

**ACADEMIC RESEARCH FLEET (ARF)**

**\$77,800,000**  
**-\$4,230,000 / - 5.2%**

**Academic Research Fleet Funding**  
(Dollars in Millions)

FY 2017 Actual	FY 2018 (TBD)	FY 2019 Request	Change over	
			FY 2017 Actual Amount	Percent
\$82.03	-	\$77.80	-\$4.23	-5.2%

The U.S. Academic Research Fleet included 18 vessels in calendar year 2017 with the two new Office of Naval Research (ONR) vessels being fully integrated into the fleet. The vessels in ARF range in size, endurance, and capabilities, enabling NSF and other federally- and state-funded scientists to conduct ocean science and technology research with a diverse fleet capable of operating in coastal and open ocean waters. Funding for ARF includes investments in ship operations; shipboard scientific support equipment; oceanographic instrumentation and technical services; and submersible support. Funding levels reported here reflect investments by the Division of Ocean Sciences (OCE) within GEO. In addition to operations, OCE has undertaken selected construction projects based on inter-agency planning and coordination as discussed in the *Federal Oceanographic Fleet Status Report*<sup>1</sup> published in May 2013. Details on these construction activities are contained in the Fleet Modernization section.

**Total Obligations for ARF**  
(Dollars in Millions)

	FY 2017	FY 2018	FY 2019	ESTIMATES				
	Actual	(TBD)	Request	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Operations & Maintenance	\$82.03	-	\$77.80	\$77.80	\$77.80	\$77.80	\$77.80	\$77.80
Fleet Modernization								
Regional Class Research Vessel	2.11	-	-	-	-	-	-	-
<b>Total</b>	<b>\$84.14</b>	<b>-</b>	<b>\$77.80</b>	<b>\$77.80</b>	<b>\$77.80</b>	<b>\$77.80</b>	<b>\$77.80</b>	<b>\$77.80</b>

ARF serves as the main platform for the collection of data, testing of hypotheses about the structure and dynamics of the ocean, and the development and testing of novel technological instrumentation. Scientists contribute to advances in many areas including climate variability, marine ecosystems, fisheries, and ocean-related natural hazards, such as tsunamis, through use of these facilities. Participating graduate and undergraduate students interact with scientists and marine technicians, enabling them to gain first-hand exposure to ocean science field research. Increasingly, technological innovations allow research conducted at sea to be transmitted via satellite back to the classroom, broadening the educational impact of the vessels.

ARF is financially supported through an interagency partnership, principally with the Office of Naval Research (ONR) and the National Oceanic and Atmospheric Administration (NOAA). The operating costs for the fleet are divided proportionally among the vessel users based on usage over the past several years, including the Ocean Observatories Initiative's use of the fleet. NSF coordinates with ship-operating and ship-user academic institutions both directly and through the University-National Oceanographic Laboratory System (UNOLS) organizational structure.

<sup>1</sup> [www.nopp.org/wp-content/uploads/2010/03/federal\\_oceanographic\\_fleet\\_status\\_report.pdf](http://www.nopp.org/wp-content/uploads/2010/03/federal_oceanographic_fleet_status_report.pdf)

Funding for scientists using the fleet is provided by NSF and other federal and state agencies. Within NSF, science is funded through competitive peer-reviewed proposals, most typically funded within OCE and through selected programs in the Division of Earth Sciences, Division of Atmospheric and Geospace Sciences, OPP, and BIO. Approximately 25 percent of OCE proposals request ship time. Not reflected in this number is the science that utilizes samples or data collected on prior cruises, scientists piggy-backing on scheduled cruises to accomplish additional science, international scientists sailing with the U.S. Academic Research Fleet, and science funded by other agencies.

The FY 2019 funding level of \$77.80 million will support approximately 1,675 ship operating days, and includes the entry of *R/V Neil Armstrong* and *R/V Sally Ride*, the two new vessels delivered by ONR in 2016 into the fleet.

### **Fleet Operations/Management and Oversight**

- Oversight: NSF provides oversight to the Academic Research Fleet through cooperative agreements with each ship-operating institution and through a separate cooperative agreement with the UNOLS Office. NSF is the cognizant agency for ship day-rate negotiations for ARF, regardless of owner. In addition, NSF oversees the fleet through Business Systems Reviews, site visits, ship inspections, and participation at the UNOLS Council and various committee meetings by NSF program directors. Several program directors within OCE at NSF, at NOAA, and at ONR are involved in the activities and oversight of the Academic Research Fleet.
- After an in-depth review of the application of rate structures on ARF ship-related activities, NSF and ONR are in the process of transitioning the accounting of Fleet activities into a Specialized Service Facility in accordance with OMB's Uniform Guidance for Federal Awards 2 CFR 200.468.
- Management: Management of an institution's ship-operating facilities varies with the scale of the operation, but the core responsibility typically resides with the director of the institution, the Marine Superintendent (for all aspects of the facility), and the ship's Captain (for at-sea operations). For larger multi-ship-operating institutions, a Chief of Marine Technicians, schedulers, and finance administrators may also be involved in facility management.
- Reviews: Based on projected science requirements identified in recent reports and workshops, a fleet of vessels supporting ocean science and technological research will be needed far into the future. Documents supporting this need include the *Final Recommendations of the Interagency Ocean Policy Task Force*<sup>2</sup> of July 19, 2010. Two applicable reports by the National Research Council (NRC) include *Science at Sea: Meeting Future Oceanographic Goals with a Robust Academic Research Fleet*<sup>3</sup> published in 2009, and *Critical Infrastructure for Ocean Research and Societal Needs in 2030*<sup>4</sup> published in 2011. In coordination with UNOLS and the other federal agencies that invest in ocean research, the Interagency Working Group on Facilities and Infrastructure (IWG-FI) published a *Federal Oceanographic Fleet Status Report*<sup>5</sup> in May 2013, reviewing the status and describing plans for modernizing the Federal Oceanographic Fleet, which includes both the Academic Research Fleet and the survey ships. This report was updated in March of 2016.<sup>6</sup> In January 2015, the National Academy of Sciences Report *Sea Change 2015-2025 Decadal Survey of Ocean Sciences*<sup>7</sup> identified the U.S. Academic Research Fleet as having "the strongest match between current infrastructure and the decadal science priorities" and emphasized the overall importance of ships in all of the NAS-identified ocean science and technology priorities. Ship operations and technical services proposals undergo external review by peers every five years. Detailed annual reports describing activities accomplished are provided by the operating institutions and budgets are negotiated yearly since they are dependent on

<sup>2</sup> [https://obamawhitehouse.archives.gov/files/documents/OPTF\\_FinalRecs.pdf](https://obamawhitehouse.archives.gov/files/documents/OPTF_FinalRecs.pdf)

<sup>3</sup> [www.nap.edu/catalog/12775/science-at-sea-meeting-future-oceanographic-goals-with-a-robust](http://www.nap.edu/catalog/12775/science-at-sea-meeting-future-oceanographic-goals-with-a-robust)

<sup>4</sup> [www.nap.edu/catalog/13081/critical-infrastructure-for-ocean-research-and-societal-needs-in-2030](http://www.nap.edu/catalog/13081/critical-infrastructure-for-ocean-research-and-societal-needs-in-2030)

<sup>5</sup> [www.nopp.org/wp-content/uploads/2010/03/federal\\_oceanographic\\_fleet\\_status\\_report.pdf](http://www.nopp.org/wp-content/uploads/2010/03/federal_oceanographic_fleet_status_report.pdf)

<sup>6</sup> [www.nopp.org/wp-content/uploads/2016/06/federal\\_fleet\\_status\\_report\\_final\\_03.2016.pdf](http://www.nopp.org/wp-content/uploads/2016/06/federal_fleet_status_report_final_03.2016.pdf)

<sup>7</sup> [www.nap.edu/catalog/21655/sea-change-2015-2025-decadal-survey-of-ocean-sciences](http://www.nap.edu/catalog/21655/sea-change-2015-2025-decadal-survey-of-ocean-sciences)

the number of days the ships will be at sea in support of NSF-funded research programs.

### **Fleet Modernization**

- Oversight: The NSF coordinator for fleet modernization activities is the Program Director for Ship and Submersible Support, within the Integrative Programs Section (IPS) in OCE, with additional IPS staff providing project management assistance as required.
- Regional Class Research Vessel (RCRV): In March 2012, NSF leadership approved the request to advance the RCRV to the Conceptual Design Review (CDR) phase as a candidate Major Research Equipment and Facilities Construction (MREFC) project. Initial funds to initiate construction were requested in FY 2017. The RCRV will address requirements across government agencies for research vessels in support of ocean science research as discussed in the Fleet Status Report Update of 2016. For additional information on RCRV please refer to the MREFC chapter.
- *R/V Sikuliaq*, formerly the Alaska Region Research Vessel (ARRV): The *R/V Sikuliaq* represents NSF's first major contribution to fleet renewal in over twenty years. Delivery of *R/V Sikuliaq* took place in June 2014. This was followed by a period of final outfitting, science trials, and transit to the first science operational area. Initial science operations began in late 2014. *R/V Sikuliaq* successfully completed ice trials in the Bering Sea and three science cruises in the Arctic Ocean. All final MREFC project activities were closed out under budget by March 31, 2016. *R/V Sikuliaq* provides a sophisticated and significantly larger platform for scientists, as well as graduate and undergraduate students, to participate in complex multidisciplinary research activities and enables the training of the next generation of scientists with the latest equipment and technology. *R/V Sikuliaq* greatly expands research and technology capabilities in the Arctic, providing up to 270-300 science days at sea annually.

### **Renewal/Recompetition/Termination**

Ships supported by NSF are operated by academic institutions, each having a cooperative agreement with NSF. All ship cooperative agreements were renewed in FY 2012 using the NSB-approved criteria and review by an external panel, with upcoming renewals underway in FY 2018. Awardees are subject to additional oversight measures, including quarterly safety and financial reporting, the use of NSF Business System Reviews, and site inspections. In 2013, NSF retired *R/V Cape Hatteras*, operated by a consortium of Duke University and the University of North Carolina from its homeport at the Duke University Marine Laboratory. In 2014, NSF retired *R/V Point Sur*, operated by Moss Landing Marine Laboratories, San Jose State University. For *R/V Sikuliaq*, a re-compete clause in ten years (2024) was included in the initial cooperative agreement for operations. This clause will be added to all renewals of NSF owned vessels.