

# **INTERNATIONAL OCEAN DISCOVERY PROGRAM**

## ***JOIDES Resolution Science Operator***

**Texas A&M University**

### **FY15 Annual Program Plan to NSF**

**for time period  
1 October 2014–30 September 2015**

**Amount proposed FY15: \$62,918,708**



***JOIDES Resolution***  
**Science Operator**

Respectfully submitted to:  
National Science Foundation

---

Brad Clement  
Director,  
*JOIDES Resolution* Science Operator  
College Station, Texas

16 July 2014



# Table of contents

<b>1. Executive Summary .....</b>	<b>5</b>
1.1. Introduction .....	5
1.2. Annual Program Plan overview .....	5
1.3. Summary of FY15 scope of work.....	5
1.4. FY15 budget development.....	6
1.4.1. NSF guidance .....	6
1.4.2. FY15 budget assumptions.....	6
1.4.3. FY15 budget request.....	7
<b>2. Expedition Operations .....</b>	<b>7</b>
2.1. FY15 operations schedule.....	7
2.2. FY15 site map .....	8
2.3. Expedition overview .....	8
2.3.1. Expedition 353: Indian Monsoon.....	8
2.3.2. Expedition 354: Bengal Fan .....	9
2.3.3. Expedition 355: Arabian Sea Monsoon.....	9
2.3.4. Expedition 356: Indonesian Throughflow .....	10
2.4. Expedition outreach.....	11
<b>3. Management and Administration .....</b>	<b>11</b>
3.1. Organizational structure.....	11
3.2. Personnel summary.....	12
3.2.1. FY15 personnel summary.....	12
3.3. Management and Administration goals.....	13
3.4. M&A deliverables in FY15.....	13
<b>4. Subcontractors.....</b>	<b>14</b>
4.1. Introduction .....	14
4.2. Overseas Drilling Limited .....	14
4.3. Schlumberger Technology Corporation.....	15
4.4. Kochi Institute for Core Sample Research .....	15
<b>5. Science Operations .....</b>	<b>16</b>
5.1. Science Operations goals.....	16
5.2. SciOps deliverables in FY15.....	16
<b>6. Technical and Analytical Services.....</b>	<b>17</b>
6.1. Technical and Analytical Services goals.....	17
6.1.1. Technical support and analytical systems.....	17
6.1.2. Core curation.....	17
6.2. TAS deliverables in FY15.....	17
<b>7. Development, IT, and Databases.....</b>	<b>19</b>
7.1. Development, IT, and Databases goals.....	19
7.2. DITD deliverables in FY15 .....	19
<b>8. Publication Services .....</b>	<b>20</b>
8.1. Publication Services goals.....	20
8.2. Pubs deliverables in FY15.....	20

**9. JRSO FY15 Budget ..... 21**

- 9.1. Overview ..... 21
- 9.2. FY15 expense category summary ..... 21
- 9.3. FY15 JRSO budget detail ..... 22
- 9.4. Cost savings resulting from elimination of certain expeditions ..... 24
- 9.4. Expense category definitions ..... 24

**APPENDIX I: IT security summary ..... 29**

**Appendix II: Recommended program of insurance ..... 32**

# 1. Executive Summary

## 1.1. Introduction

Beginning with FY15, Texas A&M University (TAMU) will act as manager and science operator of the research vessel *JOIDES Resolution* as a research facility for the International Ocean Discovery Program (IODP). Administrative services in support of *JOIDES Resolution* Science Operator (JRSO) activities are provided by the Texas A&M Research Foundation (TAMRF) through the TAMU System (TAMUS) Office of Sponsored Research Services (OSRS).

## 1.2. Annual Program Plan overview

The complex nature of IODP operations will require Annual Program Plans spanning operational years to establish priorities and to allow the procurement of long-lead time equipment and services. The IODP-JRSO FY15 Annual Program Plan to the National Science Foundation (NSF) defines the *JOIDES Resolution* Science Operator (JRSO) scope of work for FY15 IODP activities and deliverables that are specifically covered under NSF Cooperative Agreement OCE-1326927. This Annual Program Plan is based on (1) the current mission forecast provided on 25 March 2014 for the JRSO by NSF and (2) the JRSO operations schedule that was approved by the *JOIDES Resolution* Facility Board (JRFB) in April 2013. The scope and budget justification of the activities described in the Annual Program Plan were derived from NSF guidance to the JRSO.

The IODP-JRSO FY15 Annual Program Plan includes a discussion of the goals of the JRSO, responsibilities and deliverables, the operational schedule, descriptions of expeditions, and the JRSO organizational structure for science operations and platform operations activities. This section (Section 1) provides budget definitions, assumptions, and directives used to construct the Annual Program Plans. Section 2 describes scheduled FY15 expedition operations; Section 3 describes the organizational structure, provides a personnel summary, and addresses Management and Administration tasks; Section 4 provides an overview of subcontracts; and Sections 5 through 8 address JRSO tasks and budgets by department. Section 9 provides a summary of costs by expense category, a cumulative budget request detail by department, a detailed budget justification, and a table showing cost savings should any of the planned expeditions be canceled.

“Appendix I: JRSO IT Security Summary” provides information requested by NSF regarding information technology (IT) security policies, procedures, and practices employed by the JRSO to protect contractual research and education activities. “Appendix II: Recommended IODP-JRSO Program of Insurance” provides information on risk management services provided to the JRSO, including insurance policy monitoring, ongoing risk assessments, marine insurance negotiations, and claims settlement.

## 1.3. Summary of FY15 scope of work

As the science operator of the *JOIDES Resolution* research facility, the JRSO will provide wireline coring and logging services and will provide technical, science, engineering, and IT support; curate core

materials; develop data applications and manage digital databases; and publish pre-expedition and postexpedition reports and results. All of these Program activities will be conducted in accordance with direction provided by the Program's advisory panels and the JRFB and as outlined in approved Annual Program Plans.

The scope of activities associated with initial planning and preparation of IODP expeditions is similar to early Integrated Ocean Drilling Program activities in terms of deliverables, challenges, and risks. In addition, the JRSO will carry out postexpedition activities related to IODP expeditions and ongoing operational tasks (e.g., completing reports and technical documentation), completing legacy work (e.g., producing scientific publications), conducting long-lead planning work in preparation for expeditions scheduled for future fiscal years, and providing all necessary environmental assessments for IODP expeditions conducted by the JRSO.

On behalf of the JRSO and as outlined in this Annual Program Plan, TAMRF has contracted with Overseas Drilling Limited (ODL) for the services of the RV *JOIDES Resolution*, with Schlumberger Technology Corporation (Schlumberger) for the provision of downhole logging equipment and engineering support, and with the Kochi Institute for Core Sample Research (KOCHI) in support of sampling and curation of core material obtained from NSF-funded scientific ocean drilling and housed at the Kochi Core Center (KCC).

## **1.4. FY15 budget development**

### **1.4.1. NSF guidance**

NSF provided guidance to the JRSO that outlined the FY15 Mission Forecast for the JRSO. The mission forecast included guidance to conduct four expeditions in FY15 and a budget upper limit of \$64,499,800. This Annual Program Plan reflects the NSF guidance to conduct four expeditions and their associated costs.

### **1.4.2. FY15 budget assumptions**

The total budget request of \$62,918,708 includes costs to support JRSO facility operations; science operations at sea and all costs in support of these operations such as planning, logistics, engineering science support, etc.; core curation tasks at the Gulf Coast Repository (GCR); publications tasks; shore-based data management tasks; and other costs in support of maintaining U.S. capability for continued scientific ocean drilling in IODP.

Assumptions about the operations schedule are outlined in the "Expedition Operations" section (Section 2). The JRSO has provided a best-effort estimate of FY15 costs in this plan. If additional funds are identified or expected costs can be avoided during the fiscal year, the JRSO may, upon consultation with NSF, use them to purchase data management system equipment, drilling or science supplies, or high-priority capital replacement items in support of JRSO deliverables.

Fuel price volatility is a major risk factor for completion of the scheduled operations. Assumptions were made using the best available data to determine a prudent estimate for FY15 fuel costs; however, market

conditions are subject to fluctuations that may result in a need for supplemental funding during the period of operations.

### 1.4.3. FY15 budget request

The FY15 JRSO budget summary below shows the overall budget request by department. The line-item total requested for each department includes only direct costs. Subcontracts to ODL, Schlumberger, and KOCHI are budgeted in Management and Administration. The cumulative JRSO costs are separated into total direct costs and indirect costs that add up to the “grand total” budget.

<b>Department</b>	<b>Cost</b>
Management and Administration	43,480,964
Science Operations	7,465,361
Technical and Analytical Services	4,910,435
Development, IT, and Databases	1,615,040
Publication Services	1,410,769
<b>JRSO total direct costs</b>	<b>58,882,569</b>
JRSO modified total direct costs	15,523,611
JRSO indirect costs	4,036,139
<b>Grand total JRSO FY15 budget</b>	<b>\$62,918,708</b>

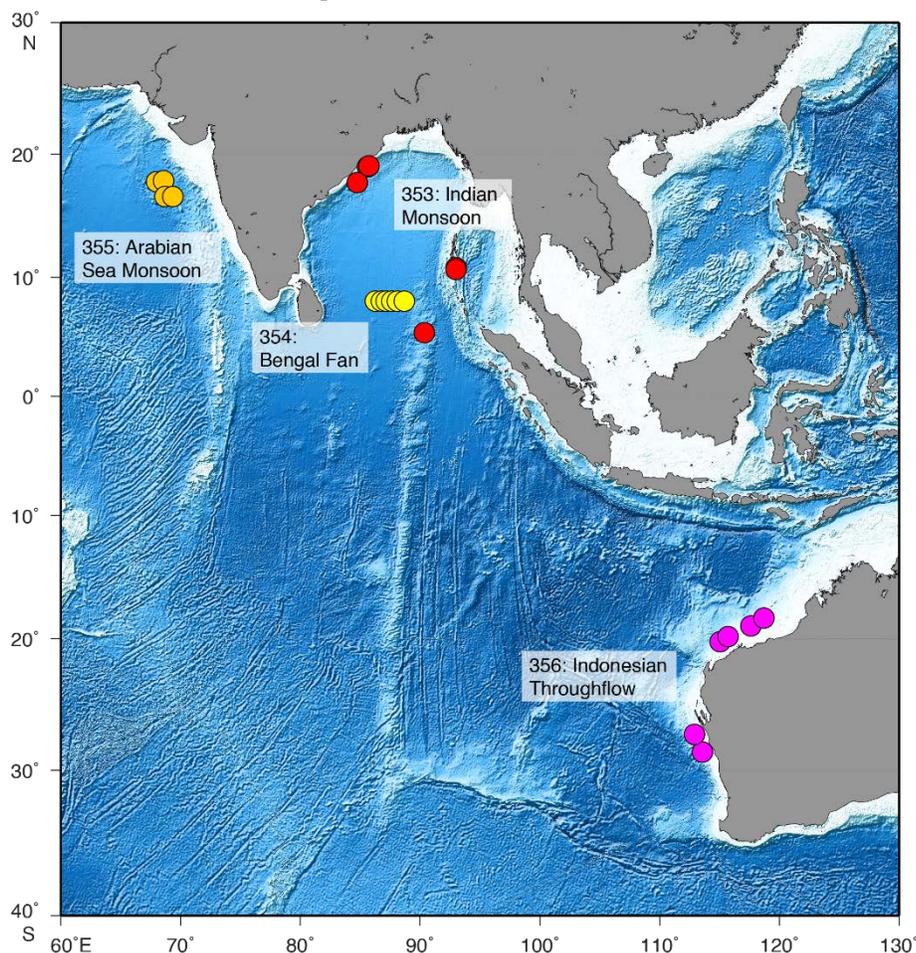
## 2. Expedition Operations

### 2.1. FY15 operations schedule

This Annual Program Plan is based on the following operations schedule published 1 October 2013, including tie-up periods.

29 September–29 November 2014	Tie-up period
29 November 2014–29 January 2015	Expedition 353: Indian Monsoon
29 January–31 March 2015	Expedition 354: Bengal Fan
31 March–31 May 2015	Expedition 355: Arabian Sea Monsoon
31 May–31 July 2015	Tie-up period
31 July–15 September 2015	Expedition 356: Indonesian Throughflow

## 2.2. FY15 site map



## 2.3. Expedition overview

### 2.3.1. Expedition 353: Indian Monsoon

#### ***Proposed Operations***

Scientific ocean drilling (DSDP, ODP, IODP) has never taken place in the Bay of Bengal north of 9°N. Thus, the core region of summer monsoon precipitation has never been investigated. Deep Sea Drilling Program (DSDP) Leg 22 in 1974 and Ocean Drilling Program (ODP) Leg 121 in 1989 drilled the southernmost region (5°–9°N), capturing the distal end of the summer monsoon influence. Expedition 353 proposes to use this unique opportunity to fill this geographic/scientific gap. We seek to capture erosion and run-off signals and the full north–south salinity gradient by drilling in the Mahanadi Basin, Andaman Sea, and the southernmost Bay of Bengal. The main objective of Expedition 353 is to understand the physical mechanisms underlying changes in monsoonal precipitation, erosion, and run-off across timescales from millennial through tectonic, spanning the Late Cretaceous through Holocene. This will be accomplished by stand-alone analysis of records developed at each site, comparison among sites, comparison with terrestrial records from South and East Asia, and comparison with existing records from

previous monsoon-themed drilling expeditions in the Arabian Sea (ODP Leg 117), South China Sea (ODP Leg 184), and the Sea of Japan (Integrated Ocean Drilling Program Expedition 346).

### ***Logistics***

Operations for Expedition 353 are budgeted based on an estimated 61 days (5 in port, 13 in transit, and 43 in operations).

## **2.3.2. Expedition 354: Bengal Fan**

### ***Proposed Operations***

Expedition 354 will drill a transect of sites in the Bay of Bengal to address interactions among the growth of the Himalaya and Tibet, development of the Asian monsoon, and processes affecting the carbon cycle and global climate. Because sedimentation in the Bengal Fan responds to both climate and tectonic processes, its terrigenous sediment records the past evolution of both the Himalaya and regional climate. The histories of the Himalaya/Tibetan system and the Asian monsoon require sampling different periods of time with different levels of precision. Accordingly, we propose drilling a transect of six sites in the fan at 8°N with two complementary objectives. To meet the first objective, we will study the early stages of Himalayan erosion, which will bear on the India-Eurasia collision and the development of the Himalaya and Tibet as topographic features. We will drill a deep site (MBF-3A to ~1500 m) in the west flank of the Ninetyeast Ridge where a reflector interpreted as a Paleocene–Eocene unconformity could be reached at a reasonable depth. To meet the second objective, we will study the Neogene development of the Asian monsoon and its impact on sediment supply and flux. Our east–west transect of drill sites at 8°N will include Site MBF-3A and two other 900 m penetration sites (MBF-1A and MBF-2A) to reach sediment at least as old as 10–12 m.y. Records from the Arabian Sea and the Indian subcontinent suggest that at ~7–8 Ma the intensity of the monsoon increased and C4 plants expanded. Moreover, these changes appear to be linked to changes in the erosional regime as recorded by ODP Leg 116 and possibly to the tectonic evolution of southeast Asia. This transect will allow study of the extent to which strengthening of the monsoon encompassed the Bay of Bengal, where increased rainfall, not strengthened wind, characterizes the monsoon and will allow quantitative studies of the interrelations of climate change and sediment accumulation. In addition, three sites (MBF-4A, MBF-5A, and MBF-6A) will document how the depocenter migrated across this transect during the Pleistocene and will provide the most complete record of channel-derived terrigenous material through this time interval.

### ***Logistics***

Operations for Expedition 354 are budgeted based on an estimated 61 days (5 in port, 6 in transit, and 50 in operations).

## **2.3.3. Expedition 355: Arabian Sea Monsoon**

### ***Proposed Operations***

The continental margin of India adjoining the Arabian Sea offers a unique opportunity to delineate the relative role of climate and tectonics and the net impact on weathering and erosion of the Himalaya. We propose scientific drilling in the Arabian Sea to understand co-evolution of mountain building, erosion, and climate over various timescales. The southwest monsoon is one of the most intense climatic

phenomena on Earth. Its long-term development has been linked to the growth of high topography in South and Central Asia. Conversely, intensification of the summer monsoon rains is linked to the tectonic evolution of the Himalaya and Tibet, not least the exhumation of the Greater Himalaya, and to the rate of plate convergence. Weathering of the Himalaya has also been linked to the long-term drawdown of atmospheric CO<sub>2</sub> during the Cenozoic, culminating in the onset of Northern Hemispheric glaciations. No other part of the world has such intense links between tectonic and climatic processes. Unfortunately, these hypotheses remain untested due to limited information on history of erosion and weathering. This cannot be accomplished onshore because the foreland basin records are disrupted by major unconformities and depositional ages are hard to determine with high precision. During Expedition 355, we propose to recover long records of erosion and weathering from the Indus Fan that will allow us to establish links between these processes and the oceanographic history of the region already reconstructed from drilling on the Oman margin. Such records can further be correlated to structural geological data in the Himalaya and independent records of evolving Tibetan Plateau to estimate sediment fluxes and erosion rates. The proposed drilling will be accomplished within a regional seismic stratigraphic framework, allowing a robust estimation of sediment budget along with quantitative estimates for weathering fluxes. Drilling through the fan base and into the underlying basement will permit additional constraints to be placed on the nature of crust in the Laxmi Basin (Eastern Arabian Sea). This is highly significant for understanding problems of global interest such as paleogeographic reconstructions along conjugate margins in the Arabian Sea and models of continental breakup on rifted volcanic margins.

### ***Logistics***

Operations for Expedition 355 are budgeted based on an estimated 61 days (5 in port, 5 in transit, and 51 in operations).

## **2.3.4. Expedition 356: Indonesian Throughflow**

### ***Proposed Operations***

The Indonesian Throughflow (ITF) is a critical part of the global thermohaline conveyor. It plays a key role in transporting heat from the equatorial Pacific (the Indo-Pacific Warm Pool [IPWP]) to the Indian Ocean and exerts a major control on global climate. The complex tectonic history of the Indonesian archipelago due to the continued northward motion and impingement of the Australasian plate into the southeast Asian part of the Eurasian plate makes long-term (million year) reconstructions of ITF history difficult. The best areas in the Indian Ocean to determine ITF history are either in the deep ocean away from strong tectonic deformation or along passive margin regions that are directly under the influence of the ITF. While previous deepwater ODP and DSDP cores in the Indian Ocean have been used to chart IPWP influence (and by proxy ITF variability), these sections lack direct biogeographic and sedimentological evidence of the ITF. We propose to drill a transect of shelf to shelf margin cores over 10° latitude in the Northwest Shelf of Australia (NWS) to obtain a 5 m.y. record of ITF, IPWP, and climate evolution that has the potential to match orbital-scale deep-sea records in its resolution. Drilling the NWS will reveal a detailed shallow water history of ITF variability and its relationship to climate. It will allow us to understand the history of the Australian monsoon and its variability, a system whose genesis is thought to be related to the initiation of the East Asian monsoon and which is hypothesized to have been in place

perhaps since the Pliocene or earlier. It also will lead to a better understanding of the nature and timing of the development of aridity on the Australian continent. Detailed paleobathymetric and stratigraphic data from the transect will also allow us to construct subsidence curves to constrain the spatial and temporal pattern of vertical motions caused by the interaction between plate motion and convection within the Earth's mantle, known as dynamic topography. The NWS is in an ideal location to study this phenomenon since it is positioned on the fastest moving continent since the Eocene, on the edge of the degree two geoid anomaly. Accurate subsidence analysis over 10° of latitude will resolve whether northern Australia is moving with/over a time transient or long-term stationary downwelling within the mantle, thereby vastly improving our understanding of the dynamics of deep Earth processes.

### **Logistics**

Operations for Expedition 356 are budgeted based on an estimated 61 days (5 in port, 7 in transit, and 49 in operations).

## **2.4. Expedition outreach**

Berths will be made available for Onboard Education Officers during each expedition, and JRSO personnel will facilitate the activities of teachers at sea, give port call tours, and work with the U.S. Science Support Program, the IODP Science Office, the IODP Forum, and the TAMU College of Geosciences on diversity and education issues and to further advance the Program through outreach.

# **3. Management and Administration**

## **3.1. Organizational structure**

The JRSO's existing organizational structure directly reflects the responsibilities specified by NSF for the technical and scientific management, administration, and operation of the *JOIDES Resolution*, including planning, coordinating, overseeing, reviewing, and reporting activities. The TAMU portion of the organization consists of four departments: Science Operations (Sci Ops); Technical and Analytical Services (TAS); Development, Information Technology, and Databases (DITD); and Publication Services (Pubs). Managers of these departments report to the JRSO Director, who is responsible for the Program's overall management and performance. The Human Resources group resides within the Director's Office.

On-site administrative staff dedicated to JRSO support are overseen by a General Manager who reports to the Executive Director of the TAMUS OSRS. This separate reporting chain ensures that the administrative unit retains the independence to ensure regulatory compliance while working directly with the JRSO staff to efficiently implement the Program. The Director's Office and the Administrative Services group combined comprise the Management and Administration portion of this APP.

On behalf of the JRSO, and as outlined in this Annual Program Plan, TAMRF has contracted with ODL for the services of the *JOIDES Resolution* for use as the JRSO riserless drilling vessel, with Schlumberger for the provision of wireline logging equipment and engineering support, and with KOCHI for maintenance of core material obtained from NSF-funded scientific ocean drilling.

## 3.2. Personnel summary

The personnel summary table presents an accounting of the cumulative estimated effort within the departments to which positions are assigned. The table reflects actual senior personnel and departmental staffing as of 1 April 2014 plus projected staffing for FY15. Staffing levels may change annually due to unanticipated changes in the operations schedule and/or scope of work. The table does not show student workers or the dedicated Administrative Services, IT, and application developer positions that are supported through indirect costs.

### 3.2.1. FY15 personnel summary

Department/ senior personnel	Position title	Personnel (#)
<b>Management and Administration</b>		<b>3</b>
Brad Clement	Director of Science Services	1
	Administrative Assistant	1
Barbara Neyses	General Manager, JRSO Administrative Services	1
<b>Science Operations</b>		<b>24</b>
Mitch Malone	Manager of Science Operations	1
	Administrative Assistant	1
	Supervisor of Engineering Services	1
	Staff Engineers	2
	Designers	3
	Staff Researcher	1
	Supervisor of Operations and Logistics Support	1
	Operations Superintendent	1
	Operations Engineer	1
	Materials Specialist	1
	Marine Logistics Coordinator	1
	Materials Technician	1
	Shipping and Receiving Coordinator	1
	Supervisor of Science Support	1
	Staff Scientists	7

**Note:** Continued on next page.

IODP-JRSO FY15 Annual Program Plan

Department/ senior personnel	Position title	Personnel (#)
<b>Technical and Analytical Services</b>		<b>37</b>
Jay Miller	Manager of Technical and Analytical Services	1
	Business Coordinator	1
	Supervisor of Analytical Services	1
	Imaging Specialists	2
	Supervisor of Technical Support	1
	Laboratory Officers	3
	Assistant Laboratory Officers	4
	Marine Laboratory Specialists (Res. Asst./Res. Spec.)	16
	Marine Instrumentation Specialists	4
	Curator	1
	Superintendent of the Gulf Coast Repository	1
	Curatorial Specialists	2
<b>Development, IT, and Databases</b>		<b>5</b>
Jim Rosser	Manager of Development, IT, and Databases	1
	Supervisor of Databases/Archives	1
	Senior Software Applications Developer	1
	Data Analyst	1
	Systems Analyst	1
<b>Publication Services</b>		<b>18</b>
Angie Miller	Manager of Publication Services	1
	Publications Coordinator	1
	Supervisor of Editing	1
	Editors	4
	Supervisor of Production	1
	Production Editors	3
	Distribution Specialist	1
	Supervisor of Graphics	1
	Graphics Specialists	5
<b>Total FY15 JRSO personnel</b>		<b>87</b>

### 3.3. Management and Administration goals

Management and Administration goals include planning, coordinating (with other IODP-related entities), overseeing, reviewing, and reporting on IODP activities.

### 3.4. M&A deliverables in FY15

- Program planning: Develop and assure implementation of Annual Program Plans.
- Progress reporting: Provide content for and submit quarterly and annual reporting deliverables, including financial reports. During the first year of the cooperative agreement, this effort will include reframing the quarterly and annual reports to best inform NSF and the JRFB.
- Reporting and liaison activities: Report to and liaise with funding agencies and with IODP-related agencies (e.g., the JRFB, JRFB advisory panels, Program Member Offices, and other national organizations and facility boards). Act as a liaison to IODP advisory and other panels, task forces, and workshops as appropriate.

- Project portfolio management: Manage large cross-departmental tasks and projects through teams using a formal project portfolio management approach to identify, categorize, review, evaluate, select, and prioritize proposed projects.
- Compliance support: Ensure compliance with university, state, and U.S. federal statutes and rules governing research, including U.S. export control regulations for all materials shipped to the *JOIDES Resolution*, including third-party instruments, and all scientific personnel sailing during a JRSO expedition.
- Contract services: Provide contract services for IODP-related activities, including negotiation, management, and contractual oversight of subcontracts.
- Other administrative services: Manage payroll, travel, invoicing, financial and subcontract reporting, equipment inventory, and risk management services for the Program.
- Human resources management: Assist with management and supervision of JRSO staff to ensure adherence to TAMU's policies and procedures for maintaining a well-trained and productive workforce and safe work environment.
- Legacy documentation: Routinely archive electronic copies of documents and reports produced by the JRSO on behalf of IODP.

## 4. Subcontractors

### 4.1. Introduction

The Administrative Services department manages subcontracts by implementing established policies and procedures that ensure compliance with the applicable laws, regulations, provisions, and obligations of the NSF cooperative agreement with the JRSO. Establishment of subcontracts involves development of a detailed scope of work that outlines operational responsibilities of the subcontractor, a review of the subcontractors' policies and agreements to ensure that applicable flow-down regulations are incorporated into any subagreements (e.g., shipboard catering), and monitoring of the subcontractors' adherence to the established scope of work through direct supervision, periodic meetings, and review of progress reports. Administrative Services staff review subcontractor invoices prior to payment and conduct periodic audits of the subcontractors' financial records to ensure financial compliance with cost allowability and other contractual requirements.

### 4.2. Overseas Drilling Limited

ODL is responsible for safely conducting drilling and coring operations to meet the scientific goals outlined in the Annual Program Plan. This includes providing the marine crew, the drilling crew, and complete logistical requirements (i.e., ship supplies, drilling supplies, spare parts, and port call-related activities) in accordance with the approved Operations Plan. The JRSO Operations Superintendent monitors ODL adherence to their scope of work on board the *JOIDES Resolution*. In addition, JRSO

Science Operations staff review the required daily operations report that details logistical, scientific, and operational data. Expedition planning and crossover meetings held with ODL also ensure that the subcontractor adheres to the scope of work and scientific objectives. Review of ODL policies and agreements related to catering, travel, and purchasing ensure that applicable flow-down regulations are incorporated. Thorough review of invoices submitted prior to payment and periodic audit of ODL financial records ensure financial compliance with cost allowability and other contractual requirements.

### **4.3. Schlumberger Technology Corporation**

Schlumberger provides services associated with the design, installation, and operation of logging infrastructure on board the *JOIDES Resolution* to meet the scientific goals outlined in the Annual Program Plan. To ensure the Program's goals are met through the subcontract with Schlumberger Technology Corporation, the JRSO will follow similar procedures to those used for managing established subcontracts.

### **4.4. Kochi Institute for Core Sample Research**

The Kochi Institute for Core Sample Research (KOCHI), Japan Agency for Marine-Earth Science (JAMSTEC), will provide services in support of sampling and curation of core material obtained from NSF-funded scientific ocean drilling and housed at the KCC. The JRSO Curator will interact with and provide technical expertise to KOCHI curatorial staff, as needed. Curation of the cores at the KCC will include proper storage of cores and management of core-related information for facilitating sampling, observation, education, and core display. Sample requests from the science community will be evaluated, and approved sample requests will be fulfilled through extraction of samples from the cores. Curatorial and sampling duties will also involve regular updates of an in-house database for core sample management, KCC website, KCC core catalog, and so on, and information about the cores will be publicized through academic meetings. KOCHI curatorial staff will also assist visiting researchers in utilizing analytical facilities at the KCC.

To ensure the Program's goals are met through the subcontract with KOCHI, the JRSO will follow similar procedures to those used for managing the established subcontracts.

## 5. Science Operations

### 5.1. Science Operations goals

The Science Operations (SciOps) department is responsible for providing scientific and operational planning and implementation for *JOIDES Resolution* drilling expeditions in response to the IODP science planning structure. SciOps goals include leading the scoping, planning, and implementation of science expeditions; interacting with and providing oversight to the drilling and logging subcontractors; conducting long-range operational planning for out-year JRSO expeditions; and utilizing IODP resources to oversee engineering development projects.

### 5.2. SciOps deliverables in FY15

- Drilling proposal evaluation: Scope proposals and conduct risk assessment for proposed expeditions.
- Risk management: Engage a panel of experts (the TAMU Safety Panel) to participate in site reviews with the Environmental Protection and Safety Panel (EPSP) to provide independent recommendations to the JRSO on drilling safety and environmental protection.
- Expedition planning and implementation: Provide scientific, technical, and operational planning and execution for each scheduled expedition; interact with and provide oversight to the drilling subcontractor (ODL) and wireline logging subcontractor (Schlumberger); manage rig instrumentation; perform/oversee drilling, logging, and coring operations; plan and implement large projects; and conduct long-range operational and science planning for out-year expeditions.
- Expedition staffing: Provide selection and support for scientific staffing and Co-Chief Scientist selection for each scheduled JRSO expedition.
- Logistics support: Provide for expedition and shore-based activities including procurement, shipping, and inventory of equipment and supplies.
- Clearance/Environmental assessment: Obtain permits and clearances to drill in U.S. and international waters, as well as the Exclusive Economic Zones (EEZs) and territorial waters of potentially any coastal country; provide for environmental assessment services for marine mammal permitting associated with seismic operations; and ensure environmental protection and safety.
- Engineering support: Provide engineering support for maintaining and developing shipboard and shore-based drilling, coring, logging, and downhole systems, including third-party developments and long-lead time borehole installation projects, for each scheduled JRSO expedition.
- Scientific leadership: Provide scientific leadership within the JRSO for expeditions, projects, and Laboratory Working Groups and provide scientific leadership on board the *JOIDES Resolution* during expeditions.
- Progress reporting: Provide expedition-related reports and content for expedition publications (e.g., *Scientific Prospectus*, *Preliminary Report*, etc.). Provide content for shipboard and shore-based

reporting deliverables (e.g., daily and weekly ship reports, site summaries, and JRSO quarterly and annual reports).

- Liaison activities: Act as a liaison to IODP advisory and other panels, task forces, and workshops as appropriate.
- Education/outreach support: Facilitate activities of teachers at sea, give port call tours, and participate in efforts to further advance the Program through outreach.
- Legacy documentation: Routinely archive electronic copies of documents and reports produced by the JRSO on behalf of IODP, including expedition science and operations reports.

## 6. Technical and Analytical Services

### 6.1. Technical and Analytical Services goals

The Technical and Analytical Services (TAS) department's major responsibilities are to facilitate core flow and oversee laboratories. TAS stocks, maintains, upgrades, and staffs the shipboard and shore-based laboratories and instrumentation and oversees the GCR staff who curate, archive, and manage cores and samples collected by the Program.

#### 6.1.1. Technical support and analytical systems

TAS goals include managing the complex supply chain for stocking the shipboard laboratories; operating scientific measurement equipment and providing support to shipboard scientists in the fulfilling of their responsibilities and expectations; providing a supervisory and reporting structure for seagoing JRSO personnel; educating customers regarding laboratory-specific and general shipboard safety requirements; maintenance, repair, and development of scientific equipment and laboratories while at sea to enable expedition staff to meet scientific objectives; providing support for downhole tools and measurements; working to ensure proper quality assurance (QA)/quality control (QC) of measurements made in the shipboard laboratories; and support of shore-based laboratories.

#### 6.1.2. Core curation

Core Curation goals include providing services in support of IODP core sampling and curation of the core collection archived at the GCR and interacting with and providing technical expertise to the KOCHI subcontractor in support of core material obtained from NSF-funded scientific ocean drilling and housed at the KCC.

### 6.2. TAS deliverables in FY15

- Analytical systems: Support and maintain shipboard and shore-based analytical facilities, tools, instruments, and associated QA/QC protocols.
- Laboratory working groups: Provide oversight, research direction, and advice on corrective actions and potential developments for laboratories and QA for the methods, procedures, and analytical

systems both on the *JOIDES Resolution* and on shore through regular review of cruise evaluations, expedition technical reports, issues management communications, and interactions with members of the science community.

- Shipboard laboratory support: Ensure shipboard laboratory safety; handle core; oversee and assist in shipboard analytical measurements; manage and troubleshoot issues in the shipboard laboratories; ensure effective capture and transfer of expedition to database systems; manage supply chain for shipboard consumables; and support Science Parties in achieving scientific objectives;
- Scientific leadership: Provide scientific leadership within the JRSO for project management and in Laboratory Working Groups.
- Sampling and curation policy and procedures: Work with other IODP facilities and the IODP advisory panel to review and revise the IODP Sample, Data, and Obligations Policy, as needed, and implement a policy for IODP core curation. Work closely with staff to coordinate, standardize, and document curatorial procedures for IODP cores and samples.
- Sample and curation strategies: Plan sample and curation strategies for upcoming JRSO expeditions and review all shipboard and moratorium-related requests in coordination with the other members of the Sample Allocation Committee for each expedition.
- Core sampling: Provide curator specialist on board the drillship to supervise core sampling during ship operations.
- Core curation and sample requests: Conduct all responsibilities associated with curation of core collections at the GCR and provide services in support of core sampling, analysis, and education; fulfill postmoratorium sample requests from the scientific community; analyze geological core in shore-based laboratories; and provide technical expertise in interactions with the KOCHI subcontractor in support of sampling and curation of core material obtained from NSF-funded scientific ocean drilling and housed at the KCC.
- Use of core collection: Promote outreach use of the core collection in collaboration with IO education/outreach personnel and other science partners by providing materials for display at meetings or museums, as well as conducting tours and supporting other JRSO outreach activities.
- Progress reporting: Provide content for reporting deliverables (e.g., JRSO quarterly and annual reports).
- Liaison activities: Act as a liaison to IODP advisory and other panels, task forces, and workshops as appropriate. Participate in annual IODP curatorial staff meeting.
- Education/outreach support: Facilitate activities of teachers at sea, give port call tours, and participate in efforts to further advance the Program through outreach.
- Legacy documentation: Routinely archive electronic copies of documents and reports produced by the JRSO on behalf of IODP.

## 7. Development, IT, and Databases

### 7.1. Development, IT, and Databases goals

The Development, IT, and Databases (DITD) department oversees JRSO data collection/storage, management, and archiving; maintains IT infrastructure on ship and shore; develops and maintains instrument-specific software for data acquisition; and manages the Programs' extensive databases.

DITD goals include management of data supporting IODP activities, management of expedition and postexpedition data, providing long-term archival access to data, and supporting IT services.

### 7.2. DITD deliverables in FY15

- Expedition data services: Maintain and manage databases supporting expedition planning and data collected during expeditions; operate and maintain data management and harvesting systems (including QA/QC for storage and archival of expedition and postexpedition data, including core and sample tracking); ensure data integrity; respond to data requests from the scientific community; process downhole log data as needed; and plan data handling for special/third-party science equipment.
- Program-wide data query services: Provide JRSO customers with access to expedition databases and data using web-based services.
- Operation and maintenance: Operate and maintain computer and network systems both on ship and shore; maintain IT infrastructure, including satellite communications, personal computers, and network instrumentation hosts; and maintain congruency between ship and shore system architectures.
- IT service support: Provide help desk services and support IT needs of visiting scientists.
- Security services: Monitor and protect JRSO network and server resources to ensure safe, reliable operation and security for IODP data and IT resources.
- Software development: Provide software development services as needed, maintain software, and provide training support for shipboard scientists as necessary.
- Project Portfolio Management: Administer the JRSO project portfolio management program.
- Reporting: Provide content for reporting deliverables (e.g., JRSO quarterly and annual reports). Act as a liaison to IODP advisory and other panels, task forces, and workshops as appropriate.
- Expedition outreach: Facilitate activities of teachers at sea and enable ship-to-shore videoconferencing with classrooms, museums, and meetings.
- Legacy documentation: Routinely archive electronic copies of documents and reports produced by the JRSO on behalf of IODP, including documentation of all IT architecture and corresponding services configurations.

## 8. Publication Services

### 8.1. Publication Services goals

The Publication Services (Pubs) department is responsible for JRSO publications, from pre-expedition planning documents (i.e., *Scientific Prospectuses*) to postexpedition *Proceedings* volumes, along with technical documentation and Program reporting deliverables. Integrated presentation of IODP Program publications will be managed through contracts to the JRSO from CDEX and ESO for expeditions taking place from FY15 forward.

Pubs goals include providing publications support services for JRSO drilling expeditions and editing, production, and graphics services for all required reports and scientific publications as defined in the JRSO cooperative agreement with NSF. IODP publications for FY15 will include quarterly and annual reports for the JRSO; a *Scientific Prospectus*, *Preliminary Report*, and *Proceedings of the International Ocean Discovery Program* volume for each JRSO expedition; and *Proceedings of the Integrated Ocean Drilling Program* volumes for USIO, CDEX, and ESO expeditions that concluded by the end of FY14. CDEX and ESO *Proceedings* volumes will be produced according to standard schedules that commence upon receipt of content by the JRSO.

### 8.2. Pubs deliverables in FY15

- Shipboard publications support: Provide a Publications Specialist for publications support and report coordination during each FY15 JRSO expedition.
- Postexpedition editorial meetings: Provide editorial, graphics, and production support during each JRSO postexpedition editorial meeting.
- IODP scientific publishing: Produce scientific and expedition reports, including approximately 8 JRSO scientific reports (*Scientific Prospectuses* and *Preliminary Reports*) and expedition reports from 5 JRSO expeditions and 1 ESO expedition that will be published or in production during FY15, as well as postexpedition data reports and synthesis papers from 18 Integrated Ocean Drilling Program expeditions and 3 IODP expeditions.
- Publications management: Manage peer-review process for USIO and JRSO *Proceedings* volumes (~40 data reports or synthesis papers) and provide centralized record keeping of IODP postexpedition research submissions.
- Bibliography and citation management: Manage postexpedition publication citations, maintain cumulative Program and expedition-related bibliographies, prepare annual report of Program-related citation statistics, and respond to special requests for Program-related citation data.
- Progress reporting: Edit and produce the Integrated Ocean Drilling Program USIO FY14 fourth quarterly report, 4 JRSO FY15 quarterly reports, the JRSO FY15 Annual Report, and the JRSO Annual Program Plan, including original versions and all revisions required by NSF.
- Expedition outreach: Facilitate activities of teachers at sea during JRSO expeditions.

- Legacy and technical documentation: Routinely archive electronic copies of all documents, reports, technical documentation, and scientific publications produced by the JRSO on behalf of IODP.
- Integrated Ocean Drilling Program closeout activities: Dismantle publications warehouse, complete and archive expedition publications, and produce NSF-required Program reports such as the (e.g., IODP-USIO Final Technical Report to NSF).

## 9. JRSO FY15 Budget

### 9.1. Overview

The budget summary and detailed departmental budgets in this section describe the overall JRSO FY15 budget requests to provide a framework for interpreting fiscal data in quarterly reports delivered to NSF by the JRSO.

Section 9.1 provides the cumulative total for each major expense category in the JRSO FY15 budget, Section 9.2 shows the detailed budget request for each department, and Section 9.3 outlines the potential cost savings by expedition that would result from elimination of a scheduled expedition. The budget explanation for each expense category is provided in Section 9.4.

### 9.2. FY15 expense category summary

<b>FY15 JRSO budget by expense category</b>	
<b>Expense category</b>	<b>Cost</b>
Salaries and fringes	7,894,593
Equipment	1,610,982
Travel	1,465,595
Materials and supplies	2,236,752
Consultant/professional services	415,730
Computer services	20,000
Subcontracts	41,822,976
Other direct costs	3,415,942
<i>Shipping</i>	<i>1,442,738</i>
<i>Communication</i>	<i>416,470</i>
<i>Business conferences</i>	<i>40,394</i>
<i>Training</i>	<i>208,340</i>
<i>Insurance</i>	<i>669,087</i>
<i>Maintenance and repair</i>	<i>474,740</i>
<i>Other</i>	<i>164,174</i>
<b>Total direct costs</b>	<b>58,882,570</b>
<b>Modified total direct costs</b>	<b>15,523,611</b>
<b>Indirect costs</b>	<b>4,036,139</b>
<b>Total JRSO FY15 budget</b>	<b>\$62,918,708</b>

### 9.3. FY15 JRSO budget detail

<b>FY15 JRSO budget by department</b>	
<b>Department/expense category</b>	<b>Cost</b>
<b>Management and Administration</b>	
Salaries and fringes	346,827
Equipment	0
Travel	100,500
Materials and supplies	13,700
Consultant/professional services	19,000
Computer Services	20,000
Subcontracts	41,822,976
<i>Overseas Drilling Limited</i>	<i>38,001,715</i>
Day rate	26,071,118
Fuel and lubricants	7,462,773
Per diem	644,313
Port calls	2,114,769
Insurance— <i>JOIDES Resolution</i>	833,742
Travel—ODL	875,000
<i>Schlumberger Technology Corporation</i>	<i>3,338,673</i>
Day rate	3,075,673
Supplies	173,000
Consultant/professional services	30,000
Travel	35,000
Maintenance and repair	25,000
<i>Kochi Institute for Core Sample Research</i>	<i>482,588</i>
Salaries and fringes	282,353
Shipping	48,235
Supplies	50,000
Contractual services	25,882
Indirect costs	76,118
Other direct costs	1,157,961
<i>Shipping</i>	<i>5,100</i>
<i>Communication</i>	<i>401,800</i>
<i>Business conferences</i>	<i>37,350</i>
<i>Training</i>	<i>9,000</i>
<i>Insurance</i>	<i>661,087</i>
<i>Maintenance and repair</i>	<i>5,000</i>
<i>Other</i>	<i>38,624</i>
<b>Total Management and Administration direct costs</b>	<b>\$43,480,964</b>

**Note:** Continued on next two pages.

IODP-JRSO FY15 Annual Program Plan

<b>FY15 JRSO budget by department</b>	
<b>Expense category by department</b>	<b>Cost</b>
<b>Science Operations</b>	
Salaries and fringes	2,595,444
Equipment	1,310,000
Travel	349,398
Materials and supplies	1,525,182
Consultant/professional services	143,500
Computer Services	0
Subcontracts	0
Other direct costs	1,541,838
<i>Shipping</i>	<i>1,403,838</i>
<i>Communication</i>	<i>4,000</i>
<i>Training</i>	<i>31,000</i>
<i>Insurance</i>	<i>8,000</i>
<i>Maintenance and repair</i>	<i>35,200</i>
<i>Other</i>	<i>59,800</i>
<b>Total Science Operations direct costs</b>	<b>\$7,465,361</b>
<b>Technical and Analytical Services</b>	
Salaries and fringes	3,177,185
Equipment	174,500
Travel	757,300
Materials and supplies	464,500
Consultant/professional services	47,800
Computer Services	0
Subcontracts	0
Other direct costs	289,150
<i>Shipping</i>	<i>32,900</i>
<i>Communication</i>	<i>2,000</i>
<i>Training</i>	<i>102,750</i>
<i>Maintenance and repair</i>	<i>103,500</i>
<i>Other</i>	<i>48,000</i>
<b>Total Technical and Analytical Services direct costs</b>	<b>\$4,910,435</b>
<b>Development, IT, and Databases</b>	
Salaries and fringes	449,368
Equipment	126,482
Travel	208,147
Materials and supplies	219,770
Consultant/professional services	200,930
Computer Services	0
Subcontracts	0
Other direct costs	410,344
<i>Shipping</i>	<i>600</i>
<i>Communication</i>	<i>7,470</i>
<i>Business conferences</i>	<i>3,044</i>
<i>Training</i>	<i>58,590</i>
<i>Insurance</i>	<i>0</i>
<i>Maintenance and repair</i>	<i>323,640</i>
<i>Other</i>	<i>17,000</i>
<b>Total Development, IT, and Databases total direct costs</b>	<b>\$1,615,040</b>

Note: Continued on next page

<b>FY15 JRSO budget by department</b>	
<b>Expense category by department</b>	<b>Cost</b>
<b>Publication Services</b>	
Salaries and fringes	1,325,769
Equipment	0
Travel	50,250
Materials and supplies	13,600
Consultant/professional services	4,500
Computer Services	0
Subcontracts	0
Other direct costs	16,650
<i>Shipping</i>	300
<i>Communication</i>	1,200
<i>Training</i>	7,000
<i>Maintenance and repair</i>	7,400
<i>Other</i>	750
<b>Total Publication Services direct costs</b>	<b>\$1,410,769</b>
JRSO total direct costs	58,882,570
JRSO total modified total direct costs	15,523,611
JRSO indirect costs	4,036,139
<b>Total JRSO FY15 budget</b>	<b>\$62,918,708</b>

## 9.4. Cost savings resulting from elimination of certain expeditions

<b>Expense category</b>	<b>Indian Monsoon</b>	<b>Bengal Fan</b>	<b>Arabian Sea Monsoon<sup>1</sup></b>	<b>Indonesian Throughflow<sup>1</sup></b>
Ship operations reduction	679,491	665,759	727,190	743,094
Payroll and travel reduction	303,634	281,065	293,714	300,195
Supplies reduction	214,761	608,851	406,710	371,747
Shipping reduction	174,531	271,678	242,592	100,644
<b>Total potential budget reduction</b>	<b>\$1,372,417</b>	<b>\$1,827,353</b>	<b>\$1,670,206</b>	<b>\$1,515,680</b>

<sup>1</sup> Does not include \$502,319 in long-lead supplies to be purchased in FY14 for FY15 expeditions.

## 9.5. Expense category definitions

**Salaries and fringe benefits.** Salaries, fringe benefits, and sea pay, including an anticipated cost-of-living allowance for staff supporting the Program (see Section 3.2). Fringe rates are calculated based on a University-established percentage of 17.4% plus insurance premiums.

**Equipment.** Procurement, upgrading, or fabrication of operational equipment with an acquisition cost of more than \$5,000; computer and network equipment to replace aged network models, workstations, and plotters, and new workstations for new staff. Costs associated directly with equipment (computer, scientific, and drilling) intended solely for use on the ship over a period of time greater than one expedition, equipment purchased for a specific expedition, and the pro-rata cost of shore-based equipment used partially to support expedition activities. Tools and equipment in support of logging operations. Operational equipment replacement and acquisition of parts and spare units for downhole tools. Acquisition of new analytical systems and capital replacement or upgrades of failed or obsolete

laboratory equipment. Estimated equipment costs are projected based on potential for loss during operations as well as on the need for replacement and are calculated using current quotes on file.

***Travel.*** Transportation, per diem, lodging, and other associated costs.

**Domestic.** Travel to IODP meetings and workshops, pre- and postexpedition planning meetings; subcontractor, insurance, and vendor meetings; and professional conferences. Travel costs to bring off-site JRSO staff to participate in on-site meetings. Costs are estimated at \$2,500 per domestic trip based on the current published government per diem rates.

**International.** Travel for personnel attending international Program meetings and workshops and for personnel who will work at port calls, sail during expeditions, and/or work on the ship during transits or tie-up periods. Costs are estimated at \$3,500 for regular meetings and \$5,000 for port calls/expeditions based on the expedition schedule, the current published government per diem rates, and estimated air travel costs specific to the port call location.

***Materials and supplies.*** Operational, laboratory, logistical, and shipping supplies for shipboard and shore-based analytical and engineering laboratory and test facilities and expeditions, including long-lead hardware for FY16 expeditions (to be determined based on the outcome of the April 2014 JRFB meeting). Cost estimates for drill bits, core liner, hardware, and coring supplies are calculated based on expedition-specific requirements such as estimated penetration, core recovery, lithology, and potential hole instability. Standard reference material; shipboard laboratory consumables and safety supplies; specialized supplies for core sampling and curation tasks; expendables and small hardware for continued operation and maintenance of IT resources; digital photographic supplies (e.g., drum scanner supplies, CDs, DVDs, and tapes) for processing images on shore; general operational and office supplies including printer and copier supplies and paper; non-inventory equipment costing less than \$5,000; software purchases and upgrades, software subscriptions, volume licensing agreements, concurrent usage software agreements, electronic media, and other computer supplies; costs of office furniture, including replacing broken or aging office furniture; and general safety and cleaning supplies.

***Consultant/professional services.*** Costs for expert assistance, including annual physical examinations for seagoing personnel, external printing and copier services, vehicle and warehouse equipment repair, testing and calibration of laboratory instruments and equipment, machine shop services, facilities repair, lease of off-premises records storage facility, visitor parking permits, back-up services, IT expert assistance services, TAMU Physical Plant services, temporary labor, tuition for Graduate Assistant Research positions, transfer fees, and weather reports. Consultant and contract services, including services in support of network and videoconferencing equipment, engineering evaluation services as needed, and liaisons to selected panels as needed. American Geosciences Institute (AGI) Ocean Drilling Citation Database fee for inclusion of new citations, CrossRef annual membership and administrative costs, digital object identifier (DOI) registration charges.

***Computing services.*** Use of TAMU's financial and management information system (FAMIS), including the Program's share of costs based on the number of entry lines.

**Subcontracts.** Consultant and contract services.

Overseas Drilling Limited (ODL). Subcontract for operations of the research vessel *JOIDES Resolution*.

Costs related to this subcontract include

*Day rate:* Vessel staffing for the subcontractor's sailing crew and drilling personnel, not including the cost of the USIO personnel or scientists aboard the ship. The day rate varies according to the mode of the ship, which is operating (drilling or cruising) or standing by (in port). Although it is a fixed rate per day, the day rate is adjusted for changes in the Consumer Price Index-Urban (CPI-U) and Employment Cost Index (ECI). The amount is based on 365 days, which includes all or part of the tie-up period, and the budget allows for one CPI-U adjustment of 2.468915% and one ECI adjustment of 2.266903%, each based on an average of the last 3 actual percentage increases. The anticipated operating/transiting and standby day rates, respectively, are \$71,449.94 and \$69,105.43 through 31 March 2015, then adjusting to \$72,919.06 and \$70,526.34 for the remainder of the fiscal year.

*Fuel and lubricants:* Fuel to be purchased for the riserless vessel estimated at a total of 5,947 metric tons: 606 metric tons in Keelung, Taiwan; 1,154 and 1,139 metric tons in Singapore (2 refuelings); 1,652 metric tons in Colombo, Sri Lanka; and 1,396 metric tons in Fremantle, Australia. Price per metric ton is based on prices quoted by Bunkerworld for those locations as of 28 February 2014.

*Per diem:* Shipboard catering costs associated with meals and berthing on the vessel and cleaning of the laboratory stack. The estimate is based on a shipboard party of 60 participants at \$33.91/day/person for all nontransit and nonmaintenance periods. The number of personnel on board for transit and non-IODP periods was estimated based on previous staffing schedules in like circumstances. This category does not include per diem for the ship subcontractor's sailing crew and drilling personnel, as they are accounted for in the day rate unless charged as a reimbursable (see "Day Rate" above).

*Port call costs:* Vessel agent's expenses, subcontractor freight, and meals and lodging costs incurred during subcontractor's crew rotations for port calls scheduled for Subic Bay, Philippines (49-day tie-up period); Singapore (2 port calls at 5 days each); Colombo, Sri Lanka (5 days); Mumbai, India (5 days); Fremantle, Australia (45-day tie-period); Fremantle, Australia (5 days); and Darwin, Australia (5 days).

*Insurance—JOIDES Resolution.* Annual insurance premiums for subcontractor and TAMRF, including subcontractor's premium costs for All Risks Marine Hull and Machinery (H&M) and Removal of Wreck (ROW) insurance and TAMRF premium costs for General and Automobile Liability, Workers Compensation, Cargo, Third Party Property (Equipment), Excess Liability, Control of Well and Seepage and Pollution Liability, Charterers Legal Liability, and Contractor's Pollution Liability—Gradual coverage for the vessel. All premium amounts are based on 365 days of coverage, and the premiums for Sections 1 and 2 of the Hull & Machinery coverage are discounted 50% during the non-IODP periods, which total 94 days in FY15.

*Travel—ODL:* Subcontractor transportation, including airfare for ship subcontractor's crews to/from 7 scheduled crew changes—Subic Bay, Philippines (non-IODP period); two in Singapore (Expeditions 353 and 354); Colombo, Sri Lanka (Expedition 355); Mumbai, India (transit and non-IODP period);

Fremantle, Australia (Expedition 356); and Darwin, Australia (scheduled to occur 30 September 2015 for a TBD expedition). The estimate is based on a crew of 60 personnel with various domestic and international origin fly points arriving and departing each port call.

Schlumberger Technology Corporation (Schlumberger). Subcontract for the provision of a standard suite of tools, engineer services, software support, mobilization services, and specialty tools as needed; support for a dedicated engineer on the ship for each cruise and support from the base of operations; the services of a district engineer, staff engineer, electronics technician, and special services engineer on an as-needed basis. Costs (including shipping charges) related to leasing equipment needed for wireline fishing, back-off and severing services, day rate and travel expenses for the Schlumberger engineer, and the day rate for tool insurance for the deployment of downhole logging tools.

Kochi Institute for Core Sample Research (KOCHI). Subcontract for the curation and sampling of cores core material obtained from NSF-funded scientific ocean drilling and housed at the collected from the *JOIDES Resolution* and housed at the KCC. Costs are estimated based on initial contract discussions between KOCHI and the JRSO. Costs include salaries and fringe benefits for curatorial staff and part-time workers; general office supplies for curatorial task and laboratory supplies for sampling (e.g., scoops, shrink-wrap etc.); courier and postage for sample shipping (i.e., standard shipping), container, and other associated costs for shipping archive halves; industrial waste disposal, PC rental, core inventory management software maintenance, regular maintenance of reefer, and forklift rental; and indirect costs.

***Other direct costs.*** Costs not covered in other categories.

Shipping. Postage, express mail, and freight, including general postage and express mail/courier services for regular correspondence, scientific reports, small packages, and data and photo requests; shipping of materials, equipment, and supplies to and from expeditions; regular-sized sample shipments to scientists; and costs for special shipments of deep-frozen microbiological samples, U-channels, or whole core sections for X-ray fluorescence scanning. Estimated costs are based on historical averages of similar shipments for standard items sent to the ship for each expedition as well as expedition-specific items.

Communication. Standard telephone line, long distance, and fax charges; cellular phone charges; satellite; and cost of web and video conferencing as needed. Cost for very small aperture terminal (VSAT) communication and Marisat communication to and from the *JOIDES Resolution*.

Business conferences. Catering, supply, and incidental costs associated with hosting pre- and post-expedition meetings, core sampling events, educational workshops, on-site training events, and visits to the GCR. The cost per meeting is based on the past three years' expense data for these meetings. IODP-TAMU hosts approximately 21 meetings per year.

Training. Registration, transportation, per diem, and lodging expenses related to professional courses and meetings and online training courses.

Insurance. Annual insurance premiums for JRSO vehicles.

Maintenance and repair. Equipment service agreements and non-contracted maintenance and repair of equipment in warehouse, forklift, overhead cranes and other loading dock equipment, deep freezers, shrink-wrap and bagging machinery, office equipment, copiers, postage meter, imaging equipment such as cameras, vehicle fleet, IT computer hardware and software; and drilling, coring, logging operations, laboratory, repository, and safety equipment.

Equipment rental. Rental of equipment when it is more economical to rent than purchase, including conference equipment and water cooler rental.

Recruiting and relocation. Employee recruitment costs, including local, internet, and science and trade journal advertisements as well as other costs related to filling/replacing positions and recruiting professional staff. Relocation costs for new employees.

Library. Technical books, journals, and other resources, including subscriptions to professional publications and documentation materials required for reference.

***Indirect costs.*** The TAMU off-campus indirect cost rate of 26% modified total direct cost (MTDC) is applied to this cooperative agreement. MTDC is calculated as total direct costs minus costs in exempt categories (e.g., equipment and subcontract costs over \$25,000).

## Appendix I: IT security summary

### Policies and procedures

Extensive Standard Administrative Procedures provided by Texas A&M University are available at <http://rules-saps.tamu.edu/TAMURulesAndSAPs.aspx>.

The JRSO policy for communications to and from the RV *JOIDES Resolution* is available at [http://iodp.tamu.edu/participants/policies/IODP\\_Comm\\_Policy.pdf](http://iodp.tamu.edu/participants/policies/IODP_Comm_Policy.pdf). IT-specific policies for IODP are available on IODP's intranet site (not open to the public).

All employees must take yearly security awareness training as required by Texas A&M University. As part of this training, all users are required to acknowledge that they have read, understand, and will comply with university requirements regarding computer security policies and procedures.

### Risk assessment

The JRSO completes an annual Information Security Assessment, Awareness, and Compliance (ISAAC) report as required by TAMU. The results are electronically reviewed by the Supervisor of Information Technology & Support, department manager, and Director, and then filed with the Texas A&M University Risk Management Office.

### Roles and responsibilities

System Administrator, Marine Computer Specialist, and Service Desk Specialist (departmental IT personnel) responsibilities include

- Applying platform technical safeguards.
- Supplying the first-level response (i.e., restoration services) to any security breach.
- Immediately reporting any security breach to the Supervisor of Information Technology & Support.

Supervisor of Information Technology & Support responsibilities include

- Assuring that best practices are followed in the administration of systems.
- Reporting criminal activity under applicable state code concerning computer or telecommunications crimes to the department manager, Director, College of Geosciences Dean, and Texas A&M University's Chief Information Security Officer or designee.
- Determining if a violation rises to the standard of fraud or fraudulent action and reporting it to the department manager, Director, and College of Geosciences Dean.
- Determining the physical and electronic evidence to be gathered as part of incident investigation such as initiating, completing, and documenting the incident investigation.

## Technical safeguards

- Departmental IT personnel shall test security patches prior to implementation where practical. Departmental IT personnel are encouraged to have hardware resources available for testing security patches in the case of special applications.
- Departmental IT personnel shall ensure that vendor-supplied patches are routinely acquired, systematically tested, and installed promptly based on risk-management decisions.
- Departmental IT personnel shall enable security features included in vendor-supplied systems in accordance with best practices, including but not limited to firewalls, virus scanning and malicious code protections, and other file protections, where possible. Audit logging shall also be enabled. User privileges shall be set utilizing the “least privileges” concept of providing the minimum amount of access required to perform job functions. Privileges may be added as need is demonstrated by the user. The use of passwords shall be enabled in accordance with Texas A&M University policies referenced below.
- Departmental IT personnel shall disable or change the password of default accounts.
- Departmental IT personnel or their designee shall test servers, especially, for known vulnerabilities periodically or when new vulnerabilities are announced.
- Departmental IT personnel shall seek and implement best practices for securing their particular system platform(s).

## Physical safeguards

After business hours, JRSO building entry is allowed via identification (ID)/keycard. Information is logged and available for retrieval at a later date. An access list is maintained by the Building Proctor. Entry into the main computer room is granted only to authorized personnel whose job responsibilities require access to the facility, and to vendors, when necessary. Doors are secured using push-button locks for which codes are changed periodically and whenever there is personnel change, regardless of the employee’s status upon termination. Access codes are not to be shared with others.

Power to the computer room is provided via 50 kVA uninterruptible power supply (UPS) and matching power distribution unit (PDU). In case of power outage, power is supplied to UPS and backup heating, ventilation, and air-conditioning (HVAC) by a diesel generator. The computer room is protected from fire by a halon fire suppression system.

Incremental backups are completed on a daily basis and full backups are completed weekly. One full backup copy is kept locally and another is removed to off-site storage.

## **Cybersecurity breach notification procedures**

In the event of a cybersecurity breach:

1. Departmental IT personnel have information security roles and responsibilities that can take priority over normal duties.
2. Departmental IT personnel are responsible for notifying the Supervisor of Information Technology & Support and department manager and initiating the appropriate action, including restoration. The department manager will notify the Director and Texas A&M University's Chief Information Security Officer or designee.
3. Departmental IT personnel are responsible for determining the physical and electronic evidence to be gathered as part of the incident investigation, such as initiating, completing, and documenting the incident investigation.
4. Departmental IT personnel shall report security incidents that may involve criminal activity under their respective state's penal code concerning computer or telecommunications crimes to the Director or department manager and Texas A&M University's Chief Information Security Officer or designee.
5. If fraud or theft is suspected as part of security incident detection, the person detecting the incident shall follow their respective system policies concerning the control of fraud and fraudulent actions.
6. If there is a substantial likelihood that security incidents could be propagated to other systems beyond departmental control, Departmental IT shall report/escalate such incidents as soon as an incident is identified.
7. The Supervisor of Information Technology & Support shall file an after-action report to the Texas A&M University Information Technology Risk Management (ITRM) office by e-mail to security@tamu.edu.

## **Security measures for nonemployees**

All subcontractors, researchers, and others who will have access to the systems employed in support of this contract are required to follow all Texas A&M University and JRSO security policies.

## Appendix II: Recommended program of insurance

TAMRF will utilize the risk management services of TAMUS and TAMU. These services will include insurance policy monitoring, ongoing risk assessments, marine insurance negotiations, and claims settlement. TAMRF’s established relationship with the London insurance market coupled with the Program’s safety history have enabled TAMUS and TAMU staff to obtain cost-effective premiums. TAMUS and TAMU staff have used market relationships, attention to detail, and clear communication to educate insurance brokers and underwriters to the specific risks involved in deep-ocean coring and to foster an understanding of risk mitigation along with differentiation from the common risks incurred during energy-related drilling.

Premium negotiations include documentation and explanation of specific exposures, estimated payroll costs, estimated operational time, confirmation of valuation, and operational history. As a result of proactive risk management, communication, and education, the Program’s premiums have historically averaged less than the energy market, and terms and conditions for insurance coverage have been more favorable than the norm in the energy sector. The premiums in the table below are preliminary estimates subject to underwriter confirmation in FY14.

The FY15 proposed program of insurance for mitigation of drilling risks and marine/employer’s liability is depicted in the following table. In addition, TAMUS and TAMU, on behalf of the JRSO, will assess specialty risks and procure insurance if warranted.

<b>JRSO FY15 program of insurance details</b>			
Program of insurance with government indemnification	Coverage limits	Deductible	Estimated annual premiums
Hull & Machinery and Removal of Wreck <sup>1</sup>	190,000,000	250,000	896,091
Control of Well	25,000,000	50,000	121,143
Seepage & Pollution Liability <sup>2</sup>	1,000,000	50,000	0
Cargo	5,000,000	25,000	52,671
Third Party Property/Equipment	10,000,000	25,000	33,313
Charterer's Legal Liability	1,000,000	10,000	13,944
Contractor's Pollution Liability—Gradual	10,000,000	1,000,000	31,654
Umbrella	200,000,000	Per underlying limits	319,285
Worker's Compensation & Maritime Employer's Liability	1,000,000	None	84,394
Comprehensive General & Automobile Liability	1,000,000	None	28,326
<b>Total estimated annual premiums</b>			<b>\$1,580,821</b>

<sup>1</sup> Carried by ship subcontractor (ODL) and reimbursed by TAMRF.

<sup>2</sup> Included in Control of Well Policy and covered under the Umbrella.