



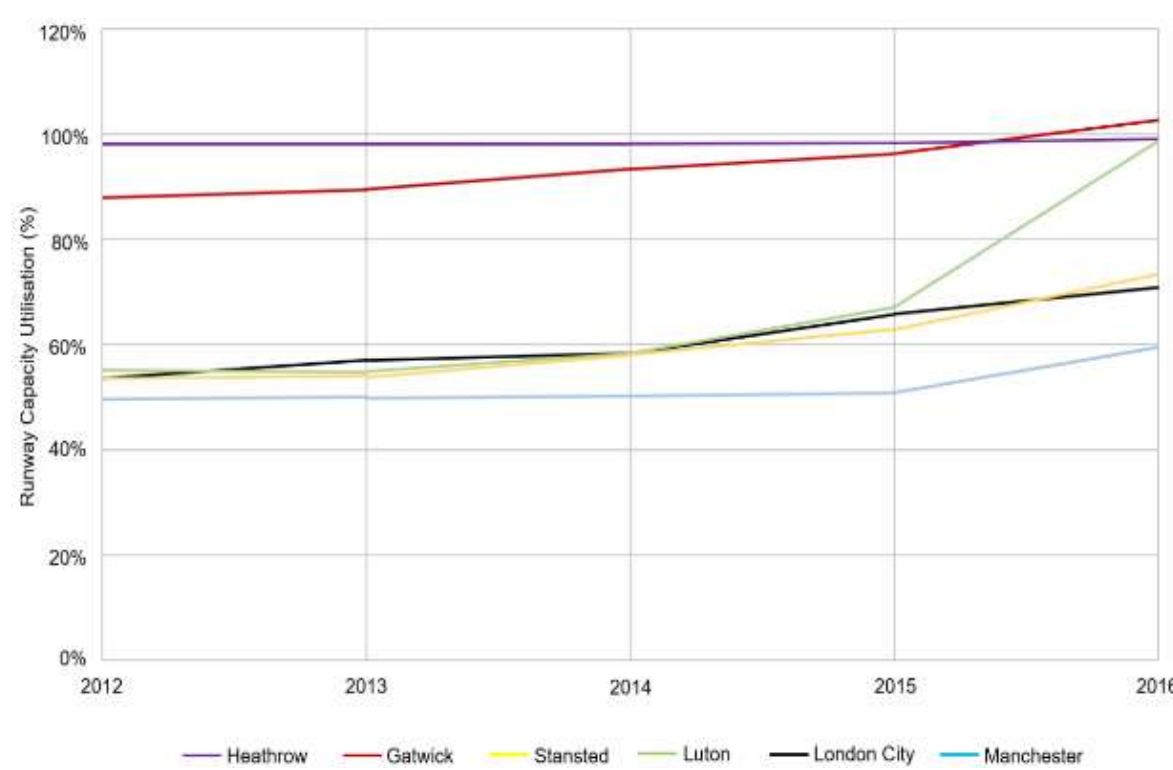
# MARS

## Modelling Aviation Resilience Scenarios

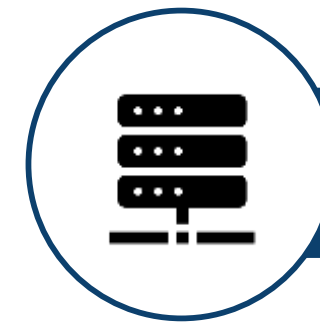


### Introduction

Mass diversion events place significant operational strain on the UK aviation system. High airport utilization and limited spare capacity complicate the ability of air traffic controllers to efficiently divert flights.



Source: Civil Aviation Authority



### Methods

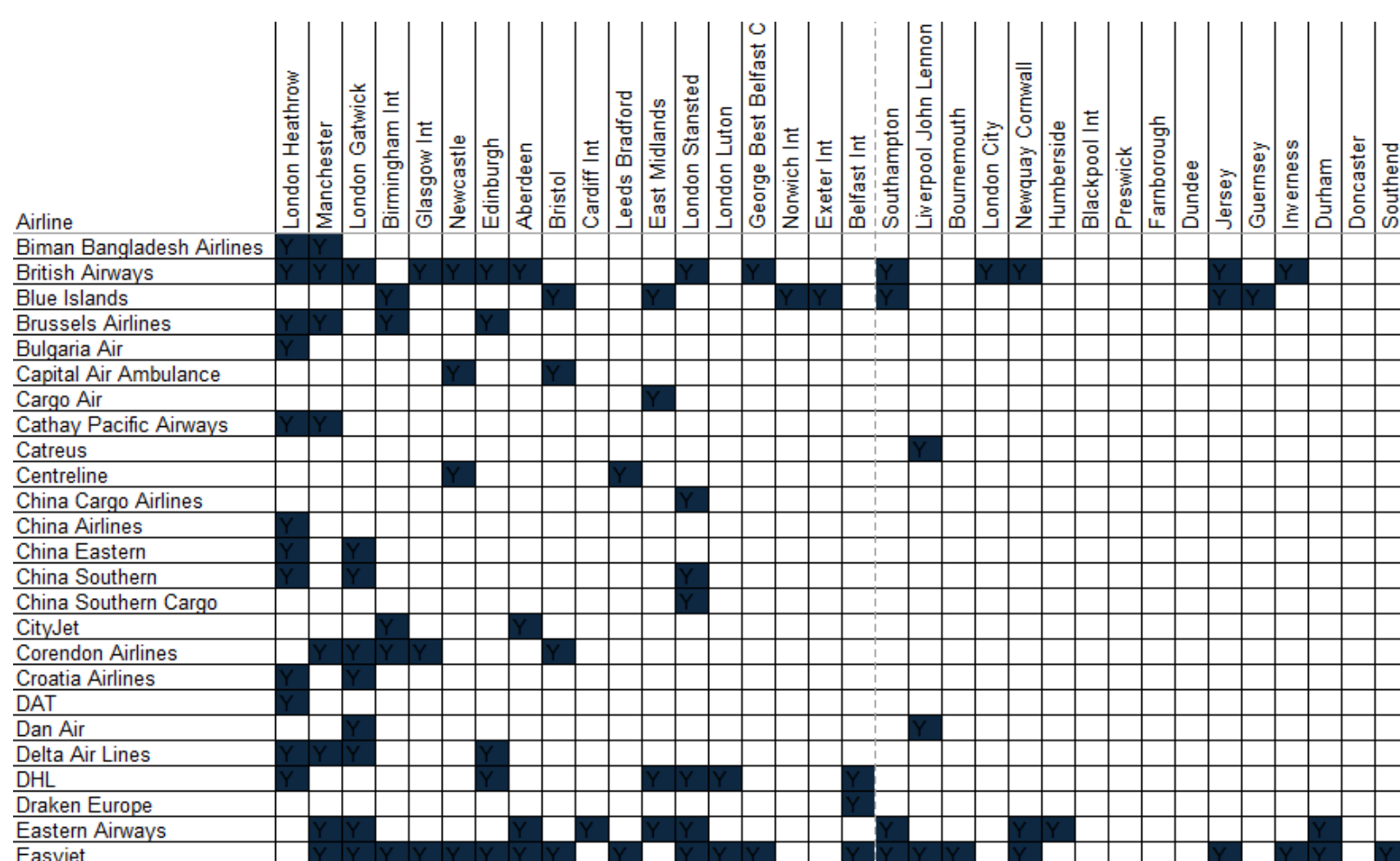
- Digital model of 34 largest UK commercial airports
- Historical arrival and departure data
- Simulate airport closure and model diversion process
- Identify optimal diversion airports

Scheduled Arrivals – London Gatwick (LGW)						
Time	Flight number	Airline	Aircraft type	Code	1 <sup>st</sup> Diversion	2 <sup>nd</sup> Diversion
12:20	W95776	Wizz Air	A321neo	C	LTN	BHX
12:25	VY6009	Vueling	A320neo	C	LHR	MAN
...						

Stand availability – London Heathrow				
Code B	Code C	Code D	Code E	Code F
0	7	0	2	1



### Algorithm



#### Steps:

- Data Loading and Preprocessing
- Initialising Airport Infrastructure and Agreements
- User Input Handling
- Extracting Affected Flight Data
- Diversion Simulation
  - Declared Diversion Priorities
  - Distance to Nearest Airport
  - Available Stands at Diversion Airport
  - Contractual Agreements
- Dynamic Resource Management
- Output Generation
- Post-Simulation Evaluation



### Simulation Outputs

- Holistic Diversion Overview
- Interactive Airport Map
- Detailed Flight List

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Total flights: 82
Successful diversions: 82
Unsuccessful diversions: 0
Success rate: 100.00%

**Total Flights Diverted to Each Airport**
Southend: 2 flight(s) diverted
London Luton: 4 flight(s) diverted
London Heathrow: 11 flight(s) diverted
Birmingham: 11 flight(s) diverted
Southampton: 7 flight(s) diverted
London Stansted: 15 flight(s) diverted
East Midlands: 2 flight(s) diverted
Bournemouth: 5 flight(s) diverted
Manchester: 14 flight(s) diverted
Jersey: 4 flight(s) diverted
Bristol: 7 flight(s) diverted
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BY5487 (Airline: Ascend Airways) from Ibiza (IBZ) to London Gatwick scheduled at 13:30:00 was diverted to East Midlands and landed at 13:54:18.  
U28244 (Airline: easyJet) from Thessaloniki (SKG) to London Gatwick scheduled at 13:30:00 was diverted to London Stansted and landed at 13:40:21.  
Z0704 (Airline: Norse Atlantic) from New York (JFK) to London Gatwick scheduled at 13:30:00 was diverted to Birmingham and landed at 13:51:39.  
U28762 (Airline: easyJet) from Malta (MLA) to London Gatwick scheduled at 13:35:00 was diverted to Bournemouth and landed at 13:49:51.  
W43031 (Airline: Wizz Air) from Bucharest (OTP) to London Gatwick scheduled at 13:40:00 was diverted to Birmingham and landed at 14:01:39.

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