

**PROGRAM CHARTER FOR
THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)
UNMANNED AIRCRAFT SYSTEMS (UAS) PROGRAM**

EXECUTIVE SUMMARY

Numerous legislative acts call for the advancement of technologies to better observe, understand, and anticipate changes in climate, weather, oceans, and coasts; and to better monitor and manage marine resources. These requirements drive the National Oceanic and Atmospheric Administration (NOAA) to develop optimized observing strategies utilizing innovative observing systems and products that can address critical information needs or gaps. NOAA strives to develop systems that can be operated safely and feasibly with cost-effective life-cycle support and that can maximize cross-cutting benefits to the NOAA mission.

NOAA's Next Generation Strategic Plan (NGSP) recognizes the importance of earth observations to the NOAA mission of science, service, and stewardship. Accordingly, it sets a five-year objective for more reliable, accurate, and integrated earth observations for NOAA's Enterprise Science and Technology. It also emphasizes that the growing NOAA requirements for observations greatly exceed the capacity of current NOAA observing assets. Thus, there is a critical need to maintain the balance of observation continuity while implementing efficient emerging technologies. The NGSP specifically recognizes unmanned air and water vehicles as emerging capabilities, which can strengthen NOAA's observation of hard-to-reach regions of the Earth such as the Arctic and remote ocean areas.

The NOAA UAS Program was established to examine innovative UAS technologies and observations, to incubate UAS applications beneficial to the NOAA mission, and to integrate UAS observing strategies into the NOAA research and operational Earth observing framework. The NOAA UAS Program will evaluate the feasibility of UAS technologies to address the NOAA mission using a requirements-based systems approach in partnership with the Office of Marine and Aviation Operations and the NOAA Line Offices. The NOAA UAS Program will be managed by the Office of Oceanic and Atmospheric Research and will maintain regular communication with the NOAA Research Council, Observing Systems Council, Fleet Council, Line Office Transition

Management Committee, and the Technology Integration and Planning Office to ensure Program priorities are aligned with Agency goals.

PROGRAM VISION

UAS will begin to revolutionize NOAA observing strategies by 2014 with new, innovative capabilities as unprecedented as the introduction of satellite and radar assets decades earlier.

PROGRAM MISSION

UAS have the potential to efficiently and safely bridge critical information gaps in data-sparse and remote locations of the global environment and advance the understanding of key processes in Earth systems. Optimizing the capabilities that UAS offer will advance NOAA's mission goals through improved understanding of oceanic and atmospheric exchanges, hurricanes, wildfires, marine ecosystems, polar regions, hazards, and other environmental and ecological processes, ultimately leading to improved climate and weather predictions and management of marine resources. NOAA is partnering with other civilian agencies, industry, and the academic community to develop UAS operations, systems, and platforms that can be safely deployed, both nationally and globally, to fill observational data gaps with increased efficiency and decreased risk to personnel.

PROGRAM DRIVERS

NEXT GENERATION STRATEGIC PLAN

NGSP LONG-TERM GOALS

The NOAA UAS Program will directly support the NGSP long-term goals by improving the reliability, accuracy, and integration of observations needed for the NOAA mission of science, service, and stewardship. The NOAA UAS Program will target UAS technologies and observations, which provide measurable progress towards the achievement of the NOAA long-term goals of:

- Climate Adaptation and Mitigation - An informed society anticipating and responding to climate and its impacts
- Weather-Ready Nation - Society is prepared for and responds to weather-related events

- Healthy Oceans - Marine fisheries, habitats, and biodiversity are sustained within healthy and productive ecosystems
- Resilient Coastal Communities and Economies - Coastal and Great Lakes communities are environmentally and economically sustainable.

NGSP PERFORMANCE OBJECTIVES:

The UAS Program will seek to directly impact the following specific subset of NGSP performance objectives through improved NOAA observing strategies using UAS technologies and observations:

- Climate Adaptation and Mitigation
 - Improved scientific understanding of the changing climate system and its impacts
 - Integrated assessments of current and future states of the climate system that identify potential impacts and inform science, services, and decisions
- Weather-Ready Nation
 - Reduced loss of life, property, and disruption from high-impact events
 - Improved transportation efficiency and safety
- Healthy Oceans
 - Recovered, rebuilt, and sustained living marine resources
 - Healthy habitats that sustain resilient and thriving marine resources and communities
- Resilient Coastal Communities and Economies
 - Resilient coastal communities that can adapt to the impacts of hazards and climate change
 - Comprehensive ocean and coastal planning and management
 - Safe, efficient, and environmentally sound marine transportation
 - Safe, environmentally sound Arctic access and resource management.

NGSP SCIENCE AND TECHNOLOGY ENTERPRISE OBJECTIVES:

The NOAA UAS Program will directly support or implement the following NGSP enterprise objectives:

- NOAA's Science & Technology Enterprise
 - A holistic understanding of the Earth system through research
 - Accurate and reliable data from sustained and integrated Earth observing systems
 - An integrated environmental modeling system

- NOAA's Engagement Enterprise
 - An engaged and educated public with an improved capacity to make scientifically informed environmental decisions
 - Integrated services meeting the evolving demands of regional stakeholders
- NOAA's Organization & Administration Enterprise
 - Diverse and constantly evolving capabilities in NOAA's workforce
 - A modern IT infrastructure for a scientific enterprise
 - Sound, life-cycle management of capital investments.

NOAA STRATEGIC INITIATIVES AND POLICY DRIVERS

The NOAA UAS Program will assist the Agency in meeting the information requirements necessary for the goals and objectives of NOAA strategic initiatives and policy drivers including:

- The Final Recommendations of the Interagency Ocean Policy Task Force released by the White House Council on Environmental Quality on 19 July 2010 highlights ocean, coastal, and Great Lakes observations, mapping, and infrastructure as one of nine national priority objectives of the National Ocean Policy. These recommendations include fully integrating groundbreaking observation technologies to observe and study global processes at all scales as a key opportunity. "The use of unmanned vehicles and remote sensing platforms and satellites to gather data on the health and productivity of the ocean, our coasts, and the Great Lakes" is specially identified as an area to be addressed during the development of the future strategic plan for the National Ocean Policy.
- NOAA's Arctic Vision and Strategy provides a high-level framework and six strategic goals to address these emerging issues and stakeholder requirements in the region. These strategic goals are:
 - Forecast Sea Ice
 - Strengthen Foundational Science to Understand and Detect Arctic Climate & Ecosystem Changes
 - Improve Weather and Water Forecasts and Warnings
 - Enhance International and National Partnerships
 - Improve Stewardship and Management of Ocean and Coastal Resources in the Arctic
 - Advance Resilient and Healthy Arctic Communities and Economies
- The NOAA National Weather Service Strategic Plan 2011 – 2020 describes a future emphasis on impact-based decision support services in order to meet

society's new and evolving needs. Future forecasters will be expected to focus more on "maintaining continuous situational awareness, interpreting information and providing decision support for high-impact events" and less on fine-tuning the accuracy of model output. Integrated four-dimensional weather, water, climate, and environment observations and forecasts will be essential along with other scientific and technical advancements such as next-generation observations and Earth system models at all possible spatial and temporal scales.

- The National Hurricane Operations Plan and the National Winter Storms Operations Plan requires NOAA to provide weather reconnaissance flights, including synoptic surveillance to ensure that necessary preparedness actions are taken to minimize loss of life and destruction of property.
- The First U.S. Integrated Ocean Observing System (IOOS) Development Plan – A Report of the National Ocean Research Leadership Council and the Interagency Committee on Ocean Science and Resource Management Integration (January 2006) provides a framework for the development of an IOOS and its improvement through enhancements and research
- Interagency Oceans and Human Health Research Implementation (OHHI) Plan: A Prescription for the Future by the Interagency Working Group on Harmful Algal Blooms, Hypoxia, and Human Health (Joint Subcommittee on Ocean Science and Technology, 2007). The OHHI identified six implementation actions to advance OHH research and application, leading to reduced health risks and increased health benefits for people. Action 3, support research infrastructure, specifically includes ocean observing and infrastructure to enable data sharing and integration.

NOAA LEGISLATIVE DRIVERS:

The NOAA UAS Program will assist the Agency in meeting the information requirements of NOAA legislative drivers including:

- 15 USC § 313, the "National Weather Service Organic Act" directs the National Weather Service to forecast the weather, issue storm warnings, collect and transmit marine intelligence for the benefit of commerce and navigation, report temperature and rainfall conditions, and take such meteorological observations as may be necessary to establish and record the climate conditions of the United States.
- 15 USC § 313c, the "Inland Flood Forecasting and Warning System Act of 2002" authorizes NOAA through research, modeling, training, and outreach to enhance

the capability to accurately forecast inland flooding, including flooding caused by coastal and ocean storms.

- 49 USC § 1463, the “Federal Aviation Act” directed the National Weather Service to make “observations, measurements, investigations, and studies of atmospheric phenomena, and establish such meteorological offices and stations, as are necessary or best suited for ascertaining, in advance, information concerning probable weather conditions.”
- 33 USC § 17, the “National Ocean Survey” requires NOAA to acquire shoreline topographic data, promulgate standards, products and services for charts and related information for the safe navigation of marine and air commerce as well as basic data for engineering, scientific, and commercial purposes.
- 42 USC § 85, the “Air Pollution Prevention and Control” requires NASA and NOAA to monitor and report to Congress on the current average tropospheric concentration of chlorine and bromine and on the level of stratospheric ozone depletion.
- 15 USC § 2921 et. seq., the “Global Change Research Act” provides for a research program which to obtain global measurements, establishing worldwide observations necessary to understand the physical, chemical, and biological processes responsible for changes in the Earth system on all relevant spatial and time scales.
- 16 USC § 31, the “Marine Mammal Protection”, § 35 “Endangered Species”, and § 38 “Fishery Conservation and Management” make NOAA’s National Marine Fisheries Service responsible for protecting, restoring, and managing species listed under the Endangered Species Act and Marine Mammal Protection Act.
- 16 USC § 1801 et. seq., the “Magnuson-Stevens Fishery Conservation and Management Act” declares that the collection of reliable data is essential to the effective conservation, management, and scientific understanding of the fishery resources of the United States; and that habitat ... should receive increased attention for the conservation and management of fishery resources of the US.
- 41 CFR § 102–33, Management of Government Aircraft, which describe how to “acquire, manage, and dispose of Government aircraft (*i.e.*, Federal aircraft and commercial aviation services (CAS)); as safely, efficiently, and effectively as possible consistent with the nature of your agency's aviation missions.”

PROGRAM GOALS

The NOAA UAS Program will pursue three primary goals to fulfill its vision and mission.

- Goal 1: Increase access to UAS technologies and observations for the NOAA science community through investments, acquisitions, and partnerships based on safe, efficient and cost-effective operational practices.
- Goal 2: Apply UAS technologies and observations to focused missions with high scientific return and measurable progress of advancing technology readiness toward integration into routine research and operational applications. Program priorities will begin in 2012 with development of research and operational UAS missions for improved high-impact weather, polar, and marine monitoring. Other mission priorities may be added at a later date depending on the evolving observing needs of the Agency.
- Goal 3: Proactively engage stakeholders from across the NOAA enterprise and externally to ensure the NOAA UAS Program is continually and adequately addressing the NOAA observing strategies needed to support the NOAA mission of science, service, and stewardship.

PROGRAM OUTCOME

The NOAA UAS Program will deliver optimized information system solutions based on UAS technologies and observations that demonstrate science traceability to the goals of the Agency and measurable benefit to the NOAA mission as these solutions are transitioned into routine research or operational applications.

PROGRAM BENEFICIARIES

The optimized UAS information system solutions delivered by the NOAA UAS Program will provide cross-cutting benefits to research and operational activities of all NOAA Line Offices when aircraft capabilities are needed for longer endurance, lower flight altitudes, quieter noise performance, and easier transportability than manned aircraft options. Depending on the application, these UAS solutions may also offer higher spatial and temporal resolution observations than satellites or broader spatial coverage than surface observing platforms positioned at fixed locations. NOAA leadership, in transitioning UAS technologies and observations into civil applications, will demonstrate the viability of UAS technologies for commercial markets and employment opportunities benefiting both private industry and academia.

PROGRAM ROLES AND RESPONSIBILITIES

The NOAA UAS Program was established to examine innovative UAS technologies and observations, to incubate UAS applications beneficial to the NOAA mission, and to

integrate UAS observing strategies into the NOAA research and operational Earth observing framework. The NOAA UAS Program will evaluate the feasibility of UAS technologies to address the NOAA mission using a requirements-based systems approach. This includes: researching Agency information requirements and technology capabilities, acting as the NOAA science and technology conscience during the identification of promising UAS technologies and observations, and leading the development, acquisition, and transition efforts of UAS technologies and observations into routine NOAA application in a timely and economical fashion. This also includes support for the regional partners through its cooperative institutes. Operational transition efforts will follow the NOAA Policy on Transition of Research to Application (NOAA NAO 216-105) and be closely coordinated with the NOAA Line and Staff Offices.

The NOAA UAS Program will be managed and resourced by the Office of Oceanic and Atmospheric Research in partnership with the Office of Marine and Aviation Operations and the NOAA Line Offices. The Program will follow project management practices established in the NOAA Business Operations Manual (BOM). The NOAA UAS Program will be led by a Program Director reporting to the OAR Deputy Assistant Administrator for Laboratories and Cooperative Institutes. The NOAA UAS Program Director will have overall responsibility for the development, execution, and oversight of the UAS Program strategic direction and investments. The NOAA UAS Program Director will manage fiscal and staff resources, formulate and execute the UAS Program Budget and Annual Operating plans, and report plans, milestones, and results to NOAA management. The NOAA UAS Program Director will maintain regular communication with the NOAA Research Council, Observing Systems Council, Fleet Council, Line Office Transition Managers, and Technology, Planning, and Integration for Observations Program to ensure NOAA UAS Program priorities are aligned with Agency goals.

PROGRAM STAKEHOLDERS AND PARTNERSHIPS

INTERNAL NOAA STAKEHOLDERS

The NOAA UAS Program will respect the roles and responsibilities of all NOAA Corporate, Line and Staff Offices outlined in the NOAA BOM. The NOAA UAS Program will also build the following specific relationships to address NOAA UAS issues:

NOAA LABORATORIES AND COOPERATIVE INSTITUTES

The NOAA UAS Program will solicit UAS science and technology ideas, impact studies, evaluations and recommendations from NOAA Laboratories and cooperative institutes to ensure proposed UAS information system solutions are aligned with OAR research goals and objectives as well as Line Office needs. NOAA Laboratories and cooperative institutes will assist the NOAA UAS Program in identifying promising UAS technologies and observations suitable to serve the NOAA mission and in incubating the readiness of UAS technologies and observations for transitioning into routine research and operational application.

NOAA LINE OFFICES AND LINE OFFICE TRANSITION MANAGERS

The NOAA UAS Program will solicit UAS science and technology ideas, evaluations, and proposed concept of operations from all Line Offices and Line Office Transition Managers to ensure UAS information system solutions are aligned with Line Office needs. The Line Offices Transition Managers will assist the UAS Program by disseminating information regarding UAS technologies and observations to Line Office personnel, assisting in the development of performance requirements for UAS information system solutions and collaborating to secure funding for UAS operations after research transition.

NOAA TECHNOLOGY, PLANNING, AND INTEGRATION FOR OBSERVATIONS PROGRAM

The NOAA UAS Program will coordinate UAS observing and performance requirements with the NOAA Technology, Planning, and Integration for Observations Program (TPIO). The NOAA TPIO will assist the NOAA UAS Program with verification and validation of these requirements by disseminating information from the NOAA Consolidated Observation Requirement List, the NOAA Observing System Portfolio Analysis, the NOAA Observing System Architecture, and the Information Management System Inventory and the Global Earth Observation-Integrated Data Environment.

NOAA OFFICE OF MARINE AND AVIATION OPERATIONS

The NOAA UAS Program will coordinate the following activities with OMAO to ensure all UAS operations are evaluated for safety, cost effectiveness, and operational feasibility before deployment:

- NOAA-sponsored UAS science and technology demonstrations and field operations,
- Systems engineering and business case analyses of UAS technologies
- UAS acquisition recommendations

UAS acquisitions will be Agency assets. OMAO will be the Agency custodian of all UAS assets and will be responsible for the safe and efficient operation and maintenance of UAS in accordance with NOAA Policy for Management and Utilization of Aircraft (NAO 216-104). OMAO will:

- Maintain operational authority over NOAA UAS to ensure safe, efficient, and consistent use of resources
- Provide logistical, technical, and administrative support necessary for the successful accomplishment of NOAA UAS schedules
- Approve changes to UAS schedules in conjunction with the UAS Program Director provided the general intent of the original allocation is not significantly changed
- Represent NOAA on external and interagency groups in the area of aircraft management
- Approve, by waiver, deviations from policies regarding the qualifications of UAS operators, maintenance personnel, and other crew members as set forth in the NOAA Aircraft Operations Center Flight Operations Manual
- Administer policy and guidelines for the management and use of NOAA UAS
- Obtain the required clearances from the Federal Aviation Authority for NOAA UAS operations in national air space
- Obtain the required clearances from foreign government(s) through the Department of State for NOAA UAS operations abroad
- Develop policies governing the management of NOAA UAS, standard operating procedures, aviation personnel, and related matters
- Perform technical assessment and evaluation of proposed acquisitions, classifications, assignments, and dispositions of NOAA UAS
- Assess UAS airworthiness and provide for continuing airworthiness

NOAA RESEARCH, OBSERVING SYSTEM, AND FLEET COUNCILS

The NOAA UAS Program will provide regular updates to the NOAA Research, Observing System and Fleet Councils regarding the Program strategic priorities and acquisition recommendations. The NOAA Research, Observing System and Fleet Councils will guidance and decisional support for NOAA UAS Program priorities and acquisition recommendations.

NOAA UNMANNED SYSTEMS WORKING GROUP

The NOAA UAS Program will collaborate with the NOAA Unmanned Systems Working Group to document, plan, and advocate the utilization of unmanned, autonomous, robotic, remotely piloted, and animal-borne observing systems to meet NOAA observing needs or gaps when high scientific return may be accomplished with safe, feasible, and cost-effective operations.

EXTERNAL NOAA PARTERSHIPS

FEDERAL AGENCIES AND INTERAGENCY UAS WORKING GROUPS

The NOAA UAS Program will share UAS technologies and information, strategic and operating plans, observing and performance requirements, technology assessments, impact studies, system and business case analyses, and lessons learned with other Federal agencies and interagency UAS working groups when taking advantage of economies of scale, avoiding duplication of effort, and sharing national air space are in the best interest of the Government and the NOAA mission.

PRIVATE INDUSTRY AND ACADEMIA

The NOAA UAS Program will solicit UAS technology information and proposal ideas from private industry and academia to ensure UAS information system solutions are state-of-art, safe, feasible, and cost-effective for NOAA research and operational applications. Private industry and academia will assist the NOAA UAS Program in identifying promising UAS technologies and observations suitable to serve the NOAA mission and in incubating the readiness of UAS technologies and observations for transitioning into routine research and operational application.

INTERNATIONAL PARTNERS

The NOAA UAS Program will collaborate with international UAS working groups to coordinate and advocate the utilization of UAS for scientific observation. The NOAA

UAS Program will assist NOAA in jointly collecting and sharing UAS observations with international partners pertaining to science topics of international interest and concern

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