

A large commercial airplane is parked on a tarmac. A ground power unit (GPU) is connected to the aircraft's nose, providing power. The scene is set in an airport environment with other ground service equipment and vehicles visible in the background.

# FIXED ELECTRICAL GROUND POWER

Working with airlines to achieve 90% of  
turnarounds using FEGPs rather than APUs

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# INTRODUCTION & OVERVIEW

The practise of aircraft running their Auxiliary Power Unit (APU) whilst parked on stand could be a growing environmental, social and economic impact at airports across the world.

London Stansted Airport ('Stansted') shares these concerns, with particular reference to the noise and emissions generated by APUs and the associated local environmental impact. Stansted is currently one of the fastest growing major airports in the UK where the anticipated growth in the number of Air Traffic Movements (ATMs) and thus simultaneous turnarounds could escalate these issues should little or no action be taken to mitigate the use of APUs.

Some major international airports, including Hong Kong and Barcelona El Prat, have gone as far as prohibiting the use of APUs outside of set times following the arrival and prior to the departure of aircraft, enforcing mandatory use of Fixed Electrical Ground Power (FEGP).

As outlined in Action 3 of the Stansted Noise Action Plan, relating to the control of ground noise, Stansted has a long-term commitment of achieving FEGP usage on 90% of aircraft turnarounds.

Figure 1<sup>1</sup> below shows the guidelines in place set out in liaison with Sustainable Aviation (SA) which helps to achieve this goal.

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	Airport Terminal, or ground-based facilities such as FEGP and PCA should always be used where provided
Where they are not available...	GPUs and air-conditioning units should be used as these provide a reduction in fuel, emissions and noise levels over APUs
When FEGP, PCA or GPUs are not available...	APUs, associated generators and air bleeds should be used

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Figure 1. SA Guidelines from Departures Code of Practice

Stansted is a signatory to Sustainable Aviation.

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<sup>1</sup> <http://www.sustainableaviation.co.uk/wp-content/uploads/2015/09/Departures-Code-of-Practice-June-2012.pdf>

## METHODOLOGY

For the purposes of Action 3 of the Stansted Noise Action Plan, a 'turnaround' is defined as an aircraft with an actual time on stand (ie. chocks-on to chocks-off time) of no more than 60 minutes.

Where the chocks-on to chocks-off time is greater than 60 minutes, this is regarded as parking or night-stopping aircraft rather than a turnaround. It should be made clear however that aircraft are also required to use FEGP when parked or night stopped if the stand has FEGP facility.

The data analysis is broken down into each "Stand Group" which is set out as follows:

- SAT1 – Stand numbers 10 to 25
- SAT2 – Stand numbers 30 to 45L/R (Includes both Domestic and International level)
- SAT3 – Stand numbers 50 to 65L/R (Includes both Main building and Forward Coaching Facility)



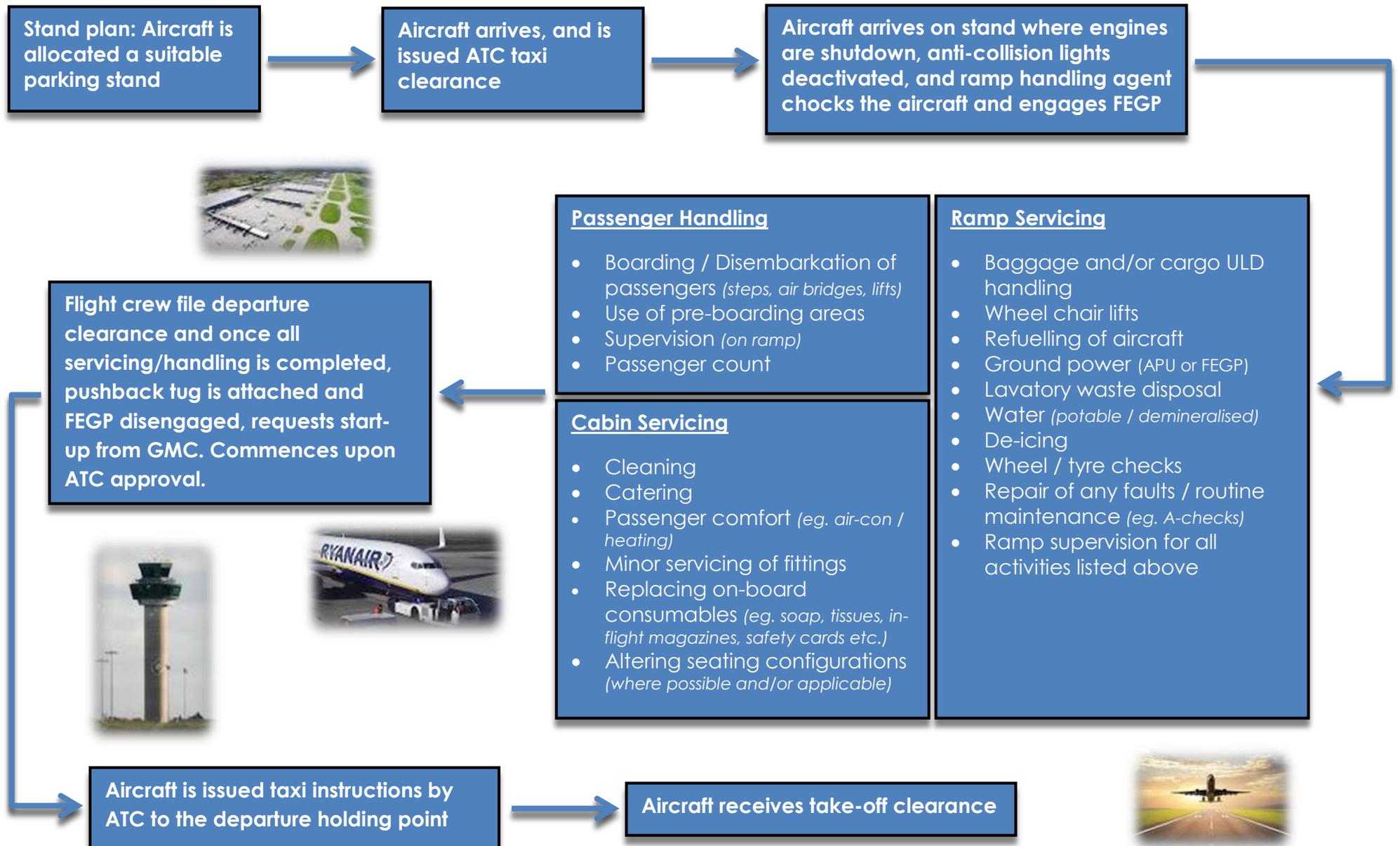
Each sample is taken on the single busiest day in the Summer 2015 schedule season (29<sup>th</sup> March – 24<sup>th</sup> October) for the number of aircraft turnarounds on each Satellite, though it should be noted that Stands 23R and 51L/R are excluded due to FEGP data recording error.

A turnaround on any parking stand which does not provide FEGP facilities, or exceeds the 60 minute chocks-on to chocks-off time as outlined

above, is disregarded from the data sample. As such, pure-cargo aircraft are not included due to disproportionate parking times to meet the definition of a turnaround as set out above.

The assumption is made that aircraft utilising FEGP are not also running their APU simultaneously.

# PROCESSES OF AN AIRCRAFT TURNAROUND



# PROVISION OF FEGP AT STANSTED

FEGP at Stansted is provided across most stands on the south-side of the airfield, used mainly by commercial passenger and cargo operators.

The following stands/parking areas however do not provide FEGP:

- Stands D74, D76, Z204F
- The Compass base
- Leased parking areas; Hangers 8 and 10

All stands to the north-side of the airfield also do not provide FEGP facilities. Figure 2 shows more clearly the provision of FEGP facilities at Stansted:

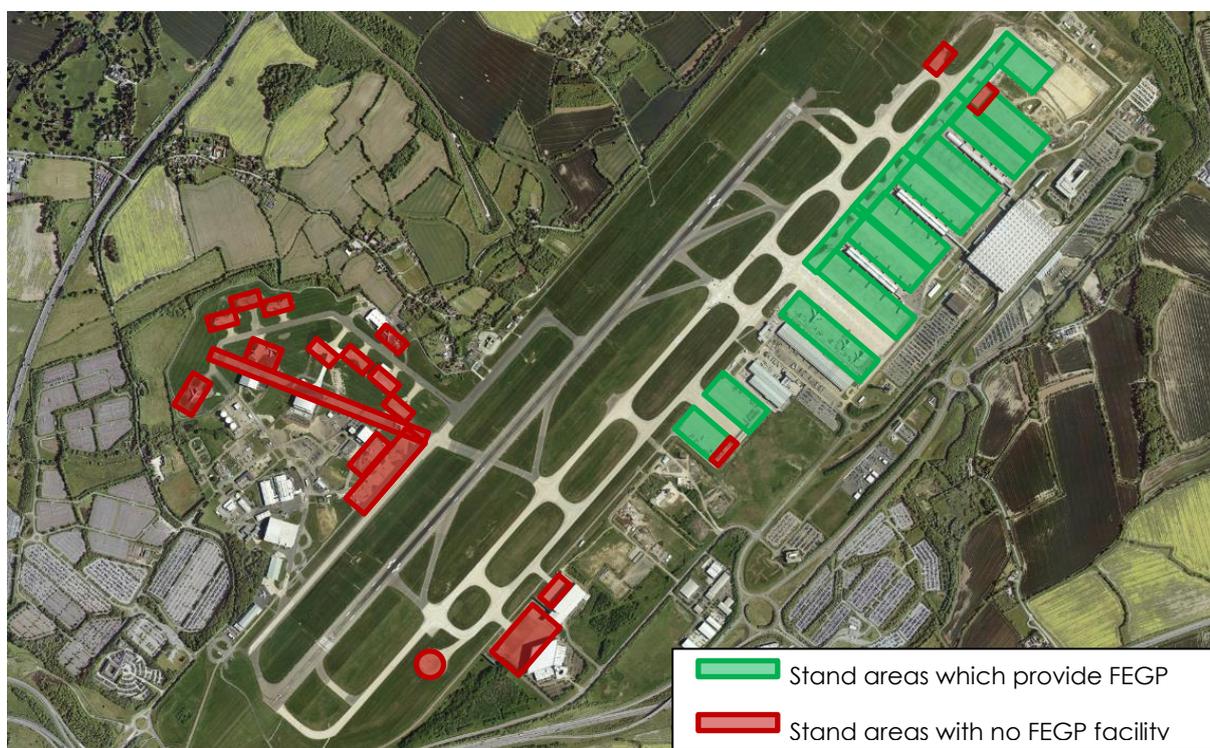


Figure 2. Provision of FEGP at Stansted

The types of FEGP facilities at Stansted vary depending on the stand location and provide either single or dual output cables. The majority are carried via a "crocodile cable" with the exception of the SAT3 contact stands which are instead a "dabico" fitting fixed in the ground.





Crocodile cable carriers are advantageous in that they are compatible with a wide range of aircraft types. Consequently, this makes Stansted already well positioned to mitigate potential environmental and noise concerns for any increase in wide-body operations through the airport's long-haul ambitions.

SAT3 contact stands however are intended to only handle Code C aircraft types, meaning the benefits of a crocodile cable are counteracted. As such dabico fittings are better suited to provide a greater manoeuvring area for serving vehicles and are conducive to achieving minimum turnaround times.

## FINDINGS

The key benefits of FEGP are reduced noise and emissions. The exact fuel burn and environmental impact of running APUs are dependent on various factors such as aircraft type, weight and turnaround times.

The graph below (Figure 3.) shows typical APU fuel burn in kg/hr by aircraft size:

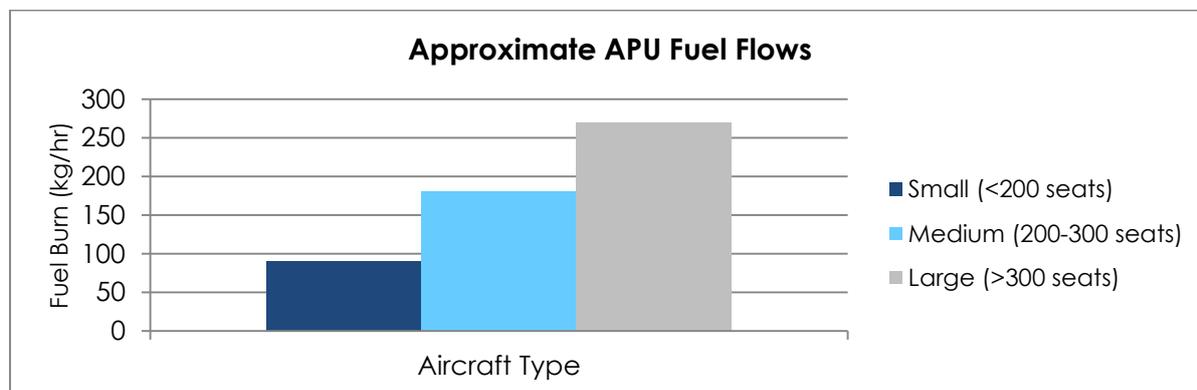


Figure 3. Approximate APU fuel flows by aircraft size<sup>2</sup>

Based on these figures, if Ryanair alone were to run APUs constantly through every turnaround at Stansted during the peak summer season, the total fuel burn would exceed 40,000kg every week.

Figure 4 shows the FEGP Usage (%) for each of the Satellites, or Stand Group. The breakdown of each data sample, by airline and turnaround time, can be found in the Appendices section.

The results of this survey show that SAT1, SAT2 and SAT3 stands attained approximately 95%, 92% and 93% respectively of aircraft turnarounds using FEGP facilities.

As such, all three Stand Groups based on their respective busiest days, exceed the FEGP usage target of 90% as set out in the Stansted Noise Action Plan.

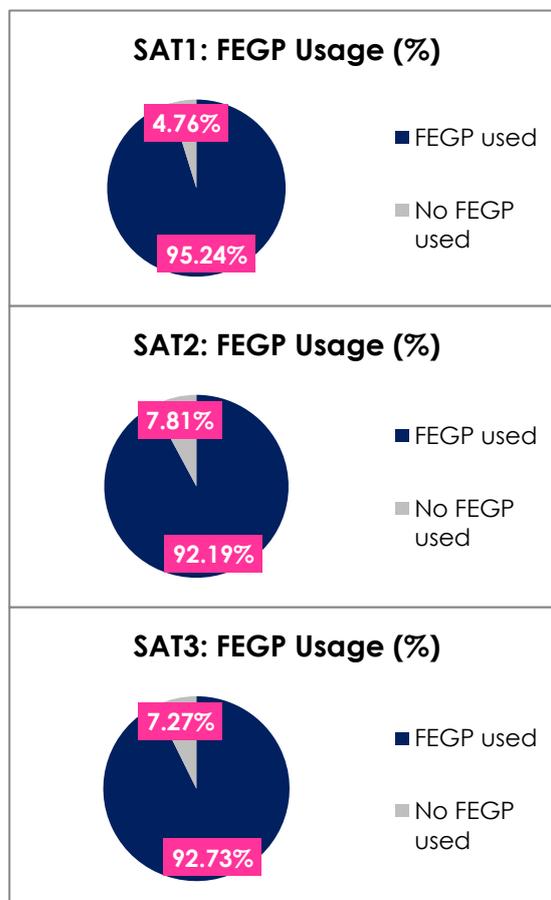


Figure 4. FEGP Usage (%)

<sup>2</sup> <http://www.sustainableaviation.co.uk/wp-content/uploads/2015/09/Departures-Code-of-Practice-June-2012.pdf>

## CONCLUSION

The data shown, as per each satellite, can be treated as minimum compliance figures. Although there are some aircraft parking stands that have not generated the FEGP data used for this analysis, there is a high degree of confidence that aircraft on those stands will have also used FEGP.

Compliance for FEGP usage is also monitored during the Airside Operations daily checks. During the daytime, the Airside Rangers carry out turnaround checks, for all aspects of safety during the busy turnaround process. One of these turnaround checks also monitors FEGP usage.

During the night period, the Airside Rangers also carry out specific FEGP compliance checks at 01:00, 03:00 and 05:00 (local time) on a nightly basis to ensure there have been no FEGPs left running on any aircraft unnecessarily.

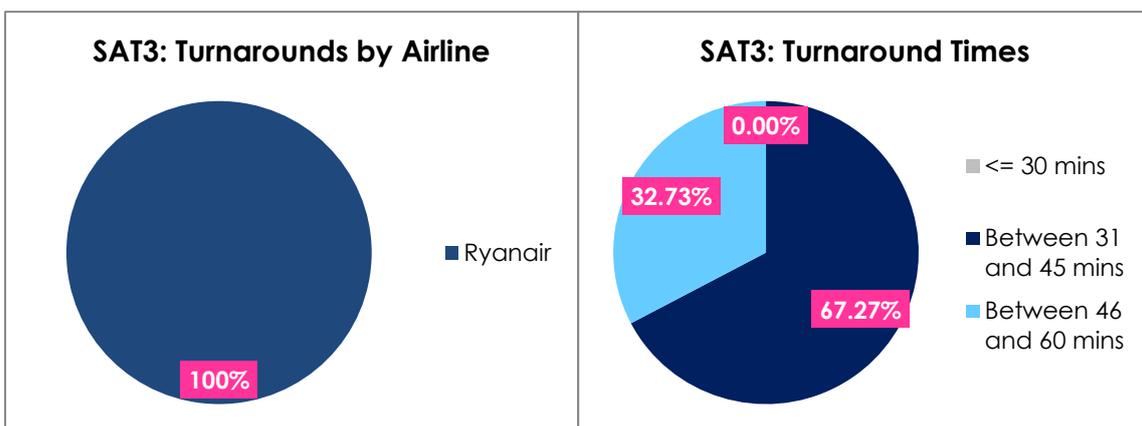
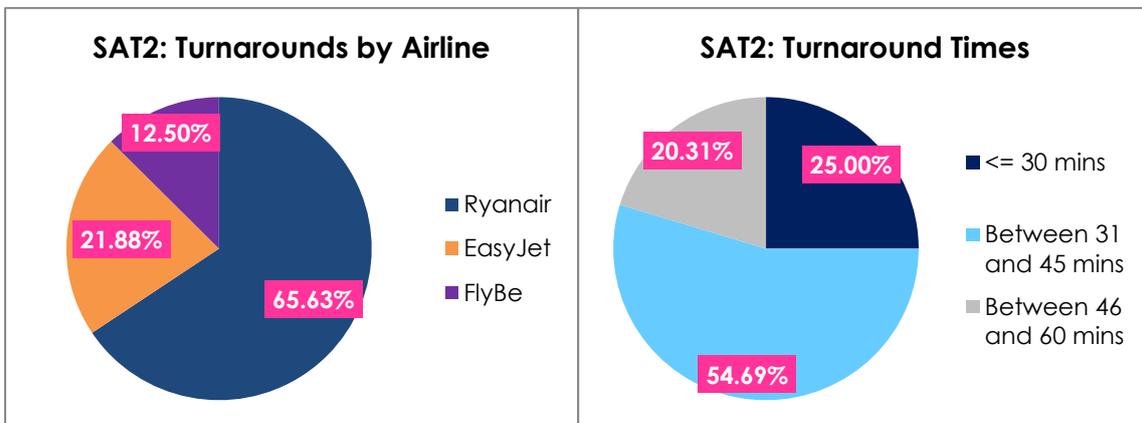
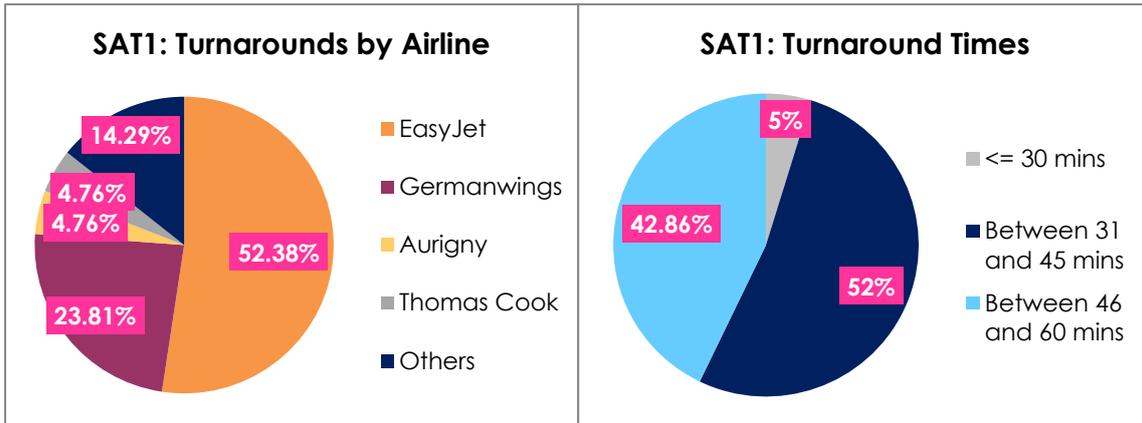


## GLOSSARY OF TERMS

<b>APU</b>	Auxiliary Power Unit
<b>ATC</b>	Air Traffic Control
<b>ATM</b>	Air Transport Movement
<b>FEGP</b>	Fixed Electrical Ground Power
<b>GMC</b>	Ground Movement Control
<b>GPU</b>	Ground Power Unit
<b>SA</b>	Sustainable Aviation
<b>SAT</b>	Satellite
<b>ULD</b>	Unit Load Device



# APPENDICES



END