The Future of Safety in ATM
NATS Safety Strategy for 2020

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The ATM world is undergoing unprecedented change from technology, automation, airspace consolidation and regulation. In anticipation of these challenges, NATS has developed a truly strategic safety programme. It has been developed through consultation with the business on the safety challenges we face and has been informed by recent reports on safety in other industries and by the latest thinking in academia.

The safety strategy recognises what we have done in the past and acknowledges the achievements we have made. It respects the strengths of our people and the robustness of the systems and procedures which we use in delivering safety today. However, the strategy sets out the need for a change in the way we think about safety if we are to continue to strive for and deliver the very highest standards and to continue to live up to our value of ‘Safe in Everything We Do’.

Our safety performance, by our current measures, continues to be excellent but this presents its own challenges and we must guard against any creeping complacency. In the strategy we propose evolving how we measure and control safety in the operation, strengthening the role of people in delivering safety and making best use of our limited resources.

The strategy sets out the road to 2020 but this does not mean it will take this long to achieve all its goals. There will be both short-term actions and longer-term changes. It also does not set out the explicit technology or airspace changes which will be implemented as a result of the strategy much of this will be set out in the strategies of other business areas. I hope the strategy will stimulate innovation in how we think about safety and how we deliver safety throughout the organisation. The strategy should set out the path ahead and be a catalyst for change.

The goals of the strategy should be both challenging and engaging and it should start a conversation throughout the company about the future of safety. I welcome and invite your comments.

Dr. David Harrison,
NATS Safety Director

The strategy should stimulate innovation in how we think about safety.
Introduction

NATS has achieved excellent levels of safety performance and we should feel rightly proud of this accomplishment. But in an industry where the consequences of failure are potentially catastrophic, it is clear that our methods of safety management must challenge the risk of any creeping complacency and remain appropriate, so that they continue to inform us of and alert us to our risks.

Rather than waiting for possibly catastrophic, unrepresentative and increasingly rare incidents from which to learn and mitigate future risks, with possible knee-jerk, uncoordinated, and ‘fix everything’ reactions, the NATS safety approach must evolve to become more sensitive, anticipative, intelligent and surgical.

When we reflect on these thoughts we conclude that the application of the current understanding of ATM safety may be less effective in the future. We need to understand ATM safety in a different way, and through this new understanding challenge the way that ATM undertakes safety assurance and enacts safety interventions. The implication is that if we carry on as we have done before we may be in the unenviable situation of not knowing how safe we really are.

The aim of the new NATS Safety Strategy is that it should create a mind-set change in how people working in NATS think about safety. We believe that in such a diverse organisation, a mind-set change is the only possible method of achieving the necessary changes we set out. However, the themes of the strategy will mean different things to different people and we do not expect everyone to engage with them in the same way. This is natural and to an extent encouraged since, in proposing the strategy, we are stating the direction of travel. It will be for individuals to stop and think about how and what they will change to meet the themes of the strategy and how they can make it a reality in their part of the organisation.

About this document

This document provides a short overview of the 4 key themes which form the NATS Safety Strategy. It describes the challenges to the way we currently think about safety and provides more justification for these statements and ideas. In preparing the strategy a number of guiding principles emerged which guided its development and will inform the implementation actions to bring the strategy to life. These are included and summarised on pages 14 & 15.

We believe that in such a diverse organisation, a mind-set change is the only possible method of achieving the necessary changes we set out.

A catalyst for change.

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A Strategy for Safety in ATM

Given the amount of change now and on the horizon, and the predicted growth in air traffic, how do we continue to improve our safety performance? We cannot take safety for granted or just assume that the future will be safe – it will require hard work and a long term vision to make sure it is safe.

As a starting point for the development of the strategy we posed the question: Will We Be Safe in Future?

We examined this question by looking at it from a number of different perspectives:

- How has ATM safety evolved?
- How do we currently measure how safe we are?
- How do we assure the safety of our systems, processes and procedures?
- How is safety delivered in the operation?
- Has all of this worked?
- What do we mean by safe in the future?
- How will we predict hazards and calculate risk?
- How do we address the challenges of regulation and the pace of change?
- What is the role of the human in delivering safety and how do we protect this?
- How do we prioritise what actions we should take to ensure a safe ATM operation?

We have attempted to answer these questions through a review of the relevant safety science literature including the developments in Safety II and Resilience Engineering. We have also reviewed our current safety methods and surveyed wider industry practices. We conclude that our current safety approach may be insufficient in future to answer key questions about risk and aid our understanding of what safety means. We need to think about safety – in all of its manifestations - in a new way.
A Vision for Safety in 2020

We have evolved into an organisation where Safety has been embedded in everything we do. Our business and safety processes have become fully integrated since we appreciate that the more we understand about performance the more we understand about safety. We now have a far greater understanding of what makes the services we deliver safe. We are using new measures which allow us to anticipate risks and control safety in the operation.

Everyone in NATS understands how their role relates to safety today as well as in the future. Safety Capability across the organisation has been improved through our awareness and safety programmes. The capability of our safety leaders has been raised to strengthen our organisational culture enabling us to make the right decisions about safety. Everyone recognises that People create Safety.

NATS’ safety management system is adaptable, progressive and fit for the challenges of the future. It permits different but appropriate ways of providing the required assurance, and is sufficiently portable so that we can use it in the variety of regulatory environments where we do business, supporting NATS future and enabling our growth ambitions. We have a fully Tailored and Proportionate safety management system.

Leading as well as lagging indicators have enabled us to create a real time operational safety baseline. We anticipate, predict and control safety in the operation by understanding what went well, not just what went wrong. We collaborate with our ATM stakeholders to gain a consistent view of risk. NATS Safety Intelligence has grown to match its needs.

Ownership of risk is better understood amongst our ATM stakeholders, enabling improved challenge of the rigor and pace of risk mitigation. Equally we have increased our learning and collaboration with others where a risk or a benefit is shared. NATS is a learning organisation which anticipates the unexpected and which constantly challenges itself. We have become an organisation with a strong culture of questioning, Challenging and Learning both within and outside of NATS.

To achieve this vision we have developed a strategy built around 4 key themes which are simple, clear, meet the challenges of the future and which should guide the development of a new safety philosophy in NATS and the ATM industry. These 4 themes are:

- People Create Safety
- Safety Intelligence
- Tailored & Proportionate
- Challenging & Learning

Each of these themes is briefly explained in the following pages.

We need to think about safety – in all of its manifestations - in a new way.
The safety of our services, as judged on past performance is rightly perceived and talked about within NATS as being good, but we must guard against any complacency in our organisation. We need to be watchful for an over reliance on past successes in our attitudes to safety in the future. We must continue, against our natural instincts, to harbour a sense of unease about our performance. We need to be curious for the bad news as well as the good.

The use of advanced automation, that sees greater integration between human and technical support systems in the operation, means that the non-operational functions of the organisation will have a more significant role in the shape of safety in the future. For example, decisions made by engineering design teams will be increasingly influential in determining the safety of the operation.

The Piper-Alpha, Challenger, Columbia, Nimrod and Mid Staffordshire investigations, among others, have also highlighted the importance of organisational culture, managerial capability and leadership in delivering safety. We must continue to nurture the culture of our organisation towards a self-critical and informed view of safety.

Firstly, safety comes from individuals in the organisation taking personal responsibility and ownership for safety. However, where we may have focused on the front-line operation, we need to embed a belief of forward-thinking accountability, making the future operation safer, into all aspects of the organisation. We need to ensure that everyone talks about and understands how their part, at any level of the organisation even if it appears divorced from the front-line operation, relates to how the company produces safety today as well as in the future. But we cannot ask people to feel responsible if they don’t have the capabilities or authority to act. Therefore, we need to raise awareness formally and informally about safety and the role the individual plays. We will re-energise our programmes on safety capability for everyone in the organisation. We will continue to recognise that the individual doing the work is the most knowledgeable about the safety risks and is in the best position to control them effectively and should be empowered to do so. Safety is a value, held by everyone, and not a competing priority. It is not service versus safety, but service with safety.

Secondly, we recognise that individual actions and behaviours reinforce our organisational principles and values. We will be clear on the safety principles that the company stands for and act justly if these standards are breached. We will encourage a culture where people feel comfortable in challenging poor behaviours wherever they are in the organisation. Many actions are undertaken without close supervision so only a real commitment by everyone in the organisation can sustain a safe operation. It is only by working together that we deliver a safe service.

"People deliver safety, not paper."
Our leaders and accountable managers set the tone for safety and ultimately influence the culture of the organisation through their commitment. This group must also guard against complacency and anything which could distract us from a safe service. We need to ensure that targets or objectives drive the right behaviour and do not create perverse incentives. We will raise the capability of our safety leaders to strengthen our organisational culture and improve safety decision making.

Lastly, safety cannot be tacked on as an afterthought or done in isolation; it must be integrated into how we do business. This means that it is fully embedded in our business processes, not hidden, but not separate. Safety is good business; not just in avoiding accidents or incidents, since doing safety properly and early—on results in more effective and efficient products and services.

Individual actions and behaviours reinforce our organisational principles and values.

We need to ensure that when we set targets or objectives that they drive the right behaviour and do not create perverse incentives. We will raise the capability of our safety leaders to strengthen our organisational culture and improve safety decision making.

What are we already doing?
- Just Culture policy
- Safety Culture programme
- Local initiatives such as culture surveys, fatigue management and reviews of engineering shift patterns

What could we do differently?
- Safety Awareness Programme for the whole organisation
- New Safety Leadership Programme to raise awareness and capability
- Enhanced safety data to help leaders make improved risk-based decisions
- Develop competencies in safety through mentoring, coaching and formal assessments
- Shift the organisational culture from a focus on the operation to safety of the whole organisation
- Ensure that safety, both good and bad news, has a higher profile in corporate communications
The traditional approach to safety monitoring and measurement that NATS has evolved to use has been one which identifies and counts the number of times we fail to provide a safe service. We then investigate each failure in order to learn the lessons to eliminate a reoccurrence. This is a philosophy that seeks to learn from the past to make the future safer; whilst it has served us well, it is a philosophy rooted in the past, in hindsight and in retrospect.

Since accidents are very rare in ATM, we have used surrogates for accidents and have counted and investigated losses of separation and other phenomena which describe the extent to which control over the situation has been lost.

NATS has therefore defined safety as a reduced frequency of specified adverse safety related events. For example, if there are fewer losses of separation we are therefore safer or safe enough.

When we have an adverse event our focus has been on what we did wrong, what failed or malfunctioned. We strive to learn the lessons of these events and then, through incident investigation, try to identify the root cause and eliminate it or improve the barriers to trap the event before it could become an incident again.

This has been highly effective. As is observed in the recorded data, we are experiencing record low numbers of safety events. However, if we have no adverse events it makes understanding how safe we are, in this classical philosophy of safety, very difficult. Just because we have no losses of separation do we truly believe that there is no risk in the operation — as our current metrics could lead us to conclude? When we do have incidents, are we learning anything new and are they exposing the true risks in our operation? Given the number and the nature of the changes the ATM operation is about to undergo, can we really infer our future performance from the past?

Our current performance and the structural changes to the ATM system are such that we must adopt new measures not only to understand how safe we are, but also to understand what safety is.

We will do this by thinking about and approaching safety in a new way. We will redefine safety to include what went well, not just what we did wrong. We will change our view of safety to recognise that safe performance comes from the same processes which yield success and failure. We need to understand why, and how, for the vast majority of the time, things go right and do not result in incidents. We will then use this understanding of normal, day-in-day-out performance to do better and so be safer.

It will still be important to learn the lessons from unexpected events, as we do today; but what we learn must be more meaningful and look at the ATM system as a whole rather than mainly focusing on the human contribution to error.

Our performance is such that we must adopt new measures to understand how safe we are. We must redefine safety to mean ‘as many things as possible go right’, not just ‘as few things as possible go wrong’. We will continue to learn from incidents but also define new measures of performance which allow us to anticipate risk.
Not just the absence of things going wrong but also the presence of things going right.

We will develop new ways of measuring our everyday performance and develop new understanding of how the ATM system produces a safe operation. Safety is a moment-to-moment achievement and we must study this activity to understand how it is accomplished. We should then use this understanding to strive for more consistent, robust, appropriate and repeatable levels of high performance. We should be able to tell whether we are eroding our safety margins and exposing ourselves to increased risk. We should set the target for this safety performance and be able to control the risk explicitly and dynamically using a wider variety of proven actions to control safety. We will use all available information about how the service is being delivered as leading indicators of our safety performance to enable us to anticipate risk.

Lastly, we will also take this new view of safety into the design and assurance of the systems which we use in the operation. Rather than just focusing on how they can fail, we need to ensure that we embed safety benefits in the design of new systems from the start.

“What are we already doing?”
Activities like Day–2–Day, which focuses on identifying best practice in the operation and then trying to make this consistent
The Business Intelligence project will allow us to access and analyse our operational data more easily

“What could we do differently?”
New understanding of risk which uses real-time operational data of how the service is really delivered
Development and greater use of leading indicators of risk
Different ways of controlling risk in the operation which can be changed moment-to-moment
Build greater resilience into the operation which allows us to anticipate and cope with risks even when they are unknown and never conceived or experienced before
Safety assessments explicitly demonstrate that the right functionality and performance is embedded within the design to deliver maximum safety benefits
Risk assessment and incident investigations use a common language so that each informs the other
Tailored & Proportionate

The ATM world is changing rapidly and we need to make sure how we do safety is fit for the challenges of the future. We need to understand the real risks and address them in a proportionate way — focusing on what really matters. We will maintain our fundamental safety principles whilst also supporting our growth ambitions.

The ATM world is undergoing a significant revolution in technology, automation, airspace and regulation and we observe that it is out-growing our current Safety Management System. We believe that NATS will struggle to cope with and understand the safety implications of the increasing dependency on automation and the increased complexity of future systems. The SMS was not designed to cope with the increasing levels of connectivity across ATM systems, where a single decision can propagate across the ATM network. It has no concept of sharing of responsibilities between the ground and the air or even between technical and human elements of ground-based ATM. Lastly, it is not ideally suited to the strategic partnerships and collaborative system developments which deliver the harmonised systems we need at a cost we can afford.

Ever increasing cost pressures from our customers and regulators mean we must ensure our safety actions are appropriate. We must be intelligent and surgical in our approach so that we do not waste resources on the wrong action or the wrong risk. When we do take action to change how we deliver a safe service it has to be proportionate to the risk.

We need to evolve our safety management system so that it is adaptable, progressive and fit for the challenges of the future. The safety philosophy which we adopt must perfectly match the intended purpose — it does not require more and more assurance it requires just enough and no more. The SMS needs to support our growth ambitions and be sufficiently portable so that we can use it in the variety of regulatory environments where we do business. The SMS should be built around a set of fundamental principles or values, but it should permit many different ways to provide the assurance that we need.

Being tailored and proportionate goes beyond the processes which we use to manage the assurance of safety; it embodies an ethos. It describes how we could, for example, use past performance to tailor training programmes specifically to the individual. It also emphasises that risks are best managed at the level of the organisation where they have an effect. It is about empowering individuals to take risk-mitigating actions as part of their normal day-to-day role. This will enable us to be more proportionate in our approach to risk.

"Ever increasing cost pressures from our customers and regulators mean we must ensure our safety actions are appropriate. We must be intelligent and surgical in our approach so that we do not waste resources on the wrong action or the wrong risk."

Surgical in our approach but with the flexibility we need.
What are we already doing?
Root and branch review of the entire Safety Management System to make it more proportionate.

What could we do differently?
Using safety intelligence to improve how we invest our money for safety.
Allow us to use other assurance methods which still meet our needs.
Employ the same safety measures and language in design as we do in the operation.
Incorporate safety into all aspects of how we do business instead of tacking it on at the end.
Tailor training specifically to the individual based on their needs.

Our efforts must be proportionate to the risk.

The vision we have, the business strategy we adopt and the priorities we give must all be taken with safety in mind.

We will implement a more tailored approach to the integration of safety into how we undertake projects, make changes or introduce new procedures. With safety integrated into how we do business, rather than being tacked on at the end, we can take more proportionate and structured decisions in design, procurement, planning, maintenance, contracting and partnerships. Procedures which are tailored to safety will have risk control mechanisms built-in to the task. The vision we have, the business strategy we adopt and the priorities we give will all be taken with safety in mind. Our attitude to the on-going rulemaking programme needs to become more proportionate to the risk which it might present so that we can target our efforts appropriately.
Challenging & Learning

NATS operates in a wider world. We must improve how we learn from and collaborate with others to address the risks in ATM. We will create a culture of questioning and challenging in the organisation. We must also challenge others on the pace and rigour of their risk mitigation actions.

NATS operates in a wider world. We are increasingly collaborating with other organisations on, for example, systems development or sharing of airspace. The rules and our regulators are changing. We also understand that we are, and will be even more so in future, resource constrained. Whereas in the past we may have adopted an altruistic approach to helping other organisations and, to some extent, we have taken on their risks for them, we will not be able to continue to do this. Conversely, we have also been accused, rightly or wrongly, of being an introverted organisation which does not learn lessons from others. When considering the future of safety in ATM, we need to find ways of helping others and also learning from them, removing any perception of arrogance.

In future, we should respect that others will own risks that influence our operations and be certain that ownership of risks is clear. We should be more questioning of others and challenge the rigour and pace of risk mitigation by them. But we must also learn from and collaborate with others where a risk or a benefit is truly shared so that we can ensure it is properly addressed to the benefit of aviation safety.

It is also clear that we need to be at the forefront of safety management and safety innovation. This will put us in a position of strength when we are challenged by others as to the safety, cost and efficiency of our services.

With the increasing amount of international rules and regulations imposed upon us we must ensure that the metrics which are used to measure us drive the right behaviours. Rules do not necessarily make us safer and proving an activity is within the rules does not necessarily make it safe.

This theme also takes an inward look at NATS. We should continue to foster a culture of challenge and questioning in the organisation to guard against complacency and to support us in striving for better, safer, more efficient levels of performance. It is also about supporting a diversity of views across the organisation so that we have broad expertise to draw upon when addressing the challenges we face.

At the forefront of safety management.
The accumulation of knowledge and ensuring that it is available for use in safety management is vital. We will encourage a more systemic approach to learning from previous experience (both internal and external) which includes operations, engineering, flow management and all aspects of our business. We will share insight, promote learning and understand how safety is produced by the ATM System.

Effective and open two-way communication connects and aligns the entire organisation to the common goals and objectives of safety management. Whilst visions, policies and strategies from management are important in setting the tone of the organisation, we also recognise the value of feedback and welcome challenge from across the organisation to the realities of the operation and use this to inform our risk management activities. Our leaders empower the right people, give them the resources they need and prioritise safety actions accordingly. NATS must become a learning organisation which anticipates the unexpected and which constantly challenges itself.

What are we already doing?
A leading role in CANSO Safety activities which ensures that ANSPs have a strong voice with our regulators
Worked with industry on safety improvements, such as AWARE & SkyDemon

What could we do differently?
Propose the metrics for future regulatory control periods
Obtain a clear view of risks and prioritisation of those which we tackle ourselves and those which we challenge others to address
Improve safety lesson-learning through new investigation processes
Encourage people to challenge and learn from and collaborate with others

Welcoming and encouraging challenge from across the organisation when it makes us safer.

“
We should continue to foster a culture of challenge in the organisation to guard against complacency and to support us in striving for better, safer, more efficient levels of performance.
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Guiding Principles
A number of principles have informed the development of the strategy. They point towards how we believe ATM safety should be managed in future. These need to be embedded within the ATM industry to enable it to achieve safe and efficient operations in the future.

1 Cultivate a culture of curiosity & challenge
We must have a culture which supports questioning and which challenges complacency and the reliance on past success as a perceived guarantor of future safety. We continually ask "How did that happen?" not just about failures, but also about our successes. The understanding of normal operations will be as important to safe and efficient operations as learning from failure. Normal day-to-day operations are seen as opportunities to learn just as much as incidents. The investigation procedure changes to an analysis process with all levels of the organisation involved and learning openly shared.

2 People are our strength, not our weakness
The human in the ATM system has a key role in ensuring the safety of the operations. Human decisions can only be understood in the context in which they are taken. Human error is not a cause but a symptom. Competence in every role is essential to sustaining reliable and safe operations. We empower individuals and devolve responsibility, recognising experience and expertise. We ensure that training is relevant and provides the right knowledge and skills.

3 Performance measures are proactive and anticipate risk
We can no longer measure safety by simply counting incidents. We need to move from a model which relies overly on lagging indicators to a mixed model that also makes use of leading indicators. A model which uses measures that help us understand how mutually dependent functions in the ATM system can come together to create the opportunity for performance variation. Our measures must help us prepare and anticipate risks in all our operations and provide the capability for resilient operations, even when the risks are unknown and never conceived or experienced before. We no longer only use the past to inform the future and neither is safety only assured from past performance.

4 Failure and success come from the same source
Our safety model should reflect progressive safety thinking and must go beyond simplistic cause and effect, since the world is more complex than that. Our capacity to deliver a safe and efficient service depends on our ability to make performance adjustments and adapt to risks and critical situations. Incidents result from the consequences of our normal everyday actions when we cannot make these adjustments — and not simply from failures, broken components and a predictable sequence of events.

Our measures must help us prepare and anticipate risks in all our operations.
5  Safety is a value, not a competing priority
Safety is a product of our everyday activities and our performance. It needs to be integrated into our business processes and decision making. It must not be tacked on at the end. We must evolve from a view of service versus safety to service with safety.

6  Knowing when enough is enough
Our processes must support us in taking the right actions to address the right risks to achieve the right outcomes. But they must also tell us when to stop or give us the confidence to change direction. We must guard against gold-plating and look to make our management processes goal-based and flexible without necessarily prescribing the method to achieve it.

7  Beware of perverse incentives
We should use metrics and measures carefully and ensure that they drive the right behaviours, system outcomes and performance. We need to communicate our values and goals so that when we use targets they are set at the right level in the organisation. We verify not only that the necessary activities are being executed but also that the expected outcome is being achieved.

8  Make it safe rather than prove it is safe
We embed safety by design principles in our project lifecycle to deliver optimum safety benefit from projects. We understand that good engineering helps create good safety, we use detailed risk models and quantitative requirements appropriately and make better use of expert judgement. We adopt a progressive approach to what delivers safety which does not assume, suppose or resort to safety by numbers.

9  Do not just blindly ‘do’ safety
Through training, we provide the workforce with the capability to make these principles real, to progress from the service versus safety view, evolving, over time, to a company ethos of service delivered safely. We extend the benefits of the human contribution to safe operations to everyone, not just those in the front line.

Competence in every role is essential to sustaining reliable and safe operations.

“Taking the right actions to address the right risks to achieve the right outcomes.”
Tell us what you think
We are seeking your comments, insights and thoughts on the strategy.

We are seeking your views on:
• how this strategy is understood and the language it uses;
• whether it makes you stop and think about safety in a different way;
• what do the 4 themes mean for you;
• how it might affect you in your area of the organisation;
• if it is challenging enough and promotes innovation; and
• whether you support its principles.

We have purposefully not set out the full implementation plan here. We have chosen to set out the strategy as a catalyst for change and hope that by stating the problem and by posing the question, we can gain your engagement to help deliver the next step in safety performance.

Our expectation is that this strategy will continue to evolve to reflect your comments, ideas and suggestions. A detailed Safety Plan is being developed which will describe the activities which will deliver the tactical and strategic changes which the strategy describes. However, it is only by working together and engaging with the entire organisation that we will be able to deliver the NATS Safety Strategy.

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