

## REPORT

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REP: 17/2002

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All times given in this report is local time (UTC + 1 hour), if not otherwise stated.

### Aircraft

-type & reg.: Airbus A-310, AP-BED / Boeing 737-600, LN-RPK  
Radio call sign: PIA 752 and SAS 2367  
Date and time: 21 February 2001, at 1510 hrs  
Location: 10 NM north of Oslo airport Gardermoen (ENGM)  
Type of occurrence: Air Traffic incident, violation of sep. min. due to Level Bust  
Type of flight: Commercial, scheduled services  
Weather cond.: ENGM METAR at 1450: W/V: 300° at 10 kt, variable  
between 250° and 350°. CAVOK. Temperature/Dewpoint:  
3 °C/-11 °C. QNH: 997 hPa. TEMPO: W/V: 350°  
at 15-26 kt  
Light cond.: Daylight  
Flight cond.: VMC  
Flight plan: IFR/IFR  
No. of persons onb. : Not reported  
Injuries: None  
Aircraft damage: None  
Other damage: None  
Information sources: Reports from both Commanders, report from Oslo ATCC,  
EUROCONTROL Safety Letter (Level Bust) and AAIB/Ns  
own investigations.

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### SUMMARY

The incident occurred 10 NM north of ENGM, and led to a violation of separation minimums between an Airbus A-310 from Pakistan International Airlines (PIA 752) and a Boeing 737-600 from Scandinavian Airlines System (SAS 2367).

SAS 2367 inbound to ENGM from Ålesund airport Vigra (ENAL), called Oslo ATCC Approach (APP) sector East at time 15:04:40, established on Standard Arrival Route (STAR) MES 2A arrival. The crew was cleared down to FL 100. PIA 752, flying from ENGM to Copenhagen airport Kastrup (EKCH), called APP sector East at 15:07:37 climbing to 7 000 ft on Standard Instrument Departure (SID) GOTUR 2A. PIA 752 was radar identified, and the crew was cleared climb to FL 090, and instructed to level off at FL 090 due to crossing traffic above (SAS 2367). The crew correctly read back the clearance to

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FL 090. At time 1509, both crew reported TCAS-alarm. At that time SAS 2367 was level at FL 100, and PIA 752 was approaching FL 090. The crew of PIA 752 did not stop their climb at FL 090, and as SAS 2367 passed just overhead the vertical distance had been reduced to 800 ft. The SAS 2367 crew had climbed to FL 102, according to TCAS Resolution Advisory (RA), and according to radar transcript, PIA 752 passed FL 094 and was still climbing. PIA 752 continued climb to FL 097, before starting descend back to FL 090. The horizontal distance though, had been increasing from the moment the vertical distance between the two aircraft was 800 ft. All involved parties reported the incident to AAIB/N.

## **COMMENTS FROM THE ACCIDENT BOARD**

It is the AAIB/Ns opinion that there was a risk of collision involved during this incident. The ATC planning was according to radar separation rules, but any traffic planning is depending on the involved aircrews acting according the instructions and clearances that has been issued. In this incident the crew of PIA 752 did not adhere to their clearance limit of FL 090, thus leading to a violation of separation minimums. Both crews reported TCAS warnings, and the SAS 2367 crew acted according to TCAS RA-climb. The PIA 752 crew also reported receiving RA-climb, but this seems inconsistent with how the ACAS system works, as the different TCAS installations are supposed to be "communicating" in order not to create additional conflicts. According to radar transcripts, PIA 752 was observed in a steady climb to FL 094, and then a short halt followed by further climb to FL 097.

EUROCONTROL (HEIDI: Harmonisation of European Incident Definitions Initiative) defines a "level bust" as follows:

"Any deviation from an assigned altitude or flight level in excess of 300 feet."

Level bust is an old and until recently, an increasing problem. ASRS (Aviation Safety Reporting System) operated by the NASA has published data and the FAA and US airlines have set up programmes to reduce level busts as far back as 1970. Yet, as much as 36% of the reports to ASRS are level busts. A British survey covering the period 1996-2000, shows an increase in reports up to 1996, with a small decline in year 2000. UK LBWG (Level Bust Working Group) was established in 1997 with one of its aims to raise awareness of the level bust issue. According to EUROCONTROL the decrease in 2000 could indicate that the LBWG initiatives are taking effect. There are many causes for the Level bust issue, but surveys show that the majority of the reported level busts are caused by active failures on the flight deck. A British survey from 1999 covering 455 reported level busts, shows that in 80% of the reports that involved flight deck failures, aircrew failed to comply with correctly read-back ATC vertical clearances. According to the same survey, 247 of the 455 reported occurrences were during climb, and 132 occurrences during descend. Figures provided by ASRS are slightly different, a majority of level busts take place during descend phase. That might have an origin in different working methods in the US.

As mentioned earlier there are different cause for level busts, some of them are as follows:

- Complexity of SIDs
- Density of traffic (causing lack of hearback by the controllers)
- Long/complex clearances
- “Expect level...” clearances
- Callsign confusion
- FMS (Flight Management System) equipment modes
- Simultaneous transmissions

The different surveys show that level busts are a problem to be taken seriously, and that aircrews cause the majority of occurrences. It is of utmost importance that the airlines focus on this issue in their training programs. CRM (Crew Resource Management), Situational Awareness, procedures for altimeter setting and the use of correct FMS modes are all important issues in the work for reducing the amount of level busts. Another important aspect is that SIDs and STARs should be constructed in a way that minimizes the consequences if a “level bust” occurs. This is an important area of responsibility for the Norwegian Air Traffic and Airport Management (NATAM).