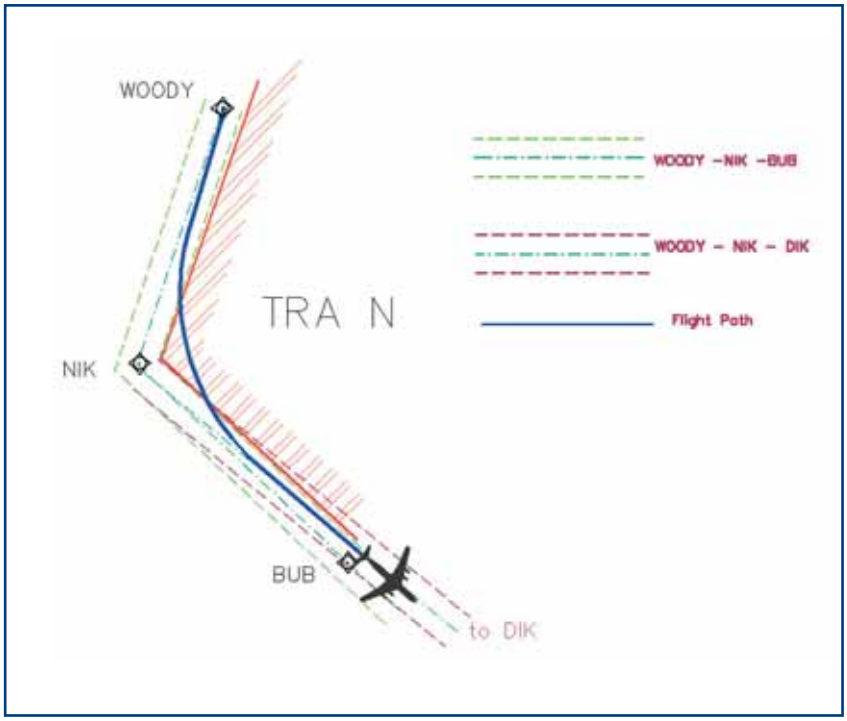
UNAUTHORISED PENETRATION OF AIRSPACE

Almost invariably, unauthorised penetration of airspace occurs due to pilot error. In many cases, unauthorised penetration involves GA aircraft which accidentally stray into controlled or restricted airspace, often due to inaccurate navigation, lack of awareness of the location of the airspace, lack of knowledge of the procedures for obtaining clearance to enter the airspace, or poor communication technique.



Military aircraft too, are often responsible for airspace infringement. The cause may be sudden deterioration of weather, particularly when low flying is being undertaken, coupled with inability to communicate with civil air traffic authorities due to incompatibility of RTF equipment (many military aircraft are equipped with UHF radios only).

In the cases cited above, the ATCO's best defence is awareness of the problem; when, where and how it is most likely to occur; and constant vigilance, especially when unidentified radar returns are observed approaching controlled airspace from outside. Usually, the only action the ATCO can take is to issue avoiding action to aircraft under control.

The ATCO should always report airspace infringement, even when no danger (e.g. loss of separation) results, and regardless of whether the culprit is identified. Reporting action, the subsequent investigation process and detection of the intruder help raise awareness of the issue.

The nature of commercial airline operation is such that airliners usually conduct the whole of their flight within controlled airspace; therefore, unauthorised penetration seldom occurs. However, there have been examples of penetration of military danger areas due to early turns. An example of this is reproduced below.

Early Turns

Introduction

Occasionally, control staff report aircraft turning (very) early before an en-route point, in some cases flying on the edge or even within military areas. In modern aircraft, this seems to be a "feature" of the state-of-the-art navigation system. According to aircraft manufacturers, it "smoothens" the turn, increases passenger comfort and minimises the mileage flown.

As it introduces some uncertainty to what the aircraft is doing, this aircraft behaviour can be annoying for ATC. The early turn should result in the aircraft exactly over-flying the corner edge of the two crossing airways. In the example from the NICKY sector, it is the crossing of the dotted blue lines in the plotting.

The Problem

However, if you modify the routing of the aircraft, e.g. by clearing the aircraft from NIK direct to DIK in the example, the FMS will aim for the corner edge of the new, non-existing route NIK-DIK, which is almost, but not quite the same as NIK-BUB-DIK. By omitting the 3° left turn in BUB, the corner which the aircraft aims for shifts slightly. As a result in the aircraft briefly enters the restricted airspace, in this case the TRA-North.

Technically, the early turns are within the RNAV specification and there's little to prevent aircraft from "optimizing" the space available in an airway. In this particular case, controllers are advised not to clear aircraft from NIK direct to DIK when the TRA-North is active. If similar situations exist in your area of

operation, you might consider recommending similar advice.

Conclusion

These situations are of course not limited to the TRA North corner. Some airways have "do-not-turn-before" points defined in the AIP to avoid coming too close to military areas etc. But keep in mind that even when there is no restricted area, the issue can still affect conflict geometry and how you solve them. If you really need the aircraft to stay on a route to avoid TRA's or other aircraft, the surest way is to lock them on headings.