

## Safety and Airspace Regulation Group

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Airspace Change Proposal - Operational Assessment

Version 1.0/ 2016

<b>Title of Airspace Change Proposal</b>	<b>STANSTED AIRPORT RNP1 SIDS</b>
<b>Change Sponsor</b>	<b>Stansted Airport (Manchester Airports Group)</b>
<b>AR Project Leader</b>	<b>[REDACTED]</b>
<b>Case Study commencement date</b>	<b>Planned: 12 Mar 16 (Doc Check 3 - 25 Feb 16)</b>
<b>Case Study report as at</b>	<b>10 January 2017</b>

### Instructions

In providing a response for each question, please ensure that the 'Status' column is completed using the following options:

- Yes
- No
- Partially
- N/A

To aid the AR Project Leader's efficient Project Management it may be useful that each question is also highlighted accordingly to illustrate what is: resolved Green not resolved Amber or not compliant Red as part of the AR Project Leader's efficient project management.

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1.	Justification for change and “Option Analysis”	Status
1.1	<b>Is the explanation of the proposed change clear and understood?</b>	<b>Yes</b>
	<p>The development of Global Navigation Satellite System (GNSS) Required Navigation Performance 1 (RNP1) Standard Instrument Departures (SIDs) aligns with UK policy and is a cornerstone of the Future Airspace Strategy (FAS). The introduction of these SIDs also aligns with the SESAR ATM Master Plan which aims to reduce reliance on ground-based navigation aids, allow airlines to operate using the full capability of their respective FMSs and provide more accurate navigation guidance.</p> <p>At the 2007 36th International Civil Aviation Organization (ICAO) General Assembly, States agreed to Resolution 36/23, which urges all States to implement routes and airport procedures in accordance with the ICAO PBN criteria. EU Legislation, through the Common Pilot Project, instructs states to implement PBN through RNP1 by 2024. ICAO Assembly Resolution A37-11 also stipulates that by 2016 States complete a PBN implementation plan to achieve the implementation of RNAV and RNP operations (where required) for en-route and terminal areas, according to established timelines and intermediate milestones.</p> <p>Stansted Airport has been trialling RNP1 technology for over 2 years in collaboration with the local community and industry partners. This has been the first trial of RNP1 with Radius to Fix (RF) turns conducted in the UK. The 2 trial RNP1 SIDs are designed as replications of existing conventional SIDs along existing Noise Preferential Routes (NPRs). The SIDs are designated CLN 1E and DET 1D and are planned to complement and not replace the existing conventional SIDs.</p>	
1.2	<b>Are the reasons for the change stated and acceptable?</b>	<b>Yes</b>
	<p>The changes proposed in this ACP are uncontroversial and are replications of existing SIDs along existing NPRs. The reason for introducing these new departure procedures is to improve the autonomous navigational accuracy of departing aircraft and reduce reliance on radar vectoring. This will in turn achieve the stated aim of minimising the numbers of people affected by direct overflight; a positive benefit to many members of the public.</p> <p>The Stansted RNP1 trial aims to provide evidence of how the changes will ensure the stated positive benefits. The trial has the following 3 stated objectives:</p> <ol style="list-style-type: none"> <li>1. Assess the impact of noise nuisance, pre and post the trial, by avoiding populated dwellings along the SIDs where possible;</li> </ol>	

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	<p>2. Gain ATC and aircraft operator experience of RNP1 operations using instrument flight procedure designs incorporating the Radius-to-Fix (RF) path terminator;</p> <p>3. Assess the track keeping accuracy of participating aircraft flying Stansted Rwy 22 CLN and Rwy 04 DET RNP1 SIDs during the initial RF leg turns.</p>	
1.3	<p><b>Have all appropriate alternative options been considered, including the 'do nothing' option?</b></p> <p>This proposal has been presented as a direct response to the initiatives detailed in 1.1 above. Furthermore, the trial was devised to improve track keeping by adhering closely to the existing NPR centreline. Consequently, no other options were considered.</p>	<b>N/A</b>
1.4	<p><b>Is the justification for the selection of the proposed option sound and acceptable?</b></p> <p>Yes, the justification for the proposed change is sound. Additionally, the supporting trial data, including consultation responses indicates that the RNP1 SID replications are suitable solutions that deliver the stated operational benefit on the CLN 1 E SID. However, the assessed benefit in terms of the numbers of people directly overflowed on the DET 1D SID is overstated in the proposal. The Environmental Assessment (Para 5.2) indicates that this benefit should not be considered.</p>	<b>Yes</b>
2.	<b>Airspace Description and Operational Arrangements</b>	<b>Status</b>
2.1	<p><b>Is the type of proposed airspace clearly stated and understood?</b></p> <p>No changes to airspace class or dimensions are proposed in this ACP. The RNP1 SIDs will be wholly contained within existing NPR swathes and closely match the existing NPRs.</p>	<b>Yes</b>
2.2	<p><b>Are the hours of operation of the airspace and any seasonal variations stated and acceptable?</b></p> <p>Yes; these SIDs will be available during the published normal operating hours. Of note, the DET 1D SID will only be available between 2300-0600 winter, and 2200-0500 summer. For positioning flights within the London area and flights leaving the London FIR via L10, the DET 1D is available H24.</p>	<b>Yes</b>

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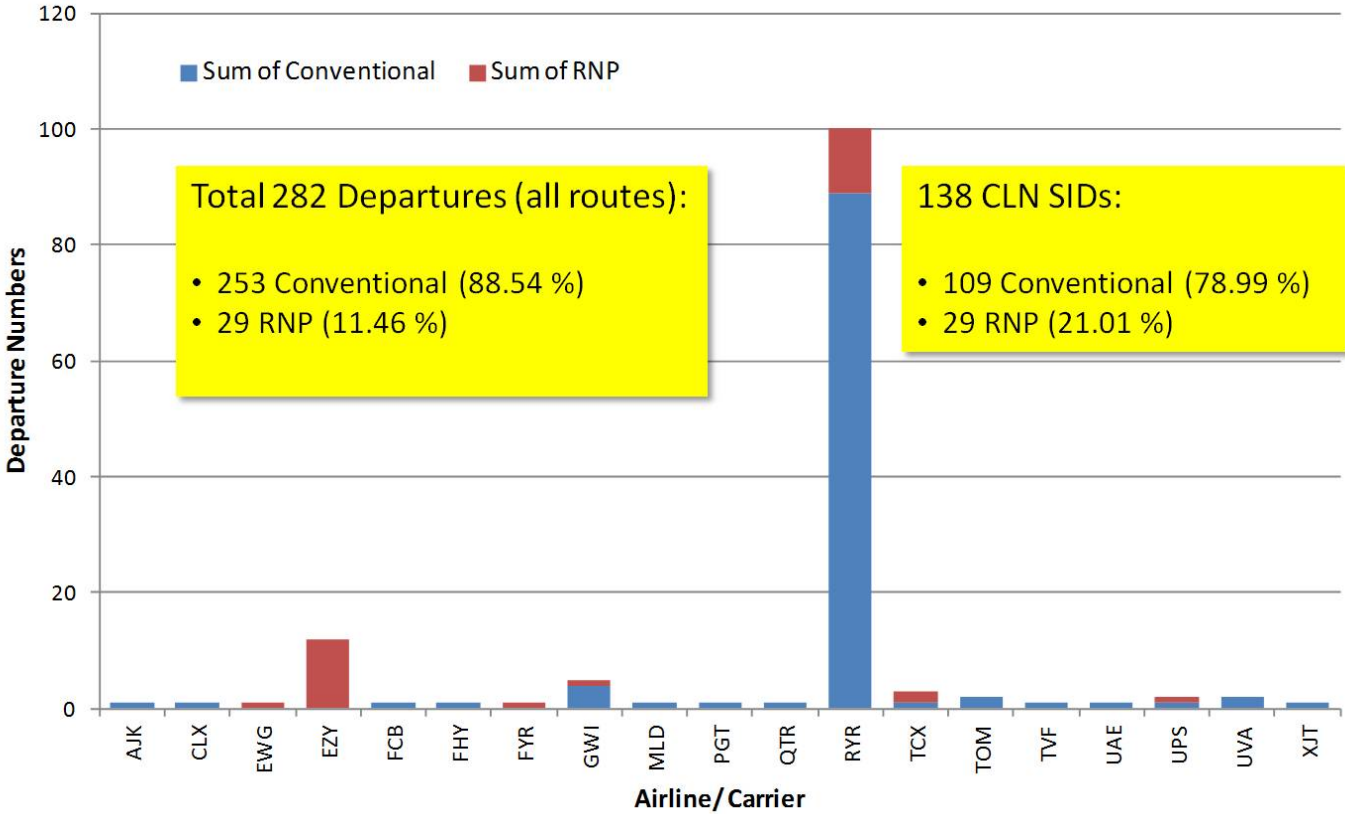
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<b>2.3</b>	<b>Is any interaction with adjacent domestic and international airspace structures stated and acceptable including an explanation of how connectivity is to be achieved? Has the agreement of adjacent States been secured in respect of High Seas airspace changes?</b>	<b>N/A</b>
	There are no additional interactions introduced by these procedures. Both procedures are contained within Stansted Class D airspace and the LTMA above.	
<b>2.4</b>	<b>Is the supporting statistical evidence relevant and acceptable?</b>	<b>Yes</b>
	<p>The Stansted RNP SID trial began on 7 May 13 as a partnership between Stansted Airport, Civil Aviation Authority (CAA) Safety and Airspace Regulation Group (SARG), NATS and the Stansted Airport Consultative Committee (STACC). In the period to November 2014 a good deal of data was collected by the Airport Noise and Operations Management System (ANOMS). The Trial Report is based on this dataset and clearly provides evidence to support the actual (not just theoretical) impact of the actual SID tracks flown in relation to the ground and the agreed NPRs. The datasets used are summarised in Appendix E and F to the Trial Report.</p> <p>In addition, Boeing (Ryanair) specific track adherence data produced during the more recent trial period has been supplied to complement the proposal document data. This data shows that Ryanair Boeing aircraft are also capable of flying the new SID designs, and do so well within stipulated accuracy limits.</p> <p>Statistical evidence was provided by Stansted to help quantify the rate at which the procedures will be adopted and the stated benefits delivered. This data is summarised in the graphs below that show usage during the trial in Aug 16 and estimated usage by end May 17, by airline. It should be noted that the procedures are not planned to be implemented until AIRAC 08/2017, on 20 Jul 17. By then over 90% of Clacton departures will be flying the RNP profile.</p>	

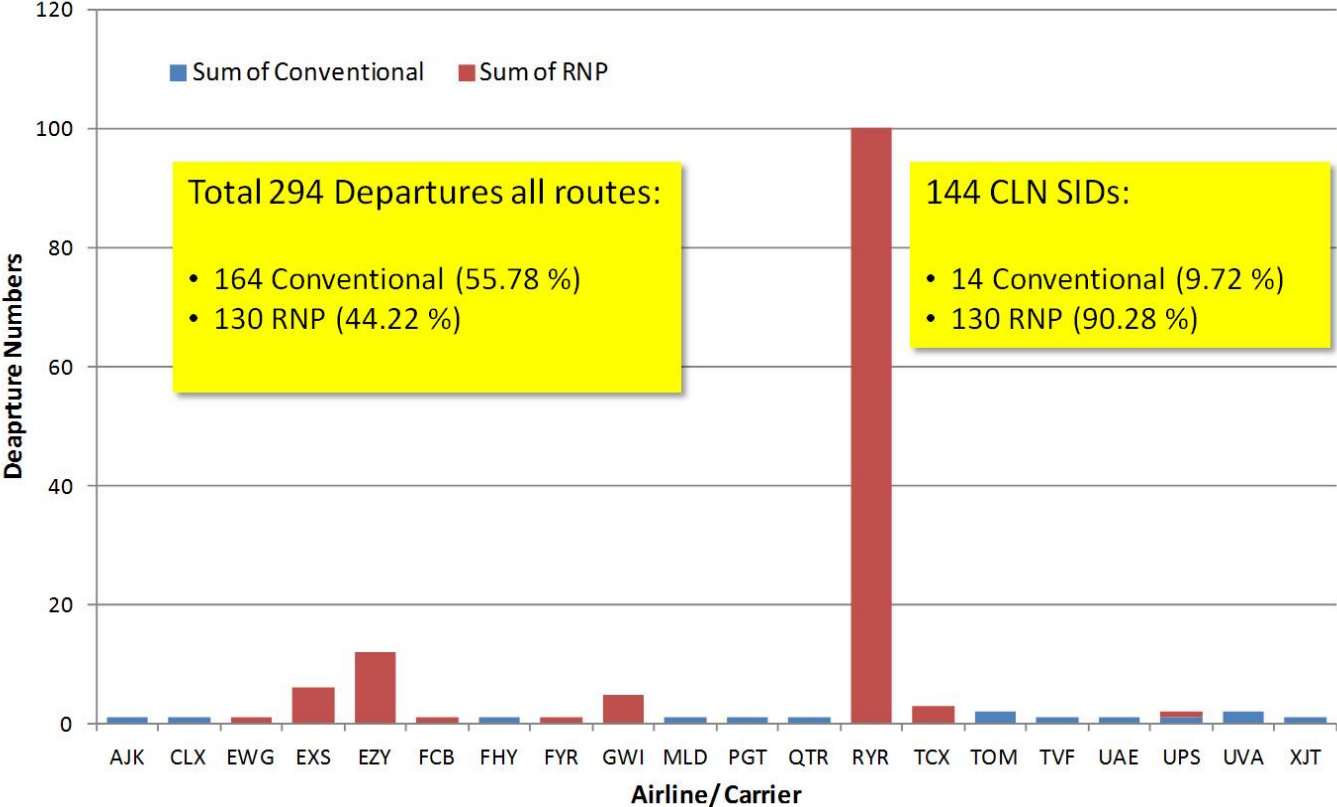
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**Numbers of Conventional & RNP SIDs by Airline**  
**8 Aug 16 - Actual**



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Numbers of Conventional & RNP SIDs by Airline  
 31 May 17 - Estimate





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2.5	<b>Is the analysis of the impact of the traffic mix on complexity and workload of operations complete and satisfactory?</b>	<b>Yes</b>
	Any such impact is not explicitly stated in either the proposal or the Trial Report. However, the early radar vectoring associated with the normal SID would not be necessary until slightly later in the flight profile. Stansted have stated that introduction of these SIDs will not have any impact on the complexity or workload of operations.	
2.6	<b>Are any draft Letters of Agreement and/or Memoranda of Understanding included and, if so, do they contain the commitments to resolve ATS procedures (ATSD) and airspace management requirements?</b>	<b>No</b>
	None required - the sponsor has stated there are no such letters that need to be updated.	

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<b>2.7</b>	<b>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?</b>	<b>N/A</b>
	Not applicable.	
<b>2.8</b>	<b>Is the evidence that the Airspace Design is compliant with ICAO SARPs, Airspace Design &amp; FUA regulations, and Eurocontrol Guidance satisfactory?</b>	<b>Yes</b>
	The draft procedures were designed by CAA IFP designers in accordance with ICAO Doc 8168 Vol II. A final obstacle assessment has been conducted by the CAA (IFP designer) ahead of inclusion in the UK AIP. There are no anticipated issues that might prevent the final endorsement of this proposal.	
<b>2.9</b>	<b>Is the proposed airspace classification stated and justification for that classification acceptable?</b>	<b>N/A</b>
	This ACP entails no change to the airspace classification.	
<b>2.10</b>	<b>Within the constraints of safety and efficiency, does the airspace classification permit access to as many classes of user as practicable?</b>	<b>Yes</b>
	This ACP entails no change to access arrangements.	
<b>2.11</b>	<b>Is there assurance, as far as practicable, against unauthorised incursions? (This is usually done through the classification and promulgation)</b>	<b>Yes</b>
	This ACP introduces no change to the current levels of risk associated with unauthorised incursions.	
<b>2.12</b>	<b>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?</b>	<b>Yes</b>
	The ACP involves no new airspace structure or controlled airspace. Arrangements for transiting a Class D CTR are already well publicised.	



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<b>2.13</b>	<b>Are appropriate arrangements for transiting aircraft in place in accordance with stated commitments?</b>	<b>Yes</b>
	The ACP involves no new airspace structure or controlled airspace. Arrangements for transiting a Class D CTR are already well publicized.	
<b>2.14</b>	<b>Are any airspace user group's requirements not met?</b>	<b>No</b>
	No.	
<b>2.15</b>	<b>Is any delegation of ATS justified and acceptable? (If yes, refer to Delegated ATS Procedure).</b>	<b>N/A</b>
	Not applicable.	
<b>2.16</b>	<b>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?</b>	<b>Yes</b>
	No change to existing Controlled Airspace (CA) or other airspace structures.	
<b>2.17</b>	<b>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).</b>	<b>Yes</b>
	Yes. These procedures replicate existing SIDs.	
<b>2.18</b>	<b>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?</b>	<b>Yes</b>
	Yes. No change from current operations.	
<b>2.19</b>	<b>Is the airspace structure designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace?</b>	<b>Yes</b>
	The ACP involves no new airspace structure. The existing SIDs and these new replications take into account terrain clearance issues.	

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<b>2.20</b>	<b>If the new structure lies close to another airspace structure or overlaps an associated airspace structure, have appropriate operating arrangements been agreed?</b>	<b>N/A</b>
	Not applicable as nothing has changed.	
<b>2.21</b>	<b>Where terminal and en-route structures adjoin, is the effective integration of departure and arrival routes achieved?</b>	<b>Yes</b>
	Yes. These new procedures are replications of existing SIDs.	

<b>3.</b>	<b>Supporting Resources and CNS Infrastructure</b>	<b>Status</b>
<b>3.1</b>	<b>Is the evidence of supporting CNS infrastructure together with availability and contingency procedures complete and acceptable? The following are to be satisfied:</b>	
	<ul style="list-style-type: none"> <li>▪ <b>Communication:</b> 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&amp;S Section?</li> </ul>	<b>Yes</b>
	There are no new communications infrastructure requirements. The proposed routes are contained within the lateral dimensions of airspace where radar and R/T coverage is well proven.	
	<ul style="list-style-type: none"> <li>▪ <b>Navigation:</b> Is there sufficient accurate navigational guidance based on in-line VOR or NDB or by approved RNP1 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 eg. a DEMETER report, and if so, is it satisfactory?</li> </ul>	<b>Yes</b>
	The procedures were designed by a CAA IFP designer to ensure compliance with ICAO Doc 8168 Vol II. The Trial Report indicates a high degree of accuracy in terms of lateral track keeping. A lateral swathe of 400m contains 98% of all procedures flown. Even those tracks that deviated from the concentrated majority still remained within the +/- 0.5nm tolerance. No tracks deviated beyond the limits of the NPR Swathe.	

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	<ul style="list-style-type: none"> <li>▪ <b>Surveillance:</b> Radar Provision – have radar diagrams been provided, and do they show that the ATS route/ airspace structure can be supported?</li> </ul>	<b>Yes</b>
Yes.		
<b>3.2</b>	<p><b>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?</b></p>	<b>N/A</b>
Not applicable. The proposal is not directly linked to any anticipated growth in traffic or to overcome complexity or efficiency issues. There are no resource implications.		
<b>4.</b>	<b>Maps/Charts/Diagrams</b>	<b>Status</b>
<b>4.1</b>	<p><b>Is a diagram of the proposed airspace included in the proposal, clearly showing the dimensions and WGS84 co-ordinates?</b>  <b>(We would expect sponsors to include clear maps and diagrams of the proposed airspace structure(s) – they do not have to accord with AC&amp;D aeronautical cartographical standards (see CAP725), rather they should be clear and unambiguous and reflect precisely the narrative descriptions of the proposals. AC&amp;D work would relate to regulatory consultation charts only).</b></p>	<b>Yes</b>
Final versions of the procedure design charts are currently in use on the Trial. These will be modified by the SARG AR IFP Designer as necessary, prior to publication.		
<b>4.2</b>	<p><b>Do the charts clearly indicate the proposed airspace change?</b></p>	<b>Yes</b>
There is no requirement for new airspace aeronautical charts. Design plates detailing the procedures will be appropriately reviewed by SARG AR IFP Designers.		
<b>4.3</b>	<p><b>Has the Change Sponsor identified AIP pages affected by the Change Proposal and provided a draft amendment?</b></p>	<b>Ongoing</b>
Yes. Draft amendments have been identified and these amendments will be refined prior to submission for the appropriate AIRAC cycle.		

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5.	Operational Impact	Status
5.1	<p><b>Is the Change 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?</b>  <b>Consideration should be given to:</b>  <b>a) Impact on IFR GAT, on OAT or on VFR general aviation traffic flow in or through the area.</b></p>	Yes
	Yes. No anticipated changes.	
	<p><b>b) Impact on VFR Routes.</b></p>	Yes
	The new SIDs are wholly contained within existing controlled airspace and are not linked to a related forecast growth in traffic volumes. There is no impact upon any existing VFR routes.	
	<p><b>c) Consequential effects on procedures and capacity, ie on SIDS, STARS, holds. Details of existing or planned routes and holds.</b></p>	Yes
	The detailed SID profiles are included in the proposal and will have no effect on conventional procedures or capacity.	
	<p><b>d) Impact on Airfields and other specific activities within or adjacent to the proposed airspace.</b></p>	Yes
	Nil.	
	<p><b>e) Any flight planning restrictions and/ or route requirements.</b></p>	Yes
	Nil.	

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<b>5.2</b>	<b>Does the Change Sponsor Consultation letter reflect the likely operational impact of the change?</b>	<b>Yes</b>
	Yes. The consultation material and proposal explains NPRs and shows track information in relation to ground features. At times, the terms NPR and NPR Swathe are not always used appropriately, but the material presented does demonstrate how RNP1 SID tracks differ to those of conventional procedures and how they differ from the published NPR (track).	

<b>6.</b>	<b>Economic Impact</b>	<b>Status</b>
<b>6.1</b>	<b>Is a provisional economic impact assessment to all categories of operations and users likely to be affected by the change included and acceptable? (This may include any forecast capacity gains and the cost of any resultant additional track mileage).</b>	<b>No</b>
	This proposal is aimed entirely at minimising the numbers of people affected by noise as a result of departing aircraft from Stansted Airport. The new procedures replicate existing procedures, a growth in departure numbers will not result as a direct impact of this proposal. There are no positive or negative economic changes anticipated following the introduction of the new SIDs.	

<b>Case Study Conclusions – To be completed by AR Project Leader</b>	<b>Yes/No</b>
<b>Has the Change Sponsor met the AR Airspace Change Proposal requirements and Airspace Regulatory requirements above?</b>	<b>Yes</b>
Yes. The sponsor has complied with all relevant regulatory requirements during the term of the this ACP to date.	

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### Outstanding Issues

Serial	Issue	Action Required
1	Collate Airspace Change Request (ACR).	Sponsor to prepare ACR in parallel to regulatory approval process.
2	Cancel AIP Sup detailing trial extension.	Sponsor to ensure ACR includes cancellation instruction.

### Additional Compliance Requirements (to be satisfied by **Change Sponsor**)

Serial	Requirement
1	Track diagrams that enable a comparison between pre- and post-implementation traffic patterns for aircraft up to 7,000ft. The diagrams should portray both traffic dispersion and extent of any concentration (i.e. a density plot of traffic). Data to be available by Post Implementation Report (PIR) commencement date currently planned for 18th August 2018.
2	Figures for usage of both RNP1 SIDs, and comparison to the usage of the remaining conventional SIDs. Data to be available by Post Implementation Report (PIR) commencement date currently planned for 18 <sup>th</sup> August 2018.

### Recommendations

Recommendations	Yes/No
<b>Is the approval of the SofS for Transport required in respect of the Environmental Impact of the airspace change?</b>	<b>No</b>
No - but see Environmental Assessment para 18.1 which suggests the CAA should notify the SofS because of the minor difference in RNP and conventional tracks.	
<b>Is the approval of the MoD required in respect of National Security issues surrounding the airspace change?</b>	<b>No</b>
No.	

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### General Summary

Stansted Airport has been fully compliant during this regulatory process. The proposed new procedures have been flown as a notified trial for over 2 years and no unanticipated effects have been observed. The trial is planned to continue until the end of May 2017, by which time the procedures will have been published in the UK AIP at AIRAC 05/2017 (27 Apr 17), if approved. The flight profiles closely follow the NPR tracks and are additionally well within the NPR swathes. Whilst the flight tracks minimise the numbers of communities directly overflowed by Stansted Airport departing air traffic, there are a smaller number of communities who will be over-flown more frequently. The assessed impacts are consistent with current governmental guidance and no issues have arisen that justify withholding approval for this ACP. The evidence presented supports the introduction of the RNP1 procedures to ensure future compliance with the guidelines and policies described in para 1.1.

### Comments & Observations


Ryanair trial participation continues with a select number of crews operating the Boeing 737-800 on the designed RNP1 SIDs. The trial results indicate that both Boeing and Airbus aircraft closely follow the designed SID profile accurately. As Ryanair participation increases, the magnitude of the stated impacts will also increase, in both the positive and negative dimensions.

Operational Assessment Sign-off/ Approvals	Name	Signature	Date
Operational Assessment completed by:	 AR Case Officer		10 January 2017
Operational Assessment approved:	 Mgr AR		3 February 2017
Mgr AR Comments:			



**Safety and Airspace Regulation Group**

Hd AAA Comment/ Approvals	Name	Signature	Date
Operational Assessment Conclusions approved:	[Redacted] Hd AAA	[Redacted]	1 March 2017
Hd AAA Comments: I have asked for a number of issues to be modified within this assessment package and I am content with the changes that have now been made.			

GD SARG Decision/ Approval	Name	Signature	Date
GD SARG Decision:	Mark Swan GD SARG		3 May 2017
GD SARG Comments:			