NOAA Fleet Update

SEPTEMBER & OCTOBER 2015

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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http://www.facebook.com/NOAAOMAO

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Office of Marine and Aviation Operations (OMAO) and the NOAA Commissioned Officer Corps – In the News -

Below is a sampling of clips and web links to recent news items related to OMAO and the NOAA Corps.

Scientists discover remains of World War II-era ship in Northwestern Hawaiian Islands
-West Hawaii Today
A World War II-era U.S. Navy tanker that sank nearly 60 years ago after running aground on Maro Reef has been discovered by NOAA researchers in waters that are now part of Papahanaumokuakea Marine National Monument in the Northwestern Hawaiian Islands. On Oct. 1, 1957, USNS Mission San Miguel departed Apra Harbor, Guam, bound for Seattle and ran aground on Maro Reef on Oct. 8 while running at full speed and carrying only ballast. The Navy safely evacuated the 42-member crew. On Aug. 3, a team of NOAA scientists and research partners aboard NOAA Ship *Hi'ialakai* discovered Mission San Miguel during a multidisciplinary expedition to the monument. At 523 feet in length, Mission San Miguel is the largest ship reported lost in the monument. It was located at a depth of 80 feet...

Deep-sea exploration off Hawaii reveals strange creatures
-CBS News
Using remotely operated vehicles and the most advanced mapping systems, scientists set out to this summer to explore some of the deepest and most remote stretches of the ocean off the Hawaiian Archipelago. The operation, led by the National Oceanic and Atmospheric Administration (NOAA) and launched from its ship *Okeanos Explorer*, came across a wide array of fish and other sea creatures several miles down, as well as high-density, diverse sea coral and sponge communities. The Hawaii mission returned with scores of cool images from some of the deepest parts of the oceans, including a rainbow colored squid, *Walvisteuthis youngorum*, set against the darkness of the ocean at nearly 3,000 feet...

USVs for NOAA's Shoaler-depth Nautical Chart Surveys
-Hydro International
On U.S. coastal nautical charts, the areas closest to the shore, shoals and rocks generally do not have updated depth measurements. In many areas, safety concerns prohibit the use of NOAA ships or launches to survey the shoalest depths. Charting those shallow areas is about to get safer, thanks to recent purchases of small, commercial off-the-shelf, unmanned survey vessels (USVs). This summer, NOAA Ship *Thomas Jefferson* is deploying a Z-Boat offered by Teledyne Oceanscience...

Unmanned vessel aids in charting Arctic waters

-Arctic Newswire

When those discussing the expanding Arctic talk of the greatest obstacles facing development and shipping in the region, one of the first topics to come up is the lack of good nautical charts. As was discovered in Unalaska this summer when Shell's rig *Fennica* ripped a hole in its hull while entering the harbor area, there is no such thing as too much charting. But there are hundreds of thousands of miles that need to be charted, and only a few ice-free months to do so. That's where the newest technology in chart surveying -- the autonomous surface vehicle -- comes in, says one of the leading surveyors in the Arctic, TerraSond. This summer, the company, which contracts for the National Oceanic and Atmospheric Administration as well as many other clients, started using an unmanned craft to assist it. The Lego-like bright orange vessel was used to perform bathymetry in the Alaska Arctic this summer, surveying alongside TerraSond's mother vessel...

ScanEagles to Search for Cetaceans in Alaska

-AUVSI

Researchers are using unmanned aircraft to detect and monitor marine mammals such as whales and to predict ice formation. The UAS Program Office of the National Oceanic and Atmospheric Administration (NOAA) has teamed with the National Marine Fisheries Service's Office of Science and Technology and National Marine Mammal Laboratory; the Office of Naval Research; and the Bureau of Ocean Energy for the work, which is expected to kick off as early as this week from Barrow, Alaska. The project will collect imagery from manned and unmanned aircraft and use software to automatically detect cetaceans in the imagery, and try to assess how many there are. The UAS work will be handled by two Insitu ScanEagles, flying beyond visual line of sight within an 80-mile radius offshore of Barrow. The ScanEagles will operate until Sept. 7.

Coast Guard and NOAA responds to downed aircraft off Atlantic City

-U.S. Coast Guard news release

The Coast Guard is searching Thursday after a small aircraft reportedly crashed approximately seven miles east of Atlantic City.

Searching are:

-A 47-foot Motor Lifeboat crew from Coast Guard Station Atlantic City

-An MH-65 Dolphin helicopter crew from Air Station Atlantic City

-The crew of the Coast Guard Cutter Ibis from Cape May

-A 25-foot Response Boat-Small crew from Station Great Egg

-The crew of the Coast Guard Cutter Morro Bay

The Coast Guard is working with multiple agencies including the New Jersey State Police and the NOAA Ship *Henry Bigelow*. The cause of the crash is under investigation.

Workspace: Sandalwood graduate living childhood dream as Hurricane Hunter

-Daily Record

It was easy to find young Ian Sears when there was a thunderstorm rumbling through his Jacksonville neighborhood. He'd be under the carport, watching the storm build throughout the afternoon. And he'd always keep an eye out to see if he could catch lightning strike a tree. Once, when there were snow flurries in Jacksonville, Sears couldn't wait to get outside to watch the little flakes drifting from the skies. And as a 7-year-old weather aficionado, it was Sears who was getting the oil ready for the hurricane lamps as Hurricane Hugo approached the East Coast in September 1989. Tracking the powerful hurricane's path was "absolutely fascinating," Sears said. Now, the 2000 Sandalwood High School graduate tracks storms for a living. Sears has been a flight director with the National Oceanic and

Atmospheric Administration's Hurricane Hunters since 2009. The team flies through tropical storms and hurricanes, gathering data to track the path and intensity...

Scientists probe effects of unusual warming pattern in fish-rich Bering Sea

-Alaska Dispatch News

When the Bering Sea warms, there are telltale signs. One is a bloom of phytoplankton that turns the water's normally gray surface to a lovely turquoise...Though it is pretty, that bloom means ugly conditions for much of the sea life in the Bering Sea, the source of about half of the commercially harvested seafood in the United States...This is the second consecutive year the Bering Sea has been unusually warm -- and turquoise -- and scientists from NOAA, the University of Washington and the U.S. Fish and Wildlife Service are on a month-long cruise aboard the research vessel *Oscar Dyson* to try to understand what is happening in these waters...

NOAA Corps - Basic Officer Training Class (BOTC) 126

NOAA Corps BOTC 126 reported to the United States Coast Guard (USCG) Academy in New London, CT, on July 29, 2015. The 10 new officers got underway aboard the USCG *Barque Eagle* completing their two week training cruise and arriving in Baltimore on August 29, 2015.

NOAA BOTC 126 Officer Candidate Carria provides the weather update for the USCG Barque *Eagle*. [Photo: USCG]

NOAA Corps and USCG shipmates participate in flare drills aboard the USCG Barque *Eagle.*
[Photo: USCG]

OMAO's Ships and Centers

OMAO's Ship Tracker - http://shiptracker.noaa.gov - (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: CDR Marc Moser
Primary Mission Category: Hydrographic Surveys
DEPART: Norfolk, VA **ARRIVE:** Norfolk, VA

Project: Mapping Chesapeake Bay

Objectives:
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.

Instrument deployment aboard NOAA Ship *Ferdinand R. Hassler*.
[Photo: NOAA]

Woods Hole, MA (currently docks in Newport, RI)

NOAA Ship *Henry B. Bigelow*
Commanding Officer: CDR G. Mark Miller
Primary Mission Category: Fisheries Research
DEPART: Newport, RI **ARRIVE:** Newport, RI
DEPART: Newport, RI **ARRIVE:** Newport, RI

Project 1: Autumn Multispecies Bottom Trawl Survey

Objectives:

- Determine the autumn distribution and relative abundance of fish and invertebrate species found on the continental shelf and upper slope.

Davisville, RI

NOAA Ship *Okeanos Explorer*
Commanding Officer: CDR Mark Wetzler
Primary Mission Category: Oceanographic Exploration and Research
DEPART: Pearl Harbor, HI **ARRIVE:** Pearl Harbor, HI

Project: Campaign to **A**ddress **P**acific monument **S**cience, **T**echnology, and **O**cean **NE**eds (CAPSTONE -Leg IV) - Northwest Hawaiian Islands & Johnston Exploration (Mapping)

Objectives: This is an exploratory mapping expedition that seeks to:

- Acquire data to support priority Monument and Sanctuaries science and management needs, including habitat surveys in recently expanded boundary areas.
- Identification and characterization of vulnerable marine habitats - particularly high density deep sea coral and sponge communities.

- Characterization of seamounts within the Prime Crust Zone (PCZ). The PCZ is the area of the Pacific with the highest expected concentration of deep sea minerals, including rare metals and rare earth elements.
- Collect information on the geologic history of Central Pacific Seamounts, including those that are or may be relevant to our understanding of plate tectonics and subduction zone biology and geology.
- Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities.

NOAA Ship *Okeanos Explorer* launches Deep Discoverer.
[Photo: NOAA]

Norfolk, VA

NOAA Ship *Thomas Jefferson*
Commanding Officer: CAPT Shepard Smith
Primary Mission Category: Hydrographic Surveys
DEPART: Norfolk, VA **ARRIVE:** Norfolk, VA

Project: Mapping Buzzards Bay

Objectives:
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.

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

CAPT Anne Lynch, Commanding Officer MOC-A

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

Charleston, SC

NOAA Ship *Nancy Foster*

Commanding Officer: LCDR Jeffrey Shoup
Primary Mission Category: Oceanographic Research, Environmental Assessment
DEPART: New York City, NY **ARRIVE:** New London, CT
DEPART: New London, CT **ARRIVE:** Bridgeport, CT

Project: Mapping Essential Fish Habitat in Long Island Sound to Inform MPA Management

Objectives:

- To collect multibeam bathymetry datasets with 100% seafloor ensonification, along with backscatter suitable for seafloor characterization.

Double Rainbow off of NOAA Ship *Nancy Foster*.
[Photo: NOAA]

NOAA Ship *Ronald H. Brown*

Commanding Officer: CAPT Robert Kamphaus
Primary Mission Category: Oceanographic Research, Environmental Assessment
DEPART: Dutch Harbor, AK **ARRIVE:** Seattle, WA

Project: Bioeffects of Chukchi Sea

Objectives: Assess habitat conditions that influence biodiversity and distribution of benthic infaunal communities, contaminants, and chemical body burdens of resident organisms as measures of environmental health in the bays and lagoons in the Chukchi and Beaufort Seas in the vicinity of proposed oil transport pipelines. Baseline data will be essential for monitoring pollution control effectiveness and National Resource Damage Assessment activities in the event of a spill.

Pascagoula, MS

NOAA Ship *Oregon II*

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

Project: Shark Red Snapper Longline

Objectives:

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

NOAA Ship *Gordon Gunter*

Commanding Officer: Master Donn Pratt
Primary Mission Category: Fisheries Research
DEPART: Miami, FL **ARRIVE:** Pascagoula, MS

Project: West Florida Shelf Bottlenose Dolphin Survey

Objectives:

- Collect tissue biopsy samples and detailed photographs of bottlenose dolphin on West Florida shelf
- Collect visual and passive acoustic data to characterize Bryde whale abundance and spatial distribution on the eastern Gulf of Mexico.
- Satellite tag Bryde whales if the opportunity allows.
- Selectively collect acoustic recordings of marine mammal vocalizations for use in species identification.
- Collect oceanographic and environmental data including hydrographic profiles, continuous surface water characteristics, and scientific echo sounders data to quantify acoustic backscatter due to small fish and zooplankton.

- Recover and deploy two HARP recording packages.

NOAA Ship *Gordon Gunter* collects instrumentation.
[Photo: NOAA]

NOAA Ship *Pisces*

Commanding Officer: CAPT Michael Hopkins
Primary Mission Category: Fisheries Research
DEPART: Pascagoula, MS **ARRIVE:** Pascagoula, MS

Project: Southeast Area Monitoring and Assessment Program (SEAMAP) Fall Ichthyoplankton

Objectives:

- Assess the occurrence, abundance and geographical distribution of the early life stages of fall spawning fishes, especially King and Spanish Mackerel, Red Drum and Snappers on U.S. continental shelf waters in the GOM at selected Southeast Area Monitoring and Assessment Program (SEAMAP) stations in support of annual stock assessments.
- Describe the pelagic habitat of fish larvae through the measurements of various physical and biological parameters.
- Map the Distribution of fish eggs and invertebrate zooplankton along the cruise track using a Continuous Underway Fish Egg Sampler.
- Measure the vertical distribution of fish larvae by sampling at discrete depths in the water column at selected locations along the SEAMAP plankton survey grid.
- Collect detailed observations of net-caught jellyfish and ctenophores.
- Examine the spatial resolution of Red and Vermillion snapper distribution.

Scientists aboard NOAA Ship *Pisces* collect data from their biological surveys.
[Photo: NOAA]

San Diego, CA

NOAA Ship *Reuben Lasker*
Commanding Officer: CDR John Crofts
Primary Mission Category: Fisheries Research
DEPART: Kodiak, AK **ARRIVE:** Kodiak, AK

Project: Collaborative Large Whale Survey

Objectives:

- Mark-recapture estimate (from photo-id) of abundance over the entire southern summer feeding area(s) of large Whales.
- Examine population structure, including maturity and sex composition and assessment of internal and external recruitment.

A gray whale dives with the NOAA Ship *Reuben Lasker's* RHIB nearby.
[Photo: NOAA]

Newport, OR

NOAA Ship *Rainier*
Commanding Officer: CDR E.J. Van Den Ameele
Primary Mission Category: Hydrographic Surveys
DEPART: Nome, AK **ARRIVE:** Kodiak, AK

Project : Approaches to Shumagin Island

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

NOAA Ship *Bell M. Shimada*
Commanding Officer: CDR Brian Parker
Primary Mission Category: Fisheries Research
DEPART: Newport, OR **ARRIVE:** Newport, OR

Project: Northern California Current Ecosystem Survey (Leg 1)

Objectives: This project continues long-term studies of the Northern California Current (NCC) pelagic ecosystem and includes study of broad-scale patterns of hydrography, plankton and ocean acidification/hypoxia in the NCC Large Marine Ecosystem off Oregon and Washington. Ecosystem studies were initiated in 1996, and studies of ocean acidification/hypoxia were initiated in 2010. Assessment of fish populations and habitat in Northern California Current using Autonomous Vehicles. Water sample collection with Niskin bottle rosette to assess phytoplankton distributions.

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.

Bird's eye view of NOAA's Marine Operation Center – Pacific.
[Photo: NOAA]

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

CDR Joseph Bishop, Acting 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 David Zezula
Primary Mission Category: Hydrographic Surveys
DEPART: Kodiak, AK **ARRIVE:** Juneau, AK

Project: OPR-190 South East Alaska

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

Kodiak, AK

NOAA Ship *Oscar Dyson*
Commanding Officer: CDR Arthur "Jesse" Stark
Primary Mission Category: Fisheries Research
DEPART: Dutch Harbor, AK **ARRIVE:** Kodiak, AK

Project: Groundfish and Salmon Recruitment Processes: Gulf of Alaska

Objectives: Fisheries (midwater trawl) and oceanographic survey to:

- Extend time series of age-0 Walleye Pollock abundance in the western Gulf of Alaska;
- Describe the community structure, biomass, energetic status of pelagic nekton (Capelin, Eulachon, Pacific Cod, Walleye Pollock, Arrowtooth Flounder, Sablefish, and rockfishes);
- Collect age-0 Walleye Pollock associated prey and measure environmental variables that potentially affect Walleye Pollock ecology; and
- Occupy a series of cross-shelf transects of conductivity, temperature and depth stations to examine cross-shelf physical and chemical oceanography.

Honolulu, HI

NOAA Ship *Hi'ialakai*
Commanding Officer: CDR Daniel Simon
Primary Mission Category: Oceanographic Research, Environmental Assessment
DEPART: Honolulu, HI **ARRIVE:** Honolulu, HI

Project: Northwestern Hawaiian Islands (NWHI) Reef Assessment and Monitoring Program (RAMP)

Objectives:

- Reef Assessment and Monitoring Program: Divers will conduct rapid ecological assessments using stratified sampling of reef fish, corals, other invertebrates, and algae. The RAMP is for the purpose of conducting ecological assessments employing standardized methods to improve understanding of the spatial and temporal processes influencing the health of coral reef ecosystems throughout the archipelago.
- Coral Disease and Prevalence Study: a dive team will conduct coral disease surveys to determine disease presence within the NWHI.
- Maritime Heritage: Conduct non-invasive wreck assessment surveys of selected maritime heritage sites and continued monitoring of known shipwreck and sunken aircraft sites for the purposes of understanding impacts and changes to maritime heritage resources. The maritime heritage efforts will be conducted with the use of SCUBA and snorkel using tow boards or Diver Propulsion Vehicles and have proposed terrestrial surveys for historic camps utilized by shipwrecked whaling ships at Lisianski Island, Laysan Island and Kure Atoll.
- Sea Turtle Surveys: A sea turtle biologist will conduct shoreline surveys for sea turtles at Pearl and Hermes Atoll, Kure Atoll, Midway Atoll, Lisianski Island and Laysan Island. These will be done when dive operations are being conducted in close proximity to emergent islands.

NOAA Ship *Oscar Elton Sette*

Commanding Officer: LCDR Keith Golden
Primary Mission Category: Fisheries Research
DEPART: Honolulu, HI **ARRIVE:** Honolulu, HI

Project: Hawaiian Monk Seal Population Assessment

OBJECTIVE: Recover Hawaiian monk seal camps and translocate the seals between a rehabilitation facility in Kona, HI and returned to a site in the Northwestern Hawaiian Islands.

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"

Aircraft Commander: N/A
Temporary Base: Naval Air Station Jacksonville, FL
Current Mission: Scheduled Maintenance - Until April 2016

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

One of NOAA's two Lockheed WP-3D Orion aircraft has entered a long-term maintenance period at Naval Air Station, Jacksonville. The aircraft will receive new wings and significant additional upgrades as part of a service life extension program that will allow our WP-3D Orion aircraft to continue supporting all of NOAA's critical missions for years to come. These photos show the removal of the wings from the airframe.

[Photo: Victor Pitts, FRCSE Jacksonville]

WP-3D (N43RF) – "Hurricane Hunter"

Aircraft Commander: TBD
Temporary Base: Western Atlantic, Gulf of Mexico and Eastern Pacific
Current Mission: Hurricane Research

The 2015 Hurricane Season is underway and the NOAA Hurricane Hunter aircraft are ready to respond. Radar reconnaissance missions on both NOAA WP-3D aircraft will be conducted to support tropical cyclone forecasting and the Hurricane Forecast Improvement Project. These flights will use the WP-3D's tail Doppler radar system to obtain high-density, three-dimensional measurements of the inner core wind structure of each tropical cyclone, potentially throughout its full life cycle. The hurricane research missions will also use the WP-3D to support the calibration/validation of satellite measurements and instrumentation development for the tropical cyclone environment and sampling of other aspects of the tropical cyclone inner core. These measurements will be used to enhance the accuracy of track and intensity guidance generated by NOAA's numerical weather prediction models. They will also be used directly by NWS hurricane specialists with the ultimate outcome being improved accuracy of intensity and track forecasts, extended forecast/warning lead-times and improved confidence levels by decision makers.

NOAA's G4 and NOAA's P3 conducting preflight checks prior to their first mission into Category 3 Hurricane Danny.
[Photo: NOAA OMAO]

Gulfstream IV (N49RF) – "Hurricane Hunter"

Aircraft Commander: TBD
Current Mission: Hurricane tasking ready

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

Jet Prop Commander (N45RF)

Aircraft Commander: LCDR Patrick Didier/ LTJG Kevin Doremus
Temporary Base: Duluth, MN
Current Mission: Gravity for the Redefinition of the American Vertical Datum GRAV-D

Aircraft is supporting NOAA's National Geodetic Survey (NGS) on a project to re-define the vertical datum of the United States by 2022. Beginning in 2007, GRAV-D is one of the most ambitious projects undertaken by the NGS with the goal of modeling and monitoring Earth's gravity field to serve as a zero reference for all heights in the nation. Accurate heights are critical to many scientific endeavors, but particularly to understanding and protecting low-lying coastal ecosystems. At the completion of this project, NGS will be able to execute its mission with substantial improvements to both accuracy and efficiency. The benefits to the nation will be immense in avoidance cost from improved floodplain management alone.

Twin Otter (N46RF)

Aircraft Commander: LT Francisco Fuenmayor/LTJG Michael Hirsch
Temporary Base: Various locations
Current Mission: Soil Moisture Surveys

The aircraft is conducting soil moisture work for the National Operational Hydrologic Remote Sensing Center (NOHRSC) using an airborne gamma radiation detector to make soil moisture measurements in TX and OK. These measurements are used by NWS Weather Forecast Offices (WFO) and NWS River Forecast Centers (RFC) when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.

Twin Otter (N48RF)

Aircraft Commander: TBD
Temporary base: Various locations
Current Mission: Soil Moisture Surveys

The aircraft is conducting soil moisture work for the National Operational Hydrologic Remote Sensing Center (NOHRSC) using an airborne gamma radiation detector to make soil moisture measurements in TX and OK. These measurements are used by NWS Weather Forecast Offices (WFO) and NWS River Forecast Centers (RFC) when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.

Twin Otter (N56RF)

Aircraft Commander: LCDR Chris Kerns
Current Mission: Harbor Seal Surveys

Supporting the National Marine Fisheries Service, the aircraft is working in conjunction with a second NOAA Twin Otter aircraft conducting photographic surveys of harbor seals. Imagery collected is used to determine distribution and abundance of seals as required by the Marine Mammal Protection Act.

Twin Otter (N57RF)

Aircraft Commander: LT Mathew Nardi
Temporary base: Destin, FL
Current Mission: Leatherback Turtle Survey

Little is known about Leatherback turtles in the Gulf of Mexico. NOAA scientists will use the aircraft for performing aerial surveys helping to understand Leatherback biology and track these animals aiding in the recovery of the species.

King Air (N68RF)

Aircraft Commander: LCDR Rebecca Waddington
Current Mission: Various Locations – Continuous Coastal Mapping

King Air is conducting Coastal Mapping mission flights in various locations. The Coastal Mapping work is an on-going mission, run by the Remote Sensing Division of the National Geodetic Survey, with the goal of providing a regularly-updated national shoreline for supporting marine navigation, defining territorial limits, and managing coastal resources. Stereo photogrammetry and LiDAR are used to produce a digital database for a national shoreline.

OMAO'S AIRCRAFT OPERATIONS CENTER (AOC)

CAPT Harris Halverson, Commanding Officer AOC

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

NOAA's Aircraft Operations Center at MacDill Air Force Base, Tampa, FL.
[Photo: NOAA]

Unmanned Systems Support

NASA Global Hawk

Location: Edwards Air Force Base (AFB), CA/ NASA Wallops Flight facility
Mission: Sensing Hazards with Operational Unmanned Technology (SHOUT) project

NASA's Global Hawk Unmanned Aircraft System is completing instrumentation for hurricane surveillance and research to support the Sensing Hazards with Operational Unmanned Technology (SHOUT) project. The SHOUT project is a NOAA funded hurricane surveillance and research activity that is scheduled to operate from both Edwards Air Force Base and the NASA Wallops Flight Facility beginning in August and running through mid-October. NOAA Corps officer, LCDR Neuhaus, is supporting Global Hawk as a project manager and instructor pilot.

APH-22 Hexacopter

Location: San Diego, CA
Mission: Pribilof Island Fur Seals / Stellar Sea Lion

NMML's primary objective is to use the APH-22 hexacopter unmanned aircraft system (UAS) equipped with a high resolution camera to photograph northern fur seal (NFS) rookeries on the four islands in the Pribilof Islands: St. Paul, St. George, Otter, and Walrus Islands. Images will be captured to update historical photographs of rookery space-use of NFS as well as testing this platform for the possible future use to supplement abundance studies. Additionally, opportunistic surveys of Steller sea lions hauled out will be photographed to collect counts and sight for permanent marks.

APH-22 Hexacopter

Location: Coastal OR / CA
Mission: Coastal Oregon / California Stellar Sea Lions

National Marine Mammal Laboratory (NMML) will use the APH-22 hexacopter unmanned aircraft system (UAS) equipped with a high resolution camera at three sites off the coast of California and Oregon. The three sites are the St. George Reef, CA; Rogue Reef, OR; and Orford Reef, OR sea lion rookeries. The primary objective is to capture images to obtain counts of sea lions (pup and non-pups) to be used in modeling abundance trends. The second objective is to sight for permanently marked animals from images for the long-term life-history study. The third objective is capture aerial images of the sea lion rookeries to create site maps.

Puma UAS

Location: U.S. Northeast Offshore Waters
Mission: Sea Turtle Surveys

The objective of this project will be to locate, capture, sample, and satellite tag loggerhead sea turtles in the poorly understood area from the southern flank of Georges Bank through the Scotian Shelf. Operations will be conducted from the NOAA Ship Henry B. Bigelow. Puma operations will be conducted as part of the 8-day cruise operating along the southern flank of Georges Bank, across the northeast channel, and onto Browns Bank and the Scotian Shelf. The Puma UAS will be used to locate sea turtles and relay the location information to the ship and scientific crew. The locations of the turtles will be used to vector the ship's launches to the turtles. The crew aboard the launches will capture, tag and release the turtles.

PUMA UAS

Location: Polar Sea Arctic
Mission: Arctic Shield aboard USCGC Healy

Arctic Shield 2015 will be the third trip with NOAA and the Puma AE onboard USCGC HEALY. Last year, Puma AE flew as part of a joint technology demonstration in the Beaufort and Chukchi Sea. The Puma AE was used to search, detect, and map the ice flow from the air. Utilizing its standard payload configuration, the Puma AE provided real-time imagery back to the ship improving situational awareness of the exercise. The imagery depicted actual on-scene ice conditions, ice movements and simulated oil spill locations, dimension, and size which were vital to the success of the Oil Spill Response Demonstration. Due to its success last year, the Puma AE will be utilized again this year for another ISR Arctic and Ice Exercise. Due to a lack of permissions and policy last year, landing the Puma AE on HEALY's using the autonomous net-capture system was not permitted. As a result, autonomous landing procedures for the Puma AE have been under development in order to continue to reduce personnel and equipment safety risks. This operation was recently successfully tested onboard NOAA's R/V SHEARWATER and a U.S. Navy Patrol Boat. The system was successful throughout 20 autonomous captures during developmental testing.

DJI S-1000

Location: Oak Ridge, TN
Mission: Convective Initiation

This project is an initiative from OAR's Atmospheric Turbulence and Diffusion Division (ATDD) to measure the conditions that lead to Convective Initiation (CI) in the lower boundary layer. A DJI S-1000 rotor-based UAS system will be operated by NOAA/ATDD and will be used to measure the dynamics of land-atmosphere interactions in the lower boundary layer. 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. A field experiment is planned for the summer of 2015 using this UAS in Northern Alabama to help accomplish this mission.

OMAO Partnerships

United States Senate Committee on Commerce, Science, and Transportation – Chair, Senator John Thune (R-SD)

Location: Washington, DC
Detail: LCDR Wendy Lewis, NOAA Commissioned Officer Corps

LCDR Lewis is currently on detail to the Committee 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: LT Jesse Milton, NOAA Commissioned Officer Corps

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

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

Location: Honolulu, HI
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. Northern Command (USNORTHCOM)

Location: Boulder, CO
Embedded Liaison: CAPT Mark Moran, NOAA Commissioned Officer Corps

U.S. Northern Command (USNORTHCOM) partners to conduct homeland defense, civil support, and security cooperation to defend and secure the United States and its interests. NORTHCOM's area of responsibility includes air, land, and sea approaches and encompasses the continental United States, Alaska, Canada, Mexico, and the surrounding water out to approximately 500 nautical miles. It also includes the Gulf of Mexico, the Straits of Florida, and portions of the Caribbean region that include The Bahamas, Puerto Rico, and the U.S. Virgin Islands. CAPT Moran serves as the liaison for the NOAA Corps, helping to plan, organize, and execute homeland defense and civil support missions.

Department of Defense - U.S. Navy

Location: Washington, DC

Embedded Liaison: CDR Christiaan van Westendorp, NOAA Commissioned Officer Corps

CDR van Westendorp 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, CDR van Westendorp 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.

Department of Defense - U.S. Navy

Location: Stennis Space Center, MS

Embedded Liaison: LCDR Jonathan French, NOAA Commissioned Officer Corps

Embedded in the Navy's Naval Oceanography Mine Warfare Center, LCDR French works side by side with Navy officers operating Unmanned Underwater Vehicles worldwide and is currently deployed to the Arabian Gulf. 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: CAPT Scott Sirois, NOAA Commissioned Officer Corps

As the NOAA liaison to the United States Coast Guard (USCG), CAPT Sirois 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. CAPT Sirois 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 2015 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. More info: http://teacheratsea.noaa.gov

2015 Season Stats: 20 teachers sailed on different projects; 1 teacher scheduled

NOAA Ship *Rainier*
Name: Ms. Rebecca Loy
School: East Syracuse Minoa Central Schools, Cicero NY
Cruise: Approaches to Shumagin Island 9/8-9/24, 2015
Blog: https://teacheratsea.wordpress.com/category/rebecca-loy/

Teacher-At-Sea Rebecca Loy, aboard NOAA Ship *Rainier* preparing to throw a heaving line.
[Photo: ENS Chris Wood/NOAA]

OMAO - NOAA Dive Program

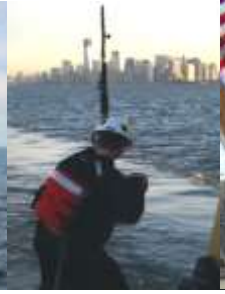
OMAO manages and implements NOAA's Dive Program (NDP), which trains and certifies scientists, engineers, and technicians from federal, state, tribal governments, and the private sector to perform the variety of tasks carried out underwater to support NOAA's mission. NDP also has cooperative diving agreements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

NOAA Divers explore a kelp forest along the shoreline within the newly established Greater Farallones National Marine Sanctuary.
[Photo: Chad King/NOAA]

OMAO - NOAA Small Boat Program

OMAO 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. More info: http://www.sbp.noaa.gov/

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

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

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

NOAA Commissioned Officer Corps

– Honor, Respect, Commitment –

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

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

Benefits of the NOAA Corps to the Nation

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

- In November 2014, our aircraft flew missions over upstate New York after the record snow falls of up to seven feet and conducted airborne Snow Water Equivalent (SWE) and soil moisture measurements. Airborne SWE measurements are used by NOAA's National Weather Service when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.

- After Hurricane Sandy in 2012, NOAA ships *Thomas Jefferson* and *Ferdinand R. Hassler* conducted emergency bathometric surveys to locate possible submerged navigational hazards in the ports of New York and Virginia. These surveys enabled the ports to reopen quickly. Aerial images of storm-stricken regions, taken by NOAA aircraft, helped residents and emergency workers to quickly assess the condition of houses, bridges, and vital infrastructure.

- After Hurricane Irene in 2011, the NOAA Ship *Ferdinand Hassler* and team completed 300 lineal nautical miles of survey work in less than 48 hours providing a Damage Assessment that enabled the U.S. Coast Guard to re-open ports and restore more than $5M per hour in maritime commerce less than three days after the storm.

- In 2010, the NOAA fleet and the NOAA Corps played a major role in the response to the BP Deepwater Horizon oil spill. NOAA's entire Atlantic fleet and over a quarter of the total strength of the NOAA Corps were deployed to the Gulf following the spill, developing mission plans and assisting response efforts.

Find out more about the NOAA Corps, its mission and history at http://www.noaacorps.noaa.gov/.