ACP-2020-24

GATEWAY DOCUMENTATION:
STAGE 2 DEVELOP & ASSESS

STEP 2B OPTIONS APPRAISAL, (PHASE I); INITIAL

Drafting and Publication History

Issue	Date	Change Summary
1.0	9 Feb 22	Submitted to CAA

Contents

Introduction

Where are we in the Airspace Design Process?

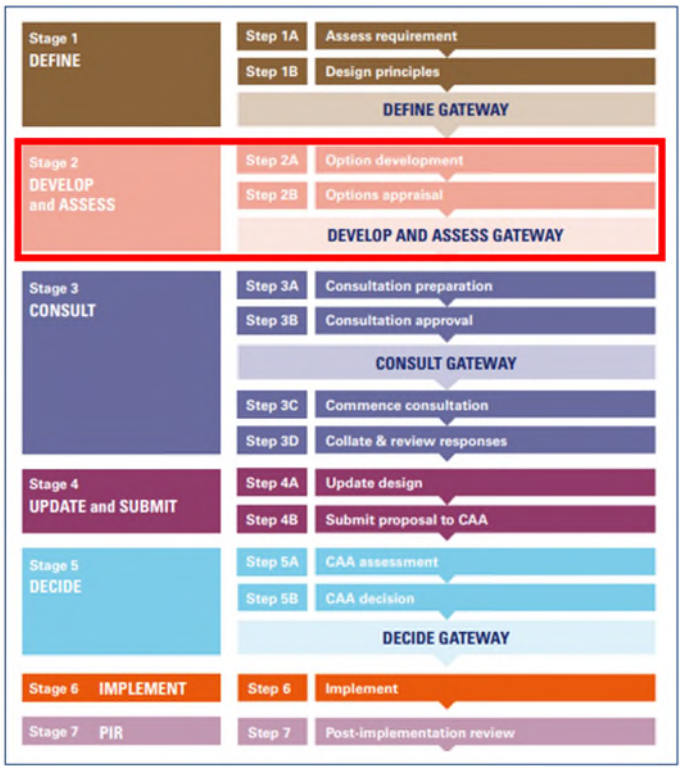


Figure 1. CAP1616 Airspace Change Process

Following the initial CAP1616 ***Stage 1 – Define*** phase, we are now in ***Stage 2 – Develop and Assess***, whereby we (the ISTAR Force as the change sponsor) is looking to establish one or more options to meet the Statement of Need (SoN – detailed later), aligned with the design principles agreed during stage 1. We will then look to make an appraisal of the impact, both positive and negative, of the potential options.

What was the statement of need for this proposal?

Currently the E-3D Sentry AEW Mk 1 utilises the UK AEW areas for UK training and operations. In 2023[1] the E-7 Airborne Early Warning Wedgetail Mk 1 will enter RAF service. Though fulfilling the same role as the Sentry, advances in technology mean that the Wedgetail will not be able to utilise exactly the same orbit areas. The Wedgetail will be required to fly approximately 100 nm by 20 nm raceareas. Best use can be made of some of the existing orbit areas (e.g. UK 1, 7 and 9) as they are both large enough to accommodate the Wedgetail flight profile and are appropriately located to enable Wedgetail to provide a service to its forecast traffic and trade. The existing orbit areas may still be utilised by NATO/visiting forces partners as the UK will retain its NATO commitment in this respect. Therefore, whist the extant orbit areas must remain in place for the time-being, there is a requirement for new orbit areas to be created where the current areas are not sufficient.

Design Principles

DP ID	Agreed Design Principle
a	Must be safe. The defined airspace must provide ATS providers a known traffic environment to ensure safe separation against GAT.
b	Defined areas must be sufficient in location to achieve training and operational objectives.
c	Defined areas must be the minimum dimension to achieve task.

[1] E-7 In Service Date (ISD) has moved to Q3/4 2024.

d	Minimise the impact to Commercial Air Traffic flow, sector complexity and sector capacity.
e	Airspace management and FUA principles will be applied to ensure collaborative decision-making protocols and management processes are established.
f	Defined areas shall not be segregated airspace but will align to current or revised procedures detailed within current NATS/MOD interface documents.
g	The defined areas will detail the separation standard required between GAT and the OAT using the designated area.
h	The design shall seek to rationalise existing areas where appropriate.
i	The design shall minimise the impact on all ATM stakeholders. This will include NATS and other ANSPs (including foreign ANSPs) so as not to over complicate airspace, sector design and service provision.

Noise, environmental, and other costs and benefits

Frequency of Activation

As detailed in Stage 2A, it is expected that E-7 area activation will be in support of one sortie per day for a period of approximately 8 hours. During a sortie, an E-7 may use more than one area. It is assessed that UK E coast areas will be used more than those elsewhere in the UK due to training requirements and support provided to RAF and USAFE fast jet training.

Weekend activation is only likely to be for major exercise activity or for national security requirements.

Noise

The Department for Transport Air Navigation Guidance 2017 details the Government's altitude-based guidance.

- It clearly states that for all changes to airspace with no impact below 7000 feet the CAA should prioritise the reduction of aircraft CO2 emissions and the minimising of noise is no longer the priority; **The sponsor invites CAA to agree that this proposal constitutes a Level M2 in line with this guidance.**

Environmental Impact

The Air Navigation Directions 2017 enable the CAA to disregard the environmental impacts of military aircraft when the proposal has been submitted by, or on behalf of, the MoD. However, the CO2 emissions of civil aircraft re-routing as a consequence of the proposed change must be assessed. A qualitative assessment has already been conducted (see table below), the Sponsor will evaluate whether quantitative analysis, via WEbtag or other means, is needed at Stage 3.

10 Year Forecast

It is anticipated that sortie rates for the E-7 fleet will not increase at all in the 10 years post in service date. This is predicated on annual flying rates mandated by the Royal Air Force. Whilst there is some ongoing discourse about an increase in the fleet size to the original planned 5 airframes, should this ever be achieved it is assessed that it will not increase UK FIR E-7 flying as it would predominantly come with increased deployment of the capability to overseas locations.

NATS Assessment on Quantitative Modelling

In consultation with NATS (see Annex A), they highlighted the following:

"In summary the time, cost and complexity required to produce any data would not be proportionate to the change. Clearly there will be some Operational impact and we look forward to continuing our discussions on this and will, of course, provide formal feedback in to the ACP process via your consultation."

Airspace Change Proposal Classification

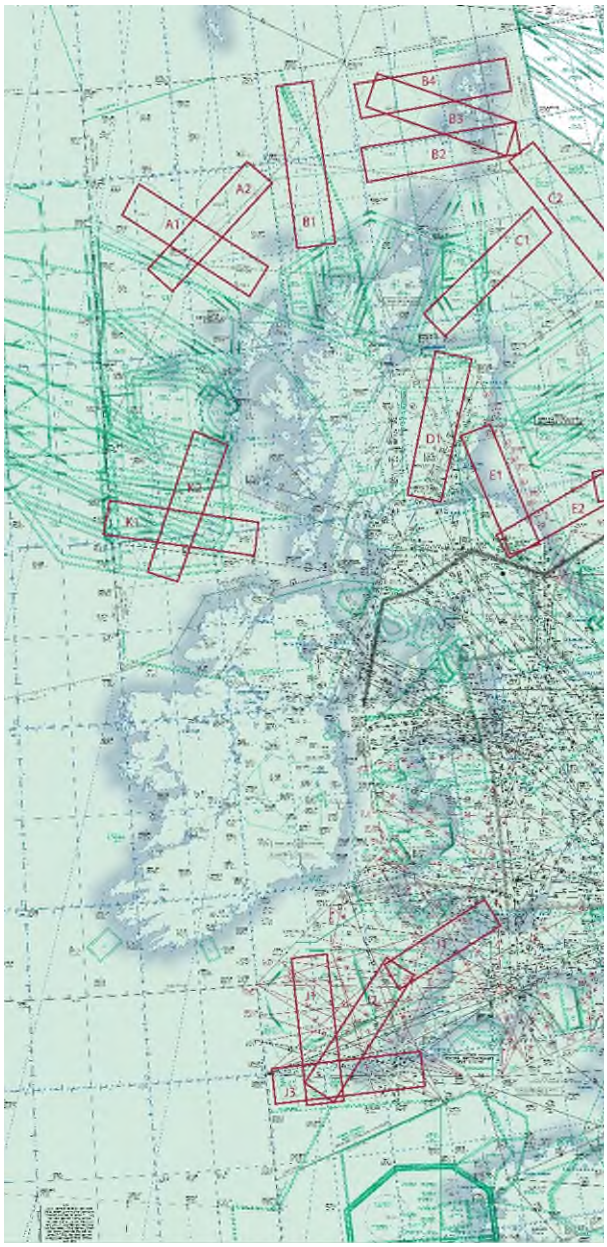
The changes proposed in this ACP affect civil aviation traffic patterns at 7000' or above and is therefore expected to be classified as **M2**. For the environmental assessment of a level M proposal, the Ministry of Defence need only ever assess the anticipated environmental impacts of the consequential changes on civil aviation patterns.

Options Appraisal

“Do nothing” Against Dedicated E-7 Areas

Figure 1. Existing AEW&C Orbit locations

Figure 2. Proposed E-7 Areas



Figures 1 and 3 show the existing AEW&C orbit areas whilst Figures 2 and 4 show the proposed E-7 areas. The existing areas will remain to support NATO E-3 operations until the planned withdrawal from service of the NATO E-3 fleet in 2035. It is for this reason that the Sponsor has elected to use them as the “Do-nothing” baseline for comparative assessment of the proposed areas.

Table 1 then shows the comparison of the E-7 areas against the baseline option.

Figure 3. Existing AEW&C Orbit locations

Figure 4. Proposed E-7 Areas

Table 1. Comparison Table

Group	**Impact**	**Level of Analysis**
Communities	Noise impact on health and quality of life	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	**E-7 Areas (Option 1)**	
The operating heights for the current E-3 orbits and the proposed E-7 areas are in the band FL270-FL330. It is therefore assessed that there would be no noise impact on health and quality of life - this is outside the scope of this metric.	The operating heights of the proposed E-7 areas are in the band FL270-FL330. It is therefore assessed that there would be no noise impact on health and quality of life – this is outside the scope of this metric.	
Group	**Impact**	**Level of Analysis**
Communities	Air Quality	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	**E-7 Areas (Option 1)**	
The operating heights for the current E-3 orbits and the proposed E-7 areas are in the band FL270-FL330. It is	The operating heights for the proposed E-7 areas are in the band FL270-FL330. It is therefore assessed that	

therefore assessed that there would be no air quality issues - this is outside the scope of this metric.	there would be no air quality issues - this is outside the scope of this metric.

Group	Impact	Level of Analysis
Wider Society	Greenhouse gas impact	Qualitative

Evidence Analysis

Do-nothing (Option 0)	E-7 Areas (Option 1)
Without dedicated E-7 areas GAT may encounter some route deviations (operating areas not known in advance/random areas). This would result in additional track miles, additional fuel burn and an increase in greenhouse gas impact. Note: E-7 will represent a reduction in CO2 emissions against E-3D given more efficient engines.	With dedicated E-7 areas GAT could be routed in advance to avoid E-7 operating areas or be allocated a transit FL that negates a climb or descent to route through the operating area (not restricted airspace). This would result in negligible additional fuel burn and have a negligible increase in greenhouse gas impact. Note: E-7 will represent a reduction in CO2 emissions against E-3D given more efficient engines.

Group	Impact	Level of Analysis
General Aviation	Access	Qualitative

Evidence Analysis

Do-nothing (Option 0)	E-7 Areas (Option 1)
The operating heights for the current E-3 orbits and the proposed E-7 areas are in the band FL270-FL330. It is therefore assessed that there would be no impact General Aviation - this is outside the scope of this metric.	The operating heights for the proposed E-7 areas are in the band FL270-FL330. It is therefore assessed that there would be no impact General Aviation - this is outside the scope of this metric.

Group	Impact	Level of Analysis
General Aviation/Commercial Airlines	Economic impact from increased effective capacity	Qualitative

Evidence Analysis

Do-nothing (Option 0)	E-7 Areas (Option 1)
Outside the scope of this ACP.	Outside the scope of this ACP.

Group	Impact	Level of Analysis
Commercial Airlines	Fuel Burn	Qualitative

Evidence Analysis

Do-nothing (Option 0)	E-7 Areas (Option 1)
Without dedicated E-7 areas GAT may encounter some route deviations (operating areas not known in	With dedicated E-7 areas GAT could be routed in advance to avoid E-7 operating areas or be allocated a

advance/random areas). This would result in additional track miles, additional fuel burn.	transit FL that negates a climb or descent to route through the operating area (not restricted airspace). This would result in negligible additional fuel burn.

Group	Impact	Level of Analysis
Commercial Airlines	Training Costs	Qualitative

Evidence Analysis

Do-nothing (Option 0)	**E-7 Areas (Option 1)**
No additional training costs to commercial airlines as a result of using the current E-3 orbit structure as they are already established areas.	No additional training costs to commercial airlines as a result of using this airspace option as they will be operationally similar to E-3 orbit areas.

Group	Impact	Level of Analysis
Commercial Airlines	Other Costs	Qualitative

Evidence Analysis

Do-nothing (Option 0)	**E-7 Areas (Option 1)**
No additional costs to commercial airlines as a result of using the current E-3 orbit structure.	No additional costs to commercial airlines as a result of using this airspace option.

Group	Impact	Level of Analysis
Airport / Air Navigation Service Provider	Infrastructure costs	Qualitative

Evidence Analysis

Do-nothing (Option 0)	**E-7 Areas (Option 1)**
No additional infrastructure costs to airports or air navigation service providers as a result of using the current E-3 orbit structure.	No additional infrastructure costs to airports or air navigation service providers as a result of using this airspace option. Radar maps and charts will be updated in line with the AIRAC cycle. Therefore no additional costs (routine update process).

Group	Impact	Level of Analysis
Airport / Air Navigation Service Provider	Operational Costs	Qualitative

Evidence Analysis

Do-nothing (Option 0)	**E-7 Areas (Option 1)**
No additional operational costs to airports or air navigation providers as a result of using the current E-3 orbit structure.	No additional operational costs to airports or air navigation providers as a result of using this airspace option.

Group	Impact	Level of Analysis

Airport / Air Navigation Service Provider	Deployment Costs	Qualitative

Evidence Analysis	
Do-nothing (Option 0)	**E-7 Areas (Option 1)**
No additional deployment costs to airports or air navigation service providers as a result of using the current E-3 orbit structure.	No additional deployment costs to airports or air navigation service providers as a result of using this airspace option.

Safety Assessment

This section provides a brief qualitative overview of the impact of this proposal on aviation safety. The evidence feeding into this safety assessment is based upon MOD and NATS incident reporting (DASORs/Airprox's) and engagement with E-3 crews who have successfully operated safely in the current structure in the UK. This assessment covers operating in the current E-3 orbits and the proposed E-7 areas but does not include the transit to/from the orbit which would be undertaken using MOD/Civ ATC services. The proposed sortie rate and duration of the E-7 is similar to the E-3 so no additional workload should be placed on crews or controllers.

The E-3 has operated safely in the current UK orbit structure for over 30 years. Notification of the required orbit is passed to Swanwick Mil by a Military Pre-note/F2919 approx 2 hours prior to departure by the operating crew. This data is therefore available to both Mil and Civ ATC in a timely manner allowing sufficient time for safe planning and co-ordination against other traffic. Once established in the operating area (orbit/area) the crew will maintain their allocated FL allowing any conflicting traffic to be routed safely around the area laterally or vertically (airspace is non-segregated and not restricted). Separation once established in the operating areas is provided by Swanwick Mil ATC in liaison with the Civilian sector; additionally, the E-7 is equipped with TCAS to further enhance safety and avoid conflict. The aircraft also generates its own air picture with any conflicting air areas (10nm or 2000ft) being called to the pilots to enhance their SA and overall safety awareness.

The proposed E-7 area structure has, wherever possible, being absorbed within the current E-3 orbit structure to maintain SA for ATS and limit the change to known safe operating areas/procedures. On some occasions the new E-7 areas extend slightly outside the current operating areas, but orientation has been taken into account to limit the effect on ATS whilst maintaining the op requirement for the E-7 radar. Where new areas have been created their locations have been designed to have minimal impact on the civ sector, thus reducing potential conflict and enhancing air safety. It has not been possible to totally isolate the proposed E-7 areas from other Mil traffic requirements, however, when this conflict occurs, operating within an MDA or in close proximity to an AARA for example both the E-7 and conflicting Mil traffic will be coordinated to ensure safe separation by the same ATS.

In summary, safe operation within the new E-7 area structure will be achieved by Swanwick Mil but enhanced by TCAS and the E-7's own sensor. The new areas have been overlayed where possible with E-3 orbits and consideration given to positioning new areas away from civ traffic routes to reduce potential conflict and enhance air safety.

Conclusion

There are minimal financial and other costs in implementation of dedicated E-7 areas and there are also many advantages to doing so. These include safety, operational effectiveness, flexible use of airspace and environmental savings. **As such, Option 1 is the preferred option of the Sponsor.**

	Option	Description
0	Baseline/"Do Nothing"	The "do nothing" option. Keep everything as it is currently, continue to use existing AEW orbit areas. This will limit the operational effectiveness of the E-7 Wedgetail sensor, hindering its ability to fulfil defence tasks. In many instances, operation outside of the AEW orbits would then be required utilising way points for routings. This would reduce predictability and planning for other airspace users, and limit the tactical effectiveness of the E-7.
1	Create dedicated E-7 areas areas	Create new E-7 Wedgetail area locations, predominantly co-located with existing AEW orbit areas. As highlighted, this allows fulfilment of all DPs, particularly through maintenance of the known traffic environment.

Next Steps

This document will be submitted to the CAA as evidence to support the ACP 2020-24 Stage 2B. It is part of the documentary evidence for the Stage 2 assessment gateway (document deadline 10 Feb 23, for the CAA assessment gateway scheduled for 24 Feb 23).

The following CAP 1616 timeline is anticipated.

Event as per CAP1616	Planned Date
Stage 3 CONSULT	26 May 23
Stage 4 UPDATE and SUBMIT	27 Oct 23
Stage 5 DECIDE	12 Jan 24
Stage 6 IMPLEMENT	Apr 24

ANNEX A: UC ACP 2020-24 E7 Wedgetail - Impact analysis discussion

Archived: 30 January 2023 20:37:59
From: [redacted]
Sent: 07 September 2022 16:27:59
To: [redacted]
Cc: [redacted] Flt Lt (Air-1Gp-ISTAR E7B SO3Pers); [redacted]; [redacted]
Subject: RE: UC ACP 2020-24 E7 Wedgetail - Impact analysis discussion
Sensitivity: Normal

[redacted],

As discussed at our meeting this morning re: analytics for E7 airspace:

- I have sought input internally over the last few weeks and our Analytics team have come to the following conclusion.
- The view is that it is not possible to accurately assess the environmental impact of E7 airspace and therefore it is an ineffective use of time and effort to perform any such task. The main constraining factors being:
- The proposed airspace is not segregated from the network (and so does not affect the pre-tactical or flight planning aspects which would normally be assessed to measure any change to the current baseline)
As it is only the aircraft that needs to be deconflicted from GAT, the airspace and aircraft are coordinated on a tactical basis between Mil and Civil ATC as and when required, at a mutually convenient level in the confines of the lateral airspace. The tactical nature and multiple variables at play here including multiple locations, time of day, required/requested levels, GAT / Network demand and frequency for example; adds significant complexity.

It is our view that at best, and if even possible, any analytics would be excessively complex and unreliable to the point that the effort required would be prohibitive and any output would come with a number of CAVEATS that would make it open to challenge.

In summary the time, cost and complexity required to produce any data would not be proportionate to the change. Clearly there will be some Operational impact and we look forward to continuing our discussions on this and will, of course, provide formal feedback in to the ACP process via your consultation.

I'm sorry that we are unable to help on this occasion.

Regards

[redacted]

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NATS Internal

From: [redacted] <[redacted]@qinetiq.com>
Sent: 12 August 2022 13:04
To: [redacted] <[redacted]@nats.co.uk>
Cc: [redacted] <[redacted]@qinetiq.com>; [redacted] Flt Lt (Air-1Gp-ISTAR E7B SO3Pers) <[redacted]@mod.gov.uk>; [redacted] <[redacted]@mod.gov.uk>; [redacted] <[redacted]@qinetiq.com>
Subject: UC ACP 2020-24 E7 Wedgetail - Impact analysis discussion

Hi [redacted],

In advance of the E7 discussion booked for 7 Sep, PSB proposed agenda items. Following our second meeting last year (on 28 Jun 2021), the E-7 Proj O provided the revised co-ordinates for the 13 proposed orbit areas having taken into account NATS' feedback. I have attached them here for ease. Graphical representation of the updated co-ordinates is not available at this stage, but we hope to be able to provide it prior to the meeting.

As you know CAP1616 requires sponsors to describe and monetise the impact of an airspace change on other stakeholders – in this case any impact on civil air traffic and ATM infrastructure/ATS providers. Given that the orbit areas are not blocks of segregated airspace, but areas within which a single level will be used by E-7, it may be difficult to use routine methods to formally analyse any predicted impact.

We understand that any analysis would need to be conducted against a baseline scenario, which we can describe. But before we delve any deeper we would appreciate your advice on how any such modelling /analysis could be managed.

Agenda items:

NATS guidance on modelling activity for activation of proposed orbit areas:

- Suggested modelling approach to assess environmental, economic and CO2 emissions when orbit areas are activated
- How to assess potential financial implications of trg, equipment updates, fuel burn (etc.) required as a result of the airspace change
- Requirement for Webtag analysis
- Potential tasking for ADQ data
- Assessment of whether modelling would be cost/time effective
- Timescales

Please note that this is not a request for the analysis itself, the intention is to establish the art of the possible before any effort is expended on resourcing this task.

Should you require any additional information in preparation for the meeting, please let me know.

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