Edinburgh Airport
TUTUR1C Trial
Findings Report

Trial period: 25 June – 28 October 2015
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Executive summary

Edinburgh Airport is Scotland’s busiest airport and a significant contributor to the nation’s economy. We are growing rapidly, welcoming over 11 million passengers in 2015 and introducing more airlines and routes than ever before.

In order to cope with this growth and ensure we are fit for the future we have invested in our facilities, opening a new terminal extension and security hall in 2014 and in 2015 unveiling a second immigration hall.

It is clear that as we look at our forward plans, which show continued growth, especially in 2018 when the Scottish Government plans to half Air Passenger Duty, that managing growth is one of our main challenges.

Although our terminal is currently small by many airport standards, we have the land on which to grow and develop.

As an airport our primary asset is our runway and a 2015 runway capacity study highlighted current unacceptable delays at peak times and runway and airspace inadequacy by 2017.

No matter what we do on the ground, we must tackle the issue of modernising airspace around the airport.

In June 2015 therefore we began a six month trial of a new Standard Instrument Departure (SID) route from Runway 24. The trial was overseen and approved by our regulator the Civil Aviation Authority (CAA) and supported by our Air Navigation Service Provider (ANSP) NATS.

Utilising modern technology and continuous climb departure, the aim of the trial was to test the ability of departing aircraft to fly the route using Area Navigation (RNAV1) technology whilst achieving our objectives of reducing taxi time and runway congestion, reducing fuel burn, CO₂ and NOX emissions and increasing runway capacity and on time departure performance.

Achieving these objectives would show that this new SID would be viable and allow us to meet growth demand from new carriers and routes by optimising use of the runway and negating the need for a second runway for the foreseeable future.

In addition to the technical aspects of the trial, we measured the noise impact in local communities and gathered community feedback throughout the trial.

The results of the trial indicate that it is possible to reduce separation times between departing aircraft from Runway 24. This reduces queuing and taxi times as well as fuel burn and, based on findings by NATS, results in an estimated annual CO₂ reduction of 87 tonnes. Additionally wider I
airspace benefits have been identified, with the Scottish Air Traffic Control Centre at Prestwick reporting “a reduction in complexity with aircraft flying routes which were naturally further apart... resulting in increased capacity across the airspace directly affected”.

Results from independently produced noise reports concluded that “flights generate significant noise over and above background noise”. We recognise that if we wish to introduce a new route we must understand, measure and mitigate the impacts our operations have on our local communities.

We’ll be reviewing our options over the next few months. We have to analyse thoroughly our findings and discuss with the CAA. We will then have to deliberate on the benefits that a new SID would deliver versus the views of some members of the communities under any new or alternative route.

If we want to implement a new SID route permanently we’ll be required to follow the formal Airspace Change Process (ACP) set by the UK Civil Aviation Authority which includes a full public consultation.¹ We would ensure that all stakeholders are communicated with and informed throughout the process.

¹ CAP 725 CAA Guidance on the Application of the Airspace Change Process, Civil Aviation Authority (2007)
## Summary of trial objectives

<table>
<thead>
<tr>
<th>Trial objective</th>
<th>Status</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test the use of RNAV1 technology</td>
<td>Achieved, however anomalies will have to be further investigated</td>
<td>During this period 130 (4.7%) aircraft were deemed to be off-track. This on track performance issue figure met the RNAV1 standard (the navigation systems on-board the aircraft must be able to calculate its position to within one nautical mile 95% of the time) and the route was deemed flyable. However issues were identified with the flight management system on board certain aircraft causing off-track events. This will need to be further investigated should we want to implement the TUTUR SID permanently.</td>
</tr>
<tr>
<td>Reduce separation times between departing aircraft from Runway 24</td>
<td>Achieved</td>
<td>The trial allowed us to achieve 1 minute separation times between departing aircraft using the formation GOSAM-TUTUR or TUTUR-GOSAM.</td>
</tr>
<tr>
<td>Reduce taxi time and runway holding point congestion</td>
<td>Achieved</td>
<td>Calculations indicate that 944 taxi time minutes were saved during the TUTUR trial.</td>
</tr>
<tr>
<td>Reduce fuel burn and CO₂ and NOₓ emissions</td>
<td>Achieved</td>
<td>Calculations of taxi time savings indicate a saving of 9 tonnes of fuel and 30 tonnes of CO₂ were saved during the trial.</td>
</tr>
<tr>
<td>Contribute to wider airspace improvements and benefits</td>
<td>Achieved</td>
<td>The Scottish Air Traffic Control Centre at Prestwick reported “increased capacity across the airspace directly affected.”</td>
</tr>
</tbody>
</table>
Introduction

Edinburgh Airport has one primary runway (Runway 06/24), which operates in two directions. Our secondary runway is not equipped with the same technology, such as an Instrument Landing System (ILS) and is only used for short periods when runway maintenance is taking place on the primary runway. When Runway 06 is in operation, aircraft arrive from the west and depart to the east. When Runway 24 is in operation, aircraft arrive from the east and depart to the west. The direction of operation is entirely dependent on weather conditions as, where possible, aircraft will take off and land into the wind.

Departing aircraft follow pre-defined routes called a Standard Instrument Departure (SID). SIDs are a set of instructions, designed by licenced Instrument Flight Procedure designers and approved by the CAA, which are coded by Flight Plan Data Providers into the Flight Management Systems (FMSs) of aircraft which an aircraft will follow when departing from an airport. SIDs ensure that all departing aircraft climb at an appropriate rate, speed and angle of bank to remain clear of all obstacles and terrain in a safe and ICAO compliant manner. The SID an aircraft will follow is largely dictated by the en-route ATS Route structure to its final destination.

Although SIDs are depicted as straight lines, factors such as individual aircraft performance and weather conditions will affect the position of the aircraft in relation to these centre lines. Given that aircraft are unable to follow an exact line, when the SIDs were created we introduced Noise Preferential Routes (NPRs) which extend one nautical mile either side of the nominal centre line of the SID. Aircraft are required to remain within these routes until an altitude of 3,000ft has been reached. On occasion, and to ensure aircraft safety, Air Traffic Control may permit aircraft to deviate from the NPR. The most common reason for this is avoidance of extreme weather conditions in the airport vicinity.

There are currently three SIDs operating from Runway 24; TALLA, GRICE and GOSAM.

Like most major airports in the UK, our SIDs were designed in the 1970s. This was at a time when aircraft had different performance characteristics to those of today and hence they do not fully utilise the benefits of the modern navigation equipment now carried and improved climb performance by the majority of aircraft departing from Edinburgh Airport.
The TUTUR Trial

On 25 June 2015, supported by our ANSP NATS and in line with the Department for Transport Air Navigation Guidance and with CAA approval, we began a trial to test the feasibility of a new westerly SID - TUTUR. The TUTUR trial tested if a new SID would allow aircraft to depart in one minute intervals – allowing the airport to encourage and maintain safe and sustainable growth whilst ensuring performance is unaffected.

Unlike existing SIDs the TUTUR SID would use newer Area Navigation (RNAV) technology, allowing a much more precise route to be flown. When following a RNAV SID an aircraft will navigate between a series of waypoints held in its on-board Flight Management System (FMS). This newer technology reduces the corridors or swathes that aircraft fly within, allowing for a more accurate track to be flown when compared with the current tracks flown using ground-based navigation aids.

The route would also encourage continuous climb departure – this reduces the likelihood of flights levelling off at lower altitude at which noise impacts would be more noticeable/impactful for local communities, enables better fuel planning, which can assist in reducing the amount calculated as necessary for the flight, and also results in cost savings for the airlines.2

The TUTUR departure route saw aircraft take off in a south westerly direction and turn right towards the River Forth, climbing above water before flying back over land at (or in many cases above) 13,000ft.

Image 2: The TUTUR SID

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2 Ten Steps to Flight Efficiency, NATS (2012)
Objectives of the trial

The objectives of the TUTUR trial were to:

- test the use of RNAV1 at Edinburgh Airport – a more precise navigation standard than is used for our existing SIDs. The RNAV1 capability means that the navigation systems on-board the aircraft must be able to calculate its position to within one nautical mile 95% of the time.
- reduce taxi time and runway holding point congestion.
- reduce fuel burn and CO$_2$ and NO$_x$ emissions.
- lower risk of ground movement congestion.
- increase runway capacity.
- increase on time departure performance.
- meet growth demand from new carriers and routes.
- optimise use of the existing runway, negating the need for a second runway for the foreseeable future.
**Stakeholder engagement**

Prior to the TUTUR trial starting in June we briefed local stakeholders including the Edinburgh Airport Consultative Committee, MPs, MSPs, Community Councils and local and national media. The briefing included background to the trial, details of the SID route, project purpose and approach, details of data gathering and key dates throughout the trial.

Additionally, in June we invited MPs and MSPs to the airport to discuss the trial route and answer any questions that they may have. We also created a dedicated microsite sid.edinburghairport.com providing information on the trial and a feedback channel.

Overview of stakeholder engagement before and during the trial:

<table>
<thead>
<tr>
<th>Date</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2015</td>
<td>Issued letter to stakeholders including the Edinburgh Airport Consultative Committee, MPs, MSPs, Community Councils and local and national media. New SID published in the Aeronautical Information Publication (AIP). Press release issued and added to website.</td>
</tr>
<tr>
<td>June 2015</td>
<td>Issued second letter to stakeholders including the Edinburgh Airport Consultative Committee, MPs, MSPs, Community Councils and local and national media. Noise monitor deployed at first location (Ochiltree). Dedicated microsite opened.</td>
</tr>
<tr>
<td>September 2015</td>
<td>Hosted Community Council meeting on 9 September at Edinburgh Airport Hilton Hotel. Public meeting in Broxburn on 16 September.</td>
</tr>
<tr>
<td>October 2015</td>
<td>Attended drop in session in Philpstoun on 27 October.</td>
</tr>
</tbody>
</table>

Table 1: Stakeholder engagement before and during the TUTUR trial.

Community feedback increased as the trial went on and we saw a significant increase in complaints. A key theme emerging was that local residents were disappointed that the airport had not directly consulted with them prior to the trial starting.

In response we held a meeting for Community Council representatives at the Edinburgh Airport Hilton Hotel on 9 September 2015 and attended public meetings in September and October to further explain the trial and answer the questions of local residents.

Although the consultation process that we followed during the trial met the engagement criteria stipulated by the CAA, any future airspace changes will be preceded by a direct engagement process with community councils and their local residents.
Results

Flight data

Between 25 June and 28 October 2015 there were 21,691 departures from Edinburgh Airport. Of these 15,917 (73%) departed from Runway 24 and 5,739 (26%) departed from Runway 06.

Of the aircraft departing from Runway 24, 2,626 aircraft followed the TUTUR SID (16%).

During this period 130 (4.7%) aircraft on the TUTUR SID were deemed to be off-track. Reasons for these exceptions are varied e.g. aircraft technical issue(s), weather conditions, unfamiliarity with route, etc. but the deviations were approved by NATS at the time.

This on track performance issue figure met the RNAV1 standard (the navigation systems on-board the aircraft must be able to calculate its position to within one nautical mile 95% of the time) and the route was deemed flyable. However, the trial also helped us identify anomalies with the on-board flight management systems in certain aircraft. This meant that some of the navigation points were missed, resulting in off-track events. At no time did this result in an unsafe situation, but this will need to be resolved should we want to proceed with the TUTUR SID on a permanent basis.

Throughout the trial we worked closely with our airline partners to ensure that the correct departure procedures were followed. Should an aircraft be found to be off-track, our Operations team would contact the airline concerned directly to understand why and to ensure that going forward the correct procedures were followed.

<table>
<thead>
<tr>
<th>Month*</th>
<th>Total R24 departures</th>
<th>Total TUTUR departures</th>
<th>Percentage of TUTUR departures (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>1,040</td>
<td>168</td>
<td>16.1</td>
</tr>
<tr>
<td>July</td>
<td>3,922</td>
<td>670</td>
<td>17.0</td>
</tr>
<tr>
<td>August</td>
<td>4,500</td>
<td>749</td>
<td>16.6</td>
</tr>
<tr>
<td>September</td>
<td>3,636</td>
<td>610</td>
<td>16.8</td>
</tr>
<tr>
<td>October</td>
<td>2,819</td>
<td>429</td>
<td>15.2</td>
</tr>
</tbody>
</table>

Table 2: Runway 24 and TUTUR departures between June and October 2015.
*25 June – 28 October 2015
**CO₂ and fuel savings**

The TUTUR trial enabled reduced separation between successive jets departing on either GOSAM-TUTUR or TUTUR-GOSAM sequences, i.e. a jet aircraft was departing on GOSAM route followed by another jet aircraft departing on TUTUR route. These departure sequences enabled a one minute interval between departing flights (instead of the pre-TUTUR trial 2 minute minimum interval that would have been applied by ATC), therefore saving a minute for the second aircraft in the pair and for each aircraft queued behind (i.e. regardless of the aircraft type and route, if an aircraft ahead of it departs on a 1 minute interval from the preceding one, then all subsequent aircraft that are queued for take-off can potentially depart 1 minute earlier than they would have otherwise done – see below for more detail).

**CO₂ and fuel savings methodology**

We asked NATS to calculate the reduction in taxi time due to the TUTUR trial and the associated fuel burn and CO₂ savings.

The results are based on NATS Electronic Flight Progress Strip (EFPS) data between 25 June and 28 October 2015. The following methodology was used:

- Identify a GOSAM-TUTUR or TUTUR-GOSAM departure pair.
- Calculate the assumed pre-trial departure time based on two minutes separation standard for all departures.
- Calculate the time difference between the actual departure time and the assumed pre-trial departure time of the second flight in the first pair (note, where wake turbulence requirements or performance differentials were such that a 2 minute interval was needed...
then this over rides the potential for 1 minute departure interval and a 2 minute separation was assumed).

- Repeat the previous two steps until the actual time of departure is greater than the assumed pre-trial of departure.
- Identify next pair and repeat.

Typical aircraft fuel burn and CO₂ emissions from taxiing (kg/hour) for each aircraft group are used. The average ground fuel burn rate for the Edinburgh Airport fleet mix is approximately 10kg per minute.

**CO₂ and fuel savings results**

<table>
<thead>
<tr>
<th>Taxi Time Saving (minutes)</th>
<th>Fuel Burn Saving (tonnes)</th>
<th>CO₂ Saving (tonnes)</th>
<th>Taxi Time Saving (minutes)</th>
<th>Fuel Burn Saving (tonnes)</th>
<th>CO₂ Saving (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25&lt;sup&gt;th&lt;/sup&gt; June – 28&lt;sup&gt;th&lt;/sup&gt; October 2015</td>
<td>944</td>
<td>9</td>
<td>30</td>
<td>Annualised *</td>
<td>2,734</td>
</tr>
</tbody>
</table>

Table 3: Taxi time, fuel burn and CO₂ savings during the TUTUR trial

*Annualised saving = saving from sample (126 days) × 365/126

These calculations indicate that 2,734 taxi time minutes are saved per year as a result of the TUTUR trial equating to a saving of 27 tonnes/year of fuel and 87 tonnes/year of CO₂.

**Network impacts**

We worked closely with the Scottish Air Traffic Control Centre at Prestwick throughout the trial to monitor the wider network benefits. Feedback from NATS was positive, “for Prestwick Centre the Edinburgh TUTUR trial lead to a reduction in complexity with aircraft flying routes which were naturally further apart. These deconflicted routes have resulted in increased capacity across the airspace directly affected”.

**Noise results**

At the start of the trial, we planned to deploy one noise monitor which would be moved to three points beneath the SID route. The dates and locations of this monitor were:

- Ochiltree, 9 June – 18 August 2015
- Uphall, 18 August – 18 November*
- Blackness, 6 October – 18 November*

*The trial finished on 28 October 2015 - the noise monitor in Ochiltree was deployed a few weeks before the trial began to collect noise levels pre-trial and at Uphall and Blackness they remained for a few weeks after the trial ended, allowing us to collect noise measurements with and without the trial flights for comparison.

Full Community Noise Reports for these areas will be available to view in separate reports.

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<sup>3</sup>Evaluating the True Cost to Airlines of one Minute or Airborne or Ground Delay, University of Westminster, May 2004.
As a result of community feedback three additional noise monitors were deployed in the local community in October to gather data for the last month of the trial. Feedback data was used to identify key areas affected by the trial and local residents were contacted directly and asked if they would be willing to have noise monitors placed in their gardens.

These additional noise monitors were deployed in:

- Forrest Walk, Broxburn
- Badger Wood, Dechmont
- Pardovan Crescent, Philpstoun.

Map 1: Location of additional NATS noise monitors deployed in October

**Noise methodology**

The following methodology was used to calculate the noise impact at each of the three locations:

- Noise level readings were taken at/adjacent to three different positions along the TUTUR SID route.
- The noise levels were compared when there was a flight in the vicinity of the readers and when there wasn’t.
- Noise levels were measured and recorded at one minute intervals.
- The noise measurements were matched with flights impacting the reader at the one minute interval each noise measurement covered.
- Each flight was recorded for all the one minute intervals it was in the readers’ vicinity, and the noise it generated on each interval was used for the analysis.
- Data for 2,400 flights and 13,000-14,000 radar records were used for each location, recorded between 7th October and 24th October.
**Noise results**

The additional noise studies and calculations were conducted by NATS. As can be seen from the graphs below, aircraft generate significant noise over and above background noise, particularly at short lateral distances as well as medium altitudes (3,000-10,000 feet). After 3km or 5km away aircraft noise is not louder than that from non-aircraft sources, except from the quieter location of Forrest Walk where aircraft noise is distinguishable up to 8km away. Despite differences in background noise among locations, aircraft noise is similar for:

- 0-1 km away and 0-3,000, 3,000-7000 and 7,000-10,000 feet high
- 1-3 and 3-5 km away and 3,000-7000 and 7,000-10,000 feet high

Although 2-engine turbo-prop aircraft did not fly the TUTUR route, noise was measured as they passed the monitors on the GRICE or GOSAM SIDs. Jet aircraft flying the GRICE route were also picked up and recorded by the monitors.

**Graph 2: Average peak noise by height, ground distance and aircraft class.**
Graph 3: Average peak noise by height and ground distance at Forrest Walk, Broxburn

Graph 4: Average peak noise by height and ground distance at Badger Wood, Dechmont
Graph 5: Average peak noise by height and ground distance at Pardovan Crescent.
Community complaints

In addition to the noise studies conducted, it was important that we gathered qualitative data to understand the noise disturbance of aircraft operations in our local communities. Analysing the complaints we receive allows us to better understand the noise and operational impacts to residents in these areas.

To gather feedback we created a dedicated feedback form, available on our microsite as well as receiving complaints through the existing noise line and email channels.

We received a total of 7,934 complaints from 567 individual complainants during the TUTUR trial. Of these complaints 3,389 (42.7%) were comments or feedback in relation to the trial or noise complaints against aircraft flying on the TUTUR route. The majority of complaints received, 4,540 (57.1%) were regarding flights operating on existing flight paths.

The key themes for complaints received were:

- Noise
- Off-track
- Night noise.

All aircraft operations are monitored using our Noise and Track Keeping System. Should an aircraft be identified as off-track we will work with NATS and our airline partners to understand why and ensure that the correct procedures are followed. The most common reason for an aircraft being vectored out with the SID is to avoid adverse weather conditions and maintain the safety of the aircraft in flight.

We received a number of complaints about night flights. Although there were no night restrictions on the TUTUR SID, we worked with NATS to ensure that where possible night flights did not use the TUTUR SID in order to reduce the disturbance on our local communities.

The majority of complaints received (62%) came from Uphall and Broxburn, see graph below. A large percentage of complaints received came from the same complainant, with 40% of complaints received by five individuals - in Uphall 47% of complaints came from two complainants and in Broxburn 78% of complaints came from three complainants.

<table>
<thead>
<tr>
<th>Total complaints received</th>
<th>7,934</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total complainants</td>
<td>567</td>
</tr>
<tr>
<td>Complaints relating to TUTUR operations</td>
<td>3,389 (42.7%)</td>
</tr>
<tr>
<td>Complaints relating to non TUTUR operations</td>
<td>4,540 (57.1%)</td>
</tr>
<tr>
<td>Feedback in support of TUTUR route</td>
<td>32 (0.4%)</td>
</tr>
</tbody>
</table>

Table 4: Summary of feedback data
<table>
<thead>
<tr>
<th>Individual</th>
<th>Total complaints</th>
<th>% of total complaints</th>
<th>TUTUR complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1,121</td>
<td>14.7%</td>
<td>TUTUR – 427 (38%)&lt;br&gt;Non TUTUR – 694 (62%)</td>
</tr>
<tr>
<td>B</td>
<td>988</td>
<td>12.5%</td>
<td>TUTUR – 572 (57.8%)&lt;br&gt;Non TUTUR – 416 (42.2%)</td>
</tr>
<tr>
<td>C</td>
<td>374</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>306</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>365</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Top five complainants’ data

Graph 6: Complaint analysis by location
Although the majority of complaints received during the trial period did not relate to TUTUR we understand that they cannot be ignored.

As a result of increased community complaints we:

- have developed and implemented a noise complaints policy that is published on our website.
- have created an arrivals and departures guide to further explain the processes and procedures in place at Edinburgh Airport.
- have met with Community Councils in areas affected by the TUTUR SID to understand local concerns and build relationships to improve communications going forward.
- will be proactively updating our five year Noise Action Plan and reviewing the way we monitor and mitigate noise from our operations.
Conclusions

During the trial period 2,626 aircraft departed using the TUTUR SID. The trial had no negative impact on Edinburgh Airport’s daily operation and demonstrated that modern aircraft are capable of following a defined ground track with a high degree of accuracy. The trial proved that it was possible to achieve 1 minute separation times between similar types of departing jet aircraft using the formation GOSAM-TUTUR or TUTUR-GOSAM.

There was a taxi time saving of 944 minutes during the trial period, with an annualised saving of 2,734 minutes; a fuel burn saving of 9 tonnes, with an annualised saving of 27 tonnes and a CO₂ saving of 30 tonnes, with an annualised saving of 87 tonnes. Additionally, for the Scottish Air Traffic Control Centre the trial lead to a reduction in complexity with aircraft flying routes resulting in increased capacity across the airspace directly affected.

Although track keeping performance met the RNAV1 standard, it was identified that certain aircraft suffered anomalies with the on-board flight management systems (FMS), meaning that some of the navigation points were missed. These issues would need to be resolved should we want to proceed with the TUTUR SID on a permanent basis.

Regarding noise, studies confirmed that aircraft generate significant noise over and above background noise, particularly at short lateral distances as well as medium altitudes (3,000-10,000 feet).

After the TUTUR trial ended in October 2015, all aircraft returned to using pre-existing SIDs – GOSAM, TALLA & GRICE.
Next steps

Although the TUTUR SID did meet our trial objectives, the FMS issue with certain aircraft types means that the procedure will have to be reviewed so that these problems can be resolved.

The trial has highlighted improvements that could be made to other SIDs as well as TUTUR. On the back of the trial we will review all departure routes and the wider airspace around the airport. Any permanent changes to airspace and or routes would require us to follow the CAA Airspace Change Process (CAP724/725), involving a full stakeholder consultation.

The trial saw a significant increase in community complaints and we will be reviewing our Noise Action Plan this year to improve the way we measure and mitigate our noise impact on local communities. We will also be looking at ways we can improve communication with local residents and community councils.
### Appendix A – Glossary of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP</td>
<td>Airspace Change Process</td>
</tr>
<tr>
<td>ANSP</td>
<td>Air Navigation Service Provider</td>
</tr>
<tr>
<td>ATC</td>
<td>Air Traffic Control</td>
</tr>
<tr>
<td>ATS</td>
<td>Air Traffic Service</td>
</tr>
<tr>
<td>CAA</td>
<td>Civil Aviation Authority, the regulating body for the aviation industry in the UK</td>
</tr>
<tr>
<td>CAP 725</td>
<td>Airspace Change Process Guidance document produced by the CAA and providing a framework for consideration of airspace changes</td>
</tr>
<tr>
<td>FMS</td>
<td>Flight Management System</td>
</tr>
<tr>
<td>NATS</td>
<td>Our Air Navigation Service Provider</td>
</tr>
<tr>
<td>NM</td>
<td>Nautical Mile</td>
</tr>
<tr>
<td>NPR</td>
<td>Noise Preferential Route, the route established to reduce the noise impact from departing aircraft on local communities</td>
</tr>
<tr>
<td>RNAV</td>
<td>Area Navigation</td>
</tr>
<tr>
<td>Runway 06</td>
<td>Runway in operation when aircraft arrive from the West and depart to the East</td>
</tr>
<tr>
<td>Runway 24</td>
<td>Runway in operation when aircraft arrive from the East and depart to the West</td>
</tr>
<tr>
<td>SID</td>
<td>Standard Instrument Departure procedure</td>
</tr>
</tbody>
</table>
Appendix B – Frequently asked questions

What is a SID?
SID stands for Standard Instrument Departure. This is a Instrument Flight Procedure (IFP) designed by licenced IFP designers and approved by the CAA which are coded by Flight Plan Data Providers into the FMS of an aircraft which the aircraft will following when departing an airport to ensure that all departing aircraft climb at an appropriate rate, speed and angle of bank to remain clear of all obstacles and terrain in a safe and ICAO compliant manner.

Why are you changing the route above Edinburgh Airport?
The existing SIDs at Edinburgh Airport were designed in the 1970s when the new runway was built and since then, aircraft performance has changed significantly. This new SID will allow aircraft to utilise modern technology to fly more accurate routes, climb more efficiently as well as allowing for one minute separation times between aircraft. Improving the routes within our airspace will allow us to grow safely and efficiently whilst ensuring that service levels do not deteriorate and negating the need for a second runway.

Additionally, the increased feedback from local communities during the TUTUR trial has highlighted improvements that could be made to other SID routes and as well as TUTUR. On the back of the trial we are going to review all departure routes and the wider airspace around the airport. Any permanent changes to airspace would require us to follow the CAA Airspace Change Process (CAP724/725), involving a full stakeholder consultation.

Is this new SID safe?
Yes. Safety is always our top priority and prior to the trial the route was flown in a state of the art aircraft simulator to ensure the aircraft flying on it are comfortably able to do so.

Who gives Edinburgh Airport permission to run the pilot project?
The Civil Aviation Authority (CAA) which is the airspace regulator in the UK.

Are one minute interval departures safe? What is the average time interval for other UK airports?
At most airports the time interval between departures is governed by demand i.e. there are more departure slots available than there are aircraft willing to take up those departure slots. For most of the day at Edinburgh Airport this is the case.

At busier airports, like Gatwick and Heathrow, demand outstrips supply so it is necessary to utilise the available runway capacity by allowing one minute departure intervals between aircraft of a similar size and performance. In order to introduce this it is necessary to demonstrate to the Regulator that it is safe to do so and that was one of the objectives of the trial - to allow us to gather data that will demonstrate that what we are doing is safe.
How many flight paths are there around Edinburgh Airport?
There are currently three Standard Instrument Departures (SIDs) at Edinburgh for each end of the main runway; GOSAM, TALLA and GRICE.

Why were residents not told of the trial before it began?
We used the communications model we use to communicate operational changes i.e. runway works, however we do admit that we could have and should have done more to communicate the trial directly to local residents. This has been one of our key learnings throughout the trial and as a result we will be much more proactive when communicating with residents in the future.

Why do the flights start so early and continue through the night?
There are no night flying restrictions on any of our SIDs and very few aircraft operations between 23:00-06:00. However, based on community feedback we worked with NATS to ensure that where possible night flights used existing departure routes to reduce the disturbance on our local communities. Due to the nature of our passenger mix we see a number of peaks throughout the day. One of our busiest times is the first rotation of departures from 06:00. Our operators are keen to maintain an on time schedule and key to this is minimising any delay on the first rotation to avoid knock-on effects during the day.

Why are aircraft still flying the TUTUR route?
No aircraft have flown the TUTUR SID since the trial ended on 28 October 2015. Due to wind direction and runway use, the final TUTUR flight was actually on the 26 October before the trial officially ended. The SID is no longer published as a procedure and cannot be in the FMS of any aircraft and the SID has not been issued by ATC to any aircraft since 26 October.
Appendix C – Aircraft tracks

Week 1 TUTUR tracks
Week 2 TUTUR tracks
Week 4 TUTUR tracks
Week 5 TUTUR tracks
Week 6 TUTUR tracks
Week 8 TUTUR tracks
Week 9 TUTUR tracks
Week 10 TUTUR tracks
Week 11 TUTUR tracks
Week 14 TUTUR tracks
Week 15 TUTUR tracks
Week 16 TUTUR tracks
Week 17 – TUTUR tracks