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COMBAT AIR – TRAINING AIRSPACE

CAP1616 STAGE 2b Options Appraisal

This document forms part of the Airspace Change Proposal process as defined in CAP 1616. For ease of reading the Statement of Need, Design Principles and a summary of the Options Development stage are re-iterated. The second part of the document contains the options appraisal with the initial safety assessment.

1. Statement of Need

In SDSR 2015, the Government committed the UK to increasing the number of combat aircraft that the MOD will operate and confirmed the intention to buy 5th generation fast jets. Additionally, as its NATO ally, the US Government has committed to the continued basing of combat aircraft within the UK. Resultantly, there is a projected growth of more capable combat aircraft planned to operate within the UK. To support this Government-directed expansion in military capability, there is a requirement for a larger area of segregated airspace to accommodate training requirements and thus ensure operational capability.

2. Design Principles

Key Principles/Requirements

1. The training area will be within reach of UK/USAFE Main Operating Bases.

2. The design will provide a suitable training area.

3. The design will provide a sufficient overland portion for siting land based assets (Training Requirement).

4. Safety – apply current airspace design safety parameters e.g. buffer policy. Final solution Tolerable and ALARP (Safety).

5. Management of airspace to utilise FUA principles (Efficiency + Airspace Sharing).

6. Minimise impact upon the network where possible (Efficiency + Airspace Sharing).

7. Simplicity - utilise existing structures where possible (Efficiency, Simplicity + Safety).

8. Conformity – use standard airspace structures where possible (Simplicity + Safety).

9. Minimise impact upon any other airspace users (Given the likelihood that any impact will be over the sea and above FL100, it is assessed that there will be few other stakeholders. These will be engaged through wider consultation in Stages 2 & 3 but will not impact the design principles).

3. Options Developments Summary

A number of geographical options were examined during stage 2a. When tested against the design principles the location with the best fit, indeed the only feasible option, without a major redevelopment of UK airspace, was to expand EG D323 in the North Sea. This option achieved the essential requirements of being within reach of RAF/USAFE operating bases, providing airspace that had an overland portion, and was of sufficient size to permit meaningful training. It utilised existing airspace structures and is comparatively simple when compared against a significant redevelopment. There is an impact to the network and potentially some other airspace users, which will be mitigated by the use of Airspace Management protocols and Flexible Use of Airspace principles. Given the lack of geographical options and once military requirement has been met, other than safety, the need to minimise impact of the network has driven development. Hence rather than a series of options, there has been, through collaboration and negotiations between the MOD and NATS, a series of modifications to the design – thus the process has been highly iterative.

4. Methodology

CAP 1616 encourages the development of multiple options that can be tested against criteria in order to provide an objective rationale for an option choice. This methodology may work well for some ACPs such as airfield approaches/departures. It is less useful for airspace design work where any design is complemented by Flexible Use of Airspace principles. This in essence produces, depending upon complexity, a potentially unlimited number of scenarios and configurations. The approach taken with this ACP has been an iterative one. Building on the initial Feasibility and Options Study, the MOD working together with NATS produced an initial airspace design that has subsequently been finessed as more information became available and Airspace Management protocols agreed. The starting point was to produce a segregated airspace structure that met the Statement of Need and then mitigate the impact upon the network through the addition of new upper air routes, activation protocols and modifications to the design. This is in keeping with UK, EASA and ICAO policy for the flexible use of airspace and civil/military cooperation.

In sum,

- Identify and understand State (MOD) requirement.
- Identify location that meets needs with minimum impact on network and other airspace users.
- Design airspace and agree management protocols to minimise impact.
- Assess impact.
- Confirm that impact is acceptable compared with state requirement. This will have to be a subjective judgement as there is no methodology to make a financial cost/benefit analysis between a State Military requirement and commercial entities.

This design and associated Airspace Management has now reached a level of maturity such that some objective comparative measurement of impact can be made against a baseline. CAP 1616 allows for only one option to be appraised and this is the case in this ACP. Though it is worth reiterating, that the potential airspace configurations mean that within this one option there are several options dependent upon the agreed airspace management protocols. To facilitate the appraisal, a baseline of ‘Do Nothing’ is used. Whilst this clearly does not meet MOD requirements, it does allow an assessment of change from what happens now to what is likely to happen in the future with the new airspace. For this appraisal an impact of likely increase in track mileage and subsequently CO2 can be made – details will be included at stage 3. In addition, some soft, non-measurable impacts will be captured.

5. Current Design Option

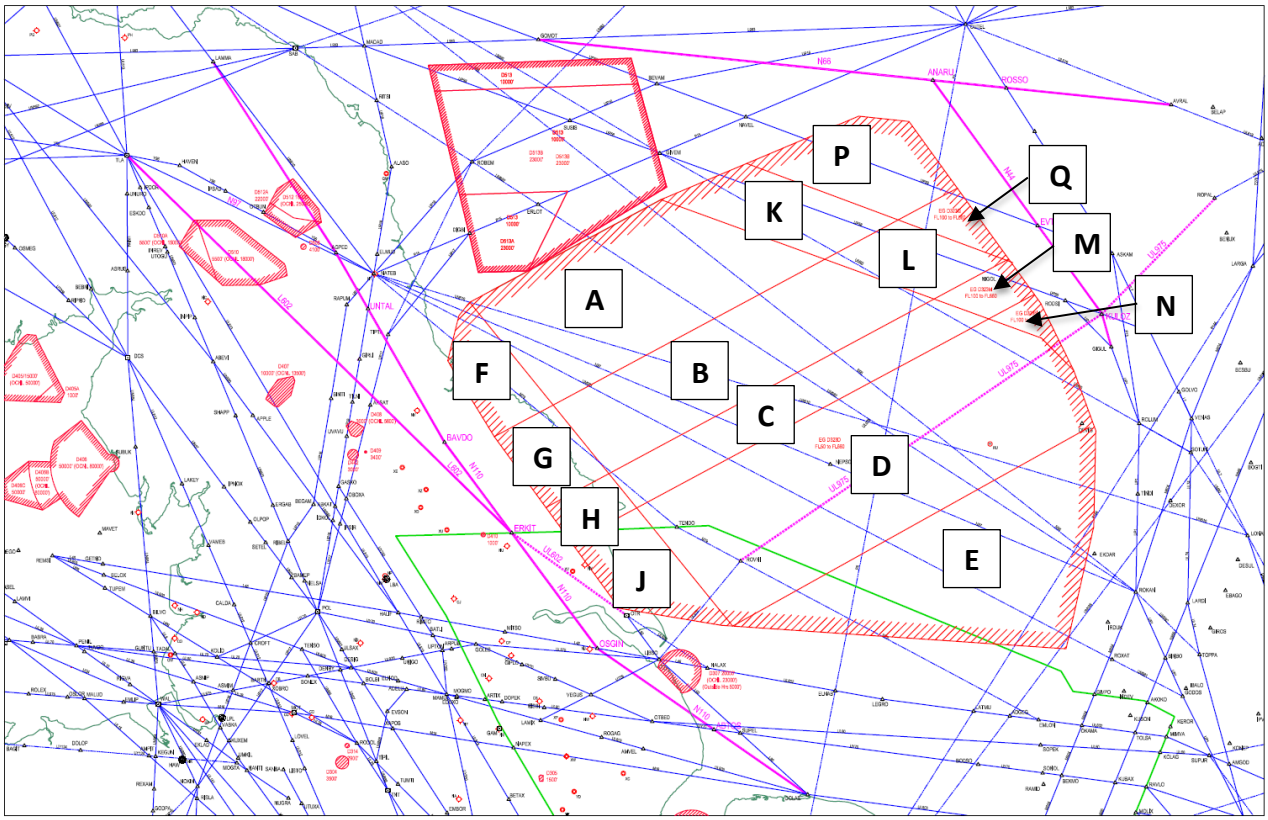

Fig 1 Current Design Option

To meet the SoN the current EG D323 has been expanded by the addition of areas K to Q from FL50 to UNL and areas F-J from FL 100 to UNL. The design is sub-divided to provide airspace configuration options to meet training requirements and to ensure that only the airspace required is booked and not the entire complex. Bookings will also be height sensitive. Activation of the segregated airspace will be via the Military Airspace Booking Coordination Cell (MABCC) at D-1 in order to allow publication of the Route Availability message.

Brief Airspace History

This design option makes use of airspace structures that already exist. The D323 Managed Danger Area was introduced as part of large scale UK airspace re-structuring in 2003 in meet MOD requirements. The location of EG D323 in the North Sea places it within reach of most Military Main Operating Bases. Decisions on the geographical location of UK Main Operating Bases are largely historical to meet threats during the Second World war and Cold war. As such they are well founded large infrastructure locations that have historically utilised the North Sea or operations or training such as the Air Combat Manoeuvring Instrument range.

5.1 Network and wider airspace impact.

a. Areas K to Q effect upper air routes P58 & P59 when active.

Mitigation:

Areas not bookable for segregation above FL 300 when North Atlantic tracks are 'Northerly', between 1000-1500. A metric for 'Northerly' is being developed between MOD & NATS.

A new route bypassing the new segregated airspace (shown in pink) which adds 18nm to the route.

b. Areas F to J effect upper air route L602

Mitigation:

Two new routes (in pink) added to the west of segregated airspace. One route for over flights is -0.2nm northbound and +2nm southbound. The other for traffic into/out of the Scottish TMA is +5nm northbound and +3.2nm southbound. Both these routes can be reduced further through the use of a CDR which can be used when area J is not active to -4.3nm northbound and -4.2nm southbound for overflights, and for traffic into/out of the STMA +1nm northbound and +0.9nm southbound.

c. Areas F to J affect some off route traffic.

Some civilian traffic may choose to route 'off-route' through airspace that will be impacted by Areas F to J. However, this traffic mainly chooses this option when the current EG D323 complex is inactive, rather than follow L602.

Mitigation

When areas F to J are active, off route traffic will be able to route to the west of the segregated airspace adding approx. 5nm to the routing.

d. AEW Orbit Area 4 potentially not viable with the 2 new western routes.

Discussions are on-going with NATS as to whether the 2 new routes will be permanent or CDRs that are available when L602 is not.

Mitigation

If the 2 new routes are CDRs then AEW Orbit area 4 will only be available when areas F to J are not active, which will permit civil traffic to route via L602. If it is decided that the 2 new routes will be permanent, NATS simulation has shown that the AEW area is not viable. Discussions are on-going between the MOD ISTAR Force, DAATM and NATS to resolve.

e. USAFE Tanker route not compatible with new westerly routes.

If the 2 new routes are permanent then a current USAFE tanker route is not compatible.

Mitigation

If routes not permanent, deconflict USAFE tanker route from F to J activation and leave route as is. If routes permanent move tanker route to the east through areas F to J and deconflict segregated activity from tanker times.

f. Area J close to Humberside traffic pattern.

Early engagement has highlighted a potential concern for Humberside controllers with military traffic leaving area J into conflict with Humberside traffic with little warning.

Mitigation

Military aircraft operating in area J not allowed to leave into class G unless under an ATS.

g. Potential difficulty for north/south transiting military traffic ivo NATEB.

When Areas F to J are active there is a potential bottle neck for military traffic transiting north-south ivo NATEB

Mitigation

Potential traffic corridor through area F or amend design to create more room for transits.

h. TRA(G) above FL245 available Sat/Sun interacts with proposed new routes.

The TRA(G) in Yorkshire permits gliding above FL245. It is only available at weekends and records show it has been used very infrequently since 2012.

Mitigation

NATS are confident that as long as Areas F to J are not activated on the weekend, which is expected to be the normal situation, then the TRA(G) activity can be accommodated. Therefore, given the unlikelihood of Areas F-J being active at the same time as the TRA(G) this potential conflict should be acknowledged and resolved by negotiation should it ever happen.

5.2 Further Impact Mitigation

The EG D323 complex is one of several portions of segregated airspace which are managed by the MABCC. They manage the airspace to produce a plan at D-1. There are on-going trials to examine whether improved tactical (Level 3) management can improve the efficient use of UK airspace for both military and civil users. Such improvements will increase the efficiency in which segregated airspace that is no longer required is reallocated to other military units or released for civil use. Early indications are that the trials are having a beneficial effect. Should the trials be successful, it is hoped to introduce the enhanced L3 management with this ACP thus further mitigating any impact created by the activation of new segregated airspace. This positive evolution in UK Airspace Management further complicates any comparison between the 'Do Nothing' option and the option proposed in this ACP.

As part of the on-going discussions with NATS regarding this ACP, they have requested a Reduced Coordination Area be established around the enhanced EG D323 complex in order to permit civil controllers to route aircraft more directly when segregated airspace is active. Thus further mitigating the impact of the new segregated airspace. This is an early adoption of the concepts involved with Free Route Airspace.

5.3 Other Impacts

Implementation

- There will be a cost to NATS of approx. £1m to £1.5m for adaptation of system architecture and training for controllers.

- Likewise there will be a cost to the MOD for the education, publication and the additional management required for the new segregated airspace.

- Other than the minor alterations to route lengths there is no anticipated additional impact upon the airlines.

- All activity is above FL100 so there is no impact upon communities.

- There is no impact upon North Sea commercial activity – Windfarms/Oil Industry.

- There is no perceived impact upon General Aviation.

6. Environmental Impact

Communities There are no proposed changes below 7000ft overland therefore no assessment of environmental impact upon communities is required.

Air Quality There is no requirement for an assessment of Air Quality.

CO2 Given the wide range of variables calculating the impact of the option on CO2 emissions is challenging. There are a number of airspace configurations available that need to be matched up against a number of civil traffic density scenarios. This is further complicated by intended Airspace Management protocols that will give priority to civilian traffic. Any results should be further mitigated by the intended use of enhanced Level 3 (tactical) Airspace Management aimed at increasing the timely release of airspace from military use to the network. This is currently being trialled – early indications are that this is proving beneficial to civilian airspace use. As in the most demanding airspace activation configuration some aircraft will have a small number of additional track miles to fly, as discussed in section 5.1. It is initially assessed that there will be some dis-benefit for CO2 emissions over the baseline of 'Do Nothing'. Data is still being gathered in order to make a more informed estimate of the number of aircraft affected in each airspace configuration. Fuller details will be included in subsequent consultation documents.

7. Identified Stakeholders

Specific Stakeholders

NATS
Airlines
Other MOD entities
Newcastle Airport
Humberside Airport
Durham/Tees Airport
Norwich Airport
BGA

Wider Stakeholders

General Aviation
DfT
CAA
MAA

8. Safety Summary

An initial Safety Assessment has been conducted on the impact of the new Airspace Design. It is assessed that any new hazards are those concerned with introduction of new airspace i.e

familiarity and complexity. In addition, there is a potential high level airspace congestion issue for military aircraft transiting north/south ivo NATEB.

A number of barriers and mitigations already exist for the detailed hazards that may result from a lack of familiarity. In addition, bespoke training and education will be provided to aircrew, controllers and Airspace Managers. If deemed a requirement, segregated airspace use could be phased in and potentially a radar service mandated for early sorties.

The additional airspace structures add complexity to both the operation and management of the airspace. There are already barriers and mitigation in place for the hazards that may arise from airspace complexity. These will be tested against the potential additional complexity, though it is expected that current procedures will prove to be robust and sufficient.

Following early simulation work there is some potential concern that the airspace design when fully active will create conflictions for military aircraft routing north/south through the NATEB crossing, climbing and descending civil traffic. In the most demanding traffic scenarios it is possible that these conflictions may not be resolvable via normal Air Traffic Control methods. Whilst a number of barriers and mitigations to the hazards that may arise from this already exist, it will be examined in more detail. This may potentially require a minor airspace design alteration to create greater space between the segregated airspace, or the establishment of a military transit corridor through the segregated airspace.

All change creates an element of risk to safe operations. In this case, the potential new hazards are broadly understood and the barriers/mitigations required are either in place already or can be readily applied. It is therefore considered that at this stage the design option will meet the required level of safety.

NATS have a mature Safety Management system. The proposed routes have been simulated and will be further simulated prior to controllers training. The routes will be subject to a full NATS safety assessment in due course but currently there are no major hazards identified that will prevent the preferred option from proceeding.

9. Option Appraisal

Two appraisal forms have been completed comparing the proposed design with the 'Do Nothing' baseline. As can be seen from the forms below, the 'Do Nothing' option does not meet the airspace requirements to facilitate Government directed force generation of Combat Air. As such the 'Do Nothing' option is discounted and the proposed design put forward as the preferred option.

Preferred Option

Expand EG D323	**ACCEPT**		
Description of Option			
This option is the only viable geographical location and builds on existing airspace structures of EG D323 to provide a suitable portion of segregated airspace for training.			
Design Principle 1: The training area will be within reach of UK/USAFE Main Operating Bases.	NOT MET	PARTIAL	MET
Option within reach of RAF Marham, RAF Lakenheath & RAF Coningsby.			
Design Principle 2: The design will provide a suitable training area.	NOT MET	PARTIAL	MET
The design option provides the minimum 120nm x 60nm area for routine training and provides sub-divisions that will ensure that segregated airspace is used efficiently.			
Design Principle 3: The design will provide a sufficient overland portion for siting land based	NOT MET	PARTIAL	MET

assets.			
The design provides for land based assets to be sited below segregated airspace.			
Design Principle 4: Safety – apply current airspace design safety parameters e.g. buffer policy. Final solution Tolerable and ALARP.	NOT MET	PARTIAL	MET
Any risks posed by the option have been initially assessed as being ALARP and the option will be subject to full safety assessment.			
Design Principle 5: Management of airspace to utilise FUA principles.	NOT MET	PARTIAL	MET
Through the use of sub-divisions and by management through the MABCC FUA principles are designed in. Moreover, the intention is to bring in improved Level 3 management which will benefit both civil and military airspace users.			
Design Principle 6: Minimise impact upon the network where possible.	NOT MET	PARTIAL	MET
There will be some residual impact upon the network, although this is mitigated to the absolute minimum possible by designing in additional routes and through agreed airspace management protocols.			
Design Principle 7: Simplicity - utilise existing structures where possible.	NOT MET	PARTIAL	MET
The design builds upon an already existing segregated airspace structure.			
Design Principle 8: Conformity – use standard airspace structures where possible.	NOT MET	PARTIAL	MET
All airspace design features are standard for the UK.			
Design Principle 9: Minimise impact upon any other airspace users.	NOT MET	PARTIAL	MET
There is some impact to other MOD airspace users, such as AEW Orbit Area 4 and there may be some impact to aircraft routing off route or above FL100 along the Yorkshire coast.			

Do Nothing Option

Do Nothing	**REJECT**		
Description of Option			
This option does not change airspace structures and requires Combat Air aircraft to use.			
Design Principle 1: The training area will be within reach of UK/USAFE Main Operating Bases.	NOT MET	PARTIAL	MET
EG D323 is within reach of RAF Marham, RAF Lakenheath & RAF Coningsby.			
Design Principle 2: The design will provide a suitable training area.	NOT MET	PARTIAL	MET
Airspace not large enough for routine training.			
Design Principle 3: The design will provide a sufficient overland portion for siting land based assets.	NOT MET	PARTIAL	MET
No overland training area.			
Design Principle 4: Safety – apply current airspace design safety parameters e.g. buffer policy. Final solution Tolerable and ALARP.	NOT MET	PARTIAL	MET
Current situation already ALARP.			
Design Principle 5: Management of airspace to utilise FUA principles.	NOT MET	PARTIAL	MET
There is already some FUA applied, but not the enhanced Level 3 management that the new design would utilise for both this area and other segregated airspace.			
Design Principle 6: Minimise impact upon the network where possible.	NOT MET	PARTIAL	MET

Impact upon network not changed.			
Design Principle 7: Simplicity - utilise existing structures where possible.	NOT MET	PARTIAL	MET
Airspace structure not changed.			
Design Principle 8: Conformity – use standard airspace structures where possible.	NOT MET	PARTIAL	MET
No change to airspace structures.			
Design Principle 9: Minimise impact upon any other airspace users.	NOT MET	PARTIAL	MET
No change.			

10. Summary

The proposed design option has been appraised in accordance with CAP1616 Stage 2. It meets the Design Principles, is achievable and meets the requirements of the SON with the minimum impact upon the civil network and other airspace users. The design has been reached in consultation with NATS and is iterative in nature. It is considered to be compliant with the CAP 1616 process and suitable for progression to Stage 3.