



NOAA Fleet Update

July 2016

The following update provides the status of NOAA's fleet of ships and aircraft, which play a critical role in the collection of oceanographic, atmospheric, hydrographic, and fisheries data. NOAA's current fleet of 16 ships – the largest civilian research and survey fleet in the world – and nine aircraft, are operated, managed, and maintained by NOAA's Office of Marine and Aviation Operations ([OMAO](#)). OMAO includes civilians, mariners, and officers of the United States NOAA Commissioned Officer Corps ([NOAA Corps](#)), one of the nation's seven Uniformed Services.



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OMAO and the NOAA Corps – In the News

[25-day expedition observes 3 probable new fish species, coral bleaching](#)

-West Hawaii Today

A 25-day research expedition aboard NOAA Ship *Hi'ialakai* to explore the deep coral reefs of Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands uncovered three specimens of deep-water fishes never before seen by divers. It documented significant coral mortality, as well, and what the future looks like for that coral is still unknown. "We collected the first specimens of male Hawaiian pigfish in 330 feet of water," said Randall Kosaki, PhD., chief scientist of the expedition in a press release issued Wednesday. "Males and females have dramatically different color patterns, and prior to this, no males have ever been seen or collected." Using advanced dive technology to survey reefs at depths far greater than conventional scuba gear allows, scientists collected two probable new species of fishes, and filmed a third...

[Understanding Rogue Ocean Waves May be Simple After All](#)

-Georgia Tech

An international team of scientists has developed a relatively simple mathematical explanation for the rogue ocean waves that can develop seemingly out of nowhere to sink ships and overwhelm oil platforms with walls of water as much as 25 meters high. The waves stem from a combination of constructive interference – a known wave phenomenon – and nonlinear effects specific to the complex dynamics of ocean waves. An improved understanding of how rogue waves originate could lead to improved techniques for identifying ocean areas likely to spawn them, allowing shipping companies to avoid dangerous seas. Furthermore, new insights into the unsolved problem of wave breaking and into the wave manifestation of light are to be gained, according to the researchers...

[Hurricane hunter's career spans 5 decades](#)

-Government Matters

James McFadden, chief of programs and projects at NOAA's Aircraft Operations Center, discussed his five-decade career as a federal hurricane hunter...

[Bigelow Gives an Assist to Fisheries Research](#)

-Newport This Week

It is 209 feet long, cost \$54 million, can trawl nets at depths of 1,000 fathoms, can study our marine ecosystem from the largest pod of sperm whales to microscopic plankton, and works to protect, manage, and preserve our natural resources. The National Oceanic and Atmospheric Association (NOAA) fisheries research vessel *Henry B. Bigelow* is now permanently home-ported at the U.S. Navy Base in Newport, with a diverse crew of 22 who are trained in every aspect of its mission – from design to computers, navigation, depth plumbing, lab maintenance, Hazmat gear, firefighting, first aid, mechanics, intricate repairs, and even minor surgery and cooking. They need to be. There are more movable parts on the *Bigelow* than in the national touring companies of the musical "Hamilton"...

[How do you forecast for hurricanes? Weather you'd like to know](#)

-Cleveland.com

Forecasting for hurricanes can be extremely tricky. Meteorologists from National Weather Service offices across the country must work with the National Hurricane Center and hurricane hunter aircraft to figure out where the havoc will strike. But getting it right matters -- to let the right areas know where to evacuate and keep millions of people safe...It all starts with data collection. First, meteorologists look for an area of organized storms over warm waters. From there, they use both satellite and observational data...After this area of storms is suspected of forming into something stronger, NOAA and the U.S. Air Force Reserve weather squadron send out their hurricane hunter aircraft...



Transgender Service



A Message from the Director

On June 30, 2016, Secretary of Defense Ashton Carter announced a significant and historic policy change by allowing transgender Americans to serve openly in our Nation's Armed Forces. This is an important day for equality of all Americans. Our Nation cannot reach its fullest potential until every American is free from discrimination and has unfettered access to life, liberty, and the pursuit of happiness.

While this announcement marks a substantial policy change for the DOD, I am honored to lead the Office of Marine and Aviation Operations and the NOAA Corps, and proud of the NOAA Corps for being at the forefront of equality for LGBT Americans. Many LGBT Americans have served and continue to serve OMAO as we support NOAA's mission and I'm especially proud of our track record in recruiting and retaining our transgender employees. In fact, over six years ago the NOAA Corps commissioned, trained and sent the first openly transgender officer in any United States service to sea with no fanfare or press releases. The individual was qualified for a commission, and that's all that mattered. OMAO and the NOAA Corps do not have a policy on open transgender service because we have a rich history of championing the principles of merit based on individual performance.

It is fitting that this announcement comes as the annual LGBT pride month events come to a close and the Nation prepares to embark on its 242nd year of independence. I'm grateful that the Secretary of Defense has announced this bold policy change to enhance the freedom of all Americans. This is in keeping with OMAO's commitment to support a diverse and inclusive work environment that values and respects every individual for their unique contributions to NOAA's mission.

Sincerely,

Rear Admiral David A. Score (two star)

Director of the NOAA's Commissioned Officer Corps and Director of NOAA's Office of Marine and Aviation Operations (OMAO)





New Director Office of Coast Survey



Secretary Penny Pritzker has recommended and President Obama has approved the recommendation of Captain Shepard “Shep” Smith, NOAA as the next Director of the National Ocean Service Office of Coast Survey, following Rear Admiral (one star) Gerd Glang. His appointment to the rank of Rear Admiral (one star) will become official upon the change of command.

Captain Smith brings a distinguished record of accomplishment to his new post. He joined the NOAA Corps in 1993 and currently is the Commanding Officer of NOAA Ship *Thomas Jefferson*. Captain Smith has served 10 years on NOAA Ships *Thomas Jefferson*, *Rainier*, and the R/V *Bay Hydrographer* in many positions, including Commanding Officer, Executive Officer, and Operations Officer.

Within the Office of Coast Survey, Captain Smith led its Marine Chart Division, where he managed the maintenance and publication of NOAA’s suite of more than 1,000 nautical charts. During his tenure, he oversaw the privatization of paper chart printing and distribution, and began the transition to a database-driven chart production system. He has also served ashore integrating new technology to improve the efficiency of NOAA’s seafloor mapping efforts.

Captain Smith earned a Master’s of Science degree from the University of New Hampshire and a Bachelor’s of Science degree in mechanical engineering from Cornell.

Rear Admiral Gerd Glang has faithfully served as the Director of the Office of Coast Survey the past four years and has led Coast Survey during a time of tremendous advancement. Among his major accomplishments are transforming nautical chart production with a primary focus on providing charts through modern electronic navigation systems; increasing the range and scope of charting data acquisition to include information gathered from satellites, ship tracking systems, and boaters; and establishing a vision and process to deliver integrated products for tomorrow’s precision navigation.





OMAO's Ships and Centers



OMAO's [Ship Tracker](#) (screen shot below) shows information about the location - present and past - of our fleet of research and survey ships. Please note: To access Ship Tracker you must create an account with a **.gov** or **.mil** email address. All other access is restricted.



OMAO's ships and related Marine Centers are listed below based on the geographical location of the vessels' homeports starting in the Northeast and ending in the Pacific.

New Castle, NH

NOAA Ship *Ferdinand R. Hassler*

Commanding Officer:

LCDR Briana Welton/LCDR Mathew Jaskoski

Primary Mission Category:

Hydrographic Surveys

DEPART: Norfolk, Virginia

ARRIVE: Norfolk, Virginia

DEPART: Norfolk, Virginia

ARRIVE: Norfolk, Virginia

Project: Approaches to Wilmington

Objective: To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation, as identified during the course of survey operations.



NOAA Ship *Ferdinand R. Hassler* gets underway on a recent sea trial.

[Photo: James Hutton/NOAA]

Newport, RI

NOAA Ship Henry B. Bigelow

Commanding Officer: LCDR Jeffery Taylor
Primary Mission Category: Fisheries Research
DEPART: Newport, Rhode Island **ARRIVE:** Newport, Rhode Island
DEPART: Newport, Rhode Island **ARRIVE:** Woods Hole, Massachusetts

Project: AMAPPS Abundance Survey

Objectives: Determine the distribution and abundance of marine mammals, sea turtles and sea birds within the study area. Collect vocalizations of cetaceans using passive acoustic hydrophones. Determine the distribution and relative abundance of plankton using bongo nets with CTDs, midwater trawls, visual plankton recorder and EK-60. Collect hydrographic and meteorological data, and when possible, collect biopsy samples and photo-identification pictures of cetaceans.

Davisville, RI

NOAA Ship Okeanos Explorer

Commanding Officer: CDR Mark Wetzler
Primary Mission Category: Oceanographic Exploration and Research
Depart: Apra Harbor, Guam **Arrive:** Apra Harbor, Guam
Depart: Apra Harbor, Guam **Arrive:** Kwajalein, Republic of the Marshall Islands

Project: CAPSTONE

Objectives: CAPSTONE is a three year initiative to collect critical baseline NOAA science and management needs in largely unknown areas of U.S. waters in the Pacific. Operations conducted during this campaign support NOAA missions to understand and predict changes in climate, weather, oceans and coasts, and share that knowledge and information with others. Much of this work associated with CAPSTONE will contribute to and complement Deep Sea Coral Research and Technology Program's three-year Pacific Islands Regional Initiative.

Norfolk, VA

NOAA Ship Thomas Jefferson

Commanding Officer: CAPT Shepard Smith/CDR Christiaan Van Westendorp
Primary Mission Category: Hydrographic Surveys

Ship Status: Alongside US Coast Guard Yard Curtis Bay - Baltimore, Maryland, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

OMAO'S MARINE OPERATIONS CENTER – ATLANTIC (MOC-A)

CAPT Scott Sirois, Commanding Officer MOC-A

MOC-A serves as a homeport for one NOAA ship, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the research and survey ships in NOAA's Atlantic fleet. Each year these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.

Charleston, SC

NOAA Ship *Nancy Foster*

Commanding Officer: LCDR Jeffrey Shoup/LCDR Lindsey Kurelja
Primary Mission Category: Oceanographic Research, Environmental Assessment
Depart: Charleston, South Carolina **Arrive:** Savannah, Georgia
Depart: Savannah, Georgia **Arrive:** Pascagoula, Mississippi
Depart: Pascagoula, Mississippi **Arrive:** Galveston, Texas

Project 1: Southeast Regional Ecosystem Assessment

Objectives: Ship based mapping and characterization of benthic habitats in the waters around Gray's Reef National Marine Sanctuary. Collected data will need to include backscatter. Assess spatial variation in distribution of prey and associated predators both on and off reefs (i.e., along a gradient of distance from edges of undercut ledges), using acoustic and direct visual survey methods, over diel periods. Continue collecting data on the abundance, diversity and distribution of invertebrates both inside and outside the research area in Gray's Reef. This project will include diving to assess invertebrate populations around the sanctuary.

Project 2: Hypoxia Monitoring Gulf of Mexico

Objectives: Monitor the Gulf of Mexico hypoxic zone, by measuring the size of the dead zone, which is used by the Interagency Mississippi/Gulf of Mexico Hypoxia Task Force to evaluate their progress toward achieving the 2001 Action Plan (reaffirmed in 2008 Action Plan) goal to reduce the size of the hypoxic zone to 5,000 km² by 2035. The project's science activities will be conducted within an area approximately 13,650 km² west of the Mississippi River Delta within and just outside of the hypoxic zone in water depths of 5 to 120 meters.

NOAA Ship *Ronald H. Brown*

Commanding Officer: CAPT Robert Kamphaus
Primary Mission Category: Oceanographic Research, Environmental Assessment
DEPART: Seattle, Washington **ARRIVE:** Seattle, Washington

Project: Ocean Observatories Initiative

Objectives: This cruise is the fourth deployment (third turnaround) for the Station PAPA of the National Science Foundation's Ocean Observatories Initiative (OOI; <http://www.oceanobservatories.org>). The Station PAPA Array includes a network of moorings and gliders to monitor waters in the data sparse high latitudes of the Gulf of Alaska. The moorings and the gliders give the array the capability to address the role of the mesoscale flow field in ocean dynamics (3203-00007 CGSN Site Characterization: Station PAPA). The cruise originates at the US Coast Guard Base Seattle, WA where equipment will be loaded and the science party will join. The Station PAPA cruise objectives include the recovery and deployment of the Global Hybrid Profiler Mooring and the Mesoscale Flanking Moorings A and B, the recovery of three and deployment of five gliders: three perimeter gliders with modems and two profiling gliders, and CTD casts with water sampling at the mooring sites for instrument calibration and data verification. In addition, intercomparisons of shipboard and moored sensors will be carried out as well as various shipboard oceanographic and atmospheric sampling.

Pascagoula, MS

NOAA Ship *Pisces*

Commanding Officer: CDR William Mowitt
Primary Mission Category: Fisheries Research
DEPART: Morehead City, N Carolina **ARRIVE:** Morehead City, N Carolina
DEPART: Morehead City, N Carolina **ARRIVE:** Morehead City, N Carolina

Project: Southeast Fisheries Independent Survey

Objectives: Conduct applied fishery-independent sampling focusing on assessment of spatial variability in distribution and abundance of species within the snapper-grouper complex, comparative analysis of fish traps, video cameras, and acoustics, and bathymetric and backscatter data collection (for subsequent habitat mapping) over hardbottom habitats.

NOAA Ship *Oregon II*

Commanding Officer: Master Dave Nelson
Primary Mission Category: Fisheries Research
DEPART: Pascagoula, Mississippi **ARRIVE:** Pascagoula, Mississippi
DEPART: Pascagoula, Mississippi **ARRIVE:** Mayport, Florida

Project 1: SEAMAP Summer Groundfish Survey

Objectives: Sample the northern Gulf of Mexico (GOM) with Southeast Area Monitoring and Assessment Program (SEAMAP) standard trawl sampling gear to determine the abundance and distribution of benthic fauna Commission for the Conservation of Atlantic Tuna). Now these data along with satellite imagery inform models describing the ABFT spawning habitat which is believed to be located exclusively to the Gulf of Mexico. Collect size measurements to determine population size structures, transmit real-time shrimp biological data weekly to Gulf States Marine Fisheries Commission, and record profiles of the water column for temperature, salinity, fluorescence, dissolved oxygen, and turbidity using a Conductivity/Temperature/Depth unit at SEAMAP stations.

Project 2: Shark Redsnapper Longline

Objectives: Sample the U.S. Atlantic and northern Gulf of Mexico for data concerning the distribution and abundance of shark and red snapper populations to aid in stock assessments. Collect morphological measurements and biological samples to facilitate life history studies. Conduct conductivity, temperature and depth casts to profile water column temperature, salinity, transmissivity, dissolved oxygen concentrations and fluorometry.

NOAA Ship *Gordon Gunter*

Commanding Officer: Master Donn Pratt
Primary Mission Category: Fisheries Research
DEPART: Norfolk, Virginia **ARRIVE:** Norfolk, Virginia
DEPART: Norfolk, Virginia **ARRIVE:** Charleston, South Carolina

Project: Southeast Mammal and Seabird

Objectives: To better understand offshore cetacean stock structures in the US north Atlantic Exclusive Economic Zone (EEZ), the primary objective of this cruise will be to conduct a dual team visual and acoustic line transect survey of these waters. The primary survey area will occur in waters between 28°N and 38°N, and from 50m water depth to the boundary of the US EEZ. Secondary objectives will include cetacean tissue biopsies and the recovery and redeployment of a deep water autonomous acoustic recorder.



NOAA Ship *Gordon Gunter* as seen from the NOAA Twin Otter underway on Northern Right Whales.

[Photo: Tim Cole and Christin Khan/NOAA]

San Diego, CA

NOAA Ship *Reuben Lasker*

Commanding Officer: CDR Kurt Dreflak
Primary Mission Category: Fisheries Research
DEPART: San Diego, California **ARRIVE:** Newport, Oregon
DEPART: Newport, Oregon **ARRIVE:** San Francisco, California

Project: Summer California Current Ecosystem Survey

Objectives: Assess the biomasses, distributions, and biological compositions of sardine, anchovy, hake, and other Coastal Pelagic Species (CPS) populations in U.S. and Canadian waters off the Pacific coast. The primary goal of the survey is to estimate the biomasses, distributions, and biological compositions of populations of CPS and hake using data from an integrated acoustic and trawl survey. Also, a small portion of the survey will be devoted to testing and evaluation of acoustic and optical instrumentation, and a remotely operated vehicle.

Newport, OR

NOAA Ship *Rainier*

Commanding Officer: CDR E.J. Van Den Ameele
Primary Mission Category: Hydrographic Surveys
DEPART: Kodiak, Alaska **ARRIVE:** Nome, Alaska
DEPART: Nome, Alaska **ARRIVE:** Dutch, Alaska

Project: Arctic Alaska

Objective: To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation, as identified during the course of survey operations.

NOAA Ship *Bell M. Shimada*

Commanding Officer: CDR Paul Kunicki
Primary Mission Category: Fisheries Research
DEPART: Newport, Oregon **ARRIVE:** Newport, Oregon
DEPART: Newport, Oregon **ARRIVE:** Seattle, Washington

Project: Hake Survey Methods

Objectives: Investigations of Pacific hake (*Merluccius productus*) and joint survey methods, life history, and associated ecosystem components (trophic structure and oceanography). Use paired midwater trawls to evaluate potential selectivity of Pacific hake age/size classes by different codend liners. Test a larger kite on the Aluetian Wing Trawl for stability and ease of use with headrope sensors. The project will continuously sample multi-frequency acoustic backscatter data using the ship's Simrad EK60, EK80, and ME70 scientific echo sounder systems to estimate the distributions and abundances of hake, myctophids, gelatinous zooplankton, and krill.

OMAO'S MARINE OPERATIONS

CAPT Todd Bridgeman, Director of Marine Operations

OMAO's Marine Operations over-sees operations of the three regional Centers, including the Marine Operations Center-Pacific, Marine Operations Center-Atlantic, and Marine Operations Center-Pacific Islands.

OMAO'S MARINE OPERATIONS CENTER – PACIFIC (MOC-P)

CDR Brian Parker, Commanding Officer MOC-P

MOC-P serves as a homeport for two NOAA ships, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the research and survey ships in NOAA's Pacific fleet. Each year these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.

Ketchikan, AK

NOAA Ship *Fairweather*

Commanding Officer:	LCDR Mark Van Waes
Primary Mission Category:	Hydrographic Surveys
Depart: Homer, Alaska	Arrive: Kodiak, Alaska
Depart: Kodiak, Alaska	Arrive: Dutch Harbor, Alaska

Project: South Kodiak Island Survey

Objective: To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation, as identified during the course of survey operations.

Kodiak, AK

NOAA Ship *Oscar Dyson*

Commanding Officer:	LCDR Michael Levine
Primary Mission Category:	Fisheries Research
Depart: Dutch Harbor, Alaska	Arrive: Dutch Harbor, Alaska
Depart: Dutch Harbor, Alaska	Arrive: Dutch Harbor, Alaska

Project: Summer Pollock-Bering Sea

Objective: Collect acoustic-trawl (AT) data necessary to determine the distribution, biomass, and biological composition of walleye pollock, including regularly deploying a stereo-camera system (CamTrawl) in the midwater trawl to optically sample fish. Collect target strength data using hull-mounted transducers for use in converting acoustic data to estimates of absolute abundance. Calibrate the shipboard EK60 and a temporarily-installed broadband system using standard sphere calibration techniques. Collect physical oceanographic data (temperature, salinity, fluorescence and oxygen profiles with associated water samples) at selected sites, and continuously collect sea surface temperature, salinity, and fluorescence.



NOAA Ship *Oscar Dyson* underway on the Seal Ice project earlier this field season.

[Photo: LT Carl Rhodes/NOAA]

Honolulu, HI

NOAA Ship *Hi'ialakai*

Commanding Officer:

CDR Elizabeth Kretovic

Primary Mission Category:

Oceanographic Research, Environmental Assessment

Depart: Pearl Harbor, Hawaii

Arrive: Pearl Harbor, Hawaii

Project: Hawaiian Archipelago RAMP

Objective: The Hawaiian Archipelago Reef Assessment and Monitoring Program (HARAMP) is a component of an integrated coral reef ecosystem assessment led by the Coral Reef Ecosystem Program (CREP) of the Pacific Island Fisheries Science Center in some 50 U.S.-affiliated Pacific Islands. This comprehensive, multi-agency research and education effort is sponsored by NOAA's Coral Reef Conservation Program (CRCP), a partnership between the National Marine Fisheries Service, National Ocean Service, and other NOAA agencies with the objective of improving understanding and management of coral reef ecosystems. Scientists will collect data to monitor nearshore physical and ecological factors associated with ocean acidification and general water quality, including data on water temperature, salinity, and other physical and biological characteristics of the coral reef environment using an assortment of oceanographic sampling and monitoring instruments, including systems deployed from the ship, underwater moored instruments, and sensors on the ship.



The NOAA Ship *Hi'ialakai* moored at the pier on Midway Atoll.

[Photo: Nick Jeremiah/NOAA]

NOAA Ship *Oscar Elton Sette*

Commanding Officer:

LCDR Donald Beaucage

Primary Mission Category:

Fisheries Research

DEPART: Pearl Harbor, Hawaii

ARRIVE: Pearl Harbor, Hawaii

Project: Main Hawaiian Islands Cetacean Survey & Technology Assessment

Objectives: Primary objectives include testing operational capabilities of APH-22 hexacopter from NOAA Ship *Oscar Elton Sette*, including evaluating launch and recovery protocols, and operational limits, including weather conditions, distance, and behavior of sampled cetacean groups, conducting surveys for cetaceans along the windward and leeward coasts of the main Hawaiian Islands, and sampling operations from launched small boats, and deployment and recovery of High-Frequency Acoustic Recording Packages (HARPs), underwater gliders, and passive acoustic profiling floats. Activities will take place in waters near the main Hawaiian Islands, though will primary extend from Oahu to the Big Island nearshore and in pelagic waters out to 100 nautical miles from shore.

OMAO'S MARINE OPERATIONS CENTER – PACIFIC ISLANDS (MOC-PI)

CDR Matthew Wingate, Commanding Officer MOC-PI

MOC-PI serves as a homeport for two NOAA ships, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the ships in NOAA's Pacific Islands' fleet.



OMAO's Aircraft



Tampa, Florida

WP-3D (N42RF) – “Hurricane Hunter”

Temporary Base:

Naval Air Station Jacksonville, FL

Current Mission:

Scheduled Maintenance - Until August 2016

The aircraft is at the Naval Air Station Jacksonville, Florida undergoing an extensive refurbishment period which will include replacing the wings and upgrading various components. This effort will extend the useful life of the aircraft for another 15-20 years.

WP-3D (N43RF) – “Hurricane Hunter”

Current Mission:

2016 Hurricane Season - June through November 2016

June 1 marks the beginning of the 2016 Hurricane Season and the NOAA Hurricane Hunter aircraft are ready to respond. Radar reconnaissance missions on the NOAA WP-3D aircraft will be conducted to support tropical cyclone forecasting and the Hurricane Forecast Improvement Project. These flights will use the WP-3D's tail Doppler radar system to obtain high-density, three-dimensional measurements of the inner core wind structure of each tropical cyclone, potentially throughout its full life cycle. The hurricane research missions will also use the WP-3D to support the calibration/validation of satellite measurements and instrumentation development for the tropical cyclone environment and sampling of other aspects of the tropical cyclone inner core. These measurements will be used to enhance the accuracy of track and intensity guidance generated by NOAA's numerical weather prediction models. They will also be used directly by NOAA's National Weather Service hurricane specialists with the ultimate outcome being improved accuracy of intensity and track forecasts, extended forecast/warning lead-times and improved confidence levels by decision makers.

Jet Prop Commander (N45RF)

Temporary Base:

Various locations

Current Mission:

Soil Moisture Surveys (till Mid July)/ GRAV-D-Mid July through mid-September

NOAA aircraft use specialized detection equipment to make accurate, real-time measurements of snowpack characteristics and soil moisture across the country. This information is critical for managers and others to make optimal decisions supporting river, flood, and water supply forecasting, agriculture and forest management, recreation and winter tourism, and the commerce, industry, and transportation sectors of the Nation's economy. A single snowmelt flood can cause billions of dollars in damage and in the western areas of the country spring snowmelt provides over 70% of the annual water supply. The benefits of accurate snow and soil moisture measurements are immense and NOAA aircraft are uniquely capable to provide this information.

In mid-July the aircraft will switch to supporting NOAA's National Geodetic Survey (NGS) on the Gravity for the Redefinition of the American Vertical Datum (GRAV-D) project. This project launched in 2007 and will conclude in 2022. When complete, the National Spatial Reference System will have a new, more accurate, gravity-based vertical datum. Vertical heights will be known throughout the US at a 2-cm accuracy, a vast improvement over the current vertical datum. Accurate height measurement is essential to accurate mapping and surveying, as well as floodplain mapping and management nationwide.

Gulfstream IV (N49RF)

Current Mission:

2016 Hurricane Season - June through November 2016

NOAA's Gulfstream IV aircraft will support operational tropical cyclone forecasting and the Hurricane Forecast Improvement Project. The G-IV will be the primary aircraft for surveillance missions with the Air Force's WC-130J and NOAA's WP-3D aircraft serving as backup platforms. The radar reconnaissance missions will use the G-IV's Tail Doppler Radar (TDR) system to obtain high-density, three-dimensional measurements of the inner core wind structure of tropical cyclones, potentially throughout its full life cycle. NOAA's National Weather Service is seeking to gather data on the performance of the TDR observation system and will work with the Hurricane Research Division to develop observing strategies for maximizing the utility of the TDR with the goal of improving hurricane track and intensity forecasts.

Twin Otter (N46RF)

Temporary Base: Northeast US Coast

Current Mission: Northeast AMAPPS

The aircraft will be supporting the NMFS Atlantic Marine Assessment Program for Protected Species (AMAPPS) project in the Northeast US. This survey helps to develop models and tools to provide seasonal density estimates incorporating habitat characteristics of marine mammals, turtles, and seabirds in the western North Atlantic Ocean. The project will provide data essential to supporting conservation initiatives mandated under the National Environmental Policy Act (NEPA), Marine Mammal Protection Act (MMPA), Migratory Bird Treaty Act (MBTA), and Endangered Species Act (ESA).

King Air (N68RF)

Temporary Base: Various locations

Current Mission: Continuous Coastal Mapping

Coastal Mapping is an on-going mission of NOAA's National Geodetic Survey (NGS) to survey approximately 95,000 miles of United States coastline providing the Nation with an accurate, up-to-date and seamless database of the national shoreline. This data is used as the baseline for defining America's marine territorial limits, including its Exclusive Economic Zone, and for the geographic reference needed to manage coastal resources and support marine navigation. Stereo photogrammetry and LiDAR are used to produce a digital database. In addition, the Coastal Mapping Program supports NOAA's homeland security and emergency response requirements by rapidly acquiring and disseminating a variety of datasets to federal, state, and local government agencies as well as the general public.

Twin Otter (N48RF)

Temporary base: Various locations

Current Mission: Soil Moisture Surveys

NOAA aircraft use specialized detection equipment to make accurate, real-time measurements of soil moisture content across the country. This information is critical for managers and others to make optimal decisions supporting river, flood, and water supply forecasting, agriculture and forest management, recreation and winter tourism, and the commerce, industry, and transportation sectors of the Nation's economy. The benefits of accurate soil moisture measurements are immense and NOAA aircraft are uniquely capable to provide this information.

Twin Otter (N56RF)

Temporary base: Alaska

Current Mission: Steller Sea Lions Surveys and Greenhouse Gases

The National Marine Fisheries Service is charged with will monitoring the abundance of Steller Sea Lion pups, juveniles, and adults in the North Pacific Ocean. Using a sophisticated motion-compensating camera system, imagery and data collected will be used to update multi-decadal population trends of the species. This year, the mission is to survey all terrestrial rookeries and haulout locations in the Aleutian Islands during the height of the summer breeding season.

There are significant amounts of methane and carbon dioxide being emitted from the North Slope region in late summer. It is believed these emissions are biogenic and not being emitted as a result of fires or fossil fuel extraction. This survey will measure methane, carbon dioxide and other gas concentrations to better understand the source and distribution of emissions in the region.

Twin Otter (N57RF)

Temporary base:

Florida Keys

Current Mission:

Coastal Mapping TopoBathy Lidar and Florida Keys National Marine Sanctuary surveys.

The Coastal Mapping mission will use a TopoBathy lidar sensor to collect topographic and bathymetric data in the coastal zone. Data will be used to produce the most up-to-date- and accurate marine navigation charts and for other Integrated Ocean and Coastal Mapping (IOCM) applications. The data collected will also directly support the Florida Keys National Marine Sanctuary (FKNMS). In conjunction with the mapping surveys, the FKNMS will acquire data providing a greater understanding of usage patterns within the sanctuary and surrounding waters. This information is essential to sanctuary managers and will allow them to better manage resources, modify or create new marine zones, and improve the sanctuary management plan.

OMAO'S AIRCRAFT OPERATIONS CENTER (AOC)

CAPT Michael Silah, Commanding Officer AOC

The AOC, located at MacDill Air Force Base in Tampa, Florida, serves as the main base for OMAO's fleet of nine aircraft and provides capable, mission-ready aircraft and professional crews to the scientific community. Whether studying global climate change or acid rain, assessing marine mammal populations, surveying coastal erosion, investigating oil spills, flight checking aeronautical charts, or improving hurricane prediction models, the AOC flight crews continue to operate in some of the world's most demanding flight regimes.



NOAA G-IV Aircraft and WP-3D sit on the ramp in Barbados.

[Photo: LT David Cowan/NOAA]



Unmanned Systems Support



NASA Global Hawk

Location: NASA Wallops Flight facility
Mission: SHOUT

The NASA Global Hawk project will install and test several hurricane science instruments during the month of July in preparation for the 2016 Hurricane Season. This year's hurricane surveillance campaign is called SHOUT (Sensing Hazards Operationally using Unmanned Technology), which is a NOAA funded project entering its third year. Basing out of Wallops, VA allows the Global Hawk to operate in the Atlantic, Caribbean, and Gulf of Mexico as well as spend added time on station over hurricanes.

APH-22 Hexacopter

Location: Sandy Point, Bahamas
Mission: Bahamas Beaked Whale

SWFSC in collaboration with the Bahamas Marine Mammal Research Organization seeks to utilize the APH-22 Hexacopter to survey Beaked Whales in the vicinity of Great Abaco Island in the Bahamas. Beaked whales are known to be particularly vulnerable to sonar exposure, and are difficult to reliably find and study at sea. However, these whales are known to naturally congregate in an area south of Abaco Island. Aerial images will assist in developing a baseline data set to determine the health of whales in a control population, not regularly disturbed by ship sonar. This project will assist in the future monitoring and understanding of the population levels affected by sonar within Navy operating areas.



Blainville's beaked whale mother and calf.

[Photo: Dr. John Durban/NOAA]

Location: NOAA Ship *Oscar Elton Sette*

Mission: Hawaiian Cetaceans

The Pacific Islands Fisheries Science Center (PIFSC) Cetacean Research Program (CRP) conducts research on various cetacean species within the Hawaiian Archipelago, including both nearshore and offshore waters annually. As part of these efforts CRP collects data on species ID of sighted groups, group size, behavior, the occurrence of calves and data on individual animal condition. The CRP plans to evaluate the APH-22 Hexacopter from the NOAA Ship *Oscar Elton Sette* for future ship based cetacean research, and to test the capability and utility of the platform for obtaining photographs of cetacean groups that may be used for calibration of observer based group size estimates.

Location: Pribilof Islands, Alaska

Mission: Pribilof Fur Seals

The National Marine Fisheries Service (NMFS), Marine Mammal Laboratory (MML) seeks to utilize the APH-22 Hexacopter to photograph northern fur seal rookeries in the Pribilof Islands: St Paul, St. George, Otter, and Walrus Island. The Eastern Pacific northern fur seal stock is managed by NMFS and listed as depleted under the Marine Mammal Protection Act. Photographic survey flights will be flown above the targeted animals at a height of 100 feet. The captured images will be used to update historical photographs of rookery spaced used by northern fur seals. Additionally, opportunistic surveys of Steller sea lions will be collected to gather population data and catalog permanent markings of individuals.

Location: Olympic National Marine Sanctuary, Washington

Mission: Olympic Coast Stellar Sea Lions

NMFS MML seeks to utilize the APH-22 Hexacopter to obtain aerial imagery of two Steller sea lion rookeries in the Olympic Coast National Marine Sanctuary. UAS flights will be used to determine the number of pups and non-pups present at each rookery. This information is then used to calculate abundance and trends. Images will also be analyzed for branded animals. Sightings of branded animals provide researchers with important information on animal movement, survival, and productivity.



OMAO Partnerships



United States Senate Committee on Commerce, Science, and Transportation

Location: Washington, DC

Detail: LCDR Wendy Lewis, NOAA Commissioned Officer Corps

LCDR Lewis is currently on detail to the Committee with the staff of the Chair, Senator John Thune (R-SD), where she is assisting on activities pertaining to oceans, atmosphere, and fisheries policy, as well as other matters within the Committee's jurisdiction.

National Science Foundation

Location: Antarctica

Mission: LTJG Rafael Klein, NOAA Commissioned Officer Corps

Members of the NOAA Commissioned Officer Corps carry out NOAA's mission in remote locations across the globe. LT Milton is assigned to Antarctica where he serves as the Station Chief for NOAA's Atmospheric Research Observatory (ARO) at the Amundsen-Scott South Pole Station. The ARO at the Amundsen-Scott South Pole Station is a National Science Foundation facility used in support of scientific research related to atmospheric phenomena.

Department of Defense - U.S. Pacific Command (USPACOM)

Location: Honolulu, Hawaii

Embedded Liaison: CAPT Barry Choy, NOAA Commissioned Officer Corps

The U.S. Pacific Command (USPACOM) area of responsibility encompasses approximately half the earth's surface and more than half of its population. The 36 nations that comprise the Asia-Pacific include: two of the three largest economies and nine of the ten smallest; the most populous nation; the largest democracy; the largest Muslim-majority nation; and the smallest republic in the world. The region is a vital driver of the global economy and includes the world's busiest international sea lanes and nine of the ten largest ports. By any meaningful measure, the Asia-Pacific is also the most militarized region in the world, with seven of the world's ten largest standing militaries and five of the world's declared nuclear nations. Under these circumstances, the strategic complexity facing the region is unique. CAPT Choy is linked closely with the activities within the region allowing for identification of opportunities and cooperation between USPACOM and NOAA, and better overall government function situational awareness in the region.

Department of Defense - U.S. Navy

Location: Washington, DC

Embedded Liaison: LCDR Jason Mansour, NOAA Commissioned Officer Corps

LCDR Jason Mansour serves as NOAA liaison to the Oceanographer of the Navy and is an important interface between the U.S. Navy and other U.S. federal agencies, including NOAA. As NOAA Liaison, LCDR Jason Mansour serves as the Head of the Interagency Policy Branch of the International and Interagency Policy Division, Office of the Oceanographer of the Navy, located at the U.S. Naval Observatory. The mission of this Division is to coordinate and execute the Oceanographer of the Navy functions related to policy and programs involving international and/or interagency oceanography. Oceanography includes meteorology, oceanography, mapping, charting and geodesy, astronomy, and precise time and time interval.

Location: Stennis Space Center, Mississippi

Embedded Liaison: LTJG Laura Dwyer, NOAA Commissioned Officer Corps

Embedded in the Navy's Naval Oceanography Mine Warfare Center, LTJG Laura Dwyer works side by side with Navy officers operating Unmanned Underwater Vehicles worldwide and is currently stationed at Stennis Space Center. This collaboration will provide knowledge and experience that will keep NOAA on the cutting edge of this emerging technology as well as strengthen the partnership between NOAA and the Navy.

Department of Homeland Security - U.S. Coast Guard

Location: Washington, DC

Embedded Liaison: CDR G. Mark Miller, NOAA Commissioned Officer Corps

As the NOAA liaison to the United States Coast Guard (USCG), CDR Miller maintains a current and comprehensive knowledge of interagency activities and policies related to the USCG and NOAA. He identifies potential conflicts or benefits issues for analysis and evaluation, conducts appropriate assessments and studies, and serves as the interface between NOAA and the USCG. CDR Miller initiates, designs, and implements strategies through federal agency liaison and coordination that results in cooperative arrangements for maritime security, oceanographic research, hazardous materials spill response, and many other activities.



Teacher at Sea Program



The mission of the [Teacher at Sea](#) (TAS) program is to give teachers a clearer insight into our ocean planet, a greater understanding of maritime work and studies, and to increase their level of environmental literacy by fostering an interdisciplinary research experience. The program provides a unique environment for learning and teaching by sending kindergarten through college-level teachers to sea aboard NOAA research and survey ships to work under the tutelage of scientists and crew. Then, armed with new understanding and experience, teachers bring this knowledge back to their classrooms. Since its inception in 1990, the program has enabled more than 600 teachers to gain first-hand experience of science and life at sea. By participating in this program, teachers enrich their classroom curricula with knowledge that can only be gained by living and working side-by-side, day and night, with those who contribute to the world's body of oceanic and atmospheric scientific knowledge. Below is a list of the NOAA Teachers at Sea for the current monthly update for the 2016 Field Season. Once they have embarked on their cruise, you can gain access to their [blogs](#) which document their missions at sea and offer a wealth of information about the research being conducted as well as personal stories.

- Teacher at Sea Lynn Kurth from Prairie River Middle School, Merrill, Wisconsin sailing out of Homer, Alaska to Dutch Harbor, Alaska on NOAA Ship *Rainier* during a hydrographic survey project.
 - <https://teacheratsea.wordpress.com/author/lynnkurth/>
- Teacher at Sea Julia Harvey from South Eugene High School, Eugene, Oregon sailing out of Honolulu, Hawaii on the NOAA Ship *Hi'ialaki* on an oceanographic project.
 - <https://teacheratsea.wordpress.com/author/harvey753/>
- Teacher at Sea Sandra Thornton from Broadwater Academy, Exmore, Virginia sailing out of Seward, Alaska on a PolarTREC research cruise on USCG HEALY.



Teacher-At-Sea, Spencer Cody underway aboard NOAA Ship *Fairweather*.

[Photo: NOAA]



OMAO - NOAA Dive Program



OMAO manages and implements [NOAA's Dive Program](#) (NDP), which trains and certifies scientists, engineers, and technicians from federal, state, tribal governments, and the private sector to perform the variety of tasks carried out underwater to support NOAA's mission. NDP also has cooperative diving agreements with over 100 government agencies and academic institutions. NOAA has more than 400 divers who perform over 14,000 dives per year. The NDP is headquartered at the NOAA Diving Center at the NOAA Western Regional Center in Seattle, Washington.

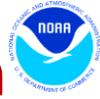


A small male whale shark swam up to NOAA Diver Ryan Eckert at West Flower Garden Bank, after he and other fellow NOAA Divers had just finished maintaining water quality equipment and were heading topside. The shark circled around them for almost 30 minutes, allowing them to measure it (6 meters in length, or about 20 feet) and tag it.

[Photo: Marissa Nuttall/NOAA]



OMAO Small Boat Program



OMAO manages NOAA's [Small Boat Program](#) and sets policy and provides safety inspections for almost 400 small boats operated by the various Line and program offices throughout NOAA, which support fisheries laboratories, dive support, nautical charting, ocean and Great Lakes research, and more.



NOAA small boats support many diverse operations across the country.

[Photos: NOAA]



Office of Marine and Aviation Operations



Providing Environmental Intelligence for a Dynamic World

The personnel, ships, and aircraft of NOAA play a critical role in gathering environmental data vital to the nation's economic security, the safety of its citizens, and the understanding, protection, and management of our natural resources. The NOAA fleet of ships and aircraft is managed and operated by the Office of Marine and Aviation Operations (OMAO), an office comprising civilians, mariners, and officers of the NOAA Commissioned Officer Corps, one of the seven uniformed services of the United States. NOAA's roots trace back to 1807, when President Thomas Jefferson ordered the first comprehensive coastal surveys. Those early surveys ensured safe passage of ship-borne cargo for a young nation. As the needs of the nation have grown, so too have OMAO's responsibilities. Today, OMAO civilians and NOAA Corps officers operate, manage, and maintain NOAA's active fleet of 16 research and survey ships and nine specialized aircraft. Together, OMAO and the NOAA Corps support nearly all of NOAA's missions.



NOAA has the largest fleet of federal research and survey ships in the nation. The fleet ranges from large oceanographic ships capable of exploring and charting the world's deepest ocean, to smaller vessels responsible for surveying the shallow bays and inlets of the United States. The fleet supports a wide range of marine activities including fisheries surveys, nautical charting, and ocean and climate studies. Based throughout the continental United States, Alaska, and Hawaii, the ships operate in all regions of the nation and around the world.

NOAA's aircraft provide a wide range of airborne capabilities. Our highly specialized Lockheed WP-3D "Hurricane Hunter" aircraft are equipped with an unprecedented variety of scientific instrumentation, radars, and recording systems for both in situ and remote sensing measurements of the atmosphere, the Earth, and its environment. Equipped with both C-band weather radar and X-band tail Doppler radar systems, the WP-3Ds have the unique ability to conduct tropical cyclone research in addition to storm reconnaissance. Together with NOAA's Gulfstream IV-SP hurricane surveillance jet, these aircraft greatly improve our physical understanding of hurricanes and enhance the accuracy of tropical cyclone forecasts. NOAA's light aircraft also play a vital role in monitoring our environment. Our King Air, Commander and Twin Otter aircraft support marine mammal population studies, shoreline change assessments, oil spill investigations, and water resource/snowpack surveys for spring flood forecasts.



The NOAA fleet provides immediate response capabilities for unpredictable events. For example, in November 2014, our aircraft flew missions over upstate New York after the record snow falls of up to seven feet and conducted airborne Snow Water Equivalent (SWE) and soil moisture measurements. Airborne SWE measurements are used by NOAA's National Weather Service when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.

After Hurricane Sandy in 2012, NOAA ships Thomas Jefferson and Ferdinand R. Hassler conducted emergency bathymetric surveys to locate possible submerged navigational hazards in the ports of New York and Virginia. These surveys enabled the ports to reopen quickly. Aerial images of storm-stricken regions, taken by NOAA aircraft, helped residents and emergency workers to quickly assess the condition of houses, bridges, and vital infrastructure. In 2010, the NOAA fleet and the NOAA Corps played a major role in the response to the BP Deepwater Horizon oil spill. NOAA's entire Atlantic fleet and over a quarter of the total strength of the NOAA Corps were deployed to the Gulf following the spill, developing mission plans and assisting response efforts.

While manned aircraft and sea-going vessels have been, and will continue to be, a primary source of environmental data, new technology will have a significant role to play in the future NOAA fleet. OMAO, in coordination with other NOAA offices and federal agencies, is evaluating and deploying remotely piloted underwater and aircraft systems that could significantly contribute to environmental observations. OMAO's ongoing challenge is to meet the growing demand for in situ scientific data while providing the highest level of service. To better serve the needs of the nation, NOAA is examining the composition of the fleet through an exhaustive and critical review of at-sea science and observation requirements. Our objective is to develop a clear, cost-efficient path forward to ensure that the NOAA fleet can continue to conduct at-sea surveys and research vital to fisheries management, updating nautical charts, responding to natural and manmade disasters, and understanding coastal and marine systems more fully. Meeting these requirements is essential to developing sustainable, science-based management and conservation plans that protect the health and resiliency of these resources over the long-term.

We continue our efforts to build a civilian and NOAA Corps officer work force that is uniquely qualified to gather critical environmental intelligence and be adaptive and responsive to a changing world and work to expand our partnerships with other federal agencies. For example, NOAA Corps officers are currently assigned to work in the Department of Defense, National Science Foundation, and the U.S. Senate among others where they lend their expertise and service. We also continue to strengthen our partnership with the U.S. Coast Guard. Our basic NOAA Corps officer training class is held at the U.S. Coast Guard Academy, where newly commissioned officers train alongside Coast Guard officer candidates, developing skills and professional relationships that will benefit both services, especially during challenging times. Active collaboration among the Federal family is critical to ensuring the long-term capability and success of the federal ocean infrastructure. Our partners' success is our success. The men and women of OMAO and the NOAA Corps provide environmental intelligence for a dynamic world as they serve our nation every day from the farthest seas to the highest skies.

NOAA Commissioned Officer Corps

– Honor, Respect, Commitment –



The [NOAA Commissioned Officer Corps](#) (NOAA Corps) is one of the nation's seven uniformed services and serve with the 'special trust and confidence' of the President. NOAA Corps officers are an integral part of the National Oceanic and Atmospheric Administration (NOAA), an agency of the U.S. Department of Commerce. With 321 officers, the NOAA Corps serves throughout the agency's line and staff offices to support nearly all of NOAA's programs and missions. The combination of commissioned service and scientific expertise makes these officers uniquely capable of leading some of NOAA's most important initiatives.

The NOAA Corps is part of NOAA's Office of Marine and Aviation Operations (OMAO) and traces its roots back to the former U.S. Coast and Geodetic Survey, which dates back to 1807 and President Thomas Jefferson. In 1970, NOAA was created to develop a coordinated approach to oceanographic and atmospheric research and subsequent legislation converted the commissioned officer corps to the NOAA Corps. The NOAA Corps today provides a cadre of professionals trained in engineering, earth sciences, oceanography, meteorology, fisheries science, and other related disciplines. Corps officers operate NOAA's ships, fly aircraft, manage research projects, conduct diving operations, and serve in staff positions throughout NOAA.

Benefits of the NOAA Corps to the Nation

The combination of commissioned service with scientific and operational expertise, allows the NOAA Corps to provide a unique and indispensable service to the nation. NOAA Corps officers enable NOAA to fulfill mission requirements, meet changing environmental concerns, take advantage of emerging technologies, and serve as environmental first responders. For example:

- In November 2014, our aircraft flew missions over upstate New York after the record snow falls of up to seven feet and conducted airborne Snow Water Equivalent (SWE) and soil moisture measurements. Airborne SWE measurements are used by NOAA's National Weather Service when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.
- After Hurricane Sandy in 2012, NOAA ships *Thomas Jefferson* and *Ferdinand R. Hassler* conducted emergency bathymetric surveys to locate possible submerged navigational hazards in the ports of New York and Virginia. These surveys enabled the ports to reopen quickly. Aerial images of storm-stricken regions, taken by NOAA aircraft, helped residents and emergency workers to quickly assess the condition of houses, bridges, and vital infrastructure.
- After Hurricane Irene in 2011, the NOAA Ship *Ferdinand Hassler* and team completed 300 lineal nautical miles of survey work in less than 48 hours providing a Damage Assessment that enabled the U.S. Coast Guard to re-open ports and restore more than \$5M per hour in maritime commerce less than three days after the storm.
- In 2010, the NOAA fleet and the NOAA Corps played a major role in the response to the BP Deepwater Horizon oil spill. NOAA's entire Atlantic fleet and over a quarter of the total strength of the NOAA Corps were deployed to the Gulf following the spill, developing mission plans and assisting response efforts.