positioning system unserviceability

The number 2 GPS was recorded as unserviceable and raised as an MEL item for QPC on 31 July 2016. The A330 GPS MEL had a repair interval of 10 consecutive calendar days and was scheduled for repair on 8 August 2016. No change was made to this schedule prior to the dispatch of flight QF61 on 4 August 2016.

Flight dispatcher comment

The flight plan had a free text box on the front page, which the flight dispatcher used to communicate the presence of a tropical storm to the flight crew in the incident flight. The flight dispatcher commented that in future they would use this free text box to communicate to the flight crew if they expected a change to the MEL status of the aircraft before dispatch.

ATSB comment

The ATSB notes that in large organisations there may be multiple departments with responsibilities for the dispatch of an aircraft. Whereas procedures are normally executed within a department, processes often involve multiple departments. Cross-checks occurred within the IOC and separately among the flight crew during this incident flight, but the cross-checks were not conducted between the departments, where personnel had a different mental model of the situation. The flight dispatcher believed the GPS 2 MEL item would be cleared before flight and the captain believed the flight was planned to be released with the GPS 2 as an unserviceable MEL item.

Safety message

This incident highlights the importance of personnel challenging their own assumptions when something does not appear right in the environment. After the dispatch of QF61 from Brisbane Airport, the captain experienced a 'gut feeling' that something was not right. Rather than ignore their sense of unease, the captain reviewed the flight plan and company documents, identified the problem and resolved the issue so that the flight could continue without compromising safety. Throughout the process, they kept the other flight crewmembers informed of the problem they had identified and their decision-making, which enabled the crew to provide feedback to the captain.

General details

Occurrence details

Date and time:	4 August 2016 – 1000 EST	
Occurrence category:	Incident	
Primary occurrence type:	Aircraft preparation event	
Location:	Brisbane Airport, Qld	
	Latitude: 27° 23.05' S	Longitude: 153° 07.05' E

Aircraft details

Manufacturer and model:	Airbus A330	
Registration:	VH-QPC	
Operator:	Qantas Airways Limited	
Serial number:	0564	
Type of operation:	Air Transport High Capacity – passenger	
Persons on board:	Crew – 12	Passengers – 231
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.