1F Sqd UK Naval Flight Ops SOP

This is a guide to the Standard Operating Procedures for No.1 Squadron RAF air when operating with UK Royal Navy Fleet Air Arm Aircraft Carriers and Ships.

It has been produced with the limitations of the systems and gameplay of DCS and is subject to change and amendments as and when they are released.

A special thanks go to Lt Brian Spence RN (Rtd) for his assistance with the Royal Navy's Sea Harrier flight operations and procedures.

Introduction

The following procedures have been created with the assistance of a former Royal Navy Sea Harrier pilot who flew Sea Harriers (SHARs) FR1's and FR2's during his Navy career and saw active service in Bosnia flying off HMS Invincible. He agreed to supply this information but with the proviso that a certain amount of leeway is granted to him as the experience was 30 years ago and some of the details, such as some procedures and configurations are based on his memories and may not reflect modern day procedures. However, in the interest of attempting to give RAFair pilots the most immersive experience we can, we have devised the following UK procedures for the 1F squadron to employ when flying to and from UK based ships represented in DCS. RAFair will expect all its pilots to be able to employ both this procedure and the USA SOP for landing on American ships. **The two are not interchangeable!**

Communication

Unlike the USMC deck operations, the Royal Navy (RN) did not employ extensive communications procedures and in operational conditions the airwaves were completely silent (known as EMCON, look at your UFC and the EMCON button is bottom right of the keypad, not modelled at time of writing). The onus was very much on the pilot's skill and training to operate the jet safely in the circuit and any Hold. RAFair intends to replicate this in this new procedure.

1. Start up

Start-up procedures are as per DCS's systems and comms as for the RAFair SOP. When training, the launch time is denoted by the person leading the sortie, In missions this may be set by the mission requirement/Planners. It is assumed in these procedures the UK ships used in DCS will have launch ramps modelled.

2. Types of launch

There are basically 2 types of launch from the ship. **Single** which is self-explanatory. A single aircraft takes position on the centreline at the correct distance and is launched. Or the **Operational Launch** in which a maximum of 4 aircraft are lined up on the centre line just feet from each other and launch as soon as the aircraft in front reaches the ramp. This was not used often because the SHAR's huge intake could very easily ingest any Foreign Objects & Debris (FOD) being displaced by the jet wash of the aircraft in front. DCS does not model FOD so this type of launch can be used more often.

Single
Aircraft must be ready to launch **-2 minutes** to the launch time. At **-1 minute**, lead aircraft to line up on the deck centre line. Second aircraft should taxi to a position in which it can be ready to line up as soon as the aircraft in front has launched.

Operational Launches
Aircraft must be ready to launch **-2 minutes** to the launch time. At **-1 minute**, lead aircraft to line up on the deck centre line. Remaining aircraft to line up on centre line directly behind the lead aircraft. On the lead aircraft launching the no. 2 aircraft should be ready to launch as soon as the lead reaches the ramp. This should be the case for both No.3 and 4 in turn etc.

3. Launching

Where to line up
Based on meteorological factors and weight loadings the minimum launch distance is **200ft** to a maximum of **650ft**, for most operations **600-450ft** will be used. Deck marking will indicate the distance to the ramp. For operational launches with 4 aircraft, good airmanship is required to line up all aircraft given the restricted space at the stern of the ship where parking spots are situated. With heavy loading, Lead should line up at **450ft** to ramp.

Nozzle stops

In the real world the nozzle stop position for the launch would be calculated in the ready room prior to launch based on a maximum speed for the nose wheel reaching the ramp at **90-100KIAS**. On average these settings were **35^0 to 40^0** nozzle angles. The VREST calculations to set NRAS on the jet are not applicable here as the take-off speed is refenced at the ramp where the nozzles are rotated. Reaching the ramp **above** 100kts may result in nose wheel oleo damage. However, you may want to use the NRAS facility to warn you in the hud that you have reached the rotation speed that you can't exceed (Vne) and its time to back off the throttle! Ensure you set the nozzle STO stop leaver to the required nozzle angle.

Launching

To launch, set flaps to full, STO stop to desired nozzle angle, water to T/O (if required), Stab trim down **2^0** and holding the aircraft on the toe brakes, move the throttles to full power. When the aircraft starts to skid release the toe brakes and concentrate on keeping the aircraft straight to the ramp and the correct speed to reach the ramp at 90-100kts. When on the ramp move your nozzles to the STO stop. After leaving the ramp the aircraft will start climbing away and after the initial sink retract landing gear, and gradually reduce the nozzle angle to zero. When reaching **125 -150 KIAS,** flaps can be retracted to auto. If you were using water injection, switch it off as soon as possible as you only have 90 secs worth and you may need most of it for the landing.

Formations

For operational launches direct to Battle formation, lead and No.3 will turn right immediately after launch at **45^0** of the Designated Flying Course (DFC)* after 1 mile Lead/No. 3 return to the DFC which if No. 2 and 4 took off in sync with the lead and no.3 all aircraft should be saddled into Battle in readiness to take up the designated course.

**DFC is the term used in the RN and is the course the ship is heading to launch or recover aircraft (here is an example of the differing terms between the USA and UK deck ops procedures where the BRC is the termed used in the USA. You will be expected to refer to BRC if flying to the Tarawa or any of the American surface ships).*

4. Recovery

Procedures for recovery

As mentioned in the comms section above, the UK methods of carrier operations are far more reliant on the pilot's initiative, their skills at flying the SHAR and their extensive training and as such don't have the rigid inflexibility of the USMC NATOPS procedures. We will replicate this approach wherever possible.

Re-join

The in-game R/T does allow for calls to a ship which will supply a BRC and until there is anything different offered by DCS we are still required to use this. So once the US voiced first contact and BRC information is received, replace BRC with DFC from this point onwards when recovering to a UK ship. There is no need to initiate any calls to the ship again from this point until in the circuit to land. There are only two recovery states to consider, visual or instrument. There are no case 1, 2 or 3 recovery states.

The Hold

The regular Hold circuits were flown based on a 30^0 racetrack circuit to the stern of the ship. The Hold was flown at 2 minutes at 250kts indicated on a course of 30^0 followed by medium level turn left hand turn to a reciprocal 210^0 again flown at 2 minutes at 20 miles from the ship no matter what the heading of the ship was. Pilots were then given assigned time (Charlie) for their landing as the ship would turn into wind onto the DFC. In general, it would take 10 minutes from the Hold to reach their assigned Charlie time (Charlie time is both a US and UK term) The Hold is used at night or in poor IMC visibility. Because the ships in DCS do not turn into wind for the recovery all Holds will be flown using the DFC of the ship. Until the R/T improves with DCS and unless there is a Charlie time given using the US R/T procedure in game. Charlie times can be ignored for now.

RAFair Hold

To simulate the procedure described above the RAFair Hold will be as follows (see figure 1.): Using the known DFC and the ships TACAN set the course line on the MPCD to that of the DFC. Join the Hold on the course line at **20 miles DME to the stern** and at **250KIAS** at **2000ft RADALT**. Fly **10 miles** along the course line at **250KIAS** or **2 minutes** then turn medium rate turn (30^0) **180^0** to the left on a reciprocal heading of the course line/DFC for **10** miles or **2 minutes** and return back onto the course line. Formations are flown flat in the Hold because when multiple aircraft are in the Hold the separation to the next level of the Hold is only 1000ft. For accurate 30^0 turns use the Standby Attitude Indicator (SAI) until you have a mental image of what 30^0 looks like on your HUD velocity vector indicator. (see fig 2)

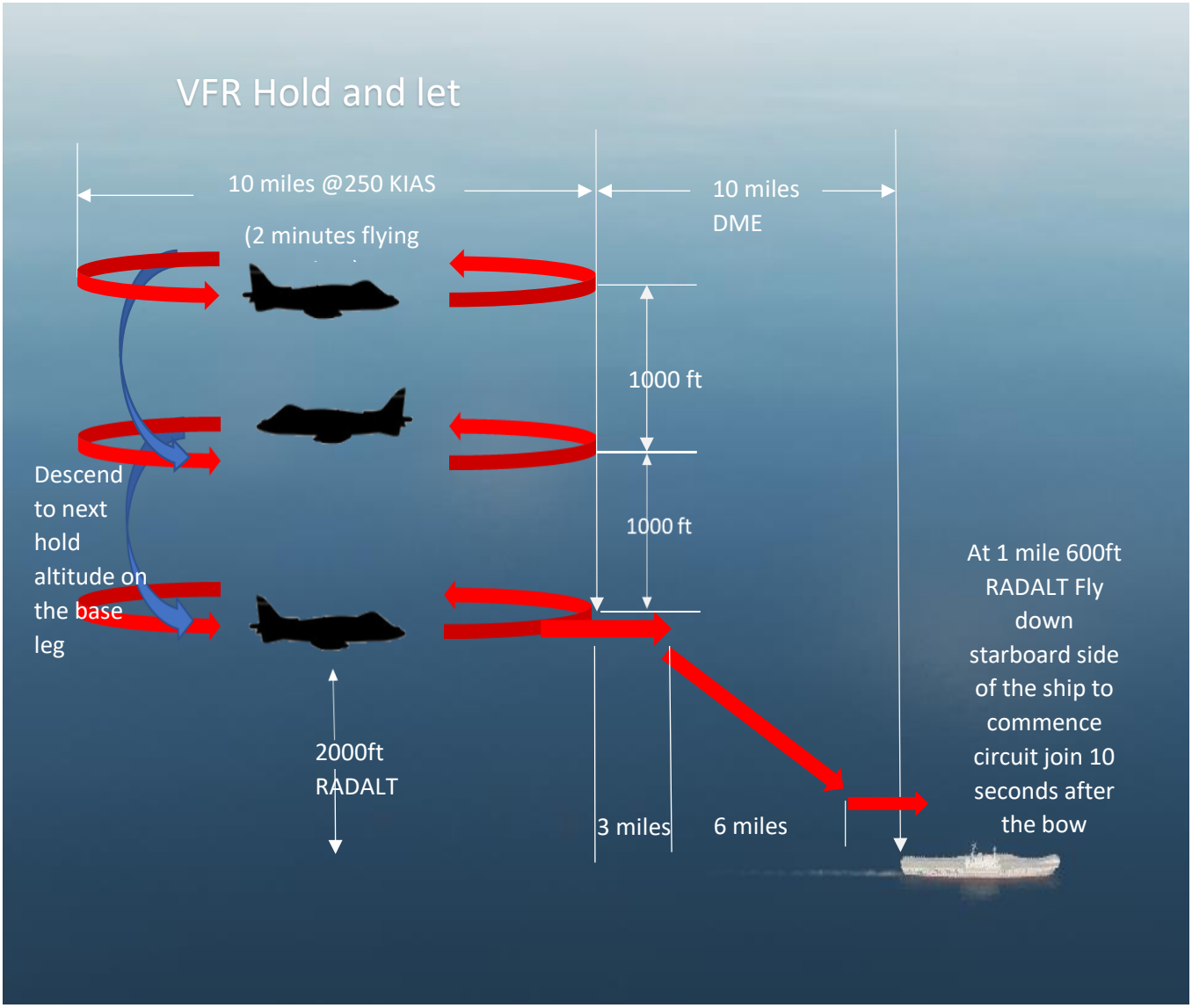
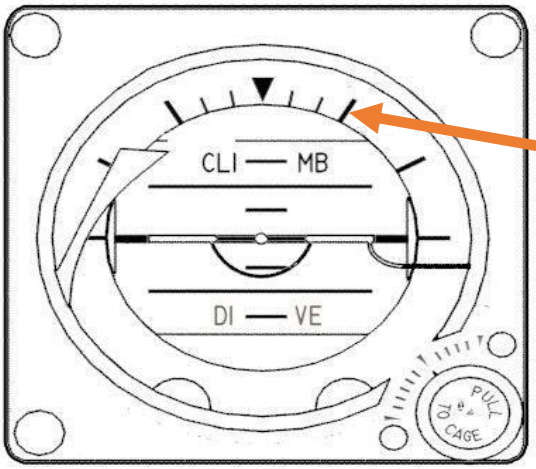


Figure 1. the RAF air Hold and let down procedure



Bank angle indicators 10^0, 20^0 30^0 of bank and then 60^0 and 90^0

Fig 2. The SAI (Standby Attitude Indicator)

Recovery in VFR *(see figure 3)*

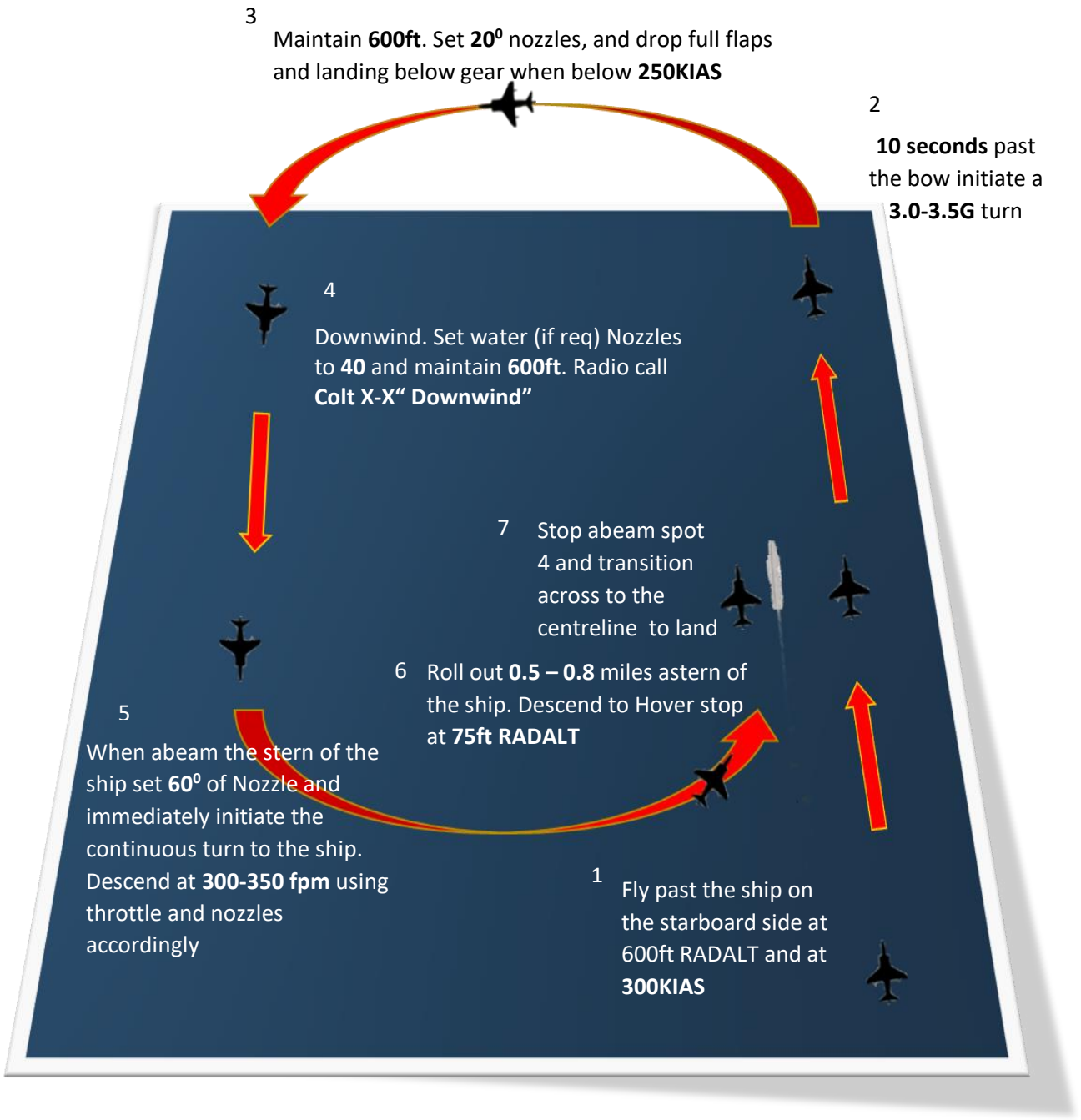
Fly a straight in approach using the ships TACAN and course line based on the DFC. Descend to **600ft RADALT** and set an indicated airspeed of **300KIAS**. Set Flaps to auto and STOL mode on the the HUD. Fly past the ship on the starboard side turning to break at **10 seconds** past the bow. If in formation, Lead turns at 10 seconds and all other aircraft in the formation will break **3 seconds** after each aircraft. (There is no need to call you are on the break).

Break into the circuit using a flat **3.0 – 3.5 G turn** to scrub off speed, maintain **600ft**. Set **20^0** nozzles, and drop full flaps and landing gear when below **250KIAS**. Roll out on the DFC reciprocal. Call '**Downwind'** when established **(not when abeam)** set **40^0** of Nozzle. When abeam the stern of the ship set **60^0** of Nozzle and immediately initiate the continuous turn to the ship. Set **85% RPM**, hold **12^0 of AOA** all the way round the turn whilst descending at **300-350 fpm** using throttle and nozzles accordingly. At the **90^0** point of the turn, altitude should be no lower than **300ft RADALT**. Roll out behind the ship at **.5 to .75 miles** from the ship at **150ft RADALT**. call '**Finals'**. Decel using nozzles to Hover stop at **75ft RADALT** alongside **spot 4** *(see fig 4.)* unless given an alternative landing spot. Commence transition over the deck to land on the centre line.

Missed approach

If a go around is necessary, and no other aircraft in the circuit, continue ahead and climb not above **600ft at 250KIAS**. At **3 miles DME** from the ship, turn left **180^0** to re-join the circuit and fly the reciprocal DFC course to re-join the downwind leg of the circuit. If there are aircraft already established in the circuit ahead of you, extend the climb out course to **5 miles** not above **600ft** prior to re-joining the circuit as described above (see figure 5.).

Figure 3. The Circuit Diagram



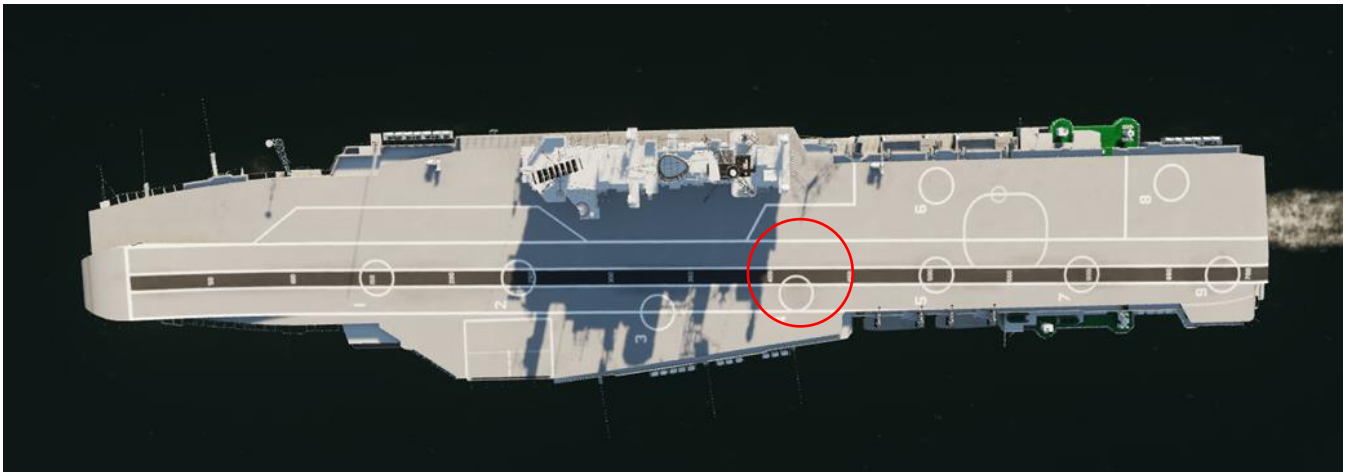


Figure 4. Location of Spot 4. HMS Hermes

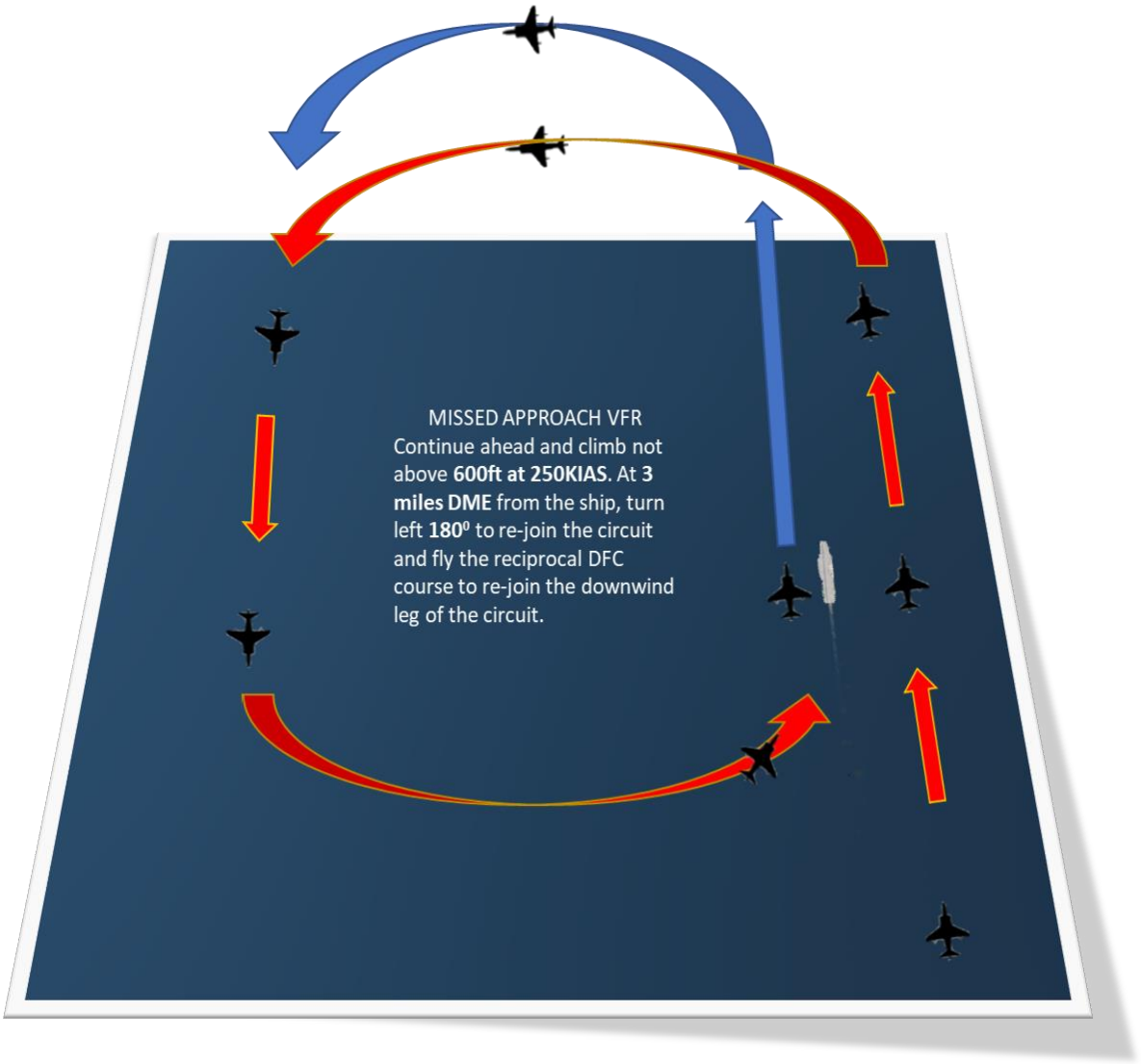


Figure 5. VFR Missed approach diagram

Night or IMC recovery

On a UK ship operating the SHAR the approach from a Hold at night would always be straight in via a Carrier Controlled Approach (CCA) assisted by the *MADGE system (if working!). Night visual circuits were **never** carried out as it was considered too hazardous and disorientating. The aircraft would be under the control of the ship's ATC Officer who would provide radar directions very similar to a Surveillance Radar Approach (SRA) ashore. He would provide headings and distance/height check calls on the way down based on a **-3⁰ approach** slope so 300' per 1nm.

**MADGE Microwave Aircraft Digital Guidance Equipment*

We don't have either a CCA, MADGE or an ATC controller so pilots will need to let down from the Hold using the **-3⁰** Glideslope rule as above. On leaving the Hold to land at **10miles DME**, maintain **250KIAS** at **2000f**t. at **6 miles DME** descend at -**3⁰** approach slope. at **1 mile DME**, lower flaps, landing gear and set **60⁰** maintaining **12⁰ AOA**. Decel to accommodate the hover stop at **75ft RADALT** at spot 4 using throttle and nozzles. (see figure 6.) Only one aircraft should be on the approach at any one time. When landing the landing pilot will call on the ships R/T frequency that the deck is clear, and the next aircraft will start their let down from the hold. Therefore, it is vital that, just as in the real world, Harrier pilots manage their fuel efficiently and should endeavour to join the hold with at least **2200lbs** of fuel.

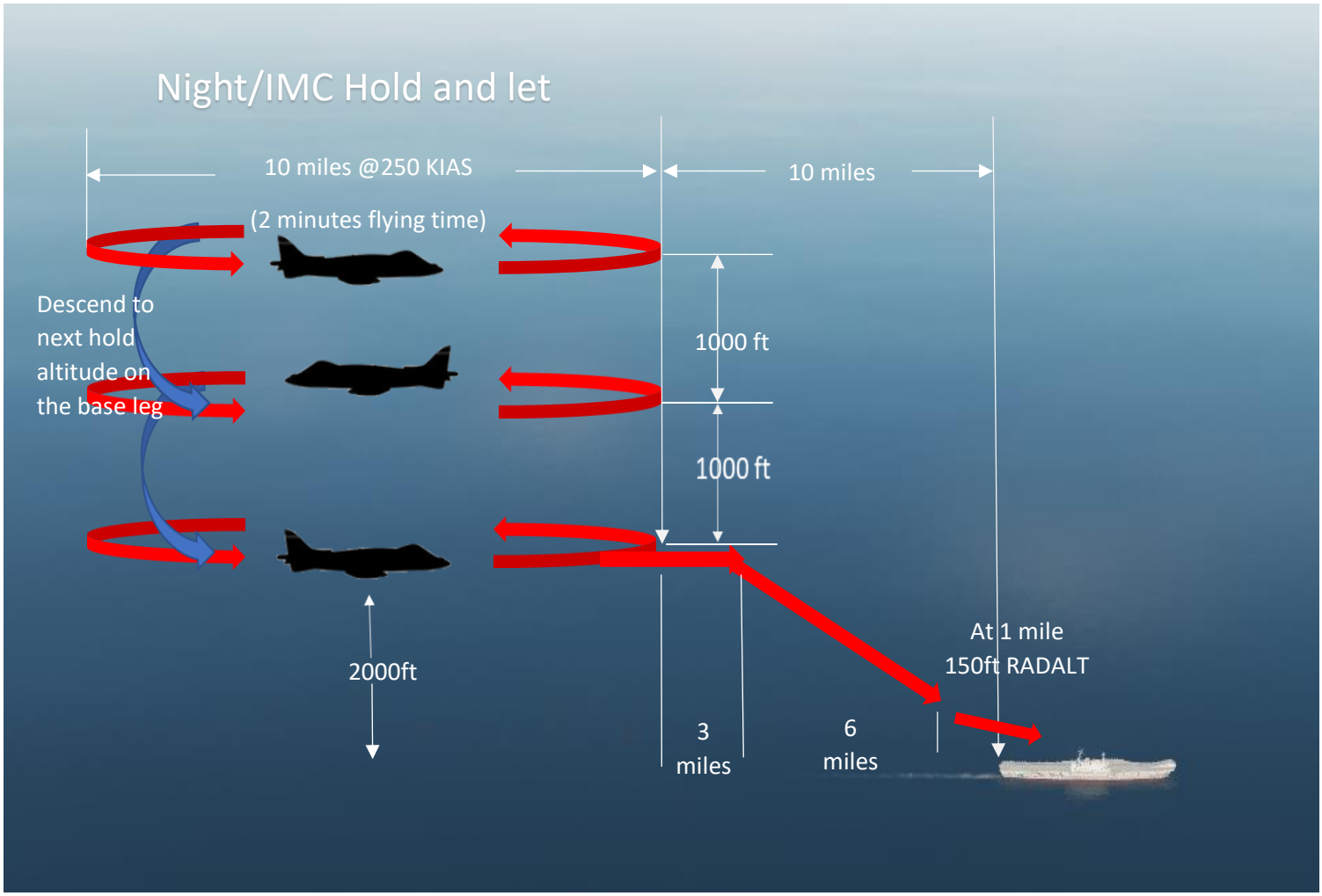
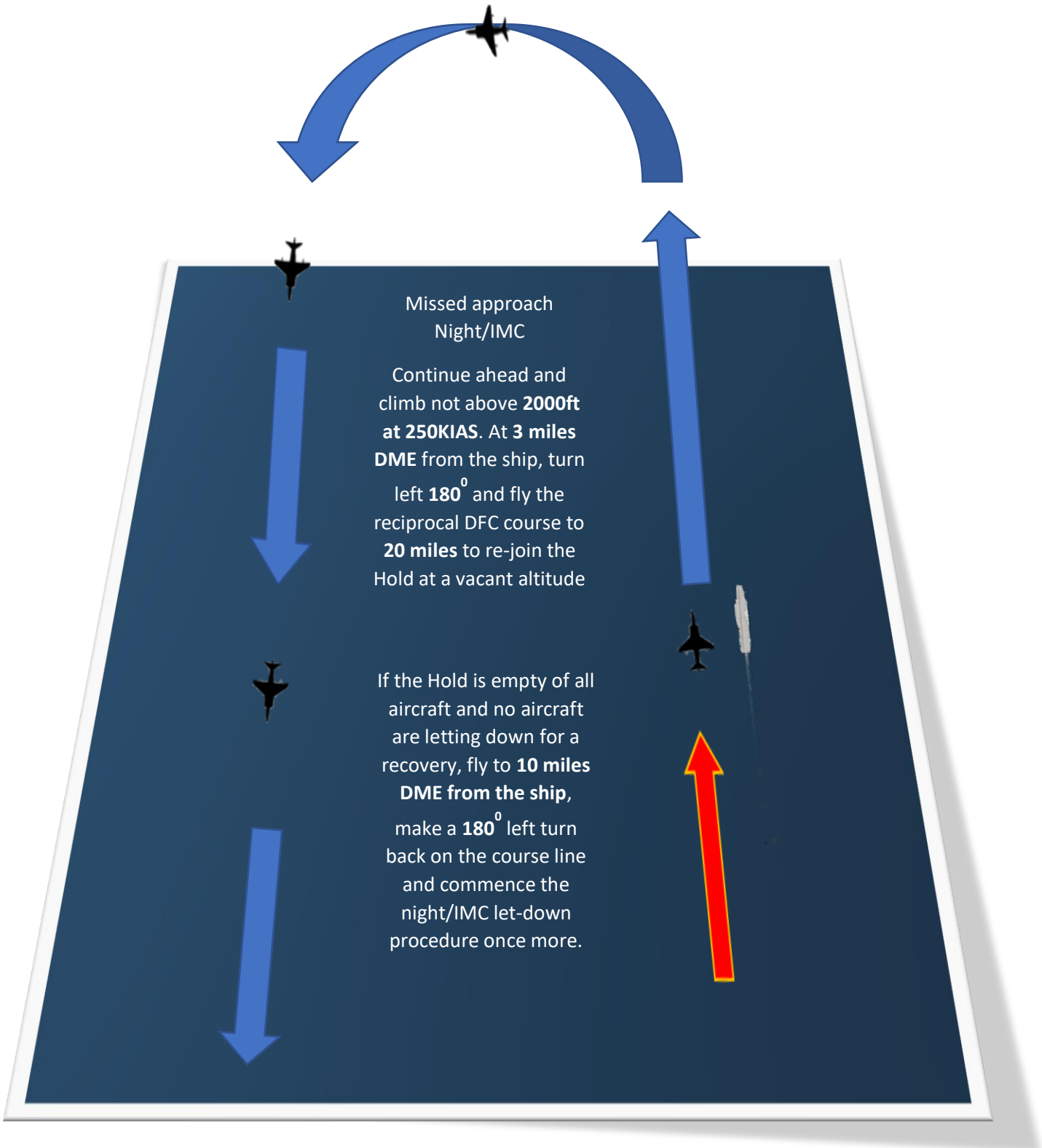


Figure 6. The night/IMC hold and let down procedure diagram

Missed approach at night/IMC

If a go around is necessary, continue ahead and climb not above **2000ft at 250KIAS**. At **3 miles DME** from the ship, turn left **180^0** and fly the reciprocal DFC course to **20 miles** to re-join the Hold. If there are aircraft at the lowest altitude of 2000 ft in the Hold, join the Hold at **3000ft** or at the next available 1000 feet interval if multiple aircraft are Holding. Once established in the Hold, let down to the level below when it becomes empty, let down from your level 1000 on the **base leg turn**. (see figure 7.)

If, on the return course to re-join the Hold from the missed approach and the Hold is empty of all aircraft and no aircraft are letting down for a recovery, fly to **10 miles DME**, make a **180^0** left turn back on the course line and commence the night/IMC let-down procedure once more.



5. Radio Procedures

Radio calls

Ensure that the ships radio frequency is selected. Broadcast all your positional R/T calls on this frequency. To give other pilots a situational awareness of the Hold, when joining report **your callsign and you are joining the Hold at XXXXft when you reach the Hold join position. (20 miles DME to the stern on the DFC course line)** R/T comms and brevity is key to making the hold a safe place so adhere to the R/T procedures.

R/T call examples for the Hold

When reaching the Hold join position call. If an aircraft or formation (pair max) is already in the Hold join at the next available altitude at 1000ft interval

Call - Colt 1-1 joining the Hold X000ft
Call - Colt flight – 2 (number of aircraft in the flight) joining the Hold X000ft

Aircraft leaving a Hold altitude for the next level down will descend on base leg of the racetrack to join the lower altitude Hold at the 20 mile DME

Call - Colt 1-1 descending to X000ft

If a pilot in a hold altitude hears another aircraft joining or letting down into the same hold altitude as they are at with the potential to cause conflict, an immediate call to that aircraft should be made.

Call - Colt 1-1 to Colt 1-2 Negative your join, altitude occupied.
Call - Colt 1-1 to Colt 1-2 Negative your decent, altitude occupied.

R/T call examples for the Landing

At 10 miles DME and the course line, commence the approach let down procedure. Be sure that there are no aircraft letting down to land in front of you before announcing on the ships radio frequency your callsign and your intention to let down. Remember, only one aircraft should be on the approach at night or during IMC landings.

Call - Colt 1-1 commencing let down

If you are not clear if anyone is ahead of you in the let-down you can question the frequency by asking. Although whilst in the Hold or approaching to join, maintain a careful listening watch on the Hold R/T traffic to maintain situational awareness. This call isn't a standard call so only use it if you need to.

Call - Colt 1-1 commencing let down. Any traffic on approach?

Any aircraft on the approach hearing this call is to reply.

Call - Colt 1-1 from Colt 1-2 Negative let down- Colt 1-2 on approach, X mile final.

No reply can assume the approach is clear but maintain a good look out in case of R/T difficulties with the aircraft in front.

When making a successful landing on the deck the pilot shall call the following

Call - Colt 1-1 wheels on, clear deck

If a missed approach is initiated.

Call – Colt 1-1 missed approach – going around

Keeping an awareness of where each aircraft is without seeing them will be the key to maintain separation so all pilots must keep a good listening watch during night-time/IMC recoveries. If you fail to make the correct calls at the correct position you reduce the information needed for other pilots to form their situational awareness and increase the risk of collision.