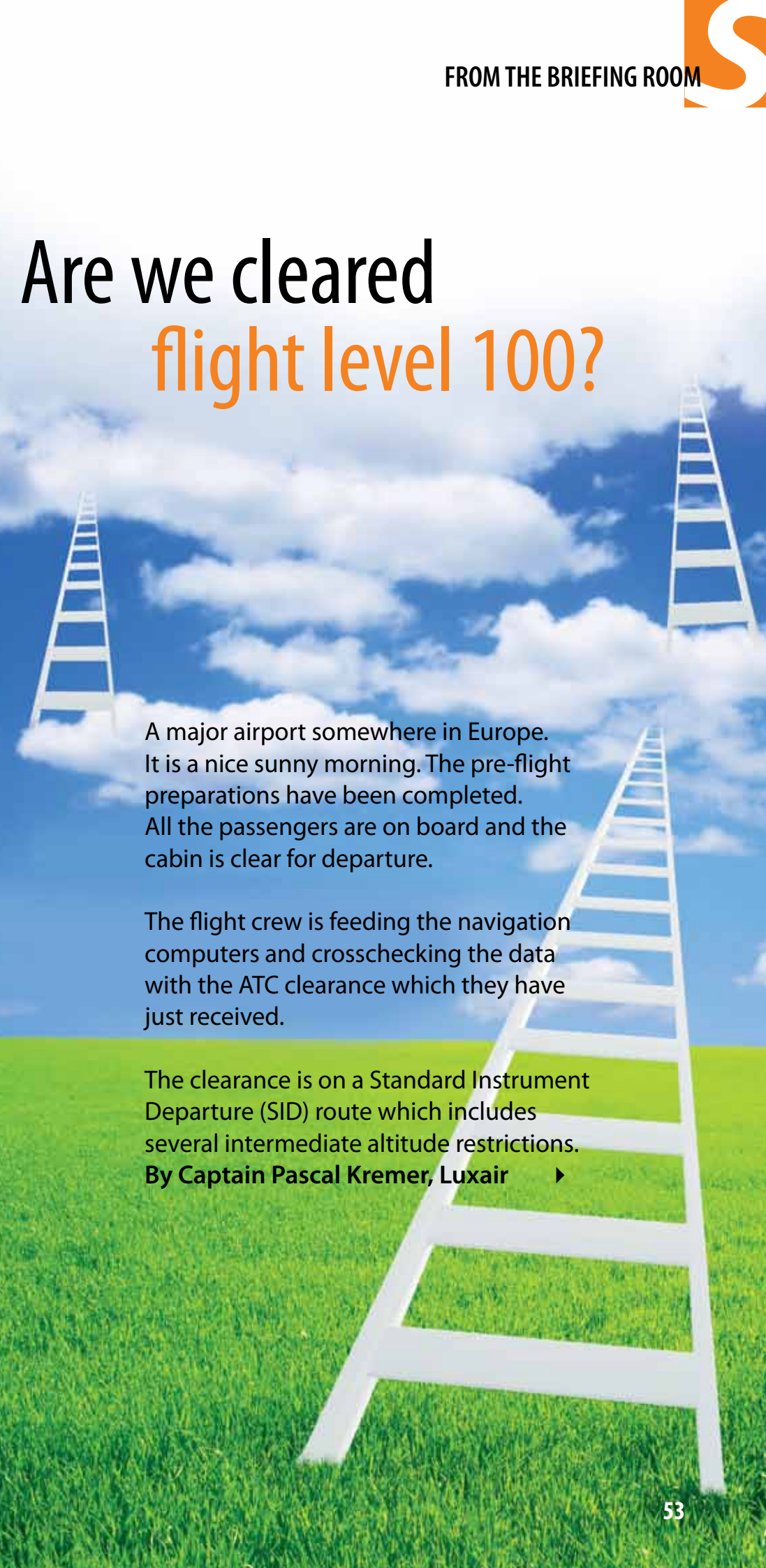
Are we cleared flight level 100?

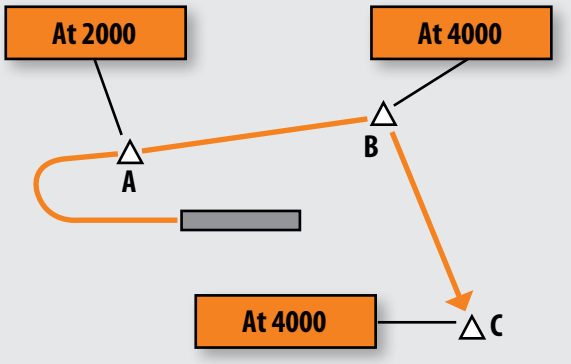


A major airport somewhere in Europe. It is a nice sunny morning. The pre-flight preparations have been completed. All the passengers are on board and the cabin is clear for departure.

The flight crew is feeding the navigation computers and crosschecking the data with the ATC clearance which they have just received.

The clearance is on a Standard Instrument Departure (SID) route which includes several intermediate altitude restrictions.

By Captain Pascal Kremer, Luxair



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After a short taxi time the aircraft is ready for take off. The crew is preparing for one of the most work-intensive parts of the flight. Both crew members mentally review the departure procedure.

> ***"Flight 123, cleared for take off runway 27, wind 270 at 5.***
> ***Contact departure when airborne. Goodbye."***
> ***"Flight 123 cleared take off. Goodbye."***

The captain advances the thrust levers. The aircraft accelerates down the runway. "V1, rotate." A gentle pull on the control column helps the aircraft leave the ground. The flight is on its way.

> ***"Departure, good morning, Flight 123 passing point A at 2000 feet"***
> ***"Flight 123, good morning, climb flight level 100."***
> ***"Climb flight level 100, Flight 123."***

The crew select flight level 100 on their instruments and start to climb. A few minutes later the ATC controller switches them over to the next frequency. Flight 123 is now cleared to climb to its final cruising level. After an uneventful flight the aircraft touches down at its destination.

A normal flight? Well, maybe not…Two years ago, the procedures for vertical clearance restrictions specified in ICAO Doc 4444, PANS-ATM, were altered by the issue of Amendment 5. The revised procedures state that:

> **"When a departing aircraft on a SID is cleared to climb to a level higher than the initially cleared level or the level(s) specified in a SID, the aircraft shall follow the published vertical profile of a SID, unless such restrictions are explicitly cancelled by ATC." and require the use of phraseology in the form:**
>
> ***CLIMB TO (level) [LEVEL RESTRICTION(S) (SID designator) CANCELLED***
> ***(or)***
> ***LEVEL RESTRICTION(S) (SID designator) AT (point) CANCELLED]***

The same applies for a Standard Instrument Arrival (STAR):

> **"When an arriving aircraft on a STAR is cleared to descend to a level lower than the level or the level(s) specified in a STAR, the aircraft shall follow the published vertical profile of a STAR, unless such restrictions are explicitly cancelled by ATC. Published minimum levels based on terrain clearance shall always be applied" and require the use of similar phraseology in the form:**
>
> ***DESCEND TO (level) [LEVEL RESTRICTION(S) (STAR designator) CANCELLED***
> ***(or)***
> ***LEVEL RESTRICTION(S) (STAR designator) AT (point) CANCELLED]***

So if ICAO procedures were being used, in the example given above the correct course of action would have been to respect the altitude restrictions of the SID until point C and only then begin the climb to flight level 100. And if in any doubt seek clarification from the ATC controller that the climb clearance cancelled the SID restrictions.

A discussion during a pilot safety refresher course highlighted the potential for level busts in these situations. In the example given, the pilot did not clarify the climb clearance with the ATC controller because he "had done so on previous flights and they always want you to start the climb straight away".

Unfortunately, before this change in PANS-ATM, the procedures for ATC ad-hoc vertical clearances following an initial SID or STAR clearance were the same as for any other vertical re-clearance. A new clearance cancelled all previous intermediate level restrictions unless they were specifically restated. But afterwards, the procedure for SID/STAR became different and most - but not all - European civil aviation authorities adopted the change and published it in their national AIP.

So back to the pilot's point of view. This change makes matters more complicated than they were before. Even worse, a State with some of the busiest airspace in Europe, the United Kingdom, has not adopted the change, and has published a difference in their AIP which retains the previous procedures under which an ATC re-clearance after an initial SID/STAR is exactly the same as any other re-clearance: There are no intermediate restrictions unless they are stated or re-stated upon re-clearance.

This would be difficult enough if ATC in the majority of States which have adopted the change always applied the new procedure strictly. But our pilot discussion suggested that this was not always the case, with many variations in the actual phraseology being used which sometimes left doubt in the pilots' minds as to whether or not a re-clearance of a SID/STAR involved continued intermediate restrictions. Add more difficulties such as bad weather, congested airspace, busy frequencies, non-native English-speaking pilots, technical difficulties, complacency or high workload to the cocktail and everybody in the discussion would agree that the way is open for a level bust and maybe worse.

So, since the safe option for pilots in any doubt as to possible restrictions on their ATC re-clearance is to request clarification from ATC, many more of these requests from pilots should be expected until:

- All European States operate the same procedures for re-clearance of initial SIDs and STARs, and
- ATC more carefully apply whichever phraseology for these re-clearances their State has decided to use

At least this way, it may be possible to prevent an increase in the risk of level busts from this cause until there is a better solution.

And by the way, the example used at the beginning of the article was taken from the UK, so our crew did have a normal flight after all….

SOME UK CAA COMMENTS – THE RATIONALE FOR FILING A DIFFERENCE WITH ICAO…

Pending the outcome of an ICAO review into this subject, UK procedures (AIC Y 048/2009 and the UK AIP GEN 1-7-48) state that for all stages of flight, instructions to climb or descend cancel any previous restrictions, unless these are reiterated as part of the later instruction. Additionally for aircraft on an SID, the word 'now' is added to climb clearances above the SID profile.

In considering the ICAO procedures and potential options, the UK CAA undertook extensive analysis of the international dimension, safety risks and human factors considerations concerning both flight crew and controllers, which identified a number of concerns.

- The revised PANS-ATM procedures for SID/STAR introduced an opposing convention to other stages of flight and a consequent need for flight crews to assess which phase of flight they are in so as to apply the correct convention.
- The revised procedures introduced a form of 'conditional' clearance but without the relevant conditions being explicitly stated on RTF.
- From a human factors perspective, there is a high likelihood of unintentional flight crew non-compliance. Such misunderstanding would result in an incorrect immediate climb or descent, and consequent level bust, which in busy TMA airspace has significant potential to be safety-critical.

The UK CAA continues to work both in Europe and ICAO towards a satisfactory resolution. In the meantime, the UK CAA guidance to UK pilots is that in the case of any doubt about the intention of a clearance, pilots should request clarification from ATC. If doubt arises when airborne, the safest course of action would be to continue to follow the SID/STAR profile while seeking clarification. ■