



Doncaster Sheffield Airport: Airspace Change Proposal

**Proposal to introduce RNAV
Standard Instrument Departure and
Instrument Approach Procedures**

PART B

Operational Report

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1. Introduction

- 1.1. This ACP, triggered by the withdrawal of the GAM VOR, is a proposal by DSA to replace the existing conventional SIDs and the outdated PDRs with RNAV-1 (GNSS) SID procedures designed to provide controlled airspace linkage for aircraft departing from DSA to enter the en-route ATS route network. An additional portion of controlled airspace is required to achieve full containment of the ROGAG SIDs. As the SIDs are not a full replication of the existing procedures, it is proposed that the Noise Preferential Routings (NPRs) be amended to be coincident with the proposed departure profiles. No further changes to the Noise Abatement Procedures are proposed. The proposal also includes the intention to introduce a suite of RNAV IAPs to complement the existing ILS procedures.
- 1.2. **Part B** of the ACP document is the Operational Report and provides a description of the proposed changes and justification for them. It details the operational and environmental objectives to be achieved with the SIDs and how the proposed procedure designs have been developed and largely integrated within the airspace arrangements. It also details how the environmental objectives have been balanced against the operational and flight safety requirements in the configuration of the procedures, both in the general development of the SID procedures and in specific terms for each procedure.
- 1.3. This part of the ACP relies heavily on the documentation provided for the Consultation Phase of the ACP development, which comprises the Stakeholder Consultation Document together with its technical Annexes, which detail each SID procedure individually, and the Post-Consultation Report. The above documents are submitted separately as part of the ACP, as detailed in **Part A** of the ACP document bundle. In order not to create excessive duplication between this document and the supporting documents, cross-referencing to information contained in the supporting documents is made to the maximum extent practicable. The narrative in this document amplifies, where necessary, the technical procedure design aspects in greater detail than was appropriate to the Stakeholder Consultation Document and Report to enable the CAA to carry out its Operational and Environmental Assessments of the proposal.
- 1.4. The ACP project commenced with a 'kick-off' meeting with the CAA in December 2016 followed by a Framework Briefing on 1 February 2017. **Documents 1 and 2** in the ACP Document Bundle are the Framework Brief Presentation and the associated Minutes. The development of options for the proposal was iterative and engagement with key stakeholders took the form of a series of Focus Groups with ATM, airline, aviation and community representatives held between February and August 2017. The 13-week Stakeholder Consultation ran from 25 September to 22 December 2017 and the Post-Consultation Report was published on 12 February 2018. Details of the engagement and consultation process are given in **Part D** of the ACP.

2. Airspace Description

2.1. Departure Procedures

- 2.2. DSA currently has three conventional SIDs (for aircraft joining airways at UPTON) and three PDRs (for aircraft joining airways at ROGAG), all of which are predicated on the GAM VOR.
- 2.3. The current UPTON SIDs are detailed in the UK AIP at AD 2-EGCN-6-1 and are reproduced at **Appendix B** for ease of reference. Two of the SIDs originate from Runway 20, the other is for Runway 02. The reason for two UPTON SIDs off Runway 20 is to provide an alternative, non-conflicting, departure profile for the eventuality that there is gliding activity in the Upton Corridor. It is proposed that this arrangement is maintained to preserve the protection afforded to the gliding community. More detail on the arrangements with local gliding groups can be found in the MATS Part II, Section 4 Appendices.
- 2.4. The three ROGAG PDRs were implemented as PDRs as opposed to SIDs as there was insufficient controlled airspace granted to DSA to contain the procedures when they were originally proposed. The terminology PDR was used by the CAA to clearly differentiate PDRs from SID procedures. SID procedures were specified for use only in a wholly controlled airspace environment. Similarly, PDRs were not charted in the UK AIP, their publication being in text format only with suitable safeguarding text to emphasise to pilots that they were procedures outside controlled airspace and not SID procedures. The basic differences between PDRs and formal SID procedures are outlined in the Stakeholder Consultation Document.
- 2.5. The current ROGAG PDRs (one for each runway) are detailed in the UK AIP at AD 2-EGCN-15 Section 6 (b) 'Procedures for Outbound Aircraft' and are reproduced at **Appendix B** for ease of reference. *Note: The ROGAG 20 North PDR will be withdrawn as it has rarely been used and is no longer required.*
- 2.6. In this ACP DSA proposes to replace these five procedures with five RNAV-1 SIDs. The proposed SID procedures are:
- UPTON 2A to replace UPTON 1A;
 - UPTON 2B to replace UPTON 1B;
 - UPTON 2C to replace UPTON 1C;
 - ROGAG 1A to replace the ROGAG 20 South PDR; and
 - ROGAG 1B to replace the ROGAG 02 PDR.
- 2.7. The objectives for the design of the SID procedures and the detailed description of each procedure are detailed in the subsequent paragraphs. Draft SID charts are depicted at **Appendix C**.
- 2.8. DSA is committed to providing all operators who use the airport an appropriate instrument departure procedure that ensures the minimum obstacle clearance. As not all operators are

able to meet the minimum navigation performance for RNAV-1 SIDs, DSA proposes the introduction of an Omni-Directional Departure (ODD) for each runway to safeguard departures against obstacles in the initial departure area. Aircraft will be issued an ODD together with appropriate ATC instructions to access the Terminal and Network ATM systems if they are either:

- non-RNAV-1 capable;
- non-GNSS equipped; or
- not capable of complying with the demands (climb gradients) of the SID procedures.

2.9. The usage of the ODDs is expected to be very low as an average of less than 3 aircraft per month are currently unable to comply with the current SIDs over the last 12 months. **Document 6** in the document bundle is a summary of the findings of the Equipage Survey.

2.10. A detailed description of each proposed SID is given in the **Stakeholder Consultation Document** and its supporting **Annexes** and is amplified in **Section 3** of this ACP document. The hours of operation of the SIDs will not change from the current airport operating hours.

2.11. Approach Procedures

2.11.1. DSA currently has an array of conventional approach procedures as detailed in the UK AIP at AD2-EGCN-8. The Instrument Landing System (ILS) will remain the primary approach aid for aircraft carrying out an instrument approach at DSA. Given that many CAT aircraft are no longer equipped with NDB navigational capability, the new RNAV (GNSS) IAPs will provide the redundancy required for continued operations when the ILS is out of service.

2.11.2. Following research and engagement with the operators, DSA propose the introduction of the following RNAV IAPs for each runway:

- Lateral Navigation (LNAV);
- Lateral Navigation with Vertical Guidance (LNAV/VNAV); and
- Localiser Performance with Vertical Guidance (LPV200).

2.11.3. The combination of the airspace layout, the inbound routing infrastructure, and the proximity of nearby airfields and gliding areas, does not lend itself to a standard “T” or “Y”-Bar design for these RNAV IAPs. Thus the ‘best fit’ design that is proposed for DSA is an approach design extending from the landing runway end out to a 10NM final approach point. This design also ‘replicates’ the existing ILS Approach path. The RNAV IAPs will have only two points defined on them, the first is the Intermediate Fix (IF) and the second a Final Approach Fix (FAF). *Note: In this instance, the Initial Approach Fix (IAF) and the IF are coincident.*

2.11.4. The final approach track of the proposed RNAV IAPs replicates that of the existing ILS procedures. There is little expected change to how aircraft will track over the ground when flying the RNAV IAP resulting in minimal change to the impact on the environment. Draft IAP charts are depicted at **Appendix C**.

- 2.11.5. Due to the procedure design criteria for RNAV IAPs detailed in ICAO PANS-OPS, it is not possible to replicate the existing conventional MAPs as RNAV procedures. The proposed MAPs for the RNAV IAPs are also depicted on the Draft IAP charts.

2.12. Airspace

- 2.12.1. DSA currently has a CTR and several portions of CTA, all of which hold Class D classification. The existing airspace is depicted in the UK AIP at AD 2-EGCN-4-1 and are reproduced at **Appendix B** for ease of reference.
- 2.12.2. There are no proposals to make changes to the dimensions or classification of the existing controlled airspace for the UPTON SIDs as the connectivity to the route network remains uninterrupted as is the case today. The Post Implementation Review (PIR) of the existing DSA Class D airspace which was completed in June 2017 confirmed the justification and configuration of this airspace.
- 2.12.3. DSA proposes an additional Class D CTA portion of airspace to the east of DSA to fully contain the new ROGAG SIDs (described as CTA-X in the Stakeholder Consultation Document) together with a small amendment (lowering) of a portion of the airways designated L60 and L603 to further support the airspace containment of the ROGAG SIDs. The combination of these two proposals will ensure a CAS linkage from DSA to ROGAG and will provide a safe, efficient and managed airspace environment. It will facilitate the effective integration of the increasing numbers of DSA CAT operations to/from the east with the diverse activities of various other airspace users.
- 2.12.4. It is noted that CAA Policy¹ allows for SIDs to be designed in a manner that does not provide full CAS containment provided that a suitable safety case is made. However, there are numerous General Aviation (GA) airfields in proximity to DSA generating a high density of diverse airspace operations. Therefore, DSA considers that the protection of CAS must be afforded to Commercial Air Transport (CAT) traffic flying under IFR, particularly in the critical stages of flight and to enable the effective integration of the diverse airspace activities. DSA does not consider that an acceptable Safety Case could be established which would support the operation of SID procedures outside controlled airspace.
- 2.12.5. It is important to note that the original introduction of Class D airspace improved safety not just for the CAT operators but also for all aircraft operating within it as a 'known traffic environment' prevails. Since its introduction, the number of AIRPROX reports between CAT operating from DSA and VFR aircraft in the immediate vicinity of the Airport has substantially reduced.

2.13. Airspace – CTA-X

- 2.13.1. The vertical and lateral (WGS84 – UTM30N) elements of the proposed **CTA-X** are presented in **Table 1** overleaf:

¹ CAA SARG Policy Statement 'Controlled Airspace Containment Policy' dated 17 January 2014

Latitude	Longitude	Vertical	Classification
531600.1266N	0005541.9325W	FL85-FL105	D
532530.8135N	0005036.7748W	FL85-FL105	D
531433.8815N	0004258.4066W	FL85-FL105	D
531343.0244N	0004324.8305W	FL85-FL105	D
531600.1266N	0005541.9325W	FL85-FL105	D

Table 1: Vertical and Lateral confines of the proposed CTA-X

- 2.13.2. This portion of airspace aligns to the minimum climb gradient of the ROGAG SIDs, allowing 500 feet for vertical containment, to provide continuous climb and permitting adequate separation from traffic transiting below.
- 2.13.3. The ROGAG 1B minimum climb gradient between CNE07 and CNS21 is 9% with the minimum altitude calculated to be FL90 at CNS21. The ROGAG 1A minimum climb gradient between CNW05 and CNS21 is 9.5% with the minimum altitude at CNS21 calculated to be FL90.
- 2.13.4. From waypoint CNS21 the proposed SID procedures share a common track. The next point on the SIDs is CNS29 and subject to a proposed relaxation of the CAA’s Safety Buffer Policy², through an LoA, aircraft may reduce their climb rate to a more acceptable level (8.4%) to achieve FL125 by CNS29. Beyond CNS29, the climb gradient reduces to 3.7%.
- 2.13.5. The upper limit of CTA X is limited to FL105 adjoining PC airspace (L60/L603) above.

2.14. Airspace – L603/L60

- 2.14.1. In support of this proposal, DSA are sponsoring the airspace change associated with L60/L603 to ensure alignment of airspace requirements at implementation. NATS PC agreed ahead of the consultation that DSA would propose these changes to this portion of airspace as can be seen in **Document 28** of the document bundle. NATS PC also supported the changes in their response to the Stakeholder Consultation.
- 2.14.2. DSA is proposing lowering the base of L603 and L60, (above R313) to allow the SID to be contained within controlled airspace to position ROGAG. This involves lowering that portion of the route airspace structure from LAMIX eastbound towards ROGAG from FL155 to FL125 (aligning the lower limit to above the required safety buffer above R313 with consideration to pressure variation).

² CAA SARG Policy Statement dated 22 August 2014 – Special Use Airspace – Safety Buffer Policy for Airspace Design Purposes.

2.14.3. The vertical and lateral (WGS84 – UTM30N) elements of the proposed **L60** are presented in **Table 2** below:

Latitude	Longitude	Vertical	Classification
531640.3698N	0004152.6050W	FL125-FL195	A
532324.8202N	0003821.4143W	FL125-FL195	A
532613.2695N	0003605.1971W	FL125-FL195	A
532440.4866N	0002039.0196W	FL125-FL195	A
532031.6886N	0002400.2075W	FL125-FL195	A
531511.2885N	0002658.7528W	FL125-FL195	A
531640.3698N	0004152.6050W	FL125-FL195	A

Table 2: Vertical and Lateral confines of the proposed extension to L60

2.14.4. The vertical and lateral (WGS84 – UTM30N) elements of the proposed **L603** are presented in **Table 3** below:

Latitude	Longitude	Vertical	Classification
531343.0244N	0004324.8305W	FL125-FL195	A
532314.9143N	0003826.6012W	FL125-FL195	A
532031.6886N	0002400.2075W	FL125-FL195	A
531103.2935N	0002916.3948W	FL125-FL195	A
531343.0244N	0004324.8305W	FL125-FL195	A

Table 3: Vertical and Lateral confines of the proposed extension to L603

2.14.5. The minimum climb gradient for the portion of the SID between CNS29 and ROGAG is 3.7% and this proposal would allow most aircraft to remain inside controlled airspace in the climb towards ROGAG. Those incapable of achieving the required climb gradient on the ROGAG SID will be given an ODD to ensure airspace containment.

2.14.6. **Figures 1 and 2** overleaf illustrate the airspace configuration proposal in elevation and plan view.

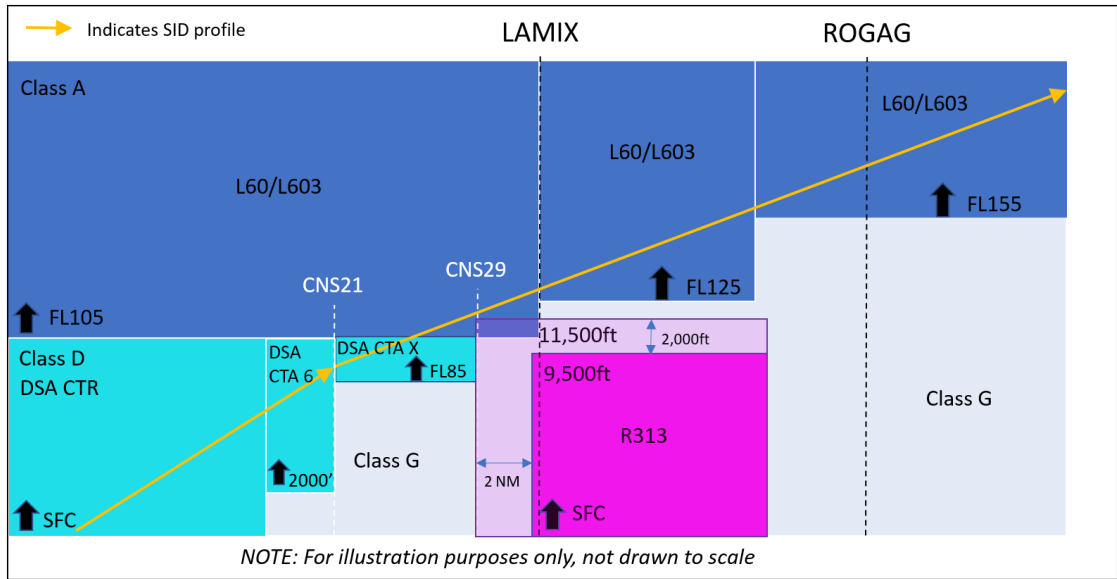


Figure 1: Elevation View of Proposed Airspace Configuration

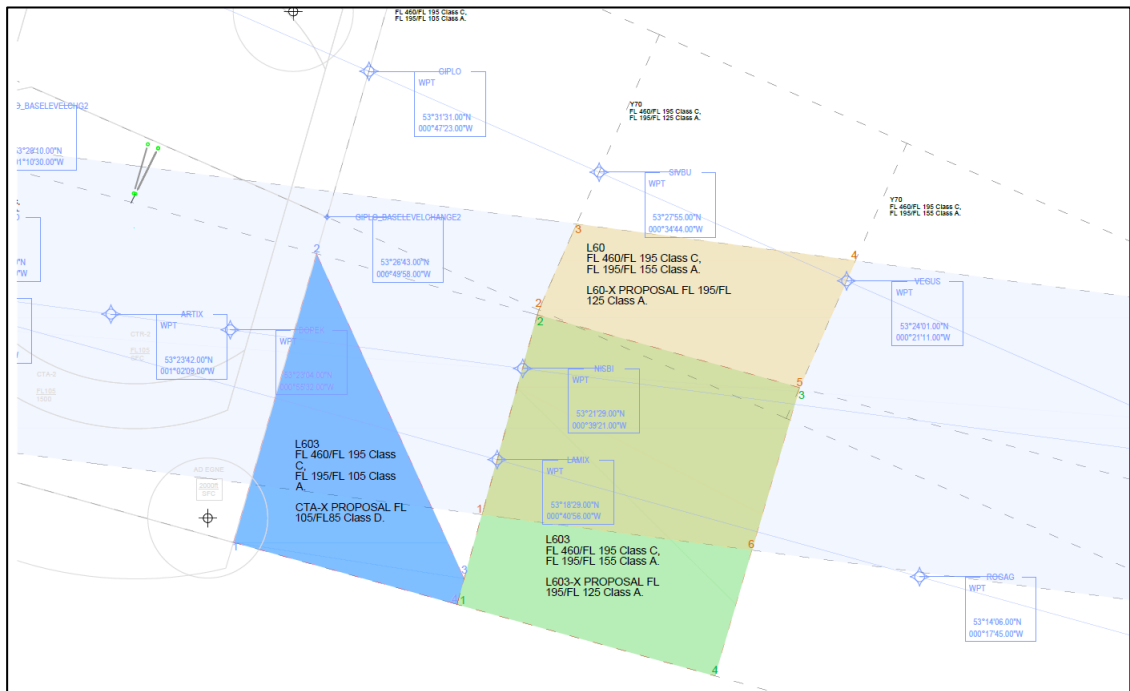


Figure 2: A Plan View of Proposed Airspace Configuration

- 2.14.7. The CAA SARG Safety Buffer Policy requires a lateral 5NM buffer around and a vertical 2,000ft buffer over R313 however it allows for 'Policy Dispensations' in para 3.1.
- 2.14.8. DSA engaged with the MoD, the CAA and Prestwick Centre over the airspace proposals and it was agreed that a Letter of Agreement (LoA) should be written between DSA ATC and the Ministry of Defence (MoD) to facilitate a reduction of distance between CTA X and the lateral limit of the Safety Buffer Zone of R313 from 5NM to 2NM (and for the corresponding vertical buffer to apply only from 2NM also), during published hours of R313 operation with

- mitigating conditions in place. It remains the case that it is not the intent of this proposal to allow DSA flights to enter R313 during published hours of operations.
- 2.14.9. Supporting evidence of this engagement can be found at **Documents 20, 21, 23, 26, 27 and 28**. Since the completion of the Stakeholder Consultation, the LoA has been agreed in principle and the latest draft can be found as **Document 40** in the ACP bundle.
- 2.14.10. As stated above, the existing CTR and associated CTA surrounding DSA hold Class D classification. Class D airspace delivers a known and managed (VFR and IFR) ATC environment that allows VFR access to RT-equipped aircraft in an organised and orderly manner once two-way communication with the operating authority is established. It should be noted that the ANSP at DSA makes every effort to facilitate equitable access to the existing airspace under their stewardship. Logically, the presence of Class D airspace provides a safer environment for all airspace users than Class E. In the latter, VFR aircraft may penetrate and transit without a clearance, or use of radio and without transponding. Essentially, they can be either invisible to ATC, impossible to contact or both and, in any case, are not compelled to comply with any instructions issued by ATC to facilitate the effective integration of flights. Consequently, Class D is therefore naturally the classification applied to all CTRs and associated CTAs in the UK FIR at airports comparable in size and operation to DSA (i.e. all those that do not hold Class A status) and is reflected in CAA Policy. Therefore, DSA proposes that the new CTA segment should be classified as Class D airspace in accordance with established Policy.
- 2.14.11. Notwithstanding the above, DSA has considered the alternative of Class E airspace supplemented by other airspace management tools such as a Transponder Mandatory Zone (TMZ) and/or “listening” squawk. However, such an arrangement would not enable ATC to marshal aircraft safely and expeditiously in a coordinated manner through the airspace as there would be no ability to effectively manage VFR itinerant traffic. Furthermore, were the CTAs to be Class E plus a TMZ only, VFR flights would be able to penetrate the airspace without prior communication with ATC. ATC would be required to treat such aircraft as “unknown traffic” and apply the increased radar separation minima applicable and would only be able to endeavour to achieve the specified separation minima through vectoring the IFR (CAT) aircraft off the SID track. The ability for controllers to comply with the vectoring requirements of keeping aircraft 2NM within the boundary of controlled airspace (in accordance with CAP 493, Chapter 6, Section 13A.4) would be compromised and a commensurately larger volume of controlled airspace might be needed to enable compliance. Therefore, DSA rejected further consideration of Class E airspace.
- 2.14.12. DSA does not deny access to the existing Class D airspace by VFR or IFR itinerant flights or from conducting training operations within the CTR/CTA and is committed to providing equitable access to the all airspace under its jurisdiction. The contracted ANSP is, and will continue to be, adequately resourced, in line with forecast growth, to ensure the airspace is not managed ‘by exclusion’. Records maintained since 2014 indicate that ATC is facilitating an average of more than 17,500 GA (per annum) aircraft in and around the DSA airspace with a majority being provided airspace crossings.
- 2.14.13. **Figures 3, 4 and 5** overleaf depict the track data from aircraft given a 6160 Mode 3A squawk (DSA VFR Zone transit code for aircraft under a Basic Service) taken from the months of July, August and September 2017 respectively. These clearly show that access is provided routinely and on a flexible basis.

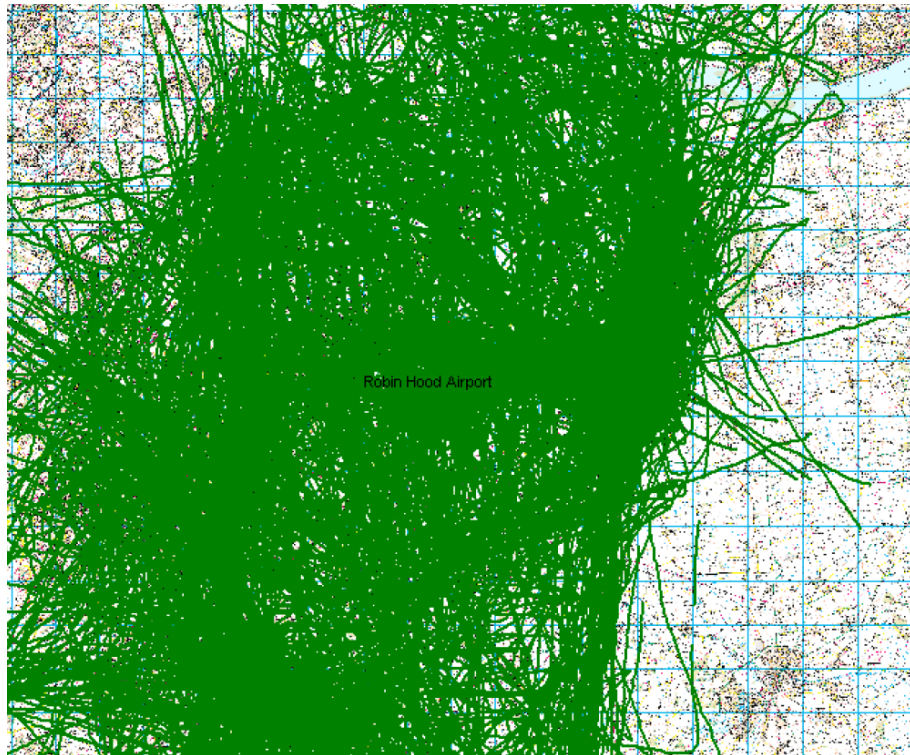


Figure 3: Track Data for Mode 3A 6160 - July 2017

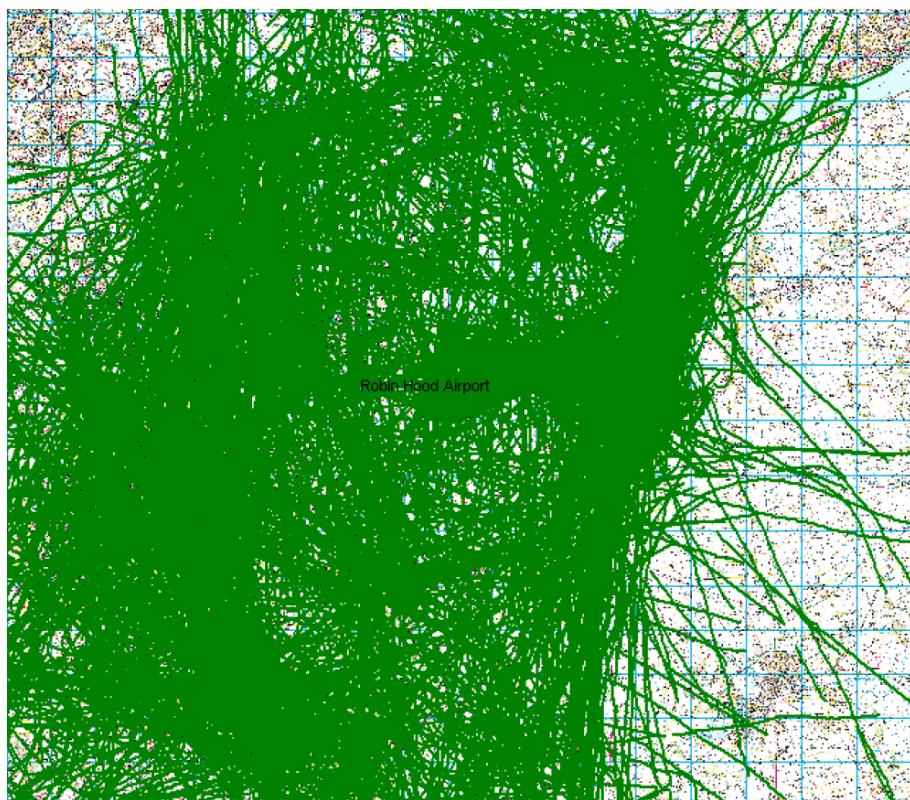


Figure 4: Track Data for Mode 3A 6160 - August 2017

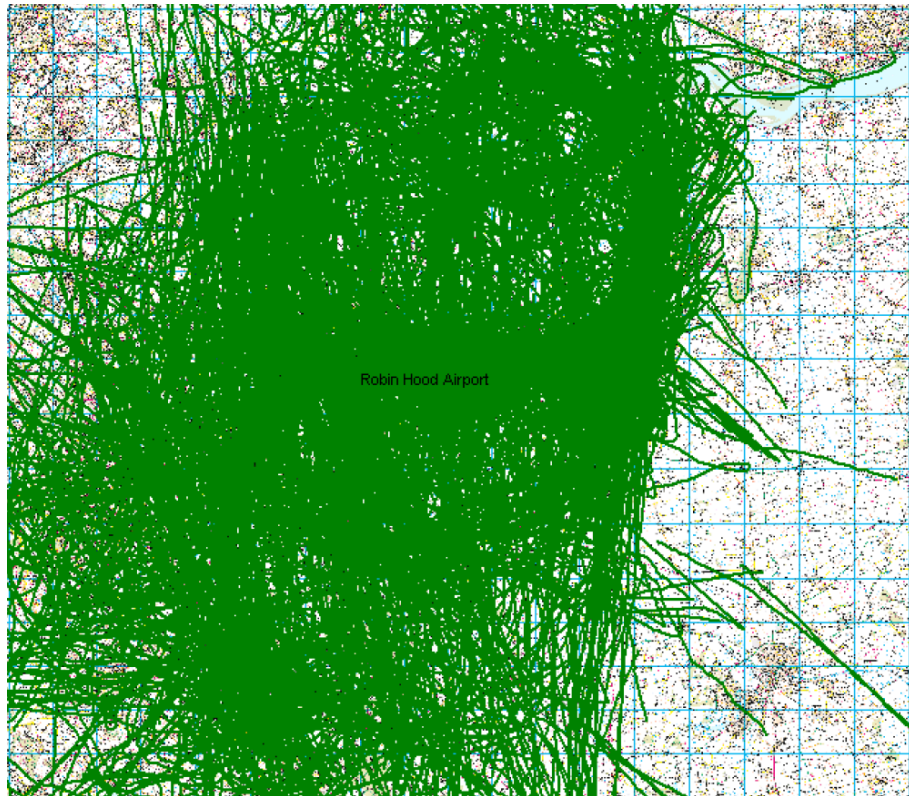


Figure 5: Track Data for Mode 3A 6160 - September 2017

- 2.14.14. The case for retaining the existing airspace (and its classification) at DSA was set out clearly during the PIR and can be found in **CL-5216-RPT-002** (PIR Options Report already held by the CAA). Furthermore, SARG found in the CAA Conclusions to the PIR document, dated 14 June 2017, that despite some options having been identified, that no changes should be implemented.
- 2.14.15. DSA believe that the proposal will enhance the safety environment through the continued accommodation of GA aircraft across the airspace system resulting in the minimisation of ‘choke’ points. Safety is improved where communication is effective.

2.15. Airspace Design

- 2.15.1. The airspace design proposal, aimed at containing the proposed ROGAG SIDs, is in accordance with the SARG Policy Statement ‘Controlled Airspace Containment Policy’, dated 17 January 2014. It states that, *‘a SID provides a specified Instrument Flight Rules (IFR) departure procedure that should remain wholly within Controlled Airspace (CAS) and permits connectivity with the en-route Air Traffic Service (ATS) route system’*. It also states that, *‘in exceptional circumstances, and subject to an acceptable proposal supported by a safety case, to justify why SIDs without CAS are deemed to be appropriate, the establishment of SIDs outside CAS is now being considered by the CAA on a case by case basis’*. DSA do not believe that such a Safety Case can be made and for this reason propose that the SIDs be contained as per the Policy Statement. There has also been no amendment to CAP778 relating to this Policy Statement to provide the greater detail that was anticipated.
- 2.15.2. The airspace proposal is a volume of airspace that is of the minimum practicable size necessary *‘for the effective protection of the ATC operation as defined by an ATS provider*

and to support a safe service, subject to any identified overriding environmental requirements and the need to avoid over complication of airspace structures’.

3. Justification for the Change and Analysis of Change Options

3.1. The trigger for the proposal to implement these new procedures is the removal of the GAM VOR without which the existing departure procedures cannot be maintained. The VOR removal does however provide an opportunity to modernise the ATM arrangements.

3.2. As described in Part B of the Stakeholder Consultation document, it was considered that realistically there were only three available options; Do Nothing, Replicate or Redesign:

- **Do Nothing** – this option is not available because the navigational aid that the current procedures rely upon is being withdrawn by NATS Services Ltd; or
- **Replicate** – this option was considered the most viable as the entry and exit points to the existing route network will remain extant and the controlled airspace configuration to the west was designed around the procedures that exist today; or
- **Redesign** – given the existing controlled airspace configuration to the west and the airspace activities to be considered to the east, there was very limited scope for designing procedures radically differently from how they are today. It was considered that the opportunity to deliver significant environmental or operational benefits from the complete redesign of the procedures was minimal without total redesign of the associated airspace.

3.3. It was evident, and evidenced in the various diagrams depicted in the Stakeholder Consultation Document, that aircraft currently do not follow the conventional SIDs or PDRs exactly as they were designed. Whilst there are differences in how the procedures have been interpreted from that which was intended, there is however a consistency to the way aircraft have flown them.

3.4. Full replication of the existing departures was proven to be not entirely possible due to a variety of factors, including design incompatibility with the PDRs which did not align with PANS-OPS criteria. A balance was sought between that which was previously designed versus that which is currently flown. Slight adjustments were identified that could be made to allow for a balanced solution aimed at affecting fewer people on the ground whilst, where possible, improving the operational aspects for aircraft operators and ATC. The resulting proposals are a combination of replication and redesign.

3.5. **Document 5** in the ACP bundle is the Focus Group Presentation used at the Options Development stage of the process. This brief set out the various options available to the designers in the development of the SID proposals. The views of those present at these Focus Groups can be found in **Documents 8, 9 and 10**.

3.6. UPTON SIDs

3.6.1. **Document 15** is the Stakeholder Consultation Technical Annex associated with the **UPTON 2A** (designed to replace UPTON 1A), the westerly departure off Runway 20. There is little change with the proposal, in design terms, until the turn south of the community of Tickhill, after which the SID turn has improved, i.e. less steep, and avoidance of communities

en-route to UPTON are considered. The latter portion of the proposed UPTON 2A SID procedure replicates, as closely as practicable, what is currently flown rather than what was previously designed. The increased accuracy of navigation performance in RNAV SID (versus conventional) should result in a narrowed swathe of traffic thereby impacting fewer communities. The current departure together with two solutions involving bank angles of 20 degrees and 25 degrees were presented to the Focus Groups together with Noise Track Keeping (NTK) data and the potentially affected communities. The Focus Group Notes (**Documents 8, 9 and 10**) demonstrate that provided the procedure remained contained in CAS, the Stakeholders were in favour of moving the track slightly further west over to between the 20-degree and 25-degree bank angle.

3.6.2. **Document 16** is the Stakeholder Consultation Technical Annex associated with the **UPTON 2B** (designed to replace UPTON 1B), the westerly departure off Runway 20. The existing UPTON 1B impacts both Bawtry and Scrooby and an opportunity was seen to re-design those elements of the SID that impact these communities. As a result, the UPTON 2B is mostly a replication with changes to the initial segment made in an attempt to reduce the impact on those communities previously impacted. At the Focus Groups an option was presented with a slight change to the bank angle of 25 degrees at the northern (left-turn) section of the departure to improve the turn consistency towards UPTON. The Focus Group Notes (**Documents 8, 9 and 10**) demonstrate that the Stakeholders accepted that this change should be proposed. UPTON 2B was retained as it provided a contingency operation for the occasional eventuality that there is gliding activity impacting the use of UPTON 2A. Despite the additional track mileage for CAT, the retention of this concession facilitates the use of the airspace for glider operations.

3.6.3. **Document 17** is the Stakeholder Consultation Technical Annex associated with the **UPTON 2C** (designed to replace UPTON 1C), the westerly departure off Runway 02. At the Focus Groups the NTK data clearly showed that aircraft were not currently following the published track of the current SID. Aircraft were routinely following a track that cut inside the turn resulting in overflight of built up areas. DSA expressed their intention to replicate the published procedure to concentrate traffic on the published nominal track and in so doing lessen the environmental impact. The Focus Group Notes (**Documents 8, 9 and 10**) demonstrate that the Stakeholders accepted this proposed solution.

3.7. ROGAG SIDs

3.7.1. **Document 18** is the Stakeholder Consultation Technical Annex associated with the ROGAG 1B (designed to replace ROGAG PDR), the easterly departure off Runway 02. Replication of how the ROGAG 02 had been interpreted was not possible in line with design criteria and obstacle limitation requirements. Four potential solutions were offered for discussion at the Focus Groups:

- Replication of the intended PDR using PANS-OPS criteria, this would have resulted in several communities (namely Wroot, Westwoodside and Haxey) being overflown that were not currently being overflown;
- Use of a design brief that avoided Haxey; but it was not ideal and resulted in a nominal flightpath close to Wroot and not sufficiently far enough away from Westwoodside;

- Use a Course-to-Fix leg with 2 options (20 degrees or 25 degrees) in a bid to try and replicate the NTK tracks but again neither was ideal as these impacted both Wroot and Westwoodside;
- Finally, develop a hybrid design of the second and third solutions in an attempt to avoid as many built up areas as possible. The hybrid resulted in overflight of a portion of an SSSI (area of Significant Scientific Interest) area although it was captured within the existing Noise Preferential Route limitations. The communities of Wroot, Blaxton, Finningley, Westwoodside, Haxey and Gringley-on-the-Hill would all have limited impact from the implementation of this option.

3.7.2. The Focus Group Notes (**Documents 8, 9 and 10**) demonstrate that the Stakeholders accepted the 'Hybrid' proposal was the best solution for the ROGAG 1B.

3.7.3. **Document 19** is the Stakeholder Consultation Technical Annex associated with the ROGAG 1A (designed to replace ROGAG PDR), the easterly departure off Runway 20. Two solutions were provided at the Focus Groups based on the initial departure flown followed by 20-degree and 25-degree bank angles following the existing NTK tracks. The actual PDR was not plotted as there is no graphical representation of what the route should be. The Focus Group Notes (**Documents 8, 9 and 10**) demonstrate that either of the proposed solutions or any route bracketed between the two angles presented with the inclusion of additional track miles for climb (if possible) would be acceptable. The extra track miles were requested by airline and ATM stakeholders for the purposes of airspace containment.

3.7.4. The 'threat' posed to the continued safety of operation resulting from the retention of the current airspace structure (i.e. the do-nothing scenario) is largely covered in the Stakeholder Consultation Document and is further amplified in **CL-5216-RPT-002** (PIR Options Report already held by the CAA). The containment of SIDs in accordance with CAA Policy³ is considered appropriate and in keeping with the concerns raised by the aviation stakeholders as highlighted in paragraph 3.7.3 above.

3.7.5. Moreover, there are operational safety and efficiency benefits of increasing the volume of CAS. Both controller and cockpit workload is increased by having procedures that leave one form of controlled airspace to venture into uncontrolled airspace before re-entering controlled airspace. The human factors associated with change of ATS over a short distance must not be downplayed. Conversely, the smooth uninterrupted vertical and lateral profile afforded to the aircraft contained within controlled airspace is far more efficient. For this reason, the additional airspace for containment of the ROGAG SIDs is considered justified.

³ SARG Policy Statement, 'Controlled Airspace Containment Policy', dated 17 January 2014.

4. Supporting Infrastructure/Resources

- 4.1. Although there are no changes required to the airspace configuration which supports the conversion of the existing SID procedures to RNAV SID procedures, the previous sections highlight the proposed changes to the airspace necessary to support the conversion of the PDRs to the east to RNAV SID procedures.
- 4.2. There are no changes required to the ATM infrastructure and resources at DSA as a consequence of this ACP. However, a minor change is required to the en-route ATM network, as detailed in paragraph 2.12.7 above. This will require no changes to the ATM resources at NATS PC.
- 4.3. ATM interfaces with NATS PC at Prestwick are well established and are subject to regular review by both Units. The proposed change to the en-route network has been agreed with NATS PC.
- 4.4. ATC staffing arrangements will remain unchanged from those that exist today.
- 4.5. Minimal staff training will be required to assimilate the change in nomenclature, revised route alignments and application of RNAV principles.
- 4.6. The SID procedures are suitable for navigation by means of GNSS. GNSS coverage and continuity is adequate to support the procedures.
- 4.7. Contingency arrangements in the event of loss of RNAV-1 navigation capability by an aircraft whilst within the DSA CTR/CTA include the provision of navigation assistance by means of surveillance systems. This is acceptable and would be within ATC workload.
- 4.8. The proposed SID procedures are contained within airspace where the Communications, Navigation and Surveillance (CNS) infrastructure is well proven and appropriate contingency procedures already exist.
- 4.9. No changes are required to the extant SSR Code assignments.
- 4.10. Existing separation standards and ATC procedures are adequate to support the replacement of the existing PDRs with RNAV-1 SID procedures. The establishment of Class D controlled airspace to the east will enable the appropriate “inside controlled airspace” separation minima to be used against other airspace activity and will reduce controller workload in comparison to the current “outside controlled airspace” operating environment.

5. Operational Impact

5.1. Overview

- 5.1.1. This Section outlines the impact on airspace users under the bullet points detailed in CAP725 Appendix A paragraph 7.

5.2. Impact on IFR General Air Traffic or Operational Air Traffic or VFR traffic through the area

- 5.2.1. There is no impact on the operation of other IFR or VFR flights through the existing DSA CTR/CTA as a consequence of the replacement of the conventional SIDs and PDRs with RNAV SID procedures or the introduction of RNAV IAPs.

- 5.2.2. IFR and VFR transit flights in Class D controlled airspace are subject to ATC clearance which enables potential conflict between these flights and any DSA aircraft to be managed and resolved in accordance with standard ATC practice. The introduction of the additional segment of Class D CTA is no different and will be managed in the same way. Despite the views of some GA organisations, the dimensions of this additional segment are not excessive and are considered to be proportionate with the traffic profiles. As the base is set at FL85, it is considered to have little impact on traffic transiting the area.

- 5.2.3. The lowering of L603/L60 above R313 is also perceived to have little impact on transit traffic as when R313 is active (up to 9,500ft amsl). The MoD were engaged in focus group activities (as evidenced) as DSA were conscious of the need for military aircraft to transit from the Lincolnshire AIAA into the Vale of York AIAA and onwards to the Danger Area complex over the North Sea. The MoD have agreed a draft Letter of Agreement (LoA – Document 40) and they did not object to the proposal either at the Focus Group level or in the formal consultation.

5.3. Impact on VFR operations

- 5.3.1. There is no impact on the operation of VFR flights (whether arriving, departing, transiting or manoeuvring) through the existing DSA CTR/CTA as a consequence of the replacement of the conventional SIDs and PDRs with RNAV SID procedures or the introduction of RNAV IAPs.

- 5.3.2. All VFR flights in Class D controlled airspace are subject to ATC clearance which enables potential conflict between such aircraft and any DSA IFR flights using the SIDs or IAPs to be managed and resolved in accordance with standard ATC practice and with the minimum of disruptive impact on VFR activity.

- 5.3.3. The operation of VFR flights in the proposed new Class D airspace will be accommodated in the same way. The existing ATM resources are adequate to manage the very small amount of additional Class D airspace without detriment to the service within the existing Class D airspace or to services routinely provided outside controlled airspace.

5.4. Consequential impact on procedures and capacity

- 5.4.1. The capacity of the airspace, ATC and the Airport are not affected by the change from PDRs to SID procedures. The SID procedures are suitable to handle the approved forecast traffic growth at DSA.
- 5.4.2. The SID procedures are compatible with NATS requirements for access to the overlying route network.
- 5.4.3. Integration of departing traffic with other arriving, departing or overflying flights, including those carrying out notified IFPs, will be carried out in accordance with standard ATC practice. No significant changes are anticipated.

5.5. Impact on aerodromes and specific activities within or adjacent to the proposed routes

- 5.5.1. The Sandtoft ATZ is embedded within the DSA CTR for which a Letter of Agreement (LoA) exists to ensure a fully integrated operation within the normal Class D airspace rules. The replacement of PDRs with SIDs does not impact on these arrangements.
- 5.5.2. There are a number of aerodromes in close proximity to the DSA CTR/CTA such as Retford/Gamston, Sherburn-in-Elmet, Sandtoft, Netherthorpe and Darlton. Some operate training flights within or through the CTR/CTA subject to ATC clearance; these flights are integrated into the overall ATM operation in accordance with normal ATC practice.
- 5.5.3. Sandtoft, Retford (Gamston) and Sherburn-in-Elmet were all engaged with during the development of these proposals.
- 5.5.4. The Airport has LoAs with neighbouring GA airfields/units and these continue to result in the provision of access to both IFR and VFR aircraft as required in a co-ordinated fashion. These LoAs were reviewed with the airspace change in mind and were found to not be impacted. Local and neighbouring airspace users are engaged regularly for professional discussion and DSA has convened a Local Airspace Infringement Team (LAIT). Members of this team consist of local and neighbouring aviation schools, clubs (fixed wing and glider) and pilots including neighbouring airports and a CAA Airspace Regulator.

5.6. Any flight planning restrictions or route requirements

- 5.6.1. There are no other restrictions or route requirements for the use of the SIDs by aircraft approved for RNAV-1 operations in Terminal Airspace. The small numbers of aircraft incapable of meeting the demands of the RNAV-1 SIDs will be issued an ODD as detailed in para 2.8.

6. Economic Impact

- 6.1. CAP725 suggests that an economic appraisal and valuation should be made of the economic impact of the proposal. However, it acknowledges the difficulties in doing so.
- 6.2. There are no economic benefits accruing to DSA as a consequence of the replacement of the conventional SIDs and PDRs with RNAV-1 SID procedures, nor with the introduction of RNAV IAPs. These IFPs do not increase airspace or runway or Airport capacity nor do they enable any reduction in the provision of infrastructure or resources.
- 6.3. Minor economic benefits may accrue to aircraft operators through the application of more regularised flight procedures and the more efficient and continuous climb profile of the ROGAG SIDs. The more efficient climb will help to negate the slight increase in track miles associated with the proposed designs which prioritise the reduction in the adverse effects of aviation noise over fuel and emissions below 7,000ft.
- 6.4. Conversely, there may be slight economic detriment arising from the application of less than optimum speed control requirements for jet aircraft to the first few miles of each SID procedure. The speed limits are applied to ensure track adherence for environmental (noise) and operational reasons and are compatible with aircraft operating parameters. Any perceived detriment is considered to be unquantifiable.
- 6.5. It is not possible to develop any viable cost-benefit analysis of the proposed IFPs.

7. Safety Management

- 7.1. Safety Management is an intrinsic element of any airspace change. DSA has an obligation to provide ATS and IFPs which are safe.
- 7.2. DSA operates a Safety Management System (SMS) in accordance with the provisions of CAP670⁴ and Single European Sky Common Requirements.
- 7.3. DSA has used sound safety management principles throughout the development of the IFPs detailed in this ACP.
- 7.4. DSA has taken due regard of that which was learned from the Flyability Assessments conducted in a B737-800 simulator in the application of climb gradients and speed limits to the procedure designs and has welcomed the support of Virtual Aviation in providing simulation facilities to meet the procedure validation requirements of CAP785. **Document 11** in the ACP bundle is the Flyability Assessment Plan. A Flight Validation Plan will be written and submitted ready for the simulations expected to take place in both a B737-800 and an A320 simulator in late-June 2018.
- 7.5. A HAZID Analysis has been carried out on the proposed SID procedures and will be documented within the ATCSL SMS. Local Operators and the ANSP (ATCSL) were involved in the HAZID so that the safety implications could be assessed alongside each other. The results of the HAZID will be made available to SARG ATS regulation department and to SARG IFP Regulation Staff with the CAP785 submission. **Documents 3, 4 and 7** contain the HAZID Brief, Presentation and the HAZID Report.

⁴ CAP670: ATS Safety Requirements

8. Airspace and Infrastructure Requirements

8.1. A key element of any change proposal is the need to demonstrate that the proposed airspace change complies with the Airspace and Infrastructure Requirements. The Airspace and Infrastructure Requirements are derived from SES Regulations, ICAO SARPs and ECAC/Eurocontrol requirements, and any additional requirements to satisfy UK Policy. These are met as follows:

- The proposed airspace structures are of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to contain horizontal and vertical flight activity in both radar and non-radar environments;
- As the airspace structure is required for radar control purposes, the dimensions should be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer. This safety buffer should be in accordance with agreed parameters as set down in SARG Policy Statement 'Safety Buffer Policy for Airspace Design Purposes Segregated Airspace' unless covered by 'Policy Dispensations'. This is covered by the LoA referred to at paras 2.12.8-2.12.9;
- The Air Traffic Management (ATM) system remains adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures;
- Existing Air Traffic Control (ATC) procedures are sufficient to ensure required separation between traffic inside the new airspace structures and traffic within R313 and the Class G airspace;
- Within the constraints of safety and efficiency, the airspace classification (Class D) will permit access to as many classes of user as practicable;
- Assurance against unauthorised incursions is assured, as far as practicable, through the promulgation of an AIC, through the AIRAC cycle, through annotation of the airspace structure on the relevant VFR chart and through the DSA Local Airspace Infringement Team (LAIT) highlighted in para 5.5.3;
- Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available;
- The notification of the implementation of the new airspace structures will be adequate to allow interested parties sufficient time to comply with user requirements. This will be done through a single AIRAC cycle;
- There is sufficient R/T coverage to support the ATM system within the totality of proposed controlled airspace;
- If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered; and

- Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc.) in the vicinity of the new airspace structure and no suitable operating agreements or ATC Procedures can be devised, the Change Sponsor shall act to resolve any conflicting interests.

8.2. Terminal Airspace (CTR/CTA)

8.2.1. Airspace changes in respect of Terminal Airspace (CTR/CTA) structures are subject to additional requirements and these are met as specified in the paragraphs below:

- The airspace structure is of sufficient dimensions to contain the procedures, holding patterns and their associated protected areas;
- There is effective integration of departure and arrival routes associated with the airspace structure and linking to designated runways and published IAPs;
- The routes between the proposed terminal airspace and existing en-route airspace structure are linked;
- The airspace structure has been designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace;
- Suitable arrangements for the control of all classes of aircraft (including transits) operating within or adjacent to the airspace in question, in all meteorological conditions and under all flight rules, are already in place;
- Sufficient VRPs are already established within or adjacent to the DSA CTR/CTAs to facilitate the effective integration of VFR arrivals, departures and transits of the airspace with IFR traffic;
- There remains suitable availability of radar control facilities;
- DSA (through their ANSP) shall, upon implementation of this airspace change, continue to gather and maintain statistics on the number of aircraft transiting their airspace. DSA shall maintain records on the numbers of aircraft refused permission to transit their airspace, and the reasons why; and
- Continuous Descent Approach (CDA) profiles have not been incorporated into the RNAV IAP designs from the holding facility.

8.3. Off-Route Airspace Structures

8.3.1. Airspace changes in respect of Off-Route Airspace Structures are subject to additional requirements and these are met as specified in the paragraphs below:

- As the new structure lies close to another airspace structure (R313), a LoA setting out the operating agreements has been drafted; and

- As there is significant aviation activity (military low flying, gliding, parachuting, microlight site etc.) in the vicinity of the new airspace structure there are several LoAs already in place containing suitable operating agreements and ATC Procedures. DSA shall continue to act to resolve any conflicting interests through the Local Airspace Infringement Team (LAIT).

9. Supporting Maps, Charts and Diagrams

- 9.1. Formal Proposals must include diagrams and descriptions of the airspace proposed, clearly showing the dimensions and WGS84 co-ordinates of the proposed changes. The division of complex airspace structures must be clearly annotated, in accordance with charting convention as far as possible. An explanation for each proposed structure must be given to substantiate the need.
- 9.2. An overlay of the proposed airspace changes has been provided in order to illustrate the difference between current and proposed structures on a 1:500 000 series VFR chart. This chart can be viewed at Appendix C9.
- 9.3. **Table 4** below details the UK AIP charts and paragraphs that are affected by the proposed changes.

Chart Title	Chart No.	Remarks
Doncaster Sheffield Aerodrome – Textual Data	AD 2-EGCN-1	2.8 VOR checkpoints 2.17 Air Traffic Services Airspace 2.19 Radio Navigation and Landing Aids 2.21 Noise Abatement Procedures para 3 (Departures) 2.22 Flight Procedures para 3 (Non-Radar Approach Procedures), para 4 (Holding), para 5 (Radio Communications Failure Procedures), para 6 (Procedures for Outbound Aircraft) and para 9 (VRPs) 2.24 Charts Related to an Aerodrome
Control Zone and Control Area Chart - ICAO	AD 2-EGCN-4-1	Additional CTA
ATC Surveillance Minimum Altitude Chart – ICAO	AD 2-EGCN-5-1	Remove GAM VOR

Chart Title	Chart No.	Remarks
Upton SIDs Chart - ICAO	AD 2-EGCN-6-1	New Chart for RNAV SIDs
Additional Chart Required – ROGAG SIDs Chart - ICAO	N/A	New Chart for RNAV SIDs
Additional Charts Required – RNAV IAPs	N/A	New Charts for RNAV IAPs

Table 4: AIP Amendments

- 9.4. The VFR charts will need amending to reflect the removal of the GAM VOR. As the additional segment of CTA is above 5,000ft it will not need annotating on the 1:250,000 chart but it will need annotating on the 1:500,000 chart along with changes to the base of L603/L60. DSA will ensure these changes are made subject to these changes being approved.
- 9.5. Draft IFP Charts and Data Coding Tables are included at **Appendix C** and include WGS84 co-ordinate data. These, together with the additional data required to satisfy the CAP785 IFP approval requirements will be submitted separately to the IFP Regulation Section of SARG. Waypoint co-ordinates in both WGS-84 and OSGB-36 format are given in **Appendix C**.
- 9.6. The Stakeholder Consultation Document carries a selection of charts and diagrams depicting the proposed SIDs and the NPRs against both Google Earth and Ordnance Survey backgrounds. The Technical Annexes to Part B of the Stakeholder Consultation Document also carry a selection of charts and diagrams depicting the route of the SIDs against Google Earth backgrounds. In addition, track plot diagrams were included showing the historic actual flight paths of departing aircraft (derived from the Airport NTK equipment) against the proposed SID routes.
- 9.7. These graphical illustrations enabled consultees to assess how they might be affected by the alignment of the proposed SID procedures against how they had been affected by the use of the existing SIDs and PDRs in the past.

10. Designation of SIDs and Waypoint Naming

- 10.1. CAA Policy for the designation of SIDs (in accordance with ICAO Annex 11, Appendix 3) is detailed in CAP778 and CAA Policy Statement of 18 February 2014⁵.
- 10.2. It is proposed that the Route Designators, UPTON and ROGAG, be allocated to DSA RNAV SID procedures.
- 10.3. Waypoint naming is in accordance with the CAA Policy detailed in CAP778 and CAA Policy Statement of October 2008⁶.
- 10.4. SID termination waypoints and existing waypoints on ATS routes are given the ATS Route Significant Point.
- 10.5. Waypoints that are likely to be spoken in RTF dialogue or are at the intersection of two or more SID procedures are allocated a 5-Letter Name Code (5LNC).
- 10.6. All other waypoints are given an alpha-numeric designator comprising CN, then a letter denoting the appropriate quadrant from the Airport (N, E, S, or W) and a number denoting the approximate distance from the departure runway.
- 10.7. The IAFs for the RNAV IAPs will be assigned 5LNCs as will the IFs and FAFs as per the CAA Policy at footnote 6 (para 2.2). These names will not be known until application is made following CAP785 approval.

⁵ SARG Policy Statement 18 February 2014: Designation of Standard Instrument Departures and Standard Approach Procedures in the UK Flight Information Region; Paragraph 1.

⁶ DAP Policy Statement 30 October 2008: Use and allocation of RNAV Waypoints

11. Inputs to the Environmental Assessment

11.1. Overview

- 11.1.1. CAP725⁷ details the required inputs to the environmental assessment. This Section outlines the way DSA has approached the environmental assessment of the proposed SID procedures, including the consideration of anticipated dispersion about the nominal centre-line of each route.
- 11.1.2. Details of the specific environmental considerations applicable to the generality of the development of the proposed SID procedures, as well as their application to each specific SID were documented in the Stakeholder Consultation Document and supporting Technical Annexes.
- 11.1.3. This Section of the ACP provides an additional rationale of the headline aspects of environmental assessment detailed in CAP725. Additional details of the specific environmental considerations for each individual route are given in Sections 14 to 19 of this Document.

11.2. Traffic Forecasts

- 11.2.1. Traffic growth forecasts were included in the environmental assessment of the impacts of the proposals and were made clear in the Stakeholder Consultation document. The new DSA Master Plan predicts growth to sustain the handling of between 4.7 and 7.2 million passengers and between 70,000 and 176,500 tonnes of cargo annually by 2037.
- 11.2.2. Forecast traffic growth is not affected by either the replacement of PDRs or the conventional SIDs with RNAV SIDs.
- 11.2.3. In each SID description detailed in the technical Annexes to the Stakeholder Consultation Document, we included an estimated utilisation of the routes based on Summer 2016 data.

11.3. Airport Noise Contours

- 11.3.1. CAP725⁸ requires that ACP Sponsors must produce $L_{Aeq, 16h}$ and $L_{Aeq, 8h}$ noise exposure contours for any changes to departure routes below 4000ft.
- 11.3.2. DSA provided noise contour charts depicting the pre-RNAV arrangements (2017), the immediate post-implementation “with RNAV” arrangements and the 5-year forward (2023) situation.
- 11.3.3. The Noise Contour Charts are depicted and described in the Stakeholder Consultation Document and can be viewed in full in the Environmental Assessment Report (**Document 31**).

⁷ CAP725 Appendix B Section 3.

⁸ CAP725 Appendix B Section 4.

11.4. SEL Footprints

- 11.4.1. CAP725⁹ requires SEL footprints to be calculated when any changes to the distribution of flight paths at night below 7000ft within 25km of a runway are proposed.
- 11.4.2. DSA commissioned the production of SEL charts for the Boeing 737-800 for the proposed departure routes. The B737-800 is the most common and the noisiest type at night in the forecasts for both 2017 and 2023.
- 11.4.3. The SEL Charts were explained in the Part A of Stakeholder Consultation Document¹⁰. The SEL chart analysis and depiction is given for each SID in the technical annexes to Part B of the Stakeholder Consultation Document and can be viewed in full in the Environmental Assessment Report (**Document 31**).
- 11.4.4. As with the L_{Aeq} contours, the SELs depicted the pre-RNAV arrangements (2017), the immediate post-implementation “with RNAV” arrangements and the 5-year forward (2023) situation.

11.5. Lateral Dispersion of Traffic

- 11.5.1. The expected lateral dispersion of the RNAV SIDs will be in keeping with RNAV-1 navigational tolerance. The lateral dispersion for the RNAV IAPs is not expected to change as the omission of the T-bars was intended to allow the design to replicate the pattern flown by aircraft being vectored to the ILS. This is described in Part C, Section 1.2 of the Stakeholder Consultation Document.

11.6. National Parks and Areas of Outstanding Natural Beauty

- 11.6.1. No National Parks or Areas of Outstanding Natural Beauty are impacted by the proposals.

11.7. Visual intrusion, Tranquillity and Biodiversity

- 11.7.1. Although difficult to measure, the potential visual intrusion and impact on tranquillity is recognised.
- 11.7.2. In terms of biodiversity, the Site of Specific Scientific Interest (SSSI) at Hatfield Moors was already overflowed by the ROGAG 02 PDR, the ROGAG 1B goes slightly further north over this SSSI (a lowland peat bog). A response of ‘No comment’ from both the Environment Agency and Natural England was received to the Stakeholder Consultation.

11.8. Local air quality

- 11.8.1. Technical guidance material from the CAA does not require DSA to make an assessment of air quality as neither the airport nor the surrounding airspace lie within an Air Quality Management Area (AQMA).

⁹ CAP725 Appendix B Section 4.

¹⁰ Stakeholder Consultation Document, Part A, Section 3.5

11.8.2. This was detailed in the Stakeholder Consultation Document¹¹.

11.9. Climate change and emissions

11.9.1. CAP725 states¹² that the potential to maximise CO₂ efficiency is primarily above 7000ft where local impacts are not a priority. The UPTON SID procedures do not extend above 7000ft. The ROGAG SID procedures do extend to FL160 but the DfT's altitude-based priorities have been heeded in the designs resulting in slightly longer track distances up to 7000ft.

11.9.2. The DfT Air Navigation Guidance (ANG) (2017) states that *'in the airspace from the ground to below 4,000 feet the government's environmental priority is to limit and, where possible, reduce the total adverse effects on people.'* It goes on to state that in the airspace at or above 4000ft to below 7000ft *'the environmental priority should continue to be minimising the impact of aviation noise in a manner consistent with the government's overall policy on aviation noise, unless the CAA is satisfied that the evidence presented by the sponsor demonstrates this would disproportionately increase CO₂ emissions.'*

11.9.3. The proposal is to replace the PDRs and SIDs with RNAV SID procedures which are aligned to a large extent on comparable flight paths, and the proposals do not alter the numbers of aircraft accessing the route network. DSA were very conscious of the DfT guidance on noise below 7000ft and as a result the track distances of the SIDs are slightly longer than the corresponding existing departure routes (as flown, not necessarily as published). DSA considers that the negative impact of this ACP on emissions and climate change (highlighted in **Document 32**) is not 'disproportionate' to the proposed changes aimed at reducing the total adverse effects (noise) on communities close to the Airport.

11.10. Relief and Respite

11.10.1. Although no defined respite options were deemed to be practical, DSA has considered relief in accordance with the DfT ANG. The Stakeholder Consultation Document¹³ covers the relief afforded to several communities associated with the proposed changes to the departure procedures. Note: The 2014 ANG was utilised as the 2017 ANG had not been released at consultation launch.

11.11. Altitude-Based Priorities

11.11.1. As the SIDs are contained largely below 7,000ft, DSA's priority, in the conceptual design phase of the proposed SIDs, was to minimise noise impact of aircraft and the number of people on the ground significantly affected by it. Again, this aligns with the DfT ANG (2014) and the Altitude-Based Priorities contained within it.

¹¹ DSA Stakeholder Consultation Document, Part A, Section 4.4.

¹² CAP725 (2016 edition) Appendix B paragraph B101.

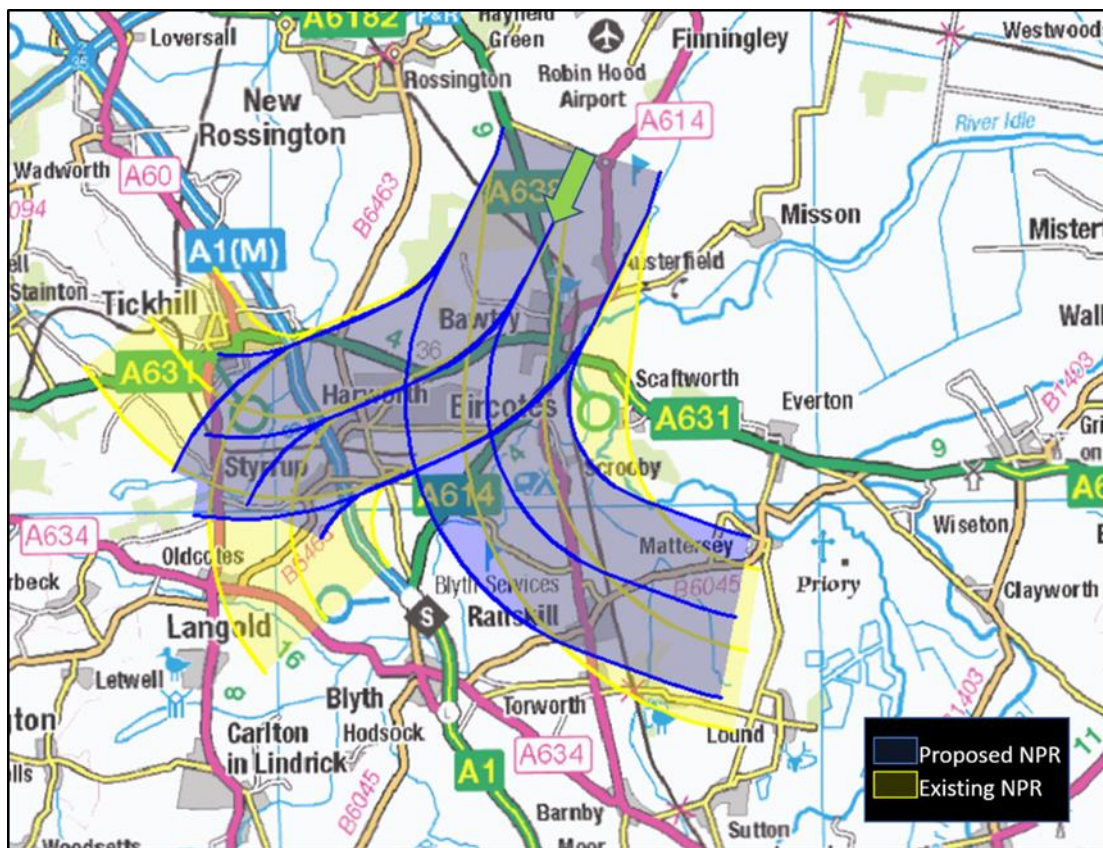
¹³ DSA Stakeholder Consultation Document, Part A, Section 4.2.

11.12. Continuous Descent Operations

- 11.12.1. Continuous Descent Operation were not factored in as transitions between the STAR and the IAP were not part of this ACP.

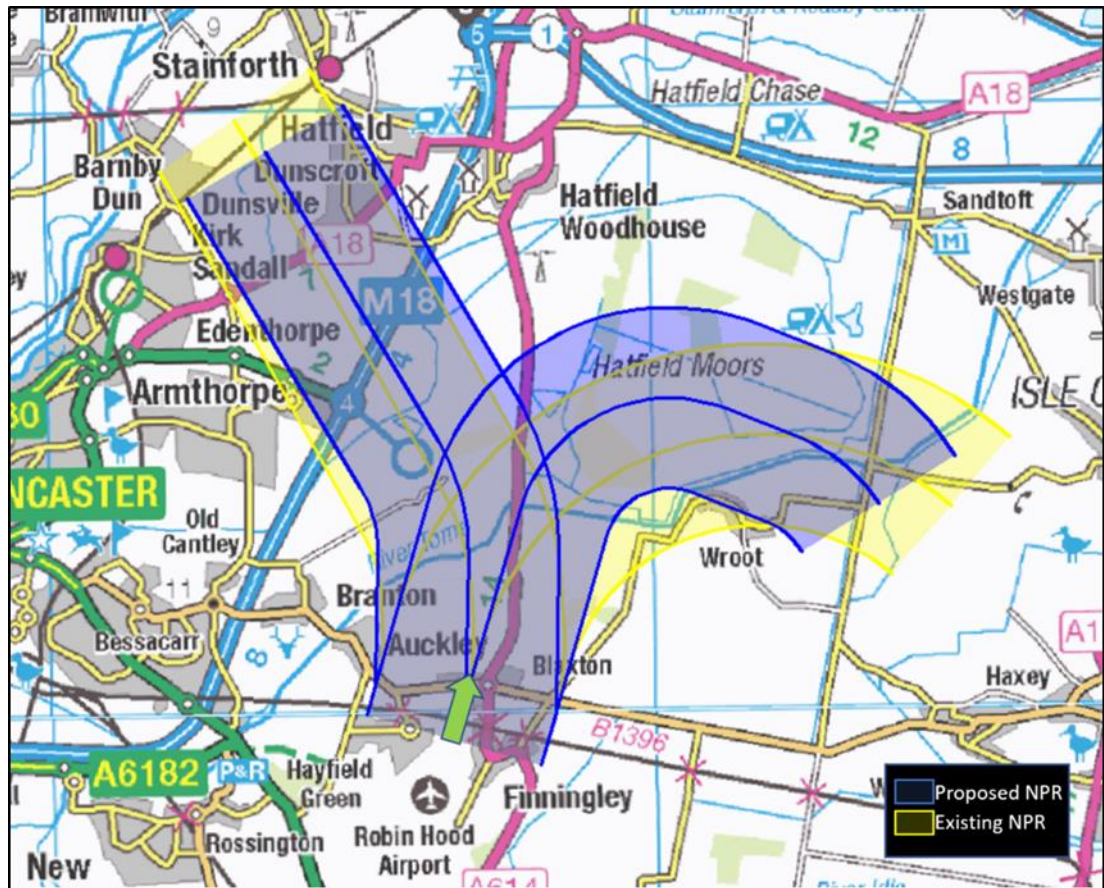
12. Noise Preferential Routings (NPRs)

- 12.1. Although there is no proposal to amend any other aspect of their Noise Abatement Procedures, DSA wish to amend the NPRs that were agreed with the Local Planning Authority, Doncaster Metropolitan Borough Council, under a Section 106 Agreement (see **Document 41**).
- 12.2. The proposal is clearly set out in Section 3 of Part A of the Stakeholder Consultation Document. The existing NPRs at DSA extend from the designated runway end, centred on the nominal track of the SID and either side by 1.5km and extending to an altitude of 3,000 feet based on the minimum procedure climb gradient.
- 12.3. Each SID has a defined NPR and since it is proposed that the SIDs change, the NPRs need to be adapted to follow the new designs. **Figures 6 and 7** (below and overleaf) provide an overview of the existing (yellow) and proposed (blue) NPRs providing a graphical indication of the changes. The proposed NPRs are slightly shorter owing to the increased climb gradient, but will still extend to an altitude of 3,000 feet.



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Figure 6: Runway 20 DSA Noise Preferential Routings



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Figure 7: Runway 02 DSA Noise Preferential Routings

A. CAP725 Compliance Matrix

This Compliance Matrix is submitted to assist in the evaluation of the ACP document against the requirements specified in CAP725. It is modelled on the Compliance Matrix utilised by CAA SARG accompanying a Decision Letter on the implementation of a previous CAP725 ACP.

1.	Justification for the change and Options Analysis	Status
1.1	Is the explanation of the proposed change clear and understood?	Yes
	A full description of the proposed changes is provided in Part A in the Executive Summary. It provides an overview of the submission and the document is laid out to align with CAP725 requirements.	
1.2	Are the reasons for the change stated and acceptable?	Yes
	The GAM VOR is being withdrawn as stated in the Executive Summary and this is the driver for change.	
1.3	Have all appropriate alternative options been considered, including the “do nothing” option?	Yes
	See Section 3 of Part B and the Technical Annexes to the SC Document.	
1.4	Is the justification for the selection of the proposed option sound and acceptable?	Yes
	See Section 3 of Part B and the Technical Annexes to the SC Document. Focus Groups were held with a variety of Stakeholders to ensure that a wide array of considerations was factored into the proposed options.	

2.	Airspace description and operational arrangements	Status
2.1	Is the type of proposed airspace clearly stated and understood?	Yes
	See Section 2.12 of Part B.	

2.	Airspace description and operational arrangements	Status
2.2	Are the hours of operation of the airspace and any seasonal variations stated and acceptable?	Yes
	The proposal is for H24 operation of the airspace (no change in terms of hours of operation).	
2.3	Is any interaction with adjacent domestic and international airspace structures stated and acceptable including an explanation of how connectivity is to be achieved? Has the agreement of adjacent States been secured in respect of High Seas airspace changes?	Yes
	Any chance of interaction with R313 has been factored into the LoA between RAF Waddington and DSA. NATS has also accepted the proposed changes.	
2.4	Is the supporting statistical evidence relevant and acceptable?	Yes
	Traffic numbers per route were provided in the Technical Annexes that accompanied the SC Document. Supporting statistical information was provided in the environmental assessment report.	
2.5	Is the analysis of the impact of the traffic mix on complexity and workload of operations complete and satisfactory?	Yes
	No change to the traffic mix is proposed and the complexity or workload should be reduced for both ATC and pilot owing to airspace containment of the procedures.	
2.6	Are any draft Letters of Agreement and/or Memoranda of Understanding included and, if so, do they contain the commitments to resolve ATS procedures (ATSSD) and airspace management requirements?	Yes
	Yes, see the LoA between DSA and RAF Waddington.	
2.7	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site etc) in the vicinity of the new airspace structure and no suitable operating agreements or ATC Procedures can be devised, what action has the sponsor carried out to resolve any conflicting interests?	Yes

2.	Airspace description and operational arrangements	Status
	See the LoA between DSA and RAF Waddington.	
2.8	Is the evidence that the Airspace Design is compliant with ICAO SARPs, Airspace Design & FUA regulations, and Eurocontrol Guidance satisfactory?	Yes
	Designs have been completed by a UK accredited APD and designs will be submitted in accordance with CAP785.	
2.9	Is the proposed airspace classification stated and justification for that classification acceptable?	Yes
	See Section 2.12 of Part B.	
2.10	Within the constraints of safety and efficiency, does the airspace classification permit access to as many classes of user as practicable?	Yes
	DSA does not deny access to the existing Class D airspace by VFR or IFR itinerant flights or from conducting training operations within the CTR/CTA and is committed to providing equitable access to the all airspace under its jurisdiction. The contracted ANSP is, and will continue to be, adequately resourced, in line with forecast growth, to ensure the airspace is not managed 'by exclusion'.	
2.11	Is there assurance, as far as practicable, against unauthorised incursions? (This is usually done through the classification and promulgation)	Yes
	Radar Surveillance is used to manage the airspace which is published in UK AIP and will be portrayed on UK VFR charting. DSA is proactive in this regard through the Local Airspace Infringement Team (LAIT) meeting held on a regular basis.	
2.12	Is there a commitment to allow access to all airspace users seeking a transit through controlled airspace as per the classification, or in the event of such a request being denied, a service around the affected area?	Yes
	See bullet 2.10 above.	

2.	Airspace description and operational arrangements	Status
2.13	Are appropriate arrangements for transiting aircraft in place in accordance with stated commitments?	Yes
	See bullet 2.10 above.	
2.14	Are any airspace user group’s requirements not met?	Partial
	Although the existing airspace arrangements are not the subject of this ACP, elements within the GA fraternity appear dissatisfied with both the existing and the proposed airspace arrangements. As previously explained, the ANSP does not deny access to the airspace to the GA community and is committed to continue providing flexible access. This is substantiated with evidence from NTK in the submission.	
2.15	Is any delegation of ATS justified and acceptable? (If yes, refer to Delegated ATS Procedure).	N/A
2.16	Is the airspace structure of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to contain horizontal and vertical flight activity (including holding patterns) and associated protected areas in both radar and non-radar environments?	Yes
	Yes	
2.17	Have all safety buffer requirements (or mitigation of these) been identified and described satisfactorily (to be in accordance with the agreed parameters or show acceptable mitigation)? (Refer to buffer policy letter).	Yes
	See Section 2.12 of Part B.	
2.18	Do ATC procedures ensure the maintenance of prescribed separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures?	Yes
	There are no changes to ATC procedures in relation to prescribed separation.	

2.	Airspace description and operational arrangements	Status
2.19	<p>Is the airspace structure designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace?</p> <p>No changes to airspace near the surface.</p>	N/A
2.20	<p>If the new structure lies close to another airspace structure or overlaps an associated airspace structure, have appropriate operating arrangements been agreed?</p> <p>See Section 2.12 of Part B.</p>	Yes
2.21	<p>Where terminal and en-route structures adjoin, is the effective integration of departure and arrival routes achieved?</p> <p>No changes have been made to the integration of routes.</p>	Yes

3.	Supporting Resources and Infrastructure	Status
3.1	<p>Is the evidence of supporting CNS infrastructure together with availability and contingency procedures complete and acceptable? The following are to be satisfied:</p> <ul style="list-style-type: none"> ▪ Communication: Is the evidence of communications infrastructure including RT coverage together with availability and contingency procedures complete and acceptable? Has this frequency been agreed with S&S Section? ▪ Navigation: Is there sufficient accurate navigational guidance based on in-line VOR or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol Standards? Eg. Nav aids – has coverage assessment been made e.g. a DEMETER report, and if so, is it satisfactory? ▪ Surveillance: Radar Provision – have radar diagrams been provided, and do they show that the ATS route / airspace structure can be supported? <p>The CNS infrastructure meets the needs of the proposed procedures.</p>	Yes

3.	Supporting Resources and Infrastructure	Status
3.2	Where appropriate, are there any indications of the resources to be applied, or a commitment to provide them, in line with current forecast traffic growth acceptable?	N/A

4.	Maps, Charts, Diagrams	Status
4.1	Is a diagram of the proposed airspace included in the proposal, clearly showing the dimensions and WGS84 co-ordinates? (We would expect sponsors to include clear maps and diagrams of the proposed airspace structure(s) – they do not have to accord with AC&D aeronautical cartographical standards (see CAP725), rather they should be clear and unambiguous and reflect precisely the narrative descriptions of the proposals. AC&D work would relate to regulatory consultation charts only).	Yes
	Draft Charts (including Waypoint Co-ordinates) included in the ACP document. Database Coding Tabulation is included and will also be submitted within the CAP785 requirement.	
4.2	Do the charts clearly indicate the proposed airspace change?	Yes
	Flight path of proposed SIDs across the ground is depicted in the Annexes to Part B of the ACP.	
4.3	Has the Sponsor identified AIP pages affected by the Change Proposal and provided a draft amendment?	Yes
	Yes, Section 9, Table 1 in Part B of this document refers. Draft AIP amendments will be submitted to AIS in due course once approval of the ACP is assured.	

5.	Operational Impact	Status
5.1	<p>Is the Sponsor’s analysis of the impact of the change on all airspace users, airfields and traffic levels, and evidence of mitigation of the effects of the change on any of these, complete and satisfactory?</p> <p>Consideration should be given to:</p> <ul style="list-style-type: none"> a) Impact on IFR GAT, on OAT or on VFR general aviation traffic flow in or through the area. b) Impact on VFR Routes. c) Consequential effects on procedures and capacity, ie on SIDS, STARS, holds. Details of existing or planned routes and holds. d) Impact on Airfields and other specific activities within or adjacent to the proposed airspace. e) Any flight planning restrictions and/or route requirements. 	Yes
	Comprehensively detailed in Section 5 of Part B of this ACP	
5.2	<p>Does the Stakeholder Consultation letter reflect the likely operational impact of the change?</p>	Yes
	Consultation document sighted by CAA SARG staff before release and no changes recommended.	

6.	Economic Impact	Status
6.1	<p>Is a provisional economic impact assessment to all categories of operations and users likely to be affected by the change included and acceptable?</p> <p>(This may include any forecast capacity gains and the cost of any resultant additional track mileage).</p>	Yes
	See Section 6 of Part B of the ACP.	

7.	Environmental Impact	Status
	See Environmental Impact Matrix appended to Part C of the ACP	Yes

8.	Consultation Process	Status
	See Consultation Matrix appended to Part D of the ACP	Yes

9.	Case Study Conclusions	Status
9.1	Has the Sponsor met the Airspace Change Proposal requirements and Airspace Regulatory requirements above?	Yes
	The requirements of CAP725 have been followed throughout this process.	
9.2	Is the approval of the SoS for Transport required in respect of the Environmental Impact of the airspace change?	N/A
9.3	Is the approval of the MOD required in respect of National Security issues surrounding the airspace change?	N/A

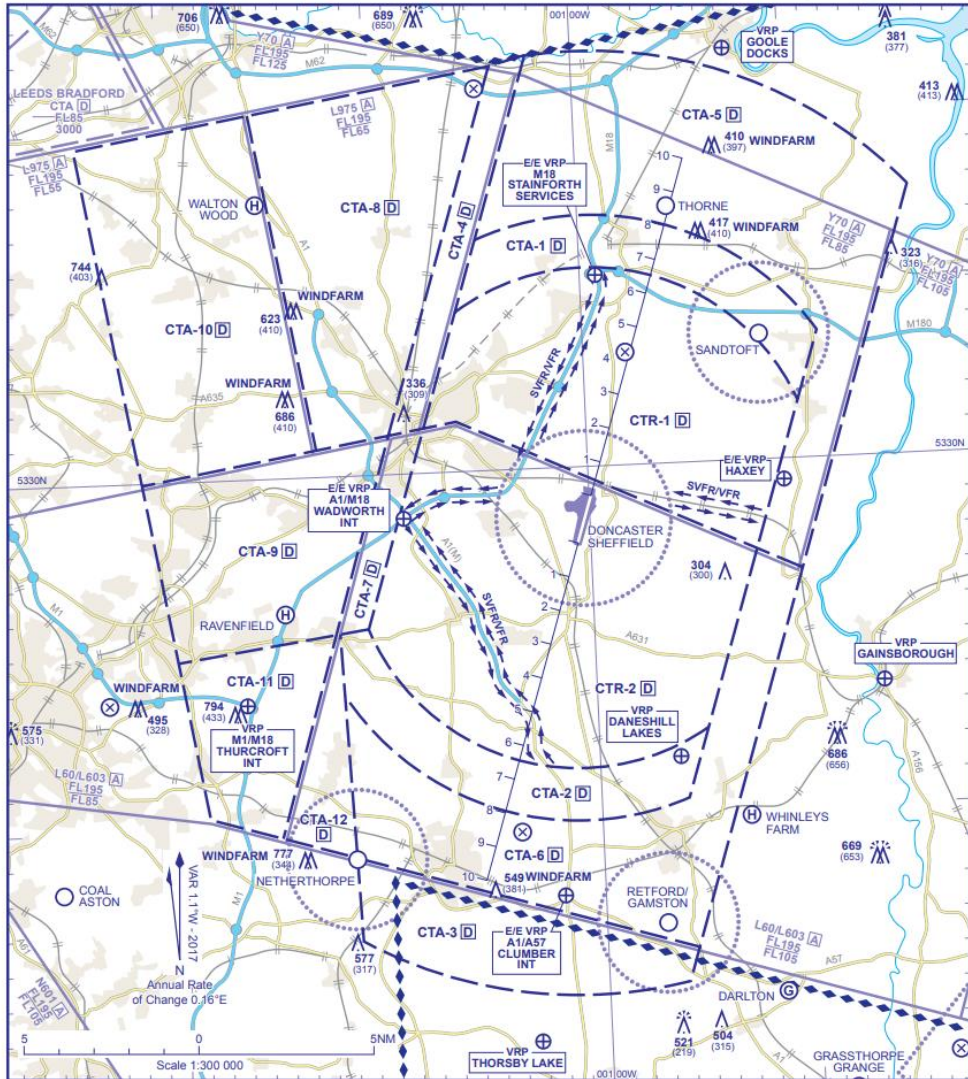
B. Current Charts

B.1. Airspace

UNITED KINGDOM AIP

AD 2-EGCN-4-1
13 Oct 2016

CONTROL ZONE AND CONTROL AREA CHART DONCASTER SHEFFIELD



ATS AIRSPACE VERTICAL LIMITS Controlled airspace with an upper vertical limit of FL195 and above is not shown.

DONCASTER SHEFFIELD			
CTR-1	D	FL85 SFC	
CTR-2	D	FL105 SFC	
CTA-1	D	FL85 1500	
CTA-2	D	FL105 1500	
CTA-3	D	FL60 2000	
CTA-4	D	FL65 2000	
CTA-5	D	FL85 2000	
CTA-6	D	FL105 2000	
CTA-7	D	FL105 2000	
CTA-8	D	FL65 4000	
CTA-9	D	FL85 4000	
CTA-10	D	FL55 4500	
CTA-11	D	FL85 FL60	
CTA-12	D	FL105 FL60	

LATERAL LIMITS

See AD 2-EGCN 2.17

GENERAL INFORMATION

There is an increased risk of Controlled airspace infringements by unknown aircraft in the vicinity of Sandtoft and Netherthorpe airfields.

CHANGE (11/16): MAG VAR. ANNUAL RATE OF CHANGE. AWY L26 REPLACED BY L60.
AERO INFO DATE 15 JUL 16

B.2. UPTON SIDs

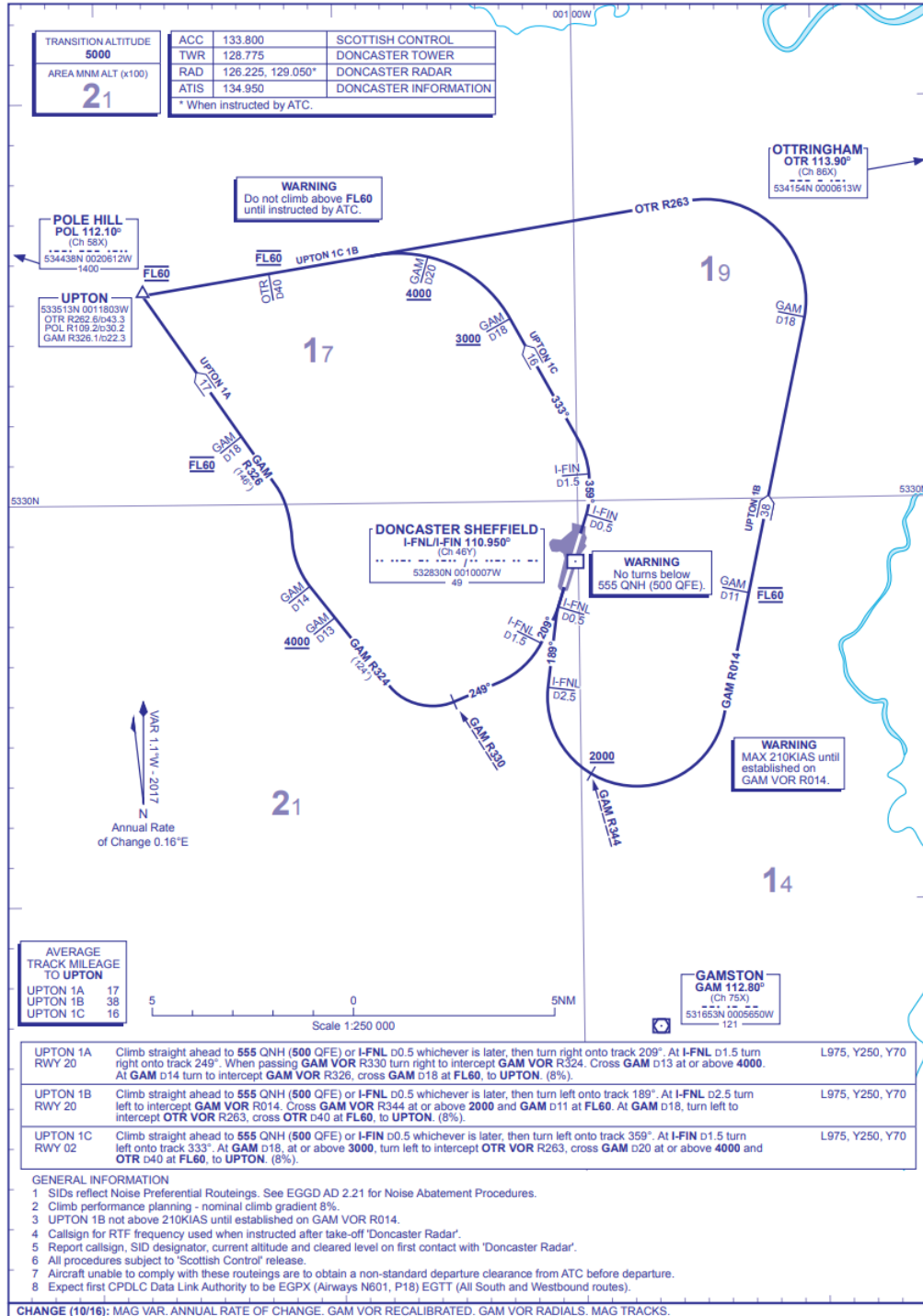
UNITED KINGDOM AIP

AD 2-EGCN-6-1
15 Sep 2016

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

DISTANCES IN NAUTICAL MILES
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
ALTITUDES AND ELEVATIONS ARE IN FEET

DONCASTER SHEFFIELD UPTON



B.3. ROGAG PDRs

UNITED KINGDOM AIP

AD 2.EGNC-15
9 Nov 2017

EGCN AD 2.22 FLIGHT PROCEDURES (continued)

Outbound to	Via	Route
West	L975	UPTON - WAL
	L975/L70	UPTON - DESIG

(b) Aircraft joining airways at UPTON will depart on an UPTON SID detailed in AD 2-EGNC-6-1. Aircraft joining Airways at ROGAG will depart on a ROGAG Planned Departure Route as detailed below:

East L603/Y70 ROGAG -SUPEL - BODSO L603 LAMIX - ROGAG - AMVEL	ROGAG	02	Climb straight ahead to 500 ft or I-F IN D1.0, whichever is later, turn right to intercept the GAM VOR/DME 017R from GAM VOR/DME (197R to GAM VOR/DME) and continue the climb inbound towards GAM VOR/DME. At GAM VOR/DME D5 or FL 80, whichever is later, turn left to intercept the GAM VOR/ DME 099R to ROGAG. Climb not above FL 80 initially. Climb when instructed to cross ROGAG level or above FL 160
		20 North	Climb straight ahead to 500 ft or I-FNL D0.5 whichever the later, then turn left on track 190°. At I-FNL D2.5 turn left to establish on the GAM VOR/DME 015R. At GAM VOR/ DME 015R D11 or FL 60, whichever is sooner, turn left to LAMIX then ROGAG. Climb not above FL 80 initially. Climb when instructed to cross ROGAG level or above FL 160
		20 South	Climb straight ahead to 500 ft or I-FNL D0.5, whichever is later, turn right to track 210 M. At I-FNL D1.5 turn right to track 250°M and at I-FNL D3.5 turn left to intercept the GAM VOR/DME 322R to GAM VOR/DME. At GAM VOR/DME D2 turn left to intercept the GAM VOR/DME 099R to ROGAG. Climb not above FL 80 initially. Climb when instructed to cross ROGAG level or above FL 160

Note 1: These routes are not assessed for obstacle clearance and do not constitute Standard Instrument Departure procedures.

Note 2: The above routes include the Noise Preferential Routes detailed in EGCN AD 2.21.

Note 3: Climb Performance Planning - Nominal climb gradient 8%.

Note 4: Aircraft unable to comply with these routings or climb gradients are required to obtain a non-standard clearance from ATC before departure.

Note 5: Depending on rate of climb, aircraft following ROGAG departures may leave controlled airspace to the East of Gamston. To remain inside controlled airspace aircraft must be above FL 110 abeam GAM and above FL 160 abeam LAMIX.

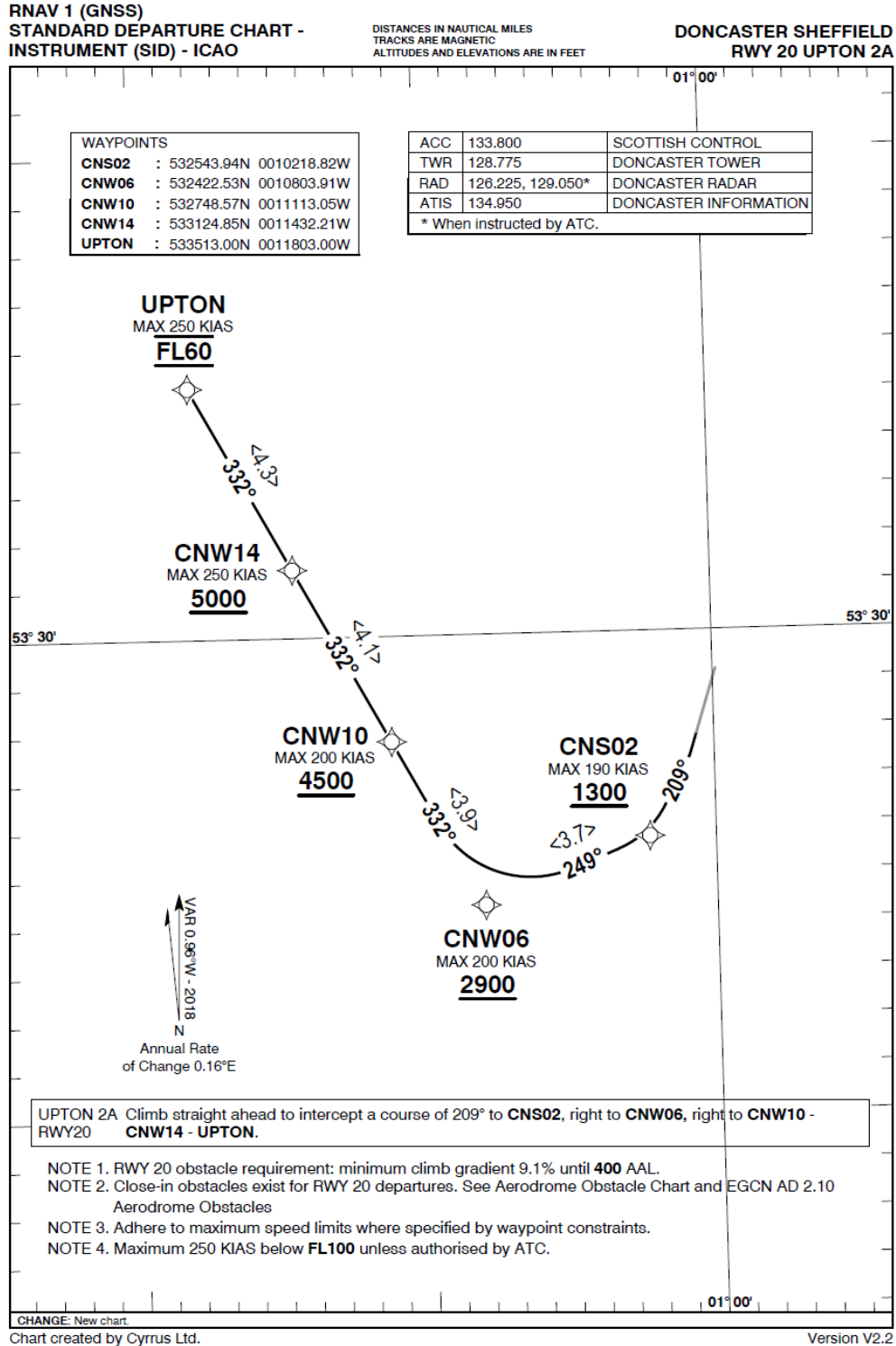
(c) Aircraft outbound to the FIR:

- (i) IFR aircraft wishing to leave the Doncaster Sheffield CTR/CTA and enter the London FIR will be cleared by the most direct route consistent with the current traffic situation.
- (ii) VFR and SVFR aircraft will usually be instructed to route via one of the Visual Reference Points (paragraph 9), not above altitude 2000 ft (aerodrome QNH).

C. Proposed Charts

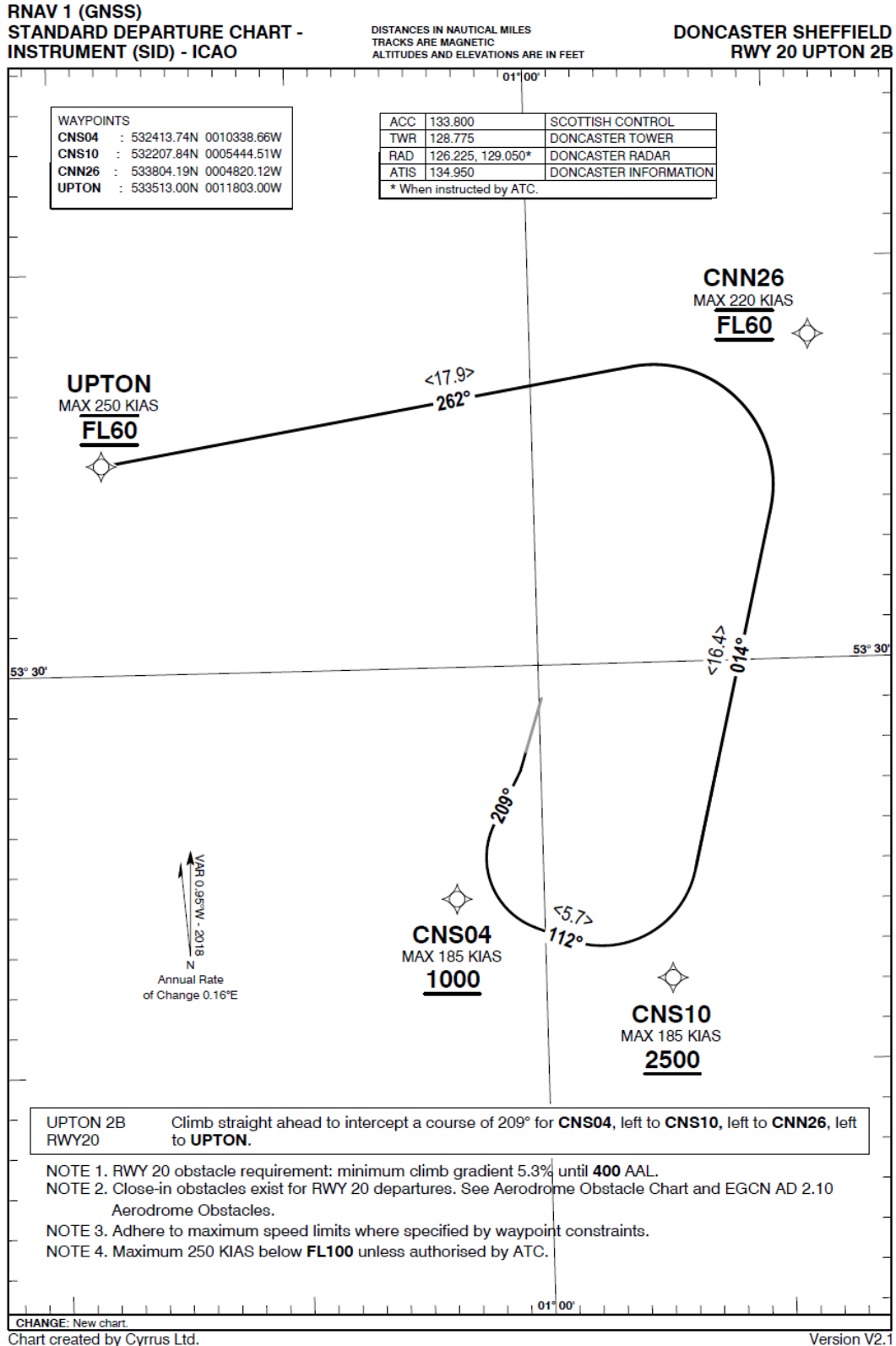
C.1. UPTON 2A

NOT FOR OPERATIONAL USE



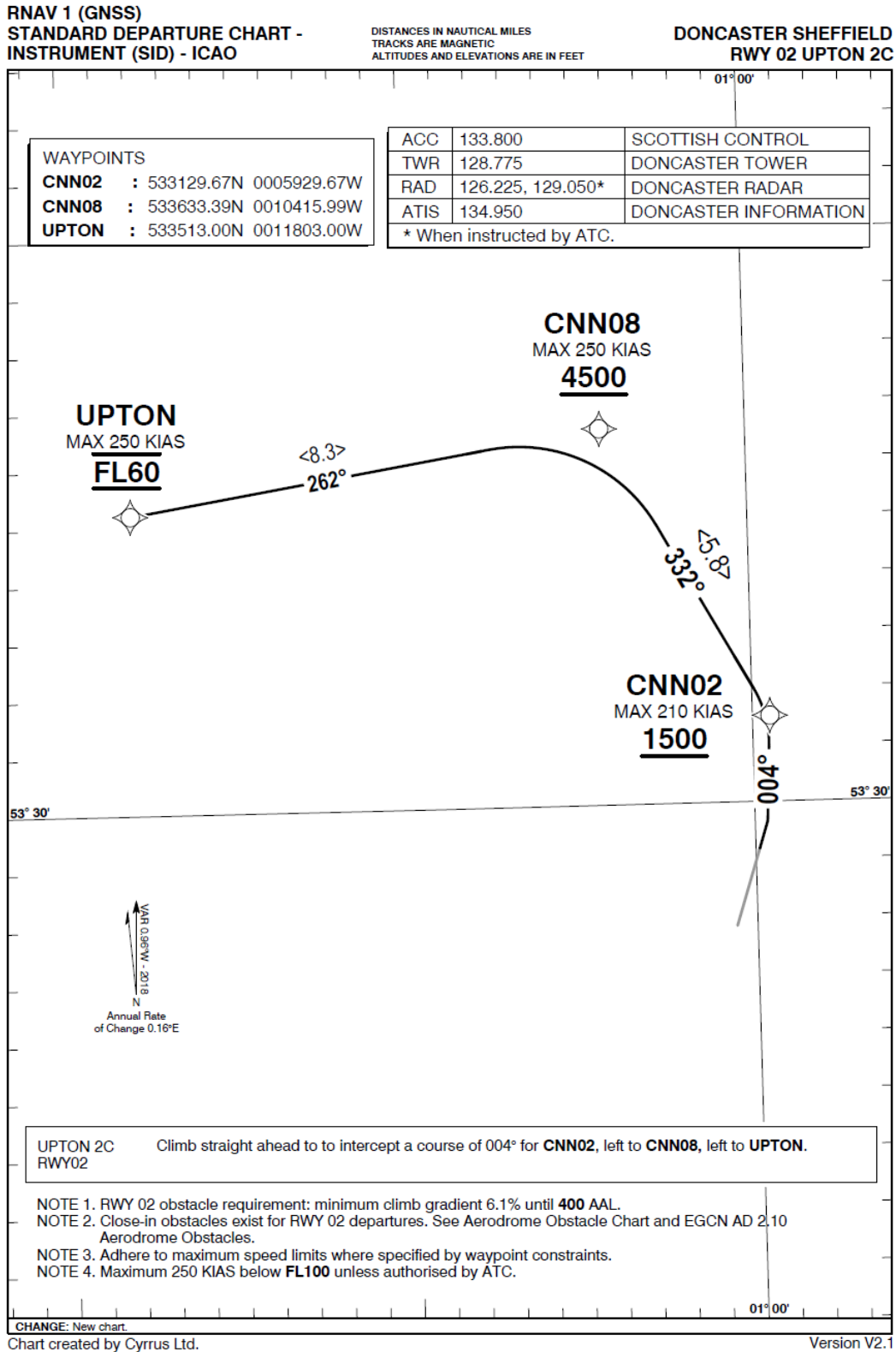
C.2. UPTON 2B

NOT FOR OPERATIONAL USE

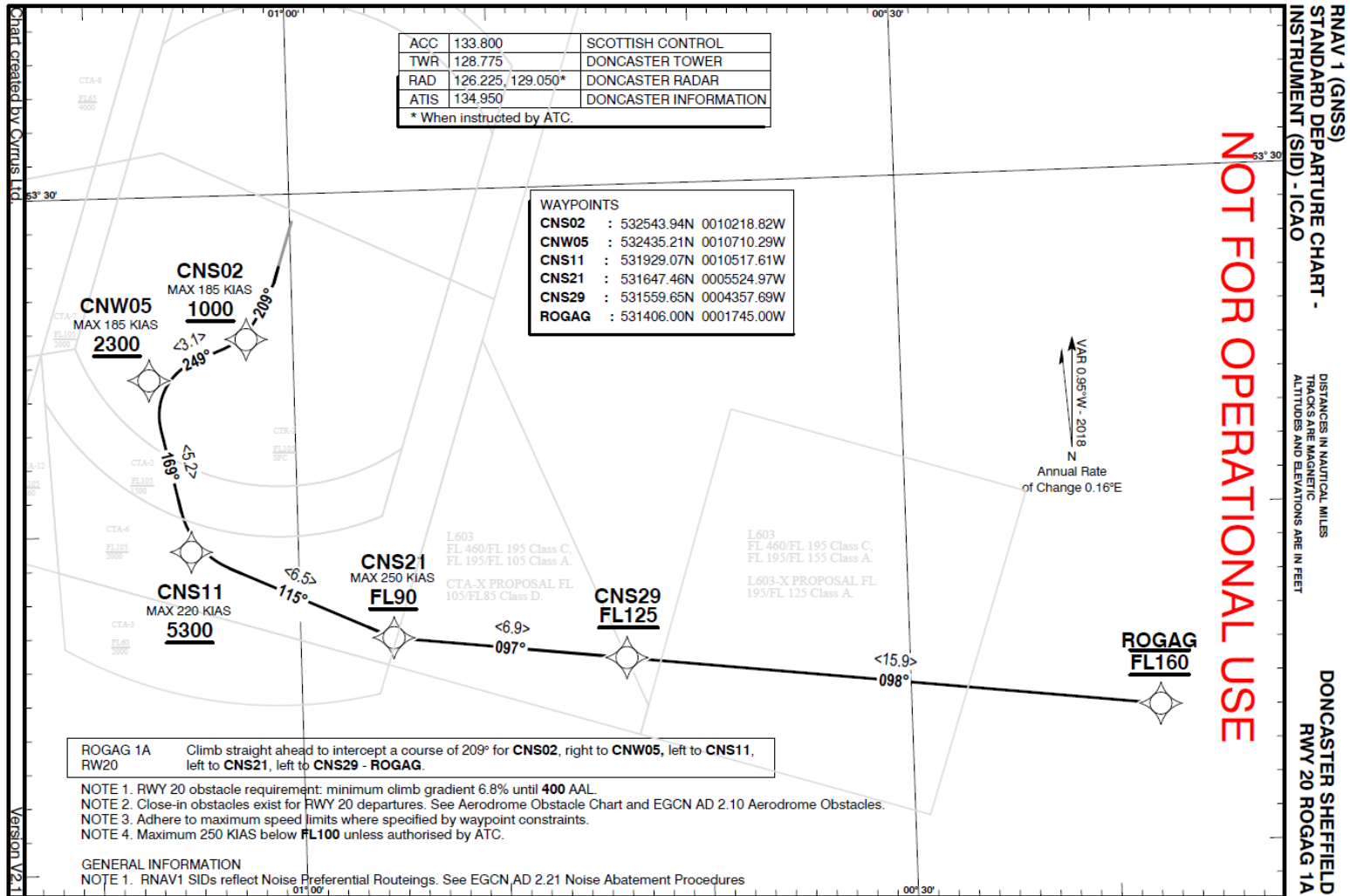


C.3. UPTON 2C

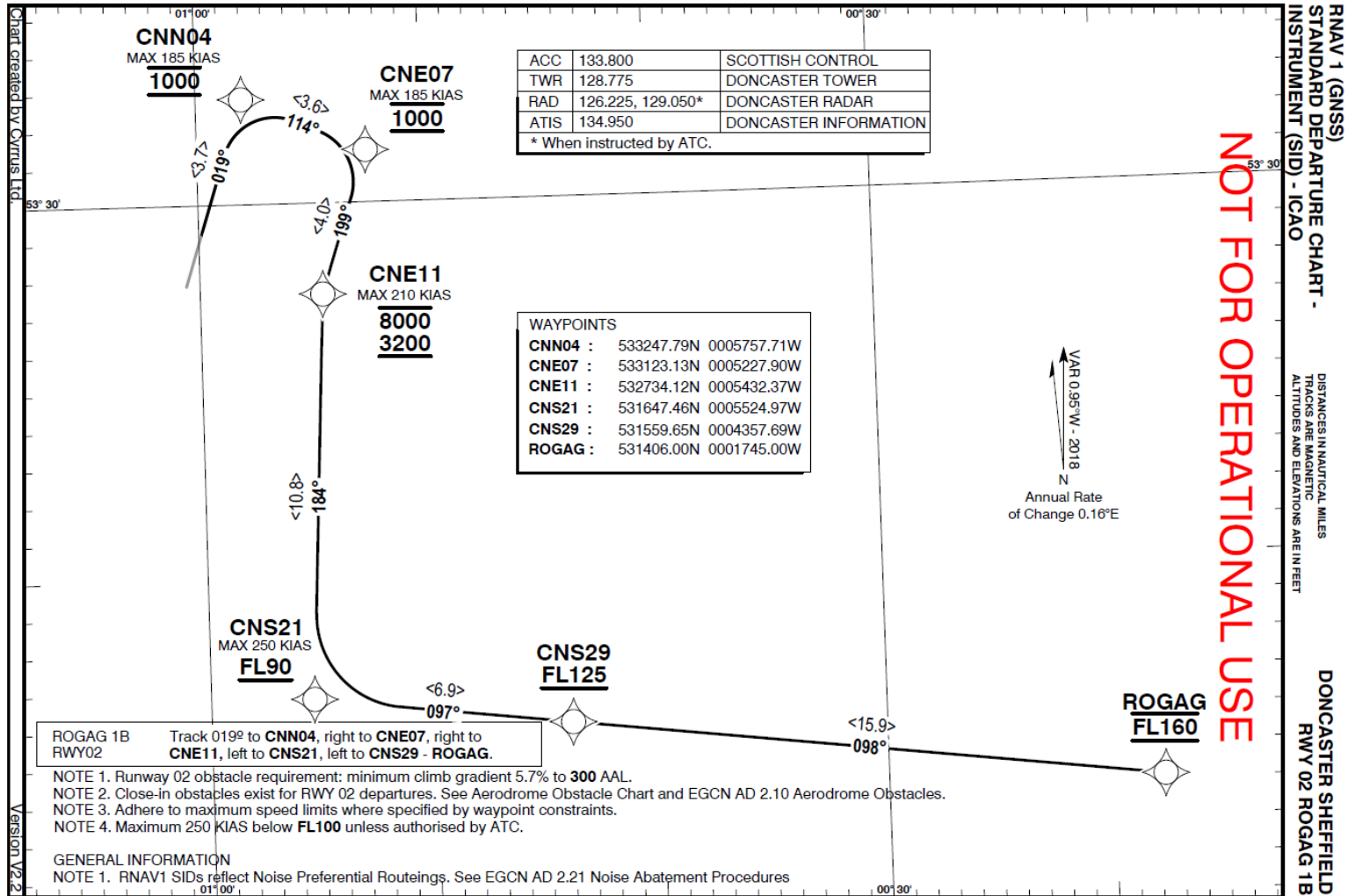
NOT FOR OPERATIONAL USE



C.4. ROGAG 1A



C.5. ROGAG 1B



C.6. Omni-Directional Departures

C.6.1. Cyrrus Ltd were commissioned by Doncaster Sheffield Airport (DSA) to design Omnidirectional Departures for aircraft unable to fly new RNAV Standard Instrument Departures (SIDs). This would include aircraft which are non-RNAV1 capable, non-GNSS equipped and/or not capable of complying with the demands of the SID procedures.

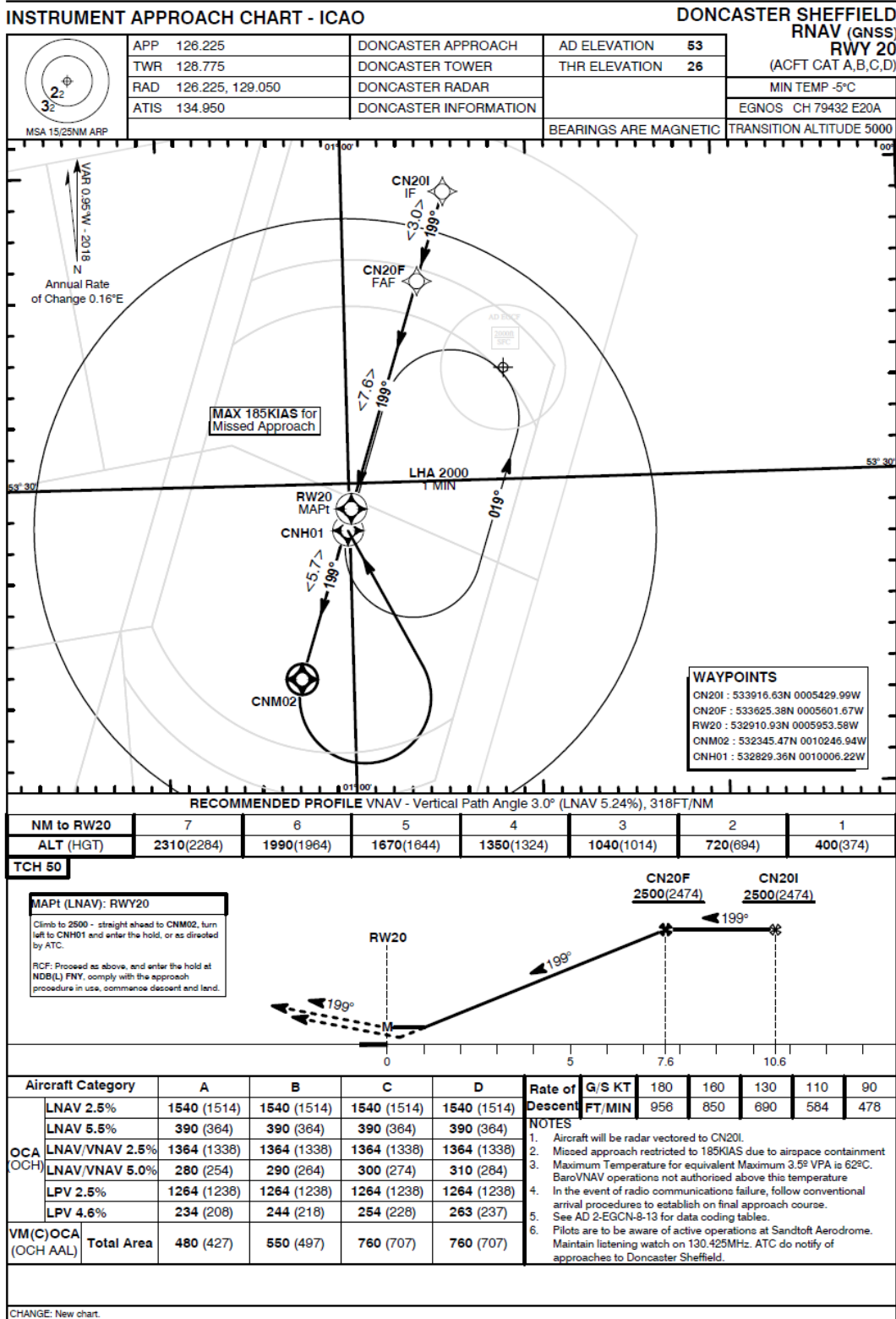
C.6.2. The departures are designed with the intention for aircraft to fly to an altitude of 3500ft Above Mean Sea Level (AMSL), based on a minimum Procedure Design Gradient (PDG) of 7% (deemed an efficient, reasonable and acceptable PDG for all operators), before executing a turn. Climbing straight ahead to 3500ft is the best option to allow for the subsequent turns to the North (UPTON) or South (ROGAG).

C.6.3. The following is to be added to EGCN AD 2.22:

			Omnidirectional Departures
Runway	Direction of Turn	Description	Restrictions
02	-	Climb straight ahead on track 019° MAG until reaching 3500ft, then turn on track to <u>en-route safety altitude</u> or as directed by radar.	Minimum Climb Gradient 7% for operational reasons.
20	-	Climb straight ahead on track 199° MAG until reaching 3500ft, then turn on track to <u>en-route safety altitude</u> or as directed by radar	Minimum Climb Gradient 7% for operational reasons.

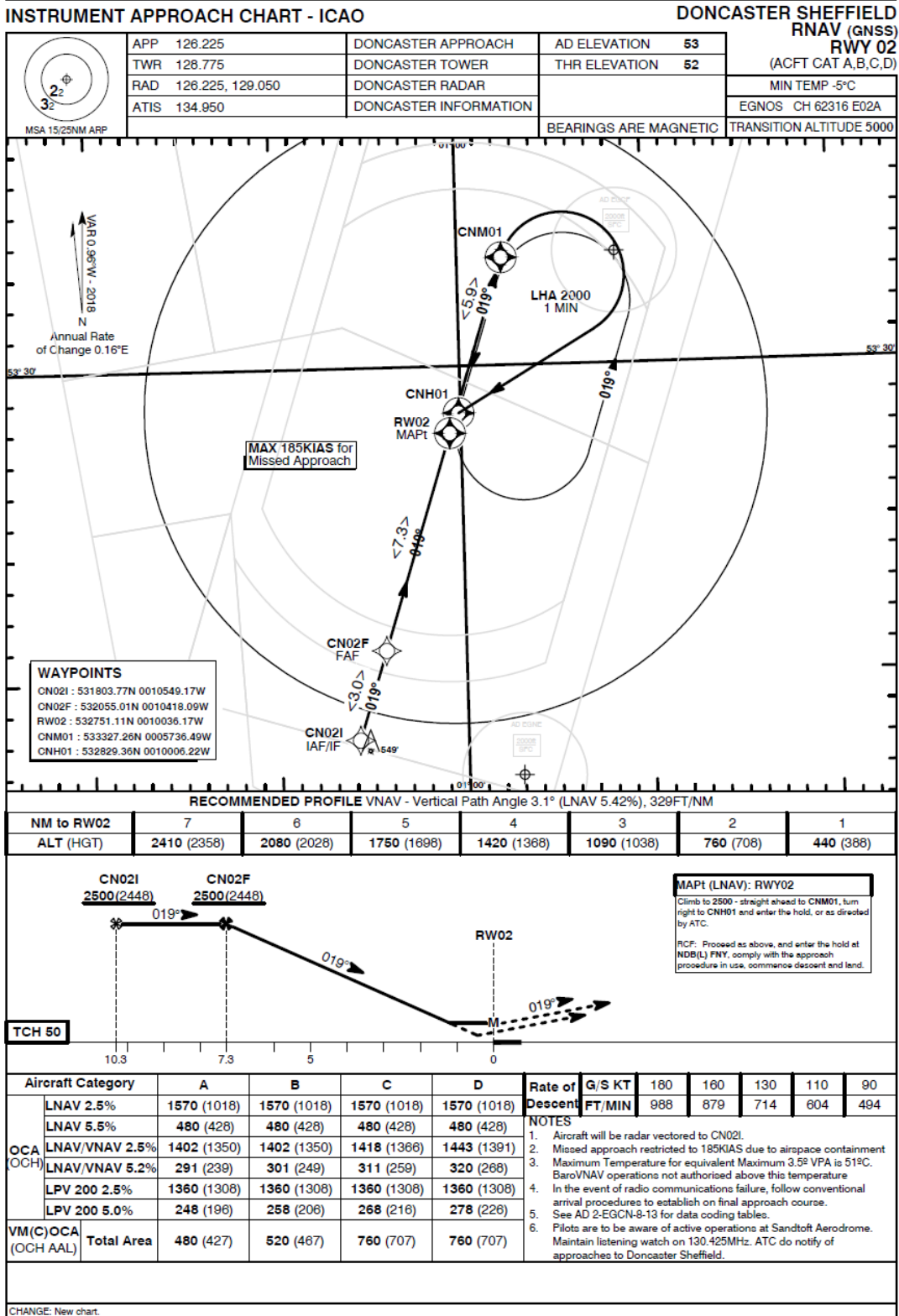
C.7. RNAV (GNSS) APCH RWY20

NOT FOR OPERATIONAL USE



C.8. RNAV (GNSS) APCH RWY02

NOT FOR OPERATIONAL USE



C.9. 1:500,000 VFR Chart with Proposed Airspace Change



Note: If this proposal is adopted, the portions of Y70, L603 and L60 between Humberside and Lincoln will all have the same base level (FL125) and will not appear as complex as is depicted above.



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