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RESUBMISSION SPACEPORT 1 AIRSPACE CHANGE PROPOSAL TEMPORARY DANGER AREA AIRSPACE PROPOSAL REPORT

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Administration Page

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Executive Summary

This report has undergone several iterations due to three changes to the date when the Temporary Danger Area (TDA) for the Spaceport 1 (SP-1) vertical launch rocket site at Scolpaig is required namely: September 2021; November 2021; and latterly June 2022. Furthermore, the TDA eastern boundary was expanded in August 2021, (following extensive safety evaluation) and a second round of formal engagement was conducted. Therefore, some stakeholders have responded more than once due to new timings being affected by other airspace considerations. The report was further updated following Civil Aviation Authority (CAA) feedback and input from Sollas airfield interested parties; this report is now submitted to the CAA as issue 4.

The TDA at Scolpaig is required to enable sub-orbital sounding rocket launches from Scolpaig into the existing EG D701 Danger Areas. This temporary airspace change, a relatively small volume of airspace over the Spaceport-1 (SP-1) site, provides the necessary segregation of hazardous activities around the launch site. Linking the TDA to the D701 Danger Areas enables a variety of sounding rockets to be launched into a safe environment of pre-defined dimensions with existing proven airspace management, surveillance and clear range procedures in place. Furthermore, use of D701 reduces the need to design a completely new modular structure for relatively few launches. Moreover, any such new structure would not have the benefit of being integrated into the existing airspace management and flight planning systems operated by EUROCONTROL Network Manager (NM).

Despite the small size of the airspace and location, in an area of low populous with very little aviation activity below 7000ft, the Sponsor has undertaken engagement activities with a wide number of aviation stakeholders. When considering stakeholder engagement, the Sponsor recognised that the small fillet of airspace required for the TDA was only part of the story and the subsequent activation of the necessary D701 Danger Areas in support of SP-1 operations had a much wider effect and impact on some stakeholders; in particular Air Navigation Service Providers (ANSPs), North Atlantic (NAT) Airline Operators (AOs); and, the Ministry of Defence (MOD).

Due to COVID restrictions, the change Sponsor conducted all engagement by email, telephone and several WebEx events. The airspace change Sponsor is fully conversant with the issues associated with activation of the D701 complex and was able to predict and mitigate some of the feedback in advance. Due to this and early engagement with key stakeholders, it was considered appropriate to scale the engagement timelines accordingly.

The engagement process revealed that the size of the TDA fillet of airspace was only of concern to the users of the beach landing strip at Sollas. The extension of the eastern boundary of the TDA in August 2021 meant the Sollas beach landing strip was now encompassed within the TDA and concern was raised regarding the Sollas annual fly-in event that occurs in the summer. Furthermore, users of the landing strip outside the annual fly-in event were also worried that the TDA would impact on their use of the landing strip and it was suggested the TDA boundary should be moved. Research revealed use of the landing strip to be extremely limited outside the annual fly-in event and, when balanced against the infrequent planned use of the TDA, it was considered that it would not be cost effective to redesign the TDA and induce additional risk to the program. Moreover, it was agreed with the organisers that the TDA would not be activated during the weekend of the annual Sollas fly-in on 23 and 24 July 2022.

The main ANSP challenged D701 use, concluding that this was not the most efficient use of airspace and proffered that a standalone bespoke airspace design solution would be more effective, requiring less airspace. The use of the D701 areas and existing letters of agreement was also disputed based

on the fact the airspace change for D701 and subsequent agreements approved in 2014, was for MOD activity only, not commercial use. MOD raised concern regarding deconfliction and prioritisation of SP-1 activities against MOD use of D701, as well as the commercial processes that would enable SP-1 to operate in D701 without any MOD liability. A series of WebEx meetings were held to fully understand the concerns raised by these key stakeholders and to establish a way forward. Although agreement was reached on how to address the MOD issues, not all the ANSP areas could be addressed, in particular those that involved regulatory or government policy decisions. The Sponsor carefully evaluated the suggestion of a bespoke airspace TDA design solution rather than using the existing D701 areas but concluded that the benefits of the latter far outweighed any potential reduction in airspace volume required for sounding rockets.

Following the formal engagement rounds, the Sponsor continued to work with the MOD to reach agreement on the principles of using D701 for SP-1 sounding rocket launches. As SP-1 launches will be conducted using largely MOD sponsored airspace (D701), MOD equipment and MOD contracted personnel at the MOD Hebrides Range, it has been agreed that all launches will effectively come under MOD jurisdiction and commercial approvals process (between QinetiQ and MOD). This means current Letters of Agreement (LoAs) and Airspace Management (ASM) procedures in place regarding the use of D701 will be used and SP-1 launches will be subject to these (and restrictions contained therein) as for any other activity in D701 approved by the MOD. Having reached a solution, it was agreed these principles would be captured in a new LoA between MOD, SP-1 and QinetiQ; a draft LoA has been developed.

Another concern raised was the short lead in time from engagement to TDA implementation; both the September and November timelines were a challenge to ANSPs and airspace managers alike and these concerns were reflected in several of the stakeholder's comments. It is considered that the revised timeline for the TDA for June 2022, alleviates many of these concerns and will allow the necessary processes and procedures to be implemented in time.

The remainder of the stakeholders generally focussed on the assurance that access to the TDA and adjacent D701 areas would be enabled in the same fashion as the current access to D701. The Sponsor recognised that the detailed operational considerations associated with SP-1 activities (and limitations imposed) were crucial in tackling the various stakeholder's worries. These considerations are captured in the report accordingly along with the details of stakeholder engagement, feedback, and resolution of concerns highlighted, as well as ongoing work.

1 Introduction

The report is compiled as part of the Airspace Change Proposal (ACP) process prescribed in Civil Aviation Publication (CAP) 1616 [A] for temporary airspace changes and the Civil Aviation Authority (CAA) policy letter for Danger Areas (DAs) and Temporary Danger Areas (TDAs) [B]. ACP-2021-37 has been commenced in order to establish segregated airspace in the form of a TDA around the Spaceport 1 (SP-1) launch site on the Outer Hebrides. QinetiQ is the Sponsor for the airspace change process.

The Spaceport 1 (SP-1) consortium led by the local council, Comhairle nan Eilean Siar, 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 to 10% by 2030 and be at the forefront of small satellite launch capability.

A permanent airspace change for SP-1 is in progress (ACP-2021-12 refers) however, this is unlikely to be implemented before late 2023 and there is a commercial demand to launch a limited number of sub-orbital sounding rockets in 2022. The first launch was planned for September 2021 but it was evident this timeline was probably too ambitious for a number of reasons including the concerns of stakeholders. The first launch was subsequently postponed to November 2021 however, this was further delayed due to a number of factors not all related to the ACP process. The first launch is currently planned for 13 June 2022, with a further four launches thereafter all within the 90 day period. It is expected that demand for launches will continue beyond the 90 day TDA period and similar additional periods may be necessary to undertake subsequent launches; the Sponsor will follow the process detailed in CAP 1616[1] to meet any additional requirement.

The intention is to launch a variety of different sounding rockets from the SP-1 site into the existing Hebrides Range Danger Areas, EG[2] D701. Utilising the existing D701 areas enables many different sounding rocket types, with varying capabilities, to be launched and contained safely within existing segregated airspace. Activation of the TDA and subsequent D701 areas will be by Notice To Airman (NOTAM) using the extant processes and procedures pertaining to D701; (the TDA will effectively become an extension to D701 using exactly the same notification, control and Range clearance procedures as agreed with the MOD).

The SP-1 site at Scolpaig currently lies beneath Class G unregulated airspace but is only a few miles from the D701 complex. As sounding rocket launches will pose a risk to other airspace users, there is a requirement to safely segregate such activity to minimise risk. Segregation can be achieved by establishing a small fillet of airspace between the existing D701 and D704 Danger Areas as shown in Figure 1. Note; this design was updated on 19 August 2021 from that initially proposed in May 2021, following additional safety analysis.

[1] CAP1616 page 88 paragraph 297 refers.

[2] EG is the Intentional Civil Aviation Organisation (ICAO) prefix for UK reserved/segregated airspace with the 'D' designating a Danger Area

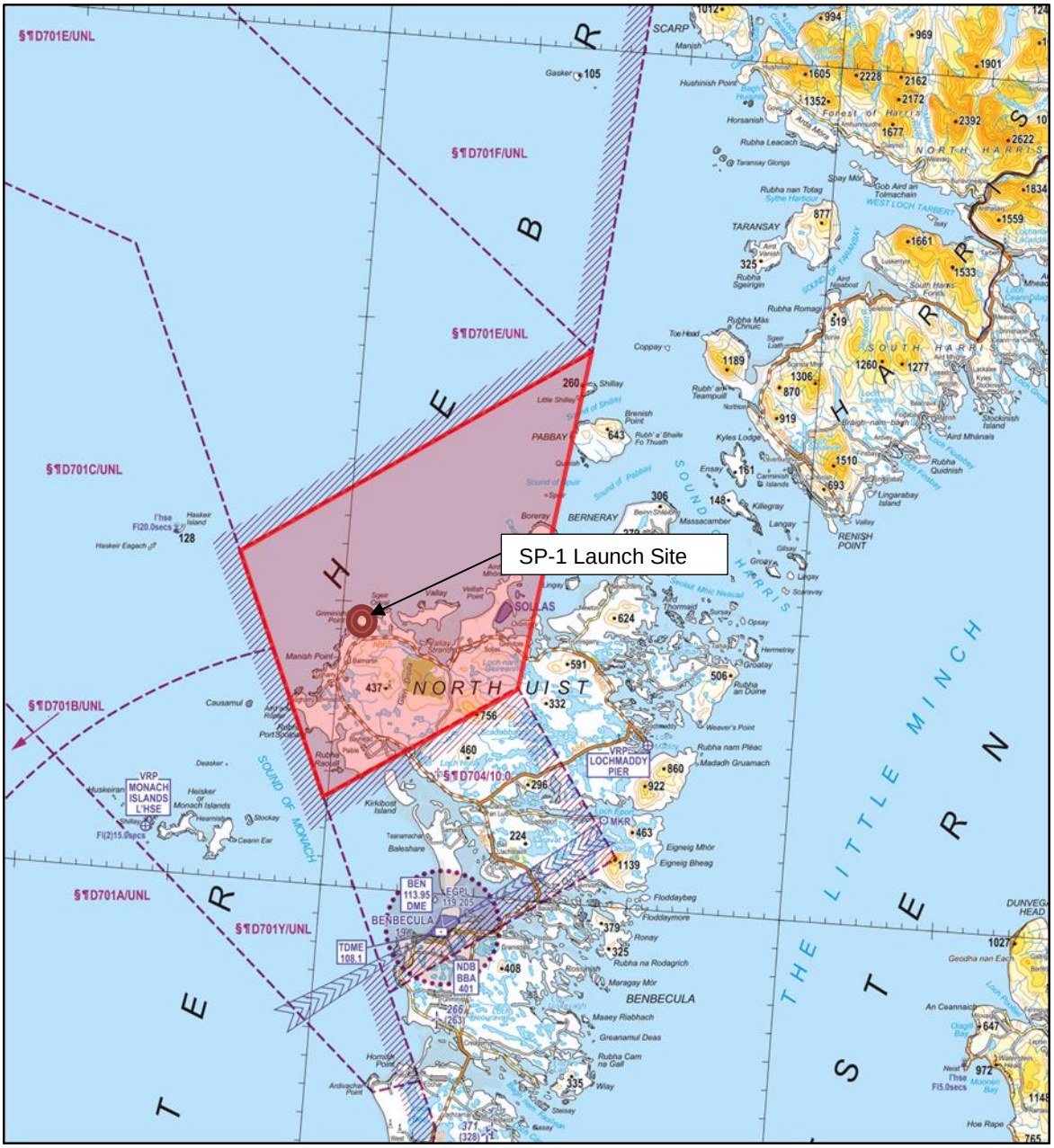


Figure 1: Revised Proposed TDA over SP-1 Launch Site Necessary for Sounding Rocket Launch into the Hebrides Range D701

1.1 Purpose

The purpose of this report is to demonstrate that the Sponsor has followed due process as defined in CAP 1616 [A] and CAA policy letter for DAs and TDAs [B], for a temporary airspace change; demonstrating that the appropriate level of stakeholder engagement and safety analysis has been undertaken.

1.2 Report Structure

The report is split into the following sections

- Section 1 – Introduction:
  - Purpose
  - Structure
- Section 2 – TDA Design
  - Safety Analysis
  - TDA Design Options
- Section 3 – Stakeholder Engagement:
  - Stakeholder Identification
  - Engagement Methods
  - Engagement Chronology
  - Flights below 7000ft
  - Summary of Stakeholder Feedback
  - SP-1 Operational Considerations & Design Following Feedback
  - Final TDA Design Post Stakeholder Feedback
  - Aeronautical Information Publication (AIP) Supplement (SUPP) Draft Submission
- Section 4 – Draft AIP Supp Submission
- Section 5 - Environmental Noise Assessment and Engagement
- Section 6 – Monitoring Complaints
- Section 7 – Next Steps
- Section 8 – Glossary
- Section 9 - References
- Appendices
  - A – List of Stakeholders
  - B – Stakeholder Feedback Evidence
  - C – Environmental Impact Assessment Extract – Noise & Vibration

2 Safety Analysis Affecting TDA Design

2.1 Safety Analysis – Factors Affecting Determination of TDA Parameters

There are two generic risks to other airspace users from launch activities:

- Collision with a sounding rocket during a nominal flight profile – this is where the sounding rocket flight is following the intended path; and,
- Collision with all or parts of a sounding rocket that has failed – this is where a sounding rocket fails to follow the intended flight path and/or fails explosively on the launch pad or in flight.

Clearly, in both cases, it is vital that risk is managed such other airspace users are not exposed to additional hazards associated with the activities, and the most effective way to achieve this is to segregate the sounding rockets from other airspace users through the establishment of a TDA.

When designing the dimensions of the TDA both generic risks are considered. The shape of the TDA is determined by these risks but also by the proximity of the existing Danger Areas, D701 and D704. The aim of the TDA is to provide segregated airspace connectivity to the D701 complex to the north and west. Any hazards existing beyond the western or northern boundary of the TDA can be safely

segregated by activating the appropriate D701 areas. It is not intended to use D704 to the south however, the boundary of D704 provides a convenient demarcation line for the southern boundary of the TDA; this boundary line is more than adequate to contain all credible hazards as depicted in Figure 3. Therefore, the line of most significant interest is the eastern boundary of the TDA. Initial analysis indicated that this line could be drawn between the point where D701E joins with D701F to the point where D704 joins D701Y; the initial TDA design. However, following significant safety analysis of several sounding rocket types and considering the worst case (an 11m rocket), it became apparent that the original TDA design might be too small to contain all credible hazards. It was therefore decided to expand the TDA airspace to the east as depicted in Figure 1. Although this airspace may be larger than is needed, it is considered the safest option as not all safety data is yet available for each sounding rocket type. Furthermore, using pre-existing Aeronautical Data Quality (ADQ) approved points is the simplest (and probably safest solution) in terms of airspace management as they already feature in the EUROCONTROL flight planning process systems used by the Network Manager (NM).

The following safety analysis is based upon the experience of QinetiQ in supporting numerous large area weapons firings on the MOD Hebrides Range, including the 12 suborbital rocket launches conducted there since 2015. This allows an assessment of what safety areas are achievable in practice. For the purpose of this assessment, QinetiQ are considering the maximum TDA area that might reasonably be required for a launch. It should be noted that the ground safety footprint also becomes a limiting factor in rocket size/capability and the TDA will contain all credible hazards within the maximum ground safety footprint available.

2.1.1 Collision with a sounding rocket during a nominal flight profile

Nominal flight profiles include all of the numerous possible minor variations to the intended flight profile, all of which would be considered to meet the mission parameters.

Unguided Sounding Rockets - Unguided sounding rockets adopt an initial flight path determined by the launch tower arrangement. In all cases the launch tower will have an elevation (from horizontal) of 88° or less. Depending on the sounding rocket boost phase characteristics, it may remain essentially on the initial elevation angle for a short period of time but will be progressively and increasingly affected by gravity, having the effect of continuously reducing the elevation angle during the flight. Therefore, as all launch azimuths are west or northwest, no point on a nominal flight path can be further east than the position of the launch pad.

Guided Sounding Rockets – For a guided sounding rocket, the launch may be canted to the west as for the unguided rockets; however, it is expected that in the majority of cases, the sounding rocket will be launched vertically (e.g. an elevation from horizontal of 90°).

In either case, the guided sounding rocket will assess their current flight parameters, compare these to the planned flight parameters and apply corrections in order to achieve the planned flight profile.

Wind drift effects for nominal launch flight profiles:

During flight of non-exo-atmospheric projectiles, both powered and unpowered, it is possible for the trajectory to be affected by the presence of wind. A controlled projectile will be designed to compensate for deviations in planned trajectories caused by external influences, but it is possible for wind effects to cause an uncontrolled projectile to exit from the TDA.

The effect of wind on projectile trajectories is likely to be most significant when its forward speed is at its lowest, such as at ballistic apogee with a broadside wind or, during a near vertical launch. The amount of deviation caused will be dependent on, amongst other things:

- The projectile's incident airflow direction and speed (a combination of projectile airspeed and direction and wind speed and direction);
- Air pressure; and,
- A coefficient, or aerodynamic derivative, known as the Longitudinal Moment (also known as Yaw Moment), which depends on the projectile's physical configuration.

Furthermore, if the speed of final descent is controlled by parachute, then once again the trajectory of that descent will be significantly affected by wind speed and direction.

The effects of wind on all phases of flight will be considered during the mission safety analysis for each launch. The analysis may show that under certain wind conditions, there will be an unacceptable probability of the projectile exiting the TDA. Wind conditions would be assessed on the day of launch and the launch delayed or aborted if the calculated safety limits were exceeded. Therefore, for any launch, the probability of wind related excursion from the TDA will be reduced to be as low as reasonably possible to ensure that airspace users outside the TDA will not be exposed to any unacceptable risk.

Conclusion for nominal launches:

The main risk to other airspace users is therefore determined to be downrange, which is a sector from the southwest to the northwest of the launch pad location. The TDA, by connecting to the D701 Danger Areas, ensures adequate segregated airspace to contain all credible hazards. As the trajectory of the rockets will always be in this westerly sector, the airspace to the east of the launch pad does not need to be as big and only needs to be of sufficient volume to contain a rocket vehicle failure as described in 2.1.2.

2.1.2 Collision with all or parts of a sounding rocket that has failed

A failed or "off-nominal" sounding rocket is any one where the rocket fails to complete a complete nominal flight profile.

There are several possible failure scenarios, each of which could cause a hazard to an airspace user. Considering these in turn we have:

- A sounding rocket exploding on the launch pad;
- A sounding rocket exploding during an otherwise nominal flight;
- A sounding rocket deviating from the nominal flightpath and exploding; and,
- A sounding rocket deviating from the nominal flightpath and remaining in one piece.

Explosions may be due to a failure or due to flight termination; however, the cause isn't critical to this assessment.

Scenario 1: Sounding Rocket Exploding on the Launch Pad

To examine the risk associated with a sounding rocket exploding on the launch pad, the largest sounding rocket anticipated to be launched from SP-1 may be considered as the worst case. This rocket is an 11 metre guided vehicle with a propellant mass of circa 1.5 tons. Utilising the United States (US) Federal Aviation Authority (FAA) and US Department of Defence (DoD) methodologies for

calculating Hazardous Fragment Distances (HFD), this sounding rocket attracts a safety zone of approximately 426m radius from the pad as depicted in Figure 2.

Figure 2: Diagram Depicting Indicative HFD Following Catastrophic Sounding Rocket Failure on the Launch Pad

Scenario 2: Sounding Rocket Exploding During the Ascent Phase

When considering a sounding rocket exploding during the ascent phase the normal safety approach is to model the dispersion of fragments for a rocket exploding at a series of points during the boost phase, for a variety of wind/atmospheric conditions. The analysis used for this scenario is the worst case rocket, on the planned flightpath, which has been modelled for explosive failure at 10, 20 and 30 seconds, after launch during the 'worst case wind conditions' (considered to be the maximum wind velocity that any rocket can be launched in).

This debris field analysis was then cross referenced with the sounding rocket safety data provided for use on the MOD Hebrides Range; both were similar. The comparison of data provided confidence that the maximum dispersion of debris following catastrophic failure after launch was no more than 6.1km from the launch pad in any direction during the worst case wind conditions as shown in Figure 3. It should be noted that the ground safety footprint might preclude rockets being launched in certain wind conditions where this causes debris to fall over the land areas. Therefore, the hazard to both the east and south of the launch pad would be significantly reduced.

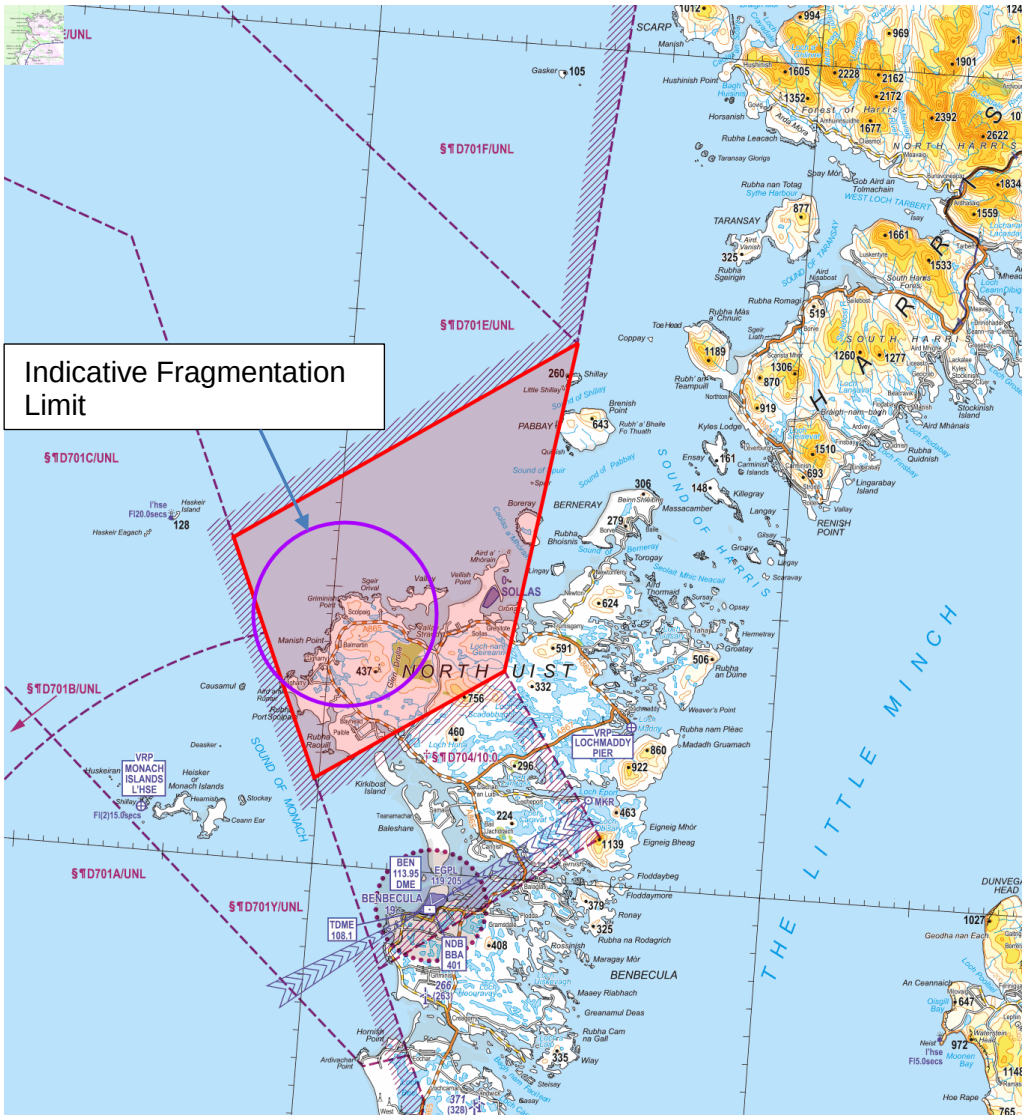


Figure 3 : Indicative Fragmentation Limit Worst Case Wind Conditions From Any Direction

Scenario 3: Sounding Rocket Deviating from the Planned Flightpath due to a Failure, and Exploding either due to a Failure or due to Flight Termination

This situation combines two types of failure namely the sounding rocket deviating from its nominal flightpath and either breaking up (due to a sudden dynamic deviation causing structural failure), or is

flight terminated (explosively) having deviated from the planned flight path by a predetermined distance and/or for a predetermined time.

These distances and times will be launcher specific and all the relevant data will be evaluated for each launch on a case-by-case basis. However, discussions with operators and the experience gathered on the MOD Hebrides Range supports using a time of 5 seconds between deviation beginning and the initiation of flight termination.

Due to the nature of sub-orbital launches, the rockets used are either unguided or, for guided systems, are capable of course correction, they should not however be considered manoeuvrable. The effect is that while the deviation flightpath may over time result in a significant positional change from that planned, in 5 seconds the deviation from the nominal flightpath will be relatively small.

Sounding rockets, even guided versions, are designed to withstand thrust along the axis of the rocket. Note that despite the name, guided sounding rockets are only capable of gentle course correction (low g manoeuvers). While there is some inherent capability to withstand off-axis thrust, the drive to minimise vehicle weight and their pencil-like shape makes manoeuvrability very limited. Sudden changes of direction will therefore cause structural failure of the vehicle and it will break up rather than achieving a significant deviation.

Low g deviations at very low speed, close to launch, may result in a more significant change of direction in a short time; however, the distance travelled will be small due to the low speed. As the speed rises, low g manoeuvers will inherently move the rocket less and less distance off its flightpath within the flight termination time allowed. This is one reason why unguided sounding rockets use launch rails – lateral deviation is constrained until speed has risen significantly.

The result is that this scenario does not change the proposed TDA as the debris would still be contained within the 6.1km area from the launch pad or, will be sufficient distance down range from the launch pad that the debris will be contained in the D701 Danger Areas.

Scenario 4: Sounding Rocket Deviating from the Planned Flightpath, due to a Failure, and remaining Unitary

Unguided sounding rockets all launch from rails pointing downrange. Baring catastrophic failure early in flight, covered in scenarios 1 and 2, all of their hazards are inherently constrained to a downrange footprint. Even in failure cases such as the loss of a fin, the rocket will break up downrange. There is therefore, no credible risk from an unguided sounding rocket to airspace users outside the TDA and associated D701 areas[3].

It is expected that guided rockets will always be fitted with flight termination systems to mitigate the hazard created by their inherent capability to achieve a slow and steady deviation from their nominal trajectory (given that they enter an appropriate failure mode). Therefore, the flight termination system becomes an integral part of the overall safety analysis process associated with guided rockets. Each guided rocket system will also be extensively tested before use and will need to meet specific legislative requirements associated with the rocket operator's licence so the risk of failure is reduced. Similarly, the flight termination system will undergo extensive testing and pre-flight checks; based on experience

[3] Those D701 areas that are activated to contain sounding rocket launch hazards (paragraph [3.6] refers).

of utilising such systems at QinetiQ managed Ranges, failure of these systems is considered a low probability event. The flight termination system may be initiated by the guidance system and/or by ground control. While there might be a trigger from the flight control computer to the flight termination system, these are required to be separate systems and therefore the failure of both will require independent simultaneous failures to prevent operation. The chance of these failures occurring at the same time reduces the probability of an unterminated deviating rocket leaving segregated airspace, to incredibly low.

2.2 Initial TDA Options

During the detailed safety analysis and comparison of data between sounding rockets and rockets already fired on the Hebrides Range, it was evident that the design at Figure 1 provided adequate segregated airspace to ensure all credible hazards associated with a variety of potential sounding rocket launches were contained. It is recognised that using the pre-existing ADQ points at the junction of D701E and D701F is a convenient design for the eastern boundary line however, this design also enables flexibility in choice of launch trajectories and subsequent selection of required D701 areas. Furthermore, as the safety data pertaining to all potential sounding rockets is not yet known, it should enable more launch options to be available for a wider variety of rocket providers.

It is notable that no respondent registered concern about with the size of the proposed TDA for either the original design or the expanded final solution as depicted at Figure 1 other than users of Sollas beach landing site. Here the main concern was with regard to the annual summer Sollas fly-in weekend event. It has subsequently been agreed not to activate the TDA during this event on 23 and 24 July 2022. It was further evaluated that the limited use of the beach landing site (see paragraph [3.6]) and the expected rationed use of the TDA, did not warrant a reduction in size of the TDA when balanced against the possibility of limiting the number of potential sounding rocket providers who could then use the site. Furthermore, given the associated D701 areas that would always need to be activated regardless of sounding rocket range (D701C and Y or, D701 C and E); it is considered that there would be no benefit in having a smaller TDA available given the ‘blocking’ effect of the adjacent D701 areas.

3 Stakeholder Engagement

3.1 Stakeholder Identification

Due to the location of the SP-1 site and relatively small volume of temporary airspace being created under the ACP, it was considered that a reduced targeted key stakeholder engagement would be necessary. In the interests of transparency, the Sponsor did include several National Air Traffic Management Advisory Committee (NATMAC) members although as expected, the responses were very limited.

Although the TDA airspace is of small volume, the Sponsor identified that the activation of this airspace enabled uninterrupted segregated airspace connectivity to all the D701 Danger Areas and it was the activation of these areas that would cause the greatest impact on other airspace stakeholders. Based on the Sponsor’s wide knowledge, experience and understanding of the design, operating procedures and Letters of Agreement (LoA) pertaining to the Hebrides Range, it was fairly straightforward identifying the key stakeholders (utilising information used for the Hebrides Range ACP in 2014 and current regular engagement with stakeholders affected by Range activities). It was noted at the CAA assessment meeting that some of these stakeholders operated helicopters from a number of different

companies; the CAA forwarded a comprehensive list of these companies to the Sponsor who was able to add them to the engagement list. Furthermore, as a result of CAA feedback the Sponsor reached out to users of the Sollas beach landing site. Following the WebEx meetings and subsequent update of the TDA it was also decided to engage with the UK Airspace Management Cell (AMC) given their functional input into the D701 complex.

3.2 Engagement Methods

Due to COVID restrictions, the main engagement method was through email correspondence and telephone calls, the latter were evidenced through a follow up email confirming discussions and agreements. WebEx meetings were held, firstly with MOD to address the many points raised in their response and secondly, with NATS where it was deemed necessary to have two such events, the latter with the CAA in attendance.

3.3 Engagement Chronology

The following list of main stakeholders at [Table 1] were contacted in advance of the CAA formal assessment meeting in the interests of expediency necessary because of the challenging original timeline of the TDA process and submission of data to meet the AIP SUPP publication cycle, for a proposed September launch:

Stakeholder	Engagement Method	Date Sent	Remarks
Highlands and Islands Airports Ltd (HIAL) Benbecula, Barra and Stornoway	Email and Power Point Presentation (PPP) sent detailing basic TDA requirements	9 Mar 21	Initial engagement also included information on permanent airspace change and requested local aviation stakeholder contact details
	Email exchange	11 Mar 21	
	Email exchange	17 Mar 21	
	Email with PPP requesting formal response	5 May 21	Response received
	Letter detailing updated TDA	19 Aug 21	No additional comments
	Letter notifying updated timeline	17 Nov 22	No response
	Email exchange	3 Feb 22	Arranging Haz ID meeting, info on App and Dep procedures
	Email exchange	21 Feb 22	Aircraft movements summer 2019
Loganair	Email as sent to Benbecula 9 Mar 21	17 Mar 21	Benbecula forwarded details of SP-1 to Loganair
	Email exchange	18 Mar 21	Introduction, details of At Sea Demonstration/Formidable Shield (ASD/FS21) and SP-1
	Email with PPP requesting formal response	5 May 21	No response

	Letter detailing updated TDA	19 Aug 21	No response
	Letter notifying updated timeline	17 Nov 21	No response
	Email requesting route information and frequency of flights	3 Feb 22	Details of routes received & maximum number of flights per day
Northern Lighthouse Board (NLB)	Email with PPP requesting formal response	5 May 21	Response received
	Letter detailing updated TDA	19 Aug 21	No response
	Letter notifying updated timeline	17 Nov 21	No response
MOD DAATM	Email with PPP requesting formal response	5 May 21	Email exchange
	WebEx	8 Jun 21	Discussion MOD response
	Letter detailing updated TDA	19 Aug 21	No additional comments
	Letter notifying updated timeline	17 Nov 21	Acknowledged
	WebEx	11 Jan 22	Agreement reached on use of D701 and additional LoA
MOD DAAM	Email with PPP requesting formal response	5 May 21	Email exchange
	Telephone discussion	11 May 21	Response recorded
	Letter detailing updated TDA	19 Aug 21	No additional comments
	Letter notifying updated timeline	17 Nov 21	Acknowledged
NATS	Email with PPP requesting formal response	5 May 21	Email exchange
	WebEx	15 Jun 21	Discussions on NATS response, issues and points of clarification.
	WebEx	7 Jul 21	Further discussion with CAA in attendance
	Letter detailing updated TDA	19 Aug 21	Detailed additional comments received
	Email referencing delay to 2022	8 Sep 21	
	Email notifying change to timeline and request for information	26 Oct 21	No response
	Letter notifying updated timeline	17 Nov 21	No response
	Email requesting information with proposed FBZs	25 Jan 22	No response

	Email chasing response to 25 Jan 22 FBZ design	17 Feb 22	Response 2 Mar 22 suggesting EUROCONTROL input

Table 1: List of Key Stakeholder Engagement Prior to CAA Formal Assessment Meeting

In addition, the following targeted stakeholder engagement at [Table 2] was conducted post the CAA formal assessment meeting:

Stakeholder	Engagement Details	Date Sent	Remarks
Highlands and Islands Airports Ltd (HIAL) Head Office	Email sent detailing basic airspace requirements	27 Apr 21	Sent before assessment meeting but not specific to TDA
	Email with PPP requesting formal response	18 May 21	Response received
	Letter detailing updated TDA	19 Aug 21	No response
	Letter notifying updated timeline	17 Nov 21	No response
Maritime Coast Guard Agency (MCA)	Email with PPP requesting formal response	18 May 21	Response received
	Letter detailing updated TDA	19 Aug 21	No response
	Letter notifying updated timeline	17 Nov 21	No response
Selected NATMAC members as detailed at Appendix A	Email with PPP requesting formal response	18 May 21 and 2 Jun 21	A second email was sent on 2 Jun as no responses received Addressees confirmed first email had been received
	Letter detailing updated TDA	19 Aug 21	No response
	Letter notifying updated timeline	17 Nov 21	No response
Helicopter operators supporting MCA, police and other emergency services	Email with PPP requesting formal response	18 May 21	Response received
	Letter detailing updated TDA	19 Aug 21	No additional comments

	Letter notifying updated timeline	17 Nov 21	No response
Irish Aviation Authority (IAA)	Email with PPP requesting formal response	18 May 21	Response received
	Letter detailing updated TDA	19 Aug 21	No response
	Letter notifying updated timeline	17 Nov 21	No response (watching brief at UK/Irish Functional Airspace Block (FAB) meetings)
UK Airspace Management Cell (AMC)	Letter detailing updated TDA	19 Aug 21	Response received
	Letter notifying updated timeline	17 Nov 21	Acknowledged
	Email exchange Regarding FBZs	2 Mar 22	Confusion regarding FBZs design responsibilities
General Aviation Alliance (GAA)	Email with PPP requesting formal response	18 May 21	No response
	Letter detailing updated TDA	19 Aug 21	No response
	Letter notifying updated timeline	17 Nov 21	No response
	Email	12 Feb 22	Response regarding Sollas beach landing strip
	Letter containing TDA decision	3 Mar 22	Letter explaining Sponsor's position
Sollas Annual Fly-in Coordinator	Email exchange and letter detailing TDA	10 Feb 22	TDA will not be activated during annual fly-in 23/24 Jul 22
	Letter containing TDA decision	3 Mar 22	Letter explaining Sponsor's position
Highlands & Islands Strut Light Aviation Association (LAA)	Email exchange – offer to facilitate WebEx	14 Feb 22	Request information on use of Sollas outside Fly-in event
	Letter containing TDA decision	3 Mar 22	Letter explaining Sponsor's position
Highland Aviation	Email and letter detailing TDA	16 Feb 22	No response

	Letter containing TDA decision	3 Mar 22	Letter explaining Sponsor's position

Table 2: Additional Stakeholder Engagement List and Follow on Engagement Details

The timescale to achieve a first launch in September 2021 was considered challenging and the Sponsor elected to commence early discussion (March - May 2021) with several known key stakeholders before the CAA assessment meeting on 13 May; these included:

- HIAL, Benbecula, Barra and Stornoway – due to the proximity of Benbecula airport to the proposed TDA site;
- MOD - To understand the formal arrangements necessary to conduct SP-1 sounding rocket launches into D701 and other considerations;
- NLB – Regular operators in D701;
- NATS – As the affected en-route ANSP; and,
- Loganair – The only scheduled commercial carrier operating to the Hebrides.

The formal engagement process commenced on 18 May 2021 and, due to the challenging timeline to meet CAA review and Aeronautical Information Regulation And Control (AIRAC) deadlines, stakeholders were asked to respond within three weeks, specifically by 9 June 2021. Several stakeholders responded within a few days and all main points have been consolidated; details can be found at para [3.5]. The selected NATMAC members were contacted twice as the Sponsor did not receive a single response after three weeks. The second email did prompt two addressees to respond accordingly.

With the first launch being deferred until November 2021 and, following more in depth safety analysis resulting in an increase in size of the TDA airspace volume, a second formal engagement process was undertaken commencing 18 August 2021. In addition to these updates, the Sponsor was also able to present the expected D701 usage applicable to a number of different sounding rocket capabilities; this had been called for by NATS in their previous response. Furthermore, it was predicted that the TDA would support up to four launches in total during the 90 day period. Stakeholders were respectfully asked to respond to the TDA and launch date change by 01 September 2021. Again the timeline for responses had been compressed (to three weeks) to meet both CAA and AIRAC cycle deadlines, enabling a November launch. It was considered reasonable to reduce the response time given the lack of concern over the original TDA design and the fact the new design was still contained between D701 and D704. Moreover, the previously prescribed processes and procedures would remain unaffected. This second engagement round prompted very few responses and those that did, with the exception of one, had nothing further to add from their initial response. The Sponsor took the opportunity to invite the UK AMC to comment on the TDA proposal despite not being included in the initial round of engagement. This decision was made based on the fact they attended one of the WebEx events and their involvement in the ASM procedures for the Hebrides Range.

The Sponsor contacted all stakeholders a third time, on 17 November 2021, to notify a further delay to the TDA ACP with an expected first launch on 13 June 2022, followed by four subsequent launches within the 90 day period. The opportunity was taken to advise stakeholders that the TDA ACP proposal had been submitted to the CAA and a redacted version was available on the CAA airspace portal. Furthermore, stakeholders were reminded of the intention to utilise the extant airspace management procedures for D701 and the TDA subject to formal agreement with the MOD. It was further acknowledged that other key stakeholders directly affected by the TDA and D701 activation would be contacted in the New Year to formalise operational procedures and address issues highlighted in their

formal responses. Stakeholders were reminded that they could contact the ACP Sponsor should they have any questions or require additional information.

NATS, MOD, and Benbecula ATC were contacted in the New Year to move forward the outstanding actions from their formal feedback and WebEx meeting discussions. A further WebEx was held with MOD on 11 Jan 22 where a solution was reached on the use of D701 in conjunction with the TDA. The principles of this agreement are captured in a new LoA between MOD, SP-1 and QinetiQ; a draft LoA is currently under development and key elements are captured at paragraph [3.6].

In January 2022 it was identified that the new proposed summer launch date might impact on the 'Sollas annual fly-in' to the beach landing strip at Sollas that lies within the redesigned TDA boundary. The Sponsor contacted the coordinator and received a response raising concern regarding this annual event and the impact the TDA may have. This was in conjunction with an email received from the programme manager for the General Aviation Alliance (GAA) whom raised concern that Sollas had not been included in the earlier rounds of engagement especially as the landing strip featured on the CAA VFR charts. This was also followed by an email from the Highlands and Islands Strut of the Light Aviation Association (LAA), raising similar observations. The Sponsor had endeavoured to gain information on the Sollas landing strip operator to ascertain usage and to open engagement but could only find information and contact details for the Sollas fly-in event. The Sponsor therefore elected to engage with the GAA, LAA, Sollas annual Fly-in coordinator and Highland Aviation[4] as the main interested parties at Sollas, adding them to the list of stakeholders for SP-1 ACPs. It should be noted that the GAA were included in all engagement correspondence and launch timing update letters as detailed at Appendix B.

3.4 Flights Below 7000ft

It is acknowledged that the TDA will affect aircraft operating below 7000ft above ground level. However, local knowledge gained from Range operations (observing flight profiles) and discussions with Benbecula airport suggest little or no GA[5] traffic other than the helicopter operators contacted as detailed at Appendix [9A] and the Sollas summer annual fly-in. Furthermore, the only scheduled flights operating in this height band are Loganair who have stated the TDA will not adversely affect their operations. In order to gain further clarification the Sponsor contacted Loganair to ascertain details of their summer schedule and routes flown. It was confirmed that they anticipate operating no more than six flights (12 movements) a day in and out of Benbecula during the summer of 2022 (including cargo flights) and it is unlikely the flight profiles for any instrument approaches will be affected by the TDA activation (see Figure 4). 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. Furthermore, they suggested that the revised TDA was only likely to affect a visual approach to Runway 06 from the North, where a minor re-route might be necessary. However, it is anticipated that a maximum of three flights (six movements) will occur in the afternoon when the TDA could be active. It is concluded therefore, that there will be little change in flight profiles below 7000ft that will affect the few local residents who live

[4] It was identified that Highland Aviation offered Gyrocopter beach landing training and one of the sites advertised for this purpose is Sollas. The Sponsor contacted Highland Aviation but received no response.

[5] It is noted that there is an annual Sollas Fly-in to Benbecula during July and the Sponsor has confirmed with the Sollas coordinator that activation of the TDA will not take place during this period 23 and 24 July 2022.

in the vicinity and resource expended on further detailed analysis of the exact routes flown when the TDA is active, would be disproportionate when considering the number of flights involved (three).

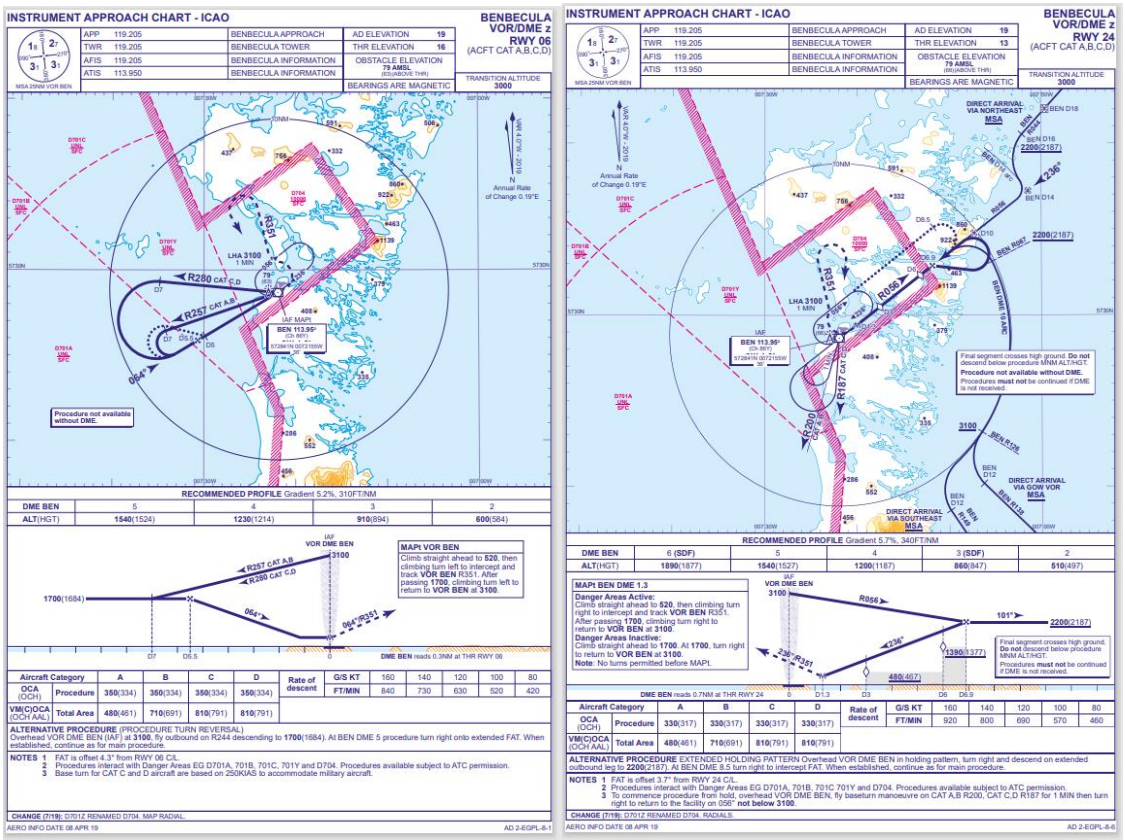


Figure 4: AIP Extract Depicting Main Instrument Approach Charts to Runway 06 and Runway 24 at Benbecula

3.5 Summary of Stakeholder Feedback

The main stakeholder feedback was received from the MOD and NATS; these are detailed separately.

MOD Feedback – The MOD sent a comprehensive response [Appendix 9B] and raised the following points for consideration:

- Location of the TDA adjacent to D701 had negligible impact on MOD operations;
- Radar mapping at Swanwick Military only updated quarterly in line with Aeronautical Information Regulation And Control (AIRAC) cycle; the TDA timeline would leave insufficient time to update their radar maps and temporary mitigations would have to be put in place;
- The AMC request extant Airspace Management (ASM) protocols are used for D701;
- It should not be assumed current procedures and practices for D701 are relevant or can be mapped across to rocket launch activity – further discussions necessary between MOD and QinetiQ;
- MOD will assume exemptions to the Air Navigation Order (ANO) and other CAA approvals regarding the firing of rockets will be in place prior to first launch;

- Commercial agreement between QinetiQ and MOD regarding access and use of D701 will need to be ratified prior to the first launch and commercial activities prioritised against other Range users and fit with current MOD agreements and LoAs; further amplification:
    - The potential impact on Oceanic Entry Points (OEPs) and current limitations on number of closures per year needs to be considered;
    - The current LoA prescribing number of OEP closures is being re-drafted and due to changes in jamming requirements, the figures may change and factored into any agreements made;
    - Safety trace information will dictate the number of D701 areas needed and subsequent impact on other airspace users;
    - Launches may have to take place at certain times of the day to minimise impact on other airspace users;
    - Implications on Benbecula airport removing ATC cover and Danger Area Crossing Service (DACS) for D704 should be considered along with the re-write of the current LoA with Benbecula;
- MOD wishes to understand procedures for enabling flights and operations of national security to enter/cross the TDA and associated D701 complex and provision for DACS/Danger Area Activity Information Service (DAAIS); furthermore, how 'Clear Range' will be effected for the TDA and associated D701 areas; and,
- UK Space Operations Centre (UK SpOC) will require launch details in advance namely, launch area, drop and abort zones, mission profiles, tracking data frequencies and understanding go/no go criteria.

MOD Feedback was discussed at length at the WebEx held 8 June 2021 and all points were addressed. Details of the outcome of the WebEx are contained at Appendix 9B with relevant issues and concerns addressed in the 'operational considerations' detailed at paragraph [3.6]. MOD had no further comments following the TDA redesign in August.

NATS Feedback – NATS provided detailed feedback, although the Sponsor considered some of the points raised were not relevant to the TDA and sub-orbital sounding rockets but were more suited to the final airspace solution for orbital rocket launch. Furthermore, some of the concerns were related to government and CAA policy. A copy of the letter containing NATS feedback is contained at Appendix 9B and is summarised as follows:

- NATS cannot support TDA without issues being addressed to NATS satisfaction;
- Clarification on how NATS work associated with TDA (e.g. Hazard Analysis) will be funded;
- How will the existing QinetiQ/MOD/IAA/CAA/NATS LoA be affected in particular to OEP closures and number permitted to be closed each year;
- Clarification required on whether additional Buffer Zones will be required or if rocket activity will be wholly contained in D701;
- Clarification that no further buffer zones will be applied when free route airspace D1 is deployed in December 2021;
- TDA would need to be included in Local and sub-regional airspace management support system (LARA);
- Danger Area descriptors do not include rocket launch therefore associated safety assurance around them does not exist;
- Clarity required on how SP-1 launches will be deconflicted from other launch sites in UK;
- Clarification needed concerning how airspace management priorities, especially with regard to military activities such as jamming, will be coordinated with SP-1 launches;

- Consideration should be given to design protocols associated with these SP-1 launches and Global Positioning System (GPS) jamming;
- Reference Period 3 (2020-2024) settlement to NATS is made when delays are attributable to Military Operations therefore, how will rocket launch activity be classified by the state where these cause delays;
- Sponsor and CAA will need to agree acceptable impact in relation to General Air Traffic (GAT) with respect to rocket launch activities;
- What happens if launch delayed, can launch times be adjusted to minimise impact on network;
- How will pre-planning be coordinated with NATS Prestwick and who will determine priorities, GAT v Rocket launch;
- What contingency arrangements are there for malfunction at launch and post launch;
- Lat and Long coordinates need to be ADQ approved - NATS require dimensions of airspace;
- Will launches use all D701 areas as depicted in briefing material, if not how will efficient use of airspace be managed;
- Have the 5 Letter Name Codes (5LNCs) been reserved with International Codes And Route Designators (ICARD) to allow circumnavigation of TDA;
- What is status of coordination with other ANSPs and states;
- What is the duration of sounding rocket activity;
- What is the impact on Oceanic airspace;
- TDA will not meet AIRAC timescale therefore AIP SUPP required and timelines tight NATS will need to prepare a Temporary Operating Instruction (TOI) and Hazard Analysis;
- Mapping changes to NATS equipment can only be made in March, Jun, Sep and Dec; and,
- Two solutions - Delay TDA implementation to meet Dec AIRAC or, using a TOI procedural fix between Sep and Dec to bridge AIRAC gap; second option high risk due outcome of Hazard Analysis.

All points raised by NATS were discussed during the 'Microsoft Teams' WebEx meeting convened on 16 June 2021; details of the outcome are captured at Appendix 9B and main concerns summarised:

- NATS wished to understand how their costs in supporting the establishment and activation of the TDA (development meetings with Sponsor, hazard analysis and TOI) would be funded as their main revenue is from the airlines who would be adversely affected by the TDA/D701 activation and therefore would not receive any benefit from this work. Furthermore, delays caused to the airlines as a result of MOD activity (normal use of D701) which NATS have to manage, are captured in NATS reporting period 3 settlement but no provision has been made for spaceport operations and additional usage of D701;
- The convenience of using D701 may induce a demand for more airspace than is actually required for sounding rocket activities especially where these rockets are approved under the ANO and by definition have a limited range – NATS would prefer to see sub-divisions within D701 or even a bespoke area that was designed to contain the sounding rocket hazards rather than relying on the existing D701 Areas; and,
- Despite recognising that extant ASM procedures for D701 will ease the notification and processes for SP-1 rocket launch NATS considered the current LoA, where the MOD was a main signatory, was not applicable. The NATS position is that the LoA was agreed based on MOD use of the Range and this did not consider other 'commercial' users activating D701 at additional times; they consider this as a new requirement and one that needs to be renegotiated regarding activation periodic and process in order to safeguard their operations and impact on the ATM network in the UK.

NATS provided additional feedback following the second round of engagement in September:

- Due to the introduction of Free Route Airspace there is an imperative to establish a Flight Planning Buffer Zones (FBZ) around the proposed TDA noting the coordinates are to be ADQ compliant.
- There is also a requirement to establish new reporting point to facilitate circumnavigation of the TDA.
- FBZs and new reporting points requires joint effort of NATS, UK AMC and EUROCONTROL to implement – this necessitates a minimum of 3 month lead in time.
- As the Sponsor cannot declare exactly which D701 areas will be utilised in conjunction with the TDA, NATS cannot conduct a meaningful impact assessment; furthermore NATS are unable to develop tactical plans in good time to ensure adequate and consistent briefing of staff and customers.
- NATS concerned that time pressures may inhibit them conducting effective safety analysis and procedure development as well as controller familiarisation. NATS encourage early engagement on developing the appropriate LoAs.
- NATS would welcome definitive timelines for activation of the TDA in order to understand if sufficient time exists to complete the necessary work to support the TDA proposal.
- Due to other demands on similar airspace by a different spaceport operator, it may become necessary for multi-ANSP prioritisation and coordination processes to be developed and completed before requested activations can be confirmed, in particular for any subsequent activations of the same illustrative airspace design.

Other Stakeholder Feedback – The following summarised feedback was received from other stakeholders:

- Highlands & Islands Airports Ltd (HIAL):
  - Support any extension to current LoA to include SP-1 TDA activities;
  - QinetiQ would need to support Benbecula airport in conducting a Hazard Identification/Analysis pertaining to SP-1 activities;
  - Ideal if TDA could be activated during periods of nil traffic;
  - If D704 needed to be activated this would require close coordination with the airport with Search and Rescue (SAR) activities taking precedence; and
  - TDA may affect visual approaches and Loganair were best placed to comment.
- Northern Lighthouse Board (NLB):
  - No objection providing Notices to Mariners and Airmen are issued and NLB informed of activity in advance.
- Maritime Coastguard Agency (MCA):
  - No objection providing activation is via NOTAM.
- Bristow Helicopters – Feedback via MCA.
- Babcock Aviation – No objection.
- Gamma Aviation – No objection providing access can be obtained as SOP for TDAs.
- 2Excel Aviation – No objection.
- British Helicopter Association – No objection.
- Loganair – No objections raised.
- Heavy Airlines (Virgin Atlantic):
  - Would like to see activities commence after 1600 UTC;
  - Consider historical NAT track data to establish peak/common periods in the year when Jetstream favoured NAT tracks over Scotland; and,

    - Recommended spaceport operators to work with industry on developing airspace requirements/procedures.
- Irish Aviation Authority (IAA):
    - Supports the TDA proposal;
    - Encourage launches post 1400 UTC; and,
    - Continued engagement with IAA and NATS to identify any potential issues.
- UK Airspace Management Cell (AMC):
    - The AMC UK require a minimum of 3 months' notice before a newly established TDA can be incorporated into the UK pre-tactical Airspace management process.
    - Any TDA that is established outside of the UK ASM process will be managed tactically. In this case (less than 3 months' notice) the segregated airspace will be protected from incursion by the publication of a NOTAM and the protection that an ATC environment affords. After the 3-month lead in time, an "FUA flight planning restriction" may be established and managed by the UK AMC that will reject flight planned traffic during the pre-tactical phase as deemed appropriate. However, careful consideration must be given to this case where initially a tactical process for the TDA is coupled with a pre-tactical process for the activation of EG D701 (parts thereof). This, albeit temporary, arrangement sets a new precedent for UK ASM.
- GAA and Highlands & Islands Strut of LAA:
    - Raised concern that Sollas had not been contacted earlier in ACP process
    - Annual fly-in not the only activity, members use Sollas and other beaches on 'Long Island' at any time of the year.
    - Suggested TDA redesign with eastern boundary dog-leg to avoid Sollas beach strip.

3.6 Operational Considerations and Airspace Design Following Feedback

Following stakeholder feedback and subsequent WebEx meetings with both the MOD and NATS (details contained at Appendix 9B), the resulting operational considerations are made:

- The intention is for QinetiQ to manage SP-1 launch activity and associated ASM processes and procedures thereby removing the need for SP-1 to develop any bespoke procedures or need to apply separately for use of the D701 complex;
- The TDA will be considered an extension of D701 and ASM processes and procedures will be mapped across accordingly subject to the conditions agreed in the Long Term Partnering Agreement (LTPA) Other Works Approvals (OWA) between QinetiQ and MOD (TEST Project Team (PT)), and LoA. Both the OWA and LoA will be in place before the first rocket launch;
- The MOD/QinetiQ/SP-1 LoA will detail conditions of use for D701 including Range capacity, priorities (not overriding MOD activities) and requirement for rocket and launch operators to have the appropriate CAA approvals and licences (it was noted that sounding rockets would be granted permission under the ANO and sit initially outside the Space Industry Act (SIA) 2018);
- QinetiQ use of the Hebrides Range, facilities and equipment all fall under the QinetiQ and MOD LTPA and as such require MOD approval; activities therefore, follow MOD guidelines and are subject to MOD Letters of Agreement associated with Range operations. This includes OWA, regardless of customer. Therefore, SP-1 activity remains under MOD jurisdiction through the OWA process and consequently, use of the Range (D701) is covered under extant LoAs and ASM processes and procedures. It is not considered appropriate to alter these extant LoAs to capture the TDA because of the temporary nature of the airspace. However, it is considered sensible and safer to mirror the ASM procedures contained in the

D701 LoAs when activating the TDA – this way all processes and procedures remain unchanged and are understood by interested parties. It is acknowledged that for the final airspace solution this may not be appropriate.

- Sounding rockets will be treated in the same manner as for rockets fired during ASD/FS21 regarding due diligence and safety management processes conducted by QinetiQ who will meet the necessary Health and Safety Executive (HSE) legislation on safety and risk to third parties where the risk level must be at least As Low As Reasonably Practicable (ALARP) if not 'broadly acceptable'; it is considered and agreed with the MOD, that sounding rockets will be fired under the 'live munitions' descriptor for D701 Danger Area use;
- QinetiQ will work with the rocket operator to establish the appropriate safety traces based on the MEB of the system and follow due safety analysis and processes accordingly; this data will form part of the rocket operator approval to operate;
- It is anticipated that sounding rockets will be launched with a suppressed vertical ceiling to meet the restrictions of the ANO. This will result in an increase in range of the rockets that will broadly fall into one of three categories, namely: 80km, 114km and 250km range. To support these launches, the following D701 areas may need to be utilised and will be NOTAMed accordingly:

- 80km range – Two Options Figure 5:
  - D701C and D701 E; or,
  - D701A, D701B, D701C and D701Y.

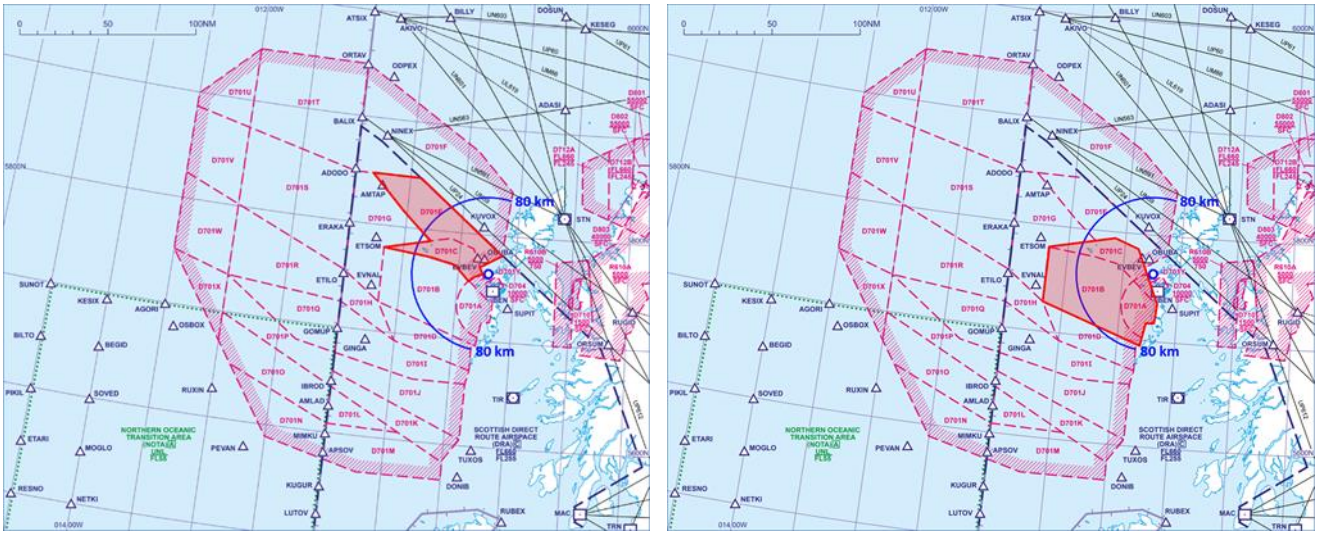


Figure 5: Sounding Rocket 80km Safety Range – Diagram Depicting Two Potential Options for D701 Activation

- 114km range – D701C and D701E Figure 6:

Figure 6: Sounding Rocket 114km Safety Range – Diagram Depicting Potential D701 Activation

- 250km range – Two Options Figure 7:
  - D701C, D701E, D701F and D701TE; or,
  - D701A, D701Y, D701B, D701C, D701G and D701S.

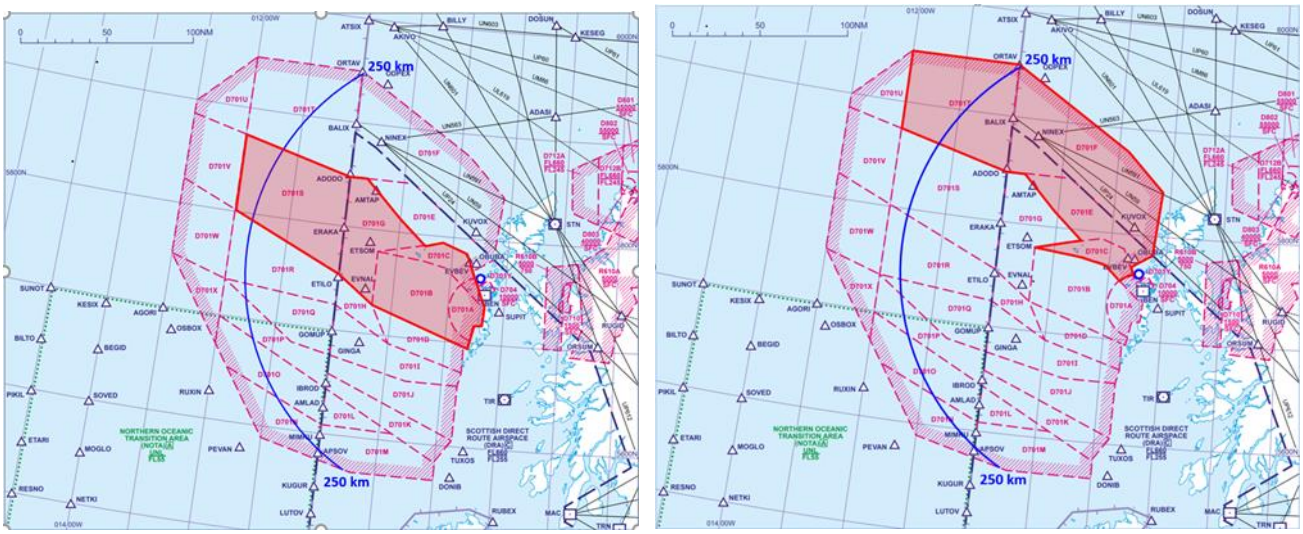


Figure 7: Sounding Rocket 250km Safety Range – Diagram Depicting Two Potential Options for D701 Activation

- The orientation of the rocket launch will aim to be aligned with the existing D701 areas to minimise the number of areas needed to be activated;
- Sounding rocket launches will occur post 1400 UTC (unless contained within D701A, B, C and Y – 80km range option 2[6]) to prevent impact on the number of OEPs the Range is allowed to close as prescribed in the LoA that; defines the coordination, agreement and notification procedures for the use of airspace by MOD Hebrides Range within the Scottish Flight Information Region (FIR), the Shanwick Oceanic Control Area (OCA) and the Northern Oceanic Transition Area (NOTA) dated 1st Oct 2020 [C]. Where practicable, sounding rocket launch may be delayed beyond 1400 UTC, this later time may also be driven by MOD usage of D701. However, in response to the Heavy Airlines request to delay launch until post 1600 UTC and consider historical data on NAT traffic flows; the Sponsor suggested that later launches would form part of the discussion on timings with the ANSPs and MOD in accordance with the procedures detailed in the main LoA [C]. It is not however, intended to conduct a study into historical data on NAT flows given the limited number of expected launches using the TDA – it is recognised that this study may be necessary when considering the permanent airspace solution especially where launches are more time critical;
- TDA activation, by necessity, will require elements of D701 to be activated as prescribed above dependant on the maximum range of the rocket. Utilising the existing D701 structure for this purpose removes some of NATS concerns regarding 5LNCs being reserved with ICARD that allows circumnavigation of TDA however, it does induce the potential to activate more airspace

[6] In accordance with the extant main LoA [C], activities wholly contained within D704, D701A, B, C, D and Y can occur at any time without restrictions (paragraph C.2.1 of the LoA refers).

than is necessary to contain the hazard. To reduce this risk NATS suggested an interim solution for launches in 2022 where the Sponsor should consider a more bespoke airspace design that does not rely wholly on the shape and size of the existing D701 areas. Such design could be modelled specifically for sounding rocket profiles using a layered approach, similar to how the MOD use D701 but orientated on the SP-1 launch site. It is recognised that this may be a more efficient use of airspace but the Sponsor considers that the consequential effects may outweigh any benefits; these consequential effects include but are not limited to:

  - TDA boundary within D701 would not be integrated into the systems and processes employed by the UK AMC and the Eurocontrol Network Manager (NM). Therefore, unlike the D701 complex, this would not enable the harmonised and dynamic planning of the Air Traffic Management (ATM) network. The TDA would therefore have to be built into the EUROCONTROL NM flight planning system (circa 6 months prior to activation) for each sounding rocket profile to enable the necessary safety testing and ATM impact assessments to be developed as well as applying the obligatory flight planning buffer zones;
  - The requirement for 5LNCs being reserved with ICARD that allows circumnavigation of the TDA (for each sounding rocket profile);
  - Renegotiating and designing complex LoAs specific to the bespoke TDA design;
  - The requirement for a significant update of Air Traffic Control and Range control maps as opposed to a single straight line connecting two existing ADQ coordinates;
  - Obtaining ADQ coordinates for each geographical point of the TDA;
  - MOD objection to having bespoke Danger Areas within MOD sponsored D701 and the confusion this could cause; and,
  - Developing bespoke ASM procedures specific to the TDA.

- It should also be noted that the maximum number of launches in 2022 is highly unlikely to exceed 10. This is less than two per month on average and given these launches will generally[7] occur post 1400UTC the impact on NATS and the NAT traffic is likely to be minimal. As such expending the resource required to design, implement and above all manage a bespoke airspace structure, is not considered cost effective when balanced against using the existing D701 structure and ASM procedures.

- Sounding rocket launch timings will remain flexible to work around MOD activity as necessary;
- Benbecula DACS provision for D704 not relevant as D704 is not required for SP-1 operations;
- QinetiQ is cognisant of HIAL ACP regarding removal of ATCOs and remote tower at Benbecula; work has commenced on Hazard Identification and additional procedures that SP-1 activities may necessitate. It was suggested that it would be too late to include SP-1 Operations in the most recent update to the LoA however, since agreement has been reached with MOD on the use of D701 and extant procedures, this is being investigated further;
- Extant Range procedures will be used for access to TDA and corresponding D701 areas by national security/emergency aircraft;
- Extant 'Clear Range' processes and procedures will be in place for SP-1 activities; the safety trace will be monitored to ensure awareness of what is there using sensors/surveillance systems (including use of MPA where necessary);

[7] Unless contained within D701A, B, C or Y (see Figure 5 right diagram) where OEPs are unaffected.

- Deconfliction and coordination with other spaceports and MOD activities. Members of the SP-1 consortium are engaging with Sutherland Spaceport with a view to open discussion regarding any process that may be developed to deconflict coincident rocket launch. However, this may not be relevant for the TDA in Jun 22 as it is not thought Sutherland are planning any launches this year. Deconfliction with other MOD activity will be in accordance with current ASM processes as contained in the relevant LoAs and protocols pertaining to D701;
- The SpOC will be informed of all necessary information regarding the launch, including the mission profile, tracking data, frequencies used, abort zones, etc;
- This requirement, to provision details to the SpOC, is the responsibility of the launcher operator and the SIA regulator (CAA), and is linked to the granting of a launch licence. It supports the UK responsibilities under the Outer Space Treaty; and,
- For commercial launches the launch operator also holds the responsibility for provisioning information to OfCom, the MCA, Environment Agencies, and a number on non-airspace related stakeholders.

Sollas beach Landing Strip - It was suggested by the Sollas users that the TDA boundary should be realigned so as not to include the Sollas beach site as it was thought the Sponsor was utilising too much airspace, in particular to the North. It is acknowledged that the airspace required for the TDA may be more than is absolutely necessary however, the safety analysis is working on a worst-case scenario for a number of possible trajectories and different sounding rockets which the full safety data is not yet available. The option to have different trajectories are needed to minimise the impact on the ATM network for CAT and enable different combinations of the D701 areas to be utilised accordingly. Furthermore, using pre-existing ADQ validated reference points to determine the boundary line of the TDA does simplify the notification process as these points are already in the EUROCONTROL flight planning systems and do not require any additional validation.

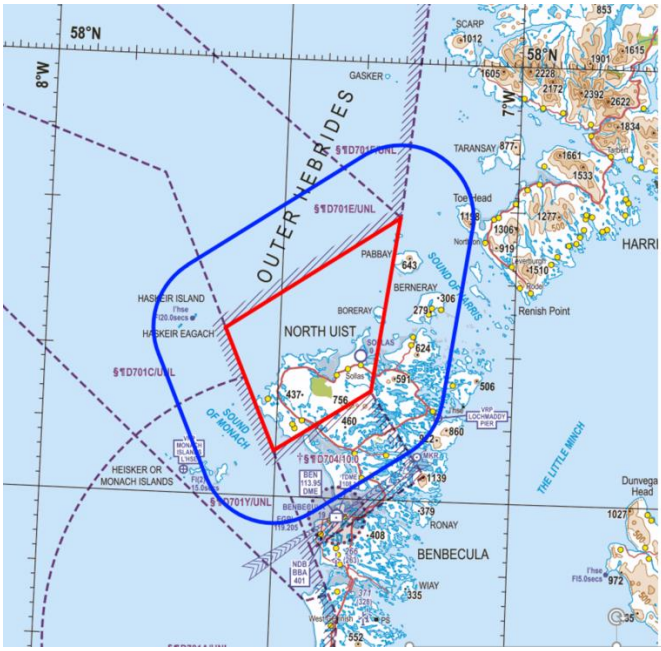
Recognising that the proposed TDA, when activated, will impact on the use of the beach landing strip at Sollas, the Sponsor, (using local knowledge from the Hebrides Range personnel/operators, Benbecula ATC and requested data from the LAA/Sollas Fly-in Coordinator), determined that the use of the landing 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[8] when the majority of the sounding rocket activity is likely to occur. Moreover, the number of rocket launches during the TDA period is not expected to exceed five in total, so less than two launches per month. When this is balanced against the infrequent use of the beach site, the probability of the two occurring at the same time (given the other factors such as tide and weather limitations for Sollas), is probably remote. It was therefore decided that; undertaking the additional safety work to redesign the TDA and subsequent limitations this may pose to potential sounding rocket providers; and, conducting a third round of formal engagement, was not proportionate when balanced against the 'potential' impact on so few. It is accepted that the location of the beach strip at Sollas will need to be considered when developing the airspace options for the permanent solution in ACP-2021-12 and affected interested parties will be invited to participate in the engagement process.

For the TDA activation, the Sponsor has offered to provide additional notification to the LAA when the launch timings are finalised (providing TDA activation times and duration, updates and cancellations as well as contact numbers for the Range). Furthermore, SP-1 have agreed not to conduct any

[8] An assumption is made that, like other parts of the UK, GA flying predominantly occurs at weekends.

launches on the weekend of the Sollas annual fly-in 23 and 24 July 2022, to ensure this event is not impacted by SP-1 launches.

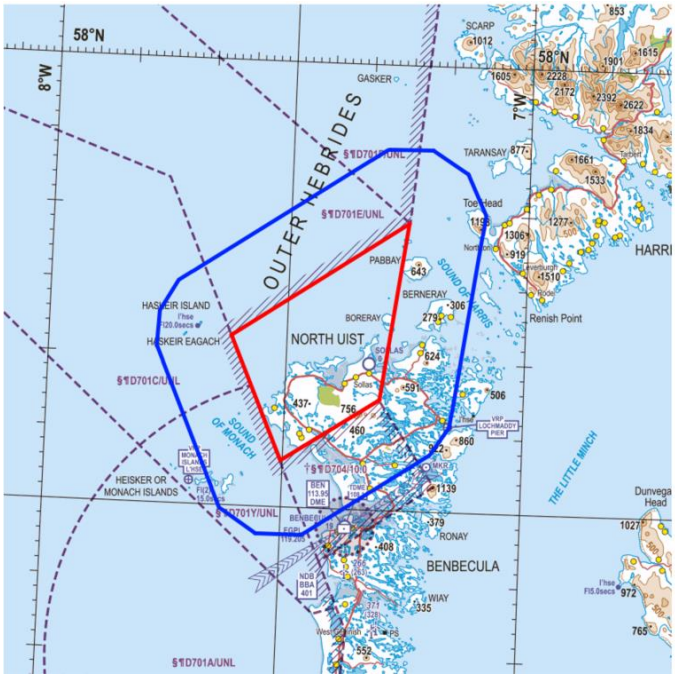
FBZs - To address NATS and UK AMC concern regarding FBZs and lead in times (3 months to meet AIRAC cycle), the Sponsor proposed to NATS the following three potential FBZ options at Figure 8 to Figure 10 below:



Minimal Buffer Zone – 5NM from TDA

574536N 0074217W -
575332N 0072012W thence clockwise by the arc of a circle radius 5NM centred on
574923N 0071500W to
574841N 0070544W -
573644N 0070858W thence clockwise by the arc of a circle radius 5NM centred on
573727 0071811W to
573318N 0071301W -
572856N 0072507W thence clockwise by the arc of a circle radius 5NM centred on
573305N 0073017W to
573105N 0073847W -
573929N 0074536W thence clockwise by the arc of a circle radius 5NM centred on
574128N 0073703W to
574536N 0074217W

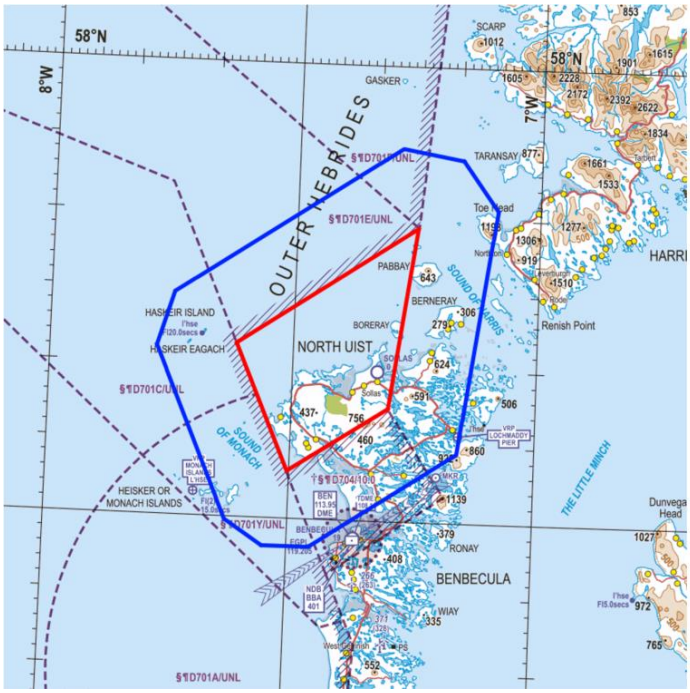
Figure 8: FBZ Option 1



Tight Buffer Zone – no more than 5.25NM from TDA

574457N 0074406W -
575422N 0071753W -
575424N 0071221W -
575249N 0070739W -
575008N 0070520W -
573541N 0070915W -
573353N 0071122W -
572806N 0072726W -
572804N 0073301W -
572943N 0073742W -
574034N 0074629W -
574254N 0074615W -
574457N 0074406W

Figure 9: FBZ Option 2



Loose Buffer Zone – no more than 5.5NM from TDA

574436N 0074504W -
575440N 0071703W -
575357N 0070936W -
575040N 0070512W -
573432N 0070934W -
572806N 0072726W -
572804N 0073301W -
572943N 0073742W -
574108N 0074657W -
574436N 0074504W

Figure 10: FBZ Option 3

NATS offered no preference and referred the Sponsor to the NM at EUROCONTROL. However, the UK AMC suggested that this was not a EUROCONTROL decision and the FBZs simply needed to conform to CAA policy, namely 5NM around the TDA. Therefore, the Sponsor is proposing Option 1 as the FBZ and this is included in the draft AIP Supp insertion at paragraph [4].

Remaining Feedback - All other feedback is addressed through the operational considerations, namely by treating the TDA as an extension of the D701 complex with regard to extant airspace management notification and control procedures.

3.7 Conclusions – TDA Design Post Stakeholder Feedback

The proposed TDA is a relatively small volume of airspace and it is evident that this 'fillet' of airspace is of little concern to the majority of stakeholders apart from those using the Sollas beach landing strip. Here, the interests of these stakeholders have been considered and deconfliction with the annual summer Sollas Fly-in agreed. Furthermore, TDA activation notification will be provided well in advance to the necessary interested parties. As recognised by the Sponsor, it is the subsequent use and activation of the adjoining D701 areas that causes disquiet and raises a number of issues. The MOD were primarily concerned with the processes involved by which the D701 areas may be used for commercial operations and any subsequent impact on MOD operations – these are resolved through the commercial approvals process (OWA) and LoA between MOD/SP-1 and QinetiQ. NATS primary concern is how additional use of D701, above and beyond MOD use, will impact on their operations especially transatlantic traffic and whether utilising D701 is the most efficient use of airspace where a bespoke design might avail more airspace to be used for CAT. The Sponsor considers several of NATS other concerns are not specifically related to the TDA but would be more appropriately addressed in ACP-2021-12 and by the regulatory/government bodies. Other feedback (non-Mod/NATS) focused almost entirely on access to the TDA airspace and D701.

In considering the feedback as summarised in paragraph [3.5], the Sponsor proposes that all concerns and issues raised can be addressed through the operational considerations detailed at paragraph [3.6]. Although these are likely to satisfy the MOD concerns, and other stakeholders, it is unlikely they will meet all of NATS' arguments however, as many of these are outside the scope of the TDA, the Sponsor would contend that the TDA proposal attends to most of the salient points with the exception of designing a bespoke volume of airspace within D701. Here the Sponsor advocates that the benefits of using an existing airspace structure and associated ASM procedures outweighs any benefit of reducing the overall volume of airspace required for sounding rocket activities in particular given the limited number of rocket launches expected and the flexibility of launch times. It is therefore proposed that the TDA should be configured as prescribed in Figure 1.

4 AIP SUPP Submission

4.1 Draft AIP SUPP Submission

The following draft AIP SUPP information is proposed for Inclusion in the AIP SUPP publication on 2 June 2022. The details pertaining to new 'Reporting Points' remains work in progress.

AIP SUPPLEMENT (CAA to insert number)/2022

TEMPORARY DANGER AREA EG D (*CAA to insert TDA identifier*) – 13 JUNE TO 11 SEPTEMBER 2022

1. Introduction

Between 13 June 2022 and 11 September 2022 up to five sub-orbital 'sounding rockets' are planned to be launched from the Spaceport-1 (SP-1) proposed launch site at Scolpaig, North Uist, on the Outer Hebrides, into the existing EG D701 Hebrides Range. In support of this activity a Temporary Danger Area (TDA), as detailed in figure 1 below, will be established from 2359 on 12 June 2022 until 2359 on 11 September 2022.

2. Details

- AMC – manageable
- Upper Limit: UNL
- Lower Limit: SFC
- Activity: Ordnance, Munitions and Explosives (OME)
- Service: Danger Area Activity Information Service (DAAIS): Scottish Information on 127.275 MHz:
- Contact: Pre-flight information: Range Control, Tel: [redacted]
- The TDA is sponsored by QinetiQ Ltd in accordance with Airspace Change reference ACP-2021-37.
- Hours: Activated by NOTAM.

3. Activations

TDA EG D (*CAA to insert number*) will be notified for activation by NOTAM no less than 24 hours prior to the planned activity by the UK Airspace Management Cell (AMC) via the Airspace Usage Plan (AUP).

The period of activation for 13 June 2022 and 11 September 2022 is nominally expected to consist of five launch periods each in the region of two to three hours duration. Spare launch days of similar duration will be required and will be notified accordingly. The TDA will normally be activated in conjunction with one or more EG D701 areas, the latter being activated in accordance with extant Airspace management (ASM) processes, procedures and agreed protocols. Where EG D701 areas are required in addition to EG D701A, B, C & Y, launches will occur post 1400 UTC to minimise impact on Oceanic Entry Points (OEPs).

Cancellation of activities will be undertaken by the Swanwick Military Level 3 Airspace Management (L3M) function via the Updated Usage Plan (UUP) and NOTAM.

4. Lateral Dimensions

Area bounded by straight line joining:
Point A - 573305N 0073017W with
Point B - 574128N 0073703W and;
Point C - 574923N 0071500W and;
Point D - 573727N 0071811W and back to;
Point A - 573305N 0073017W

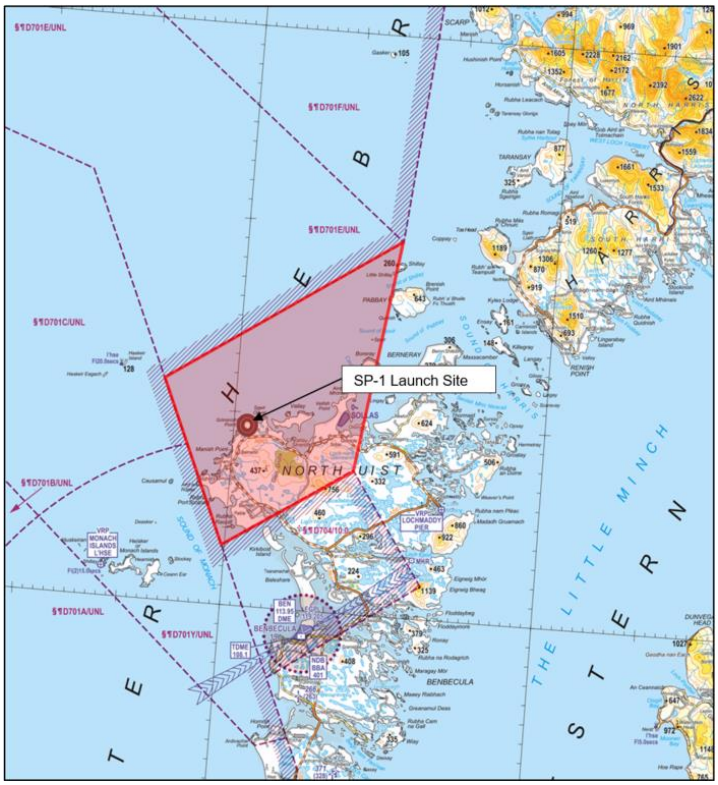


Figure 1: SP-1 TDA Location (in red)

5. Flight Planning Procedures

5.1. Flight Plan Buffer Zone

A Flight Plan Buffer Zone (FBZ) is associated airspace that defines the lateral and vertical limits for validating IFR FPL when the TDA is planned to be active. A FBZ (EG D (*CAA to insert number*)) will be established to provide a 5 NM buffer zone around TDA EG D (*CAA to insert number*), at figure 2, within the area bounded by joining successively the following points:

Point A - 574536N 0074217W straight line to;
Point B - 575332N 0072012W thence clockwise by the arc of a circle radius 5NM centred on 574923N 0071500W to:
Point C - 574841N 0070544W straight line to;
Point D - 573644N 0070858W thence clockwise by the arc of a circle radius 5NM centred on:
Point E - 573727 0071811W to;
Point F - 573318N 0071301W - straight line to:
Point G - 572856N 0072507W thence clockwise by the arc of a circle radius 5NM centred on
Point H - 573305N 0073017W to
Point I - 573105N 0073847W – straight line to:
Point J - 573929N 0074536W thence clockwise by the arc of a circle radius 5NM centred on 574128N 0073703W to:
Point A - 574536N 0074217W.

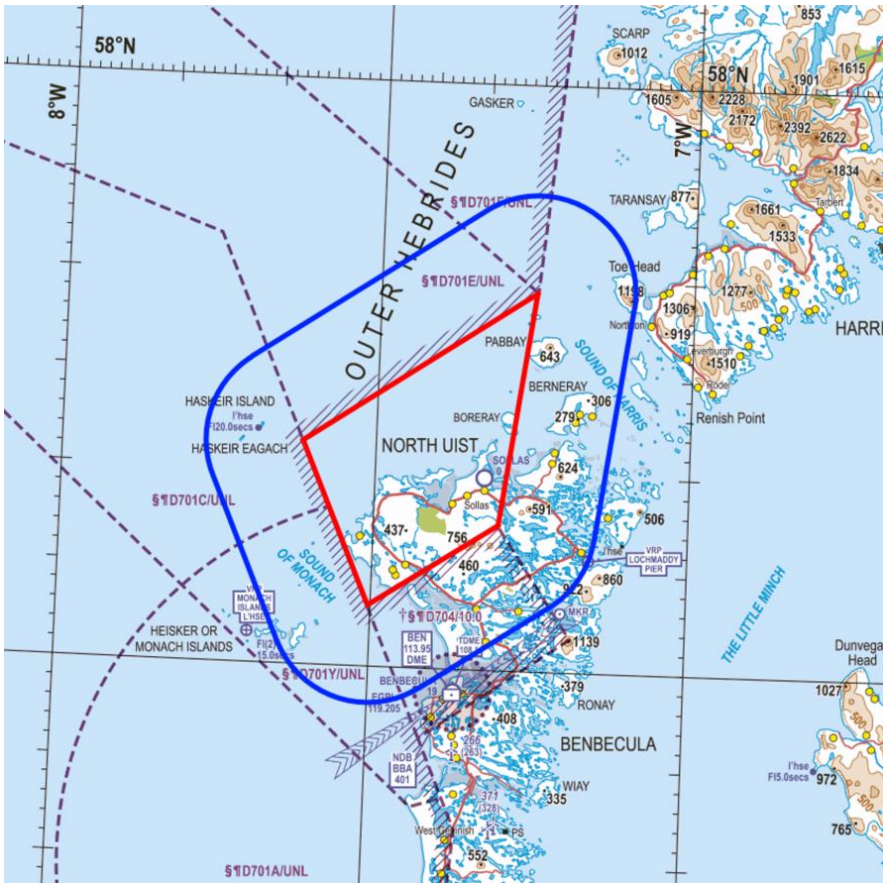


Figure 2: TDA with FBZ (in Blue)

5.2. FBZ Promulgation

The FBZ shall be promulgated via the AUP/UUP but cannot be activated without the parent Temporary Danger Area also being activated. FBZ activation will cause the associated Flexible Use of Airspace (FUA) restriction to be activated, which will inhibit all appropriate flight planning through the reference airspace. FUA restriction and FBZ details may be found in Appendix 7 of the UK Route Availability Document (RAD).

5.3. New Reporting Points

For periods where the airspace is activated, new reporting points will be established in order to provide flight plan connectivity associated with available Direct Routings (DCTs) or within Free Route Airspace (FRA): *{To be completed as required}*

6. Contact Details

Any enquires regarding the content of the AIP SUP should be direct to the SARG Project Officer via airspace.policy@caa.co.uk.

Booking, management or activation enquiries should be made to the UK AMC via the Military Airspace Management Cell, Tel: 01489-612495.

Further enquiries (including issues or complaints) should be made to QinetiQ Airspace Change Sponsor for ACP-2021-37 via email: SP1ACP@QinetiQ.com.

5 Environmental Noise Assessment and Engagement

5.1 Environmental Impact Assessment (EIA)

As part of the planning application for a vertical launch spaceport site at Scolpaig North Uist, the SP-1 consortium has been required to commission a comprehensive EIA [D] for the site covering a multitude of rocket type launches both sub-orbital sounding rockets and orbital rockets. The EIA is now available in the public domain at:
https://planning.cne-siar.gov.uk/PublicAccess/applicationDetails.do?activeTab=documents&keyVal=R4RKXJROGNG00

The 'noise' and 'noise & vibration' sections of the EIA have been extracted and are contained at Appendix C-1 to this report. It is considered that the detail presented at the Appendix meets, and in places exceeds, the requirements stipulated in CAP 1616 regarding the Sponsor 'assessing the likely noise impact'. The EIA includes details of the engagement process undertaken, questions and objections raised – these are referred to in the extract at the Appendix.

The EIA does not consider the noise effect of aircraft flying below 7000ft that may have to deviate around the TDA when active, thereby changing the current noise profiles in the area. However, as detailed at paragraph [3.4], it is anticipated that the TDA will have minimal impact on flights below 7000ft and therefore, any subsequent changes in noise profiles is likely to be insignificant. Given the very small numbers of aircraft movements likely to be affected by the TDA and corresponding low population in the area, further detailed noise analysis is not considered appropriate.

6 Monitoring Complaints

6.1 Complaints Process

It is recognised that CAP1616 determines that Sponsors should have an appropriate complaints process to collate, monitor and assess any complaints once the TDA is in place. The Sponsor intends to publicise the complaints process closer to the time of the first launch. It is expected the process will be similar to that already in place for the Hebrides Range; this will be confirmed in due course and notified to all stakeholders accordingly.

Furthermore, QinetiQ will monitor the success of the TDA and capture any issues through engagement with the key stakeholders, namely: MOD, NATS, Benbecula Airport, HIAL, Loganair, Sollas users and local helicopter operators supporting NLB, MCA and other emergency services. All stakeholders will be encouraged to provide any feedback on the TDA through the SP1ACP@QinetiQ.com email address.

7 Next Steps

7.1 DECIDE Gateway

Assuming the CAA approves the TDA as described herein, the Sponsor will upload the appropriate redacted documentation including this report onto the airspace portal and inform stakeholders of the CAA decision. A draft AIP SUPP will be drafted and forwarded to the CAA for approval; thereafter it will be sent to NATS AIS for publication.

8 Glossary

Acronym	Meaning
5LNC	5 Letter Name Code
ACP	Airspace Change Proposal
ADQ	Aeronautical Data Quality
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation And Control
ALARP	As Low As Reasonably Practicable
AMC	Airspace Management Cell
ANO	Air Navigation Order
ANSP	Air navigation Service Provider
AOs	Airline Operators
ASD/FS 21	At Sea Demonstration/Formidable Shield 2021
ASM	Airspace Management
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAT	Commercial Air Transport
DA	Danger Area
DAAIS	Danger Area Activity Information Service
DAAM	Danger Area Airspace Manager
DAATM	Defence Airspace & Airspace Traffic Management
DACS	Danger Area Crossing Service
EG D	UK Segregated Airspace Designator and Danger Area
EIA	Environmental Impact Assessment
FAA	Federal Aviation Authority
FBZ	Flight planning Buffer Zone
FIR	Flight Information Region
FRA	Free Route Airspace
FUA	Flexible Use of Airspace
GAT	General Air Traffic
GPS	Global Positioning System
HFD	Hazardous Fragmentation Distances
HIAL	Highlands & Islands Airports Ltd
HIE	Highlands & Islands Enterprises
IAA	Irish Aviation Authority
ICAO	International Civil Aviation Organisation
ICARD	International Codes And Route Designators
LARA	Local and sub-regional airspace management support system
LoA	Letter of Agreement
LTPA	Long Term Partnering Agreement
MCA	Maritime Coastguard Agency
MEB	Maximum Energy Boundary
MOD	Ministry of Defence
NAT	North Atlantic
NATMAC	National Air Traffic Management Advisory Committee
NLB	Northern Lighthouse Board
NOTA	North Atlantic Transit Area

Acronym	Meaning
NOTAM	Notice To Airman
OEPs	Oceanic Entry Points
OWA	Other Works Approvals
PPP	Power Point Presentation
PPR	Prior Permission Required
PT	Project Team
RP3	Reporting Period 3
SAR	Search And Rescue
SIA	Space Industry Act
SOPs	Standard Operating Procedures
SP-1	Spaceport 1
SUPP	Supplement
TCO	Trials Conducting Officer
UK SpOC	United Kingdom Space Operations Centre
US	United States
UTC	Coordinated Universal Time

9 References

A. CAP 1616 Fourth Edition published March 2021; online, available at: http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=8127
B. CAA Policy Statement 20200721 Policy for the Establishment of Permanent and Temporary Danger Areas; online available at: http://publicapps.caa.co.uk/docs/33/Policy%20Statement%20Permanently%20Established%20Danger%20Areas%20and%20Temporary%20Danger%20Areas.pdf
C. 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.
D. Spaceport-1 Environmental Impact Assessment Report 7 February 2022; available at: https://planning.cne-siar.gov.uk/PublicAccess/applicationDetails.do?activeTab=documents&keyVal=R4RKXJROGNG00

A List of Stakeholders

2Excel Aviation
Aircraft Owners and Pilots Association (AOPA)
Airfield Operators Group (AOG)
Airspace Change Organising Group (ACOG)
Airspace4all
Babcock Aviation
Benbecula & Barra ATC
Bristow helicopters
British Airline Pilots Association (BALPA)
British Airways (BA)
British Business and General Aviation Association (BBGA)
British Helicopter Association (BHA)
Gamma Aviation
General Aviation Alliance (GAA)
Guild of Air Traffic Control Officers (GATCO)
Heavy Airlines
Helicopter Club of Great Britain (HCGB)
Highland Aviation
Highlands and Islands Airports Ltd (HIAL)
Highlands & Islands Strut of Light Aircraft Association
HM Coastguard Maritime & Coastguard Agency (MCA)
Irish Aviation Authority (IAA)
Light Aircraft Association (LAA)
Loganair
Ministry of Defence - Defence Airspace and Air Traffic Management (MoD DAATM)
Ministry of Defence Danger Area Airspace Manager (DAAM)
NATS
Northern Lighthouse Board (NLB)
PDG Helicopters
Sollas Fly-in Coordinator
Stornoway ATC
UK AMC

B Stakeholder Engagement Records – Evidence

From: [redacted]
Sent: 09 March 2021 12:33
To: [redacted]
Subject: UC Spaceport 1 Scolpaig ACP

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.

[redacted]

Hi again, [redacted] Spaceport 1 at Scolpaig. I am unsure what if any visibility you have had regarding this matter and I have only recently been brought into the project to commence the ACP process for a small fillet of airspace over the future launch site in order that it can connect to the existing D701 Danger Areas.

We are only just commencing the process and at this stage are not asking for any formal responses as we have not yet had the initial CAA assessment meeting to establish if an ACP is appropriate or not. That said, I believe early exposure of the plans would be beneficial if shared with you now given your knowledge and understanding of aviation operations in the local area. To this end could I ask you to consider the attached and let me have your thoughts on the following:

- Would the new fillet of airspace affect any flights/approach or departure procedures at Benbecula airport? Please see attached for Benbecula's AIP entry which includes IAPs. It appears that none would be affected by the new fillet of Danger Area. We do not have formal departure procedures. Our missed approach procedures are contained wholly within D704.
- What level of GA or recreational flying occurs in this airspace, if any? Annual Sollas fly-in during July with multiple light aircraft. Sporadic GA, primarily in the summer months.
- What other flights could potentially be affected, e.g. Northern lighthouse board, SAR, Helo flights to/from hotels & businesses as well as fisheries flights? St Kilda resupply helicopter routeing may be affected. NLB. SAR/Ambulance. Fisheries. QinetiQ range clearance aircraft.
- Anything else we should consider? Would shipping have to be cleared in the same manner as QinetiQ range clearance?

As stated, this is informal at this stage as I just need to have a feel for the level of stakeholder engagement we are likely to need and any potential impact on local aviation activities. Please bear in mind the small fillet of airspace is only likely to be activated infrequently and for relatively short periods probably in the order of 30 mins or so (and probably no more than a few times per month). Formal consultation will follow and only if the CAA decide an ACP is appropriate for this infrequent type of activity.

[redacted] Please pass on my details if Logan Air would like more information on [redacted] or Spaceport 1.

Kind Regards

[redacted]

SPACE PORT 1

Wed 17/03/2021 14:56

[redacted]

RE: UC Spaceport 1 Scolpaig ACP

To [redacted]

This message is part of a tracked conversation. Click here to find all related messages or to open the original flagged message.

[redacted]

Thanks for the update and forwarding the briefing material to Loganair.

Kind Regards

[redacted]

From: [redacted]
Sent: 17 March 2021 14:36
To [redacted]
Subject: RE: UC Spaceport 1 Scolpaig ACP

[redacted]

To follow up on my initial email and your response, the inbound/outbound radial from/to Stornoway is R044 so this would be out with the new fillet of airspace. Visual approaches and VFR arrivals would require to be instructed to remain clear.

It should also be noted that it is the intention to introduce GNSS approaches to Benbecula in advance of the removal of our VOR Navigational Aid. We have already had two postponements of its withdrawal so it is likely to be withdrawn in the not too distant future. The location of proposed waypoints would have to be considered in any ACP.

We got to the initial planning stage several years ago but it was paused for several reasons.

I have a new contact at Loganair who is happy for me to send your emails regarding the Spaceport and the upcoming exercise.

Best regards,

[redacted]

SPACE PORT 1

Tue 18/05/2021 10:32

[redacted]

FW: UC Spaceport 1 Scolpaig - Temporary Dander Area ACP Targeted Engagement

To SP1 ACP

Follow up. Completed on 02 June 2021.

From: [redacted]
Sent: 08 May 2021 11:09
To: [redacted]
Cc: [redacted]
Subject: RE: UC Spaceport 1 Scolpaig - Temporary Dander Area ACP Targeted Engagement

Good morning [redacted]

Thank you for the opportunity to comment on the potential impact on the ACP to Benbecula Airport Operations.

My previous email provided more detail on the stakeholders who may give additional feedback.

We have a good working relationship with QinetiQ supported by the LoA you refer to in your presentation. Expansion of this LoA to capture SP1 activities is something we would support.

The ideal scenario would be for the activity to take place during periods of nil traffic but coordination is an effective tool to enable minimum disruption to scheduled aircraft.

Activation of D704 effectively closes the airport so would only be agreed during periods of nil traffic with the caveat that Ambulance/SAR takes precedence over SP1 activities.

The location of the proposed TDA does not impact on our Instrument Approach Procedures but would impact on routeings available for visual approaches. Loganair will be best placed to comment on this.

Best regards,

[redacted]

www.hial.co.uk

Please consider the environment - think before you print!

Spaceport 1 Scolpaig TDA ACP-2021- 037 Planning

Briefing Prepared by:

[redacted]

V1.2 dated 12 May 2021

Background – SP1

- QinetiQ Manage the MOD sponsored Hebrides Range Danger Areas (EG D701)
- QinetiQ collaboration with MOD to enable access – MOD Memo
- SP1 consortium led by local council comprising Highlands & Islands Enterprises, private investors and QinetiQ
- Location – Scolpaig North Uist, Outer Hebrides
- Site sits beneath Class G, adjacent to EG D701 and EG D704
- ACP required to protect launch site/other airspace users and connect to existing Danger Areas
- SP 1 - 2 Phases:
  - Phase 1 - 'Sounding rocket' sub-orbital launches to West (requiring TDA)
  - Phase 2 - Small satellite orbital launches to North/North East (permanent airspace solution ACP-2021-12)

Statement of Need

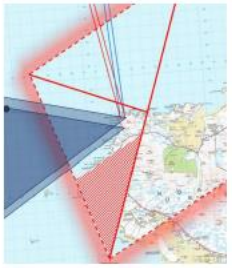
- Opportunity under government 'LaunchUK' space programme
- Local government investment programme for vertical launch small satellite site
- Generate revenue for local communities and jobs
- Low population, immediate 'over the sea' access
- Adjacent MOD Danger Areas D701/D704 providing safe testing environment
- Use irreducible spare capacity of Danger Areas
- Capitalise extant ASM procedures for Hebs Range
- Utilise full Range capabilities, surveillance/tracking/communications/FTS
- ACP for a small fillet of airspace to connect site to Hebs Range

TDA Options

Preferred Option

Preferred option mirrors what we believe ACP-2021-12 will reveal; supports both Sounding Rockets and Polar/Sun Synchronous launches – future proof permanent solution

Alternate Option



Option 2 allows less airspace to be active for Sounding Rocket launch only. Hatched area may not be needed

Addressing Issues

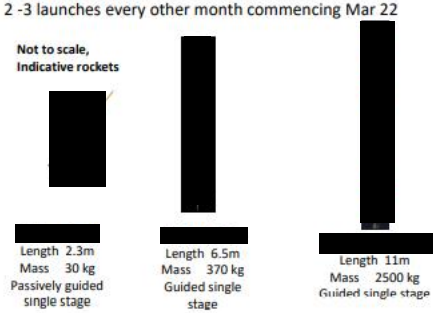
Addressing Issues:

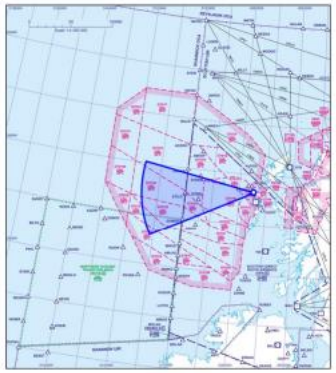
- Minimise impact on CAT by avoiding peak periods, DAs fully integrated into existing ATM systems enabling harmonised and dynamic planning (Sounding Rocket outside core hours/MOD use therefore minimal impact on NAT traffic)
- Benbecula airport LOA with QinetiQ expanded to capture SP1 activities
- QinetiQ can micro manage DAs expeditiously between MOD and SP1 use with opportunity for coincident activities, embracing FUA concepts
- Airspace only activated when needed; low frequency of sounding rocket launches & contingency days. Short duration (circa 2-3 hrs) – plan to launch early in 2-3 hr window, cancel airspace immediately after launch
- Extant Range procedures easily expanded to capture SP1 activities for Northern Lighthouse Board, Fisheries Protection/Survey and SAR

SPACE PORT 1 QINETIQ

Timelines

- Suborbital 'Sounding Rockets', contained within D701 complex – Approvals under ANO (rocket capability < 50Km <10,240Ns or large rocket permission), expected launch requirements:
- First launch Sep 21, (possible 2nd launch Oct)
- 2 launches in Nov 21
- 2 -3 launches every other month commencing Mar 22





SPACE PORT 1 QINETIQ

Provisional TDA Timeline – Spaceport 1

Stage 1 DEFINE Complete awaiting CAA Formal Assessment Meeting w/c 10 May
- Assuming approved, commence Stage 3 Targeted Engagement
- Following engagement, TDA submission updated

TDA Submission to CAA by end May 21
- CAA Review (<28 days)

CAA DECIDE Gateway – Jun 21
- Target AIRAC 09 published Jul 21

Stage 6 Target IMPLEMENTATION Sep 21

Tue 18/05/2021 10:28

[redacted]

UC FW: UC Spaceport 1 Scolpaig - Temporary Dander Area ACP Targeted Engagement

To SP1 ACP

Follow up. Completed on 02 June 2021.
This message was sent with High importance.

20210504_SP-1_TDA_ACP_Provisional_Planning_V1.pdf
2 MB

From: [redacted]
Sent: 05 May 2021 08:59
To: [redacted]
Subject: UC Spaceport 1 Scolpaig - Temporary Dander Area ACP Targeted Engagement
Importance: High

Good Morning [redacted]

In addition to my request below I now need to commence the formal engagement process in support of ACP-2021-37 Spaceport 1, Scolpaig TDA. This TDA is required ahead of the main ACP (ACP-2021-12) to support the launch of suborbital 'sounding rockets' from Scolpaig into the Hebrides Range, EG D701. Ahead of the CAA assessment meeting I would like to commence formal engagement with HIAL regarding the TDA and offer the following for consideration:

- TDA requirements from Oct 2021 SFC – UNL activated by NOTAM as per D701 areas
- Associated D701 Areas activated simultaneously will be minimised with preference to utilise D701A, B, D & C in the first instance but may include D701E, G, H & I worse case (not necessarily all but combinations as determined by safety trace or sounding rocket)
- Sounding rockets will fit in around any MOD activity (where safe to do so – coincident operations); launches restricted to post 1300UTC and probably later (MOD activity dependent)
- Frequency of launches:
  - First rocket circa late September 2021, with a second launch in October and two more in November 2021
  - Recommence launch sequence in March 2022 with two to three launches occurring every other month
- Acknowledged TDA extending 90 days would accommodate the launches for 2021 but not for 2022 where it is envisaged a further two TDAs would be required, one of which would have to extend the 90 day period by approximately one month – This and requirement for repeat TDAs will be negotiated with the CAA at forthcoming Assessment meeting.
- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place

As part of the ACP process for a TDA it would be useful if HIAL could consider the above bullets and presentation and highlight any concerns or issues with the TDA proposal to the undersigned by Thursday 13 May 21.

Kind Regards

[redacted]

SPACE PORT 1

Wed 17/03/2021 16:22

[redacted]

RE: UC Spaceport 1 Scolpaig ACP

To [redacted]

Cc [redacted]

Follow up. Start by 18 March 2021. Due by 18 March 2021.
You replied to this message on 18/03/2021 08:57.
This message is part of a tracked conversation. Click here to find all related messages or to open the original flagged message.

Afternoon [redacted]

Thanks for this slide deck, and the one for Exercise Formidable Shield. The only impact from FS will be mitigating against any GPS jamming associated with it; the spaceport shouldn't have any impact on us – apart from increased passenger numbers!

Regards,

[redacted]
Manager Flight Support

[redacted]
Web: http://www.loganair.co.uk

Loganair Scotland's Airline FlySafe CLEAN & HEALTHY

From: [redacted]
Sent: 17 March 2021 14:46
To: [redacted]
Cc: [redacted]
Subject: [redacted]

[redacted]

As promised, this is the information on the proposed Spaceport and associated airspace.

From: [redacted]
Sent: 09 March 2021 12:33
To: [redacted]
Subject: UC Spaceport 1 Scolpaig ACP

SPACE PORT 1

Wed 12/05/2021 09:27

[redacted]

RE: UC Spaceport 1 Scolpaig - Temporary Dander Area ACP Targeted Engagement

To [redacted]

Cc [redacted]

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
.pdf File

[redacted]

Thanks for your response all points noted. I can confirm that there would not be a requirement to activate D704 during SP-1 activities and SAR aircraft would always take precedence of sounding rocket launch furthermore, the TDA will be managed in exactly the same way as the existing D701 areas. I am in discussion with my colleague who is responsible for the LoA update to establish if we can indeed include the SP-1 activities in here; my only cautionary note is that MOD DE&S are a signatory and they have no interest, involvement or liability for SP-1 activities as it is purely a commercial civil activity.

Thank you too for your other email providing contact details – I will be forwarding the presentation to HIAL head office and Stornoway. PSA a slightly updated version V1.2, main PTN is slide 6 that shows a more accurate representation of D701 usage for sounding rockets.

Kind Regards

[redacted]

Connect with us:

[redacted]

Sent: 08 May 2021 11:09

[redacted]

Subject: RE: UC Spaceport 1 Scolpaig - Temporary Dander Area ACP Targeted Engagement

Good morning [redacted]

Thank you for the opportunity to comment on the potential impact on the ACP to Benbecula Airport Operations.

My previous email provided more detail on the stakeholders who may give additional feedback.

We have a good working relationship with QinetiQ supported by the LoA you refer to in your presentation. Expansion of this LoA to capture SP1 activities is something we would support.

The ideal scenario would be for the activity to take place during periods of nil traffic but coordination is an effective tool to enable minimum disruption to scheduled aircraft.

Activation of D704 effectively closes the airport so would only be agreed during periods of nil traffic with the caveat that Ambulance/SAR takes precedence over SP1 activities.

The location of the proposed TDA does not impact on our Instrument Approach Procedures but would impact on routeings available for visual approaches. Loganair will be best placed to comment on this.

Best regards,

[redacted]

www.hial.co.uk

Please consider the environment - think before you print!

SPACE PORT 1

Wed 17/03/2021 16:22

[redacted]

RE: UC Spaceport 1 Scolpaig ACP

To [redacted]

Cc [redacted]

Follow up. Start by 18 March 2021. Due by 18 March 2021.
You replied to this message on 18/03/2021 08:57.
This message is part of a tracked conversation. Click here to find all related messages or to open the original flagged message.

Afternoon [redacted]

Thanks for this slide deck, and the one for Exercise Formidable Shield. The only impact from FS will be mitigating against any GPS jamming associated with it; the spaceport shouldn't have any impact on us – apart from increased passenger numbers!

Regards,

[redacted]
Manager Flight Support

Tel: [redacted]
E-Mail: [redacted]
Web: http://www.loganair.co.uk

Loganair Scotland's Airline FlySafe CLEAN & HEALTHY

From: [redacted]
Sent: 17 March 2021 14:46
To: [redacted]
Cc: [redacted]
Subject: FW: UC Spaceport 1 Scolpaig ACP

Hi [redacted]

As promised, this is the information on the proposed Spaceport and associated airspace.

From: [redacted]
Sent: 09 March 2021 12:33
To: [redacted]
Subject: UC Spaceport 1 Scolpaig ACP

SPACE PORT 1

Wed 09/06/2021 08:42

SP1 ACP

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

To [redacted]

This message was sent with High importance.

[redacted]

Very many thanks your response and we agree your sentiment regarding finding a permanent solution. As you will be aware this is our intention for SP-1 and you should have been sent a copy of our design principles for you to comment on; ACP-2021-12 refers.

Kind Regards

[redacted]

QINETIQ

Connect with us:

From: [redacted]
Sent: 04 June 2021 11:58
To: SP1 ACP <SP1ACP@qinetiq.com>
Subject: RE: UC Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist

Morning[redacted]

Apologies for the late reply. I can't foresee such a small chunk of airspace, particularly in the context of the D701 complex, to have an adverse impact on our operation.

Having said that, the sooner there's a permanent airspace solution the better – we're involved in a number of drone-related ACPs with TDAs and frankly we're minded to object. But that's primarily in relation to drone-related applications as TDAs seem to be the cheap and cheerful quick solution to getting drone trials underway. Our view is that the real issue for the drone operators is to solve the segregation problem first. In the case of Scolpaig that's not the issue and I'll ensure that the TDA isn't seen in the same adverse context as the other TDAs we're involved with currently.

Cheers

[redacted]
Manager Flight Support

Thu 27/05/2021 08:11

SP1 ACP

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

To [redacted]

Cc

Follow up. Completed on 02 June 2021.

From: [redacted]
Sent: 26 May 2021 12:11
To: SP1 ACP <SP1ACP@qinetiq.com>
[redacted]
Subject: RE: UC Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist

Afternoon [redacted]

I can confirm that provided all associated TDA/Spaceport facility activity is covered under NOTAMs, we have no issues with these. I trust this covers the TDA and design principles however if you require me to reply to your other email as well, please let me know.

For your information, I have clarified this position with our aviation team and Bristow SAR.

Cheers

[redacted] **Offshore Energy Liaison Officer**
HM Coastguard, Maritime & Coastguard Agency
Marine House, Blaikies Quay, Aberdeen, AB11 5EZ
[redacted]

Generic email: OELO@mcga.gov.uk
[redacted]

Maritime & Coastguard Agency | HM Coastguard

Safer Lives, Safer Ships, Cleaner Seas

SPACE PORT 1

Tue 18/05/2021 10:31

[redacted]

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

To SP1 ACP

Follow up. Completed on 02 June 2021.

20210504_SP-1_TDA_ACP_Provisional_Planning_V1.pdf
2 MB

[redacted]

Sent: 05 May 2021 16:45

[redacted]

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

Good Afternoon [redacted]

I am the QinetiQ lead for the airspace change proposal in support of the Spaceport 1 consortium looking to establish a vertical launch spaceport at Scolpaig on North Uist. The permanent airspace change is detailed in ACP-2021-12 and I will be progressing formal stakeholder engagement on this in due course. However, the most pressing airspace change is to establish a TDA at the Scolpaig site in order to support suborbital 'sounding rockets' by this September (ACP-2021-37). Ahead of the CAA assessment meeting I would like to commence formal engagement with the MCGA regarding the TDA and offer the following for consideration:

- TDA requirements from Sept 2021 SFC – UNL activated by NOTAM as per D701 areas – SOPs for the Hebrides Range regarding emergency services access will include the TDA
- Associated D701 Areas activated simultaneously will be minimised with preference to utilise D701A, B, D & C in the first instance but may include D701E, G, H & I worse case (not necessarily all but combinations as determined by safety trace or sounding rocket)
- Sounding rockets will fit in around any MOD activity (where safe to do so – coincident operations); launches restricted to post 1300UTC and probably later (MOD activity dependent)
- Frequency of launches:
    - First rocket circa late September 2021, with a second launch in October and two more in November 2021
    - Recommence launch sequence in March 2022 with two to three launches occurring every other month
- Acknowledged TDA extending 90 days would accommodate the launches for 2021 but not for 2022 where it is envisaged a further two TDAs would be required, one of which would have to extend the 90 day period by approximately one month – This and requirement for repeat TDAs will be negotiated with the CAA at forthcoming Assessment meeting.
- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place

As part of the ACP process for a TDA it would be useful if MCGA could consider the above bullets and presentation and highlight any concerns or issues with the TDA proposal to the undersigned by Thursday 27 May 21. For information, I have sent a similar request to HIAL, NATS and LoganAir.

Kind Regards

[redacted]

SPACE PORT 1

Tue 18/05/2021 08:03

[redacted]

UC TDA for Spaceport 1 Scolpaig North Uist

To [redacted]

Cc SP1 ACP

You forwarded this message on 25/05/2021 15:10.

20210518_SP-1_TDA_ACP_Provisional_Planning_V1.3pptx.pdf
2 MB

Good Morning,

By way of introduction I am the QinetiQ Principal Air Traffic Management (ATM) advisor who is currently managing the Airspace Change Proposal (ACP) for the Spaceport 1 (SP-1) consortium who in turn are developing a small vertical launch spaceport at Scolpaig, North Uist on the Outer Hebrides.

The attached slide pack contains a brief summary of the requirement for a Temporary Danger Area (TDA) to support suborbital 'sounding rockets' by this September (ACP-2021-37). I would like to commence formal engagement on the TDA proposal in accordance with the ACP process. It should be noted that this ACP (ACP-2021-37) is being run in parallel to a permanent airspace change for the same site, namely ACP-2021-12; full details can be found via the CAA airspace portal at: https://airspacechange.caa.co.uk/search?Page=1&SponsorOrganisation=QinetiQ%20Ltd - Correspondence regarding ACP-2021-12 will be sent out separately in support of Step 1B, (design principles) of the ACP process. In addition to the information contained within the slide pack contained herein, the following is offered for consideration:

- TDA requirements from Sept 2021 SFC – UNL activated by NOTAM as per D701 areas
- Associated D701 Areas activated simultaneously will be minimised and orientation of launch sector depicted on Slide 6 might be variable to minimise impact on Oceanic Entry Points (OEPs)
- Sounding rockets will fit in around any MOD activity (where safe to do so – coincident operations); launches restricted to post 1300UTC and probably later (MOD activity dependent)
- Frequency of launches:
  - First rocket circa late September 2021, with a second launch in October and two more in November 2021
  - Recommence launch sequence in March 2022 with two to three launches occurring every other month
- Acknowledged TDA extending 90 days would accommodate the launches for 2021 but not for 2022 where it is envisaged a further two TDAs would be required, one of which would have to extend the 90 day period by approximately one month – This and requirement for repeat TDAs will be negotiated with the CAA.
- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place
- There will be no requirement to activate D704

As important aviation operators in the local area it is requested that you could consider the above bullets and attached presentation, and highlight any concerns or issues with the TDA proposal to the undersigned at SP1ACP@qinetiq.com by Wednesday 9th June 21. Your participation in this process is very much appreciated.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

Wed 12/05/2021 12:26

[redacted]

UC FW: UC FW: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

To 'steve.richardson@fly.virgin.com'

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
.pdf File

Good Afternoon,

By way of introduction I am the QinetiQ Principal Air Traffic Management (ATM) advisor who is currently managing the Airspace Change Proposal (ACP) for the Spaceport 1 (SP-1) consortium who in turn are developing a small vertical launch spaceport at Scolpaig, North Uist on the Outer Hebrides.

The attached slide pack contains a brief summary of the requirement for a Temporary Danger Area (TDA) to support suborbital 'sounding rockets' by this September (ACP-2021-37). I would like to commence formal engagement on the TDA proposal in accordance with the ACP process. It should be noted that this ACP (ACP-2021-37) is being run in parallel to a permanent airspace change for the same site, namely ACP-2021-12; full details can be found via the CAA airspace portal - Correspondence regarding ACP-2021-12 will be sent out separately in support of Step 1B, (design principles) of the ACP process. In addition to the information contained within the slide pack contained herein, the following is offered for consideration:

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- Sounding rockets will fit in around any MOD activity (where safe to do so – coincident operations); launches restricted to post 1300UTC and probably later (MOD activity dependent)
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- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place
- There will be no requirement to activate D704

As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned by Wednesday 9th June 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

Wed 12/05/2021 12:27

[redacted]

UC FW: UC FW: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

To [redacted]

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
.pdf File

Good Afternoon,

By way of introduction I am the QinetiQ Principal Air Traffic Management (ATM) advisor who is currently managing the Airspace Change Proposal (ACP) for the Spaceport 1 (SP-1) consortium who in turn are developing a small vertical launch spaceport at Scolpaig, North Uist on the Outer Hebrides.

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- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place
- There will be no requirement to activate D704

As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned by Wednesday 9th June 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

Wed 12/05/2021 12:20

[redacted]

UC FW: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

To [redacted]

You forwarded this message on 12/05/2021 12:28.

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
.pdf File

Good Afternoon,

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As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned by Wednesday 9th June 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

Wed 12/05/2021 12:22

[redacted]

UC FW: UC FW: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

To [redacted]

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
.pdf File

[redacted]

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As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned by Wednesday 9th June 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

Wed 12/05/2021 12:23

[redacted]

UC FW: UC FW: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

To [redacted]

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
.pdf File

[redacted]

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- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place
- There will be no requirement to activate D704

As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned by Wednesday 9th June 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

Wed 12/05/2021 12:24

[redacted]

UC FW: UC FW: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

To [redacted]

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
.pdf File

Good Afternoon,

By way of introduction I am the QinetiQ Principal Air Traffic Management (ATM) advisor who is currently managing the Airspace Change Proposal (ACP) for the Spaceport 1 (SP-1) consortium who in turn are developing a small vertical launch spaceport at Scolpaig, North Uist on the Outer Hebrides.

The attached slide pack contains a brief summary of the requirement for a Temporary Danger Area (TDA) to support suborbital 'sounding rockets' by this September (ACP-2021-37). I would like to commence formal engagement on the TDA proposal in accordance with the ACP process. It should be noted that this ACP (ACP-2021-37) is being run in parallel to a permanent airspace change for the same site, namely ACP-2021-12; full details can be found via the CAA airspace portal - Correspondence regarding ACP-2021-12 will be sent out separately in support of Step 1B, (design principles) of the ACP process. In addition to the information contained within the slide pack contained herein, the following is offered for consideration:

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- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place
- There will be no requirement to activate D704

As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned by Wednesday 9th June 21.

Kind Regards

[redacted]

SPACE PORT 1

Thu 27/05/2021 12:53

SP1 ACP

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

To [redacted]

Cc SP1 ACP

[redacted]

Many thanks your swift response to the TDA application for SP-1 at Scolpaig. Your 'no objection' has been noted along with your other comments regarding notification processes to airmen and mariners as well as you helicopter requirements to service several islands located within the EG D701 Hebrides range complex. As stated, it is fully expected that extant procedures at the Range concerning access to EG D701 and notification procedures will be extended to include the TDA and SP-1 sounding rocket operations.

I thank you again for your timely response and look forward to hearing from with regard to the design principles for the permanent airspace solution contained in ACP-2021-12.

Kind Regards

[redacted]

QINETIQ

Connect with us:

From: [redacted]

Sent: 27 May 2021 12:38

[redacted]

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

Good afternoon [redacted]

Please see the attached response from the Northern Lighthouse Board Ref : Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist.

If any further information is required please get in touch.

Best wishes,

[redacted]

SPACE PORT 1

Tue 18/05/2021 07:46

[redacted]

UC Spaceport 1 Scolpaig North Uist - TDA

[redacted]

Cc SP1 ACP

This message was sent with High importance.

20210518_SP-1_TDA_ACP_Provisional_Planning_V1.3pptx.pdf
2 MB

[redacted]

By way of introduction I am the QinetiQ Principal Air Traffic Management (ATM) advisor who is currently managing the Airspace Change Proposal (ACP) for the Spaceport 1 (SP-1) consortium who in turn are developing a small vertical launch spaceport at Scolpaig, North Uist on the Outer Hebrides.

The attached slide pack contains a brief summary of the requirement for a Temporary Danger Area (TDA) to support suborbital 'sounding rockets' by this September (ACP-2021-37). I would like to commence formal engagement on the TDA proposal in accordance with the ACP process. It should be noted that this ACP (ACP-2021-37) is being run in parallel to a permanent airspace change for the same site, namely ACP-2021-12; full details can be found via the CAA airspace portal - Correspondence regarding ACP-2021-12 will be sent out separately in support of Step 1B, (design principles) of the ACP process. In addition to the information contained within the slide pack contained herein, the following is offered for consideration:

- TDA requirements from Sept 2021 SFC – UNL activated by NOTAM as per D701 areas
- Associated D701 Areas activated simultaneously will be minimised and orientation of launch sector depicted on Slide 6 might be variable to minimise impact on Oceanic Entry Points (OEPs)
- Sounding rockets will fit in around any MOD activity (where safe to do so – coincident operations); launches restricted to post 1300UTC and probably later (MOD activity dependent)
- Frequency of launches:
  - First rocket circa mid-September 2021, with a second launch in October and two more in November 2021
  - Recommence launch sequence in March 2022 with two to three launches occurring every other month
- Acknowledged TDA extending 90 days would accommodate the launches for 2021 but not for 2022 where it is envisaged a further two TDAs would be required, one of which would have to extend the 90 day period by approximately one month – This and requirement for repeat TDAs will be negotiated with the CAA.
- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place
- There will be no requirement to activate D704

As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned at: SP1ACP@qinetiq.com by Wednesday 9th June 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

Tue 18/05/2021 14:33

[redacted]port 1 Scolpaig North Uist

[redacted]

Cc SP1 ACP

[redacted]

The Blue shaded area is a pictorial representation of the D701 areas we would have to activate in conjunction with the TDA to enable the sounding rocket launch. In essence the D701 areas will be activated in exactly the same way as they are today and QinetiQ will manage the airspace accordingly. Access to the danger Areas can be gained in the normal manner from range control.

Kind Regards

[redacted]

QINETIQ

Connect with us:

[redacted]

Sent: 18 May 2021 13:02

[redacted]

Subject: FW: UC TDA for Spaceport 1 Scolpaig North Uist

[redacted]

I hope you are well!

My DFO [redacted] forwarded this to me. We do some pretty regular flying trials work in (when the danger airspace is cold) or near D701 for the MoD - it looks like this would not have an effect but can I just check what the blue bounded airspace is on Slide 6 please (as opposed to the red on slide 2, 3 and 4 which I assume is the TDA)?

Thanks very much in advance [redacted]

[redacted]

SPACE PORT 1

Wed 19/05/2021 16:36

SP1 ACP

UC FW: UC TDA for Spaceport 1 Scolpaig North Uist

To [redacted]

Follow up. Completed on 02 June 2021.
This message was sent with High importance.

20210518_SP-1_TDA_ACP_Provisional_Planning_V1.3pptx.pdf
2 MB

[redacted] duties I am also managing the Airspace Change Proposal (ACP) for the Spaceport 1 (SP-1) consortium who in turn are developing a small vertical launch spaceport at Scolpaig, North Uist on the Outer Hebrides (as previously briefed at the UK/Irish FAB).

The attached slide pack contains a brief summary of the requirement for a Temporary Danger Area (TDA) to support suborbital 'sounding rockets' by this September (ACP-2021-37). I would like to commence formal engagement on the TDA proposal in accordance with the ACP process. It should be noted that this ACP (ACP-2021-37) is being run in parallel to a permanent airspace change for the same site, namely ACP-2021-12; full details can be found via the CAA airspace portal at: https://airspacechange.caa.co.uk/search?Page=1&SponsorOrganisation=QinetiQ%20Ltd - Correspondence regarding ACP-2021-12 will be sent out separately in support of Step 1B, (design principles) of the ACP process. In addition to the information contained within the slide pack, the following is offered for consideration:

- TDA requirements from Sept 2021 SFC – UNL activated by NOTAM as per D701 areas
- Associated D701 Areas activated simultaneously will be minimised and orientation of launch sector depicted on Slide 6 might be variable to minimise impact on Oceanic Entry Points (OEPs)
- Sounding rockets will fit in around any MOD activity (where safe to do so – coincident operations); launches restricted to post 1300UTC and probably later (MOD activity dependent)
- Frequency of launches:
  - First rocket circa late September 2021, with a second launch in October and two more in November 2021
  - Recommence launch sequence in March 2022 with two to three launches occurring every other month
- Acknowledged TDA extending 90 days would accommodate the launches for 2021 but not for 2022 where it is envisaged a further two TDAs would be required, one of which would have to extend the 90 day period by approximately one month – This and requirement for repeat TDAs will be negotiated with the CAA.
- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place
- There will be no requirement to activate D704

As a key stakeholder affected by the activation of the EG D701 Danger Areas (in particular where they affect the NOTA), it is requested that you could consider the above bullets and attached presentation, and highlight any concerns or issues with the TDA proposal to the undersigned at SP1ACP@qinetiq.com by Wednesday 9th June 21. As always, your participation in this process is very much appreciated.

Kind Regards

[redacted]

SPACE PORT 1

Wed 19/05/2021 15:26

[redacted]

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

[redacted]

Cc SP1 ACP

Follow up. Completed on 02 June 2021.
You replied to this message on 19/05/2021 15:54.

[redacted]

Sent: 18 May 2021 08:03

[redacted]

Cc: SP1 ACP <SP1ACP@qinetiq.com>
Subject: CAUTION: External email - UC TDA for Spaceport 1 Scolpaig North Uist

Good Morning,
By way of introduction I am the QinetiQ Principal Air Traffic Management (ATM) advisor who is currently managing the Airspace Change Proposal (ACP) for the Spaceport 1 (SP-1) consortium who in turn are developing a small vertical launch spaceport at Scolpaig, North Uist on the Outer Hebrides.

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- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place
- There will be no requirement to activate D704

As important aviation operators in the local area it is requested that you could consider the above bullets and attached presentation, and highlight any concerns or issues with the TDA proposal to the undersigned at SP1ACP@qinetiq.com by Wednesday 9th June 21. Your participation in this process is very much appreciated.

Kind Regards

[redacted]

QINETIQ

SPACE PORT 1

Wed 12/05/2021 12:28

[redacted]

UC FW: UC FW: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

[redacted]

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
.pdf File

Good Afternoon,

By way of introduction I am the QinetiQ Principal Air Traffic Management (ATM) advisor who is currently managing the Airspace Change Proposal (ACP) for the Spaceport 1 (SP-1) consortium who in turn are developing a small vertical launch spaceport at Scolpaig, North Uist on the Outer Hebrides.

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- Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place
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As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned by Wednesday 9th June 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

Wed 12/05/2021 12:24

[redacted]

UC FW: UC FW: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

[redacted]

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
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As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned by Wednesday 9th June 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

Wed 12/05/2021 12:25

[redacted]

UC FW: UC FW: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

[redacted]

20210512_SP-1_TDA_ACP_Provisional_Planning_V1.2.pdf
.pdf File

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As part of the ACP process for a TDA it would be useful if you could consider the above bullets and presentation, and highlight any concerns or issues with the TDA proposal to the undersigned by Wednesday 9th June 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

other range users, fit in with current MOD agreements for airspace and range use and take into account any existing agreements within extant LoAs. MOD comments related to this are as follows:

a. Any Airspace Management Protocols that are in force, such as the limitation on the number of days per calendar year that certain numbers of Oceanic Entry Points (OEPs) can be 'closed' due to the resulting impact on the North Atlantic Track should be considered. The D701 LOA pertaining to the range activation and OEP closures is about to be reviewed regarding the [redacted] classified in relation to weapons traces and effects on civil traffic. This may affect further use and closure of OEPs moving forward and should be considered within any agreements made.
b. Information on the size of the safety traces/maximum energy boundary of the rocket would dictate how many segments of D701 and therefore the impact on other airspace users.
c. As discussed informally, the launch activity may have to take place at certain times of day to help minimise the impact to other airspace users.
d. Have the potential implications of HIAL removing ATS provision from Benbecula, and therefore a DACS from D704, unless the Hebrides Range is manned with ATCOs for larger scale activity, been considered? This may cause a bottleneck effect of traffic avoiding both D704 and also the proposed TDA. The current LoA with the MOD is being rewritten.

8. The MOD would like to understand what procedures would be put in place to enable flights and operations of national security to enter/cross the active TDA and D701 complex. This includes a routine DACS or DAAIS and times when they may not be available. The MOD would also like to understand how QinetiQ will employ 'clear range procedures' when operating within D701 and the TDA.

9. The UK Space Operations Centre (UK SpOC) is responsible for monitoring and reporting of all UK space launch activities. The UK SpOC require information on numerous elements of a launch and subsequent activity, including but not limited to; notification of upcoming launches, launch area, drop and abort zones, mission profiles, tracking data, frequencies and understanding go/no go criteria. This information will be used to enable the UK SpOC to Detect, [redacted]

10. Please do not hesitate to contact the undersigned if further information, discussion or clarity is required. The comments above may also be relevant to the permanent ACP; however, the MOD are fully aware of the formal CAP1616 process and will be happy to re-assess them at the appropriate stage of that ACP process. The MOD look forward to working with QinetiQ on this and other ACPs.

Kind regards,

[redacted]
Airspace Operations

Ministry of Defence

Defence Airspace and Air Traffic Management (DAATM)

Email: DAATM-AirspaceConsultation@mod.gov.uk

21 May 2021

Dear QinetiQ,

FORMAL MOD RESPONSE TO ACP-2021-037 SPACE PORT 1 TDA

1. The MOD would like to thank QinetiQ for the opportunity to provide feedback on ACP-2021-037 Space Port 1 (SP1). Whilst discussions have already taken place between Qinetiq and the MOD on some of the subjects described in this feedback, please accept this as the full formal MOD response for your consideration, which includes those discussions. The feedback is split into two parts; firstly, reference the TDA location itself and secondly on the wider impacts on MOD operations, including utilisation of D701.

Proposed TDA Location

2. Regarding the location of the TDA required for SP1, the MOD assess that there is a negligible impact to operations, as it is adjacent to existing Danger Areas (EG D701 and EG D704).

3. [redacted] (formerly known as RAF(U) Swanwick) are an ATS provider in that area and due to the constraints of the equipment provided by NATS, radar mapping is only updated on a quarterly basis in line with an AIRAC cycle. Therefore, they require a longer than normal lead in time of between 3 and 5 months to accurately depict the DA on their surveillance displays. In this instance the MOD are aware that these timescales may not be met and temporary mitigations may have to be put in place at 78 Sqn. This factor should be taken forward for related ACPs.

4. The Airspace Management Cell request that extant Airspace Management (ASM) procedures and protocols for the utilisation of D701 are used (or renegotiated by another party), to maximise FUA and minimise the impact of a military Danger Area on the wider route network.

Wider Impacts on MOD Operations and Other Comments

5. The following comments, although not necessarily linked to the airspace structure itself, are relevant to the activity involved and potential impact on MOD users. Regarding any utilisation of EG D701, it should not be assumed that current operating procedures and practices are relevant or can be mapped across to rocket launch activity until further discussions between the MOD and QinetiQ have taken place and agreements reached. These factors have been added for transparency and clarity.

6. As alluded to in informal discussions with QinetiQ, the MOD will assume that any exemptions to the Air Navigation Order (ANO), and/or other CAA approvals regarding the firing of rockets will be in place prior to the TDA being approved.

7. To enable activities to take place in D701, QinetiQ will be required, as a commercial user, to enter into some form of agreement with the MOD to access and utilise D701. This could be as part of the Long Term Partnering Agreement (LTPA) via the Other Work Approvals (OWA) process. Commercial activity, such as this proposal, would need to be correctly prioritised against

Tue 18/05/2021 10:29

[redacted]

FW: SP-1 ACP TDA -: DAATM engagement

To SP1 ACP

Follow up. Completed on 02 June 2021.
This message was sent with High importance.

20210504_SP-1_TDA_ACP_Provisional_Planning_V1.pdf
2 MB

[redacted]

Sent: 05 May 2021 12:09

[redacted]

Subject: SP-1 ACP TDA -: DAATM engagement

Importance: High

[redacted]

In addition to managing the ACP for Spaceport 1 (SP-1), ACP-2021-12, I have recently initiated an ACP for a TDA to cover the launch of suborbital 'Sounding Rockets' from the SP-1 site (North Uist) this September. Ahead of the formal assessment meeting with the CAA, I have decided to engage with targeted stakeholders such as NATS, HIAL and MOD in an effort to meet the challenging deadline of the first planned launch (full ACP not expected until Q1 2023). I therefore forward the following for your (and wider MOD) consideration:

- TDA requirements from Sep 2021 SFC – UNL activated by NOTAM as per D701 areas
- Associated D701 Areas activated simultaneously will be minimised with preference to utilise D701A, B, D & C in the first instance but may include D701E, G, H & I worse case (not necessarily all but combinations as determined by safety trace or sounding rocket)
- Sounding rockets will fit in around any MOD activity (where safe to do so – coincident operations); launches restricted to post 1300UTC and probably later (MOD activity dependent)
- Frequency of launches:
    - First rocket circa late September 2021, with a second launch in October and two more in November 2021
    - Recommence launch sequence in March 2022 with two to three launches occurring every other month
    - Acknowledged TDA extending 90 days would accommodate the launches for 2021 but not for 2022 where it is envisaged a further two TDAs would be required, one of which would have to extend the 90 day period by approximately one month – This and requirement for repeat TDAs will be negotiated with the CAA at forthcoming Assessment meeting.
    - Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place

As part of the ACP process for a TDA it would be useful if MOD could consider the above bullets and presentation and highlight any concerns or issues with the TDA proposal to the undersigned by Thursday 13 May 21. If you have any questions please drop me an email or call on the numbers below. I intend to contact the DAAM in a separate email as I am aware that DE&S do have concerns regarding future spaceport use of EG D701 however, if you would prefer me not too then please let me know.

Kind Regards

[redacted]

SPACE PORT 1

Tue 11/05/2021 08:40

[redacted]

UC SP-1 Discussion

Required [redacted] &Assurance SO1)

As the meeting organizer, you do not need to respond to the meeting.

When 11 May 2021 09:30-10:00 **Location**

[redacted]

Hope this Webex link works if not call me on [redacted]

Rgds

[redacted]

-- Do not delete or change any of the following text. --

When it's time, join your Webex meeting here.

Join meeting

More ways to join:

Join from the meeting link

[redacted]

Join by meeting number

Meeting number (access code): [redacted]

Tap to join from a mobile device (attendees only)

[redacted] United Kingdom Toll

Some mobile devices may ask attendees to enter a numeric meeting password.

Join by phone

[redacted]

Global call-in numbers

Join from a video system or application

[redacted] your meeting number.

SPACE PORT 1

Tue 11/05/2021 16:14

[redacted]

RE: UC 20210510-UC SP-1 TDA

To [redacted]

Cc

Bcc

This message was sent with High importance.

[redacted]

Thanks again for your timely response and follow up Telcon this morning. I offer the following (inline below) in response to your questions and highlighted points. If you have any further questions or points please do not hesitate to contact me.

Kind Regards

[redacted]

QINETIQ

Connect with us:

[redacted]

Sent: 10 May 2021 17:11

[redacted]

Subject: 20210510-UC SP-1 TDA

[redacted] delay in responding.

Looking at the requirement my thinking is:

The PP appears to suggest that the sounding rocket and follow up space launches are all joint QQ projects with a presumption that they are, therefore, within current MOD agreements for airspace and Range use? Yes, the intention is for QQ as part of the SP-1 consortium to manage the airspace and seaspace associated with SP-1 activities (both suborbital and orbital launches) in the same manner current activities are managed in the Hebrides Range. Any such 'commercial' activities will be conducted within current MOD agreements for airspace and Range use.

The proposed requirement is not, as far as myself and the [redacted] DAA, part of the current LTPA. This is being addressed through commercial with an update to the 'Other Work Approvals' (OWA) process. I am not sure what level of Range support and use of any equipment associated with the Range would be required but, if available, use the airspace without such support is clearly available to all through the booking process you highlighted. That is now the same for all users. This use would, therefore, be seen as a commercial agreement and would need to be a commercial contract in areas where MOD/[redacted] equipment is utilised. For the purposes of the TDA ACP it is assumed the appropriate OWA will be in place in time for the first sounding rocket launch later this year (circa September) but recognise this is dependant on MOD approval.

Clearly any booking would be as per the process and adheres to that booking priority – any MOD requirement would sit higher. Accepted, as per direction detailed in the MOD (DAATM signed) memo as referenced. SP-1 are fully aware any sounding rocket activity will have to fit around MOD activity with MOD retaining priority. It is envisaged that the sounding rockets will only launch after 1300 UTC to minimise impact D701 activity has on the NAT tracks and any such launches, as infrequent as they are, may have to be delayed until late afternoon/early evening if MOD activity dictates.

I would be interested to know what regulations they would be following and launching under and to what ANO? The CAA have made provision under the ANO for small rocket launch where such rockets fall within specified criteria; this means certain sounding rockets can be launched under CAA regulation vice space industry act as referenced in your following bullet. It is recognised that the secondary legislation for the act is not to be released until July this year. More information on the CAA process can be found at: https://www.caa.co.uk/Consumers/Space/Rocket-launch/Requirements-for-launching-a-rocket/
The MOD utilises an exemption against the ANO - i.e. Formidable Shield...as they sit under the MOD umbrella etc. Do they have such an exemption? When you book you would need to confirm which ANO you will operating or what exemption you have [redacted] non-MOD use under exemption. Understood, for the purposes of the TDA ACP it is assumed all appropriate CAA approvals will be in place.

If this an approved MOD use then DE&S could approve but the ANO and information we have seen suggests there will be a separate SPACE ANO, (SPACE INDUSTRY ACT 2018 stated there would be a separate SPACE regulatory body). As such, I do not think there are currently regulations or ANOs specific to this task? Please see previous response.

We have had no direction on prioritisation from HM Govt and, as such, would look at this as simply another booking, at this stage. Acknowledged, as above; SP-1 recognise MOD priority.

The Benbecula vs QQ LOA for Ops at Benbecula Airport is currently being re-written, following extensive liaison as Benbecula Airport will shortly become a remote asset of HIAL. As such, the operating procedures have changes considerable in relation to EG D704 and portions of EG D701 around the airfield. This LOA is due signature in the next few weeks. I note the aspiration is for an ACP for an additional DA to be bolted onto the e.g. d701/704 Complex. Given the recent conversation and changes with Benbecula I expect this may be challenged. QQ is cognisant of the LOA re-write and potential implications of Benbecula removing ATC cover however, the TDA will not necessitate activation of D704 and the proposed airspace design will not affect any of the airport's procedures or flight profiles flown by LoganAir; both parties have confirmed this. The clear range procedures that QQ operate for D701 will be extended to cover the TDA airspace.

The diagrams suggest that up to 2 x OEPs could be affected. What is the trace based upon, as if the trace is any larger there could be an issue re the current MIOD V NATS LOA on numbers of closures per annum? The diagram is for representational purposes only; the actual D701 areas affected will be driven by the type of sounding rocket in use. These areas will be the minimum required to safely contain the Maximum Energy Boundary (MEB) of the subject rocket using the same process and procedures the Range experts use for any T&E activity. The aim will be to plan a trajectory that will have the minimum impact on OEPs and launches will be planned post 1300 UTC. It is envisaged any OEP closures necessary for SP-1 operations in the future (for both sub and orbital operations) would have to be negotiated separately to the MOD/QQ/NATS/CAA/IAA LOA

I will follow up through the official DAATM channel for the MOD formal response but happy to chat as required. Thanks for the call, our discussion most useful and hopefully clarified many of your points.

Regards

SPACE PORT 1

Tue 08/06/2021 12:07

SP1 ACP

UC SP-1 TDA Sep 21 - MOD Response WebEx Meeting Record.

To [redacted]

Cc

Bc

This message was sent with High importance.

Dear All,

Thank you again for your participation in today's WebEx meeting (20210608-0900) and clarifying the MOD position and concerns associated with the proposed TDA to support SP-1 Sounding Rocket activities later this year. As promised, I have summarised the details of points raised, discussion and understanding:

- in attendance; all addressees listed in this email;
- QinetiQ provided a brief background description of SP-1 and the requirement for a TDA; it was further explained that the TDA and associated airspace requirements was just one piece of the jigsaw with many other parallel activities (planning consent, licences, environmental impact, etc) dependent on each other, and needing to be completed prior to first launch;
- the intention is for QinetiQ to manage SP-1 launch activity and associated Airspace Management (ASM) processes and procedures thereby removing the need for SP-1 to develop any bespoke procedures or need to apply separately for use of the EG D701 complex;
- in effect, the TDA will be considered an extension of EG D701 and ASM processes and procedures will be mapped across accordingly subject to the conditions agreed in the LTPA Other Works Approvals (OWA) between QinetiQ and MOD (TEST PT);
- LTPA OWA will detail conditions of use for EG D701 including Range capacity, priorities (not overriding MOD activities) and requirement for rocket and launch operators to have the appropriate CAA approvals and licences (it was noted that sounding rockets would be licenced under the ANO and sit initially outside the space industry act 2018);
- sounding rockets will be treated in the same manner as for rockets fired during ASD/FS21 regarding due diligence and safety management processes conducted by QinetiQ who will meet the necessary Health and Safety executive (HSE) legislation on safety and risk to third parties where the risk level must be at least ALARP if not 'broadly acceptable';
- QinetiQ will work with the rocket operator to establish the appropriate safety traces based on the Maximum Energy Boundary (MEB) of the system and follow due safety analysis and processes accordingly;
- once MEB is known the corresponding EG D701 areas will be identified and where possible, the orientation of the rocket launch will be adjusted to cause the minimum impact on other airspace users;
- sounding rockets launches will occur post 1300 UTC to prevent impact on the number of OEPs the Range is allowed to close as prescribed in the LoA that defines the coordination, agreement and notification procedures for the use of airspace by MoD Hebrides Range within the Scottish Flight Information Region (FIR), the Shanwick Oceanic Control Area (OCA) and the Northern Oceanic Transition Area (NOTA) dated 1st Oct 20;
- sound rocket launch timings will remain flexible to work around MOD activity as necessary;
- Benbecula DACS D704 not relevant as D704 is not required for SP-1 operations;
- QinetiQ is cognisant of HIAL ACP regarding removal of ATCOs and remote tower and will work with them on Haz ID and any additional procedures SP-1 activities may necessitate; it was suggested that it would be too late to include SP-1 Ops in the most recent update to the LoA and therefore a separate mechanism may be necessary;
- extant Range procedures will be used for access to TDA and corresponding D701 areas by national security/emergency aircraft;
- extant 'Clear Range' processes and procedures will be in place for SP-1 activities; the safety trace will be monitored to ensure awareness of what is there using sensors/surveillance systems (including use of MPA where necessary);
- the SpOC will be informed of all necessary information regarding the launch, including the mission profile, tracking data, EM frequencies used, abort zones, etc
- this requirement, to provision details to the SpOC, is the responsibility of the launcher operator and the SIA regulator (CAA) and is linked to the granting of a launch licence. It supports the UK responsibilities under the Outer Space Treaty; and,
- for commercial launches the launcher operator also holds the responsibility for provisioning information to OfCom, the MCA, Environment Agencies, and a number on non-airspace related stakeholders.

Please contact me by COP today if you believe I have missed anything significant or you disagree any of my points above.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

Tue 18/05/2021 10:29

[redacted]

FW: UC 'Space' enquiry

To SP1 ACP

Follow up. Completed on 02 June 2021.
This message is part of a tracked conversation. Click here to find all related messages or to open the original flagged message.

[redacted]

Sent: 27 April 2021 16:40

[redacted]

Subject: RE: 'Space' enquiry

[redacted]

Hope all is well at your end! In addition to the four of us, can we request that you also include [redacted], also Cc'd, as the NATS POC for external (ie not NATS sponsored) ACPs in any correspondence in the first instance.

Look forward to continuing engagement on the ACPs.

Regards

[redacted]

Working remotely until further notice

[redacted]

[redacted]

Sent: 27 April 2021 12:54

[redacted]

Subject: 'Space' enquiry

[redacted]

As requested.

Please contact [redacted] in the first instance regarding any SPACE enquiries you may have.

[redacted]

Kind regards

[redacted]

[redacted]

SPACE PORT 1

Tue 18/05/2021 10:29

[redacted]

FW: UC 'Space' enquiry

To SP1 ACP

Follow up. Completed on 02 June 2021.
This message is part of a tracked conversation. Click here to find all related messages or to open the original flagged message.

[redacted]

I'll have a chat internally and come back ASAP

Regards

[redacted]

[redacted]

Sent: 05 May 2021 08:46

[redacted]

Subject: RE: UC 'Space' enquiry

Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.

[redacted]

In addition to ACP-2021-12, I have commenced an ACP on behalf of the Spaceport 1 (SP-1) consortium for a TDA (ACP-2021-037) that is required for sub-orbital sounding rockets. Ahead of the CAA assessment meeting I would like to commence formal engagement with NATS regarding the TDA and offer the following for consideration:

- TDA requirements from Oct 2021 SFC – UNL activated by NOTAM as per D701 areas
- Associated D701 Areas activated simultaneously will be minimised with preference to utilise D701A, B, D & C in the first instance but may include D701E, G, H & I worse case (not necessarily all but combinations as determined by safety trace or sounding rocket)
- Sounding rockets will fit in around any MOD activity (where safe to do so – coincident operations); launches restricted to post 1300UTC and probably later (MOD activity dependent)
- Frequency of launches:
    - First rocket circa late September 2021, with a second launch in October and two more in November 2021
    - Recommence launch sequence in March 2022 with two to three launches occurring every other month
    - Acknowledged TDA extending 90 days would accommodate the launches for 2021 but not for 2022 where it is envisaged a further two TDAs would be required, one of which would have to extend the 90 day period by approximately one month – This and requirement for repeat TDAs will be negotiated with the CAA at forthcoming Assessment meeting.
    - Launches in 2022 are likely to cease by late October with the intention of recommencement in March 2023 by which time it is anticipated a permanent airspace solution will be in place

As part of the ACP process for a TDA it would be useful if NATS could consider the above bullets and presentation and highlight any concerns or issues with the TDA proposal to the undersigned by Thursday 13 May 21.

Kind Regards

[redacted]

QINETIQ

Connect with us:

Tue 25/05/2021 15:32

[redacted]

RE: UC 'Space' enquiry

To SP1 ACP

[redacted]

Follow up. Completed on 02 June 2021.
You replied to this message on 01/06/2021 17:21.

[redacted]

Sent: 25 May 2021 13:55

[redacted]

[redacted]

Can I check that the consultation on TDA ACP (ACP-2021-37) closes on the 9th Jun

Regards

[redacted]

[redacted]

Sent: 12 May 2021 14:11

[redacted]

Subject: RE: UC 'Space' enquiry

[redacted]

Thanks for the update. The affected areas of the business are Impact Assessing the change. We will endeavour to respond to you by the 27 May. I will let you know if that timescale will slip.

Regards

[redacted]

SPACE PORT 1

NERL plc Response to Spaceport 1 TDA (ACP-2021-37)

Thank you for allowing NATS to respond to your consultation on Spaceport 1 TDA (ACP-2021-37). At the time of writing, NATS cannot currently support this ACP until;

1. The questions posed below are resolved to our satisfaction,
2. NATS has clarity on how any work associated with the development of this TDA will be funded. Therefore, this response is provided on a no commitment basis.

Set out below are some issues/considerations raised by the ACP.

Impact on EG D701

NATS understands that the use of EG D701 is tightly controlled by a Letter of Agreement (LoA) signed by NATS, the MOD, QinetiQ and the IAA. The use of EG D701 can have a significant impact on North Atlantic traffic. This has raised some questions on which we would seek clarity from the Sponsor,

1. Is there capacity left within the LoA to fulfil the Spaceport requirement?
2. Can the Spaceport activity be contained within the overall number of activations per year?
3. Will the LOA need to be re-negotiated to allow for the increase in activity? If so, can this be achieved within the timescale stated?

Airspace Capacity Management

NATS seeks clarity from the Sponsor on the protocols that will allow a predictable flow of GAT that works beyond the current low levels of traffic that we see now. Forecasts show traffic will likely return to 2019 levels by around 2024 so the impact modelling needs to reflect this regeneration of civil traffic. Specific issues include,

Buffer Zone:

NATS would seek clarity from the Sponsor that

(a) No further Buffer Zone is to be applied and that all activity is contained within the EG D701 complex.
(b) No further Buffer Zone is to be applied when Free Route Airspace D1 is deployed in December 2021.

ERNIP Pt3 requires all SUA to be managed by the UK AMC that effect the network. EG D701 is a managed danger area. The Network Manager doesn't recognise TDAs in terms of airspace management and as such the new area would need to be added to the UK ASM tool, LARA. To enable management of the proposed area it would require a SUPP to the AIP to be published. Danger Area activity descriptors do not cover 'Space Rockets' and therefore the associated Safety assurance around them does not exist.

Total Impact on the UK Network:

These launches will have an impact on the UK Network and the effects are yet to be quantified. NATS would seek clarity from the Sponsor on

(a) What criteria will be used to deconflict launches here, and across the UK, when more space ports become available, to minimise any impact to GAT and support the recovery of the airline sector?
(b) Airspace management priorities and how this activity and other related activities (e.g. Military exercises, GPS jamming) which have an impact on the UK network will be coordinated.

Consideration should also be given to designing protocols associated with these launches, and GPS jamming, that allows for civil suppressions to minimise disruption to civil traffic flows.

25/5/21

[redacted]

NERL plc Response to Spaceport 1 TDA (ACP-2021-37)

- **Attributable Delays:**

In our RP3 settlement, delay due to direct military activity is NATS attributable. NATS needs to understand how these events are to be classified by the state.

Similarly, we would expect any impact to flight efficiency (the 3Di metric) because of launch activity to be afforded the same treatment.

The sponsor and CAA would need to agree the acceptable impact in relation to GAT with respect to these activities.

General Queries Requiring Sponsor Clarification

1. There are no references to altitudes or scheduled times. Whilst it states the launch will "avoid peak periods" what happens if there is a delay and impact on NAT? Can the delay time be adjusted to minimise the impact on the network? NATS would seek clarity on the definition of 'peak period'.
2. How will the sponsor ensure that there is robust pre-planning and co-ordination with Prestwick Centre? Who will determine the priority and balance airspace demand between a Space launch and a busy North Atlantic track day?
3. What are the contingencies arrangements if it malfunctions before/after lift-off?
4. There is no associated detail in terms of altitudes or lats/longs. The airspace should always be the minimum required to safely undertake the required activity. NATS will require the dimensions of the Segregated Airspace including details of all points associated with the area which would need to be ADQ checked.
5. Will all launches require the full extent of the identified airspace, and if not how will the efficient use of airspace be managed by reducing the activated volumes to minimise the impact and burden on other users?
6. Flight Plan Buffer Zones (FBZ) Dimensions: These need to be ADQ checked co-ordinates. Have the 5 LNCs been reserved with ICARD to allow circumnavigation of the new area?
7. What is the status of co-ordination with other States & ANSPs (if applicable)?
8. What is the anticipated duration of each activation?
9. What is the impact to the Oceanic Airspace?

Timelines and ATC Procedures

The AIP submission date for the September AIRAC is the 11th of June. The June gateway targeted for approval is the last Friday of June. If being promulgated via a SUPP (as is the ERNIP P3 requirement) the final submission date is the 13th of August. To enable these to be 'managed areas', adaptation would be required. Furthermore, the cut-off date for the 09 Sep AIRAC for changes to the EU NM system is the 15 July 21. The dates for system updates would also need to be considered and co-ordinated with NATS and considered by the sponsor to ensure they could be accommodated into their plan.

Therefore, timescales to deliver this change in time for the Sept AIRAC build are not considered feasible. This means that there is an associated risk that the proposed TDA will not be AMC managed nor will the necessary EU NM flight plan avoidance requirements be introduced should the CAA approve this ACP in the proposed timescale.

25/5/21

[redacted]

NERL plc Response to Spaceport 1 TDA (ACP-2021-37)

To overcome this issue, NATS will need to prepare a Temporary Operating Instruction (TOI) and associated hazard analysis before the TDA can become active. September will be a challenging timescale to complete this work. We will require input from the Sponsor to assist with the associated Hazard Analysis work. We will require further details to enable the team to develop this TOI. It should be noted by the sponsor, that the outcome of the hazard analysis is far from certain and there is potential for the identification of a risk which would be unacceptable to NATS.

Major system (including mapping) changes can only be made in March, June, September and December.

Based on the information provided, NATS can describe two options which may be able to deliver the change;

1. Ask the sponsor to delay implementation to the December AIRAC date so the changes could be made to the system.
2. Using a TOI, it may be possible to implement a 'procedural fix' between September and December so that ATC could tactically manage the TDA to bridge this AIRAC gap. If possible, the TDA could be implemented in the December AIRAC to align with the implementation of FRA DP1.

As previously stated, option 2 carries a risk for the sponsor that, as a result of a hazard analysis, an unacceptable risk to the operation is identified.

SPACE PORT 1

Thu 10/06/2021 08:28

SP1 ACP

RE: UC 'Space' enquiry

[redacted]

This message was sent with High importance.

[redacted]

Thank you for the NATS response to ACP-2021-37 TDA for SP-1 Scolpaig. Now that we have had time to consider all the points raised we would very much like to discuss these with you and your colleagues as soon as possible, ideally via WebEx that I can arrange. As time is extremely tight to meet the June Gateway approval, we would be much obliged if you could accommodate this meeting early next week (as previously suggested). We are available Mon, Tue, Wed and Thu morning next week. Please could you consider our request and come back to me with your preferred day and time.

Kind Regards

[redacted]

QINETIQ

Connect with us:

[redacted]

Sent: 09 June 2021 18:06

To: SP1 ACP <SP1ACP@qinetiq.com>

[redacted]

Subject: RE: UC 'Space' enquiry

[redacted]

Please find attached the NERL plc response to Spaceport 1 TDA (ACP-2021-37)

Regards

[redacted]

would be put in place. Sponsor confirmed that the actual volume of airspace expected to be activated is not yet known, is subject to confirmation and further analysis by consortia partners, but would be known no later than D-21.

This led to NATS primary concern - that more airspace would be activated for 'convenience' than will be needed, especially given the limited range of the sounding rockets operating under an ANO approval (circa 50 km), leading to greater airspace access being frequently denied to GAT (in particular NAT operators), and in addition to the extant disruption created by additional military activation of the D701 complex (e.g. FS 21, GPS jamming et al). The Sponsor reiterated the fact the Range would only activate the minimum number of corresponding D701 areas that were absolutely necessary to contain the hazard and as yet this information was not available. Orientation of rocket launch would also factor in the best use of D701 areas to minimise impact on the ATM network – Range staff are very familiar with these requirements. Full safety analysis regarding the safety trace/Maximum Energy Boundary (MEB) of the subject sounding rockets would have to be undertaken before the number of D701 areas could be declared. NATS expressed concerns that this information might not be known until D-21 and therefore the subsequent impact on the network not understood until after D-21. The increased cost to the airline operators could not be evaluated neither could the environmental impact through increased fuel burn and CO_2 emissions.

NATS suggested further sub-division in D701 once safety trace/MEB detail known may offer a more suitable, safe and sustainable approach, as this could lead to a more efficient use of airspace and would demonstrate compliance with CAA policy and Sponsor requirements to only use the minimum airspace necessary to contain hazards/activity. It was recognised this could not be done in time for Sep launch but NATS would like to see this approach, or similar, implemented for 2022 launches and beyond to achieve a more sustainable operation for SP-1 and GAT alike. This requirement is especially pertinent following the introduction of FRA in Dec 21 given each area is required to be managed by the UK AMC in this environment and have an appropriate Flight Plan Buffer Zone associated to it. Sponsor agreed this should be considered and made a priority. NATS requested early engagement once full airspace requirements were known for first and corresponding launches.

It was also recognised that the UK AMC would need to add the TDA into LARA for it to be managed through the AUP process, noting that this would not be possible for Sep activations; however, QinetiQ were encouraged to start reusing LARA at the Hebrides Range for them to be in position to manage this activity.

NATS highlighted the issue regarding descriptors associated with Danger Area activities as prescribed in the AIPs and the fact 'rocket launch' did not feature therefore there was no safety assurance against such activity[redacted]. The Sponsor explained that as the first sounding rocket launches would most likely be under the ANO their performance/capability would be limited accordingly and as such they would have significantly less impact or capability of the ballistic missile targets flown during the At Sea Demonstration/Formidable Shield (ASD/FS) MOD exercises; it was therefore considered that the appropriate assurance against this activity was in place and could be fielded under one of the existing descriptors. However, it was recognised that sounding rockets were not a MOD activity and as such the Sponsor agreed that this should be a subject of discussion with the CAA. The Sponsor recognised that for orbital rocket launches this issue would need ratifying by the regulator and this would most likely fall out of the secondary legislation associated with the Space Industry (SIA) Act 2018.

NATS-QinetiQ WebEx Discussion SP-1 TDA Response – 16 June 2021

In Attendance:

[redacted]

Introductions:
Aim of meeting to run through NATS response and for Sponsor to gain an understanding of concerns and issues as highlighted:

Funding:
Discussion on how will NATS activities associated with TDA be funded. Wider aspects of funding discussed (i.e. NATS gain revenue from charges to airlines for their investment and operating expenses) – TDA development costs, plus corresponding use of D701 for additional activities may cause delays and/or increased costs for airlines with no corresponding benefit to them. Justification for increased costs are expected to be difficult for NATS to pursue. NATS RP3 settlement is based on a planned programme of airspace change, and SP-1 activity for 2021/22 was not identified or included, was confirmed to be not MOD activity as per extant D701 LOA, and funding to support implementation would need to be resolved. Sponsor agreed that funding for these changes should be captured in the submission and they would discuss with the CAA accordingly.

LOA
Sponsor explained that process and procedures will be in accord with extant LoA for all D701 areas, TDA will be managed as an extension of D701 and the numbers of OEP closures were not considered an issue as sounding rockets will be launched post 1400UTC. NATS view is that the LoA and use of D701 was previously agreed for MOD activity and planned MOD use, and not for use as proposed here. Therefore, it is anticipated that new agreements/arrangements would have to be negotiated regarding SP-1 use as in effect this was an unforeseen increase in use that is currently not agreed.

Buffer Zones
It was recognised that the TDA requested for Sep and Nov 21 would not be managed by the UK AMC given the time needed to achieve the system updates and associated management processes required to be introduced with the Network Manager. As a consequence, the Sponsor acknowledged that specific D701 areas would need to be activated in conjunction with the TDA; as a minimum these would be: D701Y, D701C and D701E in order that appropriate flight planning restrictions

[redacted] [redacted]

recognising the Westerly NAT tracks occur predominately 0900- 1600 UTC with 'peak' traffic occurring 1000-1300 UTC based on NATS heat Maps from 2018 and 2019.

2. QQ will use the same ASM protocols and procedures that are established in the existing LoA with MOD, NATS and IAA; QQ will therefore provide the necessary pre-planning accordingly at D-21, D-5 and D-1 – recognising that the formal LoA may not be applicable as this is with MOD DE&S however, the Range would still adopt exactly the same processes and procedures for the TDA and activation of the associated D701 areas; it is considered that this is the safest and most easily managed process for airspace management. It is noted however, NATS concern regarding inefficient use of airspace by using the D701 areas without any sub-divisions. The Sponsor considered on balance, until the extent of D701 usage was known, the safest option was to utilise the existing D701 areas and corresponding ASM procedures as this is understood by all airspace users.
3. Contingency arrangements for the TDA will be that same as for D701 procedures.
4. ADQ checks [redacted] the TDA coordinates are derived from existing ADQ checked D701/4 coordinates. The Sponsor Acknowledged the TDA briefing pack did not contain the coordinates however, the single line depicting the boundary of the TDA is drawn between two existing ADQ geographical points associated with the existing D701 and D704 Danger Areas. These coordinates are:

   574923N 0071500W

   574128N 0073703W

   573305N 0073017W

   In addition, the Sponsor will need to provide ADQ compliant coordinates for the Flight Plan Buffer Zone that will need to be established around the area, upon introduction of FRA (Dimensions and Design guidance can be provided by NATS [redacted]

5. As per SoPs at the Range once the Max Energy Boundary (MEB) of the rocket system is known (as evidenced in the CAA approvals process), the Range will determine which D701 areas will need to be activated - QQ will work with NATS PC to establish which areas may have the least impact if we can alter the launch orientation of the rocket. Only the minimum areas require will be activated as per current FUA processes at the Range.
6. Flight planning buffer zones – previously covered.
7. IAA engaged pre 1400UTC launches their only concern.
8. Duration of activity expected to be between 2 – 3 hours per launch
9. Impact on oceanic airspace will not be known until MEB fully understood.

It is recognised the timelines are tight but the CAA have advised the TDA change if approved, will be promulgated via an AIP SUPP that the Sponsor will draft; the Sponsor is aware of the associated submission dates to meet a Sep launch and associated risks to the project.

Discussion points prepared by:

[redacted] Sponsor for ACP-2021-37 TDA Scolpaig.
16 Jun 21

The Sponsor explained that the TDA and associated airspace requirements was only one of many requirements to enable the first sounding rocket launch; others including planning consent, launcher and rocket licences and potentially a space range licence. All were parallel work strands inextricably linked but each carrying its own risk to the project. The Environmental Impact Assessment (EIA) was also part of this work and it was recognised by the Sponsor that the ACP for the permanent solution would also need to consider the impact on GAT being re-routed as a result of D701 being active.

Total impact on UK network:
NATS is keen to understand how coincident airspace restrictions such as MOD activities and other spaceports would be coordinated in order to minimise impact on ATM network. Of particular concern to NATS is when the MOD are conducting GPS jamming and the associated volume or airspace needed to contain this activity. Discussion included the UK AMC involvement and their role in pre-planning. It was identified that new protocols would be required and it was unclear how priorities or future arbitration would be conducted as no priority for access to airspace has been laid out with regard to space industry activity under CAA UK ASM policy. PMN: SP-1 are engaging with Sutherland Spaceport with a view to deconflict future launch activities and how this may be accomplished [redacted]

The Sponsor shared the expected sounding rocket activity with first proposed launch Sep this year, a second launch in October and two further launches in November. Launches would recommence in March 2022 with a rate of approximately two launches every other month until November (a potential for circa 9-10 launches). It was acknowledged that the TDA duration is nominally 90 days and the Sponsor had already engaged with the CAA to establish how this could be extended or, the TDA reactivated for 2022 without the need to expend resource on applying for additional TDAs.

NERL expressed the concern that the activation of components of the D701 Danger Area and the Temporary Danger Area proposed in ACP 2021-037 to support commercial activity, such Sounding Rockets and Spaceflight would create delays and increased track mileage to commercial aircraft. It is expected that the activation of the volumes of airspace necessary to ensure safety of life will have a detrimental impact on the KPIs and environmental metrics that NATS is measured on. D701 is a Defence sponsored complex under the authority of DE&S and designated for defence activity. The effects of direct military activity is accounted for in the setting of the targets for the KPI's and metrics. Additional utilisation for commercial activity of D701 and associated TDA will create a detrimental impact on the KPI's and metrics, and NATS needs to understand how this will be accounted for in the KPI's and Metrics, to ensure that it is not unreasonably penalised as a result of these activities. Therefore, NERL cannot support activity where it leads to a NERL-attributable degradation in the performance metrics assigned by customers and/or our regulator (e.g. airline delays, degraded environmental or 3Di performance etc.). In this regard, and consistent with how these are handled in different circumstances (e.g. airports), NERL expects attribution of such degradations to be assigned/designated as non-NERL attributable.

General Queries Requiring Sponsor Clarification – Sponsor Response

1. The first sounding rockets will be regulated under the ANO and as such their Range and altitude are restricted accordingly as per details provided in the PPP. However given the altitude will still be above 29000ft it is expected the TDA and D701 areas will be promulgated as SFC to UNL. Timings are not yet known but it has been accepted [redacted] launches will be post 1400 UTC and not after 2359 UTC thus the statement avoiding 'peak periods' -

[redacted]

[redacted]

SPACE PORT 1

Thu 24/06/2021 14:03

SP1 ACP

RE: UC 20210616_WebEx_QQ_NATS_Response_Discussion_Points

To [redacted]

Cc [redacted]

This message was sent with High importance.

[redacted]

Regret the 8th is no good for [redacted]. Can we stick with the 7th Jul 0930-1100 and could I ask you to facilitate the meeting through 'Microsoft Teams' again given our IT issues and preferred use of WebEx. Please could you also invite those CC'd. Might I suggest two parts to the meeting with a rough agenda as follows:

- TDA (ACP-2021-37) Discussion covering:
  - Expected sounding rocket profiles
  - Use of D701 for any launches (circa max of 4) this year – ASM considerations
  - Subsequent TDA requirements 2022 and potential design options for a bespoke area within D701
  - Activation processes, notification periods
  - Orientation of launch to minimise impact on ATM network
- ACP-2021-12 Design principles:
  - Discussion covering NATS response

Kind Regards

[redacted]

QINETIQ

Connect with us:

[redacted]

Sent: 24 June 2021 10:51
To: SP1 ACP <SP1ACP@qinetiq.com>
Subject: RE: UC 20210616_WebEx_QQ_NATS_Response_Discussion_Points

[redacted]

Unfortunately, the other dates don't suit. There is availability on the 8th July between 1400 and 1600. Would this work?

Regards

[redacted]

SPACE PORT 1

Thu 08/07/2021 13:24

[redacted]

RE: UC FW: UC ACP-2021-37 TDA SP-1 Scolpaig - WebEx meeting 2 NATS, QQ, CAA

To [redacted]

Cc [redacted]

You forwarded this message on 08/07/2021 15:39.

Good afternoon [redacted]

Thank you for the invite to yesterday's meeting and for the read out below. I agree, the meeting was very useful indeed and I think we achieved some progress. Certainly still more to do and I can assure you that I am following up within the CAA to keep the momentum.

Regarding your bullet points, I do have a few comments:

- We can stick with the original TDA design that provides the minimum airspace necessary around the SP-1 launch site to enable segregated airspace connectivity to the D701 complex for the launches this year; Agreed.
- This will facilitate the first launch in late Sep or Oct depending when we can submit the TDA submission proposal (23 Jul or 20 Aug) and subsequent launches thereafter within the 90 day period;
- We will include in the submission report the expected airspace requirements (in terms of D701 areas) that we calculate will be needed for the first launches – if more than one rocket type then the corresponding areas for each type will be provided once known;
- The TDA will be for a duration of 90 days from first day of activation (activated by NOTAM in accordance with normal process and procedures – aligned to the QQ/MOD/NATS/IAA/CAA LoA with regard to notification periods and processes); The TDA will be 'in existence', if you will, for a period of 90 days from the day of the AIC publication, which is referred to as its notification. For example, using our timeline of submission to us 23 July, AIS submission 13 Aug, AIC publication 23 Sep, this would notify the TDA for the period 23 Sep to 22 Dec. It will then be activated by NOTAM as agreed during the notification period.
- Extant Airspace Management (ASM) procedures for activation of D701 will be used when activated in support of SP-1 sounding rocket activity as already agreed with MOD;
- All information on rocket type (capabilities), D701 airspace requirements, expected dates of launch, duration of NOTAM and any other pertinent information will be shared with NATS, CAA and MOD as soon as it is available;
- SP-1 airspace change Sponsor is recommended to commence a further TDA for sounding rocket launch commencing March 2022; as always, the request from AR is that the temporary application process is started as early as possible and preferably a minimum of 6 months ahead of the planned activity date. The remainder of your points in this bullet (highlighted) summarise the NATS feedback on how they would prefer to see any future temporary airspace applications to be structured. From a CAA perspective we do not tell sponsors what a future application ***should*** look like or seek to influence your proposal or design at this stage. It is possible that some feedback may be provided following the Decision related to this application that could be fed into any future application you may make. this TDA should be proposed as an interim solution to the final airspace design and should consider:
  - A more bespoke airspace design that does not rely wholly on the shape and size of the existing D701 areas;
  - Should be modelled specifically for sounding rocket profiles using a layered approach, similar to how the MOD use D701 but orientated on the SP-1 launch site;
  - A combination of a bespoke solution but integrated into elements of D701 where this proves the most viable solution while considering impact on the ATM network.
  - Work should commence on this second TDA as soon as possible to ensure there is at least a 6 month lead in time to manage the process properly.

I hope this is of use but please feel free to get in touch if you have any questions or require any further clarification of any of the points I have made.

Kind regards,

[redacted]

Airspace Regulator (Technical)
Airspace, ATM & Aerodromes
Civil Aviation Authority

[redacted]

Follow us on Twitter: @UK_CAA

Civil Aviation Authority

SPACE PORT 1

Thu 15/07/2021 16:29

[redacted]

RE: UC SP-1 WebEx (2) 7 Jul 21 - QinetiQ Readout

To SP1 ACP

[redacted]

[redacted]

Thanks for your brief summarisation below. Following internal review, and whilst also acknowledging your reflection that we were in danger of going round the wheel again on detail when we met last, we would suggest that your notes of the meeting have some inaccuracies with those we took.

Given all sides want to move forward on this matter, we would offer the following summary of our position as this may assist the sponsor in formulating next steps:

1. We advised that, to assure the safety of the network and our operation, we have commenced work to implement use of any approved TDA/airspace needed for a September launch,-should that be granted UK CAA approval. This work, regardless of the nature of any approval issued by CAA in this regard, does not constitute NERL's endorsement of this airspace design as either suitable or sustainable beyond the initial September launch, and should be viewed simply as a pragmatic approach by NERL to ensure our customers' safe operations within this airspace.

   In our meeting, both NATS and CAA were consistently clear that the accommodation was for one single launch, and had followed senior level discussions between both organisations. QinetiQ noted that this fell short of what they had indicated to be a possible requirement in their statement of need, with CAA/NATS consensus being that more than one launch had not been agreed and would require further discussion. QinetiQ advised the potential for the September launch, originally planned for September 15th, to move to end of September or potentially further into very early October. NATS did not expect this to prove problematic in itself, but that typical prioritisation processes would be used to ensure the Network isn't already reserved by other sponsors and/or wouldn't become compromised (i.e. business as usually processes) before confirming any date would be suitable.
2. NATS indicated that they would categorise any consequential delays or 3Di penalties following the use of this airspace (for this purpose, and for the September launch) as "other" (i.e. not NATS-attributable).
3. Consistent with our previously stated position, these arrangements apply only to the single September launch as there was insufficient time to bring forward a more transparent, justifiable and sustainable airspace design to accommodate this launch, but NERL expects that launches after September be subject to full and timely coordination to achieve a safe and sustainable use of the airspace that aligns more closely with CAA policy on airspace use.

   In this regard, NATS advised that airspace requested by the sponsor should expect to satisfy DfT policy guidance to the CAA, recently published, that requires them (the CAA) "to ensure that spaceflight activities do not unduly impact on the efficient use of airspace which could result in an increase in the emissions contributing to climate change produced by air traffic. All reasonable steps should be taken to ensure that these impacts are minimised."
4. NATS commented that SP1 had not yet provided any indication of anticipated launch trajectories and/or of the airspace impact this may have, nor any indication of when this information may become available and this was hampering their ability to impact assess this against the network. NATS noted this contrasts with other Spaceports who have responded to NERL requests to share this information. SP1 indicated that some basic data could be provided, that NATS expected to find helpful, that they may be available to share, and SP1 agreed to progress this.
5. NERL and SP1 remain unclear of the airspace that will be necessary. For pragmatic reasons, and to accommodate only the single September launch, NATS indicated it would seek to be prepared for this single event, using an airspace design that reflects:
   a. The airspace described in the TDA application, plus
   b. A defined volume of airspace, recognised and bounded by ADQ-compliant and published coordinates. By proxy, this defined volume of airspace is recognisable as one or more sub-divisions of the D701 complex.
   c. Consensus existed that ASM processes recorded within the D701 LOA provide an adequate template for this single September launch, and SP1 indicated their intent to follow them.
   d. NATS notes that this complex has not been notified for this purpose, nor has it been consulted or agreed by LOA signatories that it be used for this purpose. [post-meeting note: For the avoidance of doubt, NATS requests that the accommodation of the single September launch does not indicate support for a change of use of any part of D701 for this purpose. Should this be the outcome desired, we would advise that LoA signatories should schedule a separate meeting to discuss, something NATS are willing to commence or facilitate if considered necessary].

      NATS reiterated its lack of understanding around documented CAA policy on the re-purposing of Danger Areas for activities, durations and utilisation that haven't previously been consulted or approved. Further, NATS referenced the description by QinetiQ that "precedent had been set" in this regard with activities around D201/Cardigan Bay by sponsors who were not signatories to the LoA for that airspace structure. NATS indicated that they intended to follow this up with CAA to ensure that there was a commonly held view on what sponsors and impacted stakeholders can expect as CAA policy and suggested the sponsor may also wish to consider an approach on this matter.
6. CAA indicated that their Manager Airspace Regulation had granted a form of approval for one or more space launch sponsors to "re-use" TDAs on a limited number of occasions. Where re-use of TDAs has been agreed with other spaceports the CAA indicated that a maximum of three utilisations had been agreed in principle, which was understood to mean that, subject to satisfying other steps in their TDA approval review and approval processes, there could be a maximum 3 x 90-day windows of use – a total of 270 days – coverage from the three "approvals". [post-meeting request of QinetiQ - please confirm this to be your understanding and clarify if it is not (?)]. CAA described that the timing of those 3 "approvals" were down to the sponsor, with contextual discussion indicating that some ACPs take longer to approve than others, thus implying that sponsors needed to time the use of each use wisely.

We discussed a possibility that, after the initial September launch, a separate "interim" TDA be established to bridge the gap between this year's activity and the projected approval of a permanent ACP solution/outcome. CAA provided guidance around how to progress such an idea and there was consensus that this approach may offer an opportunity to co-develop an airspace design that offers a more sustainable solution for all airspace users and the regulator alike. The CAA indicated that they would require a separate ACP for this interim TDA. SP1 agreed to consider this suggestion.

NATS indicated that space launches currently were not assigned a priority by CAA and that an action was agreed by CAA in April for this to be considered, the risk for space launch sponsors being that low priority activity could potentially put at risk launches which cannot be assigned any priority. NATS considered it would be helpful for CAA to issue policy or guidance in this respect to prevent any undue delay to sponsors, and so that expectations are set fairly and transparently for all airspace users.

QinetiQ commented on the prolonged timescales for airspace change processes, hence their need to manage the risks created and their proposal to use D701 as a simple and efficient solution. NATS indicated their mutual understanding of CAA processes, that they recognised that these processes applied to all airspace users, equally, and that their experience was in working closely across industry to navigate the process as fairly and efficiently as possible for all stakeholders. Specifically, NATS indicated that sponsor-risk cannot conveniently be crystallised to other airspace users to work around, and that Industry must work together to create the best, and a fair, solution for all.

Finally, whilst our readout from the meeting doesn't appear to align with you in all places, we trust these points will assist as we fully recognise there can be some discrepancies in small meetings of complex discussion and detail. Whilst it wasn't our intent to invite CAA to this meeting, your decision to do so may with hindsight proved beneficial within the meeting and may be helpful again, should you consider our account to be significantly different to that stated in the meeting-incomplete or unrecognisable. I haven't shared this with them, but I'm happy to do so – please advise ?

As always, I would be more than happy to follow up on any of the above as I believe we all recognise how important it is to progress both the Interim and permanent solutions in order to ensure the safe and efficient operation of Airspace in the future.

Regards

[redacted]

SPACE PORT 1

Tue 08/06/2021 14:37

SP1 ACP

RE: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

To: [redacted]

Cc:

Follow up. Start by 17 February 2022. Due by 17 February 2022.

Dear [redacted]

Many thanks for your response to the SP-1 ACP for a TDA which will support vertical launch sounding rocket activity utilising the MOD Hebrides Range EG D701. Your views are most welcomed and will be included in the operational planning considerations, especially the timings of launches. Although I am unable at this time to confirm when launches are likely to take place you can be assured that best efforts will be made to minimise the impact on the NAT structure and we will work with our colleagues at NATS to find the best solution.

Due to the nature of sounding rocket operations (sub-orbital and limited range) combined with the low number of expected launches, (probably averaging at no more than one every two months); we do not intend to examine CAT North Atlantic flows and prevailing conditions around specific times of year. This work is likely to be part of the permanent airspace solution, namely ACP-2021-12.

We recognise that emerging spaceports will place a further demand on limited airspace capacity in the UK and the need to work together with airline operators, the MOD, ANSPs and other airspace users is vital to ensure the most efficient use of airspace is exercised.

I thank you again for your response and look forward to receiving your thoughts on the airspace design principles for ACP-2021-12.

Kind Regards

[redacted]

QINETIQ

Connect with us:

From: [redacted]
Sent: 08 June 2021 14:08
To: [redacted]
Cc: [redacted]
Subject: RE: UC Spaceport 1 Scolpaig North Uist - Temporary Danger Area (TDA)

Dear [redacted]

Thank you for contacting us regarding this. Note for future correspondence on this and any other ACPs, please contact both myself and navigation.services@fly.virgin.com.

SPACE PORT 1

Reply Reply All Forward IM

Wed 18/08/2021 17:30

SP1 ACP

UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Minor Modification Notification

To [redacted]

This message was sent with High importance.

20210818_TDA_ENGAGEMENT_Letter_V2.0.pdf
996 KB

Dear All,

Following further in depth safety analysis it has been necessary to modify the TDA for the Spaceport-1 site at Scolpaig North Uist. PSA letter explaining the change and offering more detail regarding the potential activation of corresponding D701 Danger Areas. It should be noted that the first launch from the SP-1 site is now not expected until mid-November this year. Please can you respond if you wish to provide any additional feedback as a result of this necessary change. Responses are required by the 1st September please.

Kind Regards

[redacted]

QINETIQ

Connect with us:

SPACE PORT 1

QINETIQ

SPACE PORT 1

SP-1 Airspace Change Manager
Room 113 AT Building
QinetiQ Malvern technology Centre
St Andrews Road
Malvern
Worcestershire
WR14 3PS

18 August 2021

ACP-2021-37 Temporary Danger Area Spaceport-1 Scolpaig North Uist

Introduction

As Sponsor for the above titled temporary airspace change, I contacted you in May this year requesting feedback on the change proposal for a Temporary Danger Area (TDA) over the Spaceport 1 (SP-1) proposed launch site at Scolpaig, North Uist. A Power Point Presentation (PPP) and accompanying email description were delivered outlining the TDA proposal and airspace management processes, in particular the main purpose of the TDA; to enable connectivity to the existing D701 Danger Areas. Although the particulars pertaining to connectivity, airspace management processes and use of the D701 areas has not changed, it has been necessary to modify the TDA design over the SP-1 launch site. The original TDA is depicted at Figure 1, with the new requirement depicted at Figure 2.

Figure 1: Original TDA Design 25 May 2021

Figure 2: Revised TDA Design 18 Aug 2021

Details of Change

The change to the original design was needed following a comprehensive re-evaluation of the safety analysis, this resulted in an extension of the TDA to the East. The extension now enables a number of different types of sub-orbital sounding rockets to be launched safely from the Scolpaig site into D701. It is recognised that this extension of the Eastern boundary of the TDA may now have an

increased impact on Benbecula airport operations and as such it is intended to utilise the same procedures for accessing the TDA as those currently in place for access to D701Y when active.

The coordinates for the revised TDA are as follows:

573305N 0073017W -
574128N 0073703W -
574923N 0071500W -
573727N 0071811W and back to
573305N 0073017W.

All coordinates are coincident with existing D701 coordinates using pre-existing Aeronautical Data Quality (ADQ) approved points. The TDA extends from surface level to unlimited (SFC-UNL).

It should be noted that the sounding rockets are likely to fall into one of three 'safety range' categories, namely 80km, 114km and 250km. The associated D701 areas that could potentially be activated in conjunction with these launch categories are depicted below in Figure 3 to Figure 5:

Figure 3: Sounding Rocket 80km Safety Range – Diagram Depicting Two Potential Options for D701 Activation

Figure 4: Sounding Rocket 114km Safety Range – Diagram Depicting Potential D701 Activation

Figure 5: Sounding Rocket 250km Safety Range – Diagram Depicting Two Potential Options for D701 Activation

Purpose

The purpose of this letter is to inform you of the TDA design change and request that you confirm your original response still remains extant or, if you wish to add any new comments as a result of this necessary change. It should also be noted that the TDA is predicted to be required from November this year, precise timing is still uncertain at this time, and is expected to be utilised for up to four launches during the 90 day period. The requirement for further launches and possible repeat of the TDA in 2022 remains extant and will be subject to CAA approval.

You are respectfully requested to respond to this letter by 1200 Wednesday 1st September 2021.
Please provide feedback by email to the airspace change manager at: SP1ACP@QinetiQ.com

Distribution:

NATMAC
MOD DAATM
NATS
HIAL
Loganair
MCA
NLB
UK Search and Rescue
Bristow Helicopters
Gamma Aviation
Babcock Aviation
2Excel Aviation
SATCO Benbecula (and Barra)
SATCO Stornoway
IAA
UK AMC

SPACE PORT 1

Mon 23/08/2021 15:06

[redacted]

RE: SP-1 ACP TDA -: DAATM engagement - Updated TDA Design

To Qinetiq-SP1 ACP

Follow up. Start by 24 August 2021. Due by 24 August 2021.

Hi [redacted]

Having reviewed the new proposal we have no further comments to add to our original response regarding the change in dimensions. We agree that all other processes and procedures will remain as already discussed. Thanks for the update.

Regards

[redacted]

From: SP1 ACP <SP1ACP@qinetiq.r.mil.uk>
Sent: 19 August 2021 07:52
To [redacted]
Subject: SP-1 ACP TDA -: DAATM engagement - Updated TDA Design
Importance: High

Hi [redacted]

I am not sure if your received this through the NATMAC DAATM email address so sending again to you direct to ensure receipt. In sum we have had to redesign the Eastern edge of the TDA in order to facilitate the launch of more than one type of sounding rocket – all other processes and procedures (and outstanding actions as described in previous correspondence with you and Neil Hope) are unaffected. If you do wish to add anything to your original response due to this change, then please let me know.

Kind Regards

[redacted]

QINETIQ

Wed 18/08/2021 17:35

[redacted]

RE: CAUTION: External email - UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Minor Modification Notification (UNCLASSIFIED)

To SP1 ACP

Follow up. Start by 19 August 2021. Due by 19 August 2021.
You replied to this message on 19/08/2021 07:39.

Classification:UNCLASSIFIED

[redacted]

Nothing additional from Babcock Onshore.

BW,

[redacted]

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

Please consider the environment before printing this email

Thu 19/08/2021 10:02

[redacted]

RE: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Minor Modification Notification

To SP1 ACP

Follow up. Start by 19 August 2021. Due by 19 August 2021.

Hello

I can confirm that we see no change to our original response as a result of the modified TDA.

Kind regards

[redacted]

Director of Flight Operations
2Excel Aviation Ltd
Doncaster Hangar 3 Te[redacted]
[redacted] | www.2excelaviation.com | www.broadswordaviation.com

Aviation from a World-Class Team

Registered Office: The Tiger House | Sywell Aerodrome | Sywell | Northampton | NN6 0BN | Company No: 05391365

Mon 23/08/2021 09:29

[redacted]

RE: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Minor Modification Notification

To SP1 ACP

Follow up. Start by 24 August 2021. Due by 24 August 2021.

Thanks, no additional comments.

Best Regards

[redacted]

Head of Surveillance

[redacted]

[redacted] | www.2excelaviation.com

Registered Office: The Tiger House | Sywell Aerodrome | Sywell | Northampton | NN6 0BN | Company No: 05391365

Wed 01/09/2021 13:27

[redacted]

RE: UC FW: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Minor Modification Notification

[redacted]

Good afternoon [redacted]

The SATCO email address has been deleted so we operate with named accounts from now on.

Thank you for providing the opportunity to feedback on your revised TDA design.

My original response remains extant. As stated in your email, good comms and coordination will be key to managing the launches in close proximity to Benbecula Airport.

I do not believe that this change will have a material change to Loganair operations but they should respond under separate cover.

Best regards,

[redacted]

Benbecula Airport, Isle of Benbecula, HS7 5LW

[redacted]

www.hial.co.uk

Please consider the environment - think before you print!

From: [redacted]
Sent: 19 August 2021 07:58
To: [redacted]
Subject: UC FW: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Minor Modification Notification
Importance: High

SPACE PORT 1

NERL plc Response to Spaceport 1 TDA (ACP-2021-37) V2.0

CAP1616, and in providing clear and credible feedback to this consultation and/or to other airspace users. Specifically:

1. The consulted document lists 5 different "illustrative" airspace configurations (Figures 3, 4 and 5 respectively), all of which could be used and would seem to indicate a welcome and more sustainable reduction in the volume of airspace requested under this revised proposal.
2. However, the inclusion and intent of the word "potential" confirms that these airspace configurations cannot be relied upon though, that the design and final volume of airspace requested may rise/revert to previous levels much later in the process and serves to undermine confidence in exactly how much airspace Spaceport 1 will eventually choose to activate.
3. NATS would like to see evidenced, further design or assurance around the design, to confirm the likely extent of impact on the primary airspace users of the airspace here (i.e. the NAT flow), recognising that the sponsor may not yet know how much airspace they need, even at this late stage. This will enable NATS to better predict this impact, develop tactical plans in good time and ensure adequate and consistent briefing of staff and customers.
4. We note that all 5 "illustrative" potential design options continue to include airspace that will be booked under this TDA yet cannot / will not be used under the operational scenario envisaged by the sponsor, either because of stated range limitations, or because the airspace booking is constrained using existing airspace structures that weren't originally designed for the purpose the sponsor intends within this ACP. We continue to believe this has the potential to lead to additional Oceanic Entry/Exit Point access constraints with the undesirable consequence for additional Airline and ATC workload, cost, and adverse environmental impact.
5. NATS is concerned that the operational uniqueness of certain airspace configurations not stated here may present time pressures for NATS to conclude safety analyses, procedure development and controller familiarisation. The timely completion of planned LoA work may go some way to tackling this risk (and NATS would encourage early engagement around this) but this risk, and the impact(s) this may have, may not be known until final designs become clear/reliable.

Timescale

NATS remain unclear of the timeline that supports the path to activation for this TDA and would welcome a clear indication of dates by which this Airspace design (including ADQ compliant coordinates) will be approved vis-à-vis the earliest expected promulgation of activation, noting the notice period that AMC need to establish this airspace. Without this we are not yet able to provide confirmation that NERL and our partners can complete the necessary work to support this proposal and your launch activities.

Quotas

We note that timing of planned launch activities is unchanged and are intended to sit outside of the quotas agreed within the extant LoA for D701.

Conflicting Activity

It is noteworthy that some potential and illustrative airspace configurations may "conflict" with the indicative design of other potential space launch operators. We await final designs from all before we can confirm, but it may become necessary for multi-ANSP prioritisation and coordination processes to be developed and completed before requested activations can be confirmed, in particular for any subsequent activations of the same illustrative airspace design.

NERL plc Response to Spaceport 1 TDA (ACP-2021-37) V2.0

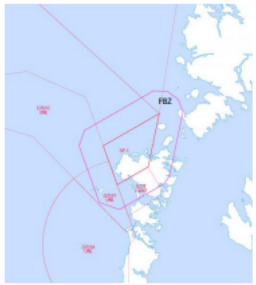
Thank you for allowing NATS to respond to your consultation of August 18th on Spaceport 1 TDA (ACP-2021-37) V2.0. This response augments that supplied previously on 09/06/21 which remains extant.

We note changes to the potential size and scale of this TDA and the deferment of initial activity until later in 2021 and, following internal discussions, we have added some further comments because of the changes contained within V2.0 of the document.

Flight Plan Buffer Zone (FBZ)

Deferment of the establishment of TDA initial operations to Nov 21, extending over a 90 day duration, alongside your intent to reactivate this airspace again in 2022, **necessitates** a requirement to introduce a FBZ around the proposed airspace volume as well as the introduction of reporting points to facilitate the circumnavigation of the area. An example of this requirement can be found in UK SUP 039/2021, noting the requirement for all coordinates to be ADQ compliant. This requirement, whilst noted in NATS previous response, is now an imperative given the introduction of Free Route Airspace on the 02 Dec 2021. This work needs to be jointly managed between NERL and our partners in AMC/Eurocontrol and this requires a minimum notice period of 3 months to ensure joint safety processes can be completed.

A non-ADQ compliant visualisation of what a Flight Plan Buffer Zone may resemble is provided below. This is provided purely to visualise and bring to life this requirement, noting that this work was not prepared by a qualified procedure designer.



Management of Activities

Additionally, the management of any activations must be undertaken by the UK AMC in accordance with their planning, notification and publication requirements European Route Network Improvement Plan - Part 3 (ERNIP P3). This process activates both the TDA and FBZ restriction within the EU NM systems and consequently ensures that flight plan acceptance and rejection is assured and underpins NATS operational safety processes.

"Potential" D701 Danger Area utilisation

We note the indications provided around the "potential" usage of D701 activation areas. Whilst we understand the complexity faced by the sponsor and agent, the continued lack of clarity around, and commitment to, the actual airspace that's intended to be used (that's planned for the near future) presents challenges for NATS in many areas, not least in concluding our impact assessment under

UK Airspace Management Cell response to:

ACP-2021-37 Temporary Danger Area Spaceport-1 Scolpaig North Uist.

The UK AMC response is separate to the NATS and MOD response and only considers matters relating to pre-tactical airspace management.

Ref: Page 3 "It should also be noted that the TDA is predicted to be required from November this year, precise timing is still uncertain at this time"

The AMC UK require a minimum of 3 months notice before a newly established temporary danger area (TDA) can be incorporated into the UK pre-tactical Airspace management process. Any TDA that is established outside of the UK ASM process will be managed tactically. In this case (less than 3 months notice) the segregated airspace will be protected from incursion by the publication of a NOTAM and the protection that an ATC environment affords. After the 3-month lead in time, an "FUA flight planning restriction" may be established and managed by the UK AMC that will reject flight planned traffic during the pre-tactical phase as deemed appropriate. However, careful consideration must be given to this case where initially a tactical process for the TDA is coupled with a pre-tactical process for the activation of EG D701 (parts thereof). This, albeit temporary, arrangement sets a new precedent for UK ASM.

SPACE PORT 1

Mon 06/09/2021 17:07

[redacted]

UK AMC response

To [redacted]

Cc

Follow up. Start by 06 September 2021. Due by 06 September 2021.

UK AMC response to ACP 2021-12 ADP- Kev comments.pdf .pdf File

ACP-2021-37 Temporary Danger Area.pdf .pdf File

Please see the attached response from the UK AMC

NATS

[redacted]

Sopwith Way
Swanwick
S031 7AY
www.nats.co.uk

[redacted]

SPACE PORT 1

Wed 08/09/2021 15:13

SP1 ACP

RE: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Minor Modification Notification

To [redacted]

Cc [redacted]

[redacted]

I appreciate the detailed response from NATS and I would like to thank [redacted] for his time yesterday in explaining the rationale behind the comments. I acknowledge the minimum 3 month lead in time that is required to ensure the correct ADQ coordinates for the associated FBZ are in place to enable the AMC and Eurocontrol to fulfill their ASM obligations. I can hereby confirm that we will make best endeavours to adhere to this requirement. It should be noted that we have delayed submission of the TDA ACP proposal this week and no longer intend to meet a 25 Sep Decide Gateway review therefore, there will be no TDA or launch in November this year as planned. Once I have a better idea of the revised timeline I will share with you and other stakeholders accordingly and arrange for a meeting to ensure that we can meet all the requirements to safely implement this temporary airspace change early next year.

Kind Regards

[redacted]

QINETIQ

Connect with us:

[redacted]

Sent: 08 September 2021 14:24

To: SP1 ACP <SP1ACP@qinetiq.com>

[redacted]

Subject: RE: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Minor Modification Notification

[redacted]

Please find attached the NATS NERL response to V2.0. Please let me know if you wish to discuss any of the comments with the Team.

Regards

[redacted]

NATS

[redacted]
Sent: 16 September 2021 16:02
[redacted]
Subject: RE: UC ACP-2021-37

Good afternoon [redacted]

Sorry for the delay in getting back to you, I have been tied up with another capability team here at the CAA.

With regards to the delay of your ACP, you may wish to look at temporarily pausing the TDA ACP until the new dates have been confirmed. We are unable to make a decision for a final submission unless we have the planned dates and time included, as this makes up a part of your stakeholder engagement. We can discuss further if needed the process for pausing and unpausing a Temporary Airspace Change. With regards to the FBZ, I will take this away and discuss this with management with Airspace Regulation and see how we are able to accommodate this part of the ACP. As most TDAs are of low impact, this has not been an issue to date.

With regards to the local stakeholder comments, you are correct. A Temporary Airspace Change needs to only focus on targeted aviation stakeholder unless you have assessed you will affect traffic patterns below 7000ft over inhabited areas, at which you are required to inform those affected communities. If you assess there is no change to traffic patterns, you do not need to provide formal feedback or comments from local stakeholders. For furth details, I would engage with your Engagement and Consultation Regulator who attended the Assessment Meeting to discuss this matter further.

[redacted]

[redacted]
Sent: 16 September 2021 09:52
[redacted]
Subject: RE: UC ACP-2021-37
Importance: High

[redacted]
I wondered if you had had chance to consider my questions below, in particular the line highlighted? The situation has become a little more pressing as we engage with the customer and decide how to best move forward.

On the same topic; while engaging with local resident groups on the design principles for ACP-2021-12, they were most interested in the TDA and queried why they had not been asked to comment on this too. I suggested that for a TDA the same level of stakeholder engagement that is required for a permanent airspace change is not necessary and a more targeted aviation audience is engaged for a TDA given it is only temporary. I recognised however, that keeping local interested parties informed is important and I agreed I would do this with regard to the TDA (I also signposted the airspace portal) – Can you please confirm that this is correct and an appropriate level of engagement or, should I be asking them formally to comment on the TDA proposal?

Kind Regards

[redacted]

From: SP1 ACP
Sent: 09 September 2021 08:58
[redacted]
Subject: UC ACP-2021-37

[redacted]
I have just been informed by the SP-1 [redacted] that there has been a delay in the approvals process for the first sounding rocket launch that was planned for November. As such, the requirement to establish a TDA around the Scolpaig site will need to be deferred. When I have a clearer indication of when the TDA will be required I will notify you (and stakeholders) accordingly – best guess early March 22.

In the meantime I do have the following question. As I have just completed a second round of engagement due to the resizing of the original TDA and have captured all comments and actions in the proposal report, can I still submit the report to the CAA for consideration, but without committing to an exact date when we would like the TDA to be established?

My reasoning behind this is that, the only respondent to add anything to their original response (following TDA change) was NATS. Their addition mainly focused on the need to establish ADQ FBZ around the TDA due to the advent of FRA in the region. They, and the UK AMC, have stipulated that a minimum of 3 months lead in time is required following publication and validation of these coordinates, before the airspace can be implemented. Therefore, in essence this means we will need to have successfully passed through the CAA Gateway at least 3 months before the TDA is activated. Ideally, I would like to submit the TDA proposal to meet a DECIDE Gateway in October so we have sufficient time to put all the necessary processes, procedures, agreements and ADQ coordinates in place well in advance of the TDA – keeping the activation date of the TDA on hold (subject to the AIP SUPP lead in times) until we have a high level of confidence that the first sounding rocket will launch.

Kind Regards

[redacted]

SP-1 Airspace Change Manager
Room 113 AT Building
QinetiQ Malvern technology Centre
St Andrews Road
Malvern
Worcestershire
WR14 3PS

17 November 2021

ACP-2021-37 Temporary Danger Area Spaceport-1 Scolpaig North Uist – Updated Timeline

Introduction

As Sponsor for the above titled temporary airspace change, we contacted you in August this year updating you on the dimensions of the anticipated Temporary Danger Area (TDA) over the Spaceport 1 (SP-1) proposed launch site at Scolpaig, North Uist; at Figure 1 . At time of writing it had been hoped to launch the first sub-orbital rocket from SP-1 into the existing Hebrides Range D701 in November. However, we are writing again to inform you that, due to a number of factors, there has been a delay to the first launch; this is now planned for early June 2022. A temporary airspace change proposal report has been submitted to the CAA with the updated timeline and additional comments received in August.

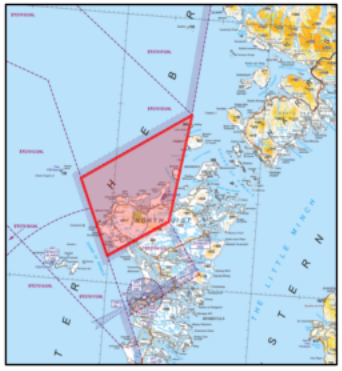


Figure 1: Proposed TDA airspace over SP-1 Launch Site at Scolpaig

Update

Assuming the CAA approve the TDA application, it remains our intention to activate and manage the TDA in exactly the same fashion as we manage D701; using the same Airspace Management (ASM) processes and procedures. This is considered essential, as activation of the TDA will nearly always

necessitate corresponding D701 areas to be activated at depicted in Figure 2, Figure 3 & Figure 4 below. It is acknowledged that formal agreement to operate under this modus operandi remains work in progress however, given the extended timeline it is considered that sufficient time exists to complete this task and others (that had previously been time critical), well in advance of the first launch. It is anticipated that this and other work strands will commence early in the new year, if not before. We will be contacting relevant stakeholders in due course to coordinate timings.

The first sub-orbital sounding rocket launch is planned for 13th June 2022 and is expected to be a low capability vehicle that may only require the airspace contained within the TDA, and not the D701 areas. It is expected this launch will be followed by four subsequent launches within the 90 day period. These will be larger launch vehicles however, they are all predicted to be contained within the areas depicted in Figure 2 & Figure 3; remaining east of 10º west. Following the first activation of the TDA in June, and assuming CAA Manager Airspace Regulation (Mgr AR) approves subsequent 90 day activation periods (circa late Sep/Oct 22), it is likely the sounding rockets will be larger and requiring the D701 areas depicted in Figure 3 & Figure 4. These details will be confirmed later next year.

Figure 2: Sounding Rocket 80km Safety Range – Diagram Depicting Two Potential Options for D701 Activation

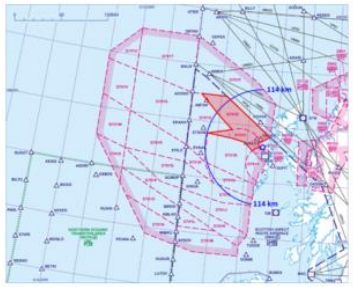


Figure 3: Sounding Rocket 114km Safety Range – Diagram Depicting Potential D701 Activation

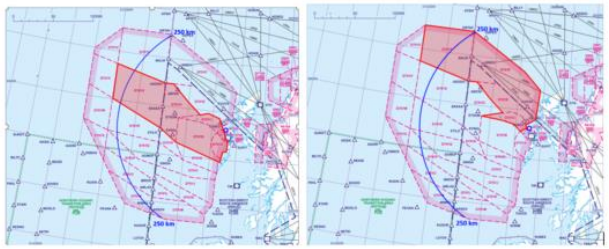


Figure 4: Sounding Rocket 250km Safety Range – Diagram Depicting Two Potential Options for D701 Activation

Next Steps

It is recognised that details of the TDA will need to be published through NATS Aeronautical Information Service (AIS) and to achieve a June 2022 launch, such details will need to be with NATS AIS no later than 22nd April 2022 (publication date 02nd June 2022). We will therefore, be contacting key stakeholders presently to address outstanding actions and ensure the appropriate ASM

processes and procedures are agreed and in place. If you have any queries, or require more information, please contact the SP-1 airspace change manager at: SP1ACP@QinetiQ.com

Distribution:

NATMAC
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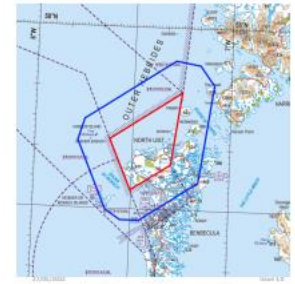
2Excel Aviation
SATCO Benbecula (and Barra)
SATCO Stornoway
IAA
UK AMC

Minimal Buffer Zone – 5NM from TDA

574536N 0074217W -
575332N 0072012W thence clockwise by the arc of a circle radius 5NM centred on
574923N 0071500W to
574841N 0070544W -
573644N 0070858W thence clockwise by the arc of a circle radius 5NM centred on
573727 0071811W to
573318N 0071301W -
572856N 0072507W thence clockwise by the arc of a circle radius 5NM centred on
573305N 0073017W to
573105N 0073847W -
573929N 0074536W thence clockwise by the arc of a circle radius 5NM centred on
574128N 0073703W to
574536N 0074217W

Tight Buffer Zone – no more than 5.25NM from TDA

574457N 0074406W -
575422N 0071753W -
575424N 0071221W -
575249N 0070739W -
575008N 0070520W -
573541N 0070915W -
573353N 0071122W -
572806N 0072726W -
572804N 0073301W -
572943N 0073742W -
574034N 0074629W -
574254N 0074615W -
574457N 0074406W



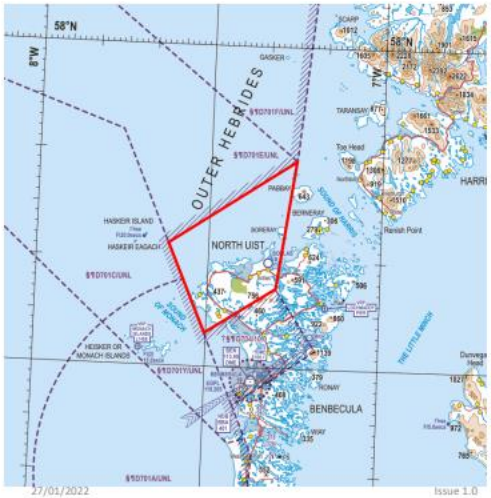
Loose Buffer Zone – no more than 5.5NM from TDA

574436N 0074504W -
575440N 0071703W -
575357N 0070936W -
575040N 0070512W -
573432N 0070934W -
572806N 0072726W -
572804N 0073301W -
572943N 0073742W -
574108N 0074657W -
574436N 0074504W

SP-1 Scolpaig TDA Proposed FBZs Zones

QINETIQ IN CONFIDENCE

QINETIQ



TDA

574128N 0073703W -
574923N 0071500W -
573727N 0071811W -
573305N 0073017W -
574128N 0073703W

SPACE PORT 1

Reply Reply All Forward

Tue 26/10/2021 12:48

SP1 ACP

RE: UC CAA Portal

[redacted]

You replied to this message on 25/01/2022 15:56.

[redacted]

I have just received confirmation that the SP-1 TDA (ACP-2021-37) date for activation is now not required until 02 May 2022. Clearly this provides us with the much needed time to ensure all necessary airspace management processes and procedures are in place including FBZs, before the first launch date. Although we have the exact TDA dimensions and expected associated FBZ coordinates (still to be ADQ ratified), we do not yet have the precise detail on associated D701 requirements for each sounding rocket; we are hopeful we will have this information and expected launch frequency, early next year. In order for me to fully understand what needs to be done between now and then, it would be most useful if you could let me know what information/detail NATS needs from the Sponsor and by when, to enable TDA operations from SP-1 commencing 02 May 22.

Kind Regards

[redacted]

QINETIQ

Connect with us:

[redacted]

SPACE PORT 1

Reply Reply All Forward

Tue 25/01/2022 15:57

SP1 ACP

RE: UC CAA Portal

To [redacted]

Cc

20210930_SP-1_TDA_ACP_Associated_FBZ_Options_V1.pptx
2 MB

[redacted]

Further to my email request below, you are invited to note that the TDA for SP-1 (ACP-2021-37) is now not required until 13 Jun 22. The ACP proposal has been submitted to the CAA and a redacted version uploaded to the CAA airspace portal. To ensure that we do not once again fall foul of compressed timelines, I am very keen to understand what you need from me, as the Sponsor, to enable the TDA to go ahead in June. We have plotted three variations of what the FBZ might look like around the TDA (attached) and acknowledge these will need to be ratified to be ADQ compliant.

As previously stated, our intention is to use the D701 areas in conjunction with the TDA, to facilitate the safe operation of a number of different sounding rockets this year. The MOD have agreed to this approach as the activity will fall under their jurisdiction with sounding rocket launches being conduct as a trial, utilising MOD Hebrides Range personnel, equipment and procedures.

It would be useful if we could discuss the best way forward either via a Teams meeting or, face to face – I am happy to travel to a NATS location to achieve this if preferred (CTC or Prestwick whichever is most suitable). If you would be kind enough to let me have your availability dates for a meeting that would be appreciated.

I thank you for your assistance in this matter and look forward to your response in due course.

Kind Regards

[redacted]

Email: SP1ACP@QinetiQ.com

QINETIQ

Connect with us:

From: SP1 ACP
Sent: 26 October 2021 12:48
To [redacted]
Subject: RE: UC CAA Portal

[redacted]

I have just received confirmation that the SP-1 TDA (ACP-2021-37) date for activation is now not required until 02 May 2022. Clearly this provides us with the much needed time to ensure all necessary airspace management processes

SPACE PORT 1

Reply Reply All Forward

Thu 17/02/2022 16:45

SP1 ACP

UC ACP-2021-37 SP-1 TDA Request Feedback FBZs Options

To [redacted]

Cc

This message was sent with High importance.

[redacted]

I am chasing up a response to my two earlier emails sent 26 Oct 21 and 25 Jan 22 respectively, where I suggested three options for the FBZs associated with the SP-1 TDA. We remain interested in your view on this matter so that we can progress the draft AIP SUPP entry pending CAA approval (they need the draft entry prior to issuing approval). We would very much appreciate your assistance in this matter.

Kind Regards

[redacted]

Email: SP1ACP@QinetiQ.com

QINETIQ

Connect with us:

SPACE PORT 1

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

Morning [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

Loganair Scotland's Airline FlySafe CLEAN & HEALTHY

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.

Hi [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]

SPACE PORT 1

Thu 10/02/2022 08:47

SP1 ACP

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

To BenbATC

This message was sent with High importance.

[redacted]

You will note the response from [redacted] and attached flight profiles however, I wonder if you could help provide a little more detail for me? I note the fight profiles all originate from Benb overhead when in reality, especially for approaches, there will be a downwind or cross wind leg before final and these will vary depending upon type of approach (visual/Instrument). Similarly, on departure the aircraft will transit a specific distance on Rwy heading before turning onto track (I assume once they reach safety alt?). My question therefore, would it be possible for you to provide me with this information for those flights that might need to transit close (or even through) the proposed TDA (block of airspace between D701 & D704), i.e. approaches to Rwy 06 and Rwy 17 from the North and departures Rwy 24 to the North?

In addition, could you provide me with a rough estimate of aircraft movements during the summer months, CAT and GA for Jun, Jul and Aug?

As always appreciate your assistance and look forward to catching up in March.

Kind Regards

[redacted]

QINETIQ

Connect with us:

From: SP1 ACP <SP1ACP@qinetiq.com>
Sent: 09 February 2022 17:27
[redacted]
Subject: RE: UC Temporary Danger Area Application for Spaceport 1 Scolpaig North Uist
Importance: High

[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

SPACE PORT 1

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:

SPACE PORT 1

Thu 10/02/2022 16:20

SP1 ACP

UC Spaceport-1 Scolpaig North Uist Temporary Danger Area Application

[redacted]

This message was sent with High importance.

20211117_TDA_ENGAGEMENT_Letter_Timeline_Update_V1.pdf
893 KB

Dear [redacted]

I am the airspace sponsor for the Spaceport-1 (SP-1) temporary airspace change that has been submitted to the CAA for approval. In sum, SP-1 site at Scolpaig North Uist will, subject to planning consent and CAA approval, be launching sub-orbital sounding rockets from the launch site into the existing MOD Hebrides Range EG D701 complex, this summer. The TDA dimensions are described in detail at the attachment.

Although it is unlikely such sounding rocket activity will take place at the weekend, I thought I would bring this activity to your attention should you have any concerns regarding the annual Sollas beach fly-in event. For our planning purposes it would be most useful if we had a better understanding of the number of aircraft you normally have attend this event and whether any/many are likely to fly during the week.

Clearly opening lines of communication are always useful and I hope you don't mind me using your email as the initial point of contact. If you would like me to contact others then please let me know. Full details of the ACP Temporary Danger Area (TDA) application can be found at the CAA airspace portal:

https://airspacechange.caa.co.uk/PublicProposalArea?pID=368

Kind Regards

[redacted]

Email: SP1ACP@QinetiQ.com

QINETIQ

Connect with us:

Sent: 11 February 2022 15:11
To: SP1 ACP <SP1ACP@qinetiq.com>
Subject: Re: UC Spaceport-1 Scolpaig North Uist Temporary Danger Area Application

[redacted]

Thank you for your email regarding the Spaceport-1 (SP-1) temporary airspace change that has been submitted to the CAA for approval.

I am a bit confused. Your link (https://airspacechange.caa.co.uk/PublicProposalArea?pID=368) when enlarged indicates Sollas beach landing strip is well away from the area marked and shaded in red. But your PDF shows the Proposed TDA airspace over SP-1 Launch site at Scolpaig includes the beach landing strip. Please clarify.

Just to let you know that the flyin dates **this year** have been advertised for some time and are set for 23rd and 24th July 2022. These dates are dependent on the tides and obviously change from year to year - They cannot be changed because these are the best tides for us. Sollas Beach Landing Strip has been a recognised landing strip for decades and is on the CAA charts as such. Since it is a public beach and CAA recognised landing strip anyone is allowed to land there at any time of the week, tides permitting.

We have no idea how many planes are expected this year because this is dependent on the weather - these are small GA aircraft with limited instrumentation who could arrive from all over the UK. We could have anything between 2 aircraft to 50 + over the weekend, depending on the weather. Some could arrive on Friday and leave on Monday. Some could arrive anytime over the weekend and leave the same day.

I trust that answers your questions and hope that this proposed TDA will not impact our flying activities at the beach.

Kind regards

[redacted]

Sat 12/02/2022 19:36

[redacted]

RE: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Timeline Change Update

[redacted]

You forwarded this message on 15/02/2022 12:08.

20211117_TDA_ENGAGEMENT_Letter_Timeline_Update_V1.pdf
885 KB

[redacted]

We have just been made aware that the operators of Sollas airfield have not been directly included in any of the engagement work on the proposed TDA until an email of the 10Feb2022, despite it being clearly depicted on the CAA VFR chart and in the stakeholder documentation.
This appears to be confirmed by the complete non-appearance of the word Sollas in the "Spaceport 1 Airspace Change Proposal Temporary Danger Area Airspace Proposal Report" submitted to the CAA.
This has to be at best regrettable.
Please confirm that this email will be immediately passed on to the CAA's ACP Case Officer?

We offer the following comments:

- Whilst this application is only for a TDA we are concerned as to the precedents that could be set for the pretty inevitable permanent airspace ACP proposal
- Sollas is not a weekend only operation and can be used any day of the week, any week of the year
- Sollas can be, and is, used by aircraft that do not have electronic conspicuity
- Sollas can be, and is, used by aircraft that do not have a radio communications capability
- How critical is the volume as shown on page 1 of the attached stakeholder engagement document? It does look as though the easy route of joining two existing airspace points has been used?
- From the document it is not clear as to why Sollas traffic needs to be affected at all
- We suggest that the now established contact with Sollas is used to move the eastern boundary of the proposed TDA such that Sollas traffic has sufficient room to operate regardless of the status of the TDA. Maybe by dog legging the boundary and/or shifting the start and end points of that boundary?

Regards

[redacted]
Programme Manager
General Aviation Alliance

Email: prog.man@gaalliance.org.uk

From: [redacted]
Sent: 17 November 2021 16:50
[redacted]
Subject: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Timeline Change Update

Dear All,
PSA letter containing details of the updated expected timeline for the TDA over the proposed vertical launch rocket site at Scolpaig, North Uist.

Kind Regards

Sat 12/02/2022 19:36

[redacted]

RE: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Timeline Change Update

[redacted]

You forwarded this message on 15/02/2022 12:08.

20211117_TDA_ENGAGEMENT_Letter_Timeline_Update_V1.pdf
885 KB

[redacted]

We have just been made aware that the operators of Sollas airfield have not been directly included in any of the engagement work on the proposed TDA until an email of the 10Feb2022, despite it being clearly depicted on the CAA VFR chart and in the stakeholder documentation.
This appears to be confirmed by the complete non-appearance of the word Sollas in the "Spaceport 1 Airspace Change Proposal Temporary Danger Area Airspace Proposal Report" submitted to the CAA.
This has to be at best regrettable.
Please confirm that this email will be immediately passed on to the CAA's ACP Case Officer?

We offer the following comments:

- Whilst this application is only for a TDA we are concerned as to the precedents that could be set for the pretty inevitable permanent airspace ACP proposal
- Sollas is not a weekend only operation and can be used any day of the week, any week of the year
- Sollas can be, and is, used by aircraft that do not have electronic conspicuity
- Sollas can be, and is, used by aircraft that do not have a radio communications capability
- How critical is the volume as shown on page 1 of the attached stakeholder engagement document? It does look as though the easy route of joining two existing airspace points has been used?
- From the document it is not clear as to why Sollas traffic needs to be affected at all
- We suggest that the now established contact with Sollas is used to move the eastern boundary of the proposed TDA such that Sollas traffic has sufficient room to operate regardless of the status of the TDA. Maybe by dog legging the boundary and/or shifting the start and end points of that boundary?

Regards

[redacted]
Programme Manager
General Aviation Alliance

Email: prog.man@gaalliance.org.uk

[redacted]

Subject: UC ACP-2021-37 Spaceport-1 Scolpaig North Uist TDA - Timeline Change Update

Dear All,
PSA letter containing details of the updated expected timeline for the TDA over the proposed vertical launch rocket site at Scolpaig, North Uist.

Kind Regards

SPACE PORT 1

Tue 15/02/2022 10:52

[redacted]

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

To SP1 ACP

You replied to this message on 15/02/2022 17:36.

Sollas + Traffic patterns + 1nm circles.jpg
239 KB

Sollas + Traffic patterns + 1nm circles + proposed boundary.jpg
280 KB

This is a resend[redacted] my system tells me that my first one (underlying) did not land with you. ☺

From:[redacted]
Sent: 14 February 2022 11:48
To: 'SP1ACP@qinetic.com' <SP1ACP@qinetic.com>
[redacted]
Subject: UC Spaceport-1 Scolpaig North Uist Temporary Danger Area Application

Hello[redacted]

UC ACP-2021-37 SPACEPORT-1 SCOLPAI

My name[redacted], and I am a committee member of the Highlands & Islands Strut of the Light Aviation Association (LAA). Within our committee I specialise in airspace matters, and in particular in our response to new ACPs. Given that background, it is perhaps unsurprising to you that I am responding to the above ACP for which you are the Qinetic sponsor.

I am pleased that you have contacted[redacted] about the potential impact of the ACP on light aircraft operations at Sollas Beach. I am a little surprised however, why it has taken so long for you to contact her, given that your proposal was dated the 17th of November 2021 and that the Sollas beach landing strip is clearly marked on the CAA chart? (*I have just looked out Edition 16 of the 1:500,000 chart, dated 1995, and it was marked then*).

You have no doubt been made aware that each year we hold one of our fly-ins at Sollas Beach. It is scheduled to happen over a weekend, and whether or not it goes ahead is very much weather dependent. This may give the impression that the interface between your activation of your TDA and the fly-in is the only concern, but I must point out that our members can and do land on the beach (and others along the west coast of the Long Island) on an opportunity basis. Whatever solution that is arrived at for your TDA must therefore take this occasional usage into account as well.

As with any airstrip, it must be possible to fly both left or right circuits, depending on the wind and weather, and Sollas is no exception. It must also be possible to fly reasonable approach and departure routes. It follows that there must be a generous separation between the boundary of the danger area and the manoeuvring area of the light aircraft. Given that some of our aircraft do not have electrical systems, let alone conspicuity devices, that margin should sensibly be measured in terms of nautical miles.

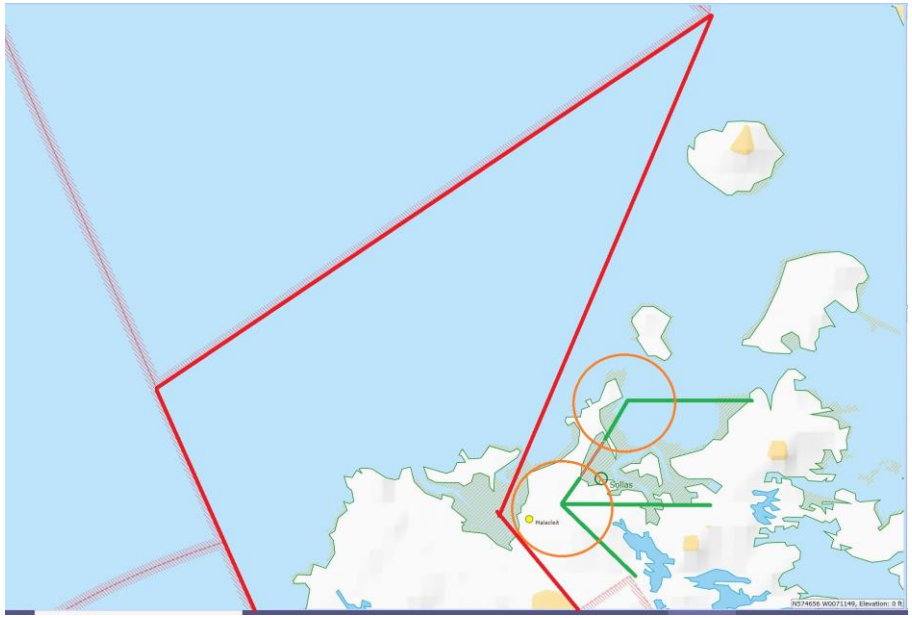
We do of course realise that your proposal is for a temporary danger area, which will only be activated when required and will presumably be notified by NOTAM in each case (ideally with a goodly notice period). That notification will necessarily occur whatever the boundaries of the TDA, but perhaps more fundamentally it may also be possible to ameliorate the impact of the TDA on Sollas by adjusting its shape. Looking at the TDA area outlined in your proposal it does appear that your boundary proposal is displaced further to the north than is necessary? I understand that you aim to achieve low polar orbits with your rockets, but usually such rockets are able to dog-leg, and do, once at altitude?

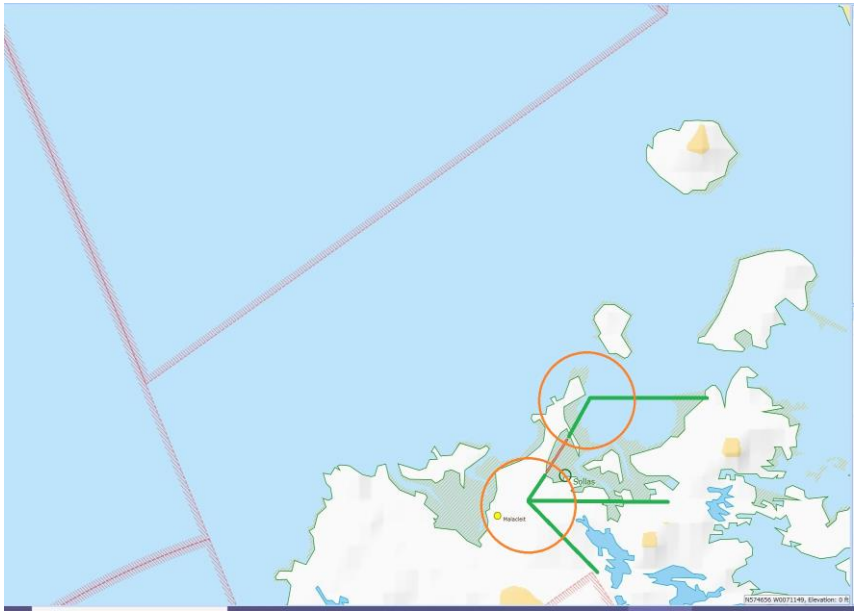
I have attached two diagrams. In the first I show the approach patterns in each direction to the beach at Sollas, and on it I have marked one nautical mile radius around the turning point to finals which reflect a degree of uncertainty of position according to wind conditions, etc. On the second I have marked the effect of these "variability" circles were you to accept a "dog-leg" in your TDA zone as drawn. An altered TDA boundary such as this would seem to eliminate the conflict with Sollas Beach without squeezing the TDA area too much, and I would welcome your comment on our suggestion.

The last point that I would make at this junction is one of a need for consultation with all stakeholders. I would be grateful if you would include me and Tom Hardie on your distribution list for future correspondence relevant to your TDA. This will hopefully ease the whole process for you and lead to greater harmony all round! As with Tom's recent email to you, I would also be grateful if you would forward a copy of this email to the CAA airspace team.

Kind Regards,

[redacted]
LAA Highland Strut


Sollas
Malacleit


Sollas
Malacleit

Tue 15/02/2022 13:55

[redacted]

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

To SP1 ACP

Cc [redacted]

Dear [redacted]
Thank you your email just now.

I know that [redacted] have written to you with some suggestions regarding the proposed TDA, so to obviate the need for repetition I will let them respond.

As they have previously requested, please make sure that any response includes all on the above email list.

Kind regards
[redacted]

On Tue, 15 Feb 2022 at 11:50, SP1 ACP <SP1ACP@qinetiq.com> wrote:

[redacted]

Very many thanks for your prompt reply and I apologies for not contacting you sooner regarding the Spaceport -1 development. I can confirm that the proposed revised TDA will necessitate the airspace over Sollas although the periods of activation will be extremely limited, probably only amounting to a few hours each month and unlikely to occur at the weekend. The specific details of the first launches (planned for the summer) are still in the very early stages of planning and I imagine it will be fairly easy to avoid launching around the period you specify therefore, the TDA should not affect the Sollas fly in.

Clearly it will be important for you to receive any future information on the progress of SP-1 and I would like to confirm if you are the sole point of contact or whether there are others I should engage with? I am also interested to know a bit more about the landing strip, who it is operated by and how it is operated, e.g. notification of operation etc. Any assistance that you can provide would be much appreciated.

I have received an email from the General Aviation Reliance regarding Sollas and SP-1 TDA; I will respond to this accordingly.

Kind Regards

[redacted]

From: SP1 ACP <SP1ACP@qinetiq.com>
Sent: 15 February 2022 17:36
[redacted]
Subject: RE: UC Spaceport-1 Scolpaig North Uist Temporary Danger Area Application
Importance: High

Dear [redacted]

Thank you for your most informative email and attachments forwarded for our consideration. I apologies for the late engagement with interested parties at Sollas but other than for the 'Sollas annual fly-in', we have had difficulty tracking down any airfield operator or contact details for Sollas. This is why, for all our engagement activities on both the TDA ACP (2021-37) and the full ACP (2021-12), we have included NATMAC members such as the General Aviation Alliance (GAA), Light Aircraft Association (LAA), Helicopter Club of Great Britain (HCGB), British Microlight Aircraft Association (BMAA), Aircraft Owners and Pilots Association (AOPA) and several more, in the belief they would reach out to members for comment. It is therefore unfortunate that you and your members are only now being exposed to these potential airspace changes.

With regard to the proposed TDA area, (within which the beach landing area at Sollas sits), this 'air Danger Area' has been designed to ensure there is no credible risk from SP-1 rocket launches to other aviation stakeholders operating on or beyond the TDA or D701 boundaries. Although the eastern boundary of the TDA sits conveniently between two pre-existing Aeronautical Data Quality (ADQ) defined reference points and it may appear we are utilising more airspace to the North than is required; this design is intentional to enable a number of trajectory options to be considered depending upon the potential impact on the Air Traffic Management (ATM) network, in particular the transatlantic traffic. Our safety experts have had to work on a worst-case scenario in trying to define the airspace requirements ahead of receiving all the different rocket data (as there will be more than one sounding rocket type being launched), and this determined the eastern boundary line.

It is accepted that the worst-case scenario design might result in more airspace being restricted than is necessary. However, before attempting to fine tune any parameters, or considering moving the boundary, we need to understand whether the effort to undertake this significant piece of work is proportional when balanced against the normal use of the beach landing strip at Sollas, in particular given the expected infrequent use of the TDA (probably no more than one or two activations per month of duration circa 2-3 hours). With this in mind, it would be most useful to gain an understanding of just how often the beach at Sollas is used in any given month, the aircraft types and typical time of day when activity occurs; is this something you could help us with?

With regard to notification, we should be able to provide several weeks' notice of planned launches (direct to you and others as required) and any activation of the TDA will always be by NOTAM. The MOD Hebrides Range will be managing the airspace in exactly the same fashion as D701 and interested parties will be able to contact the Range on a daily basis for updates on launch information, either by telephone or radio (where aircraft are equipped).

We firmly believe that we can work with you and other Sollas users (and those using other beach strips along the West coast of Long Island), to enable SP-1 launches to be conducted safely without adversely impacting on local aviation stakeholders. Our engagement with you will also help inform the final airspace solution that is currently entering Stage 2 of the ACP process, where your concerns and suggestions will be carefully considered in the design options and operational procedures.

Finally, with regard to the Sollas Fly-in, it is hoped that we can adjust any potential rocket launch timings to prevent impacting on this event. We would welcome engaging with interested parties on this matter as we progress the planning process. If it would be of use, I could facilitate a WebEx to help answer any questions that you or your members might have. Thank you again for contacting me and I look forward to working with you to find a safe and pragmatic solution. I have copied this email (and your email below) to the CAA as requested.

Kind Regards

[redacted]

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

[redacted]

Please see figures below for the movement numbers requested.

Best regards,

[redacted]
SATCO
Benbecula Airport, Isle of Benbecula, HS7 5LW
[redacted]
01870 602051 (Switchboard)
[redacted]
www.hial.co.uk

Please consider the environment - think before you print!

From [redacted]
Sent: 21 February 2022 13:30
To:
Cc: [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]

SPACE PORT 1

Mon 28/02/2022 11:24

[redacted]

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

To SP1 ACP

[redacted]

You replied to this message on 01/03/2022 08:39.

[redacted]

Apologies for my wee delay in getting back to you with light aircraft beach landing statistics.

As you can see below, [redacted] has made a sterling effort to draw together the statistics that we know about of light aircraft landing on the Long Island beaches. The Sollas weekend statistics are solid, as a log of visiting aircraft is kept; from them you can see how weather-dependent the annual arrival rate is.

Numbers of landings on other beaches are as long as a piece of string. [redacted] has indicated some of the ones that [redacted] been aware of, but as [redacted]s, light aircraft are sometimes landing without speaking to [redacted] anybody else, so we simply do not know the gross statistics I am afraid. What we can say with confidence is that there are more such landings per year than one might think, and that they can occur at any time of the year.

I hope this information is useful to you. We are still reflecting on what you have described as the reasons for the TDA proposal being shaped as it is, and may come back to you later to discuss.

Kind Regards,

[redacted]

[redacted]

Sent: 16 February 2022 15:08

[redacted]

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

Hello again

Re numbers and figures for Sollas Landings and usage:

Mon 28/02/2022 11:24

[redacted]

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

To SP1 ACP

[redacted]

You replied to this message on 01/03/2022 08:39.

As you can see below, [redacted] has made a sterling effort to draw together the statistics that we know about of light aircraft landing on the Long Island beaches. The Sollas weekend statistics are solid, as a log of visiting aircraft is kept; from them you can see how weather-dependent the annual arrival rate is.

[redacted]

I hope this information is useful to you. We are still reflecting on what you have described as the reasons for the TDA proposal being shaped as it is, and may come back to you later to discuss.

Kind Regards,

[redacted]

[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 [redacted] 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 when [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 John organised. 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 last [redacted] organised before his passing. Around 6-8 aeroplanes (I have pictures of that fly-in.

I and [redacted] 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]

SPACE PORT 1

[redacted]

Spaceport 1 Scolpaig TDA - NATS Response Regarding the FBZ Options

Follow up. Start by 02 March 2022. Due by 02 March 2022.
You replied to this message on 02/03/2022 16:07.

Dear [redacted]

Thank you for the opportunity to comment on the FBZ options associated with your TDA proposal.

Operationally, NATS has no preference between the 3 options. We believe that Eurocontrol Network Manager and/or the Flight Data providers may have a view as to which is more viable from their perspective so would suggest you contact them if you haven't already to seek their view from an airspace user perspective.

However, a number of our concerns remain around the use of the extant EG D701 design and the potential impact both operationally and to the NATS regulatory regime (as documented at Annex B to your formal Proposal Report). From your responses, we presume that MOD have agreed with you that:

1. This launch is being counted as part of MOD's existing activation quota for D701 should launches fall within the agreed time windows.
2. The description of the D701 segments in the UK AIP ENR 5.1 will be updated via a separate ACP to include commercial space/rocket launches to the use that is described within the Remarks column.
3. The LoA for D701 will be jointly reviewed and updated as a matter of some urgency, and prior to first launch.

Could you please confirm our understanding?

As in all our previous correspondence, we would again stress the importance of activating the minimum number of D701 elements which are necessary for safety reasons, so as to reduce the level of disruption to other airspace users.

Also, please note tha[redacted] has changed roles within NATS so his name should be replaced with mine in your distribution lists.

Kind Regards

[redacted]

NATS

[redacted]

Manager, ATM Portfolio - Design & Benefits

[redacted]

www.nats.co.uk

[redacted]

SPACE PORT 1

Brundle Paul R | SP1 ACP

FW: UC Spaceport 1 Scolpaig TDA - NATS Response Regarding the FBZ Options

This message was sent with High importance.

[redacted]

Sent: 03 March 2022 11:10

[redacted]

Importance: High

Good Morning[redacted]

Thank you for confirming that NATS does not have a preference on the three FBZs options offered in our letter 25 Jan 22; these have now been forwarded to EUROCONTROL for their consideration. With regard to your questions posed below, and QinetiQ discussions with MOD, I offer the following:

From your responses, we presume that MOD have agreed with you that:

1. This launch is being counted as part of MOD's existing activation quota for D701 should launches fall within the agreed time windows. Correct
2. The description of the D701 segments in the UK AIP ENR 5.1 will be updated via a separate ACP to include commercial space/rocket launches to the use that is described within the Remarks column. Incorrect - Sounding Rocket launches are being treated the same as all other 'rocket' launches in D701 and these fall under the Other Munitions & Explosives (OME) descriptor. Sounding rockets will be treated by the Range, and safety personnel, in the same manner as any other live munitions. Moreover, the CAA have not prescribed a bespoke rocket launch descriptor.
3. The LoA for D701 will be jointly reviewed and updated as a matter of some urgency, and prior to first launch. Incorrect - The use of D701 remains unaffected as this activity will come under MOD jurisdiction and approvals, all activity including sounding rocket launch, will be subject to the conditions and restrictions contained in the extant LoA. Because the TDA is only a short term temporary airspace solution, it is not considered appropriate/cost effective to change the main LoA. For simplicity and in the interests of safety, we are proposing to map the LoA restrictions and requirements to the TDA – this is considered the most logical and simplest method of operation especially as the TDA is likely to always need one or more D701 areas being activated at the same time. If NATS consider a separate LoA between QinetiQ/SP-1 & NATS for the small TDA is necessary, then we are willing to move this work forward as soon as possible.

In accordance with current SoPs, LoAs and agreements, QinetiQ will always only activate the minimum number of D701 areas that are absolutely necessary to contain the hazard – sounding rockets will be treated no differently.

I hope this provides the clarification you desire. We are keen to work with NATS (as offered in our emails 26 Oct "*In order for me to fully understand what needs to be done between now and then, it would be most useful if you could let me know what information/detail NATS needs from the Sponsor and by when, to enable TDA operations from SP-1 commencing 02 May 22*"; and email 24 Jan 22; "*To ensure that we do not once again fall foul of compressed timelines, I am very keen to understand what you need from me, as the Sponsor, to enable the TDA to go ahead in June*"). As I previously offered, "*I am happy to travel to a NATS location to achieve this if preferred (CTC or Prestwick whichever is most suitable). If you would be kind enough to let me have your availability dates for a meeting that would be appreciated*".

I look forward to working with you to move this work forward.

Kind Regards

[redacted]

QINETIQ

SPACE PORT 1

[redacted]

RE: UC SP-1 TDA NATS Latest Response

You replied to this message on 03/03/2022 11:04.

[redacted]very happy with your response and intended COA.

[redacted]

[redacted]

Battlespace Management Force
SO1 DAAM (Danger Area Airspace Manager) & Head of BM Assurance
[redacted]

[redacted]

SPACE PORT 1

Reply Reply All Forward

[redacted]

Thu 03/

RE: UC FW: UC CAA Portal

You replied to this message on 03/03/2022 16:19.

[redacted]

Apologies if Im missing something fundamental here, but how can it be the decision of the Network Manager? They simply act on our instruction.
We apply a standard 5nm buffer in UK domestic airspace (in most cases) but that is based on the UK SUA buffer policy and is something we do as standard. Who is it that you spoke to? Im happy to approach them to understand their rational as I'm somewhat confused by that statement.

[redacted]

Kind Regards

[redacted]

From: SP1 ACP <SP1ACP@qinetiq.com>
Sent: 02 March 2022 16:18

[redacted]

Subject: UC FW: UC CAA Portal
Importance: High

Your attachments have been security checked by Mimecast Attachment Protection. Files where no threat or malware was detected are attached.

[redacted]

I have shared the attached with NATS and asked for comment and they have suggested that it is not their call but that of the NM at EUROCONTROL. Therefore, could I ask you to forward the attached to EUROCONTROL for their view on which FBZ is preferred; alternatively, I am happy to go direct to EUROCONTROL myself if you can point me to the correct person; would it be [redacted] again? There is some [redacted]), I would therefore appreciate some priority on this matter if you can.

fi [redacted]

Kind Regards

[redacted]

QINETIQ

Connect with us

SPACE PORT 1

[redacted]

RE: UC FW: UC CAA Portal

Thu 03/03

This message was sent with High importance.

[redacted]

PSB highlighted in yellow. This is becoming increasingly [redacted] view on the FBZs we drafted as they have always protested that these need a 3 month lead in time to implement. This was always raised as an issue by NATS for our previous Sep and Nov launches. With the delay in launch until Jun 22, [redacted] we had plenty of time….this time is running out. Any help you can provide will be most useful. I will send you my response to NATS email below shortly.

Kind Regards

[redacted]

QINETIQ

Connect with us:

[redacted]

Sent: 02 March 2022 14:21

[redacted]

Subject: Spaceport 1 Scolpaig TDA - NATS Response Regarding the FBZ Options

[redacted]

Thank you for the opportunity to comment on the FBZ options associated with your TDA proposal.

Operationally, NATS has no preference between the 3 options. We believe that Eurocontrol Network Manager and/or the Flight Data providers may have a view as to which is more viable from their perspective so would suggest you contact them if you haven't already to seek their view from an airspace user perspective.

However, a number of our concerns remain around the use of the extant EG D701 design and the potential impact both operationally and to the NATS regulatory regime (as documented at Annex B to your formal Proposal Report). From your responses, we presume that MOD have agreed with you that:

1. This launch is being counted as part of MOD's existing activation quota for D701 should launches fall within the agreed time windows.
2. The description of the D701 segments in the UK AIP ENR 5.1 will be updated via a separate ACP to include commercial space/rocket launches to the use that is described within the Remarks column.
3. The LoA for D701 will be jointly reviewed and updated as a matter of some urgency, and prior to first launch.

Could you please confirm our understanding?

As in all our previous correspondence, we would again stress the importance of activating the minimum number of D701 elements which are necessary for safety reasons, so as to reduce the level of disruption to other airspace users.

Also, please note that [redacted] s changed roles within NATS so his name should be replaced with mine in your distribution lists.

SPACE PORT 1

Reply Reply All Forward

[redacted] 1 Fri 04/03

RE: UC FW: Spaceport 1 Scolpaig TDA - NATS Response Regarding the FBZ Options

Follow up. Start by 08 March 2022. Due by 08 March 2022.
You replied to this message on 08/03/2022 08:15.

20140822PolicyStatementSafetyBufferPolicy.pdf
50 KB

Hi [redacted]

As you know our role as the AMC is to manage the airspace and ensure that we apply FUA policy at level 2 as per CAP740 etc. The 3 months for the airspace to be built is worst case scenario and governed by the AIRAC process which comes with significant lead in times as I'm you are already aware, for example the AIRAC cut off for June is the 18th of this month for an AIP change.

The actual process of building the restriction/FBZ is much quicker but as it normally accompanies an AIP submission of some description we mention the lead in time. It's worth noting here that the submission time for an AIP Supp is considerably less and found here eg June AIRAC submission time is 22/04.

In answer to your question re buffer requirements, I would agree that [redacted] will be a good contact for any SUA questions, I would fully expect that he will be agnostic as to which buffer size to apply, I would also think that the Flight data providers will provide you with a collective shrug. The attached buffer policy has what you need in terms of UK requirement, if the regulator decide a different size buffer is required for the type of activity I would have expect that to come out of your ACP discussion.

Please feel free to call me on the number below if you wish to discuss further.

[redacted]
Senior Airspace Management Specialist
UK Airspace Management Cell

[redacted]
London Area Control Centre
Sopwith Way
Swanwick
S031 7AY
[redacted]

[redacted]

SPACE PORT 1

Reply Reply All Forward

SP1 ACP [redacted]

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

This message was sent with High importance.

20220303_TDA_Design_Sollas_Letter_V1.2.pdf
381 KB

Dear All,
Please see attached letter for your information.

Kind Regards

[redacted]

Email: SP1ACP@QinetiQ.com

QINETIQ

Connect with us:

QINETIQ

SP-1 Airspace Change Manager
Room 113 AT Building
QinetiQ Malvern technology Centre
St Andrews Road
Malvern
Worcestershire
WR14 3PS

02 March 2022

See Distribution.

Dear All,

ACP-2021-37 Temporary Danger Area Spaceport-1 Scolpaig North Uist – Sollas Users Update

As Sponsor for the above titled temporary airspace change, I have been engaging with you regarding the shape of the anticipated Temporary Danger Area (TDA) over the Spaceport 1 (SP-1) proposed launch site at Scolpaig, North Uist; at Figure 1 . It is recognised that this design (modified and extended in late August 2021), now encompasses the beach landing strip at Sollas and this has caused you concern.

Figure 1: Proposed TDA airspace over SP-1 Launch Site at Scolpaig

In your email correspondence (various), disquiet was raised that the annual Sollas summer fly-in event of the weekend 23 and 24 July this year, (that could see up to 50 aircraft participants), could be adversely affected by the activation of the TDA. Furthermore, it was highlighted that light aircraft operators use Sollas and adjacent beaches on 'Long Island' all year round for recreational flying and occasionally, Highlands Flying Club conduct Gyrocopter beach landing training at Sollas. Although

figures on the number of aircraft participating in the annual fly-in events have been provided, there is little data available to quantify the annual use of the Sollas beach site. This is unsurprising given there is no Prior Permission Required (PPR) to use the landing strip (other than for the fly-in event) or formal process to notify intention to use the beach. However, it is noted that some interested parties do contact the organiser of the annual fly-in event for information on using Sollas beach landing strip.

You kindly provided diagrams of likely traffic patterns to Sollas beach landing strip and a suggestion how the TDA could be reconfigured to avoid these areas. It was further opined that the TDA design was based primarily on convenience, utilising pre-existing points from the adjacent Danger Areas (D701 & D704).

Following significant deliberation of your concerns and further investigation by the Spaceport-1 (SP-1) consortium, it has been decided not to redesign the TDA; this decision is based on the following:

- It is confirmed that the TDA will not be activated during the period 23 and 24 July 2022 to prevent impacting upon the Sollas annual fly-in event this year.
- By using pre-existing Aeronautical Data Qualified (ADQ) reference points, the TDA can be fully integrated into the national and international air traffic management network flight planning systems that enables more robust (and safe) activation and deactivation of the airspace. Furthermore, the volume of airspace contained within the TDA is now of sufficient size to safely accommodate a wide number of different sounding rocket types and facilitate launches on different trajectories in a broader spectrum of meteorological conditions – any reduction in size, even to the North, could compromise the trajectories available and use of the site by certain rocket operators.
- Based on local knowledge of Hebrides Range sensor operators, information from Benbecula airport and material provided on Sollas beach usage outside the annual fly-in, it is considered that the beach site is used infrequently and more likely at weekends. 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 during the TDA period is not expected to exceed five in total, so less than two launches per month. When this is balanced against the infrequent use of the beach site, the probability of the two occurring at the same time (given the other factors such as tide and weather limitations for Sollas), is probably remote. Therefore, the cost of redesigning the TDA (safety analysis, launch operator limitations and stakeholder re-engagement), when balanced against the remote chance that the beach landing strip might not be available, is not considered proportional.
- The TDA will only be activated for the minimum period necessary to facilitate the safe launch of each sounding rocket, this is likely to be in the region of two to three hours at most, and could be less than one hour based on Range experience; the TDA will be cancelled immediately after launch. The TDA will only be activated by NOTAM and the NOTAM request process will normally commence a minimum of 21 days in advance of the launch date. This means prior warning of activation to interested parties can also be shared well in advance; it is also expected launches will be notified through parish notices and local press. Updates can be provided on request and a contact telephone number for information requests will be available, nominally during the working day. When the TDA is activated the airspace will be

managed by the QinetiQ MOD Hebrides Range staff and a Danger Area Activity Information Service (DAAIS) provided in the same manner as that for the D701 Danger Area complex.

It is recognised that the TDA may cause an inconvenience on rare occasions to a small number wishing to use the beach landing strips and this is regretted. However, you should be reassured that the TDA will only be activated when necessary, for the shortest time possible and will be notified well in advance; this should enable individuals to plan accordingly. We will endeavour to provide information to stakeholders upon request and are keen to keep lines of communication open with users of Sollas (and other beach landing sites). We will share with you our plans and design options for the permanent airspace solution (ACP-2021-12 refers) and work with you to alleviate concerns.

During the TDA period (expected 13 June to mid-September) there will be a complaints process implemented where Sollas users (and anyone else affected) can highlight any issues they encounter with the TDA. This complaints process will be published in advance of the TDA becoming active. In the meantime, if there are any further concerns or issues you would like to raise then please contact me at: SP1ACP@QinetiQ.com

I thank you for your engagement thus far and look forward to working with you as we move this exciting and challenging project forward.

{Signed Electronically}

[redacted]

Email: SP1ACP@QinetiQ.com

QINETIQ

Distribution:

[redacted]

C Appendix C –Environmental Impact Assessment (EIA) Extract ‘Noise’

C.1.1 The pages below are extrapolated from the EIA that has been commissioned in support of the SP-1 planning application and provides the evidence to support the requirements of CAP 1616 regarding noise analysis associated with a temporary airspace change is reproduced:

ARCUS

SPACEPORT 1
SCOLPAIG FARM, NORTH UIST

TECHNICAL APPENDIX: NOISE

DECEMBER 2021

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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.

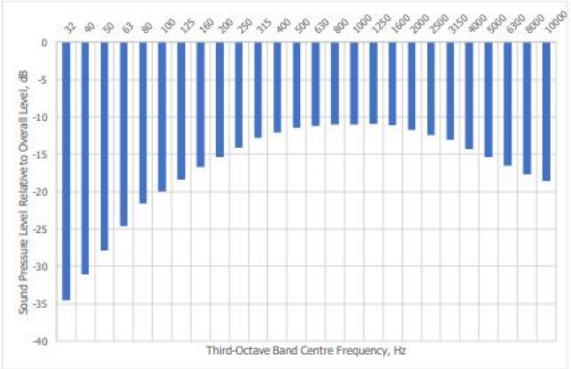
The results are for a neutral wind vector velocity. Launches could occur at surface wind speeds of up to 10 ms^{-1}. Under a negative wind vector velocity (i.e. upwind of the launch site), noise levels may be reduced by around 10 dB, based on studies carried out on wind turbines.

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

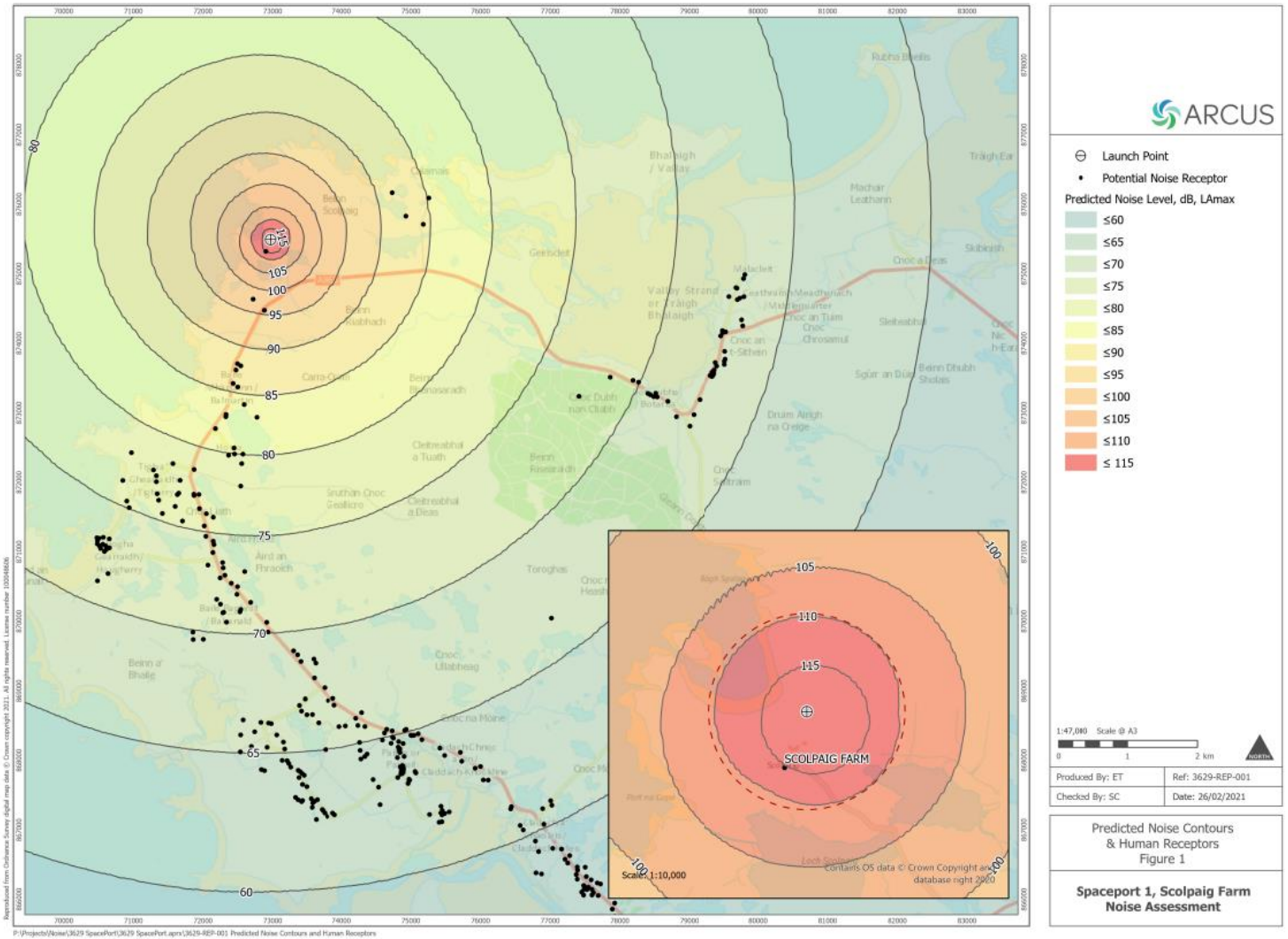
that a PLdB of up to 75 dB is acceptable for unrestricted supersonic flight over land[7]. To put this into context, the sonic boom noise level of Concorde was 105 PLdB, with NASA research (as of 2018) reducing sonic booms from commercial jets to as low as 79 PLdB. An increase of 10 dB is perceived as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


105
100
95
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80
75
70
65
60
105
110
115
SCOLPAIG FARM
Scale 1:10,000
Launch Point
Potential Noise Receptor
Predicted Noise Level, dB, LAmax
≤60
≤65
≤70
≤75
≤80
≤85
≤90
≤95
≤100
≤105
≤110
≤ 115
1:47,000 Scale @ A3
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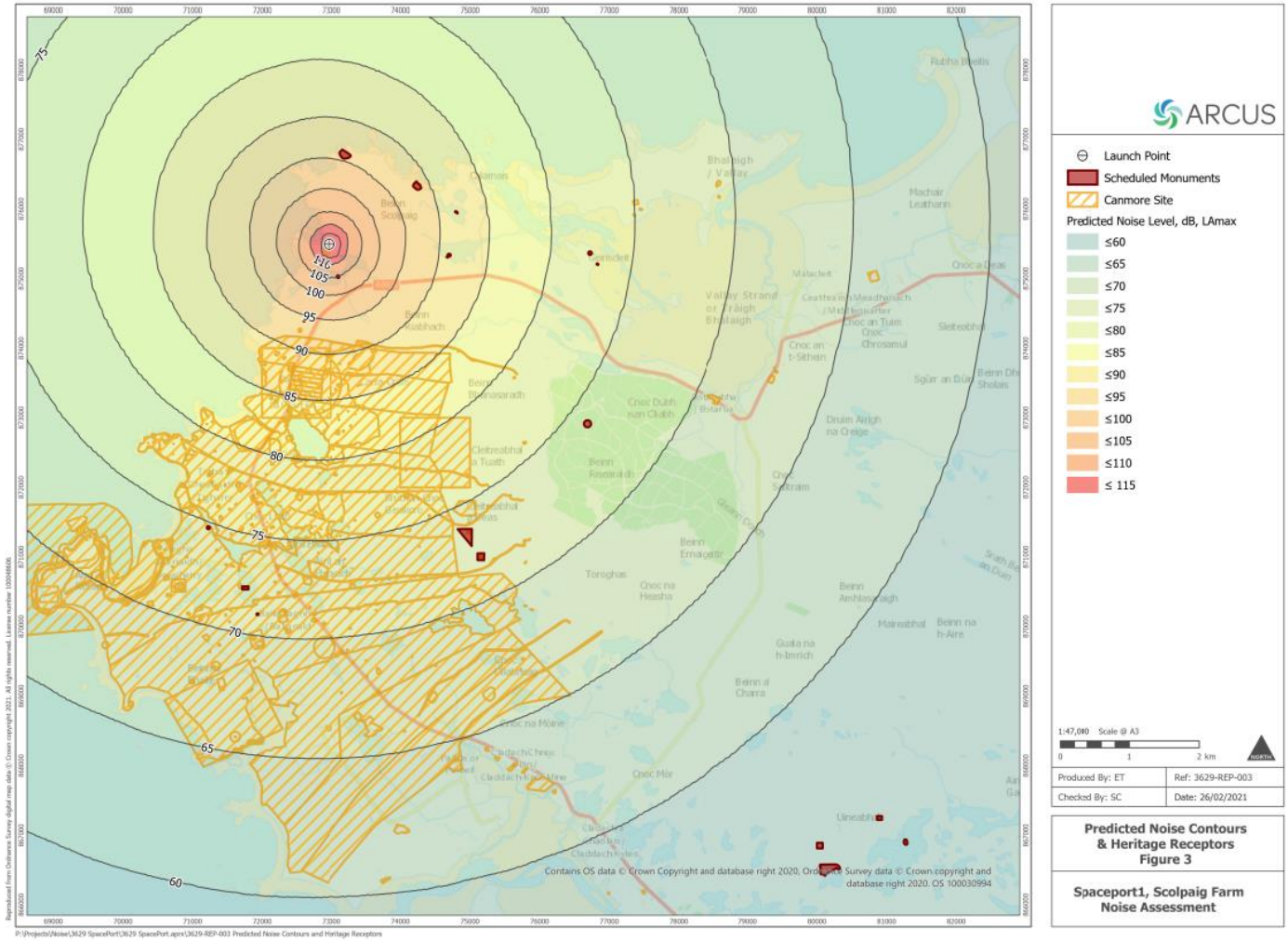
Produced By: ET
Ref: 3629-REP-001
Checked By: SC
Date: 26/02/2021
Predicted Noise Contours
& Human Receptors
Figure 1
Spaceport 1, Scolpaig Farm
Noise Assessment


ARCUS
Launch Point
Scheduled Monuments
Canmore Site
Predicted Noise Level, dB, LAmax
≤60
≤65
≤70
≤75
≤80
≤85
≤90
≤95
≤100
≤105
≤110
≤ 115
1:47,080 Scale @ A3
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1
2 km
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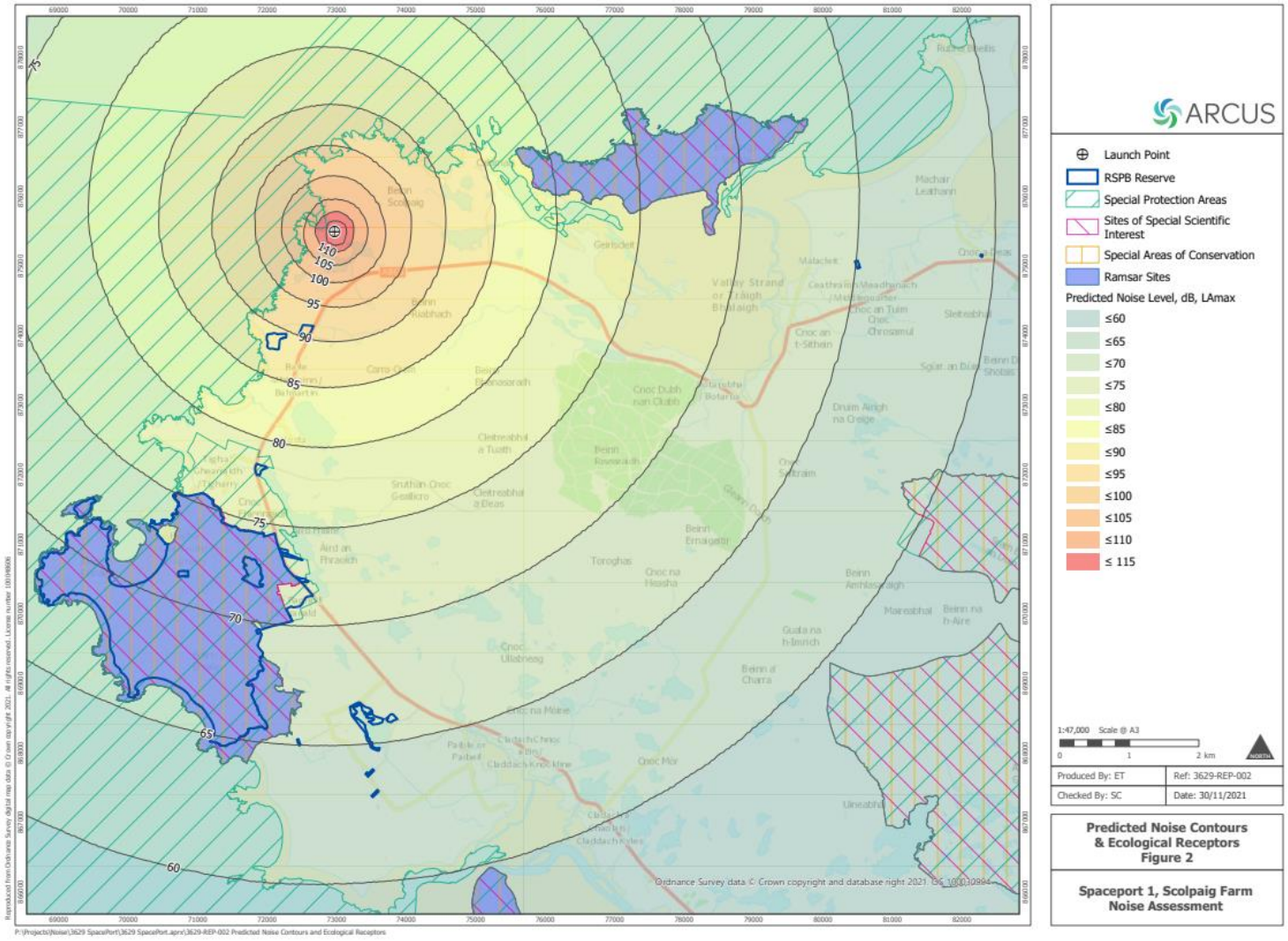
Checked By: SC
Date: 26/02/2021
Predicted Noise Contours & Heritage Receptors Figure 3
Spaceport1, Scolpaig Farm Noise Assessment
Contains OS data © Crown Copyright and database right 2020. Ordnance Survey data © Crown copyright and database right 2020. OS 100030994


ARCUS
Launch Point
RSPB Reserve
Special Protection Areas
Sites of Special Scientific Interest
Special Areas of Conservation
Ramsar Sites
Predicted Noise Level, dB, LAmax
≤60
≤65
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≤75
≤80
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≤95
≤100
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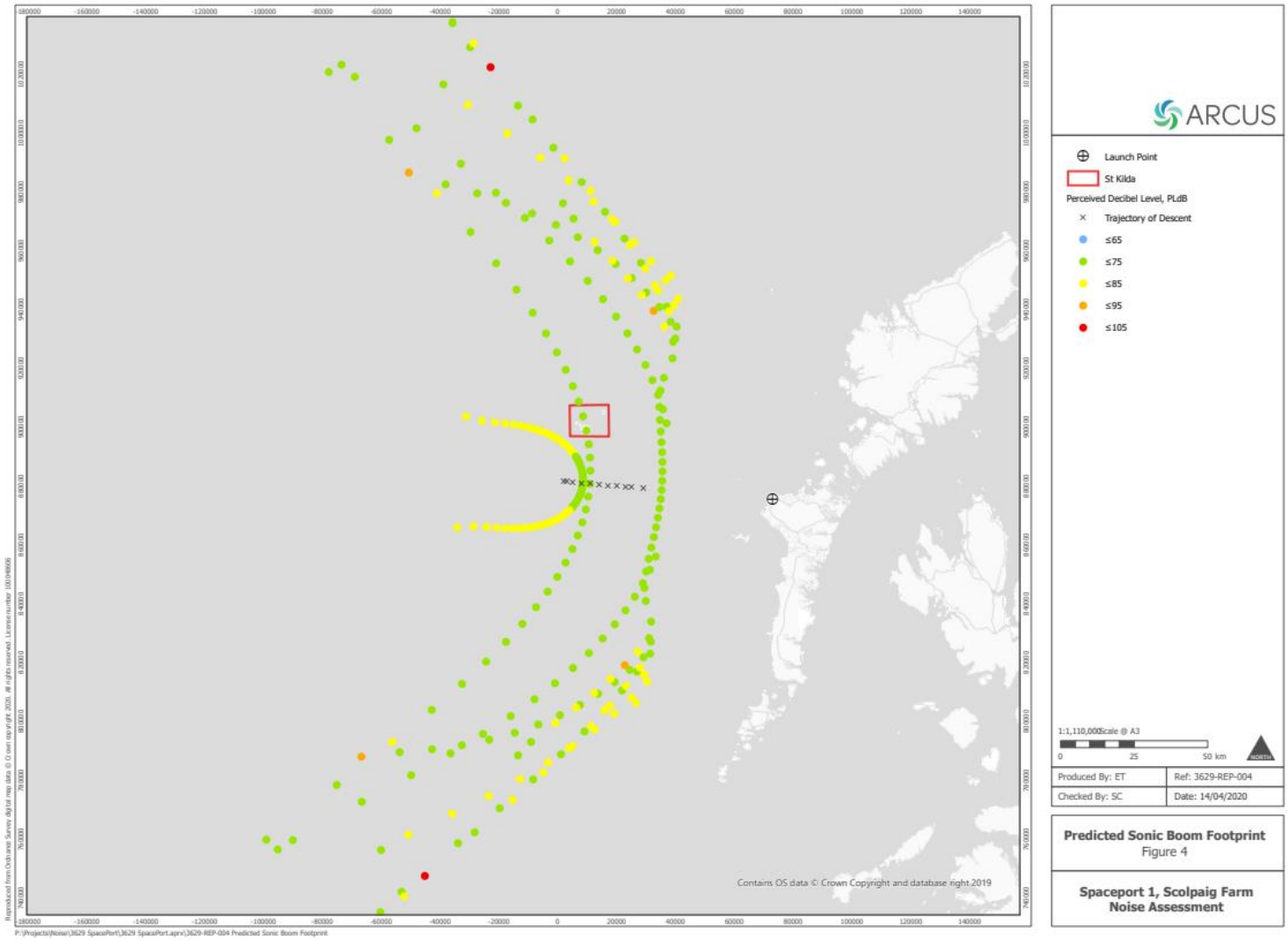
Predicted Noise Contours & Ecological Receptors Figure 2
Spaceport 1, Scolpaig Farm Noise Assessment
Ordnance Survey data © Crown copyright and database right 2021. OS 100010994


ARCUS
Launch Point
St Kilda
Perceived Decibel Level, PLdB
Trajectory of Descent
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≤75
≤85
≤95
≤105
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25
50 km
NORTH
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Predicted Sonic Boom Footprint
Figure 4
Spaceport 1, Scolpaig Farm
Noise Assessment
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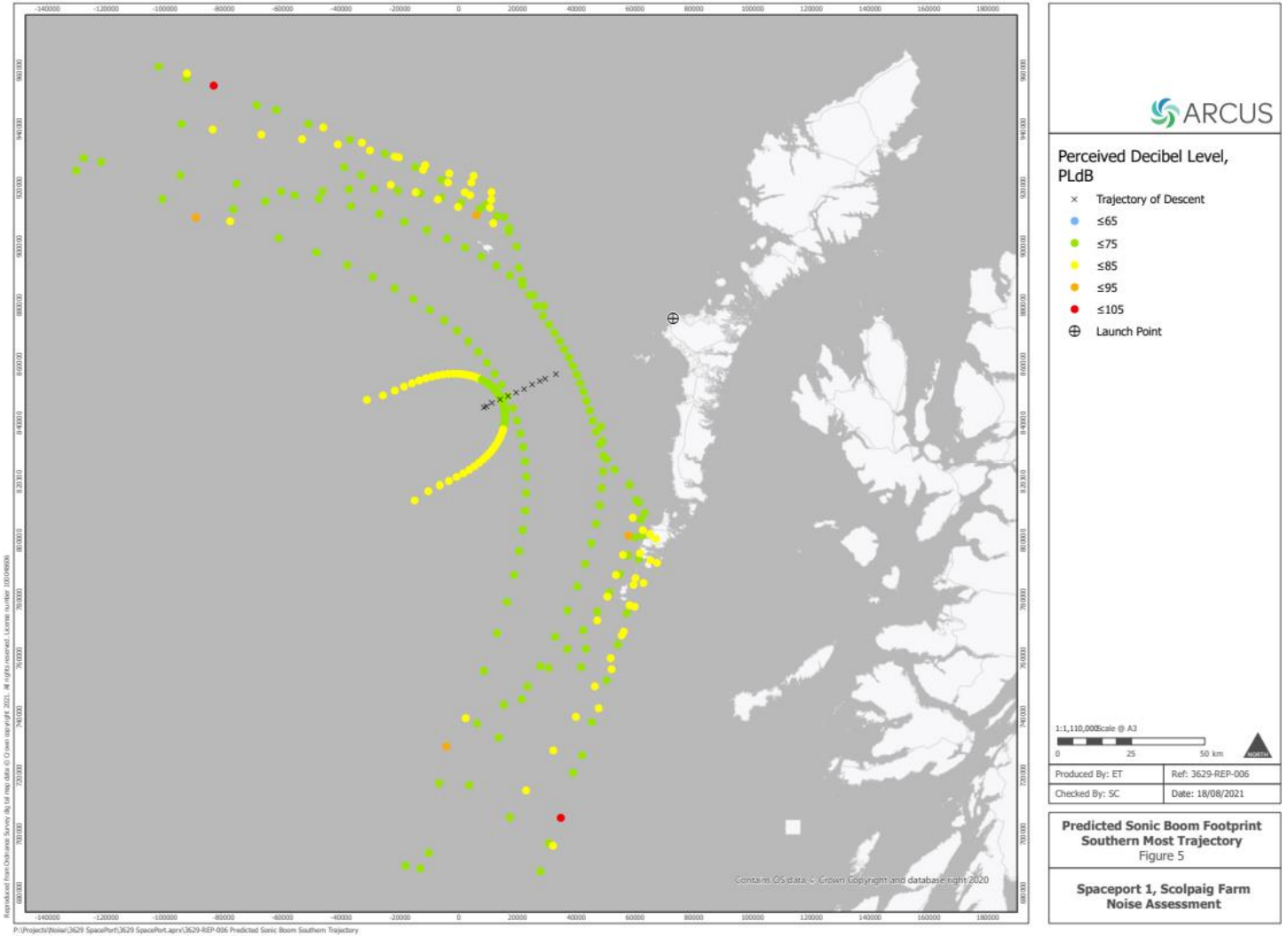
Perceived Decibel Level, PLdB
Trajectory of Descent
≤65
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≤95
≤105
Launch Point
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25
50 km
NORTH
Produced By: ET
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Checked By: SC
Date: 18/08/2021
Predicted Sonic Boom Footprint
Southern Most Trajectory
Figure 5
Spaceport 1, Scolpaig Farm
Noise Assessment
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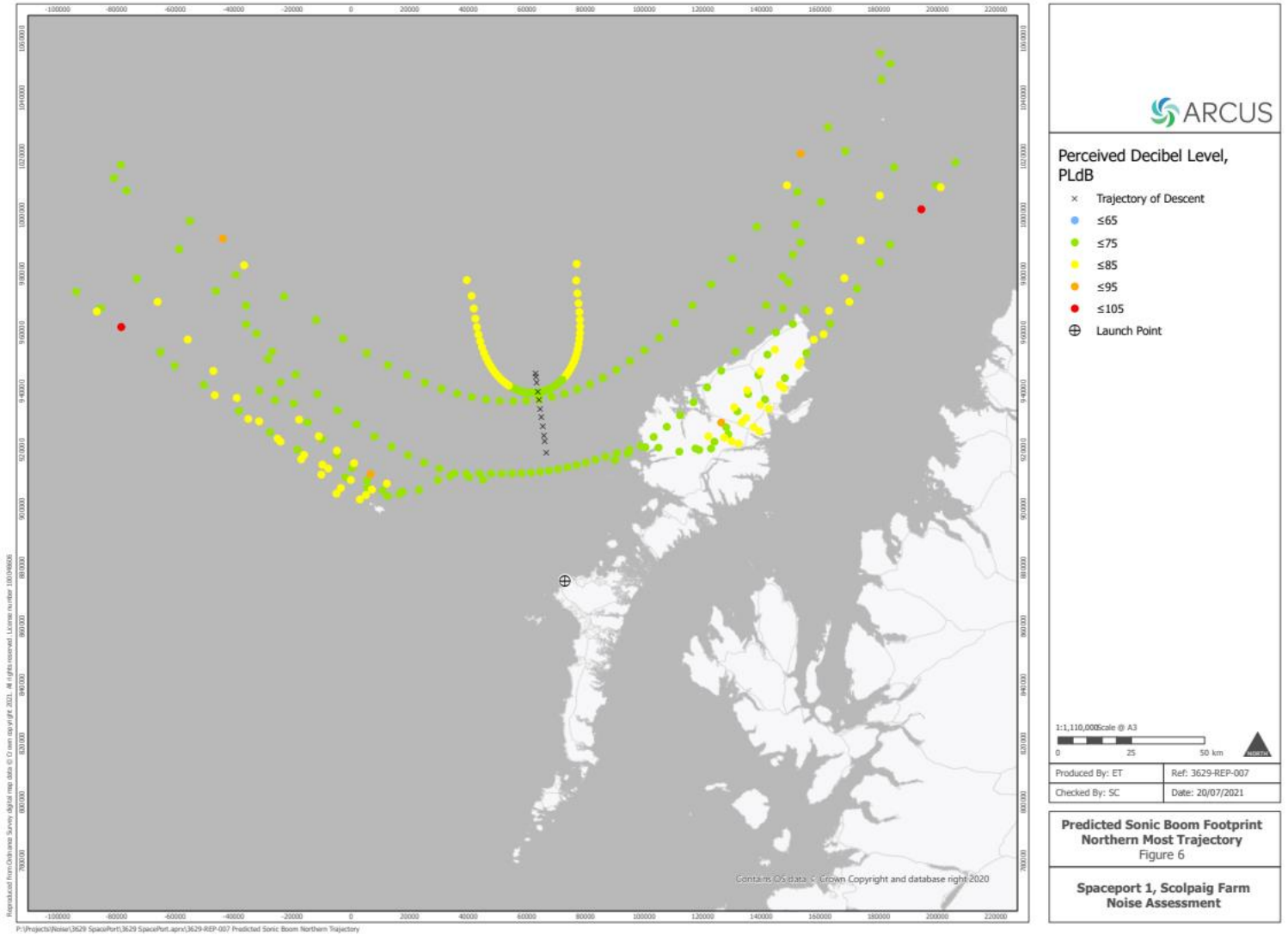
Contains OS data © Crown Copyright and database right 2020
ARCUS
Perceived Decibel Level, PLdB
Trajectory of Descent
≤65
≤75
≤85
≤95
≤105
Launch Point
1:1,110,000 Scale @ A3
0
25
50 km
NORTH
Produced By: ET
Ref: 3629-REP-007
Checked By: SC
Date: 20/07/2021
Predicted Sonic Boom Footprint
Northern Most Trajectory
Figure 6
Spaceport 1, Scolpaig Farm
Noise Assessment

Noise and Vibration EIA Extract (note: Page 2 is Intentionally Blank)

19 NOISE AND VIBRATION

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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

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.

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

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.

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.