



**Snowdonia Aerospace Airspace Change Proposal
(Stage 4B), ACP-2019-58
Llanbedr Aerodrome Danger Area(DA)**

Annex 4 – Safety Assessment

Document Details

Approval Level	Name	Authorisation
Author		Consultant
First reviewer		Airfield Manager
Second reviewer and release authorisation		Chief Executive

Issue	Amendment Details	Date
1.0	First formal release	8 th February 2021
2.0	Updated following the annual ANSP audit on 17 th March 2021	23 rd March 2021
2.1	Numbers added to risk classification / tolerability table to be consistent with SMP	26 th April 2021

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1. SAC ANSP Safety Management System

The following details the relevant section of the Snowdonia Aerospace (SAC) Air Navigation Service Provision (ANSP) Safety Management System (SMS) Manual that addresses the risk assessment and hazard mitigation process.

SMP 01 - Safety Assessment

1. SMP 01 – SAFETY ASSESSMENT

Objective

Snowdonia Aerospace (SAC) personnel are to undertake a safety assessment prior to the introduction and implementation of any change to the provision of air traffic services in order to demonstrate that the change meets a tolerable safety level.

In addition, SA personnel are to periodically undertake a safety assessment on existing procedures to ensure that they remain fit for purpose and that all risks are mitigated to as low as reasonably practicable; this process may be initiated by a number of triggers, including:

- A Safety Survey (see SMP 03),
- Following an incident / accident,
- Risk Register Review
- A Document Impact Assessment conducted in accordance with the Quality Management Manual - any amendment to an externally or internally produced document is to be fully assessed so that the impact of the change on local procedures and documentation is fully understood, safety assessed (in accordance with this procedure) and implemented as required.
- Staff suggestion

SAC will develop a Risk Register / Hazard log to identify the hazards, mitigation and pre- and post-mitigation risk levels. The risk assessment process detailed in this section and the risk assessment form in Section 4 shall be used to determine the hazards, level of risk and mitigation.

Requirements

Any changes to the SAC air traffic services, including the human, procedure and equipment elements, shall be subject to the safety assessment process which is comprised of the following stages:

Scope

- System Description
- Hazard Identification
- Estimation of the severity of the consequences of hazard occurring; Estimation of the likelihood of the hazard occurring
- Evaluation of the risk
- Risk mitigation and safety requirements
- Documentation of the safety assessment incorporating claims, arguments and evidence

The procedure applies to the SAC ATS Unit and any contractors who are subject to the SAC SMS.

Responsibilities

The CEO SAC is responsible for ensuring that finance is available for appropriate safety assessment training to be undertaken by selected personnel.

The Aerodrome Manager is accountable for ensuring that all changes to ATS procedures and equipment are assessed for their safety impact and to ensure that appropriate risk reduction measures, where appropriate, are taken for each change to meet an acceptable level of safety

The Aerodrome Manager and Assistant Operations Manager / Senior AFISO are responsible for ensuring that adequate safety assessments are undertaken for all changes affecting the safety of the air traffic service.

Process

Before any change to organisation, personnel, procedures or equipment is made, a safety assessment must be undertaken to ensure that hazards and associated risks have been identified and, where necessary, reduced to an acceptable level of safety. For further guidance see the Llanbedr Aerodrome Change Management Manual.

The seven stages of the safety assessment are:

Step 1 – System description

The key activities in Step 1 are to describe:

- The system/change.
- The purpose of the system.
- How the system will be used (concept of operation).
- The system functions (operational requirements). The boundaries of the system.
- The environment including the interface with any larger system.

If all potential hazards are to be identified, the people involved in the safety assessment must have a good understanding of the proposed new system or change to the existing system, and how it will interface with the other components of the overall aerodrome system, or ATS system, of which it is a part.

Step 2 – Hazard and consequence identification

The key activities in Step 2 are:

- Identify the hazards.
- Identify the consequences of each hazard, assuming that no control measures are in place.
- Each identified hazard is to be allocated a reference number and recorded in the hazard log.

Step 3 – Estimation of the severity of the consequences of the hazard occurring

The key activities in Step 3 are:

- Assess the severity of each consequence
- Record the results on the risk assessment form.
- The Severity Classification Table is to be used to determine the severity.

Severity Classification Table

Definition	Meaning	Value
<p>Accidents (Catastrophic)</p>	<p>'Accident' means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:</p> <p>A person is fatally or seriously injured (For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by ICAO) as a result of:</p> <ul style="list-style-type: none"> • Being in the aircraft, or • Direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or • Direct exposure to jet blast, except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or <p>The aircraft sustains damage or structural failure which:</p> <ul style="list-style-type: none"> • Adversely affects the structural strength performance or flight characteristics of the aircraft, and • Would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tyres, brakes, fairings, small dents or puncture holes in the aircraft skin; <p>The aircraft is missing or is completely inaccessible (An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located).</p>	<p>A</p>
<p>Definition</p>	<p>'Serious incident' means an incident involving circumstances indicating that an accident nearly occurred.</p> <p>The examples of serious incidents listed below is not intended to be exhaustive and only serves as a guide:</p>	<p>B</p>

	<ul style="list-style-type: none"> • A near collision requiring an avoidance manoeuvre or when an avoiding manoeuvre would have been appropriate to avoid a collision or an unsafe situation. • Controlled flight into terrain (CFIT) only marginally avoided. • An aborted take-off on a closed or engaged runway or a take-off from such runway with marginal separation from obstacle(s). • A landing or attempted landing on a closed or engaged runway. • Gross failure to achieve predicted performance during take-off or initial climb. • All fires and smoke in the passenger compartment or in cargo compartments, or engine fires, even though such fires are extinguished with extinguishing agents. • Any events which required the emergency use of oxygen by the flight crew. • Aircraft structural failure or engine disintegration which is not classified as an accident. • Multiple malfunctions of one or more aircraft systems that seriously affect the operation of the aircraft. • Any case of flight crew incapacitation in flight. • Any fuel state which would require the declaration of an emergency by the pilot. • Take-off or landing incidents, such as undershooting, overrunning or running off the side of runways • System failures, weather phenomena, operation outside the approved flight envelope or other occurrences which could have caused difficulties controlling the aircraft. • Failure of more than one system in a redundancy system which is mandatory for flight guidance and navigation 	
<p>Major Incident (Major)</p>	<p>A major incident associated with the operation of an aircraft, in which safety of aircraft may have been compromised, having led to a near collision between aircraft, with ground or obstacles.</p>	<p>C</p>
<p>Significant Incidents (Minor)</p>	<p>Significant incident involving circumstances indicating that an accident, a serious or major incident could have occurred, if the risk had not been managed within safety margins, or if another aircraft had been in the vicinity.</p>	<p>D</p>

	A significant reduction in safety margins but several safety barriers remain to prevent an accident. Reduced ability of the flight crew or air traffic control to cope with the increase in workload as a result of the conditions impairing their efficiency.	
No Effect Immediate	No immediate effect on safety	E

Note 1: For the purposes of Risk Assessments (form SM03) the Value for each Severity Classification is shown thereon.

Step 4 – Estimation of the likelihood of the hazard consequences occurring

The key activities in step 4 are:

- Estimate the likelihood of hazard consequences occurring
- Record the details in the Hazard Identification Log

The likelihood of occurrence is defined below.

Probability of Occurrence Definitions					
	Extremely Improbable	Extremely remote	Remote	Reasonably probable	Frequent
	1	2	3	4	5
Qualitative definition	Should virtually never occur	Very unlikely to occur	Unlikely to occur during the total operational life of the system	May occur once during total operational life of the system	May occur several times during operational life
Quantitative numerical definition	< 10 ⁻⁹ per hour	10 ⁻⁷ to 10 ⁻⁹ per hour	10 ⁻⁵ to 10 ⁻⁷ per hour	10 ⁻³ to 10 ⁻⁵ per hour	1 to 10 ⁻³ per hour
Quantitative annual/daily equivalent (approx.)	Never	Once in 1000 years to once in 100,000 years	Once in 10 years to once in 1000 years	Once per 40 days to once in 10 years	Once per hour to once in 40 days

Step 5 – Evaluation of the Risk

By combining the results of the Severity and Likelihood tables, the initial risk level is determined by one of three classifications, as shown below in the Risk Classification Table, shown below.

Each consequence is to be checked against the table for tolerability by placing the consequence in the correct Table Cell that lines up with the Likelihood and Severity.

Risk Classification / Tolerability Table

			Probability of Occurrence (Likelihood)				
			Extremely improbable	Extremely remote	Remote	Reasonably probable	Frequent
			< 10 ⁻⁹ per hour	10 ⁻⁷ to 10 ⁻⁹ per hour	10 ⁻⁵ to 10 ⁻⁷ per hour	10 ⁻³ to 10 ⁻⁵ per hour	1 to 10 ⁻³ per hour
			1	2	3	4	5
ESACRR 4 Severity	Accidents	5	Review (Medium) (5)	Not Normally Acceptable (High) (10)	Not Normally Acceptable (High) (15)	Not Normally Acceptable (High) (20)	Not Normally Acceptable (High) (25)
	Serious Incidents	4	Acceptable (Low) (4)	Review (Medium) (8)	Not Normally Acceptable (High) (12)	Not Normally Acceptable (High) (16)	Not Normally Acceptable (High) (20)
	Major Incidents	3	Acceptable (Low) (3)	Acceptable (Low) (6)	Review (Medium) (9)	Not Normally Acceptable (High) (12)	Not Normally Acceptable (High) (15)
	Significant Incidents	2	Acceptable (Low) (2)	Acceptable (Low) (4)	Acceptable (Low) (6)	Review (Medium) (8)	Not Normally Acceptable (High) (10)
	No Effect Immediate	1	Acceptable (Low) (1)	Acceptable (Low) (2)	Acceptable (Low) (3)	Acceptable (Low) (4)	Review (Medium) (5)

Each consequence should be checked against the above table for tolerability by placing the consequence in the correct Table Cell that line up the Likelihood and Severity. The electronic risk assessment form filed in the document control under risk assessment – see: Llanbedr DA Risk Register blank approved 20210308 is a more convenient way of illustrating results.. The consequence will fall in one of the three regions:

<p>Acceptable (Low) - 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) in order to further minimise the risk of an accident or incident.</p>
<p>Review (Medium) - 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 Senior AFISO/Aerodrome Manager as appropriate.</p>
<p>Not Normally Acceptable (High) - the likelihood and / or severity of the consequence is intolerable for normal operations. Major mitigation or redesign of the system may be necessary to reduce the likelihood or elimination of the severity of the consequences associated with the hazard. In the unlikely event that suitable mitigation is not possible, a High risk may be accepted for a short duration (e.g. for an Air Display) provided the Aerodrome Manager <i>and</i> the CEO understand the risk and sign to accept it. Signatures are to be recorded on form <u>SM01</u>.</p>

Step 6 – Risk Mitigation and safety requirements

The key activities in Step 6 are:

- Mitigate those risks identified as Not Normally Acceptable.
- Apply 'As Low as Reasonably Practicable' principles generally.
- Generate Safety Requirements.

It will be noted that many of the hazards identified are acceptably mitigated by the application of existing standards, regulations, procedures or practices. This does not mean that the process need not identify further mitigating factors. Although risk mitigation has been placed at Step 6, it is not unusual for mitigations to be identified earlier in the process (i.e. before the risk is evaluated).

Step 7 – Claims, Arguments and Evidence

Claims, Arguments and Evidence that the Safety Requirements have been met and documenting this in a safety assurance document

The key activities in Step 7 are:

- Identifying all applicable Safety Objectives and Safety Requirements.
- Developing Claim, Argument and Evidence statements.
- Documenting the results in a logical and complete manner.

The documenting of claims, arguments and evidence that a system meets its safety requirements is part of the safety assurance process and may be presented as a stand-alone document for the system. Safety objectives and requirements will have been identified in the previous steps of this procedure, however further safety objectives and safety requirements may be applicable from regulatory material and other standards.

The purpose of the safety assurance document is to demonstrate that all safety requirements for the system under consideration have been addressed and that the system is tolerably safe. It is necessary, therefore, to clearly state the safety requirements being addressed early in the safety assurance document.

Guidance

CAP 760 - Guidance on the Conduct of Hazard Identification, Risk Assessment and the Production of Safety Case


References

- Llanbedr Aerodrome Change Management Manual
- SAC Risk Assessment Form SM01
- Regulation (EU) 1035/2011
- ICAO SMM Doc 9859 V3.0

2. Risk Assessment

SAC has safety assessed all aspects of the proposed permanent Danger Area design throughout the ACP process in discussion with stakeholders and airspace management meetings, and we have identified the new / additional hazards and examined the risk and mitigation accordingly. The risk assessment is detailed overleaf.

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ASSESSMENT SUBJECT:		DATE OF ASSESSMENT:	ASSESSORS:	SIGN OFF:			DATE OF SIGNING					
Llanbedr Danger Area Design Option 2 Final Submission		27th January 2021	David Young Billy Mackintosh	ACCEPTABLE			Yes			5th February 2021		
SHEET NUMBER:		DATE OF REVIEW:		MONITOR			Yes			5th February 2021		
One		N/A		FURTHER REVIEW REQUIRED			ANSP review summer 2021			5th February 2021		
NUMBER	HAZARD	DETAILS OF THE RISK (INCLUDING POSSIBLE CONSEQUENCES)	THE PARTIES, PROCEDURES ETC AFFECTED	CURRENT SCORE			FURTHER CONTROLS OR MITIGATIONS	REVISED SCORE			ACCOUNTABLE PERSON	TARGET DATE
				SEVERITY	LIKELIHOOD	RISK RATING		SEVERITY	LIKELIHOOD	RISK RATING		
1	Total Volume of airspace impacts GA & military traffic flow	Forces GA & military traffic into less airspace and potentially towards high ground, potential for near miss or collision, CFIT, injury or death	Aircraft pilots, FISO, members of the general public	5	2	10	Sub division of airspace and the way it is activated reduces funnelling and provides two coastal routes past the aerodrome, one inland just to the east and one just off the coast to the west. The DAAIS will assist providing traffic information.	3	1	3	LJP	N/A
2	Sub division of airspace may be confusing to pilots	Aircraft inadvertently enters active DA with risk of collision with unmanned vehicle. Consequence injury or death	Aircraft pilots, FISO, members of the general public	3	3	9	Sub division clearly classified and logical, activity promulgated (incl on new SA website from summer 2021). DAAIS will provide FIS.	2	1	2	LJP	N/A
3	Funnelling of GA traffic in conflict with military traffic	Risk of mid air collision or entering DA to avoid collision. Consequence injury or death	Aircraft pilots, FISO, members of the general public	5	3	15	Sub division and policy has provided two coastal GA traffic routes, and will ensure only the minimum amount of airspace is activated for the minimum time. A DAAIS will provide information during DA activation periods.	4	2	8	LJP	N/A
4	GA traffic on inland route being forced too close to mountainous terrain	Aircraft risk of CFIT, pilots subject to pressure complying with low flying rules, avoiding low cloud and turbulence. Potential aircraft could move west into DA. Consequence risk of collision with unmanned vehicle and injury or death	Pilots, FISO, members of the general public	5	3	15	Re-designed airspace E and F provides more space compared to the original design Option 2. The route is only needed if aircraft are unable to fly above the DA and when in addition to A that B or C or C & D are active. Estimated number of days use 36 per annum and times of use published to maximise FUA principles. DAAIS can advise if DA not active.	3	2	6	LJP	N/A
5	GA traffic on coastal route forced too far out to sea	Increased risk in low cloud conditions of need to ditch in event of engine/catastrophic failure. Consequence - injury or death. Pilot may fly inside the DA to remain nearer the coast. Consequence - risk of collision with unmanned vehicle.	Pilots, FISO, members of the general public	3	3	9	Airspace B or C or C & D will not be activated when E is activated, DAAIS will pass information to pilots	2	1	2	LJP	N/A

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6	Tunnel under area D too narrow.	Possibility of near miss/collision of aircraft.	All aircraft traffic, maritime traffic	4	3	12	The distance from the edge of area D201 to the boundary with airspace area C is increased from 4nm to 5nm	3	2	6	LJP	N/A
7	Aircraft enters active danger area	Risks of collision if pilots do not avoid when active	Pilots, FISO, members of the general public	5	3	15	DA activated only when required and for the minimum times. DA published and NOTAM when active. Promulgated in accordance with LOAs and in PPR information. DAAIS assists with information.	4	1	4	LJP	Review with FIS RA
8	Recreational flying activity including paragliding and hang gliding	Risk of mid air collision with consequence of injury or death	Pilots, FISO, members of the general public	4	4	16	DA activated only when required and for the minimum times. DA published and NOTAM when active. DAAIS assists with information. Area F where there is a launch site for the Harlech sand dunes, and area E, where there is a ridge launch site at the north end of the airspace are only likely to be activated up to six days per year. Good communications to be maintained with the BHPA community.	4	1	4	LJP	Reviews with FIS RA
9	Users of the airspace use it inappropriately or stray from it	Risk of accident, CFIT, mid air collision and consequence of injury or death	Pilots, FISO, other staff, members of the general public	4	4	16	Operational Safety Cases (OSC) are developed for all BVLOS activity and will comply with CAA & SA requirements including the ANSP requirements. OSC include provision for warning if a drone nears an airspace perimeter buffer zone and ultimately a FTS requirement.	4	1	4	LJP	Review with FIS RA
10	That during the time of activation of any part of the DA there is a lack of emergency response, loss of manpower, failure of equipment.	Risk to life	Pilots, FISO, other SA staff, members of the general public	5	3	15	Each OSC must include an Emergency response section additional to the ANSP ERP taking into account any special nature of a deployment. This will incorporate notification to emergency services, first aid plan, fire action, HASMAT. It will also include action required for equipment failure and loss of any service including the FIS.	4	2	8	LJP	Review with FIS
11	That part of the functional system of the SAC ANSP providing the DAAIS is not valid e.g. maintenance of personnel competencies, equipment certification.	Safety of all activity is compromised, recording of flights potentially invalid, insurance compromised.	Pilots, FISO, other SAC staff. Procedures are contained in the suite of ANSP documentation	3	3	9	The ANSP SMS must flag all validity dates in relation to licenses, equipment, certificates in addition to compliance with agreed procedures Safety meetings etc.	3	2	6	LJP	Review with FIS

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12	Users of the airspace are not competent, fail to maintain personnel competencies, do not attend safety meetings.	Safety of all activity is compromised, recording of flights potentially invalid, insurance compromised.	Pilots, FISO, other SAC staff. Procedures are contained in the suite of ANSP documentation and in the Operational Safety case	3	3	9	The User Operational Safety Case, which must be approved by SAC, in addition as required by CAA, is the document that contains all such references specific to users. When an operation is booked the ANSP will check the validity of all documents supplied are valid for the duration of that operation. A failure to comply with the terms of the Operational Safety Case without good reason may lead to an immediate suspension of any operation.	2	1	2	LJP	Review with FIS
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3. CAA Competent Authority Service Provider Certificate

The full suite of ANSP documents, including the SMS and Change Management Manual, was audited by the CAA on 20th March 2020. The extant CAA Competent Authority Service Provider Certificate UK/2020/00108 is attached overleaf.



**CERTIFICATE FOR SERVICE PROVIDER
EUROPEAN UNION
COMPETENT AUTHORITY
SERVICE PROVIDER CERTIFICATE**

UK/2020/00108

Pursuant to Implementing Regulation (EU) 2017/373 and subject to the conditions specified below, the UK Civil Aviation Authority hereby certifies

SNOWDONIA AEROSPACE LLP

Company Registration No: OC335994

Company Address: Snowdonia Aerospace, Estate Office, Southwell Park, Portland, Dorset, DT5 2NA

as a service provider with the privileges, as listed in the attached service provision conditions.

CONDITIONS:

This certificate is issued subject to the conditions and the scope of providing services and functions as listed in the attached service provision conditions.

This certificate is valid whilst the certified service provider remains in compliance with Implementing Regulation (EU) 2017/373 and the other applicable regulations and, when relevant, with the procedures in the service provider's documentation.

Subject to compliance with the foregoing conditions, this certificate shall remain valid unless the certificate has been surrendered, limited, suspended or revoked.

Date of issue: 20th March 2020

Signed:

R LEWIS
For and on behalf of the
UK Civil Aviation Authority

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