East Anglia Hub Aviation Study Data

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1 Introduction

1.1 Project Overview

The aim of this document is to demonstrate the level of activity of General Aviation (GA) near the East Anglia Hub (EA Hub) proposed development area. This area is a ScottishPower Renewables (SPR) project representing a group of wind farm developments located in the Southern North Sea. The EA Hub consists of four Wind Farm sites in the North Sea region, East Anglia 1 (EA1), 1 North (EA1N), 2 (EA2), and 3 (EA3). EA1 is already a fully operational wind farm to the south of EA1N and is not part of this aviation study. Figure 1 shows a representation of EA1N, EA2, and EA3 and their approximate distances from the UK coastline.

This study serves as a basis for the Change Sponsors' (CS) assertion in their Habitats Regulations Assessment (HRA) that GA traffic levels at each of the sites is so low that the development of the wind farms and the subsequent establishment of a Transponder Mandatory Zone(s) (TMZ) will not cause significant impact to current or future flight patterns.

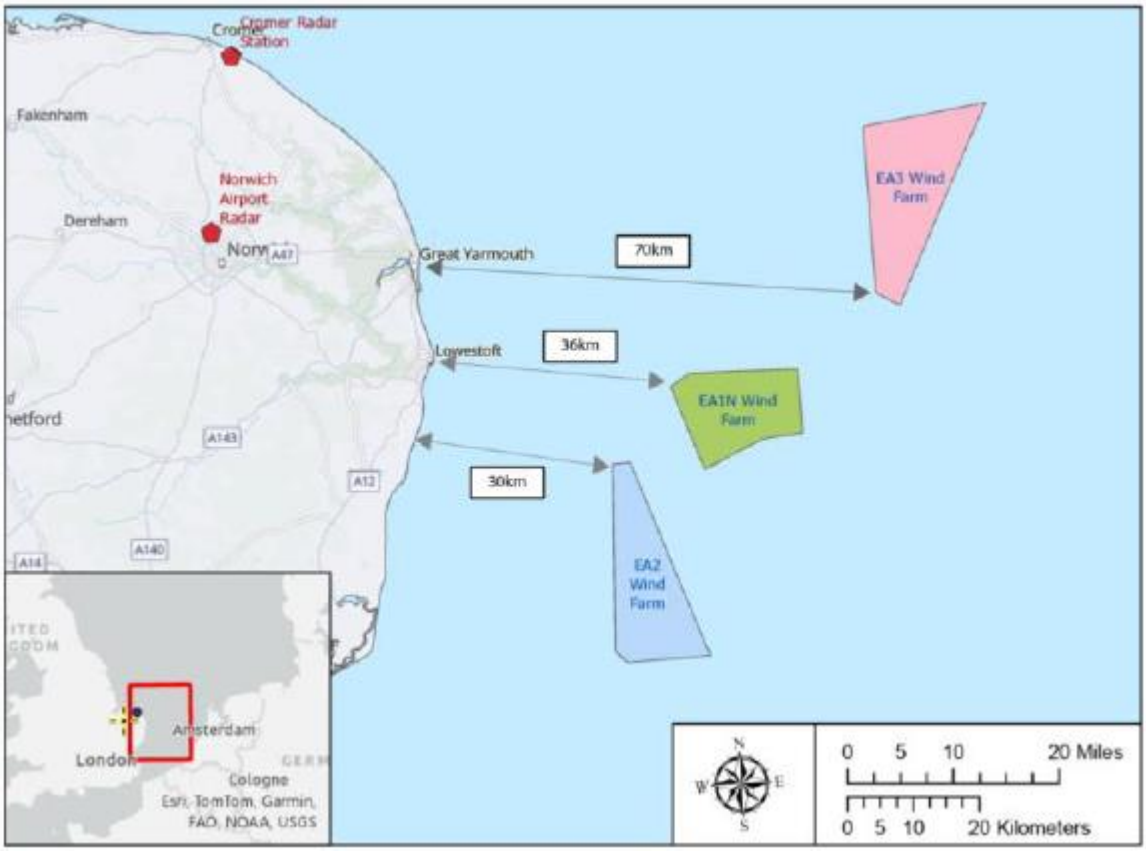

Figure 1 - EA Hub Location and Proximity to UK Coastline

2 2024 Aviation Traffic Survey

2.1 Background

In order to ensure that the most up to date aviation data was used to analyse the potential aviation impact of the proposed TMZ, the CS conducted a traffic survey. The aim of the traffic survey was to determine the density of transiting GA traffic in the area of the proposed EA Hub TMZ and estimate the number of aircraft potentially affected by the proposed airspace solution. The CS did not identify military or commercial aircraft during this survey, as these have the use of a transponder and therefore would not be expected to be affected by any TMZ.

2.2 Method

FlightRadar24 (FR24).com was chosen as the primary data source for this survey. It is considered one of the most comprehensive aircraft tracking websites available, using various data sources including Automatic Dependent Surveillance-Broadcast (ADS-B), Multilateration (MLAT), FlightAware (FLARM), and Open GNSS (OGN). The survey covered a two-week period between 1st June 2024, and 14th June 2024. Data was collected continually 24 hours per day. The area of interest was development areas as laid out in Figure 1. The survey focused on GA aircraft at or below 10,000 feet altitude within this designated airspace.

2.3 Traffic Survey Results

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. This data would suggest minimal GA traffic would be affected by the proposed TMZ. The details of the findings can be found in Table 1.

Hub	Date	Time (UTC)	Registration	Type	Altitude (ft)
EA1N	01.06.24	0830	G-JMOS	PA-34	5,000
EA1N	09.06.24	1507	G-RDDM	C-182	8,500
EA2	01.06.24	0835	G-JMOS[1]	PA-34	5,000
EA2	02.06.24	1305	N10CD	SR-22	9,000
EA2	12.06.24	0605	G-MOFO	C-172	2,700
EA2	12.06.24	1210	P-HPWW	DA-62	10,000

[1] Continued transit on 1st June 2024

Hub	Date	Time (UTC)	Registration	Type	Altitude (ft)
EA2	12.06.24	1420	G-MOFO[2]	C-172	1,700
EA2	13.06.24	0912	D-EBTO	C-172	5,000
EA3	01.06.24	0850[3]	G-JMOS[4]	PA-34	5,000
EA3	11.06.24	1234	N166BZ	R66	1,000

Table 1 - GA Flight Study Data

Table 2 displays the GA interaction per EA Wind Farm and extrapolates the interactions to a 12-month period (Transponder Aircraft). Although only 7 GA aircraft were observed during the period, they interacted a total of 10 times with the proposed development area, and therefore that is the data that has been extrapolated to produce the estimated 12-month data for the purpose of this study.

Hub	2-Week Findings	Extrapolated to 12-Month Period
EA1N	2	52
EA2	6	156
EA3	2	52
Total	**10**	**260**

Table 2 – Number of estimated GA Aircraft Per Hub

2.4 Analysis

To estimate the maximum potential effect of the proposed development, a scaling factor would usually be applied to the GA traffic data. This survey required aircraft to have suitable equipment onboard to be displayed on FR24; however, it is not a mandatory requirement in the UK for all aircraft to have such equipment. Therefore, GA movements in the area may have occurred that have not appeared in the survey. To compensate, the following scaling calculation has been applied.

Data from CAA CAP 2498A[5], paragraph 4.5.2 suggests that as of 2021, 46% of aircraft on the 2021 UK Register operate Mode-S Transponder. As the operation of Mode-S is required to enter a TMZ in the UK, then the aviation study results would usually be scaled to include those aircraft that do not operate Mode-S. However, when an aircraft crosses the London/Amsterdam FIR boundary from the UK, based on the flight data of the GA aircraft logged during the aviation study, it enters either the TMZ

[2] Return Journey on Same Day
[3] Approximate time – Radar contact lost. Assumed transit direction to next radar contact
[4] Continued Transit on 1st June 2024
[5] Minimum Technical Standards for Electronic Conspicuity and Associated Surveillance

North Sea Area Amsterdam which is active from surface (SFC) to Flight Level (FL) 55 (approximately 5,500ft amsl), or it enters the Amsterdam Control Area (CTA) which is active from FL55-FL195. Within both these pieces of airspace, the carriage and operation of a transponder is mandatory[6][7]. Therefore, despite there being a requirement to scale the number of non-transponding aircraft that operate close to the TMZs, the Amsterdam requirement takes priority and thus no non-transponding aircraft can cross the FIR boundary. As the aviation study demonstrates, all of the observed aircraft during the 2-week period transited east to west and vice versa and, no aircraft were observed operating from the UK coastline to the development areas and back again.

2.5 Aviation Study Heat Map

The high-level heat map of the 7 aircraft that entered the proposed TMZ boundaries are detailed below in Figure 2. From this information it can be seen that all of the aircraft that transited the EA Hubs crossed the FIR boundary in one direction or another. Figure 3 shows a much more detailed display of the transit data.

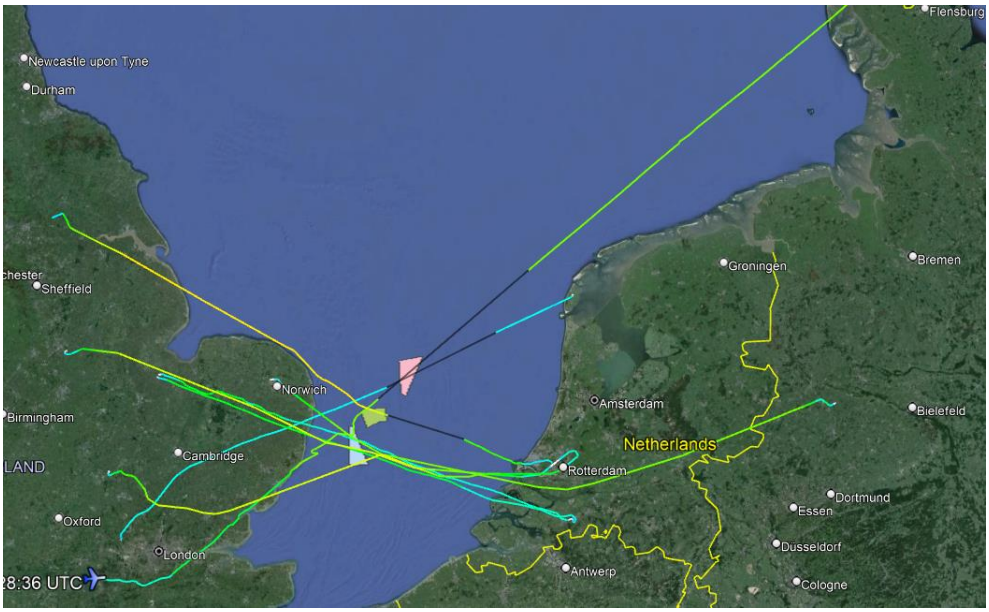

Figure 2 - High-Level Overview of the Flight Data

[6] TMZ North Sea Area Amsterdam - Netherlands AIP ENR 6-2.6
[7] Netherlands AIP GEN 1.5 Section 4.1

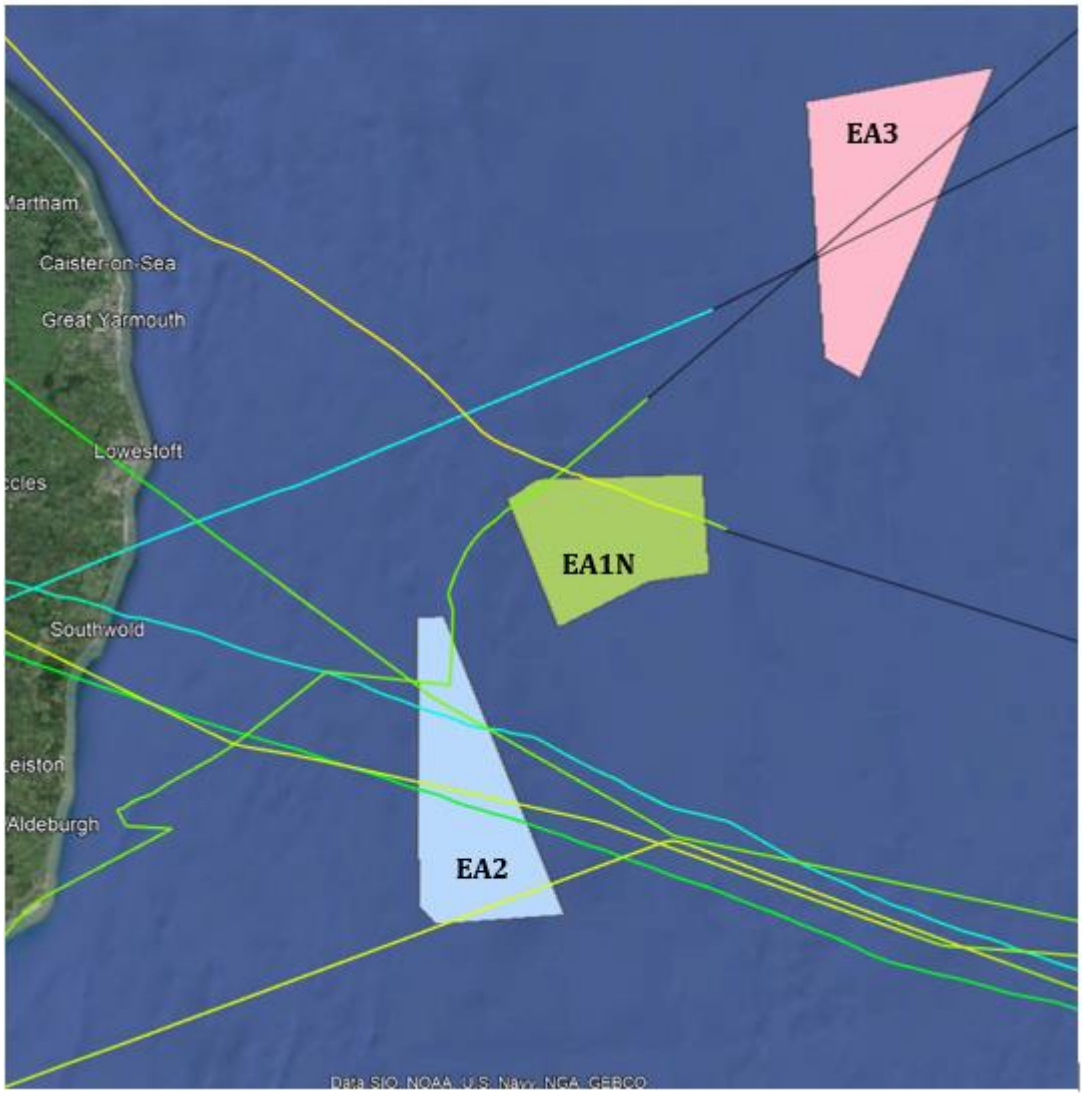

Figure 3 - Detailed View of Flight Data

The main reason for the large number of crossings of EA2 is believed to be that east of the development area on the FIR boundary is a crossing waypoint, named REDFA, and this is one of a few boundary crossing points in the area, hence the increase in traffic in that area.

2.6 Conclusion

The traffic survey captured data on 7 GA aircraft over the two-week period, all of which transited the proposed EA Hub TMZ boundary while routing to/ or from the Amsterdam FIR boundary. Since the carriage of a transponder is mandatory within the Amsterdam FIR when entering a TMZ or CTA, non-transponding aircraft wouldn't be able to use this route. Therefore, applying a scaling factor to account for unobserved non-transponder aircraft wouldn't be accurate.

Additionally, the observed flight paths did not show any GA aircraft operating solely within the UK FIR. While this doesn't definitively prove the absence of non-transponding local traffic, it suggests that there would be minimal impact on such potential traffic. The CS is therefore content that the tracks observed during the study period reflect an accurate usage picture of the area and consider that the implementation of a TMZ would have minimal effect.