NOAA Information Resources Management Strategic Plan

2021 - 2025

National Oceanic and Atmospheric Administration

U. S. Department of Commerce

NOAA IRM Strategic Plan 2021-2025

Approved - February 2021

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Introduction from the CIO

Every day, the people of NOAA are diligently advancing our mission of science, service, and stewardship, and this work is empowered by our NOAA Information Technology (IT) community. On behalf of the NOAA CIO Council, I am pleased to present this five-year Information Resources Management (IRM) Strategic Plan that outlines the ways in which NOAA IT will deliver the vision, services, security, and people to empower NOAA's multi-faceted missions.

Increasingly, technology and data are integrated into all aspects of our lives, including throughout the work of the Federal Government. This makes the business of managing IT more complex than ever before. As we navigate to the future horizon of this Strategic Plan, we embrace technology as a force of change, and IT leaders as change agents.

Throughout this Plan, you will find data addressed as a prominent success factor. NOAA has a duty to collect, steward, and deliver data and information effectively, efficiently, and securely. The customers for this data include NOAA employees and contractors, federal partners, research institutions, private industry, and ultimately to the American People. We are making swift progress defining the enterprise data governance, security, and forward-looking management policies that will unlock the full potential of this data.

Collaboration was an essential ingredient to writing this Strategic Plan, and it will be essential to successful implementation over the lifetime of this Plan. I want to thank the more than 350 people across NOAA who collaborated to review early drafts of this document. This Strategic Plan is designed to align with and empower the Department of Commerce Strategic Plan, NOAA mission Line Office Strategic Plans, and the NOAA Science & Technology (S&T) Strategies.

NOAA has a wide variety of missions, from the surface of the sun to the depths of the ocean. Our vision is to empower the use of data, and to provide IT tools and services, in a way that is as seamless as the Earth's ecosystem itself. In addition to the seamlessness of the Earth system, the binding element for NOAA is data: we all rely upon data to power our missions. In this ecosystem, no one element exists on its own; the complex interactions and dependencies are what makes it so fascinating, and so powerful. I think our approach to IT would benefit from an ecosystem approach, breaking down silos, collaborating extensively, and sharing tools, data, and information so that we can all serve NOAA's missions even more effectively.

This IRM Strategic Plan 2021-2025 was written to guide the IT tools, capabilities, and workforce that NOAA will need to achieve our mission in the next five years, and beyond. Thank you for being a part of this important work.

Zachary G. Goldstein
NOAA Chief Information Officer &
Director, High Performance Computing & Communications

Executive Summary

NOAA Mission

Science, Service and Stewardship

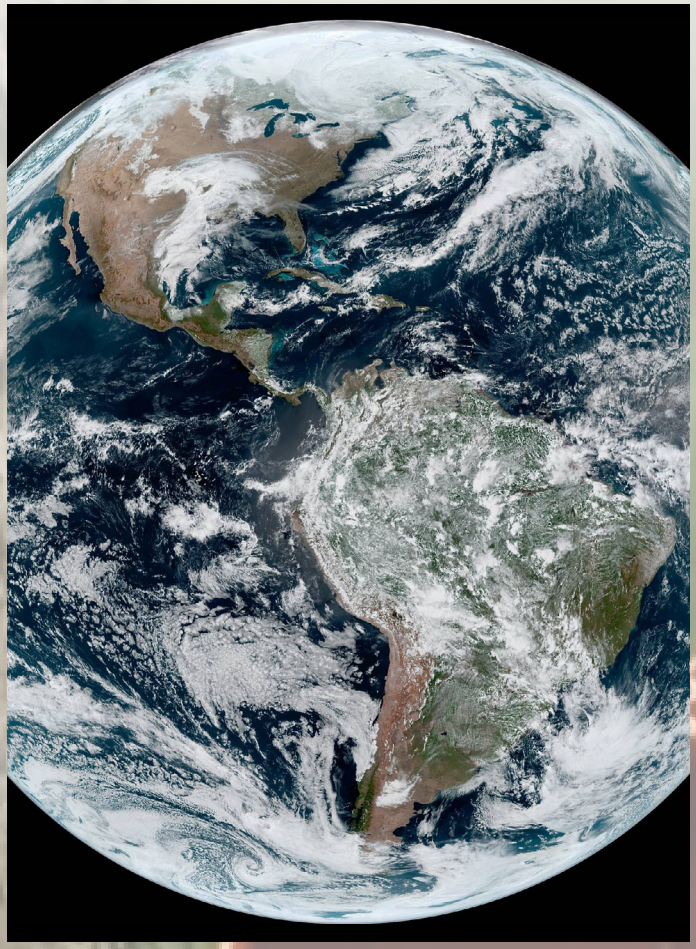
NOAA's mission is to understand and predict changes in climate, weather, oceans, and coasts; to share that knowledge and information with others; and to conserve and manage coastal and marine ecosystems and resources

NOAA IT Mission

To deliver information technology services that enable the operations and functions of NOAA

NOAA IT Vision

IT empowers NOAA missions as a strategic partner, and customers trust the IT community to deliver fast, reliable, and quality solutions



Goal 1: Promote Our People Who Make the Mission Possible

1.1 Establish diversity and inclusion as essential factors in mission and workforce success

1.2 Implement full-lifecycle workforce management

1.3 Prepare an IT and data literate workforce

Goal 2: Propel the Mission

2.1 Drive technology-enabled transformation of research into operational products and services

2.2 Invest in IT innovation and modernization

2.3 Empower the use of data across NOAA

Goal 3: Protect the Mission

3.1 Continuously mature NOAA cyber security posture and techniques

3.2 Ensure the security of NOAA networks, systems, and data

3.3 Secure NOAA's access to required radio-frequency spectrum

Goal 4: Deliver Customer-Centric Service Excellence

4.1 Develop strategic relationships with customers and partners

4.2 Deliver quality products and services sought by customers

4.3 Continuously improve the delivery of technology, data, and information services

Goal 5: Optimize for Maximum NOAA Value

5.1 Support transparent, collaborative investment management

5.2 Enable stewardship of NOAA's data as a strategic asset

5.3 Organize shared services for quality, efficiency, and cost-effectiveness

5.4 Increase effectiveness in IT program and project management

Purpose

This Information Resources Management (IRM) Strategic Plan was designed to support NOAA's mission and strategic direction, including the NOAA Science & Technology (S&T) Strategies, which in turn are aligned with the Department of Commerce Strategic Plan.

This IRM Strategic Plan will be a tool to NOAA, guiding the direction, mission alignment, investment planning, workforce management, and accountability of NOAA's Information Technology (IT) community. Over the next five years, the outcome of this Plan will maximize the value of IT to NOAA's missions, partners, workforce, and the American people.

As part of the Clinger-Cohen Act of 1996, in Title 44 Section 3506(b)(2) of the United States Code, the CIO is required to develop an IRM Strategic Plan. This Plan is designed to fulfill this mandate, and is intended to actively guide NOAA IT through annual strategy reviews by CIO Council, with updates published as appropriate.

Principles

As this Strategic Plan was developed, a few cross-cutting principles emerged that address both mission IT and enterprise infrastructure IT, and that are universal to the way NOAA achieves its IT mission and vision.

- **Integration:** For IT management to be most effective, systems and processes should be integrated and teams should be constantly collaborating and communicating.
- **Customer-focus:** Our customers, employees, and consumers of NOAA information expect high-quality, reliable IT tools and services that are designed, operated, and maintained with users at the center.
- **Funding innovation through efficient shared services:** The more NOAA can benefit from the economies of scale and cost management provided by a modernized enterprise infrastructure IT, the more we can dedicate resources to mission IT and innovation.
- **High utility cloud:** NOAA is migrating, operating, and building in the cloud at unprecedented levels. NOAA's approach, which aligns to the Federal Cloud Smart Strategy, includes both public and private cloud use, and hybrid cloud models. Our systems, platforms, and security must be ready to empower a near-future state where a unified approach to cloud empowers NOAA across our missions.
- **Continuous improvement & agile processes:** We must adapt and deliver IT at the speed of American innovation. This means NOAA's IT will embrace agile and iterative frameworks, and will seek optimum utility and continuous improvement throughout the lifecycle.

NOAA's IRM Strategic Planning Cycle

NOAA's IRM Strategic Plan serves as the Agency's IT strategy, and is sponsored by the Office of the Chief Information Officer (OCIO). At the NOAA enterprise level, IT is managed in OCIO. Each of NOAA's six mission Line Offices (LOs) has an Assistant Chief Information Officer (ACIO) guiding mission-specific IT needs. NOAA CIO and the ACIOs comprise the CIO Council, as NOAA's IT governing body. The CIO Council plays a key role in ensuring that this strategy speaks to all NOAA missions, empowers NOAA's business functions, and addresses the full NOAA IT workforce so that they, in turn, can deliver IT tools and services to enable all NOAA employees.

The CIO Council also guides the successful implementation of this Strategic Plan by setting priorities, creating initiatives and measuring progress. The Council evaluates the IRM Strategic Plan and its Objectives and Key Results (OKRs) annually at strategy workshops. CIO Council members can add agenda items throughout the year calling for a review and discussion of strategy points to ensure responsiveness to emerging trends.

Technology in our modern world is rapidly evolving, and NOAA's IT strategy must be ready to adapt to new challenges and opportunities. On a biannual basis, OCIO leads a full strategy review and progress check to ensure that this IRM Strategic Plan continues to point NOAA's IT in a direction that 1) aligns with Agency leadership and mission priorities, 2) accurately reflects Agency activities, and 3) encompasses modern technology frameworks, tools, and best practices. This biannual review may result in edits to the IRM Strategic Plan, in a process led by OCIO, validated by CIO Council, and signed by the CIO. Any updated documents will be published and shared across NOAA and with the American People.

Goal 1: Promote Our People Who Make the Mission Possible

"People first, mission always," is a famous motto in American leadership. Inspired by this perspective, NOAA's IT strategy begins with people.

The full NOAA IT workforce includes 1,000+ federal IT Specialist employees, plus our workforce partners, including contractors and grantees. In our increasingly technology- and information-driven modern world, every worker across NOAA interacts with IT to achieve our missions. NOAA should have the best, most capable IT workforce; a workforce as diverse as America, included in determining our path forward, and inspired by NOAA's mission.

To reach the vision defined in this Strategic Goal, we must invest in our IT workforce, and improve our employee experience (EX). We will also need to change some of the ways we currently manage our workforce, and evolve our understanding of how people across NOAA interact with technology. An ever-evolving threat landscape means that our workforce culture must embrace the understanding that IT security is everyone's job. Partnership with NOAA's Office of Human Capital Services (OHCS) and with the NOAA Civil Rights Office (CRO) will be essential to achieving this success. This IRM Strategic Goal aligns with and is expanded by the NOAA IT Workforce Strategic Plan.

We must shape the NOAA IT workforce of the future so that they can support the success of the other Goals advanced in this Strategic Plan. We envision NOAA's IT professionals as mission-enabling partners and ambassadors for the skills and knowledge that will be needed across NOAA as technology and information take on an ever-growing role in our mission work. This success must be led, and can only be achieved, by our most valuable asset: our people.

Objective 1.1 Establish diversity & inclusion as essential factors in mission and workforce success

Diverse perspectives lead to innovation and we must work to represent diversity in our own teams, so that we are able to address the diverse needs of our technology customers, our mission partners, and ultimately of the American people whom we serve. We must proactively seek out ways to include diverse perspectives. Inclusion will empower our strategic imperatives for innovation, security, service, and value.

To achieve this Objective, diversity should be represented across factors including but not limited to: inherent qualities such as ethnicity, gender, and generation, as well as acquired qualities such as experience. To grow diversity across the NOAA IT Workforce, we will ensure diversity in hiring pools, and we will pay particular attention to increasing diversity among managers and supervisors. Recruiting and nurturing tomorrow's leaders will ensure the future success of this strategic Objective. Accessibility is an important component of inclusion, ensuring that people are empowered to engage with NOAA's technology and information.

Success in this Objective will require an honest assessment of our current performance. We know that good intentions alone will not be enough to address structural inequalities; we are dedicated to redesigning our internal structures, systems, and processes to ensure equity, diversity, and inclusion, and we hold ourselves accountable for actions that will measurably improve these outcomes.

Objective 1.2 Implement full life-cycle workforce management

In the face of rapidly evolving technologies, our workforce must be empowered to meet tomorrow's challenges. This means recruiting top talent, retaining these workers, and preparing them with the skills, knowledge, and tools they will need for the future.

We want to deliver a positive EX from the moment an individual aspires to join the NOAA workforce through the celebration of their retirement. Each worker has the potential to contribute tremendous advancements to NOAA missions between those milestones. Therefore, our workforce strategy must aim to retain great people today and reskill workers for tomorrow. To achieve this Objective, NOAA will require an evolving curriculum of professional education and ongoing training programs to ensure our workforce is ready for the future.

NOAA will need to invest in training to build a workforce capable of delivering IT solutions across the full breadth of NOAA's missions, for the 5-year horizon of this Strategic Plan and into the future. Specifically, NOAA will need a trained cadre of IT system engineers to support mission and business decisions and provide IT leadership across the value chain. An important tool for success in this Objective will be to create and apply competency models for current and future employees. These models will set the bar for the various IT competencies that are required to achieve NOAA's complex missions. Most importantly, these competency models will support an excellent EX, improving satisfaction and performance while clearly defining paths for career success and fulfilling this strategic Objective to attract and retain top talent.

Objective 1.3 Prepare an IT and data literate workforce

All of NOAA's workforce and mission partners should be empowered to take full advantage of available technologies, information, and data. In addition to having the right hardware, software, and infrastructure, this means having the skills and mindsets to make the most of those tools. Data science and data engineering should be identified as a critical competency for NOAA's future mission success.

This Objective calls for IT and data literacy and training: understanding the capabilities enabled by technology, so our users enjoy a great digital experience as they deliver value to NOAA's missions and to the American People. We want our employees to innovate and make smart choices in their selection and application of IT and data, and for our partners and customers to be informed and empowered as users and recipients of NOAA's technology and data products. Supporting this training across the NOAA enterprise, all employees engage in annual cyber security training, as well as safety and continuity training to keep our workforce safe and productive. In accordance with the IT Workforce Strategic Plan, we will expand our training programs in Project Management (also supporting Objective 5.4 in this Strategic Plan), Contracting Officer's Representative (COR) & Technical Monitoring, and other soft skills.

NOAA's Data Strategy calls for "investing in training, tools, communities, and other opportunities to expand capacity for critical data-related activities such as analysis and evaluation, data management, and privacy protection." As we grow in our use of big data, cloud-based high performance computing (HPC), and artificial intelligence (AI) applications, this investment in our people, and their value to NOAA's mission outputs, becomes even more important.

Key Results

» Support a full-time mobile workforce by providing secure and always accessible remote access to information, devices, and tools across NOAA by FY25

» Expand the NOAA IT Fellowship Program to 25 IT Fellow billets, with a strategy to connect this Program to succession planning, across NOAA by FY23

Goal 2: Propel the Mission

Our NOAA information and technology exists to serve our Agency mission. Technology must be mission-enabling, never a barrier to progress. We require modern, innovative technology to support the frontiers of NOAA's science and research, in addition to our IT systems and tools that establish a reliable, efficient, and secure enterprise infrastructure. At all times, NOAA's IT should be engaged in conversation with mission leaders to ensure our technology understands mission needs and is prepared to support mission activities in a way that is secure and architecturally aligned.

Just as technology is integrated into almost every aspect of our modern lives, today NOAA's IT is much more than traditional hardware, software, and network pipelines. NOAA's Science & Technology (S&T) Focus Areas have defined pathways to future success with a NOAA Cloud Strategy and Data Strategy, as well as Strategic Plans for applied areas including Artificial Intelligence (AI), 'Omics, Uncrewed Systems (UxS), and Citizen Science.

NOAA has been applying cloud-based technologies for more than a decade, but recent years have seen us bringing our mission to the cloud at unprecedented rates. We have demonstrated that we can execute truly innovative work, including high performance computing and research, in the cloud. We envision that this move to cloud will continue, and that over time all NOAA work that can be cloud-based, will be. Our IT solutions should anticipate this high-utility cloud state, supporting mission success with enterprise architecture, security, and processes to help NOAA missions succeed in the cloud.

Objective 2.1 Drive technology-enabled transformation of research into operational products and services

As a science-based service Agency, we achieve our mission when we apply NOAA's world class research to operational actions that protect life and property, promote economic vitality, and facilitate the stewardship of our environmental resources. Our technology should accelerate the entire research-to-operations (R2O - O2R) cycle. The scientists leading NOAA's research and development (R&D) are advancing science and technical capabilities to support the future demands of our mission. Key programs such as the Earth Prediction Innovation Center (EPIC) require success in this strategic Objective. The NOAA IT community has a responsibility to make sure our Agency technology is prepared for this future state, achieving the goals defined by the NOAA S&T Strategies and empowering NOAA to sustainably expand the American Blue Economy.

Success in this Objective will require long-term collaboration and multi-year investments, which provide full-lifecycle funding. We will need to apply technology and data across the R2O cycle, from early requirements and project definition, to facilitating gates and transitions, to prototyping, and ultimately to application and operations. The increased use of automation can improve our R2O transitions. More broadly, improved processes and streamlined administration can propel the mission by removing barriers so that everyone, especially researchers, has more time to focus on science. Technology to easily share software and software engineering efficiency advances is critical to facilitating the entire research-to-operations (R2O - O2R) cycle. The IT community must work closely with NOAA scientists to harness collective advancements, support agile and innovative approaches to testing applied research design, and to strategically manage IT investments to optimize cost-benefit ratios.

One of our most powerful tools in R2O is NOAA High Performance Computing (HPC). HPC is defined in NAO-216-110 as the unified system for solving NOAA's largest computational problems, composed of supercomputer systems and associated communications, analysis, visualization and storage systems, and application and systems software with all components well integrated and linked over a high speed network. NOAA manages and operates major investments for operational and R&D HPC. The combination of our strategic migration to the Cloud, together with exponentially increasing processing demands, calls for an extraordinary level of HPC innovation and application. We will be ready to meet these challenges with world class IT solutions that advance NOAA's mission.

Objective 2.2 Invest in IT innovation and accelerate modernization

NOAA works to support the strategic imperatives in federal IT calling for innovative IT capabilities and modernized IT systems. This involves increasing the application of cutting-edge technologies, as well as improving and adapting our legacy enterprise IT. The IT community must work closely with our customers and partners in identifying and retiring older technologies, products, and services while supporting the business case for new investments. Improved innovation and modernization also mitigates cyber security risks. Success in this Objective will empower the NOAA's S&T Strategies' focus on innovation, including 'Omics, artificial intelligence, and machine learning.

Innovation must be supported by analyzing technology trends, providing long term funding models, and removing barriers to implementation. IT modernization depends on continual research into the latest capabilities that technology can offer our programs. This means that NOAA cannot be static in its technology decisions and must continually look to improve and evolve solutions. Strategic decisions on the use of technology like cloud or AI are not one-time, but rather adaptive, being routinely revisited and updated, as called for in Objective 4.3 of this Strategic Plan.

As technology changes, resources need to be made available on a consistent basis and not depend on year-to-year, project-by-project resourcing. Budgets must make an effort to identify funding streams that support changing technologies to accomplish the mission rather than single investments. For example, in some areas a strategic transition from CapEx (large one time expenditures) to OpEx (smaller recurring expenditures) funding models may be appropriate. In other areas it might be more efficient to buy a technology once and reuse it across multiple applications.

Finally, to successfully support the implementation of innovative technology, business processes should be streamlined to give programs additional flexibility in the development of new solutions. This calls for continuing to balance innovation in risk management, as well as advancing innovation by providing additional means for experimenting that do not impact the security of operational systems. Streamlined processes for technology acquisition, software development, and R2X (Research to Operations/Commercialization/Application/Services) transition are needed to support innovative approaches and solutions.

Objective 2.3 Empower the use of data across NOAA

NOAA's complex missions require better data, more data, and improved data management capabilities. To meet these challenges, we will need to build enterprise data management capabilities and governance structures, increase compute power, and optimize our ability to share data and information. Data sharing and the management of comprehensive data inventories should be guided by the Open, Public, Electronic and Necessary Government Data Act (commonly known as the OPEN Data Act), with an approach that promotes openness and interoperability and that safeguards information systems and information. Success in this Objective will deliver value across NOAA, to our mission partners in research and the private sectors, and to the American people.

With NOAA's Data Strategy as a guide, and referencing all the NOAA S&T Strategies, we must break down silos both in our practical data management and with our cultural approach to data. NOAA is already making great strides in governance, management, analytics tools, and collaboration capabilities. Key programs including the NOAA Big Data Project (BDP) and EPIC will rely on an unprecedented level of data empowered across NOAA. All of this work requires increased investment, establishing data science as an essential IT and mission success factor.

Key Results

» Accelerate community-developed scientific and technological enhancements into the operational applications for numerical weather prediction via EPIC by FY24

» Implement an integrated Research to Operations (R2O - O2R) enterprise linking research, development, demonstration, and deployment that is efficient and effective in identifying and using significant new IT R&D products to meet NOAA's mission needs by FY24

» Employ cutting-edge innovation and strategic academic and industry partnerships to demonstrate improvements in performance in satellite data and information products and services, numerical weather prediction, ocean models, and big data analysis, storage, and dissemination by FY23

Goal 3: Protect the Mission

We guard NOAA's data and IT assets in a dynamic threat landscape that is increasing in complexity every day. Protecting NOAA networks, systems, and data requires understanding and anticipating risks, and constantly improving our ability to defend against attacks. NOAA's leaders increasingly require better -- and more -- information to support risk-based decision making as they propel innovation and mission needs while ensuring security requirements. When it comes to effective IT, proactive risk management is everyone's job.

Our Agency's improvements are supported by guidance from the US Office of Management and Budget (OMB), US Congress, the US Department of Homeland Security (DHS), and the National Institute of Standards and Technology (NIST), particularly with regard to cyber security and enterprise risk management. As we fulfill FISMA and FITARA laws, our cyber security and IT investment and portfolio decisions are made with return-on-investment (ROI) driven business cases and cost transparency.

Objective 3.1 Continuously mature NOAA cyber security posture and techniques

The frequency, sophistication, and maliciousness of cyber attacks directed at NOAA are rapidly increasing. NOAA's IT footprint continues to expand. We have a duty to protect NOAA's IT and data by applying the best and most effective security measures. Those who seek to harm our systems are innovating their attacks constantly, and we must stay ahead of these techniques with our own defensive posture and methods.

With our increased use of distributed and mobile technologies, NOAA will apply methods from the federal Cloud Smart Strategy for safe and secure system and information access. Because collaboration, particularly with global research colleagues, is essential to NOAA's missions, we build security to empower safe partnerships. We will be continually improving our security processes and posture to enable secure collaboration. We will use advanced threat protection for early detection, strong defense, and effective response.

We acknowledge that even with the best technical tools and techniques, some of the most effective methods for modern cyber attacks do not come through hardware or systems, but through people. We will help guard NOAA against social engineering attacks through a robust Internal Risk Mitigation program that includes training across the Agency.

Objective 3.2 Ensure the security of NOAA networks, systems, and data

At the center of our mandate to protect NOAA's mission is the security of our IT and data, beginning with our Primary Mission Essential Functions (PMEFs). We guard against NOAA IT security compromises that threaten observation, ingest, processing, and dissemination capabilities. Functional risks can include lapsed data integrity, network failures, and website compromise. Solutions to mitigate these risks include designing redundancy of critical systems, ensuring backup, and eliminating single points of failure. To ensure the continuity of PMEFs, the Homeland Security Program Office (HSPO) plays a key coordination role with the NOAA IT community.

NOAA has been a leading bureau in the Department of Commerce for cyber security. We will build on this work and adapt to meet new challenges. This evolution will include transformation of NOAA Cyber Security Center services, continued roll-out of Continuous Diagnostics and Mitigation (CDM) for real time, threat-informed security, and implementation of the Zero Trust framework to secure increasingly cloud-based and mobile data and systems that fulfill NOAA's global mission needs.

As NOAA's cloud and mobile systems become increasingly complex, we must anticipate security requirements to protect the mission without slowing the mission down. This must be accomplished while empowering collaborative and secure data sharing outside of our security perimeters, including with foreign partners who are essential to the global scope of our climate, ocean, and weather research missions.

To ensure effective security, legacy architecture must be upgraded to protect the availability and integrity of mission data from unauthorized access. Increased adoption of enterprise security services decreases the effectiveness and impact of cyber attacks. We will at all times maintain our cyber hygiene and ensure a robust cyber security workforce.

Objective 3.3 Secure NOAA's access to required radiofrequency spectrum

Demand for radio spectrum by operators of high-capacity, mobile communications services such as 5G, the internet of things (IoT), self-driving vehicles, and drones has never been higher. NOAA benefits from advances in digital communications and must keep pace with these disruptive technologies to coexist with and leverage advances in wireless capabilities. NOAA must also secure the radio communications allocations and assignments, and the regulatory protections needed to operate its mission-critical, spectrum-dependent systems.

Updates in technology and policy related to radiofrequency spectrum management can have significant impacts on NOAA's missions. It remains a priority for NOAA's IT strategy to secure and protect the radiofrequency spectrum needs and to evolve our management and effectively address security and privacy risks.

Partnerships with US Government Agencies, such as the National Telecommunications and Information Administration (NTIA), as well as with global forums, including the International Telecommunication Union (ITU), will be essential to the success of this Objective.

Key Results

- Implement 100% of Internal Risk Mitigation best practices (i.e., policies, procedures, standards, controls) by FY24
- Deploy NOAA Cloud security standards on 100% of Cloud Service Provider instances by FY24
- Manage 100% of applicable NOAA endpoints through the NOAA BigFix solution by FY22
- Deploy DHS Trusted Internet Connections (TIC) 3.0 across 100% of NOAA locations by FY21

Goal 4: Deliver Customer-Centric Service Excellence

The IT organizations across NOAA deliver reliable, high-quality services and products around the globe, 24 hours a day, 7 days a week, 365 days a year to support NOAA missions. Customers seeking NOAA's technology services and NOAA data include the NOAA workforce, as well as mission partners including private industry, other US Government organizations, academia and research institutes. Ultimately, our customer is the American people.

There are opportunities to: increase trust in NOAA by improving the experience citizens and businesses have with our services across all delivery channels; transform the customer experience (CX) by improving the usability and reliability of our most critical digital services; and, create measurable improvements in customer satisfaction by using the principles and practices proven by leading private-sector organizations.

Fulfilling this Strategic Goal requires clearly identifying our customers and building robust relationships with them so that together we can advance NOAA's missions. These are ongoing conversations, requiring NOAA's IT service catalog and service delivery methods to evolve over time. We seek to put the customer's needs and the CX at the center of our IT product and service design. Success in this Goal will streamline the user experience, supporting informed IT choices based on mission requirements, getting customers what they need and unburdening them of the need for technical expertise.

As we measure excellence in meeting this strategic Goal, we will set benchmarks to evaluate our current performance. We will learn from best practices in industry and Government IT service management, including the CX Cross-Agency Priority (CAP) Goal in the 2018 President's Management Agenda, and set targets for performance improvements. And we will consistently engage with our customers to learn about their experiences, their service needs, and their satisfaction with NOAA's IT products and services.

Objective 4.1 Develop strategic relationships with customers and partners

We achieve our mission outcomes by working collaboratively with our customers and partners; we cannot achieve the full scope of NOAA's mission without them. Our IT tools and services should be designed with this value chain in mind. Achieving this strategic Objective will include defining business standards and effective service delivery methods, including relationships with suppliers to fulfill end-to-end service delivery.

NOAA's IT acquisition models, built on strategic sourcing and relationship management, create opportunities for cost efficiencies and economies of scale, as well as faster onramps, for IT procurement. Success in this strategic Objective will leverage the speed and adaptiveness of our customer and partner ecosystems, accelerating NOAA's ability to innovate. From our NOAA Mission Information Technology Services (NMITS) and Enterprise Infrastructure Solutions (EIS) contracts to our innovative partnership models in the Big Data Program (BDP) and the Enterprise Cloud Services Program, we continue to pursue maximum ROI with transparent investment management and careful stewardship of American taxpayer dollars.

Objective 4.2 Deliver quality products and services sought by customers

The NOAA IT Customer Experience (CX) Vision Statement calls for "[quality] products and services sought by [customers]." NOAA IT services, both in mission Line Offices and through the enterprise IT service catalog, will be responsive to customer needs. In many cases, NOAA's IT community serves customers as a trusted advisor or a broker for IT tools and services, facilitating business partnerships.

The NOAA IT community is aware of the increasing customer demand for NOAA's data. Frontline mission programs, including EPIC and BDP, support the management and delivery of NOAA's data so that it may be applied and consumed by researchers, private sector service providers, and by the American public. This service delivery of NOAA's data contributes value to the American Blue Economy through streamlined permitting, operational cost reductions, and applied insights.

To meet this strategic Objective, we are constantly communicating with customers, maturing our digital experience, improving service delivery processes, and measuring the quality of our tools and services against both internal performance metrics as well as external benchmarks and standards. Overall, our customer experience should be well-designed and efficient, fulfilling the CX CAP Goal identified in the President's Management Agenda.

Objective 4.3 Continuously improve the delivery of technology, data, and information services

Improved IT service delivery will empower NOAA missions, increase the productivity and efficiency of our workforce, and increase the security and reliability of NOAA data and technology tools and services. This ongoing testing and discovery is called for across the IT landscape, in addition to the investments in IT innovation and modernization called for in Objective 2.2. Continuous improvement should exist throughout NOAA's IT management cycle, from service design, investment review, customer service delivery, and evaluation. This ability to adapt our products and services, meeting the evolving needs of customers as they fulfill NOAA's missions, is called for in federal mandates including FITARA and the Digital Accountability and Transparency Act (commonly known as the DATA Act).

Areas in which NOAA's technology, data, and information services will benefit from continuous improvement include resilient and redundant systems, cloud adoption and optimization, automation, and increased mobile security to support NOAA's global mission. Automated processes, including AI applications, will be leveraged to improve digital experiences and to accelerate and streamline service delivery.

To achieve this Objective, NOAA will apply frameworks, including agile methodologies, incremental development, ITIL, and DevSecOps. Reliable, transparent, integrated business information will be needed for NOAA leadership to monitor the continuous improvement.

Key Results

- Increase the cumulative number of NOAA datasets made openly available to the public via Weather Enterprise and other environmental information partnership cloud platforms to 200 by FY22
- Fully deploy N-Wave as the OneNOAA Network by FY22

Goal 5: Optimize for Maximum NOAA Value

We must target our IT capabilities to empower NOAA's mission and business needs. By evolving our IT systems engineering capabilities and operating models, and clarifying their role in NOAA value chains, we optimize overall return-on-investment (ROI) and ensure the effective stewardship of taxpayer dollars. As we make great advances in our strategic use of data across the Agency, there is an opportunity to steward NOAA's authoritative data so that it stands ready to empower science both inside NOAA, through partnerships with researchers and businesses, and to the public at large.

NOAA's CIO Council and the Office of the Chief Information Officer (OCIO), in partnership with IT Program Managers and our Chief Financial Officer (CFO) colleagues, diligently manage our Agency's IT investments. We work to improve transparency, maximize cost savings, fulfill all review and reporting requirements for NOAA's increasingly complex IT investment portfolio.

The optimization efforts described above are guided by FITARA and are informed by NOAA's adoption of the OMB's Technology Business Management (TBM) and OMB's Capital Planning and Investment Control (CPIC) framework.

Objective 5.1 Support transparent, collaborative investment management

The full scope of NOAA's IT organization contains both mission-specific technologies as well as enterprise products and services. Because of the scope and complexity of NOAA's IT portfolio, the Agency benefits from coordinated, collaborative investment planning and management. Clear guidance and policies, facilitated by robust IT governance, ensure prudent stewardship of taxpayer dollars to meet evolving business needs.

IT investments should be ROI-driven and strategically sourced to ensure full-lifecycle scalability and flexibility. NOAA should seek efficiencies throughout end-to-end investment management, including beginning with streamlined acquisitions and maturing to cost-effective enterprise delivery where appropriate. Requirements for acquisitions should be based on insights from NOAA, partners, and customers' ecosystems.

Success in this Objective will require visibility into the right business intelligence data, the right tools to analyze this information, the right process and governance to maximize communication and transparency, and a workforce with the right skills to manage complex IT investments. Overall, we see a long-term trend for NOAA's IT from CapEx to OpEx, where we may invest less in maintenance and overhead, and dedicate resources to running our technology and data systems leveraging strategic partnerships, including cloud partners and other business partners.

Objective 5.2 Enable stewardship of NOAA's data as a strategic asset

NOAA works with data on a tremendous scale, with observing systems producing petabytes of data every day. The EPIC program will dramatically advance NOAA's numerical weather prediction capabilities. Across NOAA, scientific data has powerful applications that can create economic opportunity, mitigate climate- and weather-related losses, and preserve America's ecological resources. Researchers at all levels of Government, research partners who are academics and citizen scientists, and individuals and organizations in the public and private sectors all rely on NOAA as the authoritative source of environmental data. It is NOAA's responsibility to enable stewardship of this data as a strategic asset, one that can unlock enormous value to the American people.

As NOAA's missions and business continue to grow in scale, complexity, and data intensity, we must optimize our data management to empower access to and application of NOAA data. Guided by the Foundations for Evidence-Based Policymaking Act (commonly known as the Evidence Act) and the NOAA Data Strategy, our Agency is making great breakthroughs in enterprise data governance. And our innovative partnerships are allowing for unprecedented access to NOAA data in a way that simultaneously saves taxpayers potentially millions of dollars in egress and dissemination costs. Success in this Objective will require coordination across NOAA program offices, particularly with leaders in this area such as the National Centers for Environmental Information (NCEI).

Beyond the enormous value of NOAA's environmental and scientific data, our Agency business data can yield insights and be applied for business value. By designing data-ready systems, by embracing an open-by-default approach where appropriate, by preparing a data-ready workforce, and by leveraging our business data for insights, we can do NOAA's business, better.

Objective 5.3 Organize shared services for quality, efficiency, and cost-effectiveness

Shared IT services become essential in complex and distributed organizations like NOAA. Optimizing for maximum value means balancing enterprise-wide opportunities for efficiency and shared innovation with the need for the unique capabilities that local offices or specific missions or projects require.

Leveraging an enterprise approach to shared IT services, whenever appropriate, can ensure continuity of service and sustained service quality while at the same time maximizing federal IT budgets. Through consolidation, NOAA can identify duplicative services and tools, and streamline data centers through increased adoption of our enterprise cloud approach. Where NOAA users demand software at scale, enterprise license agreements increase the buying power of taxpayer dollars. Enterprise contracts should be the preferred method of large-scale and multi-year IT investment management, as demonstrated by NOAA's successful NOAA Mission Information Technology Services (NMITS) consolidated acquisition platform.

Success in this Objective will rely on intentional enterprise design for IT, including integrated and aligned architecture, as well as Agency-wide agreement to embrace the enterprise effort. At scale, consolidation and strategic sourcing together will deliver improved cost management, optimize IT budget resources, and empower investment in mission technologies and innovation. This approach supports the Department of Commerce's strategic objective which calls for our IT enterprise organization to "achieve economies of scale, standardized processes, and reduced transactional burden."

Objective 5.4 Increase effectiveness of IT program and project management

In order to achieve success in this Strategic Goal of "Optimize for Maximum Value," and indeed in this total IT Strategic Plan, NOAA must grow its ability to manage and execute at the project level. The effectiveness of our IT strategy implementation will rely on clear performance metrics for success, and projects to ensure we are regularly contributing towards those measurable targets.

To achieve success in this Objective, NOAA's IT community will work closely with enterprise frameworks for risk, cost management, and performance measurement, collaborating with our colleagues in the NOAA Office of the Chief Financial Officer (OCFO), including the Budget Office and the Performance, Risk, and Social Science Office (PRSSO). A mature enterprise approach to IT program and project management will leverage insights across NOAA to improve technology and its applications, continuously improving our ability to steward funding and increase value delivery.

Robust project management, based in best practices and standardized wherever possible, will be supported by policies and procedures that maximize effectiveness and efficiency. The expertise of program and project managers will inform leadership decisions by applying data-driven insights on performance, risks, and opportunities. This increased effectiveness of IT program and project management, based in NOAA's IT authorities and delegations of those authorities, will enhance accountability for the implementation of our IT strategy and the overall value delivery of our IT investments.

Key Results

» Prioritize AI-based approaches in NOAA IT policies and procedures, emphasizing the purpose to improve performance, computational efficiency, and cost effectiveness by FY25

» Implement an IT Working Capital Fund with NOAA CFO and CFO Council approval by FY24

Strategies, Mandates, & Directives

As part of the Clinger-Cohen Act of 1996, in Title 44 Section 3506(b)(2) of the United States Code, NOAA CIO is required to develop an Information Resources Management (IRM) Strategic Plan. As a Bureau in the Department of Commerce, this NOAA IRM Strategic Plan supports the Department of Commerce Strategic Plan 2018-2022.

This Strategic Plan supports fulfillment of FITARA mandates and requirements in the 21st Century Integrated Digital Experience Act (21st Century IDEA). This Strategic Plan fulfills priorities in the 2018 President's Management Agenda (PMA) and its Cross-Agency Priority (CAP) Goals, as well as related federal strategies including the Federal Data Strategy (FDS), the Foundations for Evidence Based Policymaking Act (Evidence Act) and the Geospatial Data Act (GDA). This Strategic Plan fulfills federal directives including the Executive Order on Maintaining American Leadership in Artificial Intelligence and the Department of Homeland Security Federal Continuity Directives, which identifies NOAA's Primary Mission Essential Functions (PMEFs).

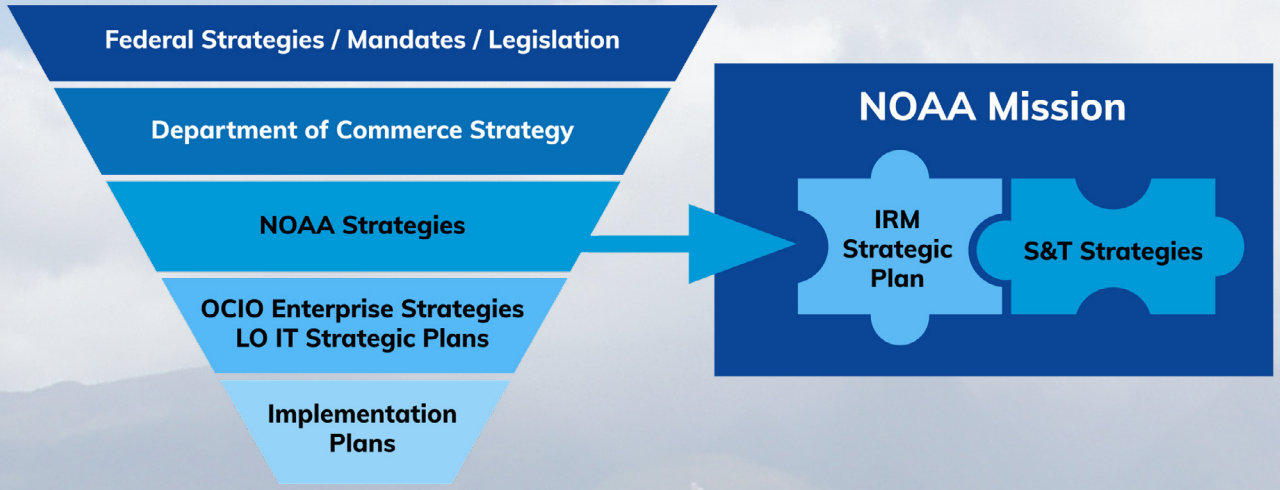
Implementation of this IRM Strategic Plan fulfills the Government Performance Results Modernization Act (GPRA), and future Annual Operating Plan (AOP) initiatives and metrics should align to this IRM Strategic Plan and support the implementation and execution of the Goals and Objectives defined here.

Underlying Strategies

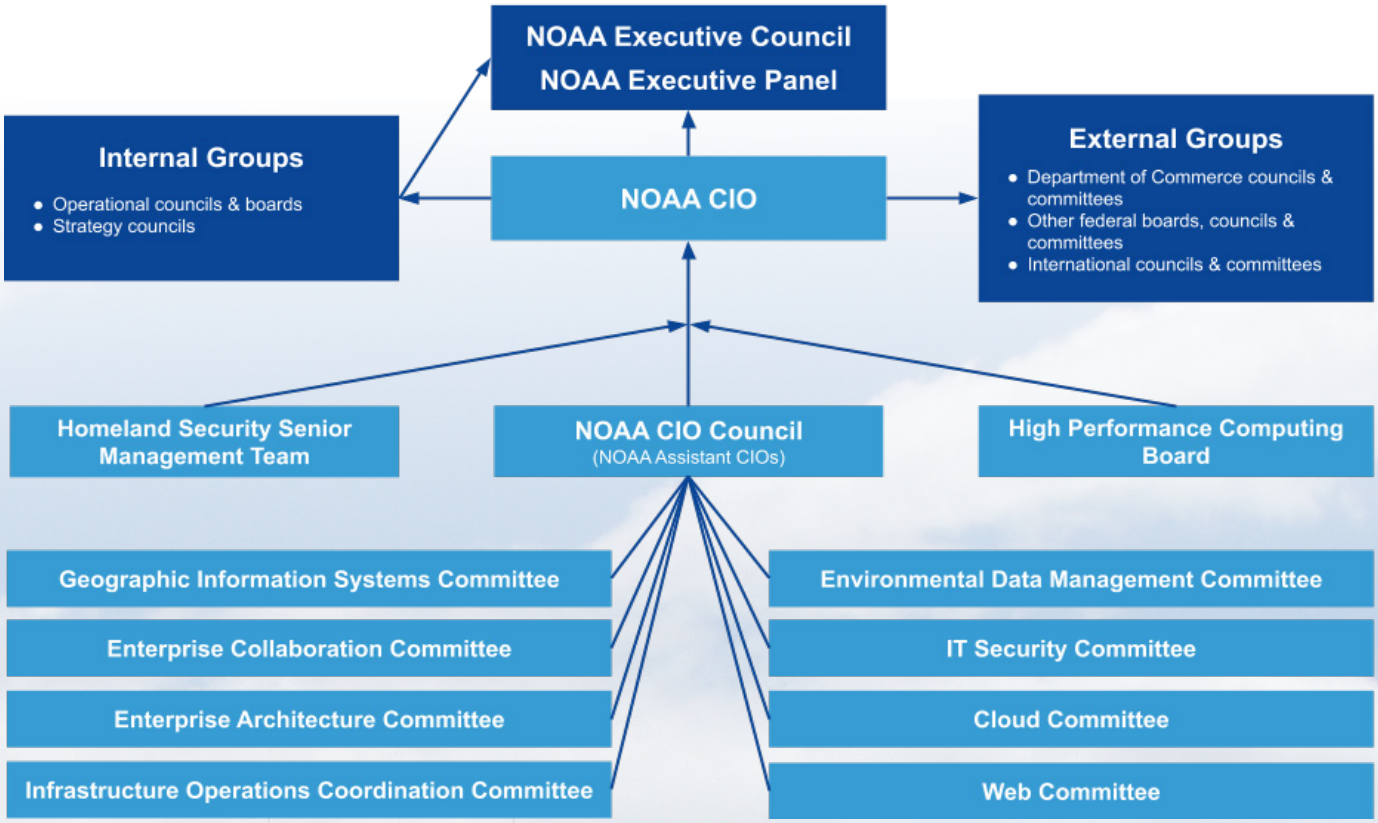
This IRM Strategic Plan provides a strategic framework to guide underlying enterprise IT strategies including but not limited to the OCIO High Performance Computing Strategic Plan and the OCIO Enterprise Network Strategic Plan.

Parallel Strategies

This IRM Strategic Plan was designed to fully align to other NOAA strategies, including the NOAA Science and Technology Strategic Plans (S&T Strategies) led by the NOAA Science Council. This IRM Strategic Plan is designed to enable NOAA mission Line Office (LO) Strategic Plans and to guide NOAA LO IT (or IRM) Strategic Plans. This IRM Strategic Plan aligns with the NOAA IT Workforce Strategic Plan (internal) . This IRM aligns to the NOAA Research & Development Visions Areas 2020-2026 and is designed to support the implementation of their Key Questions.



IT Governance



NOAA CIO Council

The NOAA CIO Council members and deputies who led the development of this Strategic Plan include:

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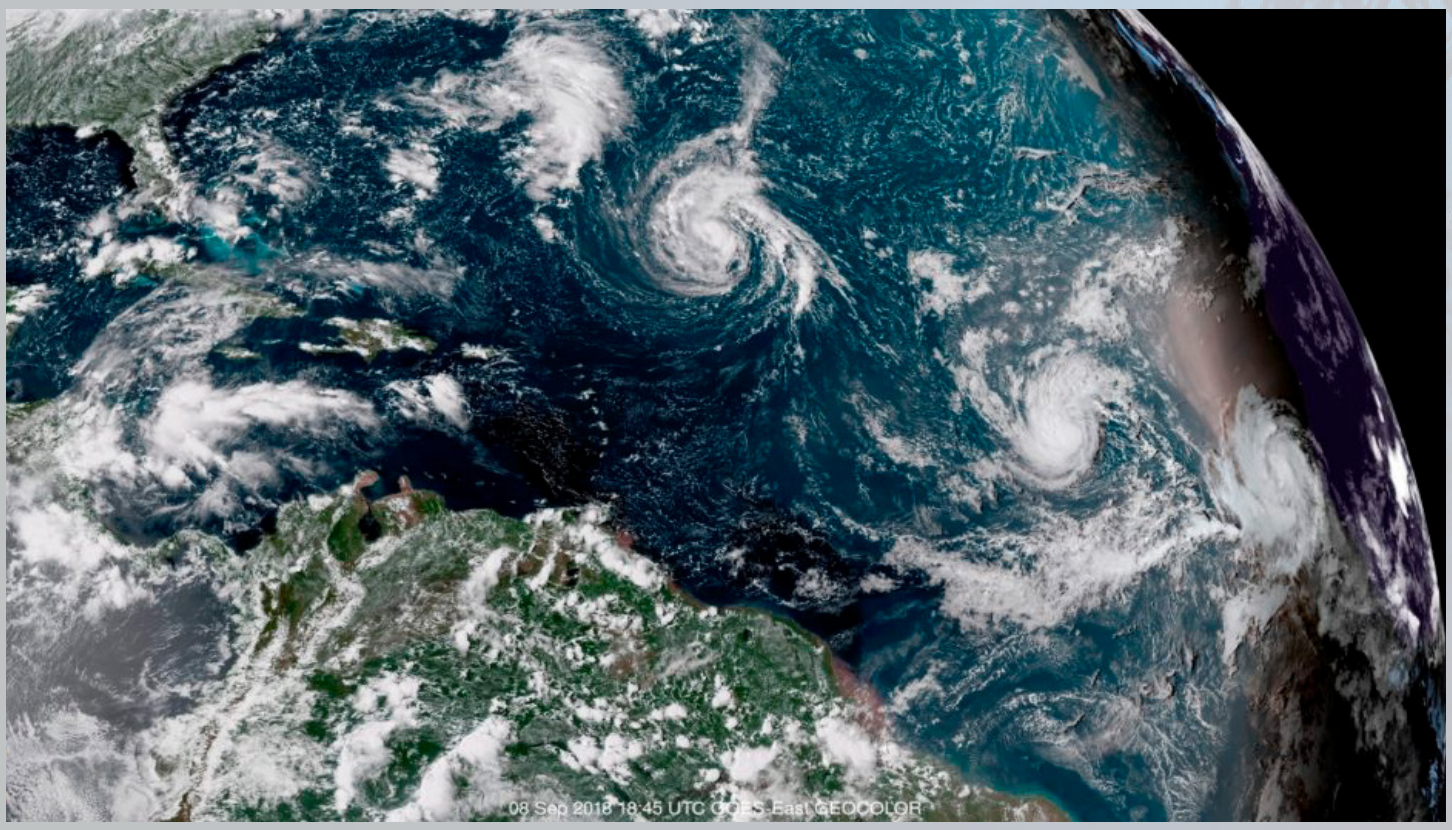

Acronyms

ACIO - Assistant Chief Information Officer
AI - Artificial Intelligence
AI/ML - Artificial Intelligence / Machine Learning
AOP - Annual Operating Plan
BDP - NOAA Big Data Program
CAP Goals - Cross Agency Priority Goals, as defined in the President's Management Agenda (PMA)
CapEx / OpEx - Capital Expenses / Operational Expenses
CDM - Continuous Diagnostics and Monitoring
CDO - Chief Data Officer
CFO - Chief Financial Officer
CIO - Chief Information Officer
COR - Contracting Officer's Representative
CPIC - Capital Planning and Investment Control
CRO - NOAA Civil Rights Office
CX - Customer Experience
D-CIO - Deputy Chief Information officer
DevSecOps - Development, Security, and Operations
DHS - United States Department of Homeland Security
DOC - United States Department of Commerce
EIS - Enterprise Infrastructure Solutions
EPIC - NOAA Earth Prediction Innovation Center
EX - Employee Experience
FDS - Federal Data Strategy
FISMA - Federal Information Security Management Act
FITARA - Federal Information Technology Acquisition Reform Act
GDA - Geospatial Data Act
GPD - NOAA OCIO Governance & Portfolio Division
GPRA - Government Performance Results Modernization Act
HPC - High Performance Computing
HPCC - High Performance Computing & Communications
HSPO - NOAA OCIO Homeland Security Program Office
IoT - Internet of Things
IRM - Information Resources Management, in the context of strategic planning
IT - Information Technology
ITIL - Information Technology Infrastructure Library
ITU - International Telecommunication Union
LO - Line Office
ML - Machine Learning
NAO - NOAA Administrative Order
NCEI - National Centers for Environmental Information
NDP - NOAA Data Program
NESDIS - National Environmental Satellite, Data, and Information Service, a NOAA mission Line Office
NIST - National Institute of Standards and Technology
NMFS - National Marine Fisheries Service, a NOAA mission Line Office
NMITS - NOAA Mission Information Technology Services
NOAA - National Oceanic and Atmospheric Administration
NOS - National Ocean Service, a NOAA mission Line Office
NSC - NOAA Science Council, formerly known as the NOAA Research Council (NRC)
NTIA - National Telecommunications and Information Administration
NWS - National Weather Service, a NOAA mission Line Office
OAR - Office of Oceanic and Atmospheric Research, a NOAA mission Line Office
OCFO - Office of the Chief Financial Officer, a NOAA Staff Office
OCIO - Office of the Chief Information Officer, a NOAA Staff Office
OHCS - Office of Human Capital Services, a NOAA Staff Office
OKRs - Objectives and Key Results
OMAO - Office of Marine and Aviation Operations, a NOAA mission Line Office
OMB - United States Office of Management and Budget
'Omics - Branches of biological science across various disciplines whose names end in the suffix -omics, including genomics, proteomics, metabolomics, and glycomics
OpEx - Operational Expenses (see CapEx)
PMA - President's Management Agenda
PMEF - Primary Mission Essential Function(s)
PMO - Program/Project Management Office
PRSSO - NOAA Performance, Risk, and Social Science Office
R&D - Research & Development
R2O - Research to Operations (also RTO)
R2X - Research to Operations/Commercialization/Application
ROI - Return on Investment
RTO - Research to Operations (also R2O)
SO - Staff Office
S&T Strategies - NOAA Science & Technology Strategies
TBM - Technology Business Management
TIC - Trusted Internet Connection
UxS - Uncrewed Systems, also sometimes known as Unmanned Systems

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February 2021