ACP-2021-12

GATEWAY DOCUMENTAION: STAGE 2 DEVELOP & ASSESS

STEP 2B OPTIONS APPRAISAL (PHASE 1) INITIAL – **VERSION 3**

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Executive Summary

The main business demand for the Spaceport-1 (SP-1) facility is for the operation of sub-orbital sounding rockets. It was envisaged that orbital launches would be facilitated sometime in the future and in the interests of economies and future proofing the launch site, this Airspace Change Proposal (ACP) originally covered both sub-orbital and orbital airspace requirements despite the requirements being significantly different. The planning application for the SP-1 launch site is however limited to sub-orbital launch only and to avoid confusion and possible misinterpretation of intent, it was decided that the ACP should focus solely on sub-orbital rocket launch. This ACP was subsequently de-scoped in September 2022 to capture only the requirements for sub-orbital sounding rocket launch; all stakeholders were informed accordingly through the Step 2A engagement process.

The airspace change Sponsor developed a variety of airspace design options which were shared with a wide range of identified stakeholders including those who were engaged in Stage 1B of the process. Feedback on the design options and how they aligned to the Design Principles (DPs) was invited. Despite a four week engagement period, feedback received was limited to the three main stakeholders; the Ministry of Defence (MOD); Highlands and Islands Airports Ltd (HIAL); and NATS. From the feedback obtained and meetings held with MOD and NATS, it was concluded that only three of the six options presented were credible to take forward into Step 2B, namely:

- Option 3 - New fillet of airspace around launch site and use of existing Danger Areas D701;
- Option 4 - Creation of a whole new bespoke modular airspace structure from the SP-1 site; and,
- Option 5 - Used in conjunction with Option 3 and applying sub-divisions/reconfiguration of D701.

Stage 2B requires an initial appraisal of the impacts of the design options against a “do nothing” option. The chosen methodology was to conduct a simple qualitative assessment of the three different options, both positive and negative, against the headings identified in Civil Aviation Publication (CAP) 1616, Appendix E, Table E2: “Guide to expected approach to key analysis for a typical airspace change”. An initial indication of safety implications was also produced.

From the options appraisal, Option 3 emerged as the preferred option, followed by Option 3 with Option 5, and then Option 4. The latter option is considered the most costly in terms of operational cost (for ANSPs and the MOD Hebrides Range) especially when balanced against planned use (10 launches per year). Moreover, there are potential negative safety implications associated with two similar airspace structures with different airspace management procedures being superimposed in the same area.

Following the CAA Develop & Assess Gateway, this report has been updated to include additional information on the following:

- Local traffic operating below 7000ft, including traffic patterns;
- Raw data to support low traffic statements;
- Data on Benbecula airport movements;

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- Evidence supporting low impact on Benbecula flights and other activity to support scalability of potential environmental impact;
- Justification for not providing a noise category in accordance with CAP 2091;
- Details of area of Natural Scenic Areas (NSAs) captured in the Environmental Impact Assessment (EIA) report;
- Additional detail on metrics to be collected in Stage 3;
- Inclusion of a detailed stakeholder list (including NATMAC members contacted);
- Inclusion of Airspace Options table as featured in the Design Options and Design Principle Evaluation report; and,
- Minor changes to technical description regarding liability and impact on instrument approaches to Benbecula Airport.

1. Introduction

1.1 Introduction

The report is compiled as part of the ACP process prescribed in CAP 1616 [A] for a permanent airspace change. ACP-2021-12 has been commenced in order to establish segregated airspace to facilitate sub-orbital rocket launch from the Spaceport 1 (SP-1) launch site on the Outer Hebrides as shown in *Figure 1.*

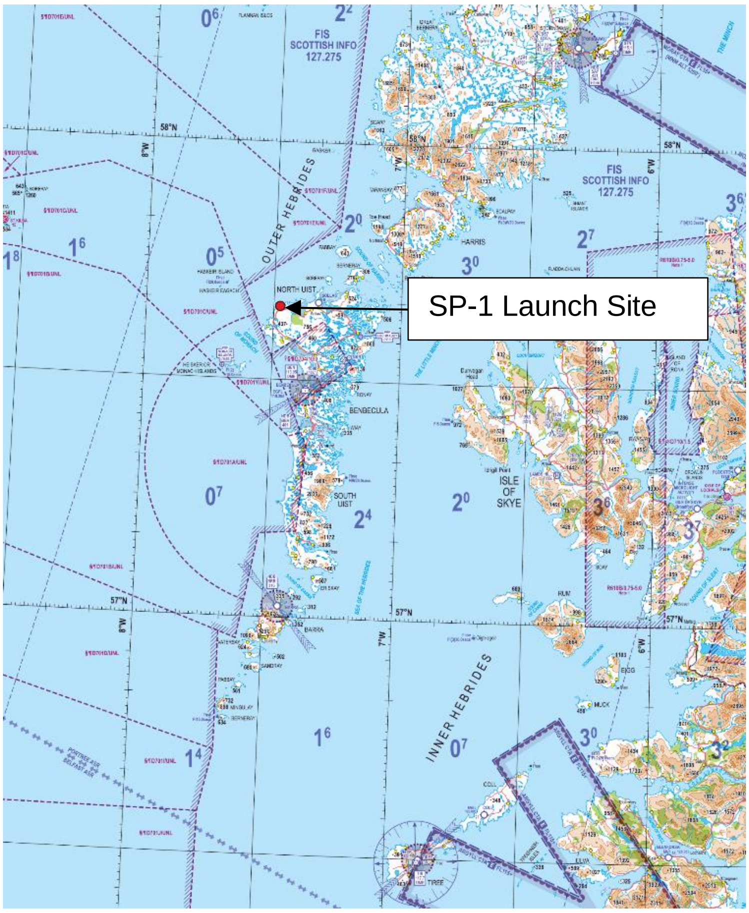

Figure 1: SP-1 Launch site location

The SP-1 consortium led by the local council, Comhairle nan Eilean Siar, and comprising Highlands & Islands Enterprises (HIE), private investors and QinetiQ, are developing, subject to planning consent, a vertical launch spaceport located at Scolpaig, North Uist. This site is being developed as an opportunity in support of the UK government's spaceflight programme, 'LaunchUK', which aspires to grow the UK's global market share of the space sector and be at the forefront of small satellite launch capability. QinetiQ is the airspace change Sponsor for this proposal, which seeks to secure suitable airspace for the safe operation (from launch to splashdown) of sub-orbital sounding rockets operating from the SP-1 launch site at Scolpaig, North Uist.

Despite the main business demand for the SP-1 facility focusing on the operation of sub-orbital sounding rockets, it was envisaged that orbital launches may be facilitated sometime in the future. It was therefore decided, in the interests of economies and to future proof the launch site, that this ACP should capture the airspace requirements for both sub-orbital and orbital rocket launches despite their differences. However, driven by the planning application for the SP-1 launch site, which only considers sub-orbital launch, it was subsequently decided to de-scope the ACP to facilitate just sub-orbital launches. This was to prevent any confusion and possible misinterpretation of intent to those stakeholders with a vested interest in the planning process. It is recognised that should orbital launches become an option in the future then this will be the subject of a new planning application and ACP.

This report makes a number of references to the airspace design options and design principle evaluation report available on the CAA airspace portal at Reference [B]. Furthermore, several items of evidence supporting the qualitative assessment used in this document refer to work undertaken in the ACP for a Temporary Danger Area (TDA) at the Scolpaig launch site (ACP-2021-37), details can be found on the CAA airspace portal at Reference [C].

The nature of modern sounding rockets, with limited pedigree and testing, means there is very limited evidential data available to conduct meaningful safety analysis so a more generic exemplar approach is made to determine the airspace requirements for rocket launches. This exemplar approach is underpinned by experience and safety assessment criteria used by QinetiQ for the rocket launches conducted during the At Sea Demonstration/Formidable Shield (ASD/FS) large scale military exercises that occur bi-annually at the MOD Hebrides Range. Using this data, combined with what is known of the various rocket types, a worst-case scenario is developed and the airspace volume designed around this to ensure aircraft operating at or outside the airspace boundary are not exposed to any additional credible risk. The airspace dimensions thus determined might be greater than actually required for all rocket launches and to address this, outside of the immediate[1] launch site, a modular design is promoted that enables different segments of airspace to be activated to meet the specific requirements of individual sounding rockets. Such a design may involve use of the existing airspace structure of EG D701[2], or design of a wholly new bespoke set of areas; both options are presented here along with the option to modify the D701 areas to enable more efficient use of the airspace.

At this stage of the process, it is not possible to monetise costs and benefits due to the nature of rocket launch where there are no benefits to other airspace users, only costs. Furthermore, the value of rocket launch is extremely difficult to quantify given the infancy of the capability and business. However, it has been identified that SP-1 will drive growth in the local economy, creating:

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[1] The minimum airspace requirements around the launch site are known and have been calculated using experience and safety processes used in launching ballistic missile targets from the MOD Hebrides Range and using an exemplar 'worst-case' scenario rocket type.

[2] EG is the ICAO designator for UK Segregated Airspace and D specifies Danger Area – EG D701 is abbreviated to D701 throughout this document.

- Much needed jobs for younger people (thereby slowing down the exodus of younger persons from the Outer Hebrides);
- Revenue for local businesses; and,
- Indirect benefits to local businesses providing support to the UK space sector.

The negative impacts are likely to be environmental cost associated with SP-1 operations where Commercial Air Transport (CAT) is required to re-route around the activity thereby increasing fuel burn and CO_2 emissions. It is not considered proportionate to provide a quantitative assessment of what this impact will be for each of the options at this stage of the ACP process (this will be captured in later stages for those options taken forward) however, a simple high-level quantitative assessment is provided that suggests the impact is likely to be low when all factors are considered, namely: the modest number of launches and backup days, the expected time of day for the launches and the fact the jet stream favours a west bound track structure over Scotland less frequently than a track structure over the south and central UK. This assessment is further expanded at paragraph 3.5 of this document.

1.2 Purpose

The purpose of this report is to demonstrate that the Sponsor has followed due process as defined in CAP 1616 [A] for Stage 2 Step 2B of the ACP process as far as it is practicably possible for a permanent airspace change to facilitate vertical sub-orbital rocket launch. The report forms part of the overall requirements for the Stage 2 Develop and Assess Gateway.

1.3 Report Structure

The report is split into the following sections

- Section 1
    - Introduction
    - Purpose
    - Structure
- Section 2
    - Statement of Need
    - Design Principles
    - Design options summary
- Section 3
    - Initial impact appraisal of design options
    - Methodology
    - The Do-Nothing option (Baseline)
    - Options appraisal
    - Conclusion of options appraisal summary
    - Simple high level quantitative assessment
    - Evidence to be collected for full appraisal
    - 10 year forecast
    - Economic forecast

- Assessment of noise impact and high level assessment of other costs and benefits for each airspace design option
    - Noise modelling requirement
    - Environmental impact
    - Tranquillity and biodiversity
    - Safety assessment
    - Airspace classification options
    - Airspace classification comparison
    - Measures to reduce impact on other airspace users
- Section 4
    - Next steps
- Section 5
    - Glossary
- Section 6
    - References
- Appendices
    - A – Evidence from Environmental Impact Assessment (EIA)
    - B – Stakeholder List
    - C – Raw Feedback Evidence
    - D – Socioeconomic Analysis for SP-1 (Extract)
    - E – Benbecula Airport Movement Statistics 2022 & 2019

2. Statement of Need & Design Principles

2.1 Statement of Need (SoN)

Since the SoN was written orbital rocket launch airspace requirements have been removed from this ACP.

"A consortium led by the local council (Comhairle nan Eilean Siar), comprising Highlands & Islands Enterprise, private investors and QinetiQ, are developing a vertical launch spaceport site, herein known as 'Spaceport 1', at Scolpaig, North Uist on the Western Isles. This site is being developed as an opportunity in support of the UK government's spaceflight programme, 'LaunchUK', which aspires to grow the UK's global market share of the space sector to 10% by 2030 and be at the forefront of small satellite launch.

Spaceport 1 has been the recipient of local government investment to construct a vertical launch spaceport that will enable small satellite launch. Development of the site and future use by operators will generate much needed revenue for local communities. It is envisaged that significant economic return will result from the creation of high quality job opportunities for local residents, direct and indirect financial income and an increase in personnel residing and visiting the area.

The location has been carefully selected in order to minimise disruption to the public and airspace users, the latter through the exploitation of the existing Ministry of Defence (MOD) managed Danger Areas known as the Hebrides Range; the EG D701 complex. Using irreducible spare capacity of the existing Danger Area complex will enable safe testing of suborbital 'sounding rockets' and future small satellite launch rockets[3]. The existing Danger Areas are fully integrated into systems and processes employed by the UK Airspace Management Cell (AMC) and the EUROCONTROL Network Manager enabling harmonised and dynamic planning of the Air Traffic Management (ATM) network. Moreover, it is envisaged that QinetiQ will manage any 'new' airspace created under the ACP in exactly the same fashion the Hebrides Range airspace is managed, thereby utilising existing airspace management processes and procedures enabling efficient use of airspace under the Flexible Use of Airspace (FUA) concept. Furthermore, this will facilitate expedient transfer of airspace use from MOD activity to Spaceport operations as well as accommodating short notice changes and, where appropriate, coincident operations.

The Spaceport 1 site at Scolpaig currently lies beneath Class G unregulated airspace but is only a few miles from the EG D701 complex. As rocket launch will pose a risk to other airspace users, there is a requirement to safely segregate such activity to minimise risk. Segregation is normally achieved through the promulgation of temporary reserved airspace activated by a Notice to Airmen[4] (NOTAM). However, as the airspace is likely to be needed on a regular basis, the promulgation of a NOTAM

[3] The requirement for orbital launch options is no longer included in this ACP.

[4] Since the SoN was produced the CAA have changed the terminology to be gender neutral and should now read: 'Notice to Aviation'.

detailing the coordinates and control procedures for every launch is probably not appropriate as a long term solution. Furthermore, such temporary airspace is not fully integrated into the airspace management systems and has to be created on a case by case basis thereby increasing workload and, by necessity, the notification periods for activation.

It is therefore considered an ACP is required to provide a small fillet of segregated airspace that provides both adequate protection for the spaceport activities and connects the spaceport with the Hebrides Range Danger Areas. It should be noted that the MOD has developed an agreed process for non-MOD activities to be conducted in MOD sponsored Danger Areas such as the Hebrides Range. This formalised process is an enabler that should allow Spaceport 1 to operate, under certain conditions, in the Hebrides Danger Areas. The small fillet of airspace required under the ACP effectively joins the most easterly boundary point of D701E with D701Y, where the latter adjoins D704.

The ACP will enable both sounding rockets to be tested (nominally on a westerly bearing) and small satellite rocket launch to the North[5]; both trajectories maximising the use of the D701 complex."

2.2 Design Principles (DPs)

It should be noted that the expanded explanation of DP2 and DP3 make reference to orbital rockets, which have since been removed from this ACP. Furthermore, DP9 is no longer relevant as this relates solely to orbital rocket launch and is therefore Not Applicable (NA).

DP1	**Safety**	**The safety of all airspace users is the paramount factor in the airspace design**
DP2	**Safety**	**The airspace design will be of the smallest volume to safely segregate Spaceport rocket launches from other airspace users thereby minimising the impact on other airspace users**
DP3	**Operational**	**Minimise the impact (on other aviation stakeholders) of activating specific EG D701 Danger Areas in support of SP-1 operations**
DP4	**Operational**	**Use Flexible Use of Airspace (FUA) principles by integrating the airspace design into the extant Airspace Management (ASM) procedures operated within the EG D701 complex**
DP5	**Operational**	**Integrating/deconflicting SP-1 activity safely with MOD activity in EG D701 is a vital element of the operational use of the airspace design**
DP6	**Operational**	**The airspace design shall take into account Free Route Airspace (FRA) and Flight Planning Buffer Zones (FBZs) remaining cognisant of CAA Buffer Policy**

[5] Although the requirement for orbital 'launch to the North' has been removed, there remains a requirement to be able to conduct certain sub-orbital launches to the North where they can be wholly contained within D701.

DP7	**Environmental**	**The airspace design and associated activation of EG D701 need to consider the environmental impact of aircraft being re-routed around the airspace in addition to considering the noise, emissions and light pollution in the local area**
DP8	**Regulatory**	**The airspace design will need to consider any emerging regulations pertaining to spaceports and Ranges under the Space Industry Act 2018**
DP9	**Operational**	**Rocket stage drop zones may be required outside the EG D701 Areas and will need to be considered**

2.3 Design Options Summary

The Sponsor prepared a number of airspace design options (see summary at Table 1 below) upon which it invited feedback and comment from a range of stakeholders (stakeholder list contained at Appendix 6.B); this feedback incorporated a request to consider how each option was aligned to the DPs.

Six airspace options were presented including the baseline 'Do-Nothing' Option 0; this option was not considered viable for rocket launch as it does not provide any segregation – a critical element of the DPs and SoN. It is strongly argued that segregation of rocket launch is categorically essential in ensuring safety as rockets are unable to comply with the Rules of The Air (RoTA), thereby increasing the risk of mid-air collision and, following catastrophic failure or flight termination, create a debris hazard to other aircraft.

Option 1 required temporary airspace being designed for each launch necessitating a unique bespoke airspace design driven by the individual rocket safety assessment and safety trace analysis. Although this option utilised a smaller volume of airspace than the other options, it would require individual NOTAM and associated Aeronautical Information Publication (AIP) Supplement (SUPP) information to be created and published for each launch to enable segregation. Such one-off NOTAMs would not be fully integrated into the UK Airspace Management Cell (AMC) or EUROCONTROL Network Manager (ENM) ASM systems that enable the harmonised and dynamic planning of the ATM network. Furthermore, temporary airspace is not featured on navigation charts or in Air Traffic Control (ATC) and MOD Hebrides Range surveillance systems. Temporary airspace reservations have to be drawn using dynamic mapping tools – a lengthy process that induces a higher probability of plotting error. This option was therefore discounted as it failed to meet several of the DPs based on these issues.

Option 2, (using D701 but with a bespoke temporary airspace design around the launch site), was similarly discounted on the same grounds based on the fact a temporary airspace solution around the launch site would be needed for each launch and, unlike Option 1, the volume of airspace utilised was no less than the other options presented.

The three remaining options (Options 3, 4 & 5) were taken forward to the Options Appraisal.

The following table provides a summary of proposed options:

Option	Description	Notes
0 - Do nothing	No change to current airspace	Not viable for rocket launch.
1 - Do Minimum	Design and publish unique airspace design NOTAM & AIP SUPP information for every individual launch	Temporary NOTAMs not integrated into ASM systems.
2 - Do Minimum & Utilise D701	Design and publish unique airspace design NOTAM & AIP SUPP information for airspace around launch site	Temporary NOTAMs not integrated into ASM systems.
3 - New Fillet of Segregated Airspace around Launch Site and Utilise D701	New fillet would be an extension of D701 and activated in a similar fashion	Fully integrated into ASM systems; Utilise existing ASM processes and procedures.
4 - Construct New Bespoke Segregated Airspace Blocks From Launch Site	Design a new bespoke airspace complex from the launch site extending out over D701	Require new ASM processes and procedures; Area delineation may be an issue.
5 – Adding Sub-division of D701B, C, D, E, & F	Use in conjunction with either Options 2 & 3 – sub-divisions reduce the overall airspace volume in use within D701	May need additional ACP to change D701; Additional airspace made available would have limited use.

Table 1: Summary of airspace design options presented to stakeholders for comment

2.3.1 Design Options – Stakeholder Feedback

Despite sharing the design options with a wide number of stakeholders (88 in total), only nine responses were received and, from these nine, just three provided feedback, two requested unrelated[6] information and the remainder had no comment. The feedback was limited to the main stakeholders namely, MOD, NATS and HIAL. The feedback included their view on whether the design option met the DPs; this information was used to help inform the DP evaluation and decision to consider three options in Step 2B. Two of the respondents, HIAL and MOD suggested Option 3 as their preferred option based on the fact this option largely uses an existing segregated airspace structure with well-established ASM processes and procedures. MOD proffered that they would support Option 5 (modification of the D701 areas) providing it was cost neutral to them and the benefits of such changes could be shown to be cost effective when all aspects were considered. Both options (3 and 5) require a new 'fillet' of segregated airspace to connect the launch site to the existing D701 and D704 Danger Areas (see *Figure 2*). NATS suggested Option 4 as the preferred option and challenged the fact

[6] Unrelated to the airspace design options or DPs. One respondent requested more information on the ACP process and the other wanted to better understand the relationship between the airspace safety volume and ground safety footprint. Details are captured in the Step 2A report at Reference [B].

several of the DPs made reference to the use of D701. The Sponsor acknowledged this observation and agreed that, by removing the reference to D701, at least three of the DPs would enable Option 4 to meet the DP requirements. Option 4 is therefore considered along with the other two options. All options require a small additional circular area of segregated airspace in the immediate vicinity of the launch pad in order to protect SP-1 personnel (while engaged in certain pre-launch activities), from the noise/distraction caused by low flying aircraft (see *Figure 3*). This additional small area also provides protection from Radio Frequency (RF) emissions from low flying aircraft should the rocket systems prove susceptible.

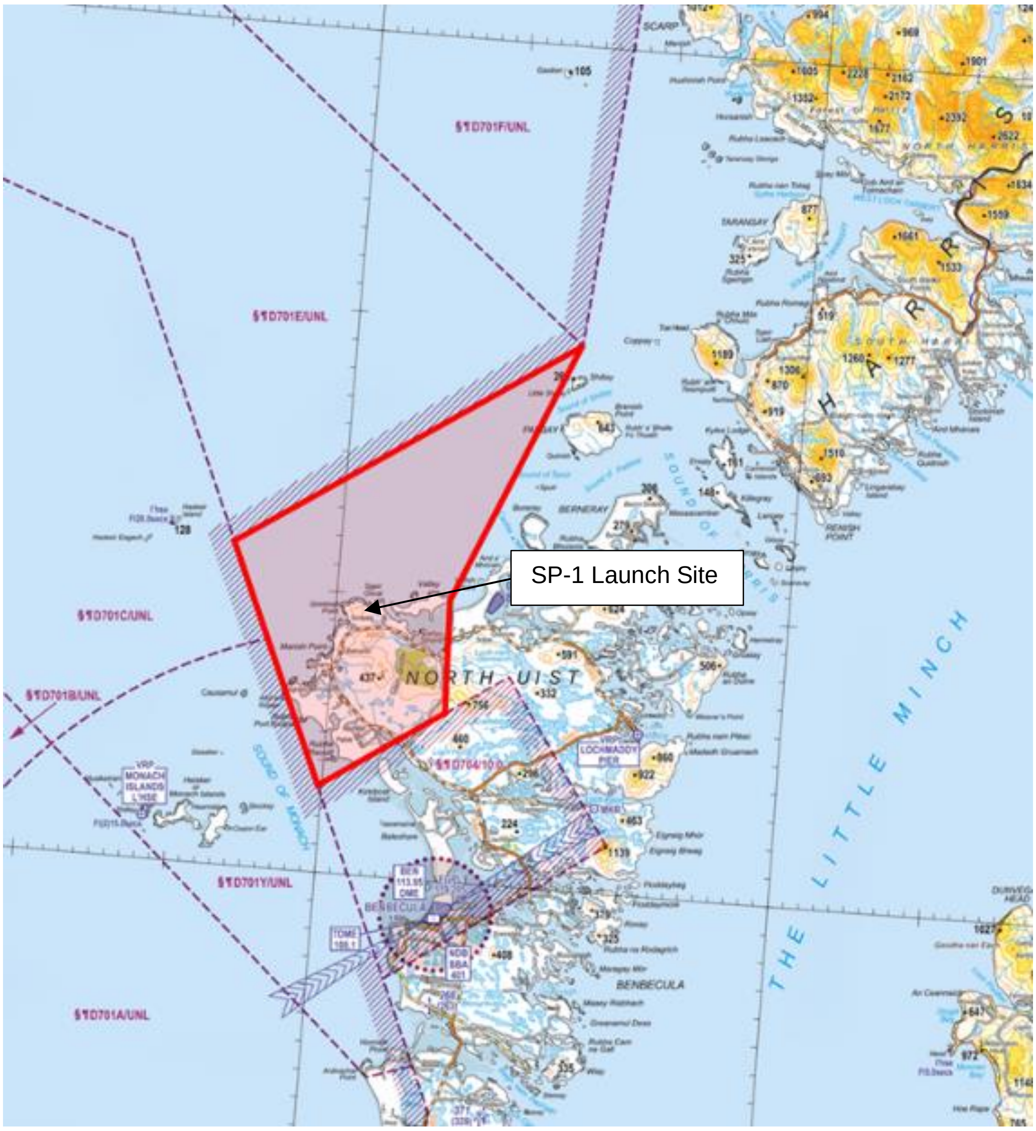

Figure 2: Airspace 'fillet' connecting airspace around launch site with D701 & D704

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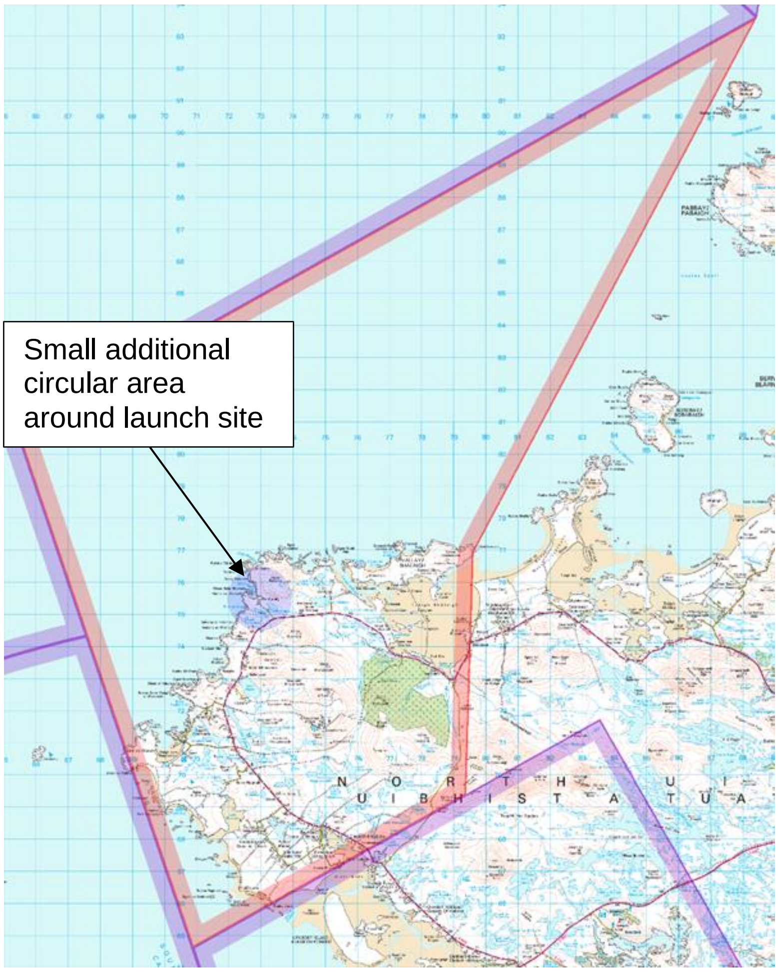


Figure 3: Small circular area of segregated airspace within 'fillet' to protect SP-1 ground personnel

2.3.2 **Option 3 – New Fillet of Segregated Airspace around Launch Site and Utilise D701**

This option includes the use of a new fillet of airspace around the launch site between D701 and D704 that could be activated by NOTAM in the same manner as the D701 areas. This would provide a permanent airspace solution over the launch site and connectivity to the D701 Danger Areas. The D701 areas could be activated in the normal manner using only those areas necessary to contain the safety trace of the rocket being launched. Both the fillet of airspace and D701 would be fully integrated into the systems and processes employed by the UK AMC and the ENM, enabling the harmonised and dynamic planning of the ATM network. Furthermore, this option provides the most straightforward operation for MOD Hebrides Range staff as each different sounding rocket launch would be treated in exactly the same manner as any MOD weapon firing or test and evaluation event. The new fillet of airspace would be treated as an extension of D701 for ASM purposes and the associated D701 areas would be activated accordingly to meet the safety trace requirements of the rocket being launched.

Notification, activation and deactivation would follow existing procedures and Letters of Agreement (LoAs).

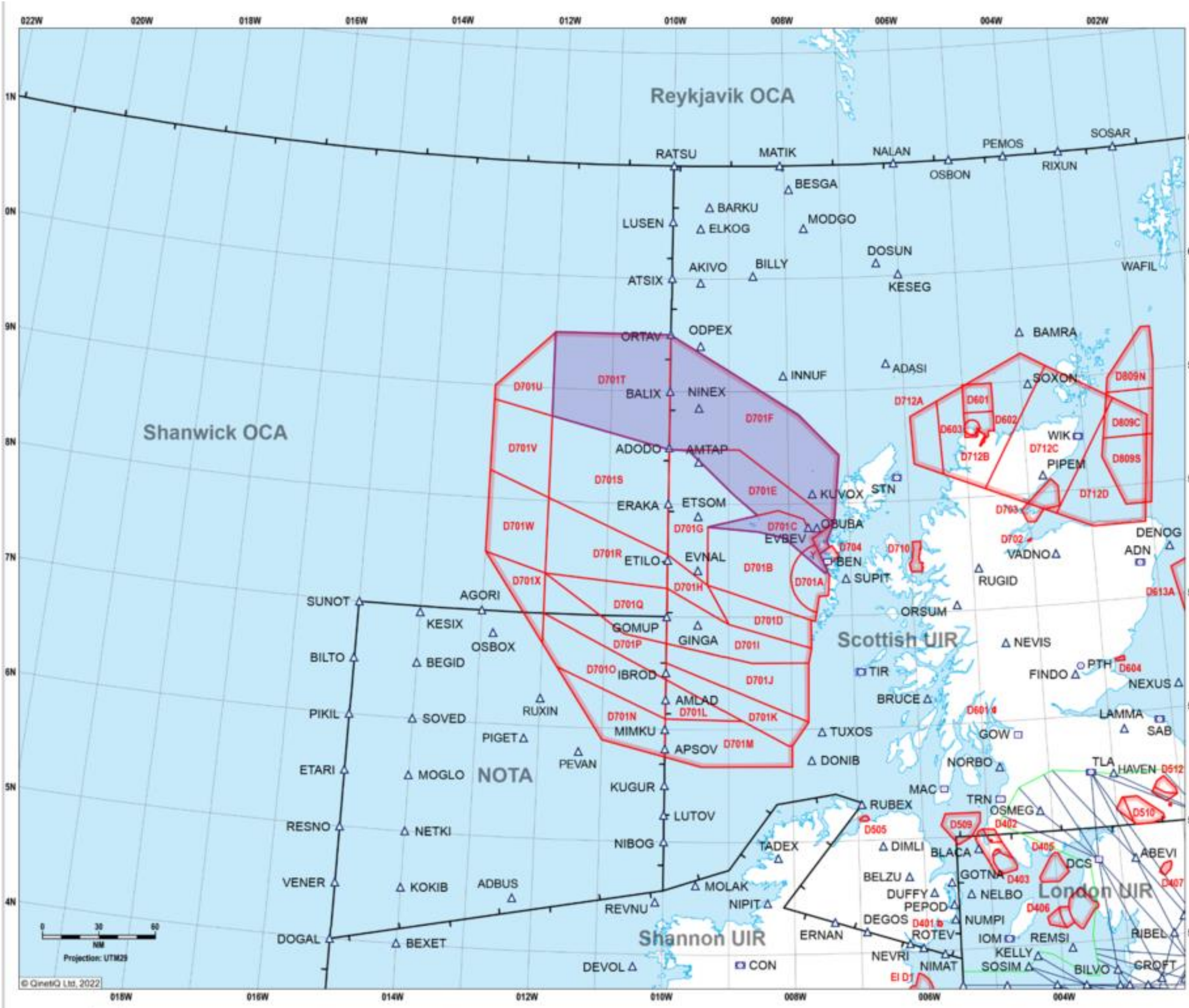


Figure 4: Option 3 – New fillet of segregated airspace around launch site and utilisation of D701 – Diagram depicts possible D701 areas (and new 'fillet') activated for a long range sounding rocket

2.3.3 **Option 4 – Construct New Bespoke Segregated Airspace Blocks from Launch Site**

As many of the modern sounding rockets have very limited pedigree, endeavouring to accurately predict the launch profiles, and critically the safety traces, is not feasible at this stage (so far in advance of the launch). Therefore, any attempt to design new airspace blocks introduces risk unless a large bespoke modular design is used. Any such large bespoke modular design for sounding rockets would have to extend in excess of 250km west north-west from the launch site and be constructed of several different airspace blocks to enable a process of tailored activation (similar to that currently used for D701) to be adopted. With experience gained from the ACP pertaining to the redesign of the D701 areas in 2014, it is expected any such modular design would have to be largely aligned to the existing boundaries of D701 to enable minimum disruption to traffic routing to/from the Oceanic Entry Points (OEPs) at 10° west. The modular design and alignment of the D701 Danger Areas may not always occupy the absolute minimum volume of airspace (with more airspace sometimes being activated than is absolutely necessary) however this alignment enables CAT to fly the shortest routes to/from the OEPs. Therefore, any additional unused airspace becomes largely irrelevant especially as this airspace is rarely used by anything other than CAT. For this reason, it was considered that any modular bespoke design would have to follow similar alignments to that of D701 as depicted in *Figure 5*. However, NATS in their feedback suggested a more symmetrical design as shown in *Figure 6.* Either airspace design would be fully integrated into the systems and processes employed by the UK AMC and the ENM, enabling the harmonised and dynamic planning of the ATM network. Despite the bespoke design, the airspace around the launch site would still need to be the same shape as the airspace 'fillet' required for Option 3 & 5 based on the safety analysis conducted for the TDA, ACP-2021-37 [C].

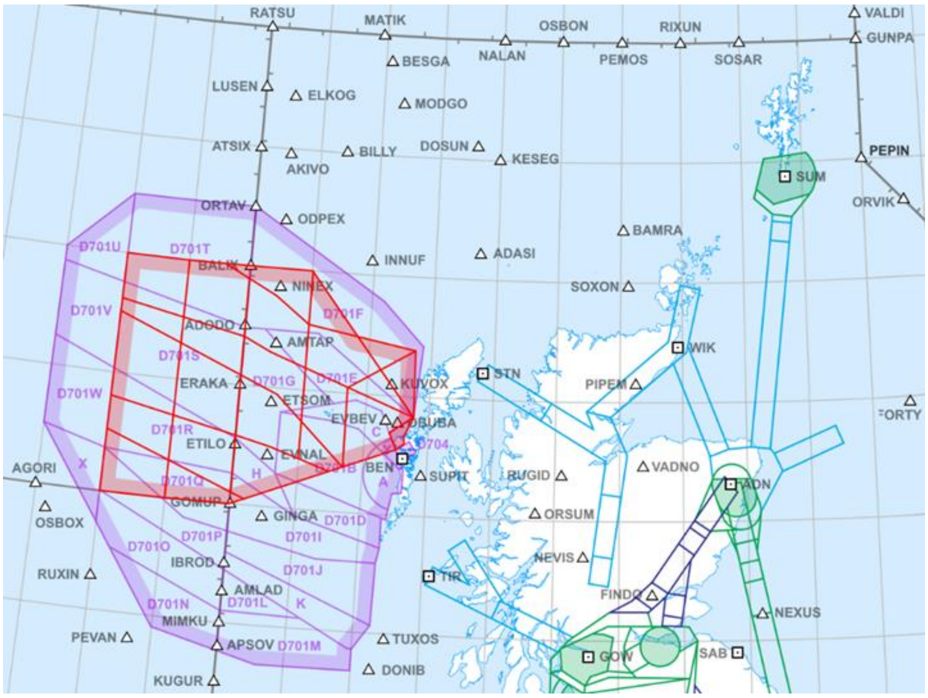


Figure 5: Option 4 – Bespoke airspace design originating from the SP-1 site with similar alignment to the existing D701 areas.

The new airspace blocks would overlay a significant part of the existing D701 areas (see *Figure 6*) and would require careful delineation to prevent confusion; this would be particularly important when simultaneous activities were occurring (MOD use of D701 and SP-1 use of new areas). New and separate (from D701) ASM process and procedures would be required for this option.

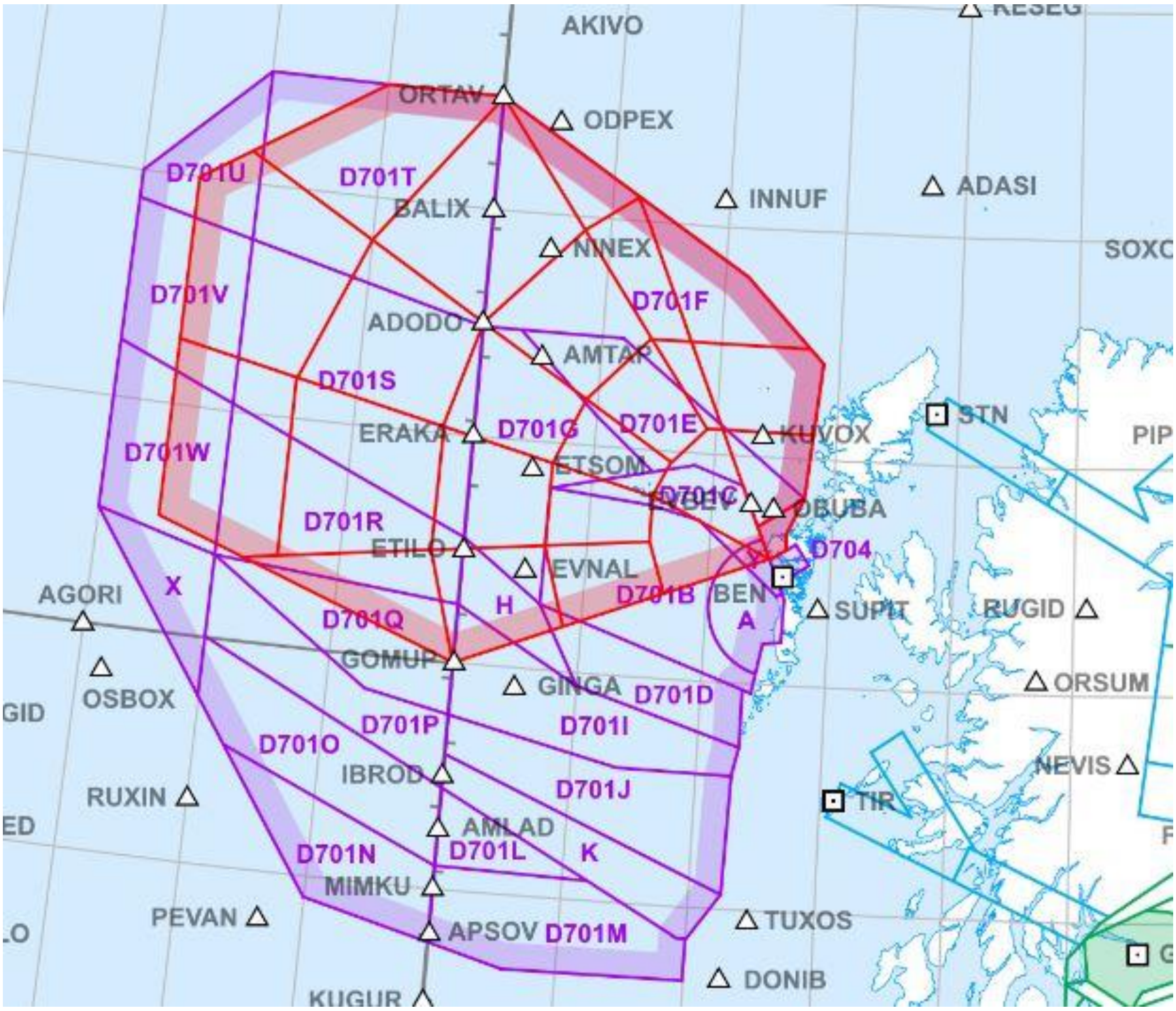


Figure 6: Option 4 – An alternative bespoke modular airspace design originating from SP-1 site with D701 overlay

2.3.4 Option 5 – Use in Conjunction with Option 3 Adding Sub-division of D701C, E, & F or reconfiguration of D701

This option introduces a series of sub-divisions of the existing D701 areas or reconfiguration of the existing layout in order to reduce the overall volume of airspace unavailable to other airspace users. The exact positions of these sub-divisions would require further work to conclude the optimum location; examples of what this might look like are depicted at *Figure 7.*

Whether the additional airspace made available by this option would be of benefit to other airspace users will form part of the analysis in this document. MOD suggested they would support this option if it was cost neutral to them however, they strongly suggested the cost benefits of this option should be carefully examined especially when balanced against the limited use (of 10 launches per year).

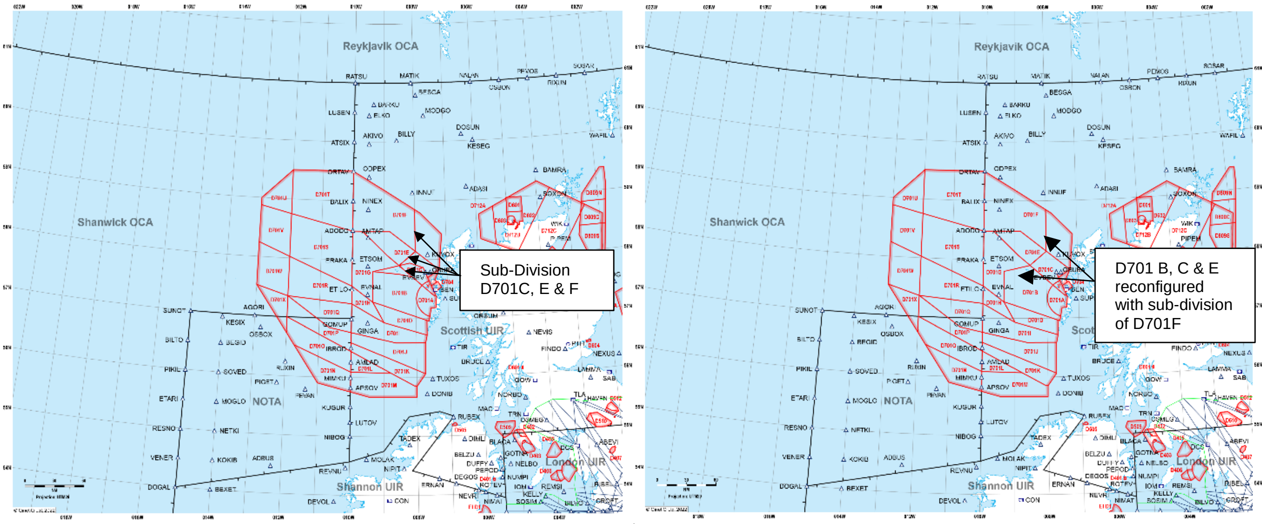


Figure 7: Option 5 – Sub-divisions of D701 or reconfiguration of existing areas

3. Initial Impact Appraisal of Design Options

3.1 Stage 2B - Methodology

Stage 2B requires an initial appraisal of the impacts of the design options presented in Section 2 against a "do nothing" option. The chosen methodology is to conduct a simple qualitative assessment of the different options, both positive and negative, against the headings identified in CAP1616, Appendix E, Table E2: "Guide to expected approach to key analysis for a typical airspace change". This approach has been applied previously in other Airspace Change Proposals of similar scale/proportionality that have successfully passed the Stage 2 Gateway and it has been deemed compliant both with the spirit of CAP1616 and the Government Green Book.

3.2 The Do-Nothing Option

This option leaves the airspace as it currently exists (depicted in *Figure 8* and *Figure 19* below) with the SP-1 launch site sitting within Class G airspace. Although utilisation of D701 Danger Area could provide segregation for a portion of the rocket trajectory (where this is permitted), the area around the launch site would remain unsegregated. Without segregation, it is considered that rocket launch could not occur due to the risk to other airspace users as rockets will have no means of complying with the RoTA, thereby increasing the risk of mid-air collision and, following catastrophic failure or flight termination, create a debris hazard to other aircraft. CAP1616 requires that the Change Sponsor assess each option against a baseline; the 'Do-Nothing' option provides that baseline, describing the existing situation against which to assess the effect of implementing each of the proposed design options.

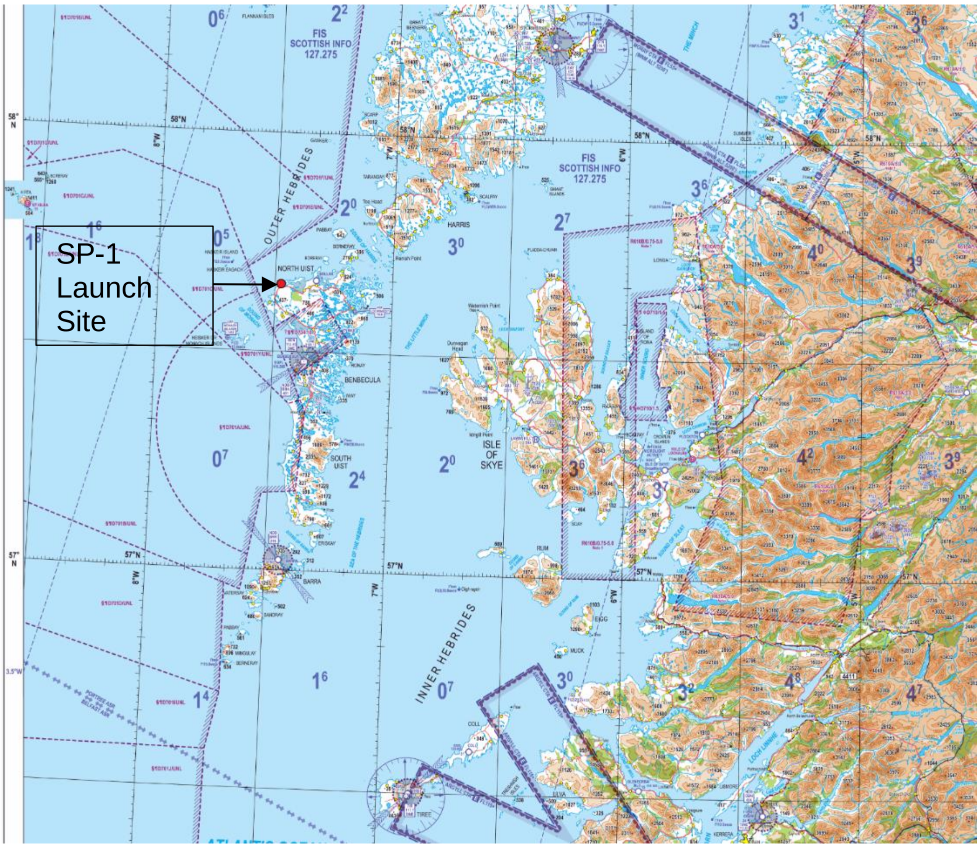


Figure 8: Local area airspace in the vicinity of SP-1 site

3.2.1 Local Airspace

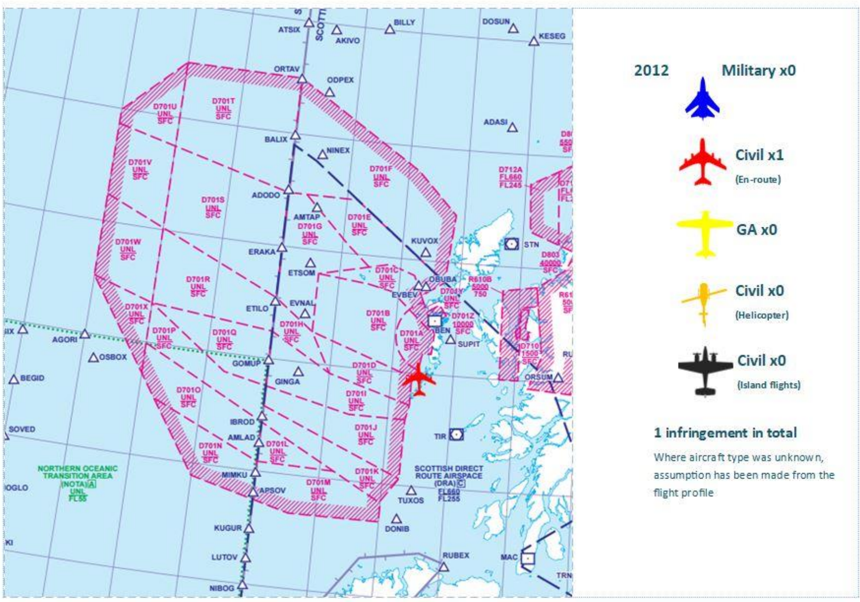
The SP-1 launch site at Scolpaig, North Uist has Benbecula Airport approximately 10 Nautical Miles (NM) to the south, Barra beach landing strip 38NM south, the small beach landing strip at Sollas approximately 5.5NM to the east and Stornoway Airport approximately 58NM to the north east. The launch site is located between the MoD Hebrides Range Danger Areas D701 and D704 (see *Figure 8*).

3.2.2 Flights Below 7000ft

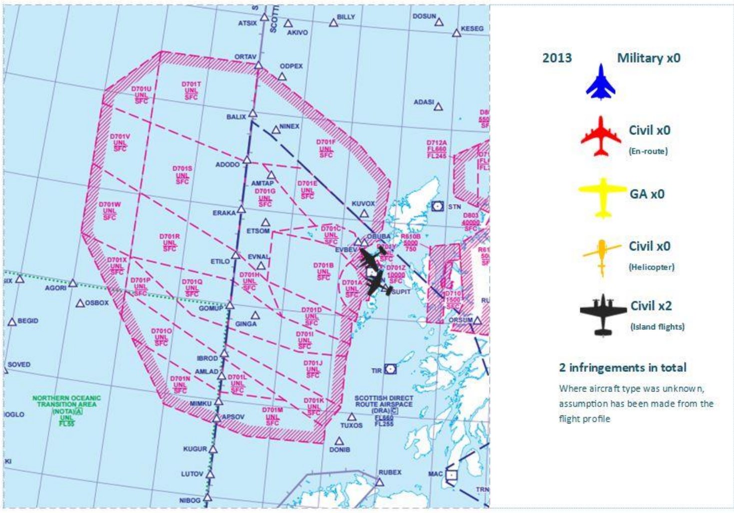
It is acknowledged that the airspace fillet around the Spaceport and activation of certain D701 areas will affect aircraft operating below 7000ft above ground level (agl). Local knowledge gained from MOD Hebrides Range operations (observing flight profiles on radar whilst conducting clear range procedures for 25+ years), would suggest that flying in the local area below 7000ft is extremely limited when compared to other parts of the UK. This statement is substantiated by the following evidence presented in paragraph 3.2.2.1 to paragraph 3.2.2.8 inclusive.

3.2.2.1 **Danger Area infringement data**

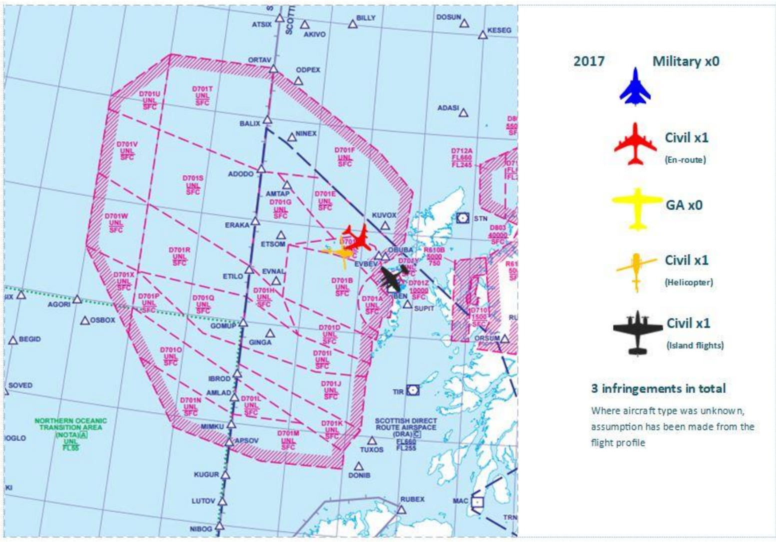
The Danger Area airspace infringement data (see last page of Appendix 6.C.2) compares 10 years of data from MOD Aberporth Range (Wales) and MOD Hebrides Range (see *Figure 9*), and demonstrates that there is a significant difference in numbers of infringements. Aberporth recorded 116 infringements between 2012 and 2022 whereas Hebrides recoded only 10 infringements for the same period. From these infringements the majority (circa 90%) for both Ranges, were aircraft operating below 7000ft. It is evident from *Figure 9*[7] that for the Hebrides Range none of the infringements involved GA; this compares to 32 infringements involving GA at MOD Aberporth Range. These statistics would suggest significantly lower levels of GA in the Outer Hebrides than in south-west Wales. Further, examination of the two Ranges' infringement data similarly suggests significantly lower levels of military activity in the Outer Hebrides.



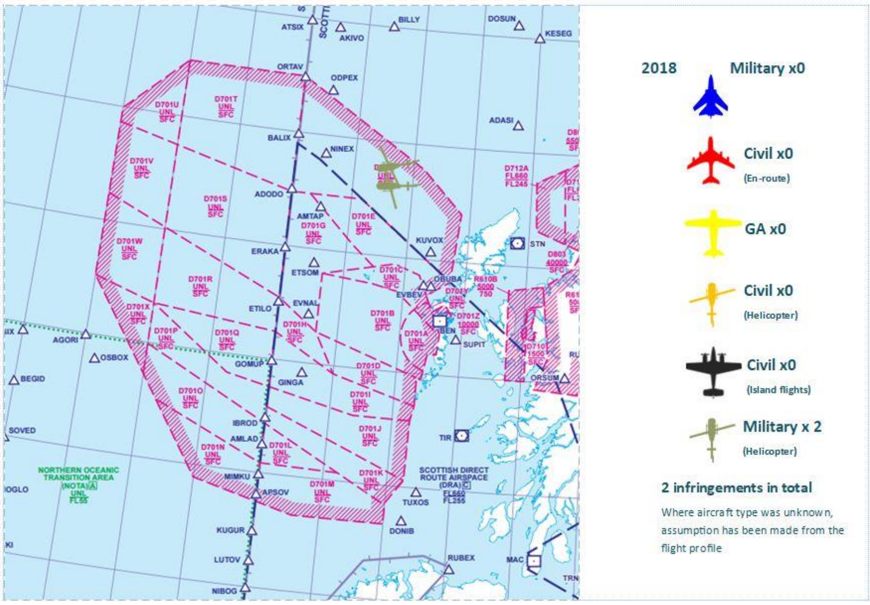
[7] Note: There were no recorded Danger Area infringements for the Hebrides Range during 2014, 2015, 2016, 2020 or 2021 so these diagrams have been omitted.

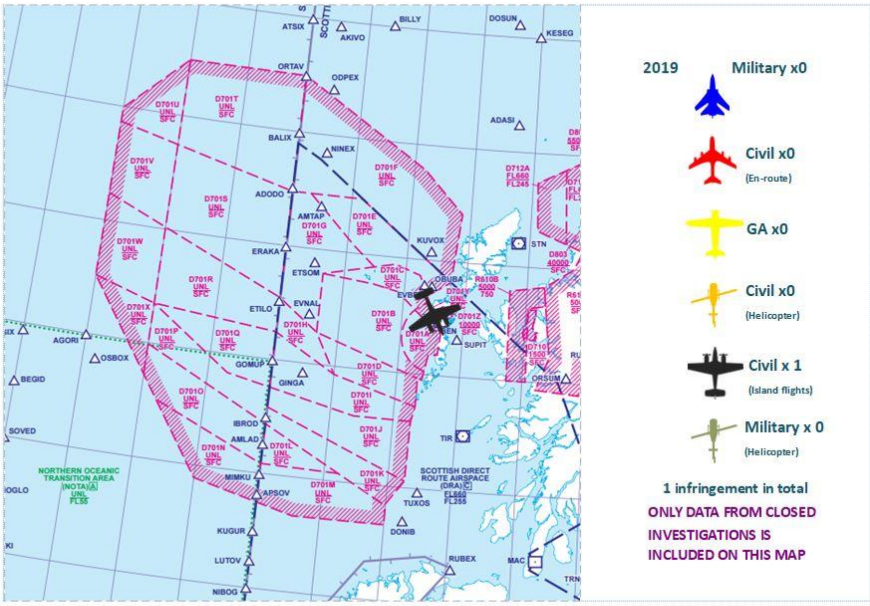


2013
Military x0
Civil x0
(En-route)
GA x0
Civil x0
(Helicopter)
Civil x2
(Island flights)
2 infringements in total
Where aircraft type was unknown, assumption has been made from the flight profile



2017
Military x0
Civil x1
(En-route)
GA x0
Civil x1
(Helicopter)
Civil x1
(Island flights)
3 infringements in total
Where aircraft type was unknown, assumption has been made from the flight profile





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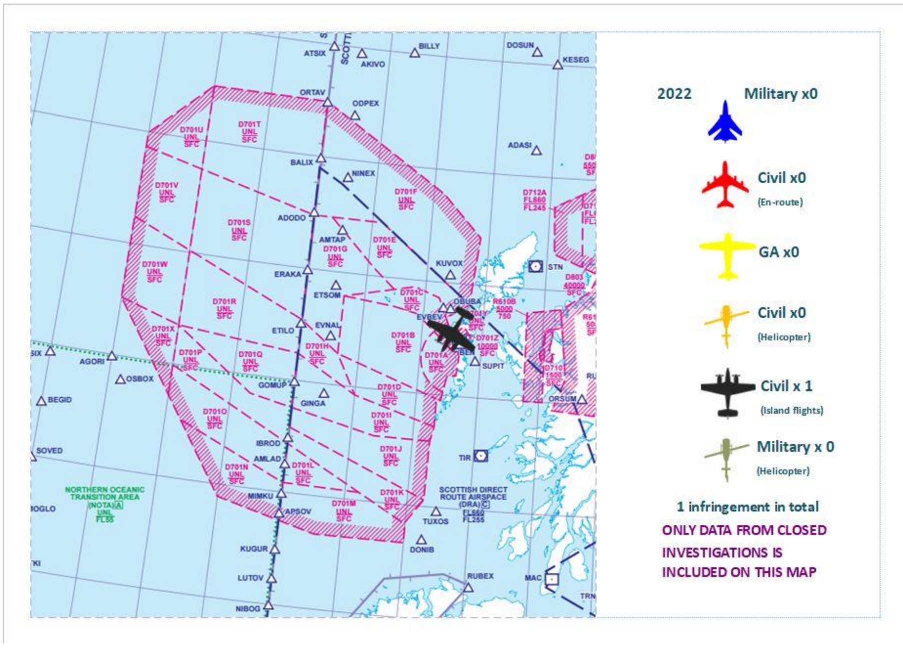

Figure 9: Danger Area infringement data for MOD Hebrides Range 2012-2022 inclusive (Source: NATS Ltd)

3.2.2.2 **Air Proximity (AIRPROX) Data**

Air Proximity (AIRPROX) report data provided by the UK AIRPROX board shows that there are no recorded AIRPROX in the vicinity of the Outer Hebrides during the period 2000-2021. AIRPROX risk often increases with higher concentrations of aircraft, it can therefore be argued that areas of the UK with few or no AIRPROX are those areas with light traffic levels. The snapshot of the UK AIRPROX interactive map at *Figure 10* shows the distribution of AIRPROX[8] across the UK for the period 2000 – 2021 inclusive. It can be seen that for most of England and parts of Wales, where high levels of traffic are experienced (in particular GA[9]), there are a large number of AIRPROX; Scotland has fewer and the Outer Hebrides no reported AIRPROX during this period. Analysis of the data using the AIRPROX Board interactive map (see *Figure 11*), shows three AIRPROX in the vicinity of Stornoway airport and three in the vicinity of the 'Inner Hebrides' (approximately 24 miles to the east of SP-1) the most recent of these being in 2012. This evidence further supports the analysis that there is 'limited GA activity in the local area' and 'low concentrations of air traffic, including GA, operating below 7000ft in the vicinity of the Outer Hebrides'.

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[8] AIRPROX are categorised A-E with the most serious being A 'risk of collision; B 'safety not assured'; C 'no risk of collision'; D 'risk not determined' and E (unique to UK) 'incident met the criteria for reporting but, by analysis, it was determined that normal procedures, safety standards and parameters pertained'.

[9] 82% of aircraft-to-aircraft events involved a GA Sports and Recreational light aircraft (this number includes Unknown/Untraced aircraft where the description fitted this category). (Source UK AIRPROX Board).

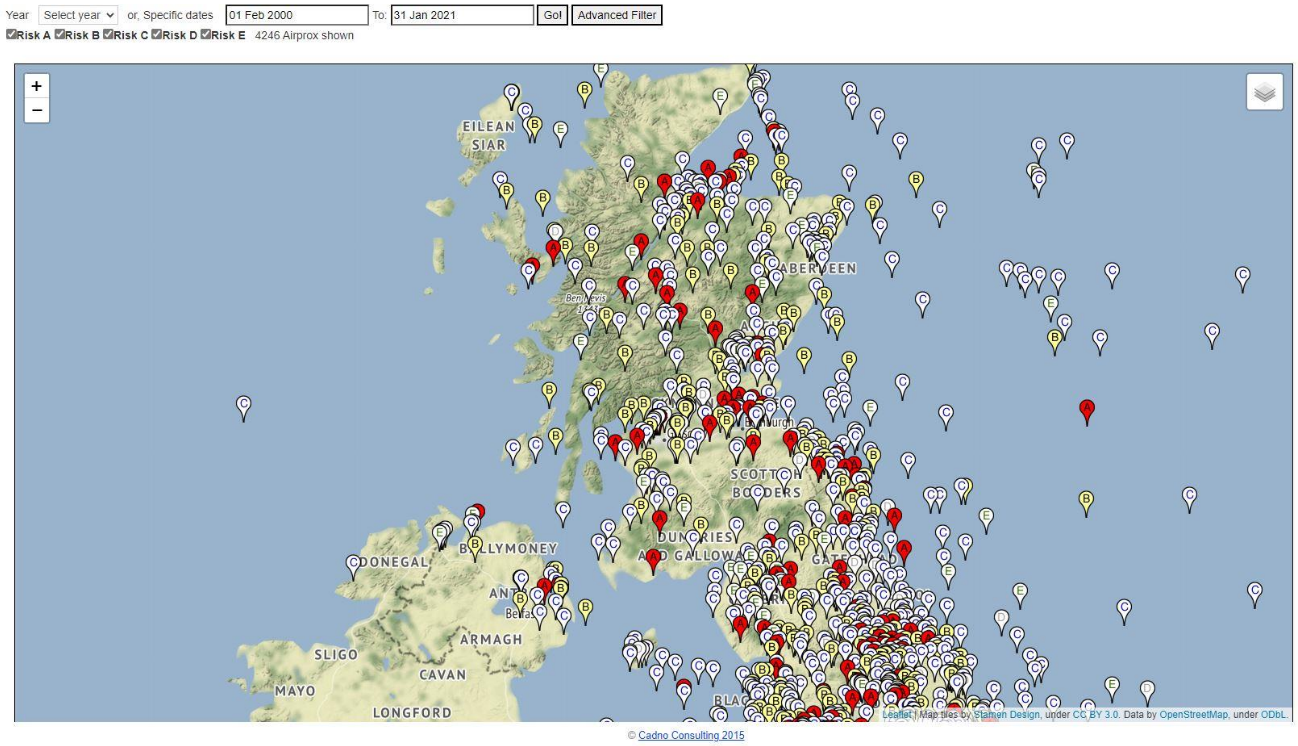

Figure 10: UK AIRPROX Board interactive map showing distribution of AIRPROX by category A-E for the period 2000-2021 (Source: UK AIRPROX board)

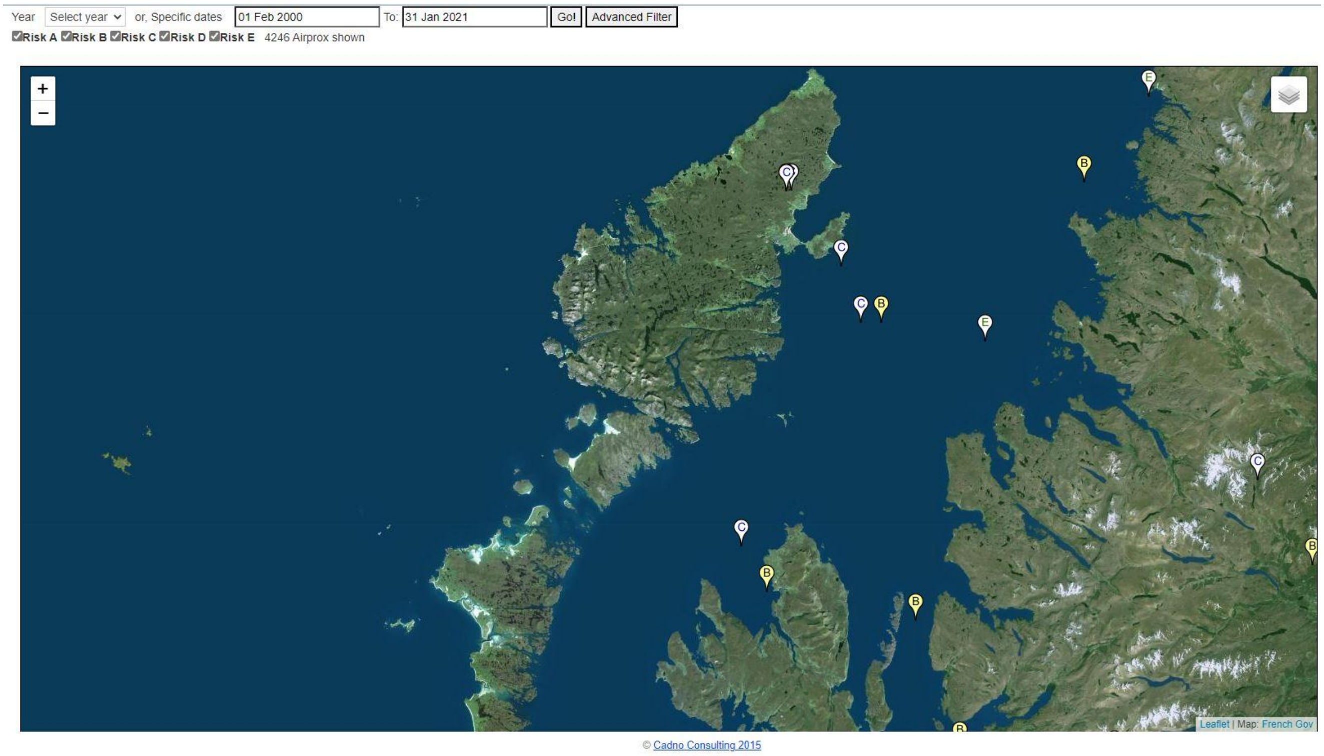

Figure 11: UK AIRPROX Board interactive map showing distribution of AIRPROX in the vicinity of the Outer Hebrides 2000-2021

3.2.2.3 **Sollas 'Fly In' Coordinator**

Details obtained from the Sollas[10] 'fly in' coordinator determined that the use of the landing strip outside the annual fly-in event was extremely limited. It is acknowledged that, as the landing strip does not have Prior Permission Required (PPR) status, gaining exact data is not possible; however, it is conjectured that there is probably less than one aircraft a week using the beach during the working week when the majority of the sounding rocket activity is likely to occur. Moreover, the number of rocket launches is not expected to exceed two to three in any single month. When this is balanced against the infrequent use of the beach site, the probability of the two occurring at the same time (given other factors such as tide and weather limitations for Sollas), is considered remote.

[10] The annual Sollas beach Fly-in event is held most summers over a single weekend (with aircraft often arriving Friday and departing Monday). GA aircraft numbers vary significantly each year: 2014 - 9 aircraft; 2015 - 12 aircraft; 2016 - 24 aircraft; 2017 - 2 aircraft; 2019 - 5 aircraft; 2020/21 Cancelled due COVID; and, 2022 – 8 aircraft (Source: Sollas 'Fly In' Coordinator).

Figure 12: Sollas traffic patterns (in green) plus 1NM radius circle suggested[11] manoeuvring area in red. The shaded red line indicates the boundary of the proposed airspace fillet. (Source: Highlands & Islands Strut of the LAA)

The flight profiles flown by aircraft operating to the beach landing strip at Sollas have been obtained from the Highland and Islands Strut of the LAA; their drawings have been overlaid onto the most current Ordinance Survey (OS) map in an attempt to show typical flight profiles; these are depicted at *Figure 12*.

3.2.2.4 **HM Coastguard**

Stornoway airport facilitates the base for the coastguard helicopter supporting the Outer Hebrides and adjacent areas. Details obtained from the current helicopter operator, Bristows, and data from the government web-site suggest that these aircraft operate in the local area on average five times a month (this includes training flights). From these flights approximately 3 per month (circa 30 per annum - using the government figures for the past five years), are SAR 'tasking flights' as captured in the government figures shown in *Figure 13*.

[11] Suggested by the Highland & Island Strut LAA.

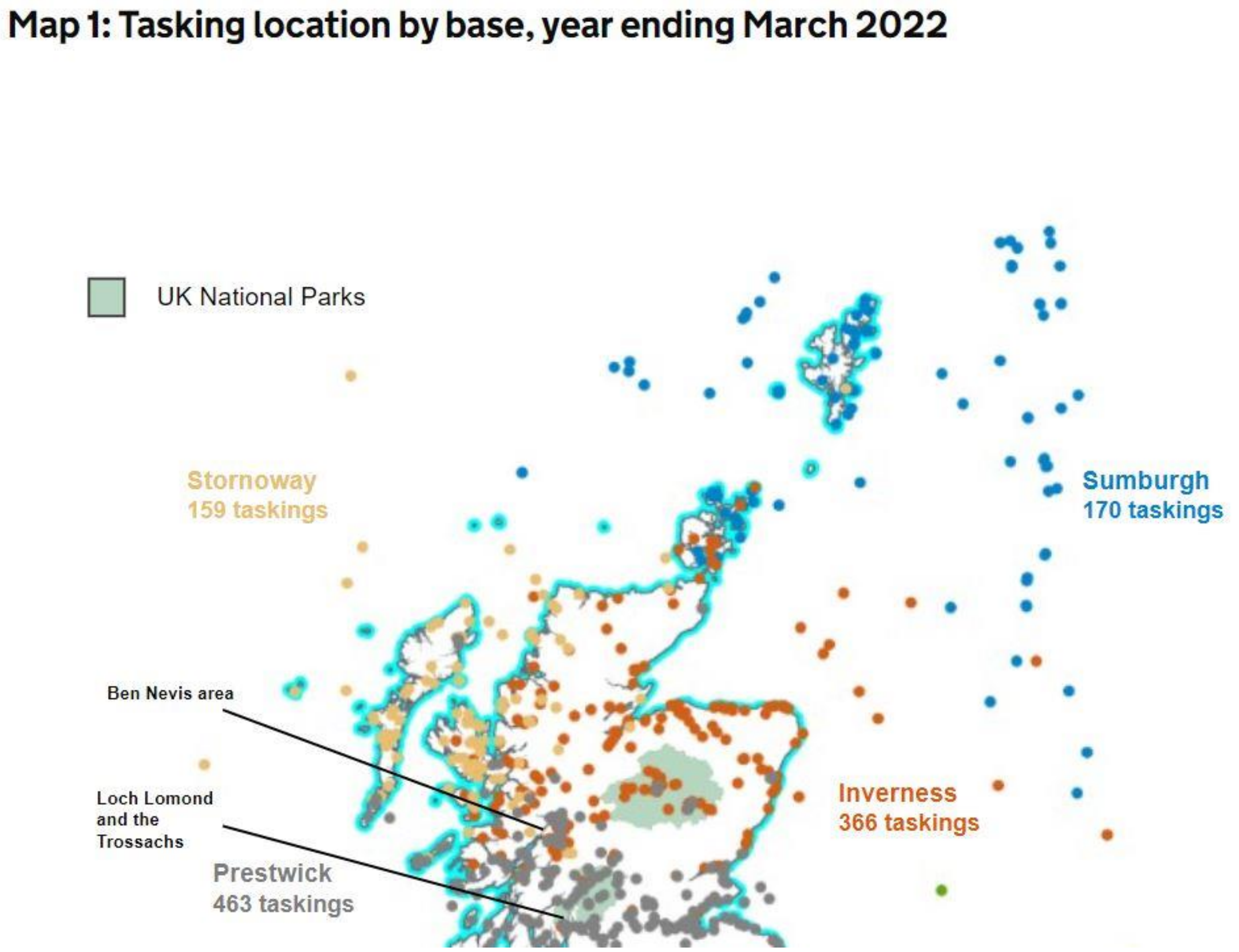

Figure 13: Stornoway SAR tasking (in light brown) showing approximately 30 flights in the vicinity of the Uists during a 12 month period March 2021 - March 2022. (Source: Dft National Statistics for SAR)

3.2.2.5 **Benbecula Airport Movements Data & Flight Profiles**

Loganair are the single operator conducting scheduled flights to Benbecula. They have stated that they did not expect the small new airspace fillet shown in *Figure 2* to adversely affect their operations (see Appendix 6.C.1). In order to gain further clarification the Sponsor contacted Loganair to ascertain details of their summer schedule and routes flown (see *Figure 14* and *Figure 15*) as these are the busiest periods. It was confirmed that they anticipated operating no more than six flights (12 movements) a day in and out of Benbecula during the summer[12] of 2022 (including cargo flights).

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[12] This data was received in conjunction with the TDA work, namely ACP-2021-37 and was therefore received before the summer of 2022.

Statistics obtained since this request indicate that fewer flights were flown in 2022 than previously expected with average daily number of scheduled movements being 6; see Table 2 and Appendix 6.E. Benbecula ATC confirmed that for the summer of 2019 they handled an average of seven commercial movements and less than three GA movements per day during the summer months (June to August); this period included the Sollas fly-in; see Appendix 6.E. From the current flight schedules, 50% of these movements occur prior to 1300 UTC (the earliest expected rocket launch time), therefore it is concluded that only 4 movements are likely to occur at the time the airspace fillet and associated D701 areas are active. It is argued that there will be little change in these flight profiles below 7000ft that will affect the few local residents who live in the vicinity especially as Benbecula ATC have suggested that the new airspace fillet is only likely to have a slight impact on a visual approach from the north to runway 06 (where a slight deviation may be necessary). It can be seen from *Figure 15* that the Instrument flight profiles and normal routings are not affected by the new airspace fillet around the SP-1 launch site. Given the very limited number of aircraft movements that could potentially be affected (probably less than 4), it is not considered proportionate to conduct any further detailed analysis. It is acknowledged that activation of certain D701 areas (in particular D701A and Y) can impact on instrument approaches to runway 06, however, this is catered for in current LoAs and it is intended to use these extant procedures when D701 is activated for SP-1 launches (as per Options 3 & 5). New similar procedures would have to be created, possibly mapping across from extant LoAs, should Option 4 be the final solution.

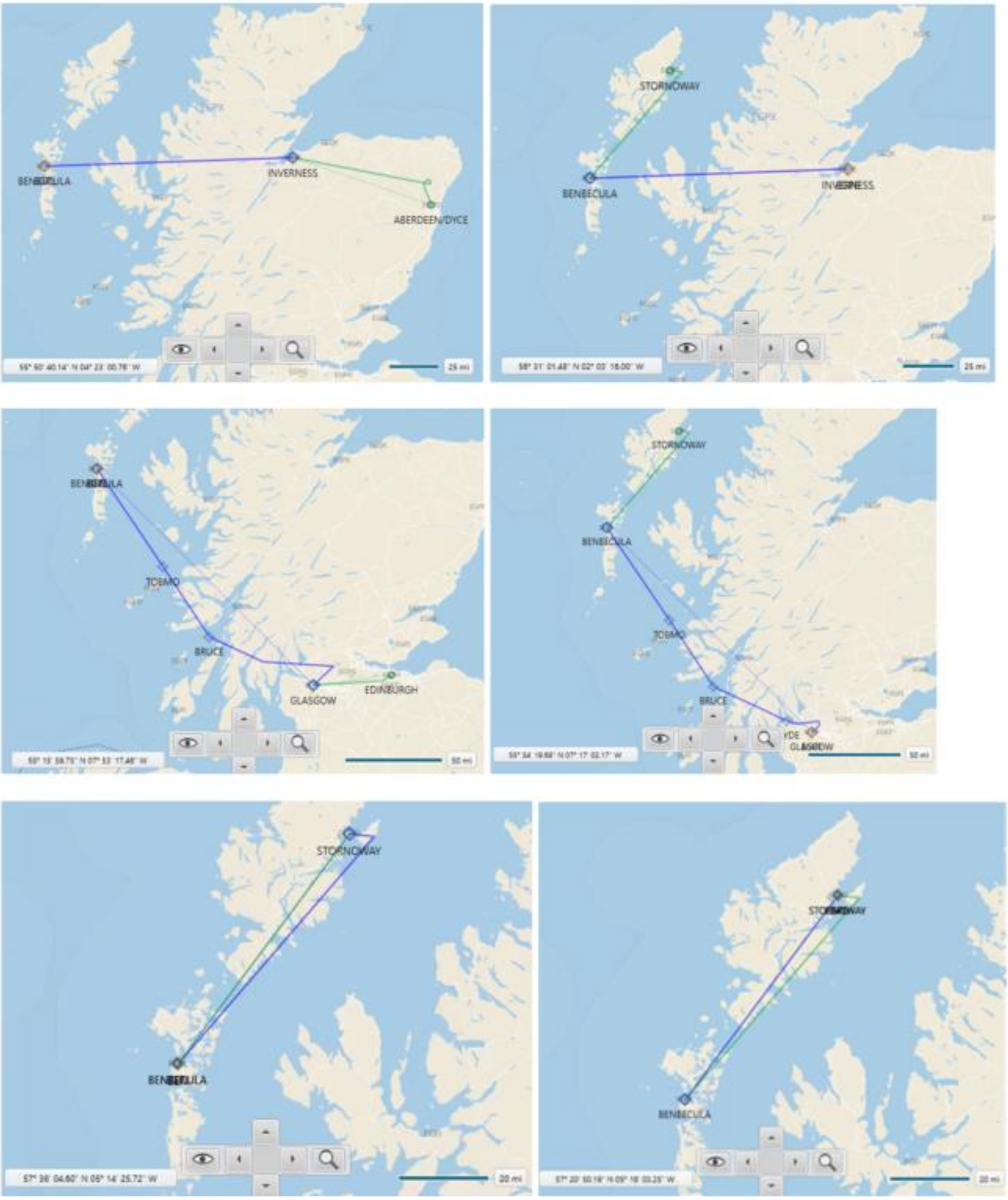

Figure 14: Loganair traffic patterns to/from Benbecula Airport (Source: Loganair 9 Feb 22)

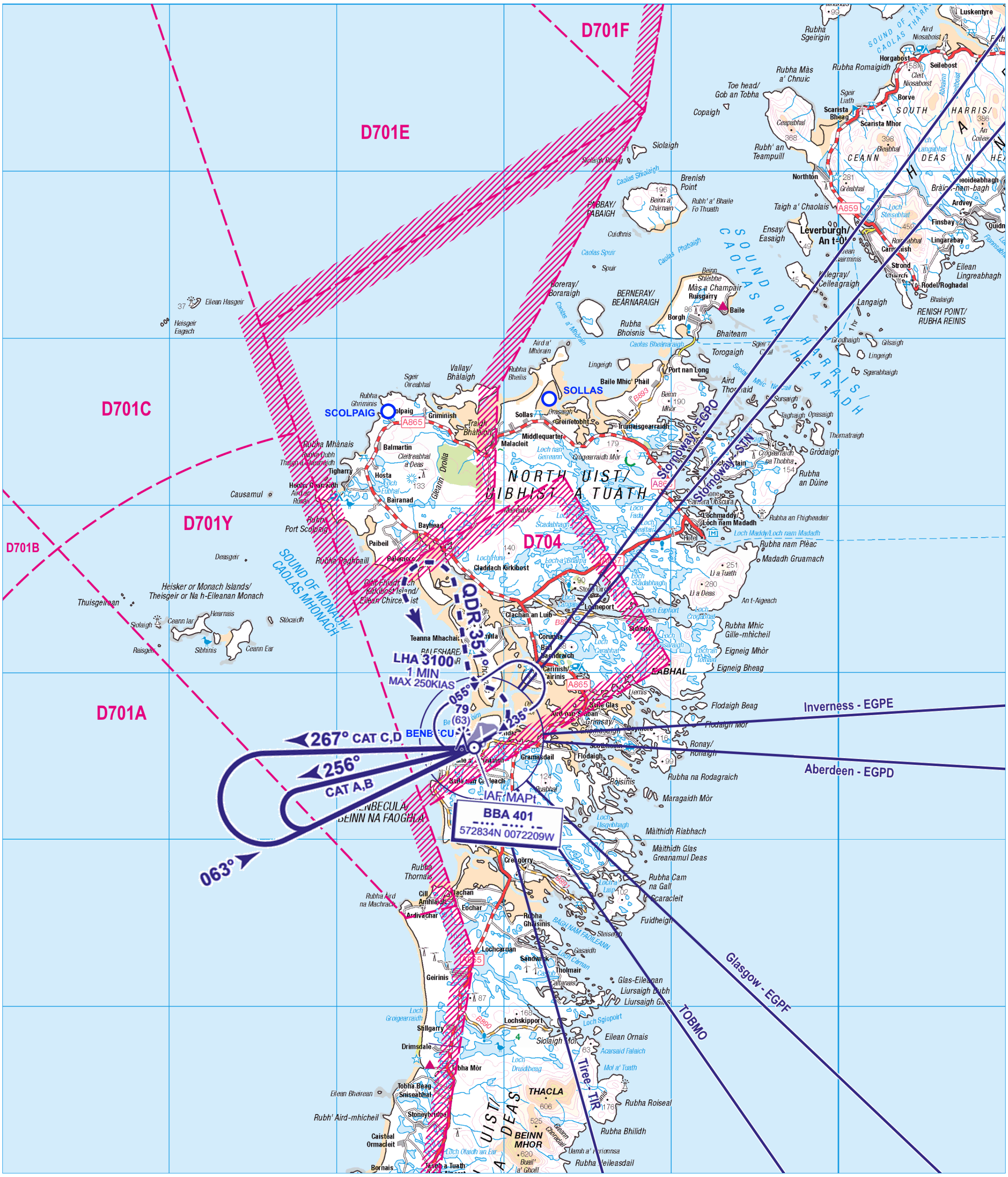

Figure 15: Loganair routes from Figure 14 transposed onto current CAA 1:250000 chart with instrument approach chart overlay for runway 06 at Benbecula and SP-1 site at Scolpaig

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Benbecula airport operates instrument approaches to two main runways namely 06 and 24; an extract of the approach charts contained within the AIP is shown at *Figure 16*.

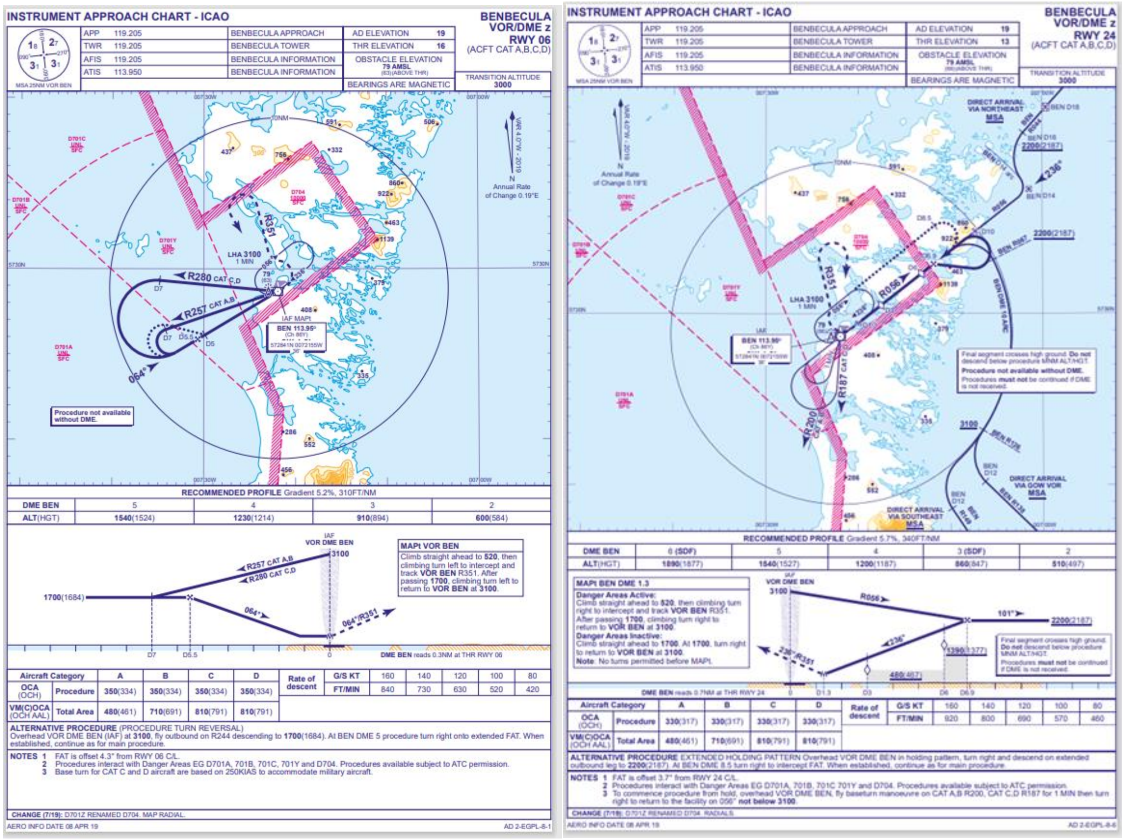

Figure 16: AIP extract depicting main instrument approach charts to Runway 06 and Runway 24 at Benbecula

Airport movements at Benbecula for 2022 (see Table 2) show that the average number of scheduled movements per month is circa 231, (Barra average is 106 per month). In addition to this the average number of military movements is <2 per month, with GA <4 movements per month. Other movements, including positioning flights, air taxi and SAR make up < 16% of total movements per month. Full details including a breakdown of different flight movements is contained at Appendix 6.E to this document. From over 60 airports featuring in the CAA's statistical analysis, Benbecula features in the bottom seven airports for the number of movements, with Barra generally in the bottom two. It is considered that these figures provide a good indicator regarding levels of traffic in the local area and it is determined that the numbers of aircraft operating in the local area below 7000ft is extremely low compared with most other parts of the UK. A comparison of movements in 2019 indicates that airport movements in 2022 are on average circa 20% less than for 2019; this is about the same across all categories: commercial, military GA and other flights. It is anticipated that 2019 traffic levels should return by 2025 based on EUROCONTROL predictions (see paragraph 3.7) although this is difficult to substantiate for such a small airport.

Month/Year	Number of Aircraft Movements By Category				
	Total Movements	CAT	Other	Military	GA
Jan 2022	213	193	20	0	0
Feb 2022	202	191	11	0	0
Mar 2022	268	225	38	0	5
Apr 2022	240	192	39	2	7
May 2022	240	199	41	0	0
Jun 2022	234	198	25	0	11
Jul 2022	202	141	53	2	6
Aug 2022	249	204	37	6	2
Sep 2022	263	195	61	2	5
Oct 2022	243	193	48	2	0
Nov 2022	217	170	38	0	9
Dec 2022	201	153	44	2	2
Monthly Average 2022	231	188	38	1.3	4

Table 2: Benbecula airport aircraft movements by category for 2022 with average monthly totals

3.2.2.6 Military Activity

The majority of military activity is associated with trials and testing of systems on the MOD Hebrides Range D701 and training flights. As this activity is managed by QinetiQ any SP-1 activity will be appropriately deconflicted; specific processes will be detailed in the LoA between SP-1, QinetiQ and MOD. Military training flights increase significantly twice a year for two weeks during the Joint Warrior Exercises and again for the biennial ASD/FS and Atlantic Thunder (AT) Exercises (that each occur alternate years). During these periods of increased military activity it is highly unlikely SP-1 launches will occur (unless operating in direct support of the MOD) due to restricted access to the D701 areas. This increase in military activity accounts for a number of the military movements recorded at Benbecula airport although, as observed from 2019 data (at the time of FS19), this increase is only one or two movements over the month. Other military activity not associated with MOD Hebrides Range is generally low flying training flights.

The Outer Hebrides lie within the MOD day Low Flying Area (LFA) 14 and Night Sector (NS) 1 Bravo West (see *Figure 17*); the former covers an extensive area including the majority of Northern Scotland and the latter encompasses just the Outer Hebrides. The majority of flights in LFA 14 are focused on mountain flying training so it is considered that very little of this activity (total of 1205 low flying[13] bookings for 2022) occurs in the vicinity of the Outer Hebrides. This is supported by the very low night low flying figures for NS 1 Bravo West that determine for the whole of 2022 only 6 low flying bookings were made. The assumption that little military low flying occurs in the SP-1 local area is further evidenced by the Danger Area infringement data at *Figure 9*, where there have only been two instances of military aircraft infringing the MOD Hebrides Range in the last 10 years[14]. Based on this simple analysis it is suggested that the average number of military low flying flights in the local area probably amounts to less than 2-3 flights per month. It is considered disproportionate to undertake further research or analysis to determine exact numbers.

[13] Low Flying is considered to be operations below 2000ft agl for fixed wing aircraft and below 500 agl for rotary wing aircraft (Source: Military AIP).

[14] MOD Aberporth Range recorded 77 military infringements for the same period.

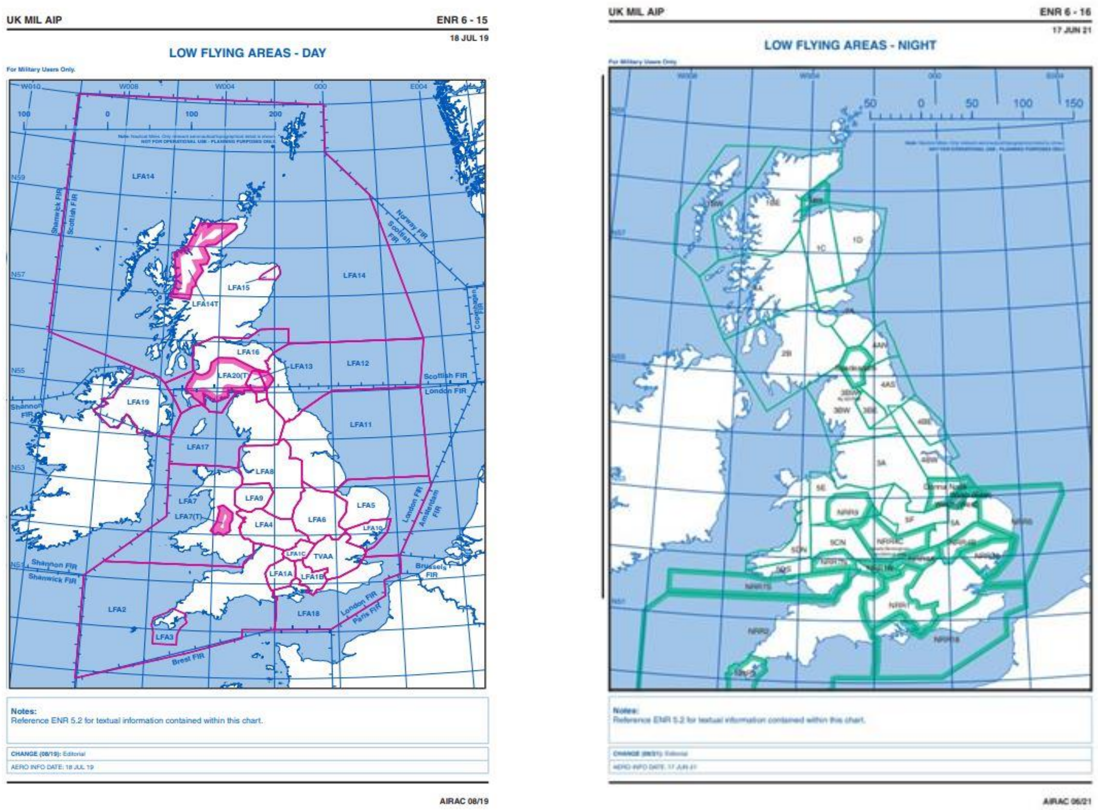

Figure 17: MOD UK LFA day (Left diagram) and NS (right diagram). (Source: UK Mil AIP)

3.2.2.7 Local Area Operators – Approximate Annual Flights per Year in Local Area

The following operators were contacted with a request to provide information on the average number of flights they conducted in the local area[15] per annum; the responses are as follows:

- PGD Aviation – 20 flights[16];
- NLB flights – 24 flights;
- Babcock Aviation – circa 100 flights;
- Bristow helicopters (incorporating HM Coastguard figures) - 60 flights; and,
- Gamma Aviation – no response, assumed less than 24.

[15] Local area in the vicinity of North and South Uist.

[16] These flights include all NLB flights; the NLB provided more granularity on the exact number of flights conducted per annum thus the figures are different.

The total number of flights in the local area is summarised at Table 3 It should be noted that all the NLB flights are conducted by PGD Aviation and the reason for the difference in figure between the two is probably because NLB have included a number of short flights (that occur on a single day) between a support ship and adjacent lighthouse – either Haskeir (approximately 10 miles to the west of SP-1 launch site) or Ushenish (located on South Uist and likely to be unaffected by SP-1 activities), see Figure *18*. It is also likely that the 'total numbers' shown in Table 3 actually far exceed actual number of flights that occur as it is inevitable many of the flights listed use Benbecula airport for fuel, crew change/passenger drop; therefore these flights will have been 'double accounted' (both in Benbecula airport statistics and the figures supplied by the operators).

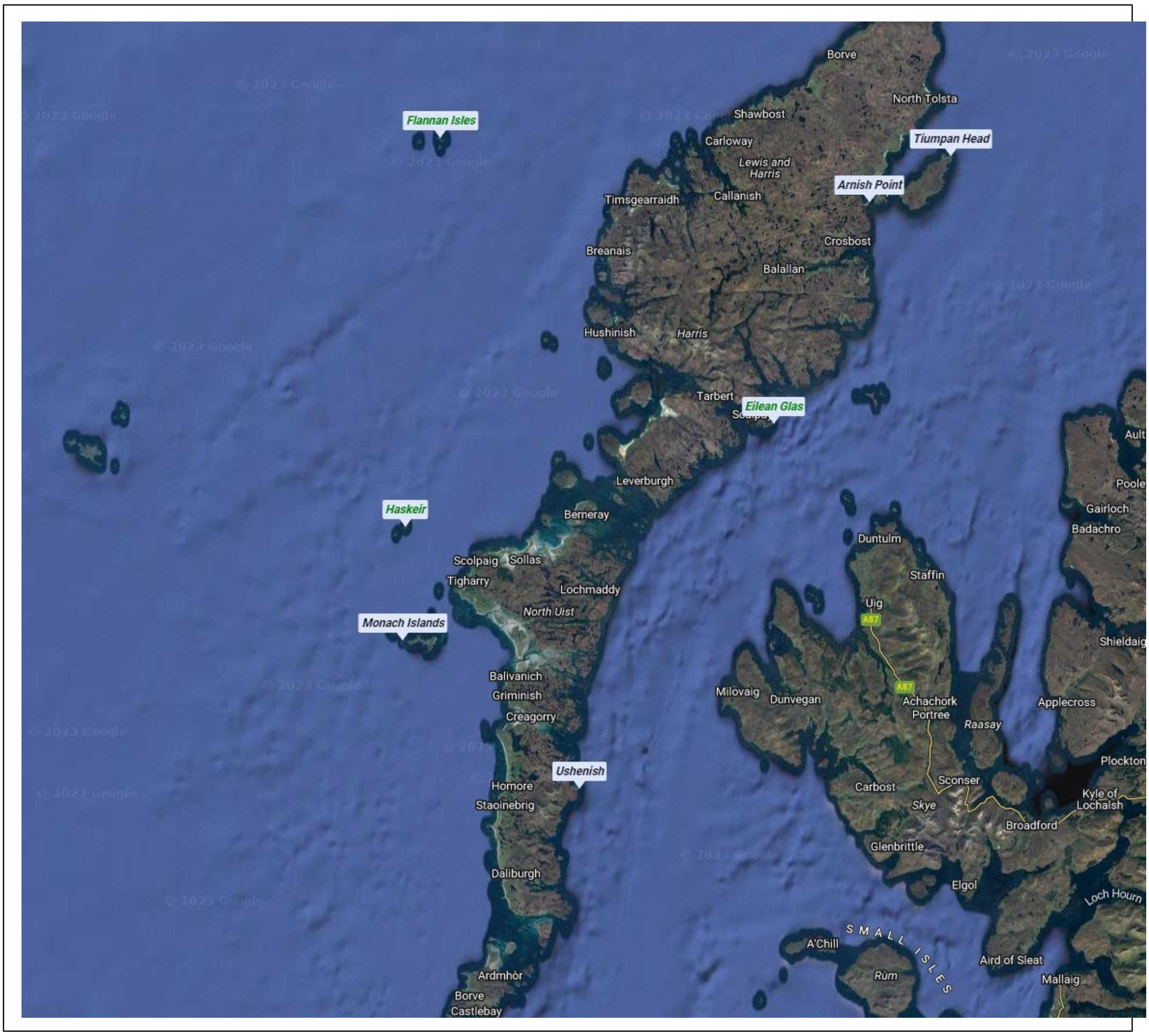

Figure 18: NLB sites supported by helicopter (PDG Aviation) in the vicinity of SP-1 launch site at Scolpaig

Operator – Provider of Statistical Evidence	Approximate annual flights in region	Monthly Average	Comments
2Excel Aviation	30	<3	Fisheries protection & UK SAR
Northern Lighthouse Board	24	2	Conducted inclusively by PDG Aviation; figures include short transits to and from support ships operating in close proximity to 2 lighthouse stations (Haskeir & Ushenish).
Bristow Helicopters	60	5	Coastguard Stornoway – Difficult to predict but stated nil flights some months with up to 10 in a busy month; numbers include all flights, tasking (see Figure 13) & training flights
PDG Aviation	20	<2	Figure includes all NLB support flights.
Sollas beach site	>24	<2	Annual figure based on busiest year annual fly in event. Monthly figure based on general enquires to use landing site as provide by Sollas Fly In coordinator.
Babcock Aviation	104	<9	Operating Air Ambulance and Police helicopters; the former averaging 8 flights per month in the local area and the latter one flight every 6 months.
Gamma Aviation	>24	>2	Survey and air ambulance flights considered to be less frequent than SAR flights, estimated to be circa >2 per month – no formal response received, estimate based on local knowledge from MOD Hebrides Range staff.
Loganair	2256	188	CAT cargo & passenger operator to Benbecular.
Military – Low Flying Booking	24	>2	Assumed to be less than 2 per month based on night flying statistics and infringement data.

Danger Area Infringements (NATS)	1	>1	Data obtained from QinetiQ contracted civil air traffic Range controllers (NATS)
AIRPROX Reports	0	0	UK AIRPROX board data
Total Number	2546	212	
Total Number Excluding Scheduled Flights	290	24	Circa 24 'other[17]' flights per month

Table 3: Summary table of local area aviation operators - annual and average monthly flights.

3.2.2.8 **Summary of Local Area Aircraft Movements below 7000ft**

It is evident from the data gathered and presented in this section that the assumption of 'limited GA activity in the local area' and 'low concentrations of air traffic, including GA, operating below 7000ft in the vicinity of the Outer Hebrides', would be valid. This is substantiated by the fact Benbecula airport total aircraft movements are amongst the lowest of (bottom 10%) all UK airports. Furthermore, other aviation activity evidenced by responses from local operators also suggests very light activity in the SP-1 local area, circa 24 flights per month – this is strongly support by the infrequent Danger Area infringement data and AIRPROX data where the latter provides a useful UK-wide comparison. The fact that there have not been any recorded AIRPROX in the vicinity of the Outer Hebrides in the past 21 years is in itself a reliable indicator that traffic levels are extremely low.

[17] Where 'other' flights include SAR, Air Ambulance, Air Taxi, NLB support, military, GA and any non-commercial aircraft flights.

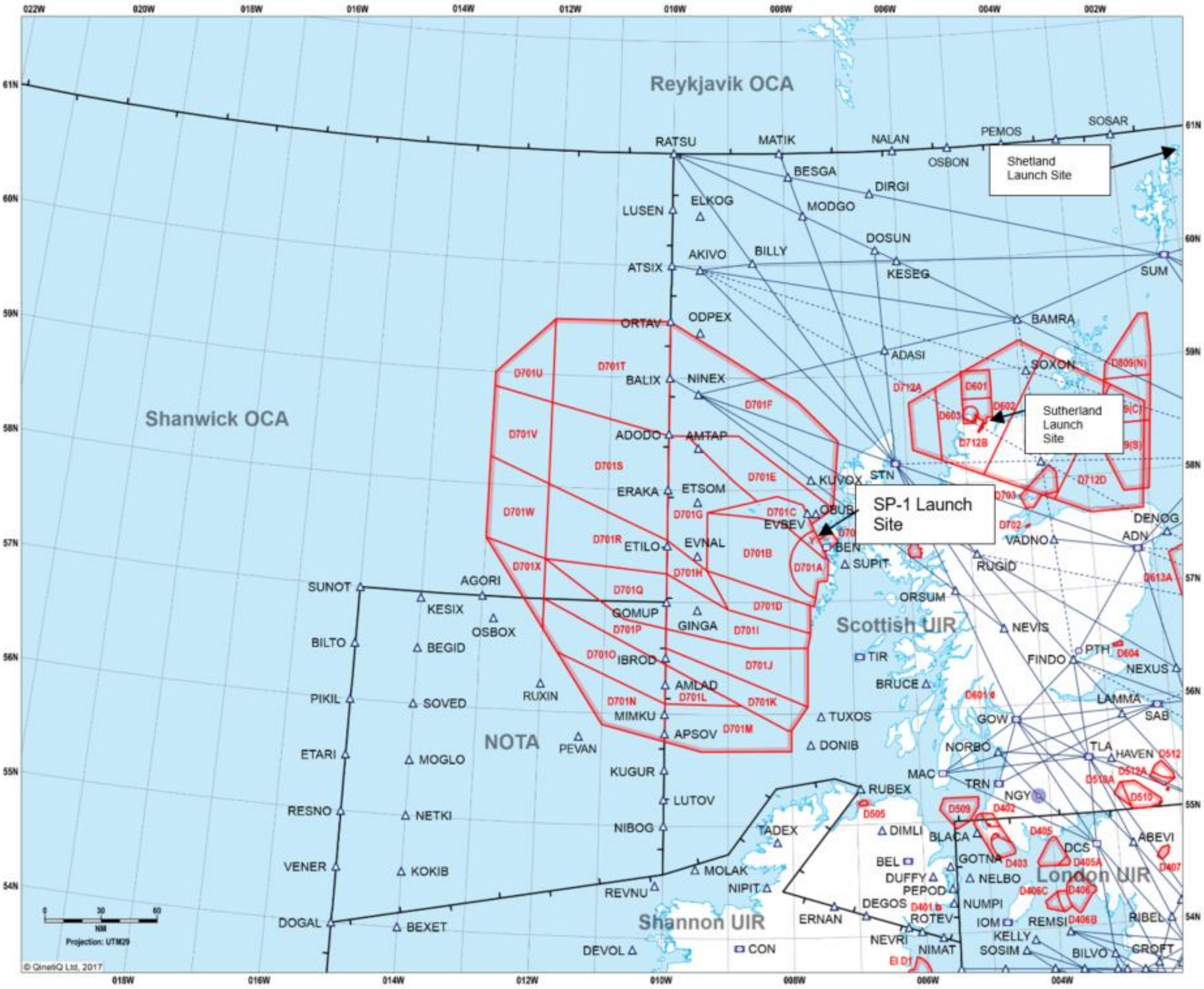

Figure 19: Adjacent airspace in relation to SP-1 launch site including other planned vertical launch spaceports

3.2.3 Wider Affected Area

Considering the airspace further afield, it can be seen that SP-1 activity will mostly affect CAT routing on the North Atlantic (NAT) oceanic tracks through the OEPs at 10° west and, potentially[18], MOD activity. There are also a number of other military sponsored Danger Areas over the North of Scotland that if active at the same time as SP-1 could have a blocking effect on CAT over Scotland. This is potentially further exacerbated by the development of other vertical launch Spaceport sites at Sutherland and Shetland (see *Figure 19*).

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[18] SP-1 activity and use of D701 or airspace contained therein, will normally be deconflicted from MOD activity where possible – details will be contained in the relevant LoA between SP-1, QinetiQ and MOD.

The impact of activating D701 has on CAT and the ATM network is well documented and the methods used to minimise the impact are contained in the appropriate LoAs and Standard Operating Procedures (SOPs) for the MOD Hebrides Range.

The original design of the D701 Danger Area complex was driven by the need to have a flexible modular airspace structure extending outwards from the MOD Hebrides Range facility (target and ordinance launch pads) that could be activated area by area to accommodate the vast array of different systems being tested and trialled on the MOD Hebrides Range. This design further evolved to replicate the main upper air, Air Traffic Service (ATS) routes from the UK and Ireland, where these joined the OEPs at 10° west. This alignment of the area boundaries to the ATS routes accounts for the unusual shape of several of the D701 areas. This alignment enables the most efficient use of the airspace by minimising the number of routes and OEPs that would be unavailable when specific D701 areas are activated. This does have the consequential impact of occasionally having greater volumes of airspace segregated than is necessary to contain the safety traces of the systems being operated. It was considered the benefits of the alignment far outweighed the loss of usable airspace.

Since the D701 areas were re-designed (2014), the ATS routes have been discontinued and the upper airspace is now FRA. Although this means the criticality of having the boundaries of D701 aligned to air routes has been removed, the need to minimise impact on the OEPs remains. In essence, FRA still requires aircraft to route through the OEPs for their oceanic track and as such the routes flown under FRA are similar to the old ATS routes. It is understood that at some stage in the future, FRA will be introduced to the NAT thereby removing the need for OEPs.

The existing D701 Areas lie within Shanwick Oceanic Area and the Northern Oceanic Transition Area (NOTA). Here the Air Navigation Service Providers (ANSPs), NATS and Irish Aviation Authority (IAA), apply flight planning separation criteria to the boundary of the respective D701 Areas when active. The separation criteria applied east of 10° west is the standard 5NM radar separation criteria but once west of 10° west, NATS apply non-radar procedural separation of 30NM or 60NM for aircraft that cannot comply with the NAT Minimum Navigation Performance Specification (MNPS). The IAA apply standard radar separation criteria for the NOTA. It is expected that the procedural separation criteria will be reduced at some stage in the future with the advent of Automatic Dependant Surveillance–Broadcast (ADS-B) capability in the NAT. This is ongoing work within the International Civil Aviation Organisation (ICAO) working groups.

As the D701 Areas are fully integrated into the ASM systems[19] used by the UK AMC and ENM, they can be activated at relatively short notice with the airspace restrictions being automatically applied along with the necessary FBZs that are required for FRA. These can be activated for a number of scenarios dependent upon which D701 areas are activated. This means the available OEPs are known for any number of D701 activated areas and any restrictions such as FBZs are quickly applied or, conversely removed when the areas are deactivated. This enables the harmonised and dynamic planning of the ATM network in line with the FUA principles.

[19] The UK AMC, NATS and MOD Hebrides Range use the EUROCONTROL preferred system called 'Local and sub-regional airspace management support system' (LARA) as an airspace management tool.

3.3 Options Appraisal

Table 4, Table 5 and Table 6 detail the appraisal of, respectively, Options 3, 4 & 5 and the 'Do-Nothing' baseline option against the high-level objectives and assessment criteria laid out in CAP1616, Appendix E, and Table E2. Over and above the requirement in CAP1616 Appendix E, Table E2, an additional row has been added to the table outlining initial safety considerations in brief. The list is not exhaustive and will be expanded as required as the options appraisal is matured.

Table 4: Summary of options appraisal for Option 3

Group	Impact	Option 3 - New Fillet of Segregated Airspace around Launch Site and Utilise D701	Do-Nothing
Communities	Noise impact on health and quality of life	It is recognised that the nature of sounding rocket launch will create noise at the time of launch albeit for only a short period of 1-2 minutes. However, there are only a small number of dwellings in the immediate vicinity of the launch site so the number of individuals affected will be low. Furthermore, the launch site is restricted to 10 launches per year so it is considered that the noise impact will be low. Details of noise profiling can be found in the EIA that has been produced as a requirement of the planning process for the SP-1 launch site. An extract from the EIA concerning noise modelling can be found at Appendix A to this document. The location of the airspace around the launch site should not cause any deviation of the scheduled flights operating to Benbecula or divert any GA or helicopter traffic in the local area such that there should not be any noticeable difference in local flying activity that would induce noise in areas not normally affected by aircraft noise.	Rocket launch not viable so there would be no associated increase in noise.
Communities	Air Quality	With no expected impact on GA or CAT aircraft operating below 7000ft in the local area, the air quality associated with this activity will remain unchanged. It is anticipated that the air quality in the immediate vicinity of the launch site may be affected for a short period (a few seconds) during the actual launch but this should quickly disperse and, given the prevailing wind is from the south-west, be experienced largely over the sea.	Rocket launch not viable so there would be no associated impact on air quality.

Table 4: Summary of options appraisal for Option 3			
Group	**Impact**	**Option 3 - New Fillet of Segregated Airspace around Launch Site and Utilise D701**	**Do-Nothing**
		It is not anticipated that the air quality for communities would be affected by any re-routing of CAT in the upper air caused by activation of D701 or the fillet of airspace around the launch site.	
Wider society	Greenhouse gas emissions	The nature of sounding rockets, engine design and fuel used will result in greenhouse gas emissions, which will vary between different rocket types and so is difficult to quantify at this stage. It is thought that the impact should be fairly negligible given the number launches will average at less than one per month. Of probably more significance is the greenhouse gas impact caused by CAT having to fly extended track miles to route around the active elements of D701, although this only becomes significant for the longer range sounding rockets where a large number of D701 areas are used. It is anticipated that several of the sounding rockets will remain within the 'inner' D701 areas – areas that do not noticeably impact CAT.	Rocket launch not viable so there would be no increase in greenhouse gas from any new activity. Furthermore, there would be no increase in greenhouse gas from existing aviation, since civil and military pilots would carry on as they do now so there would be no associated impact on greenhouse gas effect.
Wider society	Capacity / resilience	Where a large number of D701 areas are active this could potentially induce a capacity issue on the NAT track structure where other adjacent airspace reservations are also active. This can be alleviated by using the same extant airspace protocols and ASM procedures in place for D701, for SP-1 operations. This would mean certain adjacent Danger Areas not being active at the same time as D701. Moreover, by adhering to the limitations posed on the time of day when specific D701 areas are activated, the impact on the ATM network is further reduced.	There would be no change from present day.

Table 4: Summary of options appraisal for Option 3			
Group	**Impact**	**Option 3 - New Fillet of Segregated Airspace around Launch Site and Utilise D701**	**Do-Nothing**
General Aviation	Access	There may be a very small impact on GA when the airspace around the launch site is activated, especially on non-radio fitted aircraft. It is anticipated that access for radio fitted aircraft will be possible during periods where the airspace is activated but launches are delayed or awaiting full range clearance. As is current practice for the D701 areas, MOD Hebrides Range staff are able to permit aircraft to enter active Danger Areas when considered safe to do so. Given the extremely light levels of GA activity and the infrequent use of the segregated airspace around the launch site, any impact on GA is considered negligible.	There would be no change from present day.
General Aviation / commercial airlines	Economic impact from increased effective capacity	Not Applicable	Not Applicable
General Aviation / commercial airlines	Fuel burn	Activation of the fillet of airspace around the launch site is unlikely to invoke any increase in fuel burn for either GA or CAT; however, activation of D701 can lead to increase in fuel burn for CAT where they are forced to fly additional track miles around active Danger Areas. This increase in fuel burn can be calculated more easily for known combinations of D701 than for a new airspace structure such as Option 4. Extant ASM processes and procedures detailed in current LoAs associated with the MOD Hebrides Range, are an important facet in reducing the impact D701 has on CAT and their subsequent additional fuel burn. In particular, the limitations posed on the time of day when certain D701 areas are activated is crucial in reducing the impact on the ATM network. Utilising these same procedures and LoAs for rocket launch and use of D701 as proposed under this option, means that 'best practice' is being followed and consequential impact on CAT is minimised.	Rocket launch would not be viable therefore there would be no additional use of D701 so no change to current impact activation of D701 has on CAT and fuel burn.

Table 4: Summary of options appraisal for Option 3			
Group	**Impact**	**Option 3 - New Fillet of Segregated Airspace around Launch Site and Utilise D701**	**Do-Nothing**
Commercial airlines	Training costs	Not Applicable	Not Applicable
Commercial airlines	Other costs	Not Applicable	Not Applicable
Airport /ANSP	Infrastructure costs	Not Applicable	Not Applicable
Airport /ANSP	Operational costs	The operational cost should be minimal other than the cost of capturing the small fillet of airspace around the launch site into the ATC training system and any additional training associated with the minor amendments to extant LoAs and SOPs. By using D701 in its current form, the costs to ANSPs remains at the lowest possible as ASM processes and procedures remain largely unchanged. A similar argument applies for Benbecula airport where utilisation of existing LoAs, modified to include SP-1 and the fillet of airspace around the launch site, reduces the cost especially when compared to the creation of a new bespoke set of Danger Areas or, to a lesser degree, modification of the existing D701 areas.	No change to current ways of working.
Airport /ANSP	Deployment costs	The deployment cost should be minimal other than the cost of introducing the small fillet of airspace around the launch site into the ATC and ASM systems and applying a new FBZs where appropriate. Other costs would include making minor amendments to extant LoAs and SOPs and minor amendments to aeronautical charts including two new Aeronautical Data Quality (ADQ) points to be validated for the airspace fillet. Using D701 in its current form means the costs to ANSPs remains at the lowest possible as there would be no requirement to: • Introduce new additional reporting points.	No change to current ways of working.

Table 4: Summary of options appraisal for Option 3			
Group	**Impact**	**Option 3 - New Fillet of Segregated Airspace around Launch Site and Utilise D701**	**Do-Nothing**
		• Make large changes to ATC and MOD Hebrides Range systems mapping. • Introduce wholly new LoAs, ASM processes or procedures (and associated training costs). A similar argument applies for Benbecula airport where utilisation of existing LoAs, modified to include SP-1 and the fillet of airspace around the launch site, reduces the cost especially when compared to the creation of a new bespoke set of Danger Areas or, to a lesser degree, modification of the existing D701 areas.	
Safety Considerations (not exhaustive list)		Pilots may be unaware of the activation of the fillet of airspace around the launch site and inadvertently infringe the airspace – in particular non-radio fitted aircraft operating to beach landing sites.	It would be unsafe to conduct rocket launch so there would be no additional safety considerations.

Table 4: Summary of options appraisal for Option 3

Table 5: Summary of options appraisal for Option 4			
Group	**Impact**	**Option 4 - Construct New Bespoke Segregated Airspace Blocks from Launch Site**	**Do-Nothing**
Communities	Noise impact on health and quality of life	It is recognised that the nature of sounding rocket launch will create noise at the time of launch albeit for only a short period of 1-2 minutes. However, there are only a small number of dwellings in the immediate vicinity of the launch site so the number of individuals affected will be low. Furthermore, the launch site is restricted to 10 launches per year so it is considered that the noise impact will be low. Details of noise profiling can be found in the EIA that has been produced as a requirement of the planning process for the SP-1 launch site. An extract from the EIA concerning noise modelling can be found at Appendix A to this document. The location of the airspace around the launch site should not cause any deviation of the scheduled flights operating to Benbecula or divert any GA or helicopter traffic in the local area such that there should not be any noticeable difference in local flying activity that would induce noise in areas not normally affected by aircraft noise.	Rocket launch not viable so there would be no associated increase in noise.
Communities	Air Quality	With no expected impact on GA or CAT aircraft operating below 7000ft in the local area, the air quality associated with this activity will remain unchanged. It is anticipated that the air quality in the immediate vicinity of the launch site may be affected for a short period (a few seconds) during the actual launch but this should quickly disperse and, given the prevailing wind is from the south-west, be experienced largely over the sea. It is not anticipated that the air quality for communities would be affected by any re-routing of CAT in the upper air caused by activation of any new bespoke airspace design including the fillet of airspace around the launch site.	Rocket launch not viable so there would be no associated impact on air quality.
Wider society	Greenhouse gas emissions	The nature of sounding rockets, engine design and fuel used will result in greenhouse gas emissions, which will vary between different rocket types and so is difficult to quantify at this stage. It is thought that the impact should be fairly negligible given the number launches will average at less than one per month.	Rocket launch not viable so there would be no increase in greenhouse gas from any new activity. Furthermore, there would be no increase in

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Table 5: Summary of options appraisal for Option 4			
Group	**Impact**	**Option 4 - Construct New Bespoke Segregated Airspace Blocks from Launch Site**	**Do-Nothing**
		Of probably more significance is the greenhouse gas impact caused by CAT having to fly extended track miles to route around the active elements of the new bespoke airspace structure although this only becomes significant for the longer range sounding rockets where a large number of bespoke areas are used. The new bespoke areas should be designed such that for the shorter range sounding rockets the subsequent areas activated over the sea have minimal impact on CAT.	greenhouse gas from existing aviation, since civil and military pilots would carry on as they do now so there would be no associated impact on greenhouse gas effect.
Wider society	Capacity / resilience	Where a large number of areas in both domestic and oceanic airspace are active this could potentially induce a capacity issue on the NAT track structure where other adjacent airspace reservations are also active. New bespoke airspace protocols would have to be agreed to minimise any such impact on capacity.	There would be no change from present day.
General Aviation	Access	There may be a very small impact on GA when the airspace around the launch site is activated, especially on non-radio fitted aircraft. It is anticipated that access for radio fitted aircraft will be possible during periods where the airspace is activated but launches are delayed or awaiting full range clearance. It is anticipated that MOD Hebrides Range staff should be able to permit aircraft to enter active Danger Areas when considered safe to do so. Given the extremely light levels of GA activity and the infrequent use of the segregated airspace around the launch site; any impact on GA is therefore considered negligible.	There would be no change from present day.
General Aviation / commercial airlines	Economic impact from increased effective capacity	Not Applicable	Not Applicable

Table 5: Summary of options appraisal for Option 4			
Group	**Impact**	**Option 4 - Construct New Bespoke Segregated Airspace Blocks from Launch Site**	**Do-Nothing**
General Aviation / commercial airlines	Fuel burn	Activation of the fillet of airspace around the launch site is unlikely to invoke any increase in fuel burn for either GA or CAT; however, activation of large volumes of airspace to the west of the Outer Hebrides can lead to increase in fuel burn for CAT where they are forced to fly additional track miles around active Danger Areas. This increase in fuel burn is unknown for any new bespoke modular airspace design and several different scenarios would need to be modelled to understand the full impact. New ASM processes and procedures detailed in LoAs associated with the new airspace would have to be developed with a view on minimising the impact on the ATM network, and consequent increasing in fuel burn) while balancing against the operational requirements of the Spaceport.	Rocket launch would not be viable therefore there would be no additional use of D701 so no change to current impact activation of D701 has on CAT and fuel burn.
Commercial airlines	Training costs	It is understood that airlines already have a training requirement (and associated cost) to fly in the NAT oceanic regions. It is not known if a new bespoke set of Danger Areas were created, whether this training would be impacted such that there is additional cost to the airlines.	NAT training costs already exist, these would remain unchanged.
Commercial airlines	Other costs	Not Applicable	Not Applicable
Airport /ANSP	Infrastructure costs	Not Applicable	Not Applicable
Airport /ANSP	Operational costs	Operational costs will increase when associated with ongoing training and currency that will become more complex through the introduction of two similar airspace structures in the same volume of airspace but managed in a different manner using separate ASM process and SOPs for each. A similar argument applies for Benbecula airport where ongoing training and currency is more complex thereby costs increase.	No change to current ways of working.

Table 5: Summary of options appraisal for Option 4			
Group	**Impact**	**Option 4 - Construct New Bespoke Segregated Airspace Blocks from Launch Site**	**Do-Nothing**
Airport /ANSP	Deployment costs	The deployment costs for this option would be the most significant of the three airspace options presented. New ASM processes and procedures would have to be developed, negotiated and implemented for the new airspace along with associated LoAs and SOPs. Furthermore, all ATC, ASM and MOD Hebrides Range systems would need significant updates to reflect the new airspace structure that would have to be made clearly distinguishable from the existing D701 areas. The following additional costs would also be applicable: • The requirement for 5 Letter Name Codes (5LNCs) being reserved with International Codes And Route Designators (ICARD) (new reporting points) that allows circumnavigation of the new airspace areas when activated. • Creating new FBZs for a number of different combinations of areas activated. • Validating all reference points in the new structure to ensure ADQ standards are met. • Special instructions and associated training costs for ANSP and MOD Hebrides Range staff • Integration of new areas into LARA and automated flight planning systems. • Major update to aeronautical and maritime charts. HIAL (operating Benbecula) would also see an increase in deployment costs compared to Options 3 and 5 through the development of new LoAs and SOPs pertaining solely to SP-1 and activation of the new bespoke areas – new agreements regarding access to the areas would need to be established for CAT and Cat A flights.	No change to current ways of working.

Table 5: Summary of options appraisal for Option 4			
Group	**Impact**	**Option 4 - Construct New Bespoke Segregated Airspace Blocks from Launch Site**	**Do-Nothing**
Safety Considerations (not exhaustive list)		Pilots may be unaware of the activation of the fillet of airspace around the launch site and inadvertently infringe the airspace – in particular non-radio fitted aircraft operating to beach landing sites. The new areas could be confused with D701 leading to errors in the flight planning management processes or confusion by pilots. MOD Hebrides Range and ATC staff become confused with operating different but similar areas under different but similar ASM arrangements and LoAs. Airspace charts become cluttered and are difficult to read with two sets of different Danger Areas overlaid. Simultaneous activation of both the bespoke SP-1 areas and D701 causes confusion to MOD Hebrides Range, ATC and aircrew leading to errors that could have safety impact.	It would be unsafe to conduct rocket launch so there would be no additional safety considerations.

Table 5: Summary of options appraisal for Option 4

Table 6: Summary of options appraisal for Option 5			
Group	**Impact**	**Option 5 - Use in Conjunction with Option 3 Adding Sub-division of D701C, E, & F or reconfiguration of D701**	**Do-Nothing**
Communities	Noise impact on health and quality of life	It is recognised that the nature of sounding rocket launch will create noise at the time of launch albeit for only a short period of 1-2 minutes. However, there are only a small number of dwellings in the immediate vicinity of the launch site so the number of individuals affected will be low. Furthermore, the launch site is restricted to 10 launches per year so it is considered that the noise impact will be low. Details of noise profiling can be found in the EIA that has been produced as a requirement of the planning process for the SP-1 launch site. An extract from the EIA concerning noise modelling can be found at Appendix A to this document. The location of the airspace around the launch site should not cause any deviation of the scheduled flights operating to Benbecula or divert any GA or helicopter traffic in the local area such that there should not be any noticeable difference in local flying activity that would induce noise in areas not normally affected by aircraft noise.	Rocket launch not viable so there would be no associated increase in noise.
Communities	Air Quality	With no expected impact on GA or CAT aircraft operating below 7000ft in the local area, the air quality associated with this activity will remain unchanged. It is anticipated that the air quality in the immediate vicinity of the launch site may be affected for a short period (a few seconds) during the actual launch but this should quickly disperse and, given the prevailing wind is from the south-west, be experienced largely over the sea. It is not anticipated that the air quality for communities would be affected by any re-routing of CAT in the upper air caused by activation of D701 or the fillet of airspace around the launch site.	Rocket launch not viable so there would be no associated impact on air quality.
Wider society	Greenhouse gas emissions	The nature of sounding rockets, engine design and fuel used will result in greenhouse gas emissions, which will vary between different rocket types and so is difficult to quantify at this stage. It is thought that the impact should be fairly negligible given the number launches will average at less than one per month.	Rocket launch not viable so there would be no increase in greenhouse gas from any new activity. Furthermore, there would be no increase in

Table 6: Summary of options appraisal for Option 5			
Group	**Impact**	**Option 5 - Use in Conjunction with Option 3 Adding Sub-division of D701C, E, & F or reconfiguration of D701**	**Do-Nothing**
		Of probably more significance is the greenhouse gas impact caused by CAT having to fly extended track miles to route around the active elements of D701 although this only becomes significant for the longer range sounding rockets where a large number of D701 areas are used. It is anticipated that several of the sounding rockets will remain within the 'inner' D701 areas – areas that do not noticeably impact CAT.	greenhouse gas from existing aviation, since civil and military pilots would carry on as they do now so there would be no associated impact on greenhouse gas effect.
Wider society	Capacity / resilience	Where a large number of D701 areas are active this could potentially induce a capacity issue on the NAT track structure where other adjacent airspace reservations are also active. This can be alleviated by using the same extant airspace protocols and ASM procedures in place for D701, for SP-1 operations. This would mean certain adjacent Danger Areas not being active at the same time as D701. Moreover, by adhering to the limitations posed on the time of day when specific D701 areas are activated, the impact on the ATM network is further reduced. Furthermore, by adding sub-divisions in D701 may cause less deviations for CAT and thus reduce the impact this has on capacity when compared to Option 3.	There would be no change from present day.
General Aviation	Access	There may be a very small impact on GA when the airspace around the launch site is activated, especially on non-radio fitted aircraft. It is anticipated that access for radio fitted aircraft will be possible during periods where the airspace is activated but launches are delayed or awaiting full range clearance. As is current practice for the D701 areas, MOD Hebrides Range staff are able to permit aircraft to enter active Danger Areas when considered safe to do so. Given the extremely light levels of GA activity and the infrequent use of the segregated airspace around the launch site, any impact on GA is considered negligible.	There would be no change from present day.
General Aviation / commercial airlines	Economic impact from increased effective capacity	Not Applicable	Not Applicable

Table 6: Summary of options appraisal for Option 5			
Group	**Impact**	**Option 5 - Use in Conjunction with Option 3 Adding Sub-division of D701C, E, & F or reconfiguration of D701**	**Do-Nothing**
General Aviation / commercial airlines	Fuel burn	Activation of the fillet of airspace around the launch site is unlikely to invoke any increase in fuel burn for either GA or CAT; however, activation of D701 can lead to increase in fuel burn for CAT where they are forced to fly additional track miles around active Danger Areas. This increase in fuel burn can be calculated more easily for known combinations of D701 than for a new airspace structure such as Option 4. Extant ASM processes and procedures detailed in current LoAs associated with the MOD Hebrides Range, are an important facet in reducing the impact D701 has on CAT and their subsequent additional fuel burn. In particular the limitations posed on the time of day when certain D701 areas are activated is crucial in reduce the impact on the ATM network. By utilising these same procedures and LoAs for rocket launch and use of D701 as proposed under this option, means 'best practice' is being followed and consequential impact on CAT is minimised. Furthermore, by adding sub-divisions in D701 may cause less deviations for CAT and thus reduce the impact this has on fuel burn when compared to Option 3.	Rocket launch would not be viable therefore there would be no additional use of D701 so no change to current impact activation of D701 has on CAT and fuel burn.
Commercial airlines	Training costs	Not Applicable	Not Applicable
Commercial airlines	Other costs	Not Applicable	Not Applicable
Airport /ANSP	Infrastructure costs	Not Applicable	Not Applicable

Table 6: Summary of options appraisal for Option 5			
Group	**Impact**	**Option 5 - Use in Conjunction with Option 3 Adding Sub-division of D701C, E, & F or reconfiguration of D701**	**Do-Nothing**
Airport /ANSP	Operational costs	The operational cost should be less than for Option 4 but greater that for Option 3. Costs will include training related to the new fillet of airspace and reconfiguration of D701 areas, and associated amendments to extant LoAs and SOPs.	No change to current ways of working.
Airport /ANSP	Deployment costs	The deployment cost should be less than for Option 4 but greater than for Option 3. The new fillet of airspace and reconfiguration of D701 will need to be integrated into the ATC, MOD Hebrides Range and ASM systems. Depending upon what the final design for any reconfiguration of D701 looks like there may be a requirement for the following: • Validating all reference points in the new structure to ensure ADQ standards are met. • Special instructions and associated training costs for ANSP and MOD Hebrides Range staff. • Integration of new areas into LARA and automated flight planning systems. • Minor amendment to aeronautical and maritime charts. • Amend current LoAs, ASM processes or procedures (with associated training costs). A similar argument applies for Benbecula airport where utilisation of existing LoAs, modified to include SP-1 and the fillet of airspace around the launch site, reduces the cost especially when compared to the creation of a new bespoke set of Danger Areas	No change to current ways of working.

Table 6: Summary of options appraisal for Option 5			
Group	**Impact**	**Option 5 - Use in Conjunction with Option 3 Adding Sub-division of D701C, E, & F or reconfiguration of D701**	**Do-Nothing**
Safety Considerations (not exhaustive list)		Pilots may be unaware of the activation of the fillet of airspace around the launch site and inadvertently infringe the airspace – in particular non-radio fitted aircraft operating to beach landing sites. New nomenclature for reconfiguration/sub-divisions could cause confusion for pilots, MOD Hebrides Range staff and ANSPs who are very familiar with existing taxonomy.	It would be unsafe to conduct rocket launch so there would be no additional safety considerations.

Table 6 Summary of options appraisal for Option 5

3.4 Conclusion of Options Appraisal Summary

3.4.1 Option 3 – The Preferred Option

Option 3 is considered the preferred option for the following reasons:

- It meets the SoN;
- It meets the majority of the DPs and those it doesn't meet are partially met;
- It is the least costly option;
- It is the simplest to understand and implement; and,
- It is considered the safest option.

It is recognised that this option will, on occasions, result in more airspace being used than is absolutely necessary to contain the safety trace of the sounding rocket. However, this is not unusual when testing/operating embryonic systems within a modular airspace structure. It is considered that the benefits of utilising an existing airspace structure and associated operating procedures and processes, far outweigh the reduction in overall airspace the other two options may make available. This is particularly pertinent when considering the limited use of the airspace (10 launches per year that probably equates to less than four airspace activations (accounting for contingency days) per month). Through careful planning and adoption of best practice currently in operation at the MOD Hebrides Range, the impact of these contingency days can be greatly reduced (as demonstrated in the ASD/FS exercises). Furthermore, the current airspace structure is well known to MOD Hebrides Range and ANSP staffs alike and is already fully integrated into the UK AMC and ENM ASM and flight planning systems (including LARA) – these will only require minor modifications to include the fillet of airspace around the launch site and rocket launch operations.

Option 3 is considered the least costly options due to the following:

- There is no requirement for 5LNCs being reserved with ICARD (new reporting points) to allow circumnavigation the new airspace structure as these are already in place and feature in existing flight planning system; so no updates[20] required;
- FBZs are already in place other than for the small airspace 'fillet';
- Only two reference points (associated with the 'fillet') will need to be ADQ validated;
- Special instructions and associated training costs for ANSP and MOD Hebrides Range staff will be less than those for the other two options where significant airspace changes are made;
- Only the small 'fillet' will require integrating into LARA as all other areas already exist;
- ATC and MOD Hebrides Range system mapping will only require minor modifications to include the airspace 'fillet';
- Only aeronautical charts will require a minor update (maritime charts will not require any amendment); and,
- It should be possible to make minor amendments to current LoAs, ASM processes or procedures rather than producing new standalone documents.

[20] It is recognised that the new 'fillet' of airspace will need to be included in an update to systems but the change is very small in comparison with other options.

This option is considered the safest based on the fact it induces the minimum of change and adds little additional complexity to the existing airspace structure, unlike Option 4 and, to a lesser degree, Option 5.

3.4.2 **Option 5 – An Alternative to the Preferred Option**

Option 5 retains the external boundaries of D701 thereby removing the requirement for new additional reporting points and FBZs (other than around the airspace fillet). Furthermore, this option could use extant ASM processes and procedures, LoAs and other orders/instructions with minor modifications.

The main benefit of this option would be to reduce the overall volume of airspace that would need to be activated to contain the hazards associated with sub-orbital rocket launch; however, this reduction in volume of airspace needs to be balanced against expected use of available airspace when considering the number of launches each year and expected activation of airspace.

There will be a greater operational cost associated with this option compared to Option 3 although, this cost should be lower than for Option 4. Cost will include:

- Additional FBZs around the new airspace fillet;
- Several new reference points that determine the origin of each new line drawn to subdivide or reconfigure D701 will need to be ADQ validated;
- Special instructions and associated training costs for ANSP and MOD Hebrides Range staff are increased slightly when compared with Option 3; however, these will be limited if extant ASM processes and procedures are utilised and amended to include SP-1 activities;
- Minor changes to LARA;
- Minor changes and updates to ATC and MOD Hebrides Range systems mapping; and,
- Minor updates to aeronautical and maritime charts.

3.4.3 **Option 4 – Least Preferred Option**

Option 4 introduces an extremely complex airspace structure due to the presence of the existing D701 areas and there is concern the two could easily be confused as they are managed by the same organisations (MOD Hebrides Range staff and ANSPs). This would be particularly pertinent where new standalone ASM processes and procedures are developed and are operated in conjunction with existing procedures. Furthermore, both aeronautical and maritime charts would become complex; similarly the radar maps used by MOD Hebrides Range and ATC staff would be multifaceted.

This option is also considered the most costly due to the number and magnitude of the changes that would have to be made:

- Requirement for 5LNCs being reserved with ICARD (new reporting points) to allow circumnavigation of the new airspace structure;
- Introduction of a number FBZs around the new airspace structure depending upon which elements are activated;

- All new reference points for the origin of each line associated with this modular structure will need to be ADQ validated;
- Special instructions and associated training costs for ANSP and MOD Hebrides Range staff are increased significantly when compared against the other two options due to the size of the airspace change and associated standalone new ASM processes and procedures;
- Major update to LARA;
- Significant updates to ATC and MOD Hebrides Range systems mapping;
- Significant updates to aeronautical and maritime charts; and,
- Development and agreement of wholly new LoAs along with the development of SP-1 specific ASM processes and procedures including orders/instructions to MOD Hebrides Range and ATC staff.

3.4.4 **Cost Benefit Analysis of Reduced Airspace Volume**

While considering the benefits of reducing the overall volume of airspace used by either designing a wholly new bespoke modular airspace structure (Option 4) or, modifying the existing D701 areas (Option 5), the following factors should be taken into account:

- Usage of the airspace (how often will it be activated and for how long);
- Timings – what time of day the airspace is to be activated;
- What proportion of sounding rockets will be contained within the inner areas (as created by sub-divisions in Option 5) and what proportion will be medium/long range;
- Assessment on the ‘usability’ of any extra airspace made available by sub-divisions or a bespoke solution with regard to CAT routing through OEPs; and,
- A rough order of magnitude of costs associated with significant updates to MOD Hebrides Range and ATC radar mapping systems, aeronautical and navigation charts; the design of new ASM procedures, LoAs; and associated training costs.

3.5 Discussion and Simple High Level Quantitative Assessment of Environmental Impact

At this stage of the ACP process a quantitative assessment for each of the three airspace options taken forward is not considered proportional especially as elements of the data are not yet known and it is acknowledged that further research is required to ascertain potentially affected traffic flows on the NAT. A simple high-level quantitative assessment is provided.

It has been established that the maximum number of rocket launches is limited to 10 per year and it is recognised that there will be backup days. However, it is unclear how many backup days will be needed or how the exact ASM procedures will operate. It is anticipated that a worst case scenario is where the airspace is activated for a period (in the region of 2-3 hours) and the launch does not occur. A backup day would be utilised and the airspace activated a second time and possibly a third should the second launch not be successful. Given the resource involved – availability of the MOD Hebrides Range (regardless of Option selected) – it is considered highly unlikely there will be more than two backup days. This means in any year a worst case scenario could mean 30 activations of the airspace, although this is highly improbable based on MOD Hebrides Range experience of similar operations and it is probably more realistic to state the worst case scenario is in the region of 20 airspace activations in a year.

Considering 20 airspace activations, the majority will be planned to occur post 1300 Coordinated Universal Time (UTC), to minimise[21] the impact on the ATM network, with some launches potentially occurring later, circa 1500UTC. Furthermore, it may be assumed that 50% of the sounding rockets will be long range such that any sub-divisions (that would be available under Option 4 and Option 5) will become ineffective. This means the number of occasions the airspace is activated where sub-divisions or bespoke solution provides benefit, is reduced to less than 10 occasions per year. When this is factored against the frequency the NAT tracks are planned through D701 (driven by the position of the jet stream), the times this number of airspace activations actually impacts on CAT is further reduced, especially when the timing of the launch is then factored in.

The cost associated with significant updates to MOD Hebrides Range and ATC radar mapping systems, aeronautical and navigation charts; the design of new ASM procedures, LoAs; and associated training is not known; however, it is not thought to be inconsequential especially for Option 4. These costs (once evaluated) will need to be balanced against the potential airspace use and number of occasions, when all factors are considered, the airspace has an impact on CAT. This evaluation will be conducted in Stage 3 of the ACP process as part of the Options Appraisal (Full).

It is anticipated that for sounding rocket launches less than 50% of the D701 areas (or equivalent bespoke airspace volume) will be required. Working on this as the worst case scenario, it is suggested that the impact on the ATM network will not be significant. To support this a simple high-level quantitative assessment has been undertaken using a worst case scenario where nearly half the northern D701 areas are active[22]. Using the example at *Figure 20* and *Figure 21*, it is anticipated that two NAT tracks could be impacted and where a deviation to the North of D701 is necessary, as shown in *Figure 20*, then it is predicted that aircraft will have to fly approximately an extra 32 kilometres (km). Where the deviation is to the south of D701, shown in *Figure 21*, the extra track distance will be in the region of 16 km. Using the Official Aviation Guide (OAG) figures [G] for fuel burn per km where an A380 burns 14 litres, a B777 10 litres and an A350 6 litres, the average of these three[23] aircraft types is 10 litres of fuel burnt for every km flown. Therefore a deviation of 32 km (to the north) will result in an average increase in fuel burn of approximately 320 litres per affected flight, while a 16 km deviation (to the south) gives an average of 160 litres additional fuel burn per affected flight (providing an average of 240 litres per flight across both deviations). When considering the number of flights affected, using data[24] obtained during the FS exercises, it is estimated that approximately 400 flights will be on the

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[21] Utilising knowledge gained operating the MOD Hebrides Range and NATS traffic 'heat maps' during FS exercises; NAT traffic reaches a peak between 0300-0700UTC and 1000-1300UTC with traffic numbers diminishing significantly after 1500UTC.

[22] These include: D701A, B, C, E, F, G, S, T & Y

[23] It is acknowledged that this is based on a simple assumption using only three aircraft types.

[24] Using May 2018 traffic levels (considered one of the peak periods).

NAT track system during the period 1300-1600 UTC. However, as only two of a number of NAT tracks are likely to be affected as shown in *Figure 20* and *Figure 21*, it could be argued that these two NAT tracks combined only take a 33% share of the total flights, i.e. circa 134 flights based on an assumption of six NAT tracks being available at any one time. Assuming half of the flights will deviate to the north and half to the south this equates to 67 flights being affected on each deviation. It is considered therefore, that the total increase in fuel burn for NAT traffic, resulting from each of these airspace activations, will be 67 x 320 + 67 x 160 = 32,160 litres; approximately 26 tonnes[25]. Using the metric[26] that one tonne of aviation fuel burnt produces 3.18 tonnes of CO_2 emissions means the total CO_2 emissions is circa 83 tonnes for a typical three hour activation 1300-1600 UTC.

Using the estimate above of approximately 20 activations of a number of northern D701 areas per year, this would result in the total increase in fuel burn of 20 x 26 tonnes = 520 tonnes creating an additional 1654 tonnes of CO_2 per annum. However, the NAT tracks generally favour a south westerly/westerly flow at a ratio of 3:1[27] over a 12 month period; suggesting that, on average, for 15 of the occasions when the D701 areas are activated for rocket launch, the jet stream will favour a south bound flow and there will be little or no disruption to GAT. This reduces the annual figure for additional fuel burn from 520 tonnes to 130 tonnes creating circa 413 tonnes of CO_2. This figure is likely to increase by 2% year on year using the EUROCONTROL traffic predictions, (see paragraph 3.7).

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[25] 1 litre of aviation fuel has a mass of approximately 0.8kg (Source: CAP 1616a para 1.86).

[26] American Society for Testing and Materials (ASTM) D1655, ASTM, 2015.

[27] This ratio is awaiting ratification from EUROCONTROL.

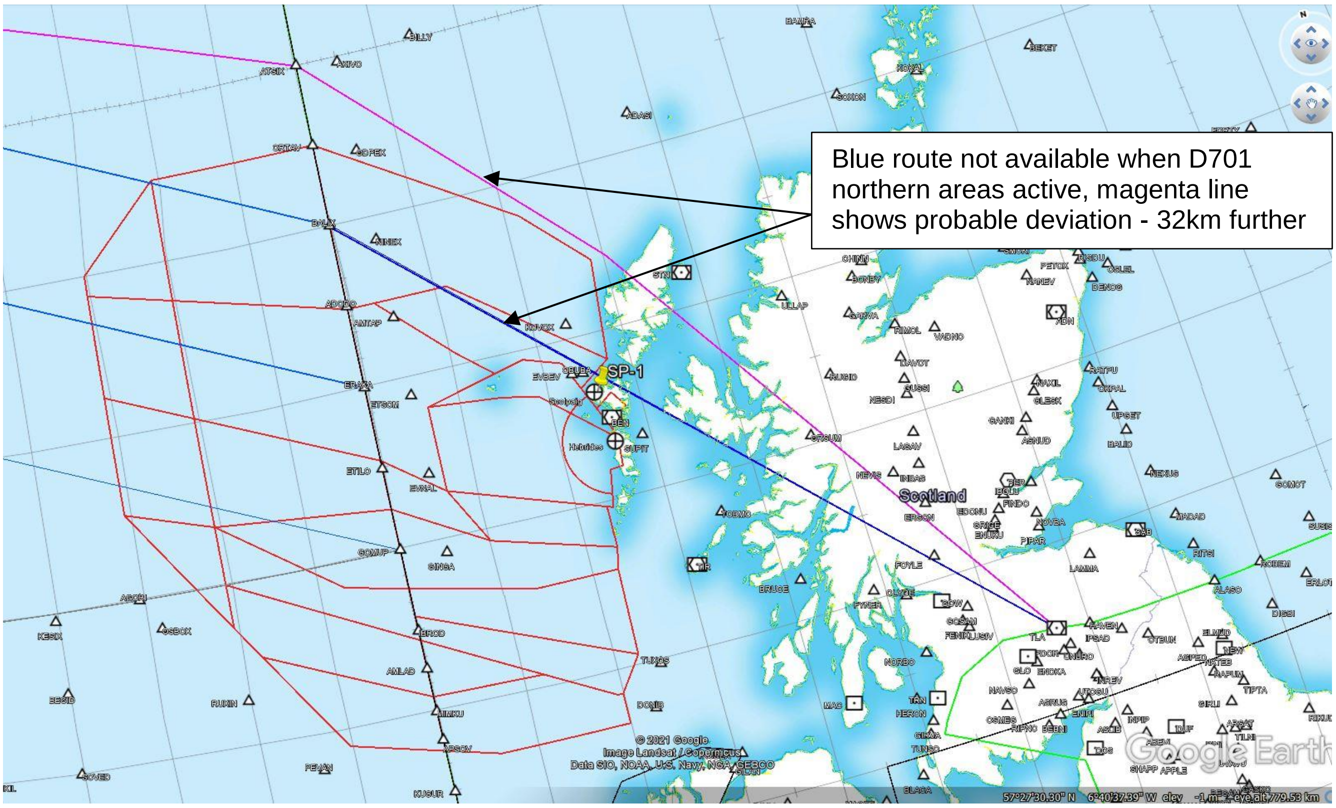

Figure 20: Exemplar route in blue, D701 inactive; magenta route shows one possible deviation necessary when several D701 areas active

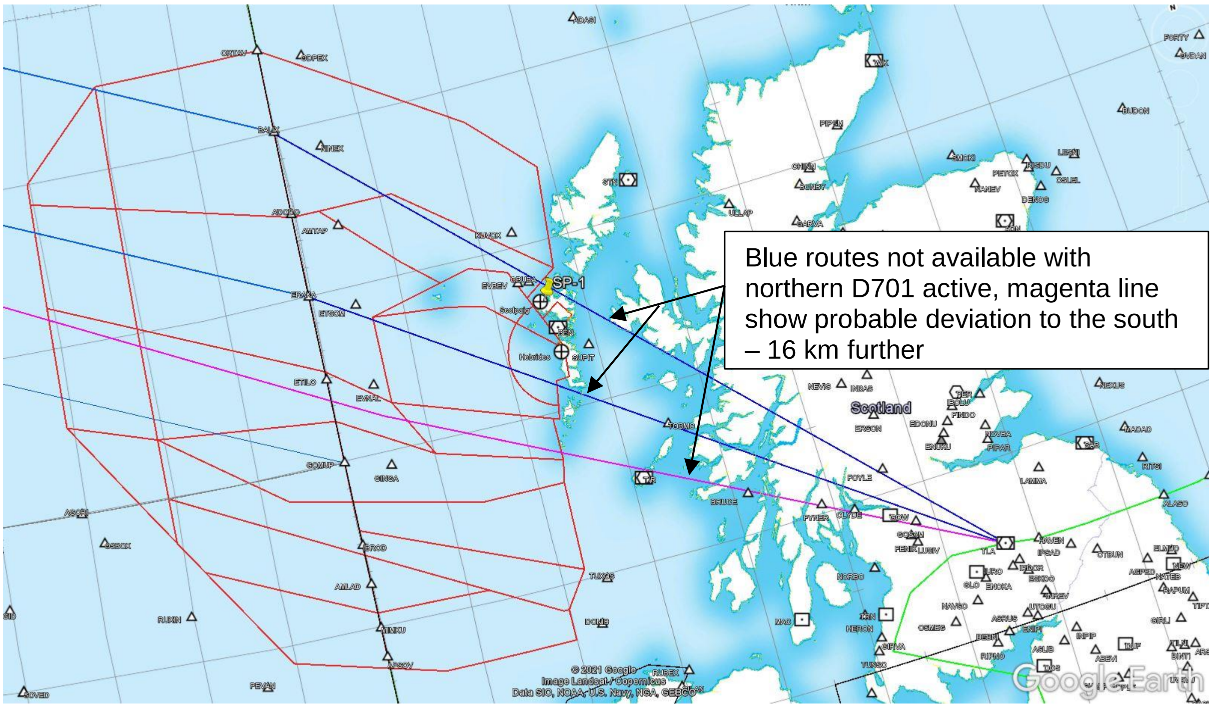

Figure 21: Exemplar routes in blue, D701 inactive; magenta route depicts possible deviation south when northern D701 areas active

3.6 Evidence to be Collected for Options Appraisal (Phase II) Full

The Sponsor will collect or firm up the following information to inform the next phase of the Options Appraisal:

- Using one or two different exemplar sounding rocket profiles, ascertain the likely areas of use for each individual option, then test these areas against worst case[28] NAT traffic flows for different times of day (probably a two-hour period prior to 1300 UTC and a two-hour period after);
- Evaluate the extra track miles flown by the number of CAT aircraft affected and calculate the approximate additional fuel burn and corresponding CO_2 emissions against each option using approved metrics or government WebTAG[29] and include a monetised value assessment based on CO_2 quantity;
- Ascertain how frequently, in an annual period, the Jet stream favours the NAT tracks to route over the D701 areas compared to over Ireland or South-west Approaches;

[28] The worst case will be assumed as when the jet stream dictates that the west bound transatlantic air traffic flow will pass over Scotland on a 'north about' track system based on 2019 traffic levels.

[29] WebTag is the department for transport analysis guidance.

- Ascertain a rough order of magnitude of the costs associated with significant updates to MOD Hebrides Range and ATC radar mapping systems, aeronautical and navigation charts; the design of new ASM procedures, LoAs; and associated training; and,
- Consider all direct environmental impacts from space launch events not already assessed in the EIA such as: identification of all tranquillity receptors on LAmax contours, structural damage assessment in L_{max}[30], sonic boom assessment in pound per square foot (psf) and identification of all Noise Sensitive Receptors[31] (NSRs) exposed above 1 psf, probability of awakening, longer term exposure to repeated noise events along exemplar trajectories and, consideration of alternative fuels. These aspects will addressed by using the existing EIA and building upon the results provided using similar modelling methodologies.

3.7 10 Year Forecast

It is extremely difficult to predict at this juncture the demand for the Spaceport over the next 10 years. It is anticipated that the first two to three years will see fewer annual launches (maybe 6 during the first year and 8 in the second year) with a gradual build-up to 10 thereafter; see paragraph 5.8.1 of the Airspace Design Options and Design Principle Evaluation report for more detail [B]. The market remains too immature to forecast the requirement beyond this early period.

It is thought that demand for passengers and cargo flying to Benbecula may increase with the advent of the Spaceport, as personnel transit to/from the mainland and rocket equipment/support items are brought in[32]. Whether the increase in demand will be sufficient to warrant any extra flights to the Outer Hebrides it is difficult to predict at this stage. Local businesses (hotels and shops) should also benefit from the increase in personnel living on the islands and potential increase in tourism, this will also augment supply chains. There may be a slight increase in helicopter support traffic where these are needed to recover any elements of the sounding rockets, although the details remain imprecise at this stage.

Transatlantic traffic levels continue to increase post the COVID pandemic but are still some way below 2019 levels. It was initially anticipated (by EUROCONTROL) that traffic levels would recover quickly post pandemic with an upsurge in 2022 and 2023. However, these predictions have recently been reviewed and their forecasts now suggest that a return to 2019 traffic levels may not be seen for several years due to the global economic turndown as a result of the war in the Ukraine and other factors. The most optimistic prediction by EUROCONTROL (see *Figure 22*) is an increase on 2019 traffic levels of 18% by 2028; their ‘Base’ prediction is an 8% increase and their ‘Low’ prediction -5% on 2019 levels. Actual growth for 2022 (see *Figure 23*) has been somewhere between the Low and Base levels. Traffic levels are not predicted to reach 2019 levels until 2025. Based on this simple analysis and extending the EUROCONTROL High, Low and Base rates (from 2022 to 2028) out to 2034 (10 years post

[30] L_{max} is the maximum sound level measurement.

[31] NSRs include but are not limited to: dwellings, hospitals, care homes, schools, higher education establishments, tranquil areas and other such facilities/areas.

[32] It is recognised that the majority of items are likely to transported by sea and land.

expected airspace implementation), it is suggested that traffic growth in the NAT region will be circa 2% as depicted in the base rate in Table 7. It is therefore reasonable to argue that when determining the impact each airspace option has on the NAT traffic, using 2019 traffic levels will provide a sensible baseline for the period when the airspace change is expected to be implemented (circa late 2024).

		2028	2029	2030	2031	2032	2033	2034
IFR Flight Movements (Thousands)	High	13045	13345	13652	13966	14287	14616	14952
	Base	11873	12111	12353	12600	12853	13109	13372
	Low	10530	10656	10786	10915	11046	11179	11313
Annual growth (Compared to previous year	High	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%
	Base	2%	2%	2%	2%	2%	2%	2%
	Low	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%

Table 7: EUROCONTROL 7 year predictions for IFR flight movements extended to 2034

FLIGHT FORECAST (OCTOBER 2022)

Summary of flight forecast for Europe (ECAC)

EUROCONTROL

ECAC*		2015	2016**	2017	2018	2019	2020**	2021	2022	2023	2024**	2025	2026	2027	2028**
IFR Flight Movements (Thousands)	High	.	.	.	.	.	.	.	9,431	11,142	11,768	12,124	12,467	12,755	13,045
	Base	9,923	10,197	10,604	11,002	11,085	4,979	6,231	9,287	10,243	10,883	11,157	11,399	11,629	11,873
	Low	.	.	.	.	.	.	.	9,126	9,583	9,994	10,150	10,285	10,405	10,530
Annual Growth (compared to previous year unless otherwise mentioned)	High	.	.	.	.	.	.	.	51%	18%	5.6%	3.0%	2.8%	2.3%	2.3%
	Base	1.6%	2.8%	4.0%	3.8%	0.8%	-55%	25%	49%	10%	6.3%	2.5%	2.2%	2.0%	2.1%
	Low	.	.	.	.	.	.	.	46%	5.0%	4.3%	1.6%	1.3%	1.2%	1.2%
Fraction of 2019 (compared to2019 level)	High					.	.	.	85%	101%	106%	109%	112%	115%	118%
	Base					100%	45%	56%	84%	92%	98%	101%	103%	105%	107%
	Low					.	.	.	82%	86%	90%	92%	93%	94%	95%

* ECAC is the European Civil Aviation Conference

** leap year

Source:
EUROCONTROL 7-year Forecast 2022-2028, October 2022.

EUROCONTROL Seven-Year Forecast Update 2022-2028 Document Confidentiality Classification: White 13

SCENARIO UPDATE (OCTOBER 2022)

Impact of war in Ukraine and Post-pandemic recovery

EUROCONTROL

	HIGH scenario	BASELINE scenario	LOW scenario
Impact of war in Ukraine	• Most of the European states with **moderate** GDP growth in 2023 and beyond • **Limited impact** on demand from inflation (including jet fuel price)	• **Weak GDP** in 2023 for most European states • **High inflation** impacts demand	• A **significant** number of European states in **recession** in 2023 • **Demand** for **travel** strongly **reduced** by effects of inflation
Post-pandemic recovery	• **Good** passenger confidence • **Dynamic** tourism flows above 2019 levels • **Fast** bounce-back of business travel • Airports and airlines **mostly able** to bring back capacity in 2023 • Cargo: **limited** staffing issues on the whole sector and **increase** on global cargo output	• **Relatively good** passenger confidence • Business travel **partly** replaced by digital alternatives • **Growing environmental** concerns in some European states • Some airlines/airports experience **staffing/capacity iss**ues in **2023** (but **much less** than in **2022**) • Cargo: **slight increase** on global cargo output in 2023	• Occasional **resurgence** of COVID-19 variants: possible travel restrictions at local level • **Substantial replacement** of business travel (digital alternatives) • **Environmental concerns strongly** affecting travel choices • More extensive **staffing/capacity issues** at airlines/airports in **2023** • Cargo: **deterioration** of staffing issues on the whole logistic sector in 2023

EUROCONTROL Seven-Year Forecast Update 2022-2028 Document Confidentiality Classification: White 11

Figure 22: Flight forecast to 2028 and scenario description table (Source: EUROCONTROL 2022).

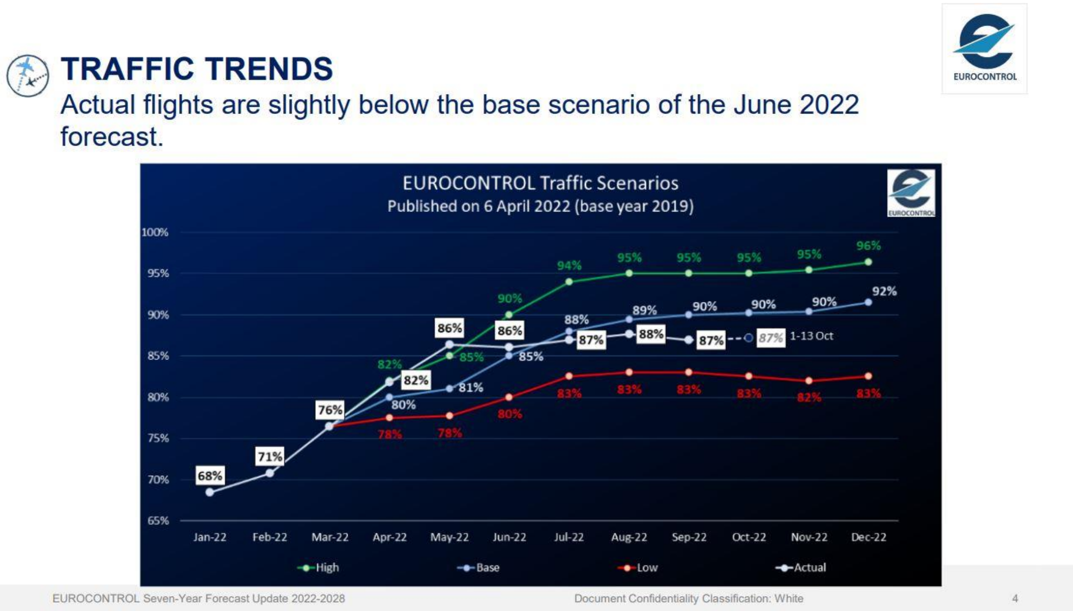

Figure 23: EUROCONTROL traffic trends 2022 (Source: EUROCONTROL 2022)

3.8 Economic Forecasting

3.8.1 Potential Impact on Airlines

Using the analysis at paragraph 3.5, it is estimated that the airlines will be impacted by a small increase in fuel burn on those occasions where the jet steam favours a westbound NAT track flow over Scotland. A rough order of magnitude estimate is an increase in fuel burn of approximately 240 litres for each affected flight. Using the International Air Transport Association (IATA) figures[33], this equates to circa $157 per flight with an annual cost of $105,190[34] shared across several Airline Operators (AOs).

3.8.2 Economic Benefits of Spaceport

Using the findings of the Social and economic report [F] it can be determined that the Spaceport operating in 2025/26 will increase prosperity in the region not least in creating up to 23 new full time jobs and creating a turnover of £6.45 million with a Gross Value Added (GVA) of £2.73 million and income of £1.18 million. The evidence supporting these values is contained within the aforementioned report, the Executive Summary of which can be found at Appendix 6.D to this document.

[33] Based on fuel price analysis 24 Feb 23 where 1 litre costs $0.6536.

[34] Assuming five airspace activations per annum that affect NAT traffic; each activation affecting 134 flights (5 x 134 = 670 flights affected per annum)) then total cost per annum is 670 flights x $157 = $105,190.

3.9 Assessment of Noise Impact and High Level Assessment of Other Costs and Benefits for Each Airspace Design Option

CAP 1616 requires the Sponsor to provide an indication of the likely noise impact for each design and a high level assessment of other costs and benefits. With regard to the noise impact, this will be the same for all three airspace options presented as, regardless of the airspace option, the noise created by a rocket launch will not be changed – full details of noise assessment is contained at the Appendix to this document and at Reference D. A summary of the Sponsor's initial assessment is found in Table 4 below:

Table 4 – Summary of likely noise impact and high level assessment of other costs and benefits

Design Option	Likely Noise Impact	Other Costs and Benefits
Do-Nothing Option	No additional noise by current airspace users as there would be no change. Rocket launch not viable so no increase in noise.	No change to the current status quo so no additional costs or benefits. As rocket launch would be unviable, the expected economic benefits SP-1 is expected to bring to the local and adjacent communities and economies, as well as the UK as a whole, will not be realised.
Option 3	Increase in noise for the local community for short periods (thought to be in the region of 43 seconds to 120 seconds at time of rocket launch). This will be limited to 10 launches per year.	Air Quality: May be affected in the immediate vicinity of the launch site for a short period (a few seconds) during the actual launch; otherwise unaffected. Greenhouse Gas: Rocket engines will have a negative Greenhouse gas effect as will CAT flying extended track miles to route around the active elements of D701, in particular for long range rockets. Capacity/resilience: A large proportion of D701 areas being active at the same time as other adjacent airspace reservations may impact on NAT capacity – this risk is reduced through extant D701 protocols. Access: Impact likely to be negligible as GA levels are extremely low in this area. SOPs for the MOD Hebrides Range would apply to the fillet of airspace around SP-1 thereby enabling access to the active DA when safe to do so.

		Fuel burn: There is likely to be an increase in fuel burn on those occasions where CAT have to fly extended track miles around the active D701 areas – this will be mitigated through extant ASM processes and agreements affecting the timings when the areas can be activated. Airport/ANSP operational costs: Minimal other than the cost of capturing the small fillet of airspace around the launch site into the ATC training system and any additional training associated with the minor amendments to extant LoAs and SOPs. By using D701 in its current form means the costs to ANSPs remains at the lowest possible as ASM processes and procedures remain largely unchanged. Airport/ANSP deployment costs: Minimal other than the cost of introducing the small fillet of airspace around the launch site into the ATC and ASM systems and applying a new FBZ where appropriate. Other costs would include making minor amendments to extant LoAs and SOPs.
Option 4	Increase in noise for the local community for short periods (thought to be in the region of 43 seconds to 120 seconds at time of rocket launch). This will be limited to 10 launches per year.	Air Quality: May be affected in the immediate vicinity of the launch site for a short period (a few seconds) during the actual launch; otherwise unaffected. Greenhouse Gas: Rocket engines will have a negative Greenhouse gas effect as will CAT flying extended track miles to route around the active elements of the bespoke airspace structure, in particular for long range rockets. The effect may be less than for Option 3 where it can be demonstrated using 'inner areas' (in particular for shorter range rockets) enables CAT to route more efficiently. Capacity/resilience: Where a large number of segregated airspace blocks is active simultaneously with adjacent airspace reservations, capacity on the NAT could be impacted – new protocols would need to be agreed. Access: Impact likely to be negligible as GA levels are extremely low in this area. New SOPs would need to be developed that could be applied to the new bespoke airspace structure to enable access when safe to do so.

		Fuel burn: There is likely to be an increase in fuel burn on those occasions where CAT have to fly extend track miles around the active bespoke areas – new ASM processes and agreements will have to be developed to help mitigate this risk. Operational costs: increased cost associated with ongoing training and currency that will become more complex through the introduction of two similar airspace structures in the same volume of airspace but managed in a different manner using separate operating procedures for each. Deployment costs: Most significant of the three airspace options presented. New operating procedures would have to be developed with associated LoAs and SOPs. ATC, ASM and MOD Hebrides Range systems would need significant updates to reflect the new airspace structure. Moreover, there is a requirement for new reporting points, FBZs and ADQ validation of reference points, incurring further cost.
Option 5	Increase in noise for the local community for short periods (thought to be in the region of 43 seconds to 120 seconds at time of rocket launch). This will be limited to 10 launches per year.	Air Quality: May be affected in the immediate vicinity of the launch site for a short period (a few seconds) during the actual launch; otherwise unaffected. Greenhouse Gas: Rocket engines will have a negative Greenhouse gas effect as will CAT flying extended track miles to route around the active elements of D701, in particular for long range rockets. The effect may be less than for Option 3 where it can be demonstrated any sub-divisions of D701 (in particular for shorter range rockets) enable CAT to route more efficiently. Where a large number of D701 areas are active concurrent to adjacent reserved airspace, this could potentially induce a capacity issue on the NAT track structure. Current airspace protocols in place for D701 help reduce this risk, which could be further reduced through the use of sub-divisions of D701 or reconfiguration. Access: Likely to be negligible as GA levels are extremely low in this area. SOPs for the MOD Hebrides Range would apply to the fillet of airspace around SP-1 thereby enabling access when safe to do so. Fuel burn: There is likely to be an increase in fuel burn on those occasions where CAT have to fly extended track miles around the active D701 areas – this will be mitigated through extant ASM processes and agreements affecting the timings when the areas can be activated.

		Operational cost: Costs will include training related to the new fillet of airspace and reconfiguration of D701 areas, and associated amendments to extant LoAs and SOPs. Deployment costs: ATC, ASM and MOD Hebrides Range systems would need significant updates to reflect the new airspace structure. This option may need additional reporting points, FBZs and ADQ validation of reference points. Current LoAs, operating procedures (with associated training costs) would need modifying to reflect airspace changes.

Table 8: Summary of likely noise impact and high level assessment of other costs and benefits.

3.10 Noise Modelling Requirement

CAP 1616 requires the Sponsor to confirm the minimum noise modelling category that is to be applied to the airspace change as prescribed in CAP 2091. While considering the category the Sponsor determined that applying a noise category was not applicable, based on the evidence presented that establishes the activation of the airspace fillet and adjacent D701 areas or bespoke solution (Option 5), will have little or no direct impact on current flight profiles for aviation activities below 7000ft (see paragraph 3.2.2). The noise associated with the rocket launch is captured in the EIA and this is expanded at Appendix 6.A, (see paragraph 19.9 of the extract, 'Assessment of likely significant effects' and attached 'technical appendix' for noise modelling and Reference D). Unlike other airspace changes where noise is associated with aircraft and their flight profiles (which can be modified or influenced by the airspace design), this is not the case for rocket launch. Rockets create noise as they are launched[35] and the initial launch profile is predominantly in the vertical plane then, as the rocket gains altitude, along a trajectory[36] line over the sea. However, by the time the rocket begins its transit along a trajectory line it is at such a high altitude that the noise becomes insignificant to personnel living in the vicinity of the launch site. It is therefore argued that the trajectory of a rocket over the sea does not influence the noise encountered at the launch site – this will be constant for any trajectory. Hence the airspace design has no impact on the noise created by rockets and potential nuisance to local populace; this can only be influenced by operational conditions (time of day/night) and environmental conditions (wind effect on blowing noise away). It is recognised however that there may be additional modelling required during Stage 3 where the EIA may not meet all the requirements of CAP 1616.

It is acknowledged that the noise created by a sonic boom may be heard on St Kilda[37] for those shorter range rockets as they commence descent, (see Appendix 6.A to this document: paragraph 3.2 of attached 'technical appendix' refers).

Because of the low concentrations of air traffic, including GA, operating below 7000ft in the vicinity of the Outer Hebrides (as evidenced at paragraph 3.2.2 and Appendix 6.C.2), the existence of a small fillet of segregated airspace around the launch site is highly unlikely to cause any changes to current traffic patterns or flight profiles of aircraft flying in the region. It is therefore judged that current noise levels caused by aviation will remain unaffected by this airspace change, regardless of option selected.

3.11 Environmental Impact Associated with Launch Site

In addition to the environmental impact rocket launch will have by causing CAT to fly additional track miles as described in paragraph 3.5, there will be a local environmental impact adjacent to the launch

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[35] Noise is assessed at lasting between 43 and 120 seconds.

[36] Trajectories are expected to be within the arc created by radials 212° and 352° from the SP-1 launch site.

[37] St Kilda has very few residents, the majority being engineering staff working for QinetiQ and tourists on day trips to the island.

site. This is captured at Reference [D] to this report and summarised at paragraph 19.11 and 18.16 of the report extracts contained at Appendix 6.A.

3.12 Tranquillity and Biodiversity

CAP 1616 further requires the Sponsor to consider the effects of new airspace on tranquillity and biodiversity. In a similar vein to the noise assessment, the Sponsor proposes that formal assessments of effects on tranquillity and biodiversity have been covered in the EIA and these can be read across into the airspace change. It is acknowledged that the airspace change is a key enabler for rocket launch, however, it is the physical effects of the rocket launch that causes any impact on tranquillity and biodiversity and these effects are considered in the planning application and covered within the EIA (extract contained at the Appendix of this document and at Reference D).

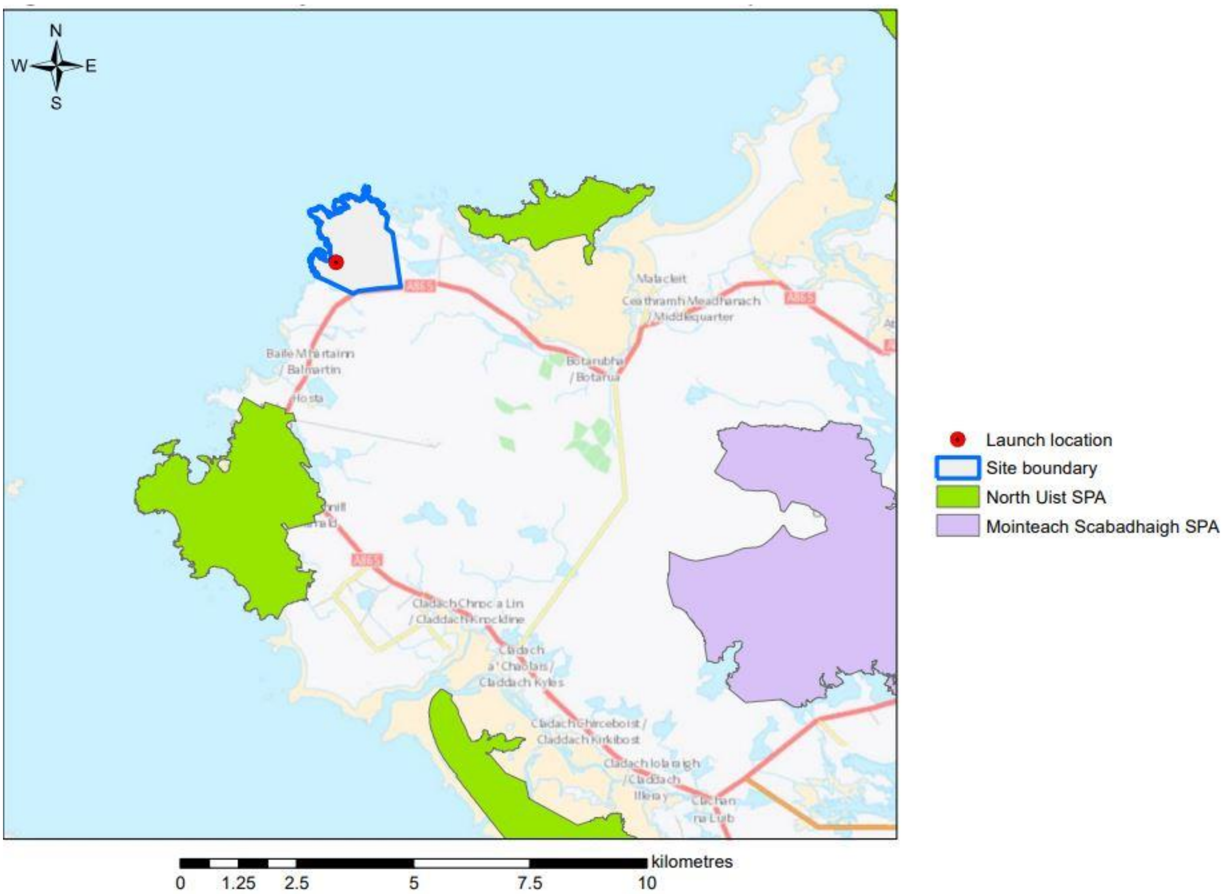

Figure 24: Special Protection Areas (SPAs) in relation to SP-1 launch site (Source: EIA extract - Dispersion modelling of emissions)

The EIA identifies several protected areas in the vicinity of the launch site including: Special Protection Areas (SPA), see *Figure 24*; Sites of Special Scientific Interest (SSSI), see *Figure 25*; and Special Area of Conservation (SAC), see *Figure 26*. The island of St Kilda is a world heritage site and lies approximately 40 miles west north-west from the SP-1 launch site. The island is largely uninhabited apart from a number of QinetiQ engineering personnel who maintain the MOD equipment on the island. The island is managed by the Scottish National Trust and from mid-April to late September, they facilitate public visits to the island including a small campsite. National Trust personnel remain on the island during this period. It is unlikely that a rocket launch from SP-1 site will be heard from St Kilda, however, a sonic boom created by certain sounding rocket types, may be heard on the island; this is generally when the rocket is descending. The EIA Section 19 'Noise and Vibration', paragraph 19.9, (see Appendix 6.A) describes the analysis undertaken to evaluate the sonic boom effect. In summary, it is concluded that even in the worst case scenario (where the trajectory of the rocket passes close to St Kilda), the noise created by a sonic boom is below the allowable limit and will last for less than a second. It is also unlikely that every rocket launch will create a sonic boom and even if 50% of the launches do create this nuisance, this still only equates to five such events each year; the impact of sonic boom is therefore considered negligible[38].

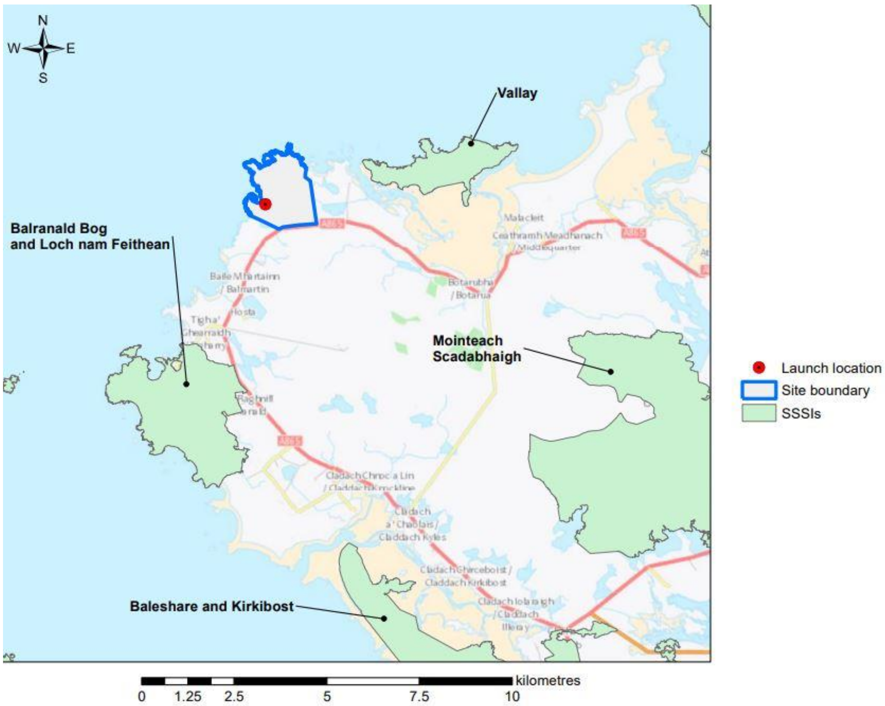

Figure 25: Sites of Special Scientific Interest (SSSIs) in relation to SP-1 launch site (Source: EIA extract - Dispersion modelling of emissions)

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[38] Negligible is defined in the EIA Section 19 as: 'A barely distinguishable change from baseline conditions'.

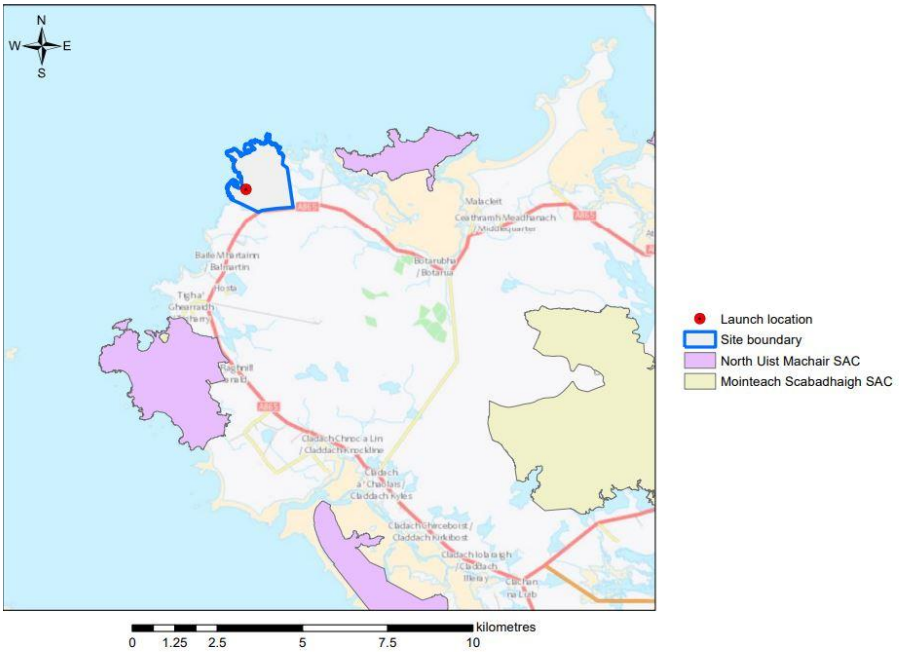

Figure 26: Special Area of Conservation in relation to SP-1 launch site (Source: EIA extract - Dispersion modelling of emissions)

3.13 Safety Assessment

3.13.1 Airspace 'Fillet' around launch site

As part of the work to establish a TDA under ACP-2021-37 [C], a thorough safety assessment was conducted to establish the segregated airspace boundaries necessary for the fillet of airspace around the launch site to support the launch of sub-orbital sounding rockets. This assessment, available at Reference [C], will be used in this ACP as evidence to support the airspace design around the launch site.

Due to the lack of pedigree of modern sub-orbital rockets, QinetiQ MOD Hebrides Range and safety staff have conducted a generic safety analysis approach using key US military and Federal Aviation Authority (FAA) reference documentation as well as experience gained from launching ballistic missile target rockets from the MOD Hebrides Range since 2015. The analysis, conducted through a risk management process, includes but is not limited to: launch risk analysis and hazard identification, risk criteria, probability of failure, hazard thresholds, casualty areas, debris risk assessment, vehicle and debris dispersion modelling, risk uncertainties and assessment of other related risks. The outcome of the analysis provides evidence to the CAA that the boundaries of the proposed segregated airspace fillet at *Figure 2* present the maximum reasonable geographic extent of the region within which credible hazards could occur due to rocket launch and flight activities.

It should be noted that the safety analysis process for aircraft, and the parameters for assessing the volume of airspace required to ensure safety, are different to those when considering third parties on the ground, either on the land area or affected sea space. The variables, environmental effects and probability of harm are very discrete for each environment (air, land and sea) this invokes different boundaries. Furthermore, it is common practice to have an ‘air Danger Area’ over a land mass but this does not mean there is a hazard to all personnel on the ground beneath this volume of airspace. EG D704, which covers Benbecula airport and the surrounding area, is a good local example; this may be activated to segregate the hazardous activity from other airspace users but it does not mean third parties on the ground beneath D704 are at risk; the ground safety footprint will determine the risk to third parties on the ground, and the area will be cordoned off as necessary. For SP-1, this cordon is considered the boundary of the spaceport.

It was further identified, from experience gained launching ballistic missile targets from the MOD Hebrides Range during the ASD/FS Exercises, that there is likely to be a requirement to safeguard personnel (working at the launch site) from the hazard created by low flying aircraft. It is determined that these spaceport personnel may be at risk of harm while engaged in pre-launch preparation such as refuelling and arming phases of the rockets, if they are suddenly alarmed by the appearance and noise from a low flying aircraft; in particular fast jets. Because these refuelling/arming activities may occur several hours or even days before the intended rocket launch, it was determined, in the interests of FUA that it would be inappropriate to have the whole segregated airspace fillet activated for the purpose of protecting ground personnel. It is proposed that a small inner circular area around the launch pad, as depicted in *Figure 3*, is made available. This can be activated for longer periods of time without adversely impacting on other aviation stakeholders. This additional volume of airspace extends 1000m laterally from the launch pad, extending to 3000ft above ground level (AGL) and sits within the larger airspace fillet. The primary use of this small area of segregated airspace is to protect SP-1 personnel on the ground from the sudden appearance and noise from a low flying aircraft. It may further be of use (should it be deemed necessary by the rocket providers) to provide the rocket systems with RF interference protection from low flying aircraft during the same critical stages of preparation.

3.13.2 **Airspace volume beyond the Fillet**

With regard to assessing the airspace volume required outside the airspace fillet around the launch site, there are a number of factors to consider. Because of the limited pedigree of modern sounding rockets, many of the factors can only be fully evaluated during the launch planning cycle[39] where the full capabilities and performance of the rocket with corresponding payload/test equipment are finally known. Only then can the detailed safety assessment be conducted, under a variety of different environmental conditions, to establish the debris field and associated safety traces. This is where any environmental limitations will be imposed. Only when all this information is available and validated can the safety trace be overlaid onto the modular airspace structure as described in Options 3 – 5. The sub-areas that the safety trace sits within can then be notified active for the launch. Only a modular airspace design can facilitate any number of different sounding rocket types with varying degrees of pedigree and capabilities. This is exactly the same process and methodology used by MOD Hebrides Range staff to test and evaluate new weapon systems and aerial targets.

[39] This is likely to be a few months in advance of the launch.

SPACE PORT 1

3.14 Airspace Classification Options

3.14.1 Types of Airspace to Accommodate Vertical Spaceport Launches

Rocket launches and flights pose a risk to other aviation users either through mid-air collision or, following catastrophic failure of the rocket (explosion), debris impacting other aircraft. To safeguard airspace users from these risks there is a requirement to segregate the activity accordingly. This is achieved through establishing segregated airspace in one form or other.

The SP-1 launch site at Scolpaig on North Uist currently sits beneath Class G 'uncontrolled' airspace. This means anyone is entitled to operate in this airspace without any specific equipment, training or air traffic control. Therefore, there is no method to safeguard them from SP-1 rocket launches. In the UK there are five classifications of airspace which can all provide a method of segregation. These are detailed and assessed for suitability by the Sponsor in the table below.

3.15 Classification of Airspace Comparison A, C, D, E & G

Type of segregated airspace	Suitability for Rocket Launch	Sponsor Comment
Class A	No	- Instrument Flight Rules (IFR) flight is mandatory in class A airspace, rockets will be largely 'uncontrolled' after launch so will be unable to comply with ATC instructions applicable in Class A or comply with RoTA - Rockets will not be equipped with the necessary Communications Navigation & Surveillance (CNS) equipment for flights in controlled airspace - Controlled airspace is currently permanently on/active, therefore in the spirit of FUA it is not practicable to have Class A for the relatively few launches - Too restrictive on other airspace users (inability to access Class due to aircraft equipment and pilot limitations)

Type of segregated airspace	Suitability for Rocket Launch	Sponsor Comment
Class C	No	- ATC instructions mandatory in class C airspace, rockets will be largely 'uncontrolled' after launch so will be unable to comply with ATC instructions applicable in Class C or comply with RoTA - Rockets will not be equipped with the necessary CNS equipment for flights in controlled airspace - Controlled airspace is currently permanently on/active, therefore in the spirit of FUA it is not practicable to have Class A for the relatively few launches - Too restrictive on other airspace users (inability to access Class due to aircraft equipment and pilot limitations)
Class D	No	- Rockets unable to comply with ATC instructions that are mandatory in class D airspace or comply with RoTA - Inability to operate under either IFR or Visual Flight Rules (VFR) as rockets will be largely 'uncontrolled' after launch - Controlled airspace is currently permanently on/active, therefore in the spirit of FUA it is not practicable to have Class D for the relatively few launches
Class E	No	- Rockets cannot comply with IFR or VFR, or RoTA - Controlled airspace is currently permanently on/active, therefore in the spirit of FUA it is not practicable to have Class E for the relatively few launches
Class G Danger Area	Yes	- Less impact on other airspace users since it can be tactically managed (does not have notified hours of activation in UK AIP) – only activated by NOTAM when needed
Transponder Mandatory Zone (TMZ)/Radio Mandatory Zone (RMZ)	No	- Rockets may not be transponder equipped - Airspace would need to be controlled by approved ATC not MOD Hebrides Range controllers – resourcing issue - TMZ/RMZ would preclude many of the aircraft using the beach landing site at Sollas during periods when the Spaceport is not active

Table 9: Proposed airspace types for consideration with sponsor comment

3.16 Measures to Minimise Impact on Other Airspace Users

3.16.1 Classification of Airspace

Airspace with the least restrictions to other airspace users is uncontrolled Class G. This airspace still has the option to 'segregate' activity through the establishment of a Danger Area; such Danger Areas can be activated by NOTAM when needed. The Sponsor therefore proposes that the airspace classification around the launch site remains Class G[40].

4. Next Steps

4.1 Next Steps in This ACP

This document, together with the 'options appraisal and design principle evaluation report' forms the documentary evidence for the Stage 2 DEVEOP and ASSESS Gateway assessment performed by the CAA. The Gateway is scheduled for 27th January 2023. On successful completion of Stage 2, the process will move to Stage 3 CONSULT. The following timeline is predicted:

CAP 1616 Descriptor	Planned Date
Stage 3 - Consult	30 June 2023
Stage 4 – Update & Submit	26 January 2024
Stage 5 - Decide	24 May 2024
Stage 6 - Implement	08 August 2024
Stage 7 – Post implementation review	To be determined (circa August 2025)

[40] It is noted that above FL195 the airspace is Class C and Class A however, as for the D701 areas when activated (including airspace above FL195) the airspace is treated as Class G.

5. Glossary

Acronym	Meaning
5LNC	5 Letter Name Code
ACP	Airspace Change Proposal
ADQ	Aeronautical Data Quality
ADS-B	Automatic Dependent Surveillance - Broadcast
AGL	Above Ground Level
AIP	Aeronautical Information Publication
AMC	Airspace Management Cell
ANSP	Air Navigation Service Provider
AO	Airline Operator
ASD/FS 21	At Sea Demonstration/Formidable Shield 2021
ASM	Airspace Management
ASTM	American Society for Testing and Materials
AT	Atlantic Thunder
ATC	Air Traffic Control
ATS	Air Traffic Service
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAT	Commercial Air Transport
CNS	Communication Navigation & Surveillance
DPs	Design Principles
EG D	UK Segregated Airspace Designator and Danger Area
EIA	Environmental Impact Assessment
ENM	EUROCONTROL Network Manager
FAA	Federal Aviation Authority
FBZ	Flight planning Buffer Zone
FRA	Free Route Airspace
FUA	Flexible Use of Airspace
GA	General Aviation
HIAL	Highlands & Islands Airports Ltd
HIE	Highlands & Islands Enterprises
IAA	Irish Aviation Authority
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
ICARD	International Codes And Route Designators
IFR	Instrument Flight Rules
LAA	Light Aircraft Association
LARA	Local and sub-regional airspace management support system
LFA	Low Flying Area
LoA	Letter of Agreement
MNPS	Minimum Navigation Performance Specification

MOD	Ministry of Defence
NAT	North Atlantic
NLB	Northern Lighthouse Board
NM	Nautical Mile
NOTA	Northern Oceanic Transition Area
NOTAM	Notice To Aviation
NS	Night Sectors
NSR	Noise Sensitive Receptors
OEPs	Oceanic Entry Points
OS	Ordinance Survey
PPR	Prior Permission Required
psf	Pounds per square foot
RF	Radio Frequency
RMZ	Radio Mandatory Zone
RoTA	Rules of The Air
SoN	Statement of Need
SOPs	Standard Operating Procedures
SP-1	Spaceport 1
SUPP	Supplement
TDA	Temporary Danger Area
TMZ	Transponder Mandatory Zone
UCT	Coordinated Universal Time
US	United States
VFR	Visual Flight Rules

6. References

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B. ACP-2021-12 Stage 2 Step 2A Airspace Design Options and Design Principle Evaluation Report Version 2 dated 16th March 2023, online, available at: Airspace change proposal public view (caa.co.uk)
C. ACP-2021-37 SP-1 TDA, available at: Airspace change proposal public view (caa.co.uk)
D. Environmental Impact Assessment Spaceport-1 Scolpaig, online, available at: https://planning.cne-siar.gov.uk/PublicAccess/applicationDetails.do?activeTab=documents&keyVal=R4RKXJROGNG00
E. Letter of Agreement between NATS (en Route) plc, MOD DE&S, AMC UK, QinetiQ Ltd, UK CAA, IAA and Shannon V1.0 effective 01 October 2020.
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G. OAG 03 Feb 2022 ‘Which part of a flight uses most fuel’ article, available online at: https://www.oag.com/blog/which-part-flight-uses-most-fuel

A Environmental Impact Assessment Extract (Noise, Air Quality & Heat)

A.1 Supplementary Environmental Information (SEI) & Technical Note

19 NOISE AND VIBRATION

Noise and vibration were assessed in Chapter 19 of the 2021 EIA Report. This section provides further technical information and should be read in conjunction with the original chapter and appendix of the EIA Report. Vibration modelling was undertaken by RSK Acoustics covering potential impacts associated with both construction and operation of the Project to address feedback relating to potential impacts on heritage receptors (Appendix 19-2. Vibration Technical Note). Table 19-1 summarises the feedback received from statutory and non-statutory consultees and includes the information requirements as part of the Request for Supplementary Environmental Information. Several representations from the public raised queries in relation to this assessment and representations made by the public on this topic expressed concerns around the following issues:

- Conflict with WHO Guidelines
- Traffic movements

A full summary of responses to representations on this topic are provided in Appendix 5.1: Public Representations.

Table 19-1 Consultee responses in relation to Noise and Vibration (Chapter 19 of the 2021 EIA Report)

Consultee	Comment	Response	Section
CnES Environmental Health Planning response	Launch Noise: The maximum sound that will be heard at the nearest noise sensitive premises, at a distance of 890m, would be 95dB(A) with a maximum of 120 seconds (Rocket A) or 43 seconds (Rocket B) of noise per launch; equating to a maximum of 1200 seconds (20 minutes) in the year. No concerns if numbers are restricted to this.	No comment.	N/A
CnES Environmental Health Planning response	Sonic Boom: The (worst-case) Perceived Decibel Level (PLdB) for both the Northern and Southern trajectories (85PLdB on the Isle of Coll and 95PLdB on the North of the Isle of Lewis respectively) from Rocket B exceed the suggested criteria for sonic boom noise at 75 PLdB (based on NASA research) at human receptors, they are below the LAmax at 110 dB (based on the WHO guidelines for community noise) and occur for such a short period of time (less than 1 second, up to 10 times a year) that we do not perceive this being a nuisance, likening it to a firework going off (approx. 120dB) or a gunshot (150-170dB).	No comment.	N/A
CnES Environmental Health Planning response	Hours of operation: The hours of operation of the site would be tied to the individual rocket launches (which last for a maximum of 2 weeks for each of the 10 proposed launches) and will therefore not be continuous year-round. It is noted that launches will only occur during daylight hours. *Condition: Any operations carried out will be limited to between the hours of 0700 – 2100 Monday to Friday, 0800 – 1900 Saturday with no Sunday working.*	All launch operations will be carried out between daytime hours of 0700 – 2100 Monday to Friday, 0800 – 1900 Saturday with no Sunday working. Ancillary spaceport activities may require operations outwith these times, including security and patrols.	SEI Annex C. Schedule of Mitigation

Consultee	Comment	Response	Section
CnES Environmental Health Planning response	The launching of rockets on the scale outlined in the EIA report is unlikely to be a significant source of vibration due to the low levels of sound and air overpressure being generated. As the sound will be dominated by mid-range frequencies that are less prone to result in induced vibration in structures than low frequencies, we do not perceive vibration to be an issue. Notwithstanding, it is recommended that conditions be put on to control vibration. *Condition 1: Ground vibration, measured as a maximum of three mutually perpendicular directions taken at the ground surface, shall not exceed a ppv of 12 mm per second. The measurement is to be taken at or near the foundations of any residential property not owned by the site owner or operator.* *Condition 2: Air overpressure shall not exceed [120dB] at any nearby residential property.*	Condition will be incorporated into planning condition / unilateral agreement and relevant operational procedures. Several monitoring locations have been proposed for discussion with CnES Environmental Health.	SEI Annex C. Schedule of Mitigation
CnES Environmental Health Planning response	Recommend that the standard noise and dust conditions are applied (provided), although it is noted that a dust management plan may be required by a planning condition. *Condition 1: I would recommend that the standard noise and dust conditions are applied (see attached).* *Condition 2: Construction hours will be limited to 07.00 to 20.00 Monday to Friday and 07.00 to 18.00 Saturday, with no Sunday working.*	Condition will be incorporated into planning condition / unilateral agreement and will be incorporated into relevant construction management procedures.	SEI Annex C. Schedule of Mitigation
CnES Planning SEI request (01/09/2022)	Provide further information on noise and vibration impacts from construction and operational traffic and, if these are not considered likely to be significant, clarification of reasoning to support this view.	Detailed vibration assessment undertaken based on assessment methodology for quarries.	SEI Appendix 19.2 Vibration Technical Note
CnES Planning SEI request (01/09/2022)	Provide details of proposed vibration monitoring location(s), (which would require landowner agreement).	Indicative vibration monitoring locations proposed, to be agreed with CnES Environmental Health.	Section 19.3
CnES Planning SEI request (01/09/2022)	Note also comments above regarding potential impacts on heritage assets.	Impacts on heritage assets from noise and vibration are assessed in the SEI based on updated vibration modelling. Consideration of construction noise has been integrated into the updated assessment of setting of archaeology and cultural heritage features.	SEI Appendix 19.2. Vibration Technical Note, Section 10 Archaeology and Cultural Heritage

SPACE PORT 1

19.1 VIBRATION MODELLING

Vibration modelling was undertaken by RSK Acoustics covering potential impacts associated with both construction and operation of the Development to address feedback relating to potential impacts on heritage receptors. The full methodology is provided in SEI Appendix 19.2. Vibration Technical Note.

19.1.1 Construction Traffic Vibration

Construction vibration modelling results have been integrated into impact assessment set out in Section 10, Archaeology and Cultural Heritage. In summary, vibration modelling concluded that construction works at a distance of 50 metres and above can be carried out without generating structural damage to heritage receptors.

19.1.2 Launch Operation Vibration

The most applicable calculation methodology for assessing vibration from launches was based on a methodology for blasting works. By using a scaled distance assessment procedure, vibration prediction calculations were made on the assumptions of a 'worst case' launch vehicle with 100 kg payload. Results from blasting vibration predictions identified that the minimum distance that a cultural heritage receptor would be unaffected would be 100 metres. However, the predicted vibration levels represent the vibration impact resulting from horizontal force exerted by blasting activities, rather than an accurate representation of downward horizontal thrust vibration exerted by launch vehicle operations. It is acknowledged that launch vehicles are expected to produce levels predominately in the mid-frequencies, with the provisional 100 Hz used within the prediction calculation in this study likely to be far lower than the frequencies expected during launch operations.

19.2 CONSTRUCTION NOISE

The 2021 EIA Report concluded that due to minimal amount of construction required for the Project, as well as the large separation distances (approximately 890 m to the nearest noise sensitive receptor), no significant construction noise or vibration effects are anticipated. Construction noise is revisited considering design changes set out in Section 4.3 and the request for further clarification set out in the SEI.

A full description of the proposed construction operations is set out in Section 4.11 and new design modifications forming part of the SEI are set out in Section 4.3. In summary, construction operations will comprise the following works:

- Upgrade of access track, associated laybys, vehicle turning area, launch pad loading area and car parking –construction works will comprise excavations / grading of surrounding area, laying of geotextile and deliveries of aggregate.
- Causeway upgrade, including box culvert – these works will include the installation of a working 'dry area', dewatering / pumping works during the removal / installation of the box culvert and installation of rip rap embankment.
- Launch pad and tether pads – excavation and grading works, pouring of reinforced concrete poured on a blinded hardcore base.
- Containment Tank and Water Storage Tank – excavation and grading works of the surrounding area, laying of a reinforced concrete slab will be constructed over blinded hardcore on a geotextile membrane laid over the sand formation level. Ready mix concrete imported to the site. Tank supports will be constructed from concrete blockwork. Two mass retaining walls will be constructed at the liquid storage tanks (blockwork or poured concrete).
- Soakaways - soakaways will be excavated and aggregate (clean crushed rock) with perforated pipe distribution installed within a filter membrane.

The closest residential receptor is An Ataireachd Ard, approximately 890 m from the launch site. No specialised machinery is required for the proposed works and no blasting or piling operations are anticipated as part of the operations. Construction works are scheduled to last between 16-20 weeks (with 4-week contingency period) and are temporary in nature. Recreational receptors may experience noise impacts during the construction phase which could diminish the sense of tranquillity and seclusion of the area, however some machinery

noise is associated with the current agricultural activities. In light of the nature of the proposed construction works, the temporary duration of the works and existing baseline agricultural noise, no changes to the conclusions of the 2021 EIA Report are suggested, and **no significant** effects are anticipated.

19.3 VIBRATION MONITORING

19.3.1 Baseline Vibration Monitoring

CnES Environmental Health has suggested conditions relating to vibration modelling. Attended vibration monitoring is proposed to be undertaken for the first rocket launch at Scolpaig Farmhouse, and subsequent requirements for vibration reviewed based on the outcome of monitoring and the nature of the launch. The monitored vibration levels will be assessed against the trigger levels detailed in BS 7385-2: 1993 '*Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground borne vibration*'.

Vibration modelling (set out in SEI Appendix 19.2) provided two indicative monitoring locations for vibration at Scolpaig Farmhouse and within the farm complex for baseline and operational monitoring. The final locations for vibration monitoring will be agreed with CnES Environmental Health, and if necessary, Western Isles Council Archaeology Service (WICAS) in terms of validating potential impacts on cultural heritage receptors. Final locations for vibration modelling may consider the following:

- A location on the road (A865) running adjacent to Scolpaig Farmhouse – a roadside monitoring location represents a point outwith the ownership boundary of Scolpaig, and not subject to private landowner permissions. However, any baseline or operational monitoring undertaken at this location may be impacted by traffic.
- A location adjacent to Scolpaig Farmhouse or Farmstead– a location at this point represents a relatively close (170 m or 100 m respectively) vibration monitoring location which would inform predictions relating to heritage receptors.
- An Ataireachd Ard – the closest residential receptor located approximately 890 m south of the launch site. As the dwelling at An Ataireachd Ard is private and access may not be permitted for vibration monitoring, it may not be possible to monitor vibration at this location.

It is not possible to definitively identify specific monitoring locations at this stage from these locations as access to a private property will be subject to landowner permissions, and vibration monitoring may be required support operational impacts on heritage receptors. The above locations are proposed as indicative to be agreed in conjunction with CnES Environmental Health, and if necessary WICAS to address potential concerns relating to heritage receptors and domestic properties.

19.4 FUTURE BASELINE

No changes to future baseline are anticipated in terms of the Noise and Vibration Assessment.

Technical Note

ATLANTIC58

SEI APPENDIX 19.2

Vibration Technical Note

RSK Acoustics

Technical Note

Project:	Spaceport 1, North Uist – GBV at Scolpaig Tower
Subject:	Construction Traffic and Launch Vehicle Vibration Impact Assessment
Prepared:	Paul Hawthorne
Date:	28 October 2022
Reference:	2061455-RSKA-TN-001 Revision: 07 Approved: Antonio Sanchez, Daniel Vallis

1 Introduction

Project Scope

1.1 Comhairle nan Eilean Siar (CnES) is currently leading a consortium, comprising CnES, Highlands and Islands Enterprise QinetiQ Group Plc, RHEA Group and Commercial Space Technologies Ltd., to build a new, permanent suborbital spaceport facility at Scolpaig on the northwest coast of North Uist, Scotland.

1.2 The construction scheme will involve a range of activities, including the upgrade of an existing track coming off the A865 and the construction of a new track leading from a disused farmstead to the proposed launch site, construction of the launch pad and pollution management system. Operational activities will involve the transport of materials to site, installation of a temporary tower or rail for the purposes of supporting the launching activities.

1.3 There are a range of heritage features located on site. Scolpaig Tower (a scheduled monument comprising an upstanding 19th century tower which overlies a prehistoric dun) is located approximately 140m to the west of the existing track. There are ruined structures located on either side of the track forming a 19th century township, and the existing Scolpaig Farmstead is located adjacent to the proposed launch complex. Concerns have been raised over the potential impact of vibration caused by the construction traffic and launch activities associated with the project on existing heritage sites.

Instruction

1.4 RSK Acoustics Ltd (RSKA) has been engaged by Headland Archaeology Ltd and Atlantic58 Ltd to undertake an assessment of the potential impact of vibration associated with construction traffic and launch vibration related to the construction and operation works of the project.

A map overview of the project site, including Scolpaig Tower and existing heritage sites with the proposed development area, is appended at the end of this document (A1).

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Introduction

Spaceport 1, North Uist – GBV at Scolpaig Tower
Technical Note 2061455-RSKA-TN-001-(07) // 28 October 2022

SPACE PORT 1

2 Guidance

Assessment Criteria

DIN 4150-3: Vibration in Buildings - Part 3: Effects of Vibration on Structures

2.1 There is no suitable published regulation guidance concerning the impact of vibration of construction traffic and launch operation activities on heritage buildings. Subsequently, German Deutsches Institut fur Normung e.V. DIN 4150-3: *Vibration in Buildings - Part 3: Effects of Vibration on Structures*[1] - a standard for identification of stringent vibration levels for heritage structures - has been used within this assessment to provide a guideline criteria when assessing the results from prediction calculations. Although a British Standard, BS 7385: Part 2: 1993 *Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground-borne vibration* exists, this guidance does not include criteria which details the limits for heritage buildings, and therefore has been substituted for DIN 4150-3 in this assessment.

2.2 Table 1 details the limits specified in the German DIN 4150-3: The Structural Vibration, Part 3: Effects of Vibration on Structures - for which the vibration predictions for both construction traffic and launch operation activities have been assessed against. DIN 4150-3 recommends frequency dependent values for Peak Particle Velocity (PPV) to avoid structural damage for specific building categories. Notably, DIN 4150-3 specifies the following PPV guidelines for foundation vibration at the listed frequencies:

Type of Structure	Guideline Values for Velocity (mm/sec)			
	Vibration at the foundation at a frequency of			Vibration at the horizontal plane of the highest floor at all frequencies
	1 Hz to 10Hz	10 Hz to 50Hz	50 Hz to 100 Hz	
Heritage Buildings	3	3 – 8	8 – 10	8

Table 1 DIN 4150-3 Guideline Values for PPV foundation vibration for Heritage Buildings

1 DIN 4150-3, 2016 Edition, December 2016 - Vibrations in buildings - Part 3: Effects on structures. This standard specifies methods of determining and evaluating the effects of vibration on structures designed for predominantly static loading. It covers structures which do not need to be designed to specific standards or codes of practice on dynamic loading.

Prediction Methodology

British Standard BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'

2.3 Both construction traffic and launch vehicle operation vibration prediction assessment methodologies have adopted the prediction methodologies outlined within BS 5228-2. This guidance provides assessment criteria for predicting the resultant vibration displacement force arising from construction and blasting activities with returned PPV values. The generated PPV values are used in assessment with the PPV guidelines as stated in DIN 4150-3 for heritage buildings to determine the magnitude of potential impact vibration risk of Scolpaig Tower, surrounding heritage sites and Scolpaig Farmstead.

2.4 The rational for the application of BS 5228-2 for both construction traffic and launch operations are described in the sections below (2.5 and 2.6).

Construction Traffic

2.5 Vibration predictions for construction traffic have been conducted in accordance with the calculation methodology for vibratory compaction (steady state) within BS 5228-2:2009+A1:2014 *'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'.*[2] However, there is no existing assessment criteria for predicting and assessing the potential vibration impact from construction traffic on heritage assets.

2.6 The methodology described within BS 5228-2 –provides vibration prediction methodologies for a series of construction activities. Prediction results (PPV) can then be assessed in the context of the PPV guidelines established in DIN 4150-3 for heritage buildings to assess if vibration poses a potential risk to existing heritage sites.

Launch Operations

2.7 In the absence of existing assessment methodologies predicting vibration arising from sub-orbital (and orbital) launch vehicle operations, vibration predictions relating to launch activities have been conducted in accordance with the calculation methodology for blasting sites within BS 5228-2:2009+A1:2014 *'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'.*

2.8 Due to the lack of substantial published works regarding the assessment methodologies of launch operations, the use of blasting activities prediction methodology was deemed the most relevant substitute due to the resultant figures producing PPV values that could be assessed against the guidelines produced in DIN 4150-3 for heritage buildings. Furthermore, although resultant vibration from blasting activities produces an extreme case value higher than expected to be produced from launch activities at the proposed Spaceport, it allows for the inclusion of estimated mass of expected launch vehicles to be included in the assessment calculation – thus, producing a provisional expected value of vibration.

2 BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration. This part of BS 5228 gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration levels, including industry-specific guidance.

Construction Traffic and Launch Vehicle Vibration Impact Assessment

3 Assessment

Methodology

Construction Traffic Vibration

3.1 Vibration predictions have been conducted in accordance with the calculation methodology for vibratory compaction (steady state) within BS 5228-2:2009+A1:2014 *'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'*. The use of compaction (steady-state) prediction methodology allows for a degree of conservative estimate on the resulting vibration impact likely to be expected. Steady-state predictions are calculated with the assumption that compaction works will be continuous, allowing for worse-case results to inform the assessment. It has been noted from Section 4.9.12, within Chapter 4. Project Description of the Spaceport 1, EIA Project Proposal (updated by Section 4 of the SEI Addendum); that construction traffic is expected to consist of movements related to the delivery of materials and components to site, along with construction staff travel, with an estimated 380 deliveries to be made to site, over a 20-24 week timetable. Additionally, the average weekly heavy vehicle movements during construction works are noted to be approximated at 16-19 per week. Due to the approximated expectancy of the traffic present on site and varied vehicle load, the use of compaction (steady-state) vibration methodology allows for an estimated prediction that works will be continuous rather than periodic, with a steady worst-case vibration expectancy – differing from the variation of vehicle load and volume to be expected on site. A resultant spreadsheet was established to allow for calculations of predictions to be produced in accordance to the calculation table present in Table E.1 within BS 5228-2. The following calculation parameters were used:

- Calculations undertaken on the basis of: $Vres = k_s\sqrt{n_d}\left[\frac{A}{x+L_d}\right]^{1.5}$ formula
- 'k_s' = Scaling factor (and associated percentage probability of predicted value being exceeded)
- 'n_d' = number of vibrating drums
- 'A'= maximum amplitude of drum vibration, in millimetres.

Launch Operation Vibration

3.2 Vibration predictions have been conducted in accordance with the calculation methodology for blasting sites within BS 5228-2:2009+A1:2014. As detailed within section E.2 of the guidance: *Prediction of vibration from blasting sites*, a series of set-back measurements of vibration can be utilised to produce a scaled distance graph, as seen in Figure 1 which illustrates predictions of the magnitude of vibration impact at a series of distances. Calculation predictions to determine vibration limits was utilised with the following equation below. From the above methodology and example described in BS 5228-2, vibration limits can be determined utilising a scaled distance approach, allowing for vibration limit predictions at a series of distances to be calculated for the potential impact of Spaceport 1 on the surrounding heritage sites.

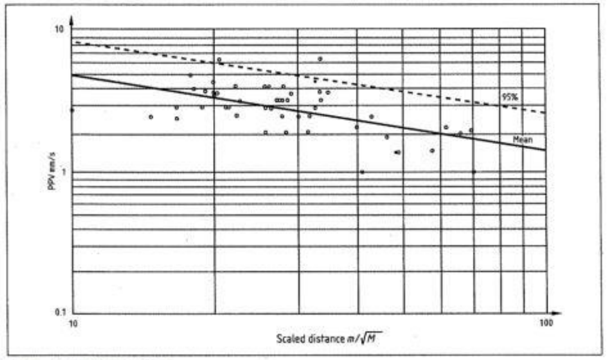

Figure 1 – Scaled Distance Graph

$$\frac{m}{\sqrt{M}}$$

Where:

m = distance from blast; and

M = Maximum instantaneous charge.[3]

[3] M (Maximum instantaneous charge) has been applied the value of the maximum expected payload provided by the EIA report (i.e. 100 Kg)

Operational Assumptions

Construction Traffic Vibration

3.3 The use of BS 5228-2 adopted was the most applicable prediction methodology for the project. Furthermore, the use of vibratory compaction (steady state) served to represent a more extreme case of compaction vibration which would be present on the construction track – and thus, allowed for a higher presence of vibration to be assumed during calculations. Predictions have assumed worse case parameter ranges – drum width of 2.1m and an amplitude movement of 1.72mm.[4]

Launch Operation Vibration

3.4 As outlined within the Chapter 10. Archaeology and Cultural Heritage of the 2021 EIA report (updated by Section 10 of the SEI Addendum), launch works are unlikely to produce a significant source of vibration due to the resultant low levels of sound and air overpressure expected to be generated. Launch vehicles have been noted to be dominated by mid-range frequencies which are less likely to result in potential vibration damage than the risk presented by low-end frequencies. As such, vibration from launch operation is not expected to impact heritage receptors, however, the assessment recommended that additional assessment (i.e., the predictive assessment utilised within this study and on-site monitoring) should be followed in the avoidance of doubt).

3.5 A worst-case launch vehicle for predicting (and subsequently assessing) vibration was used as a basis of the predictions. Launch vehicle data detailing the estimated mass of the launch vehicles was extracted from the EIA Report, and a maximum payload mass of 100 kg was used to inform the assessment procedure from DIN 4150-3.

3.6 As discussed, due to the lack of published works which allow for the adequate assessment of launch vehicle operations, the use of blasting vibration prediction methodology in accordance with BS 5228-2 was adopted. The use of blasting vibration predictions allows extreme case values to be utilised within the prediction assessment. Consequently, a degree of uncertainty is introduced to the assessment. Blasting vibration produces a larger force of vibration in a horizonal plane than the vibration which would be exerted from a typical launch vehicle, which would generally produce downward thrust vibration. Due to the polarising differences in exerted force distribution, a direct comparison of results from blasting vibration to be translated to launch vehicle operations cannot be assumed, and therefore, additional monitoring is recommended to establish an accurate representation of the vibration impact created by launch vehicle operations.

3.7 Predictions have assumed a maximum payload mass of 100 kg, with PPV 10 mms^{-1} as stated in the minimum guideline within DIN 4150-3. As discussed, due to launch vehicles expected to produce mid-range frequencies, a value of 100Hz was used to ascertain the minimum PPV value of 10 mms^{-1}. Although 100Hz is considered a low-end frequency, it is the maximum frequency allowance category available within the methodology outlined within DIN 4150-3. As such, the predicted results found within this document should

[4] Use of an 18t roller for steady state compaction activities for provisional prediction assessment with worse-case conservative value.

Construction Traffic and Launch Vehicle Vibration Impact Assessment

be used as a provisional guideline, with expected launch operations unlikely to generate a concern in terms of potential vibration damage to the structural integrity of heritage buildings.

3.8 It must be noted that vibration limits are generally expressed as a statistical average to account for the variable nature of blasts.

4 Results

Construction Traffic Vibration

4.1 **Table 2** presents the results for the prediction of construction induced vibration levels in relation of peak particle velocity associated with compaction activities (i.e., construction traffic – steady state vibration) which were made from the adopted calculation method based on Table E.1 within BS 5228-2.

Activity	Scaling factor and probability of exceedance	PPV at a range of setback distances, mm/s															
		5m	15m	20m	30m	40m	50m	60m	70m	80m	90m	100m	110m	120m	130m	140m	150m
Vibratory Compaction (steady state)	*ks= 75 (50%)*	12.6	3.4	2.3	1.7	1.3	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1
	ks= 143 (33%)	24.1	6.5	4.4	2.5	1.7	1.2	0.9	0.7	0.6	0.5	0.4	0.4	0.4	0.4	0.3	0.2
	ks= 276 (5%)	46.5	12.5	8.5	4.8	3.2	2.3	1.8	1.4	1.1	1.0	0.9	0.7	0.7	0.6	0.5	0.5

Table 2 Predicted vibration generated by compaction works (steady state)

Launch Operation Vibration

4.2 Utilising the equation and calculation methodology described in Section 3, the following values in **Table 3** were used in place in the below prediction assessment:

PPV Guideline German DIN 4150-3 mms^{-1}	Value of 95% at PPV mms^{-1}	M (mass of maximum charge / payload) kg
10 mms^{-1}	10	100

Table 3 Prediction Values used in assessment of blasting vibration

4.3 The resulting calculation results are presented below:

- Minimum distance from maximum magnitude source of vibration (blasting) – **100 metres**

SPACE PORT 1

RSK Acoustics

5 Conclusions

Construction Traffic Vibration

5.1 Due to the distance of the expected vibration sources, predictions based on compaction (steady-state) can assume that even at the most onerous scaling factor (5% probability of the predicted values being exceeded) are calculated to be below the minimum guidance level of 3 mms^{-1} stated within DIN 4150-3 at which structural damage due to construction works vibration is expected to occur for foundation level frequencies at 1Hz-10Hz.

5.2 Furthermore, whilst adopting these worst-case scaling factors, it can be assumed that construction works at a distance of 50 metres and above can be carried out without generating structural damage to heritage receptors. From these results, a vibration level of this predicted magnitude would not be of a sufficient level to cause structural damage for the listed heritage sites of Scolpaig Tower. However, cultural heritage sites, which may be situated closer than 50 metres of construction activities, may require monitoring to assess potential damage in a worst-case scaling assumption as demonstrated from this prediction methodology.

Launch Operation Vibration

5.3 As a dedicated published work detailing the potential effects on cultural heritage sites from vibration arising from launch vehicles could not be identified, the most applicable calculation methodology utilised a methodology based on *blasting* , assessed against the guidelines for heritage buildings outlined in DIN 4150-3. By utilising a scaled distance assessment procedure, vibration prediction calculations were made on the assumptions of a 'worst case' launch vehicle with 100 kg payload. Results from blasting vibration predictions identified that the minimum distance at which a structure of cultural heritage could rest unaffected by resultant vibration at a foundation level frequency of 100 Hz was 100 metres.

5.4 As stated in the assumptions of the assessment (section 3.3), the predicted vibration levels represent the vibration impact resulting from horizontal force exerted by blasting activities – rather than an accurate representation of downward horizontal thrust vibration exerted by launch vehicle operations. Furthermore, it has been noted that launch vehicles are expected to produce levels predominately in the mid-frequencies, with the provisional 100 Hz used within the prediction calculation in this study likely to be far lower than the frequencies expected during launch operations. As such, the prediction of 100 metres cannot be assumed to be a definitive distance which should be followed to avoid structural damage to heritage sites. Vibration from blasting activities would produce a larger magnitude of force than would be produced from the proposed launch activities at the proposed spaceport; rather, the predictions set out in this report - derived from blasting activities - should be regarded as a provisional assessment, with additional on-site vibration monitoring recommended. Furthermore, due to the assessment utilizing a 100 Hz frequency source to represent launch vehicles – the resultant 100 m 'at-risk' zone is likely to be far lower in practicality, due to the launch vehicles expected to produce higher mid-range frequencies than 100 Hz. Results from the prediction calculation demonstrate that at higher frequencies, vibrating sources can be situated closer to heritage buildings with a lower risk of potential vibration impact.

5.5 However, based on results from the provisional assessment for blasting activities, an at-risk zone of 100 metres has been determined and should be followed with sites that are situated less than 100 metres requiring additional monitoring and assessment.

6 Recommendations

6.1 Provisional vibration monitoring is recommended during construction and launch operations. Locations will be agreed with the CnES Environmental Health and other stakeholders as necessary post consent.

6.2 End of Section

Construction Traffic and Launch Vehicle Vibration Impact Assessment

Appendix 1 – Map Overview of Project Site

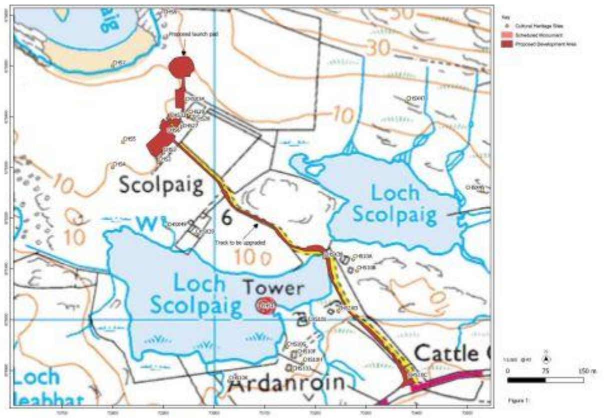

Figure A1 – Map overview of development site

End of Document

A.2 EIA Extract - Chapter 19 Noise & Vibration (to be read in conjunction with SEI and Technical note above at A.1)

19 NOISE AND VIBRATION

19.1 INTRODUCTION

This chapter of the EIA Report describes the potential noise and vibration impacts that may arise during launch activities associated with the Project. The assessment evaluates the potential significant effects arising from noise and vibration from Launch Vehicles (rockets) on human receptors only. It is supported by Appendix 19-1: Noise Technical Report, which details the modelling methodology and criteria used in this assessment. This assessment was undertaken by Arcus Consultancy Services Ltd (Arcus).

Noise impacts on ecological and heritage receptors are assessed in the following chapters:

- Chapter 10: Archaeology and Cultural Heritage;
- Chapter 14: Ornithology;
- Chapter 15: Terrestrial Ecology; and
- Chapter 16: Marine Ecology.

19.2 STUDY AREA

Modelling has been undertaken to determine noise levels during rocket launches, as well as audible sonic booms generated by downward supersonic flight. A separate study area was generated for each of these impacts based on the modelled outputs.

The resulting study areas consider all noise sensitive receptors within 10 km of the Project site (specifically the launch pad) for rocket launch noise, and receptors within 150 km for sonic boom noise, as determined by the extent of the modelling predictions. No noise effects are anticipated outwith these study areas (Figure 19-1).

The nearest human, ecological and cultural heritage receptors are shown in Figures 1 to 6 in Appendix 19-1: Noise Technical Report.

19.3 LEGISLATIVE FRAMEWORK AND POLICY CONTEXT

This assessment follows the legislative framework outlined in the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017[1] (hereafter referred to as the 'EIA Regulations'). The EIA Regulations implement European Union (EU) Directive 2014/52/EU which amended Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

There is no guidance on the assessment of noise effects from commercial spaceport developments. As such, the following guidelines / polices have been used to inform the general approach to this assessment and to provide input to the assessment criteria. Details of these guidelines/policies can be found in Appendix 19-1: Noise Technical Report.

- Planning Advice Note PAN 1/2011 *Planning and Noise*[2];
- Technical Advice Note *Assessment of Noise*[3];
- BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Part 1: Noise*[4];
- BS 4142:2014 + A1:2019 *Methods for rating and assessing industrial and commercial sound*[5];
- WHO *Environmental Noise Guidelines for the European Region* (2018)[6].

19.4 SUPPORTING SURVEYS AND STUDIES

In support of this assessment, a review of available literature and modelling methodologies for the prediction and assessment of rocket launch and sonic boom noise was carried out. The following guidance and studies are relevant to this assessment:

- *Acoustic Loads Generated by the Propulsion System*[7];
- *User Guides for Noise Modelling of Commercial Space Operations – RUMBLE and PCBoom*[8];
- *Procedure for the Calculation of the Perceived Loudness of Sonic Booms*[9]

A summary of the above studies can be found within the modelling methodology provided in Sections 3.1 and 3.2 of Appendix 19-1: Noise Technical Report. Two specialist software packages have been used to model and predict both launch noise and sonic boom noise. These are described in detail, along with the underlying calculation theory, in Sections 2.3 and 2.4 of Appendix 19-1: Noise Technical Report.

Rocket launch noise has been predicted using the RUMBLE[10] 2.0 software package. RUMBLE was developed in the USA under the Airport Cooperative Research Program (ACRP) to predict noise effects from commercial space operations.

In order to predict the effects and extent of sonic booms generated by the Project's Launch Vehicles (LVs), modelling has been carried out using the PCBoom v4.99 software package. PCBoom has been developed by Wyle Laboratories, Inc. in the USA under the ACRP to predict the extent of sonic booms from single flight operations taking into account vehicle type, atmospheric conditions and flight trajectory.

19.5 DATA GAPS AND UNCERTAINTIES

Regarding the prediction of noise from rockets, the following sources of uncertainty have the potential to result in variation in practice to the noise levels predicted and assessed:

- Source characteristics: the assessment has been carried out based on a 'worst-case' representative LV. In practice other types of LVs may be used, and any differences in the specification of these other types, could lead to corresponding differences in the noise emission and therefore the noise levels affecting receptors;
- Ground Reflections: the RUMBLE noise model assumes propagation over soft ground, i.e., the effects of reflection from water, sand or other acoustically reflective surface are not considered; and
- Atmospheric Effects: the effects of wind speed, temperature, pressure and wind speed gradients have not been considered; however, worst-case assumptions have been made in this respect.

Regarding the prediction of sonic booms, the following sources of uncertainty are present:

- Results of the modelling are shown at the calculation points only, and booms may be audible at other locations and may vary between points within the predicted boom area; and
- The model assumes calm conditions with no wind. It is possible that atmospheric wind conditions present during specific launches may result in different noise levels to these predicted here and refraction may result in booms being audible at other locations. However, these secondary booms would occur at a lower sound level than the primary booms considered in the assessment.

Overall, it is unlikely that these uncertainties could have a material effect on the outcome of the assessment. In practice, it is likely the assumptions made as part of this assessment will overestimate the levels of noise, and as such this assessment considers worst-case scenarios.

19.6 CONSULTATIONS

Following issue of the Scoping Report in 2018[11], consultation has been carried out with Comhairle nan Eilean Siar (CnES) Environmental Health to agree assessment methodology. Feedback has also been received from Marine Scotland in terms of underwater noise. The key points regarding noise and vibration raised by consultees are summarised in Table 19-1.

Table 19-1 Key issues raised by stakeholders during consultation

Stakeholder	Comment	Response/Action taken	Section cross-reference
Environmental Health – Scoping Response June 2018	No Comment to Scoping Report	N/A	N/A
Environmental Health – response to Planning Application (Noise) August 2019	Application refers to 10 launches per year and that the maximum sound that will be heard at the nearest noise sensitive premises, at a distance of 762 m would be 85 dB(A) with a maximum of 15 seconds of noise per launch; equating to 115 seconds in the year. Based on this information no concerns if launch numbers etc. are restricted to this.	Since this initial consultation, further modelling of proposed worst case rocket type results in predicted noise levels at these receptors of 95 dB(A). In addition, the distance to the nearest receptor has increased to 890 m.	Section 19.9
Environmental Health - response to Planning Application (Vibration) August 2019	It may be worth clarifying the potential for vibration, both ground and airborne, and if there is likely to be any impact given the distance to the nearest adjacent premises. Conditions covering vibration, as well as noise, for any of the launches may be applied.	Given large separation distances, both ground and airborne vibration at human receptors is scoped out in Section 19.7.5 Assessment of vibration at cultural heritage receptors is assessed in Chapter 10: Archaeology and Cultural Heritage.	Section 19.7.5, Chapter 10: Archaeology and Cultural Heritage.
Environmental Health – response to Planning Application (Operating hours) August 2019	It is assumed that the hours of operation of the site are tied to the individual rocket launches (which last for approximately 4 days for each of the 10 proposed launches) and will therefore not be continuous all year round.	Confirmed and this is assessed within this chapter.	N/A
Environmental Health – response to Planning Application (Construction noise) August 2019	In terms of construction, recommend that the normal noise [and dust] conditions are applied.	Due to the minimal amount of construction and large separation distance to nearest human receptor, no significant construction noise or vibration effects are anticipated.	Section 19.7.5

Stakeholder	Comment	Response/Action taken	Section cross-reference
Environmental Health, Comhairle nan Eilean Siar (CnES) – response to email consultation outlining assessment and modelling methodology April 2020	Agreed that BS4142 is not applicable and that suggested aircraft noise example (suggested by consultants) would be more appropriate. EH is not aware of any other relevant guidance, criteria or comparable noise sources, nor would they expect any other information, other than what [the consultants] have described, to be provided in the report.	As agreed, assessed noise from launches and sonic booms against noise measured aircraft and other common noise sources.	Section 19.7
Marine Scotland Licensing Operations Team (MS-LOT) 15/06/2021	Noted noise from jettisoned stage splashdown not likely to be of concern for marine mammals due to there being no explosion, impulsive or persistent noise, such as associated with piling activities.	No further action related to underwater noise.	Chapter 16: Marine Ecology

A planning application to develop a proposed Spaceport at Scolpaig Farm in North Uist was submitted to the Comhairle nan Eilean Siar on 26 June 2019 (Planning Reference 19/00311/PPD). The planning application attracted significant public attention and consequently, approximately 640 representations from the public were received. Comments raised from both the public and consultees highlighted key issues and concerns of relevance to the EIA process. Given the relationship to the EIA process, an analysis was undertaken of the representations submitted. The complete analysis is provided in Appendix 5-1: Review of Planning Representations.

In summary, there were 94 objections (15 % of the total of objections), which expressed concern over the unknown impact of noise pollution on local archaeological sites, wildlife (specifically birds) and the sense of peace and tranquillity for which the Uists are known. It was felt that noise and the accompanying vibrations from construction and use of the site could compromise the strength of Scolpaig Tower. The impact of noise and vibration on birds is covered in Chapter 14: Ornithology, and on archaeological features in Chapter 10: Archaeology and Cultural Heritage.

19.7 ASSESSMENT METHODOLOGY

Whilst the policy and guidance documents detailed in Section 19.3 of this report provide assessment methodologies for a wide range of noise generating developments, there is no specific guidance regarding noise generated from operation of spaceports. In addition, due to the occasional occurrence and short duration of the sound during rocket launches at the Project site, conventional noise assessment standards are of limited relevance.

In the absence of specific guidance, and as agreed through consultation with CnES Environmental Health, noise effects have therefore been considered with reference to levels generated by familiar noise sources, as detailed in Section 19.7.1 and 19.7.2.

This report therefore considers operational noise from the Project, which has two potential components:

- Noise from the launching of sounding rockets; and
- Sonic booms.

Two rocket models are assessed and presented in this chapter and Appendix 19-1 Noise Technical Report: Rocket A and Rocket B; each representing the 'worst-case scenarios' for noise from the launch of sounding rockets and noise generated by sonic booms respectively:

- Rocket A is a single stage rocket, and the largest rocket type proposed for launch at the Project site. It controls descent by way of early parachute deployment, which means that it does not reach supersonic speeds during this stage and as such will not produce audible sonic booms. Due to its size, Rocket A will generate the highest noise levels during launch and as such presents a worse case for launch noise;
- Rocket B is a two-stage rocket with the descent of the second stage reaching supersonic speeds, and as such generating an audible sonic boom. Rocket B presents a worst case for sonic booms.

The full details and specifications for Rockets A and B are commercially sensitive and as such are not reproduced here. Further details, including the methodology used to predict launch noise and sonic booms and modelling assumptions are provided in Sections 2.3 and 2.4 of Appendix 19-1: Noise Technical Report.

19.7.1 Launch Noise

Noise from each rocket launch will be of very short duration; the powered phase of Rocket A will last for approximately 120 seconds. The powered phase of the first stage of Rocket B will last for approximately 12 seconds, and the second stage powered phase approximately 31 seconds, i.e., the rocket will produce potentially high levels of noise for a total 43 seconds. However, the noise may not be audible for the full length of these powered phases, due to the altitude and distance covered. Launches will occur no more than 10 times per year, and during daytime hours only.

As agreed through consultation with CnES Environmental Health in April 2020, conventional approaches to the assessment of noise are not appropriate, given the very short duration and occasional nature of each event. Conventional methods for assessment of commercial noise (e.g., BS 4142) are typically based on the equivalent continuous ('average') sound level over a defined period of time (e.g., 1 hour) and are assessed against either absolute criteria, or against pre-existing background noise levels. Such an approach is not suitable for the assessment of occasional, short duration sounds such as rocket launches, where the maximum noise levels occurring during the launch event is likely to be more important than the 'average' over a period of time.

The WHO Community Noise Guidelines 1999 make reference to the use of L_{Amax} for the assessment of noise events which occur occasionally, for short duration or varying in level. As such, and as agreed with CnES Environmental Health in

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April 2020 (see Table 19-1), the short duration noise levels (lasting up to 120 seconds) have been assessed by comparison to L_{Amax} noise levels generated by common noise sources. Table 19-2 provides a range of commonly experienced noise levels of increasing level.

Table 19-2 Commonly experienced L_{Amax} noise levels

Level, dB, L_{Amax}	Source	Effect / Comparison
60	WHO Guidelines for Community Noise 1999	Recommended limit for night-time noise outside of an open window. Daytime noise below this level highly unlikely to be disturbing.
65	Regulation (EU) 168/2013[12]	Road motorcycle at 40 m
70		Road motorcycle at 25 m
75		Road motorcycle at 15 m
80	BS 5228[13]	39 t road lorry at 10 m (Table C.6.21)
85		35 t bulldozer at 10 m (Table c.5.14 - 86 dB)
90		Dump trucks on haul roads at hard rock quarries at 10 m (Table c.9. 16-22)
110	WHO Guidelines for Community Noise 1999	Recommended limit for protection of hearing. Noise at this level or above may be harmful.[14]

Noise from rocket launches at the surrounding human receptors is therefore assessed by comparing the predicted noise level to the commonly experienced noise levels presented in Table 19-2, with an upper limit of L_{Amax} 110 dB.

19.7.2 Sonic Boom Noise

There are no standard assessment criteria for sonic boom noise. A review of relevant studies, as discussed in Section 1.4 in Appendix 19-1: Noise Technical Report, indicates that Perceived Decibel Level (PLdB) provides the most appropriate metric for consideration of sonic boom noise. The PLdB is a metric developed to take account of the human response to shock waves relating to sonic booms, taking into account their high levels of low frequency content. Whilst there are no standard criteria for the assessment of PLdB, NASA research indicates that a PLdB of up to 75 dB is *"acceptable for unrestricted supersonic flight over land"*[15].

In addition to the PLdB, the maximum overpressure during descent of the second stage is also predicted. As with launch noise, assessment of the maximum over pressure is compared against levels generated by a range of different aircraft travelling at supersonic speeds[16] as outlined in Table 19-3. Maximum overpressure is described in PCBoom in pounds per square foot (psf) (1 psf equals 48 Pascals) and is the pressure over and above normal atmospheric pressure (2,116 psf).

Table 19-3 Example measured maximum overpressure for comparison

Source	Source speed	Overpressure
Lockheed SR-71 Blackbird	Mach 3.0 at 80,000 ft (24 km)	0.90 psf
Concord	Mach 2.0 at 52,000 ft (16 km)	1.94 psf
Lockheed F-104 Starfighter	Mach 1.9 at 48,000 ft (15 km)	0.80 psf
NASA Space Shuttle	Mach 1.5 at 60,000 ft (18 km)	1.25 psf

Although there are no recommended criteria for overpressure from sonic booms generated by aircraft, it should be noted that a complaint was made relating to a sonic boom from Concord at 0.75 psf[17].

19.7.3 Sensitivity of Receptors and Magnitude of Change in EIA Methodology

The assessment is prepared in accordance with the EIA Regulations, and its purpose is to identify whether a significant effect will occur under this context.

Sections 19.7.1 and 19.7.2 of this chapter provide context for quantifying the level of noise with reference to other sources, and it is important to consider the sensitivity of receptor and magnitude of change to determine whether an effect is significant or not under the EIA regulations.

Sensitivity of receptors is an important consideration when determining the magnitude of impact. The sensitivity of receptors to potential impacts is based on their capacity to avoid, tolerate, recover from, or adapt to a particular impact. This is informed by the magnitude of change, which is experienced by a receptor of varying sensitivity. For the purposes of environmental assessment, magnitude of a change or "effect" is generally dependent on the degree to which the change affects the feature or asset, from a fundamental, permanent or irreversible change that changes the character of the feature or asset, to barely perceptible changes that may be reversible. Magnitude would also encompass the certainty of whether an impact would occur.

This assessment evaluates effects on residential receptors, and therefore all receptors are considered to be of high sensitivity. To draw conclusions on whether the noise levels identified as part of this EIA are significant, consideration is given to the magnitude of change, and whether this would be negligible; low; medium; or high. Definitions of these levels are presented in Table 19-4.

Table 19-4 Framework for Determining Magnitude of Change

Magnitude of Change	Definition
High	A fundamental change to the baseline condition of the receptor, leading to a total loss or major alteration of character.
Medium	A material, partial loss or alteration of character.
Low	A slight, detectable, alteration of the baseline condition of the asset.
Negligible	A barely distinguishable change from baseline conditions.

When classifying magnitude of change within the above framework, the following factors are taken into consideration:

- Extent;
- Scale, including predicted noise levels compared to those identified from the literature review as being applicable:
  - Launch noise: L_{Amax} 110 dB, based on WHO guidelines;
  - Sonic boom noise: 75 PLdB, based on NASA research.
- Duration;
- Frequency of timing; and
- Reversibility.

19.7.4 Significance Criteria

As per the EIA Regulations, as referenced in Section 19.3, the purpose of an EIA Report is to identify whether or not a significant effect is likely to occur as a result of a particular development.

For the purposes of this assessment and following consultation with the planning authority, launch and sonic boom noise criteria has been determined based on:

- The literature review summarised in Appendix 19-1: Noise Technical Report and Sections 19.7.1 and 19.7.2;
- Consideration of the magnitude of change experienced by a receptor, as set out in Section 19.7.3;
- Professional judgement.

Where the magnitude would result in an effect deemed to be a material or fundamental change to a high sensitivity receptor e.g., a *medium* or *high* magnitude of change, effects would be generally deemed **significant** in accordance with the EIA Regulations. Where effects are deemed to be as a result of *negligible* or *low* magnitude of change on a high sensitivity receptor, effects would generally be deemed **not significant** in accordance with the EIA Regulations.

19.7.5 Elements Scoped Out

The launching of rockets of the scale considered within this report is unlikely to be a significant source of vibration due to the low levels of sound and air overpressure being generated. In addition, the sound would be dominated by mid-range frequencies that are less prone to result in induced vibration in structures than low frequencies. As such, both ground and airborne vibration at human receptors have been scoped out of further assessment, however precautionary measures for protecting specific structures located within the site are set out in Chapter 10: Archaeology and Cultural Heritage.

Due to the minimal amount of construction required for the Project, as well as the large separation distances (approximately 890 m to the nearest noise sensitive receptor), no significant construction noise or vibration effects are anticipated. Construction noise and vibration impacts have therefore been scoped out of further assessment. However – and as indicated above - precautionary measures for protecting specific structures located within the site are set out in Chapter 10: Archaeology and Cultural Heritage.

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19.8 BASELINE DESCRIPTION

Due to its rural nature, North Uist has a quiet acoustic environment, dominated by natural sources including the wind and sea. Artificial sources are usually limited to low levels of road traffic, occasional aircraft, agriculture and shipping.

An existing MOD rocket range is present on South Uist, and the wider area is used bi-annually for Joint Warrior[18] and other military exercises, which can generate noise from activities such as missile firings, ships and aircraft, including low-flying supersonic fighter jets and helicopters. Although baseline noise levels in the area are normally low, there are existing noise sources which have a comparable character and pattern of occurrence to those associated with the Project.

19.8.1 Potential Noise Sensitive Receptors

This chapter considers impacts on human receptors only, with impacts on cultural heritage, ornithology, terrestrial ecology, and marine ecology receptors addressed in Chapters 10, 14, 15 and 16 respectively.

Figure 1 in Appendix 19-1: Noise Technical Report shows the locations of human noise-sensitive receptors. These have been identified from Ordinance Survey MasterMap AddressBase Plus data, a database that combines features shown on large-scale digital mapping with the Royal mail address database. These consist mainly of dwellings but also include other noise-sensitive buildings such as schools and places of worship. The closest noise sensitive receptors have been identified as follows:

- Scolpaig Farmhouse is located approximately 175 m from the launch site but is currently uninhabited. It is proposed that Byre 2 in the farm steading complex is modified for use as a covered workshop, assembly and communications area. There is no intention of reinstating Scolpaig Farmhouse as a residential dwelling;
- The next closest receptor is An Ataireachd Ard at approximately 890 m south of the launch site; and
- The closest receptors to the east are at a distance of approximately 1,900 m.

All noise sensitive receptors are considered to be of **high** sensitivity for the purposes of this assessment.

The locations of ecological / ornithological receptors, in the form of Designated sites and Nature Reserves are shown on Figure 2 in Appendix 19-1: Noise Technical Report. The assessment of noise impact on such receptors is covered in Chapter 14: Ornithology, Chapter 15: Terrestrial Ecology and Chapter 16: Marine Ecology.

Figure 3 in Appendix 19-1: Noise Technical Report shows the locations of Scheduled Monuments and records from the CANMORE historic site record. The assessment of noise and vibration impact on such receptors is covered in Chapter 10: Archaeology and Cultural Heritage.

19.9 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

19.9.1 Launch Noise

Figure 1 in Appendix 19-1: Noise Technical Report shows predicted noise level contours for the powered phase of Rocket A's Stage 1 trajectory, which represents the worst-case scenario for launch noise. The near-circular shape of the contours and the fact that they are centred on the launch site indicate that the highest noise levels would occur shortly after lift-off.

The predicted L_{Amax} noise level is below the 110 dB criteria outlined in Section 1.7 of Appendix 19-1: Noise Technical Report at all identified receptors, and would only be experienced during the launch period, which is limited to 120 seconds at any one time, up to 10 times per year. Given the short duration that this noise level would occur for, this is not a

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considered to represent a material or fundamental change to the baseline conditions. The predicted noise level exceeds the criteria for a negligible magnitude of change, set out in Section 19.7.3, therefore, as a result of the predicted noise level but limited duration, this impact is characterised as **low** magnitude of change. The effects from launch noise are consequently assessed as **not significant** in the context of the EIA Regulations.

19.9.2 Sonic Booms

Based on the rocket dimensions and trajectory of the worst-case Rocket B, the footprint of the predicted PLdB of the sonic boom generated during the descent of the rocket has been calculated and is shown in Figures 4 to 6 in Appendix 19-1: Noise Technical Report, covering the most northerly trajectory of a potential flight path, the most southerly trajectory and a typical mid-range trajectory.

Westerly trajectory

The levels range from 67 PLdB to 97 PLdB occurring at distances of between 20 and 80 nautical miles outwards from the launch site. The proposed trajectory stretches out to the west of the launch site at a bearing of 275°. With this trajectory, sonic boom noise is predicted to be experienced on one habitable island, St Kilda, with a Perceived Decibel Level of 70 PLdB. This is below the 75 PLdB limit and would occur for less than a second, up to a maximum of 10 times a year. However, it is also important to note that not all LV specifications generate sonic boom, and the range of potential trajectories available indicate that the experience of sonic boom at these locations would be infrequent. Given the short duration that this noise level would occur for, this is not a material or fundamental change to the baseline conditions. The predicted noise level is below 75 PLdB limit identified through the literature review and the duration is limited to less than one second; therefore, the impact is considered to be a **negligible** magnitude of change as defined in Section 19.7.3. The effects from sonic boom noise at a westerly trajectory are consequently assessed as **not significant** in the context of the EIA Regulations.

Northern and southern trajectories

In order to allow flexibility in the trajectory of each launch event (the trajectory of any given launch can be subject to change depending on weather conditions), a Space Launch Hazard Area (SLHA) has been defined, ranging from bearings 212° to 352°, within which alternative trajectories can be used. As a worst case, the sonic boom footprint has been modelled for the southern-most possible trajectory at 212° (see Figure 5 in Appendix 19-1: Noise Technical Report) and the most northerly at 352° (see Figure 6 in Appendix 19-1: Noise Technical Report).

Figure 5 in Appendix 19-1: Noise Technical Report indicates that for the most southerly possible trajectory, the Perceived Noise Levels are predicted to be up to 85 PLdB on the Isle of Coll. For the most northernly (Figure 6 in Appendix 19-1: Noise Technical Report), sonic boom noise is predicted to be audible across the northern half of the Isle of Lewis with predicted Perceived Decibel Levels up to 95 PLdB. The Perceived Decibel Levels predicted for these worst-case trajectories exceed the suggested criteria at human receptors. However, the duration of these effects would be limited and occur for less than one second at a maximum of 10 times a year. Again, it is also important to note that not all LV specifications generate sonic boom, and the range of potential trajectories available indicate that the experience of sonic boom at these locations would be infrequent. Given the short duration that this noise level would occur, this is not considered to represent a material, or fundamental change to the baseline conditions. The predicted noise level exceeds the criteria for a negligible magnitude of change, as set out in Section 19.7.3. Therefore, as a result of the predicted noise level but limited duration (less than 1 second, up to 10 times per year), this impact is characterised as **low** magnitude of change. The effects from sonic boom noise, at a southern and northern trajectory, are consequently assessed as **not significant** in the context of the EIA Regulations.

It should also be noted that sonic booms will only be generated using two-stage rockets such as Rocket B, which represents a worst-case.

As well as Perceived Decibel Level, the maximum overpressure has also been calculated ranging from 0.01 to 0.54 psf. This is markedly below the overpressure measured for commercial and military aircraft, and almost 100 times lower than Concorde travelling at Mach 2 at an altitude of 16 km.

19.10 MITIGATION AND RESIDUAL EFFECTS

Due to the nature of the noise and its source, there are no physical mitigation measures such as screens or enclosures available to reduce the level of noise at the nearest receptors.

However, mitigation measures set out in Table 19-5 include community notification process (GM05 Pre-Launch Communications: Advance Alert and Community Notifications) and Maritime Management Procedures (MU01) for publicising information on the timing of launches through various media will be implemented so that the local population and visitors are aware of the possible occurrence of noise. This will also include a provision for alerting mariners to noise with the timing and location of launches.

Table 19-5 Mitigation Measures

Ref	Title	Description
GM05	Pre-Launch Communications: Advance Alert and Community Notifications	An Advance Alert / Pre-Launch Contact Service will provide advance notice of activities relevant to key stakeholders including emergency services, fishermen, hauliers and closest residential receptors. Stakeholders can register for the alert service on a dedicated email address and can view the range activity programme on a dedicated website. The Spaceport Operator will additionally publish notifications in local/social media, their website and at key information points in the surrounding locality to the wider community and stakeholders informed of key project activities and any associated restrictions. Measures are likely to include: • Regular updates via e-mail to local community groups. • Website – showing schedule of planned activity. Social Media – posts about planned activity.
MU01	Maritime Management Procedures	The Maritime Management Procedures will ensure the safe launch of LVs from the spaceport and include prior notification procedures and operational procedures throughout a launch campaign. Key measures to eliminate risk and minimise disruption to marine users include procedures relating to: • Maritime notifications – pre-launch, mission deviation, post-launch; (community updates through various mediums, advance alert service, Notice to Mariners (NtM), Navigation Warnings (NavWarning);

The residual effects of launch noise following implementation of the above notification process will remain **not significant**. Likewise, the resulting residual effects of sonic boom noise will remain **not significant** for the proposed westerly trajectory and **not significant** for the worst-case northern and southern trajectories for the duration of audible sonic booms (less than one second up to 10 times per year). Providing prior notice to residents will ensure that the effects have been further minimised as far as practicable.

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19.11 ASSESSMENT SUMMARY AND CONCLUSIONS

This chapter assesses the potential noise and vibration impacts that may arise during launch activities associated with the Project. The assessment evaluates the potential significant effects arising from noise and vibration from Launch Vehicles (rockets) on human receptors only. It is supported by Appendix 19-1: Noise Technical Report, which details the modelling methodology and criteria used in this assessment.

Noise impacts on ecological and heritage receptors are assessed in the following chapters: Chapter 10: Archaeology and Cultural Heritage; Chapter 14: Ornithology; Chapter 15: Terrestrial Ecology; and Chapter 16: Marine Ecology.

Construction noise and vibration impacts have been scoped out of the assessment due to the minimal construction required for the Project, as well as the large separation distances from residential receptors. Construction best practice measures will be followed to minimise potential noise disruption.

The launching of rockets of the scale considered for the Spaceport are unlikely to be a significant source of vibration due to the low levels of sound and air overpressure being generated. Therefore, ground and airborne vibration at human receptors have been scoped out of further assessment, however precautionary measures for protecting specific structures located within the site are set out in Chapter 10: Archaeology and Cultural Heritage.

Noise from each rocket launch will be of very short duration, ranging from approximately 43 to 120 seconds. Launches will occur no more than 10 times per year, and during daytime hours only. The magnitude of the predicted launch noise is within the range of commonly experienced noise levels (L_{Amax} 110 dB) at all noise sensitive receptors and of a duration of up to 120 seconds. The impact of noise from rocket launches on human receptors has been assessed as **not significant.**

Sonic booms will occur during the descent of some rockets, although modelling of the worst-case rocket type and proposed trajectory indicates that these are likely to predominantly affect areas at sea, with a possible effect on St Kilda. Depending on the flight path of the LV, other surrounding habited islands may be affected. Levels predicted at St Kilda are below that defined as acceptable by NASA and at substantially lower levels than sonic booms from commercial and military aircraft. These effects will occur for less than one second up to 10 times per year and, when considering the overall negligible magnitude of change, the effects are assessed to be **not significant**.

It is likely that other launch trajectories will be adopted when necessary; limited to within the proposed SLHA. Levels above the 75 PLdB criteria are predicted on the surrounding habitable islands at the most northernly and southernly extremes of the SLHA. The limited duration of these effects (less than one second up to 10 times per year) suggests this is not a fundamental or material change to the baseline conditions, and results in a low magnitude of change. As such, the effects of noise at these trajectories are considered **not significant** for the duration of the audible sonic boom event (less than one second).

Implementation of a community notification process will provide advanced notice to residential properties.

19.12 REFERENCES

[1] Scottish Government (2017) Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations

2017 [Online] Available at: http://www.legislation.gov.uk/ssi/2017/102/contents/made (Accessed 15/07/2021)

[2] Planning Advice Note 1/2011: planning and noise, The Scottish Government, 2011

[3] Technical Advice Note: Assessment of Noise, The Scottish Government, 2011

[4] BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise, BSI 2014

[5] BS4142:2014 + A1:2019 Method for Rating and Assessing Industrial and Commercial Sound, BSI 2019

[6] Environmental Noise Guidelines for the European Region, World Health Organisation, 2018

[7]National Aeronautics and Space Administration, (1971) *Acoustic Loads Generated by the Propulsion System*, NASA SP-8072

[8] Airport Cooperative Research Program, (2018) *User Guides for Noise Modelling of Commercial Space Operations – RUMBLE and PCBoom*, Research Report 183

[9] Bolander, Christian R., et al., (2019) *Procedure for the Calculation of the Perceived Loudness of Sonic Booms*, AIAA Scitech 2019 Forum

[10] For details, please see http://www.trb.org/Main/Blurbs/177510.aspx last accessed 15 July 2021

[11] Spaceport 1, Environmental Impact Assessment: Scoping Report, Atkins (2018)

[12] Regulation (EU) No 168/2013 of the European Parliament and the Council of 15 January 2013 on the approval and market surveillance of two- and three-wheeled vehicles and quadracycles. Annexe D defines a maximum permissible exhaust noise level for motorcycles >175 cc of 80 dB, $L_{A,max}$, measured according to UNECE regulation No 41 (at 7.5 m distance)

[13] BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise.

[14] NB, on p41 of the WHO Guidelines for Community Noise 1999, it is stated that it is uncertain whether the relationships between hearing impairment and noise exposure given in ISO Standard 1999 (ISO 1990) are applicable for environmental sounds of short rise time. For example, in the case of military low-flying areas (75 – 300 m above ground), L_{Amax} values of 110-130 dB occur within seconds after the onset of the sound.

[15] https://www.nasa.gov/topics/aeronautics/features/sonic_boom_thump.html last accessed 15 July 2021

[16] https://www.nasa.gov/centers/armstrong/news/FactSheets/FS-016-DFRC.html last accessed 15 July 2021

[17] "The Challenges of Defining an Acceptable Sonic Boom Overland", F. Coulouvrat, 15th AIAA/CEAS Aeroacoustics Conference, 2009

[18] Joint Warrior is a UK-led war exercise that takes place in spring and autumn each year. The Royal Navy, Royal Air Force and British Army are joined by forces from 13 other nations. Taking place over two weeks, Joint Warrior includes airborne assaults, amphibious landings, evacuations and live-fire exercises.

SPACE PORT 1

ARCUS

SPACEPORT 1
SCOLPAIG FARM, NORTH UIST

TECHNICAL APPENDIX: NOISE

DECEMBER 2021

SPACE PORT 1

TABLE OF CONTENTS

1 INTRODUCTION

This Technical Appendix supports Chapter 19: Noise and Vibration in the Environmental Impact Assessment Report (EIA Report) and details the underlining policy, guidance, noise modelling methodology and outputs. Also included in this Technical Appendix are figures showing the results of the rocket launch noise and sonic boom prediction modelling.

2 POLICY AND GUIDANCE

The following sections provide an overview of the policies and guidance referenced in Chapter 19 of the EIA Report.

2.1 Planning Advice Note PAN 1/2011 Planning and Noise

This document, produced by the Scottish Government, provides advice and guidance on the role of the planning system in limiting and preventing the adverse effects of noise. Whilst both documents provide guidance on a range of new noise generating development types, no guidance is given for noise generated by spaceports.

This document also provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise, with information and advice on assessment methods provided in the associated Technical Advice Note (TAN).

The PAN promotes the principles of good acoustic design and the appropriate location of new noise-generating development. The selection of a site, the design of a development and conditions that may be attached to a planning permission can all play a part in preventing, controlling, and mitigating the effects of noise. The level of detail required of a noise assessment should be balanced against the degree of risk to environmental quality, public health, and amenity.

2.2 Technical Advice Note: Planning and Noise

The Technical Advice Note: *Planning and Noise* (TAN) provides guidance on assessment methodology that may assist in the technical assessment of noise, although it is neither prescriptive nor exhaustive. It provides methodologies for the assessment of noise from various types of developments (not including spaceports).

2.3 BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise

BS 5228:2009+A1:2014 *Code of Practice for noise and vibration control on construction and open sites* (BS 5228) refers to the need for the protection against noise and vibration of persons living and working in the vicinity of and those working on construction and open sites. It recommends procedures for noise and vibration control in respect of construction operations.

The standard provides measured sound pressure levels for a wide range of noise sources commonly encountered on construction and open sites.

2.4 BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS 4142) describes methods for rating and assessing sound in order to provide an indication its likely effect upon nearby premises (typically residential dwellings).

The specific sound emitted from the Development (dB, L_{Aeq}) is rated by taking into account both the level and character (i.e. tonal elements, impulsivity, intermittency and distinctiveness) of the sound. This is achieved by applying appropriate corrections to the specific sound level externally at the receptor location, which gives the rating level of the sound in question.

This standard assesses the impact of sound over a period of 1 hour during the day (07:00 – 23:00) and 15-minutes during the night (23:00 – 07:00).

2.5 WHO Environmental Noise Guidance for the European Region (2018)

The WHO *Environmental Noise Guidelines for the European Region* (2018) recommend a limit of 45 dB(A) L_{den} for aircraft noise. L_{den} is an annualised average noise level with ratings applied to evening and night-time noise. Due to the small number of launches and their short duration, the L_{den} metric would not accurately represent the effect of noise from the Development and is therefore unsuitable for the current assessment.

The WHO Community Noise Guidelines 1999 make reference on a number of occasions to the use of other metrics for the assessment of noise which occurs occasionally or is of short duration or varying in level, including the $L_{A,max}$.

3 MODELLING METHODOLOGY

As stated in Chapter 19 of the EIA Report, only operational noise from the Development is considered, which has two potential components:

- Noise from the launching of sounding rockets; and
- Sonic booms.

Two worst-case rocket models are assessed and presented in the assessment of noise: Rocket A and Rocket B.

Rocket A is a single stage rocket and the largest rocket type proposed for launch at the Development. Its controlled descent, by way of early parachute deployment, means that it does not reach supersonic speeds during this stage and as such will not produce audible sonic booms during its entire trajectory. Rocket A generates the highest noise levels during launch and as such presents a worst-case for launch noise.

Rocket B is a two-stage rocket with the descent of the second stage reaching supersonic speeds and as such generating an audible sonic boom. Rocket B presents a worst-case for sonic booms.

The full details and specifications for Rockets A and B are commercially sensitive and as such are not reproduced here, however, key details used in the prediction of launch noise and sonic booms are provided in the relevant sections.

3.1 Prediction of Noise Levels

The levels of noise resulting during launch of Rocket A have been calculated using the RUMBLE[1] 2.0 software package. RUMBLE was developed in the USA under the Airport Cooperative Research Program (ACRP) in order to predict noise effects from commercial space operations.

The majority of noise is created by the rocket plume interacting with the atmosphere and combustion of propellants. This results in high-amplitude broadband sound which is highly directive.

RUMBLE calculates sound propagation between specific sources (vehicle trajectory points) and a grid of receiver points. The following factors are considered in the calculation:

- Source Sound Power Level;
- Forward Flight Effects;

[1] Airport Cooperative Research Program, (2018) *User Guides for Noise Modelling of Commercial Space Operations – RUMBLE and PCBoom*, Research Report 183

- Source directivity;
- Doppler effect;
- Geometrical spreading loss;
- Atmospheric Absorption; and
- Ground effects.

Sound Power Level

The sound power level of the source is estimated using the method described in NASA 1971[2], which the authors of RUMBLE validated through measurement. The following parameters define the sound power level:

- Number of engines / nozzles;
- Thrust;
- Exhaust velocity; and
- Acoustic efficiency, i.e. the proportion of mechanical energy that is converted into sound. This is calculated within the software.

Noise generated during unpowered flight, which occurs approximately 120 seconds after launch when thrust ceases, would be limited to aerodynamic noise which is likely to be negligible. It is therefore only necessary to consider the noise effects of the powered stage of the rockets' ascent.

Forward Flight Effects

A rocket in forward flight radiates less noise than the same rocket in a static environment. As the difference between flight velocity and exhaust velocity decreases, jet mixing is reduced which reduces noise emission. The maximum overall sound pressure levels are typically generated at subsonic vehicle speeds.

Directivity

Rocket noise is highly directive, with the highest noise level occurring at an angle of 65° relative to the exhaust direction, and with symmetry around the vehicle axis.

Doppler Effect

The doppler effect causes an apparent reduction in frequency of sound from an object moving away from an observer. Due to the reduced weighting of lower frequencies when applying A-weighting, overall A-weighted values are therefore lower from an object moving away from an observer, and vice versa.

Geometric Spreading

This is calculated using standard spherical propagation.

Atmospheric Absorption

RUMBLE calculates this factor based on the US Standard Atmosphere[3], which allows the relevant factors of temperature, pressure and relative humidity to be estimated for altitudes of up to 85 km.

[2] NASA SP-8072 Acoustics Loads Generated by the Propulsion System, National Aeronautics and Space Administration, 1971

[3] https://ntrs.nasa.gov/search.jsp?R=19770009539 last accessed 13 March 2021

Ground Effects

The software assumes soft (acoustically absorbent) ground. There is therefore potential for levels in practice to be higher than those predicted by the model by around 3 – 5 dB at locations where reflection can occur over water or wet sand.

Model Inputs

The following details for Rocket A were inputted to the RUMBLE software model:

- Spacecraft details:
  - Number of engines / nozzles: 1
  - Thrust: 6745 lbf
  - Exhaust velocity: 7782 ft/s
- Trajectory:
  - First stage trajectory as defined in, in 5 s increments from launch
- Activities:
  - One launch per day
- Receivers:
  - 10 x 10 nautical mile area
  - 0.05 nautical mile grid point spacing
  - 201 x 201 calculation points
  - From 2.5 nautical miles west of launch and 7.5 nautical miles south of launch

Model Outputs

The model was set to provide results as A-weighted maximum sound pressure levels, i.e., dB, L_{Amax} as this was considered to be the most relevant metric given the short-term nature of the sound from a rocket launch.

The results from the model were exported as a grid of point values, which were then processed in ArcGIS Pro Software to determine noise contour lines in 5 dB increments.

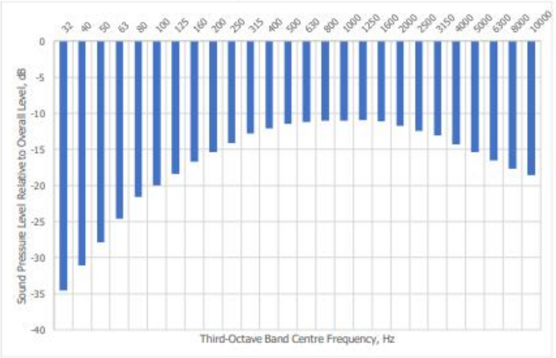
The results are for a neutral wind vector velocity. Launches could occur at surface wind speeds of up to 10 ms^{-1}. Under a negative wind vector velocity (i.e. upwind of the launch site), noise levels may be reduced by around 10 dB, based on studies carried out on wind turbines.

Atmospheric temperature, pressure and wind speed gradients at higher elevations may result in refraction of sound towards the ground under certain conditions. It is unlikely that this would result in higher levels than for trajectory points close to launch, due to the increased distance travelled by the refracted sound waves.

Frequency Content

The NASA 1971 method was used to calculate an indicative third-octave spectrum for the rocket noise source as this is not available from the RUMBLE software. This is shown in Chart 1. This shows that the mid-frequency range (500 - 2000Hz) is dominant in the overall sound. Broadband sound pressure levels in dB, dB(A) and dB(C) are consistent to within 1 dB due to the greatest relevance of the middle frequencies to the A- and C-weightings.

Chart 1: Indicative Rocket Noise Spectrum



Subjectively, the dominant medium to high frequencies is likely to result in a character of noise that resembles a screech, a description which is consistent with that provided by the rocket manufacturer and which is similar to some types of motorcycles.

Uncertainties

The following sources of uncertainty have the potential to result in variation in practice to the noise levels predicted and assessed within this report:

- Source characteristics: the assessment has been carried out for two representative rockets, anticipated to represent a worst-case for launch noise and sonic boom. In practice other types of rocket may be used, and any differences in the specification of these other types, could lead to corresponding differences in the noise emission and therefore the noise levels affecting receptors;
- Ground Reflections: the RUMBLE noise model assumes propagation over soft ground, i.e., the effects of reflection from water, sand or other acoustically reflective surface are not considered; and
- Atmospheric Effects: the effects of wind speed, temperature, pressure and wind speed gradients at the site have not been considered; however, worst-case assumptions have been made in this respect using the US Standard Atmosphere.

Overall, it is considered that these uncertainties will not have an impact on the outcome of the assessment.

3.2 Sonic Boom Prediction

Sonic Boom Theory

Sonic booms are the audible product of shock waves generated as an object travels supersonically. As an object approaches the speed of sound, pressure waves generated by the moving object are compressed to such a degree that they merge into a single shock wave which propagates away from the point of origin at speeds faster than the speed of sound. The generation of shockwaves from supersonic speeds is not limited to the moment the sound barrier is broken but are continuously generated throughout the full duration of supersonic travel. The pressure of these shock waves is known as "overpressure" which refers to the increase in pressure of these shock waves over normal atmospheric pressure.

As the object continues to move at supersonic speeds, the shock waves form a "wave cone" which extends from the front of the object at its point, back towards the rear; due to the movement of the object, the wave cone appears to trail behind it, in the manner of a ship's wake. Where this cone intersects the ground, in a hyperbolic arc, the advancement of the object along its trajectory extends the coverage of this intercept creating a "boom carpet" within which sonic booms will be heard. Typically, two "booms" are heard when a supersonic object passes over a fixed reference point as shock waves are generated at two points; at the front of the object and again at the rear. These shock waves are separated by linear expansion relative to the length of the object and are experienced at ground level by an "n-wave"; initially peaking due to compression at the front of the object, expanding linearly until recompression occurs at the rear of the object.

Sonic Boom Prediction Modelling

In the case of this Development, Rocket B (considered to represent a worst-case scenario for sonic boom generation) is travelling supersonically for the majority of its flight (starting approximately 10 seconds after launch). However, only the supersonic flight of the rocket's second stage descent will give rise to audible sonic booms at ground level. In order to predict the effects and extent of sonic booms generated by the Development, modelling has been carried out using the PCBoom v4.99 software package. PCBoom has been developed for more than 20 years by Wyle Laboratories, Inc. in the USA under the Airport Cooperative Research Program (ACRP) in order to predict the extent of sonic booms from single flight operations taking into account vehicle type, atmospheric conditions and flight trajectory.

It does this by calculating the direction and magnitude of the shock waves generated by the rocket's supersonic flight, modelled as a "ray cone" which extends forward from the front of the rocket, perpendicularly to the "wave cone". The footprint of the sonic booms, where sonic booms are predicted to be audible at ground level, is determined by the intersection of the ray cone with the ground and is calculated for each point of the rocket's trajectory.

At steep climbing angles, such as vertical launches, the ray cone will not reach ground level unless refracted back via atmospheric gradients. As this is only likely to occur in rare circumstances (requiring a specific set of conditions) only the sonic boom generated as Rocket B's second stage descends towards the ground is considered.

PCBoom uses ray tracing to predict the extent and magnitude of a number of sound metrics associated with the sonic booms such as maximum overpressure (psf[4]), A, C and E weighted Sound Exposure Levels (dBA, dBC and dBE respectively), Peak Level (dB), and Perceived Decibel Level (PLdB)[5].

In order to do this, PCBoom requires the following information:

- Atmospheric pressure at ground level;
- Temperature and wind velocity at a number of altitudes throughout the atmosphere;
- Physical properties of the object in flight (dimensions, weight, etc.);
- Object Shape Factor (single figure representation of the geometry of the object);
- Object trajectory (heading, climb angle, angle of attack, etc.); and
- Object flight properties (total thrust, plume drag, etc.).

[4] Pounds per square foot

[5] Bolander, Christian R., et al., (2019) *Procedure for the Calculation of the Perceived Loudness of Sonic Booms*, AIAA Scitech 2019 Forum

Rocket B is smaller and lighter than Rocket A with a thrust of 1664 lbf and exhaust velocity of 6145 ft/s.

The input parameters required by PCBoom for Rocket B throughout its flight, taken at 10 seconds intervals, have been determined from information provided by the rocket manufacturer. It should be noted that the predicted PLdB has been calculated for each trajectory interval only and has not been interpolated to generate equal loudness contours. As such, it is possible that the magnitude of the PLdB may differ in-between points of similar level.

Model Assumptions

Due to the wide range of inputs required by PCBoom, a number of assumptions have been made. Atmospheric wind speeds and direction will vary between launches carried out at different times during the year. For simplicity, the model assumes wind at zero velocity.

The US Standard Atmosphere, determined by NASA in 1976[6], has been assumed for atmospheric temperature and is the same as the ISO International Standard Atmosphere up to altitudes of 32 km.

In practice it is unlikely that these assumptions will impact either the predicted sound levels, or the outcome of this assessment.

Shape Factor

This is a single figure, numerical representation of the shape of the rocket; based on the dimensions, planform area, and cross-sectional area of the rocket. The shape factor for Rocket B is 0.015.

Limitations and Uncertainties

The results of the modelling are shown at the calculation points only, and booms may be audible at other locations and may vary between points within the predicted boom area.

As previously stated, the model assumes calm conditions with no wind. It is possible that atmospheric wind conditions present during specific launches may result in different noise levels to these predicted here and refraction may result in booms being audible at other locations. However, these secondary booms would occur at a lower sound level than the primary booms considered in the assessment.

As for the modelling of noise, there are a number of uncertainties associated with the prediction of sonic booms effects, including the characteristics of the rocket, propagation and atmospheric factors, however these are unlikely to significantly affect the outcome of the assessment.

Key output sound metrics

PCBoom outputs a series of different metrics for predicted sonic booms, however there are two key metrics of interest relating to human response:

- Perceived Decibel Level (dB); and
- Maximum overpressure (psf).

Perceived Decibel Level (PLdB) is a metric developed to take account of the human response to shock waves relating to sonic booms. It takes into account the high levels of low frequency content present in sonic booms. Whilst there are no standard criteria for which to assess the perceived noise generated by sonic booms, NASA research indicates

[6] US Standard Atmosphere, 1976, NASA, NOAA and USAF, https://ntrs.nasa.gov/search.jsp?R=19770009539 last accessed 31 March 2021

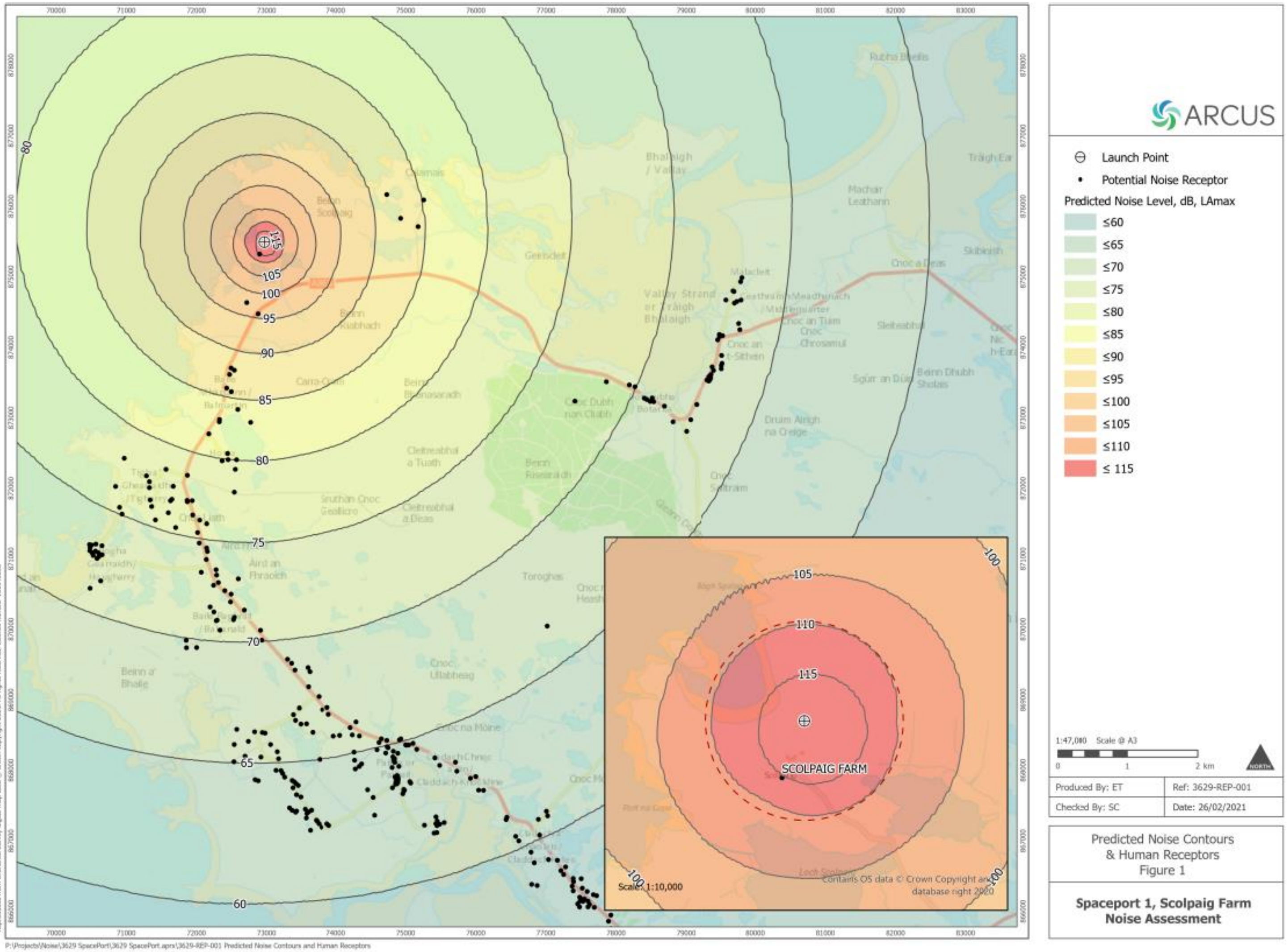
that a PLdB of up to 75 dB is acceptable for unrestricted supersonic flight over land[7]. To put this into context, the sonic boom noise level of Concorde was 105 PLdB, with NASA research (as of 2018) reducing sonic booms from commercial jets to as low as 79 PLdB. An increase of 10 dB is perceived as a doubling of loudness, as such the criteria is perceptibly an 8th of the loudness of Concorde.

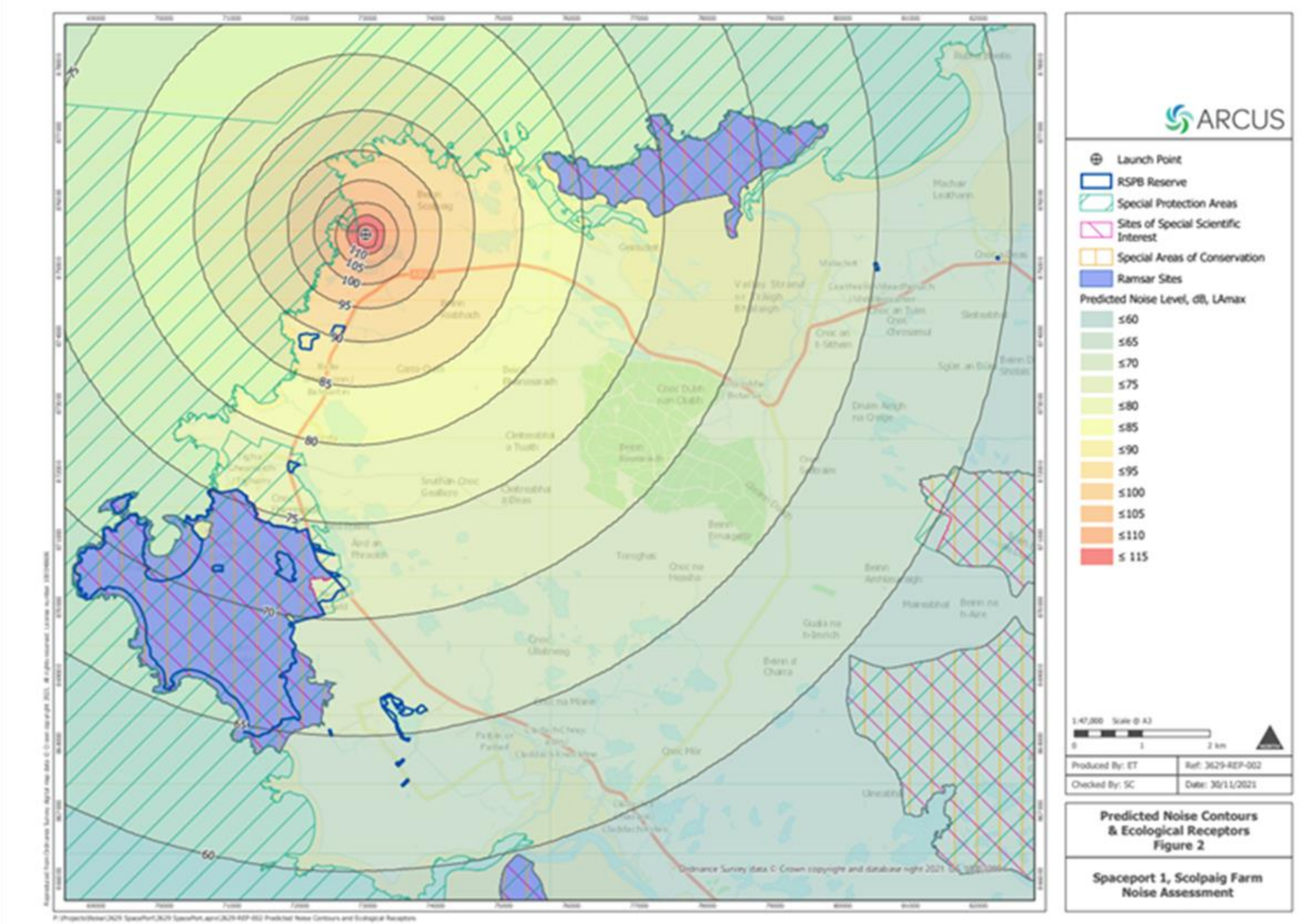
Maximum overpressure is described in PCBoom in pounds per square foot (1 psf equals 48 Pascals) and is the pressure over and above normal atmospheric pressure (2,116 psf). As a reference point the following levels of overpressure have been measured for a range of different aircraft travelling at supersonic speeds[8]:

- Lockheed SR-71 Blackbird; Mach 3 at 80,000 feet (24 km): 0.90 psf;
- Concord; Mach 2 at 52,000 feet (16 km): 1.94 psf;
- Lockheed F-104 Starfighter; Mach 1.93 at 48,000 feet (15 km): 0.80 psf; and
- NASA Space Shuttle; Mach 1.5 at 60,000 feet (18 km): 1.25 psf.

Although there are no recommended criteria for overpressure from sonic booms generated by aircraft, it is worth noting that a complaint was made relating to a sonic boom from Concord at 0.75 psf[9].

[7] https://www.nasa.gov/topics/aeronautics/features/sonic_boom_thump.html last accessed 8 March 2021
[8] https://www.nasa.gov/centers/armstrong/news/FactSheets/FS-016-DFRC.html last accessed 15 April 2021
[9] "The Challenges of Defining an Acceptable Sonic Boom Overland", F. Coulouvrat, 15th AIAA/CEAS Aeroacoustics Conference, 2009


ARCUS
Launch Point
Potential Noise Receptor
Predicted Noise Level, dB, LAmax
≤60
≤65
≤70
≤75
≤80
≤85
≤90
≤95
≤100
≤105
≤110
≤ 115
SCOLPAIG FARM
Scale: 1:10,000
Contains OS data © Crown Copyright and database right 2020
Produced By: ET
Ref: 3629-REP-001
Checked By: SC
Date: 26/02/2021
Predicted Noise Contours
& Human Receptors
Figure 1
Spaceport 1, Scolpaig Farm
Noise Assessment



ARCUS
Launch Point
RSPB Reserve
Special Protection Areas
Sites of Special Scientific Interest
Special Areas of Conservation
Ramsar Sites
Predicted Noise Level, dB, LAmax
≤60
≤65
≤70
≤75
≤80
≤85
≤90
≤95
≤100
≤105
≤110
≤ 115
Produced By: ET
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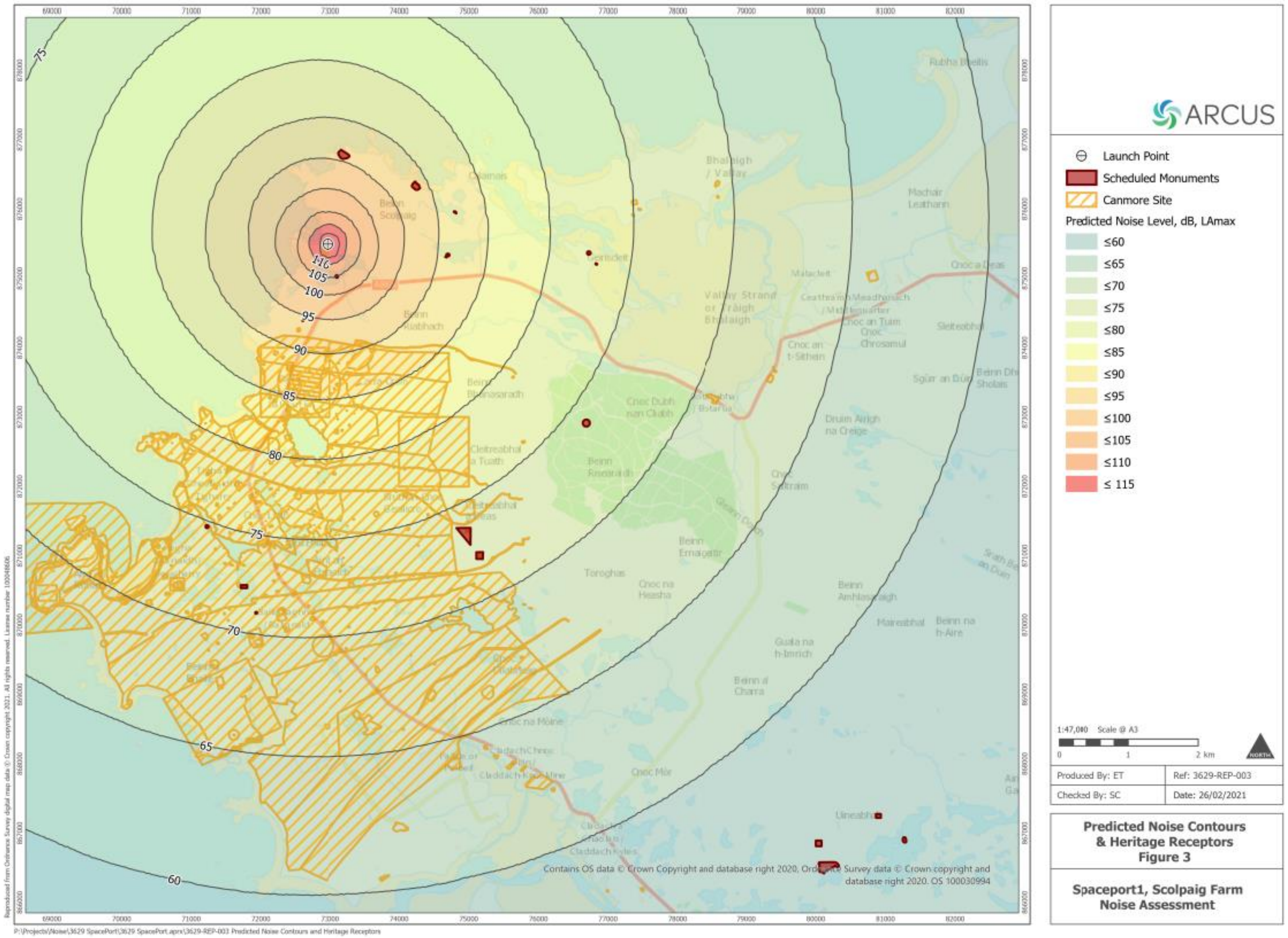
Checked By: SC
Date: 30/11/2021
Predicted Noise Contours & Ecological Receptors Figure 2
Spaceport 1, Scolpaig Farm Noise Assessment


ARCUS
Launch Point
Scheduled Monuments
Canmore Site
Predicted Noise Level, dB, LAmax
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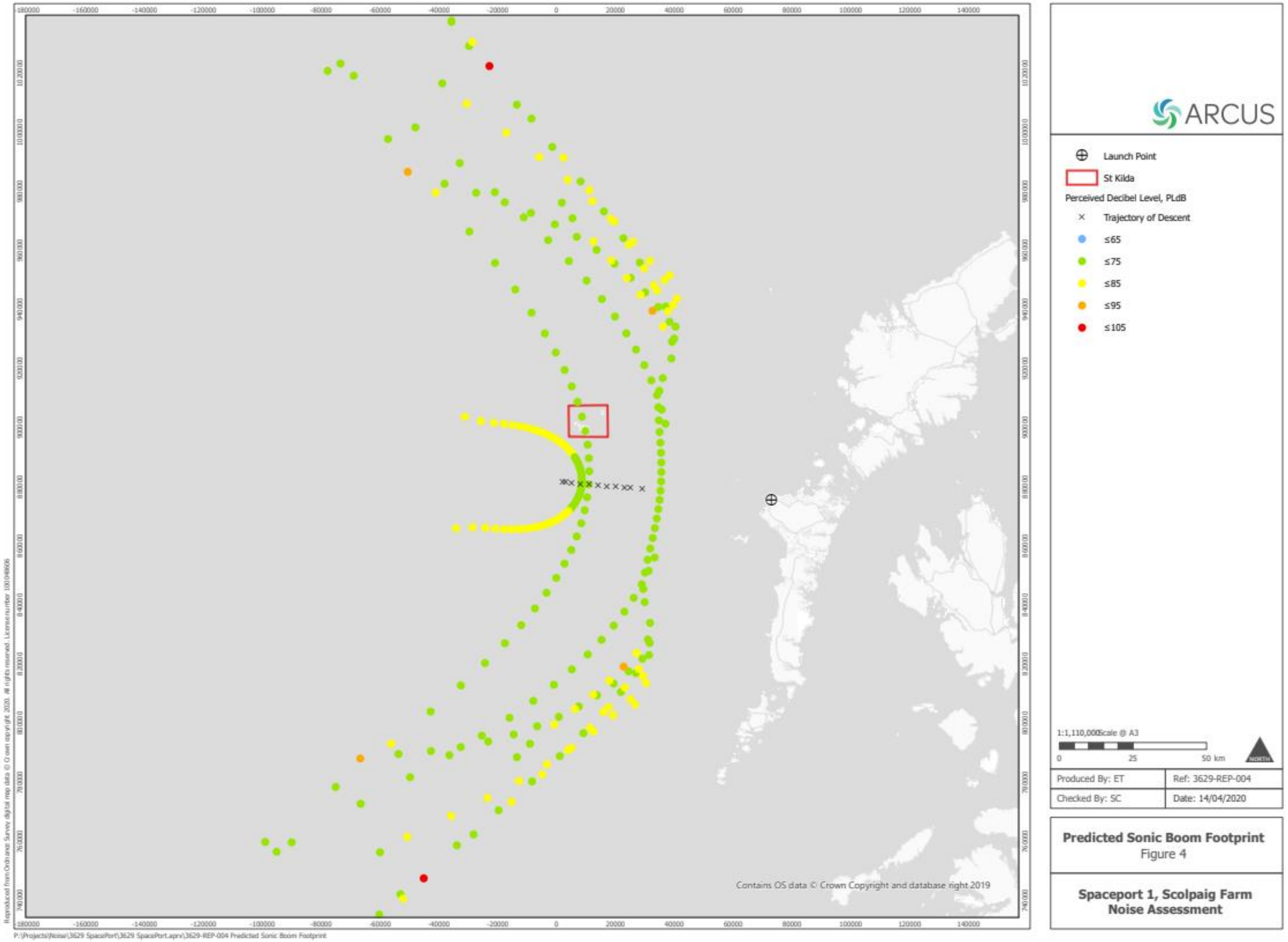
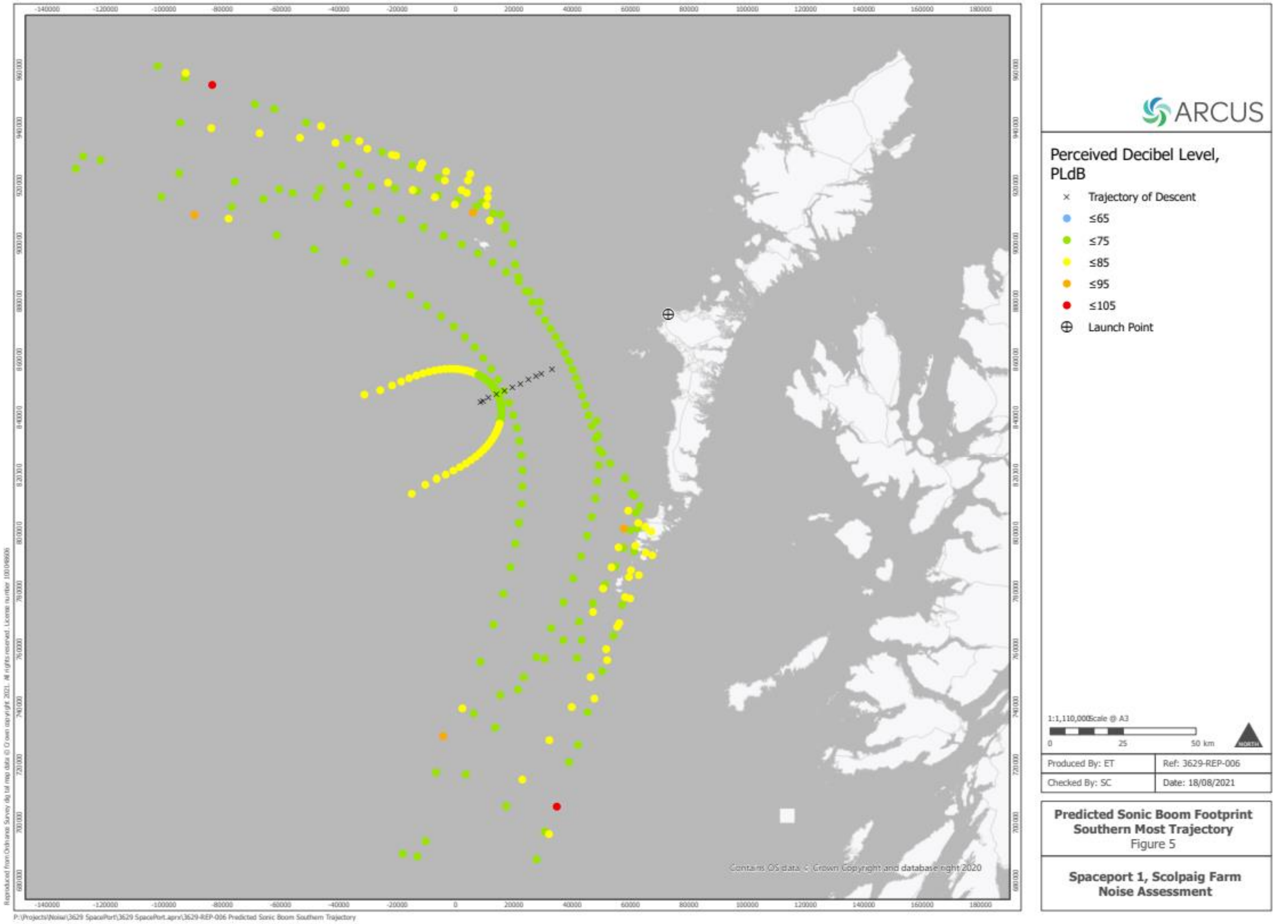
≤85
≤90
≤95
≤100
≤105
≤110
≤ 115
Produced By: ET
Ref: 3629-REP-003
Checked By: SC
Date: 26/02/2021
Predicted Noise Contours
& Heritage Receptors
Figure 3
Spaceport1, Scolpaig Farm
Noise Assessment
Contains OS data © Crown Copyright and database right 2020. Ordnance Survey data © Crown copyright and database right 2020. OS 100030994


ARCUS
Launch Point
St Kilda
Perceived Decibel Level, PLdB
Trajectory of Descent
≤65
≤75
≤85
≤95
≤105
Produced By: ET
Ref: 3629-REP-004
Checked By: SC
Date: 14/04/2020
Predicted Sonic Boom Footprint
Figure 4
Spaceport 1, Scolpaig Farm
Noise Assessment
Contains OS data © Crown Copyright and database right 2019


ARCUS
Perceived Decibel Level, PLdB
Trajectory of Descent
≤65
≤75
≤85
≤95
≤105
Launch Point
1:1,110,000 Scale @ A3
0
25
50 km
Produced By: ET
Ref: 3629-REP-006
Checked By: SC
Date: 18/08/2021
Predicted Sonic Boom Footprint
Southern Most Trajectory
Figure 5
Spaceport 1, Scolpaig Farm
Noise Assessment
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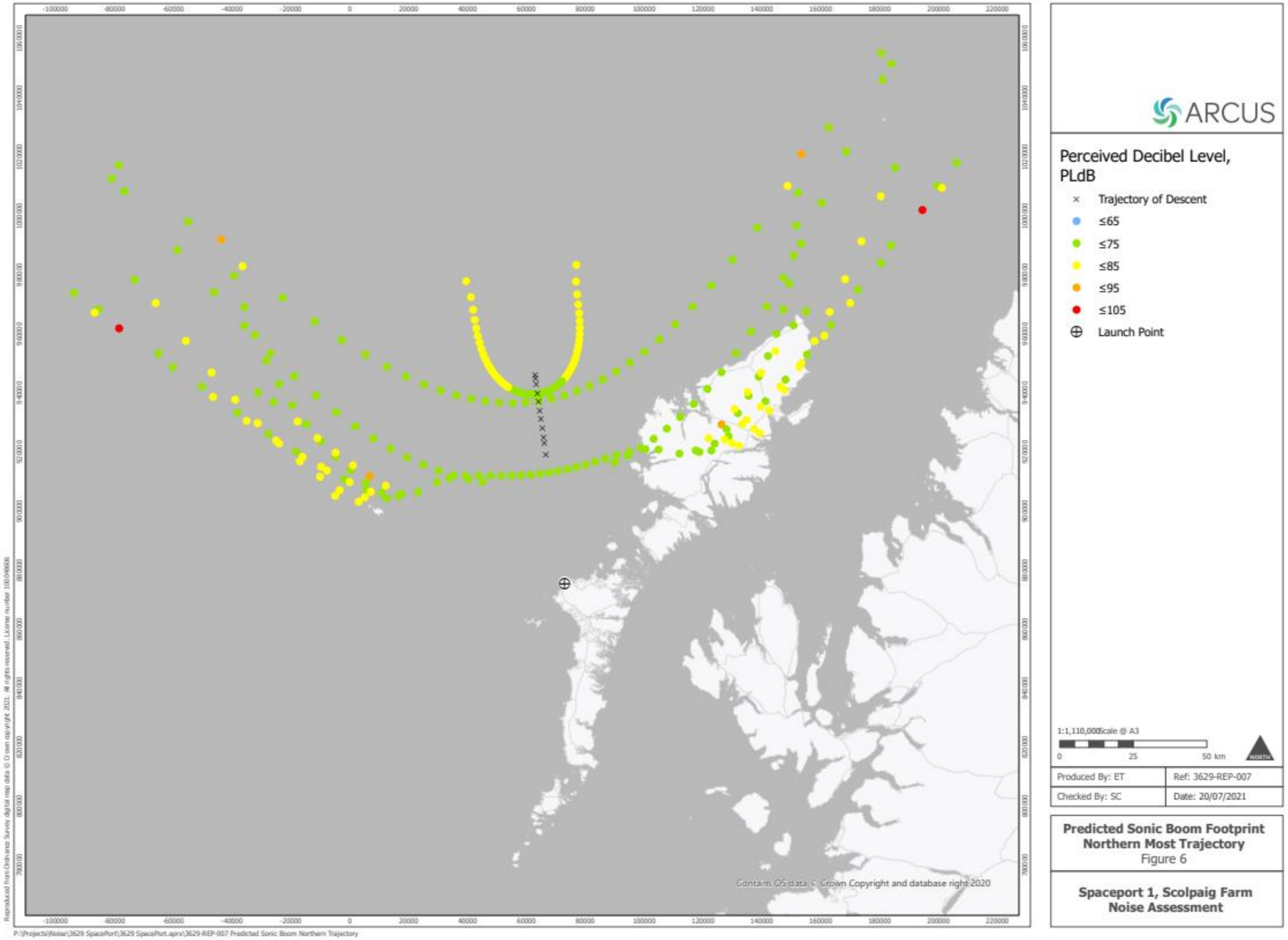
ARCUS
Perceived Decibel Level, PLdB
Trajectory of Descent
≤65
≤75
≤85
≤95
≤105
Launch Point
Contains OS data © Crown Copyright and database right 2020
Produced By: ET
Ref: 3629-REP-007
Checked By: SC
Date: 20/07/2021
Predicted Sonic Boom Footprint
Northern Most Trajectory
Figure 6
Spaceport 1, Scolpaig Farm
Noise Assessment

SPACE PORT 1

18.14.3 Acid Deposition

The rate of acid deposition calculated in this assessment is based on the PC to acid deposition from dry deposition of NO_2, and from dry and wet deposition of HCl. Table 18-19 presents the maximum predicted contributions from nitrogen and sulphur to the acid deposition rates at the designated sites. The annual average output from the model was factored to account for 10 launches over a year.

The APIS Critical Load Function Tool was used to assess the combined impact of the nitrogen and sulphur contributions at each of the designated sites. The minCLmaxS, minCLmaxN and minCLminN were input to the tool, along with the maximum PCs to the nitrogen and sulphur contributions. The HCl contributions were treated as contribution to the sulphur, as per the AQTAG06 guidance note, which states that "*The acid contribution from HCl should be added to the S contribution and treated as S in the APIS tool*".

Table 18-20 presents the maximum PC as a percentage of the critical load function, as output from the APIS Critical Load Function Tool, for each identified habitat at each site.

According to the Critical Load Function Tool, the maximum PCs to nitrogen and acid deposition are **screened out**.

18.14.4 Summary Result Tables

The summary results for each assessment which was undertaken are provided below, for each meteorological year.

Table 18-16 Predicted annual average NOx concentrations (µg/m³) at designated sites

Site name	Critical level	Year	PC	% PC of critical level	Screened in?
North Uist Machair SPA/SAC/Vallay; Balranald Bog and Loch nam Feithean; and Baleshare and Kirkibost SSSIs	30	2018	0.04	0.12	No
		2019	0.04	0.12	No
		2020	0.02	0.07	No
Mointeach Scadabhaigh SPA/SAC/SSSI	30	2018	0.01	0.04	No
		2019	0.01	0.03	No
		2020	0.01	0.04	No

Table 18-17 Predicted daily average NOx concentrations (µg/m³) at designated sites

Site name	Critical level	Year	PC	% PC of critical level	Screened in?	Background	PEC	% PEC of critical level
North Uist Machair SPA/SAC/Vallay; Balranald Bog and Loch nam Feithean; and Baleshare and Kirkibost SSSIs	75	2018	13	17	Yes	1.6	14.6	19
		2019	13	17	Yes		14.6	19
		2020	8	11	Yes		9.6	13
Mointeach Scadabhaigh SPA/SAC/SSSI	75	2018	4.1	5.5	No	-	-	-
		2019	3.7	5.0	No			
		2020	4.1	5.4	No			

Table 18-18 Maximum PC to nitrogen deposition (kg N ha^{-1} yr^{-1}) at the Designated Sites

Site name	Critical load class	Critical load	Year	PC	PC as % of critical load	Screened in?
North Uist Machair SPA/SAC/Vallay; Balranald Bog and Loch nam Feithean; and Baleshare and Kirkibost SSSIs	Raised and blanket bogs	5 - 10	2018	0.05	1	No
			2019	0.05		
			2020	0.03		
Mointeach Scadabhaigh SPA/SAC/SSSI	Permanent dystrophic lakes, ponds and pools	3 - 10	2018	0.02	0.7	No
			2019	0.02		
			2020	0.02		
	Permanent oligotrophic waters: Softwater lakes	3 - 10	2018	0.02		
			2019	0.02		
			2020	0.02		

Table 18-19 Maximum predicted S and N contributions to the acid deposition rates at the Designated Sites (kq ha^{-1} yr^{-1})

Site name	Year	PC (N)	PC (S)
North Uist Machair SPA/SAC/Vallay; Balranald Bog and Loch nam Feithean; and Baleshare and Kirkibost SSSIs	2018	0.00048	0.0014
	2019	0.00048	0.0014
	2020	0.00028	0.00083
Mointeach Scadabhaigh SPA/SAC/SSSI	2018	0.00015	0.00043
	2019	0.00013	0.00039
	2020	0.00014	0.00007

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Table 18-20 Results from APIS Critical Load Function Tool

Site name	Critical load class	PC as % of CL Function	Screened in?
North Uist Machair SPA/SAC/Vallay; Balranald Bog and Loch nam Feithean; and Baleshare and Kirkibost SSSIs	Bogs	0.1	No
	Acid grassland	0.1	No
Mointeach Scadabhaigh SPA/SAC/SSSI	Bogs	0.1	No

18.15 IMPACT ASSESSMENT (HEAT)

Heat is transferred in three ways:

- Conduction (via direct contact) – where there is direct contact with the heat source (in this case, to experience harm, the organism would have to be in the exhaust plume or close enough to such that the surrounding air has been heated to dangerous levels)
- Convection (via fluid flow) – where the heat is circulated from hot to cold in gas or liquid (in this case the heat rising above and around the exhaust plume)
- Radiation (via electromagnetic radiation) – where the heat electromagnetically radiates from the source and does not rely on a medium (such as air) to carry it. An example of this is the sun, which radiates heat through the vacuum of space, and the heat is felt when the radiation excites molecules in the substance at the receiver (in this case it would be felt in very close proximity to the exhaust plume)

Potential receptors for effects of heat are people, animals and vegetation.

In terms of understanding the potential impact of heat generated from a launch vehicle, it is important to recognise the short duration of this high temperature at any single point in space. The rocket will begin its ascent as soon as the motor ignites, the duration of the heat source moves very, and increasingly, rapidly away from the surface of the launch pad, and is therefore, brief. The risk to organisms is the potential for organisms to be in, above or very close to the flame[6].

Based on data provided by one of the launch vehicle suppliers, around 14.3 % of the total exhaust emissions are emitted in the first 500 feet (~152 metres). With a maximum total exhaust release of 1,622 kg predicted (see Table 18-5), this would correspond to 231.9 kg in the first 152 m – or around 1.5 kg/m. Based on data from another of the suppliers, around 8.0 % of the total exhaust emissions are emitted in the first 140 m. Based on a maximum total exhaust release of 1,622 kg, this would correspond 0.9 kg/m. Whilst it will vary, the temperature of release could be up to 2,600 K (~ 2,327 °C), though most estimates which have been identified are lower than this.

At an estimated 0.9 kg/m – 1.5 kg/m in a worst-case scenario, with most vehicles being significantly lower, this is considered a relatively small quantity of material over a relatively large distance. By the time this has mixed with a column of ambient air (with an assumed temperature of 10 °C) of radius in the region of 1.3 m, significant cooling would occur.

Because of the dynamic nature of the gases on emission from the rocket, this mixing will be rapid. On this basis, even allowing for some uncertainty in these calculations, there is confidence that the exhaust gases from the airborne rocket would have cooled to a safe temperature relatively quickly by mixing with ambient air. This is a narrow column of air

[6] In terms of the likely impacts, the cigarette lighter example is useful to consider for context. A finger placed in the flame would rapidly burn due to conduction and temperature being well in excess of 80 °C (according to the Burn Centre Care organisation, "a high temperature (more than 80 degrees Celsius) can cause more severe burns in a very short period of time (less than a second)". Therefore, anything in the immediate plume flame is likely to be harmed. Similarly, a finger placed immediately above the lighter flame would likely be harmed by the convection effect, due to the temperature of the rising air being above 80 °C. Lastly, a finger placed close to (1 cm), but not touching, the side of the lighter flame may feel the heat but will not burn due to the very low level of radiation produced – in fact, the detected heat will be due to the air around the flame conducting the heat, not the radiation effect. While the sounding rocket plume flame is obviously considerably bigger than a lighter flame, the same principles apply.

around the rocket trajectory, and as long as there are no birds within this, there are unlikely to be heat impacts upon them.

At ground level, on rocket launch, the hot exhaust gases will be directed into the launch pad. The launch pad is described in Chapter 4: Project Description. It has been designed with a view to adequately containing any heat impact from a launch. The speed of the hot gases will cause air turbulence and will cause them to mix quickly with the ambient air as they spread away from the rocket. This impact will rapidly decrease the temperature away from the rocket. The blast deflectors (AQH01) will further direct heat away from ground level, facilitating dispersion and cooling.

The magnitude of impact on all receptors is assessed to be low. Receptor sensitivity is considered to range between medium – high. Overall, the potential impact is considered **not significant**.

18.16 ASSESSMENT SUMMARY AND CONCLUSIONS

A detailed air quality assessment was undertaken to assess the potential impact of emissions from the launch of rockets from the proposed Project. The full results of this assessment can be found in Appendix 18.1: Detailed Dispersion Modelling.

The propellant/oxidiser combinations assessed are based on real launch vehicles and reflect the scope of vehicles most likely to be used at the Project site, however other potential propellants mixtures may be adopted by individual clients. From those currently considered, no single vehicle is the worst case. The maximum emission rate (mass) for each pollutant of concern has been estimated for each, and this confirmed that two of four vehicles considered provide the maximum emission rate for the five pollutants of most concern. It is these maximum emission rates that were progressed to full modelling and therefore the assessment aims to represent the (currently understood) worst-case scenario in terms of emissions.

Whilst the heat emission profile of vehicles launched during the operational phase of the Project will vary from rocket to rocket, they will typically exhibit heat emissions characteristics of rockets using fuel/oxidant mixtures. The operational schedule of 10 launches per year has been assessed and is expected to be a worst-case scenario.

The dispersion model prepared does not explicitly account for the blast deflector or the launch pad protection that may be installed to direct exhaust gases (and heat) from the launch pad to facilitate dispersion. Given these measures are taken to aid dispersion, their exclusion is viewed as a conservative approach.

Actual impacts from any given launch will depend on many factors specific to the time of launch, and these cannot be precisely predicted in advance. Generally, a worst-case approach to these has been taken in the assessment. This includes assumptions with regard to the mass of emissions (using maximum pollutant emission rate from any scenario in each instance), meteorological conditions (three years of hourly data have been used) and the location of human health receptors (assumed to be present at the location of maximum impact outwith the site boundary).

Various guidance was used to support the air quality assessment. The significance of each emission release was assessed by comparing the Process Contribution (PC) to the relevant air quality objective. The maximum concentration of these emissions is predicted at the site boundary (for human health receptors) and at ecological receptors (for designated sites) and compared to applicable air quality standards – to allow the potential impact of rocket exhaust emissions to be better understood.

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In general, for long-term air quality objectives, the release was screened out from further assessment if the PC is less than 1 % of the air quality objective. For short-term objectives, including percentiles, the release is screened out from further assessment if the PC is less than 10 % of the air quality objective. The process for ecological receptors in some instances followed a different methodology, where appropriate, via use of the APIS Critical Load Function Tool.

Where a release is not screened out, the Predicted Environmental Concentration (PEC) for that substance was calculated. For long-term objectives, the PEC was calculated by adding the PC to the estimated background concentration of the emission. For short-term objectives, including percentiles, the PEC was calculated by adding the PC to twice the estimated background concentration of the emission. The inclusion of background concentration data in these instances is to allow the prediction of the total combined impact (i.e., PC + background) for comparison against relevant air quality standards.

With regard to heat, there are no specific criteria for the assessment of significance, conclusions are drawn based on the professional judgement of the author, based on a review of the relevant literature and the expected heat emission profile of the launch.

The key results of the assessment undertaken are summarised below.

Human Health

- For HCl, the maximum offsite hourly average PC is 134 μg/m³, 18 % of the air quality objective of 750 μg/m³. Including the background concentration of 0.27 μg/m³, the maximum predicted PECs are well below the air quality objective of 750 μg/m³.
- For NO_2, the maximum annual average offsite PCs are **screened out.**
- For particulates/Al_2O_3, the maximum offsite PC is 7.3 μg/m³, 15% of the daily average PM10 air quality objective of 50 μg/m³. Including the background concentration of 9.8 μg/m³, maximum predicted offsite PECs are well below the air quality objective of 50 μg/m³. For the annual average PM10 and PM2.5 standards, and for the 8-hour average Al_2O_3 standard, the offsite PCs are **screened out.**
- For CO, the maximum offsite concentrations are **screened out**.

Ecological

- The maximum annual average NOx concentrations are **screened out**.
- The maximum daily average NOx PC at North Uist Machair SPA and SAC, and associated SSSIs, is 13 μg/m³, 17 % of the critical level of 75 μg/m³. At Mointeach Scadabhaigh SPA/SAC/SSSI, the maximum daily average NOx PC is 4.1 μg/m³, 5.5 % of the critical level. With site-specific background data added, the maximum PECs are below the critical level of 75 μg/m³ for maximum daily average NOx concentrations.
- For both nitrogen and acid deposition, the maximum PCs are **screened out** as they are less than 1 % of the critical load.

Heat

An assessment of the impact from heat emissions was also undertaken. There are no specific criteria for the assessment of significance of such emissions, and conclusions are drawn based on the professional judgement of the author, and based on a review of the relevant literature and heat emission profile data for likely launch scenarios. Overall, the potential impact is evaluated as **not significant.**

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Overall Significance

Based on the assessment, which was undertaken as outlined above, most impacts considered could readily be screened out as **not significant** based on the PC only. In some instances, the impacts could not be screened out, and further assessment was needed. When incorporating existing background concentrations, all PECs were comfortably below relevant air quality standards.

Various conservative assumptions were made during completion of the assessment, as per air quality assessment good practice. Most notably, this includes:

- It has been (unrealistically) assumed that all 10 launches occur during the same worst-case meteorological conditions;
- Each launch vehicle will have a bespoke propellant mixture and emissions profile, assumptions in the modelling have assumed 10 launches of the worst-case propellant mixture for a particular pollutant;
- Human health receptors were assumed to be present at the points outside the site boundary, which predicted the maximum level of impact. Additionally, even if persons were present in these locations, such points do not represent relevant exposure for daily or annual average standards.

Additionally, the following points are noted:

- The dispersion model prepared does not explicitly account for the blast deflector or the launch pad protection, which may be installed to direct exhaust gases (and heat) from the surrounding gravel area and wider vegetation to facilitate dispersion.
- In order to estimate NO_x emissions a NASA conversion factor based on solid propellant was used.
- 100% of the NO_x emissions were assumed to be in the form of NO_2.
- For a conservative assessment of PM10 and PM2.5 impacts, 100 % of the total particle emissions were assumed to be PM10 and PM2.5 in each case.
- Many sources suggest that CO would be rapidly converted to CO_2 under the high exhaust temperatures. The modelling assumption that the CO is not converted to CO_2, but that the CO emitted at the nozzle exit is conserved, is highly conservative.

Considering that all PECs were comfortably below relevant air quality standards, even with the conservative assumptions outlined above (and as such the actual impacts are likely to be less than has been shown), the proposed Project would not appear to present any significant risk to local human health or the environment, and the overall impact from air quality and heat is therefore evaluated as **not significant** in the context of the EIA Regulations.

Modelling was carried out to predict the PC of nitrogen and acid deposition rates at designated sites. For nutrient nitrogen impacts, the relevant emission is NO_2; for acidification, the relevant pollutants are NO_2 and HCl. The PCs represent the calculated TWA concentration values.

The significance of the total pollutant release was assessed by comparing the PC to the relevant critical loads[5]. For long-term impacts, as in the case of deposition, NatureScot considers the release to be insignificant (i.e., screened out) if the PC is less than 1 % of the critical loads. Site relevant critical loads (CL) are derived from:

- Scottish Natural Heritage (SNH) Considering air pollution impacts in development management casework. Guidance. April 2017.

If the PEC of a pollutant does not exceed the CL for a feature, then the additional pollution predicted to arise from the development is unlikely to have an impact on a feature and can be screened out the assessment.

Heat

There are no specific criteria for the assessment of significance in terms of impacts of heat emissions, conclusions are drawn based on the professional judgement of the author, based on a review of the relevant literature and the expected heat emission profile of the launch.

18.9 AIR QUALITY STANDARDS

18.9.1 Human Health (Concentrations in Air)

A list of relevant air quality standards for air emissions is available on the UK Government Air Quality Objectives and Air Quality in Scotland's Standards web page. Table 18-1 shows the Ambient Air Directive (AAD) Limit Values (Air Quality Objectives, AQOs) for relevant pollutants, and
Table 18-2 shows the Environmental Assessment Levels (EAL) for relevant pollutants.

There are no AAD or EAL values for aluminium oxide (Al_2O_3). An 8-hour average Workplace Exposure Limit (WEL) value of 4 mg/m^3 (4,000 µg/m^3) for Al_2O_3 in the form of inhalable dust has been used here to derive an indicative threshold of 400 µg/m^3 for environmental assessment screening, by using the commonly used approach of reducing the WEL by a factor of ten.

Table 18-1 AAD limits values for relevant pollutants

Substance	Reference period and allowed exceedances	Value (µg/m^3)
NO_2	Annual mean	40
	Hourly mean not to be exceeded more than 18 times per year	200
PM10	Annual mean	18
	Daily mean not to be exceeded more than 7 times per year	50

[5] A Critical Load is the minimum rate of deposition of a pollutant at which a habitat may be affected (kg/ha/yr). Critical Loads are key to screening the impacts of nitrogen and acid deposition, and vary depending on the sensitivity of the habitat affected (SNH, 2017)

Substance	Reference period and allowed exceedances	Value ($\mu g/m^3$)
PM2.5	Annual mean	10
CO	8-hour running average across a 24-hour period	10,000

Table 18-2 EALs for relevant pollutants

Substance	Reference period	Value ($\mu g/m^3$)
HCl	Annual limit	N/A
	Hourly limit	750

18.9.2 Ecological Impacts (Concentration in Air)

Critical levels are used for the protection of vegetation and ecosystems. These concentration standards are applicable at sensitive habitats, such as those described in Section 18-3. Values for relevant emissions are summarised in Table 18-3.

Table 18-3 Critical levels for the protection of vegetation and ecosystems

Substance	Reference period	Critical level ($\mu g/m^3$)
NOx	Annual mean	30
	Daily mean	75

Potential impacts on ecological receptors are also considered within Chapter 14: Ornithology and Chapter 15: Terrestrial Ecology.

18.9.3 Ecological (Deposition to Ground)

The Air Pollution Information System (APIS) website gives critical load values and other information for specific SPAs, SACs and SSSIs.

Nitrogen: applicable habitat types, critical loads and total nitrogen deposition values at the local designated sites outlined in Section 18-3 have been identified. A wide variety of habitat types/critical load classes are present. Nitrogen critical load ranges vary between 3 – 10 and 20 – 30 kg N $ha^{-1}yr^{-1}$. Total nitrogen deposition varies between 3.7 – 5.1 kg N $ha^{-1}yr^{-1}$. Further details – to include MaxCLminN, MaxCLmaxN, MaxCLmaxS, MinCLminN, MinCLmaxN, MinCLmaxS and total acid deposition values for 11 different habitat types - can be found within Appendix 18-1: Detailed Dispersion Modelling.

Acid: applicable habitat types, critical loads and total acid deposition values at the local designated sites outlined in Section 18-3 have been identified. A wide variety of habitat types/critical load classes are present. Acid critical load ranges and total acid deposition vary considerably. Further details can be found within the full dispersion modelling report (Appendix 18-1).

18.10 BASELINE DESCRIPTION

The Project site is part of the former Scolpaig Farm, which was purchased by CnES on 6th June 2019, having formerly been under private ownership. The total land area of Scolpaig Farm is approximately 276 ha and the total application site area is 1.8 ha.

18.10.1 Land Use

The proposed Project is situated in the north-west corner of North Uist and is bounded to the north and west by the Atlantic Ocean and to the south by the A865 road. The site is located approximately 20 km from the ferry port of Lochmaddy and 18 km from Benbecula Airport. The north-west corner of North Uist consists of rugged coastline with steep cliffs and occasional white sandy bays. The land is dominated by three small hills; Beinn Scolpaig (88 m), to the north of the A865, and Beinn Riabhach (117 m) and Carra-crom (120 m), to the south. The area consists of a mix of rough grazing land, mainly used for open grazing of sheep and cattle, machair, peat bog and sandy shoreline.

The site is unoccupied; however, the area is popular with walkers, both visitors and locals, throughout the year, with recreational use increasing following transferal of ownership to CnES. A path network (contributing to the Wider Path network) follows the coastal perimeter of the site with connections south to the A865 via Scolpaig Farm (following the farm access track) and also Griminish to the east (following the access track). The latter routes are also connected via a path that traverses Beinn Scolpaig (see Chapter 7: Community, Tourism and Recreation and Figure 7-1). The A865 forms part of National Cycle Network Route 780 (The Hebridean Way). The closest residential property is An Ataireachd Ard approximately 670 m south of the planning boundary. There are no commercial properties in close proximity to the site.

18.10.2 Air Quality Management Areas

Where exceedances of air quality standards are considered likely, the Local Authority must declare an Air Quality Management Area (AQMA) and prepare an action plan setting out the measures and objectives to address air quality. CnES currently has declared no Air Quality Management Areas (AQMAs), and monitoring of any kind was ceased first in 2007 and again in 2016 when data collected in 2015/16 showed there was no potential for exceedances of standards within the Council's jurisdiction and there was no need to restart monitoring (CnES, 2017).

18.10.3 Ambient Pollutant Levels

Background concentrations of NO_2 and PM10 are available from the Air Quality in Scotland's Data for Local Authority Review and Assessment purposes website and are shown in Table 18-4 for the location of the maximum human health impacts (as described in Table 18-9).

Gaseous HCl measurements are measured as part of the UK Eutrophying & Acidifying Network (UKEAP): Acid Gas and Aerosol Network. The nearest HCl monitoring location to the Scolpaig site is Polloch, approximately 150 km to the south-east of Scolpaig. The average value of the available measurement values is 0.135 $\mu g/m^3$.

There is no local CO background data available on either the Scottish or UK sites.

For habitats assessment (i.e., the existing level of deposition on habitats), the background data is taken from the APIS website and is included as required in Sections 18.9.3 and 18.14 (and in full in Appendix 18-1).

Background concentrations of Al_2O_3 are assumed negligible.

Table 18-4 Background concentrations from background maps

Location (x,y) of grid square centre	NO_2 ($\mu g/m^3$)	PM10 ($\mu g/m^3$)
72500, 875500	1.2	4.9

18.11 SUMMARY OF AIR AND HEAT EMISSIONS

18.11.1 Fuel Mixtures

The purpose of the Project is to facilitate the launch, up to 10 times per year, of sub-orbital launch vehicles. Following a review of the range of propellant mixtures expected on site, four representative fuel/oxidiser propellant mixes are evaluated:

- Hydroxyl Terminated Polybutadiene (HTPB) / High Test Peroxide (HTP);
- High Test Peroxide (HTP) / Kerosene;
- HTPB and powdered ammonium perchlorate (AP), and powdered aluminium metal; and
- High Density Polyethylene (HDPE) / nitrous oxide (N_2O).

The process of oxidation coverts these compounds into hot exhaust gases in a small space and time period. The hot gases are initially at very high pressure, and these are free to mix with atmospheric gases in a downward direction at the base of the rocket. The pressures equalise very quickly by the exhaust gases moving downwards, creating an upward force on the rocket.

Table 18-5 summarises the total mass of propellent mix which is expected for each vehicle being considered.

Table 18-5 Fuel mixture summary

Vehicle	Propellant	Mass of Each Component	Total Mass (kg)
1	Kerosene	191	1,622
	HTP	1,431	
2	HTPB	10	70
	HTP	60	
3	N_2O	4	4.9
	HDPE	0.9	
4	Ammonium Perchlorate	-	100
	Aluminium Powder	-	
	HTPB	-	

Note that the total mass of the propellant is conserved during combustion, as the oxidant is part of the propellant itself, with no ambient air involved. Therefore, for the purposes of the following calculations, the total mass of exhaust is taken to be the total mass of the propellant.

18.11.2 Pollutants Summary

Table 18-6 summarises the key emissions of concern which have been identified from each of the fuel / oxidiser mixes. Table 18-7 shows a summary of the relevant air quality impacts to be considered for each of these pollutants.

Table 18-6 Pollutants to be considered for assessment, for each propellent

Propellant mix	Direct pollutants	Indirect Pollutants
HTPB / HTP	CO	NO_x
HTP / Kerosene	CO	
AP / Al / HTPB	HCl, Al_2O_3, CO, PM	
HDPE / N_2O	CO	

Table 18-7 Air quality impacts to be considered, for each pollutant

Pollutant	Human health	Ecological	
		Concentrations	Deposition
HCl	Yes	No	Yes
Al_2O_3	Yes	No	No
PM	Yes	No	No
NO_x	Yes	Yes	Yes

The propellant with the likely worst-case total emission of each pollutant was selected. These are listed in Table 18-8, along with the highest estimated total emissions for each. Note that the total emissions represent the emissions over the whole trajectory of the rocket, not just at the initial stages close to ground level.

Table 18-8 Summary of worst-case total estimated emissions

Pollutant	Vehicle	Estimated Total Pollutant Emitted (kg)
HCl	1	21.4
Al_2O_3		28.4
PM		28.4
CO	2	87.6
NO_x		124

18.11.3 Heat

When the fuel/oxidiser propellant react, the reaction leads to the exothermic production of gases, with the resulting emissions being hot exhaust gas. Measured data about heat emissions from the specific rockets that are likely to be used at the Project are not currently available; however, in their report "Comparing Hydroxyl Terminated Polybutadiene and Acrylonitrile Butadiene Styrene as Hybrid Rocket Fuels", Whitmore, Peterson and Eilers (2013) have published data on exhaust plume exit temperature. The report describes both modelled and sensed temperatures. For the fuel mix used by a rocket typical of those proposed for the Project, the paper reports temperatures of 2,000 K to 2,600 K for the main reaction period, and lower temperatures outside these times. These higher temperatures are considered when assessing potential heat impact, noting that a lower temperature (1,429 ºC, or 1,702 K) was used as the source term (temperature at nozzle exit) during dispersion modelling.

18.12 MITIGATION

Ref.	Title	Description
R01	Regulatory Mitigation (Spaceport)	The Spaceport will be licensed and regulated under the Space Industry Act 2018 and Space Industry Regulations 2021. The Safety Case is the main way in which an applicant for a Spaceport Licence demonstrates compliance. The focus of the Safety Case is in managing potentially catastrophic events and is based on hazard identification /incident scenarios with corresponding measures to prevent or limit the consequences of an accident of incident to demonstrate that the risk is as low as reasonably practical (ALARP). An Assessment of Environmental Effects (AEE) also forms part of the licence application for the Spaceport and is taken into account by the Regulator (UK Civil Aviation Authority, UK CAA) in terms of deciding whether or not to grant a licence. Once the licence is granted, the Safety Case is used as the basis for ongoing monitoring, review and assessment. Reviews can also be triggered by a range of events including a change to the operations or infrastructure, or if new information relating to safety matters arises
AQH01	Blast deflection and pad protection	A temporary blast deflector and if necessary, launch pad protection will be installed around the launch pad to direct exhaust gases (and heat) from surrounding gravel area and wider vegetation.

18.13 IMPACT ASSESSMENT (HUMAN HEALTH)

The predicted impact for each pollutant is summarised below. The location of the maximum concentration is the same for all pollutants and is shown in Table 18-9 and presented in Figure 18-2 for each year of meteorological data.

Table 18-9 Location of the maximum PCs for each modelled year

Year	x	y
2018	72711	875119
2019	72673	875119
2020	72805	875065

18.13.1 Hydrogen Chloride

The maximum offsite hourly average HCl PC is 134 μg/m^3, 18 % of the air quality objective of 750 μg/m^3, calculated using meteorological data for the year 2020. Including the background concentration of 0.27 μg/m^3 (twice the annual average value), the maximum predicted PECs are well below the air quality objective of 750 μg/m^3.

Table 18-10 shows the maximum predicted PC to the ground level concentrations of hydrogen chloride (HCl), using meteorological data for all three years.

Note that there is no long-term standard for HCl

18.13.2 Nitrogen Dioxide

As the short-term human health standard for NO_2 allows the hourly mean to be exceeded 18 times per year, then, provided there are fewer than 18 launch events per year, this standard cannot realistically be breached and was therefore not considered in this assessment. The maximum annual average offsite NO_2 PCs are **screened out** for all years.

Note that, as a conservative assumption, 100 % of the NO_x emissions were assumed to be in the form of NO_2. In addition, the location of this predicted concentration (which is adjacent to the site boundary) does not represent relevant exposure for the annual average standards, so this is also a conservative estimate of the impact.

Table 18-11 shows the maximum predicted PC to the ground level concentrations of NO_2 using meteorological data for all three years.

18.13.3 Particulates / Al_2O_3

The short-term human health standard for PM10 allows the daily mean to be exceeded 7 times per year; this standard, therefore, cannot be breached if there are fewer than 7 launch events per year. If there are more than 7 launch events, the daily standard could be relevant, and was included in the assessment.

The maximum offsite PM10 PC is 7.3 μg/m^3, 15 % of the daily average PM10 air quality objective of 50 μg/m^3, calculated using meteorological data for all modelled years. Including the background concentration of 9.8 μg/m^3, maximum predicted offsite PECs are well below the air quality objective of 50 μg/m^3.

The offsite PCs are **screened out** for the annual average PM10 and PM2.5 standards, and for the 8-hour average Al_2O_3 standard, for all years.

For a conservative assessment of PM10 and PM2.5 impacts, 100 % of the total particle emissions were assumed to be PM10 and PM2.5 in each case. The location of this PC (which is adjacent to the site boundary) does not represent relevant exposure for either the daily or annual average standards, so this is also a conservative estimate of the impact. Table 18-12 and Table 18-13 show the maximum predicted PC to the ground level concentrations of particulates and Al_2O_3, respectively, using meteorological data for all three years.

18.13.4 Carbon Monoxide

The maximum offsite concentrations are **screened out** for all years. Note that many sources suggest that CO would be rapidly converted to CO_2 under the high exhaust temperatures. The modelling assumption that the CO is not converted to CO_2, but that the CO emitted at the nozzle exit is conserved, is considered highly conservative.

Table 18-14 shows the maximum predicted PC to the ground level concentrations of carbon monoxide using meteorological data for all three years.

18.13.5 Summary Result Tables

The summary results for each assessment which was undertaken are provided below, for each meteorological year.

Table 18-10 Maximum predicted offsite HCl concentrations (µg/m³)

Year	Standard	Measured as	Threshold value	PC	PC % of objective	Screened in?	Background concentration	PEC	PEC % of objective
2018	Short-term EAL	Maximum hourly average	750	133	18	Yes	0.27	133	18
2019				132	18	Yes	0.27	132	18
2020				134	18	Yes	0.27	134	18

Table 18-11 Maximum predicted offsite NO_2 concentrations (µg/m³)

Year	Standard	Measured as	Objective value	PC	PC % of objective	Screened in?
2018	Long-term AQO	Annual average	40	0.09	0.2	No
2019				0.09	0.2	No
2020				0.09	0.2	No

Table 18-12 Maximum predicted offsite PM10 and PM2.5 concentrations (µg/m³)

Year	Standard	Measured as	Objective value	PC	% PC of objective	Screened in?	Background concentration	PEC	PEC % of objective
2018	Short-term PM_{10} AQO	Daily mean not to be exceeded more than 7 times per year	50	7.3	15	Yes	9.8	17	34
	Long-term PM_{10} AQO	Annual average	18	0.02	0.1	No	-	-	-
	Long-term $PM_{2.5}$ AQO		10		0.2	No		-	-
2019	Short-term PM_{10} AQO	Daily mean not to be exceeded more than 7 times per year	50	7.3	15	Yes	9.8	17	34
	Long-term PM_{10} AQO	Annual average	18	0.02	0.1	No	-	-	-
	Long-term $PM_{2.5}$ AQO		10		0.2	No		-	-
2020	Short-term PM_{10} AQO	Daily mean not to be exceeded more than 7 times per year	50	7.3	15	Yes	9.8	17	34
	Long-term PM_{10} AQO	Annual average	18	0.02	0.1	No	-	-	-
	Long-term $PM_{2.5}$ AQO		10		0.2	No		-	-

Table 18-13 Maximum predicted offsite Al_2O_3 concentrations ($\mu g/m^2$)

Year	Objective	Measured as	Objective value	PC	PC % of objective	Screened in?
2018	Short-term AQO	Maximum 8-hour average	400	22	5.5	No
2019				22	5.5	No
2020				22	5.5	No

Table 18-14 Maximum predicted offsite CO concentrations ($\mu g/m^3$)

Year	Objective	Measured as	Objective value	PC	% PC of objective	Screened in?
2018	Short-term AQO	Maximum 8-hour rolling average	10,000	68	0.7	No
2019				67	0.7	No
2020				69	0.7	No

18.14 IMPACT ASSESSMENT (ECOLOGICAL)

The predicted impact at ecological receptors is summarised below and presented in Figure 18-3. The location of the maximum concentration is the same for all pollutants and is shown in Table 18-15, for each year of meteorological data. The locations refer to the maximum impact at each habitat site for both the concentration in air and dry deposition assessments (which are the same), and also location of maximum impact at each habitat site for wet deposition assessment (different from air and dry).

Table 18-15 Location of the maximum PCs for each modelled year

Habitat	Year	Concentration in Air, Dry Deposition		Wet Deposition	
		x	y	x	y
North Uist Machair SPA/SAC/Vallay; Balranald Bog and Loch nam Feithean; and Baleshare and Kirkibost SSSIs	2018	75832	876189	75699	876493
	2019	75832	876189	75832	876319
	2020	75920	876102	75611	876668
Mointeach Scadabhaigh SPA/SAC/SSSI	2018	81194	871900	81194	871900
	2019	81194	871900	80156	869266
	2020	81193	871900	81194	871900

18.14.1 Nitrogen Oxides

The maximum annual average NO_2 concentrations are **screened out** for all years.

The maximum daily average NO_x PC at North Uist Machair SPA and SAC, and associated SSSIs is 13 $\mu g/m^3$, 17 % of the critical level of 75 $\mu g/m^3$, predicted with 2018 and 2019 meteorological data. At Mointeach Scadabhaigh SPA/SAC/SSSI the maximum daily average NO_x PC is 4.1 $\mu g/m^3$, 5.5 % of the critical level, predicted with 2018 meteorological data. With site-specific background data added (taken from the APIS website), the maximum PECs are below the critical level of 75 $\mu g/m^3$ for maximum daily average NO_x concentrations.

Table 18-16 and Table 18-17 show the maximum predicted annual average and daily average PCs to ground level concentrations of nitrogen oxides (NO_x) at each of the designated sites, using meteorological data for the three modelled years.

18.14.2 Nitrogen Deposition

The maximum predicted annual PCs to deposition rates of nitrogen at each of the designated sites are presented in Table 18-18, together with the PC as a percentage of the most stringent critical load. The mass output from the model effectively represents a single launch, and this was factored (multiplied by 10) to account for 10 launches over a year. Note that this is based on the unrealistic but conservative assumption that all 10 launches occur during the same worst-case meteorological conditions.

The maximum PCs to nitrogen deposition are **screened out** for all modelled years as they are less than 1% of the critical load.

B Stakeholder List

Stakeholder	Email Address	Date Sent	Content of Material
2Excel Aviation	[redacted]	06/10/2021 11/10/2022 15/02/2023 16/02/2023	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Email requesting aircraft movements data Response received with estimate of flights
Airlines UK	[redacted]	11/10/2022	Email containing letter Ref airspace options and how to respond
Aircraft Owners and Pilots Association (AOPA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

Airfield Operators Group (AOG)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Airport Operators Association (AOA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Airspace Change Organising Group (ACOG)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Airspace4All	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

Association of Remotely Piloted Aircraft Systems UK (ARPAS-UK)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Aviation Environment Federation (AEF)		06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
BAe Systems		11/10/2022	Email containing letter Ref airspace options and how to respond
Babcock Aviation		06/10/2021 11/10/2022 15/02/2023 02/03/2023 14/03/2021	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Email request for aircraft movements data Email hastener Response received with data

BAe Systems	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Benbecula and Barra Airport ATC		09/03/2021 06/10/2021 11/10/2022	Email regarding TDA Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Bristow Helicopters		06/10/2021 11/10/2022 15/02/2023 17/02/2023	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Email requesting aircraft movements data Response received with ROM figures for SAR and training flights

British Airline Pilots Association (BALPA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
British Airline Pilots Association (BALPA)		06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
British Airways (BA)		06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
British Balloon and Airship Club		06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

British Business and General Aviation Association (BBGA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
British Gliding Association (BGA)	[redacted]	06/10/2021 11/10/2022 21/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Response from BGA stating ACP does not impact on gliding
British Hang Gliding and Paragliding Association (BHPA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
British Helicopter Association (BHA)	ceo@britishhelicopterassociation.org	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

British Microlight Aircraft Association (BMAA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
British Model Flying Association (BMFA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
British Skydiving	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

CnES Planning (plus various departments, where relevant- Env Health, Roads, Enviro, Access, archaeologist)	planning@cne-siar.gov.uk	06/10/2021 11/10/2022 12/10/2022 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Request via email for more information on ACP process Sponsor email response
Drone Major	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Fisheries Management Scotland	general@fms.scot	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

Friends of Scolpaig	[redacted]	06/10/2021	Email and Letter informing DEFINE Gateway outcome
		11/10/2022	Email containing letter Ref airspace options and how to respond
		09/11/2022	Email response requesting clarification and relationship ground safety and air safety areas
		16/11/2022	Email explanation provided by Sponsor
Gama Aviation	[redacted]	06/10/2021	Email and Letter informing DEFINE Gateway outcome
		11/10/2022	Email containing letter Ref airspace options and how to respond
		22/02/2023	Email request aircraft movements
		02/03/2023	Email hastener aircraft movements
		09/03/2023	Email hastener aircraft movements
General Aviation Alliance (GAA)	[redacted]	06/10/2021	Email and Letter informing DEFINE Gateway outcome
		11/10/2022	Email containing letter Ref airspace options and how to respond

General Aviation Alliance (GAA)	[redacted]	11/10/2022	Email containing letter Ref airspace options and how to respond
General Aviation Safety Council (GASCo)		06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Guild of Air Traffic Control Officers (GATCO)		06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Heavy Airlines		06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Helicopter Club of Great Britain (HCGB)		06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

Highlands and Islands Airports Ltd (HIAL)	[redacted]	06/10/2021 11/10/2022 15/02/2023 22/02/2023 28/02/2021	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Email requesting airport movements data 2019 and 2022 Response stating details would be released under a Freedom of Information request Benbecula Airport movement Stats received
Historic Environment Scotland	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
HM Maritime Coastguard Agency (MCA)	[redacted]	06/10/2021 11/10/2022 15/02/2023 20/02/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Email requesting coastguard flying stats for Uists Email with links to SAR stats

Honourable Company of Air Pilots (HCAP)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Iprosurv	iprosurvlimited@gmail.com	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Irish Aviation Authority (IAA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Isle of Man CAA	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
LAA Highlands Strut	[redacted]	16/02/2022 28/02/2023	Various email exchanges regarding TDA and impact on Sollas and request for aircraft movements and flight profiles.

		11/10/2022	Email containing letter Ref airspace options and how to respond
Light Aircraft Association (LAA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Light Aircraft Association (LAA) UK	[redacted]	11/10/2022	Email containing letter Ref airspace options and how to respond
Loganair	[redacted]	06/10/2021 03/02/2022 10/02/2022 11/10/2022	Email and Letter informing DEFINE Gateway outcome Various email exchanges regarding impact TDA airspace fillet on Loganair routes Email containing letter Ref airspace options and how to respond
Low Fare Airlines	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

Marine Fisheries & Seal Licensing Scotland	marinescotland@gov.scot	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Marine Scotland Compliance (local fisheries office)	FO.Stornoway@gov.scot	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Marine Scotland MSLOT	marinescotland@gov.scot	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
MCA	Navigationsafety@mcga.gov.uk	06/10/2021 11/10/2022 15/02/2023	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Email request for aircraft movement data

Met Office	safeguarding@metoffice.gov.uk	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Military Aviation Authority (MAA)	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Ministry of Defence - Defence Airspace and Air Traffic Management (MoD DAATM)	DAATM-AirspaceConsultation@mod.gov.uk	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

MOD DAATM	[redacted]	06/10/2021	Email and Letter informing DEFINE Gateway outcome
		10/10/2022	Email containing Draft letter Ref airspace options and how to respond
		11/10/2022	Formal letter sent & Virtual meeting with DAATM, DAAM and RAF HQ
		14/10/2022	Email exchange

MOD DAATM	[redacted]	07/11/2022	Formal Response to Stage 2A
NATS	[redacted]	06/10/2021	Email and Letter informing DEFINE Gateway outcome

NATS	[redacted]	11/10/2022 13/10/2022 18/10/2022 19/10/2022 31/01/2023 15/02/2023	Email containing letter Ref airspace options and how to respond PPP sent ahead of meeting F-2-F mtg with NATS Draft record of discussions sent to NATS for comment Email exchange regarding request for heat map NATS unwilling to share
Nature Scotland	ENQUIRIES@nature.scot [redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Navy Command HQ	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

North Uist Community Council	northuistcommunitycouncil@gmail.com	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Northern Lighthouse Board (NLB)	navigation@nlb.org.uk	06/10/2021 11/10/2022 15/02/2023 07/03/2023	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Email request for NLB movements Response received with aircraft movement details
Outer Hebrides IFG	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Outer Hebrides Natural History Society	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

Paul Jenkins LAA Highlands Strut	[redacted]	16/02/2022 01/03/2022 11/10/2022	Email exchanges regarding use of Sollas, traffic patterns and shape of TDA airspace fillet Email containing letter Ref airspace options and how to respond
PDG Aviation Services	[redacted]	06/10/2021 11/10/2022 15/02/2023 17/02/2023 22/02/2023	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Aircraft movement request Response from PGA Avn Request for more information sent Response received with aircraft movement stats
Planning North SEPA	Planning.North <Planning.North@sepa.org.uk>	11/10/2022	Email containing letter Ref airspace options and how to respond
PPL/IR (Europe)	representation@pplir.org	11/10/2022	Email containing letter Ref airspace options and how to respond
PPL/IR (Europe)	[redacted]	11/10/2022	Email containing letter Ref airspace options and how to respond

Reykjavik ANSP	[redacted]	06/10/2021 11/10/2022 07/11/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Response stating ACP does not affect Reykjavik
RSPB	RSPB.Scotland@rspb.org.uk nsro@rspb.org.uk	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
RYA	planning@rya.org.uk consultations @ryascotland.org.uk	06/10/2021 11/10/2022 20/01/2023	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond Response received no comment
Scottish Creel Fishermen’s Federation	info@scottishcreelfishermensfederation.co.uk	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond

Scottish Fishermen's Federation	sff@sff.co.uk	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Scottish Water	planningconsultations@scottishwater.co.uk	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
SEPA	Planning.North@sepa.org.uk	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
Sollas Fly In Coordinator	[redacted]	11/10/2022 08/02/2023 14/02/2023	Email containing letter Ref airspace options and how to respond Email requesting 2022 fly in stats Response received requesting engagement letter to be re-sent Engagement letter resent, update on ACP progress and link to CAA airspace change portal

		28/02/2023	Email exchange
UK Airprox Board (UKAB)	admin@airproxboard.org.uk	06/10/2021	Email and Letter informing DEFINE Gateway outcome
		11/10/2022	Email containing letter Ref airspace options and how to respond
		28/02/2023	Email request for AIRPROX data
		09/03/2023	Response received with links to obtain data
UK AMC	[redacted]	06/10/2021	Email and Letter informing DEFINE Gateway outcome
		11/10/2022	Email containing letter Ref airspace options and how to respond
UK Flight Safety Committee (UKFSC)	chief.executive@ukfsc.co.uk	06/10/2021	Email and Letter informing DEFINE Gateway outcome
		11/10/2022	Email containing letter Ref airspace options and how to respond

UKHO	navwarnings@ukho.gov.uk	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
United States Air Force Europe (3rd Air Force-Directorate of Flying (USAFE (3rd AF-DOF))	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
UK Irish Airspace Management stakeholder group	[redacted]	19/10/2022 16/11/2022 18/11/2022 15/02/2023 22/02/2023	PPP Stage 2 and f-2-f briefing Q&A Email sent with suggested wording for report in lieu of formal minutes. ASM Chair content with wording NATS civil airspace manager suggested caveat to suggested wording Sponsor emailed group with a draft 'summary of discussions' to be included as 'Stakeholder Feedback' in ACP report NATS civil airspace manager expressed view comments from meeting should not be

			published as formal ACP engagement has to go through appropriate NATS channels
Western Isles Fishermen's Association	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
CNES Public Planning	[redacted]	06/10/2021 11/10/2022	Email and Letter informing DEFINE Gateway outcome Email containing letter Ref airspace options and how to respond
SaxaVord Spaceport		25/01/2023	Request to add SaxaVord to Dist list

SPACE PORT 1

C Engagement Evidence

C.1 Extract from TDA Raw Evidence ACP-2021-37

Tue 01/03/2022 08:40

SP1 ACP

RE: UC FW: UC Spaceport-1 Scolpaig North Uist Temporary Danger Area Application

To [redacted]

Cc

This message was sent with High importance.

[redacted]

Hello again

Re numbers and figures for Sollas Landings and usage:

As we all know that the dates for the annual fly-in are chosen for best tides, which happen to coincide with a weekend, anytime between June and September - fitting in with other events in the calendar and our availability.

I carry the tide tables for Lochmaddy and Scolpaig with me wherever I go. They are permanently in my handbag because I often get called by random people throughout the year (and I really mean throughout the year) by flyers who want to use the beach just for the day or to camp for a couple of days. This is from around the UK and abroad (Switzerland, Germany, Ireland most recently). Actually, last year there were a couple of chaps based at Lossiemouth flying Typhoons, who also used the beach on their time off.

Of course, Highland Flying Club in Inverness advertise beach landings as part of their training and often use the beach - although they do not always inform me. I think I have received calls from them a couple of times to ask about suitability on a particular day. They know the drill now and recently I had to inform them of changes in the water heights and what to avoid due to the changing character of the bay itself.

There have been several groups in the last few years - for instance the Microlight groups - in particular FLY-UK organised by [redacted] who in June 2019 organised a tour of the UK taking in Sollas and the whole of Scotland - He had 100 aeroplanes signed up although he expected only 50-80 would actually participate. I believe around a dozen of them arrived at Sollas and some camped overnight. I was tracking them just because I was concerned for their welfare!!!

During 2021 there were at least 10 contacts who all wanted to arrive at Sollas at different times of the year. I was in touch with all of them throughout. Unfortunately, some nearly made it but because of different weather patterns on either side of the country they were not all successful.

In past years - at least whe[redacted] was running the event- the best attendance was from the Flying Farmers who managed to bring in 32 aircraft. Our best year was around 24-26 aircraft over the whole weekend. We used to attend every fly in[redacted]rganised. Some years we were rushed off our feet and other years we sat with him in the tent waiting for arrivals.

FLY-IN ATTENDANCES

2009- 8 or 9 aeroplanes
2013- that year was the las[redacted]rganised before his passing. Around 6-8 aeroplanes (I have pictures of that fly-in.

I and Andy took over organisation of the fly-in
2014 - 9 aeroplanes
2015- 12 aeroplanes
2016 - 24 aeroplanes - this was the weekend we inaugurated John's bench. Two aeroplanes from Germany attended.
2017- a bit of a washout - only two brave pilots from Inverness got through - Nigel amongst them!!
2018- 19 aeroplanes - it was a great weekend.
2019- weather was awful again - only 5 braved it - one from Ireland
2020- cancelled COVID
2021- cancelled COVID

Let me know if you require any further information.

Kind regards

[redacted]

From: [redacted]
Sent: 22 February 2022 14:33
To: SP1 ACP <SP1ACP@qinetiq.com>
Cc[redacted]
Subject: FW: UC FW: UC Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist

H[redacted]

Please see figures below for the movement numbers requested.

Best regards,

[redacted]

SATCO
Benbecula Airport, Isle of Benbecula, HS7 5LW
[redacted]

Please consider the environment - think before you print!

From: [redacted]
Sent: 21 February 2022 13:30
[redacted]
Subject: RE: UC FW: UC Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist

Between the 1st of June 2019 & 31st of August 2019 there was 675 commercial movements & 224 GA movements.

Thanks,

[redacted]

Wed 09/02/2022 11:07

[redacted]

RE: UC Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist

To SP1 ACP

Cc [redacted]

You replied to this message on 09/02/2022 17:27.
This message is part of a tracked conversation. Click here to find all related messages or to open the original flagged message.

PL-PE.PNG 231 KB | PE-PL.PNG 240 KB | PL-PF.PNG 249 KB | PF-PL.PNG 261 KB | PL-PO.PNG 151 KB | PO-PL.PNG 152 KB

Mornin[redacted]

Please find attached some images from our flight planning software for the following flight-planned pairs:

EGPO-EGPL: flight planned route DCT SAY DCT BEN DCT FL060 – file PO-PL;
EGPL-EGPO: flight planned route DCT BEN DCT STN DCT FL070 – file PL-PO;
EGPF-EGPL: flight planned route CLYDE L602 BRUCE Y958 TOBMO DCT BEN DCT FL140 – file PF-PL;
EGPL-EGPF: flight planned route DCT BEN DCT TOBMO Y968 BRUCE FL130 – file PL-PF;
EGPE-EGPL: flight planned route DCT BEN DCT FL100 – file PE-PL;
EGPL-EGPE: flight planned route DCT RIMOL FL090 – file PL-PE.

The green routes are the filed alternates. All routines filed IFR. Hope this helps.

Regards,

[redacted]
Manager Flight Support

[redacted]

Web: http://www.loganair.co.uk

From: SP1 ACP <SP1ACP@qinetiq.com>
Sent: 08 February 2022 11:35
[redacted]
Subject: RE: UC Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist
Importance: High

CAUTION: — This email originated from outside of the organisation. Do not click links or open attachments unless you are sure the content is safe even if you know the sender.

[redacted]

If you could have the information back to me as soon as possible that would be most useful, ideally by the 14th before you depart. The CAA are pressing us on providing evidence to support the statement that traffic patterns below 7000ft will not be unduly affected by the activation of the TDA. We made this assumption based on Range local knowledge (and observation of flight profiles), your response; that you did not believe the TDA would adversely affect your operations; and, the fact there are very few scheduled flights in/out of Benbecula, in particular post 1400UTC. However, the CAA were not satisfied with assumptions and need evidence, ideally from yourselves. Sorry to be a burden.

Kind Regards

[redacted]

Reply Reply All Forward

Thu 10/02/2022 09:24

[redacted] >

Re: UC Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist

To SP1 ACP

Cc [redacted]

You replied to this message on 10/02/2022 12:57.
This message is part of a tracked conversation. Click here to find all related messages or to open the original flagged message.

Morning [redacted]

No idea of the summer schedule. We used to get pre-notified of the timetable but the company is dynamically managing things at the moment depending on forward bookings. I would estimate no more than 6 flights per day on average, including freight.

Regards,

Get Outlook for iOS

From: SP1 ACP <SP1ACP@qinetiq.com>
Sent: Wednesday, February 9, 2022 5:27:27 PM
[redacted]
Subject: RE: UC Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist

CAUTION: — This email originated from outside of the organisation. Do not click links or open attachments unless you are sure the content is safe even if you know the sender.

[redacted]

Many thanks for the detail of your routes, most helpful. Is it possible to have a rough idea of your summer schedule for both pax and cargo flights; I am particularly interested in the number of flights per day to/from Benbecula.

Kind Regards

[redacted]

QINETIQ

Connect with us:

C.2 Additional Stakeholder Feedback Evidence Stage 2

A Stakeholder Feedback Form – ACP-2021-12

A.1 Do you assess that the presented design options achieve the Design Principles (DPs); please complete the Proforma below accordingly and consider if they are 'Met', 'Partially Met' or 'Not met' in your opinion. Add your rationale in free text as appropriate.

Name: [redacted]
Representing: Isavia ANS
Address: Nautholsvegi 60-66, IS-102 Reykjavik, Iceland

A.1 Which design option do you believe best delivers the DPs?

The area doesn´t affect the Reykjavik FIR/CTA so we feel that we shouldn´t have an oppinion on the option to choose.

SPACE PORT 1

Reply | Reply All | Forward | IM

Wed 16/11/2022 12:17

[redacted]

RE: UC Minutes from ASM group 19/20 Oct 22

To [redacted]

You replied to this message on 16/11/2022 12:17.

Hi [redacted]

OK for me, I hope to circulate the draft tomorrow.

Best Regards

[redacted]

From: [redacted]
Sent: 16 November 2022 12:13
[redacted]
Subject: UC Minutes from ASM group 19/20 Oct 22
Importance: High

*** This message originated from outside the Irish Aviation Authority. Please treat hyperlinks, attachments and instructions in this email with caution. ***

Dear All,
I am conscious that the minutes for the above titled have not yet been circulated however, as part of the ACP Stage 2 Step 2A process, I would like to capture the feedback I received at the meeting – I intend to word the feedback along the following lines:

- "Main recurring theme from airspace managers was to keep process and procedures as simple as possible; general support for utilising D701 and extant SoPs.
- LoAs were also discussed with general acceptance that SP-1 activities could be added to extant LoAs regarding D701 and also added as an additional signatory."

If there are any issues/concerns with me using these words then please let me know – They do not change the formal responses from the MOD or NATS as I believe this is the view of the airspace managers not individual organisations. It would be most useful if you could let me have your feedback by COP today if at all possible.

Kind Regards

[redacted]

QINETIQ

Fri 18/11/2022 08:18

[redacted]

RE: UC Minutes from ASM group 19/20 Oct 22

To [redacted]

Follow up. Start by 22 November 2022. Due by 22 November 2022.

[redacted]

NATS has a formal process for providing feedback for ACPs so any feedback received during the meeting from NATS staff should not be captured as formal feedback. This is to ensure sponsors receive consistent and balanced feedback which covers all relevant areas of our business. All views expressed were from a purely operational/technical feasibility perspective. Perhaps you could consider a statement to this effect to allow you to include the comments?

I have inputted into the formal NATS response document so our views should have been captured in that document.

Kind regards

[redacted]

www.nats.co.uk

NATS Internal

[redacted]

Sent: 16 November 2022 12:13

[redacted]

Subject: [EXTERNAL] UC Minutes from ASM group 19/20 Oct 22

Importance: High

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear All,

I am conscious that the minutes for the above titled have not yet been circulated however, as part of the ACP Stage 2 Step 2A process, I would like to capture the feedback I received at the meeting – I intend to word the feedback along the following lines:

- "Main recurring theme from airspace managers was to keep process and procedures as simple as possible; general support for utilising D701 and extant SoPs.
- LoAs were also discussed with general acceptance that SP-1 activities could be added to extant LoAs regarding D701 and also added as an additional signatory."

If there are any issues/concerns with me using these words then please let me know – They do not change the formal responses from the MOD or NATS as I believe this is the view of the airspace managers not individual organisations. It would be most useful if you could let me have your feedback by COP today if at all possible.

[redacted]

Wed 22/02/2023 12:20

MITTINS, Simon <Simon.MITTINS@nats.co.uk>

RE: UC SP-1 Update to UK IRISH ASM Group

To Brundle, Paul R; Joe.Ryan_iaa.ie; BENNETT, Simon N; michelle.coupar484@mod.gov.uk; Warren Downey; Robert Keane; daniel.kennedy581@mod.gov.uk; declan.mangan_iaa.ie; YOUNG, Jacob; Kevin.McMorrow@caa.co.uk

Cc ABBOTT, DANIEL Flt Lt (SWK-ATCO49); DICKINSON, Ellen; neil.hope684@mod.gov.uk; Jones, Emma; MACCRIOSTAIL Cathal; MCEVOY Keith; POLLARD Darren; MacKenzie, Donald N; Leatham, Clive; mark.smales425@mod.gov.uk; PAYNE, Jonathan D; Burn, Alexander W; Robson, Andrew FG

Hi [redacted]

Thank you for the ACP updates, confidentiality duly noted.

NATS has a policy for responding to external ACP consultation and engagement requests through our policy team which ensures that all relevant parts of the business are able to provide input.

The UK/Ire ASMOG minutes have since been finalised and shared so I think the most appropriate way forward is to use them as evidence of your briefing for inclusion in your ACP. From my perspective, any views or opinions on the proposal will be included within the NATS response. If you intend to use the meeting minutes as evidence of engagement I would ask that you redact all other content and treat the document as confidential so that it is not published on the CAA Portal.

It may be useful to add an agenda item on ACP engagement for the next meeting so that we can discuss the most appropriate way to record and manage any ACP discussions moving forward.

I very much look forward to seeing you next month in London.

Kind regards

[redacted]

NATS

[redacted]
Manager UK Airspace Management Function
Civil Airspace Manager
[redacted]

www.nats.co.uk

SPACE PORT 1

Thu 16/02/2023 18:05

[redacted]

RE: UC TDA for Spaceport 1 Scolpaig North Uist

To SP1 ACP

You replied to this message on 21/02/2023 09:20.

Hi

We estimate that our surveillance and trials aircraft operate around 30 times per year in that area.

Kind regards

[redacted]m

From: SP1 ACP <SP1ACP@qinetiq.com>
Sent: 15 February 2023 16:38
[redacted]
Cc: SP1 ACP <SP1ACP@qinetiq.com>
Subject: RE: UC TDA for Spaceport 1 Scolpaig North Uist
Importance: High

CAUTION EXTERNAL EMAIL (this email came from someone outside of 2Excel)

Dear All,

At the recent CAA gateway review for Stage 2 of the above titled ACP process the CAA recommended that we needed to gather more evidence regarding local aviation activity. Although I have Benbecula airport statistics and information from Loganair on the
have limited information on. I was wondering if you could provide me with a rough figure for the number of flights you collectively conduct in the vicinity of North Uist in any year. Without any radar data I am relying on local operators to provide me as much infor
very much appreciate your assistance in this area.

[redacted]

Reply Reply All Forward IM

Wed 08/02/2023 14:01

[redacted]

Re: UC Sollas Annual Fly In Event

To SP1 ACP

[redacted]

You replied to this message on 14/02/2023 11:12.

Hello [redacted]

I don't seem to have received the communication you mention in your email. I wonder whether you could please forward it to me. I am especially pleased and interested to see any drawings showing the change to the eastern boundary and Sollas.

As for last year's fly-in the weather was a total washout on Saturday and Sunday but we managed to have 8 aircraft visit the fly in on the Friday before the weekend storms. Nearly all had travelled up from North Weald (North west of London) and were waiting at Glenforsa, so it was especially good to see them.

This year's flyin is planned for 24/25th June with the 23rd and 26th as reserve dates.

Be advised also, that two aircraft based at Stapleford (near North Weald) are planning a Guinness book of records challenge to land on as many islands as possible in 24 hrs this summer, starting in the Shetland Isles and finishing in the Channel Islands. We are hoping the weather will allow them to land at Sollas either during our dates or some other time. Of course they will be keeping in close touch with me for that. They have got the challenge approved so they will be doing it for sure.

As I mentioned last year there are a few others who are hoping to visit but again, as you well know, that is weather and 'bravery' dependent. But they are keeping in touch with me.

Looking forward to seeing the engagement material.

All the best

[redacted]

On Wed, 8 Feb 2023 at 11:07, SP1 ACP <SP1ACP@qinetiq.com> wrote:

> Good Morning [redacted]
>
> I hope you received the recent engagement material regarding the permanent airspace change for Spaceport-1 at Scolpaig, you will note that following the feedback from yourself and others, we have managed to re-profile the eastern boundary so as to exclude the beach the site at Sollas. This will be the same for the TDA when that is activated albeit delayed until November this year, possibly later into next year.
>
> I was wondering if you had any statistics for the number of aircraft that managed to fly in for last year's event in August 2022 so I can add the total to the previous years you kindly sent through a while ago? We are still building up a picture of local aviation activity in the vicinity so any information you may have on flights or enquiries to use the beach remains an interest to us (similarly if you are planning an event for this summer). Thank you for your assistance in this matter.
>
> [redacted]

Tue 28/02/2023 08:39

SP1 ACP

RE: UC Sollas Annual Fly In Event

To [redacted]

Hi [redacted]

Thank you very much for your response and confirmation that you are content with the airspace change proposal as it currently stands. I shall keep you informed of the next stage of the process and hopefully we will have chance to meet when we deliver Stage 3 of the process (formal consultation), where it is expected that we will facilitate a 'drop in' event on the Hebrides; details still to be confirmed.

Kind Regards

[redacted]

Email: SP1ACP@QinetiQ.com

QINETIQ

Connect with us:

[redacted]

Sent: 24 February 2023 08:32
To: SP1 ACP <SP1ACP@qinetiq.com>
[redacted]

Good morning [redacted]

Please forgive the delay in replying to your email. That was some hefty document and I had to read and digest it properly before responding!

As the Sollas Beach fly-in co-ordinator, I am very pleased to see that our concerns around Sollas Beach and its usage have been taken into account and that the necessary changes were made to the design of the ACP to keep Sollas Beach outside. As long as this does not change again we are happy with the proposal as presented to us.

I wish you well with the next stage of this process and please keep me informed as the CAP progresses.

With kind regards

[redacted]

On Tue, 14 Feb 2023 at 11:14, SP1 ACP <SP1ACP@qinetiq.com> wrote:

[redacted]

Many thanks for the detail below, most useful in helping to build a picture of other aviation activity in the area. I am sorry to hear that you did not receive the engagement material sent out on 11 Oct (attached), I have checked my emails and you were certainly included in the email distribution. The engagement period has now completed and the design options and design principle evaluation report has been uploaded to the CAA airspace portal which you can access at your leisure at the following:

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

SPACE PORT 1

Tue 21/02/2023 09:15

SP1 ACP

RE: UC Spaceport-1 ACP-2021-12 - Local traffic information

To [redacted] SP1 ACP

From: [redacted]
Sent: 20 February 2023 16:50
To: SP1 ACP <SP1ACP@qinetiq.com>
[redacted]
Subject: RE: UC Spaceport-1 ACP-2021-12 - Local traffic information

H[redacted]

I'd suggest in the first instance that you look at the SAR helicopter stats on the DfT website https://www.gov.uk/government/statistics/search-and-rescue-helicopter-annual-statistics-year-ending-march-2022/search-and-rescue-helicopter-statistics-year-ending-march-2022

This does break the information down into various categories and there is an interactive dashboard. It won't show any training flights etc. so if that would be useful as well (I suspect it might), I'll reach out to Stornoway and see if they have that detail.

Cheers

[redacted]

HM Coastguard

HM Coastguard
Marine House, Blaikies Quay
Aberdeen, AB11 5EZ

To Search, To Rescue, To Save
www.gov.uk/mca

Maritime & Coastguard Agency

From: SP1 ACP <SP1ACP@qinetiq.com>
Sent: 15 February 2023 16:43
[redacted]
Subject: UC Spaceport-1 ACP-2021-12 - Local traffic information
Importance: High

CAUTION: This email originated from outside the UK Government. Do not click links or open attachments unless you recognise the sender and know the content is safe. Please use the Report Message function to report suspicious messages.

Hi Ag[redacted]

At the recent CAA gateway review for Stage 2 of the above titled ACP process the CAA recommended that we needed to gather more evidence regarding local aviation activity. Although I have Benbecula airport statistics and information from Loganair on their schedule and routes flown, it is the 'other activity' that I have limited information on. I was wondering if you could provide me with a rough figure for the number of flights in support of the MCGA that are conducted in the vicinity of North Uist in any year. Without any radar data I am relying on local operators to provide me as much information on their activities as possible; I would therefore very much appreciate your assistance in this [redacted]ase note I have contact Bristows directly but was unsure if other companies supported your operation?

[redacted]

SPACE PORT 1

Tue 21/02/2023 09:18

SP1 ACP

RE: UC A.c movements in vicinity of North Uist - SP-1 ACP-2021-12

To [redacted]

Cc SP1 ACP

Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

From: [redacted]
Sent: 17 February 2023 11:22
To: SP1 ACP <SP1ACP@qinetiq.com>
Subject: RE: UC A.c movements in vicinity of North Uist - SP-1 ACP-2021-12

Good afternoon [redacted]

As a rough guide, I would say that we operate in the area approximately 20 days throughout the year on various tasking ranging from HESLO and survey, to passenger transfers.

Please let me know if I can be of any help.

[redacted]

From: SP1 ACP
Sent: 15 February 2023 17:06
[redacted]
Subject: UC A.c movements in vicinity of North Uist - SP-1 ACP-2021-12
Importance: High

Hi Again [redacted]
I wonder if you could assist. Following the CAA Gateway review for Stage 2 of the above ACP, we have been asked to gather more evidence on aircraft movements in the local area. Although I have Benbecula airport stats and those o aviation activity' I lack. I wonder if you could provide any information on the number of times PDG aviation operate in the vicinity of North Uist in any single year? Your assistance in this matter would be greatly appreciated.

Kind Regards

[redacted]

Email: SP1ACP@QinetiQ.com

SPACE PORT 1

Reply Reply All Forward IM

Wed 15/02/2023 14:30

SP1 ACP

RE: UC SP-1 ACP-2021-12 NATS Heat Map - NAT tracks

[redacted]

This message was sent with High importance.

Hi [redacted]

I am just following up on previous email below and wondered if you would be able to provide a 'heat map/s' as requested? One for 2019 and 2022 would be most useful.

Kind Regards

[redacted]

Email: SP1ACP@QinetiQ.com

QINETIQ

Connect with us:

From: SP1 ACP
Sent: 31 January 2023 12:59
[redacted]
Subject: UC SP-1 ACP-2021-12 NATS Heat Map - NAT tracks
Importance: High

[redacted]

As part of the ongoing ACP work for SP-1 the CAA have requested that we obtain 'Heat maps' to reflect current airspace usage in the vicinity of the SP-1 launch site and wider D701 areas. I recall a heat map being shared with QQ in support of Formidable Shield 19 (I believe it was a heat map for 2018). Ideally a heat map showing pre-COVID traffic levels in 2019 would be useful (to demonstrate expected traffic levels over the next few years) together with a heat map for 2022 to show current traffic levels.

Thank you for your assistance in this matter.

[redacted]

SPACE PORT 1

From: [redacted]
Sent: 09 March 2023 11:50
[redacted]
Subject: RE: UC Info on aircraft movements in vicinity of North and South Uist

Hello [redacted]

I've sent this onwards internally, but don't have access to this information myself.

Best wishes

[redacted]

[redacted]
Sent: 09 March 2023 11:48

Hi [redacted]

Sorry to pester, but I could really do with a ball park figure on the number of flights Gama aviation conduct in the vicinity of North & South Uist in a typical year. Unfortunately I need this information this week to meet the CAA submission deadline. As always, your help in this matter is greatly appreciated.

[redacted]

QINETIQ

[redacted]
Sent: 02 March 2023 15:49
To: SP1 ACP <SP1ACP@qinetiq.com>; andrew.lister@gamaaviation.com
Subject: RE: UC Info on aircraft movements in vicinity of North and South Uist
Importance: High

Hi Agai[redacted]

I was wondering if you had time to consider my request below?

Kind Regards

[redacted]

QINETIQ

From: SP1 ACP
Sent: 22 February 2023 15:12
[redacted]
Subject: UC Info on aircraft movements in vicinity of North and South Uist
Importance: High

Dear [redacted]

At the recent CAA gateway review for Stage 2 of the above titled ACP process the CAA recommended that we needed to gather more evidence regarding local aviation activity. Although I have Benbecula airport statistics and information from Loganair on their schedule and routes flown, it is the 'other activity' that I have limited information on. I was wondering if you could provide me with a rough figure for the number of flights you collectively conduct in the vicinity of North Uist in any year. Without any radar data I am relying on local operators to provide me as much information on their activities as possible; I would therefore very much appreciate your assistance in this area.

Reply Reply All Forward IM

Thu 16/02/2023 09:12

[redacted]

RE: CAUTION: External email - RE: UC TDA for Spaceport 1 Scolpaig North Uist (UNCLASSIFIED)

To SP1 ACP

Follow up. Start by 22 February 2023. Due by 22 February 2023.
You replied to this message on 16/02/2023 14:43.

Classification:UNCLASSIFIED

Morning [redacted]

I will speak to my lead Scottish pilots and get back to you.

BW,

[redacted]

UK Aviation | Aviation
Babcock International Group
Babcock Onshore | Building Se32-33 | Gloucestershire Airport | Cheltenham | Gloucestershire | GL51 6SP
[redacted]
www.babcockinternational.com

babcock™

Creating a safe and secure world, together

From: SP1 ACP <SP1ACP@qinetiq.com>
Sent: 15 February 2023 16:38
[redacted]
Cc: SP1 ACP <SP1ACP@qinetiq.com>
Subject: CAUTION: External email - RE: UC TDA for Spaceport 1 Scolpaig North Uist
Importance: High

Dear All,

At the recent CAA gateway review for Stage 2 of the above titled ACP process the CAA recommended that we needed to gather more evidence regarding local aviation activity. Although I have Benbecula airport statistics and information from Loganair on their schedule and routes flown, it is the 'other activity' that I have limited information on. I was wondering if you could provide me with a rough figure for the number of flights you collectively conduct in the vicinity of North Uist in any year. Without any radar data I am relying on local operators to provide me as much information on their activities as possible; I would therefore very much appreciate your assistance in this area.

Kind Regards

Tue 14/03/2023 12:59

[redacted]

RE: UC CAUTION: External email - RE: UC TDA for Spaceport 1 Scolpaig North Uist (UNCLASSIFIED)

To SP1 ACP

You replied to this message on 14/03/2023 13:40.

Classification:UNCLASSIFIED

Hi [redacted]

Apologies for any confusion. Having spoken to our senior pilots, our air ambulance aircraft operates in the area on average twice a week and our police aircraft vary rarely, only once or twice in the last couple of years.

BW,

[redacted]

UK Aviation | Aviation
Babcock International Group
Babcock Onshore | Building Se32-33 | Gloucestershire Airport | Cheltenham | Gloucestershire | GL51 6SP
[redacted]
www.babcockinternational.com

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From: SP1 ACP <SP1ACP@qinetiq.com>
Sent: 14 March 2023 12:48
[redacted]
Subject: RE: UC CAUTION: External email - RE: UC TDA for Spaceport 1 Scolpaig North Uist (UNCLASSIFIED)
Importance: High

[redacted], must be crossed wires as I was requesting information from your Scottish team regarding the number of flights they routinely conduct in the vicinity of North Uist (Outer Hebs) in a year; just a ball park figure please? Happy to go direct to the team there if you have contact details?

Kind Regards

[redacted]

Email: prbrundle@QinetiQ.com

From: [redacted]
Sent: 17 February 2023 09:57
To: SP1 ACP <SP1ACP@qinetiq.com>
Subject: Coastguard SAR activity in and around Benbecula

Good morning [redacted]

I got forwarded your email regarding activity around North Uist - it's suitably vague I'm afraid, but as a rough guide we would carry out between 0 and 10 flights through the general airspace in that vicinity per month.

Often our activity in the area goes up during poor weather when scheduled flights/air ambulances cannot get in. As a rule, we will be either VFR at low level, or conducting our own radar let downs to coastal areas at any given time of day/night.

Types of flights carried out in the vicinity are training – working with local shipping and/or around local topography. SAR – missing person searches/coastal rescues/working with shipping. Medical transfers in lieu of the air ambulance – generally direct to Benbecula or indeed transiting the airspace en route to Barra or St Kilda.

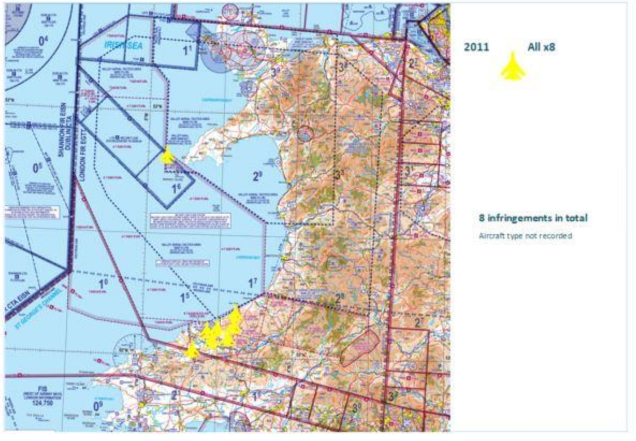
This is a rough overview, it's hard to put too many facts or figures on it due to the nature of the job but I hope this helps. Feel free to get in touch with any questions.

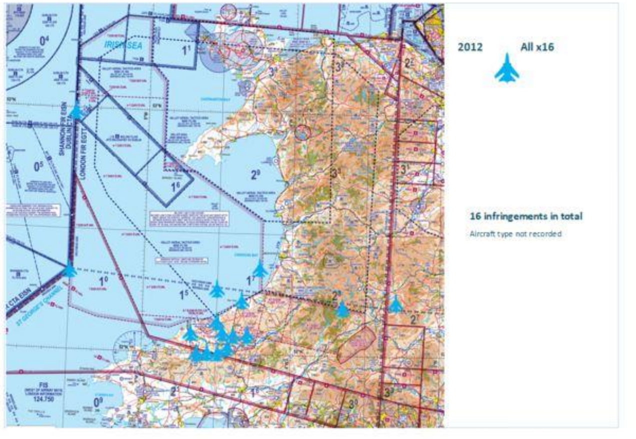
Kind regards

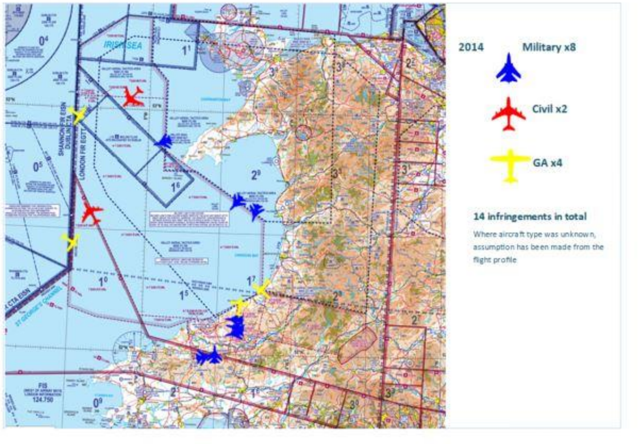
[redacted]
Chief Pilot Stornoway

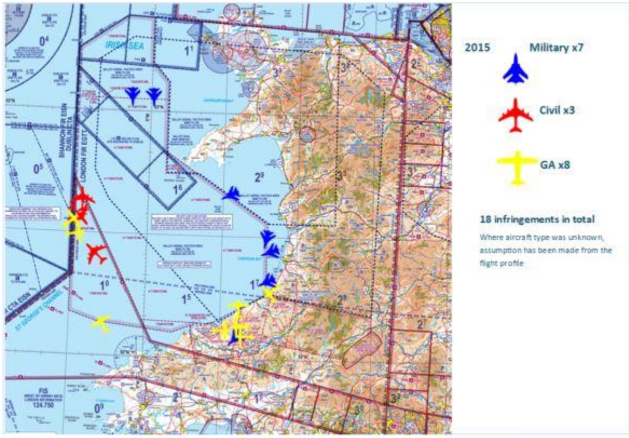
Bristow Helicopters Ltd
Stornoway Airport
Stornoway
Isle of Lewis
HS2 0BN
[redacted]
william.macleod@bristowgroup.com

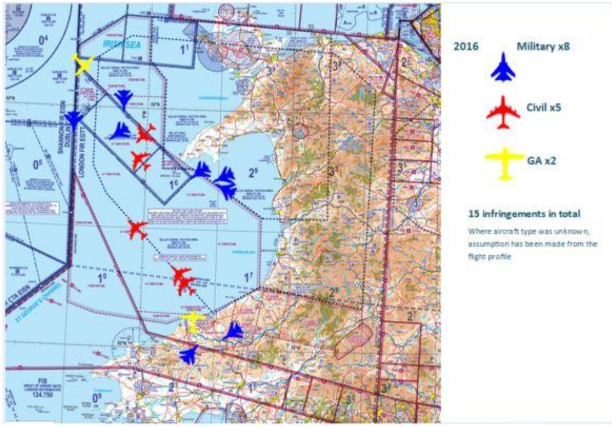
MOD Aberporth Range Danger Area Infringements 2011-2022

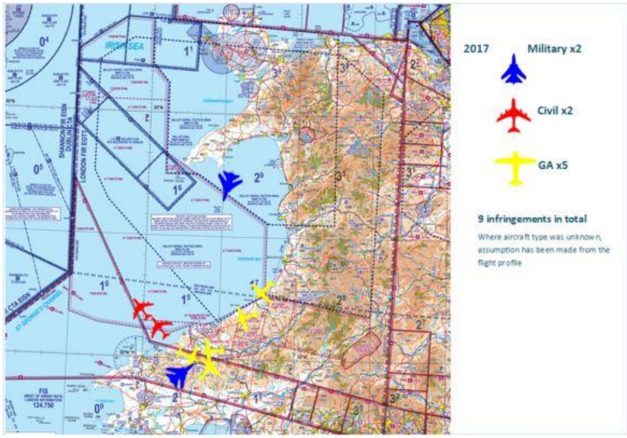


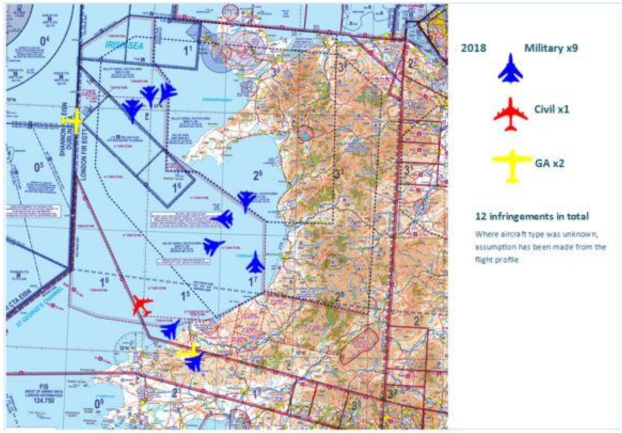


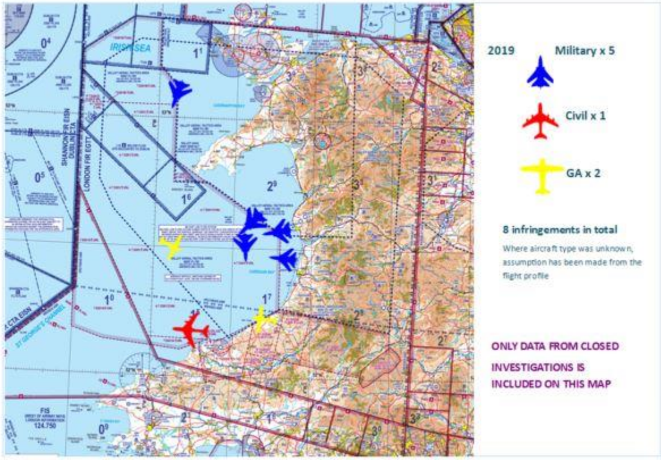


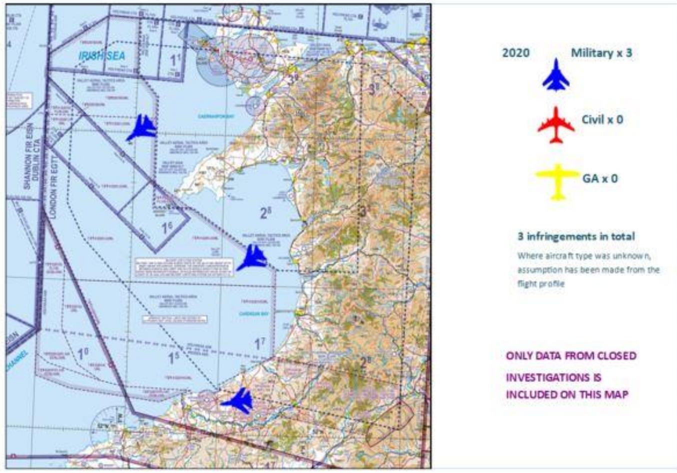

2015
Military x7
Civil x3
GA x8
18 infringements in total
Where aircraft type was unknown, assumption has been made from the flight profile


2016
Military x8
Civil x5
GA x2
15 infringements in total
Where aircraft type was unknown, assumption has been made from the flight profile


2017
Military x2
Civil x2
GA x5
9 infringements in total
Where aircraft type was unknown, assumption has been made from the flight profile


2018
Military x9
Civil x1
GA x2
12 infringements in total
Where aircraft type was unknown, assumption has been made from the flight profile


IRISH SEA
2019
Military x 5
Civil x 1
GA x 2
8 infringements in total
Where aircraft type was unknown, assumption has been made from the flight profile
ONLY DATA FROM CLOSED
INVESTIGATIONS IS
INCLUDED ON THIS MAP


IRISH SEA
2020
Military x 3
Civil x 0
GA x 0
3 infringements in total
Where aircraft type was unknown, assumption has been made from the flight profile
ONLY DATA FROM CLOSED
INVESTIGATIONS IS
INCLUDED ON THIS MAP


IRISH SEA
2021
Military x 2
Civil x 0
GA x 3 (inc
1 heli)
5 infringements in total
Where aircraft type was unknown, assumption has been made from the flight profile
ONLY DATA FROM CLOSED
INVESTIGATIONS IS
INCLUDED ON THIS MAP


2022
Military x 2
Civil x 0
GA x 1
3 infringements in total
ONLY DATA FROM CLOSED
INVESTIGATIONS IS
INCLUDED ON THIS MAP

D Socioeconomic Analysis for SP-1 (Extract)


ATLANTIC58

SEI APPENDIX 7.1

Socioeconomic Analysis

SPACE PORT 1

MKA economics

Spaceport 1

Socio-Economic Impact Assessment

2023/24 – 2025/26

Final Report

November 2022

MKA Economics
Scion House
Stirling University Innovation Park
Stirling FK9 4NF

SPACE PORT 1

Executive Summary

Introduction

MKA Economics was appointed by a consortium, led by Comhairle nan Eilean Siar (CnES) in January 2021, to formulate an independent socio-economic impact assessment of a proposed suborbital spaceport facility (Spaceport 1) in North Uist. An initial draft report was completed in March 2021 and was finalised in line with new project information in December 2021.

An independent review of the socio-economic impact assessment was commissioned by CnES, and completed by Lichfields, in April 2022. The review was responded to in August 2022, and it was agreed to update the socio-economic impact assessment to action some of these comments, as well as update aspects of the report.

The standalone socio-economic report was prepared by MKA Economics to accompany the Environmental Impact Assessment (EIA) and support the planning application. It is acknowledged by both MKA Economics and the EIA Team (Aquatera and Atlantic 58) that the potential economic impacts were not translated into potential EIA significance. At the time of assessment, the approach was considered proportionate to the scale of the development.

It was agreed that the approach was to provide a standalone report on the potential net economic benefits of the proposal to support the planning application and the Planning Authority in making its decision, giving due weight to the net economic benefit the scheme.

Socio-Economic Rationale and Policy Fit

The priority given by the UK Government to the development of a UK based Space launch industry is grounded in the forecast growth of this sector over the next two decades. The space sector is a vital part of the UK's economy, worth over £16.5 billion per year and employing over 47,000 people in diverse roles as scientists, engineers, entrepreneurs, and innovators. Space employment grew 6.7% from 2018/19, and comprised 0.14% of the UK workforce in 2019/20. The space industry contributed £6.9 billion of direct Gross Value Added (GVA), and £15.8 billion total GVA across the supply chain[1].

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1068861/20220412_BryceTech_UKSA_S_H_Summary_Report.pdf

The proposed development directly supports the UK and Scottish Space Strategies, which in turn are supported by the new National Economic Strategy for Economic Transportation (NSET)[2] and the soon to be publish National Planning Framework 4 (NPF4)[3].

There is strong public policy support to develop this market opportunity for the UK, and the Spaceport 1 site was one of only three sites which was identified as being suitable for an orbital vertical launch facility. With Spaceport Sutherland successful in attracting the funding award - and the resultant loss of opportunity for Spaceport 1 to go straight to developing an orbital launch facility - the Spaceport 1 Consortium shifted its focus to establishing a permanent business around suborbital launch. Spaceport 1, by virtue of its location and existing infrastructure, accessible through partnering with QinetiQ, is uniquely placed to offer launch capabilities to the suborbital market.

The Spaceport 1 proposal has been identified as a high priority project within Comhairle nan Eilean Siar's strategic plans[4]. It is also an important aspect of the local Community Development Plan[5] which supports the regional aim of creating more than 1,500 new jobs across the island to help mitigate against a declining population, especially the outward migration of younger people. The Business Case highlights how it will help protect the existing high paid professional jobs within QinetiQ, who operate the MoD Hebrides Range, and create new jobs in an innovative, high growth potential, high paying, space industry sector..

Spaceport 1 directly supports HIE's Strategy and Operating Plan[6] where there is a strong focus on harnessing the economic opportunity afforded by the space sector, not only in terms of new employment in areas of needs, but the wider spin-off opportunities across the region and Scotland as a whole.

Any perceived adverse effects on the tourism and recreational base of the islands can be addressed through 2019 survey work by OHT, where there is a positive sentiment amongst local tourism businesses. The launch pad itself and supporting structure, will be smaller and less prominent than a community wind turbine, of which there is an appreciation and knowledge of in North Uist. Visitor research around wind farms has widely found that tourists are no dissuaded from visiting or revisiting an area due to the existence of a wind farm(s) and there has been no stated detriment to the tourism economy of the islands due to the presence of MoD Hebrides Range in South Uist.

[2] https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/
[3] https://consult.gov.scot/local-government-and-communities/draft-national-planning-framework-4/
[4] https://www.cne-siar.gov.uk/business/economic-development-and-business-support/creating-communities-of-the-future/
[5] http://www.isleofnorthuist.com/
[6] https://www.hie.co.uk/about-us/policies-and-publications/strategy-and-operating-plan/

SPACE PORT 1

There is a role for the Consortium to support the delivery of economic and tourism benefits of Spaceport 1, notably in terms of presenting information when available on the launch profile and the potential supply chain opportunities afforded to local businesses of achieving successful launches.

Socio-Economic Baseline

This socio-economic baseline assessment is concerned with the local, sub-regional and regional areas. The assessment uses publicly available data sets to generate a number of key points and trends for discussion on the unique socio-economic opportunities and challenges within the local, and wider, population and economy of the study area.

The baseline assessment reveals a number of key issues in the study area:

- Extremely rural location with a lack of developed infrastructure, West North Uist to Baleshare is amongst the most geographically deprived area in Scotland.
- Long-term population decline due to an ageing population, low birth rates, and out-migration amongst primarily young demographics.
- A lack of a diversified economy mainly focused around primary industry, tourism and culture, and the public sector.
- Considerably lower levels of GVA per head than the national average, with figures around two-thirds of the national average
- Huge natural capital assets and a relatively untouched landscape.
- An important, and growing, tourism economy, with increasing volumes and values and longer dwell times.
- A significant adverse effect on the local economy, and tourism economy, as result of the Covid-19 pandemic, with unemployment doubling during the first national lockdown and visitor numbers significantly lower. However, unemployment levels in August 2022 have returned to pre-Covid19 levels, and it is anticipated that visitor levels have improved as Covid-19 restriction have eased.

Socio-Economic Impact

The net direct, indirect, and induced economic impacts, at the Outer Hebrides level, of the operational Spaceport 1 in 2025/26 are estimated to be:

- **Employment – 23.26 FTEs**
- **Turnover - £6.45 million**
- **GVA - £2.73 million**
- **Income - £1.18 million**

The above estimates can be aligned against those predicted at the two Scottish orbital launch sites (Space Hub Sutherland and Shetland Space Centre); these are shown in the table below. This is a high-level comparison, and a high degree of caution should be taken as each site is different in its capital expenditure, operations, market and launch cadence.

	Spaceport 1	Space Hub Sutherland	Shetland Space Centre
Gross Impact			
Total Net Jobs (FTE)	22.42	55.80	139.50
FTEs per Launch	2.60	4.70	4.70

This shows that the local employment impacts, albeit around 50% lower than the other space centres, are of a magnitude consistent with other sites. This would be expected as the focus at Spaceport 1 is suborbital launches, rather than orbital launches in Sutherland and Shetland. Furthermore, the Space Industry Act 2018 sets out 'prescribed roles' which must be appointed by every UK spaceport, The legislation therefore establishes a mandatory minimum level of staffing, regardless of whether the spaceport is providing orbital or suborbital launch facilities.

In addition, Spaceport 1 requires construction of the proposed launch site which comprises a range of capital investments over a four month period. The total construction related costs have been valued at **£3.1 million**. This has the potential to generate further front-ended economic benefits for the Outer Hebrides, which have been estimated as being **£1.0 million** and **21.4 job-years.**

Findings and Conclusions

The impacts presented above are of a significant scale, both in employment terms but also in GVA and turnover terms. The scale of the impacts for the suborbital Spaceport can have a demonstrable and immediate impact on the economic well-being of the Outer Hebrides. They can help attract new investment to the islands and set a strong foundation for future investment and longer terms economic prosperity and economic sustainability.

SPACE PORT 1

The Spaceport 1 proposal fits with the future places and productive places growth priorities of the emerging National Planning Framework 4 (NPF4) and the new National Strategy for Economic Transformation (NSET). It also supports the key sector and community development objectives of both HIE and CnES strategies.

It explicitly supports the drive for new jobs locally set out in the North Uist Development Plan, and how this will help reduce the outward migration of younger people and attract new professionals and families to the islands. Importantly, it has the potential to help the economic recovery, and tourism recovery, by encouraging new business to the area, enticing the Outer Hebrides as a place to work, invest, visit and do business. This can aid the economic challenges faced by the Outer Hebrides, widening the economic base of the area, and benefiting from the long-term benefits afforded by the valuable and growing space sector.

In addition to the estimated socio-economic impacts arriving from the successful deployment of Spaceport 1 there a range of wider, longer term and harder to measure socio-economic benefits pertinent to this proposal including:

- Supporting **new economic growth and employment opportunities**, to an area which is economically fragile and dependent on a narrow base on economic activities;
- **Higher value jobs**, and wider **supply chain opportunities**, can both encourage people of working age to find work on the Island, as well as encourage new people and investment to the Island;
- Further the **tourism sector and aid its ongoing recovery from the Covid-19 pandemic**, notably business tourism in the local area, whilst not harming the leisure tourism appeal of the sector, as agreed and ratified by a recent survey of local tourism business across the Uists. Importantly, the launches that happen outside the main tourism season can help extend the tourism appeal of the island and support tourism businesses in the shoulder season and off-peak season;
- The business model is founded on the principles of **public participation and community benefit**. Both the landowner (the local authority) and the community - via the already established community interest company - will receive a share of profits each year.
- By creating a new economic sector, not only will the new direct jobs support the economy, but these are expected to grow over time, and help restructure the economy away from a narrow base of lower value, and seasonal, activities;

- **Enhancing the MOD Range / QinetiQ offering,** this partnership is uniquely placed to be able to work with the MOD to offer complementary services. This is in a nascent phase of discussion, but significant interest is being shown by customers and suppliers alike. This could enhance the appeal of the Range to a national and international audience and potentially secure bookings for future years.
- Help to protect the existing **high paid professional jobs with QinetiQ**, and creating new jobs in an innovative high paying space industry sector

Spaceport 1 can bring immediate economic impacts to the local area, an area in need of investment and jobs. These higher value jobs have the potential to bring further investment into the area as the sector grows and develops, and as the launches develop and continue. A hub of activity around a new economic sector can play a major role in helping the restructuring of the Island community into new activities. These will not replace traditional activities but can add-to the type of economic activity, encouraging local people to find local work, stay on the Islands, as well as attract new people to the Islands.

E CAA UK Airport Statistics 2022 & 2019

January 2022

period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202201	Other UK Airports	LERWICK (TINGWALL)	69	56	25	9	0	0	0	0	4	0	0	0
202201	Other UK Airports	BARRA	80	80	0	0	0	0	0	0	0	0	0	0
202201	Other UK Airports	TIREE	88	88	12	0	0	0	0	0	0	0	0	0
202201	Other UK Airports	CAMPBELTOWN	106	82	6	7	0	9	0	0	4	0	4	0
202201	Other UK Airports	WICK JOHN O GROATS	114	20	20	49	0	6	8	0	27	0	4	0
202201	Other UK Airports	ISLAY	142	101	9	11	0	2	0	0	28	0	0	0
202201	Other UK Airports	BENBECULA	213	193	79	18	0	0	2	0	0	0	0	0
202201	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	311	233	10	1	0	8	0	0	50	19	0	0
202201	Miscellaneous	EDMISTON LONDON HELIPORT	398	142	142	90	6	0	62	0	96	0	2	0
202201	Non UK Reporting Airports	ALDERNEY	412	278	3	6	84	0	0	7	37	0	0	0
202201	Other UK Airports	CITY OF DERRY (EGLINTON)	469	226	2	0	0	58	0	118	47	0	8	12
202201	Other UK Airports	LANDS END (ST JUST)	486	280	57	2	0	141	0	2	43	0	18	0
202201	Other UK Airports	STORNOWAY	550	451	158	14	18	54	0	0	13	0	0	0
202201	Other UK Airports	KIRKWALL	881	797	115	49	0	4	18	0	11	0	2	0
202201	Non UK Reporting Airports	ISLE OF MAN	927	584	114	13	0	34	0	72	103	0	16	105
202201	Other UK Airports	CARDIFF WALES	941	208	0	32	0	12	0	310	368	0	11	0
202201	Other UK Airports	BELFAST CITY (GEORGE BEST)	1067	1043	11	5	0	4	0	0	15	0	0	0
202201	Other UK Airports	DONCASTER SHEFFIELD	1105	383	128	31	0	228	66	285	9	75	28	0
202201	Other UK Airports	HUMBERSIDE	1158	284	3	100	0	465	90	0	49	0	148	22
202201	Other UK Airports	PRESTWICK	1165	174	1	72	0	78	0	459	109	0	273	0
202201	Other UK Airports	CAMBRIDGE	1191	0	0	0	221	0	0	812	100	0	19	39
202201	Other UK Airports	SOUTHAMPTON	1205	865	12	133	1	25	27	0	0	0	4	150
202201	Other UK Airports	TEESSIDE INTERNATIONAL AIRPORT	1394	178	2	2	0	52	399	701	2	2	58	0
202201	Other UK Airports	SUMBURGH	1433	1118	75	77	20	70	142	0	0	0	6	0
202201	Other UK Airports	LEEDS BRADFORD	1439	821	71	90	0	332	5	1	172	0	18	0
202201	London Area Airports	LONDON CITY	1592	1540	174	44	0	6	2	0	0	0	0	0
202201	Other UK Airports	INVERNESS	1635	657	228	133	40	195	0	521	57	0	2	30
202201	Other UK Airports	COVENTRY	1671	0	0	0	0	1490	1	0	176	0	4	0
202201	Non UK Reporting Airports	GUERNSEY	1757	1037	26	95	222	2	12	204	148	0	4	33
202201	Non UK Reporting Airports	JERSEY	1804	934	0	51	0	5	398	334	0	73	9	0
202201	London Area Airports	SOUTHEND	1902	65	7	3	19	112	13	839	756	56	0	39
202201	Other UK Airports	HAWARDEN	1958	0	0	0	134	96	78	1066	397	0	112	75
202201	Other UK Airports	NEWCASTLE	2001	1295	6	47	0	8	0	2	483	92	66	8
202201	Other UK Airports	NEWQUAY	2241	266	164	9	0	715	70	0	772	0	369	40
202201	Other UK Airports	DUNDEE	2389	95	7	5	14	140	12	2087	14	0	0	22
202201	Other UK Airports	NORWICH	2413	1039	0	269	335	45	36	329	358	0	2	0
202201	Other UK Airports	LYDD	2519	5	5	10	0	14	0	1393	936	159	2	0
202201	Other UK Airports	EXETER	2534	291	0	11	160	405	32	816	699	0	5	115
202201	Other UK Airports	LIVERPOOL (JOHN LENNON)	2632	1304	76	39	0	37	0	946	204	0	13	89
202201	Other UK Airports	BIGGIN HILL	2723	1204	1176	29	72	0	0	348	691	0	2	377
202201	Other UK Airports	BOURNEMOUTH	2870	258	0	73	0	1430	380	124	476	0	5	124
202201	Other UK Airports	BLACKPOOL	2963	66	66	348	0	97	0	1709	712	0	4	27
202201	Other UK Airports	BRISTOL	3064	2277	61	27	0	56	220	468	0	14	2	0
202201	Other UK Airports	BELFAST INTERNATIONAL	3193	2389	20	35	0	39	367	0	0	57	305	1
202201	Other UK Airports	GLASGOW	3561	2906	83	64	3	22	261	281	0	0	7	17
202201	Other UK Airports	BIRMINGHAM	3584	3158	203	107	2	20	247	0	32	3	15	0
202201	Other UK Airports	SHOREHAM	3724	0	0	19	99	1592	14	933	1024	2	10	31
202201	Other UK Airports	EAST MIDLANDS INTERNATIONAL	3991	2913	123	302	0	71	260	0	47	0	2	396
202201	Other UK Airports	EDINBURGH	4358	4110	22	81	0	0	0	0	161	0	6	0
202201	Other UK Airports	GLOUCESTERSHIRE	4719	18	18	22	46	805	25	2510	1201	0	8	84
202201	Other UK Airports	ABERDEEN	4836	3956	408	255	4	203	171	218	0	0	8	21
202201	London Area Airports	LUTON	5880	4010	0	27	0	8	84	0	3	0	0	1748
202201	Other UK Airports	OXFORD (KIDLINGTON)	6087	25	25	319	16	4924	0	0	542	0	0	261
202201	London Area Airports	GATWICK	7191	6954	1	171	0	18	9	0	0	0	0	39
202201	Other UK Airports	MANCHESTER	7261	6773	1	121	0	25	6	0	0	0	6	330
202201	London Area Airports	STANSTED	8249	7269	26	339	0	5	44	0	0	4	0	588
202201	London Area Airports	HEATHROW	22435	22071	20	341	0	0	6	0	17	0	0	0

February 2022

reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
Other UK Airports	LERWICK (TINGWALL)	48	36	0	12	0	0	0	0	0	0	0	0
Other UK Airports	TIREE	72	72	2	0	0	0	0	0	0	0	0	0
Other UK Airports	CAMPBELTOWN	74	65	3	3	0	6	0	0	0	0	0	0
Other UK Airports	BARRA	76	73	0	1	0	0	0	0	2	0	0	0
Other UK Airports	WICK JOHN O GROATS	121	10	10	42	0	34	18	0	15	0	2	0
Other UK Airports	ISLAY	142	113	19	15	0	0	0	0	14	0	0	0
Other UK Airports	BENBECULA	202	191	71	10	0	0	1	0	0	0	0	0
Other UK Airports	CITY OF DERRY (EGLINTON)	288	208	0	4	0	12	0	12	36	0	4	12
Other UK Airports	ISLES OF SCILLY (ST.MARYS)	314	265	12	3	0	4	0	0	28	14	0	0
Other UK Airports	LANDS END (ST JUST)	351	266	20	6	0	46	0	2	29	0	2	0
Non UK Reporting Airports	ALDERNEY	394	246	3	6	55	0	0	10	77	0	0	0
Miscellaneous	EDMISTON LONDON HELIPORT	470	138	138	97	31	0	60	0	136	0	0	8
Other UK Airports	STORNOWAY	514	441	149	6	24	40	0	0	3	0	0	0
Other UK Airports	CAMBRIDGE	720	0	0	0	177	3	0	481	24	0	13	22
Other UK Airports	HUMBERSIDE	746	248	7	71	0	237	57	0	57	0	56	20
Other UK Airports	PRESTWICK	818	179	0	61	0	110	0	134	89	0	245	0
Other UK Airports	CARDIFF WALES	878	199	0	30	0	36	0	310	289	0	14	0
Non UK Reporting Airports	ISLE OF MAN	887	581	103	18	0	32	0	30	96	0	0	130
Other UK Airports	KIRKWALL	891	809	113	50	0	10	18	0	4	0	0	0
Other UK Airports	DONCASTER SHEFFIELD	904	415	206	34	0	110	40	231	1	51	22	0
Other UK Airports	TEESSIDE INTERNATIONAL AIRPORT	982	188	4	14	0	36	381	303	8	0	52	0
Other UK Airports	HAWARDEN	1044	0	0	0	108	23	67	478	268	0	57	43
Other UK Airports	BELFAST CITY (GEORGE BEST)	1093	1072	10	5	2	0	0	0	14	0	0	0
Other UK Airports	SOUTHAMPTON	1232	881	4	125	1	49	24	0	0	0	0	152
Other UK Airports	SUMBURGH	1258	993	90	79	12	52	122	0	0	0	0	0
Other UK Airports	LEEDS BRADFORD	1310	981	67	98	0	118	4	0	100	0	9	0
Other UK Airports	BLACKPOOL	1368	60	60	348	0	57	0	480	374	0	0	49
Other UK Airports	INVERNESS	1382	648	203	121	30	73	0	424	68	0	2	16
London Area Airports	SOUTHEND	1401	76	22	5	6	86	9	554	615	14	0	36
Other UK Airports	NEWQUAY	1473	270	161	29	0	514	71	0	427	0	150	12
Other UK Airports	LYDD	1537	1	1	11	0	27	0	762	615	110	6	5
Non UK Reporting Airports	GUERNSEY	1806	981	19	107	211	16	18	223	199	0	6	45
Non UK Reporting Airports	JERSEY	1816	977	0	27	0	2	420	335	0	47	8	0
Other UK Airports	NORWICH	1862	955	0	274	130	60	41	132	268	0	2	0
Other UK Airports	COVENTRY	1963	0	0	0	0	1795	0	0	168	0	0	0
Other UK Airports	NEWCASTLE	2051	1330	6	61	0	8	0	0	468	109	64	11
Other UK Airports	EXETER	2127	275	3	5	139	559	33	579	448	0	4	85
London Area Airports	LONDON CITY	2207	2152	226	52	0	3	0	0	0	0	0	0
Other UK Airports	DUNDEE	2476	91	7	13	5	136	2	2200	9	0	0	20
Other UK Airports	BOURNEMOUTH	2507	309	0	61	0	1171	373	138	320	0	9	126
Other UK Airports	BIGGIN HILL	2843	1446	1399	62	62	0	0	284	608	0	4	377
Other UK Airports	SHOREHAM	2994	0	0	7	150	1216	6	769	813	0	14	19
Other UK Airports	BELFAST INTERNATIONAL	3205	2584	30	43	0	8	272	0	0	43	255	0
Other UK Airports	LIVERPOOL (JOHN LENNON)	3536	1595	84	36	0	69	0	1379	315	4	14	124
Other UK Airports	GLASGOW	3574	3093	166	90	4	27	218	116	0	0	6	20
Other UK Airports	BRISTOL	3615	2923	69	36	0	171	214	251	0	8	12	0
Other UK Airports	GLOUCESTERSHIRE	3676	6	6	5	124	505	20	2116	836	0	8	56
Other UK Airports	BIRMINGHAM	3939	3543	158	123	0	37	214	0	18	2	2	0
Other UK Airports	EAST MIDLANDS INTERNATIONAL	4110	3120	129	264	0	123	198	0	29	0	2	374
Other UK Airports	OXFORD (KIDLINGTON)	4612	12	12	302	11	3582	0	0	465	0	0	240
Other UK Airports	ABERDEEN	4669	3883	316	239	5	168	175	178	0	0	0	21
Other UK Airports	EDINBURGH	5309	4868	37	160	0	0	4	0	270	0	7	0
London Area Airports	LUTON	6644	4306	0	49	0	4	63	0	8	1	0	2213
Other UK Airports	MANCHESTER	8550	7992	0	149	1	2	6	0	0	0	0	400
London Area Airports	GATWICK	8769	8468	2	221	0	44	7	0	0	0	0	29
London Area Airports	STANSTED	10293	9091	35	417	0	8	51	0	0	11	0	715
London Area Airports	HEATHROW	20360	20102	28	234	0	0	2	0	21	1	0	0

March 2022

_period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202203	Other UK Airports	BARRA	104	104	0	0	0	0	0	0	0	0	0	0
202203	Other UK Airports	CAMPBELTOWN	116	80	0	3	7	0	3	4	16	3	0	0
202203	Other UK Airports	TIREE	120	102	0	0	8	2	0	0	6	2	0	0
202203	Other UK Airports	LERWICK (TINGWALL)	126	84	14	21	0	0	0	0	21	0	0	0
202203	Other UK Airports	WICK JOHN O GROATS	179	6	6	1	16	28	75	10	25	4	12	2
202203	Other UK Airports	ISLAY	194	110	2	0	1	0	16	0	52	15	0	0
202203	Other UK Airports	BENBECULA	268	225	57	10	20	3	5	0	5	0	0	0
202203	Non UK Reporting Airports	ALDERNEY	569	342	6	6	72	0	0	16	133	0	0	0
202203	Other UK Airports	CITY OF DERRY (EGLINTON)	580	242	4	4	18	48	0	126	121	0	3	18
202203	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	628	525	10	9	0	0	0	0	78	16	0	0
202203	Miscellaneous	EDMISTON LONDON HELIPORT	648	211	211	157	16	0	42	0	200	2	6	14
202203	Other UK Airports	LANDS END (ST JUST)	692	428	20	23	2	154	0	4	81	0	0	0
202203	Other UK Airports	STORNOWAY	718	514	112	11	21	73	3	0	26	67	0	3
202203	Other UK Airports	DUNDEE	842	120	18	17	6	64	0	583	29	0	3	20
202203	Other UK Airports	CAMBRIDGE	1086	0	0	0	160	1	0	794	71	2	11	47
202203	Other UK Airports	HUMBERSIDE	1094	283	20	102	0	439	97	0	30	0	117	26
202203	Other UK Airports	KIRKWALL	1102	922	92	41	10	19	51	0	10	49	0	0
202203	Non UK Reporting Airports	ISLE OF MAN	1208	786	143	3	0	50	0	94	144	0	12	119
202203	Other UK Airports	BELFAST CITY (GEORGE BEST)	1326	1292	25	11	0	4	0	0	13	6	0	0
202203	Other UK Airports	DONCASTER SHEFFIELD	1402	600	267	29	0	212	66	367	1	95	32	0
202203	Other UK Airports	TEESSIDE INTERNATIONAL AIRPORT	1505	238	2	10	0	12	554	619	10	0	62	0
202203	Other UK Airports	SOUTHAMPTON	1525	1189	20	145	5	13	17	0	0	0	0	156
202203	Other UK Airports	CARDIFF WALES	1559	342	0	52	0	52	0	690	399	0	24	0
202203	Other UK Airports	SUMBURGH	1681	1317	373	103	50	71	127	0	0	11	2	0
202203	Other UK Airports	INVERNESS	1789	851	155	114	139	88	19	406	84	61	2	25
202203	Other UK Airports	PRESTWICK	1826	222	1	52	0	121	0	827	197	0	407	0
202203	London Area Airports	SOUTHEND	2060	81	25	4	49	95	7	906	821	35	8	54
202203	Other UK Airports	LEEDS BRADFORD	2125	1405	97	128	2	392	7	5	168	0	18	0
202203	Non UK Reporting Airports	GUERNSEY	2182	1174	18	103	232	12	8	289	312	0	4	48
202203	Other UK Airports	COVENTRY	2238	1	0	0	1	1987	0	0	249	0	0	0
202203	Non UK Reporting Airports	JERSEY	2303	1217	1	23	0	1	529	498	0	21	14	0
202203	Other UK Airports	LYDD	2406	5	5	21	0	0	0	1375	794	191	18	2
202203	Other UK Airports	NORWICH	2577	1259	0	356	280	18	37	274	353	0	0	0
202203	Other UK Airports	NEWCASTLE	2588	1804	9	46	0	12	0	4	563	94	54	11
202203	Other UK Airports	EXETER	2785	380	3	14	235	582	61	885	500	0	12	116
202203	Other UK Airports	NEWQUAY	2901	459	259	25	0	1041	92	0	933	0	207	144
202203	Other UK Airports	BOURNEMOUTH	3213	341	0	26	0	1662	383	154	476	0	14	157
202203	Other UK Airports	BIGGIN HILL	3237	1317	1277	58	252	0	0	400	817	0	7	386
202203	Other UK Airports	HAWARDEN	3303	0	0	0	225	44	79	2257	489	2	148	59
202203	London Area Airports	LONDON CITY	3444	3376	346	52	0	16	0	0	0	0	0	0
202203	Other UK Airports	BLACKPOOL	3680	66	66	478	0	153	0	2125	814	0	6	38
202203	Other UK Airports	LIVERPOOL (JOHN LENNON)	4039	2097	84	36	0	69	1	1379	315	4	14	124
202203	Other UK Airports	BELFAST INTERNATIONAL	4170	3134	27	46	0	10	434	0	0	47	499	0
202203	Other UK Airports	SHOREHAM	4202	0	0	3	136	1735	13	1270	982	0	26	37
202203	Other UK Airports	GLOUCESTERSHIRE	4406	24	24	58	78	521	20	2667	986	0	8	44
202203	Other UK Airports	BRISTOL	4544	3827	82	24	0	31	237	405	0	4	16	0
202203	Other UK Airports	EAST MIDLANDS INTERNATIONAL	4957	3635	109	332	0	59	316	0	77	0	13	525
202203	Other UK Airports	BIRMINGHAM	5266	4712	284	146	0	72	287	0	33	3	13	0
202203	Other UK Airports	GLASGOW	5271	4203	157	88	7	41	319	593	0	0	2	18
202203	Other UK Airports	ABERDEEN	6312	5190	498	337	5	230	233	277	0	0	10	30
202203	Other UK Airports	OXFORD (KIDLINGTON)	6553	15	14	395	1	5124	0	0	731	0	0	287
202203	Other UK Airports	EDINBURGH	6731	6345	38	131	2	0	0	0	241	0	12	0
202203	London Area Airports	LUTON	8541	6011	0	54	0	5	67	0	10	4	0	2390
202203	Other UK Airports	MANCHESTER	10919	10198	0	136	3	25	4	0	0	0	6	547
202203	London Area Airports	GATWICK	12256	11953	0	226	0	18	6	0	0	1	0	52
202203	London Area Airports	STANSTED	13071	11739	44	382	0	2	54	0	0	10	9	875
202203	London Area Airports	HEATHROW	28341	28027	32	274	0	0	6	0	30	4	0	0

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_period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202204	Other UK Airports	BARRA	92	88	0	0	0	0	0	0	4	0	0	0
202204	Other UK Airports	CAMPBELTOWN	96	68	0	2	1	0	3	3	13	6	0	0
202204	Other UK Airports	LERWICK (TINGWALL)	139	102	15	21	0	0	0	0	16	0	0	0
202204	Other UK Airports	TIREE	160	128	0	0	2	0	0	0	16	14	0	0
202204	Other UK Airports	ISLAY	192	108	4	2	5	0	16	0	52	9	0	0
202204	Other UK Airports	BENBECULA	240	192	31	17	17	0	0	0	7	5	2	0
202204	Other UK Airports	WICK JOHN O GROATS	264	73	11	4	35	19	69	2	52	6	4	0
202204	Other UK Airports	CITY OF DERRY (EGLINTON	518	243	2	7	74	47	0	50	80	0	2	15
202204	Miscellaneous	EDMISTON LONDON HELIP	616	189	189	153	34	0	60	0	154	8	0	18
202204	Non UK Reporting Airports	ALDERNEY	643	326	13	11	105	1	0	58	142	0	0	0
202204	Other UK Airports	STORNOWAY	678	460	60	10	42	60	7	0	27	61	6	5
202204	Other UK Airports	DUNDEE	908	116	13	29	6	67	2	604	26	2	8	48
202204	Other UK Airports	HUMBERSIDE	1023	276	7	67	0	480	93	0	69	0	17	21
202204	Other UK Airports	KIRKWALL	1028	872	74	49	5	8	30	2	21	39	2	0
202204	Other UK Airports	LANDS END (ST JUST)	1079	620	18	43	0	314	0	0	92	0	10	0
202204	Other UK Airports	ISLES OF SCILLY (ST.MARYS	1096	948	8	24	0	11	0	0	93	20	0	0
202204	Non UK Reporting Airports	ISLE OF MAN	1281	854	145	10	0	58	0	70	171	0	2	116
202204	Other UK Airports	BELFAST CITY (GEORGE BES	1409	1359	20	18	0	6	1	0	25	0	0	0
202204	Other UK Airports	DONCASTER SHEFFIELD	1493	717	197	57	0	164	54	373	5	83	40	0
202204	Other UK Airports	CARDIFF WALES	1588	458	0	30	0	109	0	610	363	0	18	0
202204	Other UK Airports	PRESTWICK	1590	387	0	45	0	197	0	447	157	0	357	0
202204	Other UK Airports	SOUTHAMPTON	1687	1282	47	160	0	46	24	0	0	0	10	165
202204	Other UK Airports	SUMBURGH	1721	1305	360	122	38	72	160	0	4	18	2	0
202204	Other UK Airports	TEESSIDE INTERNATIONAL	1860	370	0	13	0	54	383	1008	0	0	32	0
202204	Other UK Airports	CAMBRIDGE	1897	0	0	0	235	6	0	1391	188	0	20	57
202204	Other UK Airports	INVERNESS	1945	990	123	140	108	111	1	350	80	108	2	55
202204	Non UK Reporting Airports	GUERNSEY	2354	1310	29	116	246	7	11	280	336	2	0	46
202204	London Area Airports	SOUTHEND	2378	79	33	3	28	105	6	1077	1001	32	2	45
202204	Other UK Airports	EXETER	2605	562	3	37	262	466	53	458	634	2	18	113
202204	Non UK Reporting Airports	JERSEY	2660	1377	0	43	0	12	514	631	0	69	14	0
202204	Other UK Airports	LEEDS BRADFORD	2683	2010	119	142	0	309	8	1	201	0	12	0
202204	Other UK Airports	NORWICH	2793	1247	0	349	264	34	38	381	474	0	6	0
202204	Other UK Airports	LYDD	3109	7	7	20	230	16	0	1536	1039	210	46	5
202204	Other UK Airports	BOURNEMOUTH	3253	470	2	42	0	1358	443	176	618	0	10	136
202204	Other UK Airports	COVENTRY	3301	0	0	0	0	2960	0	0	339	0	2	0
202204	Other UK Airports	NEWCASTLE	3375	2545	10	81	0	10	0	0	578	107	36	18
202204	Other UK Airports	BLACKPOOL	3437	78	78	417	0	83	0	2103	689	0	8	59
202204	Other UK Airports	NEWQUAY	3507	635	285	28	0	1392	80	0	1077	0	196	99
202204	Other UK Airports	BIGGIN HILL	3819	1397	1344	51	578	0	0	478	892	0	4	419
202204	London Area Airports	LONDON CITY	4156	4108	241	37	0	11	0	0	0	0	0	0
202204	Other UK Airports	GLOUCESTERSHIRE	4262	2	2	8	65	415	30	2472	1225	1	9	35
202204	Other UK Airports	BELFAST INTERNATIONAL	4282	3291	39	50	0	28	341	0	0	83	489	0
202204	Other UK Airports	LIVERPOOL (JOHN LENNON	4436	2363	49	49	0	10	0	1357	421	0	8	228
202204	Other UK Airports	SHOREHAM	4494	0	0	3	130	2116	23	1305	884	0	8	25
202204	Other UK Airports	HAWARDEN	4547	0	0	0	186	100	65	3071	630	4	393	98
202204	Other UK Airports	EAST MIDLANDS INTERNAT	5318	3765	57	510	0	145	307	0	71	0	1	519
202204	Other UK Airports	BRISTOL	5476	4697	69	57	0	2	236	464	0	12	8	0
202204	Other UK Airports	GLASGOW	5828	4824	203	120	9	39	326	446	0	0	29	35
202204	Other UK Airports	BIRMINGHAM	6288	5669	218	157	0	123	299	0	31	3	6	0
202204	Other UK Airports	OXFORD (KIDLINGTON)	6848	29	29	317	2	5320	0	0	878	0	1	301
202204	Other UK Airports	ABERDEEN	7813	5391	759	661	2	304	549	634	0	1	43	228
202204	Other UK Airports	EDINBURGH	8200	7756	50	154	0	0	2	0	284	0	4	0
202204	London Area Airports	LUTON	10161	7752	0	53	0	0	73	0	0	3	0	2280
202204	Other UK Airports	MANCHESTER	13183	12380	4	204	2	16	22	0	0	0	0	559
202204	London Area Airports	STANSTED	14969	13851	44	314	0	26	52	0	0	8	5	713
202204	London Area Airports	GATWICK	18846	18536	2	256	0	10	13	0	0	1	0	30
202204	London Area Airports	HEATHROW	32852	32518	27	278	0	25	4	0	24	3	0	0

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period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202205	Other UK Airports	CAMPBELTOWN	115	93	3	3	2	0	1	0	7	3	2	4
202205	Other UK Airports	BARRA	124	122	0	0	0	0	0	0	2	0	0	0
202205	Other UK Airports	TIREE	147	122	0	0	2	0	0	0	17	6	0	0
202205	Other UK Airports	LERWICK (TINGWALL)	159	132	28	21	0	0	0	0	6	0	0	0
202205	Other UK Airports	BENBECULA	240	199	11	16	12	0	2	0	0	11	0	0
202205	Other UK Airports	ISLAY	250	126	6	2	3	0	18	0	79	21	0	1
202205	Other UK Airports	WICK JOHN O GROATS	330	104	1	1	11	36	86	10	50	17	14	1
202205	Other UK Airports	CITY OF DERRY (EGLINTON)	583	273	2	11	78	8	5	70	112	2	0	24
202205	Other UK Airports	STORNOWAY	693	464	18	2	37	61	6	0	17	84	10	12
202205	Non UK Reporting Airports	ALDERNEY	722	391	19	11	93	0	0	32	195	0	0	0
202205	Miscellaneous	EDMISTON LONDON HELIPORT	898	270	270	232	30	0	84	0	227	0	20	35
202205	Other UK Airports	LANDS END (ST JUST)	937	697	56	31	6	96	0	8	99	0	0	0
202205	Other UK Airports	DUNDEE	953	159	28	32	6	80	4	547	46	2	0	77
202205	Other UK Airports	KIRKWALL	1081	901	70	35	11	15	45	0	16	58	0	0
202205	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	1212	1057	24	7	0	0	0	0	120	28	0	0
202205	Other UK Airports	HUMBERSIDE	1214	337	6	96	0	499	116	0	95	0	46	25
202205	Non UK Reporting Airports	ISLE OF MAN	1500	947	176	20	0	30	0	58	249	0	8	188
202205	Other UK Airports	CARDIFF WALES	1702	734	0	75	0	44	0	340	484	0	25	0
202205	Other UK Airports	DONCASTER SHEFFIELD	1742	877	173	91	0	123	77	435	8	101	30	0
202205	Other UK Airports	SUMBURGH	1749	1382	372	102	32	68	135	0	2	26	2	0
202205	Other UK Airports	BELFAST CITY (GEORGE BEST)	1808	1764	26	20	0	0	0	0	21	3	0	0
202205	Other UK Airports	CAMBRIDGE	1812	0	0	0	174	8	0	1349	164	0	40	77
202205	Other UK Airports	PRESTWICK	1836	390	0	29	0	364	0	412	206	0	435	0
202205	Other UK Airports	SOUTHAMPTON	1898	1409	34	223	1	2	33	0	0	0	12	218
202205	Other UK Airports	TEESSIDE INTERNATIONAL AIRPO	1978	411	2	12	0	37	519	949	0	0	50	0
202205	London Area Airports	SOUTHEND	2236	189	29	14	51	165	4	1044	690	37	0	42
202205	Other UK Airports	INVERNESS	2243	1090	145	148	125	99	0	456	100	143	14	68
202205	Non UK Reporting Airports	GUERNSEY	2712	1502	39	142	274	6	24	289	404	2	10	59
202205	Other UK Airports	COVENTRY	2743	0	0	0	0	2456	0	0	287	0	0	0
202205	Other UK Airports	NEWQUAY	2815	722	302	14	0	789	110	0	848	0	237	95
202205	Other UK Airports	EXETER	2871	679	1	44	189	358	33	722	619	0	20	207
202205	Other UK Airports	NORWICH	2916	1378	0	317	339	49	22	356	447	0	8	0
202205	Other UK Airports	LYDD	2961	9	9	23	177	23	0	1466	928	202	123	10
202205	Other UK Airports	BOURNEMOUTH	3088	521	0	18	0	1150	509	162	568	0	2	158
202205	Non UK Reporting Airports	JERSEY	3169	1598	0	39	0	2	610	845	0	63	12	0
202205	Other UK Airports	BLACKPOOL	3450	102	102	369	0	82	0	1914	908	0	12	63
202205	Other UK Airports	LEEDS BRADFORD	3508	2909	125	155	0	231	3	0	202	0	8	0
202205	Other UK Airports	HAWARDEN	3944	0	0	0	215	72	67	2476	781	0	230	103
202205	Other UK Airports	NEWCASTLE	4263	3340	9	130	0	12	4	0	595	137	36	9
202205	Other UK Airports	LIVERPOOL (JOHN LENNON)	4445	2600	72	95	0	7	2	1133	385	0	29	194
202205	London Area Airports	LONDON CITY	4716	4668	226	36	0	6	4	0	0	0	2	0
202205	Other UK Airports	SHOREHAM	4723	0	0	8	148	2532	16	1196	756	0	16	51
202205	Other UK Airports	BIGGIN HILL	4743	1612	1540	56	1042	0	0	453	1058	0	6	516
202205	Other UK Airports	BELFAST INTERNATIONAL	4815	3676	31	65	0	36	384	0	0	97	557	0
202205	Other UK Airports	GLOUCESTERSHIRE	5956	15	15	25	125	765	21	3547	1340	0	20	98
202205	Other UK Airports	EAST MIDLANDS INTERNATIONAL	6240	4605	65	570	0	108	336	0	88	0	1	532
202205	Other UK Airports	ABERDEEN	6409	5430	513	343	8	195	233	168	0	0	0	32
202205	Other UK Airports	BRISTOL	6770	5782	86	121	2	9	249	597	0	6	4	0
202205	Other UK Airports	GLASGOW	7079	5982	315	171	2	15	342	511	0	4	9	43
202205	Other UK Airports	OXFORD (KIDLINGTON)	7198	23	23	425	0	5455	1	0	930	0	1	363
202205	Other UK Airports	BIRMINGHAM	7461	6786	240	302	0	22	319	0	25	4	3	0
202205	Other UK Airports	EDINBURGH	9342	8850	53	128	2	0	1	0	335	0	26	0
202205	London Area Airports	LUTON	11562	8396	0	41	0	2	75	0	16	2	0	3030
202205	Other UK Airports	MANCHESTER	15458	14454	0	330	1	15	21	0	0	0	8	629
202205	London Area Airports	STANSTED	16524	15053	49	419	0	2	87	0	0	15	9	939
202205	London Area Airports	GATWICK	21976	21529	2	370	0	11	31	0	0	0	0	35
202205	London Area Airports	HEATHROW	35417	35156	39	227	0	2	2	0	30	0	0	0

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_period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202206	Other UK Airports	CAMPBELTOWN	120	93	1	5	1	2	0	0	14	5	0	0
202206	Other UK Airports	BARRA	132	122	0	0	0	2	0	0	8	0	0	0
202206	Other UK Airports	LERWICK (TINGWALL)	140	114	22	17	0	0	0	0	9	0	0	0
202206	Other UK Airports	TIREE	156	129	0	3	6	0	0	0	10	8	0	0
202206	Other UK Airports	ISLAY	211	118	6	4	2	7	9	0	52	9	0	10
202206	Other UK Airports	BENBECULA	234	198	54	12	6	0	0	1	11	6	0	0
202206	Other UK Airports	WICK JOHN O GROATS	316	104	6	3	6	14	99	6	70	4	10	0
202206	Other UK Airports	STORNOWAY	665	451	95	4	35	64	1	0	34	62	2	12
202206	Other UK Airports	CITY OF DERRY (EGLINTON)	707	313	13	7	60	62	0	114	96	0	0	55
202206	Non UK Reporting Airports	ALDERNEY	783	398	13	2	91	0	0	54	238	0	0	0
202206	Other UK Airports	DUNDEE	816	180	32	34	25	63	19	380	38	0	0	77
202206	Other UK Airports	LANDS END (ST JUST)	904	672	66	19	0	39	0	4	170	0	0	0
202206	Other UK Airports	KIRKWALL	1050	877	5	19	3	18	37	2	27	59	2	6
202206	Other UK Airports	HUMBERSIDE	1112	364	13	100	0	404	76	0	87	0	59	22
202206	Other UK Airports	ISLES OF SCILLY (ST.MARYS	1164	967	6	4	0	2	0	0	179	12	0	0
202206	Miscellaneous	EDMISTON LONDON HELIP	1218	446	446	353	29	0	92	0	253	4	14	27
202206	Other UK Airports	SUMBURGH	1692	1315	363	88	50	48	142	0	4	43	2	0
202206	Other UK Airports	PRESTWICK	1734	391	0	36	0	281	0	375	338	0	313	0
202206	Non UK Reporting Airports	ISLE OF MAN	1750	1089	226	31	0	26	0	52	306	0	10	236
202206	Other UK Airports	CARDIFF WALES	1758	812	0	40	0	0	0	381	501	0	24	0
202206	Other UK Airports	DONCASTER SHEFFIELD	1897	1027	263	49	0	136	73	478	5	87	42	0
202206	Other UK Airports	SOUTHAMPTON	1920	1373	24	220	2	4	19	0	0	0	4	298
202206	Other UK Airports	TEESSIDE INTERNATIONAL	2008	324	4	2	0	32	543	1069	0	0	38	0
202206	Other UK Airports	BELFAST CITY (GEORGE BES	2177	2112	51	47	0	0	0	0	18	0	0	0
202206	Other UK Airports	CAMBRIDGE	2198	0	0	0	165	36	0	1639	197	2	29	130
202206	Other UK Airports	INVERNESS	2347	1081	169	142	86	141	7	529	82	188	6	85
202206	London Area Airports	SOUTHEND	2452	202	54	21	108	128	4	992	890	16	6	85
202206	Other UK Airports	LYDD	2802	14	14	18	170	61	0	1143	1034	240	118	4
202206	Non UK Reporting Airports	GUERNSEY	2826	1507	25	128	322	2	34	317	457	0	8	51
202206	Other UK Airports	NEWQUAY	2853	672	265	18	0	821	62	0	884	0	288	108
202206	Other UK Airports	NORWICH	2893	1384	0	358	254	36	26	319	509	0	7	0
202206	Other UK Airports	COVENTRY	3066	0	0	0	0	2704	0	0	357	0	5	0
202206	Other UK Airports	EXETER	3106	732	1	17	252	305	39	791	711	0	13	246
202206	Other UK Airports	BOURNEMOUTH	3190	561	0	13	0	1162	394	185	600	0	100	175
202206	Non UK Reporting Airports	JERSEY	3264	1644	2	50	0	3	688	822	0	47	10	0
202206	Other UK Airports	HAWARDEN	3857	0	0	0	128	76	66	2461	725	0	326	75
202206	Other UK Airports	LEEDS BRADFORD	3901	3175	167	227	0	209	7	0	273	0	10	0
202206	Other UK Airports	BLACKPOOL	4153	538	97	469	0	175	0	2120	772	0	8	71
202206	Other UK Airports	NEWCASTLE	4379	3476	10	63	0	6	0	0	628	145	40	21
202206	London Area Airports	LONDON CITY	4455	4408	251	40	0	7	0	0	0	0	0	0
202206	Other UK Airports	LIVERPOOL (JOHN LENNON	4551	2711	125	63	0	8	0	1200	376	0	19	174
202206	Other UK Airports	SHOREHAM	4563	12	12	1	124	2506	14	1090	767	0	12	37
202206	Other UK Airports	BELFAST INTERNATIONAL	4794	3674	52	59	0	6	404	0	0	86	561	4
202206	Other UK Airports	BIGGIN HILL	5229	2026	1945	61	868	0	0	465	1120	0	10	679
202206	Other UK Airports	GLOUCESTERSHIRE	5515	38	38	43	104	645	23	3228	1317	2	14	101
202206	Other UK Airports	EAST MIDLANDS INTERNAT	6245	4622	54	531	0	166	298	0	73	0	0	555
202206	Other UK Airports	ABERDEEN	6694	5581	495	376	6	198	261	261	0	0	4	7
202206	Other UK Airports	GLASGOW	6858	5916	296	102	4	23	358	405	0	0	12	38
202206	Other UK Airports	BRISTOL	6974	6044	83	67	0	0	352	500	0	9	2	0
202206	Other UK Airports	OXFORD (KIDLINGTON)	7857	19	19	533	6	5852	0	0	1009	0	4	434
202206	Other UK Airports	BIRMINGHAM	8179	7577	348	237	0	8	338	0	18	1	0	0
202206	Other UK Airports	EDINBURGH	9709	9096	50	132	0	0	3	0	476	0	2	0
202206	London Area Airports	LUTON	11675	8507	0	40	0	3	61	0	14	2	0	3048
202206	Other UK Airports	MANCHESTER	15937	15017	0	271	0	33	18	0	0	0	0	598
202206	London Area Airports	STANSTED	16738	15004	21	373	0	2	78	0	0	5	5	1271
202206	London Area Airports	GATWICK	22033	21751	0	204	0	4	30	0	0	4	0	40
202206	London Area Airports	HEATHROW	35063	34744	54	262	0	3	7	0	40	7	0	0

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_period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202207	Other UK Airports	CAMPBELTOWN	105	73	2	4	0	0	8	0	18	0	2	0
202207	Other UK Airports	LERWICK (TINGWALL)	132	98	8	20	0	0	0	0	14	0	0	0
202207	Other UK Airports	BARRA	142	134	0	0	0	0	0	0	6	0	2	0
202207	Other UK Airports	TIREE	192	133	0	0	0	0	24	0	35	0	0	0
202207	Other UK Airports	BENBECULA	202	141	4	27	0	0	26	0	6	0	2	0
202207	Other UK Airports	ISLAY	276	119	13	16	0	0	50	0	56	0	0	35
202207	Other UK Airports	WICK JOHN O GROATS	401	110	8	4	0	18	14	7	234	0	14	0
202207	Other UK Airports	STORNOWAY	620	360	4	10	5	69	111	0	44	0	2	19
202207	Other UK Airports	CITY OF DERRY (EGLINTON)	834	365	6	5	70	62	0	168	118	0	4	42
202207	Non UK Reporting Airports	ALDERNEY	934	429	22	8	114	0	6	44	333	0	0	0
202207	Other UK Airports	LANDS END (ST JUST)	1016	720	16	16	4	64	0	4	204	0	4	0
202207	Other UK Airports	KIRKWALL	1023	871	2	8	9	27	82	0	26	0	0	0
202207	Other UK Airports	DUNDEE	1089	232	91	37	70	53	2	492	70	0	0	133
202207	Other UK Airports	SUMBURGH	1223	1016	17	77	0	53	60	0	15	0	2	0
202207	Other UK Airports	HUMBERSIDE	1234	385	8	117	0	465	119	0	77	0	57	14
202207	Miscellaneous	EDMISTON LONDON HELIP	1297	388	388	308	57	0	104	0	409	0	8	23
202207	Other UK Airports	ISLES OF SCILLY (ST.MARYS	1369	1102	14	0	0	0	0	0	254	13	0	0
202207	Non UK Reporting Airports	ISLE OF MAN	1454	957	168	13	0	92	0	50	220	0	2	120
202207	Other UK Airports	NEWQUAY	1857	550	13	15	707	18	38	0	317	0	63	149
202207	Other UK Airports	CAMBRIDGE	1980	0	0	0	206	11	0	1464	139	8	23	129
202207	Other UK Airports	TEESSIDE INTERNATIONAL	2059	327	2	7	0	18	540	1089	0	2	76	0
202207	Other UK Airports	DONCASTER SHEFFIELD	2073	1060	237	71	0	150	121	535	1	93	42	0
202207	Other UK Airports	SOUTHAMPTON	2098	1560	36	234	0	4	23	0	0	0	4	273
202207	Other UK Airports	PRESTWICK	2308	399	0	34	0	620	0	588	279	0	388	0
202207	Other UK Airports	CARDIFF WALES	2456	879	0	25	0	16	0	448	1053	0	35	0
202207	Other UK Airports	INVERNESS	2485	1122	91	180	43	69	216	548	189	0	8	110
202207	Other UK Airports	BOURNEMOUTH	2620	639	51	29	0	408	420	223	686	0	4	211
202207	Other UK Airports	BELFAST CITY (GEORGE BES	2758	2705	29	34	0	0	0	0	19	0	0	0
202207	London Area Airports	SOUTHEND	2858	213	47	26	179	201	4	1007	1066	37	8	117
202207	Other UK Airports	NORWICH	2932	1318	0	366	226	35	12	399	568	0	8	0
202207	Other UK Airports	COVENTRY	2968	1	0	0	3	2623	0	0	335	0	6	0
202207	Non UK Reporting Airports	GUERNSEY	3018	1621	49	138	355	6	36	300	495	0	8	59
202207	Other UK Airports	LYDD	3192	9	9	18	172	52	0	1152	1374	342	66	7
202207	Other UK Airports	HAWARDEN	3354	0	0	0	142	110	44	2286	495	0	166	111
202207	Non UK Reporting Airports	JERSEY	3545	1786	0	46	0	9	614	1031	0	49	10	0
202207	Other UK Airports	EXETER	3553	763	0	24	267	121	58	1083	921	0	60	256
202207	Other UK Airports	BLACKPOOL	3642	484	86	2	0	110	0	2047	843	0	70	86
202207	Other UK Airports	LEEDS BRADFORD	4013	3371	198	218	0	213	18	0	180	1	12	0
202207	Other UK Airports	NEWCASTLE	4303	3470	4	64	0	4	0	0	574	127	44	20
202207	London Area Airports	LONDON CITY	4311	4281	289	30	0	0	0	0	0	0	0	0
202207	Other UK Airports	LIVERPOOL (JOHN LENNON	4753	2840	86	86	0	6	1	1316	361	0	16	127
202207	Other UK Airports	BELFAST INTERNATIONAL	4889	3698	46	35	0	4	401	0	0	83	668	0
202207	Other UK Airports	SHOREHAM	5246	29	29	10	158	2599	45	1084	1277	0	14	30
202207	Other UK Airports	GLOUCESTERSHIRE	6184	37	37	41	67	843	22	3339	1692	0	28	115
202207	Other UK Airports	BIGGIN HILL	6242	2556	2467	69	1110	0	0	504	1144	0	3	856
202207	Other UK Airports	ABERDEEN	6546	5453	481	361	10	211	241	217	0	0	14	39
202207	Other UK Airports	EAST MIDLANDS INTERNAT	6611	4795	44	503	0	188	319	0	87	0	0	719
202207	Other UK Airports	BRISTOL	7098	6197	79	54	0	4	316	506	0	10	11	0
202207	Other UK Airports	GLASGOW	7400	6232	369	97	13	41	421	555	0	1	13	27
202207	Other UK Airports	OXFORD (KIDLINGTON)	7575	19	19	546	9	5460	0	0	1037	0	4	500
202207	Other UK Airports	BIRMINGHAM	8460	7826	297	260	0	4	327	0	27	6	10	0
202207	Other UK Airports	EDINBURGH	9981	9190	40	177	0	3	3	0	594	0	14	0
202207	London Area Airports	LUTON	12035	8756	0	48	0	0	65	0	12	0	0	3154
202207	Other UK Airports	MANCHESTER	16580	15627	0	265	1	16	17	0	0	0	4	650
202207	London Area Airports	STANSTED	18088	15684	114	529	0	5	72	0	0	6	2	1790
202207	London Area Airports	GATWICK	23723	23480	0	168	0	4	23	0	0	2	1	45
202207	London Area Airports	HEATHROW	34354	34060	44	258	0	4	0	0	32	0	0	0

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reporting_period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202208	Other UK Airports	BARRA	124	124	0	0	0	0	0	0	0	0	0	0
202208	Other UK Airports	CAMPBELTOWN	143	92	3	7	0	0	0	10	22	0	0	12
202208	Other UK Airports	LERWICK (TINGWALL)	172	149	30	16	0	0	0	0	7	0	0	0
202208	Other UK Airports	TIREE	177	144	0	0	0	0	10	0	23	0	0	0
202208	Other UK Airports	BENBECULA	249	204	10	21	4	0	12	0	2	0	6	0
202208	Other UK Airports	ISLAY	287	127	13	18	0	6	43	0	65	0	4	24
202208	Other UK Airports	WICK JOHN O GROATS	324	102	5	4	8	7	8	4	152	0	37	2
202208	Other UK Airports	STORNOWAY	602	364	0	11	27	55	72	0	50	0	16	7
202208	Miscellaneous	EDMISTON LONDON HELIPORT	670	181	181	153	62	0	88	0	174	2	2	8
202208	Non UK Reporting Airports	ALDERNEY	902	407	17	16	122	0	0	51	306	0	0	0
202208	Other UK Airports	DUNDEE	975	169	38	28	31	89	2	410	135	0	2	109
202208	Other UK Airports	CITY OF DERRY (EGLINTON)	979	328	3	10	118	122	0	204	149	0	0	48
202208	Other UK Airports	KIRKWALL	1034	906	3	9	3	12	74	2	26	0	2	0
202208	Other UK Airports	LANDS END (ST JUST)	1091	810	118	24	0	34	0	12	176	0	35	0
202208	Other UK Airports	HUMBERSIDE	1163	360	5	105	0	438	91	0	89	0	52	28
202208	Other UK Airports	SUMBURGH	1319	1064	24	105	0	58	80	0	8	0	4	0
202208	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	1441	1200	30	3	0	0	0	0	217	17	4	0
202208	Non UK Reporting Airports	ISLE OF MAN	1448	987	181	10	0	26	0	92	234	0	10	89
202208	Other UK Airports	NEWQUAY	1754	522	2	14	706	27	50	0	273	0	33	129
202208	Other UK Airports	SOUTHAMPTON	1912	1509	16	162	3	4	17	0	0	0	2	215
202208	Other UK Airports	DONCASTER SHEFFIELD	2023	1175	258	43	0	132	72	487	1	87	26	0
202208	Other UK Airports	PRESTWICK	2094	398	2	86	0	512	0	618	198	0	282	0
202208	Other UK Airports	CAMBRIDGE	2140	0	0	10	239	2	0	1554	189	2	29	115
202208	Other UK Airports	BOURNEMOUTH	2182	613	44	22	0	372	350	201	453	0	7	164
202208	Other UK Airports	CARDIFF WALES	2212	921	0	39	0	8	0	484	723	0	37	0
202208	Other UK Airports	TEESSIDE INTERNATIONAL AIRPORT	2308	337	1	5	0	30	669	1165	0	0	102	0
202208	Other UK Airports	INVERNESS	2517	1173	55	152	32	73	230	571	177	1	19	89
202208	London Area Airports	SOUTHEND	2731	212	56	28	241	176	0	930	944	17	99	84
202208	Other UK Airports	BELFAST CITY (GEORGE BEST)	2922	2860	18	37	0	0	0	0	23	2	0	0
202208	Non UK Reporting Airports	GUERNSEY	2959	1546	32	128	360	2	20	312	541	0	2	48
202208	Other UK Airports	LYDD	2975	13	13	16	201	28	0	1057	1294	295	70	1
202208	Other UK Airports	EXETER	3017	740	0	27	255	66	47	960	734	0	14	174
202208	Other UK Airports	NORWICH	3025	1376	0	335	247	38	14	471	537	0	7	0
202208	Other UK Airports	COVENTRY	3088	0	0	0	0	2878	0	0	210	0	0	0
202208	Non UK Reporting Airports	JERSEY	3425	1805	1	42	0	4	533	993	0	40	8	0
202208	Other UK Airports	BLACKPOOL	3807	415	76	10	0	143	0	2310	817	0	48	64
202208	Other UK Airports	HAWARDEN	3837	0	0	0	208	26	46	2605	594	2	246	110
202208	Other UK Airports	LEEDS BRADFORD	4065	3312	141	168	0	264	11	0	267	0	43	0
202208	London Area Airports	LONDON CITY	4224	4215	196	8	0	0	1	0	0	0	0	0
202208	Other UK Airports	NEWCASTLE	4478	3515	33	64	0	0	0	0	789	63	17	30
202208	Other UK Airports	BIGGIN HILL	4771	1648	1602	44	1066	0	0	578	887	0	1	547
202208	Other UK Airports	LIVERPOOL (JOHN LENNON)	4777	2772	96	33	0	4	0	1497	356	0	47	68
202208	Other UK Airports	BELFAST INTERNATIONAL	4802	3715	51	58	0	20	452	0	0	69	488	0
202208	Other UK Airports	SHOREHAM	4899	8	8	4	137	2180	27	1351	1158	0	16	18
202208	Other UK Airports	OXFORD (KIDLINGTON)	6327	19	18	408	19	4592	2	0	926	0	14	347
202208	Other UK Airports	GLOUCESTERSHIRE	6481	40	40	42	69	658	29	3793	1752	0	22	76
202208	Other UK Airports	EAST MIDLANDS INTERNATIONAL	6520	4826	45	567	0	151	342	0	44	0	6	584
202208	Other UK Airports	ABERDEEN	6703	5638	531	324	4	208	240	270	0	0	8	11
202208	Other UK Airports	BRISTOL	7132	6227	92	61	0	4	255	568	0	1	16	0
202208	Other UK Airports	GLASGOW	7228	6088	288	77	5	34	360	625	0	0	13	26
202208	Other UK Airports	BIRMINGHAM	8534	8104	190	147	0	2	248	0	30	0	3	0
202208	Other UK Airports	EDINBURGH	9731	9064	41	173	0	0	2	0	484	1	7	0
202208	London Area Airports	LUTON	11551	8871	0	0	0	1	127	0	6	0	0	2546
202208	Other UK Airports	MANCHESTER	16561	15744	0	212	3	6	12	0	0	0	2	582
202208	London Area Airports	STANSTED	17515	15900	77	423	1	1	83	0	0	3	12	1092
202208	London Area Airports	GATWICK	24597	24394	2	167	0	3	14	0	0	0	0	19
202208	London Area Airports	HEATHROW	34093	33950	28	114	0	0	2	0	27	0	0	0

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period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202209	Other UK Airports	BARRA	128	122	2	0	0	2	0	0	4	0	0	0
202209	Other UK Airports	LERWICK (TINGWALL)	139	110	17	18	0	0	2	0	9	0	0	0
202209	Other UK Airports	CAMPBELTOWN	150	96	4	9	0	0	2	7	26	0	0	10
202209	Other UK Airports	TIREE	156	130	0	0	0	2	12	0	12	0	0	0
202209	Other UK Airports	ISLAY	212	129	7	5	0	0	20	0	23	0	0	35
202209	Other UK Airports	BENBECULA	263	195	6	19	0	2	40	0	5	0	2	0
202209	Other UK Airports	WICK JOHN O GROATS	292	102	5	1	4	10	10	4	106	0	53	2
202209	Other UK Airports	CITY OF DERRY (EGLINTON)	609	282	6	6	44	35	0	130	87	0	2	23
202209	Other UK Airports	STORNOWAY	614	366	2	20	28	55	97	0	32	0	8	8
202209	Non UK Reporting Airports	ALDERNEY	757	398	19	8	93	0	2	52	204	0	0	0
202209	Miscellaneous	EDMISTON LONDON HELIP	784	263	263	205	4	0	50	0	230	12	8	12
202209	Other UK Airports	LANDS END (ST JUST)	878	694	28	16	4	52	0	12	100	0	0	0
202209	Other UK Airports	KIRKWALL	927	811	7	29	6	0	56	0	21	2	2	0
202209	Other UK Airports	DUNDEE	961	172	40	35	14	56	9	481	70	4	2	118
202209	Other UK Airports	HUMBERSIDE	1045	359	7	110	0	352	83	0	72	0	40	29
202209	Other UK Airports	ISLES OF SCILLY (ST.MARYS	1174	1070	10	3	0	0	0	0	93	8	0	0
202209	Other UK Airports	NEWQUAY	1244	431	10	22	449	22	24	0	172	0	55	69
202209	Non UK Reporting Airports	ISLE OF MAN	1350	990	224	18	0	71	0	40	223	0	8	0
202209	Other UK Airports	SUMBURGH	1502	1260	278	94	0	54	76	0	12	0	6	0
202209	Other UK Airports	CAMBRIDGE	1603	0	0	2	163	12	0	1094	195	2	20	115
202209	Other UK Airports	PRESTWICK	1729	383	0	36	0	466	0	405	180	0	259	0
202209	Other UK Airports	DONCASTER SHEFFIELD	1759	1037	214	78	0	152	47	344	3	74	24	0
202209	Other UK Airports	TEESSIDE INTERNATIONAL	1854	310	4	8	0	20	559	863	2	0	92	0
202209	Other UK Airports	SOUTHAMPTON	1933	1464	12	168	0	0	32	0	0	0	2	267
202209	Other UK Airports	BOURNEMOUTH	2121	562	33	25	0	80	415	168	531	0	145	195
202209	Other UK Airports	INVERNESS	2162	1123	77	150	27	85	198	377	89	0	16	97
202209	Other UK Airports	HAWARDEN	2356	0	0	0	162	54	96	1260	397	3	278	106
202209	London Area Airports	SOUTHEND	2403	154	34	32	34	153	3	1056	862	24	2	83
202209	Other UK Airports	CARDIFF WALES	2459	804	5	50	0	0	0	689	885	0	31	0
202209	Other UK Airports	EXETER	2466	691	0	45	221	48	26	631	612	0	12	180
202209	Other UK Airports	LYDD	2495	11	11	14	108	26	0	805	1142	313	70	6
202209	Non UK Reporting Airports	GUERNSEY	2687	1500	46	135	277	8	24	289	409	0	2	43
202209	Other UK Airports	COVENTRY	2763	0	0	2	0	2482	0	0	277	0	2	0
202209	Other UK Airports	NORWICH	2777	1373	0	320	271	36	35	334	408	0	0	0
202209	Other UK Airports	BELFAST CITY (GEORGE BES	2904	2822	20	41	5	0	1	0	29	6	0	0
202209	Non UK Reporting Airports	JERSEY	3247	1727	1	62	0	5	636	738	0	45	34	0
202209	Other UK Airports	BLACKPOOL	3389	519	84	8	0	74	0	2090	629	0	10	59
202209	Other UK Airports	LEEDS BRADFORD	3655	3066	151	201	0	159	11	0	203	0	15	0
202209	Other UK Airports	LIVERPOOL (JOHN LENNON	4115	2642	84	25	0	12	0	933	374	0	30	99
202209	Other UK Airports	NEWCASTLE	4142	3254	10	79	0	0	0	0	548	185	40	36
202209	Other UK Airports	BIGGIN HILL	4472	1621	1553	47	886	0	0	383	846	0	1	688
202209	London Area Airports	LONDON CITY	4566	4530	323	33	0	2	1	0	0	0	0	0
202209	Other UK Airports	BELFAST INTERNATIONAL	4625	3657	20	39	0	5	447	0	0	63	410	4
202209	Other UK Airports	SHOREHAM	4840	11	11	5	77	2059	16	1640	979	0	18	35
202209	Other UK Airports	GLOUCESTERSHIRE	5662	40	40	30	80	745	30	3199	1443	0	16	79
202209	Other UK Airports	EAST MIDLANDS INTERNAT	5987	4447	3	521	0	120	252	0	70	0	6	571
202209	Other UK Airports	ABERDEEN	6383	5389	474	339	0	249	222	155	0	1	17	11
202209	Other UK Airports	OXFORD (KIDLINGTON)	6549	25	25	409	0	4854	0	0	870	0	3	388
202209	Other UK Airports	BRISTOL	6589	5779	85	59	0	12	267	465	0	7	0	0
202209	Other UK Airports	GLASGOW	7200	6176	335	102	4	65	329	488	0	2	15	19
202209	Other UK Airports	BIRMINGHAM	8471	7888	282	223	0	2	325	0	32	1	0	0
202209	Other UK Airports	EDINBURGH	9684	9141	36	129	0	1	3	0	399	2	9	0
202209	London Area Airports	LUTON	11404	8535	0	0	0	2	133	0	4	24	0	2706
202209	Other UK Airports	MANCHESTER	15838	14971	0	234	3	22	6	0	0	0	0	602
202209	London Area Airports	STANSTED	17015	15381	110	322	0	2	87	0	0	58	14	1151
202209	London Area Airports	GATWICK	23091	22794	0	235	0	0	16	0	0	11	0	35
202209	London Area Airports	HEATHROW	33440	33239	37	154	0	0	2	0	41	4	0	0

SPACE PORT 1

October 2022

_period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202210	Other UK Airports	LERWICK (TINGWALL)	87	69	6	16	0	0	0	0	2	0	0	0
202210	Other UK Airports	BARRA	110	108	0	0	0	2	0	0	0	0	0	0
202210	Other UK Airports	TIREE	118	110	0	0	0	0	2	0	6	0	0	0
202210	Other UK Airports	CAMPBELTOWN	130	80	0	1	0	4	10	0	13	0	2	20
202210	Other UK Airports	ISLAY	213	121	5	6	2	0	30	0	10	0	0	44
202210	Other UK Airports	WICK JOHN O GROATS	236	102	4	3	8	1	18	8	84	0	12	0
202210	Other UK Airports	BENBECULA	243	193	5	17	2	0	27	0	0	0	2	2
202210	Other UK Airports	STORNOWAY	594	362	0	4	27	50	94	0	34	0	16	7
202210	Other UK Airports	CITY OF DERRY (EGLINTON)	597	279	2	14	38	124	0	54	71	0	2	15
202210	Non UK Reporting Airports	ALDERNEY	614	361	16	11	76	0	8	30	128	0	0	0
202210	Other UK Airports	LANDS END (ST JUST)	660	532	4	34	0	38	0	0	56	0	0	0
202210	Other UK Airports	DUNDEE	881	166	24	21	30	49	4	467	59	0	8	77
202210	Miscellaneous	EDMISTON LONDON HELIP	892	269	269	221	2	0	100	0	272	2	6	20
202210	Other UK Airports	ISLES OF SCILLY (ST.MARYS	903	822	2	15	0	0	0	0	50	16	0	0
202210	Other UK Airports	KIRKWALL	1051	865	9	19	18	46	82	6	9	0	0	6
202210	Other UK Airports	NEWQUAY	1060	352	7	56	375	20	42	0	111	0	70	34
202210	Other UK Airports	HUMBERSIDE	1149	363	3	88	0	469	103	0	79	0	28	19
202210	Other UK Airports	DONCASTER SHEFFIELD	1190	620	127	65	0	97	20	315	1	64	8	0
202210	Non UK Reporting Airports	ISLE OF MAN	1206	978	193	4	0	14	2	34	174	0	0	0
202210	Other UK Airports	CAMBRIDGE	1368	0	0	0	227	17	0	913	64	0	22	125
202210	Other UK Airports	PRESTWICK	1413	396	0	48	0	285	0	178	162	0	344	0
202210	Other UK Airports	CARDIFF WALES	1454	593	0	54	0	11	0	443	341	0	12	0
202210	Other UK Airports	SUMBURGH	1501	1289	271	69	0	46	87	0	0	0	2	8
202210	Other UK Airports	BOURNEMOUTH	1725	554	80	25	0	54	396	157	385	0	23	131
202210	Other UK Airports	TEESSIDE INTERNATIONAL	1730	271	0	8	0	24	552	787	2	0	86	0
202210	Other UK Airports	SOUTHAMPTON	1838	1508	15	135	1	2	15	0	0	0	8	169
202210	Other UK Airports	INVERNESS	2092	1127	62	137	20	70	173	395	61	0	8	101
202210	Other UK Airports	LYDD	2126	9	9	22	144	14	0	464	1133	260	78	2
202210	Other UK Airports	EXETER	2194	553	3	39	203	130	44	578	431	0	12	204
202210	Other UK Airports	COVENTRY	2422	0	0	0	0	2155	0	0	265	0	2	0
202210	London Area Airports	SOUTHEND	2489	125	32	31	62	193	1	954	1032	23	0	68
202210	Non UK Reporting Airports	GUERNSEY	2522	1448	41	141	260	10	12	249	339	0	10	53
202210	Other UK Airports	HAWARDEN	2584	0	0	0	168	96	53	1416	550	0	216	85
202210	Other UK Airports	NORWICH	2773	1369	0	323	318	40	25	290	400	0	8	0
202210	Other UK Airports	BLACKPOOL	2834	553	93	7	0	50	0	1453	712	0	4	55
202210	Other UK Airports	BELFAST CITY (GEORGE BES	2875	2737	23	37	0	76	0	0	23	2	0	0
202210	Non UK Reporting Airports	JERSEY	2889	1502	1	55	0	12	640	605	0	62	13	0
202210	Other UK Airports	LEEDS BRADFORD	3255	2726	128	167	0	181	8	0	164	0	9	0
202210	Other UK Airports	BIGGIN HILL	3715	1295	1243	34	476	0	0	476	919	0	3	512
202210	Other UK Airports	NEWCASTLE	4112	3139	5	112	0	0	0	0	580	204	58	19
202210	Other UK Airports	LIVERPOOL (JOHN LENNON	4170	2749	82	71	0	8	0	844	400	0	19	79
202210	Other UK Airports	BELFAST INTERNATIONAL	4448	3627	30	35	0	8	334	0	0	92	350	2
202210	London Area Airports	LONDON CITY	4524	4487	317	37	0	0	0	0	0	0	0	0
202210	Other UK Airports	SHOREHAM	4635	34	34	7	58	2190	11	1584	721	0	6	24
202210	Other UK Airports	GLOUCESTERSHIRE	5224	40	40	34	58	992	32	2842	1133	2	18	73
202210	Other UK Airports	OXFORD (KIDLINGTON)	5569	28	28	326	4	4126	0	0	807	0	8	270
202210	Other UK Airports	EAST MIDLANDS INTERNAT	5913	4250	0	642	0	169	285	0	67	0	2	498
202210	Other UK Airports	BRISTOL	6405	5598	84	147	0	8	251	364	0	15	22	0
202210	Other UK Airports	ABERDEEN	6421	5454	418	290	3	309	237	96	0	0	11	21
202210	Other UK Airports	GLASGOW	6860	6029	239	142	5	17	307	299	0	0	27	34
202210	Other UK Airports	BIRMINGHAM	8030	7400	275	228	0	2	362	0	27	4	7	0
202210	Other UK Airports	EDINBURGH	9757	9194	42	162	2	0	0	0	392	0	7	0
202210	London Area Airports	LUTON	11392	8594	0	0	0	2	124	0	13	0	0	2659
202210	Other UK Airports	MANCHESTER	15277	14467	0	271	0	7	15	0	0	0	0	517
202210	London Area Airports	STANSTED	16897	15481	120	361	0	0	101	0	0	6	5	943
202210	London Area Airports	GATWICK	22837	22554	4	225	0	0	12	0	0	3	0	43
202210	London Area Airports	HEATHROW	34793	34623	45	141	0	0	2	0	25	2	0	0

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reporting_period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202211	Other UK Airports	LERWICK (TINGWALL)	60	28	8	29	0	0	0	0	3	0	0	0
202211	Other UK Airports	BARRA	86	86	0	0	0	0	0	0	0	0	0	0
202211	Other UK Airports	TIREE	98	92	0	0	0	0	6	0	0	0	0	0
202211	Other UK Airports	CAMPBELTOWN	100	67	0	7	0	2	0	0	4	0	0	20
202211	Other UK Airports	ISLAY	175	107	0	2	2	0	48	0	4	0	0	12
202211	Other UK Airports	BENBECULA	217	170	0	4	4	0	28	0	9	0	0	2
202211	Other UK Airports	WICK JOHN O GROATS	240	107	2	2	5	11	20	0	52	0	10	33
202211	Other UK Airports	DONCASTER SHEFFIELD	259	55	43	13	0	23	13	134	0	21	0	0
202211	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	379	342	12	0	0	0	0	0	29	8	0	0
202211	Other UK Airports	CITY OF DERRY (EGLINTON)	472	227	6	1	27	72	0	78	43	0	0	24
202211	Non UK Reporting Airports	ALDERNEY	484	320	14	8	66	0	0	33	55	2	0	0
202211	Other UK Airports	LANDS END (ST JUST)	501	347	39	6	0	102	6	0	36	0	0	4
202211	Other UK Airports	STORNOWAY	614	434	0	3	10	54	93	0	13	0	2	5
202211	Other UK Airports	DUNDEE	696	125	7	8	23	74	6	372	48	0	0	40
202211	Miscellaneous	EDMISTON LONDON HELIPORT	698	199	199	153	0	0	79	0	222	0	8	37
202211	Other UK Airports	KIRKWALL	921	812	2	8	15	8	68	0	10	0	0	0
202211	Other UK Airports	CARDIFF WALES	1039	400	3	30	0	26	0	282	291	0	10	0
202211	Non UK Reporting Airports	ISLE OF MAN	1105	871	175	8	0	36	2	30	158	0	0	0
202211	Other UK Airports	CAMBRIDGE	1144	0	0	0	250	4	0	666	98	0	12	114
202211	Other UK Airports	PRESTWICK	1207	189	0	41	0	370	0	278	135	0	194	0
202211	Other UK Airports	HUMBERSIDE	1224	359	7	107	0	456	127	0	71	0	84	20
202211	Other UK Airports	BOURNEMOUTH	1257	232	45	20	0	53	275	172	352	0	12	141
202211	Other UK Airports	TEESSIDE INTERNATIONAL AIRPORT	1308	257	8	10	0	18	445	508	2	0	68	0
202211	Other UK Airports	NEWQUAY	1404	332	3	62	506	215	44	0	53	2	177	13
202211	Other UK Airports	SUMBURGH	1495	1235	262	106	4	48	86	0	14	0	2	0
202211	Other UK Airports	SOUTHAMPTON	1695	1438	21	88	0	0	9	0	0	0	8	152
202211	London Area Airports	SOUTHEND	1721	43	42	12	18	115	7	591	842	25	4	64
202211	Other UK Airports	LYDD	1739	2	2	4	0	24	0	647	767	186	98	11
202211	Other UK Airports	INVERNESS	1787	935	60	74	44	76	169	317	80	0	0	92
202211	Other UK Airports	LEEDS BRADFORD	1934	1513	91	121	1	127	8	0	158	1	5	0
202211	Non UK Reporting Airports	JERSEY	2050	1188	3	28	0	12	415	346	0	55	6	0
202211	Other UK Airports	EXETER	2067	370	1	17	146	121	34	809	342	0	15	213
202211	Non UK Reporting Airports	GUERNSEY	2118	1293	32	120	185	4	17	217	229	2	10	41
202211	Other UK Airports	HAWARDEN	2197	0	0	0	129	42	72	1315	385	0	196	58
202211	Other UK Airports	NORWICH	2366	1321	0	312	181	53	36	166	294	0	3	0
202211	Other UK Airports	BLACKPOOL	2429	435	73	16	0	43	0	1438	453	0	4	40
202211	Other UK Airports	COVENTRY	2429	0	0	0	1	2269	0	0	159	0	0	0
202211	Other UK Airports	BELFAST CITY (GEORGE BEST)	2501	2437	19	35	1	9	1	0	16	2	0	0
202211	Other UK Airports	BIGGIN HILL	2512	1000	962	30	124	0	0	252	649	0	0	457
202211	Other UK Airports	NEWCASTLE	2758	2031	16	43	0	0	0	0	515	99	50	20
202211	Other UK Airports	LIVERPOOL (JOHN LENNON)	3079	1826	62	62	0	7	2	881	247	0	22	32
202211	Other UK Airports	BELFAST INTERNATIONAL	3408	2513	34	52	0	0	320	0	0	70	453	0
202211	Other UK Airports	SHOREHAM	3520	79	79	3	55	1433	12	1268	641	1	10	18
202211	Other UK Airports	BRISTOL	3963	3384	77	48	0	4	220	303	0	2	2	0
202211	Other UK Airports	EAST MIDLANDS INTERNATIONAL	4386	3071	0	659	0	79	199	0	19	0	6	353
202211	London Area Airports	LONDON CITY	4441	4401	278	38	0	2	0	0	0	0	0	0
202211	Other UK Airports	OXFORD (KIDLINGTON)	4527	25	25	311	0	3211	0	0	705	0	3	272
202211	Other UK Airports	GLOUCESTERSHIRE	4622	18	18	16	70	667	36	2674	1075	0	8	58
202211	Other UK Airports	GLASGOW	4679	4183	78	64	5	25	164	211	0	0	9	18
202211	Other UK Airports	ABERDEEN	5701	5164	209	162	4	145	149	69	0	0	2	6
202211	Other UK Airports	BIRMINGHAM	5896	5444	272	161	0	2	264	0	23	0	2	0
202211	Other UK Airports	EDINBURGH	7529	7093	30	149	2	5	1	0	273	0	6	0
202211	London Area Airports	LUTON	7974	5782	0	66	2	6	57	0	11	0	0	2050
202211	Other UK Airports	MANCHESTER	11244	10736	0	196	5	13	6	0	0	0	0	288
202211	London Area Airports	STANSTED	13659	12475	45	341	0	10	71	0	0	10	4	748
202211	London Area Airports	GATWICK	14871	14569	3	252	4	4	4	0	0	2	0	36
202211	London Area Airports	HEATHROW	34583	34390	22	164	0	1	6	0	21	1	0	0

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reporting_period	reporting_airport_group_name	reporting_airport_name	grand_total	air_transport	air_taxi	positioning_flights	local_movements	test_and_training	other_flights	aero_club	private_flights	official	military	business_aviation
202212	Other UK Airports	LERWICK (TINGWALL)	44	27	12	17	0	0	0	0	0	0	0	0
202212	Other UK Airports	BARRA	76	75	0	1	0	0	0	0	0	0	0	0
202212	Other UK Airports	CAMPBELTOWN	85	60	0	4	0	4	3	0	12	0	0	2
202212	Other UK Airports	TIREE	94	88	0	0	0	0	2	0	4	0	0	0
202212	Other UK Airports	ISLAY	156	95	3	4	1	0	30	0	8	0	0	18
202212	Other UK Airports	WICK JOHN O GROATS	181	84	0	3	12	2	12	0	43	0	0	25
202212	Other UK Airports	BENBECULA	201	153	0	18	0	0	24	0	2	0	2	2
202212	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	390	340	6	0	0	2	0	0	40	8	0	0
202212	Non UK Reporting Airports	ALDERNEY	415	305	14	9	58	0	0	14	29	0	0	0
202212	Miscellaneous	EDMISTON LONDON HELIPORT	423	151	151	98	2	0	51	0	102	0	4	15
202212	Other UK Airports	CITY OF DERRY (EGLINTON)	486	281	2	10	12	53	0	30	69	0	14	17
202212	Other UK Airports	STORNOWAY	522	362	0	6	10	49	73	0	17	0	4	1
202212	Other UK Airports	DUNDEE	536	120	19	20	8	18	4	264	46	0	0	56
202212	Other UK Airports	LANDS END (ST JUST)	574	339	36	3	0	178	0	0	54	0	0	0
202212	Other UK Airports	CARDIFF WALES	747	397	0	42	0	9	0	125	174	0	0	0
202212	Other UK Airports	KIRKWALL	769	646	0	15	9	6	71	0	16	0	0	6
202212	Other UK Airports	CAMBRIDGE	894	0	0	0	155	14	0	593	68	0	11	53
202212	Other UK Airports	HUMBERSIDE	941	286	5	77	0	307	173	0	41	0	30	27
202212	Non UK Reporting Airports	ISLE OF MAN	1092	932	180	3	0	6	12	16	123	0	0	0
202212	Other UK Airports	SUMBURGH	1141	983	210	63	9	56	15	0	15	0	0	0
202212	Other UK Airports	BOURNEMOUTH	1160	286	32	29	0	34	225	151	292	0	2	141
202212	Other UK Airports	PRESTWICK	1314	238	0	57	0	411	0	238	108	0	262	0
202212	Other UK Airports	TEESSIDE INTERNATIONAL AIRPORT	1333	243	12	12	0	30	389	644	2	1	12	0
202212	Other UK Airports	LYDD	1407	12	12	17	0	30	0	605	464	175	102	2
202212	Other UK Airports	INVERNESS	1436	853	42	69	25	74	131	192	29	0	3	60
202212	Other UK Airports	EXETER	1549	374	2	19	156	107	29	495	224	3	3	139
202212	Other UK Airports	SOUTHAMPTON	1619	1273	24	125	0	0	20	0	0	0	8	193
202212	Other UK Airports	HAWARDEN	1747	0	0	0	106	0	72	1071	347	0	112	39
202212	Non UK Reporting Airports	GUERNSEY	1913	1176	34	121	178	0	23	193	177	0	2	43
202212	London Area Airports	SOUTHEND	1993	39	39	22	10	72	5	792	976	15	0	62
202212	Non UK Reporting Airports	JERSEY	2013	1130	2	40	0	15	450	321	0	44	13	0
202212	Other UK Airports	LEEDS BRADFORD	2024	1561	91	127	31	158	11	0	128	0	8	0
202212	Other UK Airports	BLACKPOOL	2107	378	50	4	0	57	0	1307	321	0	2	38
202212	Other UK Airports	NORWICH	2107	1188	0	241	180	65	31	110	292	0	0	0
202212	Other UK Airports	COVENTRY	2108	4	4	0	0	1958	0	0	146	0	0	0
202212	Other UK Airports	BIGGIN HILL	2327	1170	1128	37	42	0	0	238	458	0	1	381
202212	Other UK Airports	BELFAST CITY (GEORGE BEST)	2528	2457	47	48	4	0	0	0	13	2	0	4
202212	Other UK Airports	NEWCASTLE	2737	2128	12	83	0	2	0	0	464	47	10	3
202212	Other UK Airports	SHOREHAM	2753	100	100	9	41	1132	12	1016	437	0	2	4
202212	Other UK Airports	LIVERPOOL (JOHN LENNON)	2993	2009	78	60	0	16	0	540	303	0	10	55
202212	Other UK Airports	OXFORD (KIDLINGTON)	3276	13	13	257	0	2272	0	0	515	0	0	219
202212	Other UK Airports	BELFAST INTERNATIONAL	3311	2676	31	60	0	0	263	0	0	72	240	0
202212	Other UK Airports	GLOUCESTERSHIRE	3313	10	10	16	109	690	23	1715	699	0	2	49
202212	Other UK Airports	BRISTOL	4279	3795	46	88	0	15	184	191	0	2	4	0
202212	Other UK Airports	EAST MIDLANDS INTERNATIONAL	4400	3142	0	618	0	76	170	0	46	0	0	348
202212	Other UK Airports	GLASGOW	4853	4197	126	94	1	30	272	225	0	0	9	25
202212	Other UK Airports	ABERDEEN	5611	4769	375	251	0	241	219	118	0	0	2	11
202212	London Area Airports	LONDON CITY	7301	7266	3633	33	0	1	0	0	1	0	0	0
202212	Other UK Airports	EDINBURGH	7734	7400	36	141	0	0	1	0	190	0	2	0
202212	London Area Airports	LUTON	9244	7072	0	75	6	0	65	0	13	0	0	2013
202212	Other UK Airports	MANCHESTER	11767	11111	0	240	2	6	12	0	0	0	0	396
202212	London Area Airports	STANSTED	13896	12603	92	415	0	3	81	0	0	10	8	776
202212	London Area Airports	GATWICK	17432	17052	0	304	0	13	18	0	0	4	0	41
202212	London Area Airports	HEATHROW	34574	34361	42	179	0	1	2	0	31	0	0	0

January 2019

g_perio	reporting_airport_group_nam	reporting_airport_nam	grand_tota	air_transpor	air_taxi	positioning_fligh	local_movement	test_and_trainin	other_flight	aero_club	private_flight	officia	militar	business_aviation
201901	Other UK Airports	LERWICK (TINGWALL)	66	59	20	7	0	0	0	0	0	0	0	0
201901	Other UK Airports	BARRA	87	81	1	6	0	0	0	0	0	0	0	0
201901	Other UK Airports	TIREE	128	124	10	0	0	0	0	0	4	0	0	0
201901	Other UK Airports	CAMPBELTOWN	154	86	8	8	0	14	0	0	4	0	42	0
201901	Other UK Airports	ISLAY	168	116	16	11	0	0	0	0	41	0	0	0
201901	Other UK Airports	WICK JOHN O GROATS	283	147	27	43	0	34	2	0	51	0	6	0
201901	Other UK Airports	BENBECULA	292	258	119	31	0	0	2	0	0	0	1	0
201901	Other UK Airports	SCATSTA	441	429	0	6	0	6	0	0	0	0	0	0
201901	Non UK Reporting Airports	ALDERNEY	514	342	9	3	63	4	2	44	44	12	0	0
201901	Miscellaneous	METRO LONDON HELIPO	524	131	131	124	27	0	54	0	158	0	8	22
201901	Other UK Airports	ISLES OF SCILLY (ST.MAR	553	454	4	1	0	36	0	0	38	24	0	0
201901	Other UK Airports	SWANSEA	563	0	0	0	0	0	0	474	89	0	0	0
201901	Other UK Airports	CITY OF DERRY (EGLINTC	566	230	2	6	14	210	0	0	79	0	18	9
201901	Other UK Airports	LANDS END (ST JUST)	603	467	61	1	0	71	0	26	38	0	0	0
201901	Other UK Airports	STORNOWAY	666	574	156	18	12	52	0	0	10	0	0	0
201901	Other UK Airports	CARLISLE	905	9	9	52	2	0	0	553	214	0	18	57
201901	Other UK Airports	KIRKWALL	1010	913	126	57	3	14	6	0	15	0	0	2
201901	Other UK Airports	CAMBRIDGE	1140	0	0	0	230	11	0	700	84	0	25	90
201901	Other UK Airports	DURHAM TEES VALLEY	1215	293	6	2	0	18	373	411	62	0	56	0
201901	Other UK Airports	HAWARDEN	1253	0	0	0	157	38	194	430	248	14	61	111
201901	Other UK Airports	SUMBURGH	1386	1043	99	105	21	75	138	0	0	0	4	0
201901	Other UK Airports	DONCASTER SHEFFIELD	1507	689	177	27	0	151	44	566	6	0	24	0
201901	Other UK Airports	HUMBERSIDE	1538	547	11	118	40	625	110	0	57	0	27	14
201901	Other UK Airports	PRESTWICK	1625	215	6	42	0	571	0	445	131	0	221	0
201901	Non UK Reporting Airports	ISLE OF MAN	1684	1192	137	73	0	6	2	214	89	0	6	102
201901	Other UK Airports	LEEDS BRADFORD	1928	1679	64	82	0	28	2	0	129	0	8	0
201901	Other UK Airports	INVERNESS	1972	1065	289	152	31	141	6	472	73	0	3	29
201901	London Area Airports	SOUTHEND	2106	897	18	46	28	161	15	543	353	3	0	60
201901	Other UK Airports	BLACKPOOL	2136	414	78	17	0	110	0	1133	404	0	12	46
201901	Other UK Airports	CARDIFF WALES	2180	950	0	44	0	82	0	695	401	0	8	0
201901	Other UK Airports	LYDD	2312	4	3	15	0	2	0	929	1246	102	14	0
201901	Other UK Airports	COVENTRY	2341	0	0	0	0	1262	0	0	1079	0	0	0
201901	Other UK Airports	BIGGIN HILL	2431	581	562	11	0	0	0	940	529	0	3	367
201901	Other UK Airports	NORWICH	2486	1406	0	278	341	67	21	135	236	0	2	0
201901	Non UK Reporting Airports	GUERNSEY	2551	1529	80	96	237	16	40	356	210	6	4	57
201901	Non UK Reporting Airports	JERSEY	2603	1580	2	42	0	3	439	480	0	50	9	0
201901	Other UK Airports	BELFAST CITY (GEORGE E	2629	2605	22	18	0	3	0	0	3	0	0	0
201901	Other UK Airports	SOUTHAMPTON	2648	2312	5	101	0	0	31	0	0	0	0	204
201901	Other UK Airports	EXETER	2822	930	0	29	276	103	46	674	446	0	50	268
201901	Other UK Airports	BOURNEMOUTH	2975	250	0	16	0	1637	383	160	365	0	12	152
201901	Other UK Airports	OXFORD (KIDLINGTON)	3044	16	16	258	14	1642	2	0	907	0	2	203
201901	Other UK Airports	DUNDEE	3070	104	11	15	4	28	6	2770	52	0	58	33
201901	Other UK Airports	NEWQUAY	3259	660	287	17	0	1244	77	0	500	0	732	29
201901	Other UK Airports	NEWCASTLE	3322	2489	3	45	0	1	0	0	542	204	41	0
201901	Other UK Airports	SHOREHAM	3384	144	144	4	26	16	33	2282	846	0	6	27
201901	Other UK Airports	LIVERPOOL (JOHN LENNC	4023	2583	43	34	0	6	1	1078	123	0	24	174
201901	Other UK Airports	BELFAST INTERNATIONA	4582	3618	97	66	259	2	0	107	19	0	470	41
201901	Other UK Airports	BRISTOL	4588	4532	0	56	0	0	0	0	0	0	0	0
201901	Other UK Airports	EAST MIDLANDS INTERN	5130	4053	333	218	0	104	191	0	58	0	2	504
201901	Other UK Airports	GLASGOW	6095	5508	110	82	0	20	256	195	0	0	6	28
201901	Other UK Airports	GLOUCESTERSHIRE	6169	13	13	28	154	764	34	4071	994	0	12	99
201901	London Area Airports	LONDON CITY	6613	6519	285	31	0	63	0	0	0	0	0	0
201901	Other UK Airports	ABERDEEN	7036	6209	265	226	7	310	184	91	0	0	4	5
201901	Other UK Airports	BIRMINGHAM	7676	7277	102	112	0	13	204	0	69	0	1	0
201901	Other UK Airports	EDINBURGH	8962	8753	103	82	0	0	1	0	122	0	4	0
201901	London Area Airports	LUTON	9877	7917	0	101	0	0	29	0	8	6	0	1816
201901	Other UK Airports	MANCHESTER	13621	13140	1	177	0	10	6	0	0	0	0	288
201901	London Area Airports	STANSTED	15016	13951	17	382	0	2	72	0	0	0	0	609
201901	London Area Airports	GATWICK	19795	19464	0	248	0	6	4	0	0	2	0	71
201901	London Area Airports	HEATHROW	37945	37726	15	138	0	3	4	0	39	28	7	0

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t_period	reporting_airport_group_name	reporting_airport_name	grand_tota	air_transport	air_taxi	positioning_fligh	local_movement	test_and_trainin	other_flight	aero_club	private_flight	officia	military	business_aviation
201902	Other UK Airports	LERWICK (TINGWALL)	97	76	14	16	0	0	0	0	5	0	0	0
201902	Other UK Airports	BARRA	98	98	0	0	0	0	0	0	0	0	0	0
201902	Other UK Airports	CAMPBELTOWN	102	75	9	9	0	8	0	0	8	0	2	0
201902	Other UK Airports	TIREE	140	128	4	0	0	12	0	0	0	0	0	0
201902	Other UK Airports	ISLAY	154	126	8	6	0	0	0	0	22	0	0	0
201902	Other UK Airports	WICK JOHN O GROATS	251	135	27	50	0	30	6	0	20	0	10	0
201902	Other UK Airports	BENBECULA	263	245	109	13	0	0	0	0	0	0	5	0
201902	Other UK Airports	CITY OF DERRY (EGLINTON)	378	178	2	5	16	79	0	8	74	2	8	8
201902	Other UK Airports	SCATSTA	412	393	0	15	0	4	0	0	0	0	0	0
201902	Other UK Airports	LANDS END (ST JUST)	475	403	10	16	8	19	2	1	16	1	9	0
201902	Non UK Reporting Airports	ALDERNEY	478	286	10	3	59	8	2	35	85	0	0	0
201902	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	485	437	4	0	0	4	0	0	26	18	0	0
201902	Other UK Airports	SWANSEA	502	0	0	0	0	0	0	418	84	0	0	0
201902	Miscellaneous	METRO LONDON HELIPORT	521	134	134	120	44	0	83	0	128	0	0	12
201902	Other UK Airports	STORNOWAY	677	574	156	12	13	60	0	0	10	0	8	0
201902	Other UK Airports	KIRKWALL	991	893	114	61	2	18	4	0	13	0	0	0
201902	Other UK Airports	CAMBRIDGE	1017	0	0	0	194	3	0	546	144	0	19	111
201902	Other UK Airports	CARLISLE	1105	10	10	35	0	0	0	669	220	0	140	31
201902	Other UK Airports	DURHAM TEES VALLEY	1135	288	5	4	0	17	390	351	49	0	36	0
201902	Other UK Airports	SUMBURGH	1226	909	87	93	20	66	132	0	2	0	4	0
201902	Other UK Airports	HAWARDEN	1328	0	0	0	128	40	193	573	220	0	67	107
201902	Other UK Airports	PRESTWICK	1480	190	2	42	0	503	0	374	131	0	240	0
201902	Other UK Airports	DONCASTER SHEFFIELD	1537	628	144	24	0	133	31	689	12	0	20	0
201902	Other UK Airports	HUMBERSIDE	1571	511	11	130	42	694	72	0	89	0	22	11
201902	Non UK Reporting Airports	ISLE OF MAN	1578	1125	118	64	0	4	4	108	121	0	14	138
201902	Other UK Airports	INVERNESS	1800	1002	248	87	28	149	16	436	66	0	3	13
201902	London Area Airports	SOUTHEND	1900	884	13	74	10	127	26	525	191	0	0	63
201902	Other UK Airports	LEEDS BRADFORD	1993	1675	66	100	0	69	7	0	135	0	7	0
201902	Other UK Airports	CARDIFF WALES	2299	988	1	54	0	20	0	728	501	0	8	0
201902	Other UK Airports	LYDD	2320	8	8	14	0	7	0	940	1237	112	2	0
201902	Other UK Airports	COVENTRY	2403	0	0	0	0	1583	0	0	820	0	0	0
201902	Other UK Airports	SHOREHAM	2477	38	38	11	11	11	12	1688	678	0	8	20
201902	Other UK Airports	BOURNEMOUTH	2501	238	0	19	0	1337	312	142	336	0	12	105
201902	Non UK Reporting Airports	GUERNSEY	2526	1487	66	86	285	16	16	319	251	0	10	56
201902	Other UK Airports	BELFAST CITY (GEORGE BES	2550	2517	12	16	0	0	0	0	3	8	4	2
201902	Other UK Airports	NORWICH	2591	1470	0	354	258	59	35	139	275	0	1	0
201902	Other UK Airports	SOUTHAMPTON	2601	2227	5	146	2	0	33	0	0	0	2	191
201902	Non UK Reporting Airports	JERSEY	2703	1542	2	27	0	11	391	674	0	48	10	0
201902	Other UK Airports	BIGGIN HILL	2749	750	732	12	0	0	0	999	660	0	4	324
201902	Other UK Airports	NEWQUAY	2799	588	259	33	0	945	55	0	498	0	655	25
201902	Other UK Airports	EXETER	2987	916	0	34	245	376	27	736	395	0	20	238
201902	Other UK Airports	OXFORD (KIDLINGTON)	3000	19	19	299	17	1804	0	0	686	0	2	173
201902	Other UK Airports	BLACKPOOL	3120	444	106	16	0	89	0	1992	529	0	10	40
201902	Other UK Airports	NEWCASTLE	3181	2381	12	50	2	15	1	0	530	161	38	3
201902	Other UK Airports	DUNDEE	3227	99	5	11	18	40	5	2966	40	0	32	16
201902	Other UK Airports	BRISTOL	4062	3994	0	68	0	0	0	0	0	0	0	0
201902	Other UK Airports	BELFAST INTERNATIONAL	4337	3457	84	77	153	8	0	115	17	0	453	57
201902	Other UK Airports	LIVERPOOL (JOHN LENNON)	4790	2542	46	73	0	20	1	1799	154	2	15	184
201902	Other UK Airports	EAST MIDLANDS INTERNAT	4968	3729	339	296	0	97	238	0	135	0	4	469
201902	Other UK Airports	GLOUCESTERSHIRE	5766	13	13	30	152	578	31	3892	980	4	16	70
201902	Other UK Airports	GLASGOW	6101	5271	97	120	3	16	270	388	0	0	10	23
201902	London Area Airports	LONDON CITY	6555	6454	305	60	0	41	0	0	0	0	0	0
201902	Other UK Airports	ABERDEEN	6665	5899	489	213	1	306	167	73	0	0	2	4
201902	Other UK Airports	BIRMINGHAM	7532	7080	112	144	4	10	239	0	49	0	6	0
201902	Other UK Airports	EDINBURGH	8740	8514	76	93	0	2	0	0	128	1	2	0
201902	London Area Airports	LUTON	9767	7551	0	106	0	2	21	0	8	8	0	2071
201902	Other UK Airports	MANCHESTER	13210	12580	3	226	2	23	0	0	0	0	3	376
201902	London Area Airports	STANSTED	13823	12772	20	399	0	0	67	0	0	0	4	581
201902	London Area Airports	GATWICK	19947	19559	0	270	0	6	8	0	0	2	0	102
201902	London Area Airports	HEATHROW	35347	35152	21	148	0	2	0	0	28	15	2	0

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201903	Other UK Airports	LERWICK (TINGWALL)	92	73	14	19	0	0	0	0	0	0	0	0
201903	Other UK Airports	BARRA	104	104	0	0	0	0	0	0	0	0	0	0
201903	Other UK Airports	TIREE	140	130	8	0	0	7	0	0	3	0	0	0
201903	Other UK Airports	CAMPBELTOWN	156	94	12	12	0	32	0	0	4	0	14	0
201903	Other UK Airports	ISLAY	187	136	12	12	0	0	0	0	34	0	5	0
201903	Other UK Airports	BENBECULA	276	257	107	13	0	0	0	0	2	0	4	0
201903	Other UK Airports	WICK JOHN O GROATS	330	154	40	60	0	40	24	0	50	0	2	0
201903	Other UK Airports	SCATSTA	422	407	0	8	0	7	0	0	0	0	0	0
201903	Other UK Airports	CITY OF DERRY (EGLINTON)	478	256	16	2	18	94	0	0	89	0	12	7
201903	Non UK Reporting Airports	ALDERNEY	594	354	20	4	65	6	0	43	120	2	0	0
201903	Other UK Airports	LANDS END (ST JUST)	674	463	9	10	0	114	7	4	56	0	20	0
201903	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	687	598	10	1	0	12	0	0	48	28	0	0
201903	Miscellaneous	METRO LONDON HELIPORT	697	196	196	167	49	0	67	0	200	2	6	10
201903	Other UK Airports	SWANSEA	734	0	0	0	0	0	0	620	114	0	0	0
201903	Other UK Airports	STORNOWAY	777	630	167	51	17	67	0	0	12	0	0	0
201903	Other UK Airports	CARLISLE	849	23	23	4	0	0	0	511	142	0	120	49
201903	Other UK Airports	KIRKWALL	1111	979	131	65	0	24	22	0	19	0	0	2
201903	Other UK Airports	CAMBRIDGE	1199	0	0	0	205	5	0	734	94	0	20	141
201903	Other UK Airports	SUMBURGH	1284	975	93	87	21	69	130	0	0	0	2	0
201903	Other UK Airports	DURHAM TEES VALLEY	1384	305	6	1	0	68	455	384	80	0	91	0
201903	Other UK Airports	HUMBERSIDE	1535	596	12	138	47	516	105	0	96	2	24	11
201903	Other UK Airports	PRESTWICK	1547	230	1	65	0	257	0	548	149	0	298	0
201903	Other UK Airports	HAWARDEN	1549	0	0	0	166	60	196	631	260	22	79	135
201903	Other UK Airports	DONCASTER SHEFFIELD	1660	718	149	30	0	116	52	714	14	0	16	0
201903	Non UK Reporting Airports	ISLE OF MAN	1716	1266	121	61	0	20	2	88	140	0	20	119
201903	Other UK Airports	LYDD	1837	9	9	13	0	2	0	819	881	109	2	2
201903	Other UK Airports	INVERNESS	2012	1181	328	96	23	116	16	478	74	0	4	24
201903	Other UK Airports	CARDIFF WALES	2173	1226	2	61	0	37	0	397	446	0	6	0
201903	London Area Airports	SOUTHEND	2178	1019	28	83	28	134	22	583	241	2	3	63
201903	Other UK Airports	LEEDS BRADFORD	2385	2025	86	130	0	46	6	0	172	0	6	0
201903	Other UK Airports	COVENTRY	2648	1	1	0	0	1152	0	0	1495	0	0	0
201903	Non UK Reporting Airports	GUERNSEY	2759	1718	76	89	255	12	10	360	258	2	6	49
201903	Other UK Airports	BLACKPOOL	2782	400	90	89	0	178	0	1531	510	0	16	58
201903	Other UK Airports	NORWICH	2787	1599	0	361	267	58	25	147	329	0	1	0
201903	Other UK Airports	BELFAST CITY (GEORGE BES	2890	2852	32	15	0	0	0	0	19	0	4	0
201903	Other UK Airports	BIGGIN HILL	2984	833	821	5	0	0	0	694	1100	0	2	350
201903	Other UK Airports	BOURNEMOUTH	2988	254	0	28	0	1643	388	153	404	0	11	107
201903	Other UK Airports	SOUTHAMPTON	2995	2577	5	144	3	6	27	0	0	0	0	238
201903	Non UK Reporting Airports	JERSEY	3032	1819	6	31	0	6	491	628	0	47	10	0
201903	Other UK Airports	EXETER	3033	1017	0	32	286	168	29	735	535	0	26	205
201903	Other UK Airports	NEWQUAY	3067	700	290	28	4	1276	35	0	560	0	418	46
201903	Other UK Airports	DUNDEE	3128	99	6	11	19	76	4	2799	96	0	8	16
201903	Other UK Airports	OXFORD (KIDLINGTON)	3267	22	22	370	4	2021	2	0	651	0	5	192
201903	Other UK Airports	SHOREHAM	3296	75	75	9	127	6	25	2106	916	1	4	27
201903	Other UK Airports	NEWCASTLE	3585	2716	4	51	0	6	1	0	540	210	53	8
201903	Other UK Airports	BRISTOL	4352	4296	0	56	0	0	0	0	0	0	0	0
201903	Other UK Airports	LIVERPOOL (JOHN LENNON)	4714	2822	52	45	0	21	0	1585	129	0	4	108
201903	Other UK Airports	BELFAST INTERNATIONAL	4815	3855	120	80	213	44	0	101	46	0	418	58
201903	Other UK Airports	EAST MIDLANDS INTERNAT	5264	4089	348	271	2	40	243	0	77	0	0	542
201903	Other UK Airports	GLOUCESTERSHIRE	6266	62	62	113	195	1113	19	3558	1082	0	28	96
201903	Other UK Airports	GLASGOW	6957	6153	139	110	3	33	300	324	0	0	14	20
201903	London Area Airports	LONDON CITY	7341	7290	409	25	0	26	0	0	0	0	0	0
201903	Other UK Airports	ABERDEEN	7387	6510	505	231	3	372	187	74	0	0	8	2
201903	Other UK Airports	BIRMINGHAM	8560	7991	213	196	0	8	308	0	43	0	14	0
201903	Other UK Airports	EDINBURGH	10091	9725	52	108	2	0	2	0	238	4	12	0
201903	London Area Airports	LUTON	10875	8480	0	102	2	2	16	0	10	4	0	2259
201903	Other UK Airports	MANCHESTER	15118	14423	0	283	2	17	4	0	0	0	6	383
201903	London Area Airports	STANSTED	15501	14321	35	398	0	7	97	0	0	0	3	675
201903	London Area Airports	GATWICK	22682	22257	0	354	0	1	10	0	0	2	0	58
201903	London Area Airports	HEATHROW	40027	39853	8	125	0	5	6	0	19	19	0	0

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t_perio	reporting_airport_group_nam	reporting_airport_name	grand_tota	air_transpor	air_taxi	positioning_fligh	local_movement	test_and_trainin	other_flight	aero_club	private_flight	officia	militar	business_aviation
201904	Other UK Airports	LERWICK (TINGWALL)	103	89	14	12	0	0	0	0	2	0	0	0
201904	Other UK Airports	BARRA	122	114	0	0	0	2	0	0	6	0	0	0
201904	Other UK Airports	TIREE	160	146	6	0	0	4	0	0	10	0	0	0
201904	Other UK Airports	CAMPBELTOWN	164	91	11	9	0	0	0	0	22	0	42	0
201904	Other UK Airports	ISLAY	318	212	29	21	0	0	0	0	73	0	12	0
201904	Other UK Airports	WICK JOHN O GROATS	323	157	31	49	0	12	16	0	85	0	4	0
201904	Other UK Airports	BENBECULA	333	306	134	15	2	0	0	0	4	0	6	0
201904	Other UK Airports	SCATSTA	433	424	0	9	0	0	0	0	0	0	0	0
201904	Other UK Airports	CITY OF DERRY (EGLINTON)	462	233	2	3	22	110	0	0	71	2	10	11
201904	Miscellaneous	METRO LONDON HELIPORT	722	133	133	128	78	0	93	0	263	0	12	15
201904	Non UK Reporting Airports	ALDERNEY	760	392	19	5	107	0	2	72	178	2	2	0
201904	Other UK Airports	SWANSEA	767	0	0	0	0	0	0	657	110	0	0	0
201904	Other UK Airports	STORNOWAY	906	675	188	25	26	66	0	0	30	0	84	0
201904	Other UK Airports	LANDS END (ST JUST)	1002	801	0	10	16	74	0	0	97	0	4	0
201904	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	1127	955	0	3	0	12	0	0	123	34	0	0
201904	Other UK Airports	CAMBRIDGE	1199	0	0	0	205	5	0	734	94	0	20	141
201904	Other UK Airports	CARLISLE	1254	3	3	5	0	0	0	722	369	0	39	116
201904	Other UK Airports	KIRKWALL	1300	1112	133	80	2	26	34	0	38	0	4	4
201904	Other UK Airports	SUMBURGH	1348	1054	98	85	21	60	122	0	6	0	0	0
201904	Other UK Airports	DURHAM TEES VALLEY	1493	323	4	9	0	91	428	501	84	0	57	0
201904	Other UK Airports	HUMBERSIDE	1527	572	18	114	10	606	106	0	68	2	30	19
201904	Other UK Airports	HAWARDEN	1776	0	0	0	172	88	180	833	226	0	80	197
201904	Non UK Reporting Airports	ISLE OF MAN	1781	1235	139	55	0	24	0	154	169	0	16	128
201904	Other UK Airports	LYDD	1794	10	8	16	0	8	0	780	875	98	6	1
201904	Other UK Airports	DONCASTER SHEFFIELD	1809	906	131	36	0	109	30	696	10	0	22	0
201904	Other UK Airports	INVERNESS	2683	1411	299	146	63	232	10	674	95	0	8	44
201904	Other UK Airports	PRESTWICK	2693	480	2	31	0	468	0	775	136	0	803	0
201904	Other UK Airports	CARDIFF WALES	2694	1387	3	37	0	38	0	795	417	0	20	0
201904	Other UK Airports	LEEDS BRADFORD	2803	2433	68	125	0	66	10	0	168	0	1	0
201904	Other UK Airports	COVENTRY	2822	0	0	0	1	1653	0	0	1167	0	1	0
201904	Other UK Airports	NORWICH	2854	1613	10	340	244	98	19	242	297	0	1	0
201904	London Area Airports	SOUTHEND	2870	1554	20	72	18	210	32	641	256	2	9	76
201904	Other UK Airports	SOUTHAMPTON	2954	2604	7	121	1	7	32	0	0	0	2	187
201904	Non UK Reporting Airports	GUERNSEY	3006	1828	81	97	304	10	18	337	340	4	6	62
201904	Other UK Airports	BELFAST CITY (GEORGE BES	3080	3020	25	21	0	4	0	0	28	5	2	0
201904	Other UK Airports	BIGGIN HILL	3097	815	792	8	0	0	0	611	1387	0	3	273
201904	Other UK Airports	BOURNEMOUTH	3387	435	0	10	0	1750	419	152	490	0	26	105
201904	Other UK Airports	DUNDEE	3490	112	15	30	21	54	15	3173	60	0	0	25
201904	Non UK Reporting Airports	JERSEY	3564	2054	1	24	0	12	518	903	0	39	14	0
201904	Other UK Airports	OXFORD (KIDLINGTON)	3608	20	20	332	4	2246	0	0	802	0	0	204
201904	Other UK Airports	BLACKPOOL	3619	606	130	7	0	109	0	2053	757	0	40	47
201904	Other UK Airports	EXETER	3693	1283	1	31	274	321	21	924	606	0	10	223
201904	Other UK Airports	SHOREHAM	3832	67	67	12	61	39	18	2659	921	0	25	30
201904	Other UK Airports	NEWCASTLE	3897	3131	1	68	2	9	4	0	576	69	26	12
201904	Other UK Airports	BELFAST INTERNATIONAL	4903	4065	127	118	223	32	0	65	45	0	315	40
201904	Other UK Airports	BRISTOL	5064	5016	0	48	0	0	0	0	0	0	0	0
201904	Other UK Airports	LIVERPOOL (JOHN LENNON)	5211	3032	54	44	0	7	0	1758	192	0	9	169
201904	Other UK Airports	NEWQUAY	5320	1132	417	40	0	1567	86	0	816	0	1605	74
201904	Other UK Airports	EAST MIDLANDS INTERNAT	6043	4858	341	295	0	17	228	0	74	0	0	571
201904	Other UK Airports	GLOUCESTERSHIRE	6796	27	27	21	43	1161	35	3980	1367	1	38	123
201904	London Area Airports	LONDON CITY	7109	7038	295	36	0	35	0	0	0	0	0	0
201904	Other UK Airports	GLASGOW	7346	6454	137	102	0	7	310	451	0	0	3	19
201904	Other UK Airports	ABERDEEN	7627	6854	378	256	18	241	171	77	0	0	8	2
201904	Other UK Airports	BIRMINGHAM	8812	8362	102	166	4	8	229	0	41	0	2	0
201904	Other UK Airports	EDINBURGH	11213	10926	73	109	0	2	1	0	173	0	2	0
201904	London Area Airports	LUTON	12027	9717	0	105	0	6	24	0	26	3	0	2146
201904	Other UK Airports	MANCHESTER	16533	15831	0	323	0	10	8	0	0	0	2	359
201904	London Area Airports	STANSTED	16831	15524	21	428	0	3	80	0	0	0	6	790
201904	London Area Airports	GATWICK	24026	23631	0	292	0	16	4	0	0	0	0	83
201904	London Area Airports	HEATHROW	40452	40278	15	90	0	6	0	0	37	41	0	0

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201905	Other UK Airports	LERWICK (TINGWALL)	133	108	22	16	0	0	0	0	9	0	0	0
201905	Other UK Airports	BARRA	148	129	0	1	0	2	0	0	16	0	0	0
201905	Other UK Airports	CAMPBELTOWN	176	101	12	13	0	2	0	0	60	0	0	0
201905	Other UK Airports	TIREE	211	152	12	0	0	0	0	0	59	0	0	0
201905	Other UK Airports	BENBECULA	363	309	139	26	0	0	0	0	6	0	22	0
201905	Other UK Airports	ISLAY	374	223	25	23	0	0	0	0	123	0	5	0
201905	Other UK Airports	WICK JOHN O GROATS	418	159	36	90	0	58	26	0	85	0	0	0
201905	Other UK Airports	SCATSTA	450	441	0	7	0	0	2	0	0	0	0	0
201905	Other UK Airports	CITY OF DERRY (EGLINTON)	679	256	4	8	46	143	0	0	174	0	26	26
201905	Non UK Reporting Airports	ALDERNEY	766	397	6	9	65	0	2	55	234	4	0	0
201905	Other UK Airports	STORNOWAY	844	673	194	32	31	64	0	0	32	0	12	0
201905	Other UK Airports	SWANSEA	946	0	0	0	0	0	0	767	179	0	0	0
201905	Miscellaneous	METRO LONDON HELIPORT	1020	244	244	216	78	0	136	0	296	0	22	28
201905	Other UK Airports	CARLISLE	1319	0	0	2	0	0	0	843	296	0	83	95
201905	Other UK Airports	KIRKWALL	1341	1124	137	67	6	20	54	0	70	0	0	0
201905	Other UK Airports	LANDS END (ST JUST)	1423	1125	82	7	4	82	0	8	187	10	0	0
201905	Other UK Airports	DURHAM TEES VALLEY	1456	345	3	6	0	43	485	470	52	4	51	0
201905	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	1676	1439	34	4	0	20	0	0	181	32	0	0
201905	Other UK Airports	HUMBERSIDE	1713	638	5	107	14	690	118	0	94	0	36	16
201905	Other UK Airports	SUMBURGH	1729	1249	112	95	36	62	273	0	2	0	12	0
201905	Other UK Airports	CAMBRIDGE	1794	0	0	0	268	5	0	1112	238	1	4	166
201905	Non UK Reporting Airports	ISLE OF MAN	2092	1398	154	63	0	8	6	172	302	0	10	133
201905	Other UK Airports	DONCASTER SHEFFIELD	2189	1168	159	70	0	117	52	751	15	0	16	0
201905	Other UK Airports	HAWARDEN	2229	0	0	0	125	114	210	1115	385	0	56	224
201905	Other UK Airports	LYDD	2412	19	19	26	0	25	0	1109	1095	128	6	4
201905	Other UK Airports	PRESTWICK	2476	530	1	32	0	404	0	934	193	0	383	0
201905	Other UK Airports	INVERNESS	2777	1492	317	203	54	106	9	769	86	0	2	56
201905	Other UK Airports	NORWICH	2854	1613	10	340	244	98	19	242	297	0	1	0
201905	Non UK Reporting Airports	GUERNSEY	3231	1980	77	99	245	14	22	404	394	2	4	67
201905	Other UK Airports	COVENTRY	3238	0	0	0	0	2766	0	0	472	0	0	0
201905	Other UK Airports	SOUTHAMPTON	3241	2781	12	135	2	4	40	0	0	0	25	254
201905	Other UK Airports	BELFAST CITY (GEORGE BES	3252	3211	47	16	0	0	0	0	16	9	0	0
201905	Other UK Airports	CARDIFF WALES	3265	1696	0	57	0	222	0	638	642	0	10	0
201905	Other UK Airports	DUNDEE	3363	122	25	39	60	48	14	2896	163	2	0	19
201905	Other UK Airports	BLACKPOOL	3382	478	125	120	0	138	8	1943	619	0	12	64
201905	London Area Airports	SOUTHEND	3504	1818	25	50	54	257	7	876	344	9	5	84
201905	Other UK Airports	LEEDS BRADFORD	3552	3019	114	169	0	66	5	0	272	0	21	0
201905	Other UK Airports	BOURNEMOUTH	3736	533	0	22	0	1848	417	169	606	0	20	121
201905	Non UK Reporting Airports	JERSEY	3877	2254	10	24	0	10	584	951	0	44	10	0
201905	Other UK Airports	OXFORD (KIDLINGTON)	4131	17	17	450	6	2505	2	0	824	0	3	324
201905	Other UK Airports	BIGGIN HILL	4159	964	950	6	0	0	0	720	2007	0	29	433
201905	Other UK Airports	NEWQUAY	4593	1229	370	20	0	1327	111	0	1108	0	724	74
201905	Other UK Airports	EXETER	4757	1430	2	47	337	309	44	1554	783	0	16	237
201905	Other UK Airports	SHOREHAM	4761	79	79	6	48	0	23	3313	1236	0	22	34
201905	Other UK Airports	NEWCASTLE	5082	3975	7	109	44	3	2	0	698	212	39	0
201905	Other UK Airports	BELFAST INTERNATIONAL	5591	4647	63	62	0	29	398	0	0	63	392	0
201905	Other UK Airports	LIVERPOOL (JOHN LENNON)	5790	3252	53	76	0	15	18	2036	171	0	26	196
201905	Other UK Airports	BRISTOL	6645	5813	42	101	0	6	234	489	0	0	2	0
201905	Other UK Airports	EAST MIDLANDS INTERNAT	7103	5584	304	395	0	73	297	0	149	0	4	601
201905	London Area Airports	LONDON CITY	7669	7613	378	40	0	16	0	0	0	0	0	0
201905	Other UK Airports	GLOUCESTERSHIRE	7839	24	24	32	134	850	23	5034	1528	0	20	194
201905	Other UK Airports	ABERDEEN	8630	7706	566	277	2	340	211	74	0	0	9	11
201905	Other UK Airports	GLASGOW	8676	7572	240	132	0	30	343	557	0	0	14	28
201905	Other UK Airports	BIRMINGHAM	10243	9696	154	215	0	27	261	0	42	0	2	0
201905	Other UK Airports	EDINBURGH	12254	11857	73	129	2	0	4	0	246	2	14	0
201905	London Area Airports	LUTON	13142	10242	0	116	2	0	29	0	14	6	0	2733
201905	London Area Airports	STANSTED	18269	16918	30	392	0	5	79	0	0	0	19	856
201905	Other UK Airports	MANCHESTER	18613	17782	0	365	4	15	2	0	0	0	0	445
201905	London Area Airports	GATWICK	26077	25677	0	324	0	10	22	0	0	0	0	44
201905	London Area Airports	HEATHROW	41740	41586	9	112	0	3	0	0	18	21	0	0

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201906	Other UK Airports	LERWICK (TINGWALL)	118	105	12	8	0	0	0	0	5	0	0	0
201906	Other UK Airports	BARRA	132	118	0	0	0	3	0	0	11	0	0	0
201906	Other UK Airports	CAMPBELTOWN	163	102	12	12	0	1	0	0	46	0	2	0
201906	Other UK Airports	TIREE	197	152	24	5	0	4	2	0	34	0	0	0
201906	Other UK Airports	BENBECULA	312	289	127	11	0	0	0	0	10	0	2	0
201906	Other UK Airports	ISLAY	351	215	25	25	0	10	0	0	101	0	0	0
201906	Other UK Airports	WICK JOHN O GROATS	387	132	24	65	2	40	12	0	130	0	6	0
201906	Other UK Airports	SCATSTA	392	386	0	6	0	0	0	0	0	0	0	0
201906	Other UK Airports	CITY OF DERRY (EGLINTON)	735	286	2	3	54	166	0	92	87	0	16	31
201906	Other UK Airports	STORNOWAY	791	649	188	35	15	65	0	0	27	0	0	0
201906	Other UK Airports	SWANSEA	795	1	1	0	0	0	0	682	112	0	0	0
201906	Non UK Reporting Airports	ALDERNEY	816	391	10	11	57	0	2	48	303	4	0	0
201906	Other UK Airports	LANDS END (ST JUST)	1218	1055	104	8	4	32	0	8	109	2	0	0
201906	Miscellaneous	METRO LONDON HELIPORT	1227	363	363	342	90	0	112	0	262	0	18	40
201906	Other UK Airports	KIRKWALL	1278	1110	125	68	3	18	30	0	49	0	0	0
201906	Other UK Airports	CARLISLE	1473	16	16	4	0	3	0	1013	297	0	30	110
201906	Other UK Airports	DURHAM TEES VALLEY	1479	341	9	3	0	36	425	491	82	0	101	0
201906	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	1479	1321	3	1	0	16	0	0	117	24	0	0
201906	Other UK Airports	CAMBRIDGE	1524	0	0	0	246	7	0	979	125	0	11	156
201906	Other UK Airports	HUMBERSIDE	1610	636	24	105	28	610	94	0	96	0	18	23
201906	Other UK Airports	SUMBURGH	1633	1289	102	87	31	50	166	0	8	0	2	0
201906	Other UK Airports	HAWARDEN	1693	0	0	0	134	34	212	706	376	2	106	123
201906	Non UK Reporting Airports	ISLE OF MAN	2099	1327	126	73	0	11	2	120	400	0	10	156
201906	Other UK Airports	DONCASTER SHEFFIELD	2299	1279	205	41	0	94	43	782	18	2	40	0
201906	Other UK Airports	LYDD	2426	16	14	23	0	30	0	1156	1076	109	12	4
201906	Other UK Airports	PRESTWICK	2450	522	0	31	0	651	0	703	262	0	281	0
201906	Other UK Airports	COVENTRY	2791	0	0	0	0	1722	0	0	1069	0	0	0
201906	Other UK Airports	CARDIFF WALES	2871	1717	0	24	0	124	0	519	415	0	72	0
201906	Other UK Airports	INVERNESS	2942	1498	345	139	49	181	10	841	125	0	5	94
201906	Other UK Airports	BLACKPOOL	3113	453	90	8	0	145	0	1699	696	0	32	80
201906	Other UK Airports	BELFAST CITY (GEORGE BES	3125	3070	45	22	1	0	2	0	28	0	0	2
201906	Other UK Airports	BOURNEMOUTH	3253	530	0	7	0	1477	381	193	420	0	87	158
201906	Other UK Airports	SOUTHAMPTON	3290	2837	11	134	2	0	22	0	0	1	42	252
201906	Other UK Airports	NORWICH	3307	1847	3	323	328	78	22	264	443	0	2	0
201906	Non UK Reporting Airports	GUERNSEY	3408	2196	44	89	205	8	16	358	480	4	0	52
201906	Other UK Airports	OXFORD (KIDLINGTON)	3606	27	27	417	18	1869	9	0	965	0	0	301
201906	London Area Airports	SOUTHEND	3690	1990	30	55	71	195	15	804	310	17	6	227
201906	Other UK Airports	LEEDS BRADFORD	3734	3256	100	181	0	87	11	0	189	2	8	0
201906	Other UK Airports	NEWQUAY	3836	1289	329	32	0	883	39	0	792	0	720	81
201906	Other UK Airports	SHOREHAM	4057	129	129	11	76	44	27	2685	1008	4	24	49
201906	Non UK Reporting Airports	JERSEY	4073	2517	17	41	0	3	643	818	0	27	24	0
201906	Other UK Airports	BIGGIN HILL	4154	1164	1121	20	0	0	0	536	1891	0	86	457
201906	Other UK Airports	EXETER	4159	1450	0	23	356	179	42	1127	580	0	145	257
201906	Other UK Airports	DUNDEE	4477	112	21	25	18	52	14	4131	57	2	8	58
201906	Other UK Airports	NEWCASTLE	4844	3999	9	35	0	6	6	0	558	203	32	5
201906	Other UK Airports	LIVERPOOL (JOHN LENNON)	5287	3217	40	92	0	4	4	1569	183	0	27	191
201906	Other UK Airports	BELFAST INTERNATIONAL	5512	4378	35	57	0	15	427	0	0	54	581	0
201906	Other UK Airports	GLOUCESTERSHIRE	6341	25	25	46	213	556	31	3997	1243	0	20	210
201906	Other UK Airports	EAST MIDLANDS INTERNAT	6904	5667	240	300	0	32	261	0	144	0	2	498
201906	Other UK Airports	BRISTOL	6989	6026	3	54	0	16	293	595	0	0	5	0
201906	London Area Airports	LONDON CITY	7266	7219	487	26	0	21	0	0	0	0	0	0
201906	Other UK Airports	ABERDEEN	7578	6851	322	187	46	204	187	99	0	0	2	2
201906	Other UK Airports	GLASGOW	8790	7768	240	134	1	11	347	485	0	0	16	28
201906	Other UK Airports	BIRMINGHAM	10286	9814	190	120	0	19	292	0	40	0	1	0
201906	Other UK Airports	EDINBURGH	12033	11532	51	149	0	2	0	0	342	4	4	0
201906	London Area Airports	LUTON	13027	10096	0	100	0	6	21	0	20	4	0	2780
201906	London Area Airports	STANSTED	18502	16766	42	479	0	6	90	0	0	1	36	1124
201906	Other UK Airports	MANCHESTER	19375	18641	0	274	4	18	11	0	1	0	0	426
201906	London Area Airports	GATWICK	26604	26319	0	211	0	2	12	0	0	1	0	59
201906	London Area Airports	HEATHROW	41013	40839	14	102	0	12	4	0	26	30	0	0

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201907	Other UK Airports	LERWICK (TINGWALL)	119	88	18	15	0	0	0	0	16	0	0	0
201907	Other UK Airports	BARRA	142	108	0	0	0	5	0	0	19	0	10	0
201907	Other UK Airports	TIREE	157	140	6	0	0	0	0	0	17	0	0	0
201907	Other UK Airports	CAMPBELTOWN	164	102	12	12	0	6	0	0	2	0	42	0
201907	Other UK Airports	BENBECULA	254	233	81	10	0	0	0	0	11	0	0	0
201907	Other UK Airports	ISLAY	336	214	27	25	0	2	0	0	93	0	2	0
201907	Other UK Airports	WICK JOHN O GROATS	409	122	21	73	0	44	32	0	132	0	6	0
201907	Other UK Airports	SCATSTA	438	421	0	13	0	2	2	0	0	0	0	0
201907	Other UK Airports	STORNOWAY	808	645	161	24	24	70	0	0	37	0	8	0
201907	Other UK Airports	CITY OF DERRY (EGLINTON)	895	291	6	5	76	134	0	96	167	3	22	101
201907	Other UK Airports	SWANSEA	1008	0	0	0	0	0	0	773	225	0	10	0
201907	Non UK Reporting Airports	ALDERNEY	1052	457	8	12	79	1	2	53	438	10	0	0
201907	Miscellaneous	METRO LONDON HELIPORT	1214	374	374	294	40	0	152	0	308	0	24	22
201907	Other UK Airports	KIRKWALL	1241	1033	121	77	2	10	62	0	57	0	0	0
201907	Other UK Airports	CARLISLE	1290	143	42	17	0	0	0	722	262	6	28	112
201907	Other UK Airports	LANDS END (ST JUST)	1435	1110	37	13	13	53	0	6	222	2	16	0
201907	Other UK Airports	SUMBURGH	1537	1196	106	69	29	46	186	0	5	0	6	0
201907	Other UK Airports	DURHAM TEES VALLEY	1576	274	10	3	0	52	548	588	78	0	33	0
201907	Other UK Airports	HUMBERSIDE	1705	734	21	132	46	542	118	0	99	0	20	14
201907	Other UK Airports	CAMBRIDGE	1711	0	0	0	232	14	0	1162	182	2	15	104
201907	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	1744	1495	12	4	0	0	0	0	208	37	0	0
201907	Non UK Reporting Airports	ISLE OF MAN	1853	1255	108	30	0	28	0	180	206	0	18	136
201907	Other UK Airports	HAWARDEN	1942	0	0	0	143	85	154	855	447	0	118	140
201907	Other UK Airports	PRESTWICK	2199	529	1	25	0	420	0	799	167	0	259	0
201907	Other UK Airports	DONCASTER SHEFFIELD	2553	1352	229	39	0	121	54	966	15	0	6	0
201907	Other UK Airports	LYDD	2750	22	18	30	0	20	0	1269	1255	135	18	1
201907	Other UK Airports	INVERNESS	2962	1542	377	173	46	195	8	758	157	0	1	82
201907	Other UK Airports	COVENTRY	3328	0	0	0	0	2429	0	0	899	0	0	0
201907	Other UK Airports	BELFAST CITY (GEORGE BEST)	3388	3319	97	23	0	8	0	0	36	2	0	0
201907	Other UK Airports	NORWICH	3409	1868	1	346	383	77	21	289	419	0	6	0
201907	Other UK Airports	BLACKPOOL	3480	508	90	10	0	152	0	1926	771	0	24	89
201907	Other UK Airports	SOUTHAMPTON	3514	2999	11	174	3	1	33	0	0	0	2	302
201907	Non UK Reporting Airports	GUERNSEY	3654	2289	29	111	261	19	12	436	480	2	4	40
201907	Other UK Airports	CARDIFF WALES	3777	1812	0	36	0	26	0	803	946	0	154	0
201907	Other UK Airports	LEEDS BRADFORD	4001	3476	114	211	0	108	6	0	173	0	27	0
201907	London Area Airports	SOUTHEND	4014	2168	52	104	87	204	29	800	380	5	8	229
201907	Other UK Airports	BOURNEMOUTH	4160	581	0	5	0	1991	560	193	651	0	9	170
201907	Other UK Airports	BIGGIN HILL	4446	1291	1253	25	466	0	0	610	1551	0	17	486
201907	Non UK Reporting Airports	JERSEY	4468	2549	2	48	0	9	671	1136	0	52	3	0
201907	Other UK Airports	DUNDEE	4667	118	21	18	28	62	23	4333	57	0	0	28
201907	Other UK Airports	SHOREHAM	4790	51	51	31	93	13	36	3231	1273	0	24	38
201907	Other UK Airports	EXETER	4871	1538	0	39	290	380	52	1565	728	2	28	249
201907	Other UK Airports	NEWCASTLE	5201	4150	5	62	16	0	2	0	570	237	154	10
201907	Other UK Airports	OXFORD (KIDLINGTON)	5345	17	17	375	7	3536	5	0	1089	0	8	308
201907	Other UK Airports	LIVERPOOL (JOHN LENNON)	5444	3352	42	67	0	4	2	1690	160	0	27	142
201907	Other UK Airports	NEWQUAY	5476	1428	389	63	0	1558	39	0	1204	0	1132	52
201907	Other UK Airports	BELFAST INTERNATIONAL	5586	4485	45	94	0	16	445	0	0	69	471	6
201907	London Area Airports	LONDON CITY	7231	7163	392	58	0	10	0	0	0	0	0	0
201907	Other UK Airports	BRISTOL	7495	6403	0	68	0	23	258	734	0	1	8	0
201907	Other UK Airports	EAST MIDLANDS INTERNATIO	7598	5955	261	331	0	123	377	0	151	0	0	661
201907	Other UK Airports	GLOUCESTERSHIRE	8055	29	29	44	196	884	40	5197	1418	2	34	211
201907	Other UK Airports	ABERDEEN	8099	7361	523	207	8	212	181	120	0	0	4	6
201907	Other UK Airports	GLASGOW	9064	8033	248	158	3	10	298	515	0	0	9	38
201907	Other UK Airports	BIRMINGHAM	10877	10382	230	132	0	12	313	0	35	2	1	0
201907	Other UK Airports	EDINBURGH	12574	12086	21	157	0	2	4	0	312	2	11	0
201907	London Area Airports	LUTON	13554	10761	0	97	0	2	15	0	18	13	4	2644
201907	London Area Airports	STANSTED	18856	17242	26	481	0	5	75	0	0	0	9	1044
201907	Other UK Airports	MANCHESTER	20361	19547	0	321	0	12	0	0	0	0	4	477
201907	London Area Airports	GATWICK	27577	27278	0	240	0	6	10	0	0	2	0	41
201907	London Area Airports	HEATHROW	42234	42068	8	104	0	2	4	0	27	29	0	0

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201908	Other UK Airports	BARRA	148	128	0	0	0	6	0	0	8	0	6	0
201908	Other UK Airports	TIREE	169	135	7	2	2	4	0	0	26	0	0	0
201908	Other UK Airports	CAMPBELTOWN	172	106	10	10	0	26	0	0	12	0	18	0
201908	Other UK Airports	LERWICK (TINGWALL)	213	174	71	21	0	0	0	0	18	0	0	0
201908	Other UK Airports	BENBECULA	303	261	85	12	0	0	0	0	17	0	13	0
201908	Other UK Airports	ISLAY	323	190	8	8	0	2	0	0	123	0	0	0
201908	Other UK Airports	SCATSTA	414	404	0	8	0	2	0	0	0	0	0	0
201908	Other UK Airports	WICK JOHN O GROATS	442	146	44	78	0	90	20	0	100	0	8	0
201908	Other UK Airports	SWANSEA	464	0	0	0	0	0	0	379	85	0	0	0
201908	Other UK Airports	CITY OF DERRY (EGLINTC	603	302	8	3	40	59	0	54	110	0	4	31
201908	Miscellaneous	METRO LONDON HELIPO	688	132	132	122	68	0	124	0	214	4	18	6
201908	Other UK Airports	STORNOWAY	869	706	188	16	29	72	0	0	46	0	0	0
201908	Non UK Reporting Airports	ALDERNEY	1092	562	8	14	119	1	2	45	345	4	0	0
201908	Other UK Airports	CARLISLE	1309	138	24	17	0	4	4	775	231	4	18	118
201908	Other UK Airports	LANDS END (ST JUST)	1355	1134	10	11	4	28	0	4	164	0	10	0
201908	Other UK Airports	KIRKWALL	1373	1153	135	83	1	17	46	0	69	0	4	0
201908	Other UK Airports	DURHAM TEES VALLEY	1495	250	4	1	0	40	584	509	61	0	50	0
201908	Other UK Airports	HAWARDEN	1652	0	0	0	155	32	141	734	404	0	119	67
201908	Other UK Airports	HUMBERSIDE	1720	690	16	145	48	538	117	0	137	0	31	14
201908	Other UK Airports	SUMBURGH	1721	1350	99	103	30	56	156	0	18	0	8	0
201908	Other UK Airports	ISLES OF SCILLY (ST.MAR	1729	1493	4	5	0	0	0	0	205	26	0	0
201908	Other UK Airports	CAMBRIDGE	1831	0	0	0	241	9	0	1224	210	0	29	118
201908	Non UK Reporting Airports	ISLE OF MAN	1861	1247	112	35	0	12	4	223	223	0	8	109
201908	Other UK Airports	PRESTWICK	2250	535	1	41	0	372	0	897	128	0	277	0
201908	Other UK Airports	LYDD	2252	26	23	29	0	50	0	936	1060	134	12	5
201908	Other UK Airports	DONCASTER SHEFFIELD	2515	1376	198	31	0	126	45	912	21	0	4	0
201908	Other UK Airports	CARDIFF WALES	3170	1805	0	29	0	12	0	708	590	0	26	0
201908	Other UK Airports	INVERNESS	3265	1576	343	163	61	176	18	992	176	0	15	88
201908	Other UK Airports	BELFAST CITY (GEORGE E	3302	3253	66	22	0	0	0	0	25	2	0	0
201908	Other UK Airports	COVENTRY	3311	0	0	1	0	2417	0	0	893	0	0	0
201908	Other UK Airports	BLACKPOOL	3357	176	87	292	0	150	0	1901	739	0	46	53
201908	Other UK Airports	NORWICH	3433	1845	0	363	333	77	30	330	452	0	3	0
201908	Other UK Airports	SOUTHAMPTON	3501	3090	14	163	5	6	31	0	0	0	1	205
201908	Non UK Reporting Airports	GUERNSEY	3740	2279	16	91	342	9	23	405	526	4	4	57
201908	London Area Airports	SOUTHEND	3896	2134	27	58	30	188	21	953	311	23	25	153
201908	Other UK Airports	BIGGIN HILL	4014	1053	1023	25	736	0	0	633	1211	0	26	330
201908	Other UK Airports	LEEDS BRADFORD	4031	3525	130	185	0	133	14	0	162	0	12	0
201908	Other UK Airports	BOURNEMOUTH	4146	568	0	23	0	1887	485	189	685	0	68	241
201908	Other UK Airports	NEWQUAY	4220	1464	477	11	0	916	31	0	955	0	715	128
201908	Non UK Reporting Airports	JERSEY	4251	2588	9	36	0	0	468	1110	0	47	2	0
201908	Other UK Airports	DUNDEE	4619	122	23	27	31	32	25	4187	105	0	4	86
201908	Other UK Airports	EXETER	4781	1520	3	27	293	382	43	1596	640	0	18	262
201908	Other UK Airports	OXFORD (KIDLINGTON)	4815	25	25	332	30	3293	0	0	873	0	3	259
201908	Other UK Airports	SHOREHAM	5043	66	66	11	90	29	24	3330	1402	0	38	53
201908	Other UK Airports	NEWCASTLE	5130	4102	11	49	24	20	6	0	704	190	24	11
201908	Other UK Airports	BELFAST INTERNATIONA	5356	4422	29	58	0	6	410	0	0	81	374	5
201908	Other UK Airports	LIVERPOOL (JOHN LENNC	5571	3373	73	41	0	5	1	1788	122	0	33	208
201908	London Area Airports	LONDON CITY	6523	6476	190	37	0	10	0	0	0	0	0	0
201908	Other UK Airports	BRISTOL	7060	6362	2	56	0	26	196	415	0	1	4	0
201908	Other UK Airports	GLOUCESTERSHIRE	7214	28	28	33	109	968	30	4633	1188	2	31	192
201908	Other UK Airports	EAST MIDLANDS INTERN	7277	5920	180	299	0	55	405	0	118	0	4	476
201908	Other UK Airports	ABERDEEN	8116	7260	686	224	4	307	187	115	0	0	0	19
201908	Other UK Airports	GLASGOW	9058	7845	215	131	1	152	323	569	0	0	9	28
201908	Other UK Airports	BIRMINGHAM	10868	10449	103	166	0	8	212	0	33	0	0	0
201908	Other UK Airports	EDINBURGH	12598	12021	34	153	0	2	3	0	413	0	6	0
201908	London Area Airports	LUTON	13057	10888	0	94	0	4	14	0	10	0	0	2047
201908	London Area Airports	STANSTED	18897	17385	59	446	0	7	104	0	0	0	4	951
201908	Other UK Airports	MANCHESTER	20798	20033	0	294	2	17	9	0	0	0	2	441
201908	London Area Airports	GATWICK	28169	27888	0	215	0	9	20	0	0	0	0	37
201908	London Area Airports	HEATHROW	42135	41951	1	109	0	4	5	0	32	34	0	0

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201909	Other UK Airports	BARRA	104	96	0	0	0	0	0	0	8	0	0	0
201909	Other UK Airports	TIREE	112	106	12	0	0	0	0	0	6	0	0	0
201909	Other UK Airports	CAMPBELTOWN	138	94	16	16	0	0	0	0	16	0	12	0
201909	Other UK Airports	LERWICK (TINGWALL)	138	120	26	14	0	0	0	0	4	0	0	0
201909	Other UK Airports	BENBECULA	269	255	109	4	0	2	1	0	3	0	4	0
201909	Other UK Airports	ISLAY	291	177	28	22	0	0	0	0	84	0	8	0
201909	Other UK Airports	WICK JOHN O GROATS	347	150	55	55	0	52	14	0	74	0	2	0
201909	Other UK Airports	SCATSTA	360	347	0	9	0	2	2	0	0	0	0	0
201909	Other UK Airports	CITY OF DERRY (EGLINTC	731	274	2	2	54	114	0	168	87	0	12	20
201909	Other UK Airports	STORNOWAY	772	632	165	31	19	59	0	0	29	0	2	0
201909	Non UK Reporting Airports	ALDERNEY	811	383	18	10	85	0	0	50	279	4	0	0
201909	Other UK Airports	LANDS END (ST JUST)	966	758	2	13	12	43	0	6	134	0	0	0
201909	Miscellaneous	METRO LONDON HELIPO	1060	298	298	237	76	0	146	0	270	0	6	27
201909	Other UK Airports	ISLES OF SCILLY (ST.MAR	1124	986	7	0	0	0	0	0	118	20	0	0
201909	Other UK Airports	CARLISLE	1144	126	20	2	0	0	0	609	206	6	43	152
201909	Other UK Airports	KIRKWALL	1207	1038	127	59	1	28	34	0	45	0	2	0
201909	Other UK Airports	HAWARDEN	1381	0	0	1	115	8	207	512	350	4	70	114
201909	Other UK Airports	CAMBRIDGE	1652	0	0	0	183	9	0	1008	254	0	32	166
201909	Other UK Airports	HUMBERSIDE	1666	588	6	124	44	593	92	0	86	0	112	27
201909	Other UK Airports	DURHAM TEES VALLEY	1736	306	7	8	0	52	628	589	60	1	92	0
201909	Other UK Airports	SUMBURGH	1811	1412	87	120	26	70	178	0	5	0	0	0
201909	Non UK Reporting Airports	ISLE OF MAN	1926	1252	103	24	0	28	0	280	192	0	12	138
201909	Other UK Airports	PRESTWICK	1977	497	0	34	0	181	0	733	232	0	300	0
201909	Other UK Airports	LYDD	2122	9	8	21	0	28	0	1007	921	119	14	3
201909	Other UK Airports	DONCASTER SHEFFIELD	2266	1293	214	50	0	111	52	717	12	1	30	0
201909	Other UK Airports	COVENTRY	2611	0	0	0	0	1669	0	0	942	0	0	0
201909	Other UK Airports	BELFAST CITY (GEORGE E	3005	2949	59	20	0	8	0	0	26	2	0	0
201909	Other UK Airports	CARDIFF WALES	3031	1626	0	51	0	0	0	701	641	0	12	0
201909	Other UK Airports	BLACKPOOL	3096	461	64	10	0	103	0	1760	639	0	48	75
201909	Other UK Airports	NORWICH	3183	1746	0	263	333	123	39	252	425	0	2	0
201909	London Area Airports	SOUTHEND	3235	1941	64	69	21	114	17	618	230	31	0	194
201909	Other UK Airports	SOUTHAMPTON	3270	2788	32	160	0	4	48	0	0	0	4	266
201909	Non UK Reporting Airports	GUERNSEY	3291	2136	20	112	280	9	20	306	362	0	0	66
201909	Other UK Airports	INVERNESS	3350	1538	310	169	33	173	7	1190	127	0	9	104
201909	Other UK Airports	NEWQUAY	3596	1125	344	30	0	871	35	0	693	0	770	72
201909	Other UK Airports	BOURNEMOUTH	3685	551	0	13	0	1732	469	208	519	0	26	167
201909	Other UK Airports	LEEDS BRADFORD	3734	3265	107	145	0	108	9	0	187	0	20	0
201909	Other UK Airports	BIGGIN HILL	3924	1077	1041	32	722	0	0	480	1167	0	6	440
201909	Non UK Reporting Airports	JERSEY	3942	2310	3	54	0	5	649	795	0	57	72	0
201909	Other UK Airports	EXETER	4259	1351	3	36	270	250	28	1184	783	0	43	314
201909	Other UK Airports	DUNDEE	4324	144	37	60	80	69	34	3777	41	1	6	112
201909	Other UK Airports	SHOREHAM	4617	68	68	21	57	27	29	3124	1240	0	6	45
201909	Other UK Airports	OXFORD (KIDLINGTON)	4719	30	30	323	62	3379	0	0	623	0	0	302
201909	Other UK Airports	LIVERPOOL (JOHN LENNC	5090	3109	70	37	0	3	0	1539	186	0	18	198
201909	Other UK Airports	NEWCASTLE	5114	4035	7	111	2	15	3	0	692	167	57	32
201909	Other UK Airports	BELFAST INTERNATIONA	5333	4349	17	84	0	0	382	0	0	65	451	2
201909	Other UK Airports	GLOUCESTERSHIRE	5979	24	24	35	137	638	23	3722	1163	0	23	214
201909	Other UK Airports	BRISTOL	7086	6176	7	118	0	3	226	550	0	7	6	0
201909	Other UK Airports	EAST MIDLANDS INTERN	7208	5865	217	367	0	60	288	0	145	0	2	481
201909	London Area Airports	LONDON CITY	7351	7298	464	37	0	16	0	0	0	0	0	0
201909	Other UK Airports	ABERDEEN	7960	7085	632	221	186	189	171	91	0	1	9	7
201909	Other UK Airports	GLASGOW	8590	7453	228	179	2	5	312	600	0	2	3	34
201909	Other UK Airports	BIRMINGHAM	10169	9548	159	214	0	15	278	0	48	57	9	0
201909	Other UK Airports	EDINBURGH	11893	11435	40	138	0	1	2	0	302	2	13	0
201909	London Area Airports	LUTON	13084	10494	0	102	0	6	15	0	6	7	0	2454
201909	London Area Airports	STANSTED	18231	16634	38	463	2	2	74	0	0	1	10	1045
201909	Other UK Airports	MANCHESTER	19568	18612	0	465	2	10	4	0	0	0	2	473
201909	London Area Airports	GATWICK	26147	25725	0	389	0	3	4	0	0	1	0	25
201909	London Area Airports	HEATHROW	39146	38992	6	84	0	5	0	0	28	37	0	0

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201910	Other UK Airports	BARRA	116	112	0	0	0	0	0	0	4	0	0	0
201910	Other UK Airports	CAMPBELTOWN	144	98	8	8	0	2	0	0	24	0	12	0
201910	Other UK Airports	TIREE	154	144	10	0	0	0	0	0	10	0	0	0
201910	Other UK Airports	LERWICK (TINGWALL)	195	163	51	22	0	0	0	0	10	0	0	0
201910	Other UK Airports	ISLAY	288	181	23	29	0	0	0	0	78	0	0	0
201910	Other UK Airports	BENBECULA	362	332	148	15	0	10	1	0	2	0	2	0
201910	Other UK Airports	WICK JOHN O GROATS	380	166	42	72	2	36	28	0	74	0	2	0
201910	Other UK Airports	SCATSTA	411	394	0	13	0	2	2	0	0	0	0	0
201910	Non UK Reporting Airports	ALDERNEY	558	353	6	5	58	2	0	38	96	6	0	0
201910	Other UK Airports	CITY OF DERRY (EGLINTON)	611	292	12	0	26	77	0	125	53	0	10	28
201910	Other UK Airports	LANDS END (ST JUST)	800	629	12	13	2	99	4	9	30	0	14	0
201910	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	803	746	4	9	0	0	0	0	41	7	0	0
201910	Miscellaneous	METRO LONDON HELIPORT	910	231	231	199	29	0	106	0	306	8	2	29
201910	Other UK Airports	STORNOWAY	923	751	231	24	6	80	0	0	26	0	36	0
201910	Other UK Airports	KIRKWALL	1291	1097	132	79	8	50	16	0	37	0	2	2
201910	Other UK Airports	HAWARDEN	1339	0	0	0	78	58	169	497	353	1	61	122
201910	Other UK Airports	CARLISLE	1365	139	39	7	0	0	6	854	214	0	23	122
201910	Other UK Airports	HUMBERSIDE	1431	541	6	117	78	430	117	0	102	0	32	14
201910	Other UK Airports	DURHAM TEES VALLEY	1442	303	0	7	0	24	490	539	44	0	35	0
201910	Other UK Airports	CAMBRIDGE	1557	0	0	0	241	7	0	967	131	0	23	188
201910	Non UK Reporting Airports	ISLE OF MAN	1740	1270	107	23	0	33	0	126	170	0	6	112
201910	Other UK Airports	SUMBURGH	1807	1400	115	110	58	53	171	0	8	0	7	0
201910	Other UK Airports	DONCASTER SHEFFIELD	2069	991	157	63	0	128	70	789	10	0	18	0
201910	Other UK Airports	LYDD	2264	6	6	20	0	64	0	1132	913	123	4	2
201910	Other UK Airports	COVENTRY	2495	0	0	0	2	1960	0	0	533	0	0	0
201910	Other UK Airports	PRESTWICK	2525	484	0	36	0	395	0	773	162	0	675	0
201910	Other UK Airports	CARDIFF WALES	2629	1352	0	71	0	0	0	640	546	0	20	0
201910	Other UK Airports	BIGGIN HILL	2853	817	787	12	243	0	0	406	888	0	14	473
201910	Other UK Airports	BELFAST CITY (GEORGE BES	2970	2944	56	10	0	4	0	0	11	0	0	1
201910	Other UK Airports	SOUTHAMPTON	2993	2636	12	119	0	2	41	0	0	0	2	193
201910	Non UK Reporting Airports	GUERNSEY	3043	2091	20	89	252	4	8	296	236	0	8	59
201910	Other UK Airports	INVERNESS	3070	1511	284	197	36	196	10	922	90	0	14	94
201910	Other UK Airports	BOURNEMOUTH	3165	506	0	14	0	1645	351	163	334	0	29	123
201910	Other UK Airports	BLACKPOOL	3181	359	80	145	0	312	2	1803	501	0	16	43
201910	Other UK Airports	NEWQUAY	3212	893	261	33	0	808	88	0	562	0	758	70
201910	Other UK Airports	NORWICH	3289	1811	0	362	380	125	41	237	331	0	2	0
201910	Other UK Airports	LEEDS BRADFORD	3317	2808	116	188	0	179	20	0	111	0	11	0
201910	Non UK Reporting Airports	JERSEY	3319	2152	7	47	0	4	528	530	0	46	12	0
201910	London Area Airports	SOUTHEND	3327	2057	30	81	9	136	17	717	210	9	2	89
201910	Other UK Airports	EXETER	3558	1207	2	37	273	344	45	807	471	0	17	357
201910	Other UK Airports	DUNDEE	3751	137	28	27	15	17	24	3407	42	0	4	78
201910	Other UK Airports	SHOREHAM	4209	54	54	9	21	22	13	2992	1061	0	26	11
201910	Other UK Airports	NEWCASTLE	4647	3666	20	112	0	15	0	0	600	169	64	21
201910	Other UK Airports	OXFORD (KIDLINGTON)	4831	28	28	282	24	3573	0	0	682	0	5	237
201910	Other UK Airports	BELFAST INTERNATIONAL	5027	4051	27	61	0	8	347	0	0	105	453	2
201910	Other UK Airports	GLOUCESTERSHIRE	5206	35	35	33	50	719	22	3178	1036	0	35	98
201910	Other UK Airports	LIVERPOOL (JOHN LENNON)	5394	3101	43	95	0	15	2	1839	165	4	6	167
201910	Other UK Airports	BRISTOL	6422	5622	134	101	0	14	199	486	0	0	0	0
201910	Other UK Airports	EAST MIDLANDS INTERNAT	6777	5498	266	362	0	96	248	0	99	0	0	474
201910	London Area Airports	LONDON CITY	7689	7634	435	43	0	12	0	0	0	0	0	0
201910	Other UK Airports	GLASGOW	8230	7049	186	157	1	85	332	551	0	0	20	35
201910	Other UK Airports	ABERDEEN	8349	7500	389	251	5	293	226	63	0	0	11	0
201910	Other UK Airports	BIRMINGHAM	9562	8974	161	229	0	10	289	0	38	17	5	0
201910	Other UK Airports	EDINBURGH	11821	11397	46	109	2	0	1	0	310	0	2	0
201910	London Area Airports	LUTON	12860	10174	0	128	0	11	21	0	2	10	0	2514
201910	London Area Airports	STANSTED	17572	16114	53	468	0	8	87	0	0	0	9	886
201910	Other UK Airports	MANCHESTER	17726	16808	0	452	2	21	13	0	1	0	1	428
201910	London Area Airports	GATWICK	24429	24006	0	352	0	7	1	0	0	19	0	44
201910	London Area Airports	HEATHROW	41431	41258	0	122	0	4	2	0	20	25	0	0

SPACE PORT 1

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201911	Other UK Airports	BARRA	104	94	0	2	0	8	0	0	0	0	0	0
201911	Other UK Airports	LERWICK (TINGWALL)	111	92	18	14	0	0	0	0	5	0	0	0
201911	Other UK Airports	TIREE	122	114	2	0	0	0	0	0	8	0	0	0
201911	Other UK Airports	CAMPBELTOWN	170	90	8	8	0	2	0	0	12	0	58	0
201911	Other UK Airports	ISLAY	227	142	26	39	0	2	0	0	44	0	0	0
201911	Other UK Airports	BENBECULA	233	221	55	10	0	0	1	0	1	0	0	0
201911	Other UK Airports	WICK JOHN O GROATS	272	122	32	57	0	26	4	0	59	0	4	0
201911	Other UK Airports	ISLES OF SCILLY (ST.MAR	420	378	22	2	0	0	0	0	26	14	0	0
201911	Other UK Airports	SCATSTA	438	417	0	15	0	2	4	0	0	0	0	0
201911	Non UK Reporting Airports	ALDERNEY	466	319	5	7	47	0	4	22	63	4	0	0
201911	Other UK Airports	CITY OF DERRY (EGLINTC	554	245	0	1	16	114	0	80	74	0	16	8
201911	Other UK Airports	LANDS END (ST JUST)	605	402	76	13	8	128	6	2	42	0	0	4
201911	Other UK Airports	STORNOWAY	741	612	118	25	14	63	0	0	21	0	6	0
201911	Miscellaneous	METRO LONDON HELIPO	845	236	236	202	31	0	80	0	262	4	8	22
201911	Other UK Airports	CAMBRIDGE	1076	0	0	0	191	1	0	639	82	0	18	145
201911	Other UK Airports	KIRKWALL	1114	958	143	81	1	24	28	0	18	0	0	4
201911	Other UK Airports	HAWARDEN	1156	0	0	2	113	98	186	317	248	0	98	94
201911	Other UK Airports	HUMBERSIDE	1187	439	3	93	103	349	79	0	69	0	26	29
201911	Other UK Airports	DURHAM TEES VALLEY	1242	296	12	2	0	38	430	402	30	0	44	0
201911	Other UK Airports	CARLISLE	1247	127	32	7	0	0	6	863	134	6	8	96
201911	Other UK Airports	SUMBURGH	1291	990	90	87	35	55	122	0	2	0	0	0
201911	Other UK Airports	DONCASTER SHEFFIELD	1344	572	177	25	0	116	43	532	8	16	32	0
201911	Non UK Reporting Airports	ISLE OF MAN	1365	1106	103	41	0	26	0	77	2	0	10	103
201911	Other UK Airports	COVENTRY	1888	0	0	0	3	1594	0	0	291	0	0	0
201911	Other UK Airports	CARDIFF WALES	2067	1018	0	59	0	64	0	641	281	0	4	0
201911	Other UK Airports	PRESTWICK	2084	210	2	61	0	603	0	799	130	0	281	0
201911	Other UK Airports	LEEDS BRADFORD	2173	1843	70	94	0	101	8	0	118	0	9	0
201911	Other UK Airports	INVERNESS	2271	1105	208	172	30	178	6	631	73	0	6	70
201911	Other UK Airports	LYDD	2325	15	15	14	0	6	0	906	1225	149	10	0
201911	Other UK Airports	BOURNEMOUTH	2336	256	0	10	0	1159	340	126	336	0	10	99
201911	Other UK Airports	BIGGIN HILL	2341	724	693	12	31	0	0	359	820	0	2	393
201911	Other UK Airports	DUNDEE	2413	124	19	24	25	74	21	2076	27	0	0	42
201911	Other UK Airports	NORWICH	2599	1422	0	353	249	67	41	195	272	0	0	0
201911	Other UK Airports	BELFAST CITY (GEORGE E	2624	2591	44	14	0	0	0	0	19	0	0	0
201911	Non UK Reporting Airports	GUERNSEY	2708	1922	16	86	157	2	8	294	180	8	0	51
201911	Non UK Reporting Airports	JERSEY	2722	1844	1	30	0	13	447	350	0	38	0	0
201911	Other UK Airports	SOUTHAMPTON	2775	2430	11	110	0	6	34	0	0	0	0	195
201911	Other UK Airports	BLACKPOOL	2901	393	66	111	0	191	0	1710	446	0	2	48
201911	Other UK Airports	EXETER	2995	875	1	25	234	199	36	865	377	0	26	358
201911	London Area Airports	SOUTHEND	3066	1892	16	93	38	74	18	606	237	6	0	102
201911	Other UK Airports	NEWQUAY	3315	743	275	32	0	786	48	0	445	0	1215	46
201911	Other UK Airports	NEWCASTLE	3344	2639	15	51	0	10	1	0	471	121	42	9
201911	Other UK Airports	SHOREHAM	3490	47	47	21	2	16	16	2470	895	0	8	15
201911	Other UK Airports	OXFORD (KIDLINGTON)	3587	21	21	215	3	2680	4	0	480	0	0	184
201911	Other UK Airports	LIVERPOOL (JOHN LENNC	3751	2245	39	39	0	12	0	1143	150	0	21	141
201911	Other UK Airports	BELFAST INTERNATIONA	4199	3265	7	56	0	2	356	0	0	82	438	0
201911	Other UK Airports	GLOUCESTERSHIRE	4632	12	12	26	55	805	31	2792	829	3	24	55
201911	Other UK Airports	BRISTOL	4724	4032	137	65	0	7	231	383	0	2	4	0
201911	Other UK Airports	EAST MIDLANDS INTERN	5234	4139	244	356	0	51	163	0	71	0	2	452
201911	Other UK Airports	GLASGOW	6661	5737	156	88	3	22	288	463	0	0	8	52
201911	London Area Airports	LONDON CITY	6741	6693	279	30	0	18	0	0	0	0	0	0
201911	Other UK Airports	ABERDEEN	7001	6253	307	224	67	222	147	76	0	0	4	8
201911	Other UK Airports	BIRMINGHAM	7396	6977	100	183	2	10	198	0	22	0	4	0
201911	London Area Airports	LUTON	9471	7180	0	120	2	4	23	0	21	2	0	2119
201911	Other UK Airports	EDINBURGH	9673	9330	33	137	4	4	1	0	196	1	0	0
201911	Other UK Airports	MANCHESTER	13749	13170	0	211	1	23	9	0	0	0	4	331
201911	London Area Airports	STANSTED	13860	12566	50	390	0	6	85	0	0	0	23	790
201911	London Area Airports	GATWICK	18465	18162	0	264	0	0	4	0	0	0	0	35
201911	London Area Airports	HEATHROW	38099	37943	0	95	0	6	6	0	12	35	2	0

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201912	Other UK Airports	LERWICK (TINGWALL)	76	68	30	8	0	0	0	0	0	0	0	0
201912	Other UK Airports	BARRA	84	84	0	0	0	0	0	0	0	0	0	0
201912	Other UK Airports	TIREE	110	108	12	2	0	0	0	0	0	0	0	0
201912	Other UK Airports	CAMPBELTOWN	120	83	11	11	0	2	0	0	6	0	18	0
201912	Other UK Airports	ISLAY	182	124	20	19	0	0	0	0	39	0	0	0
201912	Other UK Airports	WICK JOHN O GROATS	222	101	23	46	0	26	16	0	31	0	2	0
201912	Other UK Airports	BENBECULA	224	216	58	2	0	0	0	0	6	0	0	0
201912	Other UK Airports	SCATSTA	378	360	0	18	0	0	0	0	0	0	0	0
201912	Other UK Airports	CITY OF DERRY (EGLINTON)	404	261	0	1	4	20	0	44	59	0	4	11
201912	Non UK Reporting Airports	ALDERNEY	419	299	7	10	37	0	0	21	46	6	0	0
201912	Other UK Airports	ISLES OF SCILLY (ST.MARYS)	502	412	13	6	0	34	0	0	31	19	0	0
201912	Other UK Airports	LANDS END (ST JUST)	621	373	7	8	0	136	0	0	38	0	66	0
201912	Other UK Airports	STORNOWAY	670	570	114	16	14	56	0	0	14	0	0	0
201912	Miscellaneous	METRO LONDON HELIPORT	772	168	168	142	46	0	96	0	286	8	2	24
201912	Other UK Airports	HAWARDEN	805	0	0	0	97	3	112	209	265	0	45	74
201912	Other UK Airports	KIRKWALL	990	881	139	59	9	10	18	0	13	0	0	0
201912	Other UK Airports	HUMBERSIDE	1025	378	2	75	30	372	85	0	45	0	30	10
201912	Other UK Airports	CAMBRIDGE	1032	0	0	0	187	0	0	628	79	0	16	122
201912	Other UK Airports	TEESSIDE INTERNATIONAL AI	1093	254	7	6	0	26	326	412	39	0	30	0
201912	Other UK Airports	PRESTWICK	1157	215	2	63	0	72	0	439	94	0	274	0
201912	Other UK Airports	CARLISLE	1161	122	22	2	2	0	0	856	113	4	13	49
201912	Other UK Airports	SUMBURGH	1283	948	107	98	47	59	129	0	2	0	0	0
201912	Other UK Airports	DONCASTER SHEFFIELD	1295	597	144	36	0	74	52	447	9	66	14	0
201912	Non UK Reporting Airports	ISLE OF MAN	1460	1108	93	24	0	8	0	82	92	0	34	112
201912	Other UK Airports	CARDIFF WALES	1725	972	0	49	0	0	0	369	329	0	6	0
201912	Other UK Airports	COVENTRY	1832	0	0	0	0	1578	0	0	254	0	0	0
201912	Other UK Airports	LYDD	1862	4	4	21	0	2	0	820	869	139	2	5
201912	Other UK Airports	LEEDS BRADFORD	1990	1644	72	114	0	103	2	0	115	0	12	0
201912	Other UK Airports	BLACKPOOL	2122	392	64	46	0	190	0	1094	343	0	0	57
201912	Other UK Airports	BOURNEMOUTH	2208	290	6	27	0	1070	323	107	284	0	12	95
201912	Other UK Airports	INVERNESS	2234	1144	215	112	29	235	12	609	45	0	0	48
201912	Other UK Airports	BIGGIN HILL	2238	736	705	12	18	0	0	277	680	0	0	515
201912	Other UK Airports	SHOREHAM	2267	43	43	12	7	0	4	1524	654	0	2	21
201912	Other UK Airports	EXETER	2391	916	0	30	178	160	20	409	380	0	44	254
201912	Other UK Airports	NORWICH	2395	1296	0	288	262	64	44	186	255	0	0	0
201912	Non UK Reporting Airports	GUERNSEY	2480	1735	21	89	145	2	16	275	175	0	0	43
201912	London Area Airports	SOUTHEND	2541	1754	14	65	8	73	7	324	202	12	13	83
201912	Other UK Airports	BELFAST CITY (GEORGE BEST)	2567	2540	53	15	0	0	0	0	8	2	0	2
201912	Other UK Airports	SOUTHAMPTON	2691	2372	17	132	1	3	30	0	0	0	2	151
201912	Non UK Reporting Airports	JERSEY	2742	1755	0	39	0	14	436	432	0	64	2	0
201912	Other UK Airports	DUNDEE	2825	109	13	28	34	82	18	2499	29	0	0	26
201912	Other UK Airports	OXFORD (KIDLINGTON)	3073	18	18	249	1	2281	0	0	363	0	0	161
201912	Other UK Airports	NEWCASTLE	3341	2498	10	69	0	18	1	0	494	206	46	9
201912	Other UK Airports	NEWQUAY	3645	686	212	40	0	1684	73	0	491	0	623	48
201912	Other UK Airports	LIVERPOOL (JOHN LENNON)	3903	2422	47	32	0	9	0	1132	128	0	14	166
201912	Other UK Airports	BELFAST INTERNATIONAL	4018	3376	18	56	0	2	230	0	0	76	276	2
201912	Other UK Airports	GLOUCESTERSHIRE	4260	20	20	22	90	610	20	2551	853	0	37	57
201912	Other UK Airports	BRISTOL	4947	4372	62	84	0	32	163	287	0	5	4	0
201912	Other UK Airports	EAST MIDLANDS INTERNATIO	5060	4053	223	380	0	21	158	0	55	0	4	389
201912	London Area Airports	LONDON CITY	6172	6139	266	27	0	6	0	0	0	0	0	0
201912	Other UK Airports	GLASGOW	6244	5540	121	124	1	18	328	193	0	0	2	38
201912	Other UK Airports	ABERDEEN	6800	6055	343	189	26	228	205	78	0	0	4	15
201912	Other UK Airports	BIRMINGHAM	7376	6951	100	195	2	4	198	0	24	0	2	0
201912	Other UK Airports	EDINBURGH	9765	9441	38	116	0	0	1	0	207	0	0	0
201912	London Area Airports	LUTON	11117	8709	0	105	0	4	22	0	41	6	0	2230
201912	Other UK Airports	MANCHESTER	14220	13592	0	278	3	12	8	0	0	0	0	327
201912	London Area Airports	STANSTED	14567	13321	33	408	0	2	79	0	0	6	35	716
201912	London Area Airports	GATWICK	21069	20715	0	298	0	4	4	0	0	0	0	48
201912	London Area Airports	HEATHROW	38490	38311	1	114	0	4	2	0	26	33	0	0