RNP Instrument Approach Procedures at Sherburn-in-Elmet Aerodrome

Safety Case for ACP-2015-04

March 2022

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Table of Contents

Document control

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1 Introduction

Sherburn Aero Club (SAC) are the operators of Sherburn-in-Elmet aerodrome. SAC intend to publish Required Navigation Performance (RNP) instrument approach procedures (IAP) to runways 10/28 at Sherburn.

This document is intended to fulfil the requirement of CAP 725 for the safety management of an airspace change proposal. The safety assessment and mitigations for the proposed IAP are intended to conform to acceptable levels of safety within the CAP 1122 framework. In justifying the application under CAP 1122, Sherburn argues why the provision of an IAP is both of safety benefit and consistent with a level of safety appropriate for the intended operations.

It is noted that since the initial version of this document, CAP 1122 has been withdrawn by the CAA. In the absence of an alternative, Sherburn will continue to reference the content of CAP 1122 since it provides a reasonable framework for the safety arguments and risk assessments for an IAP to a non-instrument runway and/or without approach control.

The principles and guidance in CAP 760 have also been followed in assessing the risks specific to the Sherburn operating environment. The ongoing safety of the IAP will be managed under Sherburn's established SMS as a licensed aerodrome.

Sherburn Aero Club also completed the CAA's Bowtie questionnaire in 2018 and the answers have been accepted.

2 CAP 1122 'Safety Arguments'

2.1 Safety benefits of the IAP

Sherburn's primary motivation for applying for an IAP under CAP 1122 is to provide increased safety and operational resilience for the limited IFR operations which currently take place at the airfield. The IAP application is therefore considered a safety and operational enhancement.

Currently, the limited IFR flights at Sherburn typically arrive or depart under visual conditions,which may be as little as 1500 m in-flight visibility and clear of cloud[1]. Particularly in the case of arrivals, obtaining visual conditions prior to landing can be challenging, and in the absence of a published IAP, carries the risk of controlled flight into terrain (CFIT). The primary risk that the IAP will mitigate is CFIT.

The potential safety benefits of published IAPs are referenced in CAP 1122:

- Section 2, Chapter 1, under 'The case for change' on p16; and
- Annex B: 'Candidate alternative safety arguments' on p37.

2.2 Acceptable level of risk

While there may be new risks associated with introducing the IAP, which must be mitigated and managed, the overall acceptable risk level associated with operating the proposed IAP should be compared to the extant risk level for the current VFR operations. It is not realistic to

[1] In accordance with Part-SERA, Standardised European Rules of the Air in Class G airspace

establish that IFR operations with the proposed IAP at Sherburn would be as safe as those in an environment with air traffic control and an instrument runway.

SAC is confident that new risks associated with the introduction and operation of the IAP have been reduced to ALARP and are acceptable, given the local operating environment and limitations. Residual risks are judged by the sponsor to be tolerable and cannot be reduced further without unsustainable cost. The Sponsor will continue to monitor the residual risks as per the post implementation requirements under the SAC Safety Management System (SMS).

2.3 Alternative safety arguments

Operation without approach control

IFR flights represent a very limited proportion of total movements at Sherburn. Once published, it is estimated that on average the IAP will be used twice a day. This low utilisation rate is the starting point for the argument that operations without approach control can achieve an acceptable level of safety.

While a small increase in movements may occur after publication of an IAP, it is not anticipated this will be significant. If operational experience indicated that demand to use the IAP approached ten movements per day, a review of this safety case assumption would be triggered.

Considering the low utilisation rate of the IAP, provision of approach control is not considered proportionate to the risks involved in the operation. With appropriate mitigations, an acceptable level of safety can be achieved – no higher risk of mid-air collision than is associated with extant operations at Sherburn.

It is therefore proposed to use CAP 1122 alternative argument Alt 2.1[2]:

Alternative argument 2.1
'Argument that the provision of approach control in accordance with ANO Article 172[3] would not bereasonably practicable in this case'

Specifically, CAP 1122 alternative arguments 2.1.1 and 2.1.2 are considered applicable:

Alternative argument 2.1.1
'An argument that the low intensity and nature of aircraft movements in the vicinity of this aerodrome coupled with levels of traffic and the local airspace environment are such that the risks at this location will be reduced to a level which is as low as reasonably practical (ALARP) without the provision of approach control.'

[2] See CAP1122, p39

[3] Article 172 of the Air Navigation Order 2009 is now Article 183 of the ANO 2016

Alternative argument 2.1.2
'An argument that the relatively low number of users of the IAP will be managed effectively in a different way such as by the restriction of use to certain nominated users and/or by imposition of allocated slot times linked to some form of Prior Permission Required (PPR) requirement managed by the aerodrome operator and combined with other appropriate and effective risk control measures. Arguments for the use of such measures would be expected to show convincing evidence concerning documentation, procedures and regular review for continued suitability together with arguments about the training needs of staff and how these will be satisfied.'

Non-instrument runway

For the purposes of implementing an IAP, runway 10/28 is considered a runway intended for the operation of aircraft using an IAP to a point beyond which the approach may continue in visual meteorological conditions. This is in accordance with the ICAO Annex 14 definition of a 'non-instrument runway'.

While upgrade of existing infrastructure would facilitate an approach with minima less than VMC, this is not considered worthwhile for the nature and intensity of the proposed operations. It would also be difficult to justify the cost of doing so, considering that most aerodrome traffic is VFR and has operated safely from the existing runways for many years. The concept of an approach that continues visually is appropriate for the low weight and speed of the aircraft envisaged to use the IAP.

It is therefore proposed to use CAP 1122 alternative argument Alt 2.2[4]:

Alternative argument 2.2
'Argument that the provision of an instrument runway equipped to full CAP 168 standards would not be reasonably practicable in this case.'

Specifically, CAP 1122 alternative argument 2.2.1 is considered applicable:

Alternative argument 2.2.1
'An argument that the low intensity and nature of aircraft movements at this aerodrome are such that the risks at this location will be reduced to a level which is as low as reasonably practicable (ALARP) without the provision of some of the CAP 168 requirements to an instrument runway.'

[4] See CAP1122, p39

3 Safety case assumptions

The following factors are assumed to be of acceptable integrity based on established regulation and/or normal aviation practice and therefore not subject to specific mitigation in the safety case. However, they have been considered and monitored as part of the ongoing assessment of safety when the RNP IAP comes into operation.

3.1 Pilot responsibility

Pilots planning to operate at Sherburn, both under IFR and VFR, are expected to fly appropriately and follow the briefed procedures. Currently Sherburn promulgates information in the AIP to determine visual joining procedures, as well as circuit directions, heights and areas of the locality to be avoided.

The responsibility for following procedures relating to the IAP will rest with the pilots that fly them. SAC will provide a comprehensive brief for pilots flying the IAP and adherence to this brief will be expected.

3.2 Pilot training and competence

It is the pilot's responsibility to ensure they meet all existing regulations for flying under IFR and conducting instrument approach procedures. Flight crew licensing regulations require that pilots flying under IFR hold an Instrument Rating or Instrument Rating (Restricted). Since August 2018 pilots holding an Instrument Rating are required to have specific training on Performance Based Navigation (PBN) approach procedures and for most pilots this will mean executing an RNP approach procedure during recurrent training and checking.

3.3 Aircraft Equipment

To fly an RNP approach procedure, the relevant avionics system and its installation must be approved for approach operations. There will be a specific aircraft flight manual (AFM) supplement for the installation identifying which types of procedures it is approved for. In the case of Sherburn, this will require LNAV capability. SAC will assume that aircraft will be appropriately equipped to fly the IAP (as any aerodrome would).

4 Risk Assessment

Sherburn Aero Club conducted risk assessments on the introduction of the RNP IAP.These were in accordance with the Sherburn SMS, section 4.

Hazards were assessed in three overall areas of the Sherburn implementation:

- Procedure Design (section 5);
- Aerodrome environment (section 6); and
- Air traffic management (section 7).

Within each implementation area, the risk assessment was guided by the CAP 1122 risk areas 1 to 5. The aim was to satisfy the CAP 1122 alternative safety arguments and generate a list of 'safety requirements' (see section 8) which would need to be fulfilled for the implementation of the IAP. The safety requirements would need to be satisfied as part of the 'Introduction to Service' (CAP1122 section 6) and 'Through-Life Service' (CAP1122 section 7). This process generated hazards and mitigations specific to Sherburn.

By way of a cross check against the CAP 1122 safety baselines, section 10 of this document includes a reference table for all the baselines set out in CAP 1122 and how they are to be addressed for the Sherburn implementation. Where relevant, the 'alternative safety arguments' contained in CAP 1122 are referenced against these baselines.

Individual assessments were carried out to address the proximity of operations at Breighton and the Burn Glider site, these are detailed in section 11.

5 Procedure Design

It was important to keep the procedure deconflicted from other local airspace hazards as far as practical. It was also important to keep the procedures simple to execute and sometimes compromises to be struck between the two imperatives.

The IAP will comply with PANS-OPS, CAP 785 and the relevant requirements of CAP 1122. The Obstacle Clearance Height (OCH) will be not less than 500 ft and the visibility minima not less than 1500 m – in accordance with the relevant Air Operations Regulations. Only approach speed categories A and B will be provided for.

The applicable areas surrounding runway 10/28 for a non-precision approach (as set out in CAP 232 at the time) were surveyed in 2020 to generate the required obstacle data. The obstacle environment has been monitored since for changes.

The IAP is intended to be flown by aircraft equipped with either TSO-C129A or TSO-C146A GNSS units, approved for LNAV approach operations. The Signal in Space (SiS) integrity requirements will meet those of ICAO Annex 10.

6 Aerodrome environment

The IAP considered to be a procedure established to a point beyond which an aircraft's approach may continue in VMC. This is consistent with the current ICAO Annex 14 definition of a 'non-instrument runway'.

The runway is a hard macadam surface and complies with the non-instrument strip and OLS requirements for a Code 1 runway, as set down in ICAO Annex 14 and CAP 168. The runway is licensed for night operations and is currently equipped with APAPI, edge, threshold and end lighting.

6.1 Safety assessment and mitigations

6.1.1 Obstacle surface penetrations

To generate the required design obstacle data for the IAP design, the CAP 232 non-precision instrument areas were surveyed. It was not considered beneficial to fully plot these against the CAP 168 instrument runway obstacle surfaces, since it was already known the runway would not comply and there is no intention at this time to achieve 'instrument runway' compliance.

A combination of non-instrument obstacle surface and visual surface segment (VSS) penetration assessment was considered appropriate for the intended design, with the glide path angle and APAPI angle being assessed and adjusted to minimise the impact of obstacles for both visual and instrument traffic. It was clear that the glide path angle on RW28 would have to be above 3° to achieve satisfactory obstacle clearance in the visual segment.

Full details of the applicable obstacles and penetrations are available in the aerodrome survey and IAP design reports. The survey of the non-instrument CAP 168 obstacle limitation surfaces revealed several minor penetrations (mostly trees) that the aerodrome was already aware of. A number of these relating to the RW10 have been removed.

A glide path angle of 3.5° was chosen for both runway directions as the best compromise between obstacle clearance and avoiding an excessively steep approach angle. The APAPI angle has been altered to 3.5° from the existing 4°, which maintains path alignment without an excessively low approach angle for visual traffic.

Some trees have been chopped on the RW10 approach, such that the APAPI surface is not penetrated when set to 3.5°. All VSS penetrations on RW10 can be disregarded due to being less than 15m above the threshold.

The APAPI surface on RW28 was flight checked at 3.5° and found to be satisfactory. In March 2020 the aerodrome was resurveyed, and the relevant data updated in the IAP design reports. The VPA was confirmed at 3.5° and several penetrations were again found in the VSS for RW28 (see design report for full detail). All that could not be disregarded (on reduced assessment radius) were trees. The trees were reduced in height in October 2021, so they no longer constitute penetrations.

There will be an ongoing programme of tree and obstacle monitoring to ensure safeguarding of the IAP and VSS is maintained.

6.1.2 Lighting, signage and marking

There were no particular hazards or deficiencies identified – existing runway signage and markings are considered adequate for the intended operations and operating minima. Maximum use of the APAPI, threshold, end and edge lighting will be made during conditions that require the use of the IAP. The lack of approach lighting will be reflected in the aerodrome operating minima of 1500 m visibility, in accordance with the normal EASA Air Operations Regulation calculation methodology[5]

6.1.3 Runway strip

The areas beyond the visual strip are mostly free from infrangible objects that would cause significant damage to an aircraft departing the runway surface.

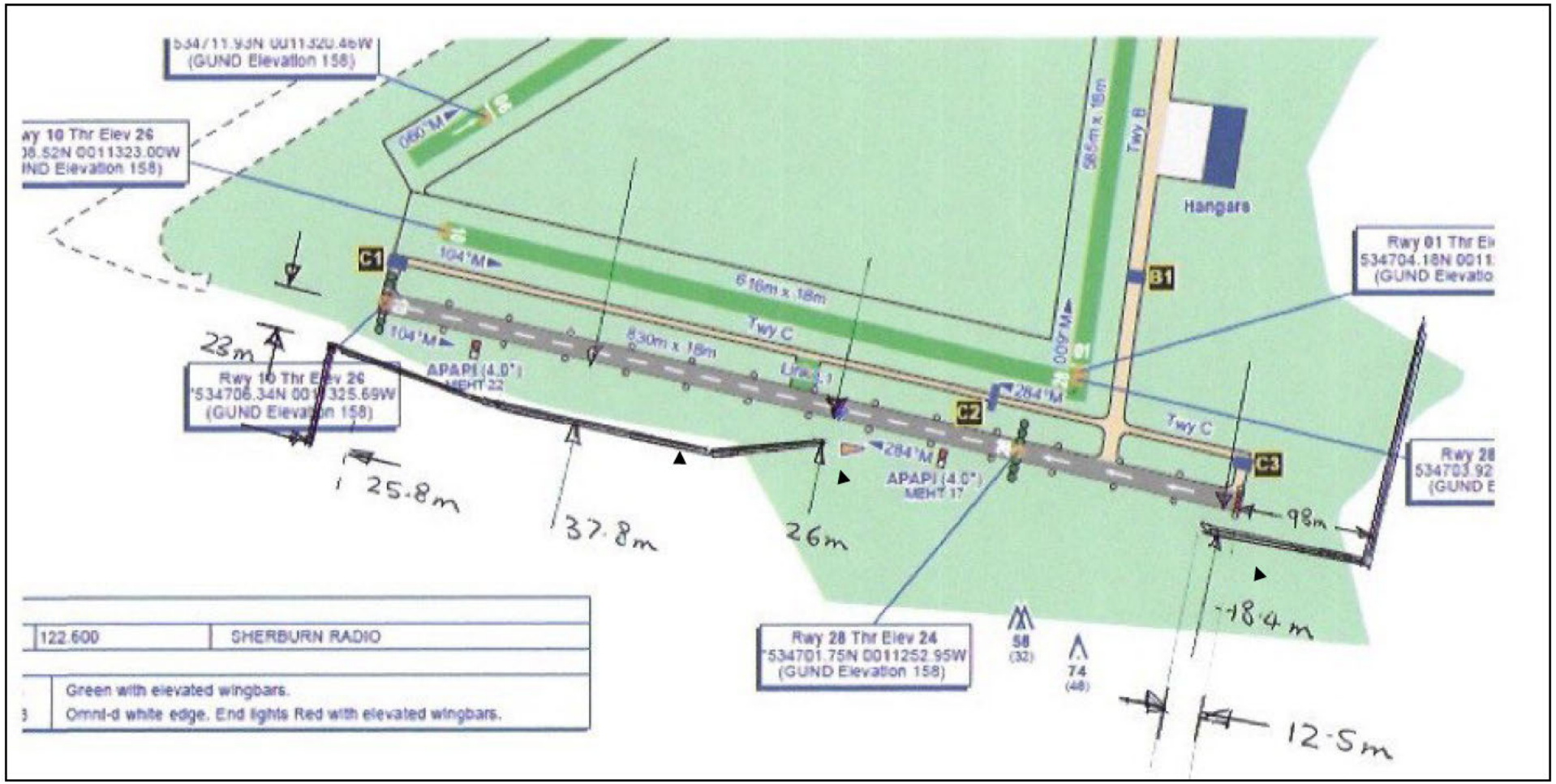
Beyond the end of runway 28 there is an obstacle free area of approximately 300 m of grass within which an overrunning aircraft could stop. At the end of runway 10 there is approximately 200 m of hard runway surface not included in the declared LDA, which forms the displaced threshold for 28. There is then a further 98 m of flat ground prior to a drainage ditch. The runoff areas at either end are therefore considered favourable for a runway of this size.

To the north of the runway the area is completely flat, with the adjacent taxiway running parallel to the strip. To the south of the runway there is a parallel drainage ditch, commencing approximately 150 m beyond the runway 28 threshold.

The main hazards that would fall within the instrument strip dimensions for the size of runway are the drainage ditch (with the associated culvert installation near the windsock) and the potential presence of aircraft on the taxiway to the north. Considering the OCH of 500 ft, neither of these hazards are considered to pose a significant risk to instrument traffic over and above that for current visual operations.

Considering the proposed minima of 500 ft OCH and 1500 m visibility, no significant changes to the aerodrome environment are considered necessary. As additional mitigation, the runway will also be inspected by trained staff in a vehicle, prior to an RNP approach being conducted.

[5] Most aircraft operating at Sherburn will under 'Part-NCO' of Commission Regulation (EU) No 965/2012



Southern ditch

Culvert installation

East ditch


Southern ditch


East ditch


Culvert installation

7 Air traffic management

7.1 Safety assessment

Prior to the development of the proposed system and procedures for the operation of the IAP, a hazard identification exercise was carried out to break down the different individual risks in the mid-air collision category and any hazards relating to the airspace environment in general.

Group discussions were held at Sherburn in 2015 and 2016 to identify hazards that might occur in the operation of the IAP – these involved SAC members, including GA pilots experienced in flying under IFR, and the Leeds Bradford SATCO. From a combination of the output of this andthe guidance in CAP 1122, appropriate mitigations and procedures were developed.

The mitigations are essentially made up of a set of standard operations procedures (SOPs), listed at 7.3, which SAC believe reduce the risks to an ALARP and acceptable level for the operating environment.

A review of the safety impact of the IAP including a holding procedure vs. not was also conducted and concluded that a published hold would be undesirable (see 7.5).

7.2 Hazards and mitigations

7.2.1 Conflict between multiple aircraft intending to fly the approach procedure

Risk that multiple aircraft fly the IAP at the same time.

Mitigations:

- Time separation process described in point 7.3.2; and
- Procedures described in 7.3.4 and 7.3.7

7.2.2 Conflict between traffic on the approach and departing traffic

Risk that departing traffic may conflict with traffic flying an IAP.

Mitigations:

- Procedures described in 7.3.8.

7.2.3 Hazard: Conflict between traffic on the approach and traffic transiting the local vicinity

Risk that IAP traffic conflicts with local non-participating traffic.

Sherburn resides in an Area of Intense Aerial Activity (AIAA), so special consideration was given to the issue of conflict between traffic on the IAP and non-participating traffic near Sherburn. Specifically, the Burn glider site, Breighton aerodrome and the landing strip at Garforth are in proximity to the IAP. As a result, specific risk assessments were conducted in accordance with the Sherburn SMS procedure (see section 11) regarding Burn and

Breighton. An LoA with Garforth has been signed and it is noted that there is very limited activity associated with Garforth.

Mitigations:

- Use of ATC services and associated LoAs (as described in 7.3.4) from adjacent radar equipped ATSUs, prior to commencing the approach, provide mitigation against conflict with both IFR and VFR non-participating traffic;
- Chart feather depiction;
- UK Rules of Air ensure aircraft announce their entry to ATZ;
- Low density of transit traffic when weather requires use of the IAP (see also 7.4);
- Pilots must maintain a good look-out in VMC and use traffic awareness technology where possible;
- See and avoid when in VMC conditions;
- Pilot brief will detail local airspace hazards Burn and Breighton; and
- Risk assessment on potential conflict with traffic operating from Burn and Breighton (see section 11).

Specific mitigations have been identified for the risk posed by proximity to Burn and Breighton.

In the case of the Burn Glider site, a coordination LoA was discussed with Burn Gliding Club but at this time has not been progressed due to do difficulties in agreeing working procedures. SAC have determined that with appropriate mitigations, operation can take place without an LoA between SAC and Burn. This situation will be kept under review and may be revisited post IAP implementation, provided there is a mutual appetite to do so.

7.2.4 Conflict between traffic flying the approach and visual circuit traffic

Risk that traffic flying the IAP may come into conflict with traffic in the visual circuit.

Mitigations:

- Procedures described in 7.3.3;
- Low density of VFR traffic when weather requires use of the IAP;
- When cloud base above 1200 ft AAL, traffic shall adopt normal visual procedures and integrate visually from the overhead or dead side;
- When the cloud base falls below an estimated 1,200 ft AAL, visual circuit training no longer takes place, in accordance with the SAC Flying Order Book.

Trial runs in VMC using the approach co-ordinates showed that in practice integration is straightforward to achieve – it is little different from a ‘straight in’ approach that either continues to land or integrates into the visual circuit (depending on the traffic situation).

7.2.5 Aircraft conducting training approaches under VFR and failing to conduct an effective 'look-out'

Risk that pilots conducting training approaches may not maintain an effective lookout in VMC.

There will be limited opportunities for Sherburn based aircraft to fly the trajectory of the IAP in VMC for training purposes. This will be coordinated internally at Sherburn and subject to slot allocation. Such flights will be under VFR, with responsibility for lookout and compliance with the Rules of the Air.

Mitigations:

- SAC approved instructor or safety pilot onboard to perform look out;
- Co-ordination through SAC Head of Training and PPR slot system
- When training on the IAP takes place in VMC, no solo student activity will be permitted in the visual circuit; and
- Pilot briefing/education.

7.2.6 Infringement of nearby controlled airspace

Aircraft flying the IAP may infringe nearby controlled airspace

Mitigations:

- Procedures described in 7.3.4.
- Pilot briefing/awareness.

7.3 Standard Operating procedures

The standard operating procedures for the IAP at Sherburn support the mitigation of the mid-air collision risk.

7.3.1 Pilot briefing

Reading and confirming understanding of the IAP Pilot Brief is mandatory for all pilots using the Sherburn IAP. The pilot briefing is largely based on the contents of 7.3.2 – 7.3.10, set out in a format for operational use.

7.3.2 Allocation of slot times

Pilots/operators will PPR in advance for the use of the approach procedure. The PPR slots will be one-hour periods, commencing at the start of Sherburn aerodrome's published operating hours.

Pilots will state their estimated time of arrival at the IAF. Once an ETA has been agreed, the aircraft has a -/+ 15-minute tolerance around that ETA to arrive at the joining IAF for the approach – ie a half-hour window. After the expiry of the tolerance (ie ETA + 15 minutes), there is a further 15 minutes within which aircraft must complete activities on the IAP.

After this period aircraft must have either landed, converted to VFR, or diverted. The next planned ETA for a subsequent arriving aircraft will then not be available until a further 30 minutes after the activity of the previous aircraft should have ceased. This provides a 15-minute buffer before the earliest time the next aircraft would be permitted to commence the IAP.

Sherburn's notified operating hours are 0930 UTC to sunset (0830 to 1830 UTC during British Summer Time), meaning the maximum number of aircraft permitted per day would be ten. It is not anticipated to reach this number in practice. It should be noted the slots are shared with LEA.

Slots will be obtained and/or amended by calling SAC operations. This can only be done after the pilot has reviewed the pilot brief document and confirmed to SAC that it has been understood and accepted.

If a pilot no longer requires a slot, they must notify this to SAC such that it can be made available to other aircraft.

Deliberate booking of multiple slots will not normally be permitted, unless special circumstances requiring flexibility are agreed with SAC in advance. When the IAP at LEA comes into operation, a common slot system will be used such that there is no simultaneous activity on the Sherburn and LEA IAPs (see LEA LoA for more detail).

7.3.3 Integration at Sherburn

To reduce the likelihood of conflict between visual traffic and instrument traffic, the IAP will not be available (other than for approved training in VMC) when the cloud base at Sherburn is assessed to be more than 1200 ft AAL. This will reduce the likelihood of encountering visual traffic both inside and outside the ATZ. Local experience at Sherburn and observation of traffic levels during periods of low cloud strongly suggests that VFR traffic is almost completely absent when the cloud base reduces to a level around 1200 ft

AAL.

Pilots should contact Sherburn prior to departure to establish the current conditions and therefore anticipate whether to fly an IAP or visual approach to Sherburn.

Prior to arriving at the IAF, pilots must be in communication with Sherburn Radio to establish whether the IAP is active or not. If the IAP is not available, pilots must adopt visual joining procedures. The unofficial weather conditions at Sherburn will also be passed to the aircraft at this point.

Outside of the Sherburn ATZ, the primary mitigations against conflict with other traffic is pilot look out (when in VMC), the use of air traffic services and the use of traffic awareness systems where these are available.

7.3.4 Contact with ATSUs and use of air traffic services

The IAP pilot brief will make it clear that the IAP is established in class G airspace, that there is no approach control service and that entry into any controlled airspace in proximity to Sherburn is only allowed with an explicit clearance to do so from the relevant ATSU.

Whether arriving from the airways system or from outside of controlled airspace, aircraft are responsible for their own navigation to the relevant IAF. Sherburn have established a common conspicuity squawk code (C 5077) for aircraft flying the IAP at Sherburn or Leeds East, which will enable ATSUs in the vicinity to establish that an aircraft is intending to fly an IAP to one of these aerodromes. This will be detailed in the pilot brief.

Aircraft intending to fly the IAP should establish contact with and obtain an air traffic service from either Leeds Bradford or Doncaster Sheffield. In the first instance aircraft approaching from the East should freecall/contact Doncaster and those approaching from the west should freecall/contact Leeds Bradford. Once within 15 NM of the intended IAF, Doncaster Sheffield should be called when using runway 28 and Leeds Bradford for runway 10. In the event of a missed approach, aircraft should re-establish contact with the relevant ATSU.

Pilots should obtain a 'Traffic Service' if it is available. If a service is not available, pilots should nonetheless continue to monitor the applicable frequency and request any tactical traffic information that may be available.

LOAs are in place to underpin these arrangements, but it will be made clear to pilots that air traffic services outside of controlled airspace and transits of controlled airspace are subject to ATC capacity.

Prior to the relevant IAF, aircraft must then contact "Sherburn radio" and follow the procedures outlined for arrival at Sherburn**.** IAP traffic will make specific mandatory calls to ensure any other aircraft are aware of position and intentions. More detail is included in the pilot's brief.

7.3.5 Determination of approach direction

Pilots will usually be able to anticipate the likely surface wind (and therefore the appropriate approach direction) by assessing the on-board wind information from their GNSS avionics.

Pilots should also contact Sherburn prior to departure to establish the general weather conditions and current runway in use. When inbound, pilots will be encouraged to monitor Sherburn radio to establish approach direction is most appropriate and make contact on

'box 2' if necessary. Pilots will be reminded that when VMC prevails at Sherburn, they must continue VFR prior tothe ATZ and integrate into any visual circuit traffic as required.

7.3.6 Altimeter setting procedures and metrological conditions

Initially, aircraft will use the QNH from the ATSU they are in contact with. Once in contact with Sherburn, pilots must use the Sherburn QNH.

Sherburn AGC/S operators will be able to pass unofficial weather reports to inbound IAP traffic. More detail on the provision of met information at Sherburn is contained separately in the Met Compliance document.

7.3.7 Delays or early arrivals

If a pilot be delayed (for example by a CTOT slot) prior to take-off and/or plans change, such that they anticipate being outside the IAF ETA tolerance of -/+ 15 minutes, they must check with SAC to establish a new slot time.

If an aircraft is delayed enroute due to unforeseen circumstances and arrives at Sherburn outside the ETA -/+ 15 minutes tolerance, the IAP may only be commenced if it is established via contact with Sherburn radio that there is no IAP traffic anticipated to arrive at Sherburn or Leeds East.

If pilots make unexpectedly good time enroute to Sherburn, they must not commence the approach more than 15 minutes prior to the original ETA for their slot.

7.3.8 Departing aircraft

Sherburn is not planning to implement formal departure procedures, so the introduction of the IAP does not change the status quo with regard to existing departures.

When traffic on the IAP has passed the FAF, the A/G operator will hold departing traffic, under the authority of the aerodrome operator to do so.

7.3.9 Radio calls

Radio Calls and procedures will be in accordance with CAP 413. The Pilot brief contains the detail of the radio calls to be made when operating on the IAP.

7.4 Relationship between weather conditions and movements

Sherburn logs all aircraft movements during opening hours. One assumption made as part of the safety case (based on the common experience of Sherburn-based pilots) is that when conditions are such that aircraft would need to execute a full IAP, there is very little traffic at the aerodrome or in the surrounding area.

To test this assumption, three days from 2018 were chosen at random on which there were no recorded movements at all throughout the day. METAR data for these days was then examined from Doncaster Sheffield Airport, which shows that the cloud base does not have to be particularly low for VFR flying at Sherburn to effectively cease.

The purpose of this is not 'prove' that there is never VFR traffic when the weather is poor, but to illustrate that generally this is the case and that when there is scattered (SCT) or greater cloud recorded below 2,000 ft movements very rapidly diminish.

It is also a logical assumption that this situation is replicated across other VFR GA aerodromes and therefore the amount of transit VFR traffic in the vicinity of the IAP would also diminish substantially.

This is not the totality of Sherburn's safety argument for reducing the risk of mid-air collision, but it does provide a degree of confidence in the natural mitigation believed to exist when the weather is poor – which is when traffic will use the IAP.

2/6/18, No flying day at Sherburn

METAR/SPECI from EGCN, Doncaster Sheffield / Airport (United Kingdom).		
SA	02/06/2018 18:50->	**METAR EGCN 021850Z 31008KT 9999 SCT021 BKN046 21/16 Q1018=**
SA	02/06/2018 18:20->	**METAR EGCN 021820Z 32008KT 9999 BKN020 21/16 Q1018=**
SA	02/06/2018 17:50->	**METAR EGCN 021750Z 31009KT 270V330 9000 SCT020 21/17 Q1017=**
SA	02/06/2018 17:20->	**METAR EGCN 021720Z 32008KT 9999 BKN020 21/16 Q1017=**
SA	02/06/2018 16:50->	**METAR EGCN 021650Z 31008KT 280V340 9000 SCT018 BKN025 21/16 Q1017=**
SA	02/06/2018 16:20->	**METAR EGCN 021620Z 32010KT 7000 SCT017 BKN022 21/17 Q1017=**
SA	02/06/2018 15:50->	**METAR EGCN 021550Z 33009KT 9999 SCT015 BKN021 21/17 Q1017=**
SA	02/06/2018 15:20->	**METAR EGCN 021520Z 30009KT 6000 SCT014 BKN018 21/18 Q1018=**
SA	02/06/2018 14:50->	**METAR EGCN 021450Z 31008KT 6000 SCT011 BKN016 21/18 Q1018=**
SA	02/06/2018 14:20->	**METAR EGCN 021420Z 31008KT 270V340 6000 SCT009 BKN013 20/18 Q1018=**

SA	02/06/2018 13:50->	METAR EGCN 021350Z 30008KT 6000 SCT008 BKN012 19/18 Q1018=
SA	02/06/2018 13:20->	METAR EGCN 021320Z 29007KT 6000 SCT006 BKN010 20/18 Q1018=
SA	02/06/2018 12:50->	METAR EGCN 021250Z 31007KT 6000 SCT005 BKN007 19/18 Q1018=
SA	02/06/2018 12:20->	METAR EGCN 021220Z 31004KT 250V350 6000 SCT005 BKN008 20/19 Q1018=
SA	02/06/2018 11:50->	METAR EGCN 021150Z 28004KT 240V310 4000 BR SCT005 SCT008 BKN012 19/19 Q1018=
SA	02/06/2018 11:20->	METAR EGCN 021120Z VRB02KT 3900 -RA BR SCT004 BKN008 18/18 Q1018=
SA	02/06/2018 10:50->	METAR EGCN 021050Z VRB01KT 3700 -RA BR SCT007 BKN010 18/18 Q1018 RERA=
SA	02/06/2018 10:20->	METAR EGCN 021020Z 15003KT 2200 RA BKN005 18/17 Q1018 RERA=
SA	02/06/2018 09:50->	METAR EGCN 020950Z 06004KT 020V110 3000 RA BKN008 19/18 Q1018=
SA	02/06/2018 09:20->	METAR EGCN 020920Z 35004KT 320V020 5000 -DZ HZ OVC006 18/17 Q1018=

17/03/18 no flying day at Sherburn

METAR/SPECI from EGCN, Doncaster Sheffield / Airport (United Kingdom).		
SA	17/03/2018 17:50->	METAR EGCN 171750Z 05014G24KT 9999 FEW015 SCT020 BKN026 M00/M03 Q1014=
SA	17/03/2018 17:20->	METAR EGCN 171720Z 05014G29KT 9999 6000W SHSN SCT022 BKN028 BKN035 M01/M02 Q1014=
SA	17/03/2018 16:50->	METAR EGCN 171650Z 05014KT 9999 FEW004 SCT020 BKN025 M00/M01 Q1013=
SA	17/03/2018 16:20->	METAR EGCN 171620Z 05017G27KT 4000 SHSN SCT002 SCT006 BKN019 M01/M02 Q1014=
SA	17/03/2018 15:50->	METAR EGCN 171550Z 05020G31KT 5000 R02/1400 -SHSN FEW002 SCT007 BKN024 M02/M02 Q1014=
SA	17/03/2018 15:20->	METAR EGCN 171520Z 06017G30KT 9999 FEW003 SCT023 BKN029 00/M00 Q1013=
SA	17/03/2018 14:50->	METAR EGCN 171450Z 06016KT 9999 FEW004 SCT018 M01/M01 Q1014=
SA	17/03/2018 14:20->	METAR EGCN 171420Z 07017G27KT 040V100 9999 R02/1000 -SHSN FEW001 SCT005 BKN014 M01/M01 Q1014=
SA	17/03/2018 13:50->	METAR EGCN 171350Z 07016G28KT 0900 R02/0375 -SHSN SCT001 BKN005 M02/M02 Q1014=

SA	17/03/2018 13:20->	**METAR EGCN 171320Z 06019KT 9999 VCSH SCT028 BKN033 00/M01 Q1014=**
SA	17/03/2018 12:50->	**METAR EGCN 171250Z 05017G28KT 030V090 9999 VCSH FEW005 SCT022 BKN031 M01/M02 Q1015=**
SA	17/03/2018 12:20->	**METAR EGCN 171220Z 06018G33KT 5000 BR SCT004 SCT013 BKN017 M00/M01 Q1015 RESN=**
SA	17/03/2018 11:50->	**METAR EGCN 171150Z 06018KT 030V100 0800 -SN SCT003 SCT007 BKN011 M01/M02 Q1015=**
SA	17/03/2018 11:20->	**METAR EGCN 171120Z 06020KT 9000 SHSN SCT017 BKN022 BKN028 00/M01 Q1015=**
SA	17/03/2018 10:50->	**METAR EGCN 171050Z 06018KT 9999 VCSH FEW013 BKN019 M01/M01 Q1015=**
SA	17/03/2018 10:20->	**METAR EGCN 171020Z 06014KT 030V090 9000 VCSH SCT008 BKN019 M00/M01 Q1015=**
SA	17/03/2018 09:50->	**METAR EGCN 170950Z 07014G24KT 040V100 9999 SCT018 BKN024 M01/M02 Q1015=**
		METAR EGCN 170920Z 06014KT 9999 VCSH FEW020 BKN049 01/M02 Q1015=

17/3/18, No flying day at Sherburn

METAR/SPECI from EGCN, Doncaster Sheffield / Airport (United Kingdom).		
SA	15/03/2018 17:50->	METAR EGCN 151750Z 10005KT 060V130 8000 FEW006 BKN009 OVC017 08/07 Q0992=
SA	15/03/2018 17:20->	METAR EGCN 151720Z 09006KT 060V120 8000 SCT006 BKN014 08/07 Q0992=
SA	15/03/2018 16:50->	METAR EGCN 151650Z 09007KT 050V120 8000 OVC005 08/07 Q0992=
SA	15/03/2018 16:20->	METAR EGCN 151620Z 09007KT 060V120 8000 OVC005 08/08 Q0991=
SA	15/03/2018 15:50->	METAR EGCN 151550Z 10008KT 9000 BKN006 08/07 Q0991=
SA	15/03/2018 15:20->	METAR EGCN 151520Z 11007KT 9999 BKN007 09/08 Q0991=
SA	15/03/2018 14:50->	METAR EGCN 151450Z 12007KT 9000 BKN007 08/07 Q0991=
SA	15/03/2018 14:20->	METAR EGCN 151420Z 12008KT 9999 BKN007 09/08 Q0991=
SA	15/03/2018 13:50->	METAR EGCN 151350Z 12009KT 080V150 9000 BKN008 08/07 Q0991=
SA	15/03/2018 13:20->	METAR EGCN 151320Z 12009KT 090V160 9000 BKN007 BKN010 08/08 Q0991=

SA	15/03/2018 12:50->	METAR EGCN 151250Z 11009KT 7000 -RA BKN007 08/07 Q0991=
SA	15/03/2018 12:20->	METAR EGCN 151220Z 12008KT 8000 -RA FEW008 BKN012 07/07 Q0991=
SA	15/03/2018 11:50->	METAR EGCN 151150Z 12008KT 7000 -RA BKN010 07/07 Q0991=
SA	15/03/2018 11:20->	METAR EGCN 151120Z 12010KT 7000 -RA BKN011 07/07 Q0990=
SA	15/03/2018 10:50->	METAR EGCN 151050Z 13009KT 7000 -RA BKN017 07/06 Q0990=
SA	15/03/2018 10:20->	METAR EGCN 151020Z 12010KT 5000 -RA OVC009 07/06 Q0990=
SA	15/03/2018 09:50->	METAR EGCN 150950Z 12011KT 9000 -RA OVC010 07/06 Q0990=
SA	15/03/2018 09:20->	METAR EGCN 150920Z 12011KT 8000 BKN010 OVC035 07/06 Q0990=

7.5 Lack of Holding Procedure at Sherburn

The inclusion of a hold for the instrument procedures at Sherburn was evaluated at the early stages of the design process and was assessed to be unnecessary and potentially unhelpful.

The conventional purposes that a hold might serve in the commercial air transport context do not really apply at Sherburn.

7.5.1 Lack of suitable location

Sherburn is located within a complex airspace environment. Publishing a holding pattern would raise the issue of optimal location and deconfliction with other local airspace reservations. No ideal location could be determined that would not potentially conflict with other local airspace stakeholders. An aircraft constrained to the same location in a complex class G environment was considered undesirable from an airborne conflict point of view.

7.5.2 A hold would serve no purpose for traffic flow management and integration

The procedure is flown and managed by the pilot operating the aircraft as there is no approach control service sequencing and integrating traffic. Safe operation is achieved by ensuring that there is only one IFR aircraft per slot.

A hold at Sherburn would be established outside of controlled airspace and increase the period aircraft might be exposed to an airborne conflict in a potentially unknown environment.

7.5.3 A hold would be of limited use in the event of poorer than forecast weather

It is not the anticipated that aircraft will hold near Sherburn due to weather – Sherburn will not have the accurate weather reporting equipment (for example RVR) which in a commercial air transport context would be used to judge the merits of waiting for an improvement vs diverting to another aerodrome.

7.5.4 A hold would be of limited use in the event of unforeseen circumstances

A holding pattern may be used in unforeseen circumstances such as a blocked runway or technical issue with the aircraft. The former scenario is thought to happen so infrequently that the operational benefit of providing for this is negligible. If such a scenario does arise, diverting to another aerodrome would be preferable.

In the case of an aircraft with technical difficulties, holding tends to be less relevant in the GA context. Transport category aircraft typically have long non-normal checklists that are designed to be completed prior to landing. Particularly in a procedural/non-radar environment, holding patterns do provide a location to carry out such checks.

In contrast typical CAT A/B approach category aircraft have limited non-normal procedures available for completion in flight and many inflight emergencies are best dealt with by getting on the ground as expeditiously as possible. It would be unusual for holding to be beneficial in a non-normal circumstance in a GA aircraft and if the nature of the issue were such, again diversion to an aerodrome with better facilities (for example LEA) would likely be preferable.

8 Safety goal – Intro service (INTRO)

CAP 1122 – 'The risk of an accident during the introduction into service of a new IAP at this aerodrome is acceptably low'

Sherburn will apply all the procedures and mitigations listed in 'INTRO 1' in Annex B to CAP 1122. Sherburn also conducted a consolidated review in September 2021 of all safety related actions or mitigations required for the introduction of the procedure.

The following specific actions have been identified as either necessary or desirable for the safe implementation and operation of the IAP and need finalising before operation:

List of safety requirements for implementation		
Item	**Status**	**Lead**
Letter of Agreement with Leeds East	Complete	S Hallas
Letter of Agreement with Leeds Bradford ATC	Complete	S Hallas
Letter of Agreement with Doncaster Sheffield ATC	Complete	S Hallas
Raise awareness at SAC and with local stakeholders	Ongoing	S Hallas
Update AIP entry with RNP details	To be completed	E Bellamy
Apply for VFR chart 'feathers'	To be completed	Paul FB
Finalise pilot briefing document	Complete	S Hallas
Chop trees to remove 28 VSS penetrations	Complete	S Hallas
PAPI alignment to 3.5^{o}	Complete	S Hallas
Implement Met provision requirements	Ongoing	S Hallas
Finalise Internal SAC procedures (PPR, monitoring etc)	Ongoing	S Hallas
Train SAC staff in IAP related procedures	Ongoing	S Hallas
Brief SAC members on IAP and related procedures	Ongoing	S Hallas
Finalise internal SAC responsibilities for IAP operation	Complete	S Hallas
Finalise ongoing SAC responsibilities for monitoring, feedback and addressing of safety issues identified	Complete	S Hallas

Contents of Internal SOPs to include:

- Recording of PPR requests and allocation of arrival times (including co-ordination with Leeds East as applicable)
- Observation of the weather conditions / assignment of recommended runway in use
- Conduct of runway inspections prior to RNP approach and activation of runway lights as required
- Liaising with local airspace stakeholders as required

9 Safety goal – Through-life operation (THRULIFE)

'The risk of an accident during the introduction into service of a new IAP at this aerodrome is acceptably low'

Sherburn will apply the approach outlined in 'THRULIFE 1' in Annex B to CAP 1122. All risks identified in the hazard assessment process prior to introduction will be considered during the 'through life' safety of the IAP. Special attention will be given to those around **mid-air collision.**

The utilisation rate will be monitored. Safety issues identified will be assessed as soon as possible by SAC, in accordance with the SAC SMS. The operational experience of the IAP will be formally reviewed after one month, three months, six months of implementation and annually thereafter. The Chairman of SAC will be responsible for ensuring this takes place and presenting the findings to the Board of Directors and the Head of Training. The Board will sanction any changes in response to any safety or environmental issues identified.

The following specific actions/tasks will also be undertaken:

- Maintaining the IAP in accordance with the standard review procedures described in chapter 2 CAP 785 – including contract for 5-year review requirement;
- An annual check of the VSS and IAP obstacle surfaces will be conducted any changes will be impacted assessed and managed, including tree growth (Aerodrome safeguarding is assured through an agreement with Selby District Council).
- Review the log of RNP approach movements (the issue of PPR numbers);
- Study any pilot reports;
- Study any incident reports;
- Study the number, type, and location of noise complaints;
- Evaluate any desirable changes in the approach and missed approach paths;
- Review the overall environmental impact; and
- Produce a review document for consideration.

Any impacts involving other airspace stakeholders will be reviewed and resolved as quickly as possible.

10 CAP 1122 safety goals and alternative arguments

To validate that all the applicable safety baselines have been addressed, the following tables use the CAP 1122 structure to cross reference the CAP 1122 safety goals with the alternative safety arguments that SAC believe to be applicable.

CAP 1122 sets out 7 'safety goals' for the introduction and ongoing safety of an IAP:

Goal	Statement
Goal 1.1	The risk of a CFIT accident is acceptably low (CFIT)
Goal 1.2	The risk of a runway excursion accident is acceptably low (REXC)
Goal 1.3	The risk of a runway collision accident is acceptably low (RCOLL)
Goal 1.4	The risk of a mid-air collision accident is acceptably low (MAC)
Goal 1.5	The risk of a loss of control accident is acceptably low (LOC).
Goal 1.6	The risk of an accident during the introduction to service of a new IAP at this aerodrome is acceptably low (INTRO)
Goal 1.7	The risk of an accident during the through-life operation of an IAP at this aerodrome is acceptably low (THRULIFE)

The table below sets out how SAC believe that the CAP 1122 safety goals will be met.

The left-hand column contains the CAP 1122 reference number for the baseline safety argument that must be addressed. The right-hand column indicates the alternative safety argument that is proposed to address each baseline.

Where a safety argument for Sherburn is substantially equivalent to one listed from the 'candidate alternative safety arguments' in CAP 1122, the applicable CAP 1122 paragraph reference number is quoted in brackets after the safety argument.

a. Goal 1.1 – The risk of a CFIT accident is acceptably low (CFIT)

CFIT 1 – CAP 168 Instrument Runway Standards are met	
Baseline safety argument	**Proposed/applicable alternative safety arguments**

CFIT 1.1	Runway 28 and 10 are licensed to CAP 168 visual runway standards. For the purposes of the application under CAP 1122, they are considered runways for the operation of aircraft using an IAP to a point beyond which the approach may continue in visual meteorological conditions. The proposed 500 ft OCH and visibility minima of 1500 m are considered appropriate for a runway of this configuration. (CFIT 1.1.1) As part of the PPR process for Sherburn, pilots will receive a specific brief on the procedures and limitations of the IAP, including the characteristics of the runway. (CFIT 1.1.2)
CFIT 1.2	Both runway ends are equipped with APAPI, threshold, edge and end lighting. The APAPIs are operational during aerodrome operating hours. When the IAP is in the use, all other runway lighting will also beilluminated, to aid visual identification. With no approach lighting, 1500m is the lowest visibility minima that is applicable to aircraft operators. This is equivalent to the minimum for VFR flight in class G airspace. **Note:** The alternative arguments are considered broadly equivalent to those listed in CAP 1122 as CFIT 1.2.2, 1.2.3 and 1.2.4. In Sherburn's case the 500 ft OCH is in accordance with the ICAO Annex 14 runway classifications and the visibility minima is set by the applicable air operations regulations – Part-NCO of Regulation EU 965/2012 for non-commercial operators.

CFIT 2 – ANO 183 Requirement for approach control is met	
CFIT 2.1	During aerodrome operating hours, the QNH is provided to aircraft by the A/GCS operator. This is derived from the barometer used at Sherburn for current visual operations. The lower level of integrity of the QNH reporting equipment is mitigated by the following the OCH of 500 ft. (CFIT 2.1.3)
CFIT 2.2	'Unofficial' met observations will be provided to aircraft by A/GCS operators. A/GCS operators will be trained in basic met observations to allow estimated cloud base and visibility figures to be passed to aircraft. This will reduce the risk of aircraft attempting to fly the IAP when the weather would likely preclude a successful approach. (CFIT 2.2.2) ATIS information from Leeds and Doncaster would also be available to aircraft flying the IAP at Sherburn, however this would only be for general situational awareness rather than a precise indication of likely weather conditions at Sherburn. (CFIT 2.2.3 – reference use of 'nearby aerodrome').
CFIT 2.3	Sherburn does not intend to provide surveillance for the IAP. Contact with neighbouring ATSUs may provide some mitigation against a gross altitude error, however this would only be prior to aircraft contacting Sherburn radio and commencing the approach. While the aircraft is flying the approach, there is no CFIT mitigation from an external source. However, modern GNSS avionics provide substantial mitigation against CFIT, particularly when flying a published IAP. These mitigations include including moving map, terrain depiction, altitude coding and in some cases vertical situation indication both prior to and after the final approach fix. The combination of these features results in a substantially reduced CFIT risk compared to older technology, with which there was little to mitigate incorrect interpretation or execution of the approach chart. From a CFIT perspective, provision of a published (and therefor coded) IAP is considered a substantial improvement over the absence of an IAP. Surveillance is not a requirement to establish an IAP and other aerodromes in the UK operate approach control without surveillance. Procedural approach control without surveillance does offer some mitigation against CFIT through provision of terrain safe levels, however this is only applicable prior to the final approach fix. Provision of the correct altitudes by the GNSS coding and avionics provides a pilot interpreted alternative to this. (CFIT 2.3.1)

CFIT 3 – The Aerodrome is licensed	
CFIT 3.1	No alternative argument is proposed. Sherburn is a licensed aerodrome. The IAP design uses survey data obtained from a conventional aerodrome survey. The relevant surrounding areas are monitored to ensure any new obstacles do not pose a threat to aircraft.
CFIT 4 – The IAP design has been conducted in accordance with PANS-OPS and the procedure notified in the UK IAP which, where appropriate, is used as the source data for coding the approaches in navigation databases and brings the required degree of data integrity	
CFIT 4.1	No alternative argument is proposed. The design submitted will follow normal PAN-OPS and CAP 785 procedures for design and ongoing review.
CFIT 4.2	No alternative argument is proposed. The design submitted will follow normal PAN-OPS and CAP 785 procedures for design and ongoing review.
CFIT 5 – The integrity and accuracy of the navigation aids used for the instrument approach meet the required standards	
CFIT 5.1	No alternative safety argument proposed. All normal requirements for SiS integrity and avionics approval will apply.
CFIT 6 – The crew members of participating aircraft are suitably qualified and proficient to safely execute an IAP with sufficient accuracy to remain clear of terrain and obstacles.	
CFIT 6.1	No alternative safety argument is proposed.
CFIT 7 – An aerodrome ATS is provided	
CFIT 7.1	The same alternative argument as per CFIT 2.2 is proposed. The A/GCS operator would pass unofficial weather (CFIT 7.1.2)

b. Goal 1.2 – The risk of a runway excursion accident is acceptably low (REXC)

REXC 1 – CAP 168 Instrument Runway Standards are met	
REXC 1.1	Runway 10/28 is compliant with the CAP 168 visual obstacle limitation surfaces and marking requirements. Provision of APAPI and lighting further enhance correct orientation. This will provide an acceptable level of safety for the proposed OCH and visibility minima and is consistent with the runway's proposed status. (REXC 1.1.1)
REXC 1.2	Runway 10/28 does not have designated RESA areas beyond that required for visual runways under CAP 168. This is also consistent with the proposed runway status. The proposed OCH and visibility minima are such that it is appropriate to consider it a visual runway for the purposes of RESA. (REXC 1.2.1) For the runway 28 direction (which will be the more commonly used direction), there is an approximately 300 m distance beyond the end of the runway which is free from any significant objects that would damage an overrunning aircraft. This is primarily a grass area which falls within the historical boundaries of the aerodrome. The runway 10 direction does not have such a large clear area beyond it, however this is mitigated by the paved distance of 180 m beyond the end of runway 10, which forms the displaced threshold for 28, but is not included in the declared landing distance available for 10. The approach will normally be flown by category A approach speed aircraft. It is only available to category A and B (REXC 1.2.2).
REXC 2 – ANO 183 Requirement for Approach Control is met	
REXC 2.1	The A/GCS operator will pass unofficial weather information. Wind information is already routinely passed by the A/GCS operator. (REXC 2.1.2)
REXC 3 – The IAP design has been conducted in accordance with PANS-OPS and the procedure notified in the UK AIP which, where appropriate, is used as the source data for coding the approaches in navigation databases and brings the required degree of data integrity	
REXC 3.1	The approach will be designed in accordance with PANS-OPS criteria. Only category A and B approach speeds are included. (REXC 3.1.1)

REXC 4 – The integrity and accuracy of the navigation aids used for the instrument approach meet the required standards	
REXC 4.1	The approach will meet the normal integrity requirements for an RNP approach.
REXC 5 – The crew members of participating aircraft are suitably qualified and proficient to safely execute an IAP with sufficient accuracy to allow a safe landing to be made on the runway or to execute a safe missed approach	
REXC 5.1	The normal standards for flight crew qualifications for flying an RNP IAP will apply.

c. Goal 1.3 – The risk of a runway collision accident is acceptably low (RCOLL)

RCOLL 1 – ANO 183 Requirement for Approach Control is met	
RCOLL 1.1	PPR and slot times will reduce the risk of runway collision (RCOLL 1.1.1)
RCOLL 2 – CAP 168 Instrument Runway Standards are met	
RCOLL 2.1	Runway 10/28 complies with the signage and marking requirements of CAP 168 for a visual runway. This will provide an appropriate level of safety for the proposed OCH and visibility minima. With visibility of not less than 1500 m, the existing holding point signage and markings should be sufficient for safe operations.
RCOLL 3 – Aerodrome ATS is provided	
RCOLL 3.1	The higher OCH and minima will reduce the risk of a runway collision between visual and instrument traffic, this will be reinforced by the use of the aerodrome A/GCS frequency for aircraft to announce their position and intentions. (RCOLL 3.1.2 and 3.1.3)
RCOLL 3.2	The same argument as per 3.1 is proposed. (ROCLL 3.2.2)

RCOLL 3.3	The proposed minima would allow sufficient time for pilots to assess the runway for any obstructions – calculated to be at least 40 seconds. (RCOLL 3.3.3) There is also an equivalence argument to the that of Sherburn's current VFR night operations – for which the current arrangements for runway safety have historically been adequate.
RCOLL 4 – The crew members of aircraft participating in the IAP and others using the aerodrome are suitably qualified and proficient to operate safely in the vicinity of the runway	
RCOLL 4.1	The normal standards for flight crew qualifications will apply.

d. Goal 1.4 – The risk of a mid-air collision accident is acceptably low (MAC)

MAC 1 – ANO 183 Requirement for Approach Control is met	
MAC 1.1	The primary mitigation against the absence of approach control will be separation by PPR slot times. This will be robust, providing ample time separation and mandatory notification if aircraft anticipate being late by a specified amount of time. (MAC 1.1.3)
MAC 1.2	Pilots flying the approach will be briefed to contact the applicable ATSUs and obtain a service outside of controlled airspace, prior to contacting Sherburn radio. This arrangement will be underpinned by LOAs. This can provide mitigation against conflict with non-participating traffic and can provide awareness of any other aircraft in the vicinity of the IAP (MAC 1.2.1).
MAC 2 – An aerodrome ATS is provided	
MAC 2.1	The IAP is only being available when the cloud ceiling is below 1200 ft AGL. When in VMC (for example training on the IAP), traffic on the IAP remains responsible for separation from other visual traffic.

MAC 3 – Airspace design measures are in place in the vicinity of the aerodrome	
MAC 3.1	No alternative argument proposed – Sherburn has an ATZ.
MAC 3.2	Sherburn currently does not believe that establishment of new controlled airspace (CAS), TMZ or RMZ is necessary.
MAC 4 – The aerodrome location and presence of an IAP are depicted in the UK AIP and, where appropriate, on aeronautical charts	
MAC 4.1	The IAP will be published in the AIP. Depiction on aeronautical (VFR) charts will be via VFR chart 'feathers'.
MAC 5 – Visual lookout by aircraft crews and the 'see and avoid principle' provides some protection against mid-air collision during relevant portions of flying the IAP	
MAC 5.1	When in VMC, traffic using the IAP is responsible for see and avoid with other traffic. In addition, when the cloud ceiling is more than 1,200 ft AGL, traffic must adopt normal visual joining procedures. This is considered to be similar to the 'IAP with higher minima' concept set out in CAP 1122 (MAC 5.1.1).

e. Goal 1.5 – The risk of a loss of control accident is acceptably low (LOC)

LOC 1 ANO Article 172 requirement for Approach Control is met	
LOC 1.1	PPR and the associated procedures around the use of the IAP should ensure that no aircraft come close enough for wake-turbulence to be an issue. The low mass of the aircraft using the approach will also reduce the likelihood of wake turbulence. (LOC 1.1.1)

LOC 2 An aerodrome ATS is provided	
LOC 2.1	Same argument as per LOC 1.1. Additionally, in the aerodrome environment, when IAP traffic might enter the ATZ while still in IMC, there should not be any visual traffic in close proximity. The procedures for ensuring deconfliction between IAP and visual traffic in the ATZ should also address the issue of wake turbulence.
LOC 3 The crew members of aircraft participating in the IAP are suitably qualified and proficient to fly the IAP safely and under control	
LOC 3.1	Normal EASA/UK FCL regulations provide that crews must be appropriatelyqualified to fly under IFR and execute approach procedures.

11 Local Risk Assessments

This risk assessments were conducted in accordance with Section 4 of the Sherburn Aero Club SMS manual. The Risk Likelihood/Severity table is reproduced below for reference. Post mitigation, all assessments were determined to be **'review'** status.

	Risk Severity				
Risk Likelihood	Catastrophic 5	Hazardous 4	Major 3	Minor 2	Negligible 1
Frequent 5	Unacceptable	Unacceptable	Unacceptable	Review	Review
Occasional 4	Unacceptable	Unacceptable	Review	Review	Review
Remote 3	Unacceptable	Review	Review	Review	Acceptable
Improbable 2	Review	Review	Review	Acceptable	Acceptable
Extremely improbable 1	Review	Acceptable	Acceptable	Acceptable	Acceptable

11.1 Risk Assessment conflict with Burn Glider Club

Part 1	
Details of Risk	Mid-air conflict/collision between aircraft conducting an IAP into Sherburn aerodrome and gliders operating in the vicinity (primarily from Burn Gliding Club)
List of compilers	[redacted]
Date of Assessment	21st October 2020
Date to be reviewed	1 month after implementation of IAP procedures

Part 2: Hazard/Threat Analysis	
Hazard/Threat	Mid-air collision with Glider operating in vicinity of the RNP approach
Hazard/Threat Consequence	Catastrophic with fatalities in air and possibly on ground

Pre-mitigated **Risk assessment**	Impact/ Severity:	***Catastrophic***	Probability/ Likelihood:	***Improbable***	Tolerability:	***Review***
Possible Control Measures						
1	Pilot brief will emphasise the presence of Burn glider site.					
2	Feathers on the chart will indicate orientation of approach tracks.					
3	Glider community will be informed of the RNP approach and tracks, including vertical profile.					
4	Slot time procedure limits traffic, in bound to Sherburn, to 1 aircraft per hour.					
5	Pilot brief emphasises that in conditions of good VFR expectation is that approach continues visually once in VMC, when Sherburn cloud base c.1200 ft or above, normal visual joining procedures apply.					
6	Aircraft are strongly advised to obtain an air traffic service (LoAs signed to facilitate this) from either Doncaster or Leeds Bradford ATC such that traffic information can be given up until aircraft join the IAP into Sherburn – they may be able to advise on likely traffic near the approach path.					
7	A/G operator will broadcast on glider frequency when traffic on the IAP is known to be inbound.					
Control Measures for implementation	**1 – 7 will be implemented.**					
Post mitigated Risk Assessment	Impact/ Severity:	***Catastrophic***	Probability/ Likelihood:	***Extremely Improbable***	Tolerability:	***Review***

11.2 Risk assessment on conflict with Breighton Aerodrome

PART 1	
Details of Risk	Mid-air conflict/collision between aircraft conducting an IAP into Sherburn and aircraft operating to/from from Breighton aerodrome
List of compilers	[redacted]
Date of Assessment	21st October 2021
Date to be reviewed	1 month after implementation of IAP procedures

Part 2: Hazard/Threat Analysis						
Hazard/Threat	Mid-air collision with Aircraft operating into/from Breighton					
Hazard/Threat Consequence	Catastrophic with fatalities in air and possibly on ground					
Pre-mitigated Risk assessment	Impact/ Severity:	***Catastrophic***	Probability/ Likelihood:	***Improbable***	Tolerability:	***Review***
Possible Control Measures						
1	Removal of northern IAF for rwy 28 near Breighton/restriction on joins 103° – 193°					
2	Pilot brief to draw attention to Breighton					
3	Promulgation of Notam/Feathers are on the Charts					
4	Breighton will be made aware of IAP dimensions					
5	Slot time procedure limits traffic, in bound to SAC, to 1 aircraft per hour					
6	Aircraft are strongly advised to obtain an air traffic service (LoAs signed to facilitate this) from either Doncaster or Leeds Bradford ATC such that traffic information can be given up until aircraft join the IAP into Sherburn – they may be able to advise on likely traffic near the approach path.					
Measures for implementation	**All**					
Post mitigated Assessment	Impact/ Severity	*Catastrophic*	Probability/ Likelihood:	*Extremely Improbable*	Tolerability:	***Review***

■ END OF DOCUMENT