GNSS RULES OK!

Some changes seem small and clear from the point of view of the procedure-writer, but in practice are far more complicated. In this article, **Emmanuelle Gravalon** describes one such change: GNSS approaches.

KEY POINTS

- **The assessment of change impact should first analyse whose job will be impacted, and then take into account that they will need to learn a new way of doing things.**
- **How operational instructions are written can affect performance and learning.**
- **Operators have to be provided different ways of learning, so they can find their own entry in the learning cycle.**

Some years ago, GNSS approaches started to be implemented, being a cheaper way to operate an IFR procedure on a small airfield, with little traffic. In the Terminal Control Area I worked in, the first GNSS approach was to be in operation on the first day of spring and had been announced by an operational instruction one week before, which said, to summarise:

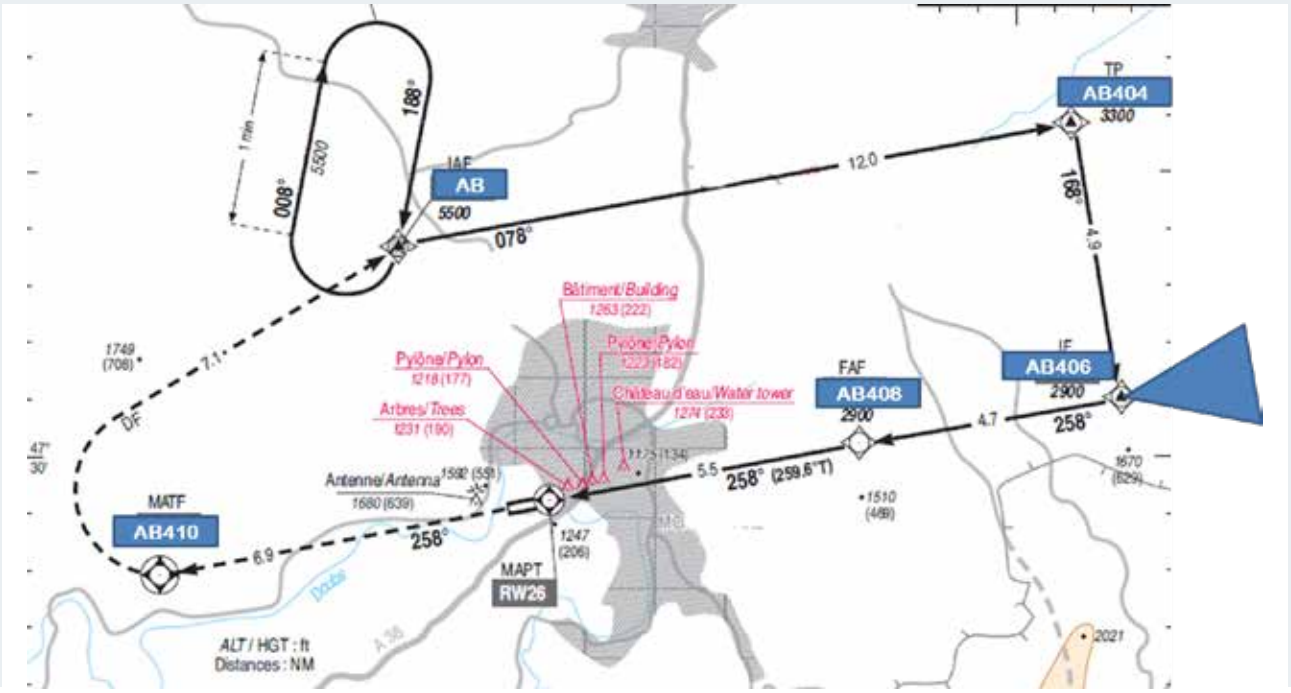
> Nothing new! GNSS approach starts at AB (beacon) and follows (almost) the conventional approach trajectory, the missed-approach procedure is the same, the job is the same. Minor changes: Each turning point is given a name, the turning point AB406 is now in D airspace of the above Terminal Control Area, so ATC has to provide control services until this point at least.

In addition, a short reminder of **"**GNSS rules**"** was provided.

It looked clear. Sparse traffic is usually expected to AB airfield. It will be easy! We can handle much more difficult traffic. The first time I had to handle a GNSS approach at AB Airport was in mid-summer, during a night shift at 0200 hrs (a critical time for tiredness and alertness), while I was alone in the tower. I had no chance to find either the memo "GNSS rules", nor the GNSS map. Fortunately, the crew didn't request a GNSS approach at first contact, and they read back the clearance to AB beacon for a conventional approach.

When I was about to give him descent and clearance for the conventional approach, the pilot asked for a direct to point AB408. Panic! I still hadn't found the map. AB408 was not the GNSS approach starting point. I had in mind that the short reminder about GNSS

Figure 1: Airspace map



said that any direct route to any point of the procedure was possible, except to the final approach fix (FAF) and with an angle restriction for the intermediate fix (IF).

I also remembered that an altitude is associated with each point. I granted him the requested direct route. I transferred him to AB auto-information frequency when passing 5000ft, leaving controlled airspace. And I kept my eyes on him as long as the radar permitted, as he was descending into uncontrolled airspace, proceeding to the FAF with an angle of 120°.

The memo and maps reappeared a little later in the night.

When the panic stopped and I collected my thoughts, some questions came to mind. I felt tricked by the "no change" message. Direct routing is actually possible to any point of the procedure except to the FAF, and at an angle <45° to the IF. This brought to mind more questions. The GNSS memo now seemed even less clear.

Does the angle restriction apply on the part of the GNSS route before or after the IF, when the IF is a 90° turning point?

- Why are the GNSS routes and points altitudes (given on the map) very different from radar safety altitudes?
- Direct routing is possible, but what about the safety altitude in this case?
- And what is the procedure in case of satellite guidance failure?

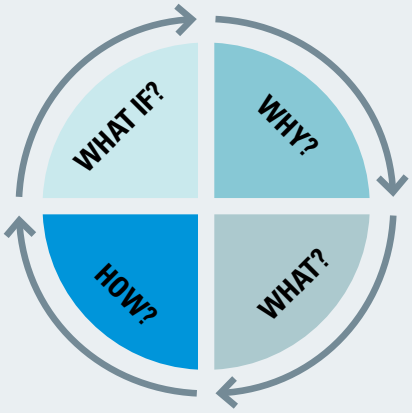


Figure 2: The learning cycle

The four questions help to acquire a new competency. The questions concern comprehension and action (e.g. Why should I do that? What is the procedure to do it?) What should I do? How should I do it? But, the cycle can be started anywhere, fulfilled in different orders. Entry into the cycle is linked to the individual and how they learn.

I certainly did my best considering my knowledge and the circumstances. But was it the best course of action to ensure the safety of this flight arriving at AB airport?

There was no loss of separation. But that was not thanks to the way the change was introduced. So what was missing? First of all, we lacked theoretical knowledge about GNSS approach. Few of us were young enough to have heard of GNSS approaches during initial training, and fewer remembered this theory, which we had never used so far. The main message in the operational instruction was that the changes were minor, that the job for ATCOs was unaffected, and that the differences were the pilot's concerns.

The assessment of change impact was based on the adaptability of controllers and exchange of experience. However, the low traffic at AB airport didn't allow for on-the-job training and experience.

Of course, it's easier to look for 'what went wrong' after the fact. But this situation can help to identify some of the key points of impact assessment for any change:

- Who will be impacted by the change?
- Which part of the job is impacted?
- What do they need to know?
- What do they need to be able to do?

Communication and training should:

- take into account the variability in actual and required competencies
- provide different ways of learning, to enable any entry in the learning cycle
- ensure basic theoretical knowledge and applied experience
- take account of how often the procedure will be used (more refresher training might be needed for rarely used procedures)
- allow for experience sharing (in this situation, with pilots operating GNSS already).

In short, even a minor technical change needs to be assessed and implemented with the users in mind.

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