

INTERNATIONAL OCEAN DISCOVERY PROGRAM (IODP)

\$48,000,000
\$0 / 0%

International Ocean Discovery Program Funding
(Dollars in Millions)

FY 2020	FY 2021	FY 2022	Change over	
			FY 2021 Estimate	
Actual	Estimate	Request	Amount	Percent
\$48.00	\$48.00	\$48.00	-	-

Brief Description

The *JOIDES Resolution (JR)* drillship represents NSF’s primary contribution to IODP. The *JR* is a deep-ocean drilling vessel whose scientific operations are procured for NSF by means of a long-term lease held by the *JOIDES Resolution* Science Operator (JRSO), Texas A&M University. Besides NSF, the Ministry of Education, Culture, Sport, Science and Technology (MEXT) of Japan, and the European Consortium for Ocean Research Drilling (ECORD) continue to provide drilling platforms to IODP.



JOIDES Resolution on station conducting scientific ocean drilling during IODP Expedition 352 (July-September 2014). Credit: Tom Fulton.

Scientific Purpose

IODP began in FY 2014 as the replacement for the Integrated Ocean Drilling Program, which succeeded the Ocean Drilling Program. The IODP represents an international partnership of the scientists, research institutions, and funding organizations of 22 nations collecting geologic data and samples from beneath the ocean floor. IODP explores Earth’s evolution and structure recorded in the ocean basins. IODP platforms provide sediment and rock samples (cores), *in situ* monitoring, sampling, measurement from borehole

Major Facilities

observatories, shipboard and shore-based descriptive and analytical facilities, downhole geophysical and geochemical measurements (logging), and opportunities to conduct experiments to determine *in situ* conditions beneath the sea floor.

Status of the Facility

The award with Texas A&M University supports facility operations during FY 2020-2024. In cooperation with the *JOIDES Resolution* Facility Board (JRFB), NSF convenes an annual external panel to examine facility performance and community responsiveness. A panel review was held in February 2020. The summary of this most recent panel review follows:

“The JRSO Site Visit Panel concludes that the facility is being managed extremely well by JRSO, with continued positive evolution of management practices, facility enhancements, and efforts related to making data and publications more widely available to the scientific community. JRSO interacts extremely well with the JRFB and related panels to implement the IODP Science Plan.”

After numerous international workshops, the IODP community has released a new science plan named *2050 Science Framework for Scientific Ocean Drilling*. This plan guides multidisciplinary subseafloor research into the interconnected processes that characterize the complex Earth system and shape our planet's future. The *2050 Science Framework* has a 25-year outlook, requiring state-of-the-art approaches for scientific ocean drilling to achieve its objectives into the mid-21st century. Foundational Earth science research is described in seven Strategic Objectives and five Flagship Initiatives with Enabling Elements that encourage innovation and new discoveries. The Framework is supported by Enduring Principles that discuss access to data, the proposal process, planning and safety, diversity and inclusion, and international collaboration. The new Framework is available on the IODP website at www.iodp.org.

The COVID-19 pandemic has had a significant impact on IODP, particularly on the operations of the *JR* facility. Following ship repair work in the first half of the calendar year, science expeditions had been planned to resume in mid-2020. However, the inability of science teams to gather and participate in the long-term research cruises has contributed to postponement or cancellation of a number of scientific voyages, although some preparatory engineering expeditions have been carried out. The earliest resumption of expeditions including an on-board science party is August 2021.

Meeting Intellectual Community Needs

A comprehensive online survey of the U.S. science community was undertaken from December 2016 to May 2017 under the auspices of the United States Advisory Committee (USAC) to assess the success of the *JR* in meeting the needs of the IODP Science Plan. A total of 876 complete responses were received. In September 2017, 81 scientists convened for the *JOIDES Resolution* Assessment Workshop (JRAW) to distill and analyze these survey responses, examine the science results of FY 2014 to FY 2017 *JR* operations, and make recommendations to NSF regarding whether the *JR* was still needed to address the remaining objectives of the ten-year science plan.

The report states: "the survey results underscore the scientific community's deep satisfaction with the *JOIDES Resolution* and its ability to continue to fulfill IODP objectives. Responses were strongly positive with respect to the ship's drilling systems, analytical systems, and logging systems, with each receiving favorable ratings from over 90% of the respondents ... the vessel's operational time has recently increased from eight to 10 or more months per year, positioning IODP to achieve high-priority science goals at an accelerated rate."

Governance Structure and Partnerships

NSF Governance Structure

The Division of Ocean Sciences in the Geosciences Directorate manages IODP operations of the *JOIDES Resolution* and the IODP Support Office under the NSF Ocean Drilling Program. NSF’s Ocean Drilling Program is located within the Integrative Programs Section, with one Program Officer dedicated to oversight. This Program Officer has responsibility for the awards supporting *JOIDES Resolution* operations, the IODP Support Office, and the United States Science Support Program that funds U.S. scientist participation in IODP.

External Governance Structure

NSF provides the *JOIDES Resolution (JR)* as the light IODP drillship through an award with Texas A&M University as the *JOIDES Resolution* Science Operator (JRSO). MEXT provides the *Chikyu* as the heavy IODP drillship through the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), while the British Geological Survey manages ECORD drilling contributions through single-use mission-specific platforms. Each entity providing an IODP drilling platform is responsible for sample and data storage, publications, and other science costs associated with the respective platform operations.

The *JOIDES Resolution* Facility Board (JRFB), one of three IODP governing bodies, is chaired by a U.S. scientist, with participation by NSF, other contributing international funding agencies, community scientists, and the facility operator. Scientific community members are selected from among nominations submitted through a process managed by the U.S. IODP Science Support Office, housed at Scripps Institution of Oceanography; representatives from the funding agencies, NSF and the facility operator are chosen by those organizations. The JRFB provides operational and management oversight of (1) the *JOIDES Resolution* (via the operator—Texas A&M University), (2) the Science Support Office, and (3) the *JOIDES Resolution* Facility Advisory Panels. The JRFB approves annual program plans and decides on ship tracks on behalf of IODP; NSF decides whether to accept these plans in executing its fiduciary and legal authority for the *JR*.

Partnerships and Other Funding Sources

IODP participants include the United States, Japan, ECORD (Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom), the People’s Republic of China, Korea, India, Australia, and New Zealand, with all participants except Japan providing financial contributions to *JOIDES Resolution* operations. Japan provides program support through substantial investment in the heavy drill ship *Chikyu* operations, with U.S. and Japanese scientists enjoying reciprocal rights on each drilling vessel.

Funding

Total Obligations for IODP

(Dollars in Millions)

	FY 2020	FY 2021	FY 2022	ESTIMATES ¹				
	Actual	Estimate	Request	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Operations & Maintenance	\$48.00	\$48.00	\$48.00	\$48.00	\$48.00	\$48.00	\$48.00	\$48.00

¹ Outyear estimates are for planning purposes only. The current cooperative agreement ends September 2024.

In FY 2021, NSF expects *JOIDES Resolution* operations in support of IODP will be funded at the level of \$48.0 million from NSF appropriations, with a similar amount needed in future years. An additional \$11.13 million from international partners will support *JOIDES Resolution* operations.

Major Facilities

Reviews

Review of FY2020 *JR* operations and awardee performance by an NSF panel would normally have occurred in February 2021. This review was postponed due to pandemic travel restrictions and the associated reduction in FY 2020 *JR* science operations. The next NSF Panel is scheduled to meet in February 2022 to review both FY 2020 and FY 2021 *JR* operations and awardee performance.

Renewal/Recompetition/Termination

After NSB authorization and the NSF Director's approval, the current award was renewed for an additional five years of operation from FY 2020 through FY 2024.

The IODP Science Support Office award at the University of California, San Diego, was extended in 2018 for another five years after excellent performance and panel proposal review.

There are no specific plans for divestment currently, but NSF does not plan to operate *JOIDES Resolution* beyond 2028, which would slightly exceed the planned service life of the drillship. NSF has recently issued a Dear Colleague Letter¹ requesting Expressions of Interest in acquiring and operating a new, globally-ranging scientific drilling vessel to meet challenges posed by the *2050 Science Framework for Scientific Ocean Drilling*.

¹ www.nsf.gov/pubs/2021/nsf21043/nsf21043.jsp