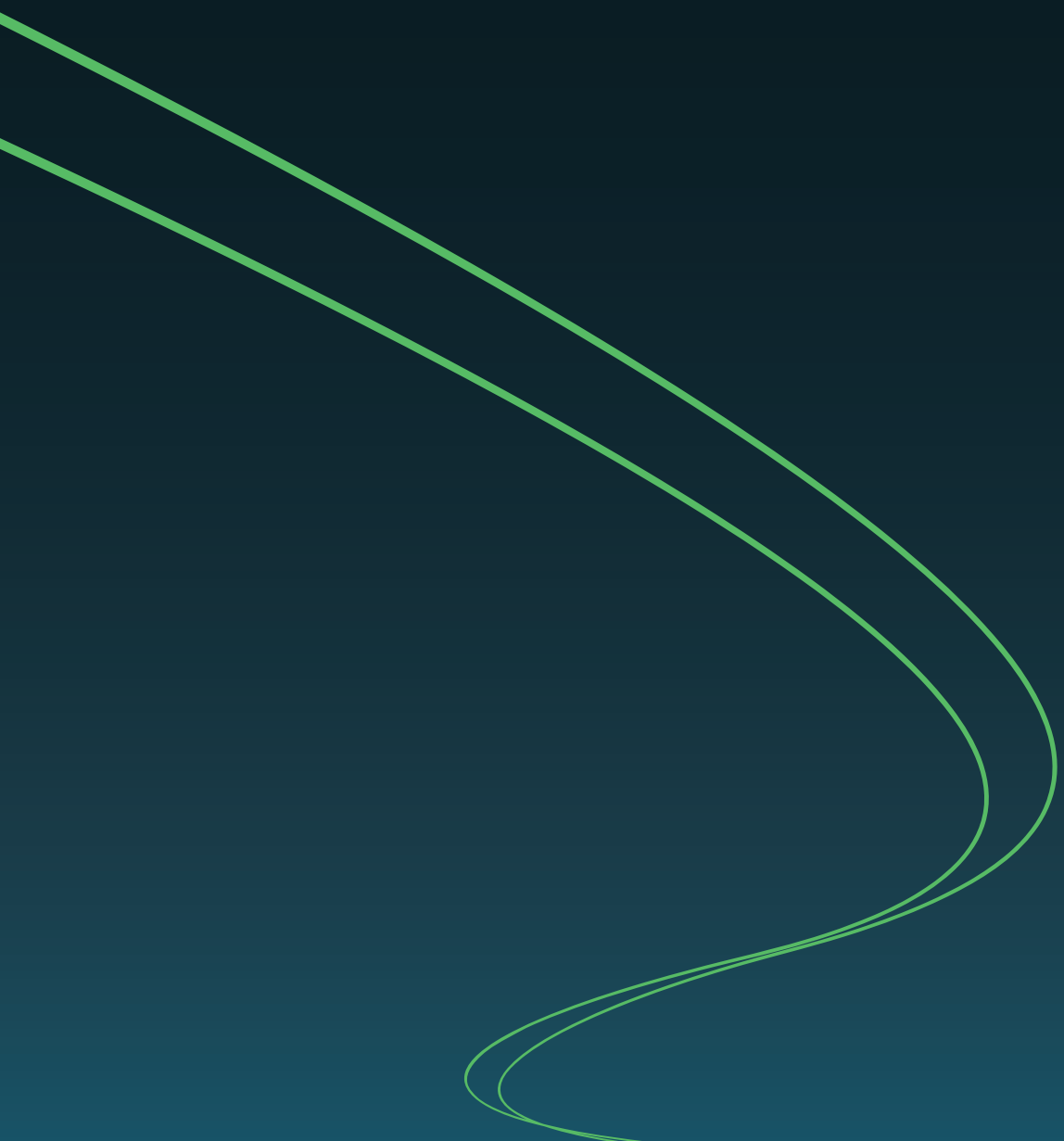
NATS

Safety Plan 2017-2019

Advancing aviation, keeping the skies safe.



THINK
ACT
BE
SAFE

Table of contents

Foreword

Our industry continues to evolve; traffic levels are increasing faster than anyone forecast and we are making good progress towards delivering on our technology programme. Over the last year we have continued to demonstrate our commitment and focus on safety, both within our current operation and as we transform our business for the future. We set ourselves an ambitious safety target for this control period and that has proven very tough to meet. But through your efforts we still show strong safety performance despite all of these challenges and we should feel proud of our accomplishments.

This last year we launched our new company vision of “advancing aviation and keeping the skies safe” and to reinforce this we have adopted the value of “Safe in Everything We Do”. Both of these statements reflect how safety is at the heart of our business.

The NATS Safety Plan is the foundation for us to continue to challenge ourselves about how we can improve our safety performance. It presents the actions we all need to take to keep the operation safe today, make us safer tomorrow and ensure we can meet the challenges of the future.

Martin Rolfe

Chief Executive Officer, NATS

NATS Safety Policy

Our safety commitment is to strive continually to improve our operational safety performance and to minimise our contribution to the risk of an aircraft accident as far as is reasonably practicable. In order to fulfil this commitment, we have a formalised, explicit and proactive approach to systematic safety management which:

- Defines the safety organisation with clear lines of safety accountability;
- Promotes a climate of safety awareness and understanding throughout the organisation;
- Monitors achievement against safety objectives and predictive indicators of safety performance;
- Ensures that everyone understands the role they play in delivering operational safety performance, has the capability to discharge their role and recognises that they have an individual responsibility for the safety of their actions;
- Encourages all staff to report operational safety concerns within a Just Culture such that appropriate improvement actions can be taken;
- Seeks out and adopts good operational and safety management practices;
- Engages with external stakeholders to share safety improvement opportunities; and
- Complies with all applicable safety standards and requirements.

As Chief Executive, I am totally committed to this safety policy and to the provision of the necessary resources to support its implementation and maintenance.

Martin Rolfe

Chief Executive Officer, NATS

1. Introduction

Safety is NATS highest priority and we are committed to its continual improvement. This new Safety Plan provides a high level view of how we intend to meet the on-going challenges of delivering a safe service.

Safety is, and will always be, a key priority for NATS. Our Safety Policy sets out our commitment to strive for continual improvement in our safety performance.

In the NATS Safety Strategy and the previous NATS Safety Plan, both published in 2014, we set out the challenges we saw to achieving this safety ambition. Foremost in our minds was that 2014 had been our best year ever and followed a number of years of significant improvements. The Safety Strategy recognised that continuous safety improvement is more challenging as the number of adverse events decreases; the Safety Plan set out the safety challenges resulting from the change programme upon which we were just embarking and both cautioned against any creeping complacency.

In particular the Safety Plan observed that the changing world of ATM was driving a faster place of evolution in how we manage air traffic. This included:

- New airspace structures and optimised network operations to reduce CO_2 emissions and increase airspace and airport capacity in support of the UK Future Airspace Strategy
- Increased ATC automation to enable our operation to handle forecast traffic increases safely
- A move from tactical controlling to trajectory-based operating methods in order to optimise flights across our airspace
- Increased pressure on terminal airspace and runway capacity
- Closer integration of operations and technologies amongst Air Navigation Service Providers (ANSPs) in line with the Single European Sky initiative
- Increased complexity and interconnectedness resulting from the networked systems we use to provide our services
- Evolution of new technologies that enable revolutionary change across our operations.

Maintaining and improving safety performance in the face of these changes was recognised as a significant challenge. Nonetheless, we set an ambitious target to reduce the accident risk per flight attributable to NATS, in line with predicted traffic, by 13% by 2020. The NATS 2014/17 Safety Plan was designed to meet this target.

The first two years of the current reference period (2015-2019) have seen traffic growth significantly greater than that which was forecast in 2014. Changing customer priorities and political and public concerns around airspace changes have also required major alteration to our planned investment programme. Despite this, the overall safety performance across all of our operations, taking account of events attributable to all stakeholders, is very close to the target. In particular, the performance at NATS Airports has shown a significant improvement over the last two years. However, the performance in NATS en-route operations has not improved as anticipated. The result is that, in terms of the NATS-attributable risk, we are not currently meeting the target. If we are to meet the target by the end of the current reference period, then additional improvement actions will be required.

This 2017/19 Safety Plan gives a high level view of how we intend to meet this safety challenge, and continue to deliver a safe operation today, whilst investing to create a safer tomorrow.

Safety is, and will always be, a key priority for NATS. Our Safety Policy sets out our commitment to strive for continual improvement in our safety performance.

2. Reflections on our Previous Safety Plan (2014-2016)

This section reviews our previous Safety Plan and discusses and reviews what safety goals we set ourselves, what others required us to do and the actions we said we would undertake to achieve these targets.

2.1 Goals and Targets

Our primary objective is to improve on our already good safety performance by reducing safety risk in proportion to traffic growth.

The following section reviews the targets we set ourselves and the targets which others have placed upon us.

2.1.1 Operational Performance Target

Our Safety Policy states that we commit to striving continually to improve our operational safety performance and to minimise our contribution to the risk of an aircraft accident as far as is reasonably practicable. In 2014 we set an ambitious safety target to reduce safety risk, the accident risk per flight, in line with currently predicted traffic growth of 13% by 2020. This was over and above the Single European Sky safety targets and following the customer consultation process for the 2015-2019 reference period.

Since 2015 we have used the Risk Assessment Tool (RAT) as a surrogate for actual risk, on the assumption that by controlling the number and severity of RAT events we would in turn be controlling risk. The safety target was translated into an operational measure that requires both Airports and En-route Operations to reduce the rate of NATS RAT points per 100,000 movements by 13% by 2020. This target essentially requires that the annual number of RAT points must stay constant over the control period despite there being an increase in traffic over the same period.

The rationale for this target was the recognition that NATS safety performance during CP3 (2011-2014) had been very good resulting in our best ever safety performance in 2014. Maintaining this year-on-year performance, whilst dealing with the predicted increase in traffic, although challenging, was believed to be achievable.

It was anticipated that the target could be met from a combination of investment in technology, airspace redesign and operational safety improvements.

The Operational Safety Performance section of this plan reviews our performance against this target.

2.1.2 Legislative requirements

The Single European Sky (SES) legislation includes other requirements which NATS must also meet. This legislation sets out mandatory EU-wide safety performance metrics and imposes binding targets with the aim of driving pan-European safety improvement.

The requirement (EU 390/2013) for the current Regulatory Period (RP2 2015-19) aims to stimulate and ensure proactive safety management, with an emphasis on automatic reporting & monitoring together with the creation of a climate where people feel confident in reporting safety issues.

This legislation requires us to achieve targets set on Key Performance Indicators (KPIs) for:

- Effectiveness of Safety Management (EoSM) - measured by the maturity level of implementation of: safety policy and objectives, risk management, assurance, promotion and culture
- Application of the Risk Assessment Tool (RAT) - the percentage of incidents assessed for severity using the RAT methodology for three categories of occurrences: separation minima infringements, runway incursions and ATM-specific occurrences at all air traffic services units
- The level of presence and corresponding level of absence of Just Culture
- There are also a number of Performance Indicators, or indicators without a target, which focus on improving the level of reporting within the industry.

2.2 Summary of NATS Safety Strategy (2014-2020)

The Safety Plan for 2014-2016 was the first Safety Plan produced with an awareness of the new NATS Safety Strategy. The NATS Safety Strategy took a critical look at NATS safety performance and the underlying trends in incident rates. It also reflected on the changing regulatory environment, commercial pressures and plans for technology deployments which could affect future safety performance. The NATS Safety Strategy has since been adopted by CANSO as the ideas and vision have a global relevance.

The following sections review the Safety Strategy themes and describe some of the actions taken in the first three years of the strategy to progress its longer term goals and deliver the strategic vision.

2.2.1 People Create Safety

The People Create Safety theme addresses two key points related to how safety is managed in NATS – Leadership and Competency & Capabilities of staff. To address this point, the number of senior managers with signed safety accountabilities has been reduced and the remaining safety accountabilities have been transitioned to a generic set of Safety Obligations which focus on behaviours. This provides greater clarity on who is accountable for what and avoids the possible situation of 'when everyone's accountable, no one is'.

The 'Think Act Be Safe' campaign was launched in 2016 and builds upon the ideas set out in the strategy by seeking to highlight the role everyone in the organisation plays in delivering a safe and secure operation and workplace.

2.2.2 Safety Intelligence

In 2014, there was a desire to continue to see an improvement in the safety measures following the trends from previous years. Therefore, a challenging target that matched the SESAR safety aspiration was set. Looking back, NATS Safety Performance in 2014 can be seen as our best year ever. Since then safety performance has returned to levels seen in previous years.

To understand why, a number of actions were put in place to reflect upon the change in mind-set introduced with the Safety Strategy. The SAGE project tested some assumptions and safety myths with data from the operation. Workload prediction for TC has been developed to better understand the demands placed on operational staff. Data from the operation about how the service is delivered has been successfully used to expose differences in the use of iFACTS between AC watches and to identify emergent controlling techniques at Prestwick. These activities are important steps towards the goal of new ways of measuring how everyday performance produces a safe operation.

2.2.3 Challenging & Learning

Over the last couple of years the European rules and regulations which govern air traffic management have been the subject of review and update. We have been heavily involved in influencing these emerging regulations to support our strategic goal of a better way of assuring changes.

Globally, NATS staff have been involved in the development of ICAO Annex 19 which sets out the requirements for Safety Management Systems. NATS also holds the chair for the global CANSO Safety Steering Committee and is a major voice in the European CANSO Safety Forum so that we influence the direction of international developments, capture international best practice and position NATS to influence EASA rulemaking groups.

Additionally, we have formed strategic partnerships with the FAA and Air Services Australia to share and learn about other ways of managing safety, challenge ourselves on our safety performance and address common safety challenges. We have also worked with NavCanada to review their safety management processes and provided a number of recommendations.

2.2.4 Tailored & Proportionate

To address the business needs of the Deploying SESAR programme we have developed a more flexible approach to risk assessments which retains the rigour of the existing scheme whilst permitting different approaches such as the SESAR method. This will be implemented as the Common Safety Method in 2017. The commercial challenges which NATS is subject to make focusing on the most beneficial safety improvement actions even more urgent. To focus our efforts in the most relevant and beneficial safety actions, we have developed an Accident-Incident Model which examines the effectiveness of the safety barriers in the operation. This will be used to support future investment decisions.

2.3 Safety Plan Actions Delivered in 2014-2016

Our previous Safety Plan set out an ambitious programme of safety improvements, both tactical (short term) and strategic (longer term), as well as delivering capability enhancement in human performance and safety management. The following sections reviews some of the major milestones achieved in the last 3 years.

2.3.1 Tactical

Our tactical improvement programme focussed on key types of events that generate risk in the operation. These improvement activities were predominately delivered by the operational units through proactive actions contained within their unit safety plans and in response to specific incidents or trends.

2.3.1.1 Level Busts

The Barometric Pressure Alerting Tool (BAT) was further developed as part of a technological solution to the risk from level busts. We also engaged with airlines to maintain awareness by pilots of the risk with a focus on defensive strategies on the flight deck.

2.3.1.2 Infringements

As part of an education and awareness programme, NATS staff visited General Aviation (GA) airfields and presented at GA seminars on the risks from infringements. Visualisations of the impact of infringements have also been made available through the NATS website and via social media. From a technological perspective, further enhancements to airspace warning and flight planning tools have been supported and the Low-Powered ADS-B Transceiver (LPAT) technology has been progressed with flight trials. We have also worked with the CAA to support them in taking proportionate enforcement action where necessary.

> *"Over the last 3 years we have delivered a significant amount of change into the ATC operation, maintained a safe service and continually driven for safety improvement. The summary you see here highlights some of those achievements."*
>
> Richard Schofield, Director Operations & Commercial Safety

2.3.1.3 Pilot/ATCO Interactions

The programme of training and awareness sessions held jointly for pilots and controllers (Scenario Training for Aircrew and Controllers (STAC)) has continued. We have also expanded the use of the Day-to-Day observation technique for the flight deck.

2.3.1.4 Ground & Runway Safety

NATS has continued to engage with all our airport customers, regulators and the industry to improve ground and runway safety. This has specifically included involvement in the CAA Ground Handling Operations Safety Team (GHOST) initiative to promote working in partnership with ground handlers and encourage effective CAA regulation of ground handlers. Internationally, we have contributed to the update of the European Action Plan for the Prevention of Runway Incursions (EAPPRI3).

Locally, airport ATC units have identified hotspots for incursions and are working with airport operators and airlines to address the risk further. Additionally work has been undertaken on human performance which is addressing core ATC skills to reduce the impact of runway incursions.

2.3.1.5 Operational Interfaces

Our units have continued to engage with partners across all our operational interfaces. This has included liaison visits to aid mutual understanding of each other's operations. Unit focal points for interfaces have been established and this approach has been used to successfully address interface issues, share improvement activities, support lesson learning and identifying common safety issues areas requiring joint action. We have also continued our strong relationship with our military partners particularly in support of exercise planning and management.

2.3.1.6 Human Performance

Defensive controlling simulations and briefing sessions were utilised across our operation in preparation for the anticipated summer traffic. This activity in particular was attributed to the improved safety performance in our oceanic operation during the summer of 2016.

ATCO Confidence and Resilience training was provided to our controllers, which included raising awareness of techniques such as visual scanning, active listening, active teamwork and active learning to drive safety performance. We have also rolled out the Operational Competence Assurance (OCA) process, which is a development of the Unit Competency Schemes, including training in effective assessment, coaching and development techniques. The Day-2-Day technique has also been successfully applied across airports to support a better understanding of human performance.

2.3.1.7 Lessons Learning & Safety Awareness

When we have incidents and events it is incumbent upon us to learn the lessons and avoid a repeat. Activities undertaken based upon lessons learnt included the 'Actively Safe' campaign that promoted recovery techniques, resilience, communication & teamwork, strip management, operational distractions, and focus/under-load scenarios.

Key to lessons learning is face-to-face discussions and briefings to raise awareness of incidents, lessons and preventative & recovery techniques. Watch safety teams have been a key element of delivering this important activity.

The Airports Safety Notice was developed as a further means of enabling regular, on-going safety communication directly with operational staff across all NATS Airports. The first 2 editions were delivered in 2016 and incorporated safety performance, lesson learning, a closer look at key safety topics (e.g. Fatigue, Visual Scanning, Safety Culture, Change) and information on safety activities across Airports.

2.3.1.8 Supporting Airports Transition

During the period of the previous Safety Plan we have achieved the successful transition of a number of Airports into and out of the NATS group: the transition out of Gatwick, the transition in of Netheravon, Middle Wallop and Belfast City.

Achieving a smooth transition requires a significant amount of preparation and ground work, not least to understand the cultural differences between the organisations. Early support and communications leading up to transition date and throughout the early stages is crucial to effective integration with NATS. This includes briefings on the NATS organisational structure, the Safety Management System, and local safety management processes including establishing a Unit Safety Steering Group, a Local Operational Competence Assurance Team, an Airport Safety Improvement Team and the appointment to key management roles at the Unit.

The central challenge for those airports transitioning out of NATS is on achieving an effective transition to the new ANSP while ensuring the continuing safety of the operation through an inevitable period of uncertainty for NATS personnel.

2.3.2 Strategic

To ensure we continue to improve safety in an ever-changing operational environment the previous Safety Plan included a number of longer term strategic actions to deliver step-changes in safety performance. In particular, these actions addressed the introduction of new technology and operating concepts.

2.3.2.1 Airspace

The first phase of the London Airspace Management Programme (LAMP) that changed airspace design and introduced new procedures around London City was delivered.

2.3.2.2 Technology

The first deployment of our new Flight Data Processing (FDP) system (iTEC) and Controller tools took place in Prestwick Upper Airspace. Enhanced controller-to-controller co-ordination across borders through the COAST (Collaboration on Oceanic Airspace & System Tools) programme was also delivered with the introduction of a new FDP system into the Oceanic operation.

We have also set out our principles for automation and these will guide the development and introduction of advanced technologies into the operation.

Our safety nets have continued to be evolved to enhance the assistance to controllers. This has included developing tools to assist in monitoring aircraft in holds, deviation alerting for final approach, and the ability to detect and alert on aircraft leaving controlled airspace.

2.3.2.3 Emerging Risks

At the beginning of the 2014-16 plan drones or Remotely Piloted Aerial Systems (RPAS) were identified as a potential future risk. By late 2015, the proliferation of small drones was increasing rapidly and the level of interest by UK government was rising. In response, NATS has been proactive in developing a strategy to safely manage the elevated risk from the hobbyist community and to facilitate the growth of commercial operators seeking access to controlled airspace. In partnership with the CAA we have developed the Drone Safe website and we launched an awareness App: Drone Assist, targeted at hobby drone operators.

2.3.3 Capability

The previous Safety Plan included a number of actions that aimed at increasing our overall safety capability.

2.3.3.1 Safety Performance Management

We have been developing a range of new approaches to safety performance measurement in line with the 'Safety Intelligence' theme from the Safety Strategy. Through the use of Business Intelligence tools, a variety of analytical techniques and methods such as data mining, hypothesis testing, barrier mapping and analysis of workload & situational awareness factors, we are now able to derive new insights into the operation to better understand our safety performance.

2.3.3.2 Change & Transition

Given the scale and pace of the change programme upon which NATS is embarked, the Safety Plan identified a set of actions related to managing change and transition. This has resulted in a re-phasing of our technology roadmap to better manage the impact of transition on our operational and engineering teams.

To ensure we understand and manage the benefits of projects in our investment portfolio, we have developed a benefit-forecasting model: Tempest. This model allows us to assess and ensure that projects deliver the required positive safety benefits whilst also allowing us to manage, and so minimise, any impact on safety as a result of the change.

NATS has been proactive in developing a strategy to safely manage the elevated risk from the Drone hobbyist community and to facilitate the growth of commercial operators seeking access to controlled airspace.

3. Performance Against the Targets

Measuring our performance and understanding our risks is crucial to the development and implementation of the Safety Plan.

3.1 Operational Safety Performance 2014-2016

The understanding of risk and the monitoring of our safety performance ensures that we are targeting our resources on the right risks as well as monitoring and refining how well we are tackling them.

NATS operational performance for the period 2011 to 2016 is shown in Figure 1. Figure 2 shows the RAT severity scores for the NATS attributable events (shown on the top). The Overall score (i.e. the combined of NATS and Airborne contribution to the occurrence) is shown on the bottom.

As can be seen from Figure 1, NATS group safety performance did not meet the ambitious target set in 2014 for a continuous improvement and a reduction in safety risk in line with traffic growth of 13%.

At the end of 2016, our Airport operations has shown continuous improvement, despite the significant increase in traffic, and is meeting its target. However, the en-route operations (i.e. Swanwick AC & TC, Prestwick Domestic & Oceanic) have experienced a deteriorating trend and have not met the target, particularly during the summer of 2016. Figure 3 shows that the number of NATS-attributable high severity events (A's and B's) does, however, remain small and comparable to previous years. Figure 3 also shows the growth in traffic against the number of RAT events.

There are several reasons why performance in en-route operations has not been as expected. The original forecast for RP2 predicted an average increase in traffic of 2.4% per year. During 2016, traffic growth exceeded this prediction by a significant margin with annual growth in traffic to the end of December 2016 of approximately 5.8%. It should also be noted that this increase in traffic is not evenly distributed across the operation and some sectors have experienced much higher traffic increases. It has previously been shown that NATS RAT points are strongly correlated with traffic levels specifically within the en-route operation. There is also evidence that the rate of increase in RAT score accelerates with higher levels of traffic.

Many safety improvements envisaged in the RP2 business plan were dependent on the delivery of major changes in airspace design, in particular the LAMP and NTCA projects. The delivery of these projects has been significantly impacted by factors outside of NATS control. Therefore the anticipated safety benefits from these projects have not been realised.

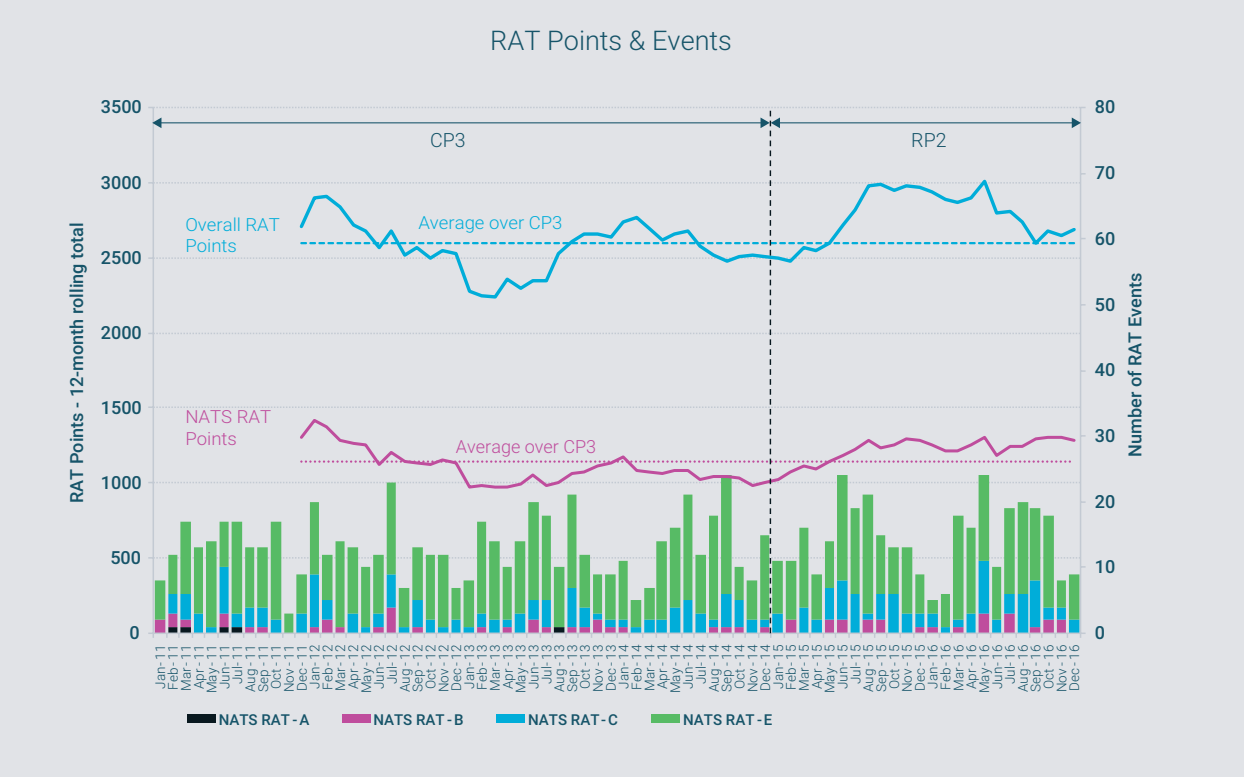


Figure 1: NATS RAT Points & Events

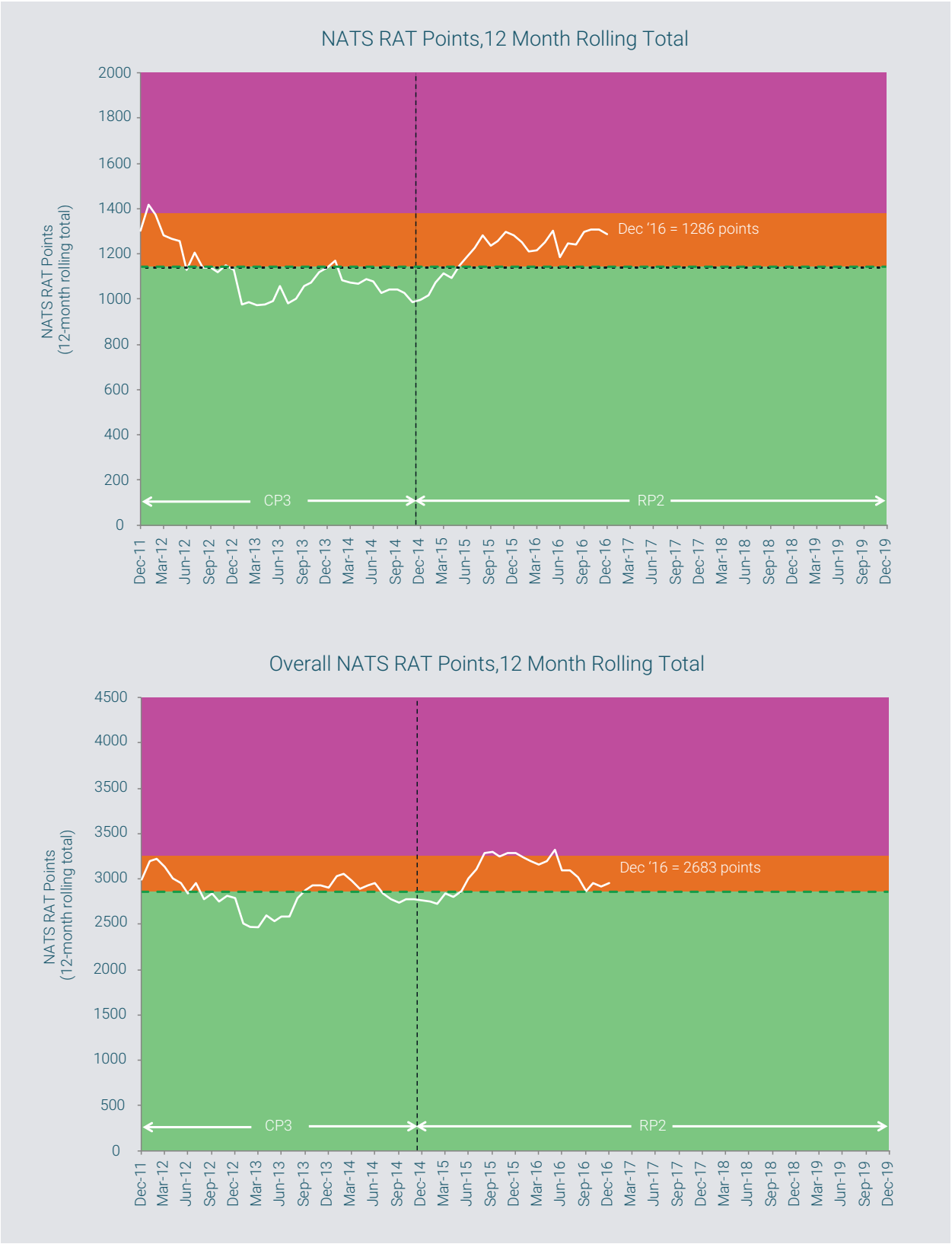


Figure 2: NATS RAT Points (top) and Overall RAT points (bottom)

Meeting the target has therefore been far more difficult than expected. During 2016, a comprehensive review of the targets was undertaken considering all the factors including higher traffic growth, the changing investment programme and impact of transitioning from the SSE scheme to RAT. The review concluded that, whilst challenging, the current targets were valid and should be maintained. The review also recommended the introduction of additional metrics on overall RAT points and the number of NATS RAT A/B/C events.

The RAT methodology has enabled us to better understand our risk. It has highlighted that one driver for the increase in NATS RAT points is increases in points within the 'plan' and 'execution' elements of RAT, particularly within en-route operations. However, the ability to 'detect' has not deteriorated compared to previous years and 'recovery' points have remained broadly similar in 2016 compared to 2015 across en-route operations, with airports exhibiting an improvement in this area. Airport operations in general have seen a decrease in points across all elements of the RAT methodology except 'detection', which remains similar to 2015 totals.

3.1.1 Oceanic Performance

Oceanic safety performance continues to be very strong. In terms of Oceanic NATS culpable events, only RAT E's have been witnessed over the past 15 months.

In terms of the overarching TLS (Target Level of Safety), we are currently meeting the target in the lateral plain however in the vertical plain we continue to miss our target across the North Atlantic, this is in no small part due to infrequent large duration errors.

3.1.2 Operational Safety Priorities

Whilst the RAT scheme provides a specific view of performance, other risk areas, which do not score within the RAT scheme, also drive priorities for improvements at the Units. The operational expertise of our people has therefore been used to also identify other risk priorities for inclusion within the Safety Plan. Examples of this include:

- Management of operational workload
- Human performance factors such as memory, visual scanning, strip use and misjudgement
- Communication issues such as ambiguous instructions, missed & wrong read-backs
- Application of ATC procedures (e.g. Visual Flight Rules (VFR) / Instrument Flight Rules (IFR) interaction)
- Understanding emergent techniques with the introduction of new equipment
- Risks associated with our current airspace design
- Distraction/ lack of focus or concentration
- A focus on defensive controlling and recovery techniques.

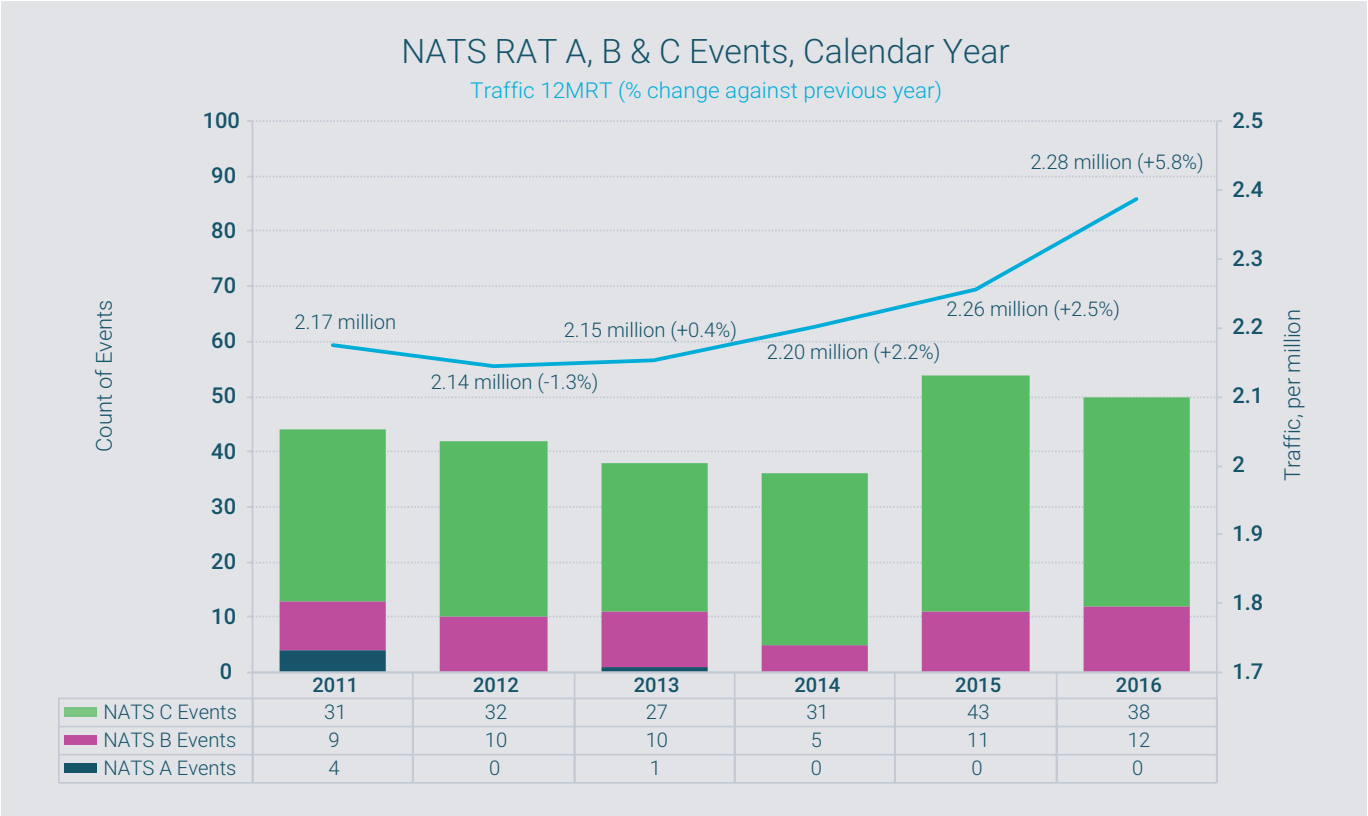


Figure 3: NATS RAT Events (A, B & C) by Calendar Year

3.2 Compliance with Legislative Requirements

Our progress towards meeting the Single European Sky Safety Targets is shown in Table 1.

Key Performance Indicator (FAB Monitoring)	Measure	Target	Achieved Level - 2016
Effectiveness of Safety Management	Air Navigation Service Provider score ranked A (low) to D (high) against a questionnaire	By 2019 Level C for the Safety Culture Management Objectives By 2019 Level D for all other Management Objectives	Target Met: Level D in all Management Objectives
Application of the Severity Classification Scheme	Application of the severity classification based on the Risk Analysis Tool (RAT) methodology to the reporting of occurrences (Separation Minima Infringements, Runway Incursions and ATM-specific occurrences)	By 2017, 80% of SMIs, RIs and ATM-specific occurrences. By 2019 100% of SMIs, RIs and ATM-specific occurrences	Target Met: 100% of SMIs, RIs and ATM-specific occurrences
Just Culture	FAB ANSPs ensure that formal Just Culture training is provided to staff at all levels of accountability in the organisation from the highest management level to front line operators. The ANSPs will ensure that a Just Culture training requirement (to include continuation training) is documented in staff training and induction programmes.	A minimum of 60% of staff will have completed the Just Culture training by end of 2017 and all by 2019	In Progress: Formal just culture training to senior managers with safety accountabilities is in progress and NATS expects to meet the 2017 target on schedule

Table 1: Progress on SES Performance Scheme Safety Targets for 2019

Performance Indicator (National Monitoring)	Achieved Level - 2016
Automated safety data recording systems, where available, for monitoring of separation minima infringements.	Tools to automatically detect SMIs are in place at all NATS units. Operational supervisors are required to acknowledge all detected encounters and determine where the event is a genuine LOS event. For all genuine events the supervisors will confirm whether an associated LOS event has been formally reported.
Automated safety data recording systems, where available, for monitoring of runway incursions.	Automated reporting of RIs is not available at any airport where NATS provides an Air Traffic Service.
Level of occurrence reporting, on an annual basis, aiming at measuring the level of reporting and addressing the issue of improvement of reporting culture.	Separation minima infringements: The reporting rate for SMI within the UK is, although higher, in line with the overall European rate, and the high-to-low severity ratio is slightly lower than the European average. Runway incursions and Airspace infringements: The reporting rate and the high-to-low severity ratios are in line with the overall European rate and ratio, respectively. ATM-Specific Events: The reporting rate for ATM-SE within the UK is in line with the overall European rate, and the high-to-low severity ratio is significantly higher than the European average.
Number of: - separation minima infringements - runway incursions - airspace infringements - ATM specific occurrences at air traffic services units	The number and details of all these occurrence types are provided to the UK CAA SARG.

Table 2: Progress on SES Performance Scheme Indicators in 2016

4. The NATS Safety Plan for 2017-2019

4.1 How this Safety Plan has been developed

Firstly, this Safety Plan re-affirms our safety target:

To reduce safety risk, the accident risk per flight, in line with currently predicted traffic growth of 13% by 2020.

The Safety Plan is divided into four areas which reflect the different aspects of safety activities which are planned for the period 2017 – 2019. Collectively they will address the safety target we have set, comply with the legislative requirements to which we are subject, deliver the vision set out in the NATS Safety Strategy and achieve our commitment to continuous safety improvement.

The four areas aim to create the right environment for our Operations and Technical Services teams to deliver a safe service now and into the future.

The four sections are:

SAFE TODAY

This section addresses our primary responsibility for managing the safety risk in our operation. It focuses on short-term and on-going tactical measures undertaken at the Units to address day-to-day risks to the Operation.

SAFER TOMORROW

The 'Safer Tomorrow' section outlines the strategic actions and longer term actions to reduce risk through the introduction of new technologies and operating concepts. This section also describes the actions to be taken with regard to emerging risks.

RAISING OUR CAPABILITY

This section looks at developing our capabilities in safety management, safety leadership, human performance and to continue to develop our understanding of what delivers a safe service.

OUTWARD LOOKING

The last section reflects upon the actions required to manage the changing operational environment and regulatory regime in which we operate. It also describes how we contribute to and influence the direction of global ATM safety whilst also being open with, and learning from, other organisations and industries.

5. Safe Today

Key to maintaining the safety of today's operation is an understanding of what makes the operation work and what keeps us safe. Short-term and on-going tactical measures will continue to be undertaken at the units to address day-to-day risks.

5.1 Operations

For many years, our business areas (Swanwick, Prestwick, Airports and Technical Services) have defined and managed their own safety plans: articulating risks and activities specifically designed to manage local priorities to drive safety improvement. These safety plans are designed, owned and delivered by the people best placed to understand and make improvements: the individuals embedded within the operation who deliver the safe air traffic service NATS provides every day.

The management of local safety plans is a mature concept in NATS. As a result many of the safety improvement activities that have been undertaken historically are now embedded in the day-to-day management of safety with improvements being realised as a result. Our work on improving runway safety, interfaces with adjacent units and ANSPs, Level Busts, Infringements and working with our customers are only a few examples where understanding and managing these risks and driving improvements are 'business as usual'. We will continue to work with our customers to maintain and improve safety in these risk areas.

As our environment changes, so do our local safety plans. We are looking at what goes right, not just at what goes wrong. Being proactive about safety, understanding what makes the operation work and making sense of what keeps us safe today is part of the day job for many people in our operation. Adopting this broader perspective to safety – looking beyond failure to understand how every day, successful work delivers a safe operation and understanding how humans and technical equipment interrelate to deliver a safe service is a priority for our units.

Across the operation, our units have embraced this approach to safety and will continue to progress work already undertaken in this area in recent years. This approach, coupled with a combination of analysis of RAT incident data and experience, the focus for the units over the coming years will be to ensure individuals are supported during times of change such as the introduction of tools and technology whilst delivering and maintaining a safe and efficient air traffic service. Ensuring appropriate resource, workload monitoring, training, effective competency schemes, processes, procedures, effective communication and lesson learning are key elements in this. This approach is about endeavouring to ensure everything goes right, not just preventing things from going wrong.

As a consequence, our units have tailored the activities in their Tactical Safety Improvement Plans to address the key priority areas for their units for 2017 to drive safety improvement and risk mitigation: These priorities and activities are structured in line with the NATS HP framework, ensuring operational people have the tools they need to perform their job well, have the capability required to perform effectively and work in an environment that is conducive to getting the best from Human performance.

For the 2017-19 plan the following areas of operational safety management have been identified for action.

5.1.1 Operational Resource & Workload Management

Managing our operational resources and workload has proved challenging, particularly with significant traffic increases at the same time as the introduction of a major programme of airspace and technology changes. Experience has demonstrated that the likelihood of an incident occurring increases when staff have very high workload or very low workload. A fundamental part of operational safety is the real-time flexibility and resilience which our controllers provide by being able to adapt their decision-making and performance in the face of a dynamic, ever-changing traffic environment whilst balancing concurrent task demands, interruptions, system constraints and time pressures.

Recognising and addressing the impact of fatigue on this resilient capability is important to the understanding of safety and in addressing operational resourcing and workload challenges. Fatigue is a normal consequence of shift-working, working at times when the body naturally wants to sleep and modern lifestyle factors. New regulations will come into force in 2020 which will require Air Traffic Service Providers to manage fatigue risk for controllers. While NATS already complies with the regulations, assessments will continue to be undertaken to ensure that the risk associated with controller fatigue remain acceptable.

To ensure our staff are supported and equipped to deliver a safe service under these at times challenging conditions, we will be focusing on the following:

- Predicting traffic flows more effectively
- More effective resource deployment
- Monitoring and managing of workload levels
- Understanding task complexity under increased workload conditions
- Completing Fatigue risk assessments.

5.1.2 Interfaces

ATC Interfaces are plentiful and varied across our operation. They may be sector, airfield, ANSP or customer/airline, controller/pilot or civil military. Due to either differing approaches to procedures, airspace complexities, lack of understanding across the interface or sub-optimal relationships, interface issues can present risk to the operation and need to be actively managed.

Work in this area has demonstrated safety improvement results in the past and our Units will continue to identify and resolve issues across our interfaces to reduce safety risks. Ongoing activities underway such as building positive relationships, increasing awareness, education, liaison visits and highlighting issues will all contribute to mitigate interface risk. Furthermore, Units are equipping their controllers with defensive controlling techniques, specifically focussing on sectors where interface issues are known that may also be contributing to safety risk.

5.1.3 Military Engagement

Tangible safety improvements have been realised at our interface with Military Ground, Maritime and Air agencies in recent years. We will continue to build on the collaborative relationships with the military with planned activities to include:

- Continuing to raise understanding and awareness of respective operational needs, providing an insight to working environments to allow decisions to be more informed and defensive controlling techniques to be enhanced
- Units will continue to provide representation for major military exercise planning to ensure both civil and military requirements are known and managed
- Lessons learned from controlled airspace infringements will be shared with the aim of reducing future risk.

5.1.4 Flexible Use of Airspace

To enable the most efficient use of airspace we are increasingly sharing it with other users. However this presents the risk of inadvertent penetration of danger areas. Whilst Units manage this tactically every day, the number of unplanned penetrations has increased in some areas. The introduction of technology is planned to mitigate some of this risk in the future, however, in the meantime, Units will continue to proactively work to minimise this risk. Units are improving and standardising processes and procedures and they are working with other relevant stakeholders to make improvements across the operation to reduce ATC error caused by danger area penetration. Units are also championing the introduction of the Eurocontrol Local and Sub Regional Airspace Management Support System (LARA), which will provide a 'single point of truth' for all Danger Area operations and reduce the risk of human error or misinterpretation.

5.1.5 Drones

In the lifetime of the previous Safety Plan the advancement and proliferation of drone technology has been substantial developing from a relatively small-scale to a significant hobby and commercial market. The UK government policy is to promote drone access to airspace in the UK, and the proposal is that by 2020, Beyond Line of Sight (BLOS) Operations will be enabled. NATS are committed to supporting this evolving policy whilst continuing to work with industry partners to maintain airport and airspace safety and security. It is important that we work collaboratively to support and influence emerging technologies that will be operating in UK airspace to ensure the safest outcomes for all parties. On-going objectives include:

- Education and awareness - Working closely with the CAA to undertake awareness programmes that educate users of the relevant guidelines and regulations
- Airport safeguarding - Working with our airport and airline partners to help maintain safety and security in their airspace and improve operational resilience
- Controlled airspace safeguarding - Provide an enhanced service to drone operators wishing to access controlled airspace that assures both safety and security of airspace
- International regulations - Influence international legislation (primarily via EASA and the FAA) that will safely encourage and not hinder market growth.

5.1.6 Infringements

Infringements of controlled airspace continue to pose a significant risk to the NATS operation, accounting for one third of all losses of separation. This risk is particularly prevalent in the South East of England. Over the last 10 years NATS, in partnership with the CAA Safety and Airspace Regulation Group (SARG) and other industry organisations, have delivered a variety of improvement activities.

Over the next 3 years, we will continue to engage with the CAA and all industry partners as we seek to further reduce the risk. Actions underway include the Infringement Awareness Course, which is akin to the Speed Awareness course for drivers and will be available as an enforcement option for the CAA and the wider deployment of Frequency Monitoring Codes.

We are planning further work with the CAA on a range actions including encouraging the universal use of Airspace Warning / Moving Map technology and raising the required standards for GA pilots particularly in the use of Radio Telephony (RT) accessing ATC services when flying and improving navigation skills with Global Positioning Satellite (GPS) technologies.

In the longer term, we believe that the overall ATM system can be improved through increased electronic conspicuity of general aviation aircraft using Automatic Dependant Surveillance-Broadcast (ADS-B) in/out and other transponder technologies. We will be actively pursuing this with the CAA during 2017.

5.1.7 Agile Safety Teams

Units have begun to establish safety action groups to manage specific areas of risk pertinent to each operation. These groups, comprised of operational experts, will be tasked with identifying safety risk areas through analysis of safety related data, leading indicators and from operational feedback. They will then be tasked with establishing and delivering safety activities to drive safety improvement. It is envisaged that this approach will provide an agile, dependable, and expeditious channel for safety improvements to be identified, prioritised, and implemented.

5.1.8 Oceanic Operations

We are tackling this risk through various working groups and in addition through the introduction of new technologies providing earlier notification of vertical or lateral deviations from the clearance held in the FMS (Flight Management System). Traffic increases in Oceanic airspace continue to grow around 8-9% and as such work is continuing both in terms of upskilling of our teams, as well as further development of the GAATS+ system.

The south east corner of Shanwick continues to be the most complex, we are engaging on a regular basis with the French and Spanish to improve the flow of traffic through this piece of airspace. In addition we are reviewing the use of geographical sectorisation as a method of reducing complexity in this area.

5.1.9 London Terminal Control Operations

Terminal Control (TC) remains the primary driver of safety risk in our operations, accounting for around 60% of the total risk. Current RAT scores for TC were last exceeded in the 12 months to June 2008, with traffic levels at a similar level to those currently being experienced. An analysis of historical performance data shows that RAT scores for TC track a similar profile to traffic. With the forecasted traffic increase it is likely that we will continue to witness an increase in NATS RAT points. Therefore we are implementing a specific improvement focus on the TC operation. In the short term this includes:

- Safety Surveys of the Thames and Essex operations to target specific risk areas, and implementation of associated recommendations
- A review of the Unit Competency Scheme to identify and action opportunities for objective-based assurance
- Human Performance analysis to gain a deeper understanding of and cause of recent events from the aspect of the controllers involved
- Increase in dedicated resource for the Safety Improvement team to drive and deliver tactical safety improvement activities and improve lesson learning and communications.

In the longer term, the introduction of electronic flight strips (ExCDS) will provide additional safety nets such as an automatic cross check of the flight level an aircraft is cleared to, against the level selected by the pilot. ExCDS also provides a technology platform for safety benefits from future technology enhancements.

Key Actions

- Monitor our compliance with regulations on fatigue risk and proactively address controller workload and operational resourcing issues
- Continue our close working relationship with the military on shared risks
- Introduce LARA to mitigate the risk from danger areas and the flexible use of airspace
- Further education and regulatory actions to mitigate drone risk
- Development of Agile Safety Teams to address emerging safety issues
- Continue cross border collaboration to improve traffic flows in Shanwick airspace
- Work with CAA to expand the use of electronic conspicuity in General Aviation
- Deliver the targeted improvement actions for Terminal Control

5.2 Tools

5.2.1 Sustainment of the Engineered System

As we develop and introduce our future platform, we must always ensure that there remains effective resilience within the current operational system. We will achieve this by sustaining and replacing our legacy equipment through good problem management, effective asset management & fault prediction and by retaining a high level of competence amongst our engineers. Furthermore, as the environment around cyber threats increases, we will continue to maintain and enhance our understanding and response to them as they apply to our current operations.

> *Delivering a safe and efficient operation today is our priority and this plan sets out how we will achieve this, through working together across NATS and with our partners, to remove and mitigate risks in our operation.*
>
> Juliet Kennedy, Operations Director

5.2.2 Understanding Emergent Behaviours

We recognise that when new systems and working practices are introduced into a complex system, such as ATM, new and sometimes unforeseen patterns of behaviour will emerge as people learn to work with the new technology. Before any major change is implemented, work is undertaken to determine how the new system, procedure or airspace is designed to be used and how controllers will be trained to use it. Once the change is implemented, controllers are likely to operate the new system, procedure or airspace in slightly different ways depending on personal experience and the operational environment within which they are working. What we observe is that the 'work as done' will be different to the 'work as imagined'.

Best practice therefore emerges and this is captured through the Day-2-Day process whereby controllers observe the good things that other controllers do day in, day out to keep the operation safe. Actions are then taken to formalise and embed this learning across the operation and to align actual methods of operation within the approved safety case and vice versa. Furthermore, any lessons we learn can then be carried forward into future projects looking to deploy technology into the operation.

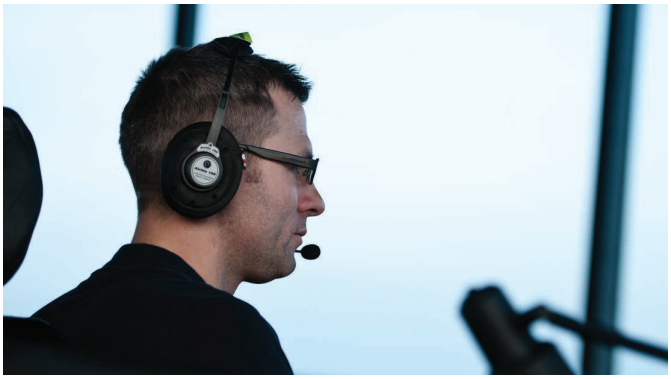
5.2.3 Risk Assessment & Management

On-going safety risks are managed through the NATS Risk Assessment and Management Plan (RAMP) whilst operational engineering hazards are managed through the Operational Risk Assessment and NATS Facility Interrupt and Reduced Redundancy processes, all of which will be continue to be given a high level of importance across Engineering.

The increasing awareness of cyber-security threats has led to greater visibility of the risks that these present to the operation. Mitigations for this risk include defined procedures to react to potential cyber-security incidents and to minimise the impact on the tactical operation and the NATS business. As understanding of the risks increases during the period of this plan, additional and appropriate mitigations will be put in place.

Key Actions

- On-going maintenance of the legacy technical architecture and development of additional defences against cyber threats
- Wider adoption of system safety approaches including capturing and understanding emerging techniques
- In Oceanic Airspace, the introduction of Surveillance Enabled Operations will improve conformance monitoring delivering significant safety benefits and enable the future introduction of reduced separation standards



6. Safer Tomorrow

We will continue to take strategic actions to reduce risks by introducing new technologies and operating concepts. We will ensure that we stay alert to emerging risks whilst pursuing a longer term vision for better safety management.

6.1 Future Operations

The deployment of SESAR into our operations will require big changes to systems, airspace and methods of operation. The rate at which such change can be accommodated in already busy operations rooms will create significant challenges for all those involved with the potential to add more risk. While our operational change processes have proved to be extremely robust in the past, we will need to ensure we have a full understanding of the potential safety risks of the planned changes so that appropriate mitigations can be applied. Therefore we will:

- Provide a better understanding of the impact of the rate of change on the safety of our operations
- Enhance development, delivery and transition approaches to ensure risks are effectively controlled / mitigated.

NATS technical and operational teams are actively committed to the development and delivery of our portfolio of change. This includes our Deploying SESAR Programme, our Infrastructure programme and our airspace modernisation programme along with the associated business transformation activities that modernise our processes and how our people work. These major changes, together, have the potential to deliver significant gains in operational safety performance.

We have defined our future Target Operating Model which is shaping our portfolio of change. This portfolio approach is being continuously enhanced to ensure we are delivering the benefits we have committed to deliver. Safety improvement remains a key element driving this decision-making process and will be enhanced by an improved Safety Benefits Panel. This panel will continue to develop by:

- Utilising predictive measurements of safety improvements
- Tracking the delivery of safety benefits against our targets
- Providing the governance to report and ensure action is taken if forecasts show that the safety target is unlikely to be met.

Key Actions

The following operational and airspace changes are currently planned for introduction into our operation to deliver our business transformation programme. Some of these projects have direct safety benefits and others contribute to the overall operational improvement which cumulatively is expected to improve safety.

- Prestwick - PLAS Phase 1: Prestwick Lower Airspace Systemisation – that is part of our airspace modernisation programme and will reduce controller intervention allowing the handling of more aircraft efficiently and safely.
- Swanwick Area Control- The redesign of parts of the airspace to deliver customer benefits and modernisation (segregated into the Swanwick Airspace Optimisation Programme and Future Capability Programme);
- Enhancements to Queue Management systems to better match capacity to demand, reduce airborne holding and simplify traffic streams;
- Enhancements to the use of Time Based Separation and Independent Parallel Approaches at Heathrow.

6.2 Future Platform

NATS is on a journey to consolidate its multiple operational and technical systems into a single operational solution for our en-route operation delivered from Swanwick and Prestwick utilising a common technology platform. This platform is designed to be capable of supporting future operational improvements developed through SESAR alongside a modernised airspace.

Notwithstanding the move to introduce a Surveillance Enabled operation in North Atlantic (NAT) airspace, with the inherent differences and efficiency of the current Oceanic CONOPS, it is not expected to align the Ocean onto the iTEC platform within the current strategy.

Therefore, NATS is working with our partner, NAV Canada, to develop a common platform and development approach to the future Oceanic FDP system. This will support the introduction of the NAT 2025 strategy in support of safety improvement, regulatory compliance and sustain service delivery to meet forecast traffic growth. We will continue to work with our Airport customers to improve and transform how airport ATC is delivered. In particular we will continue to standardise our service and will implement remote and digital tower capability.

The overall safety goal for the technical architecture of our future platform remains unchanged from that which it replaces: to support safe Air Traffic Services. However, the implementation of the envisaged architecture must maximise the potential safety benefits afforded by each new or changed capability to ensure we make the most of having this more flexible architecture.

Introducing these new technologies, platforms and airspace changes safely and effectively into our 24-hour operation is complex but is well understood. We have various teams across the organisation working together to ensure change is managed as effectively as possible. NATS' tried and tested project processes & governance arrangements will be applied to match the demands of the change programme. Our operational staff will remain key contributors to these projects which ensures operational expertise is captured and also supports engagement activities across our operations to ensure everyone is bought-in to the change.

Delivering a platform and capability to support flexible operations with the required level of safety, capacity and resilience across both centres will require a more integrated and accessible engineered system that is not dependent on the location of the technology. To achieve this, NATS will require a step change in system capability, creating a homogenous platform for controllers to use across the different operations, roles and tasks which is also completely site, location and controller position independent. The provision of assurance in this new environment will be adapted in line with the planned evolution of the Safety management System. This assurance will address all aspects of the lifecycle by developing solutions that are 'Safe by Design' and have 'Quality By Design', and through how we transition and operate the platform. It is expected that more frequent changes will be made in the future, not least to keep the platform secure against an ever changing cyber threat environment and this aspect of ongoing assurance will be a key part of how we assure our future operation.

Key Actions

In common with the operational and airspace changes some of these technology projects have direct safety benefits and others contribute to the overall operational improvement which cumulatively is expected to improve safety.

- Our TC operation will move from the use of paper flight strips onto electronic flight strips (ExCDS). This is a stepping stone towards our future platform and is expected to directly deliver safety benefits.
- The AC Operation is moving to Voice over Internet Protocol (VoIP) communications, increasing service resilience and reducing long-term maintenance costs. This is the first implementation of a core part of our new platform.
- The new platform will continue to be developed ready for deployment into our En-route operation and it will be tested in the live operation during the period of this plan and then implemented in early 2020.
- On the Ocean, the GAATS+ HMI & FDP system will be upgraded in collaboration with our development partner NAV Canada and enable Performance Based Communication and Surveillance (PBC) plan compliance. The new Oceanic platform delivers the capability for Surveillance enabled operations which are expected to deliver significant improvements against our Target Level of Safety performance on the ocean.[1]

1 The NAT PBCS plan covers Required Communication Performance (RCP) and Required Surveillance Performance (RSP) associated with North Atlantic data link operations.

6.3 Role of the Human

6.3.1 Impact of Change

Whenever a major change is made to the operation, an assessment is undertaken to determine the impact on human performance. Where there is an impact a tailored and proportionate work programme is put in place to address the risks. This uses a consistent set of processes which are applied across the whole project implementation lifecycle providing increasing levels of assurance that the change will be safe to implement and operate from a human performance perspective. A user centred approach will continue to be taken to ensure that human performance requirements will be met when the system is being used and that, as much as possible, the opportunity for the user to make an error is designed out.

The process also includes an assessment of the levels of acceptable workload, communication and team working. The resulting requirements form a key input into the design of the change or the acceptability of a commercially available system.

Prior to introduction into service a training needs analysis is undertaken to ensure that the end-user know how to use the system safely and effectively. This is followed up with assessments of both the competence and the confidence of the user in operating with the change in place. Human Performance assurance data is collected throughout the implementation stages including simulation and limited operational service providing increasing confidence that the human performance requirements will be achieved. Once operational, human performance data continues to be collected to provide assurance that the system is being used safely from a human performance perspective.

6.3.2 Automation

More automated tools are being provided to controllers providing them with additional information to do their roles more safely and effectively.

The underlying principle for the use of tools in air traffic control is that the human must remain in control. The performance of our controllers is exceptional, but is approaching the upper limit of what we can reasonably expect a human to achieve with respect to the ability to take-in all the required information and to integrate it into a plan for controlling traffic.

NATS have highlighted the potential safety benefits of introducing greater automation to help controllers, for example providing earlier warnings of potential conflicts thereby enabling controllers to handle more aircraft and to do so more safely. A set of principles for the implementation and use of automation by controllers has been developed in collaboration with the UK Civil Aviation Authority and other industry partners. These principles address areas such as: trust, training, resilience, fall backs and safety assurance. This approach will be used to ensure that future automation delivers the desired safety benefits whilst minimising human performance risk.

6.3.3 Safety Nets

While our systems and procedures are designed to meet the required level of safety performance without depending on safety nets, it is prudent to have a number of ground based safety nets that are used to detect, and alert the controller to, a potentially unsafe situation. With the move to a future platform there is an opportunity to review how controllers are presented with alerts to ensure that this conforms to our safety nets alerting philosophy in order to maximise their human performance.

Key Actions

- Provide human performance assurance for the implementation of new systems, procedures and airspace. Within the scope of this Safety Plan this will include electronic flight strips into Terminal Control, Radar in the Tower, and Automatic Dependent Surveillance - Broadcast for Oceanic airspace
- Prior to the introduction of any new automated system, apply the agreed principles of automation to maximise human performance and minimise safety risk
- As new systems are introduced, ensure that the way in which alerts are presented to controllers is designed to meet the safety nets alerting philosophy

6.4 Cyber Risks

Air traffic control is a data-centric business; we need to maintain the integrity, availability and confidentiality of data at all times to safeguard our operational service and our customers. We keep our operational and business systems under constant review to ensure they continue to meet the needs of our operations. And we have invested significantly in resources and expertise to maintain a robust cyber security defence.

The cyber threat is continually developing. We value our position as a world-leading ANSP and, as such, we are seeking to build processes and systems that are resilient and secure by design to minimise the potential for any negative safety outcomes originating from a cyber-cause.

NATS works closely with the UK government, EU bodies and other aviation industry partners to ensure that security levels are monitored, managed and appropriate. We are certified to ISO27001, the international standard of information security best practice, for elements of our cyber security activities. In addition, we regularly review our people, procedures and technologies to understand, and guard against, the latest threats.

Key Actions

The safety landscape is constantly evolving and we will remain sensitive to opportunities for safety improvements and long-term emerging issues and risks to the NATS operation, for example from cyber threats, commercial space operations, autonomous aircraft operations and satellite-based surveillance.

> *"Delivering a safer tomorrow requires the combined efforts of all NATS people, our suppliers and customers. We are changing everything about the way we operate and run our business. It is an exciting and challenging time for all of us."*
>
> Rob Watkins, Technical Services Director

6.5 Safety Strategy Development

In 2014, a new Safety Strategy was published which set out a vision for how safety in NATS will be managed in 2020. The NATS Safety Strategy took a critical look at NATS safety performance and the underlying trends in incident rates. It also reflected on the changing regulatory environment, commercial pressures and plans for technology deployments which could affect future safety performance.

In 2014, the Deploying SESAR programme was in its formative stages, the RP2 settlement was just coming into effect and NATS performance, across most measures, was exceptional. Since the publication of the NATS Safety Strategy, the challenges which the Strategy seeks to address have not fundamentally changed but they have possibly become more demanding.

Therefore we believe it is worth reviewing the NATS Safety Strategy to check on what progress has been made in the years since it was published on implementing its key principles and to set out future actions for strategic safety improvement. Additionally, we will continue to progress the strategic actions that have already been identified to deliver the strategic vision of the 4 themes of the Strategy.

Key Actions

- Continue to progress the on-going actions to deliver the vision of the NATS Safety Strategy
- Review the current NATS Safety Strategy to revalidate the core messages, determine progress towards implementation and to set out a updated strategic vision for 2025
- Identify new of amended actions to deliver the strategic vision of the updated Safety Strategy and highlight activities for inclusion in the next iteration of the Safety Plan

7. Raising Our Capability

The more we increase our overall safety capability, the safer we will become.

7.1 People

The NATS Safety Strategy and the Safety Plan recognise that people are fundamental to our safety.

This Safety Plan puts in place actions to ensure that we:

- Support our people during times of change; ensuring they are ready, trained and equipped for the evolving operation
- Learn from what we have done before; from our events and the introduction of change, and that we apply the lessons
- Provide strong leadership and support the raising of capabilities to manage our operation.

7.1.1 Accountabilities & Leadership

As an organisation, we are required to define, maintain and document clear and unambiguous lines of Safety Accountability. In the past, approximately 800 individuals have held Safety Accountability statements, leading to inconsistencies in how accountabilities are understood and discharged across the business.

In order that Safety Accountabilities become truly 'clear and unambiguous', the Safety Accountability structure in NATS is changing. There will be fewer individuals holding Safety Accountability statements and these will be held by members of the Executive Team, their direct reports and the General Managers, thereby providing clarity as to who is accountable for the Operation. The Safety Accountability statements themselves will also be revised to ensure they are consistent across one operation.

The introduction of an expected set of safety behaviours, entitled 'Safety Obligations', will be rolled out across the organisation. These Safety Obligations will be based on the 'Think-Act-Be-Safe' behaviours. A set of leadership-specific Safety Obligations will also be rolled out to individuals with formal leadership duties. The benefits of carrying out this work are improved clarity of accountability across one operation, a more consistent approach to the understanding and application of accountabilities throughout the organisation and clarity of expectation through a consistent set of safety behaviours.

Our leaders set the tone for safety and the company's managers ultimately set the culture of the organisation through their commitment to safety. They must ensure that safety is not done in isolation but integrated into how we do business while their decision-making and target-setting must drive the right behaviours across the company and avoid creating perverse incentives that distract people from delivering a safe service. Within this Safety Plan we will:

- Upskill our operational and technical leaders in order to equip them with the tools, techniques and skills they will require to manage our people in an environment of change and challenge
- Promote Just Culture, open reporting and lesson learning
- Enhance NATS staff understanding and awareness through training, management support and feedback.

7.1.2 Culture

During periods of rapid and extensive change, one of the biggest challenges is ensuring that we maintain and nurture our safety culture since it is one of our most valuable safe-guards. Our safety culture is significant to everything we do, as it underpins how we think, how we act and how we are safe. We are committed to assessing our safety culture and acting on what we find.

Underpinning our safety culture is the necessity to have an effective just culture as this is the best way to achieve truly open reporting, to allow lessons to be learned and to achieve continuous improvement in the setting and achievement of safety. We need to continue to nurture a culture where individuals are able to bring forward safety issues and risks without fear of retribution.

Figure 4: The Think Act Be SAFE behaviours

We completed the latest Safety & Cyber Security Culture Survey across our organisation in November 2016. The results from the questionnaire were positive and indicate that the organisation continues to demonstrate all the key aspects of a functioning safety culture. These results provide us with a foundation for future development. Work is ongoing in each of our business areas to develop a more detailed understanding of the survey output and to identify where improvements can be made and activities incorporated into local Safety Improvement Plans.

7.1.3 Training

NATS prides itself on delivering a thorough training programme to ensure our controllers and engineers have the capability to perform their roles effectively and competently. Establishing credible training plans that are resourced appropriately, are fit for purpose and address our future operational environment are critical to ensure we are ready for deploying change into our operations. We are supporting this through the use of new Part Task Trainers and computer based packages created by NATS Training.

One example of an area which will continue to have a particular training focus has been to support the growth in traffic. We have used traffic forecasting technologies and broadened the skills of a number of controllers to make better use of this technology and ensure effective and proactive sector management. This activity supports the identification and mitigation of high workload scenarios.

7.1.4 Lesson Learning

Effective lesson learning is central to the success of any safety related organisation particularly at a time of significant change. We continue to encourage open reporting and to improve the standard of the reports filed so that we can better understand the underlying systemic causes of incidents rather than just what occurred. This leads to more effective and timely lesson identification, sharing and learning.

Activities underway across our operation include:

- Focussing on the quality of reporting and investigations to maximise learning opportunities
- Regular sharing of unit safety directives to highlight specific safety issues
- Safety bulletins
- 'Actively safe campaigns'
- 'Get ready for summer'
- Safety Days.

An area where lesson learning has been successfully applied into the operation is the Resilience and Confidence programme which provides controllers with a set of techniques and strategies for higher pressure situations. Defensive controlling techniques have also been captured and communicated across the operation.

7.1.5 Competency

Competence schemes are fundamental to assuring operational managers that the technology, people and processes are working together effectively to provide a safe service. The assessment of competence starts at selection when assessments are undertaken to determine whether new recruits have the right capabilities and behaviours to become the controllers of the future. It continues through the college, to unit training and on to regular checks of competence after validation. Competence schemes are particularly important during and after the introduction of a change, enabling a unit to monitor and support controllers as new tools and technology are embedded into the operation. It is typically during this period that emerging techniques and trends arise and effective schemes target appropriate support to individuals.

Activities are underway across our operation to ensure the Unit Competence Schemes remain optimised for effectiveness, are objective and are appropriate to the challenges of a changing operation. Units are investing in the development of their competency assessors/ examiners, ensuring they are trained, coached and equipped to deliver their respective schemes and enhance their application, management and output.

7.1.6 Communication & Promotion

Effective safety communication and engagement ensures our staff are clear on how we are managing risks and what they can do to help. Our Units recognise that not only does an engaged workforce contribute to the safety culture of an organisation, but consistent and clear communication can allay concern and confusion in an environment that is facing challenges and change.

Units will continue their efforts on developing and enhancing communication and engagement activities such as bulletins, local communications, safety publications, project awareness and stakeholder engagement, for distribution within their own operations and across the organisation.

Unit 'Safety Campaigns' create a focus on safety priorities and engage with teams across the operation to facilitate a systemised approach to the management of activities in priority risk areas. These tend to be pre-emptive rather than just reactive and aim to ensure controllers are equipped with the capabilities and awareness they need to deliver a safe service.

In 2016 we launched the high-profile, company-wide "Think Act Be Safe" campaign to draw attention to the role everyone plays in ensuring a safe operation and a safe workplace. The campaign included many aspects of safety which have not been a traditional focus in the company including wellbeing and health and safety as well as newer risks such as cyber threats. This campaign will continue throughout 2017.

Key Actions

- Implement a new safety leadership program
- Promote safety awareness including cyber security, well-being, and health and safety as well as operational safety to ensure that everyone in the organisation understands how they contribute to safety
- Review safety accountabilities to ensure that they reside with an appropriate number of people at an appropriate level in the organisation
- On a periodic basis, undertake an assessment of safety culture across the whole of NATS and put actions in place to address areas of concern and to reinforce areas of best practice
- Continually challenge the application of our just culture principles to ensure that they are being applied fairly and appropriately
- Revise the controller competence assessment scheme to place more emphasis on behaviours, team working and human performance aspects not just purely technical competence
- Continue to promote safety across the Units and organisation including the delivery of additional themes in the Think Act Be Safe campaign

7.2 Safety Management System

7.2.1 SMS Evolution

NATS produced one of the first Safety Management Systems (SMS) for an air traffic organisation in 1991. An SMS is the way organisations like NATS ensure that they explicitly manage the safety of their operations. We operate a continuous cycle of monitoring of our performance to understand our safety risks, improving safety where risks are identified, controlling the implementation of change and actively managing operational risk during service delivery.

The NATS SMS since its initial creation has been about more than just basic compliance with the regulations and legislation. NATS has led the way, setting the standard in many aspects of the provision of its services including safety management.

As set out in the Tailored and Proportionate and Safety Intelligence themes of the Safety Strategy, we recognise that our SMS needs to evolve to remain effective. Our future SMS needs to provide us with the right safety assurance, not necessarily more assurance.

The NATS SMS has been developed over the past three years in line with the requirements of ICAO Annex 19: Safety Management and in anticipation of the new Service Provision and Oversight regulation from the European Commission. In keeping with the ethos and ethics of NATS business, the development of the SMS will continue to encompass all of NATS business rather than just those aspects which are required by legislation and regulation. This continuing development will take place in three strands to deliver a tailored and proportionate safety management system.

- SMS developed to align with service provision and oversight regulation and deploying SESAR concepts whilst maintaining the ethos and good practice across NATS including the production of safety cases in air traffic services and provision of support assurance for Communications Navigation and Surveillance, Meteorological and Aeronautical Information Services.
- SMS developed to support business specific models for military airfields, the Oceanic Operation and joint ventures such as the Heathrow Strategic partnership.
- SMS developed to support assurance concepts to align with NATS commercial strategies and plans such as Aquila, FMARS and future contracts.

This work will pave the way for us to think differently about how we manage safety and risk in the future.

7.2.2 SMS Framework

We will be re-building our SMS framework to make it more relevant to our future ATM and business environment and to provide a much clearer linkage to international ICAO and EASA standards.

Firstly, we will make our SMS more integrated with our business processes. Instead of standalone safety management, we will embed the key attributes for safety directly within the procedures that are used in the NATS Management System (NMS) so that we have one integrated set of actions rather than several parallel processes. The main benefit is that, instead of today's generic safety processes, different business areas can have proportionate processes which deliver the goals for safety in the manner most appropriate to that specific area of our business.

Secondly, we will streamline our SMS to make it more appropriate and effective in our future environment and to be traceably compliant with international standards. This will result in fewer and clearer sub-divisions of the SMS as illustrated in Figure 5. This new SMS construction will enable more efficient use by the whole organisation and make practical sense to everyone in the business not just the expert safety community, as well as making it easier to engage with regulators and stakeholders.

> *"The commitment of our people to safety is paramount to our continued safe service delivery. The introduction of the Safety Behaviours is the embodiment of this commitment and reflects our desire to be 'Safe in everything we do'."*
>
> Mark Asquith, Director Technical Services Safety & Assurance

Figure 5: New SMS Framework

7.2.3 Improving Risk Classification and Assessment

ATM 'Risk Assessment and Mitigation' is NATS' primary mechanism of assessing the risks associated with existing and changed Air Traffic Service Functional Systems. It is a procedure that has not been subject to major review since 2003, and no longer sets the benchmark for best practice in terms of efficiency and effectiveness.

The introduction of the European Service Provision and Oversight regulation allow us to implement a number of efficiencies to the way we assess changes to the safety of functional systems. We also need to ensure that we can provide the required safety assurance for our future capabilities and Deploying SESAR which are based upon a very different way of delivering technical services. The revised method for assessment needs to also support:

- Moving from an asset-based assurance to assuring services and capabilities
- Assurance that considers the 'risk to flight' as opposed to 'loss of ATC ability' as a result of system failures
- Alignment with the SESAR Barrier model approach for safety risk assessment
- Inclusion of 'Success' case assurance as well as the traditional 'Failure' case
- Collaborative projects working with strategic suppliers
- Better documentation, training, familiarisation and communication on assurance.

The improved Risk Classification Scheme (RCS) has been re-cast around a Common Safety Methodology (CSM). The CSM process has been widely adopted in the Rail industry and accepted by both the UK Office of Rail and Road (ORR) and the European Rail Regulator. NATS has capitalised on the processes and guidance materials already developed and proven in this sector.

The CSM recognises that a fully quantified risk assessment is, in most cases, not the most effective way of analysing and managing risks. It proposes that hazards are controlled by application of a code-of-practice or comparison to a reference system and only if the first two measures are unable to control the hazard, by application of a fully quantified risk assessment.

These changes are considered to provide a range of benefits in terms of standardisation of assurance across the Operation, targeting Safety improvement by the identification and strengthening of 'barriers', closer alignment between predicted risk and measured in-service performance, and easier maintenance of change assurance through the use of standardised hazard sets, assessment models and assurance documentation.

Together with our existing risk classification and assessment schemes the introduction of additional risk classification and assessment models will provide further options and greater flexibility to employing the most appropriate method applicable to a given scenario. Thus providing a better understanding of the risks and helping to identify mitigations as we continue towards deploying SESAR.

Key Actions

- Evolution of the Safety Management System to provide a more flexible approach
- Delivery and roll-out of the Common Safety Method for risk classification

7.3 Understanding

Our objective is to predict when events are going to happen to enable us to prevent them.

Harnessing technology to improve safety is a priority for our organisation. The technologies being introduced into our operation today and in the future will provide us with extensive data that will help us to understand what is influencing the operation in near real-time. This will give us the ability to interpret these influencing factors and help improve safety performance by targeting resources to address emerging risks rather than just reacting to existing risks. It also provides us with a greater understanding of the factors which affect safety performance enabling us to recognise and influence what needs to happen on a day-to-day basis.

7.3.1 Data-driven approaches

Whilst maintaining our safety improvement activities that are already underway, our safety focus needs to also consider improving our understanding of how traffic, workload and other factors affect our safety performance so that we are able to predict future risks and prevent incidents. As we deliver the future platform more data from the operation will be available to describe how the service is actually delivered. This data will be used to better understand how safety is produced by the operation and to understand the positive actions that deliver a resilient and safe service so they can be protected and reinforced.

This data-driven, positive, 'predict and prevent' approach to safety management is being progressed with a number of initiatives each examining a different aspect of the information about how the operation produces safety.

The Event Prediction Model utilises subjective workload data captured from controllers and correlates this to incident data to create sector-level risk profiles. Workload scores can then be monitored against a baseline to ensure that pre-emptive measures can be taken before safety performance is degraded. The initial focus of this work has been on our Terminal Control operation at Swanwick and future developments will focus on our Swanwick AC and Prestwick Operations.

Continuing the data-driven assessment of safety, NATS Analytics and Operations are working together to build upon the successful 'SAGE' project to use a wide range of objective data from the operation to provide tangible warnings of conditions which could be mitigated pre-tactically.

The ultimate aim of the data-driven approach is to deliver an understanding of how the operation delivers a safe operation and to reduce the time between data being captured from the operation and its use in safety decision-making within the operation. We will build upon the experience gained with the Business Intelligence data warehouse systems in use today to deliver a Data Storage Repository and Analytics (DSRA) function. This capability will make use of cloud-based storage and big data tools to deliver a single, comprehensive dataset about how the operation works, provide greater access to this information across the organisation and allow near real-time dashboards and other means of gaining insight into the safety of the operation.

Data-driven decision support can also be extended to decisions regarding change and the impact of external factors on the operation. The TEMPEST tool supports the estimation of the impact on the NATS en-route RAT score from projects, unit safety improvement activities and future traffic. This can then be compared against our safety performance targets so informing decisions about whether additional effort is required to meet our targets.

Whilst the availability of data from the operation presents new opportunities to develop understanding, a purely quantitative analysis will be insufficient to develop a complete understanding of the work. ATM is still an industry with a human at its heart and quantitative data must be married to qualitative data reflecting the judgements and experience of the highly skilled operators working within the constraints of the system. To ensure that we continue to capture this qualitative data in the best possible way, we will assess the current capability of the Safety Tracking and Reporting (STAR) database and whether it remains fit for purpose.

7.3.2 Performance-based Oversight

We are mature in our understanding of positive and negative operational management indicators. Performance-based oversight develops this by providing us with a qualitative assurance picture, promoting improvements in safety performance and aiding the effective discharge of safety accountabilities. Following the successful rollout and application of a performance-based oversight model in our Airports business in recent years, we will now focus on applying the model to our en-route environment.

The model highlights the areas of a Unit's environment which are fundamental to safety. It consists of a comprehensive set of indicators to identify whether we need to act to reduce any adverse impact on safety performance. The model uses leading indicators of safety performance derived from various data sources and expert judgement to provide a subjective assessment of likely future safety performance. Indicators are grouped into 5 main areas: Culture & Behaviour, Competence & Capability, Operational Risk Environment, Leadership and Change. The status indicated in each of these areas determines and prioritises improvement action. This formal assurance process, whose scope is wider than just the current safety issues at the Unit, provides an evidence-based picture which can be used to provide effective challenge.

Key Actions

- Extend existing data-driven analysis projects to new aspects of the operation to better understand how the operation produces a safe service and support event prediction and mitigation
- Apply the TEMPEST tool to change improvement activities, to ensure safety benefits are targeted, maximised and deliver the NATS safety performance target
- Deliver the DSRA project to support improved decision support for the operation
- Roll-out the performance based oversight process to the en-route operation
- Review whether the STAR database is adequate for future needs

8. Outward Looking

Working proactively with industry partners to further improve aviation safety.

8.1 Sharing and Learning from Others

Aviation safety is a shared responsibility and many of the risks to aircraft receiving our ATC services originate outside NATS and it is essential that we work collaboratively with others in our industry, across disciplines and internationally to address those issues effectively and deliver the change in safety thinking that is needed. We will therefore continue to conduct our safety improvement activities in partnership with airlines and airports and other sectors such as military, business and general aviation, as well as with European and international partners.

The NATS Safety Partnership Agreement (SPA) is a proactive aviation community working group that works to ensure common agreement on risk priorities and mitigations, and to jointly implement near-term safety improvements. We also participate in industry groups working, such as the Safety Improvement Sub Group (SISG) of the Eurocontrol Safety Team; CHIRP and the CAA Mid-Air Collision Challenge Group.

Our other partnership activities include:

- CAA Safety & Airspace Regulation Group (SARG) to ensure that new regulation enables a sensible and pragmatic approach to safety to be taken by UK air traffic service providers
- Civil Air Navigation Services Organisation (CANSO) to improve the measurement and prediction of ATM risk and drive risk reduction at European and global levels
- European Aviation Safety Agency (EASA) and the European Commission to assist in development of a European ATM safety regulatory framework that supports the delivery of operational safety improvements
- SESAR programme to deliver its safety benefits
- UK Flight Safety Committee
- General Aviation Partnership
- Irish Aviation Authority, other ANSP Alliance partners and our customers to improve safety through the UK-Ireland Functional Airspace Block and across alliance partners' airspace
- Support and influence to the UK State Safety Partnership activities that contribute to managing the risk posed by overseas operators and likewise to UK operators overseas
- Airport operating companies where we provide the ATC services to tackle risks in the airfield environment.

A key element to the Safety Intelligence theme of the NATS Safety Strategy is collaboration across the aviation community on sharing safety data and analysis. The CAA is establishing an industry 'Evidence Base' to collect and share safety data and information. This is in addition to the European EASA ECCAIRS platform that provides a central repository of safety information derived from airline, airport, ANSP and manufacturer data.

Sharing information on industry trends and lessons learned helps to identify changing risks and prevention strategies, while the fusion of data from different viewpoints provides a valuable insight on emerging vulnerabilities. Our aim, therefore, is to bring together the various aviation data sources in order to proactively identify safety trends and to assess the impact of changes in the future aviation and ATM operating environment.

Key Actions

- Continue to support and provide leadership in on-going safety groups and partnerships
- Identify opportunities for data sharing and lessons learning with other stakeholders and industries

8.2 Regulations, Compliance and Legislation

Each Member State must comply with an array of aviation-related regulatory requirements set at a global level by ICAO primarily through their 'Standards And Recommended Practices' (SARPs). We are continuing to work with the CAA to understand how they affect us as an ANSP. Whilst ICAO requirements are generally stable in the 19 Annexes, we are able to offer our perspective to the UK Government on amendments that are being proposed through the UK ICAO Representative or through working groups where we engage as subject matter experts.

Meanwhile European legislation continues to grow and with the publication of each new regulation or amendment the level of interdependency with ICAO increases. As ICAO requirements are transposed rather than referenced we continue to press for any proposed amendment of global requirements to be aligned with European and National rulemaking if the overall impact is to be positive, achievable and maintainable.

At a European level, legal requirements are published by the European Commission much of which is directly applicable to ANSPs. Therefore we are proactively engaging in a variety of European task forces to seek common positions with our ANSP partners to better ensure that emerging legislation delivers practical safety benefits and minimises business risks.

To support and clarify the methods we will use to satisfy this legislation we are actively engaged with Working Groups as they produce a plethora of Standards, Acceptable Means of Compliance, and Technical Specifications. For example, we represent CANSO on the European Aviation Standards Coordination Group (EASCG) to gain a perspective on the activities being planned in order to meet the SESAR Deployment Manager Programme which considers the ATM Master Plan in general and Pilot Common Projects specifically.

At a National level, requirements are published by the Civil Aviation Authority either through Civil Aviation Publications or through Publication Notifications to highlight relevant requirements generated by other bodies.

It is in this broad regulatory environment that we will continue to liaise with both internal and external stakeholders to ensure that all requirements and aspects of compliance are achieved whist still meeting increasing demands for operational efficiency, reduced costs, interoperability and improving safety.

Through our proactive approach we have demonstrated that NATS is compliant with most legislation and for those few aspects where that is not the case we are clear why that has occurred and have informed the CAA, explained the issues and communicated our plans for compliance. In the short term we are working on the assumption that we will commit to continue to meet requirements set out in European Aviation legislation until we know clearly what the exit criteria for BREXIT are and whether a new approach is required.

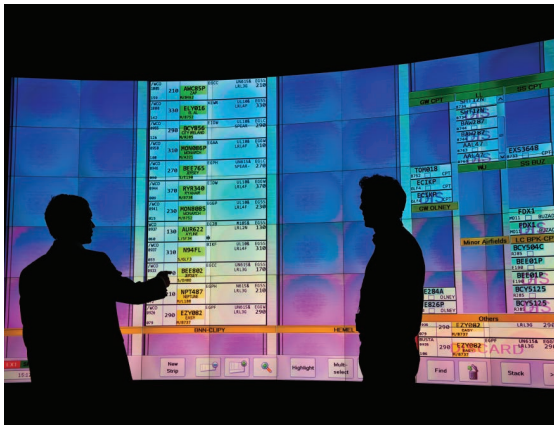
8.3 Global Alignment

Safety initiatives are coordinated at a Global level by ICAO through the Global Aviation Safety Plan (GASP) and, to a lesser extent, through the Global Air Navigation Plan (GANP). At a European Level, the European Plan for Aviation Safety (EPAS) performs a similar function, setting out the priorities for safety improvements and new rule-making tasks using a risk-based and data-driven approach. It is proposed in the revisions to the Basic Regulation, the set of rules that give EASA its power, for the EPAS to be the equivalent of the State Safety Plan for Europe, which will make its content binding on Single European Sky and aligned states. All ICAO contracting states are also required to have a State Safety Programme following the recommendations of the ICAO Global Aviation Safety Plan.

Given these emerging global requirements this is the first Safety Plan to reflect upon these International safety initiatives and to align and trace elements from the GASP to the UK State Safety Programme and the EPAS and then into our planned activities.

Key Actions

- Continue to work to align our Safety Plan activities with International safety plans and initiatives
- Proactively challenge and influence emerging international legislation and regulation to minimise business risk and ensure the effective delivery of tangible safety benefits



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Afterword

We have achieved excellent levels of safety performance and whilst we did not meet the ambitious safety targets we set ourselves, we should be proud of our achievements to date. In this Safety Plan we have re-affirmed our safety target to help create the necessary focus to continue to strive to do better.

This target will be challenging to meet given the increasing traffic levels we are observing whilst we also deliver on our change programme which includes the future operation and the future technical platform. The rate and scale of change is not diminishing, and nor will it in the coming years.

This Safety Plan puts in place a number of actions to ensure our staff are fully prepared and engaged in the change; that safety leadership is clear, our processes and ways of working are effective at delivering change safely and that we have the right capabilities to meet whatever challenges come next.

The Safety Plan requires your support and your commitment to ensure we continue to strive for the highest levels of safety performance and so that we remain safe today and can be safer tomorrow.

Dr David Harrison

Safety Director, NATS

Advancing aviation, keeping the skies safe.

NATS
4000 Parkway
Whiteley
Fareham
Hants
PO15 7FL

Tel: 01489 616001