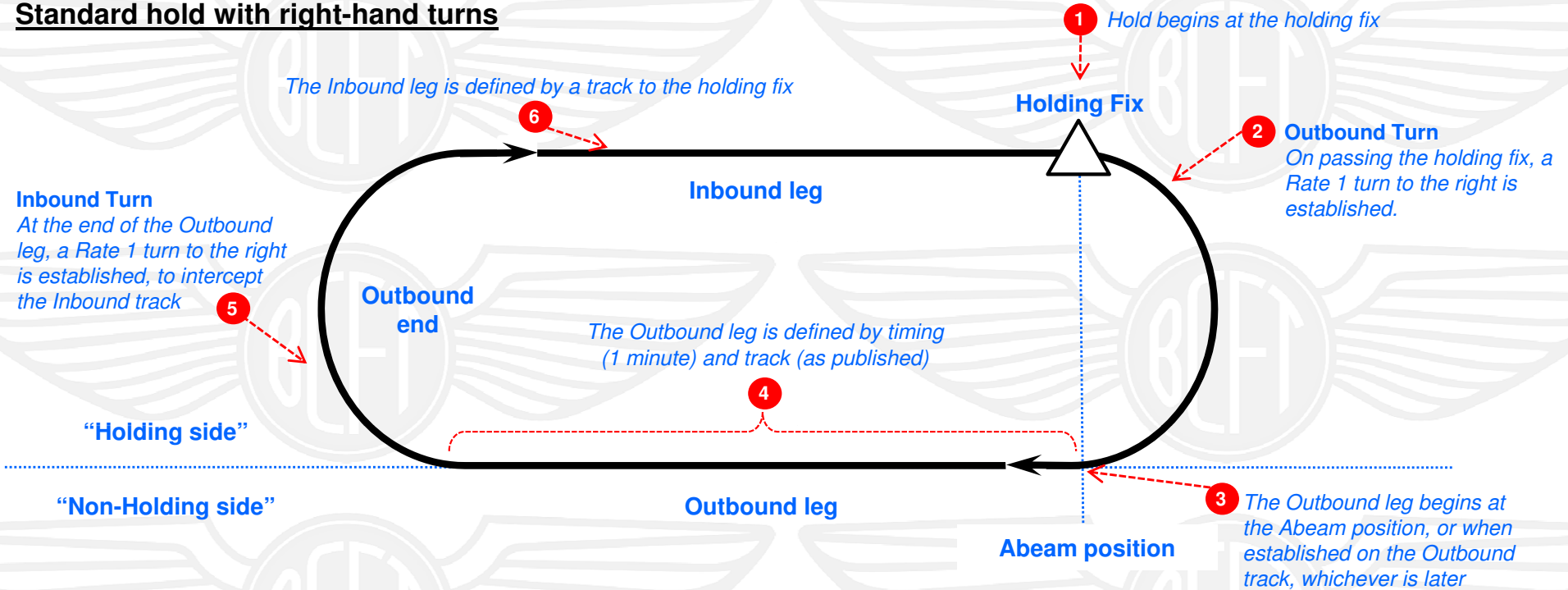


6. NDB tracking, holds and procedures

c. Holding procedures (i) The ICAO holding pattern

Standard hold with right-hand turns



The design of the Holding Area and the Buffer Area (ICAO PANS OPS Doc 8168 Part II Section 4)

- The hold is designed to be flown at a max speed of 230KIAS (280KIAS in turbulence) below 14,000'. The max speed increases in stages to Mach 0.83 above 34,000'. Holds specified as only for Category A & B aircraft are designed for a max speed of 170KIAS. Helicopters are assumed to fly holds at 100KIAS.
- The turns are assumed to use Rate 1 up to a maximum angle of bank of 25°
- The outbound leg timing is 1min below 14,000' and 1min30s above 14,000'. Note that the ICAO hold is no longer defined as a 4min pattern; so, strictly speaking, the outbound leg time need not be corrected for wind
- A **holding** area is designed around these specifications, with various tolerances for the fix position, the beginning of turns, time to establish a bank, track accuracy, and the effect of 95% probable winds *at the max holding speed*. The **holding** area provides 1000' of obstacle and terrain clearance. The **buffer** area extends to 5nm beyond the holding area, and provides obstacle clearance of 1000' at 1nm, tapering to 200' at 5nm. In mountainous areas, the obstacle clearance is greater.
- In general, the holding area is much larger than required for a light aircraft, because it is designed for jets holding at 230-280KIAS. However, the hold area is not designed for every adverse combination of strong winds and light aircraft speeds, and ICAO PANS OPS expects that *“the normal operational adjustments made by the pilots of such aircraft should keep the aircraft within the area”*. Hence, we fly holds making adjustments to track and timing to compensate for wind.
- Note that a published hold may specify a different timing or limiting speed from the ICAO standard, and 'non-standard' left-hand turns