



NOAA Fleet Update

December 2016

&

January 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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OMAO and the NOAA Corps – In the News

[NOAA Research Ties Dissolving Shells off US West Coast to CO2 Emissions](#)

-Nature World News

Most people aren't familiar with pteropods, but they're very familiar with the fish that eat it. Commercially valuable fish such as salmon, sablefish, and rock sole all consume the pteropod. However, National Oceanic and Atmospheric Administration (NOAA) and partner scientists have linked the concentration of human-caused carbon dioxide in waters off the U.S. Pacific coast to the dissolving of pteropod shells. Scientists aboard NOAA Ship Fairweather sampled ocean waters and marine life to analyze how they may be affected by ocean acidification during the 2013 West Coast cruise...

[NOAA's Hurricane Hunters moving to Lakeland](#)

-Fox 13

LAKELAND (FOX 13) - NOAA's famed Hurricane Hunters are getting a new home, but they won't be going far. The agency's Aircraft Operations Center will be moving from MacDill Air Force Base in Tampa to Lakeland Linder Regional Airport in time for the 2017 hurricane season. The city of Lakeland announced the move today, adding that the move would bring over 100 "high skill, high wage employees" to the airport...

[Nelson, Rubio praise decision to move hurricane planes to Lakeland](#)

-Tampa Bay Times

Florida Sens. Bill Nelson and Marco Rubio praised a decision that will keep the federal government's "Hurricane Hunters" fleet in Florida, though MacDill lost out to Lakeland on a 10-year lease. "Keeping NOAA's Hurricane Hunters and the nearly 100 employees who work with them here in the Tampa Bay area for at least the next decade is certainly good news for the entire region," Nelson said. "Having these planes based in Florida keeps them closer to the storms they track and will help NOAA's scientists better predict where and when a storm may hit." Said Rubio: "Although I'm disappointed the Hurricane Hunters fleet will be leaving MacDill, I'm pleased it will be staying in Florida and the disruption to crew members and their families will be relatively minimal. The Hurricane Hunters play a critical role in getting the best information possible to help people prepare for hurricanes and tropical storms. Their work has literally saved lives, and I thank the crew for their ongoing commitment and service to our country..."

[NOAA offering up-close look at Japanese mini submarines in Pearl Harbor attack](#)

-Hawaii News Now

As Americans remember the attack on Pearl Harbor 75 years ago, the National Oceanic and Atmospheric Administration is offering an up-close look at two Japanese mini submarines involved in the attack. On Wednesday, Dec. 7 -- the 75th anniversary of the attack -- the public will have the chance to see a live dive to take a look at the submarines. A NOAA team will be using the ship Okeanos Explorer to see the historic wreck site and document its condition. On the morning of Dec. 7, 1941, U.S. naval vessels and aircraft on patrol outside Pearl Harbor spotted a partially submerged submarine trying to enter the harbor....



NOAA Awards Aircraft Operations Center Lease

NOAA has awarded a 10-year lease to the City of Lakeland, Florida, to house OMAO's Aircraft Operations Center (AOC) at Lakeland Linder Regional Airport. AOC serves as the main base for NOAA's fleet of nine specialized environmental data-gathering aircraft, including the agency's three "hurricane hunter" planes.

Under the lease terms, the City of Lakeland will provide AOC aircraft hangar and office space, facilities for aircraft repairs and component storage, and a runway that is at least 8,000 feet long.

The proposal submitted by the City of Lakeland was the lowest-priced technically acceptable offer NOAA received in response to the agency's request for proposals. The competition was open to airport facilities within 50 road-miles of the MacDill Air Force Base main gate. NOAA took into account the need to retain AOC's highly skilled and specialized workforce and be ready for the 2017 hurricane season when defining the lease competition area.

AOC plans to move into the facility in the spring of 2017 and expects to be fully prepared to support hurricane research, reconnaissance and response operations during the 2017 hurricane season.

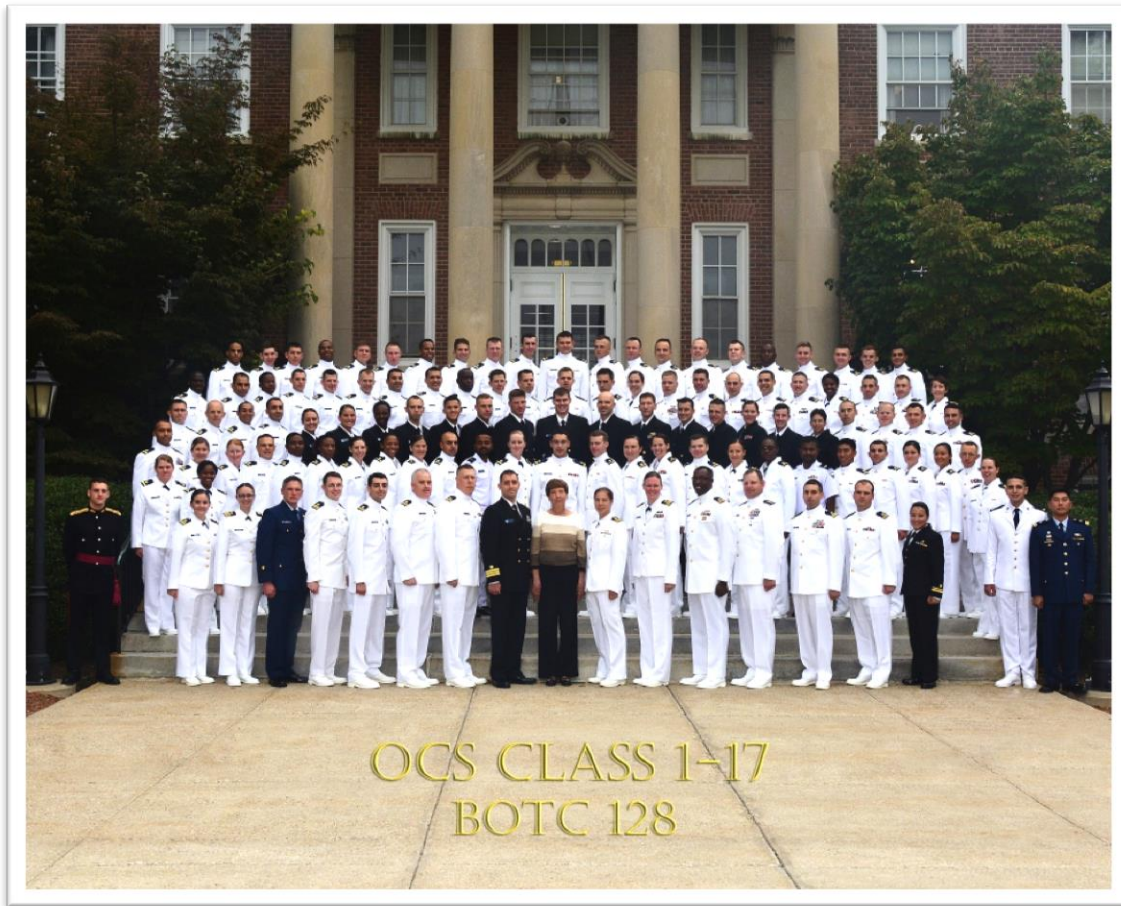




NOAA Basic Officer Training (BOTC)



Class 128



BOTC 128 completed their Officer Training class at the United Coast Guard Academy on November 22, 2016. Under Secretary for Oceans and Atmosphere and NOAA Administrator, Dr. Kathryn D. Sullivan, and United States Coast Guard Commandant, Admiral Paul F. Zukunft, provided remarks at the graduation. Following some additional training the newly commissioned Ensigns will head out to the NOAA fleet. The newest members of the NOAA Corps are:

ENS Ololade N. Ajilore
ENS Hunter L. Brendel
ENS Sydney M. Catoir
ENS Sean E. Digre
ENS Chirsotpher K. Dunn
ENS Garrison L. Grant
ENS Timothy J. Holland
ENS Patrick T. Lawler

ENS Vanessa C. Oquendo
ENS Brianna D. Pacheco
ENS Chelsea L. Parrish
ENS Lee T. Shoemaker
ENS Peter R. Siegenthaler
ENS Brandon W. H. Tao
ENS Collin H. Walker



NOAA Corps Centennial



2017 marks the centennial anniversary of the NOAA Commissioned Officer Corps. The theme for the year will be NOAA Corps: Celebrating a Century of Service. The yearlong celebration will consist of various events across the nation and will be highlighted by the NOAA Corps Anniversary Dinner held in May.



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 Matthew Jaskoski

Primary Mission Category:

Hydrographic Surveys

DEPART: New Castle, New Hampshire **ARRIVE:** New Castle, New Hampshire

DEPART: New Castle, New Hampshire **ARRIVE:** Jacksonville, Florida

Project 1: Benthic Habitat Assessment of the Northeast Continental Shelf Ecosystems

Objective: Characterize offshore benthic habitats that fall within Bureau of Ocean Energy Management designated New Jersey Wind Energy Areas, and develop benthic habitat maps, models, and other data products that can be used to improve NEFSC's analytical and decision-making capabilities with respect to offshore energy siting and monitoring, improved essential fish habitat definition, and data in support of conventional and alternative fisheries management strategies in the mid-Atlantic.

Project 2: 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

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



NOAA Ship Henry B. Bigelow, seen here passing through the Cape Cod Canal.

Photo: [David Chevrier/NOAA]

Davisville, RI

NOAA Ship Okeanos Explorer

Commanding Officer: CAPT Mark Wetzler
Primary Mission Category: Oceanographic Exploration and Research
DEPART: Honolulu, Hawaii **ARRIVE:** Honolulu, Hawaii
DEPART: Honolulu, Hawaii **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.

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



NOAA Ship *Nancy Foster* recently wrapped up a project mapping shipwrecks off of Cape Hatteras, NC.

[Photo: NOAA]

NOAA Ship *Ronald H. Brown*

Commanding Officer: CAPT Robert Kamphaus
Primary Mission Category: Oceanographic Research, Environmental Assessment
Depart: San Diego, California **Arrive:** Easter Island, Chile
Depart: Easter Island, Chile **Arrive:** Punta Arenas, Chile

Project: P18 GO-SHIP/CO2 Repeat Hydro

Objectives: This project will be a decadal reoccupation of repeat hydrography section P18 jointly funded by NOAA-COD/CPO (Climate Observation Division of the Climate Program Office) and NSF-OCE (National Science Foundation Division of Ocean Sciences) as part of the Global Ocean Ship-Based Hydrographic Investigation Program, or GO-SHIP/CO2/hydrography/tracer program. Academic institutions and NOAA research laboratories will participate. GO-SHIP focuses on the need to monitor inventories and transports of CO2, heat, and freshwater in the ocean. The program serves to constrain long term changes and variability in marine biogeochemical and physical processes in response to natural and human-induced forcing. The program provides unique high-quality measurements of key oceanographic parameters at all ocean depths.

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
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 *Gordon Gunter*

Commanding Officer: LCDR Lindsay Kurelja
Primary Mission Category: Fisheries Research
DEPART: Pascagoula, Mississippi **ARRIVE:** Pascagoula, Mississippi

Project: Fall Pelagic Trawl/Acoustic Survey

Objectives: Sample the northern Gulf of Mexico with 90 ft high-opening fish trawl to determine the abundance and distribution of benthopelagic fauna species. The project will collect size measurements to determine population size structure, and collect biological samples of selected species.

San Diego, CA

NOAA Ship *Reuben Lasker*

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

Project: 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.

Newport, OR

NOAA Ship *Rainier*

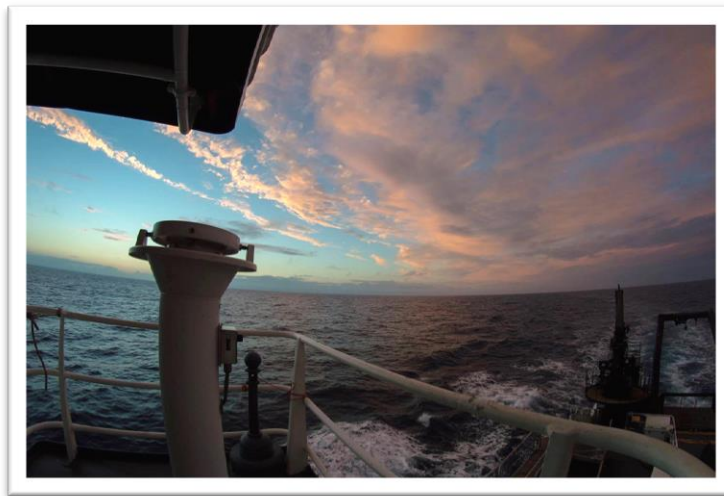
Commanding Officer: CAPT E.J. van den Ameele
Primary Mission Category: Hydrographic Surveys
Ship Status: Alongside winter repair period. Vessel will be alongside in Newport, Oregon for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

NOAA Ship *Bell M. Shimada*

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

Project: Spawning Hake Stock Acoustic

Objectives: 2017 Spawning Hake (*Merluccius productus*) Stock Acoustic-Trawl Survey will characterize the winter distribution of Pacific Hake aggregations, and the fish within those aggregations, to support evaluation of the feasibility/design of a winter hake biomass survey and increase our understanding of the winter ecology and biology of hake in the California Current Ecosystem.



NOAA Ship *Bell M. Shimada* underway from Aft Bridge Wing.
[Photo: NOAA]

OMAO'S MARINE OPERATIONS

CAPT Todd Bridgeman, Director of Marine Operations

OMAO's Marine Operations over-see 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.



NOAA Ship *Fairweather*'s underway surveying Alaska's Behm Canal.

[Photo: LT Manda/NOAA]

Kodiak, AK

NOAA Ship *Oscar Dyson*

Commanding Officer:

CDR Michael Levine

Primary Mission Category:

Fisheries Research

Ship Status: Dry Dock & Winter Repair Period. Vessel will be in scheduled dry dock in Bellingham, Washington for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

Honolulu, HI

NOAA Ship *Hi'ialakai*

Commanding Officer:

CAPT Elizabeth Kretovic

Primary Mission Category:

Oceanographic Research, Environmental Assessment

Ship Status: Dry Dock & Winter Repair Period. Vessel will be in scheduled dry dock in Bellingham, Washington for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

NOAA Ship *Oscar Elton Sette*

Commanding Officer:

CDR Donald Beaucage

Primary Mission Category:

Fisheries Research

DEPART: Pearl Harbor, Hawaii

ARRIVE: Pearl Harbor, Hawaii

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

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”

Current Mission: Equipment installation and instrumentation through December, Ocean Winds January through February.

Aircraft is at MacDill Airforce Base and is being configured for survey operations. Ocean Winds will commence mid-January. This project will use advanced microwave sensors flown aboard the NOAA P-3 aircraft to improve the use of ocean surface wind data gathered by satellites. This will allow for improvements in active and passive wind measurements and reduce the design and development risk of future observing systems. NOAA will use the information gathered to provide better surface wind data over the global oceans. This mission will also provide advanced measurements to support and calibrate satellites from multiple international organizations.

WP-3D (N43RF) – “Hurricane Hunter”

Current Mission: Training Flights through January

At the conclusion of a busy Hurricane Season, P-3 N43RF will be used for training flights in December and January. The aircraft is scheduled to be inducted into re-winging in February. No additional projects are planned on this airframe until re-wing is complete.

Jet Prop Commander (N45RF)

Temporary Base: Indianapolis, Indiana

Current Mission: Scheduled maintenance through January

This aircraft is in scheduled maintenance for engine overhauls through January 31, 2017. Following this maintenance period, the aircraft will resume its 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.

Gulfstream IV (N49RF)

Current Mission: Maintenance and training

The aircraft is undergoing scheduled maintenance through early January and will be used for training flights through the end of January.



Sunset as seen from NOAA's G-IV to the west of Hurricane Matthew.

[Photo: Mr. Mike Holmes/NOAA]

Twin Otter (N46RF)

Temporary Base: Various Locations
Current Mission: Soil Moisture 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.

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: Brunswick, Georgia, and Salt Lake City, Utah
Current Mission: Southeast Right Whales and Utah Air Quality through January

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.

The Utah Air Quality survey will study particulate matter buildup in the urban air basin along Utah's Wasatch Front. This region experiences some of the most severe particulate matter air quality issues in the Nation, particularly in December and January. Special sensors will be used to conduct vertical profiles to better understand the chemical composition of the particulate matter and the mechanisms by which the particulate matter forms.

Twin Otter (N56RF)

Current Mission: Scheduled Maintenance through January
The aircraft will be in scheduled maintenance (corrosion inspection) through the end of January.

Twin Otter (N57RF)

Temporary base: Various Location
Current Mission: Southeast AMAPPS and Southeast Right Whales through January.

The aircraft will be supporting the NMFS Atlantic Marine Assessment Program for Protected Species (AMAPPS) project on the southeast coast of the 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).

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.

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.



Unmanned Systems Support



NASA Global Hawk

Location: Edwards Airforce Base
Mission: Scheduled Inspection and Maintenance

NASA 872 continues in its phase inspection waiting the results of the Non Destructive Inspections (NDI) that were accomplished on its composite structures. NASA 874 (block 10) is in the process of being retrofitted for NASA missions. All fuselage strengthening and instrument interface structural modifications have been completed and electrical/avionics systems reinstallations are well along. Mission plans and COA's are being developed for the Fall CY 2017 missions in the Pacific, eventual flights out of Air Force Plant 42 in Palmdale, CA., and Grand Forks AFB in North Dakota.

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: Antarctic Peninsula, Antarctica
Mission: Antarctica Peninsula Whale Survey

The Southwest Fisheries Science Center (SWFSC) Hexacopter launch and recovery operations will be conducted from the deck of a Zodiac boat launched from the expedition ship National Geographic Explorer. Mission flights will typically last about 10 – 15 minutes and will be conducted at typical altitudes between 100 and 150', with occasional descents below 10' to collect blow samples. The aircraft will hover over groups of whales and take a series of still images or video before moving on to another group of whales. This project is designed to collect aerial photogrammetry images to estimate the size and shape of whales to further evaluate the krill requirements of large whales and the predatory impact killer whales in order to assess their respective trophic interactions and requirements within the context of climate change. This mission will also couple photogrammetry with the collection of whale exhalate from blow, which will be used to study the respiratory diseases that may be associated with variance in body condition. This will allow a more complete health assessment, to compare to similar studies the SWFSC is conducting on whales in the NW Atlantic and NE Pacific oceans.

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 haulout 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.

Puma/APH-22 Hexacopter

Location: Beaufort, North Carolina

Mission: Atlantic Menhaden Survey

The Northeast Fisheries Science Center (NEFSC) is collaborating with the Southeast Fisheries Science Center (SEFSC) and the University of New Hampshire to develop aerial and underwater acoustical methods that will improve fisheries-independent estimates of Atlantic Menhaden abundance and biomass on the East Coast. Operations will consist of launching and recovering an APH-22 Hexacopter and Puma from a small boat. The Puma will be used to spot schools of menhaden. Once a menhaden school is identified a small boat will be directed to that area. The APH-22 Hexacopter will then be used to take high definition photos of the menhaden school.

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.

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.

SenseFly eBee RTK

Location: Corbin, Virginia – Catlett, Virginia

Mission: Training and Operational Development

The Remote Sensing Division (RSD) and the Office of National Marine Sanctuaries (ONMS) have been funded to operate the SenseFly eBee RTK to further the development of UAS operational procedures specifically related to coastal and habitat mapping, living marine resource surveys, as well as a range of emergency preparation, response and recovery requirements. The project consists of the initial acquisition, flight training and system acceptance. Upon completion of the training/system acceptance segment several operational missions will take place during the fall to begin the development of procedures and protocols for integrating eBee operations and data collection into existing RSD and ONMS programs.



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.

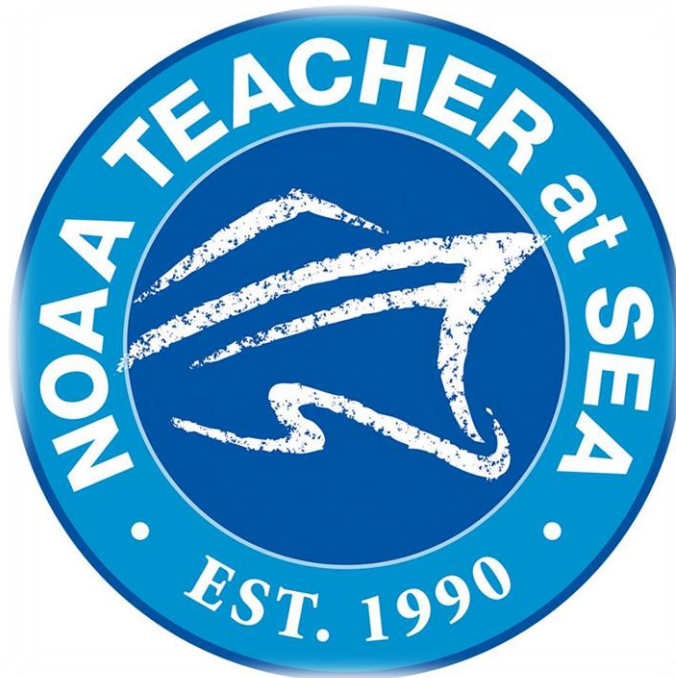


Teacher at Sea Program



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 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 In FY 16 NOAA's Teacher at Sea Program sent 13 teachers to sea, and supported 36 Teacher at Sea Events.





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 work together during Pacific Reef Assessment and Monitoring Program as the Ocean and Climate Change Team.

[Photo: James Morioka/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 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. 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. 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.

- 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.
- In 2015, several ships conducted monitoring of an extensive harmful algal bloom (HAB) extending from California to the Gulf of Alaska. The 2015 HAB was the largest in more than a decade, affecting sea birds, sea lions, and triggered closures of commercial shellfish fisheries along the U.S. west coast. Observations help scientists understand HABs and help predictive modeling for the future.
- 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 reopen 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 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.