SYNOPSIS

Type**:**	A330-302
Nationality and registration:	OH-LTO
Airworthiness certificate:	Valid until 15 May 2011
Manufacturer:	Airbus S.A.S.
Number and year of manufacture:	1013, 2009
Total hours and landings:	8 251 FH, 976 FC
Maximum takeoff weight:	233 000 kg
Takeoff weight on the occurrence flight:	181 200 kg
Owner:	Finnair Aircraft Finance Ltd
Operator:	Finnair Plc
Number of engines and engine type:	2 x GE CF6-80E1

In December 2010 two similar serious incidents occurred to Airbus S.A.S manufactured and Finnair Plc-operated A330-302 aircraft in Russian airspace as results of engine bleed air system malfunctions.

The first serious incident occurred on 11 December 2010, approximately 300 km northeast of the city of Arkhangelsk. The aircraft, registration OH-LTO, was on a scheduled flight from Osaka, Japan to Helsinki-Vantaa airport. Apart from the three crew members in the cockpit, the aircraft was empty.

Both aircraft experienced a loss of pressurisation due to dual engine bleed air system failures. The flight crews donned their emergency oxygen masks because of the decrease of cabin pressure. On OH-LTO the cabin emergency oxygen masks also deployed automatically.

OH-LTO flight crew initiated an emergency descent from cruise level about five minutes after the loss of pressurisation and about two minutes after the excessive cabin altitude warning which is a master warning. Due to a bigger fuel consumption than anticipated OH-LTO diverted to Kuopio airport.

In cooperation with the aircraft manufacturer and the manufacturer of the pressure transducer as well as the operator, the investigation searched for the causes of the engine bleed air system's dual bleed faults and the resultant reduced cabin air pressures. A dual bleed loss on A330, due to overpressure in engines' bleed air system during cruise/descent, was first reported to Airbus in 2008 with a number of occurrences increasing during the 2009/2010 winter season period. The Finnish Meteorological Institute also assisted the investigation to analyse the role of an extremely cold air mass with regard to engine bleed air system malfunctions. In addition, analysis also focused on

aircrew action during said malfunctions as well as the recording time capacity of a cockpit voice recorder from the standpoint of safety investigation.

Both serious incidents were caused by malfunctioning of the engines’ bleed regulated pressure transducers' (Pr). The malfunctioning was caused by freezing of water that had accumulated in the bleed regulated pressure transducers' pressure cell rooms, extremely confined by design.

Due to malfunctioning the transducers provided faulty pressure information to bleed monitoring computers. Due to the erroneous information the computers closed both engines’ bleed air systems which resulted loss of pressurisation in cabin, i.e. an increase in cabin air pressure altitude. The extremely cold air mass enroute during a long time period contributed to the fact that the water froze in the pressure cell rooms. Furthermore, the relatively rapidly increasing ambient temperatures enroute may have contributed to the engine’s bleed air system faults.