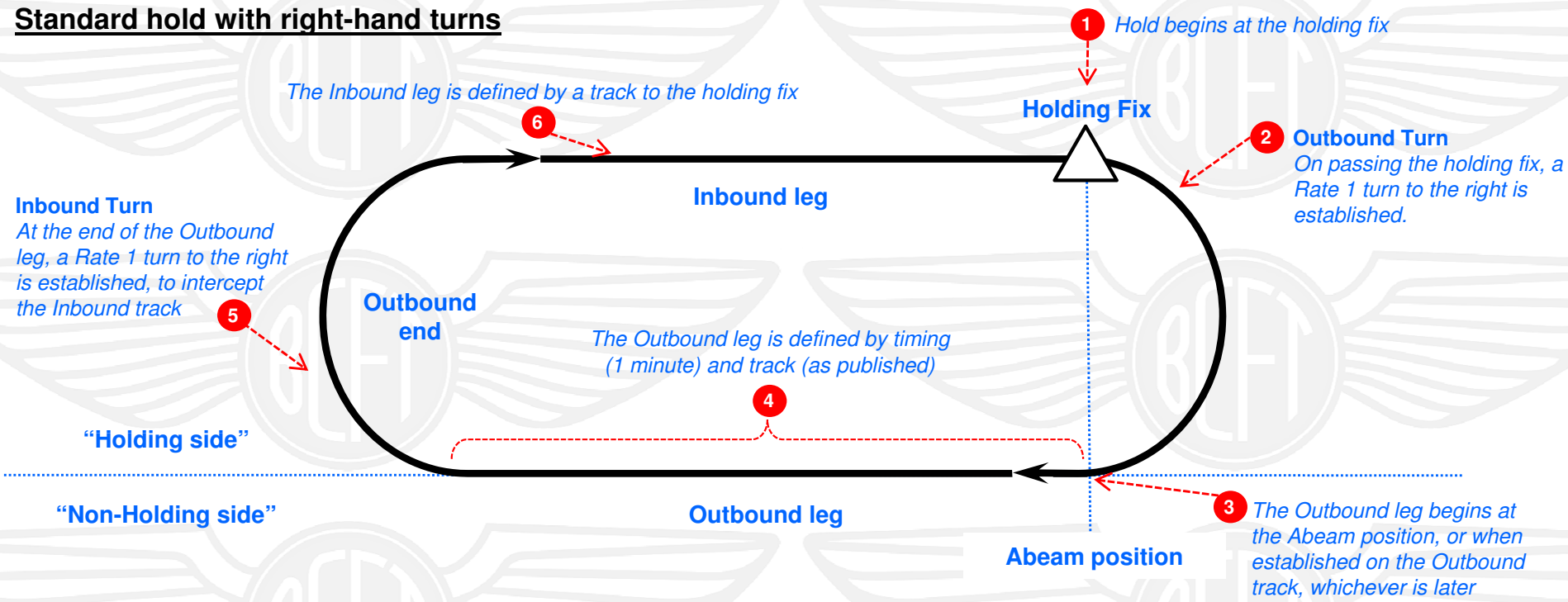
6. NDB tracking, holds and procedures

c. Holding procedures (i) The ICAO holding pattern



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^{O}
- 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