East Anglia Hub Wind Farmss

ACP-2023-079

Engagement Document

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1 Engagement – Scope and Purpose

1.1 Introduction

Welcome to the Engagement Document for the East Anglia Hub (EA Hub) Wind Farms Airspace Change Proposal (ACP). In this document we will explain the background to our engagement, tell you what we are engaging on, and explain how you can play your part and have your say.

This engagement is open to everyone. If you feel there is someone else you believe may be affected by these proposed changes, then please feel free to share this document and let them know they can find all the relevant information on the Civil Aviation Authority (CAA) airspace change portal.

This document forms part of the document set required in accordance with CAP 1616h Guidance on Airspace Change Process for Level 3 and Pre-Scaled Airspace Change Proposals. For previous stages of the airspace change process, including the Statement of Need (SoN), Design Principles (DPs), Design Options (DOs) and Design Principles Evaluation (DPE), please see the CAA Airspace Change portal, which details the progress of this proposal and includes documentation that describes how we have arrived at the options presented in this document.

1.2 Aim of the Airspace Change Proposal

This ACP is sponsored by Scottish Power Renewables (UK) Limited (SPR), referred to in this document as the Change Sponsor (CS).

SPR intend to develop 3 offshore wind farms in the southern North Sea, 36 kilometres (Km) off the East Anglian coast, which will be capable of providing power to over 2.4 million homes[1]. This ACP does not discuss the principle of the development itself.

As part of the process to apply for this development, the CS commissioned an Environmental Impact Assessment Report within which aviation was a factor to be considered. As part of this the proposal seeks to mitigate issues raised by National Air Traffic Services (NATS) regarding the 'Primary Surveillance Radar at Cromer, and its associated air traffic services'. Although the MOD have commented on the potential for a similar impact on their air surveillance and control operations, a separate technical solution workstream is being conducted in parallel to this proposed ACP under the Joint Aviation Task Force Working Group.

[1] EA Hub Current Day Scenario 2024. Pg 1-3. Airspace change proposal public view (caa.co.uk)

2 EA Hub Wind Farm Development

2.1 Introduction

This ACP supports the development of three wind farm sites in the southern North Sea, between 30 and 70km off the coast of East Anglia. These sites are named East Anglia 1 North (EA1N), East Anglia 2 (EA2) and East Anglia 3 (EA3); the geographic locations of the sites are shown in Figure 1 below. The wind farms have the potential to deliver up to a combined 3.1 gigawatt (GW) of installed capacity, making it one of the largest offshore opportunities in the world. The most northerly site is located approximately 100km to the east of NATS Cromer Primary Surveillance Radar (PSR) and 106km to the east of the Norwich Airport Radar. The southern tip of EA2 is roughly 40km to the east of Orford (see Figure 1). Collectively the EA Hub will consist of up to 242 wind turbines with a maximum blade tip height of 300 metres (m) above lowest astronomical tide (LAT) for EA1N and EA2 and 196m above LAT for EA3.

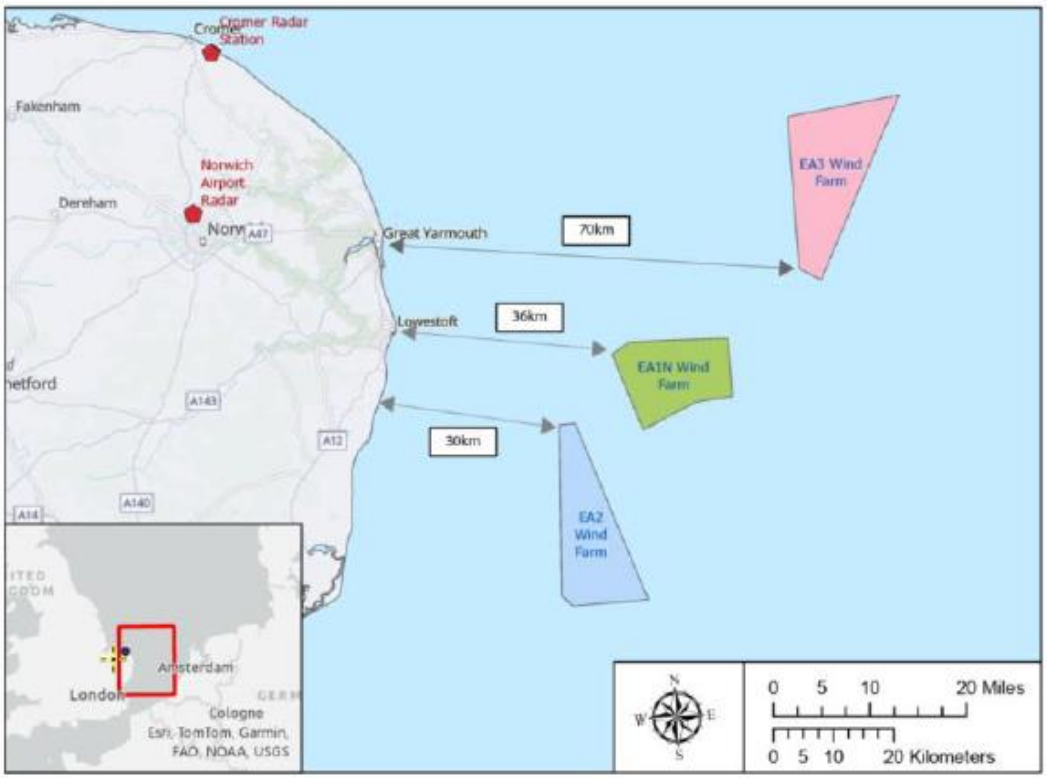

Figure 1 – EA Hub Wind Farm Locations.

More detailed information on the current airspace environment and structure in the vicinity of the proposed developments is provided in the following section. This section also includes information on the usage of these geographical areas by current airspace users, before describing the justification for this supporting airspace change. This document will then describe the options that have been considered and discounted before highlighting the two options that are the basis for this engagement exercise.

2.2 Current Airspace Environment

The proposed sites for the EA Hub Wind Farms are shown in Figures 2, 3 and 4 (more in-depth material can be found on the Airspace Change Portal). The proposed sites are predominantly located within Class G airspace, which is established from ground level to Flight Level (FL)195 (approximately 19,500 feet (ft)). When in Class G airspace around the site, aircraft are permitted to fly without the need to submit a flight plan, be in radio contact with ATC, or display any type of electronic conspicuity that would allow the aircraft to be detected by ATC. In Class G airspace there are no set routes and aircraft are free to fly anywhere, unrestricted in most directions, as long as they abide by the weather minima stipulated for flight under Visual Flight Rules (VFR).

Aircraft flying under Instrument Flight Rules (IFR) and in receipt of an ATS are also permitted to fly through this airspace. In this case, the air traffic controller will need to provide directional information to the aircraft to ensure a minimum of 5 nm separation between the aircraft receiving a radar derived ATS and any unidentified aircraft also operating in the area.

As can be seen below in Figures 2, 3 and 4, there are several exceptions to the above generalisations which apply to the airspace environment around these specific sites.

To the north of the proposed site (as per Figure 2 and Figure 3), there is the approved Norfolk TMZ (shown as orange shapes) which, in the future, will be active from surface (SFC) to FL100 (approximately 10,000ft).

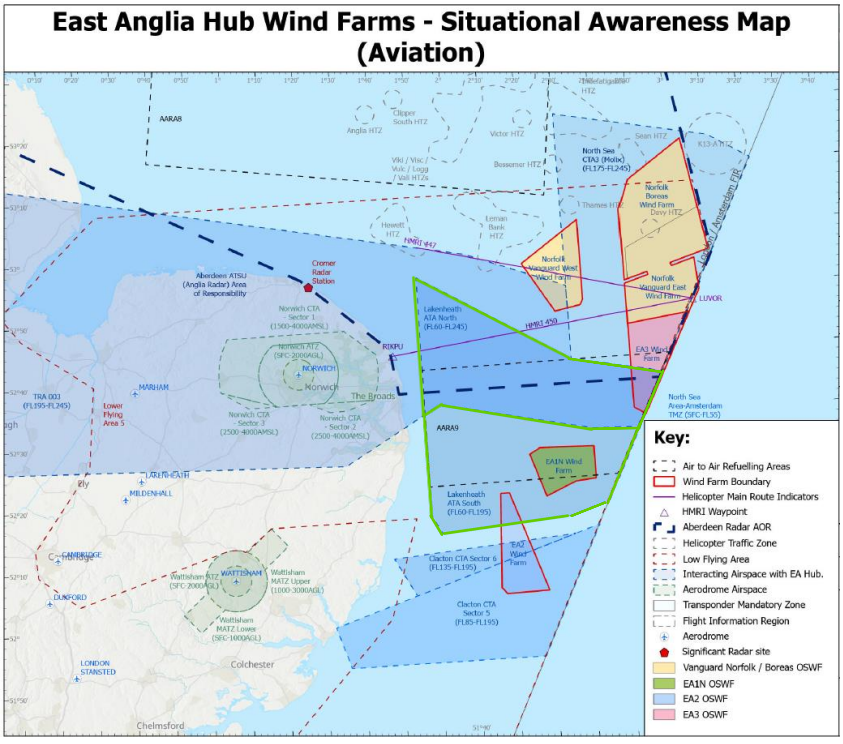

Figure 2 – EA Hub - Situational Awareness Map.

In Figure 2 above (marked in green) are the Lakenheath Aerial Tactics Areas (ATAs) North and South. When required, these areas will be used by military aircraft in

conjunction with military exercises and are operational between the following altitudes:

- ATA Lakenheath North: Lower Limit FL60, Upper Limit FL245
- ATA Lakenheath South: Lower Limit FL60, Upper Limit FL195

Further to this, above the proposed development areas for EA1N and EA3 is Air-to-Air Refuelling Area (AARA) 9 (also shown in Figure 3). When required, this area utilises the airspace between 2000ft and FL50 (approximately 5000ft) and will be used by military aircraft when conducting military exercises.

Figure 3 – Operational Map – Air-to-Air Refuelling Areas.

Above the proposed development sites are several airways. These are shown in Figure 4 , and in elevation views as in Figure 5, Figure 6, and Figure 7. More information can be found in the Current Day Scenario (CDS) but here is a broad overview of any issues or conflictions.

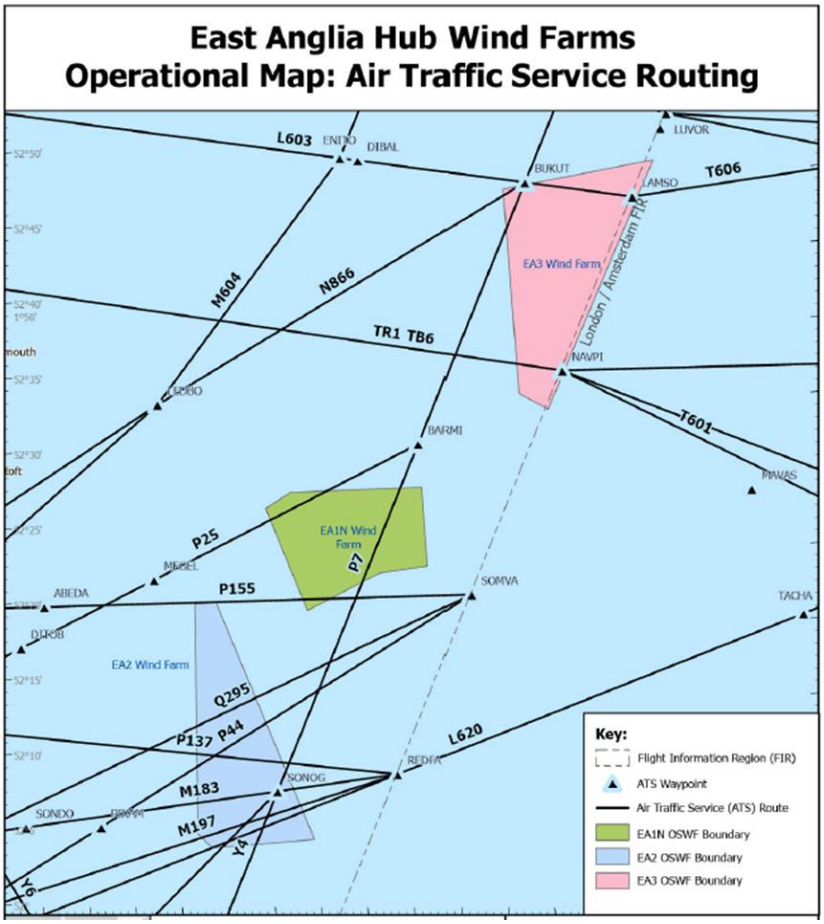

Figure 4 – Operational Map – Air Traffic Service Routing.

2.3 Airspace in Elevation View

To aid in understanding the information presented in Figures 1 to 4 above, below are 3 pictorial profile representations (Figure 5 to Figure 7) of the current airspace at each site. These views will allow stakeholders who are unfamiliar with reading aviation maps and charts to more easily visualise the potentially affected airspace at height.

In Figure 5, we can see the proposed TMZ for EA1N's upper limit is encroached by AARA 9, ATA South and Low Flying Area (LFA) 5. Aside from this, there are various ATS routes which fly above the proposed site but do not conflict.

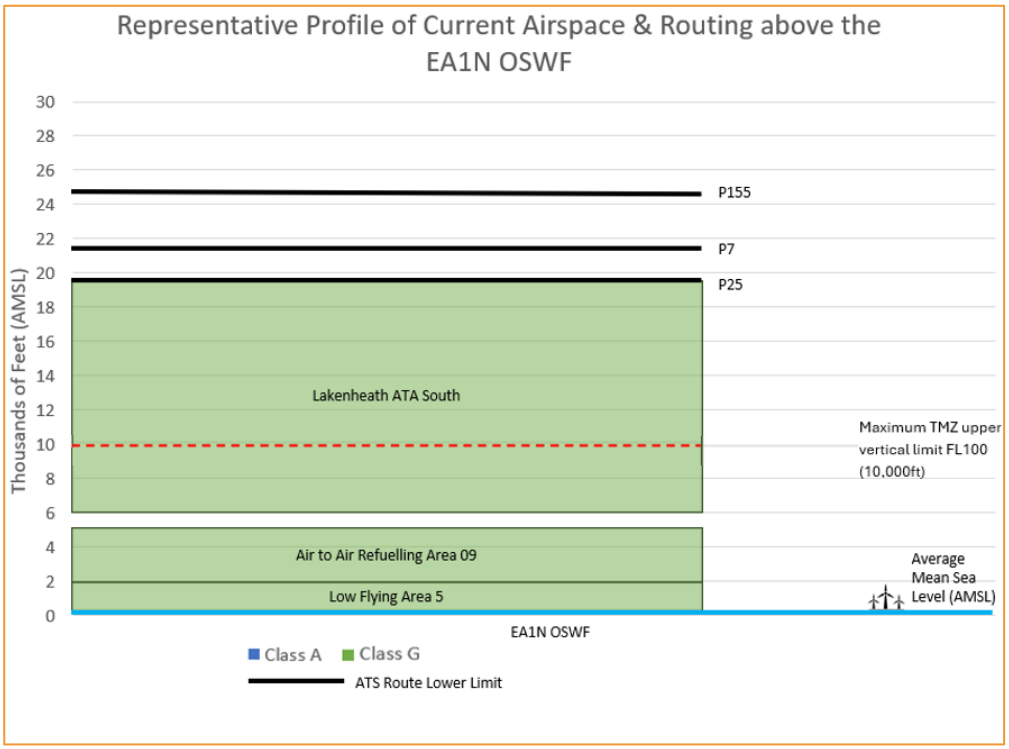

Figure 5 – Profile of interacting airspace above EA1N OSWF.

Figure 6 shows the vertical dimensions of the proposed TMZ for EA2 is more complicated. Here there is a direct confliction with the Clacton CTA Sector 5 (Class A airspace) which will need to be resolved. ATS routes Y4, L620, M197 and P7 are also in direct conflict with the proposed TMZ. As per EA1N, the ATA South and LFA 5 are also in the same area.

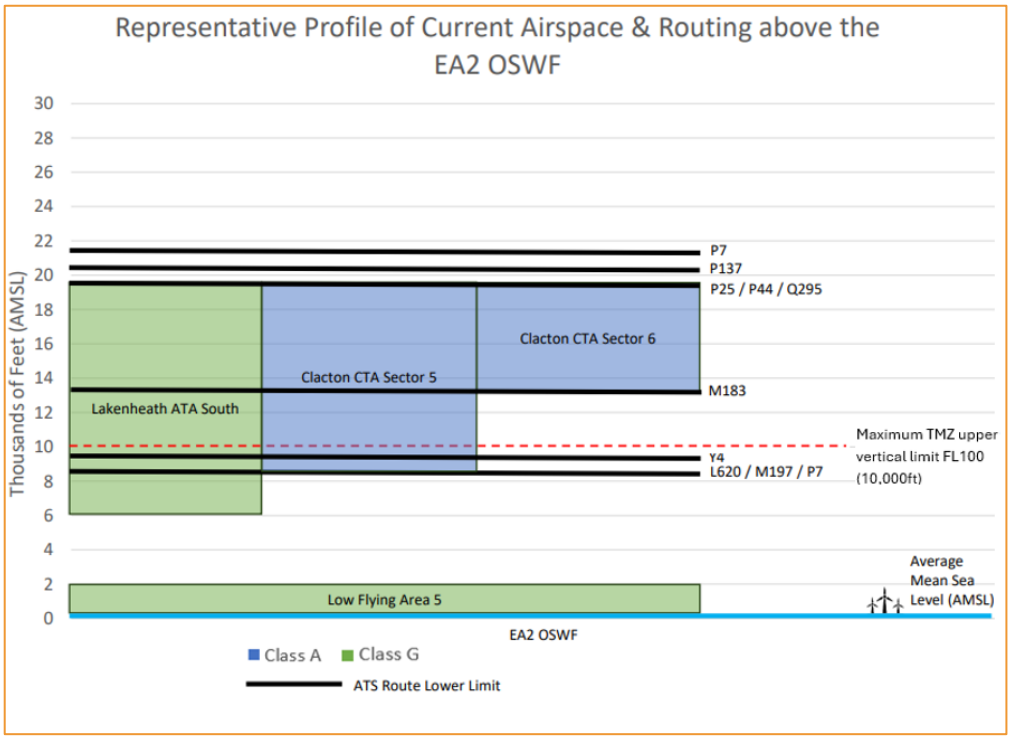

Figure 6 – Profile of interacting airspace above EA2 OSWF.

In Figure 7, we can see the proposed TMZ for EA3. This volume of airspace is not as congested as that around EA2, but it has similar issues to EA1N with encroachment from ATA North, AARA 9 and LFA 5. The main points with the EA3 airspace volume is that it is directly next to a TMZ on the Amsterdam side of the FIR boundary to the east, as well as being potentially cojoined with the Norfolk TMZ to the north.

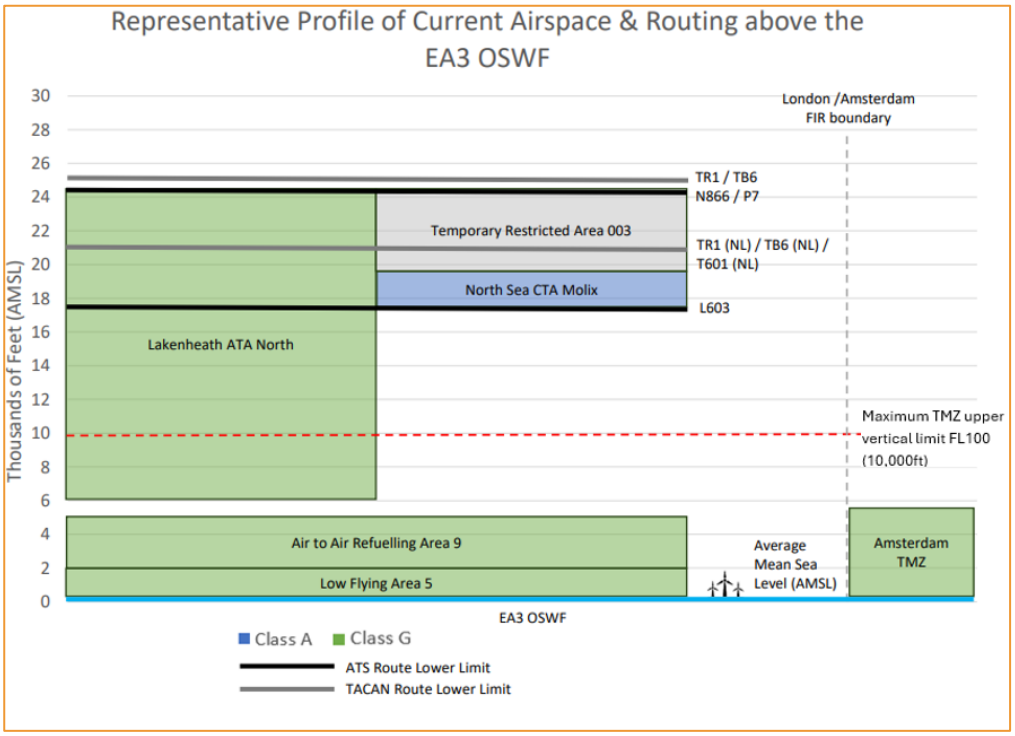

Figure 7 – Profile of interacting airspace above EA3 OSWF.

In the UK, CAA Policy states that all civilian aircraft must operate a transponder above FL100 (approximately 10,000 ft). A transponder is a piece of electronic equipment that transmits a signal that identifies the aircraft and its altitude, in response to a ground based SSR interrogation; the aircraft information is then displayed to an air traffic controller on the radar display.

2.4 Current Airspace Usage

A traffic survey was conducted during Stage 2 of the CAP 1616 process. During this survey the traffic above the proposed development sites was monitored for a 2-week period (1st – 14th June 2024). Data was collected continually 24 hours per day, focused on GA aircraft at or below 10,000 feet altitude within this designated airspace. During the survey period, only 7 GA aircraft were observed. These 7 aircraft transited the proposed EA Hub TMZ boundary a total of 10 times, with 1 aircraft entering all 3 proposed development sites. The traffic survey is available to view on the CAA ACP portal.

From this traffic survey, and based on the data analysed, it was deduced that the airspace around the wind farm is a low/zero-density air traffic environment. The CS believes that any change could likely affect less than 1 non-transponding aircraft per day (260 per year). Aircraft operating a transponder **will not** be affected by the establishment of the TMZ.

2.5 Why We Need an Airspace Solution

When providing an Air Traffic Service (ATS), Air Traffic Controllers (ATC) can use information provided by two radar systems which are generally used together but

can be used as individual systems if required. These systems are known as the Primary Surveillance Radar (PSR) and the Secondary Surveillance Radar (SSR).

2.5.1 Primary Surveillance Radar

The PSR is a conventional radar sensor that illuminates a large portion of space with an electromagnetic wave and receives back the reflected waves from targets within that space. Primary radar detects all aircraft (and other objects, such as flocks of birds, weather phenomena, other environmental factors, and wind turbines) without selection. It detects and reports the position of anything that reflects its transmitted radio signals, including the rotating blades of the wind turbines. It indicates the position of targets but does not identify them.

2.5.2 Secondary Surveillance Radar

SSR works together with transponders which are installed on the aircraft. The ground based SSR radar interrogates the transponder which transmits an electronic signal which is captured by the radar. The information transmitted by the transponder identifies the aircraft along with details as to the aircraft's altitude.

2.5.3 Primary Radar Interference

Because wind turbines blades are moving targets, it is hard for a PSR to determine if returned signals originate from moving blades or from moving aircraft. In normal operations, radar data processing algorithms connect returns from successive sweeps of the radar to calculate an aircraft's speed. Multiple wind turbines in a wind farm can create multiple radar returns and these can appear as either stationary or rapidly moving primary returns on the air traffic controller's radar display. A solution is therefore required to mitigate the impact of the wind turbine development on the operation of the PSR located at Cromer. This PSR is used to provide an ATS at RAF Lakenheath, 78 Squadron at Swanwick and Air Surveillance And Control Service (ASACS). The presence of a wind farm has no impact on a SSR since the system relies on electronic signals transmitted from a transponder unit in response to a specific interrogation signal.

As described above, radar detectable wind turbines cause a significant amount of radar false plots or clutter on a radar controllers display; this is because rotating blades can trigger the doppler threshold (e.g., minimum shift in signal frequency) of the Radar Data Processor (RDP) and appear as aircraft generated radar returns. Significant effects have also been observed on radar sensitivity caused by the substantial Radar Cross Section (RCS) of the wind turbines structural components (blades, tower, and nacelle) which can exceed that of even a large aircraft. These effects 'blinds' the radar (or the operator) from seeing real aircraft operating in the immediate vicinity of the wind turbine. False plots and reduced radar sensitivity can reduce the effectiveness of radar to an unacceptable level, compromising the provision of a safe radar service to participating aircraft.

Stationary objects do not cause an effect on radar systems because radar processing techniques remove them from display. Wind turbines therefore only normally create adverse radar effects when they are operating.

Generally, the larger a wind turbine is, the larger its RCS will be to a radar. This results in more energy being reflected with an increased chance of creating unwanted radar returns (clutter). This clutter will be processed by the radar and presented to the air traffic controller on their Radar Data Display Screens (RDDS).

Other generalised effects wind turbines have on radar systems are as follows:

- Twinkling appearance/blade flash effect which can distract a controller.
- Masking of true aircraft targets by increased clutter on an RDDS.
- Increase in unwanted targets or false aircraft tracks.
- Receiver saturation.
- Target desensitisation causing loss of valid targets that are of a small RCS.
- Shadowing behind the wind turbines caused by physical obstruction (blocking of radar transmitted signal).
- Degradation of tracking capabilities including track seduction.
- Degradation of target processing capability and processing overload.

Radar detectability of wind turbines does not automatically provide justification for an objection from radar stakeholders. Other factors will determine the nature and severity of the operational impact on the receptor. For example:

- The consideration of airspace structure and classification in the wind turbine vicinity.
- The operational significance of the airspace to the operator.
- The range of the development from the radar source.
- Aircraft traffic patterns and procedures.
- The type of radar service provided to air traffic using the airspace.

In providing a safe ATS, an air traffic controller must maintain standard separation distances between aircraft that are under control and those radar returns that are unknown or not in receipt of a radar service. Depending on the ATS being provided, the controller will need to provide a minimum of 5 nm radar separation between an aircraft receiving a radar derived ATS and any unwanted radar returns that have the potential to obscure unknown aircraft targets.

Any radar clutter presented on radar displays as a result of wind turbine operations, may require a controller to direct an aircraft away from its desired aircraft track to achieve the appropriate lateral separation criteria. Without specific wind turbine mitigation processing capabilities, radars cannot distinguish between returns from wind turbines (false returns, or 'clutter') and those from aircraft. Air traffic controllers are therefore required to assume that actual aircraft targets could be lost over the location of a wind farm.

Without appropriate mitigation of the EA Hub wind farms, the clutter created by the operational wind turbines will affect the safe and effective provision of a radar based ATS by RAF Lakenheath, 78 Squadron at Swanwick and ASACS.

Further to this, in the event of no mitigation being introduced, RAF Lakenheath, 78 Squadron at Swanwick and ASACS air traffic controllers would be required to limit or suspend the ATC radar services that they provide to aircraft operating within the vicinity of the development area. Dependent on the type of radar service being provided, controllers may also be required to vector all aircraft around any wind turbine induced radar clutter. This would inevitably lead to:

Longer routes being flown to avoid the potential new airspace.

- A larger amount of fuel being used, resulting in an increase in nitrogen dioxide (NO_2) and carbon dioxide (CO_2) emissions.
- An increase in both pilot and controller workloads.

The proposed technical mitigation is to deploy Range Azimuth Gating (RAG) on the Cromer PSR to remove all primary radar returns generated by the wind turbines. RAG blanking blocks any primary radar return from display within selected ranges and azimuth sectors. However, PSR blanking in an area means that primary radar returns from aircraft will also be masked. To mitigate against this removal of primary radar coverage, introduction of a Transponder Mandatory Zone (TMZ) works in conjunction with the RAG blanking so that aircraft remain visible to ATC via another means.

2.5.4 Justification

The above technical detail provides sufficient justification for this airspace change. If the proposal is successful, it will play a part in the construction and implementation of the EA Hub Wind Farms, which in turn will provide an environmental benefit by providing enough power for 2.4 million homes in the UK. This will only be realised if the wind farm is built, and the airspace change is implemented.

The objectives of this proposal are to:

- Ensure effective mitigation is implemented to maintain aviation safety.
- Ensure that there is no increased risk to ATC's ability to detect aircraft conflictions.

2.6 Stakeholders

Stakeholders are third-party groups or individuals interested in an ACP.

The CS has identified the key stakeholder organisations and individuals that could be potentially being affected by the proposal. The Engagement Strategy document details all the stakeholders that we have targeted to participate in this engagement exercise. The Engagement Strategy can be found on the airspace change portal alongside this document.

For details on how to respond to this engagement see Section 5.

3 Options Initially Considered

3.1 Introduction

This section will outline the proposed options for consultation and the previous work which has been undertaken to evaluate and eliminate the majority of options against a set of design principles. It will then show which options will be carried forward for the Stage 3 engagement exercise.

3.2 Proposed Options for Consideration

As part of this ACP, the CS was required to create Design Options that would help to mitigate the clutter generated at the wind farm sites. In the Design Options document, the CS generated 17 options. These options were assessed against a set of Design Principles, which were sent to a variety of stakeholders with a request for relevant feedback. On receipt of the feedback, a DPE document was produced which evaluated each of the Design Options against the set of Design Principles developed earlier in the process. The detailed DPE document can be found on the CAA ACP Portal. In summary the reasons for discounting options fell under one or more of the 4 headings shown in Table 1 below.

Option	Reasons				Description
	Safety	Policy	Technical	Environment	
0					Do Nothing
1	X	X	X	X	Temporary Suspension
2	X			X	SSR Only Operations
3		X	X		Radar Infill
4	X	X	X		Class D or E Controlled Airspace
5	X	X	X	X	Class E Controlled Airspace and TMZ
6	X	X	X		Radio Mandatory Zone
7	X	X	X		RAG Blanking Only
8	X	X			TMZ (3) Only
9	X				TMZ (3), RAG Blanking, No Buffers
10	X				TMZ (3), RAG Blanking, Norfolk TMZ Overlap
11	X				TMZ (3), RAG Blanking, Norfolk TMZ Adjoined
12	X				TMZ (3), RAG Blanking, Extended Norfolk TMZ Boundary
13				X	TMZ (2), RAG Blanking, Norfolk TMZ Overlap
14			X	X	TMZ (2), RAG Blanking, Norfolk TMZ Adjoined
15				X	TMZ (2), RAG Blanking, FIR, Norfolk TMZ Overlap
16			X	X	TMZ (2), RAG Blanking, FIR, Norfolk TMZ Adjoined
17		X	X	X	TMZ Overlap

Table 1 - Design Options Evaluation

As can be seen, 11 options (1,2, 4 to 12) were not taken forward because of an identified safety issue and, in some cases, also because of additional policy, technical or environmental concerns. Two options (3 and 17) were not taken forward because of policy and technical concerns. Two options (14 and 16) were not taken forward because of both technical and environmental concerns.

3.3 Options to be Carried Forward

Following on from above 2 options remain (Option 13 and Option 15) to be taken forward to the engagement exercise. Both options are more fully described below at Section 4.

4 Options Selected For Engagement

4.1 Introduction

This section will take a more in-depth look at Options 13 and 15. It will highlight the technical detail associated with each option and explain why this option was taken forward. This section will then show our reversionary statement which will highlight why, upon implementation, these options will not be reversible without further consultation, if at all.

4.2 Option For Engagement (Option 13)

As illustrated in Figure 8, Option 13 provides two distinct TMZs and a RAG blanking airspace solution. Each TMZ's perimeter is extended to include a 2nm buffer within established UK airspace. This option overlaps the Norfolk TMZ perimeter. This option encompasses a total area of 1,659 km^2.

This option is very similar to Option 10 (see DPE or Design Options Document). The only difference is that the gap between the EA1N and EA2's TMZ and RAG blanking areas has been closed. This provides a simpler, joint TMZ and RAG blanking solution to EA1N and EA2 by eliminating the narrow, virtually unusable corridor between the two, whilst maintaining a GA transition corridor between EA1N and EA3. This option utilises only necessary amounts of airspace, is future proofed against issues with the Norfolk TMZ and has closed the funnel between EA1N and EA2.

The only consideration with this option is that for non-transponding aircraft, there is now a virtually unusable section of airspace between the London/Amsterdam FIR boundary and EA1N and EA2 joint RAG blanked area with TMZ buffer. However, the impact of this will be minimal as a transponder is required to cross the FIR boundary.

The safety benefits of the buffer zone are complimented by the closure of the funnel between EA1N and EA2. The TMZ's areas are more sympathetic to controllers and pilots than in earlier options.

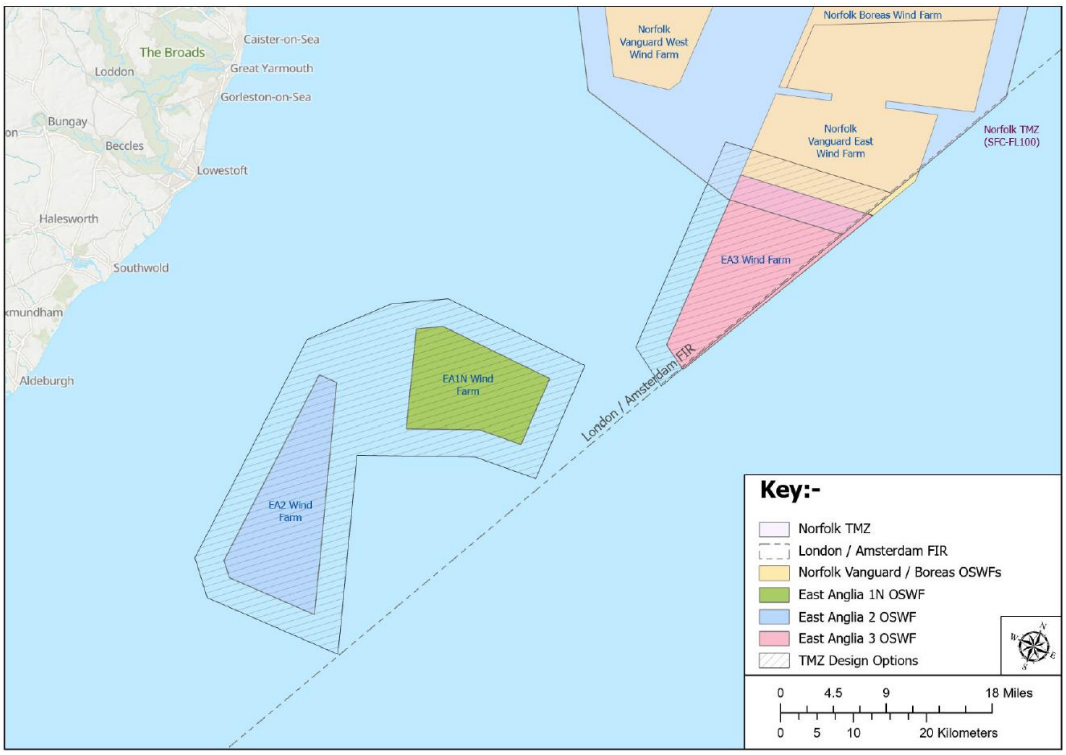

Figure 8 – Option 13 Appraisal.

4.3 Option For Engagement (Option 15)

As illustrated in Figure 9, option 15 provides two distinct TMZs and a RAG blanking airspace solution. Each TMZ's perimeter is extended to include a 2nm buffer within established UK airspace. The EA1N/EA2 combined TMZ is extended to the London/Amsterdam FIR. This option overlaps the Norfolk TMZ perimeter. This option encompasses a total area of 2,049 km[2].

The advantages of this option are similar to Option 13 but with the addition of the TMZ buffer around EA1N and EA2 which now extends south to align with the FIR boundary. The funnel between EA1N and EA2 has now been closed. The additional sector of airspace incorporated to the south also includes another OSWF, East Anglia One[2] (Figure 9) which would now be embodied into the TMZ and RAG blanking area. East Anglia One is an operational windfarm that raised no objections from NATS or MOD as no part of this site would be detected by any PSRs[3]. A gap is maintained between the EA1N and EA3 and RAG blanking areas through which non-transmitting GA users could plan to use. This option also maintains some future proofing against future issues with the Norfolk TMZ.

[2] East Anglia One (EA1) OSWF is part of the wider EA Hub OSWF group and became operational in September 2019.
[3] East Anglia One North OSWF Chapter 15 Civil and Military Aviation and Radar – Preliminary Environmental Information Report Volume 1.

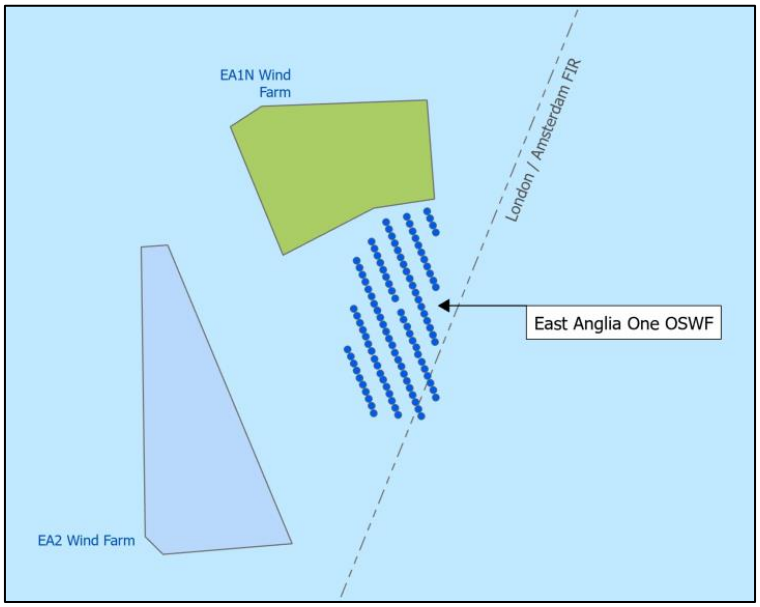

Figure 9 - Proximity of East Anglia One OSWF turbines to the proposed EA1N & EA2 OSWF sites

This option does however utilise a large volume of airspace, although the gap 'filled' between the joint EA1N and EA2 TMZ and the FIR boundary is arguably unusable for other purposes in any event. The 'unusable' airspace to the south and east of EA1N and EA2 has been incorporated into the TMZ creating a simpler solution for controllers and pilots alike.

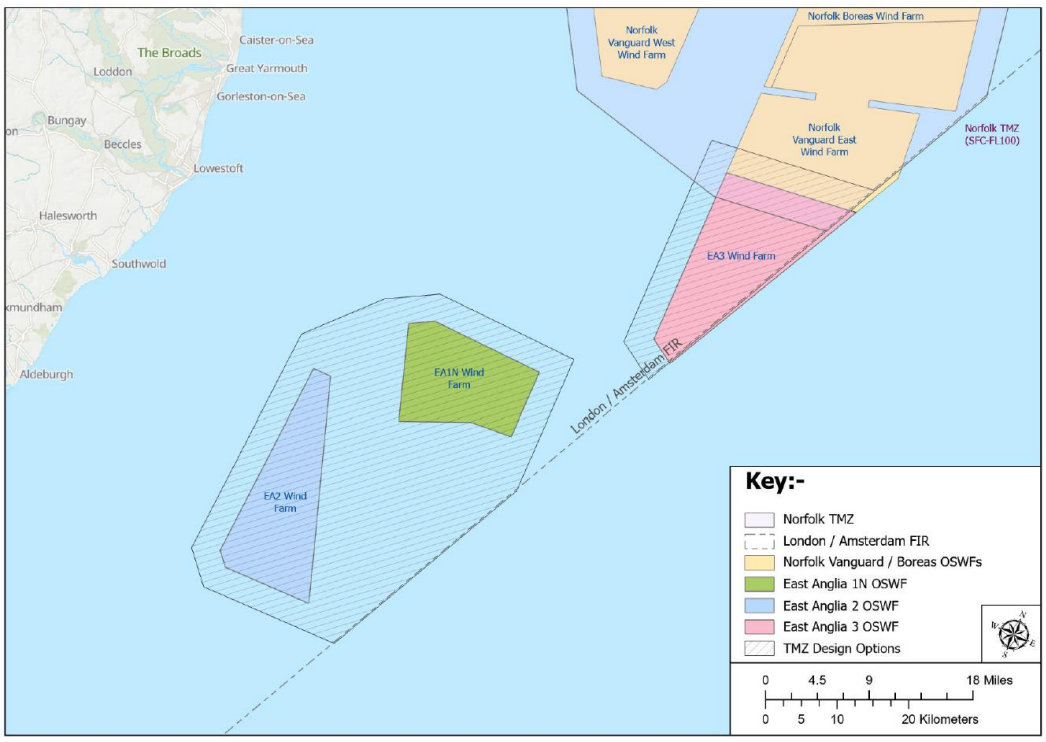

Figure 10 – Option 15 Appraisal.

4.4 Reversion Statement

As outlined in the CAP 1616, as part of the consultation preparation, the CS 'must make clear the extent to which the change is reversible if it does not achieve the objectives it is designed to achieve'. To satisfy this, this reversion statement below has been produced.

As outlined in the Design Principles Evaluation, the 'Do Nothing' option would not provide mitigation against radar clutter generated by the Wind Turbine Generators.

Should TMZ option 13 or 15 be approved and implemented, it would only be possible to revert to the pre-implementation state during the period ahead of wind farm erection. There would only be a small window where this would be a viable alternative, and only if a decision not to build the wind farm was taken. This situation is driven by UK Aeronautical Information Publication (AIP) schedules.

Furthermore, upon implementation (but following erection of the wind farm), if the proposed changes did not fully mitigate the identified technical issues, then it would not be possible to revert to the pre-implementation state without affecting ATC operations unless a technical mitigation solution was first tested and implemented.

In the unlikely event that there are unexpected issues caused by this proposal or that proposal did not achieve its aims, then appropriate measures would be developed and implemented supported by the application of short notice changes via a Notice to Aviation (NOTAM).

For a permanent reversion, the changes would have to be reversed by incorporating this into an appropriate future Aeronautical Information Regulation and Control (AIRAC) date to align with National Air Traffic Service's (NATS) engineering updates; of which there are only four a year.

The proposed TMZ change would therefore need to be considered permanent, unless a technical mitigation is developed and implemented to the satisfaction of both the MOD and NATS.

4.5 Further Reading

In-line with the CAA's CAP 1616H Pre-scaled Level 3 ACP (Version 1), the CS has completed a series of supporting documentation set out by this process, which are contained on the CAA's Airspace Change Portal[4]. Stakeholders are advised to review this documentation set, in conjunction with this engagement material, which contain further in-depth information and analysis on the development of Stages 1 and 2 of this ACP process.

Additionally, Stakeholders are specifically signposted to the following EA Hub ACP documentation for further reading which addresses both the ACP process requirements on the Habitats Regulations Assessment (CAP 1616h para B11 & B12), and the use of a qualitative assessment on any potential impacts of greenhouse gas emissions related to this ACP proposal (CAP 1616i para 9.9):

- East Anglia Hub Wind Farm Mitigation – Current-day Scenario (Issue 2)

[4] ACP-2023-079: ScottishPower Renewables (UK) Ltd East Anglia Hub Windfarms Mitigation

- East Anglia Hub Wind Farm Mitigation – Stage 2: Habitats Regulations Assessment (Issue 1)
- East Anglia Hub Wind Farm Mitigation – Stage 2: Aviation Study Data (Issue 1)

5 How to Participate

5.1 How to Respond to this Engagement

5.1.1 Engagement Period

The engagement will begin on **Monday 28th October 2024** and will run for 6 weeks. All comments must be received via the media listed below by midnight on **Sunday 8th December 2024**. This engagement is not limited to those individuals and organisations that we have contacted directly. Anyone may respond.

5.1.2 Responding to This Engagement

This engagement is being conducted by Scottish Power Renewables (UK) Limited, using an Engagement Feedback document that is available at the following link.

EA Hub Wind Farm Engagement Feedback Form

This document can be opened, completed, and submitted on any electronic device. After completing all the required sections, the document will prompt you to submit. After submission, the document will again ask for you to verify your name and email address and you must follow the directions fully to ensure your feedback is registered. A copy of your feedback form will also be emailed to you at the email address provided for your future reference.

All supporting documents for this ACP can be found through the CAA Airspace Change Portal at the following link.

Airspace change proposal public view (caa.co.uk)

The CAA's Airspace Regulation Department will oversee the engagement and ensure that it adheres to the CAP 1616h process and government guidelines. All comments made on the feedback document will appear in the public domain and the CAA will also act as moderator for the comments.

5.1.3 Responding by Post

Respondents can submit a postal response to the engagement. We will not commit to respond to all postal responses directly; however, respondents are welcome to include a stamped addressed envelope if they do require a reply or an acknowledgement of receipt. Proof of postage is not proof of delivery, and we will be otherwise unable to acknowledge receipt of responses. We have provided a Feedback Form for postal responses, which can be found at Appendix A1 of this document. If you wish to supply more information on paper by post, please enclose it with your completed feedback form. Postal responses can be sent to the following address:

FAO EA Hub ACP Team
ScottishPower Renewables
ScottishPower House
320 St Vincent St
Glasgow
G2 5AD

5.2 Compliance with the Airspace Change Process

This proposal is confirmed by the CAA as Level 3.

If you have questions or comments regarding the conduct of the airspace change process (such as adherence to the CAP1616 process), please contact the CAA:

Airspace Regulation
Ref: ACP 2023-079
Safety and Airspace Regulation Group
Aviation House,
Beehive Ring Road,
Crawley,
West Sussex.
RH6 0YR.

Form FCS 1521 –UK Airspace Report can be used for this purpose.

Note: These contact details must not be used for your response to this engagement. If you do so, your response may be delayed or missed out, reducing its effectiveness.

5.3 What Happens Next

After the engagement period closes, we will analyse the feedback received and publish a report on the CAA Airspace Change Portal summarising the findings of this engagement activity.

We will assess each response we receive, consider if the airspace design needs to change in light of the feedback, and, if needed, publish a second report detailing the amended design. Comments/feedback will only not be taken forward for further consideration if said concern has already been addressed at an earlier stage of the process, such as the DPE.

Finally, we will submit an Airspace Change Proposal to the CAA based on this engagement document and the engagement summary.

The CAA will then study the proposal to decide if it has merit and will publish a decision on its website.

If the CAA approves this ACP, it will contribute to the larger project and the current plan for the site to be active in 2026.

5.4 Thank You

Thank you for taking the time to consider the information in this document. A reminder that if you, or anyone you know, requires this information in an alternative format, please write to us at the following address:

FAO EA Hub ACP Team
ScottishPower Renewables
ScottishPower House
320 St Vincent St
Glasgow
G2 5AD

A1 Postal Response Form

Your Name:	
Your Postcode:	
Your Email Address:	
Select one of the following boxes and check as applicable:	
I am responding as an individual:	I am responding on behalf of an organisation: Organisation Name: Position in Organisation:
If you wish your response to be published anonymously your personal details will be redacted and only be seen by the CAA.	
Yes ☐ I want my response to be published with my details.	No ☐ I want my response to be published anonymously.
Feedback Section	
Do you agree that the Design Principle Evaluation was conducted appropriately in line with CAP 1616H?	
Yes ☐	No ☐
Please provide further comment here if you answered 'No' to the above question.	

After reviewing the available documentation, do you agree with the Change Sponsor (Scottish Power Renewables), that Options 13 and 15 were the only options which fulfilled the criterion for this Airspace Change Proposal?	
Yes ☐	No ☐
Please provide further comment here if you answered 'No' to the above question.	

Do you support **Option 13 (TMZ (2), RAG Blanking, Norfolk TMZ Overlap)** of this Airspace Change Proposal?			
Support ☐	Neutral ☐	Object ☐	No Comment ☐

If applicable, please provide comments on Options 13 to allow us to understand your thoughts on the introduction of this mitigation to the East Anglia Hub Wind Farm. Please consider:

- What do you believe will be the impact of the TMZs on your operation?
- How often do you think these impacts will occur to you or others?
- Do you have any suggested mitigations or design changes you think should be considered?
- Do you think there may be any unintended consequences of the TMZs?

Do you support **Option 15 (TMZ (2), RAG Blanking, FIR, Norfolk TMZ Overlap)** of this Airspace Change Proposal?			
Support ☐	Neutral ☐	Object ☐	No Comment ☐

If applicable, please provide comments on Options 15 to allow us to understand your thoughts on the introduction of this mitigation to the East Anglia Hub Wind Farm. Please consider:

- What do you believe will be the impact of the TMZs on your operation?
- How often do you think these impacts will occur to you or others?
- Do you have any suggested mitigations or design changes you think should be considered?
- Do you think there may be any unintended consequences of the TMZs?

Additional Comments (optional)

A2 Glossary

Term	Meaning and Description
ACP	Airspace Change Proposal - A formal process by which changes to the design or structure of airspace are proposed and evaluated. This process involves collaboration between aviation stakeholders, regulatory authorities, and the public to assess the potential impacts of proposed changes and make informed decisions.
ASACS	Air Surveillance And Control Service
ATC	Air Traffic Control - A service provided by ground-based controllers to guide and manage the movement of aircraft within airspace. ATC ensures safe separation between aircraft, issues clearances, and provides assistance to pilots, contributing to the overall safety and efficiency of air travel.
ATS	Air Traffic Service - A system that provides for the safe and efficient movement of aircraft within airspace.
CAA	Civil Aviation Authority - A UK Government regulatory body responsible for overseeing and ensuring the safety, security, and efficiency of civil aviation activities within the United Kingdom.
CDS	Current Day Scenario
CO_2	Carbon Dioxide - A colourless, odourless gas that is naturally present in Earth's atmosphere. It is produced through the respiration of animals and plants, as well as through the combustion of fossil fuels. Monitoring and reducing CO_2 emissions are essential for addressing environmental concerns and mitigating global warming.
DPE	Design Principles Evaluation
FL	Flight Level - A standard measure of altitude used in aviation, particularly in high-altitude cruising. Flight Level is expressed in hundreds of feet and is based on a standard atmospheric pressure at sea level.
GA	General Aviation - A term used to describe civil aviation activities other than scheduled air services and non-scheduled air transport operations. This could include, private flying, recreational flying, flight training and agricultural aviation.
GW	Gigawatt - A unit of power equal to one billion watts, commonly used to measure the capacity or output of electrical power plants, renewable energy installations, or large industrial facilities.

Term	Meaning and Description
IFR	Instrument Flight Rules - A set of regulations and procedures under which a pilot operates an aircraft by relying on instruments and navigation aids rather than visual reference to the ground. IFR is used when weather conditions do not meet the requirements for Visual Flight Rules (VFR) or when a pilot chooses to operate under instrument conditions for safety or other reasons.
LAT	Lowest Astronomical Tide - The lowest level that the sea is predicted to reach under normal meteorological conditions and under the gravitational influences of the sun and moon. It serves as a reference point for charting and mapping tidal elevations, particularly in nautical and coastal engineering contexts.
m	Metre - The basic unit of length in the metric system, equal to 100 centimetres or approximately 3.28 feet.
MOD	Ministry of Defence - The UK Government department responsible for overseeing the United Kingdom's defence and military affairs.
NATS	National Air Traffic Service – They are the United Kingdom's leading provider of air traffic control (ATC) and related services.
nm	Nautical mile - A unit of measurement used in navigation and aviation, equal to one minute of latitude. It is approximately 1.15 statute miles or 1.85 kilometres.
NO_2	Nitrogen Dioxide - A reddish-brown gas that is a component of air pollution. Nitrogen dioxide can contribute to respiratory problems and is a key component in the formation of smog and acid rain.
PSR	Primary Surveillance Radar - A radar system that detects and tracks aircraft by directly measuring the reflected radio waves from the aircraft's surface. It is a fundamental component of air traffic control systems for monitoring and managing airspace.
RAG (Blanking)	Range Azimuth Gating (Blanking) – It is a technique used in radar systems to suppress or "blank out" unwanted returns from certain ranges and azimuths. This is done to filter out clutter or interference that might otherwise degrade the radar's performance.
RCS	Radar Cross Section - A measure of the reflectivity of an object to radar signals, indicating how detectable and visible the object is to radar systems.
RDDS	Radar Data Display Screen - A visual interface used by air traffic controllers to observe and manage radar information. This screen presents real-time data from radar systems, showing the positions, movements, and identification information of aircraft within a specific airspace.

Term	Meaning and Description
RDP	Radar Data Processor - A computer system or device that processes and analyses the raw radar data received from radar sensors. It translates radar returns into meaningful information, such as aircraft positions, velocities, and other relevant parameters.
SFC	Surface – This generally refers to the ground or the immediate area at ground level.
SSR	Secondary Surveillance Radar - A radar system used in air traffic control that not only detects and tracks aircraft but also requests and receives additional information from transponders aboard the aircraft. This additional data may include the aircraft's identity, altitude, and other parameters. SSR enhances the accuracy and efficiency of air traffic management by providing more comprehensive information about the tracked aircraft.
TMZ	Transponder Mandatory Zone – A piece of airspace where aircraft are required to have an operating transponder on board and to actively reply to radar interrogations. This requirement enhances air traffic control's ability to identify and track aircraft within the designated zone.
VFR	Visual Flight Rules - A set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going. In VFR conditions, pilots navigate and control the aircraft by visual reference to the ground and other landmarks, rather than relying solely on instruments.

Table 2 – Glossary including description