

Implementation of the recommendations from the independent enquiry into the NATS systems failure on 12th December 2014

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Chapter 1

Executive summary

- 1.1 The UK Civil Aviation Authority (CAA) and NATS agreed to establish an Independent Enquiry following the disruption caused by the failure in air traffic management systems on the afternoon of Friday 12 December 2014. Led by an independent chair, the panel consisted of NATS technical experts, a board member from the CAA and independent experts on information technology, air traffic management and operational resilience.
- 1.2 The Final Report of the Enquiry published in May 2015 made recommendations across five thematic areas, namely 'safety regulation', 'resilience and contingency', 'measurement of passenger disruption', 'the statutory framework' and Single European Sky ATM Research (SESAR). The CAA studied the comprehensive report and its recommendations in detail, accepted all of the recommendations and made a commitment to taking any steps necessary and to work with NATS on implementation.

Safety regulation

- 1.3 The safety recommendations revolved around enhancing focus in existing areas of regulatory activity and strengthening international engagement. To address these recommendations, the CAA engaged with Eurocontrol and established revised procedures for crisis management (Enquiry recommendation 16).
- 1.4 The CAA facilitated engagement by NATS with the Eurocontrol Network Manager, airports and airline customers to review roles, responsibilities and priorities in Air Traffic Management (ATM) crisis management and recovery. The CAA reviewed existing procedures for the handling of a significant crisis or system outage and amended existing protocol documents, so as to have a document in place that contains material which can be promulgated to simply show where responsibilities lie and

how the essential information and decision making process operates (Enquiry recommendation 18).

- 1.5 The CAA engaged with relevant UK airports and Eurocontrol to assure appropriate Airport Collaborative Decision Making (A-CDM) system education and training, the effectiveness of A-CDM operation and that of any fallback modes. Through the Future Airspace Strategy (FAS) deployment programme, the CAA will continue to support and encourage development of A-CDM solutions suitable to the particular airports' operation (Enquiry recommendation 19).
- 1.6 In collaboration with NATS, the CAA ensured that the mechanisms and processes are in place so that we can continue to be able to provide controllers with the skills and expertise that they need to achieve and maintain operational competences appropriate to the relevant phase of the SESAR journey (Enquiry recommendation 23).

Resiliency and contingency

- 1.7 The panel's recommendations supported the work the CAA had already commenced on reforming the NATS En-route plc (NERL) licence, particularly the recommendations for a resilience condition in the licence and enhancing the CAA's oversight of NATS capital programme.
- 1.8 The CAA and NATS agreed national definitions and requirements for contingency, resilience and business continuity with NATS, subject to consultation (Enquiry recommendation 20).
- 1.9 The CAA developed a licence condition that requires NATS to submit a resilience plan for approval by the CAA (Enquiry recommendation 30), subject to consultation in the autumn of 2016.
- 1.10 The CAA developed a number of actions to increase our oversight and assurance of NATS capital programme, and overseeing its evolution through the annual Service and Investment Plan (SIP) both in the short

term (for the remainder of RP2) and with a longer term view to RP3 (Enquiry recommendation 27).

Measurement of passenger disruption

- 1.11 The Enquiry's emphasis on measuring impacts on the passenger required careful analysis to ensure a practical and cost-effective solution could be found. The preferred approach the CAA and NATS identified to estimate the impact to passengers from serious events caused by air traffic control disruption (Enquiry recommendation 29) was a method based on average 'direct' and 'reactionary' delay.

Statutory enforcement powers

- 1.12 The Enquiry's support for a statutory power to levy fines for serious or repeated breaches of the NERL licence was welcomed by the CAA, and reinforced our position that there are weaknesses in the Transport Act 2000 (TA00) around the power to enforce past breaches and limited enforcement tools.
- 1.13 The CAA engaged with the Department for Transport (DfT) to make the case for inclusion of new and revised statutory powers in any relevant forthcoming legislation (Enquiry recommendation 28). As a result, DfT launched a consultation in September 2016 on 'Modernising the Licensing Framework for Air Traffic Services'.
- 1.14 The consultation sought views from stakeholders on the inclusion in the Modern Transport Bill of the power for the CAA to enforce past breaches, impose contravention notices, impose urgent enforcement orders, require NATS to remedy the consequences of a breach and impose fines up to 10% of qualifying turnover. A simplified enforcement procedure and a licence modification regime where NATS no longer has to consent to licence changes has also been proposed.

SESAR requirements

- 1.15 The CAA agreed with NATS that the existing domestic (NERL licence under the Transport Act) and European (SES Performance, Charging and SESAR Common Project Regulations) regulatory framework established obligations and suitable monitoring mechanisms to provide assurance that the evolving capability meets the functional and non-functional requirements of SESAR while complying with the performance regime of the Single European Sky (SES) regulations (Enquiry recommendation 21). The SESAR plan develops European ATM out to 2035 and beyond.

NATS work on implementing recommendations

- 1.16 NATS have also responded to the Enquiry and prepared a Final Report, summarising the actions they have taken to address the 21 recommendations for which NATS is solely accountable. To provide additional external assurance that NATS had properly responded to the panel's recommendations, KPMG was appointed to undertake a review of NATS actions. The KPMG opinion is included in their Final Report. Sir Robert Walmsley has also undertaken a follow-up review of the NATS report, and concluded that 'NATS have engaged positively and seriously with the recommendations of the 2015 enquiry'. He recommended that all envisaged further work (that is required to demonstrate or ensure the successful implementation of the majority of NATS-only recommendations) be listed and transferred to normal NATS assurance arrangements. He also noted that any major business transformation should have explicit NATS Board approval and that a Golden Thread should run from Board Approved documents to provide context and unequivocal guidance. He also recommended that NATS' staffing should be continually assessed as to whether it is appropriate to the assigned responsibilities.

- 1.17 The key actions taken by NATS in addressing the recommendations from the Enquiry directed towards NATS include:
- Reviewing and updating the techniques and duration of the measures used by NATS to manage capacity during a system failure and during the recovery at the Swanwick and Prestwick centres;
 - Reviewing and updating NATS' crisis management facility, and updating the crisis management documentation, training and checklists to ensure consistency;
 - Conducting an industry-wide review of crisis response and resilience arrangements;
 - Reviewing and considering NATS mechanisms and systems for error management, safety reporting and the identification and management of risks to confirm that they are as good as similar safety critical organisations, and are capturing a comparable volume and range of event data;
 - Reviewing and updating the continuation training and aide memoire checklists for NATS' Air Traffic Control (ATC) and Engineering functions for system knowledge and response content, including fallbacks to provide additional support, consistency and ease of use; and
 - Reviewing NATS future requirements for system architecture, system behaviour, performance logging, software assurance and testing, and future collaboration with suppliers to retain the current strengths.
- 1.18 NATS has agreed to undertake an annual review of the implementation of its recommendations in 12 months. The CAA will monitor the effectiveness of the implementation of all the CAA and NATS recommendations, as part of our normal core regulatory activities (i.e. business as usual). The CAA will provide the CAA Board with an update on the implementation of all of the CAA and NATS recommendations in 12 months.

Summary of actions undertaken by the CAA

1.19 The CAA considers that it has effectively and appropriately addressed the recommendations directed both at the CAA only and the CAA and NATS jointly. A summary of the CAA and CAA-NATS actions are included in the table below.

Table 1: Summary of actions undertaken by the CAA to implement the recommendations from the independent enquiry

Recommendation	Actions taken by the CAA	Status
Recommendation 16 (R16) Review crisis management procedures with Eurocontrol	The CAA engaged with Eurocontrol and established revised standing, recovery and communications procedures for crisis management at Network Management (NM) level. These revised procedures were put into operation with effect from January 2016 and will be used in operations and training as required by future events. Lessons identified will be kept under review and may be modified in light of the learning from future scenarios.	Action closed. Ongoing monitoring transferred to Core Regulatory Activity (CRA) activity in the CAA's Safety & Airspace Regulation Group (SARG).
Recommendation 18 (R18)* Review Eurocontrol engagement and ATM crisis management and recovery	The CAA facilitated engagement by NATS with the Eurocontrol Network Manager, airports and airline customers to review roles, responsibilities and priorities in ATM crisis management and recovery. We amended the existing National Airspace Crisis Management Executive (NACME) protocol so as to clearly show where responsibilities lie and how the essential information and decision making process operates. The CAA and NATS developed a new capability known as the Aviation Crisis Executive (ACE). This provides a strategic executive forum that	Action closed. Any ongoing monitoring transferred to the CAA's SARG.

Recommendation	Actions taken by the CAA	Status
	will provide a Common Recognised Information Picture (CRIP) should a severe event occur.	
Recommendation 19 (R19) Assure appropriate A-CDM system education, training and effectiveness	The CAA engaged with relevant UK airports and Eurocontrol to assure appropriate A-CDM system education and training, the effectiveness of A-CDM operation and that of any fallback modes. Through the FAS deployment programme, the CAA will continue to support and encourage development of A-CDM solutions suitable to the particular airports' operation.	Action closed. Transferred to CRA through the FAS Policy and Regulatory Programme Board, chaired by the CAA.
Recommendation 20 (R20)* Agree definitions for contingency, resilience and business continuity	The CAA agreed national definitions and requirements for contingency, resilience and business continuity with NATS. These proposals will be consulted on in the autumn of 2016.	Action closed, subject to consultation in autumn 2016 and any subsequent modification to the NERL licence. Work led by the CAA's Consumer and Markets Group (CMG).
Recommendation 21 (R21)* Provide assurance that the evolving capability of NATS meets the requirements of SESAR	The CAA and NATS agreed that the existing European and domestic requirements and monitoring mechanisms provide assurance that the evolving capability meets the functional and non-functional requirements of SESAR, while complying with the performance regime of the SES regulations.	Action closed. Transferred to CRA through the CAA's CMG.

Recommendation	Actions taken by the CAA	Status
Recommendation 23 (R23)* Assess and ensure the skills and expertise required for air traffic controllers (ATCOs) in SESAR	The CAA and NATS established a NATS overarching Training Strategy, and a NATS Training Strategy Governance Board that maintains and develops the Training Strategy for NATS airports and centres. A specific Deployment Programme Training Strategy and associated governance, which sits under the over-arching Training Strategy, was also developed. These measures will ensure that NATS continues to be able to provide controllers with the skills and expertise needed to achieve and maintain operational competences appropriate to the relevant phase of the SESAR journey.	Action closed. Transferred to CRA through the CAA's Safety and Regulation Group (SARG).
Recommendation 27 (R27) Ensure the CAA has sufficient expertise to assure the NATS capital programme	The CAA has increased its oversight and assurance of NATS capital programme, including implementation of Licence modifications, putting requirements on NATS around enhanced reporting and setting up an Independent Reviewer process. The CAA has also considered the implementation of an Independent Fund Surveyor (IFS) type arrangement for RP3.	Action closed. Monitoring transferred to CRA through the CAA's Consumer and Markets Group.
Recommendation 28 (R28) Reform of the statutory framework	The CAA engaged with the DfT to make the case for the inclusion in any forthcoming Aviation Bill of powers to enforce appropriate levels of service by NATS, by considering a range of options to improve our enforcement tools. The DfT published in September 2016 a consultation on modernising the NATS regulatory framework under the Modern Transport Bill, seeking views on the powers for the CAA to enforce past breaches, impose contravention notices, impose urgent	Action closed. Monitoring transferred to CRA through the CAA's Consumer and Markets Group.

Recommendation	Actions taken by the CAA	Status
	enforcement orders, require NATS to remedy the consequences of a breach and impose fines up to 10% of qualifying turnover.	
Recommendation 29 (R29)* Create a system to measure passenger disruption	The CAA and NATS developed a system based on direct and reactionary delay to estimate the scale and direct impact to passengers of serious events caused by air traffic control disruption.	Action closed. Analysis and publication of the impact of any future event transferred to CRA through the CAA's Policy Programmes Team.
Recommendation 30 (R30) Develop a licence condition for NATS to submit a resilience plan to CAA	The CAA developed a licence condition that requires NATS to submit a resilience plan for approval by the CAA. This will be consulted on in the autumn of 2016.	Action closed subject to consultation in autumn 2016 and any subsequent modification to the NERL licence. Work led by the CAA's Consumer and Markets Group.

* Represents a CAA-NATS joint action.

Chapter 2

Introduction

Background

- 2.1 In December 2014 NATS Air Traffic Control (ATC) systems suffered a technical failure that resulted in the application of flow management regulations and flight delays. This followed a larger failure in December 2013 of the Technical Monitoring and Control System (TMCS) servers that configure the Voice Communications System (VCS) at Swanwick.
- 2.2 As a result of these two failures, the CAA and NATS jointly established an Independent Enquiry (“the Enquiry”), which published a number of recommendations in May 2015. This report provides a summary of actions taken by the CAA to respond to each of the recommendations addressed to the CAA (and to the CAA-NATS jointly).

Overview of the December 2014 incident

- 2.3 At 1444 on Friday 12th December 2014, a system failure occurred affecting the Area Control operation at the NATS’ Swanwick Centre. This operation provides ATC services in upper airspace across most of England and Wales. Systems supporting the Terminal Control operation at Swanwick (which supports low level air traffic in the London area) and the Prestwick Centre (which supports air traffic in the Scottish and Manchester areas) were unaffected.
- 2.4 During the failure, air traffic controllers did not have access to up to date flight plan information, but were still able to see aircraft on radar displays and talk to them using radio communications.
- 2.5 In order to safely manage the traffic during this period of reduced functionality, departures were stopped from London airports and an air traffic regulation applied restricting departures from European airports for traffic which would route through the affected airspace. Restrictions were

progressively lifted from 1605 with a recovery to full capacity by around 1845. There were no safety incidents as a result of this period of reduced functionality.

- 2.6 Delays were incurred totalling some 15,000 minutes and airlines cancelled around 80 flights. Of the 6,000 flights handled on the 12th December around 450 aircraft were delayed with an average delay of approximately 45 minutes.

Summary of the findings from the enquiry

- 2.7 In response to the December 2014 failure, the CAA and NATS established an Independent Enquiry.¹ Led by an independent chair (Sir Robert Walmsley, the Enquiry panel comprised NATS technical experts, a board member from each the CAA (Mark Swan) and NATS (Martin Rolfe) and independent experts on information technology, air traffic management and operational resilience. The Enquiry formally commenced work in January 2015, and the Final Report was released on 13 May 2015.²
- 2.8 The Enquiry found:
“...no suggestion that any failure of the CAA’s oversight contributed to the events of 12 December or posed any threat to safety. However, there are aspects of the CAA’s oversight arrangements which could usefully be brought further into line with regulatory best practice to minimise the risk of further incidents in the future and ensure that recovery takes place with the minimum inconvenience to passengers (whilst maintaining safety)”.
- 2.9 These measures include:
“...greater engagement by the CAA in the NATS investment programme and steps to bring the interests of airline passengers more directly into the

¹ A summary of the Terms of Reference is given here: www.caa.co.uk/News/Independent-inquiry-into-air-traffic-control-failure-announced/.

² www.caa.co.uk/Commercial-industry/Airspace/Air-traffic-control/Air-navigation-services/Air-Traffic-Control---NATS-system-failure-enquiry/.

regulatory equation. The CAA should require NATS to submit and maintain an operational resilience plan, as is required for major airports. To achieve these objectives the CAA should be given enforcement powers, including power to levy fines for breaches of the NERL licence, comparable with those of other regulators (although an incident of this scale would not have been of a sufficient magnitude to result in a fine unless it had formed part of a sustained pattern of performance failure)”.

2.10 The package of recommendations covered the following five thematic areas:

- **Safety regulation:** enhancing focus in existing areas of regulatory activity and strengthening international engagement;
- **Resilience and contingency:** introducing a resilience condition in the licence and enhancing the CAA’s oversight of NATS capital programme. These recommendations supported the work the CAA had already commenced on reforming the NERL licence around resilience;
- **Measurement of passenger disruption:** collecting data on the impact of air traffic control disruption on passengers and publishing delay estimates;
- **Statutory enforcement powers:** introducing new powers such as the ability to levy fines for serious or repeated breaches and enforcement of past breaches. The recommendations in this theme reinforced our previous position that there are significant weaknesses in the Transport Act 2000; and
- **SESAR requirements:** providing assurance that evolving ATM capability meets the functional and non-functional requirements of SESAR.

Summary of recommendations from the enquiry

2.11 The Enquiry made 31 recommendations findings, with 21 directed solely at NATS, five to the CAA and five to CAA-NATS jointly. The CAA and CAA-NATS recommendations are summarised below.

Table 2: Summary of the CAA and joint CAA-NATS recommendations

Number	Description of recommendation
R16	The CAA should request a review by Eurocontrol of the means by which Eurocontrol defines, communicates and assures understanding by air navigation service providers (ANSPs) and operators of critical network management actions and implications.
R18*	The CAA should facilitate engagement by NATS with the Eurocontrol NM, airports and airline customers to review roles, responsibilities and priorities in ATM crisis management and recovery.
R19	The CAA should engage with relevant UK airports and Eurocontrol to assure appropriate A-CDM system education and training, the effectiveness of A-CDM operation and that of any fallback modes.
R20*	The CAA and NATS, in consultation with other stakeholders, should agree national definitions and requirements for contingency, resilience and business continuity.
R21*	NATS and the CAA should agree on how to provide assurance that the evolving capability meets the functional and non-functional requirements of SESAR while complying with the performance regime of the Single European Sky regulations.
R23*	CAA and NATS to assess jointly, before the end of RP2, the skills and expertise required to fulfil the role of the Air Traffic Controller in the SESAR era.
R27	The CAA should ensure that they have sufficient internal expertise to enable them to complement, select and manage external consultants in analysing and assuring the NATS capital programme, and overseeing its evolution through the annual SIP.

R28	The CAA should look to strengthen its statutory powers in order to enforce appropriate levels of service by NATS, including the power to levy fines for serious or repeated breaches of the NERL licence. Such powers should only be invoked as a measure of last resort and having given full consideration to their possible implications for all aspects of NATS's culture and operations.
R29*	The CAA and NATS should develop systems to estimate, monitor and publish the scale and direct impact to passengers of serious events causing air traffic control disruption.
R30	The CAA should require NATS to submit a resilience plan for approval by the CAA as a condition of the NERL licence.

* Recommendations addressed to both CAA and NATS.