



WHITE PAPER

NOTAMs outage is latest sign of the need to accelerate FAA's NextGen modernization

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NOTAMs outage is an opportunity for a strategic reset to accelerate NextGen

On January 10, 2023, a major disruption to the Federal Aviation Administration's (FAA's) Notice to Air Missions (NOTAMs) system caused the first National Airspace System (NAS) ground stop since 9/11. As a result, more than 1,000 flights were cancelled and nearly 10,000 flights were delayed.

The NOTAMs system and related air traffic systems are decades old. The FAA has been actively deploying new capabilities and technologies to upgrade to the NextGen Air Transportation System (NextGen) since 2008. However, the NextGen modernization has faced several delays, pushing the timeframe for delivery past its 2030 target.

Increasing pressure to stabilize outdated systems following the NOTAMs outage may further delay NextGen modernization and the FAA's reliance on outdated systems, increasing the risk of future outages in a cycle of negative reinforcement.

Accelerating NextGen modernization requires a strategic reset

The NOTAMs outage was a symptom of a broader issue – the current pace of the NextGen modernization is not sufficient to mitigate stabilization risks, nor to keep pace with technological innovation.

Our experience with large-scale, multi-year modernization programs in the public and private sectors indicates that accelerating the FAA's NextGen modernization requires a strategic assessment to identify and address existing or potential barriers which may include:

- Validating the NextGen end-state vision to capture a compelling case for change, reflect current and projected FAA operational demands, and size the cost of underfunding
- Reviewing priority activities and securing sufficient funding to accelerate NextGen delivery
- Strengthening the link between the FAA's operating model and technical solutions to support ongoing NAS operations, leverage synergies, and accelerate NextGen modernization
- Amplify FAA leadership influence across the complex stakeholder landscape to communicate the cost-benefit analysis for funding and syndicate the case for change to drive deliberate outcomes

Four criteria for strategic assessments of multi-year modernizations

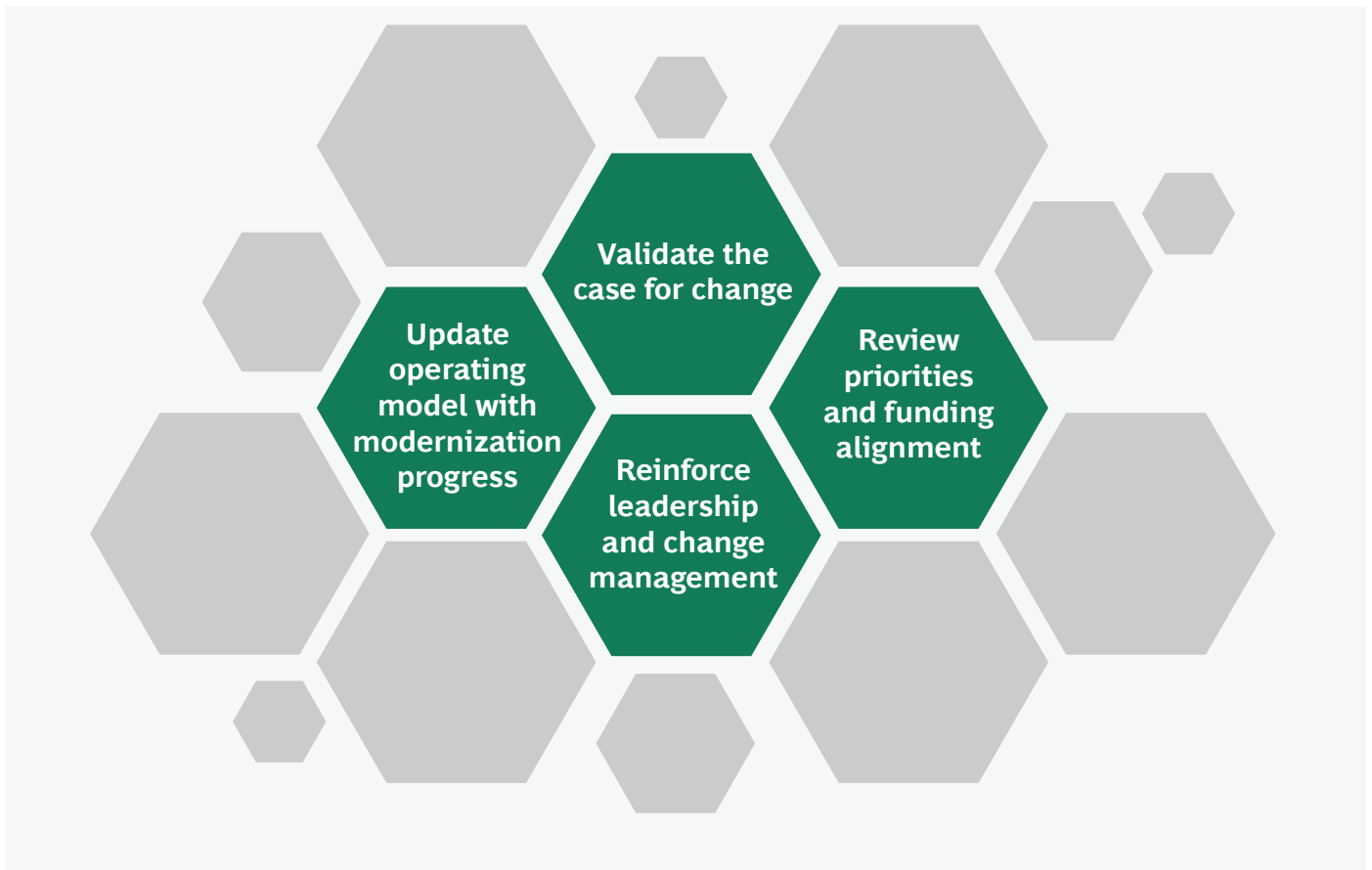


Figure 1. Assessment activities can help reset and accelerate complex, multi-year modernizations

ATO faces bifurcated mission and complex stakeholder landscape

Within the FAA, the Air Traffic Organization (ATO) has inherent responsibility for delivering the majority of NextGen technologies and capabilities while also ensuring daily execution. Yet, the ATO's bifurcated mission and the FAA's complex stakeholder landscape are two factors that have contributed to NextGen modernization delays. While the FAA cannot change these factors, it can adopt strategies from public and private sector organizations that have successfully reset their IT modernization programs under similar circumstances while concurrently building a perspective to inform Congress on alternative organizational models.

Supporting day-to-day operations and delivering long-term strategic program

The ATO developed its core capabilities to provide air traffic navigation services. More recently, the ATO took on NextGen to modernize air traffic systems. Executing both ATO missions – (1) the day-to-day operations of navigation services, and (2) the multi-year delivery of the strategic NextGen modernization – has increased demands on the ATO, especially as these missions operate on different timescales, require distinct capabilities, benefit from tailored ways of working, and may compete for resources and management attention.

Our experience indicates that most organizations faced with both “run” and “change” missions prioritize day-to-day operations over multi-year strategic modernization programs. This is especially true in the federal government, which is often risk averse in the short-term and lacks access to flexible funding for longer-term strategic priorities based on ROI.

Coordinating input and support from a complex stakeholder landscape

The FAA must coordinate input and support from a complex landscape of internal and external stakeholders to assess the NextGen modernization, especially after the NOTAMs outage has attracted an increased level of interest and scrutiny.

FAA leadership must coordinate with Congress, federal government departments and agencies, the airline industry, labor & trade unions, international partners, and other commercial partners to regularly assess the NextGen modernization’s direction and priorities, especially in response to emerging risks and new technology trends.

A renewed sense of urgency following the NOTAMs outage is an opportunity for the FAA to inform stakeholders on how best to interface and provide feedback. It also presents an opportunity for the FAA to assess its own decentralized operating model across five disparate lines of business. Such an assessment can help the FAA evaluate its readiness posture to effectively receive and leverage an increase in feedback and industry partner support.

Now is also the time to capitalize on a significant opportunity to align funding support through the upcoming FAA reauthorization bill. Congress should ensure adequate funding and interagency support between the FAA, DOT, and international civil aviation authorities to ensure that the FAA sets the standard for global aviation safety and the development of international aviation practices.

FAA has a uniquely complex web of competing stakeholders



Four strategies to assess multi-year modernization programs

As the dust settles on the initial response effort following the NOTAMS outage, the FAA can leverage this disruptive momentum to address broader issues in NextGen. The FAA can draw on experience from other organizations to inform its approach to accelerate its modernization. Below, we describe four pragmatic strategies we see in private and public sector organizations that reset their modernization programs following an outage or other destabilization event.

1 Validate the end-state vision for NextGen modernization

Delays and disruptions events can seed a lack of confidence around the end-state vision for a modernization program, especially when the vision does not appear compatible with current realities. In this instance, the vision must capture a compelling case for change, ensure it reflects both current and projected FAA operational demands and can size the risk of underfunding.

An organization responding to an outage or other destabilizing event must assess broader risks to operational resilience – beyond the root cause of the outage – to proactively address risks and inform its strategic direction. The risk assessment should also evaluate the age of and interdependency of systems to highlight areas at increased risk for “black swan” events.

Multi-year programs must deliberately evolve their end-state vision to incorporate new technologies, or the program risks being outdated or obsolete by the time it is delivered. External stakeholder engagement is critical to identify cutting-edge innovations and ensure that industry is prepared to use the program’s target capabilities and technologies.

2 Review priority activities and secure funding to accelerate NextGen delivery

A clear and compelling strategic direction is imperative to prioritize ROI and drive support for incremental investment. Before requesting incremental investment, an organization must make tough decisions to ensure resources are aligned against its most critical priorities. This involves determining what programmatic activities should be started, continued, and (most importantly) stopped.

An organization can also prioritize the delivery of capabilities and technologies that deliver quick savings in the near-term, thus helping to “fund the journey”. This reprioritization may include rebalancing funding between “run” (operation of outdated IT systems) and “change” (modernization program) activities – e.g., from an 80% to 20% split to a 60% to 40% split to accelerate modernization.

Budget plans and requests for incremental investments must be clearly communicated within the context of the articulated end-vision. Often, organizations fail to secure incremental investment for modernization because they do not make a clear case for why the funding is necessary (including leveraging external stakeholder voices to amplify the need), or they do not sufficiently convince decision makers that they are prepared to effectively deploy additional funding with the right plan, capabilities, structures, or performance measurements in place.

NextGen modernization accelerates if strategically aligned to broader digital transformation efforts across the transportation infrastructure. As mobility data continues to proliferate, data analytics offer significant opportunities for multi-agency transportation use to increase forecasting accuracy, improve risk mitigation, and enable agile decision-making.

3 Strengthen the FAA’s operating model to both strengthen support for NAS operations and accelerate NextGen

Most organizations understand they do not have the right ways of working, roles and responsibilities, governance processes, or support functions to deliver a multi-year modernization at the program’s outset, and they design operating model changes to address these gaps.

For example, modernization programs require new capabilities, such as financial oversight, change management, strategic communications, contractor management, and metrics tracking. Governance and decision-making processes in modernization programs must be streamlined to address emerging challenges, and roles and responsibilities must incorporate additional external stakeholders.

Similarly, the operating model from a multi-year program’s outset is rarely the optimal approach over a decade into the program, especially if the program is under new pressure due to delays or outages. Organizations must update and strengthen their capabilities, structures, and processes to effectively deliver a multi-year modernization without impeding day-to-day operations.

4 Amplify FAA leadership influence across the complex stakeholder landscape with rigorous cost benefit analysis for funding and a syndicated case for change

An organization must actively coordinate with stakeholders to collect input, channel support, and build consensus and trust to drive deliberate outcomes in a modernization program. As multi-year programs progress, some organizations shut the door on partners that are invested in and concerned about the program. This shift towards a “culture of negative interaction” with stakeholders is neither productive nor sustainable.

Instead, organizations must invite and lead stakeholder engagement at every step of the process to drive a modernization program. For example, stakeholders should help reimagine the program’s strategic end-vision based on their most pressing use cases and technology innovations (e.g., incorporate decision science or shift to cloud technologies); determine which capabilities and technologies should be prioritized (e.g., what activities to stop or deprioritize because industry is not prepared to adopt or it does not create enough value); champion the case for incremental investments (e.g., amplify need to accelerate progress through government affairs teams), and support program delivery against target timeframes and milestones.

To promote efficient engagement, organizations can set clear expectations for stakeholders to coordinate among themselves and develop unified proposals and perspectives (i.e., “speak with one voice”), where possible. Additionally, organizations should be open to new models and approaches to public-private partnerships to where they can support progress.

Case studies of organizations that successfully reset modernization

Organizations in the public and private sectors are facing similar challenges with their modernization programs. The FAA can look to examples of organizations that successfully reset their modernization programs to inform its next steps.

Typical digital transformations focus on systems, processes, and user journeys, while only achieving transformation success 30% of the time. Conversely, a holistic, innovation-focused approach that considers changes to business- and operating- models, digital ecosystems, and new ventures or applications has seen success rates of ~80%. Examination of 70 digital transformations and surveying 825 VPs and CxOs has revealed six success factors are critical to getting the holistic, innovation-focused approach right:

- 1** An integrated strategy with clear transformation goals that describe the 'why', 'what', and 'how' tied to targeted outcomes
- 2** Leadership commitment from the senior executive through middle management that aligns the level of engagement, and priorities to ensure strong ownership and accountability to outcomes
- 3** Deploying high-caliber talent to champion the change effort and drive transformation
- 4** An Agile governance mindset that drives broader adoption, can address roadblocks quickly, coordinates adaption to changing contexts, and drives cross-functional, fail fast-and-learn behavioral change
- 5** Effective monitoring of progress towards defined outcomes that uses clear metrics and targets around process and outcomes, supported by high data availability
- 6** Acceptance of mission-led modular technology & data platform to enable secure, scalable performance, rapid change deployment, and seamless ecosystem integration

Source: Key Success Factors in Digital Transformations, BCG research report, September 2020

Case study 1: USPTO established a stabilization program and reset modernization programs after patent application system outage

The US Patent and Trademark Office's (USPTO's) Patent Application Locating and Monitoring (PALM) system is the automated data management system that retrieves and updates computer records for patent applications. It is at the center of the global intellectual property ecosystem. On August 15, 2018, PALM experienced an issue during maintenance and was taken offline for eight days, impacting an additional four patent and trademark systems.

USPTO recognized that the outage was a symptom of both IT and organizational issues. USPTO was seven years into a multi-year modernization program; however, competing priorities between “running” and “changing” its core IT systems drove delays in delivering new systems and retiring legacy systems.

USPTO leadership designed a new IT roadmap to prioritize the backlog of IT investments based on ROI. In tandem, they overhauled its digital operating model with Agile teams and improved procurement processes to accelerate software development. Throughout this process, USPTO actively sought input and support from Department of Commerce leadership, the Office of Management and Budget, patent and trademark lawyers, and relevant industry players.

Case study 2: Wells Fargo reset modernization program and strengthened digital service availability after data center outage

Wells Fargo is responsible for ~70M bank accounts. On February 7, 2019, Wells Fargo experienced an outage at a single data center that disrupted customer-facing applications across a variety of platforms. This outage led to increased regulatory scrutiny of underlying data, system architecture, and security vulnerabilities, as well as considerable damage to customer trust and loyalty.

Wells Fargo's leadership recognized this outage was a symptom of more significant, macro-issues with legacy IT systems, decision-making processes, and talent organization. Wells Fargo established a Steering Committee to focus attention and streamline decision-making to reset ongoing modernization efforts. Additionally, they achieved ‘quick wins’ by establishing Agile “SWAT” teams to address critical system vulnerabilities and deliver priority capabilities.

Leadership celebrated early progress from these Agile “SWAT” teams and conducted regular Ready, Willing, and Able (RWA) surveys to drive internal support for a widespread shift to Agile ways of working and provide additional training and encouragement, where needed. This deliberate change management program helped build momentum for sustained progress against modernization objectives.

Next steps in accelerating modernization

The NOTAMS outage was a “black swan” event that underscores the need to go beyond a rigorous root cause analysis and conduct a full strategic assessment of the NextGen ATM modernization. A full risk profile can help the FAA to not only prevent further disruption, but also establish a data-driven case for change and additional funding.

The path forward can build on existing momentum from ongoing technology initiatives and strive for a credible evolution that will enable the NAS to incorporate beyond line-of-sight innovation. In this manner, the FAA needs to go beyond “get well” and instead push to “get ahead” with a bold and detailed plan for implementation.

Finally, the vast set of FAA stakeholders can either be an asset or a diversion depending on the strategy used to engage them. Now is the time to systematically energize the broad stakeholder landscape to build support for change, resources, and accelerated modernization.

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