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VATSIM UK
Military ATC Manual

06 Jul. 16

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Distribution and Scope

This manual outlines the recommended operational procedures for controllers within the VATSIM UK Division for Military Aerodromes.

Further information on Military ATC procedures can be obtained from the Manual of Military Air Traffic Management (MMATM).

Phraseology examples can be obtained from the CAA Radiotelephony Publication CAP 413.

Guidance on the provision of Flight Information Services should be obtained from the CAA UK Flight Information Services publication CAP 774.

Exclusion of Liability

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Amendment Record

Amendment Number	Amendment Date	Incorporated by
Revision 1	16 Sep 2015	
Revision 2	06 July 2016	

General Information

All VATSIM UK Controllers wishing to control provide Military control at RAF/MOD Airfields within the United Kingdom or at RAF/MOD installations overseas must first have completed the relevant VATSIM UK Military training and hold a validation on that unit type (i.e. Military Tower validation to Control Valley Tower Solo etc.).

The following are the minimum ratings required to begin training on the unit type.

Position	Rating Required
Ground/Tower	S2 Civilian Rating
Radar/Approach/Director	S3 Civilian Rating
Area Control	C1 Civilian Rating
Talkdown (PAR)	Special Endorsement

Training for the above will be carried out in accordance with the VATSIM UK Military Training Syllabus with validations/endorsements issued by the VATSIM UK ATC Training Department on completion of the training.

CONTENTS

GLOSSARY OF ABBREVIATIONS

A

A/C	Aircraft
A/PFL	Actual/Practice Forced Landing
AARA	Air-to-Air Refuelling Areas
ADC	Aerodrome Control
AIAA	Areas of Intense Air Activity
ATA	Aerial Tactics Area
ATCC	Air Traffic Control Centre
ATCRU	Air Traffic Control Radar Unit
ATIS	Automatic Terminal Information Service
ATS	Air Traffic Service
ATZ	Aerodrome Traffic Zone

C

C/S	Callsign
CAS	Controlled Airspace
CDR	Conditional Route
CMATZ	Combined MATZ

D

DF	Direction Finding

E

EAMTA	East Anglian Military Training Area

F

FL	Flight Level
Ft	Feet

G

GAT	General Air Traffic
GCA	Ground Controlled Approach (PAR)
GMC	Ground Movement Control
GP	Glidepath

I

IFR	Instrument Flight Rules
IP	Initial Point

K

Kg	Kilograms
Kt	Knots

L

LARS	Lower Airspace Radar Service
LVP	Low Visibility Procedures

M

MACF	Missed Approach & Communications Failure
MARSA	Military Accepts Responsibility for Separation of Aircraft

MATZ Military Aerodrome Traffic Zone
MDA Managed Danger Area
MDH Minimum Descent Height
Mins Minutes
MTA Military Training Area
MSFL Minimum Safe Flight Level

N

NM Nautical Mile
NWMTA North Wales Military Training Area

O

OAT Operational Air Traffic

P

PAPI Precision Approach Path Indicator
PAR Precision Approach Radar
PD Practice Diversion
PFL Practice Forced Landing
POB Persons on Board
PSR Primary Surveillance Radar

Q

QDM Magnetic Heading (zero-wind)

R

RA/PFL Radar Actual/Practice Forced Landing
R/T Radiotelephony
RCR Runway Condition Reading
RAF Royal Air Force
RN Royal Navy
Rpm Revolutions per minute
RPS Regional Pressure Setting
RTB Return to Base
RVC Radar Vector Chart
RVR Runway Visual Range
RVS Reduced Vertical Separation
RVSM Reduced Vertical Separation Minimum

S

SRA Surveillance Radar Approach
SSR Secondary Surveillance Radar

T

TRA Temporary Reserved Area

V

VFR Visual Flight Rules
VHF Very High Frequency

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SECTION 1 GENERAL PROCEDURES

Chapter 1 Altimeter Setting Procedures

1.1.1 Altimeter Settings

Aircraft operating at or below the transition altitude will use either:

a. Regional Pressure Setting (RPS) when outside the immediate area of an aerodrome, or

b. QFE (for the runway in use), including aircraft conducting instrument approaches

Aerodrome QNH is normally only used:

1) For calculating the Transition Level

2) For calculating Minimum Safe Flight Levels (MSFLs)

3) As a landing datum for some foreign and civil aircraft

4) On request

Brize Norton and Northolt are an exception to this rule; all Brize Norton and Northolt procedures, including visual circuits, are flown with reference to the Aerodrome QNH.

1.1.1.1 Approach and Landing

On leaving a FL, the pilot will be instructed to change to QFE. Any heights passed by the radar controller will be related to the QFE datum. A reminder of the QFE setting will be included in the RT phraseology. To ensure the greatest possible degree of safety and uniformity, all pilots, military and civil, will normally be expected to operate on QFE when operating within British military aerodrome ATC patterns, Northolt and Brize excepted. A pilot-request to use the QNH will be considered subject to the controller workload and traffic conditions. If the use of QNH is agreed, heights will be amended as necessary and “Altitude” will be substituted for “Height” in the RT phraseology.

1.1.1.2 USAF Aerodromes

At USAF operated aerodromes in the United Kingdom, QFE is not used. All procedures below the Transition Altitude are based on the aerodrome QNH, and all vertical displacements given as altitudes. Aerodrome QFE will be available on request.

1.1.1.3 Outside Controlled Airspace

At or below 3000ft AMSL, pilots should use the regional pressure setting. However, when flying in airspace below TCAs or CTAs, pilots should use the QNH of the adjacent aerodrome when flying below the Transition Altitude.

1.1.2 MATZ Transit Aircraft

To enable vertical separation to be applied, all aircraft will be given an altimeter setting to use within the MATZ. Normally this will be the aerodrome QFE, with the exception of the following:

(a) Within the Odiham MATZ the transit pressure setting will be the Farnborough QNH.
(b) Within the Warton MATZ the setting will be the Warton QNH.
(c) Within the Lakenheath/Mildenhall MATZ the setting will be the Lakenheath QNH.
(d) In the case of overlapping MATZs, the altimeter setting to be used will be the QFE of the higher or highest aerodrome of the CMATZ. This will be passed as the 'Clutch QFE'.

Chapter 2 General ATC and Pilot Information

1.2.1 General and Operational Air Traffic

There are differences between the ATS rules and procedures applicable to Operational Air Traffic (OAT) and those applicable to General Air Traffic (GAT). However, in principle, a flight may be conducted as OAT or GAT irrespective of whether the aircraft operating authority is civil or military.

The decision to fly as OAT or GAT is to be made by the pilot according to the availability of ATS to OAT and GAT and the nature of the flight. A military pilot crossing CAS in the FIR usually proceeds as OAT. Conversely, a military pilot wishing to make use of the civil CAS route structure and services should proceed as GAT.

Access to CAS by pilots of aircraft operating as OAT is permissible provided that the pilot conforms with the associated regulations and procedures concerning ATC clearance and air traffic.

Pilots of military aircraft operating within CAS as GAT are to conduct their flights in accordance with the ATC rules applicable to the airspace. The differences between the rules applying to civil GAT and those applying to military GAT are as follows:

a. Military pilots are not subject to the speed limit of 250 knots specified for civil flights below FL100

1.2.2 UK Military Aircraft Categories

All British Military aircraft are categorised according to their approach speed. These approach speeds are as follows:

A. Speed Less than 91 Knots
B. Speed 91-120Knots
C. Speed 121-140 Knots
D. Speed 141-165 Knots
E. Speed over 165 Knots

Aircraft captains have discretion to move the aircraft into a higher or lower category when circumstances dictate a significantly higher or lower approach speed than normal. The table on the following page gives the standard categories for common UK Military Aircraft Types.

Aircraft Type	Aircraft Category
Lynx (All variants)	A
Chinook (All variants)	A
Puma (All variants)	A
Sea King (All variants)	A
BN Islander (All variants)	B
Tucano	B
BAe 146	C
BAe Hawk	C
C-130 Hercules (All variants)	C
Airbus Atlas	C
Tornado GR4 (25 Wing Sweep)	D
Eurofighter Typhoon	D
Boeing C-17	D
Airbus Voyager	D
Boeing E-3 Sentry	D

1.2.3 Fighter Control

Currently VATSIM UK has no provisions to provide this. However, we have a Letter of Agreement with vRAF that sets out the procedures for this service.

1.2.4 AWACS (Airborne Warning and Control System)

Currently VATSIM UK has no provisions to provide this. However, we have a Letter of Agreement with vRAF that sets out the procedures for this service.

1.2.5 Range Control

Currently VATSIM UK has no provisions to provide this. However, we have a Letter of Agreement with vRAF that sets out the procedures for this service.

1.2.6 Rate of Climb and Descent (ROCD) Restrictions in Controlled Airspace (CAS)

1.2.6.1 Restrictions and Exceptions

All aircraft in UK Controlled Airspace within the London and Scottish FIR/UIR, other than those in an emergency and certain conditions specified for military aircraft as detailed below, operating under normal circumstances, should not operate with a climb or descent rate exceeding 8000fpm. The conditions under which higher ROCD, exceeding the 8000fpm restriction may be used when operating inside CAS are set out below:

- Aircraft in emergency
- An air defence priority flight where a high rate of climb is essential to the successful outcome of the mission
- Aircraft in receipt of avoiding action instructions to resolve an impending loss of standard separation or to avert a potential collision
- Aircraft participating in exercise activity notified/co-ordinated via an ACN

The ROCD restriction does not apply to aircraft operating in Class F & G airspace, active TRAs, MTAs, MDAs or Danger Areas.

1.2.6.2 Trigger Phrases – Transiting CAS

Pilots Discretion. When instructing a pilot to climb/descend at his own discretion but releasing him from the ROCD restriction the controller will use the following:

"Callsign climb/descend FLxxx no restriction (report level)"

Controllers instruction to Climb/Descend at best rate. The term 'expedite' expresses 2 distinct ROCD dependant on whether the aircraft is operating in or outside CAS. Whilst operating in CAS it instructs the pilot to climb/descend at his best rate but not exceeding 8000fpm. Therefore, the following phrases will be used as appropriate:

a) The phraseology to be used to instruct pilots to climb/descend at best rate but **not** exceeding 8000fpm is:

"Callsign climb/descend FLxxx expedite (report level)"

b) The phraseology to be used to instruct pilots to manoeuvre at best rate within CAS and without any restriction on his ROCD is:

"Callsign climb/descend FLxxx expedite – no restriction (report level)"

1.2.6.3 Trigger Phrase – Manoeuvring Flights.

The phraseology for controllers to inform pilots that they can manoeuvre vertically at rates in excess of 8000fpm is as follows:

By ATC controllers:

"Callsign(s), manoeuvre as required FLxxx-FLxxx no restriction report one minute to completion"

By ASACS controllers:

"Callsign(s), you are clear to operate (area), from FLxxx to FLxxx, no restriction".

1.2.6.4 Re-imposing ROCD restrictions.

If a controller needs to re-impose the ROCD restrictions for any reason, they will transmit the following instruction:

"Callsign, climb/descend restricted at 8000 feet per minute – acknowledge"

1.2.7 Conduct of Supersonic Flights within the United Kingdom FIR/UIR

In the United Kingdom FIR/UIR, all medium and high level supersonic flights are to be made over the sea. Aircraft heading directly out to sea may accelerate to supersonic speed when at least 10NM out to sea and along a line of flight at least 20º divergent from the mean line of the coast. Supersonic flights with the aircraft pointing towards the land, turning or flying parallel to the coast are to take place at least 35NM from the nearest coast line.

Supersonic flight at low level over the sea within the UK FIR may take place provided that the rules in above are adhered to and that, in addition, the following are observed**:**

a) Shipping and fixed or mobile oil and gas installations: 3NM

b) Civilian or military transport aircraft: a minimum of 6NM

c) Helicopter main routes or corridors: 6NM

1.2.8 Instrument Approach Minima

The lowest minima to which Military Aircraft are permitted to make instrument approaches to land can be found in the Manual of Military Air Traffic Management linked on page 3 of this document.

1.2.9 Squawk Code Assignment

There are a number of squawk codes generally available to military air traffic, these are shown in Table A. Aircraft operating under a specific military aerodrome's control may be asked to squawk a Conspicuity Code for that aerodrome as listed in Table B.

Table A

SSR Code	Reason
0021	Fixed Wing receiving a service from a ship
0022	Rotary Wing receiving a service from a ship
0023	Aircraft engaged in SAR Operations
0033	Air Para Dropping
1301-1327	For use by vSOA aircraft engaged in Air Policing (Air Defence) Flights
1730-1767	For use by aircraft operating in the Spadeadam Range area
7001	For use by military fixed-wing aircraft on passing 2000ft MSD in the descent to the UK Low Flying System (LFS) and retained whilst operating in the LFS.
7002	For use by military fixed-wing aircraft operating in Danger Areas
7004	For use by aircraft taking part in practice or live Aerobatics displays and other general aerobatic manoeuvres (not associated with ACM)
7005	High-Energy Manoeuvres Pilots of military fast-jet aircraft should select this code prior to engaging in sustained high-energy manoeuvres

Table B

SSR Code	Airfield
0401	RAF Leeming
1757	RAF Coningsby
2645	RAF Cranwell
3646	RAF Odiham
3701	RAF Lossiemouth
3737	RAF Brize Norton
3755	RAF Valley
4506	RAF Linton-On-Ouse
7402	RAF Leuchars
7420	RAF Shawbury
7437	RNAS Yeovilton

1.2.10 Prohibited, Restricted and Danger Areas

Prohibited, restricted and danger areas for the United Kingdom FIR/UIR are promulgated within the UK Civil AIP, available from the NATS AIS website. vSOA pilots are expected to observe the restrictions listed and to avoid any danger areas which they are not intending to utilise during their flight.

1.2.10.1 Notification of Use

- All Danger Areas/Special Use Airspace that are required must be notified on the VATSIM-UK forum prior to their use.
- Only Pilots from VATSIM approved vSOA Organisations may only utilise Danger Areas/Special Use Airspace
- vSOA Pilots may utilise any SUA within the UK providing that sufficient notice is provided by NOTAM on the VATSIM-UK forum. Whilst no set time limit has been established, it is suggested that a minimum of 30 minutes' notice ahead of the airspace becoming populated is provided.

1.2.11 Managed Danger Areas

There are four Managed Danger Areas situated in UK airspace. These MDAs are primarily for the use of activities which require segregation from other air traffic, military or civil. These activities are denoted as:

a) Air Combat Training
b) Dissimilar Air Combat Training
c) Basic Fighter Manoeuvres
d) Supersonic Profiles
e) Electronic Warfare
f) Exercise Formations
g) Night Vision Goggles (NVG) / Night Lights Out Sorties

The MDAs are co-located with Danger areas and, as such, the procedure for booking them is the same as paragraph 1.2.10.1

1.2.12 Areas of Intense Aerial Activity (AIAA)

An AIAA is defined as airspace within which aircraft, singly or in combination with others, regularly participate in unusual manoeuvres. Details of all AIAAs are available in the UK Civil AIP (ENR 5.2). These areas do not require NOTAM promulgation.

1.2.13 Aerial Tactics Area (ATA)

An ATA is airspace of defined dimensions that is designated for Air Combat Training within which high energy manoeuvres are regularly practised by aircraft formations. Details of all ATAs are available in the UK Civil AIP (ENR 5.2). These areas do not require NOTAM Promulgation.

1.2.14 Military Training Areas

Two MTAs are available within the UK FIR/UIR. These are the North West MTA (NWMTA) and the East Anglia MTA (EAMTA). These are areas within Class C airspace which have been established to provide military aircraft with the operational freedom to manoeuvre, without the requirement for the provision of a Radar Control Service. Details of the MTAs are available in the UK Civil AIP (ENR 5.2). These areas do require NOTAM promulgation in accordance with paragraph 1.2.10.1

1.2.15 Air to Air Refuelling Areas

There are 15 Air to Air Refuelling areas within the UK FIR, they are a mixture of H24 and on demand airspace. These areas do require NOTAM promulgation in accordance with paragraph 1.2.10.1

1.2.16 Unusual Air Activity

Unusual Air Activity (UAA) is an event such as an Exercise, Trail, Display or formation which could adversely affect the normal operations of other airspace users

a) A concentration of Aerial activity that is significantly greater than normal
b) Flypast or large formation flights to a set route of programme
c) Weapon or Attack techniques demonstration
d) Exercises

These will usually be communicated to other Controlling units by way of Airspace Co-Ordination Notice, either from the parent vSOA organisation or from the Military RTSM.

Chapter 3 Military Aerodrome Traffic Zones (MATZ)

1.3.1 Status

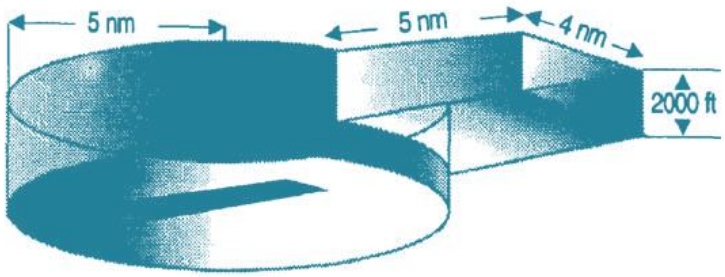
At certain military aerodromes, Military Aerodrome Traffic Zones (MATZ) have been established to provide a volume of airspace within which increased protection may be given to aircraft in the critical stages of circuit, approach and climb-out. This is in addition to the normal ATZ which is smaller and sits within the MATZ. A MATZ acquires the status of the airspace classification within which it lies and it specifies additional mandatory ATC requirements for military pilots. Captains of military aircraft who intend to fly in a MATZ must obtain the permission of the controlling ATC as soon as possible before reaching the zone boundary and maintain a continuous listening watch with the controlling ATC. Observation of MATZ procedures is not compulsory for civil pilots as they are only required to observe the (civil) ATZ within.

Figure 1 Marham MATZ depicted on a half-mil chart in blue and the ATZ within in magenta colour.

1.3.2 Dimensions

The dimensions of a MATZ are as follows:

a. A cylinder radius 5 NM around the mid-point of the longest runway, from the surface to 3000ft above aerodrome level, plus
b. A stub or stubs projected from the cylinder, reaching an additional 5 NM along the extended centreline(s) of selected runway(s). Width 4 NM (2 NM either side of the centreline) from 1000ft above aerodrome level to 3000ft above aerodrome level. In some cases, the stub or stubs may be absent or reduced in size.
c. Exceptions to the above exist; however, for details of the dimensions of specific zones and the associated stub(s) see the UK AIP ENR 2-2 and ENR 6-2-2-3-1



1.3.3 Combined MATZ

Where military aerodromes are situated close to one another or have conflicting final approach paths, Combined MATZs (CMATZ) are occasionally established as the means of integrating and coordinating traffic patterns and specified control services. One of the aerodromes is selected to be responsible for providing ATC services to other aerodromes within the CMATZ. The former is designated the 'Controlling Aerodrome' (see the table below). Where 2 or more MATZs are combined and one aerodrome is designated the Controlling Aerodrome, the upper limit of the combination is determined by the highest aerodrome in the CMATZ.

Controlling Aerodrome	Other AD within CMATZ
Cranwell	Barkston Heath
Leeming	Dishforth / Topcliffe
Brize Norton	Fairford
Lossiemouth	Kinloss
Yeovilton	Merryfield
Boscombe Down	Middle Wallop
Lakenheath	Mildenhall
Valley	Mona
Culdrose	Predannack
Waddington	Scampton
Shawbury	Ternhill

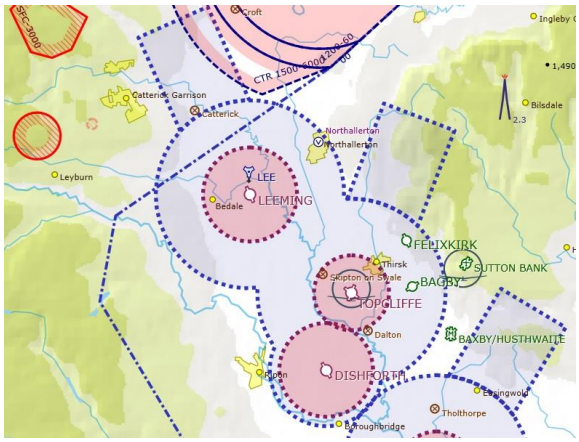


Figure 2 Dishforth/Topcliffe/Leeming CMATZ as depicted on a half-mil chart

Chapter 4 Types of Service and Separation Standards

1.4.1 Radar Services

1.4.1.1 Radar Control

Radar Control should be applied within CAS. When aircraft complete a crossing of CAS, and in the absence of a request to the contrary, controllers should reapply the type of service being given prior to Radar Control without recourse to the pilot.

1.4.1.2 Deconfliction Service and Traffic Service

Deconfliction Service and Traffic Service should be applied as follows:

(1) Below FL195 outside CAS.
(2) At and above FL195: in NW MTA and TRAs 001-008 during published hours of activity.
(3) At and above FL245 in EA MTA during published hours of activity.
(4) Within active MDAs and other DAs where appropriate agreements have been made.

1.4.2 Non-Radar Services

Non-radar services are applied as follows:

1.4.2.1 Procedural Service

Procedural Service may be applied throughout UK airspace.

1.4.2.2 Basic Service

Basic Service is available throughout UK Class F and G airspace.

1.4.3 Lateral Separation

1.4.3.1 Radar Separation

Standard Radar Separation is 5 NM.

Reduced Radar Separation of 3 NM may be provided between identified aircraft that are under the control of the same controller, or that have been subject to co-ordination, subject to the following surveillance requirements being met:

a. Both aircraft are in solid PSR cover and within 40 NM of the radar head

b. The radar equipment in use provides a data update rate of 10 rpm or better (See Note)

c. Both aircraft are in Class D, F or G airspace or an active TRA

Note: Due to the update rate of SSR (generally 8 rpm), Reduced Radar Separation is not to be applied while operating SSR-only.

When applying radar separation, controllers should note the following:

a. Where primary radar data is displayed, horizontal separation should be applied using the primary radar returns.

b. Horizontal separation should not be used between aircraft holding over the same point. However, descent clearance can be given to aircraft departing the holding facility as soon as standard radar separation is seen to be established.

1.4.4 Vertical Separation

Following co-ordination, the following vertical separation minima should be applied:

Between subsonic aircraft up to FL290 apply 1000ft. Above FL290 apply 2000ft, except for RVSM compliant aircraft where 1000ft separation may be applied up to and including FL410. Unless otherwise stated, all aircraft on VATSIM are considered RVSM compliant.

When one or both aircraft are supersonic:

a) Up to FL450 apply 2000ft
b) Above FL450 apply 4000ft

With the exception of civil aircraft in receipt of a Deconfliction Service, Terminal controllers can apply Reduced Vertical Separation (RVS) of 500ft between aircraft provided that:

a. Both aircraft are within 40 NM of the radar head

b. Both aircraft are in receipt of a service from the same controller or are the subject of military to military coordination

c. Both aircraft are below FL100 and outside CAS

Subject to their agreement, civil pilots in receipt of Deconfliction Service or operating in RAF Brize Norton airspace (Class D) may be provided with reduced vertical separation. The application of RVS to civil aircraft should be exceptional rather than routine and then only when a re-route is impractical.

1.4.5 Formation Procedures

Within a formation of aircraft, the formation leader is responsible for separation between units comprising the formation. This is known as MARSA - Military Accepts Responsibility for Separation of Aircraft.

1.4.5.1 Formation Flights in Receipt of an ATS - Specific Requirements

Formations should be **considered as a single unit** for separation purposes provided that the formation elements are contained within 1 NM laterally and longitudinally, and at the same level. Outside CAS these limitations may be increased to 3 NM and/or up to 1000ft vertically at the controller's discretion.

When first checking in on a control frequency, formation leaders are required to clearly state the number of aircraft in the formation. Controllers should ensure that this information is obtained prior to establishing an ATS.

Where traffic under service comprises a formation or stream of 2 or more aircraft, controllers should include this information during radar handovers, requests for Cleared Flight Path, verbal coordination or when passing traffic information on landline or RT. Similarly, traffic information passed on RT should include the composition of any coordinated formation or stream.

When crossing CAS all aircraft in the formation are required to monitor the relevant ATC frequency.

A formation, with elements keeping station visually or by radar, of more than 1 NM in length can receive a radar service outside CAS as follows:

a. The lead aircraft should squawk Mode C. If the stream extends for 3 NM or more, the last aircraft should also squawk the same Mode A code with Mode C. For longer streams, intermediate aircraft should squawk as appropriate.

b. Radar service should be given to the lead aircraft only

c. Controllers should identify the full extent of the stream formation during radar handovers, when effecting coordination and passing traffic information to other controllers

1.4.5.2 Formation Flights within CAS (Classes A-E)

When flying within Classes A-D airspace and when under a radar service within Class E, the following procedures should be applied:

a. All aircraft should fly within 1 NM laterally and longitudinally at the same level by visual means or by use of airborne radar

b. Prior to a formation entering CAS, controllers should obtain a confirmation on RT that all elements are within 1 NM and at the same level

c. When formations are in level flight, controllers should obtain confirmation from the leader that all elements are at their assigned level prior to the formation entering CAS. When a formation has been cleared to climb or descend in CAS controllers should obtain confirmation from the leader that all elements have reached the new assigned level. If vacating a level is relevant for separation, controllers should obtain confirmation that all elements have vacated the level

d. Formations are to be considered non-RVSM compliant and therefore 2000' vertical separation must be applied above FL290

e. Controllers can permit a formation to join up within CAS under the following circumstances:

    1) When an aircraft is in emergency and a formation join up is essential

    2) Formations commencing join-up prior to entering CAS are permitted to complete their join within CAS

    3) Within Class C airspace, controllers can allow formations to join up; however, they should give appropriate consideration to the formation’s proximity to other airspace users

1.4.5.3 Formation Break-up Procedures

The controller should determine from the formation leader when the break-up procedures should commence, the procedures to be followed and the order that aircraft will depart. The controller should indicate to the formation leader when the break-up procedure may commence. There are 3 methods for departing formation:

a. Differential airspeed

b. Achieving vertical separation

c. Applying vectors

Within CAS, the leader of the formation is responsible for the separation of all elements until standard separation is achieved. As such, executive instructions shall not be issued to individual elements until the break-up is completed and all aircraft are identified.

1.4.6 Wake Turbulence Military Advisory Separation – RAF Airfields

When wind speed is indicating a mean of **6 kt or less** and the point of aircraft confliction is likely to be **below 250ft**, wake turbulence spacing detailed in the table below should be applied to all military aircraft using RAF airfields, as follows:

a. **IFR** When the conditions specified above exist, enhanced separation in accordance with the table below should be applied. Under most circumstances, normal IFR or radar separation provides adequate wake turbulence separation.

b. **VFR** The responsibility for separation rests with the pilot. When it appears that the separation in the table below is likely to be infringed, the pilot should be advised 'Caution, wake turbulence' and provided with details of the conflicting aircraft, e.g. 'Heavy aircraft 3 miles final'.

Air Transport aircraft and civil aircraft using RAF airfield should be given separation as per the civil requirements in CAP 493 Section 1 Chapter 3. Aircraft flying in formation with heavier aircraft and aircraft of the same grade need not be given wake turbulence warnings.

APPROACH SEPARATION (NM)							
Lead A/C	Following A/C	Lead A/C	Following A/C	Lead A/C	Following A/C	Lead A/C	Following A/C
H	H = 1 M = 1 ½ S = 3 L = 6	M	M = 1 S = 1 ½ L = 3	S	S = 1 L = 1	-	-
TAKE OFF SEPARATION (mins)							
H	H = 1 M = 1 ½ L = 2	M	S = 1 L = 1 ½	S	L = 1	-	-
WEIGHT GRADES (kg)							
H (136 000 +)		M (35 000 +)		S (5000 +)		L (up to 5000)	
TRISTAR E3D SENTRY C17		BAe 146 BAC 1-11 HERCULES NIMROD VC 10 VC 10K		ANDOVER APACHE CHINOOK DOMINIE GRIFFIN HARRIER HS 125 ISLANDER JAGUAR JETSTREAM MERLIN PUMA SEA KING TORNADO TYPHOON		HAWK GAZELLE FIREFLY T67 LYNX SQUIRREL TUCANO TUTOR	

Chapter 5 Meteorological Information

1.5.1 Colour Codes

All RAF and RN airfields maintain a colour code which is used for transmitting and displaying actual and forecast weather, as laid down below.

1.5.1.1 Colour State chart

		Base of lowest cloud layer of 3/8 (SCT) or more						
		2500ft	1500ft	700ft	500ft	300ft	200ft	< 200ft or sky obscured
Minimum Surface Visibility	8 km	BLU	WHT	GRN	YLO1	YLO2	AMB	RED
	5 km	WHT	WHT	GRN	YLO1	YLO2	AMB	RED
	3.7 km	GRN	GRN	GRN	YLO1	YLO2	AMB	RED
	2.5 km	YLO1	YLO1	YLO1	YLO1	YLO2	AMB	RED
	1.6 km	YLO2	YLO2	YLO2	YLO2	YLO2	AMB	RED
	0.8 km	AMB	AMB	AMB	AMB	AMB	AMB	RED
	< 0.8 km	RED	RED	RED	RED	RED	RED	RED

Black will be used to indicate that the airfield not usable for other reasons than cloud and/or visibility minima. Black will precede actual colour state e.g. BLACKBLU.

1.5.2 Weather and Airfield Information

All weather and aerodrome information transmissions are to be prefixed with a letter code. The letter code is to start with the letter of the alphabet coincident with the first weather issued for the day and, unlike civil procedures, is only updated when there is a significant change to the ATIS (including 'Met Specials'). Significant changes include any changes to the following:

- Runway in use;
- Colour state;
- QNH (if included in ATIS) or QFE;
- Transition Level;
- Serviceability of equipment.

The letters I, O, Q and Z are not to be used. Pilots are to quote letter of weather and aerodrome information received on initial contact with each appropriate ATC element.

Weather and aerodrome information may be passed to aircraft either in full or an abbreviated 'short weather' format. Normally abbreviated information is only to be passed if colour code is better than green. If conditions dictate, pilots may be asked if they require the 'full weather'.

The long weather and aerodrome information is to be passed in the following order and format:

a) Aerodrome/letter code

b) Time

c) Runway in use

d) Surface wind

e) Colour state

f) Visibility

g) General weather observations (when applicable e.g. fog, rain)

h) Cloud levels and amounts

i) Temperature

j) Altimeter setting[+]

k) Runway condition reading (RCR)/runway visual range (RVR) (if applicable)

l) Unserviceable aids/facilities (as appropriate) *

m) Diversion Airfield (as appropriate)

The short weather and aerodrome information is to be passed in the following order and format:

a) Aerodrome/letter code

b) Time

c) Runway in use

d) Colour state

e) Altimeter setting[+]

f) Unserviceable aids/facilities (as appropriate) *

g) Diversion Airfield (as appropriate)

*Training units may require the addition of flying phase information.

[+]Altimeter setting will normally consist of QFE and Regional Pressure Setting or aerodrome QNH and Regional Pressure Setting, depending on local procedures.

When the ATIS letter changes, ATC will broadcast to 'all stations' the new ATIS letter together with the changes and all aircraft are required to readback the ATIS letter together with any mandatory readback items.

	Markston all stations; information code Bravo, Colour state White, new QFE 1-0-1-3, Barnsley 1-0-1-2
UAS11 	Bravo QFE 1-0-1-3 Barnsley 1-0-1-2 Uniform 1-1

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Chapter 6 Communication Procedures

1.6.1 General

Military specific RTF phraseology is laid down in CAP 413 Chapter 10. Military aircraft types should only be passed in clear on the following occasions:

(1) When specifically required to do so by ATC procedures.
(2) In an emergency.
(3) When failure to pass the aircraft type would be likely to cause a flight safety hazard.
(4) When passing essential traffic information on ATC VHF/UHF channels.

Generic terms such as 'rotary' or 'similar type' should be used when passing traffic information to aircraft.

The length of transmissions should be reduced to the minimum compatible with clarity.

1.6.1.1 Liaison Phraseology

It is standard practice for military controllers to answer a landline call with their controller position (e.g. Waddington Director) as well as end the landline call with it.

Liaison Occurrence	Phraseology Format
Prenote	Controller Position, Prenote, Nature of Task, Callsign, SSR Code, FL, Type, Intentions RVSM Status (see Note)
Handover	Controller Position, Handover, Nature of Task, Callsign, Position and Heading of ac, SSR Code, FL, Type, Intentions, RVSM Status (see Note)
Co-ordination	Controller Position, Request Co-ordination, position of ac, SSR code, FL, RVSM Status
CFP Request	Controller Position, Request CFP, position of ac, SSR code, Direction and Position of Crossing, FL, RVSM Status
Airways Join Request	Controller Position, Request Joining Clearance, Callsign, position of ac, SSR code, Airways Joining Point, FL, RVSM Status

Note: Formations are non-RVSM compliant irrespective of the RVSM status of the individual ac type

1.6.1 Studs (VHF Channels)

To save time-consuming manual tuning and to protect channels which are classified 'confidential', military aircraft radios normally have pre-set radio frequencies, referred to as Studs. These are assigned locally and station-based aircraft radios will be pre-set with commonly used frequencies allocated to specific Studs, enabling ATC to transfer aircraft by specifying the position and Stud e.g. 'C/S contact Tower stud 2'. For VATSIM purposes, this may be simulated by using Studs when referring to an ATC position as outlined in the table below, provided that the pilot is familiar with the procedure.

Stud	Designation
1	Ground
2	Tower
3	Approach / Zone
4	Director
5	Talkdown
6	ATIS

SECTION 2 AERODROME CONTROL

Chapter 1 Aerodrome Control

2.1.1 Responsibilities

2.1.1.1 Aerodrome Controller

The aerodrome controller is responsible for the following:

a. Control of VFR traffic flying in the circuit and all movements of aircraft on the manoeuvring area

b. Sequencing the mixed arrival and departure of visual and instrument traffic

c. For monitoring the wind speed and direction

d. Overseeing the application of unit Low Visibility Procedures (LVP) when the weather conditions dictate

2.1.1.2 Ground Controller

The ground controller should be responsible to the aerodrome controller for those duties delegated to him by the aerodrome controller. Ground will normally be delegated the following tasks:

a. Pre-note departures to Approach/Zone.

b. Pass airfield information, taxi instructions and clearances.

2.1.2 Aerodrome Control Requirements

2.1.2.1 Aerodrome Control Function

Aerodrome control is established to deal with VFR traffic flying in the circuit and all movements on the manoeuvring area. Information and instructions will be given to pilots by the aerodrome controller to achieve a safe, orderly and expeditious flow of traffic and to assist pilots in preventing collision between:

a. Aircraft, and aircraft and obstructions on the manoeuvring area

b. Aircraft landing and taking off

c. Aircraft flying within the circuit area

2.1.3 Safety Information

Local orders will dictate information required by aircrew and controllers. In addition, the following are essential requirements:

a. Persons On Board (POB). To ensure that accurate information is available in the event of an incident, the aerodrome controller should ascertain the POB an aircraft before issuing a clearance for it to take-off or to commence a final approach. POB is required to be passed to ATC at the initial request for taxi clearance or on first contact with a destination aerodrome

b. If the aerodrome controller is aware of a potential hazard to an aircraft about to start its take off run, the controller should instruct / signal the aircraft to hold. If the aircraft has already started its take-off run, the controller should inform the aircraft of the hazard; it is then the captain's responsibility to decide the best course of action as it may be more dangerous to abort than to proceed. Controllers will exercise caution when passing warnings or information to taxiing aircraft to avoid confusion or distraction to the crew on the take-off run.

2.1.4 Surface Wind Direction and Speed

The aerodrome controller should monitor the wind speed and should ensure that pilots are suitably informed. Although the aerodrome controller should warn pilots of gusts or crosswind, it is the responsibility of the pilot or operating authority to decide whether an aircraft may take-off or land in the conditions. Controllers should pass crosswind information to pilots as wind direction in degrees magnetic and strength in knots.

When the crosswind component exceeds a value, as defined below, the evaluated crosswind component should also be passed to the pilot e.g. 'Max. crosswind 19 knots from the left'.

a. Single engine piston aircraft – 15 kt
b. Twin engine propeller and turbo-prop aircraft – 20 kt
c. Jet aircraft – 25 kt

2.1.5 Conditional Clearances

Conditional clearances have been identified as a significant contributory factor in many runway incursion incidents and therefore are not normally used at military aerodromes.

2.1.6 Runway Utilisation

Military ATC do not use the phrase 'land after'. Where there are no local instructions published, the following generic procedure may be adopted for use at all VATSIM UK military airfields:

A landing aircraft may be cleared to land with one aircraft on the runway of a similar type, which has either landed or is on the runway performing a touch and go provided that:

a. there is no evidence to indicate that braking may be adversely affected
b. it is during daylight hours
c. the preceding landing aircraft is not required to backtrack in order to vacate the runway
d. the controller is satisfied that the landing aircraft will be able to see the preceding aircraft which has landed, clearly and continuously until it has vacated the runway or is airborne, and
e. Responsibility for ensuring adequate separation rests with the pilot of the following aircraft
f. The phraseology used will be 'C/S cleared to land, one on' or 'C/S cleared to land one ahead touch and go'
g. Aircraft within a formation landing in stream: each individual unit will call final and may be 'C/S cleared to land in turn'.

2.1.7 Use of ATM

Some ADC units are equipped with a Hi-Brite VCR Radar Display which is equivalent to an ATM and can be used for the tasks detailed below:

b. Determining the landing order, spacing and distance from touchdown of arriving aircraft.
c. Providing information on the position of aircraft within the circuit (e.g. one in downwind). However, such information should normally be derived from lookout or normal circuit management techniques.
d. Monitoring the position of notified transit traffic and, subject to prior agreement with appropriate radar controllers, applying or cancelling climb-out restrictions accordingly.
e. Exceptionally, passing traffic information with reference to the relative position of one aircraft to another (e.g. clock code and distance) when the controller considers that doing so would aid the integration of traffic.

Where necessary, aircraft should be identified using a recognised method of identification although aircraft performing an instrument approach can be identified from final approach liaison calls. There is no requirement to inform a pilot that he/she has been identified, or to place him/her under any form of service, prior to passing ATM-derived traffic information.

Chapter 2 Low Visibility Procedures

2.2.1 Visibility Conditions

The point at which LVPs are initiated will vary from aerodrome to aerodrome and should be clearly defined in relation to RVR/visibility conditions, however the guidelines below can be adapted to suit the unit need.

2.2.1.1 Visibility Condition 1

This is defined as visibility sufficient for the pilot to taxi and to avoid collision with other traffic on taxiways by visual reference and for ATC personnel to exercise control over all traffic on the basis of visual surveillance. No additional requirements for the protection of ground operations by aircraft are required.

Typically, LVP 1 will be implemented when the visibility is less than 1600 metres and RVR indications will be passed to pilots.

2.2.1.2 Visibility Condition 2

This is defined as sufficient visibility for the pilot to taxi and avoid collision by visual reference, but insufficient visibility for ATC to control traffic by visual surveillance. The actions taken will be dependent on the dimensions of the airfield and position of the VCR. However, measures will need to be put in place to limit the potential for undetected runway incursions.

Typically, LVP 2 will be implemented when the visibility falls below 600 metres.

Some taxiways and runway exits will be closed in order to simplify the layout of the aerodrome and reduce the likelihood of pilots taking a wrong turn; ATC cannot see the aircraft well enough to check that they are following the correct routes. Normally only one aircraft will be permitted to move within a given area of the manoeuvring area at any one time until the preceding aircraft has reported at or passing a specific holding point. Conditional clearances shall not be used.

Approach will increase the spacing between inbound aircraft to allow for these ground movement restrictions to be met after landing.

2.2.1.3 Visibility Condition 3

More restrictive and stringent control measures are initiated in response to the individual unit requirement. Further Visibility Conditions may be deemed necessary for units employing a wide variety of control measures.

Typically, LVP 3 will be implemented when the visibility falls below 300 metres. Only one aircraft will be permitted to move on the manoeuvring area at any one time.

Chapter 3 Visual Circuit Procedures

2.3.1 Circuit Pattern

The terms 'circuit' and 'pattern' are interchangeable. Most military circuits are oval. The visual circuit direction shall be left-hand unless otherwise stated, e.g. ‘Join Runway 26 Right-hand’.

Aircraft will normally turn downwind using a continuous 180 degree turn. The ‘downwind’ call is standard and pilots will normally report their intentions e.g. ‘downwind touch and go’. The ADC will respond with the number of aircraft ahead in the arrival sequence (if any) and pass the surface wind direction and speed.

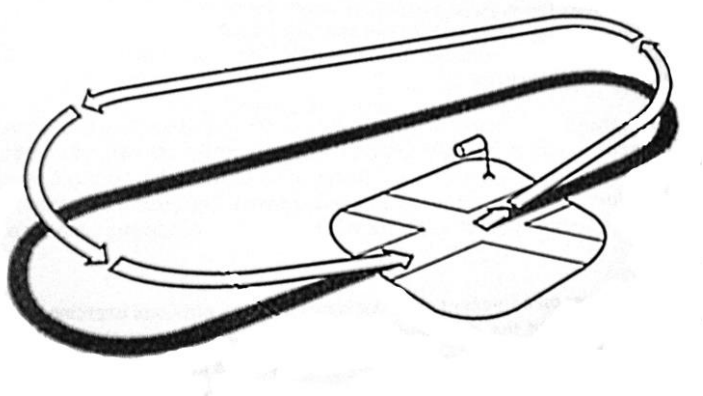
CWL23 ✈	Cranwell 2-3 downwind touch and go
▮	Cranwell 2-3 surface wind 280 degrees 14 knots **OR** Cranwell 2-3 two ahead surface wind 280 degrees 14 knots

In the visual circuit, formations remain in formation for example:

UAW62 ✈	Uniform 6-2 downwind touch and go
▮	Uniform 6-2 formation of two ahead, surface wind 320 14 gusting 24 knots

The call of ‘final’ is given as the aircraft starts its final turn, which is a continuous 180 degree turn, at the end of the downwind leg.

CWL23 ✈	Cranwell 2-3 final
▮	Cranwell 2-3 cleared touch and go **OR** Cranwell 2-3 continue approach **OR** Cranwell 2-3 go around



2.3.1.1 Circuit Heights

Circuit patterns are usually flown at heights which depend on aircraft type. For example, a turboprop trainer may fly the pattern at 1000ft on QFE, light piston aeroplanes at 800ft and if traffic is mixed, fast jet traffic at 1200 or 1500ft. There may be different circuit heights for training purposes, e.g. glide

circuits conducted at 1500ft or low level circuits conducted at 500ft. Pilots intending to carry out a non-standard circuit will broadcast the type of circuit once airborne and the controller will normally only reply if that type for circuit is unavailable.

UAS80 	Uniform 8-0; glide

2.3.2 Go-around Instructions

The instruction 'go-around' may be issued at any point in the visual circuit. An aircraft instructed to go-around will continue around the circuit pattern at circuit height. If an aircraft on final is instructed to go-around, then it will normally manoeuvre slightly onto the dead side.

2.3.3 Sequencing

Civil aerodrome control sequencing techniques (specifically instructions to orbit downwind/base/final) are not normally used. Extensions upwind/downwind and go-around at circuit height are preferred methods.

	Victor 1-3, extend upwind, traffic between high and low key

2.3.4 Initials Join

The military standard join is via the Initial Point (IP) and is most often used as a tactical method of joining the circuit from high speed.

After establishing R/T contact with the ADC the pilot will position his aircraft to run in parallel with the runway from a point on the approach to the runway in use approximately 3 NM from the threshold and offset slightly (up to 0.5 NM) on the dead side of the circuit. The exact position and height of the IP is normally defined in local orders (at units with no dead-side, the run in may take place along the line of the runway in use). The join is normally conducted at circuit height and routinely includes a 'break' or pitch from a point on the dead side in order to make a continuous circle onto final approach. Alternatively, the aircraft may conduct a standard circuit turn onto the downwind leg. This will be determined by aircraft type and/or other circuit traffic with which the joining aircraft has to integrate.

VYT14 	Markston Tower, V-Y-T 1-4, request join (via initial).
	V-Y-T 1-4, Markston Tower. **Join**; Runway 2-6 Right hand; QFE 1-0-1-0; **Three in***
VYT14 	Join, Runway 26 Right hand, QFE 1-0-1-0, Victor 1-4
OR (if no other aircraft in the circuit)	
VYT14 	Markston Tower, V-Y-T 1-4, request join (via initial).
	V-Y-T 1-4, Markston Tower, Join; Runway 2-6 Right hand; QFE 1-0-1-0; **Circuit Clear***
VYT14 	Join, Runway 2-6 Right hand, QFE 1-0-1-0, Victor 1-4

* When passing joining instructions, the ADC will inform the pilot of the **circuit state (**the number of aircraft currently in or cleared into the visual circuit. If there are *no* aircraft in the circuit, this is passed as 'Circuit clear'.

After normal joining instructions have been obtained the pilot will report 'initial(s)' or 'initial(s) for the break' and in response the ADC will pass the position of each aircraft in the circuit in the following sequence from aircraft:

1) Going around (to position dead side);

2) Dead side;

3) Crosswind (and/or upwind departing if deemed a factor);

4) Downwind;

5) Final

\+ Other aircraft joining/on the runway as required (see Note 1)

Note 1: The sequence should always be passed in the order that the *inbound* aircraft **will come into confliction** with the circuit traffic. If necessary, other aircraft positioning to join the circuit or previously in the circuit and currently on the runway (i.e. touch & go, cleared for take-off, etc.) should be included in sequence as required by circumstances).

VYT14 	Victor 1-4; Initials,
	Victor 1-4; One downwind, one final, one-on for touch and go*.
OR (if no other aircraft in the circuit)	
VYT14 	Victor 1-4; Initials,
	Victor 1-4; Roger.

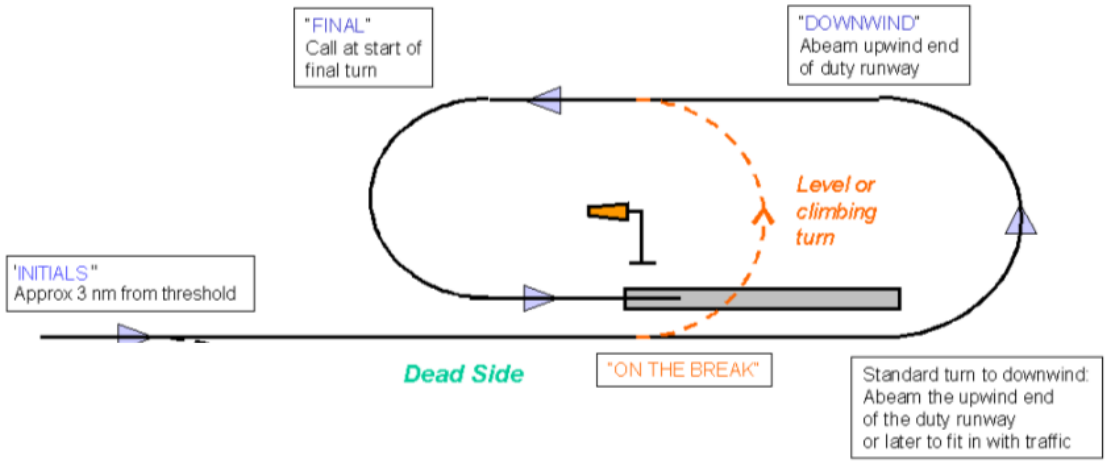
* "*One-on remaining in the circuit*" used to inform the joining pilot of an aircraft in this condition. The phrase, "*One-on departing*" would be used to indicate an aircraft cleared for take-off that will be leaving the circuit.

2.3.4.1 Run and break

From the IP, the pilot will run in to the aerodrome parallel with the runway (normally at high speed) and visually acquire the other circuit traffic following which he will adjust to circuit height (lower may be requested). Once abeam the runway on the dead side* and at an appropriate point dependent on the position of the other circuit traffic, the pilot will turn steeply (pitch) from the dead side in order to bleed off excess airspeed and position downwind. The associated r/t call, 'on the break' followed by the pilot's intentions equates to the 'downwind' call and the pilot is informed of the number of aircraft ahead of him in the circuit together with the surface wind.

*If the aerodrome circuit has no dead side (e.g. due to mixed aircraft types and/or circuit direction) the break may take place over the runway itself.

VYT14	Victor 1-4; Initials for the break,
	Victor 1-4; One downwind
VYT14	Visual, Victor 1-4.
VYT14	Victor 1-4; On the break to land.
	Victor 1-4; One ahead; Surface wind 270 degrees 6 knots



2.3.5 Landing Gear Position

Pilots of aircraft with retractable landing gear are required to report the gear position as part of the request for an ATC clearance to use a runway.

VYT14	Victor 1-4; Final; Gear down.
	Victor 1-4; Cleared to land.

If the position of the landing gear is not passed at the appropriate point or is required to be checked by the controller, then a simple instruction is issued.

VYT14	Victor 1-4; Final
	Victor 1-4; Check gear down
VYT14	Gear down; Victor 1-4
	Victor 1-4; Cleared to land

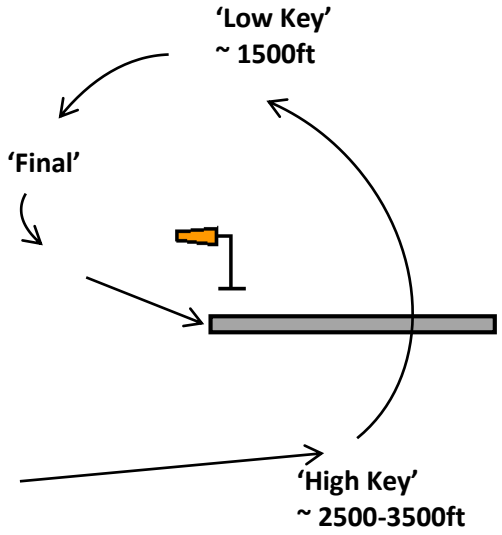
2.3.6 PFL Join

Single engine aircraft (e.g. Grob Tutor, Tucano, Hawk) may request to join for a 'Practice Forced Landing' (PFL), which will normally be via 'High Key' which is generally high 'dead-side' of the landing runway. From 'High Key' a gliding descending turn is carried out to 'Low Key' which is downwind, opposite the landing threshold. Alternatively, aircraft may join for a PFL directly via 'Low Key'.

The 'High Key' call is normally equivalent to the 'downwind' call and ADC will pass the number of aircraft ahead and the surface wind.

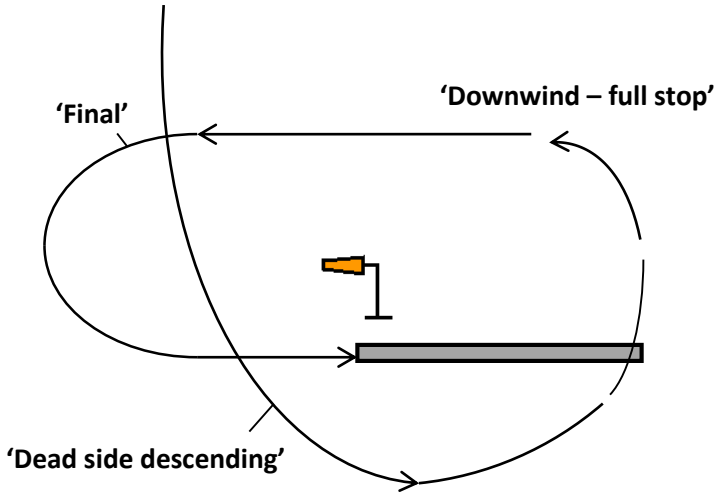
WYT14 ✈	Wyton Tower, Practice PAN Wyton 1-4; field in sight request PFL join
🛣	Practice PAN Wyton 1-4; Wyton Tower, **Join** PFL runway 0-8, QFE 1-0-1-0, one in, report high key with intentions
WYT14 ✈	Join PFL 0-8 QFE 1-0-1-0 wilco, Practice PAN Wyton 1-4
WYT14 ✈	Practice PAN Wyton 1-4; High Key for touch and go
🛣	Practice PAN Wyton 14; one ahead, surface wind 2-3-0 degrees 4 knots

The height of High Key and Low Key shown below are approximate and depend on the aircraft type.



2.3.7 Overhead Join

Aircraft may request a standard overhead join. Aircraft will fly overhead the airfield 1000ft above the circuit height (e.g. 1800ft QFE) and descend on the dead side to circuit height, making all turns in the direction of the circuit.



BKH22	Barkston Tower, Barkston 2-2 field in sight, request overhead join
	Barkston 2-2, Barkston Tower, Join overhead runway 2-4, QFE 1-0-1-2, one in
BKH22	Join overhead 2-4 QFE 1-0-1-2 Barkston 2-2
BKH22	Barkston 2-2 descending dead side
	Barkston 2-2 roger, one upwind departing

2.3.8 Integration of Radar Traffic

ADC is responsible for providing sufficient information and/or instructions to avoid conflicting with traffic undertaking instrument approaches.

a. Talkdown (PAR) will pass a range check to ADC at 8 NM with intentions and further intentions. A second check is made at 4NM. ADC is to broadcast these on the Tower frequency.
b. If clearance to land/touch & go/low approach cannot be given at 4 NM, ADC will reply 'call by 2'. Talkdown will call back when the aircraft is at 2 ¼ NM. If clearance cannot be given, the aircraft will execute the missed approach at 2 NM, unless the pilot is visual and it is colour code WHT or BLU the aircraft may continue visually and contact Tower.
c. If an aircraft in the visual circuit calls 'final' when Radar traffic is inside 4 NM, the circuit traffic shall be instructed to 'go-around'.
d. Aircraft extending downwind or routing out to 'Initials' shall be instructed to report visual with the Radar traffic and Talkdown is to be informed.

Talkdown liaison call	ADC reply	ADC broadcast
"8 miles [C/S] [ac type] (to land / touch & go / low approach for further / to join visual circuit)"	"[C/S] [ac type] 8 miles roger"	"Radar Traffic [ac type] 8 miles (to land / touch & go / low approach)"
"4 miles [C/S] (to land / touch & go / low approach)"	"[C/S] cleared (to land / touch & go / low approach)" OR "[C/S] call by 2"	"Radar Traffic [ac type] 4 miles (to land / touch & go / low approach)"
"2 ¼ miles [C/S] (to land / touch & go / low approach)" *Talkdown will readback the clearance and simultaneously transmit to the ac*	"[C/S] cleared (to land / touch & go / low approach)" OR "[C/S] break off (traffic)" OR ""[C/S] continue visually (number) ahead" * *If conditions meet criteria in local orders	"Radar Traffic [ac type] 2 miles cleared (to land / touch & go / low approach)" OR "Radar Traffic [ac type] 2 miles breaking off" OR "Radar Traffic [ac type] 2 miles continuing visually"
"[C/S] [ac type] (practice) short pattern (to land / touch & go / low approach)" * *In place of 8 NM call	"[C/S] [ac type] (practice) short pattern (to land / touch & go / low approach) roger"	"Radar Traffic [ac type] (practice) short pattern (to land / touch & go / low approach)" **Note:** ac type only given if relevant

2.3.9 Zone Transit Traffic

The Approach/Zone controller will inform the ADC of MATZ transit traffic and may impose climb-out restrictions on departing aircraft to achieve deconfliction minima. Traffic intending to enter the ATZ may be transferred to ADC, otherwise it will normally be retained by the Zone controller. ADC will pass traffic information as a broadcast or specifically to individual aircraft, as required.

Zone liaison call	ADC reply	ADC broadcast
"MATZ crosser, [direction] [height] (SSR code)"	(Read-back)	"Zone transit, [direction] [height]"
"Climb-out Restriction height [height] feet"	"Climb-out Restriction height [height] feet"	Departing aircraft to be passed height restriction individually: "[C/S] after departure not above height [height] feet"
"Climb-out Restriction Cancelled"	"Climb-out Restriction Cancelled"	"[C/S] height restriction cancelled"

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SECTION 3 SURVEILLANCE APPROACH CONTROL

Chapter 1 General Terminal Procedures

3.1.1 Responsibilities

3.1.1.1 Terminal Procedures

Terminal units are only authorised to control aircraft below FL195 within Class F & G airspace unless specifically authorised otherwise.

Controllers are required to handover aircraft that request an ATS above FL195 to an appropriate unit permitted to provide ATS.

3.1.1.2 Surveillance Approach Controller

Surveillance controllers are responsible for providing or performing some or all of the following services and functions when appropriate:

a. MATZ penetration

b. LARS

c. Control of transit traffic other than LARS

d. Departure Control

e. Radar to visual recoveries

f. Service to or re-allocation of other traffic recovering to the airfield

g. DF procedures (this responsibility can be delegated as laid down in local orders)

h. Control of aircraft in an emergency (this responsibility may be delegated to another controller depending upon the nature of the emergency and position)

i. Handovers to outside agencies

j. Such other services as may be laid down in local orders

3.1.1.3 Surveillance Director

The Surveillance Director is responsible for:

a. Control and sequencing of aircraft in the radar circuit

b. Control of aircraft handed over to him on either an internal handover or from an outside agency

c. Services to aircraft as dictated by circumstances or laid down in local orders

d. Surveillance radar approaches when required

Chapter 2 Surveillance Approach Control Procedures

3.2.1 Radar to Visual Recovery

Aircraft requiring radar-to-visual recoveries should be recovered in the most expeditious manner consistent with the prevailing weather and traffic conditions. The surveillance controller should inform the Aerodrome Controller of the approaching aircraft when it is at a suitable distance from the aerodrome, dependent on aircraft speed and local conditions.

When positioning aircraft for this type of approach the Surveillance Approach Controller should consider:

a. Reported cloud base, visibility and weather

b. Approach lighting aids available

c. Director's patterns and conflicting traffic

d. Other aerodrome traffic patterns

e. Airspace restrictions

f. Terrain clearance

Aircraft performing a straight-in approach from a radar feed are also subject to these considerations and clearance criteria.

For a Radar to Visual approach, the airfield surveillance radar can give course guidance and descent down to the appropriate safe height as determined by the Radar Vector Chart for each airfield. Airfields at which radar to visual approaches are used as a normal means of recovery will have a weather limit below which only authorised precision and non-precision instrument approaches are permitted. It is suggested that this limit be 1000ft (4 NM). In all cases where such procedures are used the minimum required obstacle clearance should be 500ft inside 10 NM from the airfield and the normal 1000ft (as specified on the radar vector chart) outside 10 NM.

3.2.2 MATZ Penetration Service

The Surveillance Approach Controller should coordinate a request for a MATZ crossing with the Aerodrome Controller and Director as necessary.

Where possible, aircraft should be permitted to cross the MATZ so as to avoid unnecessary deviation. Where it is necessary to inform other airfields of the aircraft's passage (e.g. in a CMATZ), the altitude at which aircraft are permitted to cross the MATZ/CMATZ should be carefully considered so as to cause the minimum of disruption consistent with safety. If circumstances are such that it is considered unsafe for the aircraft to cross the MATZ/CMATZ, the pilot should be informed and requested to re-route his aircraft. Controllers should note that civil pilots are only bound to recognise and avoid the ATZ.

When crossing a MATZ or CMATZ it is the responsibility of the pilot to ensure that clearance is obtained to transit each individual ATZ embedded therein. The pilot, in his request for approval to transit the MATZ/CMATZ, may ask the controller to obtain such clearance(s) on his behalf. When issuing any approval to cross a MATZ or CMATZ controllers are, where appropriate, to articulate clearly any clearance or otherwise to transit embedded ATZs. Phraseology for the penetration of a MATZ/CMATZ and ATZ is detailed in CAP413.

Chapter 3 Surveillance Director Procedures

3.3.1 Vectoring Procedures

In controlling radar recoveries, the Surveillance Director will sequence aircraft in both normal pattern radar circuits and short pattern circuits to establish on the final approach of an instrument approach as follows:

a. Normal Pattern. The main elements of a normal pattern are a base leg, a converging heading and final approach. For multiple circuits, a downwind leg will also be included

b. Short Pattern Circuit. An aircraft overshooting from an instrument approach and precluded by weather conditions or other reasons from carrying out a visual circuit or normal pattern radar circuit can be repositioned on final approach using the short pattern circuit procedure with the minimum expenditure of fuel

In directing the aircraft towards the final approach, the Director should take account of:

a. Known high ground or obstructions

b. Areas of radar shadow

c. Danger, Prohibited and Restricted Areas

d. Radar Clutter and Suppression

3.3.1.1 Multiple Instrument Approaches

If successive radar approaches to an airfield are required, the pilot should be informed of the type of service on the first approach only. For subsequent circuits the notified service will be deemed to exist and the pilot need only be told that he is identified.

3.3.1.2 Monitored Approaches

Monitored approaches (e.g. monitored ILS approaches) should be given at the request of the pilot or as laid down in local orders or other instructions. Monitoring should be carried out by the Director or Talkdown controller who should:

a. Advise distances from touchdown if required.
b. Be prepared to take over control.
c. Give warning of other traffic.
d. Give warning if the aircraft is going well below the glidepath or if for any other reason the approach is becoming hazardous.
e. Obtain, and pass to the pilot, clearances, surface wind and circuit information normally associated with a PAR approach.

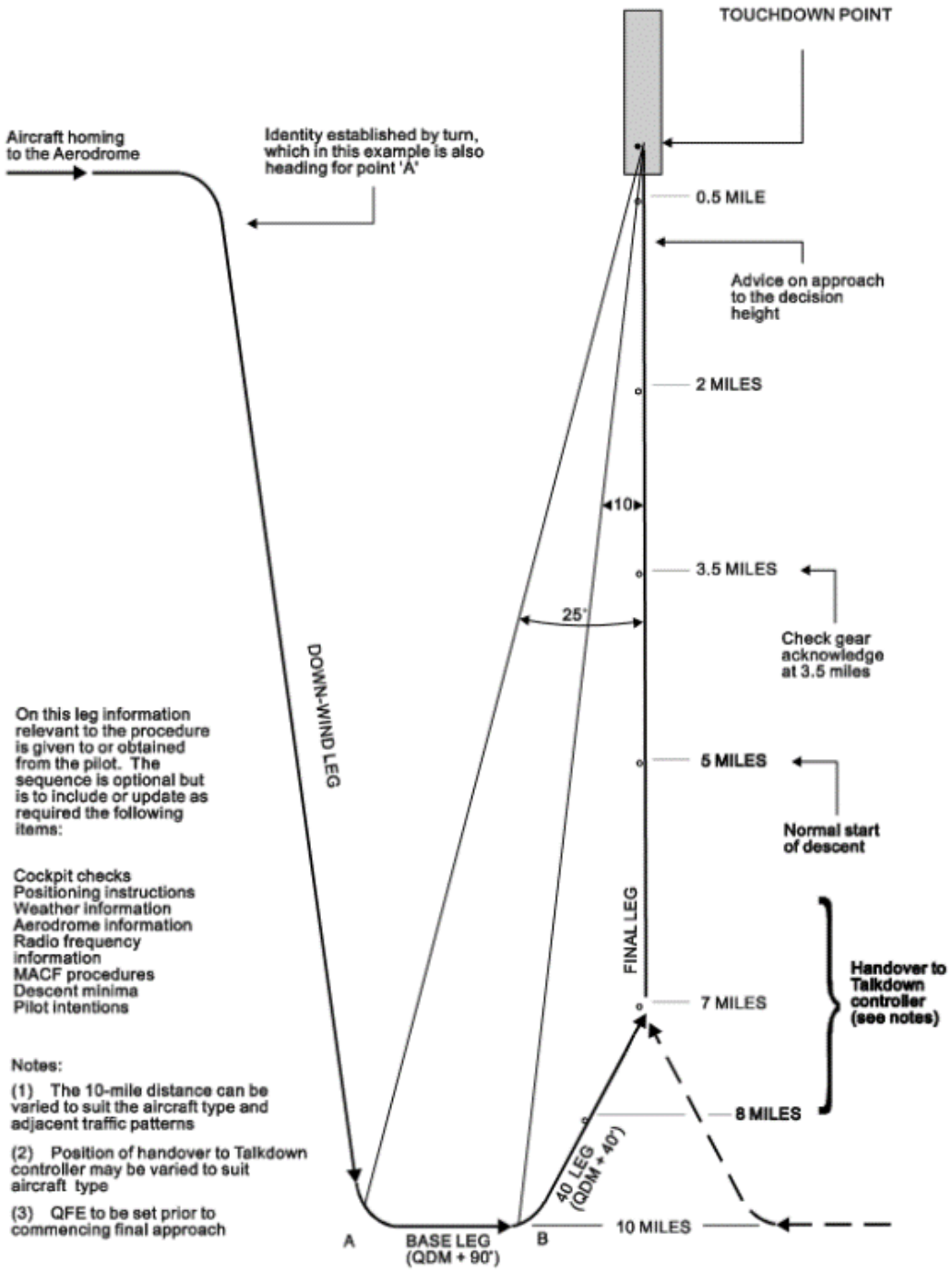
Note: If the ILS localizer is offset from the runway, the precision radar centreline will not coincide with the centreline of an ILS approach as interpreted by the pilot.

3.3.2 Ground Controlled Approach

PAR is classed as a precision approach aid by which it is possible for the pilot, on receiving instructions and information from the controller, to place the aircraft in a position from which he can land visually. The required visual reference consists of at least two bars of a standard centreline and cross-bar lighting system, or PAPIs. If these visual aids are not available, the runway threshold must be visible.

Military ATCOs should not offer a PAR approach to civil pilots. However, following the passing of weather and serviceability state at an aerodrome, if the captain of a civil aircraft specifically requests a PAR the approach can be provided.

Standard phraseology, as laid down in the CAP 413 should be used. The identification of the aircraft should be completed before it is accepted for entry into the procedure. When identified, the aircraft should be given relevant procedural information together with radio frequency instructions for contact with the Surveillance Director.



3.3.2.1 The Radar Circuit

The radar circuit (as in the diagram above) is divided into four parts:

a. The Downwind Leg

This is the leg extending from a point abeam the threshold of the runway concerned to a point 'A' situated ± 25° from the reciprocal of the runway QDM depending on the circuit direction, at a range of 10 NM (this range may be varied to suit the aircraft type and adjacent traffic patterns). When an aircraft enters the pattern from the overhead (e.g. on climb-out) procedural separation should be applied until surveillance identification and separation can be effected by the Director.

b. Base Leg

That leg of the pattern from point 'A' to point 'B', a position on the base leg where a line of bearing ± 10° from the reciprocal of the runway QDM intercepts the base leg. The heading of this leg, in still air, is equal to the runway QDM ± 90° depending on the circuit direction.

c. Converging Heading

This serves conveniently to split the 90° turn between base leg and final approach to the advantage of the controller and the pilot.

d. Final Approach

From the converging heading, the aircraft is turned to close with the extended centre-line of the runway. This phase of the procedure should not be hurried and the manoeuvre should be arranged such that the aircraft is established inbound, with the handover to the Talkdown controller complete, prior to arrival at the descent point. If at this stage the Talkdown controller is unable to accept control, the aircraft should be descended successively to pre-determined lower heights to avoid penetration of the glidepath. Headings should be passed to direct the aircraft along the extended centreline. This procedure should continue until either the Talkdown controller assumes control, the aircraft reaches the decision height/minimum descent height appropriate to the type of surveillance radar in use or the approach can be completed visually.

3.3.2.2 Cockpit Checks

On radar assisted procedures cockpit checks are instigated by controllers. If the Talkdown controller assumes control before cockpit checks are complete the Director should ensure that this fact is understood before he hands over the aircraft. A handover in such circumstances should not restrict the actions of the Talkdown controller. Pilots usually instigate their own cockpit checks on pilot interpreted non-radar assisted procedures but the controller may initiate them and may also introduce speed control measures to assist sequencing.

The Director should ensure that the following information is passed to the Talkdown controller prior to handover:

3.3.2.3 Handover to the Talkdown Controller

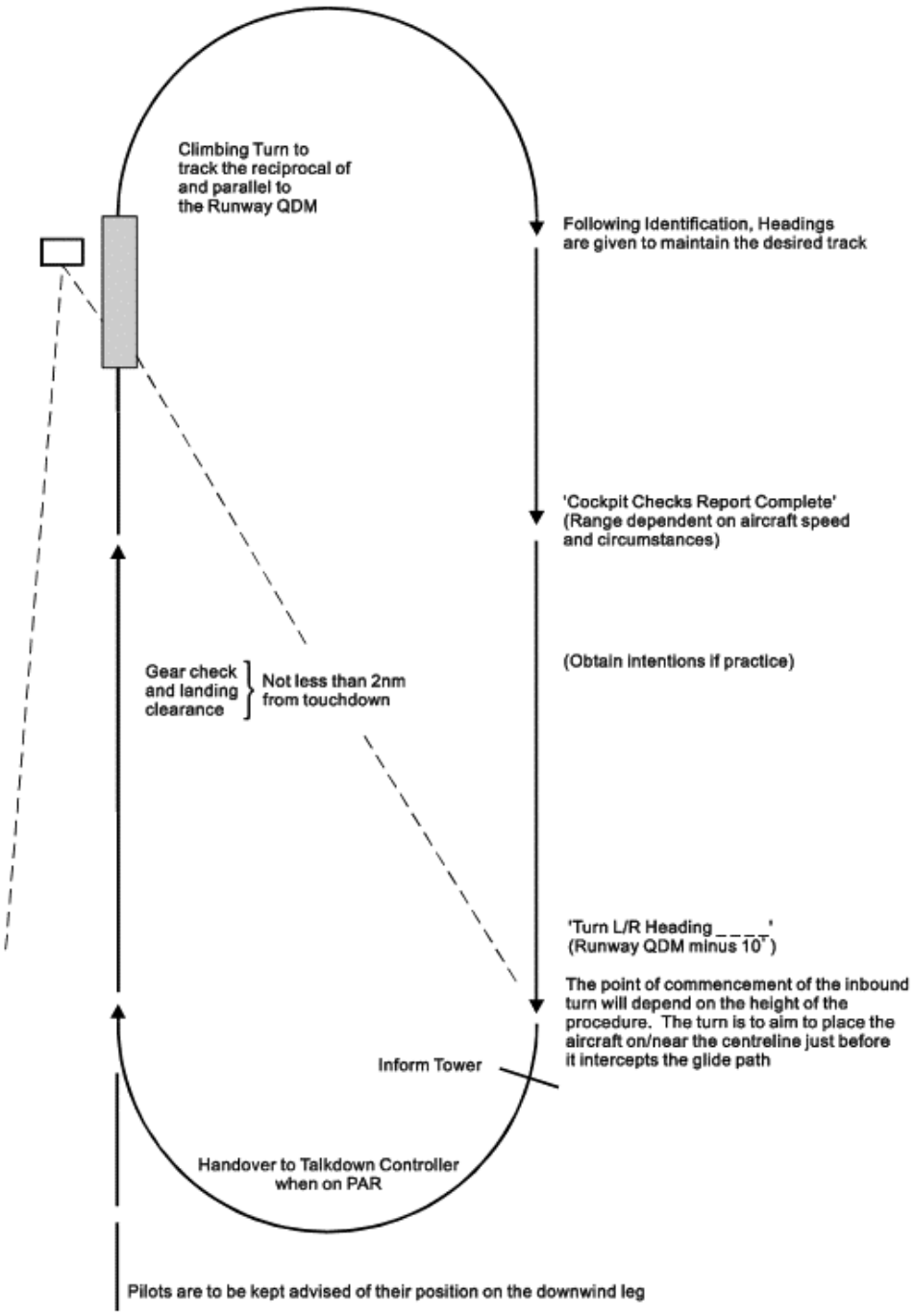
The Director should ensure that the following information is passed to the Talkdown controller prior to handover:

a. Aircraft callsign
b. Frequency to be used

c. Distance from touchdown
d. Heading of the aircraft
e. Height/altitude of the aircraft
f. Pilot's DH/MDH and intentions
g. Any other information relevant to his task or required in local or other orders

On receipt of the information, and when the Talkdown controller has signified his readiness to accept the handover, the pilot should be instructed to contact Talkdown.

3.3.2.4 Short Pattern Circuit



The direction and height of the short pattern circuit for a particular runway should be laid down in local orders. Factors that should be considered in deciding the circuit direction include high ground, traffic patterns, relative position of neighbouring aerodromes, Restricted Areas, type of approach control radar, etc. With certain surveillance equipment it may be possible to derive advantage from precision radar coverage of the final approach area by turning the aircraft in a particular direction. The procedure illustrated in the diagram above is designed for use by short endurance jets which have been unable to land from their previous approach and require a further radar approach with the minimum expenditure of fuel.

Normally, an aircraft committed to a short pattern circuit will be instructed by the Talkdown controller to contact the Director, as it will cease to be in precision radar coverage. The aircraft will be controlled thus until it is once again in precision radar coverage, when the Talkdown controller will resume control and complete the approach. Whenever possible, the short pattern circuit and subsequent approach should be completed on a single frequency.

The Director should adjust the flow of other traffic so that the aircraft on a short pattern circuit is not delayed but is given the priority the situation warrants.

In the interests of efficiency and safety, each controller in the control team should be made aware that a short pattern circuit has been initiated. Clearances to integrate the aircraft into the traffic pattern should be requested and given anew without delay.

When the Talkdown controller possesses the requisite operating endorsement and has access to a surveillance radar element in addition to precision radar, he may retain control of an aircraft on a short pattern circuit throughout the procedure. The Talkdown controller should keep other members of the team informed so that they can adjust their traffic patterns to assist the short pattern circuit.

3.3.3 Surveillance Radar Approaches

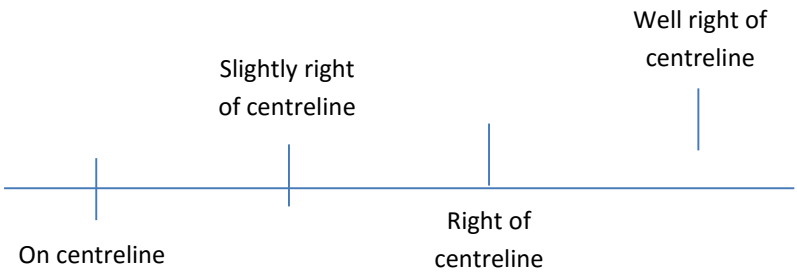
When PAR is not available, the surveillance radar can be used to carry out a non-precision surveillance radar approach (SRA). Using this procedure, the controller passes instructions and information to the pilot to enable him to follow a pre-determined approach path to a position from which a visual landing or circuit can be made. This type of approach is not as accurate as a precision approach in that no electronic glidepath information is available, nor is there a similar degree of accuracy in azimuth.

3.3.3.1 Azimuth Control

Azimuth instructions should be given in the same manner as for a precision approach; however, centreline information should be passed as per below. However, controllers will bear in mind that the slower update rate of the surveillance radar equipment and the fact that the picture, unlike PAR, is not distorted for ease of interpretation, both mask the effectiveness of smaller (2 or 3°) heading corrections.

Controllers should therefore consider carefully the size of their corrective headings and, in general, reserve 2 and 3° heading changes to maintain aircraft that have already been established on the centreline.

Surveillance Radar Approach - Relationship to the Centreline



3.3.3.2 Elevation Control

When the final approach is carried out by means of a non-precision radar equipment the pilot should be instructed to achieve a rate of descent for an equivalent glidepath (GP) angle (300ft per mile approximates to a 3º GP and 250ft per mile approximates to a 2½º GP). The descent should be commenced at a range from touchdown and at a height above the relevant datum which corresponds to the required rate of descent.

Advisory heights should be passed with range information to assist the aircraft to maintain a rate of descent for an equivalent GP angle: 'C/S, 5 miles from touchdown, height should be 1-5-0-0 feet'.

3.3.3.3 Actions

Unless the pilot has declared an emergency and requested direction to touchdown, in carrying out a normal SRA the controller should:

a. Instruct the pilot to set threshold QFE before commencing final approach
b. Pass to the pilot distances from touchdown together with pre-computed advisory heights at intervals of ½ NM until the aircraft reaches a range equivalent to the pilot's minimum descent height. Heading instructions should be passed to intercept and track the extended centreline until the aircraft reaches the missed approach point; thereafter pass advice on the aircraft's position from the projected runway centreline.

Note: At RN aerodromes, ranges will normally be passed at 1/2 NM intervals and heights at 1/3 NM intervals.

c. Advise the pilot that he is approaching his MDH
d. Advise the pilot that he is approaching Missed Approach Point (MAP). When the MDH is within ½ NM of the MAP the phrase ‘approaching MDH’ is not included

Chapter 4 PAR Controller

3.4.1 Responsibilities

A PAR is an instrument approach with the aim of enabling the pilot to obtain at least one of the required visual references at or before decision height, and be in a position to continue the approach to land, touch and go or carry out a low approach. The PAR controller is responsible for the interpretation of the information presented by the PAR equipment. The controller should pass precise heading and glidepath/height information/instructions to enable the pilot to effect a safe landing, touch and go or low approach.

3.4.2 The Talkdown

3.4.2.1 R/T Phraseology

R/T Phraseology should be standard and must be delivered in a calm, confident and unhurried manner, without error. Transmissions are normally to be interrupted by short regular breaks in order to provide the pilot with an opportunity, where necessary, to pass a short message to the controller without detracting from the limits of the procedure; however, exchanges of R/T should be kept to the absolute minimum. A continuous talkdown may be used when operationally necessary but a controller observing an unusual reaction from the aircraft return on his display or finding a pilot not reacting to his instructions should break transmission immediately to determine the reason. R/T phraseology for clearances is contained in CAP413.

3.4.2.2 Takeover of Control - Preparation

PAR controllers should ideally listen in to the Director's frequency until the aircraft is transferred to 'Talkdown'. The PAR controller should signify his readiness to take over control of an aircraft from the Director in an appropriate manner. Before accepting control, the PAR controller should ensure that a correlated (white) radar track is displayed in both (AZ & EL) pictures; finally, the aircraft Data Block should be displayed.

3.4.2.3 Azimuth Control

Adjustments to heading in order to maintain the aircraft on the centreline should decrease as range decreases during the approach. Controllers should consider this when judging the size of heading corrections and avoid using small heading changes at range unless a finely tuned adjustment is required. The aim is to guide the aircraft smoothly onto the centreline 1 to 2 NMs before Decision Height and to maintain it in that position, rather than accurately track the centreline from 10 miles. Controllers should also avoid increasing the pilot's workload by instructing him to fly a series of small heading corrections when one or more, larger turns (5, 10 or 15°) would suffice. An early appreciation of the effect of wind on the aircraft's track is vital for corrections to be timely and sufficient to correct any drift. When the aircraft passes Decision Height, the information the controller passes becomes advisory, and the controller should only pass the direction of turn and the number of degrees. The 2º and 5º azimuth lines (marked in blue) diverge either side of the centreline from touchdown to assist the controller in determining the azimuth position.

Heading changes should be assessed using the trend information gained from monitoring the track history 'trail'. Track histories also show the rate of correction to the centreline (rapidly, nicely, slowly, not correcting). The aircraft's position in relation to the centreline should be described as follows:

Azimuth Position	Interpretation
'On Centreline'	When the radar return is on or touching the orange centreline.
'Slightly Right/Left of Centreline'	When the radar return is between the centreline and the 2° azimuth line, but not touching either.
'Right/Left of Centreline'	When the radar return is between the 2° and 5° azimuth lines, or touching either.
'Well Right/Left of Centreline'	When the radar return is outside the 5° azimuth lines.

3.4.2.4 Elevation Control

The PAR controller should obtain a correct readback of the appropriate altimeter setting from the pilot prior to initiating descent. In circumstances where a late handover has taken place, it is permissible for the PAR controller to initiate descent followed immediately by a request to readback the appropriate altimeter setting. A warning that the aircraft is approaching the glidepath should be relayed to the pilot, as well as an instruction to begin descent. Accepting that allowances have to be made for the type of aircraft and approach speed, this warning will normally be issued as the aircraft reaches 200ft below the glidepath. The instruction to begin descent should be given at a range commensurate with the performance of the aircraft. As the aircraft descends, the pilot should be advised of his aircraft's position in relation to the glidepath and its rate of correction (trend), to which he will apply his own adjustments to the aircraft's rate of descent. This rate of correction (rapidly, nicely, slowly, not correcting) can be estimated by monitoring the movements of the track history 'trail'. There can be large fluctuations in the height information provided by PAR Data Block (particularly with larger aircraft or formations) therefore controllers should concentrate on interpreting the overall trend of the descent rather than report 'snapshots' based on single height indications. Where possible, glidepath information should be given down to 50ft below the published Procedure Minimum. The aircraft's position in relation to the glidepath is described as follows:

Glidepath Position	Interpretation
'On Glidepath'	When the radar return is on or touching the glidepath cursor
'Slightly Above/Below Glidepath'	When the radar return is no longer touching the glidepath but the height information on the Data Block indicates that it is within 60ft
'Above/Below Glidepath'	When the height information on the Data Block indicates that the aircraft is between 61ft and 100ft from the glidepath
'Well Above/Below Glidepath'	When the height information on the Data Block is greater than 100ft from the glidepath
'Dangerously Below Glidepath Acknowledge'	When the radar return touches or is considered to be descending rapidly towards the Lower Safe Limit Line Cursor. An acknowledgement is required from the pilot.

3.4.2.5 Clearances

It is the responsibility of the PAR controller to ensure that a clearance appropriate to the type of approach is obtained from the Aerodrome Controller. The clearance should be obtained by the 4 NM point, passed verbatim to the pilot and an acknowledgement requested. In the event of the clearance being delayed the controller should make a further attempt to obtain a positive clearance to Land,

Touch and Go, carry out a Low Approach, or an instruction to break off the approach (suitably amplified). This clearance must be passed to the pilot not less than 2 NM from touchdown.

3.4.2.6 Vital R/T Actions

Talkdown controllers should ensure that the following vital R/T actions are completed during final approach:

a. Prior to descent obtain readback of correct altimeter setting

b. Immediately prior to descent warn the pilot of his approach to the glide path and impending descent

c. During descent before a final clearance is obtained the controller should instruct the pilot to check gear and obtain an acknowledgement. There is no requirement to check fixed undercarriage aircraft

d. Request an acknowledgement of the clearance (e.g. C/S, cleared to Land/Touch and Go/Low Approach, circuit state 'acknowledge')

e. Warn the pilot that he is approaching his Decision Height. The distance from touchdown at which this warning is given should be related to the pilot's DH, the approach speed of the aircraft and its position relative to the glidepath (i.e. if the aircraft is below the glidepath, then the warning needs to be provided earlier than if the aircraft were on the glidepath). The pilot should also be informed when the aircraft's radar return passes through the Decision Height cursor line

On completion of the talkdown the controller should inform Director: 'Talkdown free'.

Chapter 5 Lower Airspace Radar Service

3.5.1 Provision of LARS

LARS provides radar services to civilian and military aircraft in transit or operating outside controlled airspace below FL100. Provision of LARS is predicated on the use of existing ATC equipment and manpower in order to provide coverage of UK airspace below FL100. Participating LARS units, availability and area of coverage are listed in the UK AIP ENR 1.6.3.

The provision of Approach Services should take priority over the LARS task. LARS ATSUs should provide either a Deconfliction Service (DS) or a Traffic Service (TS) in accordance with procedures detailed in CAP774 – UK Flight Information Services. If a LARS unit is requested to provide a radar service to an aircraft operating beyond or, particularly, above the LARS envelope the request should be referred to the appropriate Air Traffic Control Radar Unit (ATCRU). If the ATCRU is unable to provide a service, the LARS ATSU may do so subject to the ATCRU's agreement and capacity being available. Deconfliction minima and terrain clearance criteria should be in accordance with the procedures detailed in CAP 774. Operating procedures appropriate to an ATSU's LARS area should be detailed in local ATC orders.

Chapter 6 Co-ordination Procedures

3.6.1 Radar Handover

Radar Handover is the preferred method of transferring responsibility from one radar unit to another.

A radar handover can be effected between 2 agencies provided that:

a. Satisfactory 2-way speech is possible on the landline.
b. Responsibility for the aircraft is transferred directly from controller to controller.
c. The aircraft is clear of CAS (classes A, D and E).
d. The aircraft is in an area of overlapping radar cover.
e. The handover fulfils any standing agreement between the 2 agencies.
f. The releasing controller resolves any traffic conflictions before completing the handover.

The following information should be given in the order shown:

a. Control position of the handing-over controller.
b. Nature of task (e.g. VHF lower airspace transit) and callsign.
c. Position, heading/track or vectoring instructions; (the transferring controller should pause at this point to allow the receiving controller to locate the radar return, say 'contact', and pass the new SSR code for assignment by the releasing controller).
d. Flight level/altitude and flight conditions (if significant).
e. Type of aircraft.
f. Intentions (e.g., destination)
g. Any other relevant information (e.g. type of service, RVSM approval status).

The receiving controller should confirm receipt and understanding of the information by 'reading back'; additionally, the receiving unit's console number or control position should be passed to the handing-over controller.

Example of a Radar Handover from Leeming to Linton:

Transferring controller	Receiving controller
(Telephones Linton Zone)	Linton Zone
Leeming Zone, Handover on N135JP.	N135JP.
From Linton, bearing 360 range 18 miles, tracking 170 [or heading 170 if on a radar heading], squawking 0403.	Contact, squawk 4513.
"N5JP squawk 4513" (transmitted over RTF) Cessna 310 from Prestwick to Humberside FL70 Traffic Service	Cessna 310 from Prestwick to Humberside FL70 Traffic Service, N135JP identified, [heading/level instructions if required] contact Linton Zone 118.550
"N5JP contact Linton Zone 118.550", Leeming	Linton

3.6.2 Traffic Information and Co-ordination

3.6.2.1 Traffic Information

1. Traffic Information between ATS personnel, is information about an aircraft or its flight which is relevant to the provision of an air traffic service.
2. The purpose of traffic information between ATS personnel is to enable the recipient to determine whether or not any action is necessary to achieve or maintain the required separation between the subject aircraft. For example, after receiving traffic information, a controller may consider it necessary to issue avoiding action or may request co-ordination with respect to the traffic.
3. The passing of traffic information does not imply a commitment to an agreed course of action and there is no undertaking to update the information that has been passed. The dynamic nature of an air traffic environment renders traffic information obsolete once passed. **The passing or receiving of traffic information alone does not constitute co-ordination.**
4. If, after receiving traffic information, a controller believes that co-ordination is necessary, he should use the term “Request co-ordination” and should follow the verbal procedure detailed in the paragraph below.
5. When describing the height, level or altitude of an aircraft for the purposes of passing traffic information or agreeing coordination, the terms “Not Above”, “Not Below” or “Maintaining” should be used as appropriate.

3.6.2.2 Traffic Coordination – General

6. Coordination is defined as the act of negotiation between two or more parties each vested with the authority to make executive decisions appropriate to the task being discharged.
7. Coordination is effected when the parties concerned, on the basis of known intelligence, agree a course of action. Responsibility for obtaining the agreement and for ensuring implementation of the agreed course of action can be vested in one of the parties involved. Where a coordination arrangement is operated on a long-term basis, it should be covered in unit orders or an inter-unit agreement, as appropriate.
8. Approved methods of co-ordination are Tactical (including traffic not yet on frequency) and by Standing Agreement, as defined in MATS Part 1 Section 1 Chapter 11.

3.6.3 Co-ordination Procedures

When a controller intends to initiate coordination and believes, but is not certain, that another controller has responsibility for the aircraft against which co-ordination is required, the initiating controller should:

a. Make verbal contact with the most appropriate controller and open the dialogue with the words “Request Traffic Information”.
b. Refer to the aircraft upon which information is required using one of the identification methods (position).
c. If the responding controller confirms that he is controlling the relevant aircraft, obtain details of its intentions.
d. If appropriate, request coordination in accordance with the paragraph below.

When a radar controller seeking coordination is able to determine (e.g., from SSR data) which controller is controlling the aircraft against which coordination is required, the initiating controller should:

a. Make verbal contact with the appropriate controller and open the dialogue with the words “Request coordination”.
b. Refer to his aircraft and the aircraft upon which coordination is requested in the order most appropriate to the situation giving the positon and SSR code.
c. Propose a course of action upon which agreement is requested and obtain a clear decision on that proposal. To ensure clarity and avoid misunderstandings, before terminating the call, parties should explicitly state the action required of their aircraft to achieve the agreed course of action. For example, an appropriate response to a request for an aircraft to maintain FL 120 can be, “My traffic maintaining FL 120”. A response that does not reaffirm the details of the agreement, like “Roger”, should not be accepted.

The proposed course of action should be expressed in unambiguous terms. A statement that no action will be taken can constitute an agreement, although there is still a requirement for both controllers to explicitly state the actions required of their aircraft.

Where aircraft are climbing or descending, controllers can include the provision of horizontal separation until a flight profile is achieved that will provide adequate vertical separation with the conflicting traffic. For example, “I will take 5 miles until not below FL 210” or, “I will take 5 miles until 1000ft above/below on Charlie”. In the absence of an RT report from the pilot of passing or reaching the required level, the criteria for level occupancy using Mode Charlie should be applied. Where both aircraft are climbing, or both are descending, controllers can coordinate to use Mode Charlie indications to enable an expeditious step climb/descent, which maintains the required vertical separation/deconfliction minima, e.g., “I will take 1000ft above/below on Charlie” or, “I will maintain 1000ft above/below on Charlie”. In such circumstances the criteria for level occupancy using Mode Charlie should be applied.

Example of co-ordination between Leeming and Linton:

Initiating controller	
(Telephones Linton Zone)	Linton Zone
Leeming Director, Request Traffic Information Topcliffe south 3 miles squawking 4510	Tucano departing north east climbing FL150
Request Co-ordination my traffic UMBEL north 10 miles tracking north-west squawk 0422	Contact
Hawk inbound runway 16 deconfliction service, not below FL160 your traffic not above FL150 until clear	Your traffic not below FL160, my traffic not above FL150 until clear
Co-ordinated, Leeming	Linton

SECTION 4 AREA CONTROL

Chapter 1 Military Area Radar

4.1.1 Introduction

Military Area controllers work alongside civilian Area controllers to ensure the safe and expeditious integration of both military aircraft through the civil airways structure, whilst also assisting with the safe passage of civilian aircraft that require to transit outside of the airways.

4.1.1 Area of Responsibility

Callsign	EGVV_CTR
RTF Callsign	Swanwick Mil
Frequency	135.150
SSR Code allocation	3350-3367

Swanwick Mil provides radar services within the London and Scottish FIR/UIR including services to aircraft outside controlled airspace between FL100 and FL660 and within active TRAs. Airways crossing services for all Radar Corridors is also provided.

If required, the task may be divided into the sectors notified in the AIP ENR section.

4.1.2 Responsibilities

Swanwick Military provides aircraft with the following services listed in order of priority:

1. Aid to aircraft in distress
2. Radar Control of aircraft flying between FL195 and FL660
3. Radar Control of aircraft crossing the airways
4. Centralised Approach Control service to aircraft descending into or climbing away from Military airfields as appropriate (including top-down cover).
5. Deconfliction or Traffic Service to aircraft in transit below FL195 subject to control capacity and radar coverage.
6. Radar Control/Deconfliction Service to aircraft on flights classified as Special Tasks.

Aircraft routing outside the airways system for part of or all of the planned route will be provided with ATS by Swanwick Mil for the portion of the flight which is outside the airways above FL90. This routinely applies to flights to/from Newcastle, Norwich, Durham Tees Valley and Humberside.

4.1.2.1 Outbounds

The Approach unit will pre-note Swanwick Mil when the aircraft is starting by providing the callsign, SSR code and ETD. Swanwick Mil will issue the discrete SSR code, Flight Level (usually FL190) and frequency. Aircraft may be transferred by silent handover provided that they are clear of conflict and climbing to the agreed level.

Swanwick Mil will request airways joining/crossing clearance from the appropriate London/Scottish ACC sector.

4.1.2.2 Inbounds

The ACC sector will pre-note aircraft leaving the airways to Swanwick Mil who will provide a discrete SSR code and contact frequency. Swanwick Mil will pre-note the destination Approach unit at least 15 minutes before the ETA, with the callsign, ETA, SSR code. The Approach unit will provide an SSR code, Flight Level and contact frequency. Aircraft may be transferred by silent handover provided that they are clear of conflict and descending to the agreed level.

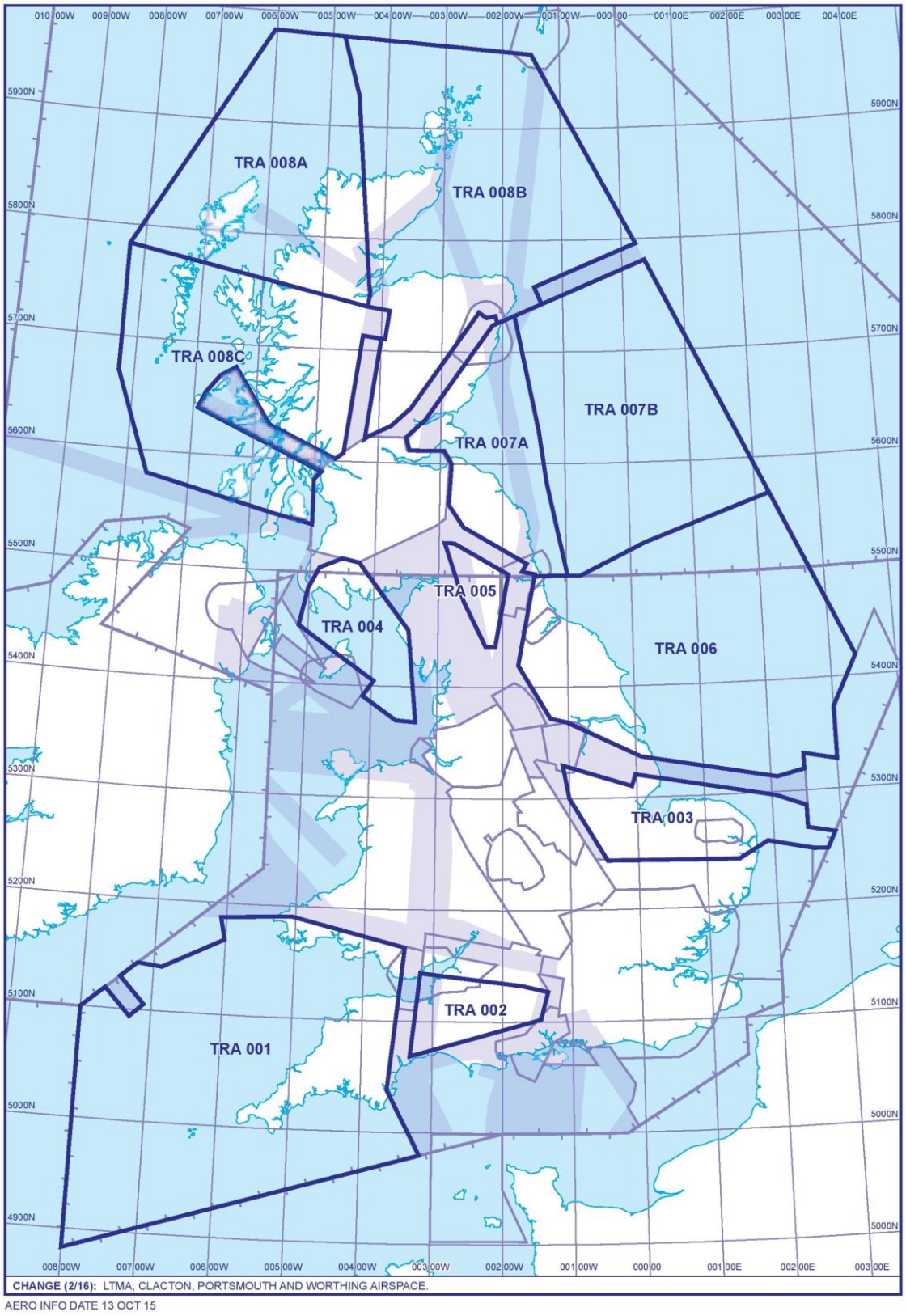
4.1.3 Autonomous Radar Status

In addition to ATCCs, certain military and civil ATC radar units are designated as Autonomous Radar Units in accordance with the appropriate DAP Policy Statement. Autonomous Radar Status authorises a unit to provide an ATS to aircraft flying in CAS for which an ATCC has specific responsibility. Certain area radar services are also available from the following autonomous radar units:

a. Plymouth Military Radar
b. RNAS Yeovilton
c. BAeS Warton.
d. MOD Aberporth
e. RAF Spadeadam

Note: Currently, the provision of Fighter Control is not permitted. AWACS aircraft do not have authority to issue instructions or provide any form of ATC service to aircraft.

4.1.4 Temporary Reserved Areas (TRAs)



Chapter 2 Area Radar procedures

4.2.1 Above FL195

The airspace classification between Fl195 and FL660 within the UK FIRs/UIRs is Class C and is therefore a known traffic environment. However, the FIR/UIR boundary is FL245. When Swanwick Mil is online, military aircraft are not permitted to fly within Class C without receiving a Radar Control or Procedural Service from Swanwick Mil except when:

a. Flying as GAT.
b. Flying as OAT or DAT under the control of an Autonomous Radar Unit.
c. Operating within the East Anglian MTA, the North Wales MTA and TRAs during their published hours of activity or within active Danger Areas.
d. Taking part in exercises under conditions specified under coordinated activity.

4.2.1.1 Co-ordination with Autonomous Radar Units

Autonomous radar units providing service to aircraft above FL195, should co-ordinate their activities with Swanwick Mil.

Controllers at Autonomous radar units should comply with the following procedures:

a. Notify the Swanwick Mil of the flight details of those movements likely to operate above FL195.
b. Identify the aircraft to the ATCRU concerned when it climbs above FL195, and confirm the details previously notified.
c. Continue to update the flight details as agreed mutually.
d. On observing a potential confliction, attempt to obtain all relevant flight details from Swanwick Mil.
e. Advise the Swanwick Mil when the aircraft is clear of its AOR.

4.2.2 Below FL195

4.2.2.1 Provision of service outside CAS

Swanwick Mil controllers provide UK FIS in class G airspace in accordance with CAP 774. Civil aircraft operating from air will be provided

4.2.2.2 Provision of services inside CAS

Swanwick Mil controllers can provide Radar Control to aircraft in Class A CTAs (including airways) and CAS of Classes C, D and E, without prior reference to the appropriate civil sector controller, provided that separation is maintained in accordance with Paragraph **Error! Reference source not found.** b elow. Swanwick Mil controllers cannot provide ATS to aircraft in CTRs (irrespective of CAS Class) except when authorised by the appropriate control authority.

4.2.3 Airways Crossing

4.2.3.1 Cleared Flight Path (CFP) Procedure

A CFP may be requested from the appropriate CAS sector. This procedure is subject to the approval of the sector controller and other conditions as follows:

a. A CFP should only be requested when the prescribed separation may not otherwise be achieved.
b. The position of the crossing should be stated in terms readily assimilated by the sector controller, e.g. as a bearing and distance from an airway reporting point.
c. Once a CFP has been obtained, the agreed track or flight level of the crossing aircraft should not be changed without the prior approval of the sector controller, or the CFP automatically becomes invalid.
d. An aircraft in receipt of a CFP is deemed to be separated from CAS traffic subject to any conditions notified by the sector controller. Consequently, controllers are not required to give instructions to avoid recognised CAS traffic unless the prescribed separation minima are observed being eroded.
e. Within CAS, an aircraft on a CFP need not be provided with separation from unknown traffic unless it is known or suspected that the unknown aircraft is lost, has experienced radio failure or has inadvertently penetrated CAS.
f. An aircraft crossing CAS under a CFP has right of way over OAT crossing CAS under Radar Control without a CFP.

4.2.3.2 Radar Corridors

In the event that an OAT aircraft wishes to transit an area of high density controlled airspace, a series of Radar Corridors has been established within the UK. These are detailed in Appendix A. In the event of a military area controller being online, the controller will provide coordination and corridor radar services.

4.2.4 Air-to-Air Refuelling Procedures

Most training refuelling is conducted on designated towlines, which are racetrack patterns some 60 to 100 NM long, usually between FL100 and FL290. AAR operations will be notified by vRAF via the forum VATSIM-UK Military RTS forum. All aircraft involved in refuelling operations in above FL195 should be under Radar Control. In airspace where Radar Control is not mandatory, any applicable ATS may be provided.

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SECTION 5 CONTROLLER'S EMERGENCY ACTIONS

Chapter 1 Speechless Procedures

If an aircraft loses the ability to transmit speech, pilots should adopt the speechless procedure and all controllers should be familiar with this phraseology. The ● symbol denotes short carrier-wave only transmissions and a long-dash indicates a long transmission. The code uses these transmissions as follows:

●	**Yes**
●●	**No**
●●●	**Say Again**
●●●●	**Homing/Request Assistance**
— ● ● —	**Further Emergency**

In addition, pilots will use one long transmission to indicate the requested manoeuvre or action has been completed, i.e. 'Speechless One report aerodrome in sight with one long transmission'.

Controllers should ascertain the pilot's needs by asking closed questions - questions with a yes or no answer. On receipt of 4 short carrier-wave transmissions the controller should answer the call giving the standard call 'Speechless aircraft do you require recovery to (Station name)?'

If the answer is yes, then instruct the pilot to 'adopt callsign Speechless One', give a heading to the aerodrome and ask:

1) 'Is this a practice?'

2) 'Do you have you any other forms of (practice) emergency?'

If the pilot has indicated a further emergency, then the main questions should be asked in sequence. These questions are not intended to provide an answer to all possible emergencies; controllers must be prepared to adapt to any given situation.

Main Question	Supplementary Questions	
	Fixed Wing	Rotary Wing
Can you maintain height?	Are you flamed out? Are you short of oxygen? Are you affected by icing?	Do you have a control problem? Do you have an engine failure? Are you affected by icing?
Can you carry out a normal recovery?	Are you short of fuel? Are you asymmetric? Do you have an instrument failure? Do you have electrical failure? (see note) Do you have hydraulic failure? (see note)	Are you short of fuel? Do you have single engine failure? Do you have an instrument failure? Do you have electrical failure? Do you have hydraulic failure?
Can you carry out a normal landing?	Do you have an undercarriage problem? Do you have a brake failure? Do you intend to engage the cable? Do you require the barrier?	Do you have an undercarriage problem? Can you hover? Do you require a running landing?

Note: If it is established that the aircraft type is a Tornado, then controllers should ask if the aircraft has a wing sweep failure.

The controller should ascertain the type of recovery required and subsequent actions depend upon the pilot's requirements. For example, if the pilot wants a radar pick-up it will be necessary to ask questions and give instructions to identify the aircraft.

On transfer between controllers it is important for the receiving controller to confirm that the speechless aircraft calling him is the same one that has been transferred to him from the other controller. The pilot will initiate contact with the receiving controller using the Homing/Request Assistance call.

Speechless 1 	• • • •
	Speechless aircraft Markston Tower, are you Speechless 1 from Markston Approach?
Speechless 1 	•

Chapter 2 Practice Emergencies

5.2.1 Practice PAN

Aircraft may carry out simulated emergencies for pilot training purposes and will call ATC with the message “Practice PAN, Practice PAN, Practice PAN, C/S”.

ATC should respond with “C/S Practice PAN acknowledged, your steer for (airfield name) is … degrees, pass details when ready.”

A steer for the airfield may be given to the aircraft using D/F or surveillance derived information.

Chapter 3 Approach Procedures

5.3.1 Hawk and Tucano Radar Actual and Practise Forced Landing

5.3.1.1 General

The following radar actual/practice forced landing (RA/PFL) procedure has been devised to permit recovery from above a cloud layer or in conditions of poor visibility following an engine failure. Relevant RT phraseology is in CAP413. The procedure, which is in use at Hawk and Tucano stations, is as follows:

a. Following the initial request for a RA/PFL, the pilot is given a steer for the airfield corrected as necessary, to permit a homing to overhead.

b. The pilot may have lost some instruments, including navigation displays, and therefore may not be able to give an accurate position report. Identification should be as expeditious as possible by whatever means are available. The pilot may be able to squawk Mode 3A 7700 in an actual emergency.

c. Once identified the pilot is given ranges from the overhead at 1 NM intervals.

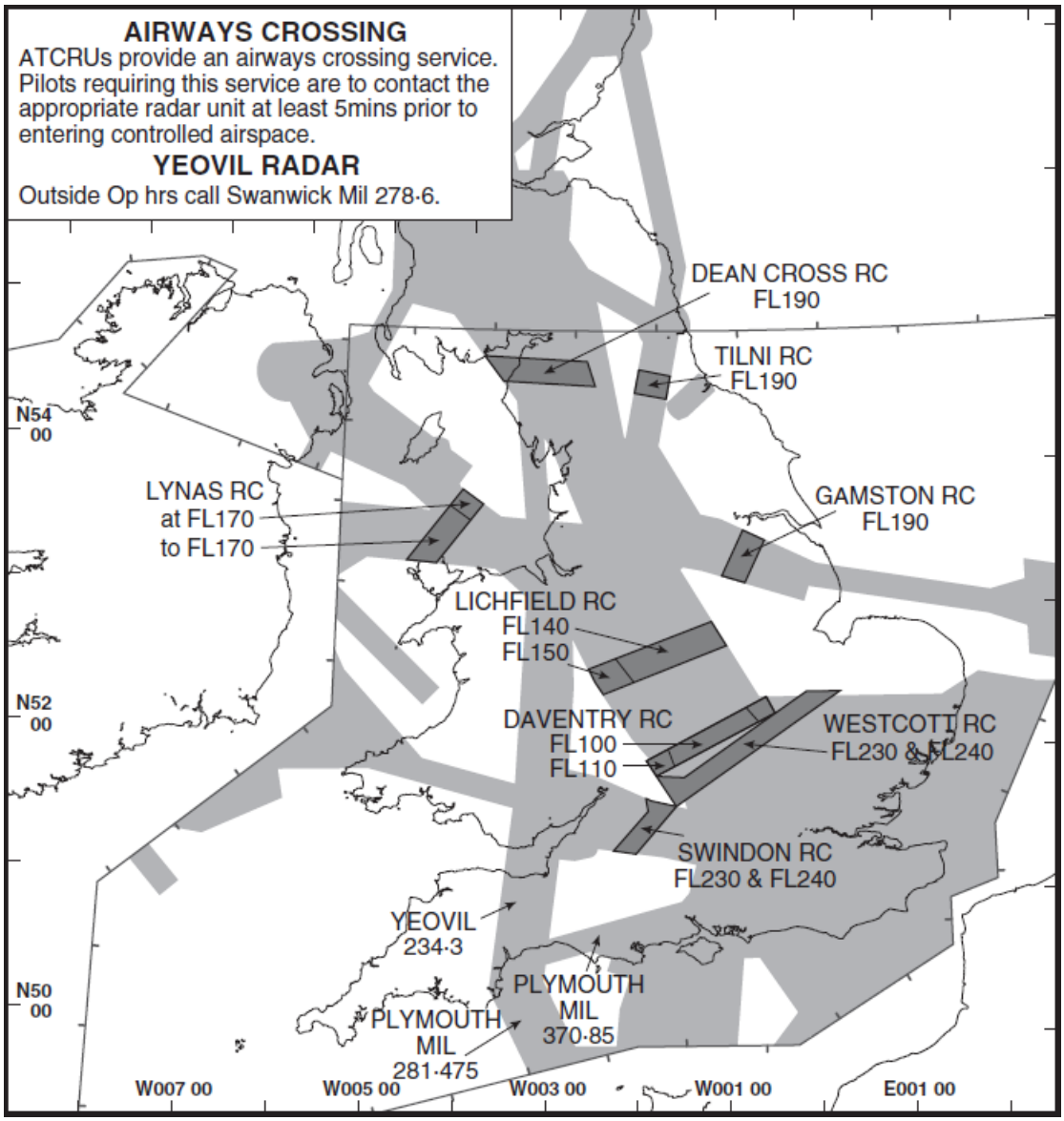
d. While gliding towards the overhead the pilot compares his range with his height in thousands of feet and adjusts his glide such that he is able, ultimately, to achieve a 1-in-1 glide slope. If the aircraft is positioned particularly high in relation to the distance to run, the aircraft captain may elect to arc or circle in order to achieve the required range/height relationship. Once the aircraft has established in the glide, range information is required at ½ NM intervals.

e. On becoming visual with the airfield (lowest altitude is the circling minimum) the pilot uses his excess speed to position for the most suitable runway at Low Key point, as for a visual A/PFL.

5.3.2 No Compass No Gyro Procedures

If a controller observes an aircraft that does not appear to be tracking as expected for the heading provided or notified by the pilot, the controller may suspect that the aircraft has suffered a compass and/or gyro failure. Initially, the controller will confirm the heading that the aircraft is following and thereafter may invoke the No Compass/No Gyro procedure. Refer to CAP413 Chapter 10 Para 3.30 for details of the phraseology to be used.

APPENDIX A – RADAR CORRIDORS



DAVENTRY Radar Corridor.

a. The Daventry Radar Corridor (DTY RC) is the preferred method for OAT to cross. The coordinates are:
FL100
52 04 33N 001 39 34W -52 20 49N 000 49 34W - 52 14 59N 000 39 38W - 51 56 49N 001 35 33W
FL110
51 59 41N 001 54 11W - 52 25 13N 000 35 44W - 52 18 21N 000 29 02W - 51 53 00N 001 47 03W
b. Centred on the DTY VOR/DME and aligned on the 066°/246° radials, the DTY RC is 8NM wide and available bi-directional at FL100 and FL110.
c. Pilots wishing to use the DTY RC are to comply with Swanwick Mil/LON_CTR pre-notification procedures and state their intention to cross the DTY RC in their flight plan.

DEAN CROSS Radar Corridor.

a. The coordinates are:
54 48 58N 003 51 26W - 54 38 42N 003 37 53W - 54 37 11N 002 37 09W - 54 47 23N 002 44 25W
b. The Radar Corridor operates at FL190. An alternative FL may be used if FL190 is not available.
c. The Radar Corridor is established along a line DCS VOR to MARGO and 5NM either side of centre-line.
d. Pilots wishing to make use of the service and not already in contact with Swanwick Mil/SCO_CTR should contact one of these authorities at least 5 minutes in advance.

GAMSTON Radar Corridor.

a. Swanwick Mil is responsible for the provision of radar controlled airways crossing services through airways L603, L26 and Y70 by military aircraft at FL190. Swanwick Mil are the only military unit authorised to use the Radar Corridor. The corridor is 10NM wide and the coordinates are:
53 17 09N 001 01 56W - 53 36 44N 000 46 12W - 53 32 25N 000 31 04W - 53 14 10N 000 45 51W
b. The Radar Corridor is defined is defined as two parallel lines 10NM apart and perpendicular to the centreline of airway Y70, coordinates 53 36 22N 000 37 13W - 53 13 49N 000 55 10W.
c. Pilots wishing to make use of the service should contact Swanwick Mil at least 5 minutes in advance.

LICHFIELD Radar Corridor.

a. Swanwick Mil/London Control are responsible for the provision of radar controlled airways crossing services to aircraft using the Radar Corridor (RC) established in the LICHFIELD area, to expedite passage through the wide belt of controlled airspace and thus avoid the delays that could otherwise be experienced with the more conventional types of radar or procedural crossings. The corridor is 12NM wide and its coordinates are:
FL140
52 41 55N 002 19 09W - 52 32 18N 002 05 38W - 52 48 06N 000 58 21W - 52 58 18N 001 08 34W
FL150
52 38 11N 002 34 42W - 52 32 53N 002 30 11W - 52 27 43N 002 24 30W - 52 48 06N 000 58 21W - 52 58 18N 001 08 34W
b. The RC operates at FL140 and FL150, and may only be used under the radar control of Swanwick Mil/LON_CTR.
c. Crossings are available in both directions at either level. Pilots wishing to use the RC should contact Swanwick Mil/LON_CTR at least 5 minutes in advance.

SWINDON Radar Corridor

a. Swanwick Mil/London Control is responsible for providing an airways crossing service through airway G1 and the Cotswold CTA from the TMA boundary to the western edge of the Swindon Radar Corridor (SRC). Traffic intensity in this area can cause delays to OAT wishing to cross the airspace. The SRC RC has been created to provide an alternative means of crossing. The coordinates are:
51 22 12N 002 16 36W - 51 21 01N 002 01 19W - 51 40 42N 001 33 28W - 51 44 17N 001 54 50W
51 38 50N 001 53 16W -
b. The SRC is established along a line Brize Norton TACAN to Yeovilton TACAN, 4NM either side of the centre line. It operates at FL230 and FL240 and may only be used under the radar control of Swanwick Mil/LON_CTR.
c. Pilots who require to use the SRC are required to state their intention to cross the SRC in their Flight Plan.

TILNI Radar Corridor.

a. Swanwick Mil/Scottish Control are responsible for the provision of radar controlled airways crossing services between 0800 - 1800 local Mon - Fri, except PH, and crossing Airway P18 by military aircraft at FL190.
The coordinates are:
54 43 56N 002 00 04W - 54 34 06N 002 03 08W - 54 31 35N 001 39 29W - 54 41 25N 001 36 19W
b. The Radar Corridor is defined as two parallel lines 10NM apart and perpendicular to the centreline of Airway P18, coordinates 54 36 08N 001 34 32W - 54 39 22N 002 04 59W.
c. Pilots wishing to make use of the service and not already in contact with Swanwick Mil/SCO_CTR should contact the relevant authority at least 5 minutes in advance.

WESTCOTT Radar Corridor.

a. Swanwick Mil/London Control is responsible for the provision of radar controlled airways crossing services to aircraft using the Westcott Radar Corridor (WCO RC). The WCO RC is established at FL230 and FL240 to ease pressure on intensive airspace demands in the wide belt of controlled airspace north of London. Therefore, OAT wishing to cross controlled airspace in this area should plan to utilize the WCO RC whenever practicable. The coordinates are:
51 53 00N 001 47 03W - 51 53 00N 001 28 44W - 52 26 10N 000 09 58W - 52 26 15N 000 13 48E - 51 42 07N 001 31 22W - 51 40 42N 001 33 28W
b. Pilots are required to state their intention to cross the WCO RC in their flight plan.

LYNAS Radar Corridor.

a. The LYNAS Radar Corridor is established to allow aircraft under the control of Swanwick Mil/London Control to cross L975, L70 and L15 from the airway base to FL170 and L10 at FL170.
b. The western edge of the corridor is delineated by a line through NATKO - CASEL. The eastern edge is 12NM parallel from the western edge. The coordinates are:
53 22 22N 004 43 29W - 53 21 32N 004 19 57W - 53 47 02N 003 49 20W - 53 53 53N 004 05 57W
Between these points the corridor is active in the climb to FL170:
53 22 22N 004 43 29W - 53 21 32N 004 19 57W - 53 38 56N 003 59 09W - 53 45 46N 004 15 44W
Between these points the corridor is active at level FL170:
53 45 46N 004 15 44W - 53 38 56N 003 59 09W - 53 47 02N 003 49 20W - 53 53 53N 004 05 57W
c. Pilots wishing to use the RC should contact the relevant authority at least 3 minutes in advance.