

This article is intended as a communication to UK Operators on the subject of Strategic Lateral Offset Procedures. It is contributed to SKYbrary by its author - Mrs. Karen Bolton, External Safety Manager Division of Safety in UK NATS.

Don't let SLOP slip your mind

*Do you understand why SLOP is recommended in the North Atlantic?
Are you selecting your offset based either on the position of nearby aircraft
or via random choice in the absence of other information?
Do you know that left offsets are not a SLOP option?*



SLOP significantly reduces the potential for collision when applied correctly!

Oceanic errors

ICAO North Atlantic Working Groups composed of State regulators, Air Traffic Control and representatives from airspace users meet regularly to discuss safety in Oceanic airspace. The North Atlantic Central Monitoring Agency (NAT CMA) compile details of errors which impact safety in this region, including Large Height Deviations defined as being an aircraft deviating from their cleared level by 300 feet or more.

These errors contribute to the region's collision risk in the vertical dimension, which remains a hot topic. During 2008, the two most common types of Large Height Deviation reported to the NAT CMA were climb/descent without ATC clearance and errors arising from ATC co-ordination issues, together totalling 86% of the total minutes spent at an incorrect flight level. Each of these lead to aircraft being in an unexpected position in a region without the benefit of radar coverage.

The combination of operational errors in the vertical dimension and the rise in very accurate navigation systems mean that the chance of aircraft being in vertical overlap (i.e. directly above another) has risen over the last 10 years. Although the Traffic Alert and Collision Avoidance System (TCAS) provides a valuable safety net to converging aircraft, it still relies on aircraft transponders being switched on and functioning correctly. A TCAS monitor can provide situational awareness, but it can also give a false sense of security. In the case of a TCAS Advisory, successful conflict resolution still relies on correct and timely pilot response, so any additional safety margins which can mitigate the effect of operational errors before necessitating avoiding action surely deserve consideration.

Strategic Lateral Offset Procedure

One initiative which was introduced in 2004 is the Strategic Lateral Offset Procedure (SLOP), developed to increase the lateral separation between aircraft with very accurate navigation systems on adjacent levels in case of altitude deviation errors. SLOP allows pilots to fly either the centreline, 1NM or 2NM to the right of centreline. SLOP may be applied from the Oceanic entry point, returning to centreline at the Oceanic exit point, by any aircraft with automatic offset programming capability.



Pilots should make their own choice of offset using whatever means available, but the optimal safety benefit is achieved when aircraft are equally distributed across the three available options. Thus, if the circumstances do not favour a particular offset position, pilots should make a random choice of centreline, 1NM right or 2NM right.

Although not its primary purpose, SLOP can also be used to avoid wake turbulence, co-ordinating with other aircraft as necessary. Note that left offsets are not authorised under SLOP and should not be flown (similarly, right offsets greater than 2NM should not be used). Offsetting left or more than 2NM right of track is only permissible when applying weather deviations (with appropriate vertical changes) or following 15NM offset contingency procedures.

Although the majority of traffic currently transits the NAT on same direction tracks, SLOP is also able to provide substantial benefit for traffic on random routes and those which may encounter opposite direction traffic – errors reported to the NAT CMA show that it is possible in rare situations for *uncleared* aircraft to transit the NAT, which may be invisible to your TCAS display if the intruder's transponder is inactive.

Operators are requested to adopt SLOP as a Standard Operating Procedure (SOP) for all oceanic crossings for safety reasons, in accordance with the recommendation of ICAO. Further information on SLOP can be found in Chapter 8.5 of the [NAT MNPSA Ops Manual](#).



Maximise safety, use SLOP:

- Make a random choice of **centreline, 1NM right or 2NM right** if situational information does not suggest a tactical offset
- Correct SLOP usage decreases potential for collision
- Optimal SLOP usage is roughly a third of aircraft on each option
- Left offsets are not authorised under SLOP
- SLOP may be used globally in procedural Oceanic airspace (e.g. across the NAT, including WATRS, and in the Pacific) and is not limited to OTS flights

SLOP usage in the NAT

Since 2005, UK NATS has analysed the proportion of NAT traffic using SLOP on behalf of the ICAO NAT Working Groups. As awareness of the procedure and its safety benefits have grown, it has been encouraging to see the proportion of SLOP usage observed (for flights reporting Oceanic position via ADS) increasing steadily to around **40%** by the end of 2009.

The procedure provides maximum safety advantage when roughly a third of aircraft are using each offset, i.e. 66% of aircraft away from the centreline. These headline comparative figures of 40% current usage and a 66% target fail to highlight the importance of the equal distribution across the three options. For example, three aircraft at adjacent flight levels all opting for 2NM right offsets is clearly not optimal use of the procedure, even though it may increase the overall SLOP usage statistics. This misunderstanding has resulted in some airlines mandating one particular offset

option in each case – the safety benefit could actually be negated if all airlines were to take this approach.

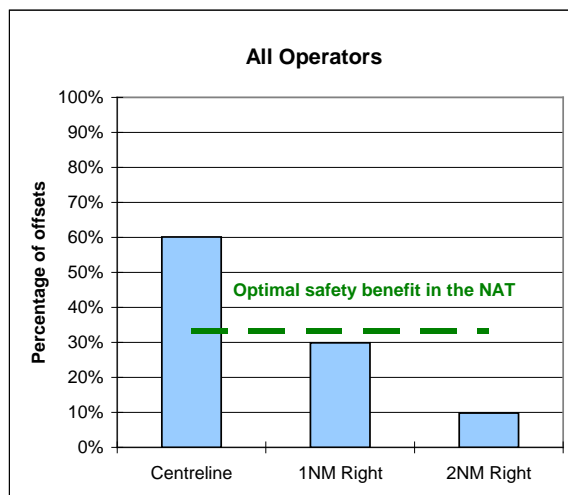
SLOP costs nothing for operators but is priceless in terms of safety when applied correctly, significantly reducing the vertical collision risk.

SLOP usage per operator

Feedback from major carriers who have incorporated SLOP information during crew recurrence training is that the resulting uptake is very good. An important feature of SLOP is that the offset is chosen so as to randomise the offsets across the NAT population.

UK NATS circulate quarterly SLOP usage trend information to airlines, which now includes a quick reference diagram of which offset options are being used by their crews. For the most recent analysis of October-December 2009, 60% of the aircraft were observed on the centreline at 30°W, 30% at 1NM right and 10% at 2NM right. This is shown in Figure 1, illustrating that we are still some way from the optimal use for the overall NAT population.

Figure 1: Use of SLOP options for all operators



	Centreline	1NM Right	2NM Right
# Aircraft	17,322	8,618	2,822
% Aircraft	60.1%	29.9%	9.8%