What is a level bust? A level bust occurs when an aircraft deviates (climbs or descends) more than 300ft from the correct level. Normally vertical separation between aircraft is 1000ft.

One Thousand to Level (Bust?)

Have you had a level bust? If you haven't, then you have probably flown with someone who has. What do you think about the consequences of a level bust? A quick reaction to TCAS, some paperwork, maybe a 'chat' with the Senior Pilot…. A few weeks will go by and the event will drift into insignificance…

On November 11th 1996, a Boeing 747 collided with an Ilyushin 76 west of New Delhi. 349 people were killed. The accident was the result of a simple level bust. You might be forgiven for thinking that a similar accident couldn't occur in Europe. With a modern radar system, high quality Air Traffic Control, and TCAS, many would have agreed with you. The events of July 1st this year (2002) should have changed your mind.

On this date, a Tupolev 154 collided with a Boeing 757 near Ueberlingen, Germany. This accident happened in well-regulated European airspace with a high-quality ATC service, and involved aircraft equipped with TCAS flying in VMC. Whilst this event was not a level bust, it demonstrated that the 'error traps' or 'safety nets', which should prevent a mid-air collision, **cannot be relied upon to work**.

This should remove any doubt from your mind as to whether level busts are a serious safety hazard. Are they a greater hazard than they were? Probably, yes. GPS-based navigation systems mean that aircraft track airway centrelines and departure and arrival routes with pinpoint accuracy. In the past, inaccuracies in tracking meant that there was a good chance that aircraft on similar tracks would miss each other. Now, if two aircraft are on a theoretical collision course, they're probably going to meet. RVSM, with its requirements for greater accuracy in vertical navigation, has a similar effect. It also means that if something does go wrong, there may be much less time and space in which to react.

Work is being done in many areas of industry to ascertain why level busts occur and to define preventative measures, but it is clear at this stage that **pilots can adopt operating methods which will substantially reduce their risk.**

Shopping for a level bust? Take this list…

The vast majority of level busts are caused by one or more of the following factors:

1. Deviation from SOPs
2. Mis-reading SID charts
3. Altimeter setting errors
4. Callsign confusion
5. High workload not mitigated
6. Confusion between heading and level instructions
7. Aircraft cleared FL110, but descends to FL100
8. Confusion or misunderstanding not checked with ATC

9. Autopilot failure to capture level

So, the problem has been analysed, and is to some degree understood. However, none of the causes above has a simple and robust cure. The information above does give us the opportunity to find ways of adapting our operating techniques in order to reduce our exposure to risk.

Positive change…

We need to pay attention to SOPs, RTF procedures, and the flight deck environment. Whilst the following advice may seem elementary, we need to think carefully about each point, and amend our own operating styles accordingly… The training department and audit team will be concentrating on these issues in an effort to ensure that standards are improving.

What's ~~it~~ he doing now?

The importance of understanding and abiding by company SOPs cannot be over-emphasised. This sets the scene for a safe operation, and engenders high quality co-operation between crewmembers. Each understands what to expect and recognises the professional manner in which the other sets about their work. This is an environment in which mis-understandings and confusion are not likely to flourish. Achieving this goal is not straightforward, only a disciplined individual approach will produce a high standard of adherence to SOPs, and this should have its roots in an understanding of the need for a standardised operation.

SOPs cover the way that we set the aircraft up for flight, especially the departure phase. Approximately 35% of all level busts involved pilots mis-reading the departure chart, and expert opinion is that users of Jeppesen charts are most at risk. It is vital that we take time to read, understand, and brief the departure plate accurately, and then manage the aircraft flight path in order to achieve the correct profile. Particular attention needs to be paid to 'Step Climb' SIDs, which have a far higher rate of level busts than others. One good technique is to carry out the departure brief and ask an open question of the other pilot, 'What is our first cleared altitude?'. This interactive style of briefing ensures that both pilots have a clear comprehension of the profile.

Altimeter setting errors, usually involving failure to set Standard Pressure when first climbing to a Flight Level, also account for a substantial proportion of level busts. A clear brief, and careful SOP adherence, should help you to avoid this error. The –700 series aircraft will give a warning if climb is continued above Transition Altitude without STD being set, but this error trap is absent on the –300. Talks are ongoing with Smiths and Honeywell to seek a technical solution.

Some difficulties with autopilots have been cited in level bust reports, generally where crews have attempted to engage the autopilot too late during a level-off. The usual advice applies, hand-fly only where appropriate and following a brief. Use of the 'Manual Veto' may be helpful – this allows either pilot to call for the autopilot if the workload is felt to be too high.

These techniques ensure shared understanding, and will help to avoid one of the most statistically risky types of level bust.

That **must** have been for us…

We operate modern aircraft – some only a few weeks old – and the air traffic control systems in many parts of Europe are up-to-date, too. Connecting the aircraft to the controller though, is a system which has been proven time and time again to be unreliable and awkward. Voice communications by VHF allow for all sorts of errors.

Operating professionally means taking care to communicate effectively, and this means setting up the receiver correctly, listening accurately and taking care to respond only to the correct callsign, and being aware of the traffic environment from other communications. When transmitting, it is vital to listen out before calling on a new frequency, to use standard words and phrases, and to seek clarification if there is any question at all over the communication received. At least one pilot must monitor VHF1 at all times – many prefer, when listening to ATIS broadcasts, for example, to leave VHF1 selected and audible, and to pick up the ATIS quietly in the background. Put simply, VHF radio is not your friend – it has the potential to do great harm, and needs to be used with utmost respect.

It is vital that readbacks are not used as a means of seeking clarification – this is not their purpose. Callsigns should never be abbreviated, and words such as 'flight level' and 'heading' should not be omitted from readbacks. If you think the standard of the communication from the controller is poor, seek clarification.

All of the above is achievable, though it will require determined effort, especially on a demanding multi-sector day! One significant way in which safety may be improved is by eliminating distraction in the flight deck, certainly in climb and descent, and when approaching the point at which descent clearance may be received. This means concentrating on the old priority list – 'aviate, navigate, and communicate', and not allowing choosing from the breakfast menu to get in the way of any of these tasks.

Malaga, this is Easy Seven Victor Tango Four Alpha Bravo…

Callsign Confusion has been identified as a contributory factor in all sorts of incidents, and a programme is underway to alter all of our callsigns, taking account of Go's operation too. This is a major project, and will not happen overnight. The objective is to find a satisfactory solution for the long term, and in the meantime, extra vigilance is necessary whilst using our present callsign scheme.

Missing You Already!

The techniques above will help us to avoid level busts – but we may still be involved in an encounter with another aircraft. The accident on July 1st should prompt us to reconsider collision avoidance, and the following are food for thought. Keeping a good lookout, weather permitting, provides a last line of defence. Normally, TCAS will inform us of traffic in time to commence a visual search. There is some opinion that pilots have become conditioned not to react to a collision risk until TCAS activates. In fact, if a definite and immediate risk of collision is identified, the crew

should take action to alter the flight path. Of course, any TCAS RA should be followed, but a timely and gentle manoeuvre will, perhaps, avoid an RA, too. What appears to be a dangerous situation may be queried with ATC, (who may be very grateful for a prompt!).

So that's all?

Taking care to abide by these guidelines will have a very substantial effect on our exposure to risk. In recent level busts and AIRPROXs, which have happened to easyJet crews, one or more of these guidelines were broken. We can't afford exposure to unnecessary risk – we have to adapt and improve.

The controller's 'bible', the Manual of Air Traffic Services Part One, gives a full account of standard RTF phraseology as used in the UK. Other European states use slightly different phraseology. The Manual is available online at http://www.caa.co.uk/publications/publicationdetails.asp?id=222, and Appendix E is the appropriate section. The UK AIP also gives relevant information at http://www.ais.org.uk. CAP413 gives an overview of RTF techniques at http://www.caa.co.uk/docs/33/CAP413.pdf.