

AAIB Bulletin S5/2013

SPECIAL

SERIOUS INCIDENT

Aircraft Type and Registration:	Boeing 787-8, ET-AOP
No & Type of Engines:	2 General Electric GENx-1B turbofan engines
Year of Manufacture:	2012 (MSN 34744)
Location	London Heathrow Airport
Date & Time (UTC):	12 July 2013, 1534 hrs UTC
Type of Flight:	Not applicable
Persons on Board:	None
Injuries:	Not applicable
Nature of Damage:	Extensive heat damage in upper portion of rear fuselage
Commander's Licence:	Not applicable
Commander's Age:	Not applicable
Commander's Flying Experience:	Not applicable
Information Source:	AAIB Field Investigation

Synopsis

A fire event occurred on a parked, unoccupied and electrically un-powered Boeing 787 aircraft at London Heathrow Airport. Subsequent examination of the fire-affected area has focussed on the Emergency Locator Transmitter (ELT). Two Safety Recommendations have been made.

This Special Bulletin contains facts which have been determined up to the time of issue. It is published to inform the aviation industry and the public of the general circumstances of accidents and serious incidents and should be regarded as tentative and subject to alteration or correction if additional evidence becomes available.

Notification

On the afternoon of Friday 12 July 2013 the Air Accidents Investigation Branch (AAIB) was notified of an occurrence to a parked and unoccupied Boeing 787-8 on Stand 592 at London Heathrow Airport. The circumstances surrounding the occurrence did not fall within the definitions of an accident or serious incident as defined in ICAO Annex 13, however, the Chief Inspector, in exercise of his powers under the Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996, initiated an investigation and deemed it appropriate to treat the occurrence as a serious incident and to invoke the protocols of ICAO Annex 13 with regard to the participation of other interested States. An investigation was commenced immediately and a team of AAIB Inspectors was deployed. Accredited Representatives from the National Transportation Safety Board (NTSB) (representing the State of Design and Manufacture), the Civil Aviation Authority of Ethiopia (representing the State of Registry and the Operator) and the Transportation Safety Board of Canada (representing a component manufacturer) were invited to participate in the investigation along with technical advisors from the Federal Aviation Administration (FAA) and aircraft and component manufacturers. The AAIB has also been assisted by the European Aviation Safety Agency (EASA) and the UK Civil Aviation Authority (CAA).

History of the event

The Boeing 787-8 aircraft landed at London Heathrow Airport at 0527 hrs on 12 July 2013 after an uneventful flight from Addis Ababa and arrived on Stand 326 at about 0540 hrs. The flight crew did not report or record any technical defects. After passenger and crew disembarkation, the aircraft was towed to Stand 592 to await its next service later that day. Before leaving the aircraft the engineer, on the flight deck, instructed the ground handling agent to remove ground electrical

power. The ground handling agent accordingly turned off ground power at the stand's control box but left the power umbilical cables attached. The engineer visually confirmed on the flight deck that ground power was no longer available. He then secured and left the aircraft.

At approximately 1534 hrs an employee in the air traffic control tower noticed smoke emanating from the aircraft and activated the crash alarm. The Airport Fire Service arrived on scene at 1535 hrs and discharged water and foam onto the aircraft. One fire fighter removed the power umbilical cables from the aircraft as a precaution.

Fire fighters equipped with breathing apparatus entered the aircraft at the L2 door and encountered thick smoke. As they moved to the rear of the aircraft the smoke became denser so they opened further cabin doors to clear the smoke. At the rear of the passenger cabin they observed indications of fire above the ceiling panels. They attempted to tackle the fire with a handheld 'Halon' extinguisher but this was not effective, so they forcibly moved a ceiling panel and tackled the fire with water from hoses. This was effective and the fire was extinguished.

Aircraft examination

The initial technical investigation confirmed extensive heat damage in the upper portion of the rear fuselage, with significant thermal effects on aircraft insulation and structure. Surveying and detailed examinations of damaged areas revealed that the greatest heat damage and highest temperatures were centred on the rear fuselage close to the crown and displaced to the left of the aircraft centre line. This corresponds to the most damaged external areas, with blackened and peeling paint and damage to the composite structure. It also coincides with the location of the aircraft's Emergency Locator Transmitter (ELT) and its associated system wiring which is mounted internally

on structure close to the aircraft skin. There are no other aircraft systems in this vicinity which, with the aircraft unpowered, contain stored energy capable of initiating a fire in the area of heat damage.

Emergency Locator Transmitter (ELT)

The ELT model installed in the aircraft contains a set of chemical batteries using a Lithium-Manganese Dioxide (LiMnO₂) composition. These allow the ELT, as required by regulation, to operate in an emergency situation entirely independent of the aircraft's electrical power system.

Detailed examination of the ELT has shown some indications of disruption to the battery cells. It is not clear however, whether the combustion in the area of the ELT was initiated by a release of energy within the batteries or by an external mechanism such as an electrical short. In the case of an electrical short, the same batteries could provide the energy for an ignition and suffer damage in the subsequent fire.

The ELT manufacturer has produced some 6,000 units of this design which are fitted to a wide range of aircraft and, to date, the incident on 12 July 2013 has been the only significant thermal event.

Safety Recommendations

The history of this ELT product line indicates that a thermal event is extremely rare and this incident occurred on the ground while the aircraft was unoccupied. However,

large transport aircraft do not typically carry the means of fire detection or suppression in the space above the cabin ceilings and had this event occurred in flight it could pose a significant safety concern and raise challenges for the cabin crew in tackling the resulting fire.

The AAIB therefore makes the following two Safety Recommendations:

Safety Recommendation 2013- 016

It is recommended that the Federal Aviation Administration initiate action for making inert the Honeywell International RESCU406AFN fixed Emergency Locator Transmitter system in Boeing 787 aircraft until appropriate airworthiness actions can be completed.

Safety Recommendation 2013-017

It is recommended that the Federal Aviation Administration, in association with other regulatory authorities, conduct a safety review of installations of Lithium-powered Emergency Locator Transmitter systems in other aircraft types and, where appropriate, initiate airworthiness action.

Detailed examination of the ELT and the possible mechanisms for the initiation and sustaining of the fire in this aircraft continues. Further updates on progress will be published as appropriate.

Published 18 July 2013

AAIB investigations are conducted in accordance with Annex 13 to the ICAO Convention on International Civil Aviation, EU Regulation No 996/2010 and The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996.

The sole objective of the investigation of an accident or incident under these Regulations is the prevention of future accidents and incidents. It is not the purpose of such an investigation to apportion blame or liability.

Accordingly, it is inappropriate that AAIB reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

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