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**Level Bust article for UKFSC magazine.  
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**What is a level bust?**

The definition of a Level Bust used by NATS is a deviation of 300 feet or more from the assigned level. The Eurocontrol definition of a level bust is an unauthorized vertical deviation of more than 300 feet from an ATC flight clearance (within RVSM airspace this limit is reduced to 200 feet), other states and service providers use their own definition. The use of different criteria makes a direct comparison between the numbers of reported events in each country difficult; it is also difficult to make a direct comparison with airline data for the same reason. The NATS view is that the rate of occurrence in the UK is still too high.

**The scale of the problem.**

The following figures indicate the scale of the problem using NATS own data, this is based on reports filed by ATCOs under CAP382, the Mandatory Occurrence Report Scheme.

2000	291
2001	254
2002	289
2003	203
2004	303
2005 Jan to Apr 30th	116

The cumulative total for 2005 from January to April is a 33% higher than the same period in 2004 and an 84% increase over 2003. Equally worrying is that the figures for each year don't provide a true indication of the scale of the problem; based on radar recordings and work with operators we believe that only one in three actual events in the UK is reported.

The safety significance of level bust events is also increasing year on year. In the UK, standard radar separation will usually be 1000 feet vertically or 3 miles horizontally, in some areas this is increased to 5 miles. Level busts which result in a loss of separation are increasing. In 2003 there were 31 losses of separation resulting from a level bust, in 2004 this increased to 53, thus far in 2005 there have been 23 losses of separation.

**What are the top causal factors in reported level bust events?**

Level bust reports are investigated by the NATS ATC Investigations staff; the majority of these investigations will also involve contact with the operator. Based on the report, feedback from the operator and the subsequent investigation a causal factor will be assigned to the event based on the NATS Event Factor Description scheme. The top causal factors for level busts since the beginning of 2003 to date have remained broadly similar as has the proportion of events involving each causal factor. A description of the top causal factors with supporting information is given below; the figure in the end box is a guide to the % of reported events which involve each of the causal factors.

Top causal factors of level busts, Jan 03 to Apr 05	% of events
<b>Correct pilot readback followed by incorrect action</b> , formerly described as CRM problems. Some events in this category will involve occasions where crews have received a clearance to a level which is known to cause confusion such as FL100/FL110 or FL200/220. The UK have introduced non-standard R/T phraseology to overcome this difficulty but the problem is still with us; in 2004 there are 8 recorded occasions where a crew have correctly acknowledged a decent clearance to FL110 but have then descended to FL100. Other events will involve a breakdown in cockpit SOPs; we don't fully understand why this type of event occurs but it is possible that high R/T loading, high cockpit workload and communication issues are all contributory factors.	20-25%
<b>Mis hear errors</b> are recorded when an ATCO fails to detect and correct an incorrect pilot R/T read back which is audible. These errors are more common at the ATC centres with high R/T workload but we believe that ATCOs hear and correct more errors than they miss.	10%
<b>Failed to follow cleared SID</b> is a particular issue with departures from Gatwick, Stansted and Luton although other airports are affected. Gatwick, Stansted and Luton all have step climb SIDs and these errors normally involve an aircraft failing to stop at the first stop altitude.	10%
<b>Incorrect pilot readback by correct aircraft</b> involves a wrong readback of an ATC clearance.	9%
<b>Pilot readback by incorrect aircraft</b> means that the crew of one aircraft took a call intended for a different aircraft.	8%
<b>Poor manual handling</b> can due to a pilot's manual handling of the aircraft or input error into the FMS. Two of the most serious level bust incidents in 2004 involved poor manual handling by military pilots.	7%
<b>Aircraft technical problem</b> which includes events where the FMS has failed to capture the selected altitude	5%
<b>Altimeter setting error</b> is a problem mainly reported in the London TMA, 80% of the errors occur when the aircraft is in the climb, is above the transition altitude/level and the standard pressure setting isn't set.	5%

### What can be done about level busts by pilots and controllers?

There is no single solution to the level bust problem because there are numerous problems.

Advice for pilots;

- Follow SOPs, full adherence to good SOPs are an excellent first defence.
- If in doubt about a clearance, confirm it on the R/T not with your colleague.
- Report your cleared level on first contact with a new frequency unless specifically asked not to.
- Maintain a good standard of R/T discipline, missing out vital information such as a cleared level or your callsign adds to controller workload because they will have to ask you for it.
- Pay attention to SID charts especially where a step climb is involved. On first contact tell the ATC sector your callsign, passing altitude, first stop altitude and SID designator.

- Increase vigilance where traffic density is high. If R/T congestion is a problem, file an MOR.
- If you hear another pilot make an incorrect readback and this isn't corrected by the ATCO then, whenever possible, advise ATC that you have heard a missed readback error.

#### Advice for ATCOs;

- File a report on any level bust even if separation is not lost. We need to know where and why all level bust events are happening.
- Monitor readbacks, insist on correct readbacks.
- R/T loading is a factor in level busts and other incidents. Split sectors to reduce R/T loading.
- If pilots don't give their cleared level on first contact then ask them to confirm it.
- Avoid multiple instructions; ideally don't include more than 2 instructions per transmission.
- Use clear and unambiguous phraseology. The introduction of new phraseology for FL100/200 etc has reduced level busts at these levels. In 2002 11% of reported level busts in the UK involve a crew confusing climb or descent instructions with a heading instruction. The best practice at LTCC is to use headings ending in 5 or the word 'degrees' if a heading ends in '0', since January 2004 there have only been 2 level busts with this causal factor.
- Avoid reference to level if giving traffic information, use 'traffic crossing, 1000 feet above/below.'
- Restate the cleared level when asking for requested level. If using 'expect' levels ensure that the 'expect' level precedes the cleared level.

#### Next steps?

This short article is intended to raise awareness of the increase in the number of level busts in the UK. We are working in conjunction with operators, regulators and others to tackle the problem and we welcome the opportunity to address operators and safety organisations in more depth about the problem. We accept that we can't provide all of the answers or advice and welcome input from all parties; if you have information or solutions we will be glad to hear them. For further information please contact Mike Edwards, NATS Head of Investigations or visit our website, [www.levelbust.com](http://www.levelbust.com) where up to date information and help is available including the Eurocontrol Level Bust Tool Kit briefing papers.