

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. | |
| <p>Recommendation 19 (R19)</p> <p>Assure appropriate A-CDM system education, training and effectiveness</p> | <p>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.</p> | <p>Action closed.</p> <p>Transferred to CRA through the FAS Policy and Regulatory Programme Board, chaired by the CAA.</p> |
| <p>Recommendation 20 (R20)*</p> <p>Agree definitions for contingency, resilience and business continuity</p> | <p>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.</p> | <p>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).</p> |
| <p>Recommendation 21 (R21)*</p> <p>Provide assurance that the evolving capability of NATS meets the requirements of SESAR</p> | <p>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.</p> | <p>Action closed.</p> <p>Transferred to CRA through the CAA's CMG.</p> |

| Recommendation | Actions taken by the CAA | Status |
|---|--|--|
| <p>Recommendation 23 (R23)*</p> <p>Assess and ensure the skills and expertise required for air traffic controllers (ATCOs) in SESAR</p> | <p>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.</p> | <p>Action closed.</p> <p>Transferred to CRA through the CAA's Safety and Regulation Group (SARG).</p> |
| <p>Recommendation 27 (R27)</p> <p>Ensure the CAA has sufficient expertise to assure the NATS capital programme</p> | <p>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.</p> | <p>Action closed.</p> <p>Monitoring transferred to CRA through the CAA's Consumer and Markets Group.</p> |
| <p>Recommendation 28 (R28)</p> <p>Reform of the statutory framework</p> | <p>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</p> | <p>Action closed.</p> <p>Monitoring transferred to CRA through the CAA's Consumer and Markets Group.</p> |

| 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.

Chapter 3

Eurocontrol and critical network management (R16)

Overview of recommendation 16

- 3.1 The recommendation of the Enquiry was that:
R16. The CAA should request a review by Eurocontrol of the means by which Eurocontrol defines, communicates and assures understanding by ANSPs and operators of critical network management actions and implications.
- 3.2 The recommendation related to the dissemination of information to Eurocontrol during the failure and their subsequent actions upon receipt of it. The Enquiry considered that the approaches adopted and information shared during the event made the recovery less efficient than it might have been.
- 3.3 The initial application of the 4 flow rate regulations that were applied did achieve the aim of stopping the inbound flow to the London airspace. However, the fact that en-route traffic already airborne and on its way to airports in the terminal manoeuvring area (TMA) area would be handled to the best of NATS ability was not communicated or understood by the NM staff. This resulted in some confused messages about the status of the airspace and probably some unnecessary diversions and cancellations. Moreover, Network Manager Operations Centre's automatic suspension of flight plans filed for the period and the lack of communication to the operators that they had taken this action, so that they could subsequently re-file, added significant friction to the recovery when it was initiated.

Summary of CAA action taken

- 3.4 The main issue to be addressed in this recommendation concerned the efficient dissemination of information to Eurocontrol and their subsequent actions upon receipt of it. The CAA engaged with Eurocontrol and established revised standing, recovery and communications procedures for crisis management, including:
- The way Air Traffic Flow and Capacity Management (ATFCM) measures are applied and definitions of information that ANSPs shall communicate during disruption and recovery phases;
 - A disruption focal point to coordinate with NM; and
 - Communication to stakeholders by NM on the nature of the disruption.
- 3.5 These revised procedures will now become core requirements 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.
- 3.6 There are no resourcing or delivery issues from the CAA perspective as this activity will fall within normal CRA requirements for oversight and monitoring. Any opportunity for exercising and testing this improved interface will be used during the routine creation of exercise scenarios.

Details of the actions taken by the CAA

- 3.7 The CAA engaged with the Director NM in Eurocontrol in June 2015 to request a review by Eurocontrol of the issues raised in the recommendation and body of the Independent Enquiry report. This was aided by virtue of the fact that the Director NM had been an expert member of the Independent Enquiry Panel and was therefore very familiar with the background to, and the content of, the request.
- 3.8 The Director NM confirmed with the CAA in July 2015 that he had already initiated an internal review of the standing procedures taken at NM level during major disruption and/or crisis situations including roles and

responsibilities, the recovery process and related communications.

Following a request for a further update in September 2015, the Director NM replied in October 2015 providing an update on the work completed and the proposed next steps. These were:

- Eurocontrol NM to develop and propose a procedure aiming at improving the management and recovery after major disruption. The procedure would describe:
 - The way ATFCM measures are applied during disruption and recovery phases;
 - Definition of the information and data that ANSPs shall communicate to the NM during disruption and recovery phases;
- A disruption focal point to be nominated by ANSP/Airport to coordination with NM; and
- The communication to stakeholders by NM on the nature of the disruption (Network Operations Portal/Aeronautical Information Publication) to be coordinated with the focal point.

3.9 The proposed steps were presented to NATS, DSNA (the French ATC agency) and Belgocontrol, and the NM undertook bi-laterals with ANSPs which included a session with NATS.

3.10 The proposed steps were then taken forward to the Eurocontrol Network Management Board and subsequently to the Network Directors of Operations (NDOP) meeting for endorsement and agreement that the revised procedures were fit for purpose. At the March 2016 NDOP meeting the NM provided an update on the NM Disruption and Recovery management procedure that was put into operation with effect from 16 January 2016.

Statement of closure

3.11 The CAA is confident that the actions taken appropriately address the recommendation of the Enquiry. Eurocontrol has completed its own internal review of the standing procedures taken at Network Manager

level during major disruption and/or crisis situations, and a revised Network Manager Disruption and Recovery management procedure was put into operation with effect from 16 January 2016. There is now a better understanding of the needs and requirements of both NATS and Eurocontrol, and as a consequence less opportunity for confusion and a speedier response to future events.

Chapter 4

Engagement with the Eurocontrol Network Manager (R18)

Overview of recommendation 18

- 4.1 The recommendation of the Enquiry was that:
R18. The CAA should facilitate engagement by NATS with the Eurocontrol Network Manager, airports and airline customers to review roles, responsibilities and priorities in ATM crisis management and recovery.
- 4.2 The Enquiry Panel considered that the recovery phase after the failure erred towards being dictated to customers by NATS, rather than being informed by and accomplished with them, and that this was likely to have resulted in a less expeditious recovery. The underlying principle behind the recommendation is for the CAA to facilitate engagement with the key players to review roles, responsibilities and priorities in ATM crisis management and recovery from the system perspective.

Summary of CAA action taken

- 4.3 The CAA persuaded Eurocontrol to develop enhanced European arrangements for managing a major system disruption and recovery effectively, by producing a Network Disruption and Recovery Procedure to ensure that significant events that occurred anywhere within the EU area were managed optimally.
- 4.4 The CAA facilitated a desk-top crisis exercise which established that extant crisis arrangements are sound. Existing procedures for the handling of a significant crisis or system or outage were also reviewed, with the aim of having an appropriate crisis management document in place which shows where responsibilities lie and how the essential information and decision making processes function.

- 4.5 The CAA also reviewed the NATS licence and established that, as only NATS has the necessary full knowledge to make necessary technical operational judgements on prioritisation during a major operational event, there is no requirement to seek modification of the licence.

Details of the actions taken by the CAA and NATS

- 4.6 The CAA and NATS identified three work-streams to address the recommendation:
- Disruption and Recovery Process: Persuade Eurocontrol to implement a process to manage a major system disruption effectively and facilitate subsequent recovery from same;
 - Crisis Management Roles and Responsibilities: Review existing procedures for the handling of a significant crisis or system outage with the aim of having an appropriate crisis management document in place that shows key responsibilities; and
 - NERL licence - Recovery Prioritisation: Evaluate the requirement for a NERL licence modification to facilitate optimal prioritisation and handling of demand during recovery from a major outage or event.

Disruption and recovery process

- 4.7 Network management operations are overseen by Network Directors of Operations (NDOP) who meet regularly. The UK proposed that there should be a Network Disruption and Recovery Procedure to ensure significant events that occurred anywhere within the EU area were managed optimally. A draft Operating Instruction was put in place on 16 January 2016 for evaluation and feedback. The resultant Network Disruption and Recovery procedure was approved formally at the March NDOP meeting. The new procedure is now available for operational use across the European network.

Crisis management roles and responsibilities

- 4.8 The CAA considered the UK's existing Crisis Management arrangements, including the NACME Protocol which documents the responsibilities,

processes and procedures during a major ATM incident. The two diagrams contained in the Protocol, regarding Government information flows and Management Structure and Representatives, were considered a useful baseline from which to work to address the recommendation.

4.9 In view of the necessity to “*review existing procedures for the handling of a significant crisis*”, the CAA facilitated a desk-top exercise with representation and participants from all key areas of the UK’s Crisis Management arrangements. This established that:

- Extant crisis arrangements were sound; and
- The NACME Protocol should be enhanced by the inclusion of a wider focussed diagram that make clear where all relevant responsibilities lie and how the essential information and decision making processes function.

4.10 A new diagram was subsequently produced and agreed upon in February 2016. This was incorporated into the Protocol in September 2016 and the new material will be placed on the CAA’s website for general access and reference.

NATS Licence – Recovery prioritisation

4.11 The NERL licence prohibits “*undue discrimination, after taking into account the need to maintain the most expeditious flow of traffic as a whole... or other such criteria as NATS may apply from time to time with the approval of the CAA*”. Given that during a major occurrence or recovery from a serious outage, NATS also has to ensure that safety is maintained and it is unlikely that full operational capacity will be available immediately, it was agreed that criteria need to be determined and agreed.

4.12 There is already a part-set of criteria, including elements that were created for the London Olympic period, which could be used as a starting point. However, it was recognised that every major event has dissimilar factors associated with it that necessitate virtually unique corrective action and recovery solutions. Therefore, it was recognised that only NATS has

the necessary full knowledge to make the necessary (technical) operational judgements for each set of circumstances.

- 4.13 An exchange of correspondence between the CAA and NATS established that it is for NATS to make the necessary decisions when required and that is facilitated by the existing licence requirements; consequently, there is no requirement to seek modification of the licence. However, given that recovery prioritisation decisions will require review by the CAA and possibly other parties, NATS will ensure that such a decision, together with the full supporting rationale, will be documented and safeguarded so as to enable such evaluation where or when necessary.

Statement of closure

- 4.14 The CAA is confident that the actions taken by the CAA and NATS appropriately address the recommendation of the Enquiry. The CAA has facilitated engagement with the key players to effectively review roles, responsibilities and priorities in ATM crisis management and recovery from the System perspective, and is confident that the steps taken will result in more informed and expeditious crisis management in the future.

Chapter 5

A-CDM education, training and effectiveness (R19)

Overview of recommendation 19

- 5.1 The recommendation of the Enquiry was that:
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.
- 5.2 While noting the benefits of A-CDM, the Enquiry noted that its use at Heathrow and Gatwick was dispensed with during the system failure, which was less efficient than it may have been, and had the effect of removing key data and communication pathways to and from the Network Manager Operations Centre and the consequential need for increased telephone coordination.
- 5.3 A-CDM aims to improve operational efficiency at airports by reducing delays, improving the predictability of events during the progress of a flight and optimising the utilisation of resources. It particularly focuses on aircraft turn-round and pre-departure sequencing processes. With A-CDM, the European network is served with more accurate take-off information to derive NM slots. As more airports implement A-CDM, the network will be able to effectively utilise available slots more efficiently.
- 5.4 The improved decision making by the A-CDM Partners is therefore facilitated by the sharing of accurate and timely information and by adapted operational procedures, automatic processes and user friendly tools. Eurocontrol A-CDM team is responsible for ensuring standardisation and dissemination of best practice of A-CDM implementation at European airports.

Summary of CAA action taken

5.5 The CAA considered the current and planned deployments of A-CDM tailored to provide the right cost effective solution for UK airports. The CAA concluded that existing systems and future deployment plans provided adequate resolution of the Enquiry recommendation. The majority of major UK airports either have A-CDM currently deployed, or plan to implement in the future. We will continue the ongoing monitoring of the A-CDM deployment picture through the FAS Policy and Regulatory Programme Board.

Details of the actions taken by the CAA

5.6 The CAA has considered our general duty under Article 70(a) of the Transport Act 2000 to 'secure the most efficient use of airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic'. The CAA considers that the input of airport operational information to the European Network Manager assists in the delivery of this key general duty.

5.7 In addressing this recommendation, the CAA has reviewed the current deployment status of A-CDM and future deployment plans for both SESAR and non-SESAR deployment airports.

5.8 A-CDM is an integral part of the SESAR program and is described in the SESAR Deployment Pilot Common Project – ATM Functionality#2 (AF#2). It has significant potential to streamline and improve European aviation system stakeholders' understanding and collaborative decision making. The CAA has confirmed that the majority of major UK airports either have A-CDM currently deployed, or plan to implement in the future. As independent businesses, airports decide the right time and level of A-CDM deployment appropriate to their needs.

5.9 Our particular role to date in relation to A-CDM deployment has been around the technical deployment of systems and tools, and the Safety Assurance required in deploying such tools. Through the FAS deployment

programme, the CAA has supported and encouraged development of A-CDM solutions suitable to the particular airports' operation. The CAA has reviewed the current and planned deployments of A-CDM at UK airports. The CAA expects the deployment of Departure Planning Information or A-CDM to mostly be complete by the end of March 2017, and by January 2021 at the latest.

Statement of closure

- 5.10 The CAA is confident that the actions taken by the CAA appropriately address the recommendation of the Enquiry. Most UK airports either have A-CDM currently deployed or plan to implement in the future. The CAA will continue to monitor A-CDM deployment in the UK to check it is delivered as a timely and cost effective solution for UK airports.

Chapter 6

Definitions of contingency and resilience (R20) and development of a resilience plan (R30)

Overview of recommendations 20 and 30

- 6.1 The recommendations of the Enquiry were that:
- R20. The CAA and NATS, in consultation with other stakeholders, should agree national definitions and requirements for contingency, resilience and business continuity.*
- R30. The CAA should require NERL to submit a resilience plan for approval by the CAA as a condition of its licence.*
- 6.2 The recommendations arose from the Enquiry noting that:
- “...the international nature of the evolving ATM capability means that NATS must ensure that all of its future plans and projects conform to internationally agreed standards and harmonised timescales. This requires clear, consistent, terminology in both setting targets and ensuring common standards for requirements such as contingency, resilience and business continuity as part of the network design. A documented concept of operations is the essential foundation for articulating requirements and their subsequent specification – a project without a defined scope is difficult to assess in either timescale or cost.”³*

Summary of CAA action taken

Definitions and requirements for contingency and resilience (R20)

- 6.3 The CAA worked with NATS to agree definitions of contingency, resilience and business continuity. They have also jointly devised a methodology for setting the requirements for contingency and resilience using a risk

³ Final Report, paragraph 4.7.1.

analysis approach based on the severity and frequency of incidents, as well as historical data as a baseline for average performance.

- 6.4 The proposed resilience requirements would be used by the CAA to monitor and scrutinise the performance of NATS and as guidance to inform the CAA's policy of a stepped approach to enforcement. This enforcement policy gives an indication of the level of scrutiny each incident should require and sets triggers for initiating more formal action under the licence. These requirements are not intended to set new performance targets or drive performance improvements and they do not replace triggers in the RP2 settlement. However, the methodology could be used to inform the debate on performance improvements as part of RP3.

The new resilience licence condition (R30)

- 6.5 The CAA has developed a licence condition for NATS to have a resilience plan on which it can be held to account more effectively than under the current arrangement. It requires NATS to submit a resilience plan to the CAA setting out the policies, processes and procedures it will follow to comply with the service obligations in its licence.
- 6.6 The CAA will appoint an independent reviewer (to be paid for by NATS) to assess the resilience plan and can require NATS to update the plan as necessary. It will remain the responsibility of NATS to ensure that the plan is up to date and fit for purpose. The condition will be subject to wider industry consultation in autumn 2016.

Details of the actions taken by the CAA and NATS for R20

- 6.7 The CAA and NATS worked together on the development of the definitions and requirements for contingency, resilience and business continuity. The definitions and requirements will be subject to wider industry consultation in autumn 2016.

Definitions of resilience, contingency and business continuity under R20

- 6.8 The CAA and NATS are proposing to adopt the following definitions:

- Resilience: Capability of an ANSP's assets, networks, people and procedures to anticipate, prevent, absorb and adapt to a disruptive event with any disruption or degradation of service managed in alignment with pre-agreed performance standards and to rapidly recover to normal services;
- Contingency: Capability of an ANSP to resume operation from an alternative site within a defined time period and at pre-defined levels following a catastrophic disruptive incident; and
- Business Continuity: Capability of an ANSP to continue delivery of Air Traffic Management Services at a pre-agreed level of service following a disruptive event, including provision for both resilience and contingency.

The resilience requirements

- 6.9 In setting the requirements for resilience, the CAA has been mindful of both the CAA's primary duty to maintain a high standard of safety and NATS absolute duty to maintain a safe system, alongside NATS duty to take all reasonable steps to meet demand. Rather than setting hardwired targets for resilience (that could put NATS at odds with its requirements under its Air Navigation Order), the CAA proposes to use indicators that would trigger intervention by the CAA in accordance with our enforcement policy. This will still require a degree of judgement by the CAA in deciding whether NATS is compliant with its duties and obligations, but it will give a much clearer framework for determining when the CAA should and would start to take more formal action.
- 6.10 The CAA were also mindful of the need to use a proportionate approach that would not unduly increase the regulatory burden on NATS and to avoid setting new requirements that might conflict with or duplicate existing ones, or create perverse incentives. The CAA therefore sought to use existing processes and methodologies as far as possible.
- 6.11 In setting the resilience requirements, the CAA and NATS considered several forms of measurement of the impact of any resulting disruption, including flight delays, cancellations and impact to passengers. However,

the CAA are proposing to use the standard delay metric (as measured by Eurocontrol) as this is a well understood, readily available and independently assessed industry standard benchmark for measuring ATM performance. We did not consider using cancellations in the methodology as the work under Recommendation 29 (Chapter 11) showed that neither the CAA nor NATS have access to information about flight cancellations caused by ATC disruption. Airlines, and to some extent airports, may have this information but the CAA's powers to gather this information are limited and not enforceable.

- 6.12 The CAA has used NATS performance over the last 10 years as an indication of acceptable performance. The CAA has looked at NATS performance compared with other EU ANSPs, as well as other causes of delay, and this shows that NATS historical performance is a reasonable starting point for setting the regulatory requirements. The CAA is mindful that requiring a more onerous set of requirements may be more costly which may not be consistent with the costs and delay incentives set out in RP2.
- 6.13 The proposed methodology for resilience requirements is based on the Risk Analysis Framework that is already used within NATS to assess and classify the tolerability of incidents that cause disruption to ATC Services and result in NATS attributable ATC delay. This gives us a scale of the degree of risk posed to the operational service from such a failure based on the severity of the service impact should the failure occur and the likelihood of its occurrence. This 'risk scale' has then been extrapolated to take account of the risk to a number of key systems and then set against historical delay as a 'baseline' performance.
- 6.14 This gives us an indication of current 'average' performance for different severity levels (Moderate, Major or Very Major). The methodology then provides a range of frequency of events for the different severity levels, based on a standard statistical normal distribution curve with an upper limit of performance that would identify a level at which the frequency and

severity of the impact of failure would lead the CAA to consider whether more formal action was required.

6.15 Based on this methodology, we are proposing the resilience requirements as set out in the following table:

Table 3: Resilience thresholds

| Description | Delay range (minutes) | | Potential stretch target | Average performance | Formal intervention threshold |
|--------------|-----------------------|----------|--------------------------|---------------------|-------------------------------|
| | Lower | Upper | | | |
| Minor | 1,000 | 4,000 | N/A | 5-10 / year | N/A |
| Low moderate | 4,000 | 10,000 | N/A | 2-4 / year | N/A |
| Moderate | 10,000 | 20,000 | 1 in 2-3 years | 1 / year | More than 3 in 1 year |
| Major | 20,000 | 100,000 | 1 in 5-10 years | 1 in 3-5 years | More than 1 / year |
| Very major | 100,000 | 100,000+ | <1 in 10 years | 1 in 10 years | More than 1 in 3 years |

6.16 Within these ranges, each event would be considered on its merits in line with the CAA's enforcement policy:

- Events under 10,000 minutes would be unlikely to trigger concern by the CAA but if the frequency was to rise significantly the CAA would investigate whether there was an underlying systemic issue;
- The CAA would seek explanations for 'Moderate' events on an informal basis, but if the frequency of events increased towards the upper limit the CAA may escalate matters, particularly looking at whether there were systemic issues in either NATS resilience planning or its policies and processes;
- 'Major' events would require a more formal report on the causes of the incident, actions taken to rectify the failure and lessons learned, but would be unlikely to trigger formal action under the licence unless the formal intervention threshold is reached;

- For 'Very Major' events, the CAA may decide to carry out a full investigation either itself or using an independent panel; and
- Any incidents involving the closure of airspace or lack of ATM service for a prolonged period would trigger an automatic investigation either by the CAA or an independent panel;
- The CAA may also take into account the number of cancellations that were made during an incident to satisfy itself that NATS was taking all reasonable steps to provide services during disruption, taking into account its safety requirements. For example, the CAA may seek further details from airlines and airports if there were significant numbers of cancellations that happened at the same time as a NATS engineering failure.

6.17 The methodology does not include disruption to service for non-engineering aspects of NATS system such as personnel and assets. Such failures will not count towards the numbers for the formal intervention threshold for each level of severity but each incident or complaint will be dealt with separately and on its own merits. The CAA will continue to investigate and enforce these failures in line with the stepped approach in our enforcement policy. In particular, such failures are more likely to manifest themselves as lower-level but longer-term issues than engineering failures which tend to be more obvious, sudden and higher immediate impact, so the CAA will in particular look at whether there are systemic failures in NATS policies or procedures that have caused or contributed to the failure.

The contingency requirements

6.18 NATS and the CAA agreed to not change the existing requirements on contingency capabilities, as NATS is currently looking at the opportunity to improve the response time for contingency as part of the Deploying SESAR programme. It was considered that it will be some time before these improvements are available and we do not yet know what level of performance can be delivered cost effectively. NATS intends to consult with customers on this capability through the SIP as the options for future

contingency performance and timescales for delivery are more fully understood. As such it is anticipated that the contingency requirement could subsequently be amended with a likely timescale for the revised standard to become effective being in late RP2 or early RP3.

Details of the actions taken by the CAA for R30

- 6.19 In developing a licence condition for NATS to submit a resilience plan for CAA approval, the CAA has adapted drafting from similar requirements in the airport, gas and rail sectors which would require NATS to submit plans or other documents setting out the principles, policies and procedures by which it will comply with its obligations in Condition 2 to supply the services. NATS must review and update its plans regularly or if the CAA requires it to do so.
- 6.20 The CAA will appoint an Independent Reviewer, to be paid for by NATS, to assess the plans and advise on whether there are any deficiencies that need to be addressed. Enforcement of the new resilience plan condition will be carried out in line with our enforcement policy. Failure to produce the required plans and to carry out a suitable independent review will trigger an urgent review by the CAA, and, if the matter is not resolved to an agreed timescale this will be considered prima facie evidence of a breach of the licence.
- 6.21 The CAA may also consider more formal action if it was clear that the plans had not been followed if, for example, there was little knowledge or understanding of these plans throughout the organisation.

Statement of closure

6.22 The CAA is confident that the actions taken by the CAA and NATS appropriately address the recommendation of the Enquiry. Following consultation in autumn, the CAA will take into account views received on our proposals in finalising both the resilience requirements and the conditions around NATS requirements to submit a resilience plan to the CAA as part of its licence. R20 and R30 will then both move to core regulatory activity.

Chapter 7

SESAR requirements (R21)

Overview of recommendation 21

- 7.1 The recommendation of the Enquiry was that:
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.
- 7.2 The recommendation arose as the Enquiry noted that a rigorous approach to assurance is the necessary complement to introducing new capabilities from the framework change provided by SES and SESAR into service in a phased manner and in collaboration with partners.⁴
- 7.3 Evolving capability refers to the future capability that NATS will require to support its Deploying SESAR Programme, a business transformation programme to deliver SESAR solutions into operation within NATS and to transform the operational and technical capabilities. Functional requirements were taken to mean those that are specific SESAR deliverables/capabilities required by the current – and any future – common project implementing rules; and non-functional requirements were taken to mean those SESAR-related deliverables required to achieve performance targets of the SES Performance Scheme.
- 7.4 The purpose of the SESAR Programme is to deliver the vision for aviation for Europe by 2035, as outlined in the 2015 European ATM Master Plan. It also underpins the longer term goal articulated in Flightpath 2050: Europe's Vision for Aviation. The vision for European aviation is predicated on trajectory-based operations in which aircraft fly their preferred trajectories. To support this concept each flight is considered in

⁴ Final Report, paragraph 4.7.2.

its end-to-end entirety, there is seamless co-ordination between ANSPs and airspace is configured flexibly. This will require a progressive increase in the level of automation support available to controllers, European wide interoperable ATM systems and modernisation of airspace.

Summary of CAA action taken

- 7.5 The CAA and NATS concluded that the existing European and domestic regulatory requirements and monitoring mechanisms that oblige NATS to implement SESAR requirements, and requirements on both the CAA and NATS to monitor and report on their implementation, capture NATS evolving future capabilities.
- 7.6 The current mechanisms provide an appropriate level of assurance for the following reasons:
- The legislative framework provides an overarching duty for ongoing monitoring by both the CAA and the Commission of investments by NATS to ensure they are being delivered as set out in the performance plan;
 - Provisions encourage continuous monitoring requirements to report on non-performance and the implementation of corrective measures can be introduced at any time where SES targets risk not being met (including due to failures of NATS investment programme);
 - Cost reporting provides for comparison of all planned and actual costs which encourages transparency over NATS investments; spending can be open to scrutiny by the Commission if there are variations;
 - Condition 10 of the NERL licence has also been recently amended to provide greater scrutiny in the development and implementation of NATS investment plans;
 - The Pilot Common Project (PCP) regulation establishes requirements for monitoring the implementation of functionalities –

this acts as an extra 'hook' to back up what is in the performance scheme; and

- Safety oversight via the Common Requirements/Safety Oversight Regulations (which have recently been amended) and NATS/CAA safety duties (which are overarching for the CAA) under Transport Act 2000.

Details of the actions taken by the CAA and NATS

Assurance on existing requirements

7.7 In addressing this recommendation, the CAA and NATS reviewed the existing legislative requirements and mechanisms for reporting on and monitoring the implementation of SESAR.

7.8 The existing requirements include:

- Current European and domestic regulatory requirements and monitoring mechanisms that require NATS to implement SESAR requirements;
- Requirements on CAA and NATS to monitor the SESAR implementation and report annually to the European Commission and Performance Review Body; and
- Requirements on NATS to report progress to the SESAR Deployment Manager as part of its Deployment Programme, which also informs the European Commission.

7.9 The CAA and other National Supervisory Authorities are able to engage with the SESAR Deployment Manager (through the SESAR working group) to help assure the regulatory outcomes required from the delivery of SESAR functionalities.

7.10 The European legislative requirements for monitoring and reporting of NATS investments, including those relating to the delivery of SESAR and the common project, are contained in the performance scheme regulations and the PCP regulation.

- 7.11 NATS and the CAA also considered evidence of assurance:
- The RP2 performance plan, which contains planned investments to support SESAR, sets a clear expectation (and legal requirement) to report against those investments and achievement of targets;
 - Article 18(2) of the performance regulation which requires national authorities to take corrective actions, at the request of the Commission, where under performance is anticipated or occurs;
 - The possibility of the Commission to take infringement action against Member States for failure to take the necessary actions where there is persistent under performance; and
 - Specific requirements in the NERL licence on the delivery of development and delivery of detailed technology and airspace programmes for the remainder of RP2.
- 7.12 The NERL licence as modified for RP2 also includes a specific Condition (10a) on the delivery of detailed project plans for key FAS airspace developments. This Condition has also recently been modified to place additional requirements on NATS to establish detailed technology and airspace programmes for the remainder of RP2, report on progress and delivery of significant milestones and provide for CAA to appoint an independent reviewer to assure the accuracy of NATS reporting. The modified Condition 10 also requires development of outline airspace and technology plans for RP3. This modification will provide an additional mechanism for monitoring the delivery of SESAR Common Projects.

Meeting evolving capabilities

- 7.13 It is expected that any future amendments to the performance framework will retain the requirement to describe investments necessary to achieve performance targets and future SESAR Common Projects, possibly in more detail than currently.
- 7.14 SESAR Common Projects regulations also require monitoring and reporting. Article 6 of Regulation 409/2013 states that the Commission will monitor the implementation of common projects and their impact on the

performance of the European Air Traffic Management programme (EATM). Article 5 of Regulation 716/2014 states that this monitoring shall be performed through planning and reporting instruments, including the:

- European ATM Master Plan planning and implementation reporting mechanisms;
- Network Strategy Plan and the Network Operations Plan;
- Performance plans;
- Reporting tables on air navigation costs; and
- Functional Airspace Blocks (FAB) planning and implementation reporting instruments.

7.15 In addition, as new SESAR requirements are mandated through additional Common Projects, these will be added to the EU managed processes such as the European Single Sky Implementation Plan and the Local Single Sky Implementation Plan.

7.16 The proposed modifications and enhancements to the NERL licence Condition 10 described above, also include a requirement for NATS to use reasonable endeavours to implement major ATM modernisation programmes as per the FAS Deployment Plan and SESAR Pilot Common Project.

7.17 The CAA and NATS agreed that these requirements capture NATS evolving future capabilities and provide an appropriate evidence of assurance that NATS' evolving capability meets the functional and non-functional requirements of SESAR while complying with the performance regime of the SES regulations.

Statement of closure

7.18 The CAA is confident that the actions taken by the CAA and NATS appropriately address the recommendation of the Enquiry. NATS and the CAA consider that the existing European and domestic requirements and mechanisms for SESAR deployment and monitoring provide the

appropriate assurance to meet the objectives of this recommendation. The CAA will continue to monitor NATS implementation of SESAR through these existing mechanisms.

Chapter 8

ATCO skills and expertise (R23)

Overview of recommendation 23

- 8.1 The recommendation of the Enquiry was that:
R23. CAA and NATS to assess jointly, before the end of RP2, the skills and expertise required to fulfil the of Air Traffic Controller in the SESAR era.
- 8.2 The recommendation arose as the Enquiry recognised that “*throughout the Deploying SESAR programme of change, the role of the Controller will evolve, as emerging technology provides more procedural ‘systemisation’ across the ATM network.*”⁵
- 8.3 The Enquiry recognised that NATS had made a step change in its approach to system procurement in support of SESAR deployment, principally to address the collaborative nature of the programme which requires a clear understanding of the end product from the outset. Air Traffic Controllers are an important part of any ATM system and as such the Enquiry viewed that NATS should have a clear understanding of their skills and expertise for the SESAR era.

Summary of CAA action taken

- 8.4 Understanding at this stage what the ultimate competencies will be needed for controllers of the future is unrealistic, given that the SESAR vision takes European aviation out to 2035 and beyond. The CAA and NATS do not yet have a clear picture of how increased automation will impact the core competencies, skills or aptitudes required by controllers. It is likely that some aspects, for example mental flexibility, will continue to

⁵ Final Report, paragraph 4.7.3.

be relevant to the role of the future whereas other aspects, such as planning, may not be.

- 8.5 As a result, the CAA and NATS concluded addressing this recommendation would require us to confirm that the appropriate mechanisms and processes are in place. In addition, that these arrangements will continue to provide controllers with the skills and expertise that they need to achieve and maintain operational competences relevant to the phase of the SESAR journey.
- 8.6 NATS will continue to apply and, when required, refine the enhanced training processes within the company. NATS and CAA will ensure that the strategic training interface is established in an effective manner and that, in the absence of any specific changes taking place that require it to be exercised, it is utilised at least annually to enable forward planning and co-ordination between both organisations.

Details of the actions taken by the CAA and NATS

- 8.7 The CAA and NATS initially considered fulfilling the recommendation through production of a road map of the controller skills and expertise required to support the SESAR programme. This proved to be impossible as the further into the future a road map for controllers skills and expertise was envisaged, the less understanding there was regarding the potential impact of the SESAR concepts. As a consequence, NATS and the CAA agreed to fulfil the recommendation by reviewing NATS current processes for ensuring that controllers have the correct skills and knowledge and how these should be enhanced to support the SESAR programme.
- 8.8 A series of workshops and extensive consultation were undertaken with stakeholders within NATS and the CAA. The outcome of these activities was that, although the individual processes and approaches of the various teams involved in aspects of this work (e.g. NATS Training, Human Factors, Simulations, Unit Competence teams etc) are effective in themselves, there is insufficient co-ordination and impact assessment between these teams. There were, in particular, some gaps in

understanding of each other's perspective and requirements, sometimes leading to the outcomes being less effective than they could have been.

8.9 Two main areas were identified where enhanced measures are needed to enable NATS to fulfil the criteria for the role of the controller in the SESAR era:

- Firstly, there is a need for an overall Training Strategy which establishes NATS collective and coherent high-level approach to establishing the skills and expertise required of future controllers. The Training Strategy must describe how NATS will ensure that the end-to-end training and competence processes will ensure the required controller skills and expertise – from recruitment and selection to initial validation and then to maintenance of operational competence. The Training Strategy will cover all elements of ATC training, for Airports as well as Area and Terminal Control operations; and
- Secondly, there is a need for a specific Deployment Programme Training Strategy and associated governance, sitting under the over-arching Training Strategy. This is to establish the particular mechanisms and processes relevant to the Operational Conversion Training for the implementation of the SESAR Deployment Programme.

8.10 In response to these identified measures, the CAA and NATS agreed to the establishment of a:

- NATS overarching Training Strategy;
- NATS Training Strategy Governance Board that maintains and develops the Training Strategy for NATS airport and centres; and
- NATS Deployment Programme Training Strategy group, sitting under the over-arching Training Strategy Governance Board to enhance Operational Conversion Training processes in support of SESAR implementation and to provide a strategic interface with the CAA.

- 8.11 The Training Strategy Governance Board will maintain a strategic overview of the end-to-end training and competence processes, to ensure appropriate impact assessment in respect of new regulation and technologies, to ensure standardised and consistent approach to training and to provide regular strategic updates to the CAA. It is the high-level mechanism through which NATS can provide internal and external assurance of fit-for-purpose ATC training and competence assessment and covers all elements of ATC Training. The first Training Strategy Governance Board meeting was held in February 2016.

Statement of closure

- 8.12 The CAA is confident that the actions taken by the CAA and NATS appropriately address the recommendation of the Enquiry. The approach agreed between NATS and the CAA is fully in place and will be absorbed into core regulatory activity for both organisations. NATS and the CAA will review the effectiveness of the enhanced training processes after one year.

Chapter 9

Oversight of the SIP (R27)

Overview of recommendation 27

- 9.1 The recommendation of the Enquiry was that:
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 Service and Investment Plan.
- 9.2 This recommendation flowed from the Enquiry panel's analysis of the CAA's approach to investment, and in particular its finding that: "*the CAA should not depend on consultation between NERL and airlines to validate the ten-year capital programme, but should develop its own capacity to form judgements on this important subject*".⁶

Summary of CAA action taken

- 9.3 The CAA has undertaken a number of actions to increase our oversight of NATS capital programme both in the short term for the remainder of RP2 (2015-2019) and with a longer term view related to RP3 (2020-2024). These include:
- Implementation of Licence modifications putting requirements on NATS around enhanced reporting and engagement, supported by an Independent Reviewer;
 - Clear articulation of CAA expectations in terms of the level of detail to be provided by NATS under its SIP processes; and
 - Consideration of how to implement an IFS type approach to RP3.

⁶ Final Report, paragraph 5.12.3.

Details of the actions taken by the CAA

- 9.4 A set of options for enhancing the level of oversight of NATS capital investment plans were developed in late 2015. This included modifications to Condition 10 of the licence, clarification of the CAA's expectations in relation to the SIP and the introduction of an IFS type approach for RP3.

Licence modification

- 9.5 Condition 10 of the NERL licence was modified on 29 June 2016 to place specific obligations on NATS in respect of the development of its airspace and technology programmes, reporting on progress and delivery against significant milestones within those programmes.
- 9.6 The modifications introduced an Independent Reviewer to assess the quality and accuracy of NATS reporting.⁷ The modifications also formalised the requirement for NATS to run a mid-year SIP process, in addition to the end-year annual SIP.
- 9.7 The Condition 10 modifications will allow the CAA and NATS customers to gain insight through the remainder of RP2 (2017-2019) on how NATS develops its capital programme, which is expected to provide insights on best practice ahead of the development of the RP3 framework.
- 9.8 The role of the Independent Reviewer developed under Condition 10 may fall away ahead of the implementation of the potential IFS role anticipated ahead of RP3, as discussed below. It is expected that experience and insights gained from the Independent Reviewer envisaged under Condition 10 would inform the development of an IFS style model for NATS.

⁷ Also refer to above discussion around an Independent Reviewer for NATS resilience plans under Recommendation 20.

Articulation of CAA expectations of level of detail to be provided in SIP process

- 9.9 In approving the form, scope and level of detail of the 2016 SIP, the CAA set out some of its expectations in terms of the level of detail to be provided by NATS under its SIP process. These included:
- Where NATS is proposing to change service and investment plans, it should clearly articulate not only the rationale for change, but also provide options and associated costs/benefits for consideration by airlines;
 - The SIP should explicitly articulate airlines feedback/view on proposals, along with NATS response;
 - The SIP should set out performance against all individual key performance indicators (note the 2016 SIP does not report performance on the horizontal flight efficiency metric (KEA));
 - The SIP should provide forecast unit costs and charges profiles for the following reference period, based on current assumptions; and
 - Where projects and programmes are renamed and/or combined, appropriate and clear links between old and new should be articulated.
- 9.10 CAA would expect to add to this guidance as necessary where it is identified additional detail would improve the engagement around the SIP process.

Independent reviewer for RP3

- 9.11 It was determined that the best use of resourcing to improve the CAA's capability (both to influence and to oversee the development and implementation of NATS capital programme) would be if NATS agreed with airlines the appointment of the equivalent of Heathrow's IFS. The CAA considered a move to an IFS type arrangement to be desirable, although it may take until the development of RP3 before such arrangements can be implemented. Proposals relating to the regulation of

NATS for RP3 will be consulted on extensively as part of normal regulatory business.

Statement of closure

9.12 The CAA is confident that the actions taken by the CAA appropriately address the recommendation of the Enquiry. Implementation of our recommended approach to increasing our oversight of NATS capital investment programme will increase our capabilities around:

- Strategic oversight, evaluation and analysis of the long-term capital expenditure programme developed as part of the UK-Ireland FAB Performance Plan;
- Regular oversight, evaluation and analysis of the SIP process, to allow issues to be addressed at a formative stage; and
- Our ability to take targeted action to influence and change NATS plans, while minimising the risk of being perceived as taking ownership of them.

Chapter 10

Statutory enforcement powers (R28)

Overview of recommendation 28

- 10.1 The recommendation of the Enquiry was that:
R28. The CAA should pursue the inclusion in any forthcoming Aviation Bill of powers to enforce appropriate levels of service by NATS, through, the grant of a power to levy fines for serious or repeated breaches of its 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.
- 10.2 The Enquiry considered that the CAA should be able to call on enforcement powers in the event of major service failures, similar to those it already holds in relation to airports and those held by other UK regulators. These powers should be deployed only as a measure of last resort, to be enforced where breaches of the NERL licence or statutory duties are so severe as to be beyond other remedies and after the full consequences of the penalty have been evaluated.

Summary of CAA action taken

- 10.3 The CAA has concluded and recommended to DfT that the CAA's statutory enforcement tools under the TA00 are not fit for purpose and should be modernised via primary legislation and more closely aligned to the enforcement regime under the Civil Aviation Act 2012 (CAA12). The CAA has considered a range of options to improve our enforcement tools, and have submitted a proposal to DfT around modifying licence conditions to generate clearer obligations to enforce. The CAA has also engaged with DfT on potential legislation.

Details of the actions taken by the CAA

- 10.4 In addressing this recommendation the CAA considered a number of issues, including whether the current economic regulatory enforcement provisions under TA00 are fit for purpose and policy objectives.
- 10.5 The CAA considered a range of options in order to improve our enforcement tools, including:
- Doing nothing;
 - Modifying conditions in the Licence to generate clearer obligations to enforce – this option proposes to retain the enforcement provisions in TA00 (sections 11-19) to generate clearer obligations in the Licence to enforce;
 - Giving the CAA access to an effective enforcement and penalty regime akin to CAA12 – this option involves repealing sections 20-25 of TA00 and replacing it with primary legislation, akin to the enforcement provisions in CAA12 (sections 31-47). This will introduce an enforcement regime that:
 - Allows us to enforce past, ongoing and likely breaches of the Licence and TA00;
 - Allows us to impose contravention notices, enforcement orders and urgent enforcement orders for past, ongoing and likely breaches requiring licencees to take appropriate steps to restore compliance and remedy the consequence of a breach;
 - Includes a penalty regime allowing us to impose (or threaten to impose) civil penalties for serious breaches as a last resort up to 10% of qualifying turnover. A penalty regime also requires the regulator to consult and publish a penalty policy;
 - Includes a simplified enforcement procedure allowing us to act more responsively to breaches; and
 - Includes a new system of appeals which should make our decisions more accountable to passengers and airlines. The new system will include rights for NATS to appeal enforcement sanctions to the Competition Appeals Tribunal.

- 10.6 The CAA has excluded the options of introducing civil sanctions under the Regulatory Enforcement Sanctions Act 2008, and introducing redress mechanisms or voluntary Alternative Dispute Resolution (ADR) as an alternative to a penalty regime.
- 10.7 In response to the second option above, to give the CAA access to an effective enforcement and penalty regime akin to CAA12, the CAA submitted a separate proposal to DfT to change the licence modification regime in TA00. As currently drafted, the CAA must secure NATS consent in making licence modifications.
- 10.8 In response to the third option above, the CAA has spent significant time working on a draft Impact Assessment and engaging with DfT on potential legislation. This included setting out our policy objectives and rationale for intervention, the options the CAA had considered and possible risks. This also involved developing and recommending a complementary proposal to DfT to improve our licence modification powers in TA00.
- 10.9 The CAA understand that DfT will soon undertake a consultation on modernising the NATS regulatory framework under the Modern Transport Bill, to ensure that it remains fit for purpose and continues to improve on the UK's record on safety, demand and resilience. This includes through measures such as CRA legislative proposals on licence modifications, enforcement powers and licence extension. The CAA has provided input into the draft consultation paper and will continue to engage with DfT through the process.

Statement of closure

- 10.10 The CAA are confident that the actions taken by the CAA address the Enquiry's recommendation as far as the CAA is able to do so. This recommendation is wholly dependent on the Government's decision to introduce primary legislation, and as such we will continue to engage with and influence, including through the upcoming consultation on modernising the NATS regulatory framework under the Modern Transport Bill.

Chapter 11

Measurement of passenger impacts of disruption (R29)

Overview of recommendation 29

- 11.1 The recommendation of the Enquiry was that:
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.
- 11.2 The Enquiry observed that NATS focuses on the impact of delay on aircraft and airlines and does not estimate the impact on passengers. The Enquiry found this focus to be too narrow and recommended that the CAA and NATS collect data about the impact of air traffic control disruption on passengers for serious events.

Summary of CAA action taken

- 11.3 The CAA has engaged with NATS to analyse a range of options to address the recommendation. The preferred option to be implemented is based on average direct and reactionary delay.
- 11.4 The CAA and NATS will published a high level and summarised estimate of the impact of ATC disruption on passengers for serious events only. This will include estimates of the number of passengers impacted and the number of passenger minutes of delay resulting from the serious ATC event.
- 11.5 It was proposed that the definition of a 'serious event' will be based on the resilience and contingency requirements developed in response to

Recommendation 20 for consistency and proportionality.⁸ Under R20, a 'major event' is defined as an event with disruption of over 20,000 minutes of NATS attributable delay.

Details of the actions taken by the CAA and NATS

Options appraisal

11.6 The CAA, in collaboration with NATS, explored a range of options of how best to quantify passenger disruption caused by serious ATC disruption. Of particular importance to deciding the appropriate method was the extent to which sources of information was readily available. A total of six options were considered, defined as follows:

- Option 1: do nothing;
- Option 2: passengers directly delayed based on overall averages, with the estimate of direct delay to passengers based on average passengers per flight and sourced from Eurocontrol;
- Option 3: passengers directly delayed based on specific aircraft used and airline load factors. The estimate of direct delay to passengers would be based on detailed flight data, number of seats according to aircraft type flown and load factor according to the operating airline;
- Option 4: passengers directly delayed based on detailed passenger data. The estimate of direct delay to passengers would be based on detailed passenger data for commercial flights to/from the UK and would need to involve matching CAA data to Eurocontrol data;
- Option 5: passengers directly and indirectly delayed based on averages. The impact on passengers of reactionary is based on a primary:reactionary delay ratio of 1:0.8.⁹ In other words, there is an average of 0.8 minutes of reactionary delay for every minute of primary delay; and

⁸ Under R20, a 'major event' is currently defined as an event with disruption of over 20,000 minutes of NATS attributable delay. In the interests of consistency and proportionality, it was therefore proposed that the trigger for R29 will be for a 'major event' as defined under R20. At the time of writing, work on R20 remains in progress and will go to consultation with industry stakeholders and as such this threshold may be subject to change.

⁹ Source: Eurocontrol.

- Option 6: all delay plus cancellations. This option was quickly ruled out as neither the CAA or NATS have access to information about flight cancellations caused by ATC disruption. Airlines, and to some extent airports, may have this information but the CAA's powers to gather this information are limited and not enforceable. Therefore, the CAA is not proposing to pursue gathering this information.

11.7 The six options were assessed against the following criteria: Credibility; Transparency; Cost effectiveness; and Timeliness. As well as assessment against criteria, a variety of academic and industry experts were consulted, as well as governance bodies in the CAA and NATS. A summary of the assessment of the six options against the four criteria is given in the table below.

Table 4: Summary of the options appraisal

| Options | Credible | Transparent | Cost effective | Timely |
|---|----------|-------------|----------------|--------|
| 1: Do nothing | Red | Red | Green | Red |
| 2: Average direct delay | Yellow | Green | Green | Green |
| 3: Detailed flight data direct delay | Yellow | Red | Yellow | Yellow |
| 4: Detailed pax data direct delay | Yellow | Red | Red | Red |
| 5: Average direct and reactionary delay | Green | Green | Green | Green |
| 6: All delay plus cancellations | Green | Red | Red | Red |

11.8 The option selected is Option 5 where the impact on passengers is measured based on average direct and reactionary delay. Option 5 scored well across the four criteria of credibility, transparency, costs effectiveness and timeliness compared to the other options.

11.9 Under Option 5, both passengers directly delayed based on overall averages, plus an estimate of the impact to passengers caused by reactionary delay based on the primary:reactionary delay outturn for 2014 of 1:0.8, based on Eurocontrol figures.

- 11.10 Given the potential size of reactionary delay, and the emphasis placed on it by the Enquiry, it seemed important to include it in estimates of impact of ATC disruption on passengers. This provides more complete coverage of passenger disruption and so has greater credibility, and comes with no additional resource requirements or financial cost.

Illustration of the passenger delay under each option

- 11.11 To test the differences in the results generated by the various options listed above, it was necessary to pick an example of an ATC disruption event. There has been no serious ATC event since the Enquiry that has resulted in over 20,000 minutes of NATS attributable delay. Therefore, the CAA used an event on the 17th August 2015 when NATS caused 6,725 minutes of NATS attributable delay due to high levels of sickness amongst air traffic controllers who work on Essex and Thames airspace. Choosing an example from 2015 also allows the CAA and NATS to use databases that can be drawn on in the future.
- 11.12 Table 5 below shows little difference in the estimates of the impact on passengers from option 2 to option 4. Including reactionary delay (option 5), increases the passenger impact measured by 80% (as a simple 1.8 factor is applied).

Table 5: Sensitivity analysis - Estimates of passenger impact across the six options

| Option | NATS attributable delay | | | | |
|-----------------------------------|-------------------------|---------|------------|----------------------|-----------|
| | Flights | | Pax/flight | Passenger | |
| | Number | Minutes | Average | Number | Minutes |
| 1: Do nothing | - | - | - | - | - |
| 2: Average direct | 254 | 6,725 | 111 | 28,194 | 746,475 |
| 3: Flight data | 254 | 6,725 | 109 | 27,655 | 728,239 |
| 4: Pax data | 254 | 6,725 | 118 | 30,105 | 789,027 |
| 5: Average direct and reactionary | 762 ¹⁰ | 12,105 | 111 | 84,582 ¹⁰ | 1,343,661 |
| 6: Including cancellation | - | - | - | - | - |

Statement of closure

- 11.13 The CAA is confident that the actions taken by the CAA and NATS appropriately address the recommendation of the Enquiry. The option developed and agreed upon by NATS and the CAA is most likely to provide the most credible estimate of the scale and direct impact to passengers of serious events causing air traffic control disruption.
- 11.14 The CAA and NATS envisage that the chosen option would be implemented for at least the next 2 years and then reviewed annually. The method should then be evaluated to see if it is delivering and reporting on the scale of passenger impacts from disruption as expected, or whether improvements in the methodology can and should be made.

¹⁰ Based on two subsequent rotations, sourced from University of Westminster.

Appendix A

Glossary

| Acronym | Description |
|---------|---|
| A-CDM | Airport Collaborative Decision Making |
| ACE | Aviation Crisis Executive |
| ANSP | Air Navigation Service Provider |
| ATC | Air Traffic Control |
| ATCO | Air Traffic Controller |
| ATFCM | Air Traffic Flow and Capacity Management |
| ATM | Air Traffic Management |
| CAA12 | Civil Aviation Act 2012 |
| CMG | Consumers and Markets Group |
| CRA | Core Regulatory Activity |
| CRIP | Common Recognised Information Picture |
| DfT | Department for Transport |
| EATM | European Air Traffic Management programmes |
| FAB | Functional Airspace Block |
| FAS | Future Airspace Strategy |
| IFS | Independent Fund Surveyor |
| NACME | National Airspace Crisis Management Executive |
| NDOP | Network Directors of Operations |
| NERL | NATS En-route plc |
| NM | Network Management |
| RP2 | Reference Period 2 |

| | |
|-------|---|
| RP3 | Reference Period 3 |
| SARG | Safety and Airspace Regulation Group |
| SES | Single European Sky |
| SESAR | Single European Sky ATM Research |
| SIP | Service and Investment Plan |
| TA00 | Transport Act 2000 |
| TMA | Terminal Manoeuvring Area |
| TMCS | Technical Monitoring and Control System |
| VCS | Voice Communications System |