

 BAVirtual

NAVIGATING SUPERSONIC CIRCLES

Procedures & Techniques

 Concorde

Revision 1 - Sept 23

0 Preface

0.1 Record of Amendment

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1 Introduction

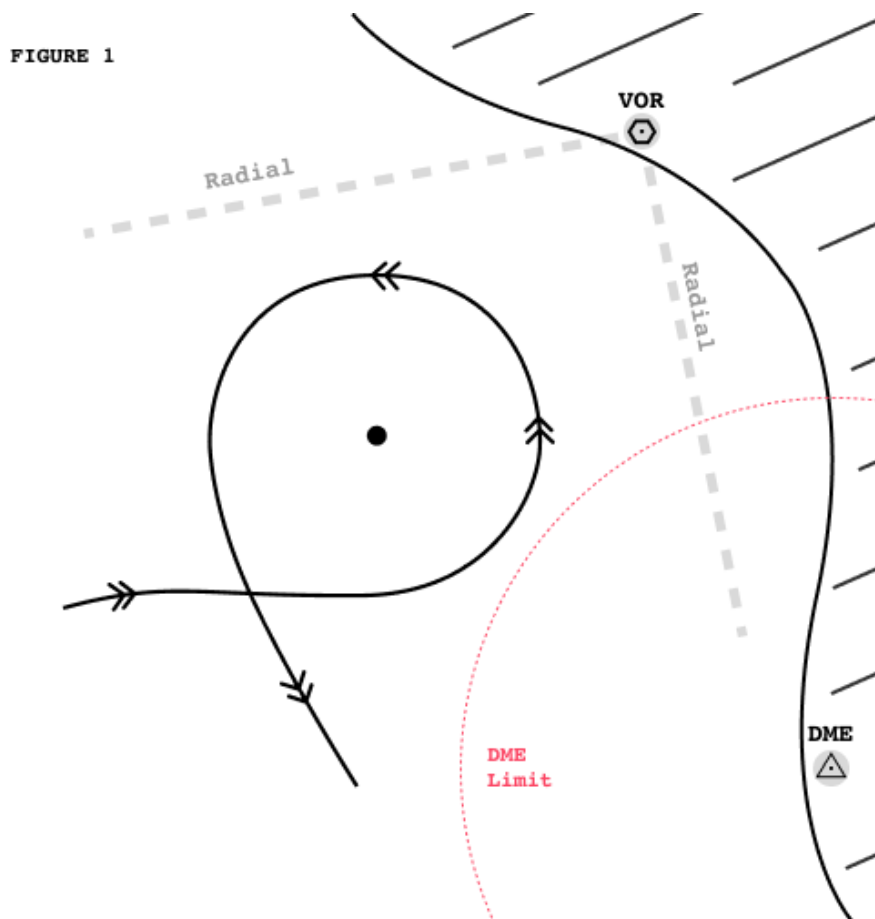
Some Concorde flights offer passengers the opportunity to experience a Supersonic Circle or Loop, allowing them to enjoy sustained Mach 2.0 speeds for an extended period. These loops are exclusive to charter and non standard flights and are conducted within the aircraft's operational limits. Optimal efficiency is achieved by swiftly climbing and accelerating while maintaining a reasonable Zero Fuel Weight (ZFW).

Currently, Supersonic Circles are planned for domestic flights departing from London Heathrow (LHR). Two routes are available: one passing through the Bristol Channel via 8W, and another through the North Sea into Scottish airspace, involving clockwise or anti-clockwise loops.

Note: Heathrow Traffic Control and London Terminal Manoeuvring Area (TMA) controllers might not be familiar with these flights. Pilots should ensure acceleration clearance is granted at least 2 minutes before reaching the acceleration point.

2 The Supersonic Circle

The Navigation Log provided to pilots includes a "Centre of Turn", which serves as the reference point for initiating these turns. Both the North Sea Loop and the 08W turn in the North Sea have defined turn centres and turn radii to adhere to. The aim is to maintain a maximum turn radius of 60 nautical miles to prevent sonic booms over specific areas.



2.1 Turn Execution

Supersonic Circle Turns are accompanied by VOR and DME information. These turns involve a bank angle of 20° at Mach 2, resulting in a turn radius of 57 nautical miles (with a range of 57-60nm). The provided VOR and DME data establish acceptable limits and necessary corrections. Vigilant monitoring is essential to avoid unintended sonic booms.

As with any circular motion, monitoring DME and distance is vital. The Inertial Navigation System (INS) is pivotal in maintaining course, with DME serving as a secondary reference.

Key Elements for Turn Execution

- Centre of Turn: Latitude and Longitude
- Radius: 57-60nm

Insert an unused waypoint into the primary INS (ideally the previous leg's waypoint, e.g., waypoint 4 for a current 5-6 leg).

For turns at speeds below Mach 2, consider the following adjustments:

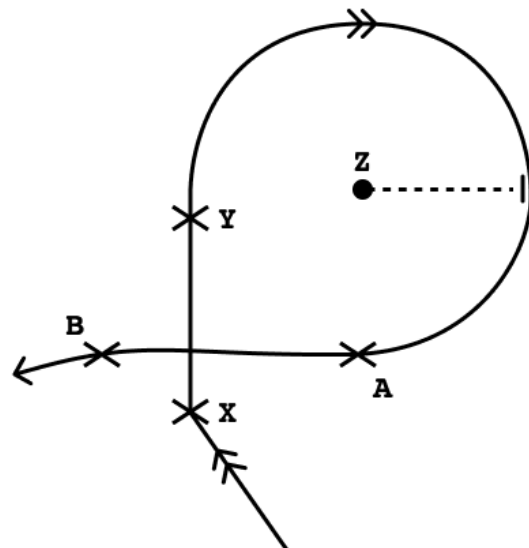
- M1.9: 18° bank
- M1.8: 16° bank

2 Executing the Supersonic Circle

During leg X-Y, switch the INS steering selector (Auto/Manual) to MAN to maintain control while heading towards the next waypoint. A few seconds before reaching the centre point (Z), apply the appropriate bank angle using the Turn Knob. This activates HDG HOLD mode.

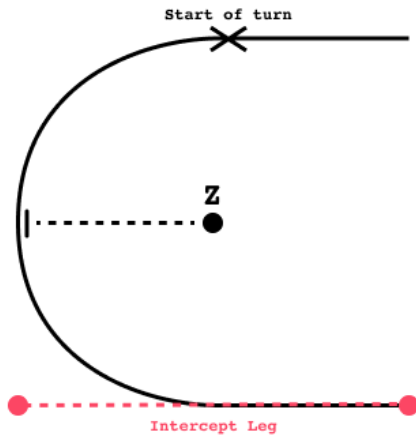
When Y denotes a few miles before reaching the centre point and Z marks the centre of turn in the NAV LOG, input waypoint 0-Z into your INS, and keep your HSI on INS mode. Ensure the distance reads 57nm to confirm accurate tracking. Re-adjust as needed, considering your track's relation to the tangent of the circle.

FIGURE 2



3 Completing 8W Semi-Circles

FIGURE 3

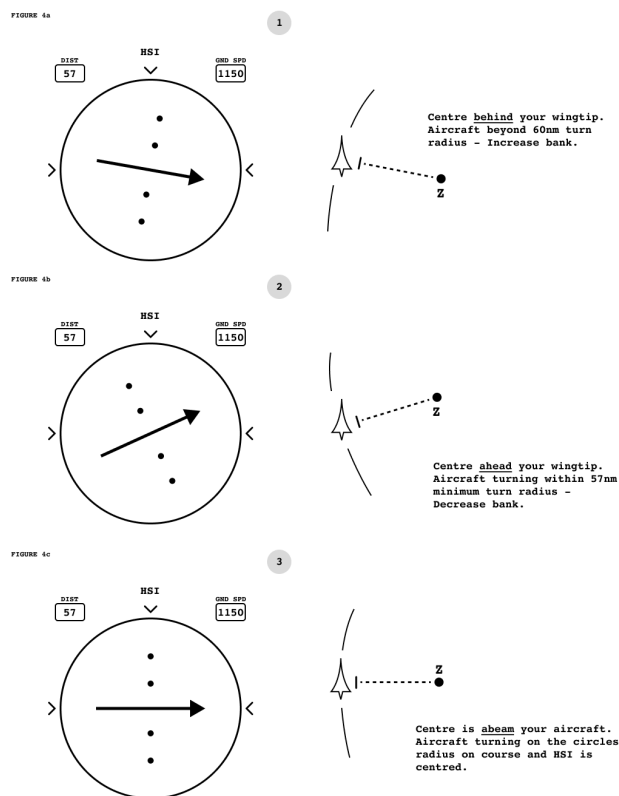


On flights around 8W, you only complete half a circle, pivoting around the Centre of Turn as you swing around the South West coast of the UK joining the intercept leg inbound to ORTAC. The technique is the same as the full Supersonic Circle, except you only complete half intercepting the inbound leg.

If continuous monitoring of the turn is maintained, you will turn to the intercept leg with an accuracy of less than half a mile.

4 HSI and situational awareness monitoring

Selecting 0-Z updates the beam bar, aiding in tracking your relative position and distance to the Center of Turn point. Modifying the bank angle by a few degrees while monitoring turn, wind, and speed can yield a turn accuracy within 1-2 nautical miles.



Repeat this process throughout the turn. Note: Exceeding a bank angle of 20° can lead to a descent of up to 400ft/min.

The First Officer (FO) should cross-check VOR/DME information against the NAV LOG for safety.

Towards the end of the turn, prepare to intercept the next track or set up the next direct course, as indicated in the NAV LOG notes or directly.

If intercepting a leg, accurate monitoring and adjustments ensure correct interception.

FIGURE 5

