



# Safety Case Part 3 – Transition into Service

## Clash Gour Airspace Change Proposal

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Harston Mill, Royston Road Harston, Cambridge CB22 7GG  
01172 422533 / [enquiries@ospreycl.co.uk](mailto:enquiries@ospreycl.co.uk)  
Registered in England and Wales under No: 06034579



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# Executive Summary

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EDF Energy Renewables Ltd (EDFER) and Force 9 Energy (Force9) are jointly proposing the Clash Gour Wind Farm development, the site of which is located approximately 12 nautical miles (NM) southwest of Royal Air Force (RAF) Lossiemouth and 15 NM southeast of Inverness Airport. It has been identified that the presence of the Clash Gour Wind Farm will affect Air Traffic Service (ATS) operations at both locations, thereby requiring a change to the arrangements and procedures in the airspace over and in the vicinity of this Wind Farm.

As part of a scheme for mitigation of the predicted wind turbine effects on the RAF Lossiemouth and Inverness Airport Primary Surveillance Radars (PSR), EDFER and Force9 are progressing with an Airspace Change Proposal (ACP) in accordance with Civil Aviation Authority (CAA) Civil Aviation Publication CAP1616. Work to date on the ACP had revolved around a range of design options, but this has now been progressed down to the single option – the implementation of a Transponder Mandatory Zone (TMZ) over the Clash Gour Wind Farm site. Associated with this will be two-dimensional blanking of PSR returns within the boundary of the TMZ over the geographic definition of the Clash Gour site. The proposed airspace solution (TMZ) only needs to be operational at the point where turbines are being erected and are being brought into testing and operation. It is currently anticipated that turbines will be delivered to site and begin being erected in approximately Q3 2026, so the TMZ only needs to start operation from that point.

Civil Air Publication (CAP) 1616 requires a robust Safety Management process to be an integral part of any proposed airspace change. Moreover, Inverness Airport, RAF Lossiemouth and the Civil Aviation Authority Safety and Airspace Regulation Group (CAA SARG) require assurance that the changes introduced by this Airspace Change will result in safe air operations at all stages of the project lifecycle.

This document is the Safety Case Part 3 (Transition into Service) for the Clash Gour TMZ and presents evidence to demonstrate that each stage of introducing the Clash Gour TMZ into service has been assessed and is considered to be safe. The Safety Case considers the following stages:

- Installation.
- Commissioning.
- Transition.
- Recovery.

RAF Lossiemouth are to be the nominated Controlling Authority for the Clash Gour TMZ and, due to the ACP schedule most of the detail in this Part 3 is theoretical against planned activities that will take place nearer to the actual introduction of the Clash Gour TMZ. Thus, there will need to be at least one further iteration of the Safety Case Part 3 as part of the transition process.

How the assessed level of safety of the Clash Gour TMZ will be sustained post implementation is the subject of the Safety Case Part 4.

# Table of Contents

---

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Background .....	1
1.2	Purpose and Scope .....	1
1.3	Structure of this Document .....	2
<b>2</b>	<b>TMZ Configuration .....</b>	<b>3</b>
2.1	Overview .....	3
2.2	Background .....	3
2.3	Implementation of the Clash Gour TMZ .....	3
2.4	Hours of Operation of the Clash Gour TMZ.....	4
<b>3</b>	<b>TMZ Implementation .....</b>	<b>5</b>
3.1	Overview .....	5
3.2	Preparation for Implementation.....	5
3.3	Implementation of Clash Gour TMZ Boundary on Display(s) .....	5
3.4	Implementation of PSR Blanking.....	6
3.5	Safety Assurance of the Clash Gour TMZ Implementation .....	6
<b>4</b>	<b>TMZ Readiness.....</b>	<b>7</b>
4.1	Overview .....	7
4.2	Satisfaction of Safety Argument .....	7
4.3	Compliance with Derived Safety Requirement.....	9
4.4	Compliance with Regulatory Requirements .....	11
<b>5</b>	<b>TMZ Testing and Commissioning.....</b>	<b>12</b>
5.1	Validation of Clash Gour TMZ Displays.....	12
5.2	Verification and Validation of the TMZ and PSR Blanking .....	12
5.3	Specific Safety Risks during Commissioning/Implementation.....	13
<b>6</b>	<b>Organisation and Safety Management.....</b>	<b>14</b>
6.1	Project Roles and Responsibilities .....	14
6.2	Safety Programme Roles and Responsibility .....	14
6.3	Initial Staffing Levels and Training .....	15
<b>7</b>	<b>Transition Arrangements .....</b>	<b>16</b>
7.1	Specific Safety Risks.....	16
7.2	Procedural Mitigation .....	16
7.3	Clash Gour TMZ Promulgation.....	16
7.4	System Monitoring .....	16
7.5	End of Transition Phase.....	17
<b>8</b>	<b>Recovery to non-TMZ Operations.....</b>	<b>18</b>



8.1 Overview..... 18

8.2 Safety Assurance..... 18

**9 Conclusions and Recommendations ..... 19**

9.1 Satisfaction of Safety Argument ..... 19

9.2 Compliance with Safety Objectives and Safety Requirements ..... 19

9.3 Compliance with Regulatory Requirements ..... 19

9.4 Recommendations ..... 19

**10 References..... 20**

**A1 Transition Risk Assessment..... 1-1**

Table of Tables

Table 1 - Satisfaction of Safety Argument ..... 7

Table 2 - Satisfaction of Safety Claim 2.3..... 8

Table 3 - Compliance with outstanding Safety Requirements. .... 11

# 1 Introduction

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## 1.1 Background

EDF Energy Renewables Ltd (EDFER) and Force 9 Energy (Force9) are jointly proposing the Clash Gour Wind Farm development, the site of which is located approximately 12 nautical miles (NM) southwest of Royal Air Force (RAF) Lossiemouth and 15 NM southeast of Inverness Airport.

The effects of wind turbines on aviation interests have been widely publicised but the primary concern is one of safety. There are innumerable subtleties in the actual effects of the wind turbines, but there are two dominant scenarios, that lead to objections from aviation stakeholders:

- Physical: Wind turbines can present a physical obstruction at or close to an aerodrome.
- Radar/Air Traffic Services: Turbine clutter appearing on radar display can affect the safe provision of air traffic services as it can mask unidentified aircraft from the air traffic controller and/or prevent him from accurately identifying aircraft under his control. In some cases, radar reflections from the turbines can affect the performance of the radar system itself.

As part of a scheme for mitigation of the predicted wind turbine effects on RAF Lossiemouth and Inverness Airport Primary Surveillance Radars (PSR), EDFER and Force9 are progressing with an Airspace Change Proposal (ACP) in accordance with Civil Aviation Authority (CAA) Civil Aviation Publication CAP1616 [Ref. 01]. This is to enable exploration of airspace-based mitigation options to successfully mitigate what is considered by the airports to be the unacceptable operational impact created by the wind farm on RAF Lossiemouth and Inverness Airport. In this case, the option being taken forward is the implementation of the Clash Gour Transponder Mandatory Zone (TMZ), with associated PSR blanking.

The proposed airspace solution (TMZ) only needs to be operational at the point where turbines are being erected and are being brought into testing and operation. It is currently anticipated that turbines will be delivered to site and begin being erected in approximately Q3 2026, so the TMZ only needs to start operation from that point.

## 1.2 Purpose and Scope

CAP 1616 states that a Safety Assessment is one of four key compliance areas that the CAA will review when making its decision at Stage 5 of the seven-stage Airspace Change Proposal (ACP) process. The form of this assurance is an operationally focused four-part Safety Case. The route map for the Safety Case is included in the Clash Gour Transponder Mandatory Zone (TMZ) Airspace Change Safety Programme Plan (SPP) [Ref. 02].

The purpose of this Safety Case Part 3 is to demonstrate that each stage of introducing the Clash Gour TMZ into service has been assessed and is considered safe. The Safety Case considers the following stages:

- Installation (e.g. changes required to the impacted surveillance system).
- Commissioning (e.g. Testing and Flight Inspection).
- Transition (e.g. Promulgation and initial operation of the Clash Gour TMZ).
- Recovery (e.g. reversion to operations without the Clash Gour TMZ).

In addition, the Safety Case will present incremental evidence that the Clash Gour TMZ, when brought into initial operational service, will comply with all specified statutory, functional, and engineering requirements.

It is understood that RAF Lossiemouth will be the Controlling Authority for the Clash Gour TMZ.

### 1.3 Structure of this Document

This document is structured as outlined below:

- Section 1 – Introduction.
- Section 2 – TMZ Configuration and implementation characteristics.
- Section 3 – TMZ Implementation.
- Section 4 – TMZ Readiness.
- Section 5 – Testing and Commissioning of the TMZ.
- Section 6 – Organisation and Safety Management
- Section 7 – Transitions arrangements and management.
- Section 8 – Reversion to non-TMZ Operations.
- Section 9 – Conclusions and recommendations.
- Annex provides the draft Transition risk assessment (template).

## 2 TMZ Configuration

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### 2.1 Overview

The overall aim of the Clash Gour TMZ is to maintain airspace efficiency and effectiveness for all users and mitigate the impacts of the onshore Clash Gour Wind Farm on flying operations at Inverness Airport and RAF Lossiemouth.

This section describes the design and configuration of the Clash Gour TMZ.

### 2.2 Background

A TMZ is airspace of defined dimensions wherein aircraft wishing to enter or fly within the defined area, will be required to have and operate Secondary Surveillance Radar (SSR) equipment or receive authorisation (approval) to enter, via radio, from the TMZ Controlling Authority.

The concept of Transponder Mandatory Airspace, in the form of a TMZ, has been developed by the CAA to cater for overriding safety reasons where the airspace classification would not normally require aircraft to carry a transponder. This SSR equipment must include a pressure altitude reporting transponder capable of operating in Mode A and Mode C and have the capability and functionality prescribed for Mode S Elementary Surveillance.

The Clash Gour TMZ provides Air Traffic Control (ATC) at both Inverness Airport and RAF Lossiemouth with assured positional identification and Commercial Air Traffic (CAT) operators with collision avoidance mitigation through the cooperative use of Airborne Collision Avoidance System (ACAS). It will also maintain current levels of safety while radar services are provided using SSR data-only in the area of the wind farm. Aircraft flying through the Clash Gour TMZ will be required to be equipped and operate SSR equipment or to have established two-way radio communications with RAF Lossiemouth, the Clash Gour TMZ Controlling Authority.

The airspace classification of the Clash Gour TMZ remains unchanged as Class G. Hence, the ATS available within and around the TMZ will continue to be applied in accordance with UK FIS through the assured provision of SSR data to the controller.

### 2.3 Implementation of the Clash Gour TMZ

#### 2.3.1 PSR Performance over the Clash Gour TMZ

The wind turbine clutter will be removed from the ATC displays at both Inverness Airport and RAF Lossiemouth by way of PSR blanking within the area of Clash Gour TMZ. Each organisation is responsible for applying this to their local surveillance systems.

#### 2.3.2 Clash Gour TMZ Design

Due to the proximity of the existing Berry Burn and Berry Burn 2 wind farms, the Clash Gour TMZ encompasses the turbines at these sites.



## 2.4 Hours of Operation of the Clash Gour TMZ

Under normal UK Integrated Aeronautical Information Package (IAIP) arrangements, the operating hours of a particular airspace segment established for ATS purposes are linked to the operating hours of the associated ATS Unit. In this case it will be those of the nominated Controlling Authority, RAF Lossiemouth.

H24 (based on current promulgated operation of Moray TMZ, where RAF Lossiemouth are the Controlling Authority)

This information is captured within the UK IAIP/MIL AIP to be published on **INSERT DATE HERE**, detailing the frequency<sup>1</sup> to be used, the boundary of the Clash Gour TMZ and timings.

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<sup>1</sup> As its Lossiemouth this could be the LARS frequency. The frequency to be used will need to be inserted here.

## 3 TMZ Implementation

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### 3.1 Overview

This section records the scope of work and the inherent processes in ensuring safety during the implementation of the Clash Gour TMZ. This includes engineering activities associated with the introduction of PSR blanking and changes to the display maps at both Inverness Airport and RAF Lossiemouth.

### 3.2 Preparation for Implementation

If possible, implementation should take place in a period with little or no planned Air Traffic, and where possible should be a simultaneous and coordinated activity at both Inverness Airport and RAF Lossiemouth. It is recommended that each site nominates a Point of Contact (PoC) for all implementation activities. An appropriate risk assessment is required that involves, as a minimum, the appropriate operational and engineering authorities within these two organisations and any associated stakeholders either impacted by the implementation of the Clash Gour TMZ or with a key role to play in its implementation.

At each location the PoC shall confirm that their respective systems are in an appropriate state to be updated. Where applicable, surveillance data from any back-up source should be available for the duration of the implementation.

This implementation phase will require two distinct elements at both Inverness Airport and RAF Lossiemouth:

- Representation of the Clash Gour TMZ on the Display system.
- Introduction of PSR blanking associated with the defined boundaries of the Clash Gour TMZ.

Further detail on these two crucial implementation stages is in the following sections.

### 3.3 Implementation of Clash Gour TMZ Boundary on Display(s)

By highlighting the Clash Gour TMZ polygon boundary on the display system at both Inverness Airport and RAF Lossiemouth, the controllers will be aware of exactly where the Clash Gour wind farm is located.

This is a routine process at both operational locations and will be undertaken by the appropriate engineering authorities at both sites, using the mapping change procedures.

## 3.4 Implementation of PSR Blanking

### 3.4.1 Overview

The solution employs inherent capabilities of the Inverness Airport and RAF Lossiemouth PSRs to completely blank, i.e. to inhibit completely, the display of all types of PSR returns (static and non-static) on the radar displays within the polygon boundary defined by the Clash Gour TMZ. Typically, the implantation of PSR blanking involves the configuration of parameter settings only within the radar itself, thus at both Inverness Airport and RAF Lossiemouth there will be:

- No physical modifications required to be made to the PSR.
- No additional hardware is required.
- No software development or modification, other than changes to configuration parameters will be required.

### 3.4.2 Technical Implementation

The intention with PSR blanking is to prevent the radar producing plots over the area defined by the Clash Gour wind farm, i.e. the TMZ.

**Inverness Airport Technical Approach to PSR Blanking (TBD – STAR2000/STAR-NG/Terma)**

**DETAILS TO BE INSERTED ONCE PSR APPROACH IS FINALISED**

**RAF Lossiemouth Approach to PSR Blanking (TBD – Watchman/STAR-NG)**

**DETAILS TO BE INSERTED ONCE PSR APPROACH IS FINALISED**

## 3.5 Safety Assurance of the Clash Gour TMZ Implementation

A Transition risk assessment will be completed<sup>2</sup> to identify any specific risks to the Inverness Airport and RAF Lossiemouth ATS provision relating to the implementation of the Clash Gour TMZ.

The specific risks that relate to the implementation of the Clash Gour TMZ are:

- Loss of operational services.
- Corruption of operational services.
- Distraction to operational staff.
- Clutter Breakthrough – wind turbine returns not blanked.

Details of how the likelihood of the hazards occurring are minimised, and the consequences mitigated, shall be shown in the completed Risk Assessment – see template at Annex A1. The review must conclude that the hazards are adequately mitigated, such that the residual risk is ACCEPTABLE.

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<sup>2</sup> There is a 'template' at Annex A1 as a starting point for the transition risk assessment with Inverness and Lossiemouth.

## 4 TMZ Readiness

### 4.1 Overview

This section summarises the status of the Clash Gour TMZ against the Safety Requirements and Safety Objectives as defined in the Safety Case Part 1.

### 4.2 Satisfaction of Safety Argument

#### 4.2.1 Overview

The Safety Claims, Arguments and Evidence were presented in the Safety Case Part 2 [Ref. 4]. Satisfaction of the Safety Claims is presented in Table 1.

Claim	Satisfied?
Claim 1: The provision of an ATS within the extant airspace is acceptably safe.	Yes, evidence presented in Safety Case Part 2 [Ref. 4].
Claim 2: The provision of an ATS within the revised airspace will be acceptably safe and will continue to be so.	See sub claims below
Claim 2.1: All hazards pertaining to the introduction of the Clash Gour TMZ have been identified and understood, including those associated with airspace users, adjacent airports, and aviation organisations.	Yes, evidence presented in Safety Case Part 2 [Ref. 4].
Claim 2.2: The design of the Clash Gour TMZ is deemed acceptably safe and agreed by the CAA and Military Aviation Authority (MAA), in accordance with the applicable sections of CAP 725 [1]	Yes, evidence presented in Safety Case Part 2 [Ref. 4].
Claim 2.3: The Programme for transitioning the Clash Gour TMZ into operational use is planned and acceptably safe.	Yes, evidence presented in Safety Case Part 3 – see section 4.2.2.
Claim 2.4: The use of the TMZ will remain acceptably safe during its operational life.	Arguments and evidence to support this claim will be the subject of the Safety Case Part 4.

Table 1 - Satisfaction of Safety Argument

#### 4.2.2 Substantiation of Safety Claim 2.3

***The Programme for transitioning the Clash Gour TMZ into operational use is planned and acceptably safe.***

Ref	Argument	Evidence	Rationale
2.3.1	Where practicable, identified hazards have been eliminated, or deemed acceptable and ALARP <sup>3</sup> .	Safety Case Part 3 (this document), Section 7, “Transition Arrangements” and Annes A1 “Transition Risk Assessment”.  Consultation with external Stakeholders – Consultation Report document [Ref. 6].	Elimination/minimisation of transition hazards through Clash Gour TMZ design implementation.
2.3.2	Appropriate control measures and mitigations are in place to support the introduction of the Clash Gour TMZ.	Amended Inverness MATS Part 2 [Ref. 8].  IAIP updated to include the Clash Gour TMZ.  Amended RAF Lossiemouth Defence Aerodrome Manual (DAM).  Amended RAF Lossiemouth Air Traffic Control Order Book (ATCOB) [Ref. 9] – procedures as the nominated Controlling Authority  MIL AIP update to include Clash Gour TMZ.	Ensures preparedness of all impacted areas for the new TMZ definition.  Publication of the revised airspace in the appropriate publications increases awareness across the Aviation community.
2.3.3	Promulgation of the TMZ is achieved in a timely manner.	IAIP/MIL AIP updated within the Aeronautical Information Regulation and Control (AIRAC) cycle to include the Clash Gour TMZ.  Exceptions to the IAIP/MIL AIP entry are promulgated by Notices to Airmen (NOTAM) <sup>4</sup> .	Publication of the revised airspace in the appropriate publications increases awareness across the Aviation community.

Table 2 - Satisfaction of Safety Claim 2.3

<sup>3</sup> ALARP - As Low As Reasonably Practical A risk is low enough that attempting to make it lower, or the cost of assessing the improvement gained in an attempted risk reduction, would actually be more costly than any cost likely to come from the risk itself (Definition from CAP760 [14]).

<sup>4</sup> NOTAMs cover short duration or temporary changes or short notice permanent changes. They contain information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

### 4.3 Compliance with Derived Safety Requirement

The Safety Case Part 1 [Ref. 3] derived safety requirements that reduce the risks associated with the implementation of the Clash Gour TMZ to an ACCEPTABLE level.

The Safety Case Part 2 [Ref. 4] demonstrated the satisfaction of many of these safety requirements. Table 3 shows the status of those requirements directly associated with the transition activities around the introduction of the Clash Gour TMZ, i.e. those that must demonstrate compliance in the Safety Case Part 3:

Req No	Description	Compliance/Evidence	Compliance Status
SR06	The TMZ shall be promulgated in the UK IAIP/MIL AIP.	<p>Detail the IAIP entries to be provided to the CAA for Inverness Airport.</p> <p>Detail the Mil AIP entries for RAF Lossiemouth.</p> <p>Details to include the TMZ frequency and operational hours, the boundary of the TMZ and any associated charts/graphics.</p>	To be demonstrated.
SR07	ATC shall have procedures to address unauthorised access of the TMZ (if detected).	<p>Entry in the appropriate RAF Lossiemouth publication. Possible wording may be:</p> <p><i>RAF Lossiemouth controllers are to endeavour to establish r/t contact with the aircraft using any practical means (e.g. blind transmission on the TMZ frequency, liaison with adjacent ATC unit(s). Any pertinent details of a TMZ infringement are to be recorded in the ACR logbook.</i></p> <p>RAF Lossiemouth may also wish to consider a procedure for control of non-transponding</p>	To be demonstrated.

		<p>traffic around/in the TMZ. For example:</p> <p><i>Other aircraft in receipt of an ATS from RAF Lossiemouth in the vicinity of the TMZ are to be provided with appropriate traffic information or avoidance advice.</i></p>	
SR09	<p>There shall be an ability for a non-transponder to request access of the TMZ from the Controlling Authority.</p>	<p>Contact frequency for the Controlling Authority included in the RAF Lossiemouth MIL AIP entry.</p> <p>Inverness Airport awareness of the TMZ frequency so it could be passed to aircraft transiting their area of interest.</p>	<p>To be demonstrated.</p>
SR10	<p>ATC shall have the tactical ability to draw a TMZ overlay on the radar display.</p>	<p>Implementation to be confirmed at both Inverness Airport and RAF Lossiemouth.</p> <p>Capability to do this at the radar display likely to be covered under existing procedure(s) for routine mapping changes.</p> <p>Inclusion/location of the TMZ on the radar video map to be confirmed and signed off by appropriate authority at RAF Lossiemouth and Inverness Airport.</p>	<p>To be demonstrated.</p>
SR11	<p>ATCOs shall receive familiarisation and/or training on the TMZ implementation and associated procedures.</p>	<p>Safety Case Part 3 – section 6.3.</p>	<p>To be confirmed.</p>

SR12	There should be alternative 'support systems' that display the location of the TMZ.	TBC with RAF Lossiemouth and Inverness Airport.	To be demonstrated.
SR13	ATC shall have procedures to address the loss of TMZ demarcation on the radar display.	Entry in the RAF Lossiemouth ATCOB [Ref. 9]. Entry in the Inverness Airport MATS Part 2 [Ref. 8].	To be demonstrated.
SR20	ANSPs shall co-ordinate to allow tactical control of aircraft in the TMZ to maintain separation.	Agreement between RAF Lossiemouth and Inverness Airport.	To be demonstrated.

Table 3 - Compliance with outstanding Safety Requirements.

#### 4.4 Compliance with Regulatory Requirements

There are no outstanding Regulatory Requirement compliance issues – this was an integral consideration in the Safety Case Part 2 [Ref. 4].



## 5 TMZ Testing and Commissioning

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### 5.1 Validation of Clash Gour TMZ Displays

Validation of the Clash Gour TMZ boundary “outline”, as displayed to the ATCOs at Inverness Airport and RAF Lossiemouth, will be achieved by:

- Cross check of the Clash Gour TMZ boundary coordinates with those entered to create the representation on the video map.
- Visual inspection of the radar display.
- Flight trial (see section 5.2.2 below).

### 5.2 Verification and Validation of the TMZ and PSR Blanking

#### 5.2.1 Verification and Validation of the PSR Blanking Method(s)

As with section 3.4.2:

**Inverness Airport Technical Approach to PSR Blanking (TBD – STAR2000/STAR-NG/Terma)**

**DETAILS TO BE INSERTED ONCE PSR BLANKING APPROACH IS FINALISED**

**RAF Lossiemouth Approach to PSR Blanking (TBD – Watchman/STAR-NG)**

**DETAILS TO BE INSERTED ONCE PSR BLANKING APPROACH IS FINALISED**

#### 5.2.2 Objectives for Verification and Validation

The objectives of the verification and validation activities for the introduction of the Clash Gour TMZ and associated PSR blanking are as follows – applies at both Inverness Airport and RAF Lossiemouth (Controlling Authority):

1. Verify that the implementation meets the requirements.
2. Validate that no PSR targets of any type (airborne, wind turbine related, surface clutter, weather, etc.) are visible on the radar display within the boundary of the Clash Gour TMZ.
3. Validate that PSR targets are visible on the radar display outside of the boundary of the Clash Gour TMZ.
4. To validate that an aircraft’s track (through SSR alone) is maintained when it transits the Clash Gour TMZ.

Demonstration of Objective 1:

To verify the introduction of the Clash Gour TMZ meets the requirements an inspection of the parameter changes, as based upon the coordinates of the TMZ, will be carried out.

Demonstration of Objectives 2, 3 and 4:

Validating that no PSR data will appear in the airspace area defined by the Clash Gour TMZ, PSR data appears outside of the airspace area defined by the Clash Gour TMZ, and that the target tracks (SSR) are maintained within the bounds of the Clash Gour TMZ will be achieved via a flight trial/inspection:

- **Dedicated Flight Trial** – This flight trial can take place upon initial implementation of the PSR blanking, i.e. with the TMZ boundary defined and in place in the respective surveillance systems at Inverness Airport and RAF Lossiemouth. This flight trial should be repeated when the Clash Gour wind turbines are all present and operating. Details on this targeted flight trial, and the results shall be appended to this Safety Case Part 3 once complete.
- **Targets of Opportunity** – Incremental validation of the Clash Gour PSR blanking solutions can be undertaken over time using ‘targets of opportunity’, i.e. aircraft actively transiting the Clash Gour TMZ. This will facilitate the validation as to whether the TMZ is free of ‘clutter’.

Following successful verification and validation that the Clash Gour TMZ and associated PSR blanking at both Inverness Airport and RAF Lossiemouth is performing as expected, and subject to the necessary approval from the CAA SARG, then this mitigation solution will be cleared to enter operational service.

Once in service it is expected that there will be a period of targeted monitoring (to be defined) to inspect for any anomalies, which should be recorded by ATC. Any persistent anomaly may necessitate the deactivation of the PSR blanking at either Inverness Airport or RAF Lossiemouth. The portrayal of the Clash Gour TMZ should remain available on the video map(s) to indicate the area where the turbines are present.

In-service monitoring of the Clash Gour TMZ, and associated PSR blanking, shall be covered in the Safety Case Part 4.

### 5.3 Specific Safety Risks during Commissioning/Implementation

As stated in section 3.5 there will be a Transition Risk Assessment conducted with stakeholders from Inverness Airport and RAF Lossiemouth prior to the Clash Gour TMZ being implemented.

A template of this Risk Assessment is at Annex A1, and thus the expected risks that specifically relates to the commissioning/implementation of the Clash Gour TMZ are:

- The conduct of the dedicated flight trial conflicts with other traffic and/or the continuity of ATS at either Inverness Airport or RAF Lossiemouth.
- The PSR blanking associated with the Clash Gour TMZ is not effective.

Details of how the likelihood of each hazard occurring shall be minimised, and the consequences mitigated, will be given in the Transition Risk Assessment – see Annex A1. The review must conclude that the hazards are adequately mitigated, such that the residual risk is ACCEPTABLE.

## 6 Organisation and Safety Management

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### 6.1 Project Roles and Responsibilities

Clash Gour Holdings Ltd is the Sponsor for the Clash Gour TMZ. Through Force 9, Clash Gour Holdings Ltd have engaged Osprey Consulting Services Limited (OCSL) to project manage the ACP on their behalf.

As the Controlling Authority RAF Lossiemouth has responsibility for:

- Obtaining all the certification and licensing necessary for the operational introduction of the Clash Gour TMZ, in accordance with UK Regulation Legislation.
- Facilitation of all assessment activities associated with the Clash Gour TMZ.
- Ensuring that all necessary amendments to the MIL AIP and the UK IAIP in a timely manner.
- Ensuring training needs are identified and implemented for all ATC and Air Traffic Engineering (ATE) staff in respect of the introduction of the Clash Gour TMZ.
- Ensuring local documentation changes are implemented in a timely manner.
- Development of the Transition Plan for the introduction of the Clash Gour TMZ.

As an 'Interested Party' in the Clash Gour TMZ, Inverness Airport has responsibility for:

- Participation in all assessment activities associated with the Inverness Airport PSR and display system and the Clash Gour TMZ.
- Ensuring training needs are identified and implemented for all ATC and ATE staff in respect of the introduction of the Clash Gour TMZ.
- Ensuring local documentation changes are implemented in a timely manner.

TBC [PSR System/Design Authority] has responsibility for implementing the changes required to the Inverness Airport PSR.

TBC has responsibility for implementing the map changes required for Inverness Airport radar display system.

TBC [PSR System/Design Authority] has responsibility for implementing the changes required to the RAF Lossiemouth PSR.

TBC has responsibility for implementing the map changes required for the RAF Lossiemouth radar display system.

### 6.2 Safety Programme Roles and Responsibility

Clash Gour Holdings Ltd, through Force 9, has subcontracted the development of the Clash Gour TMZ Safety Case to OCSL.

## 6.3 Initial Staffing Levels and Training

### 6.3.1 ATC – RAF Lossiemouth

All ATCOs will be briefed on the operation of the new Clash Gour TMZ in accordance with the ATCOB [Ref. 9]. The training provided shall be recorded in a manner that provides assurance that all ATCOs have received the training and understood the airspace change, and that they understand the implications of the change.

Additionally, a nominated ATCO, who is familiar with the airspace, will be responsible for validating the radar map display of the TMZ boundary.

### 6.3.2 ATC – Inverness Airport

All ATCOs will be briefed on the operation of the new Clash Gour TMZ in accordance with MATS Pt2. The training provided shall be recorded in a manner that provides assurance that all ATCOs have received the training and understood the airspace change, and that they understand the implications of the change.

Additionally, a nominated ATCO, who is familiar with the airspace, will be responsible for validating the radar map display of the TMZ boundary.

### 6.3.3 ATE – RAF Lossiemouth

The nominated ATE at RAF Lossiemouth will be responsible for training the ATE in any processes required to modify or maintain the PSR blanking associated with the TMZ. This training shall also be recorded in a manner that provides assurance that all ATEs have received the necessary training, understood it, and that they understand the implications of the change.

### 6.3.4 ATE – Inverness Airport

The nominated ATE at Inverness Airport will be responsible for training the ATE in any processes required to modify or maintain the PSR blanking associated with the TMZ. This training shall also be recorded in a manner that provides assurance that all ATEs have received the necessary training, understood it, and that they understand the implications of the change.

## 7 Transition Arrangements

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### 7.1 Specific Safety Risks

A transition risk assessment (Annex A1) shall be conducted to identify any specific risks to the ATS provision during the transition into service of the Clash Gour TMZ.

The specific risks that relate to the transition into service of the Clash Gour TMZ are related to the initial operation:

#### **TBC through conduct of the risk assessment**

- Lack of familiarisation.
- Poor design/configuration of the Clash Gour TMZ.
- Wind turbine breakthrough – wind turbines not sufficiently suppressed.

Details of how the likelihood of these hazards occurred are deemed to be minimised, and the consequences mitigated, as shown at Annex A1. The review concluded the hazards adequately mitigated, such that the residual risk is ACCEPTABLE.

### 7.2 Procedural Mitigation

The failure of the surveillance equipment at Inverness Airport supporting the use of the Clash Gour TMZ will be dealt with under existing ATS procedures for equipment failure as published in the MATS Part 2 [Ref. 8].

The failure of the surveillance equipment at RAF Lossiemouth supporting the use of the Clash Gour TMZ will be dealt with under existing ATS procedures for equipment failure as published in the ATCOB [Ref. 9].

In the event of a surveillance system failure at either location, any resulting loss of service will be subject to a NOTAM until normal service is restored.

### 7.3 Clash Gour TMZ Promulgation

The operational date for the Clash Gour wind farm is TBC.

The change request for the MIL AIP and UK IAIP will be made in line with the published TBC AIRAC cycle.

### 7.4 System Monitoring

The initial in-service performance of the Clash Gour TMZ and associated PSR blanking will be monitored through the existing ATE reporting systems at both Inverness Airport and RAF Lossiemouth.

See also the Safety Case Part 4.

## 7.5 End of Transition Phase

The Transition Phase for the Clash Gour TMZ shall be considered as completed successfully only when approval has been granted from the CAA SARG

## 8 Recovery to non-TMZ Operations

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### 8.1 Overview

Should the Clash Gour TMZ not achieve the operational requirement, or it is no longer required, then the PSR and radar display systems at RAF Lossiemouth and Inverness Airport should be reverted to their initial states, i.e. pre-TMZ.

### 8.2 Safety Assurance

The Transition Risk Assessment will need to consider any specific risks to the ATS provision at RAF Lossiemouth and Inverness Airport where there is a requirement to revert the PSR and radar displays systems.

Whilst not completed yet, the template for the Transition Risk Assessment at Annex A1 identifies the following specific risks associated with the removal of the Clash Gour TMZ boundary and associated PSR blanking.

- Loss of operational services.
- Corruption of operational services.
- Distraction to operational staff.

Details of how the likelihood of the hazards occurring are minimised, and the consequences mitigated, shall be documented in the completed Transition Risk Assessment at Annex A1. The review must conclude that the hazards are adequately mitigated, such that the residual risk is ACCEPTABLE.

## 9 Conclusions and Recommendations

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### 9.1 Satisfaction of Safety Argument

The overarching, top-level Safety Claim (Claim 0) is that the implementation of the proposed Clash Gour TMZ shall permit the continued provision of an acceptably safe ATS to be provided from Inverness Airport and RAF Lossiemouth, throughout its in-service usage.

Claims, Arguments and Evidence are provided in section 4.2 to demonstrate that this Claim is supported and achieved, apart from Claim 2.4.

Claim 2.4, *“The use of the TMZ will remain acceptably safe during its operational life”* will be satisfied by the Safety Case Part 4.

### 9.2 Compliance with Safety Objectives and Safety Requirements

The Safety Case Part 1 [Ref. 3] derived Safety Requirements that reduce the risks associated with the implementation of the Clash Gour TMZ to an ACCEPTABLE level.

Initial compliance with these Safety Requirements was demonstrated in the Safety Case Part 2 [Ref. 4]. Compliance with those requirements outstanding from the Safety Case Part 2, as applicable to this Safety Case Part 3, is shown in Table 3 - Compliance with outstanding Safety Requirements.

### 9.3 Compliance with Regulatory Requirements

The design rationale described in the Safety Case Part 2 [Ref. 4] along with compliance to the derived Safety Requirements (Safety Case Part 2 [Ref. 4] and Table 3 in this document) demonstrates compliance to the applicable safety principles laid out in CAP 1616 [Ref. 1].

### 9.4 Recommendations

This Safety Case Part 3 must be updated once the PSR blanking solutions are known at RAF Lossiemouth and Inverness.

Details on the targeted flight trial(s) of the Clash Gour TMZ, and the results, shall be appended to this Safety Case Part 3 once complete.

The Safety Case Part 4 will detail how the claimed level of safety will be sustained during the in-service operation of the Clash Gour TMZ at both Inverness Airport and RAF Lossiemouth.



## 10 References

Ref	Title	Origin
[Ref. 01]	CAP 1616 Airspace Design: Guidance on the regulatory process for changing airspace design including community engagement requirements. V4 Issued March 2021 <sup>5</sup>	CAA
[Ref. 02]	Safety Programme Plan Clash Gour Airspace Change Proposal 71609 013, Issue 1, 5 <sup>th</sup> January 2022	Osprey
[Ref. 03]	Safety Case Part 1 - Safety Requirements Clash Gour Airspace Change Proposal 71609 018, Issue 2 draft, 30 <sup>th</sup> April 2024	Osprey
[Ref. 04]	Safety Case Part 2 – Design Substantiation Clash Gour Airspace Change Proposal 71609 027, Draft A, 30 <sup>th</sup> April 2024	Osprey
[Ref. 05]	Hazard Identification Record Clash Gour Airspace Change Proposal 71609 015, Issue 3, 18 <sup>th</sup> March 2022	Osprey
[Ref. 06]	Clash Gour Wind Farm ACP-2021-046 Consultation Response Document 71609 030, Issue 1, 30 <sup>th</sup> April 2024	Osprey
[Ref. 07]	CAP 760: Guidance on the Conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases: For Aerodrome Operators and Air Traffic Service Providers 1st Edition (inc. amendments 2010/01), 10 <sup>th</sup> December 2010	CAA
[Ref. 08]	Inverness Airport MATS Part 2	HIAL
[Ref. 09]	RAF Lossiemouth ATCOB	RAF Lossiemouth

<sup>5</sup> Email from CAA 15 December 2023 confirmed that CAP1616 Version 4 shall apply to this ACP until it is concluded.

# A1 Transition Risk Assessment

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The level of tolerability and the risk assessment criteria are set out in the SPP [Ref. 2], which considers the risk of an unwanted event as a combination of the likelihood of occurrence and the potential severity of the consequence(s).

As stated in the SPP, the calculated level of risk categories ACCEPTABLE, REVIEW or UNACCEPTABLE that shall apply are those as defined in CAP760 [Ref. 7]. These definitions are given below.

- **ACCEPTABLE:** The consequence is so unlikely or not severe enough to be of concern. The risk is tolerable, and the Safety Objective has been met. However, consideration should be given to reducing the risk further to As Low As Reasonably Practical (ALARP) to further minimise the risk of an accident or incident.
- **REVIEW:** the consequence and/or likelihood is of concern; measures to mitigate the risk to ALARP should be sought. Where the risk still lies within the 'Review' region after ALARP risk reduction has been undertaken, then the risk may be accepted provided that the risk is understood and has the endorsement of the individual ultimately accountable for safety within the organisation.
- **UNACCEPTABLE:** The likelihood and/or severity of the consequence is intolerable. Major mitigation or redesign of the system may be necessary to reduce the likelihood or severity of the consequences associated with the hazard.

**THE TABLE BELOW IS FOR CONSIDERATION ONLY AND MUST BE COMPLETED AS PART OF THE TRANSITION PLAN AND TRANSITION ACTIVITIES - FURTHER HAZARD SCENARIOS MAY NEED TO BE CONSIDERED, E.G. IN RECOGNITION OF NOMINATED CONTROLLING AUTHORITY AND OPERATING ENVIRONMENT (SURVEILLANCE) THAT SHALL APPLY AT INVERNESS AIRPORT AND RAF LOSSIEMOUTH.**

Ref	Phase	Activity	Hazard/s	Consequences	Mitigation	Severity	Likelihood	Risk (Mitigated)
1.1	Implementation	Implementation of Clash Gour TMZ boundary on radar maps. Implementation of PSR Blanking.	Loss or Corruption of operational services.	Reduced services to ATC/Aircraft – increased workload, reduced capacity. Potential for loss of separation.	Implementation should take place during a period of little or no planned air traffic. Clash Gour TMZ Boundary is implemented as map data; this is a common and familiar task for ATEs and ATCOs. Adding new map data for the Clash Gour TMZ will not impact on existing map data.			
1.2	Implementation	Implementation of Clash Gour TMZ boundary on radar maps. Implementation of PSR Blanking.	Distraction to operational staff.	Increase in Controller workload.	Implementation should take place during a period of little or no planned air traffic. Clash Gour TMZ Boundary is implemented as map data; this is a common and familiar task for ATEs and ATCOs.			
2.1	Commissioning	Flight Trial	Conflict with other traffic	Increased air traffic over the Clash Gour wind farms/TMZ raises risk of loss of separation.	Implementation should take place during a period of little or no planned air traffic. Flight Trial activities planned and agreed with Inverness and RAF Lossiemouth ATC, aircraft under ATC service always. Other aircraft activity restricted accordingly. Class G Airspace; aircraft commander ultimately responsible for separation.			

2.2	Commissioning	Validation	Mitigation solution (TMZ) does not work; Wind Turbine Clutter breakthrough on Radar Display.	<p>Reduced services to ATC/Aircraft – increased workload, reduced capacity.</p> <p>Increase in Controller workload.</p> <p>Potential for loss of separation.</p>	<p>PSR Blanking should mean that clutter breakthrough would not occur. However, should clutter breakthrough: then revert to service without TMZ – i.e. accept level of clutter.</p> <p>Returns treated as unknown traffic, ATCO will take immediate avoiding action (procedures detailed in MATS Part 1 and Inverness MATS Part 2).</p> <p>Returns treated as unknown traffic; ATCO will take immediate avoiding action (procedures detailed in RAF Lossiemouth DAM).</p> <p>TMZ in place means that air traffic over the Clash Gour Wind Farms will be transponding (SSR coverage).</p> <p>Are there any alternative PSR sources considerations at Inverness and/or RAF Lossiemouth that could be used in the in the event of a PSR failure at either location (due to processor overload caused by excess clutter).</p> <p>Reduce Radar Service; SSR only service in accordance with MATS Part 1 and Inverness MATS Part 2.</p> <p>Reduce Radar Service; SSR only service in accordance with RAF Lossiemouth DAM.</p>			
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Ref	Phase	Activity	Hazard/s	Consequences	Mitigation	Severity	Likelihood	Risk (Mitigated)
3.1	Initial Operation	Normal operational use.	<p>Poor Clash Gour TMZ design/configuration.</p> <p>Clash Gour TMZ PSR Blanking area too big: Increase in likelihood of PSR targets of interest being blanked.</p> <p>Clash Gour TMZ PSR Blanking area too small: Clutter breakthrough - may prevent ATCO maintaining aircraft contact over wind farm.</p>	<p>Reduced services to ATC/Aircraft – increased workload, reduced capacity.</p> <p>Increase in Controller workload.</p> <p>Potential for loss of separation.</p>	<p>Set up and confirmed as correct during commissioning.</p> <p>Loss of Radar Procedure in Inverness Airport MATS Part 2.</p> <p>Loss of Radar Procedure in RAF Lossiemouth DAM.</p> <p>Revert to service without TMZ – accept level of clutter.</p> <p>Mitigations to clutter as for 2.2 (above)</p>			
4.1	Removal	<p>Removal of Clash Gour TMZ boundary on radar maps.</p> <p>Removal of PSR Blanking.</p>	<p>Loss of operational services.</p> <p>Corruption of operational services.</p>	<p>Reduced services to ATC/Aircraft – increased workload, reduced capacity.</p> <p>Potential for loss of separation.</p>	<p>Removal should take place during a period of little or no planned air traffic.</p> <p>Clash Gour TMZ Boundary is implemented as map data; the removal is a common and familiar task for ATEs and ATCOs.</p> <p>Removing TMZ boundary map data for the Clash Gour TMZ will not impact on existing map data.</p>			

Ref	Phase	Activity	Hazard/s	Consequences	Mitigation	Severity	Likelihood	Risk (Mitigated)
4.2	Removal	Removal of Clash Gour TMZ boundary on radar maps. Removal of PSR Blanking.	Distraction to operational staff.	Increase in Controller workload.	Implementation should take place during a period of little or no planned air traffic.  Clash Gour TMZ Boundary is implemented as map data; the removal is a common and familiar task for ATEs and ATCOs.			