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Highlands and Islands Airports Ltd

Report

Operational Risk Assessment

Alturlie Point Operations in Class D Airspace

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Executive summary

This Operational Risk Assessment evaluates the proposed reclassification of the current locally known ‘Alturlie Box’ paragliding area from Class G to Class D, as part of a broader airport airspace change process, under the Airspace Change Proposal (ACP) for Inverness Airport, ACP-2014-04. The initial reclassification of the ‘Alturlie Box’ to Class D presented a significant challenge, specifically concerning the mandatory radio carriage requirement, which the established gliding community, via the Highland Hang Gliding and Paragliding Club (HHGPC) previously stated they could not meet. Following extensive stakeholder engagement and feedback including local airspace users, a Temporary Segregated Airspace (TSA) has been proposed as a critical mitigation strategy. This assessment highlights the risks inherent in the initial Class D proposal without specific accommodation for paragliders and demonstrates how the proposed TSA effectively addresses these, enhancing safety for all airspace users, managing crucial stakeholder relationships, aligning with regulatory requirements and the intended goals of the ACP.

Contents

1 Introduction and Context

Inverness Airport, is undertaking a significant proposal to, transition from Class G to Class D to enhance the protection of its operations and improve air traffic management efficiency. A key area impacted by this expansion is the area known locally as the 'Alturlie Box,' currently in Class G airspace around Alturlie Point and referenced within the United Kingdom (UK) Civil Aeronautical Information Publication (AIP)[1] data for Inverness Airport. This area is a known and established operational zone for paragliders and a Letter of Agreement is in currently in force between Inverness ATC and HHGPC for operations in Class G airspace between dawn and dusk.

The initial ACP outlined the reclassification of the 'Alturlie Box' as part of the new Class D airspace and a LOA was identified within the initial and updated Inverness ACP Safety Cases to be implemented to cater for this activity. Since the adoption of SERA 6001[2], the rules for operating within Class D airspace have changed. This change inherently mandates that all aircraft operating within Class D airspace must carry and use a radio for communication with Air Traffic Control (ATC).

The proposed reclassification of the airspace from Class G to Class D has raised concerns, particularly within the paragliding community and fed back to Inverness via HHGPC, regarding the practical implications of mandatory radio carriage. In light of this feedback and having consulted the new SARG Policy 133: Policy for the Establishment and Operation of Special Use Airspace | UK Civil Aviation Authority dated 26th February 2024, the implementation of a Temporary Segregated Airspace (TSA) has been identified as the only viable mitigation strategy to ensure that paragliding operations within the proposed Class D airspace meet the requirements of SERA 6001. This approach is critical for the Airspace Change Proposal (ACP) to advance, while simultaneously ensuring that HHGPC operations can continue safely and enable ongoing access in Class D airspace for HHGPC activity whilst meeting the requirements of SERA 6001 (d).

[1] EGPE AD 2.20 LOCAL AERODROME REGULATIONS WARNINGS 4g

[2] https://www.caa.co.uk/uk-regulations/aviation-safety/basic-regulation-the-implementing-rules-and-uk-caa-amc-gm-cs/sera-standardised-rules-of-the-air/

2 Regulatory Context

The overarching principle guiding this airspace change, and indeed all air navigation functions, is enshrined in Section 70 of the Transport Act 2000, which states that the Civil Aviation Authority (CAA) “Must exercise its air navigation function so as to maintain a high standard of safety on the provision of air traffic services.” This directive underscores the necessity for any airspace modification to prioritise and enhance safety for all airspace users.

Furthermore, in considering a solution like temporary segregated airspace (TSA), reference is made to the CAA’s policy for the establishment of Special Use Airspace (SUA). Specifically, Safety and Airspace Regulation Group (SARG) Policy 133, published in February 2024, paragraph 2.4, provides the framework and guidance for the establishment of such segregated areas, acknowledging their role in facilitating specific aviation activities while maintaining overall airspace safety and order.

3 Initial Airspace Change Proposal: Alturie Box Reclassified to Class D Airspace

Under the initial ACP, the Alturie Box would be located within standard Class D airspace. This reclassification introduces a fundamental change for paraglider operations within the specific area. Of all of the additional requirements, the mandatory requirement to carry and use a radio for communication with ATC has been highlighted as problematic by a key stakeholder.

Highlands Hang Gliding and Paragliding Club (HHGPC) as a key stakeholder, following engagement, have unequivocally stated that equipping their paragliders with radios is not a feasible option for their operations due to various factors (e.g., cost, equipment weight, power requirements, operational philosophy). This presents an operational challenge and a safety risk.

3.1 Hazard Identification (HazID) and Risk Analysis

This section identifies the risks associated with implementing the 'Alturlie Box' as Class D without specific accommodation for paraglider operations, focusing on the unaddressed radio carriage requirement. The Inverness Risk Matrix used for this activity can be found at Annex A1.

Hazard	Potential Consequence	Likelihood	Severity	Risk Score(LxS)	Unmitigated Risk (LxS)
ParaGlider Operations in Class D without Radio (Non-Compliance)	Loss of separation between paragliders (unknown positions) and radio-equipped powered aircraft. Increased risk of mid-air collision. Legal implications for paragliders and airport. Undermining of Class D integrity and purpose.	4 (Likely)	5 (Catastrophic)	20	20
Increased ATC Workload and Stress	Difficulty in managing unknown paraglider positions and intentions. Increase risk of controller error/fatigue. Inability to provide standard air traffic services.	3 (Moderate)	4 (Major)	12	12
Reduced Safety Margins for	Unpredictable and uncommunicative paraglider movements in controlled	4 (Likely)	4 (Major)	16	16

Hazard	Potential Consequence	Likelihood	Severity	Risk Score(LxS)	Unmitigated Risk (LxS)
Powered Aircraft	airspace. Increased collision risk, especially during peak movements.				
Negative Stakeholder Relations and Potential Non-Compliance	Strong dissatisfaction from the paragliding community. Potential for deliberate non-compliance or protests, creating ongoing friction and undermining the ACP. Erosion of trust in the regulatory process.	5 (Almost Certain)	3 (Moderate)	15	15
Ineffective ACP	Failure to achieve intended safety and operational benefits due to persistent non-compliance and uncontrolled elements within the new Class D. Potential for costly future revisions.	4 (Likely)	4 (Major)	16	16

Table 1 - HazID with Initial Class D Proposal

4 Proposed Mitigation: Implementation of TSA

Following comprehensive stakeholder feedback regarding the inability of paragliders to comply with the radio carriage requirement in Class D, the proposal to establish a TSA within the wider Class D area has been put forward.

A TSA, as per SARG Policy 133, allows for specific air activities to occur within a defined volume of airspace where particular rules apply. In this case, paragliders would be permitted to operate within the TSA without a radio, in compliance with Visual Flight Rules (VFR) and the Standardised European Rules of the Air (SERA) regulations. Crucially, all other airspace uers would be required to remain clear of the active TSA, providing an additional safety buffer for paraglider operations. This solution directly addresses the core concerns of the paragliding community while still allowing Inverness to manage its broader Class D responsibilities.

4.1 Hazard Identification and Residual Risk Analysis

This section analyses the risks once the TSA is implemented, focussing on the remaining residual risks. The Inverness Risk Matrix used for this activity can be found at Annex A1.

Hazard	Potential Consequence	Likelihood	Severity	Risk Score	Mitigation Strategy	Residual Risk
Incursion by Non-TSA Aircraft into Active TSA	Potential conflict with paragliders if other aircraft fail to adhere to TSA boundaries	2(Unlikely)	4(Major)	8	Clear AIP publication, ATC advisories, pilot briefing/education. Currently TSA area matches existing 'Alturlie Box' dimensions.	8
TSA Dimensions /Hours Not Optimised	TSA too large/small, or active at inappropriate times, impacting other traffic flows.	2(Unlikely)	3(Moderate)	6	Existing design of 'Alturlie Box' has been used for many years without complaint from airspace users. Continued regular review based on traffic levels.	6
Environmental Factors (Aircraft Generated)	Potential hazard for UK Search and Rescue (SAR) helicopters operated by Bristow Helicopters to	2(Unlikely)	5 (Catastrophic)	10	Following established protocols for managing and assessing downwash in UK SAR	10

	induce downwash risk with paragliders when operating close to TSA boundaries.				helicopter Operations.	
ATC Workload for TSA Management	Need for ATC to manage activation/deactivation and monitor TSA boundaries, potentially adding complexity.	3(Moderate)	2(Minor)	6	Standard Operating Procedures (SOPs) similar to those already in place for the use of the Alturie Box. Clear communication protocols established with the paragliders via LOA.	6
Glider Compliance with SERA within TSA	Paragliders failing to adhere to VFR rules and safe operating practices within the TSA.	1(Rare)	2(Minor)	2	Ongoing engagement and education, and reliance on glider pilot self-responsibility and club oversight.	2

Table 2 - HazID with TSA Implemented

5 Downwash Hazard Management

This section outlines the procedure and controls implemented to effectively manage and mitigate the hazards associated with rotor downwash during operational phases, as highlighted by Bristow Helicopters but applicable to all rotor downwash and wake turbulence events. Downwash, a significant aerodynamic phenomenon generated by rotary-wing aircraft, can pose risks to personnel, equipment, and the surrounding environment if not adequately addressed.

Concerns were raised about the established wording surrounding the 'Alturie Box' as it currently stands, concerning maintaining 'sufficient protection' from paragliders, which could be misinterpreted. This Operational Risk Assessment acknowledges that downwash issues and paraglider interactions is a pre-existing, dynamic risk and the role of this assessment is not to manage the existence of this risk (as it predates the TSA's establishment), but it will address the implications within the operational context.

Specifically, within the context of the TSA, 'sufficient protection' from paragliders will be guided by established downwash mitigation procedures and the clearly defined boundaries of the TSA, aiming to prevent any adverse aerodynamic effects.

5.1 Acknowledgement of Pre-Existing Dynamic Risk

Rotor downwash, and its potential impact on lightweight aircraft such as paragliders, is known and pre-existing dynamic operational risk, inherent to the concurrent operation of rotary-wing aircraft (for example SAR helicopters) and paragliders. Prior to the establishment of the TSA, Helicopter operators, , have maintained, and continue to maintain, operational procedures designed to ensure sufficient distance from paragliders, thereby mitigating downwash risks in the vicinity of known gliding sites like the 'Alturlie Box'.

The Introduction of the TSA, encompassing the 'Alturlie Box', provides a more formally defined and communicated area of glider activity. The TSA's activation and deactivation will be communicated via standard radio telephony procedures Inverness Airport and other airspace users. This explicit communication of the Alturlie TSA "active" status will significantly enhance situational awareness for all airspace users in the vicinity.

Below is a list of identified, pre-existing hazards associated with rotor downwash and gliding activity.

5.1.1 Loss of Control/Stability for Paragliders:

- **Hazard:** Helicopters, particularly during low-level transit, hovering for observation, or during search patterns near the 'Alturlie Box', generate powerful rotor downwash. This downward flow of air can extend significant distances from the helicopter, especially in calm or light wind conditions.
- **Pre-Existing Dynamic Risk:** Paragliders rely on precise airflow over and through their canopies for lift and control. An uncommanded encounter with strong helicopter downwash can disrupt this airflow, leading to:
    - ***Sudden Loss of Lift/Altitude:*** The downward air current can effectively reduce the relative airspeed overland through the paraglider's canopie, causing rapid and unexpected loss of lift, potentially leading to a significant and sudden loss of altitude.
    - ***Altitude Changes/Turbulence***: The turbulent nature of downwash can induce uncommanded pitch, roll, or yaw movements in the paraglider, making it difficult for the pilot to maintain stable flight and potentially leading to spatial disorientation.
    - ***Stall Conditions***: If the downwash significantly reduces the airspeed over and through the canopie, the paraglider could enter an aerodynamic stall, resulting in a rapid descent and loss of control, which is particularly dangerous at low altitudes or near terrain.

5.1.2 Increased Pilot Workload and Stress for Paragliders

- **Hazard:** The unexpected onset of downwash effects requires immediate and precise pilot input to recover control.
- **Pre-Existing Dynamic Risk:** Even if a full loss of control is avoided, the sudden and unpredictable nature of downwash can significantly increase a paraglider pilot's workload and stress levels. This can lead to:
  - ***Distraction:*** The pilot's attention is diverted from routine scan and other airspace users.
  - ***Fatigue:*** Prolonged or repeated encounters can contribute to pilot fatigue.
  - ***Error Chain Initiation:*** A high-stress situation, even if recovered, can initiate an error chain that leads to subsequent mistakes.

5.1.3 Misinterpretation of Airflow/Weather Conditions by Paragliders

- **Hazard:** helicopter rotor downwash introduces powerful, localised, and uncommanded vertical air currents into the airspace, which can be difficult for paraglider pilots to distinguish from natural atmospheric phenomena.
- **Pre-Existing Dynamic Risk:** Paraglider pilots constantly seek to interpret natural air currents (thermals for lift, sink for descent). An encounter with helicopter downwash can be misinterpreted as a strong, natural area of 'sink'. The misinterpretation can lead to:
  - ***Inappropriate Corrective Actions:*** *Para*glider pilots, attempting to escape the perceived 'sink', may instinctively initiate aggressive or unexpected manoeuvres (e.g., sharp turns, rapid changes in airspeed, or even deliberately flying towards what they perceive as a 'ridge' or 'thermal' in an attempt to climb out), potentially putting the paraglider into an unsafe attitude or closer to other aircraft.
  - ***Inadvertent Convergence:*** The paraglider pilot's attempt to escape the 'sink' (downwash) could inadvertently lead them to fly into the path of the helicopter (which is generating the downwash), or into areas of the Alturlie Box where they may otherwise have avoided.
  - ***Loss of Situational Awareness:*** The unexpected and uncommanded vertical movement, combined with the pilot's efforts to correct it, can distract from maintain a visual lookout for other traffic or assessing their overall position within the 'Alturlie Box'.

5.2 Mitigating Factors (Pre-Existing)

- **Visual Lookout:** Paraglider pilots are trained to maintain a vigilant lookout for other aircraft.
- **Pilot Awareness:** helicopter pilots are generally aware of the presence of paragliders in known paragliding areas and typically aim to provide separation, but primarily mission dictates their flight path.

5.3 Helicopter Downwash Management Responsibilities within the TSA Operational Context

In light of the 'Alturlie Box' transitioning to a formally managed TSA, the responsibility for managing rotor downwash, and maintaining safe separation from paragliders within or in close proximity to the active TSA, remains with the Helicopter pilot. This aligns with r existing robust safety management systems and operational protocols for managing downwash in all operational scenarios, including:

- **Take-Off and Landing:** Where downwash can affect ground personnel, equipment, and other aircraft.
- **Winching Operations:** Where precision control and management of downwash are critical for the safety of personnel on the hoist and those on the ground/water.
- **Low-Level Transit:** Where proximity to obstacles, terrain, and other airspace users necessitates careful downwash consideration.

Therefore, when the ‘Alturlie Box’ TSA is active (as communicated by Inverness ATC), Helicopter crews are required to apply their established downwash management principles and standard operating procedures to:

- **Maintain Safe Separation:** Ensure adequate horizontal and vertical separation from the active TSA boundaries and any known glider positions within it, to prevent downwash-induced loss of control or adverse effects on glider operations.
- **Assess Environmental Factors:** Consider the prevailing wind, terrain, and other meteorological factors that influence downwash dispersion and intensity when operating in the vicinity of the active TSA.
- **Prioritise Paraglider Safety:** In situations where mission requirements necessitate operation near the TSA flight crews will prioritise the safety of paragliders by employing all available means (e.g., higher altitudes, alternative flight paths, increased visual lookout) to minimise downwash impact.

This Operational Risk Assessment facilitates management of this risk by formally defining the TSA, ensuring its active status is clearly communicated, and establishing clear protocols that enable crews to incorporate this specific airspace dynamic into their well-practiced downwash mitigation strategies.

6 Rationale for Taking Forward TSA

The implementation of the TSA is the preferred and recommended solution for managing the Alturie Box within the proposed Inverness Class DCTR. The rational is compelling:

- **Directly Addresses the Radio Carriage Issue:** The TSA provides a specific, legally recognised framework for paragliders to operate without radio, eliminating the primary conflict points identified in the initial Class D proposal. This ensures compliance with regulations while allowing traditional paraglider operations to continue.
- **Enhances Safety for All Airspace Users:** By segregating paraglider operations into a known, published area from which radio-equipped aircraft are explicitly required to remain clear, the TSA drastically reduces the risk of mid-air collision and provides significantly increased safety margins for both paragliders and powered aircraft. This aligns directly with the CAA's mandate under S.70 of the Transport Act 2000 to maintain a high standard of safety.
- **Effective Stakeholder Management:** The TSA is a direct and positive response to the concerns raised by the paragliding community. By providing a viable and accommodating solution, the airport demonstrates a commitment to collaborative airspace management, fostering positive relations and ensuring buy-in from key stakeholders. This mitigates the significant risk of non-compliance and reputational damage.
- **Facilitates Airspace Introduction Objectives:** The TSA allows the airport to successfully proceed with its broader Class D introduction, achieving its goal of enhanced protection and traffic management without being restricted by specific operational constraints of a particular airspace user. It represents a pragmatic integration of diverse airspace user needs within a more controlled environment, utilising a framework supported by SARG Policy 133.
- **Reduced Overall Risk:** As demonstrated in the risk tables, the residual risks associated with the TSA are significantly lower and more manageable than the unmitigated risks forcing non-radio equipped paragliders into standard Class D airspace.

7 Conclusion and Recommendations

The initial proposal to simply reclassify the ‘Alturlie Box’ to Class D, without specific provision for paragliders, presents critical unmitigated risks, primarily stemming from the mandatory radio carriage requirement which cannot be met by the paragliding community. These risks include severe safety concerns (mid-air collision), significant ATC workload issues, and detrimental stakeholder relations.

Therefore, this Operation Risk Assessment strongly recommends the formal adoption and implementation of a TSA for the ‘Alturie Box’ within the proposed Class D airspace. This approach proactively addresses the identified challenges, ensures the continued safe operation of paragliders, satisfies regulatory requirements, and facilitates the successful and efficient introduction of Inverness Airport’s controlled airspace.

8 Next Steps

- Formalise the TSA proposal within the ongoing ACP, collaborating closely with the CAA.
- Engage further with HHGPC to refine the TSA dimensions (if required), activation procedures, and operating hours to ensure optimal functionalities for all parties.
- Develop and publish comprehensive NOTAMs/UK AIP Information detailing the TSA's characteristics and operational requirements.
- Implement robust pilot briefing and awareness campaigns for all airspace users to ensure clear understanding and adherence to TSA boundaries.
- Update the current existing LOA between Inverness ATC and HHGPC to cater for proposed operations in Class D airspace and establish clear SOPs for ATC regarding the management, activation, and deactivation of the TSA.
- Plan for post-implementation review and data collection to assess effectiveness of the TSA and make any necessary adjustments as required.

A.1 Inverness Risk Matrix

			THREAT				
Probability							
>70%	Certain/Frequent	5	5	10	15	20	25
51% to 70%	Very Likely	4	4	8	12	16	20
31% to 50%	Likely/Probable	3	3	6	9	12	15
11% to 30%	Unlikely	2	2	4	6	8	10
0% to 10%	Extremely Unlikely	1	1	2	3	4	5
		Impact	1	2	3	4	5
			Minor	Significant	Major	Serious	Severe
		Cost	1%	4%	10%	20%	>20%
		Time	5	10	30	45	>45
		Reputation/Quality	Minor adverse Staff/User reaction. or Minor adverse impact on Project Deliverables	Significant adverse Staff/User reaction or Significant adverse impact on project Deliverables	Major adverse Staff/User reaction requiring project team response or Major adverse impact on project Deliverables	Serious adverse Staff/User reaction requiring project team and/or SMT response. or Serious adverse impact on project Deliverables	Severe adverse Staff/User reaction requiring CEO/SMT response. or Severe adverse impact on project Deliverables
		Health Safety & Environment	Minor injury; unable to carry out normal duties (7 days or less). Slight impact on the environment with little or no damage to it.	Significant Injury; unable to carry out normal duties (7 days - 1 month). Little impact on the environment resulting in minimal but persistent damage or excessive non-persistent energy consumption, noise, odour or visual impact.	Major injuries e.g. dislocation, burns, fractures etc.; Incapacity from normal duties (1 – 12 months). Moderate impact on the environment resulting in short to medium term damage to the environment	Long term (12 months) or permanent disability e.g. mental illness Complete loss of sight, hearing, arms, legs etc. Serious non-persistent impact on the environment resulting in short to medium term damage	Single/multiple fatalities. Severe and persistent impact on the environment resulting in long-term damage

		Low (1 to 4)	Moderate (5 to 10)	High (12-25)
		The risk is acceptable. Consideration should be given where possible to reducing the risk further.	The risk should be reviewed. Consideration must be given to further reducing the risk to ALARP. If the risk remains Moderate (Amber), it may be accepted provided the risk is: 1. Clearly understood 2. Subject to regular reviews to ensure identified control measures are suitable and sufficient.	The risk may require immediate action to ensure that further control measures to reduce the Likelihood and/or Severity of the Risk are introduced. Control measures should be reviewed and monitored to ensure the risk remains controlled.
		Risks should be escaleted to the SMS if they are assessed as a Business, Safety or Compliance Risk		

The table above is taken directly from the Inverness Airport Safety Management System and has been used to provide the output with Table 1 and Table 2.