



# MISUNDERSTANDINGS - WRONG QNH SETTING

A C9, operated by the US military, was approaching a civil airport. The approach controller guided the aircraft to the ILS during descent to an altitude of 3000 FT.

APP: "C9 descend altitude 3000 FT  
QNH 996"  
C9: "Descending 3000 FT 996 C9"

The pilot reported reaching 3000 FT but the Mode C indication on the radar display said "A2400 FT". The pilot confirmed being at A3000 FT, so a Mode C inaccuracy was assumed. After the aircraft had been cleared for ILS and had intercepted the LLZ, it was transferred to the TWR frequency.

When the pilot confirmed the QNH after having been transferred from APP to TWR, the cause of the presumed "Mode C inaccuracy" became apparent. The pilot had misunderstood the QNH. He had confused 996 hPa with 29.96 inches. The Mode C indication was indeed correct; the aircraft was at an altitude of 2400 FT. The difference amounted to 19hPa, which corresponds to approximately 570 FT (29.96 inches corresponds to 1015 hPa).

The glide path was intercepted at A2400 FT. The ILS guided the aircraft safely to the airport despite the wrong altitude. It does, however, raise the question as to what could have happened as a result of the wrong altimeter setting if the ILS had not been available but if an NDB approach had to be performed instead, with a low ceiling in IMC. The OCA for an NDB approach to that airport is approximately 600 FT above aerodrome level; with an error of 570 FT, this would have only left 30 FT or about 10m - with a considerable distance to cover before reaching the runway!

## Conclusion drawn by the air traffic controller:

*If the correct QNH value is set for the radar display, the actual altitude is shown on the radar screen.*

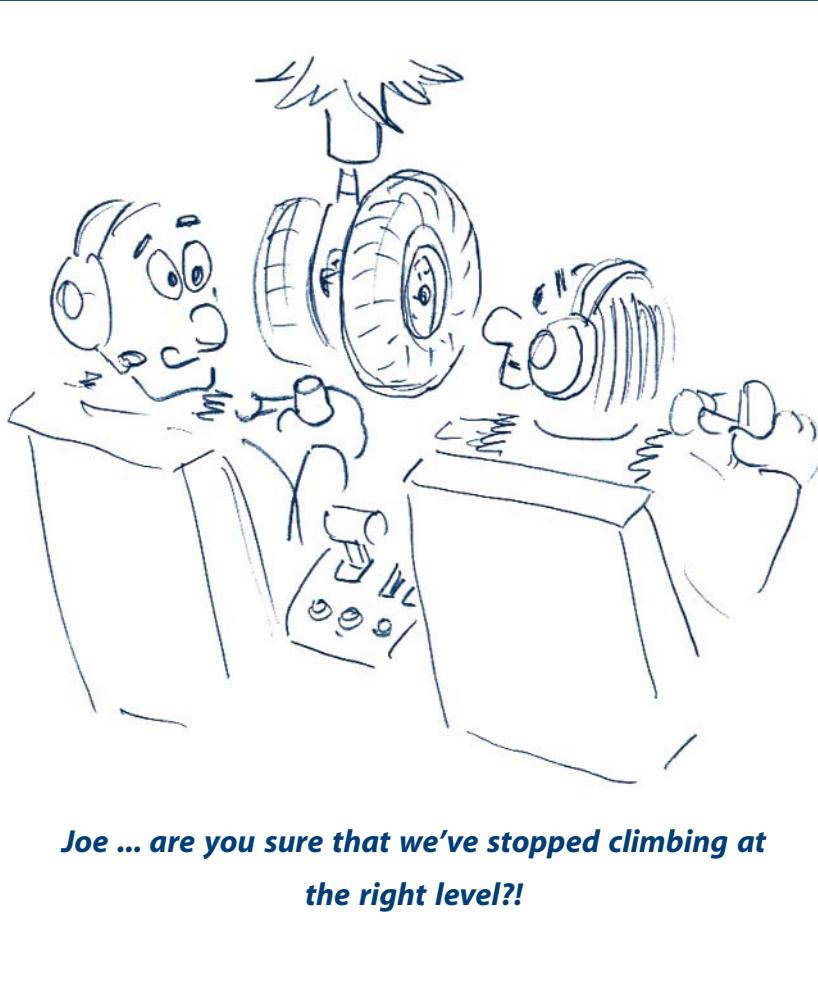
## Statement by the DFS Safety Management Department:

The conclusion drawn by the ATCO is correct since both the altimeter and radar data processing use 1013 hPa as the reference value. For altitudes below the transition level, on-board as well as ground-based systems make a correction according to the QNH set. In the incident described above, the altimeter of the C9 had the wrong correction value (which the pilot cannot see!!) while the radar used the right correction value and thus showed the actual altitude of the aircraft.

For values above 1000 hPa, the "1" clearly indicates that the air traffic controller has given the value as hPa. For QNH values below 1000 hPa, there is a risk that (mainly US or military) pilots who are used to QNH values expressed in inches confuse the hPa QNH values within the range of 900 with the QNH values expressed in inches starting with 29. The pilots appear to be used to the missing "2". This could perhaps be the result of negligent phraseology applied by foreign colleagues ...

According to present German radiotelephony procedures, it is not mandatory to explicitly mention the measurement unit of the QNH. In order to avoid misunderstandings, however, the following solutions might be advisable for QNH < 1000 hPa.

- to add a preceding "0" (e.g. QNH 0996), or
- to add "hPa" (e.g. QNH 996 hPa).



## THE LEVEL BUST TOOLKIT

The European Action Plan for the Prevention of Level Busts\* includes the Level Bust Toolkit, which contains a number of Briefing Notes dealing with a range of subjects connected with the cause and prevention of level busts. Section 7 of Briefing Note ATM 1 - Understanding the Causes of Level Busts - deals with altimeter pressure settings and features the error described above as well as some others. Briefing Note Ops 2 gives a fuller explanation of this and related errors. The recommendations which follow are taken from Briefing Note ATM1.

### LESSONS LEARNED

**From the many lessons learned from this and other incidents concerning all members of the aviation community, the following relate particularly to Air Traffic Controllers:**

The controller can reduce the likelihood of error by paying close attention to the use of standard phraseology and by insisting on the correct read-back procedure.

Standard phraseology is especially important when:

- Passing a clearance to pilots whose familiarity with the English language is limited.

- Specifying the altitude reference when this changes (e.g. "descend to 3,000 feet QNH" or "set QNH 993 hPa and descend to 3,000 feet").
- Passing the pressure setting to the pilot of a North American aircraft. In the USA and Canada, pressure settings are always expressed in in.Hg.; the pressure setting reference should therefore be stressed (e.g. "set QNH 993 hPa," not, "set 993").
- Passing an altitude or flight level clearance to a pilot accustomed to using metres as altitude reference. When passing a new altitude or level clearance the altitude reference should be stressed.
- Pilots from the USA and Canada are accustomed to a standard TA of 18,000 feet. There is therefore an enhanced risk of error when clearing them to a flight level below 18,000 feet. This risk may be reduced by repeating the clearance (e.g. descend to flight level one two zero I say again flight level one two zero).

\* The EUROCONTROL Level Bust Toolkit has been developed as a result of the EUROCONTROL Level Bust Initiative. It contains much important information and advice to help combat the level bust threat. The EUROCONTROL Level Bust Toolkit may be obtained on CD ROM by contacting the Coordinator Safety Improvements Initiative, Mr Tzvetomir Blajev, on tel.: +32 (02) 729 3965 fax: +32 (02) 729 9082 [tzvetomir.blajev@eurocontrol.int](mailto:tzvetomir.blajev@eurocontrol.int)