

Adapting to climate change: an ANSP perspective

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FIGURE 1: Impact of the storm at the Great Dun Fell radar

Introduction

Fuelled by climate change, extreme weather events are becoming more frequent. Severe weather brings specific challenges for air traffic management, and it is increasingly important for air navigation services providers (ANSPs) like NATS¹ to prepare for acute and chronic climate change impacts.

Climate hazards

During Storm Arwen in November 2021, a power failure at the Great Dun Fell radar and radio station in England's Pennines, East Cumbria, – situated 848 metres above sea level – posed a particular challenge. The site lost main power during the storm but was running on its standby

generator until that suddenly stopped, leaving the site with just its battery back-up.

NATS has specialist engineers based around the country who form part of 24/7 teams, are ready to respond as and when required. These are some of the very best in the business, but even they found the conditions caused by Arwen challenging.

Getting to the site was extremely difficult. Snow had blocked the main road and the team was forced to gain access via an off-road alternative route using a tracked vehicle (Figure 1). Once on site, the cause of the generator failure was evident, as the electrical supply and the generator fuel pumps were covered in snow, which had to be cleared before repairs could be made.

¹ NATS is the primary Air Navigation Service Provider (ANSP) in the UK. It provides Air Traffic Control (ATC), engineering and other services to aircraft flying in UK domestic airspace and the eastern part of the North Atlantic Ocean (Shanwick) and at 20 civil & military airfields in the UK plus Gibraltar.

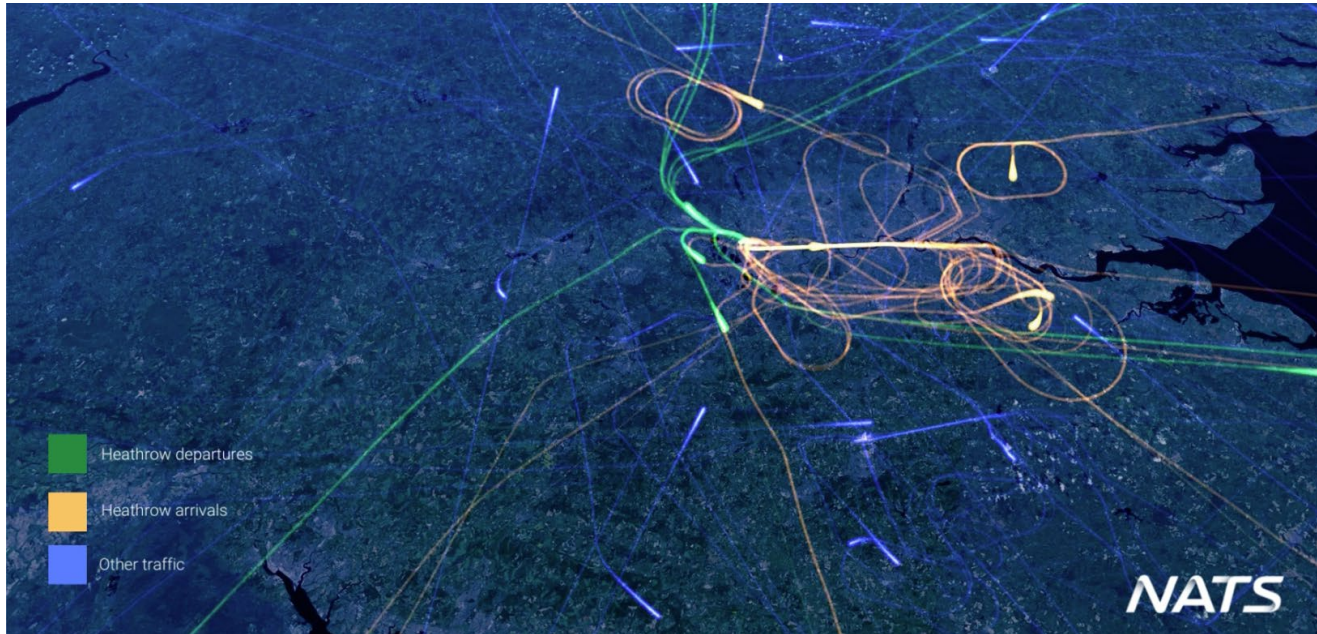


FIGURE 2: Visualisation snapshot of the day Storm Eunice hit the UK with strong winds forcing multiple go-arounds.

The Great Dun Fell team also supported the local power company to reach their own sites nearby, highlighting the interdependencies between operators of critical national infrastructure.

A few months later, the UK was heavily impacted by strong winds, snow, heavy rain and flooding from three consecutive storms in a week – Dudley, Eunice and Franklin. NATS teams did their best to tackle all the challenges to keep the people safe and the operation running effectively. It included pre-positioning people to respond more quickly and implementing proactive shutdowns of equipment where the forecast wind was above tolerances, helping avoid significant damage to the equipment and ensuring that NATS were able to return to service quickly when the weather improved.

But it is not just at NATS' sites and infrastructure that adaptation to the impacts of severe weather is needed. Storm Eunice resulted in significantly more diversions than usual. At Heathrow Airport in London, England there were a total of 40 missed approaches, compared to one a day on average, with some pilots having to make three attempts to land.

Strong winds can cause multiple challenges, ranging from larger gaps being needed between landing aircraft, to wind shear which can cause unstable approaches. If an aircraft cannot make a stable approach due to wind like seen with Storm Eunice, the pilot may decide to 'go-around' where they will climb to a safe altitude and, in most cases, attempt another approach and landing, which adds to the workload of NATS' controllers².

In airspace that is already busy with other aircraft queuing to land, it is NATS' job to make sure the pilot can do that safely. When bad weather is forecast, NATS 'regulate' – effectively putting a cap on the amount of traffic in the airspace, to ensure there is more room to safely manoeuvre and to keep the workload manageable for its controllers.

Adaptation measures

As climate change continues to make its presence felt, and extreme weather events become more regular and severe, NATS is in need to embed climate resilience into its facilities and operations. NATS' adaptation to climate change report, submitted to the UK Government before Storm Eunice hit, summarises the progress towards identifying and assessing

2 Video Storm Eunice go-arounds at Heathrow <https://www.youtube.com/watch?v=8nE62WX-x80&t=3s>

climate risks to the critical national infrastructure under NATS' management, and what is planned to do now and into the future to increase resilience to severe weather events.

NATS has identified nine physical climate risks based on the latest climate scenarios pointing to increased warmer, wetter winters, and hotter, drier summers along with an increase in the frequency and intensity of extreme weather events. The report provides the main physical hazards from an air traffic perspective and provides an assessment of the risks faced in the transition to a low-carbon economy. The NATS 2021 Climate Risks and Adaptation Progress Report is available online³.

In order to prepare for some of these risks, since 2016, NATS has had a UK Met Office team embedded at the Control Centre in Swanwick, Hampshire, England, allowing for proactive forecasting on adverse weather that could affect the operation. They are providing invaluable data for NATS' operation and engineers.

NATS continuously maintains and improves both proactive and reactive controls across the operation and its estate. More recently, NATS has been working closely with partners to develop and prioritise a comprehensive list of controls and actions to mitigate risks and incorporate these into NATS' business and planning, as part of a new climate change resilience strategy. This work is set to continue in the coming years and inform investment decisions and NATS' approach to adapting to the impact of climate change on its business.

³ <https://www.nats.aero/wp-content/uploads/2022/01/NATS-2021-Climate-risk-and-adaptation-progress-report-FINAL.pdf>