

Virtual Royal Air Force
Boeing Poseidon MRA.1
Operations Manual (Part D)

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Foreword

Welcome to 120 Squadron and the Boeing Poseidon MRA.1 Operational Conversion Unit (OCU) flight based at RAF Lossiemouth. The aim of this course is to train Poseidon pilots to vRAF standards.

The P-8 Poseidon, produced by Boeing and called “Poseidon MRA.1” by the UK is a Maritime Patrol Aircraft capable of performing Anti-Submarine warfare, Surface warfare, Reconnaissance and Search-And-Rescue taskings in one sortie. It carries a crew of 9 (Two Pilots and 7 Mission Specialists) and can remain on station for 4 hours whilst gathering data through an array of sensors onboard, before prosecuting a target using a range of weapons carried internally or externally on wing pylons.

It is highly recommended that the PMDG 737-800 model is used for Poseidon Operations in vRAF.

1 Introduction

1.1 Course Breakdown

Poseidon training is structured into several distinct phases:

- **Type Conversion Phase**
- **Advanced Phase**
- **Qualified Flight Instructor**

This course consists of a combination of instructional flights and solo practice flights that must be completed sequentially. After finishing all the flights, students will undergo a check ride to evaluate all the skills taught during the course.

The course structure outlined in this manual serves as a set of "best-practice" guidelines. However, the schedule may be adjusted due to weather conditions or other operational considerations. If a student demonstrates a solid understanding of a particular topic, they may be assessed immediately, without needing prior instruction. Any areas identified as needing improvement after instruction will be re-taught.

1.2 Solo Flying

This course contains several solo consolidation exercises that must be flown after each training sortie with a QFI. These should be flown in order and only complete the exercises the authorising QFI has directed. Students may fly the solo sorties as many times as they need to gain the required competency and to allow an effective debrief with a QFI in the next training session.

If any questions arise during a solo consolidation sortie the first point of contact will always be the authorising QFI, and in their absence the Sqn Cdr/Force Cdr/Gp Cdr as applicable.

Solo consolidation sorties must be flown before any further training sorties with a QFI are scheduled.

2 OCU Syllabus - Type Conversion

2.1 Course Prerequisites and Pre-Flight Checklist

As part of your application to the virtual Royal Air Force (vRAF), you must meet the following requirements:

- Basic Understanding of IFR and VFR Procedures: You should be familiar with the core principles of Instrument Flight Rules (IFR) and Visual Flight Rules (VFR).
- Minimum Flight Hours: A minimum of 25 logged flight hours on VATSIM is required. This ensures you have sufficient experience in live online flying and interaction with virtual air traffic control.

2.1.1 Pre-Flight Checklist

Before your first sortie, ensure the following systems and software are fully functional:

- Flight Control System: Check that your joystick, throttle, and any other hardware are correctly set up, including key bindings for the Poseidon aircraft.
- Simulator: Ensure your flight simulator is properly configured and functioning.
- VPilot: Verify your VATSIM client (VPilot) is operational.
- Discord: Ensure your Discord application is working for communication.
- ATAMS: Check that ATAMS flight tracking software is installed and functional.
- JoinFS: Check that JoinFS is working correctly for multiplayer sessions.

2.1.2 Required Reading

Before starting, you must have read and understood the following manual:

- vRAF Operations Manual (Part A): This manual contains essential information on the rules and procedures within the vRAF.

2.1.3 Recommended Reading

For a deeper understanding of military aviation procedures, it is highly recommended to familiarize yourself with the following documents:

- Military ATC Manual: Available on the VATUK website, this manual covers military air traffic control procedures.
- UK Military AIP (Aeronautical Information Publication): This document includes rules for supersonic flight and other military-specific regulations.
- vRAF and VATUK Letter of Agreement (LOA): Outlines agreements between vRAF and VATSIM UK regarding military operations.
- vRAF Pilot's Handbook: Contains important information for all airframes, such as Squawk codes, radar corridors, ICAO codes, and Areas of Responsibility for Airborne Refueling (AARAs).
- vRAF Quick Reference Handbook (QRH): Provides details on TACAN routes, weather procedures, radar corridors, frequencies, and other key operational information.
- VATSIM UK Military ATC Manual: Covers all aspects of military ATC service provision in the UK for VATSIM operations.

By ensuring these prerequisites and materials are reviewed, you will be well-prepared for successful participation in vRAF operations.

3 Type Conversion Phase

3.1 P8-TC1 - Aircraft Familiarisation and Normal Procedures

Code	P8-TC1	**Conditions**	Day VFR
Route	EGQS RV ILS EGQS		
Objectives			
• Introduction to **Poseidon** operations. • Ensure **safe aircraft handling**. • Practice safe **visual** and **instrument** circuit procedures.			
References			
Instructional Content			
• Aircraft start-up and taxi, ATC communications for airfield departure • Takeoff and departure • 'Standard Takeoff Procedure' • General handling (climbs, descents, turns) • ILS approach to go around • Visual circuits to touch-and-go and full-stop landings.			
Competency Check			
• Demonstrate **safe handling** of the aircraft.			
Notes			
Solo Clearance			
Area	As required to complete TC2-3		
Weather	Day IFR; Minimum cloud base 800 ft, Minimum visibility 1500 m		
LVO	Not authorised		

Oceanic	Not authorised

3.2 P8-TC2 - Circuit Consolidation (Solo)

Code	P8-TC2	**Conditions**	Day VFR, Maximum XW 15kts
Route	EGQS Visual Training Circuit		

Objectives

- Ensure **safe aircraft handling**.
- Consolidate **visual circuit procedures and flying**.

References

- Military ATC Guide *(pages 31+ for visual circuits)*

Sortie Profile

- Practice **visual circuits**, including both **Low Approaches** and **Touch and Go's**.

Notes

- Don't hesitate to **go around** if necessary; there's no need to force a bad approach into a poor landing.
- Conduct as many circuits as needed until you feel **comfortable and confident** with the procedures.

Requirements for satisfactory completion

Complete a minimum of:

- **4 Touch and Go's**,
- **2 Low Approaches**,

Maintain the **correct ground track** in the proper circuit direction for the active runway. Ensure all approaches are **stable**, with touchdowns made at an **acceptable rate**.

3.3 P8-TC3 - Instrument Approach Consolidation (Solo)

Code	P8-TC3	**Conditions**	Day/Night IFR; Minimum cloud base 800 ft, Minimum visibility 1500 m; Maximum XW 15kts
Route	EGQS Radar Training Circuit		

Objectives

- Ensure **safe instrument flying** within acceptable tolerances (±100 ft, ±5 degrees, ±½ scale deflection).
- Conduct **instrument approaches**.

References

Sortie Profile

- Practice instrument approaches
- Practice **full procedure** and **self positioned** ILS approaches,
- Practice **Low Approaches** and **Touch and Go's**.

Notes

- Don't hesitate to **go around** if necessary; there's no need to force a bad approach into a poor landing.
- Conduct as many approaches as needed until you feel **comfortable and confident** with the procedures.

Requirements for satisfactory completion

- Successfully complete an **full procedure ILS approach with a Missed Approach**.
- Successfully complete a **self-positioned ILS approach with a Missed Approach**.
- Consolidate **Low Approaches** and **Touch and Go's**.

3.4 P8-TC4 - Adverse Weather and Manoeuvres

Code	P8-TC4	**Conditions**	Strong winds with crosswind components
Route	EGQS/EGPK RTC		

Objectives

- Introduce operation in **high/gusty** winds
- Establish a **crosswind limit** for the student when operating solo
- Ensure student is prepared for the next stage of solo sorties.

References

Instructional Content

- Crosswind takeoff and landing technique
- Flap 15 and 25 takeoffs
- Stalling
- UPRT
- Engine spool-up time
- Ground Proximity Warning System (GPWS)
- TCAS
- Windshear

Competency Check

- Identification of an aircraft upset
- Application of correct upset recovery technique
- Correct response to GPWS
- Correct response to TCAS RA

Notes

- Crosswind limitations
    - Takeoff/Landing - 33kts including gusts (dry runway)
- Discuss effect of increased flap on rotation
- UPRT - “Upset Prevention and Recovery Training”
    - **U**pset - Stall or Attitude?

    - **P**itch - smoothly recover pitch to normal attitude
    - **R**oll - in the shortest way to wings level
    - **T**hrust - apply as necessary and smoothly recover the flight path
- Focus on smooth recovery technique - don't overstress the airframe to avoid an overspeed scenario
- GPWS Warning:
    - 'TERRAIN TERRAIN PULL UP' or 'SINK RATE PULL UP':
        - Disconnect A/T
        - Press TO/GA and aggressively advance thrust levers to fwd stop
        - Disconnect A/P and pitch to 20* nose-up
        - Retract speedbrake
        - Monitor terrain closure rate
        - Recover flight path and rebuild automation after terrain clearance assured
- GPWS Caution:
    - E.g. 'BANK ANGLE'/'GLIDESLOPE'/'CAUTION TERRAIN'/'SINK RATE'
        - Correct flight path and monitor terrain closure rate
- TCAS TA:
    - Monitor traffic and be prepared to alter flight path
- TCAS RA:
    - Disconnect A/T and A/P and call "C/S TCAS RA" - **ignore any further ATC instructions.**
    - Smoothly alter thrust and flight path to comply with TCAS commands on the PFD
    - PFD crosshair must remain outside of red trapezoid (and solid red bar on V/S tape, if fitted) until 'CLEAR OF CONFLICT' is heard
    - Ignore Flight Director commands
    - When clear of conflict, rebuild automation in stages with the MCP and teturn to last assigned flight level and call "C/S clear of conflict returning to FL___" OR " C/S clear of conflict FL___ resumed."
- Windshear Escape:
    - '(TWO-TONE) WINDSHEAR, WINDSHEAR':
        - Press TO/GA and aggressively advance thrust levers to fwd stop
        - Disconnect A/T followed by A/P and pitch to 15* nose-up
        - Retract speedbrake
        - Monitor IAS and VS

- Recover flight path and rebuild automation after signs of windshear cease
  -

Solo Clearance	
Area	As required to complete TC5
Weather	Day IFR; Minimum cloud base 800 ft, Minimum visibility 1500 m
LVO	Not authorised - approaches to CAT I minima only
Oceanic	Not authorised

3.5 P8-TC5 - Navigation, Route Flying and Flight Planning (Solo)

Code	P8-TC5	**Conditions**	Day/Night IFR; Minimum cloud base 800 ft, Minimum visibility 1500 m
Route	EGQS RIMOL N560 GOW PIK EGPK DCS RC EGNT ALASO P18 ADN EGQS		

Objectives

- Introduction to **route flying** in the Poseidon.
- Consolidate **radar corridors**.
- Practice flying **non-precision approaches**.

References

- Military ATC Guide
- vRAF Pilot Handbook *(page 4 for radar corridors)*

Sortie Profile

- Aircraft start-up and taxi, ATC communications for airfield departure
- Execute a **Military Instrument Departure (MID)**
- **Fuel planning** considerations.
- Transit the **UK radar corridors**.
- Fly an **VOR Approach** at EGPK
- Fly an **RNP approach** at EGNT

Notes

- It is recommended to use Point, distance, bearing points to enter the corridor entry and exit points in the FMC (e.g. DCS097/27 for the DCS RC)

Requirements for satisfactory completion

- Successfully fly a **MID**.
- Successfully transit the **Dean Cross** radar corridor.
- Successfully fly a VOR Approach at **Prestwick (EGPK)**
- Successfully fly an RNP approach at **Newcastle (EGNT)**.
- Successfully recover to **Lossiemouth (EGQS)**.
- Ensure adequate fuel planning.

3.6 P8-TC6 - UK Landaway and Approaches to CAT I Minima

Code	P8-TC6	**Conditions**	Day/Night IFR
Route	EGQS *(QFI planned route)* EGAA		

Objectives

- Successfully execute a **cross-country flight** utilising the UK airways structure.
- Fly an ILS Approach to CAT I minima
- Ensure sufficient fuel planning and adequate alternate planning.

References

- vRAF OM-A Section 5.4 - Fuel Planning
- vRAF OM-A Section 5.6.2 - Approach Operations

Instructional Content

- **Fuel planning** considerations.
- **Alternate** planning considerations.
- Optimum and Maximum Cruise levels (FMS)
- Coffin Corner
- IAS/Mach relationship
- ATC communications.
- Arrival procedures for an **unfamiliar airfield**.

Competency Check

- Fly an appropriate **MID/SID**.
- Navigate the **UK airways structure**
- Execute a **Standard Arrival Route (STAR)** and select an **appropriate instrument approach** to land at Aldergrove (EGAA).
- Demonstrate an understanding of the Meteorological Minima section of OMA.
- Demonstrate an understanding of **safe fuel planning**.

Notes

- Use of flight planning software such as Simbrief is strongly recommended.
- UK differences to ICAO cruising levels (generally north-even, south-odd)
- Thorough understanding of the Meteorological Minima section of OMA is essential.

• Ensure the student is competent to fly the next 3 sorties solo.	
Solo Clearance	
Area	As required to complete TC2-4
Weather	Day IFR; Minimum cloud base 800 ft, Minimum visibility 1500 m
LVO	Not authorised
Oceanic	Not authorised

3.7 P8-TC7 - RTB from UK Landaway (Solo)

Code	P8-TC7	**Conditions**	Day/Night IFR; CAT I
Route	EGAA (student planned route) EGQS		
Objectives			
• Successfully execute a **cross-country flight** back to base utilising the UK airways structure. • Ensure sufficient fuel planning and adequate alternate planning.			
References			
Sortie Profile			
• Fly an appropriate route. • Fly an appropriate arrival and approach.			
Notes			
Requirements for satisfactory completion			
• Successfully transit the **UK airways structure**. • Successfully fly a **full procedure ILS approach**. • Successfully recover to **Lossiemouth (EGQS)**. • Ensure adequate fuel planning.			

3.8 P8-TC8 - European Landaway (Solo)

Code	P8-TC8	**Conditions**	Day/Night IFR; CAT I
Route	EGQS (student planned route) ENBR		
Objectives			
• Successfully execute an **international flight** to Bergen (ENBR) • Ensure sufficient fuel planning and adequate alternate planning.			
References			
Sortie Profile			
• Fly a MID. • Fly an appropriate route. • Fly an appropriate arrival and approach.			
Notes			
Requirements for satisfactory completion			
• Successfully fly a **MID**. • Successfully fly an appropriate arrival and approach. • Successfully land **at Bergen (ENBR)**. • Ensure adequate fuel planning.			

3.9 P8-TC9 - RTB from European Landaway (Solo)

Code	P8-TC9	**Conditions**	Day/Night IFR; CAT I
Route	ENBR (student planned route) EGQS		
Objectives			
• Successfully execute an **international flight** back to base. • Ensure sufficient fuel planning and adequate alternate planning.			
References			
Sortie Profile			
• Fly a SID. • Fly an appropriate route. • Fly an appropriate arrival and approach.			
Notes			
Requirements for satisfactory completion			
• Successfully fly a **SID**. • Successfully fly an **appropriate** approach. • Successfully recover to **Lossiemouth (EGQS)**. • Ensure adequate fuel planning.			

3.10 Competency Assessment

3.10.1 P8-TCX - Type Conversion Phase Check Flight

Code	P8-TCX	**Conditions**	Strong winds with crosswind components
Route	*As planned by student based on examiner brief*		
Objectives			
• Assess the student's competency in Poseidon operations to vRAF standards			
Mandatory Check Items			
• Use of checklists • Takeoff performance • Aircraft startup • Taxi technique • Takeoff technique • Landing Performance • Landing technique • Go-around • Flight Planning • ATC Communications • Precision approach • Non-precision approach			
Optional Check Items			
• PAR/SRA Approach • TCAS • GPWS • Windshear Escape • Visual approach			
Notes			
• Example instructor briefs are available in the Poseidon Google drive folder. • This sortie is generally non-instructional but the aim is that competency is achieved by the end of the sortie.			

- The QFI will provide a mission brief to the student who should then plan and execute a flight to achieve it
- There are 2 possible results of the check flight:
    - Ready to progress to AP
    - Requires further training prior to AP
- The student should be thoroughly debriefed and notified of the outcome.
- OC 120 Sqn should be informed of the result as soon as practicable

Solo Clearance	
Area	Europe and overflight of Turkish airspace
Weather	VMC/IMC
LVO	Not authorised - approaches to CAT I minima only
Oceanic	Not authorised

4 Advanced Phase

The next stage of training is designed to prepare the student for strategic operations with vRAF and expand their area of operations outside of Europe. The phase is modular and therefore sorties may be completed in any order. Students may request certain training to be completed first, but the attending QFI will decide whether this is appropriate.

As the sorties in the Advanced Phase may be completed in any order, so solo clearances will differ between students. QFIs must ensure that students understand which types of operations they are approved for - simply, if they have not completed training for a specific type of operation then they are not approved to perform it solo.

4.1 Course Reading and Self Study

Students should be familiar with all items from the type conversion phase and should have consolidated this training with solo flying around Europe. They should remain familiar with the reference materials used in the type conversion phase.

Additionally, students should have read and understood the following manuals:

- vRAF Oceanic/ETOPS Guide

4.2 Instructional Sorties

4.2.1 P8-AP1 - ETOPS and Oceanic Flying

Code	P8-AP1	**Conditions**	Theoretical lesson

Objectives

- Teach standardised vRAF procedures for oceanic and ETOPS flights and to emphasise the planning requirements and special nature of ETOPS operations.
- Successfully plan and execute an ETOPS flight which passes through oceanic airspace. Teach oceanic communications procedures
- Teach oceanic contingencies procedures
- Familiarisation with operations to Keflavik (BIKF)

References

- vRAF Operations Manual (Part A)
- vRAF ETOPS/Oceanic Manual

Instructional Content

- Oceanic airspace structure, FIRs and agencies
- Procedural control
- Definitions of ETOPS, ERA etc
- Preferred ETOPS ERAs (Airfield approvals)
- Weather minima for suitable ETOPS ERAs
- Flight planning methods
- ETOPS routes, area of operation and equi-time points
- Maximum approved diversion times and distances
- Critical fuel
- Interpretation of Enroute weather charts
- Use of FMC
- Communications procedures
- OCX and WP reports
- Weather/systems
- NAT HLA contingency procedures (dependent on Oceanic Facility)

Competency Check

Notes

• Use the procedures in the vRAF Oceanic/ETOPS guide to supplement normal procedures.
• Keflavik is common destination for the Poseidon - main issues:
  ○ Egilsstadir (BIEG) is the alternate, however it is often unavailable for use due to weather;
  ○ RAF Lossiemouth (EGQS) may be the closest alternate when BIEG is out of limits - alternate fuel will be higher than usual
  ○ Consider operating into BIKF with no destination alternate - weather minima and fuel planning requirements (additional fuel) from OM-A must be respected
  ○ Weather phenomena at Keflavik, low cloud base and high winds

Solo Clearance	
Area	International
Weather	VMC/IMC
LVO	Authorised if **P8-AP2** complete
Oceanic	Authorised

4.2.2 P8-AP2 - Low Visibility Operations (LVO)

Code	P8-AP2	**Conditions**	LVO (*manual weather may be required)*
Route	As required for required weather minima and airfield equipment		

Objectives

- Complete approaches and landings to CAT II and IIIA
- Complete low-visibility take-offs

References

- vRAF Operations Manual (Part A)

Instructional Content

- Takeoff and landing minima
- vRAF airfield approvals
- Autoland AFDS modes
- Low visibility takeoff
- CAT II approach
- CAT IIIA approach
- ILS failure/deviation
- Autopilot failure

Competency Check

- AFDS modes and reversions
- Low level go-around in IMC

Notes

- Thorough understanding of the LVO section in OMA is essential
- Takeoff and landing minima published on charts
- Aerodrome equipment requirements
- Runway and aerodrome lighting
    - Taxiways (green/yellow-green)
    - Centreline lights on runway (red/red-white/white)

• The Boeing 737/P8 has a Fail Passive autoland system, meaning a failure of a critical system will render the autoland system inoperate and require manual input to either continue the approach, if safe, or go-around

Solo Clearance	
Area	International
Weather	VMC/IMC
LVO	Authorised
Oceanic	Authorised if **P8-AP1** complete.

4.2.3 P8-AP3 - Low-Level Operations (LLO)

Code	P8-AP3	**Conditions**	Day VMC
Objectives			
• Introduce Low-level operations in the maritime environment. • Successfully plan and execute a Low-level flight which passes through Maritime Danger Area • Discuss Hazards in the Low-level environment • Route - EGQS D809 Complex EGQS			
References			
• vRAF Operations Manual (Part A)			
Instructional Content			
• Low-level Handling • Hazards during Low-level operations • Energy Management • Low-level upset recovery • Nuisance GPWS alerts • Weather minima for suitable Low-level operations • Low-level holding • Flight planning methods • UK Danger Area Complexes			
Competency Check			
Notes			
• Pilots may elect to switch ‘GPWS FLAP’, ‘GPWS GEAR’ and ‘GPWS TERR’ from NORM to INHIBIT when conducting low-level operations			
Solo Clearance			
Area	International		

Weather	VMC/IMC
LVO	Authorised if **P8-AP2** complete
Oceanic	Authorised

5 Qualified Flying Instructors (QFIs)

5.1 P8-QF1 - Initial Evaluation

Code	P8-QF1	**Conditions**	No specific conditions
Route	EGQS CCT *(or as required for evaluation)*		
Objectives			
• Assess the applicant's knowledge and skillset and his suitability to instruct on the aircraft • If the applicant has not previously held a QFI qualification for vRAF, then this sortie shall serve to examine their existing instructional skills also • Establish a baseline from which further training to achieve QFI proficiency can be affected			
Instructional Content			
• Visual circuit to the QFI as if he were a new student to Poseidon • Assessment of existing instructional skills • Visual circuit • Use of QFI Portal • Use of ATAMS data as a debriefing tool			
Competency Check			
• As per instructional content			
Notes			

• The assessor will be a QFI authorised by 120 Sqn to assess potential new QFIs
• There are 3 possible results of this sortie:
  ○ Candidate is assessed as competent as a Posiedon QFI and qualification issued. *(Only possible for existing vRAF QFIs with extensive instructional experience and excellent aircraft specific knowledge, sortie should be filed as 'QFX').*
  ○ Candidate is suitable to continue training to become a Posiedon QFI.
  ○ Candidate is not yet suitable to become a Poseidon QFI.			

- If a candidate is assessed as ‘not yet suitable’ then a full debrief and explanation should be given to highlight areas that require development. This could include;
    - Building experience
    - Continuation training flights
    - Non-technical skills