



# NOAA Fleet Update

## March 2017

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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# Table of Contents

Please click on the Table of Contents entry below to be taken directly to a specific ship, center, aircraft, asset, program, or information. The fleet is listed based on the geographical location of their homeport/base starting in the Northeast and ending in the Pacific.

<b>OMAO and the NOAA Corps – In the News</b> .....	<b>4</b>
<b>NOAA Basic Officer Training Class</b> .....	<b>5</b>
<b>OMAO’s Ships and Centers</b> .....	<b>6</b>
<b><i>New Castle, NH</i></b> .....	<b>6</b>
NOAA Ship <i>Ferdinand R. Hassler</i> .....	6
<b><i>Newport, RI</i></b> .....	<b>7</b>
NOAA Ship <i>Henry B. Bigelow</i> .....	7
<b><i>Davisville, RI</i></b> .....	<b>7</b>
NOAA Ship <i>Okeanos Explorer</i> .....	7
<b><i>Norfolk, VA</i></b> .....	<b>8</b>
NOAA Ship <i>Thomas Jefferson</i> .....	8
OMAO’S MARINE OPERATIONS CENTER – ATLANTIC (MOC-A) .....	8
<b><i>Charleston, SC</i></b> .....	<b>8</b>
NOAA Ship <i>Nancy Foster</i> .....	8
NOAA Ship <i>Ronald H. Brown</i> .....	8
<b><i>Pascagoula, MS</i></b> .....	<b>9</b>
NOAA Ship <i>Pisces</i> .....	9
NOAA Ship <i>Oregon II</i> .....	9
NOAA Ship <i>Gordon Gunter</i> .....	9
<b><i>San Diego, CA</i></b> .....	<b>10</b>
NOAA Ship <i>Reuben Lasker</i> .....	10
<b><i>Newport, OR</i></b> .....	<b>10</b>
NOAA Ship <i>Rainier</i> .....	10
NOAA Ship <i>Bell M. Shimada</i> .....	10
OMAO’S MARINE OPERATIONS .....	10
OMAO’S MARINE OPERATIONS CENTER – PACIFIC (MOC-P) .....	10
<b><i>Ketchikan, AK</i></b> .....	<b>11</b>
NOAA Ship <i>Fairweather</i> .....	11
<b><i>Kodiak, AK</i></b> .....	<b>11</b>
NOAA Ship <i>Oscar Dyson</i> .....	11
<b><i>Honolulu, HI</i></b> .....	<b>11</b>
NOAA Ship <i>Hi’ialakai</i> .....	11
NOAA Ship <i>Oscar Elton Sette</i> .....	12
OMAO’S MARINE OPERATIONS CENTER – PACIFIC ISLANDS (MOC-PI) .....	12

<b>OMAO's Aircraft .....</b>	<b>13</b>
<i>Tampa, Florida.....</i>	<i>13</i>
WP-3D (N42RF) – “Hurricane Hunter” .....	13
WP-3D (N43RF) – “Hurricane Hunter” .....	13
Gulfstream IV (N49RF) .....	13
Jet Prop Commander (N45RF) .....	13
Twin Otter (N46RF) .....	13
Twin Otter (N48RF) .....	13
Twin Otter (N56RF) .....	14
Twin Otter (N57RF) .....	14
King Air (N68RF) .....	14
OMAO'S AIRCRAFT OPERATIONS CENTER (AOC) .....	14
<b>Unmanned Systems Support .....</b>	<b>16</b>
<i>NASA Global Hawk .....</i>	<i>16</i>
<i>APH-22 Hexacopter .....</i>	<i>16</i>
<b>OMAO Partnerships .....</b>	<b>19</b>
<i>United States Senate Committee on Commerce, Science, and Transportation.....</i>	<i>19</i>
<i>National Science Foundation .....</i>	<i>19</i>
<i>Department of Defense - U.S. Pacific Command (USPACOM).....</i>	<i>19</i>
<i>Department of Defense - U.S. Navy .....</i>	<i>19</i>
<i>Department of Homeland Security - U.S. Coast Guard .....</i>	<i>20</i>
<b>Teacher at Sea Program .....</b>	<b>21</b>
<b>OMAO - NOAA Dive Program.....</b>	<b>22</b>
<b>OMAO Small Boat Program.....</b>	<b>23</b>
<b>Office of Marine and Aviation Operations .....</b>	<b>24</b>



# OMAO and the NOAA Corps – In the News

## [US 'hurricane hunters' based at Shannon Airport](#)

-The Clare Herald

A United States "hurricane hunter" aircraft is currently based in Ireland and undertaking weather reconnaissance missions in Irish airspace. The National Oceanic and Atmospheric Administration (NOAA) Lockheed WP-3D Orion, also known as "Kermit", arrived in Ireland on January 20th where, along with its 19-person crew, is based at Shannon Airport. Best known for its role as a "hurricane hunter", it's also the plane's first major deployment since undergoing an extensive overhaul and equipment upgrades which includes a prototype antenna designed by the European Space Agency for use on Europe's next generation weather satellites...

## [First Footage of Stylodactylid Shrimp Filter-Feeding at Depth of 4826 m](#)

-The Fish Site

US - The first of a kind footage of a living stylodactylid shrimp filter-feeding at depth of 4826 m has been captured on high-quality video during the US National Oceanographic and Atmospheric Administration's '2016 Exploration of the Marianas' expedition. Depths such as those at the Marianas Trench Marine National Monument are an extreme challenge for explorers, providing scarce information about their inhabitants, let alone their behavior. While most of them are known from dead specimens gathered by trawls, a team of scientists, led by Dr. Mary Wicksten, Texas A&M University, USA, have recently retrieved footage of a living shrimp from the seafloor at a striking depth of 4826 m...

## [Researchers hope to learn more about the inversion by flying through it](#)

-KUTV

Salt Lake City- Daily flights in a specially equipped airplane may help researchers better understand the fine particulate matter that makes up the inversion found along the Wasatch Front, according to one group. This comes at an especially crucial time after the Environmental Protection Agency named Salt Lake's air the worst in the country on Jan. 31, according to the agency's air quality monitoring site. "This airplane really gets us into places that we need to get," Steven Brown from Earth System Research Lab said. The Twin Otter airplane comes from the National Oceanic and Atmospheric Administration. It will fly between 1500 and 2000 feet ....

## [UFO-looking Jellyfish Spotted by NOAA](#)

-KTRK-TV

AMERICAN SOMOA (KTRK) -- A NOAA exploration ship, the Okeanos Explorer, caught video of one of the ocean's most beautiful creatures. Diving near 9000 feet, a remotely operated vehicle (ROV) spotted a luminous jellyfish. The "cosmic" jellyfish was seen while exploring the Utu seamount, north of American Samoa in the South Pacific. NOAA said the sea creature showed the "perfectly relaxed arrangement of the two sets of tentacles, a position that would allow for optimum feeding in the mid-water environment at 3,000 meters." The same species was seen on previous Okeanos Explorer expeditions...



# NOAA Basic Officer Training Class



Class 129



**NOAA Corps OC Fuller, champion of the OCS 2-17/BOTC 129 vs. Class of 2020 Drill Down Competition, along with 2nd Place USCGA 4/C Whitney and 3rd Place USCG OC Long (pictured top right). Also competing from BOTC 129 was NOAA Corps OC Norman, who is being inspected by the judges in the pictured top left.**

[Photo: NOAA]

The NOAA Corps Officer Candidates from Basic Officer Training Class (BOTC) 129 have been making huge strides in their teamwork, professionalism, health and physical readiness, and overall development in their journey toward graduation alongside their Coast Guard counterparts.

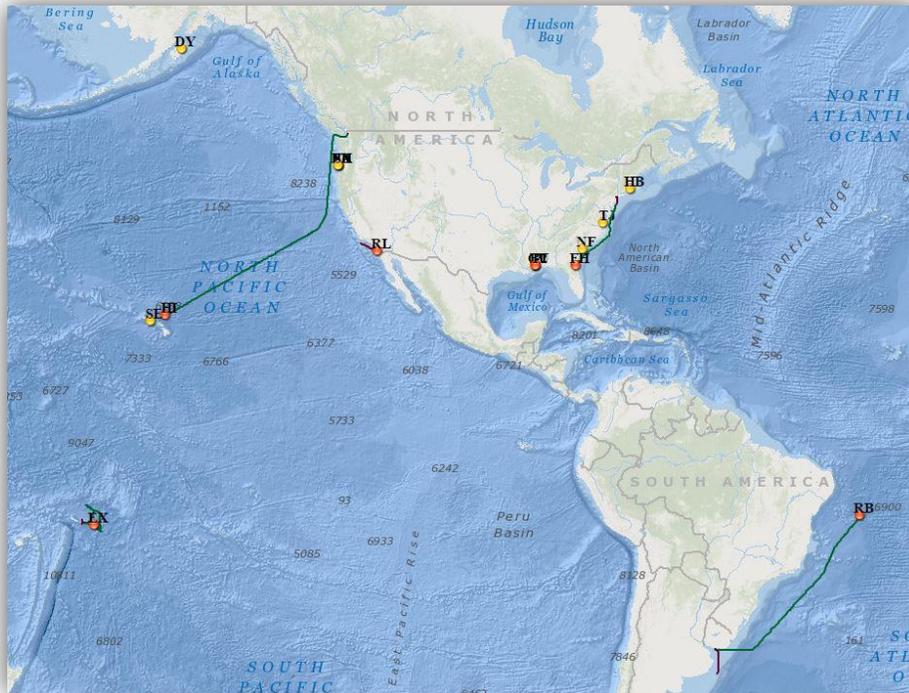
NOAA Corps Officer Candidate Fuller received 1<sup>st</sup> Place in the Drill Down. The Drill Down is a competition between the members of OCS 2-17/BOTC 129 and the 4<sup>th</sup> Class (first year) Academy Cadets. The competition is judged on each participant's Coast Guard/NOAA practical knowledge comprehension, military bearing, and execution of drill commands with their M-1 rifle. This was a very proud moment for the NOAA Corps, as Mr. Fuller was the first NOAA Corps student since BOTC 123 to take 1<sup>st</sup> Place in the Drill Down.



# 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*

<b>Commanding Officer:</b>	LCDR Matthew Jaskoski
<b>Primary Mission Category:</b>	Hydrographic Surveys
<b>DEPART:</b> Charleston, South Carolina	<b>ARRIVE:</b> Charleston, South Carolina
<b>DEPART:</b> Charleston, South Carolina	<b>ARRIVE:</b> New Castle, New Hampshire

**Project:** Approaches to Jacksonville

**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.

## Newport, RI

### NOAA Ship *Henry B. Bigelow*

**Commanding Officer:** CDR Jeff Taylor  
**Primary Mission Category:** Fisheries Research  
**DEPART:** Newport, Rhode Island **ARRIVE:** Newport, Rhode Island  
**DEPART:** Newport, Rhode Island **ARRIVE:** Newport, Rhode Island

**Project:** Spring Multispecies Bottom Trawl Survey

**Objective:** Determine the spring distribution and relative abundance of fish and invertebrate species found on the continental shelf and upper slope, including the collection of additional biological information following the pre-established sampling plan at the direction of the Chief Scientist. Opportunistically evaluate survey gear efficiency, methods, or survey related equipment that may benefit the trawl survey and fish stock assessments and collect oceanographic data including conductivity temperature and depth casts and bongo tows at selected stations. Finally collect acoustic data along cruise tracks with the EK-60 and ME-70 acoustic systems.

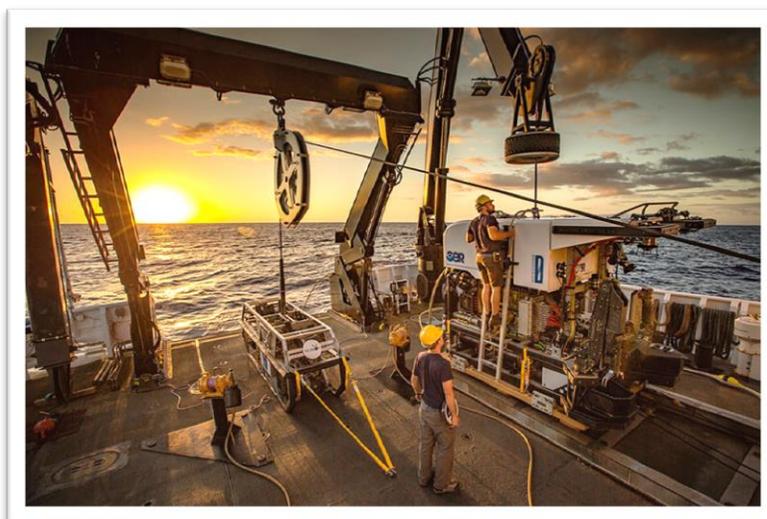
## Davisville, RI

### NOAA Ship *Okeanos Explorer*

**Commanding Officer:** CAPT Mark Wetzler  
**Primary Mission Category:** Oceanographic Exploration and Research  
**DEPART:** Apia, Samoa **ARRIVE:** Apia, Samoa  
**DEPART:** Apia, Samoa **ARRIVE:** Pago Pago, American Samoa

**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.



The ROVs *Seirios* and *Deep Discoverer* are prepared for deployment on the aft deck of NOAA Ship *Okeanos Explorer*.

Photo: [NOAA]

## Norfolk, VA

### NOAA Ship *Thomas Jefferson*

**Commanding Officer:** CDR Christiaan van Westendorp

**Primary Mission Category:** Hydrographic Surveys

**Ship Status:** Vessel will be in scheduled dry dock as well as alongside 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:** Master Donn Pratt

**Primary Mission Category:** Oceanographic Research, Environmental Assessment

**DEPART** Charleston, South Carolina **ARRIVE:** Ponce, Puerto Rico

**DEPART:** Ponce, Puerto Rico **ARRIVE:** San Juan, Puerto Rico

**Project:** Remotely operated vehicle (ROV) monitoring of nearshore and deep water habitats off south and southeast Puerto Rico

**Objectives:** In response to NOAA essential fish habitat concerns, the Environmental Protection Agency (EPA) conducted a series of side scan SONAR surveys over the last several years to determine whether any hard bottom areas having vertical relief are present in the vicinity of EPA-designated ocean dredged material disposal sites off Puerto Rico. These surveys identified various potential reef areas outside Guayanilla, Ponce and Yabucoa harbors. Unfortunately, SONAR technology cannot differentiate between live hard bottom and rock. Video confirmation is required to determine whether they are living coral reefs and must be afforded additional protections against degradation due to EPA regulated dredged material disposal activities. Accordingly, EPA has commissioned the present survey to obtain this confirmation. In addition, an area further offshore of the Yabucoa Ocean Dredged Material Disposal Site will be mapped using multi-beam echo sounder (MBES) to identify whether the area has any bathymetric features that would preclude future relocation of the disposal site further away from coastal shelf edge corals.

**Project:** Mapping Essential Fish habitat in the US Caribbean to Inform Marine Protected Area Management

**Objectives:** The purpose of the cruise will be to collect swath bathymetry, acoustical backscatter, ROV optical validation, fishery acoustics, and Slocum Glider deployments within coastal waters of Puerto Rico.

### NOAA Ship *Ronald H. Brown*

**Commanding Officer:** CAPT Robert Kamphaus

**Primary Mission Category:** Oceanographic Research, Environmental Assessment

**Depart:** Montevideo, Uruguay **Arrive:** Charleston, South Carolina

**Project:** PIRATA Northeast Extension

**Objectives:** Prediction Research Moored Array in the Tropical Atlantic (PIRATA) is a three-party project between Brazil, France and the United States that seeks to monitor the upper ocean and near surface atmosphere of the Tropical Atlantic via the deployment and maintenance of an array of moored buoys and automatic meteorological stations. This array is the Atlantic's analogue of the Pacific Ocean's Tropical Atmosphere Ocean (TAO) array. The PIRATA array consists of a backbone of ten moorings that runs along the equator and extends southward along 10°W to 10°S, and northward along 38°W to 15°N.



**NOAA Ship *Ronald H. Brown* as seen in the Southern Ocean.**

[Photo: Daniel Hauerland/NOAA]

### ***Pascagoula, MS***

#### **NOAA Ship *Pisces***

**Commanding Officer:** CDR Nicholas Chrobak

**Primary Mission Category:** Fisheries Research

**Ship Status:** Vessel will be in scheduled dry dock as well as alongside for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

#### **NOAA Ship *Oregon II***

**Commanding Officer:** Master Dave Nelson

**Primary Mission Category:** Fisheries Research

**Depart:** Pascagoula, Mississippi      **Arrive:** Pascagoula, Mississippi

**Project:** Experimental Longline Survey

**Objectives:** Test the effects of variable gear types under controlled experimental conditions on catch rates of teleost and elasmobranch fishes in the northern Gulf of Mexico. GoPro video cameras equipped with lasers attached to the longline mainline will provide an additional means of monitoring selectivity. An additional objective of the experimental survey is to explore depths outside of the annual NMFS MS Labs Shark/Red Snapper bottom longline survey.

#### **NOAA Ship *Gordon Gunter***

**Commanding Officer:** LCDR Lindsay Kurelja

**Primary Mission Category:** Fisheries Research

**Ship Status:** Vessel will be in scheduled dry dock as well as alongside for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

## San Diego, CA

### NOAA Ship *Reuben Lasker*

**Commanding Officer:** CDR Kurt Dreflak  
**Primary Mission Category:** Fisheries Research  
**Depart:** San Diego, California **Arrive:** San Francisco, California

**Project:** Coastal Pelagic Species Spring Survey

**Objectives:** Survey the distributions and abundances of coastal pelagic fish stocks, their prey, and their biotic and abiotic environments in the California Current between San Diego, California and Cape Mendocino, California. The survey domain encompasses the anticipated distribution of the central sub-population of Northern anchovy (*Engraulis mordax*). The modeled distribution of Pacific sardine (*Sardinops sagax*) potential habitat, and any information recently gathered from other research projects or the fishing industry (e.g. sardine bycatch) will be used to determine whether the survey domain also encompassed the expected distribution of sardine.

## Newport, OR

### NOAA Ship *Rainier*

**Commanding Officer:** CDR John Lomnický  
**Primary Mission Category:** Hydrographic Surveys  
**Ship Status:** Alongside winter repair period. Vessel will be alongside in Newport, Oregon for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

### NOAA Ship *Bell M. Shimada*

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

**Project 1:** Gear Selectivity Survey

**Objectives:** Determine the selectivity characteristics of the Nordic 264 midwater trawl in relation to potential escapement of coastal pelagic species (CPS). Ground truth the Saildrone unmanned system instrument suite with the Shimada.

**Project 2:** Spring CalCOFI

**Objectives:** Survey the distributions and abundances of pelagic fish stocks, their prey, and their biotic and abiotic environments in the area of the California Current between San Francisco, California and San Diego, California.

## 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:**

CDR Mark Van Waes

**Primary Mission Category:**

Hydrographic Surveys

**Ship Status:** Alongside winter repair period. Vessel will be alongside in Newport, Oregon for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

## **Kodiak, AK**

### **NOAA Ship Oscar Dyson**

**Commanding Officer:**

CDR Michael Levine

**Primary Mission Category:**

Fisheries Research

**DEPART:** Kodiak, Alaska

**ARRIVE:** Kodiak, Alaska

**DEPART:** Kodiak, Alaska

**ARRIVE:** Kodiak, Alaska

**Project:** Walleye Pollock Shumagin Sanak Pre Spawning Survey

**Objectives:** Collect acoustic-trawl data necessary to determine the distribution, biomass, and biological composition of walleye pollock. The project will also collect target strength data using hull-mounted transducers for use in scaling acoustic data to estimates of absolute abundance; and conduct trawl hauls (Aleutian Wing Trawl, Poly Nor'easter) to ground truth multi-frequency echo integration data collection.



**NOAA Ship Oscar Dyson underway surveying the Gulf of Alaska Pollock fishery**

[Photo: ST McGinnis/NOAA]

## **Honolulu, HI**

### **NOAA Ship Hi'ialakai**

**Commanding Officer:**

CAPT Elizabeth Kretovic

**Primary Mission Category:**

Oceanographic Research, Environmental Assessment

**DEPART:** Pearl Harbor, Hawaii

**ARRIVE:** Guam, Marianas Islands

**Project:** Marianna Archipelago Reef Assessment and Monitoring Program (MARAMP)

**Objectives:** MARAMP is a component of an integrated coral reef ecosystem assessment led by the Coral Reef Ecosystem Program (CREP) of the Pacific Islands Fisheries Science Center (PIFSC) 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.

## **NOAA Ship *Oscar Elton Sette***

**Commanding Officer:** CDR Donald Beaucage  
**Primary Mission Category:** Fisheries Research  
**DEPART:** Pearl Harbor, Hawaii      **ARRIVE:** Pearl Harbor, Hawaii  
**DEPART:** Pearl Harbor, Hawaii      **ARRIVE:** Pearl Harbor, Hawaii

### **Project 1: Insular Bottomfish Survey**

**Objectives:** The focus of this mission is to support the operational survey of Deep-7 bottomfish stock across the Main Hawaiian Islands using the Modular Optical Underwater Survey System (MOUSS) fishery-independent sampling gear. The MOUSS builds and improves upon previous efforts with the Baited Stereo-Video Bottom Camera System (BotCam), which has been effectively used to collect fishery-independent species-specific size-structured abundance data on bottomfish in the Main Hawaiian Islands.

### **Project 2: Leeward Oahu Pelagic Ecosystem Characterization**

**Objectives:** Perform a midwater trawl and bongo net survey to compare to a series of trawl and bongo net surveys from 1967-1978 off leeward Oahu, henceforth referred to as the baseline surveys. The baseline surveys estimated fish composition and abundance for 4 different components of the pelagic community, notably the mesopelagic fish assemblage shorefish larvae, tuna larvae, as well as a suite of zooplankton taxa from 2 forage availability studies. Comparison of current composition and abundances to the baseline composition and abundances after nearly 50 years will be a valuable scientific finding to ascertain how the pelagic ecosystem has changed, or not, over that extended time period. The sampling gears used in the baseline surveys from 1967-1978 are Isaacs-Kidd midwater trawl (IKMT), Cobb trawl, and 70cm bongo nets. The second primary component of LOPEC on SE17-03 is to establish a time series of micronekton and plankton for the leeward Oahu area for ecosystem monitoring. Some operations from the baseline comparison component will be part of the new time series with additional surveys of plankton using other sampling gear such as ring nets and other configurations (different mesh sizes) of bongo nets during both the daytime and the nighttime.

## **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:** Huntsville, Alabama  
**Current Mission:** VORTEX-SE through April

The VORTEX-SE project assesses the formation, intensity and path of tornadoes in the Southeast U.S. region. The overarching goal of VORTEX-SE is to reduce damage, injuries, and loss of life from tornadoes through improvements in understanding, forecasting and warning, and risk communication in ways that support protective decision making.

### WP-3D (N43RF) – “Hurricane Hunter”

**Temporary Base:** Jacksonville, Florida  
**Current Mission:** Scheduled Maintenance

The aircraft is scheduled to be inducted into re-winging on March 15. No additional projects are planned on this airframe until re-wing is complete in summer 2018.

### Gulfstream IV (N49RF)

**Current Mission:** Equipment Installation

The aircraft will have equipment installed in preparation for the 2017 hurricane season.

### Jet Prop Commander (N45RF)

**Temporary Base:** Various Locations  
**Current Mission:** Snow Survey

This aircraft is supporting the snow survey mission, using specialized detection equipment to make accurate, real-time measurements of snow water 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.

### Twin Otter (N46RF)

**Temporary Base:** Various Locations  
**Current Mission:** Snow Survey

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 (N48RF)

**Temporary base:** Various Locations  
**Current Mission:** Snow Survey

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:** St. Simons Island, Georgia

**Current Mission:** Southeast Right Whales

North Atlantic right whales are critically endangered and listed under the Marine Mammal Protection Act. Aerial surveys serve multiple objectives with regard to conservation including providing locations and distribution of right whales to mariners to avoid collisions with ships, photo identification records on right whales, information on distribution and abundance of marine mammals and turtles, and provide sightings of dead whales for monitoring mortality.

### **Twin Otter (N57RF)**

**Temporary base:** Various Location

**Current Mission:** Coastal Mapping LiDAR

The TopoBathy Lidar mission will collect data in the coastal zone used to produce the most up-to-date and accurate marine navigation charts, FEMA flood plain and inundation maps, and other Integrated Ocean and Coastal Mapping (IOCM) applications. Data gathered will help ensure safe and efficient marine transportation and benefit coastal communities with accurate resource management and aid emergency response efforts.

### **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.

### **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.



Construction of new hangar to house the NOAA Aircraft Operations Center at Lakeland Linder Regional Airport.



# Unmanned Systems Support



## **NASA Global Hawk**

**Location:** Edwards Airforce Base  
**Mission:** Scheduled Inspection and Maintenance

NASA's 872 Global Hawk has just completed a Major Phase maintenance inspection and associated systems retests. A new satellite command and control communications system is being installed and testing is planned for March. NASA 872 is preparing to support a Department of Defense project's systems ground and flight tests in the spring followed by mission flights in the fall. NASA 872 will also support science missions this summer as part of a NASA project to train new engineers through preparing and executing flights against cyclonic storms in the Pacific, Gulf, Caribbean, and Atlantic regions.

NASA 874 is currently in refurbishment. It is expected to complete systems reintegration this spring followed by ground tests and a Functional Check Flight by the beginning of 2018.

Mission plans are in process to support the fall 2017 missions as well as groundwork for potential flights to the Arctic for a joint NOAA/NASA project (Arctic Domain) proposed for 2018. Global ARCHER planning is being conducted on a weekly basis as a result of the NOAA Arctic Domain meetings that occurred in early February.

## **APH-22 Hexacopter**

**Location:** Livingston Island, Antarctica  
**Mission:** Antarctic Field Operations

The NOAA National Marine Fisheries Service, Southwest Fisheries Science Center (SWFSC) in partnership with the Antarctic Ecosystem Research Division (AERD) seeks to use the APH-22 hexacopter to measure wildlife response to UAVs, continue previous year's pinnipeds surveys, and fly colony-wide census flights to monitor penguin chick production. Information gathered from these flights will ensure that UAS best practices are developed as to not cause undue stress to wildlife during breeding and non-breeding periods. Aerial pinniped surveys will prevent the drugging and capture of animals to gather mass, size, and shape data. Colony wide penguin flights will be used to calculate abundance and trends of chick populations.

**Location:** Bellows Air Force Station, Hawaii  
**Mission:** APH-22 Training

The Pacific Islands Fisheries Science Center (PIFSC) utilizes the airfield at Bellows Air Force Station on the island of Oahu to conduct training and proficiency flights. This provides APH-22 operators to maintain proficiency for future operations at a reduced cost.

**Location:** Atlantic Northeast  
**Mission:** Emergency Response Turtles and Seals

The North East Fisheries Science Center (NEFSC) seeks to use the APH-22 hexacopter to respond to entanglements and other unplanned situations involving marine mammals. Photographs will be collected for the purpose of aiding emergency stranding response, event documentation, and photo ID. UAS technologies will also be used to conduct surveys for marine turtles. The intent is to assess the feasibility of using small unmanned rotorcraft to search for turtles in their marine environment both at surface and subsurface. Turtles that are discovered either by the APH-22 or by on-vessel observers will be photographed by the APH-22 and then tagged and or sampled as part of an ongoing study. Turtles may be photographed post-release with the APH-22 to document post-release behavior. NEFSC will also use the APH-22 to conduct surveys of seal haul out sites. Photographs will be collected for the purpose of obtaining local population numbers, documenting seals with evidence of fishery interactions, and collecting photo ID data of seals with brands, wounds, and other distinguishing marks.

**Location:** Florida and Georgia Coastal Waters

**Mission:** Right Whale Photogrammetry

The Northeast Fisheries Science Center (NEFSC) seeks to utilize the APH-22 airframe to obtain right whale aerial photography and collect blow samples. Vessel surveys will be conducted in the near coastal waters of Georgia and northeast Florida during the winter calving season for North Atlantic right whales. This project is in collaboration with the Southeast Fisheries Science Center (SEFSC) and Woods Hole Oceanographic Institute (WHOI). Flight crews will maintain an altitude of at least 100 vertical feet over whales for photogrammetry measurements. If an injured or entangled whale is encountered, UAS operators are permitted to descend to 50 feet for more detailed images. Permit allows for descent to 10 feet in order for collecting a blow (breath) samples.

**Location:** Seattle, Washington

**Mission:** Sand Point APH-22 Training

The Marine Mammal Laboratory (MML) intends to begin training flights in the Sand Point area in Seattle, WA. MML has several objectives for the use of the APH-22 hexacopter unmanned aircraft system throughout Alaska. These trips tend to occur in the summer and sometimes fall seasons. In between surveys in the field, it is important for our pilots to maintain currency and proficiency. The Sand Point location will significantly reduce the travel time required and provide more opportunities to meet training requirements.

**Location:** Cape Cod, Massachusetts

**Mission:** Large Whale Assessment

This collaboration between the Southwest Fisheries Science Center, Northeast Fisheries Science Center and Woods Hole Oceanographic Institution will continue to use the APH-22 for large whale photogrammetry and health assessment in the Cape Cod Bay and off the coast of New England. Aerial images and blow samples from the whales will be captured by the hexacopter when whales are at the surface. Measurements will be made from photographs using an onboard pressure altimeter to estimate scale and altitude estimates will be calibrated using images of the support vessel.

### ***APO-32 Octocopter***

**Location:** Descanso Ranch, California

**Mission:** APO-32 Test Flights and Training

The Southwest Fisheries Science Center will be conducting test flights and training flights for the APO-32 Octocopter. Initial flight testing will be conducted under Part 107 and will consist of flight maneuvers, operating in all the control modes, emergency procedures, takeoffs, landings and photogrammetry. The APO-32 is a variant of the APH-22 hexacopter, this testing and training will build upon proven technology to produce a platform that is highly reliable, capable and safe.

### ***MD4-1000/DJI S-1000***

**Location:** Corryton, Tennessee

**Mission:** Training and Operational Development

NOAA's Air Resources Laboratory, Atmospheric Turbulence and Diffusion Division (NOAA/ARL/ATDD) seeks to utilize the NOAA National Marine Fisheries Center for Cooperative Unmanned Technologies (NOAA/NMFS/CCUT) MD4-1000 and DJI S-1000 airframes to perform instrument testing to verify its performance prior to the upcoming VORTEX-SE 2017 field study. Two iMet-XQ temperature/pressure/relative humidity sensors will be flown on the MD4-1000 for inter-comparison with the existing DJI S-1000 platform.

### ***DJI S-1000***

**Location:** Bella Mina, Alabama

**Mission:** Measure Convective Initiation in the Lower boundary layer.

NOAA's Atmospheric Turbulence and Diffusion Division (ATDD) will utilize a DJI-S1000 to measure the conditions that lead to Convective Initiation (CI) in the lower boundary layer in Northern Alabama. The goal is to measure the scale and extent of the temperature and moisture fields in the lower boundary layer adjacent to fixed towers on the surface. The mission will be flown over Auburn University's Tennessee Valley Research and Extension Center (TVREC) in Belle Mina,

AL using ATDD's existing COA 2015-ESA-106 and COA 2015-ESA-200 for this area. Additionally, the mission will be flown over Auburn University's Northern Alabama Horticultural Research Center (NAHRC) in Cullman, Alabama using the FAA-NOAA Memorandum of Agreement. ATDD's DJI S-1000 will also be utilized to perform storm damage assessment over a large area of Northern Alabama. The visible and near infrared cameras will be used to document storm damage to assist the National Weather Service with determining the category of any tornado activity in the area that occurs during the VORTEX SE intensive study periods. These flights will be performed after all severe thunderstorm and/or tornado activity has subsided.

### ***MD4-1000/ SenseFly eBee RTK***

**Location:** Channel Islands, California

**Mission:** Mapping and Surveying

The Office of National Marine Sanctuaries Collaborative Center for Unmanned Technologies plan to use the Microdrone MD4-1000 and senseFly eBee to conduct habitat mapping and living marine resource surveys in support of Channel Islands National Marine Sanctuary. The areas of operation requested are seven of the eight Channel Islands of California (Anacapa, San Miguel, Santa Cruz, Santa Rosa, San Clemente, San Nicolas, and Santa Barbara, excluding Santa Catalina).

**Location:** Camarillo, CA – California State University Channel Islands

**Mission:** Training and Operational Development

West coast training and testing field to operate the micro drones md4-1000 and senseFly eBee in order to maintain operator currency and proficiency and provide a controlled environment for refining data collection protocols and procedures. California State University Channel Islands (CSUCI) and NOAA's Collaborative Center for Unmanned Technologies (CCUT) have signed a Memorandum of Agreement to partner on the use of UAS for research and monitoring at the Channel Islands and have agreed to provide access to training field and support facilities.

### ***SenseFly eBee RTK***

**Location:** Avon Park, Florida

**Mission:** Dual eBee

The Remote Sensing Division in collaboration with the Office on National Marine Sanctuaries will begin flights in the restricted airspace of Avon Park, Florida. The flights will be used for testing and evaluating the potential of flying multiple senseFly eBee's simultaneously. The successful addition of multiple eBee's flying simultaneously will increase the efficiency and capabilities of this platform when performing habitat mapping and living marine resource surveys.

**Location:** Snelling, California

**Mission:** Habitat Mapping

The Remote Sensing Division in collaboration with National Marine Fisheries Service plan to use the senseFly eBee for Salmon habitat mapping in central California river systems. Operations are to take place near Snelling, California.



# 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 Gavin Chensue, NOAA Commissioned Officer Corps

Members of the NOAA Commissioned Officer Corps carry out NOAA's mission in remote locations across the globe. LTJG Chensue 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

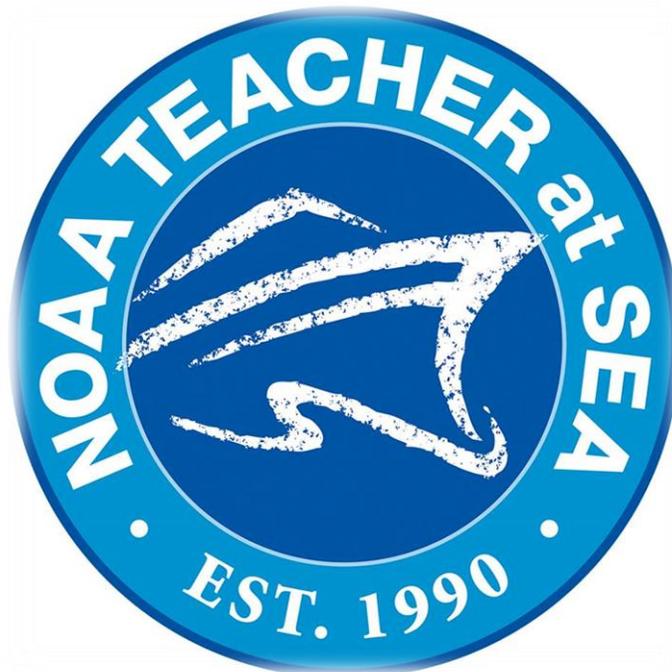


The mission of the [Teacher at Sea](#) (TAS) program is to give teachers a clearer insight into our ocean planet, a greater understanding of maritime work and studies, and to increase their level of environmental literacy by fostering an interdisciplinary research experience. The program provides a unique 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 800 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. Please access former teacher at sea [blogs](#) which document their missions at sea and offer a wealth of information about the research being conducted as well as personal stories.

- In FY 16, NOAA's Teacher at Sea Program sent 12 teachers to sea, from 10 states.
- NOAA Teachers at sea spent 182 days at sea and conducted 2,184 research hours in 2016.
- NOAA Teacher at Sea program conducted 35 outreach events.

2016 NOAA Teacher at Sea report can be viewed [here](#)

The **2017 Field Season** begins soon with 31 teachers currently scheduled to go to sea. To learn about the teachers, read their blogs, and more, please visit <http://teacheratsea.noaa.gov/#/2017/>.





# 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.



**NOAA Divers and their reciprocity partners from the California Department of Fish and Wildlife were able to collect a second abalone for the white abalone captive breeding program in Southern California. The first one was collected in late October.**

[Photo: Chris Plante/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 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 jet, these 'hurricane hunter' 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, Turbo Prop 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 October 2016, NOAA's WP-3D (N43RF) and G-IV (N49RF) conducted 21 operational missions in seven days into Hurricane Matthew gathering vital data used to improve hurricane track and intensity forecasts. Rapid response by NOAA Ship *Ferdinand R. Hassler* to survey for underwater debris and shoaling that could prove dangerous to deeper draft vessels expedited the opening of the Ports of Charleston and Savannah by the U.S. Coast Guard following the passage of Hurricane Matthew. After the storm, NOAA's King Air (N68RF) flew 14 missions to collect post-storm damage and flooding imagery from Florida to Virginia in coordination with FEMA.

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 United States' seven Uniformed Services and as commissioned officers 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 an authorized strength of 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. The U.S. Coast and Geodetic Survey Corps was founded in 1917 to provide officers to command U.S. coastal survey ships and field survey parties locally and abroad. 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. The NOAA Corps celebrates its Centennial year in 2017.

## 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. Discipline and flexibility are inherent in the NOAA Corps personnel system. Officers are trained for positions of leadership and command in the operation of ships and aircraft; in the conduct of field projects on land, at and under the sea, and in the air; in the management of NOAA observational and support facilities; as members or leaders of research efforts; and in the management of various organizational elements throughout NOAA. NOAA Corps officers must be technically competent to assume positions of leadership and command in NOAA and Department of Commerce programs and in the Armed Forces during times of war or national emergency. 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 2016, NOAA aircraft conducted research and reconnaissance missions into Hurricane Matthew, and post-storm flooding reconnaissance missions from Florida to Virginia with FEMA. NOAA Ship *Ferdinand Hassler* conducted post-storm surveys within of the ports of Charleston and Savannah within 48 hours to re-open the ports to maritime commerce, worth more than \$5M per hour.
- In 2015, NOAA aircraft conducted research and surveillance missions into some of the planet's most extreme weather, ranging from Hurricane Patricia, the strongest on record in the Western hemisphere, to severe storms over the U.S. Great Plains region. In addition, NOAA aircraft responded to unprecedented flooding in South Carolina using advanced sensors and imaging technology to provide emergency response managers with critical real-time information needed to respond to this disaster.
- 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 in the Gulf of Mexico. 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.

