

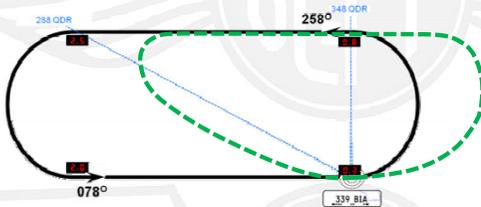
# 6. NDB tracking, holds and procedures



## c. Holding patterns and procedures (v) Effect of wind on the BIA hold

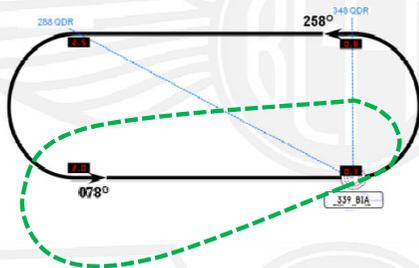
### Effect of Wind

Westerly



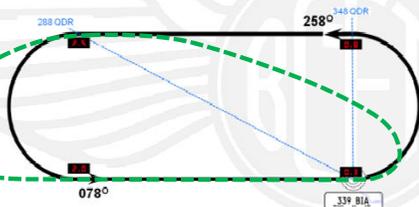
The 1 min outbound leg is shortened and the inbound turn is elongated, leaving less time to intercept the inbound track

Northerly



The outbound turn is squashed and the inbound turn elongated, making it hard to intercept the inbound track

Easterly



The timing will begin when wings are level, well beyond the abeam point; thus the entire hold is elongated

Southerly



The outbound turn is elongated and the inbound turn squashed, requiring a very large intercept to establish the inbound track

### Basic Wind Corrections

We have little flexibility on 3 of the 4 legs of the hold: we must turn at Rate 1, and we must fly the inbound track. Therefore, the outbound heading and timing is the main adjustment we can make for wind

We extend the outbound timing by 1.5s for every estimated knot of headwind, and check this correction extends the outbound leg to ~2.5dme. Alternatively, we can measure the time during the outbound turn from crossing the fix to abeam the fix, and use this as the time for the outbound leg. This only works if the fix is crossed on the correct inbound track, (which it often isn't during the hold entry)

On the outbound leg, when the 30° gate is reached, we track along it for the remainder of the timing. The inbound turn will be wide, because we can not turn more steeply than Rate 1, but the intercept onto the inbound track will be more satisfactory. A better alternative is to use an adjusted gate angle of 35-40° (see example on next page). If we estimate a drift correction inbound and apply 2-3x drift on the outbound leg, the wind effect should be negated, but we still use the gate as a back-up

The ICAO hold specifies 1min outbound, and the holding area is designed to accommodate the effects of wind. At light aircraft speeds, we will remain within the holding area under any conceivable easterly wind strength, so there is no need to reduce the outbound leg timing. We fly the hold as if it were still air, and accept the resulting flight path.

On the outbound leg, when it is apparent the 30° gate will not be reached, we make a heading adjustment towards the hold. The inbound turn will be tight, and a 30° intercept should be maintained until the inbound track is established. The best method is to estimate a drift correction inbound and apply 2-3x drift on the outbound leg, still using the gate as a back-up. The requirement for this drift correction is apparent if our DME distance when abeam the holding fix is greater than 1nm

