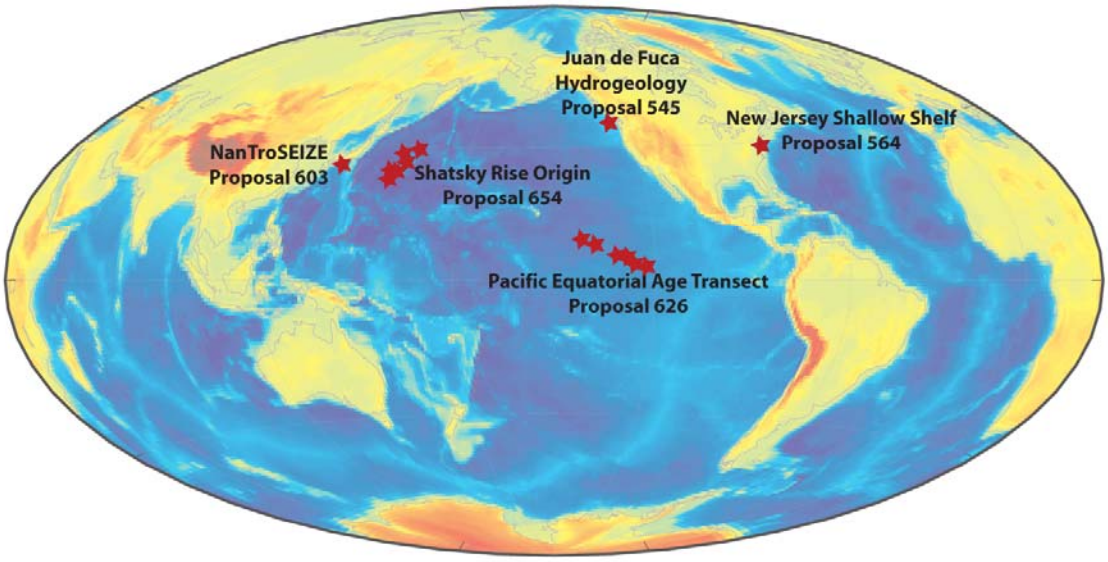
Annual Program Plan

Integrated Ocean Drilling Program

IODP

INTEGRATED OCEAN DRILLING PROGRAM



Annual Program Plan FY2009

Integrated Ocean Drilling Program

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1 Introduction

The Integrated Ocean Drilling Program (IODP) is an international partnership of scientists and research institutions established to explore Earth's history and structure as recorded in the ocean basins. IODP provides sediment and rock samples (cores), shipboard and shore-based facilities to study the samples, downhole geophysical and geochemical measurements (logging/petrophysics), and opportunities for special experiments (i.e., seafloor and subseafloor observatories) to determine in-situ conditions beneath the seafloor. IODP studies will lead to better understanding of plate tectonic processes, Earth's crustal structure and composition, environmental conditions, life in ancient oceans, and climate change.

IODP is sponsored by Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the U.S. National Science Foundation (NSF) as Lead Agencies; by the European Consortium for Ocean Research Drilling (ECORD); the People's Republic of China Ministry of Science and Technology (MOST), and the Interim Asian Consortium. IODP also welcomes the Australia/New Zealand Consortium and India as new members. The Australia/New Zealand Consortium has already paid their FY2008 contribution. At this moment, the Lead Agencies are coordinating the final draft MOU between themselves.

FY2009 marks the completion of the transition in IODP from Phase 1 to Phase 2. Phase 1 in many ways was a continuation of ODP in that drilling was mainly carried out by the *JOIDES Resolution*, although it was also supplemented by two important expeditions by ECORD Science Operator (ESO) on Mission-Specific Platforms (MSPs).The start of the transition to Phase 2 occurred in 2008 with the Japanese drillship *Chikyu* starting to drill for the NanTroSEIZE project. The *JOIDES Resolution* is also transitioning in FY2009 following shipyard repairs and vessel enhancements.

In Phase 2, IODP will begin fulfilling many of the objectives stated in the *Initial Science Plan* (ISP). The two drillships, together with planned MSP operations, mark for the first time three platforms being operated in the same year. This will be a historic milestone.

However, 2009 does provide major challenges, in part because of escalating costs. Available funding does not provide for full year operations for both drillships, or for MSP operations, with the desired frequency. *Chikyu* will drill for only about five months and the *JOIDES Resolution* for about seven months. In addition to funding shortfalls, market conditions in shipyards have been extremely tight and have led to continuous delays in completing work on the *JOIDES Resolution*. The *JOIDES Resolution* will rejoin IODP early in FY2009. *Chikyu's* IODP work is also delayed due to needed repairs to important pieces of equipment. Furthermore, the Kuroshio current is currently flowing over the majority of sites intended for riser drilling with a velocity that frequently exceeds the maximum at which the *Chikyu* can conduct riser drilling without technical modifications and/or unacceptable fatigue risks to the riser. In addition, the drilling moratorium imposed every spring season by the fishing industry poses an additional planning

challenge. The New Jersey MSP expedition had to be postponed from 2008 to 2009 due to a last-minute snag in the contract to obtain drilling crews, again due to tight market conditions.

The engineering and oceanographic problems can be solved or worked around, but the financial problems pose serious challenges: a reduced number of drilling days; and maintaining the infrastructure aboard the drillships when they are not conducting IODP drilling. Coordinating the logistics of IODP and non-IODP ship schedules can entail delays and generate extra costs.

The FY2009 engineering plan represents the first centrally coordinated, detailed engineering effort within IODP. This effort involves the creation of a process to receive, review, group, and execute engineering development proposals. Data Management integration will involve the creation of meta data for the new data management scheme being adopted by the USIO and the start of SEDIS 3. Another activity which started in 2007, and will continue in FY2009, is the consolidation of the core repositories: the Gulf Coast Repository (GCR), the Kochi Core Center (KCC) and the Bremen Core Repository (BCR). Outreach will continue to jointly staff booths at scientific meetings. The highly successful DRILLS program (lectures by IODP scientists in IODP and non-IODP countries) will take a hiatus in FY2009.

Outside the regular (annual) field of IODP-MI responsibilities is the preparation and implementation of a community-wide IODP conference targeted to provide a status of achievements and the long-term direction of IODP science post-2013. It is detailed in **Appendix I**.

2 Budget Summary

This Program Plan budget identifies a total program cost of $210,129,844 for FY2009 (see **Tables APP-1** and **APP-2**) to meet the high priority needs identified by the SAS. Of this cost, 16% is Science Operation Costs (SOCs) and the remaining 84% is Platform Operation Costs (POCs). SOCs and POCs are defined in Annex I of NSF/MEXT Memorandum on the IODP, and the latest POC-SOC guidance from Lead Agencies is attached as **Appendix H.**

	IODP-MI	IODP-MI Operators & Subcontractors					Total
		USIO	CDEX	ESO	Bremen	SIO	
SOCs	4,841,721	11,420,909	12,809,544	4,944,300	324,590	270,000	$34,611,064
POCs	0	49,343,199	106,226,381	19,949,200	0	0	$175,518,780
Total	**$4,841,721**	**$60,764,108**	**$119,035,925**	**$24,893,500**	**$324,590**	**$270,000**	**$210,129,844**

***Table APP- 1**: SOC & POC Budget Summary for FY2009.*

Description	IODP-MI	USIO	CDEX	ESO	Bremen	SIO	Total
Management and Administration	2,739,932	1,048,331	491,705	768,500	-	-	$ 5,048,468
Technical, Engineering and Science Support	-	6,112,260	8,042,515	3,520,300	-	-	$ 17,675,075
Engineering Development	992,950	-	2,988,200	-	-	-	$ 3,981,150
Core Curation	-	431,819	544,809	79,300	324,590	-	$ 1,380,518
Data Management	370,965	2,390,521	431,905	412,000	-	270,000	$ 3,875,391
Publications	150,859	1,383,739	-	-	-	-	$ 1,534,598
Outreach	587,015	54,239	310,410	164,200	-	-	$ 1,115,864
Total	$ 4,841,721	$ 11,420,909	$ 12,809,544	$ 4,944,300	$ 324,590	$ 270,000	$ 34,611,064

* ESO SOC travel directly funded to ESO by EMA	$ 474,000
*USIO SOC Operations directly funded to USIO by NSF	$ 7,515,422
*NSF- IODP-MI Contract Budget total	$ 26,621,642

Table APP- 2*: SOC Budget Summary for FY2009.*

Description	USIO SOC	
	Operations	Non-operations
Management and Administration	437,876	610,455
Technical, Engineering and Science Support	5,758,143	354,117
Engineering Development	-	-
Core Curation	101,686	330,133
Data Management	1,155,219	1,235,302
Publications	62,498	1,321,241
Outreach	-	54,239
Total	$ 7,515,422	$ 3,905,487

Table APP- 3*: SOC Operations & Non-operations of USIO for FY2009.*

IODP-MI's budget is $4,841,721**.** This includes all of the costs for providing necessary integration/coordination functions to IODP as the Central Management Organization. Beginning with this Annual Program Plan submission, the line items, fringe benefits and travel costs of IODP-MI staff members for engineering development, data management, outreach, etc. were moved from M&A to their respective work breakdown elements. Details of these costs are described in **Appendix A**.

The USIO budget is $60,764,108 (19% SOC; 81% POC). The USIO SOC budget of $11,420,909 includes costs for science support activities for SODV operations scheduled from March 2009, as well as costs for Management and Administration, Core Curation, Data Management, Publications, and Outreach. According to the guidance from Lead Agencies (LAs) in October 2007, SOC for USIO was partitioned into "operational" costs (SOC Operations), which are to be funded directly from NSF to USIO through the USIO System Integration Contract and other costs (SOC Non-operations), which are to be funded through the IODP-MI contract. SOC Operations costs are defined as "that which funds SODV SOC operations at sea and all costs in support of these operations such as planning, logistics, engineering science support, etc." The USIO SOC operations budget is $7,515,422 and SOC Non-operations are $3,905,487. The details of the USIO activities are described in **Appendix B**.

The CDEX budget is $119,035,925 (11% SOC, 89% POC). The CDEX SOC budget of $12,809,544 includes support for the *Chikyu* operation for the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) project, as well as costs for Management and Administration, Engineering

Development, Core Curation, Data Management, and Outreach. The details of the CDEX activities are described in **Appendix C**.

The ESO budget is $24,893,500 (20% SOC, 80% POC). The ESO SOC of $4,944,300 for FY2009 includes support of the New Jersey Shallow Shelf Expedition and the Great Barrier Reef Environmental Changes Expedition as well as associated costs for Management and Administration, Core Curation, Data Management, and Outreach. The details of the ESO activities are described in **Appendix D**.

The University of Bremen Core Repository budget is $324,590 (100% SOC). These funds are primarily for personnel and operating costs (consumables, supplies, telecommunications, etc.) associated with normal IODP/ODP core sampling and core archiving operations. Funds for curatorial support for MSP operations are identified in the ESO budget. Details of the University of Bremen activities are described in **Appendix E**.

The Scripps Institution of Oceanography (SIO) budget of $270,000 (100% SOC) is for operation of the Site Survey Data Bank (SSDB). Details of the SIO activities are described in **Appendix F**.

The subcontract with the Advanced Earth Science and Technology Organization (AESTO) supporting the IODP-MI Sapporo office is described in **Appendix G**.

Appendix I provides details on the IODP-MI budget requirements for an IODP Conference, the background, goals, and overall funding scheme.

3 Organizational Structure

3.1 Organizational Framework

IODP operations are based on three components:

The Central Management Office (CMO):

IODP Management International, Inc. (IODP-MI) has received a 10-year contract from the Lead Agencies to run the CMO.

The Implementing Organizations (IOs):

There are three IOs:

1. The USIO is responsible for operations of the riserless vessel, the *JOIDES Resolution.*
2. Center for Deep Earth Exploration (CDEX), which is responsible for the riser-equipped ship, *Chikyu*.
3. ECORD Science Operator (ESO), which is responsible for mission-specific platforms (MSPs).

The Science Advisory Structure (SAS):

The IODP Science Advisory Structure consists of scientists, engineers, and technologists designated by IODP member organizations.
According to the principles upon which the program was founded, IODP "Science Operations Costs" (SOCs) will be, in principle, supplied to the nonprofit corporation known as IODP Management International, Inc. (IODP-MI), the IODP Central Management Organization (see **Fig. APP-1**). In turn, IODP-MI distributes SOCs to IOs (drilling operators) and to other subcontractors according to the budgets outlined in this and subsequent IODP Annual Program Plans (APPs). SOC funds are collected from IODP Members, commingled by the U.S. NSF, and provided through contract to IODP-MI (see **Fig. APP-1**). The flow of USIO SOC operations funding became an exception as described in Section 2, but the SOC operations USIO activities remain under the umbrella of IODP-MI. Currently, IODP members are: the U.S.A. represented by the National Science Foundation (NSF); Japan, as represented by the Ministry of Education, Culture, Sports, Science, and Technology (MEXT); the European Consortium for Ocean Drilling (ECORD) as represented by the ECORD Management Agency (EMA); the People's Republic of China as represented by the Ministry of Science and Technology (MOST); and the Interim Asian Consortium represented by the Korea Institute of Geoscience and Mineral Resources (KIGAM). The NSF and MEXT are designated as Lead Agencies; EMA is a Contributing Member; and MOST and KIGAM are Associate Members. Australia and New Zealand Consortium and India are expected to become Associate Members soon. The Australia/New Zealand Consortium has already paid their FY2008 contribution. At this moment, the Lead Agencies are coordinating the final draft MOUs between China, the Interim Asian Consortium, the Australia/New Zealand Consortium and India.

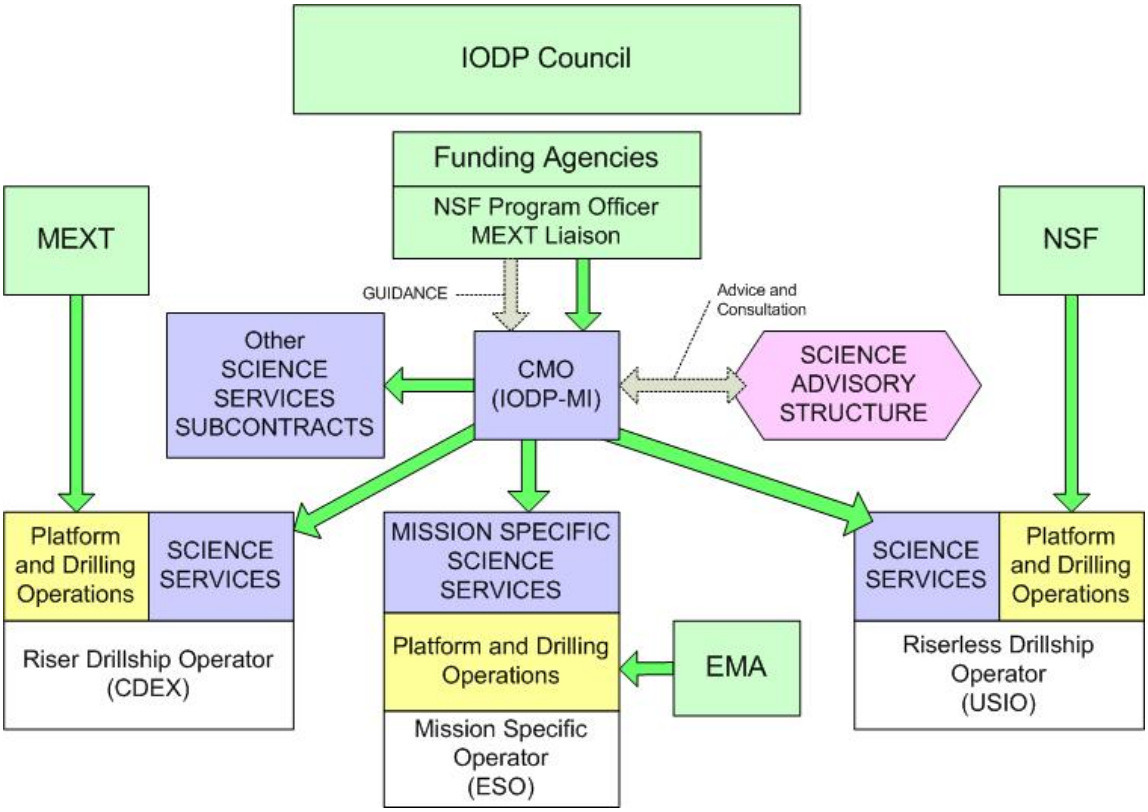

Figure APP- 1: *IODP Program Management Structure (in principle).SOCs and POCs are detailed in accompanying budgets, both in the Program Plan and in Appendices A-G. The funding agencies consist of NSF and MEXT (as Lead Agencies), EMA as a Contributing Member, MOST and the Interim Asian Consortium as Associate Members. Solid arrows indicate flow of funds. Dotted arrows indicate flow of advice.*

As detailed in **Figure APP-1**, Platform Operations Costs (POCs) are supplied directly from individual funding agencies of the countries or consortia operating IODP drilling assets: from NSF to the USIO (Consortium for Ocean Leadership, Inc., Texas A&M University [TAMU], Lamont-Doherty Earth Observatory [LDEO] of Columbia University) for operation of the SODV; from MEXT to CDEX for the riser-equipped ship *Chikyu*; and from ECORD to ESO for MSP operations. The technical management relationship consists of the following components:

a. Overall central management tasks and responsibilities for science operations by IODP-MI
b. Science advice provided by the SAS, supported by a planning office at IODP-MI
c. Multiple IOs, as listed above – USIO, ESO, and CDEX

3.2 IODP-Management International - The Central Management Organization

A Central Management Organization (CMO) was established with the concurrence of MEXT and NSF to develop and manage IODP science operations and implementation plans. CMO functions are provided by IODP-MI through a 10-year contract with NSF (**Appendix A**). The CMO: a) receives advice and recommendations from SAS on scientific priorities and plans; b) requests plans from IOs responsive to this advice; and c) works with IOs and the SAS to produce an integrated IODP Annual Program Plan (APP) (**Fig. APP-2**).

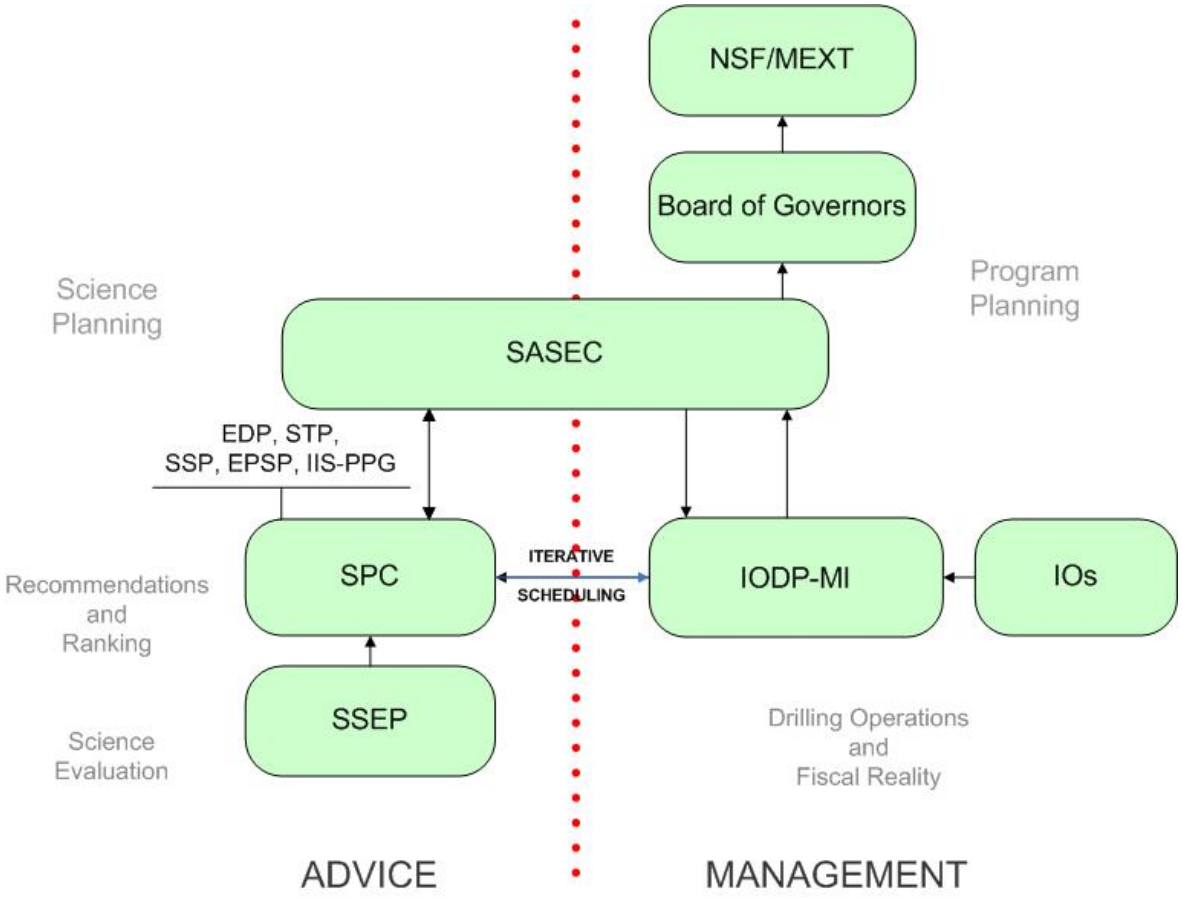

Figure APP- 2: *The flow of scientific advice towards expedition scheduling. Scientific advice to the IODP management structure occurs via advisory panels and committees. Scientific planning for the IODP is provided by a Science Advisory Structure (SAS) led by the Science Planning Committee (SPC). IODP-Management International, Inc. (IODP-MI) is the Central Management Organization (CMO) that translates the scientific priorities of the ocean-drilling community into program plans to carry out scientific IODP operations. It does so based on advice from the international IODP Science Advisory Structure (SAS), and in consultation with vessel operators or IOs.*

IODP-MI submits the program's Annual Program Plan to SASEC, which is the executive authority of the SAS and a committee of IODP-MI Board of Governors (BoG), for review and approval prior to consideration by the IODP-MI BoG and Lead Agencies. The NSF is responsible for contractual approval of the Annual Program Plan (APP) in consultation with MEXT. After Lead Agencies' approval, any significant changes in the Annual Program Plan are to be considered and approved by IODP-MI and the Lead Agencies prior to implementation, in consultation with the SASEC and the IOs, as appropriate.

The Annual Program Plan is to be consistent with budget guidance provided to IODP-MI by the Lead Agencies. The Annual Program Plan includes a presentation of total program costs, which include both SOCs and POCs. IODP-MI will manage SOC funds provided under contract with the

NSF. The NSF is expected to administer the contract with due consideration to the interests of MEXT. POCs will be provided directly to the IOs from the Lead Agencies and EMA (**Fig. APP-1**).

3.3 Implementing Organizations (IOs)

Riserless drilling capability is supplied by the NSF through a contract to the USIO, which consists of Ocean Leadership, Inc., the prime contractor and overall manager; Texas A&M University (TAMU), the subcontractor that operates the riserless drillship and provides associated services and functions such as expedition staffing, logistics, program-specific engineering development and operations, shipboard laboratories, curation, and distribution of core samples and data; and Lamont-Doherty Earth Observatory (LDEO) of Columbia University, responsible for geophysical and geochemical logging services aboard the riserless vessel, and involving acquisition, processing and interpretation of logging measurements. Details of the USIO and its operational plans for FY2009 are presented in **Appendix B**.

Riser-equipped drilling capability, by way of the vessel *Chikyu,* is supplied by CDEX (see **Appendix C**). CDEX is part of the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). CDEX also operates the Kochi Core Center Repository (KCC).

MSP drilling, sampling, and logging capability is supplied by the ESO, a consortium led by the British Geological Survey (BGS), which conducts MSP operations and program-specific engineering development; the European Petrophysics Consortium (EPC) which provides logging services, and the University of Bremen which provides repository services for MSP samples and cores. The ESO has a contractual arrangement with the EMA, affiliated with the Centre Nationale de la Recherche Scientifique (CNRS) based in Paris. Details of ESO and its operational plans for FY2009 are presented in Appendix D. ESO will utilize Bremen curatorial personnel and services during actual MSP operations. These ESO funds are separate from the normal IODP core archive and sampling operations proposed by Bremen in the Annual Program Plan (See **Appendix E**).

3.4 Science Advisory Structure (SAS)

The SAS provides long-term guidance on the scientific planning of the IODP and recommends annual science and engineering plans based on proposals from the international science community. The SAS consists of the Science Advisory Structure Executive Committee (SASEC), the Science Planning Committee (SPC), as well as several advisory panels (see **Fig. APP-3**) that contain hundreds of scientists from the international geoscience community in IODP member countries and consortia. In January 2008, SASEC decided to name a standing budget subcommittee.

The SASEC is considered the Executive Authority of the SAS and is composed of representatives from scientific organizations in IODP member countries. SASEC is also a committee of IODP-MI BoG. The SASEC provides scientific oversight and long-term planning. An important responsibility of the SPC is to prioritize the recommendations for the drilling sites. It considers

recommendations from the various SAS support panels and is the focus of scientific planning for IODP.

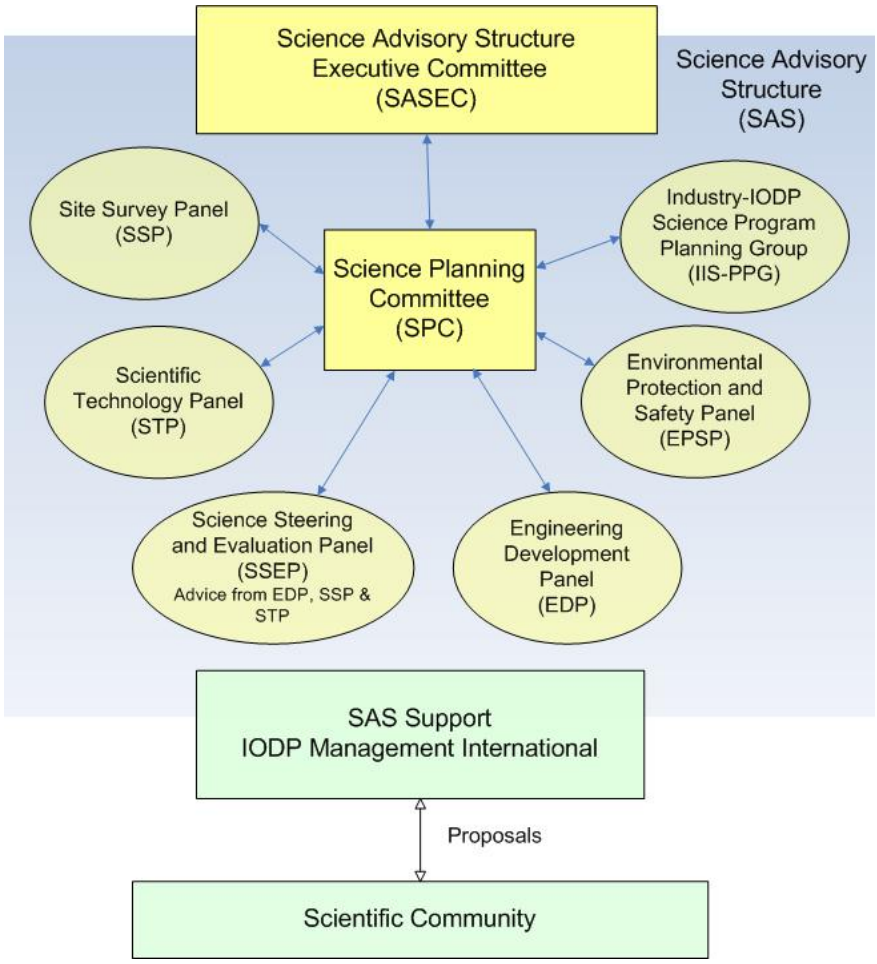

Figure APP- 3: IODP Science Advisory Structure (SAS).

4 FY2009 Expedition Operations

4.1 FY2009 Schedule

The FY2009 operational plan for *Chikyu* consists of two expeditions (totaling 150 operational days) developed in consultation with the NanTroSEIZE Project Management Team (PMT). The first expedition begins in early May 2009 and consists of a riser hole in the Kumano Basin that will be used as a long-term observatory for geodetic and seismological monitoring above the plate interface. Also during this expedition, casing will be installed at a riserless site in preparation for a long-term observatory near the splay fault. The second expedition is designed to characterize the sediments and sediment architecture of materials entering the Nankai accretionary prism.

The USIO will conduct four expeditions in FY2009 (totaling 210 operational days) following the deployment, mobilization and sea trials of the refurbished *JOIDES Resolution*. Expedition operations will commence on 5 March 2009 with the Pacific Equatorial Age Transect (PEAT) Expedition. Following this initial operation, the USIO will conduct a second PEAT expedition (which includes remedial cementing of observatories in the Juan de Fuca area), the Bering Sea expedition and the Shatsky Rise expedition. The latter expedition will span the 2009/2010 fiscal years and is budgeted accordingly.

ESO plans to conduct the offshore portion of New Jersey Shallow Shelf program in FY2009, with a proposed May 2009 start date. The expedition will take 60 to 90 days to complete, depending on the casing requirements. The latter figure is assumed in this annual program plan.
The details of all expeditions presented below are current as of the release of this document.

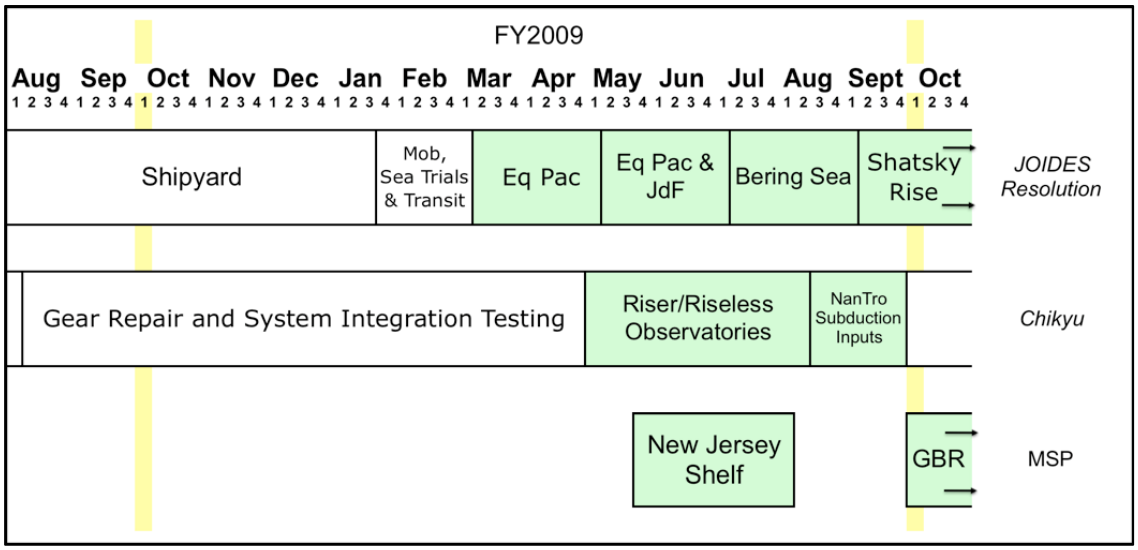

Figure APP- 4: *Operations schedule for FY2009.* Note that offshore operations for the Great Barrier Reef (GBR) expedition will most likely start in FY2010 but planning and tendering will occur in FY2009. The Shatsky Rise expedition straddles fiscal years and has been budgeted appropriately.

4.2 USIO Operations

The USIO schedule is based on operations approved by the IODP-MI Operations Task Force in October, 2008. Following acceptance of the vessel and completion of deployment and mobilization, the ship will depart Singapore for sea trials at Ocean Drilling Program (ODP) Site 807 and then transit to Honolulu, Hawaii. Expedition operations will commence on 5 March 2009 with the Pacific Equatorial Age Transect (PEAT) Expedition.

Summary of USIO FY2009 Operations Schedule:

25 January–5 March 2009	Mobilization/Sea Trials/Transit
5 March–5 May 2009	PEAT Expedition
5 May–5 July 2009	PEAT /Juan de Fuca Cementing
5 July–4 September 2009	Bering Sea Expedition
4 September–4 November 2009	Shatsky Rise Expedition

4.2.1 Pacific Equatorial Age Transect Expedition (PEAT)

4.2.1.1 *Proposed Operations*

This PEAT Expedition is the first of two expeditions that will address the goals of Proposal 626, the Pacific Equatorial Age Transect. The proposed strategy is to drill a transect using the gradual northward motion of the Pacific plate to target sediments of appropriate Paleogene and Miocene age as they exit the productivity belt, largely avoiding deeply buried diagenetically altered sediment. The PEAT program consists of seven high-priority sites, five of which will be occupied during this expedition. Primary tools will include Advanced Piston Corer (APC) and extended core barrel (XCB) coring to target each interval with multiple holes to ensure stratigraphic continuity and overlap. Standard downhole wireline tools in the paleoceanographic configuration and the Versatile Seismic Imager (VSI) in a check shot survey will be used to obtain logs for correlation to core and seismic measurements

4.2.1.1 *Experiments*

No experiments are planned for this expedition.

4.2.1.2 *Logistics*

Operations for this PEAT Expedition are budgeted based on an estimated 61 days (5 in port , 12 in transit and 44 in operations).

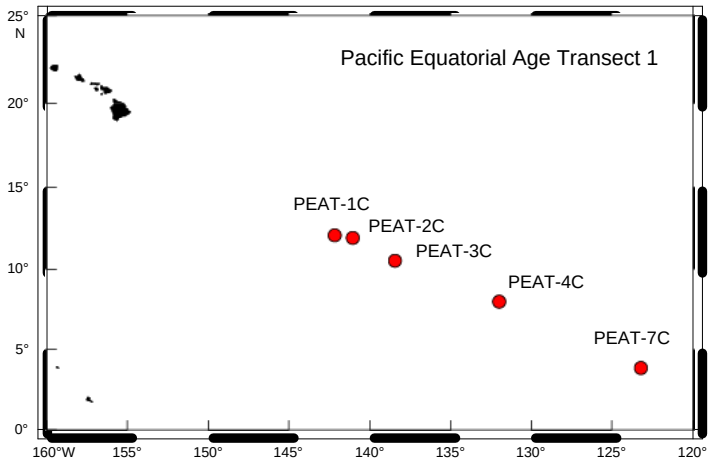

Figure APP- 5: Pacific Equatorial Age Transect Expedition 1 site map.

4.2.1.3 *Environment and Safety*

There is a potential for thin chert layers in the basal sections of sites focused on Eocene targets, which could affect recovery during some PEAT operations.

4.2.1.4 *Core Storage Location*

Cores from PEAT expedition 1 will be stored at the Gulf Core Repository.

4.2.2 Pacific Equatorial Age Transect Expedition/Juan de Fuca Remedial Cementing

4.2.2.1 *Proposed Operations*

This is the second PEAT Expedition that will address the goals of Proposal 626, the Pacific Equatorial Age Transect. The proposed strategy is to drill a transect using the gradual northward motion of the Pacific plate to target sediments of appropriate Paleogene and Miocene age as they exit the productivity belt, largely avoiding deeply buried diagenetically-altered sediment. Three of the PEAT program's seven high-priority sites will be occupied during this expedition. Primary tools will include APC and XCB coring to target each interval with multiple holes to ensure stratigraphic continuity and

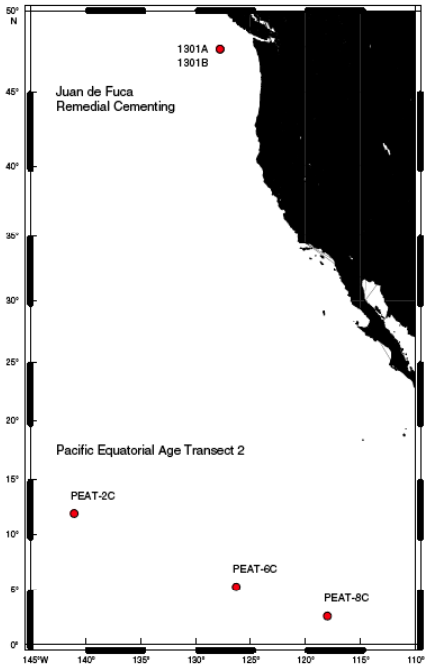

Figure APP- 6: Pacific Equatorial Age Transect Expedition 2 site map.

overlap. Standard downhole wireline tools in the paleoceanographic configuration and the VSI in a check shot survey will be used to obtain logs for correlation to core and seismic measurements.

Following PEAT operations, the *JOIDES Resolution* will return to Holes U1301A and U1301B to cement the observatories that were not sealed when installed during Expedition 301 (Juan de Fuca Hydrogeology).

4.2.2.2 *Experiments*

No experiments are planned for this expedition.

4.2.2.3 *Environment and Safety*

There is a potential for thin chert layers in the basal sections of sites focused on Eocene targets, which could affect recovery during some PEAT operations.
Effective cementing of the Site U1301 observatories requires good sea states.

4.2.2.4 *Logistics*

Operations for the PEAT Expedition/Juan de Fuca Remedial Cementing are budgeted based on an estimated 61 days (5 in port, 20 in transit and 36 in operations).

4.2.2.5 *Core Storage Location*

Cores from PEAT Expedition 2 will be stored at the Gulf Coast Repository.

4.2.3 Bering Sea

4.2.3.1 *Proposed Operations*

The primary goal of the Bering Sea Expedition is to recover a continuous, high resolution sediment record for reconstructing the detailed climate history of the North Pacific from the earliest Pliocene to the present in millennial to Milankovitch time scales. Seven primary sites will be triple cored with the APC to refusal (~200 m) to recovery the complete stratigraphic section. Four of the sites will be cored to depths of ~500-700 mbsf with the XCB to obtain the older record. Use of the rotary core barrel (RCB) may be required to reach depth objectives. Each site will be logged with the triple combination (triple combo) and Formation MicroScanner (FMS)-sonic tool strings. Selected sites may be logged with the VSI for a vertical seismic profile (VSP) survey.

4.2.3.2 *Experiments*

No experiments are planned for this expedition.

4.2.3.3 *Environment and Safety*

Operations will be conducted in the Bering Sea at the edge of the acceptable weather window.

4.2.3.4 *Logistics*

Operations for the Bering Sea expedition require an estimated 61 days (5 in port, 17 in transit, and 39 in operations).

4.2.3.5 *Core Storage*

Cores from the Bering Sea Expedition will be stored at the Kochi Core Center

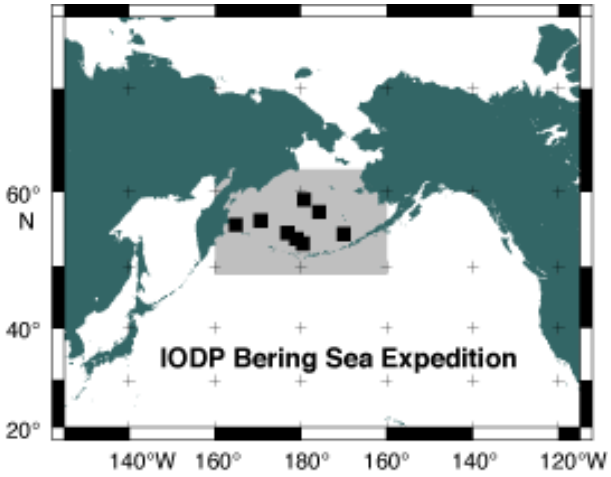

Figure APP-7: Bering Sea Expedition Site Map

4.2.4 Shatsky Rise

4.2.4.1 *Proposed Operations*

The primary objective of the Shatsky Rise Expedition is to core igneous rocks from the volcanic massifs of Shatsky Rise to determine the age, sources, and evolution of this oceanic plateau and to test the hypotheses of its origin. Five primary sites will be drilled with the RCB. Four sites will be drilled 100 m into basement and one site will be drilled 300 m into basement. Each site will be logged with triple combo and FMS-sonic tool strings and with the VSI for a VSP survey.

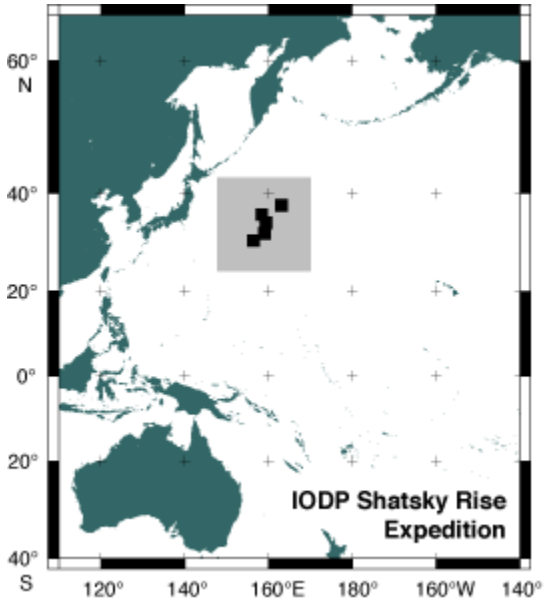

Figure APP-8: Shatsky Rise expedition site locations

4.2.4.2 *Experiments*

No experiments are planned for this expedition.

4.2.4.3 *Environment and Safety*

Operations will be conducted at Shatsky Rise during the Pacific typhoon season, which could impact operations, although the historical average for this area is < 1 storm per year during this operational window.

4.2.4.4 *Logistics*

Operations for the Shatsky Rise expedition require an estimated 61 days (5 in port, 18 in transit, and 38 in operations). ***For FY2009, these include the 5 days in port, 5 days of transit, and 16 days of operations.***

4.2.4.5 *Core Storage*

Cores from the Shatsky Rise expedition will be stored at the Gulf Coast Repository.

4.3 CDEX Operations

The FY2009 operational plan for *Chikyu* consists of two expeditions (totaling 150 operational days) developed in consultation with the NanTroSEIZE Project Management Team (PMT). The first expedition, starting in May 2009, consists of a riser hole in the Kumano Basin that will be used as a long-term observatory for geodetic and seismological monitoring above the plate interface. Also during this expedition, casing will be installed at a riserless site in preparation for a long-term observatory near the splay fault. The second expedition is designed to characterize the sediments and sediment architecture of materials entering the Nankai accretionary prism.

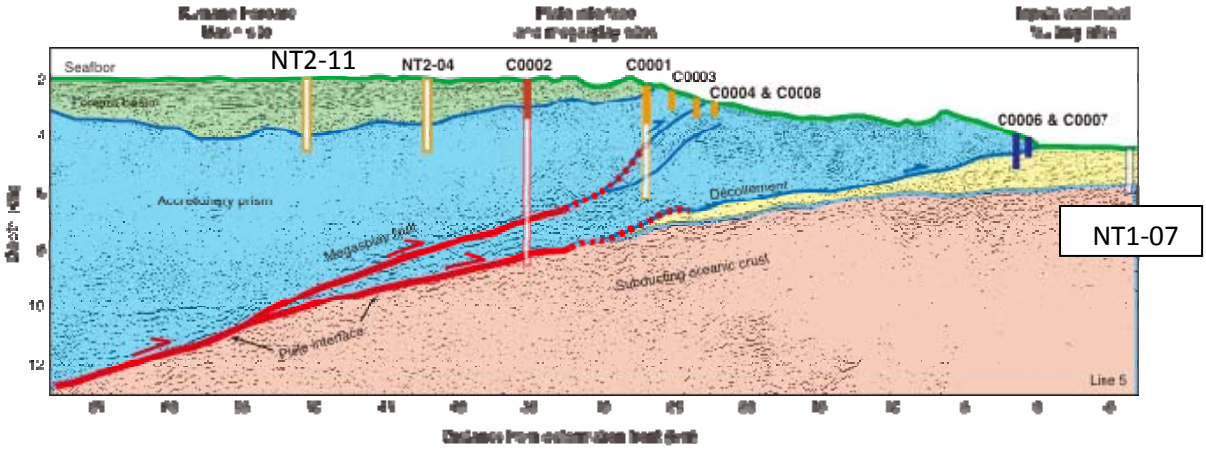

Figure APP-9: *Stylized cross-section of NanTroSEIZE area of operations. Site NT2-11 is the primary site for Expedition 319 (Riser/Riserless Observatory-1) with NT2-04 as an alternate site. Expedition 319 will also install casing for a riserless observatory at Site C0004 (NT2-01). The Subduction Input expedition (323) will core at Site NT1-07.*

4.3.1 Expedition 319 – Riser Observatory

4.3.1.1 *Proposed Operations*

Expedition 319 is the first scientific riser drilling operation in the long history of scientific ocean drilling. The main objective is to prepare a cased hole for future deployment of a long-term borehole observatory at Site NT2-11, which includes seismological monitoring above the plate interface where large earthquakes historically have occurred. This expedition will also include wellhead placing, LWD, casing, and cementing at a riserless site planned for future observatories near Site C0004 (NT2-01 J/K).

During this expedition, CDEX will install a full set of casing down to about 1600 m below sea floor (mbsf) and conduct spot coring and downhole measurements at the horizons where casing size changes. Borehole cuttings will be collected throughout the entire riser drilling operation and will be available to the Science Party for analysis. The current casing plan at NT2-11 is to install 36" casing to 60 mbsf, 20" casing to 700 mbsf, and 13-3/8" casing to 1,600 mbsf. LWD/MWD and a vertical drilling tool will be used below 700 mbsf to keep the hole plumb for future observatory installation.

For proposed riserless observatory site Site NT2-01, the primary operations consist of a single LWD/MWD followed by the installation of casing to depth. No coring is planned at this site.

4.3.1.2 *Experiments*

Leak-off tests will be conducted at appropriate intervals at proposed site NT2-11.

4.3.1.3 *Environment and Safety*

Although the proposed site NT2-11 is far to the north of the Kuroshio current, riser fairings will be employed to reduce Vortex Induced Vibration (VIV) during operations. There are no obvious faults or fracture zones expected in the proposed area.

Safety mud gas monitoring is planned as a part of standard riser operations.

Riserless Site NT2-01 (C0004) may be near the axis of the shifting Kuroshio current, so VIV must be taken into account for safety. However, during Expedition 316, Site C0004 was successfully drilled using the riserless system.

4.3.1.1 *Logistics*

The expedition consists of sub-legs wherein scientists will be transferred by helicopter between shore and ship. Supply boats and a patrol ship will also be employed. The expedition will be approximately 110 days in length.

4.3.1.2 *Core Storage*

Cores and cuttings from this expedition will be stored at the Kochi Core Center

4.3.2 Expedition 322 (Subduction Inputs)

4.3.2.1 *Proposed Operations*

The primary goal of this expedition is to characterize the input materials, architecture, and state of sediments entering into the subduction system in the Nankai accretionary prism off Kumanonada. The expedition operational plans include coring and wireline logging at the input site NT1-07.

4.3.2.2 *Experiments*

Downhole temperature measurements with APCT3 and DVTP are planned.

4.3.2.3 *Environment and Safety*

No significant drilling risks are identified.

4.3.2.4 *Logistics*

The expedition will depart the port of Shingu and return to the same port. No helicopter transfer is expected aside from emergency needs. However, if the supply boat is available, *Chikyu* will continue operations directly after the previous expedition and the science party will then depart from Minami-Ise helicopter port. Approximately 41 days are allocated to this expedition.

4.3.2.5 *Core Storage*

Cores from Expedition 323 will be stored at the Kochi Core Center.

4.4 ECORD Science Operator Operations

The FY2009 operational plan for ESO is based on the assumption that the New Jersey Shallow Shelf Expedition will take place in the early May to early August period, to be followed in October by the Great Barrier Reef Expedition which will extend into FY2010.

4.4.1 Expedition 313 – New Jersey Shallow Shelf

4.4.1.1 *Proposed Operations*

The operational plan is to core three holes to depths of approximately 750 meters while attempting to maximize core recovery. The platform to be used and the precise tools to be employed have yet to be determined and are dependent upon contract discussions, as is the methodology for downhole logging. Logging While Drilling (LWD) operations will be conducted on at least one hole at the start of the expedition. However, a number of technical, contractual concerns will need to be overcome if it is to take place.

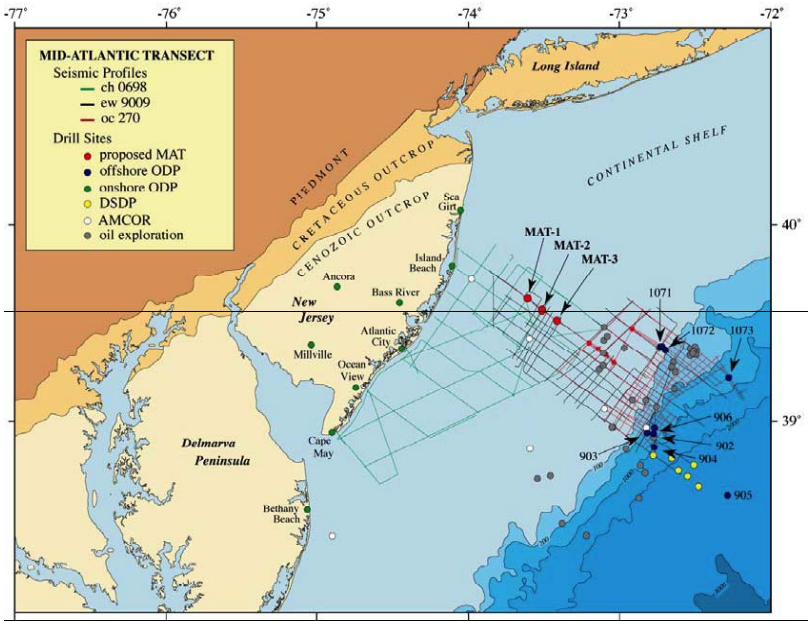

Figure APP- 10: The New Jersey continental margin showing the proposed drill sites MAT-1, MAT-2, and MAT-3 plus other drill-completed boreholes both onshore and offshore. The tracks of reconnaissance seismic lines relevant to the goals of this expedition are shown.

4.4.1.2 *Experiments*

No downhole experiments other than a VSP are planned during Expedition 313. Incorporation of the VSP operation is dependent on environmental constraints and drilling/logging methods.

4.4.1.3 *Environment and Safety*

An independent gas-hazard survey has concluded that there is no gas risk. A geotechnical site investigation and shallow seismic survey have also been conducted. A permit has been obtained from the National Marine Fisheries Service to allow seismic shooting for VSP work.

4.4.1.4 *Logistics*

Sixty to ninety days are required for the expedition depending on the requirement for casing.

4.4.1.5 *Core Storage*

Cores from the New Jersey Shallow Shelf expedition will be stored at the Bremen Core Repository.

4.4.2 Great Barrier Reef Environmental Changes Expedition

4.4.2.1 *Proposed Operations*

Details of the sites have yet to be defined or agreed by SSP and EPSP, but the general areas of interest have been agreed upon (**Fig. APP-11**). The sites will also need to be approved by the Great Barrier Reef Marine Park Authority (GBRMPA) as part of the permitting agreement. The platform to be used and the precise tools to be employed have yet to be determined, and will be dependent upon contract discussions, as is the methodology for downhole logging. However, it is anticipated that both will be similar to those used for the Tahiti Sea Level Expedition in 2005, where a piggyback drilling system was employed. Drilling depths should not exceed 100 meters sub-bottom and water depths will range from about 30-200 meters. It is assumed for financial purposes that the expedition will begin at the start of October 2009 in FY2010, but preparation time and costs of the platform, drilling services and logging are included in this program plan as finances need to be put in place to enable contracts to be let.

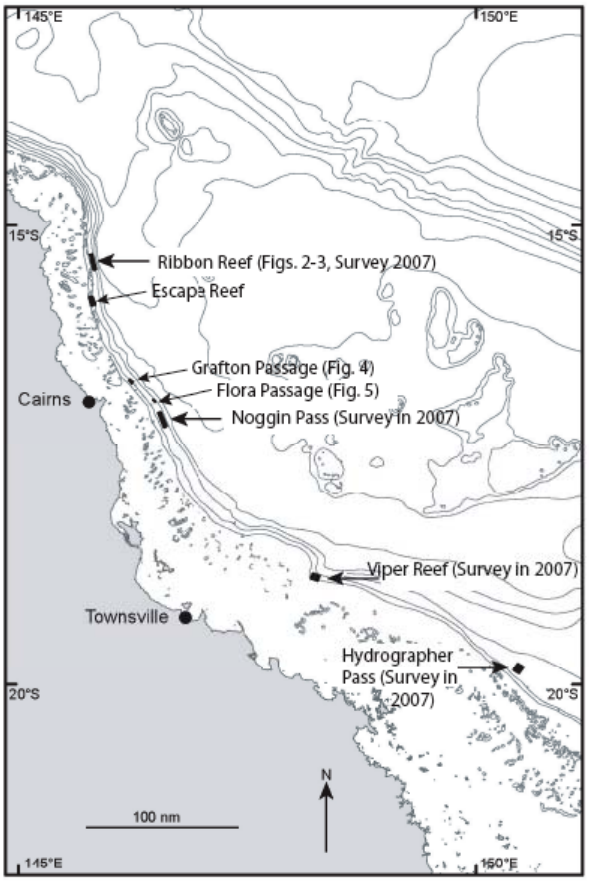

Figure APP- 11: *Expedition GBR Location map Locations of interest for drilling in the northern Great Barrier Reef. Coring sites will only be finalized after consultation with SSP, EPSP and GBRMPA, but the current proposal is for a series of transects at Ribbon Reef, Noggin Pass and Hydrographer's Passage.*

ESO is aware that the expedition may need to include three days work for an Ancillary Project Letter (APL) off Papua New Guinea if the contracted vessel is to transit through that area.

4.4.2.2 *Experiments*

No downhole experiments are anticipated.

4.4.2.3 *Environment and Safety*

Environmental protection is a key issue for this expedition. A detailed Environmental Impact Statement has been produced and it is a condition of the research permit that an Environmental Management Plan is produced in cooperation with GBRMPA.

4.4.2.4 *Logistics*

It is estimated that the duration of the expedition will be about six weeks.

4.4.2.5 *Core Storage*

Cores from the Great Barrier Reef Environmental Changes Expedition will be stored at the Gulf Coast Repository.

5 Management and Administration

5.1 Goals

The goal of Management and Administration of various IODP related entities, including IODP-MI, IOs, SAS, and Program Offices is to plan and coordinate with other IODP-related entities; oversee, review, and report on IODP activities.

5.2 Deliverables in FY2009

- Annual Program Plan – The Annual Program Plan (APP) is the central document in IODP, which describes all the planned activities and costs in Science and Platform Operations. APP is drafted by IODP-MI in close coordination with the IOs. After being approved by SASEC and the Board of Governors, the APP is finalized by approval of the Lead Agencies. Both IODP-MI and IOs are required to assure the implementation of activities written in the APP.
- Quarterly and Annual Reports – IODP-MI and IOs develop quarterly and annual reports, including financial reports.
- Reporting and Liaising (Mostly for IOs) – Report and liaise with funding agencies and with IODP-related entities (e.g., SAS meeting), Program Member Offices and other national organizations and participate in IODP-MI Task Forces, working groups, etc.
- Coordination (for IODP-MI) – IODP-MI "coordinates" with IOs, SAS Panels, SPC, SASEC, Board of Governors, Program Offices, funding agencies and various subcontractors. "Coordination" is the major deliverable of Management and Administration of IODP-MI, and various task forces play a key function in this coordination.
- Contract Services – Provide contract services for IODP-related activities.
- Legacy Documentation: During FY2009 IODP-MI and IOs, with advice from SAS, will continue developing a plan to insure that the appropriate documents are being preserved as part of the IODP Legacy. The plan will identify the documents, the responsible parties, and the appropriate resources that are required for this ongoing practice.

5.3 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	SIO	Total
Salary and Fringes	990,708	549,227	258,850	530,500	-	-	$ 2,329,285
Travel	362,500	53,005	-	181,000	-	-	$ 596,505
Supplies	-	11,200	31,000	15,000	-	-	$ 57,200
Shipping	17,000	1,320	-	-	-	-	$ 18,320
Communication	-	9,939	4,000	2,000	-	-	$ 15,939
Contractual Services	105,600	4,400	109,700	-	-	-	$ 219,700
Equipment	-	6,000	-	15,000	-	-	$ 21,000
Other Direct Costs	729,606	16,430	-	25,000	-	-	$ 771,036
Total Direct Costs	2,205,414	651,521	403,550	768,500	-	-	$ 4,028,985
Modified Direct Costs (If applicable)	-	172,287	293,850	-	-	-	$ 466,137
Indirect Costs/Administrative Fee	534,518	396,810	88,155	-	-	-	$ 1,019,483
Total	$ 2,739,932	$ 1,048,331	$ 491,705	$ 768,500	$ -	$ -	$ 5,048,468

Table APP- 4: *Management & Administration Budget for FY2009.*

5.4 Justification

5.4.1 IODP-MI

Salaries and Fringes – Include an anticipated cost-of-living allowance and estimated fringe benefits rate for IODP-MI direct M&A staff (see Table IODP-MI-2). The salaries and fringes for IODP-MI Sapporo office, except one key personnel, are included in the Subcontract with AESTO (See Appendix G).

Travel – Includes all domestic and foreign travel for the IODP-MI M&A staff (DC and Sapporo), AESTO staff (M&A only), the SPC and SASEC chairs, multiple task forces and work groups, Project Management Teams, Board of Governors and Executive Committee meetings.

Shipping – Includes costs for regular postage, overnight deliveries and bulk mailings.

Contractual Services – Include Contracts Officer position (currently a contractor).

Other Direct Costs –

Association Dues and Subscriptions $6,000 - cover organizational membership and subscriptions.

Meeting expenses $45,000 – Include the costs of meeting rooms, working lunches, audiovisual equipment, etc.

Honoraria for Panel Chairpersons $35,000 – Panel Chairs are very important to IODP. They arrange and run meetings, take and distribute the minutes. In the United States, all scientists must account for their time away from their main (funded) duties. IODP advisory duties take the chairs away from their main duties, so they need to be compensated. Annual honoraria for SAS panel chairs are $5,000. Co-chairs will receive $2,500 each. Vice chairs will not receive honoraria. The three SSEP chairs will each receive $5,000. This plan for Chairperson compensation has been approved unanimously by the IODP-MI Board of Governors.

Specialty Coordinators $20,000 – Funds are allocated for approximately one month each of salary for members of the NanTroSEIZE PMT to coordinate disciplinary science for the NanTroSEIZE FY2009 expeditions. Specialty Coordinators will focus on integration and coordination of scientific results between and among all of the individual expeditions. The anticipated workloads for each Specialty Coordinator will, by necessity, span the time from pre-cruise planning through post-expedition laboratory activities and synthesis.

IODP Conference $112,000 - Costs for the preparation and implementation of a community-wide IODP conference targeted to provide a status of achievements and the long-term direction of IODP science post-2013. See **Appendix I**.

Subcontract – $511,606 AESTO: This includes salaries and fringes for IODP-MI Sapporo Office (M&A only), office supplies, shipping, communications, software etc. The details of the subcontract are described in **Appendix G**.

Indirect Costs - Finance, administration, IT and legal expenditure are consolidated into an indirect cost pool. Total allowable indirect costs are allocated based on total direct salaries.

5.4.2 USIO

Salaries and Fringes – Salaries, fringes, and sea pay, including an anticipated cost-of-living allowance and estimated fringe benefits rate.

Travel – Transportation, per diem, lodging, and other associated costs. USIO travel to SAS panel meetings, task force meetings, IO meetings, USIO meetings, workshops, and national and international meetings; Ocean Leadership and TAMU travel to port calls; LDEO travel to subcontractor site visits and professional training courses and meetings; and TAMU travel to insurance meetings.

Supplies – General office supplies and expendables and operational supplies.

Shipping – Postage, express mail, courier services, and freight.

Communication – Telephone and fax charges.

Contractual Services – Consultant and contract services. Printing and copying of materials. Consultant services in support of network and video conferencing equipment (Ocean Leadership).

Equipment – Procurement, upgrading, or fabrication of equipment with an acquisition cost of more than $5,000, plus those items as defined by Ocean Leadership, Columbia University, or TAMRF policy. Computers, monitors, and printers for new staff and replacement of equipment (Ocean Leadership).

Other Direct Costs – Costs not covered in other categories:

> ***Training*** $2,780 – Registration, transportation, per diem, and lodging expenses related to professional training. Registration and travel costs for professional training courses and meetings (TAMU).
>
> ***Business Conferences*** $450 – Expenses associated with meetings hosted by the USIO. Expense of program-wide conferences and meetings.
>
> ***Insurance*** $800 – Annual insurance premium.
>
> ***Services*** $8,700 – Expert assistance. Lease on off-premises records storage facility, partial cost of other support services, visitor parking permits, printing services, TAMU Physical Plant services, and temporary labor.
>
> ***TAMU Computing Services*** $2,000 – Use of TAMU's financial and management information System (FAMIS).
>
> ***Equipment Rental*** $100– Rental of equipment for conferences.
>
> ***Furniture*** $200 – Office furniture. Office furniture and storage cabinets for use in office and at external storage facilities.

Recruiting $400 – Cost of advertisements of vacant positions.

Maintenance and Repair $950 – Equipment service agreements on copiers; replacement parts and service for fax machines, shredders, and so on.

Library $50 – Books, journals, resources, and subscriptions to professional materials.

Indirect Costs—Administrative and financial costs associated with operating the Program for Ocean leadership, TAMU and LDEO. The specific equations used to calculate these costs vary by institution (For details, see **5.3** of **Appendix B**).

5.4.3 CDEX

Salaries and Fringes – Salaries for managers and staff.

Supplies – Office supplies.

Communication – Telephone.

Contractual Services – Accounting Assistant ($71,000), Graphic Editor ($24,800), and Computer rental ($13,000).

Indirect Cost - 30% of total direct costs except contractual services items. (Same in all WBEs)

5.4.4 ESO

Salaries and fringes – Salaries, etc.

Travel – Transportation, per diem and accommodation for all tasks, including ESO internal meetings, IO meetings, ECORD Council meetings, ESSAC meetings, meetings of other IODP bodies including panels and committees, IODP-MI task forces, operational reviews and a range of appropriate scientific conferences (including conference fees) and workshops.

Supplies – General office supplies.

Communication – Phone, fax, etc. for Bremen.

Equipment – Miscellaneous items, upgrades, etc.

Other Direct Costs – Training for all partners.

6 Technical, Engineering and Science Support (TESS)

6.1 Goals

Goals for this Work Breakdown Element (WBE) primarily relate to the Implementing Organizations and include managing, coordinating, and performing the activities and providing the services, materials, platforms, and ship- and shore-based laboratories necessary to support IODP expeditions.

6.2 Deliverables for FY2008

Generic deliverables for this Work Breakdown Element are presented below. These deliverables are applicable to the specific IO expedition operations described in **Section 4** of the main text of this report, as well as in **Appendices B** (USIO), **C** (CDEX), and **D** (ESO).

- Expedition Planning and Implementation: Provide scientific and operational planning and execution for each scheduled expedition, including provision of a drilling platform. Conduct long-range operational planning for out-year expeditions.
- Reporting: Provide expedition-related reports and content for expedition publications (e.g., *Scientific Prospectus, Preliminary Report,* etc.). Act as a liaison to Science Advisory Structure (SAS) and other panels and task forces as appropriate.
- Expedition Staffing: Provide selection and support for scientific staffing and Co-Chief Scientist selection for each scheduled expedition. Provide support for shipboard and shore-based technical personnel and activities.
- Logistical Support: Provide for expedition and shore-based activities including procurement, shipping, and inventory of equipment and supplies.
- Analytical Systems: Provide and maintain shipboard and shore-based analytical facilities and associated quality control/quality assurance protocols. Ensure effective capture and transfer of expedition data to database systems.
- Logging: Provide for the delivery of logging services including back-off/severing services where needed.
- Engineering Support: Provide engineering support for maintaining and developing shipboard and shore-based drilling, coring, logging, and downhole systems including third-party developments.
- Applications Development: Provide maintenance and support for custom software applications for the capture and shipboard management of operational, sampling, and analytical information.
- Legacy Documentation.

6.3 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	SIO	Total
Salary and Fringes	-	2,791,623	1,086,000	950,300	-	-	$ 4,827,923
Travel	-	457,725	-	180,000	-	-	$ 637,725
Supplies	-	179,550	50,000	184,000	-	-	$ 413,550
Shipping	-	197,123	100,000	60,000	-	-	$ 357,123
Communication	-	17,416	-	26,000	-	-	$ 43,416
Contractual Services	-	1,817,540	6,435,715	2,080,000	-	-	$ 10,333,255
Equipment	-	16,000	-	20,000	-	-	$ 36,000
Other Direct Costs	-	205,119	-	20,000	-	-	$ 225,119
Total Direct Costs	-	5,682,096	7,671,715	3,520,300	-	-	$ 16,874,111
Modified Direct Costs (If applicable)	-	811,631	1,236,000	-	-	-	$ 2,047,631
Indirect Costs/Administrative Fee	-	430,164	370,800	-	-	-	$ 800,964
Total	$ -	$ 6,112,260	$ 8,042,515	$ 3,520,300	$ -	$ -	$ 17,675,075

Table APP- 5: *Technical, Engineering, and Science Support Budget for FY2009.*

6.4 Justification

6.4.1 IODP-MI

None

6.4.2 USIO

Salaries and Fringes – Salaries, fringes, and sea pay, including an anticipated cost-of-living allowance and estimated fringe benefits rate.

Travel – Transportation, per diem, lodging, and other associated costs for IODP meetings and workshops; pre-expedition and post expedition meetings, FY2010 planning meetings, meetings with drilling equipment supply vendors; subcontract site visits; and travel costs for USIO staff who will work at port calls/mobilization and/or sail on sea trials and FY2009 expeditions; and for TAMU staff who will sail on the first FY2010 expeditions. Also includes LDEO travel to professional training courses and meetings.

Supplies – General office supplies; electronic media and other computer supplies with an acquisition cost of less than $1,000 (for TAMU); printer and copier supplies; operational, laboratory, logistic, and shipping supplies for FY2009 expeditions and shipboard and shore-based analytical and engineering laboratory and test facilities. Other drilling or science supplies may be purchased in support of USIO deliverables using cost avoidances gained during the fiscal year.

Shipping – Postage for regular correspondence and small packages and shipping to and from FY2009 expeditions and to the first of the FY2010 expedition.

Communication – Satellite, telephone, and fax charges.

Contractual Services – Consultant and contract services. Subcontract to members of the Logging Consortium (University of Montpellier, France; University of Leicester, United Kingdom; University of Aachen, Germany) to provide shipboard participation of Logging Staff Scientists, liaisons to selected panels as needed, and scientific support for Program planning and logging-related projects. Subcontract to Schlumberger for provision of a standard suite of tools, engineer services, software support, and mobilization services; specialty tools for use on individual cruises as needed; 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 (part-time to nearly full-time support); and the day rate for tool insurance for the deployment of downhole logging tools. Other contracts provide laboratory analytical instrument consultant service.

Equipment – Procurement, upgrading, or fabrication of equipment with an acquisition cost of more than $5,000, plus those items as defined by Ocean Leadership, Columbia University, or TAMRF policy. Logging operations and laboratory equipment. Tools and equipment in support of logging operations and downhole measurement tool testing at the LDEO Environmental Stress Screening Facility and other facilities. Other drilling or science supplies may be purchased in support of USIO deliverables using cost avoidances gained during the fiscal year.

Other Direct Costs – Costs not covered in other categories:

Relocation $14,500 – Relocation costs for new employees.

Training $61,194 – Registration, transportation, per diem, and lodging expenses related to professional training and attendance at professional meetings.

Business Conferences $2,168 – Expenses for pre-expedition, post-expedition, and planning meetings; refreshments provided for various business meetings; and catering services occasionally required for on-site training and professional consultant services.

Insurance $3,200 – Annual insurance premiums for USIO vehicles.

Services $31,947– Expert assistance. Annual physical examinations for seagoing personnel, copier services, external copying and printing services, vehicle and warehouse equipment repair, testing and calibration of laboratory instruments, machine shop services.

Equipment Rental $600 **–** Rental of a crane and truck to support warehouse and logistical services.

Recruiting $8,660 **–** Employee recruitment. Local advertisements, advertisements in science and trade journals, and other costs related to filling vacant positions and recruiting professional staff for Phase 2 operations.

Maintenance and Repair $80,850 – Maintenance and repair of office equipment, postage meter, vehicle fleet, equipment in warehouse, overhead cranes, other loading dock equipment, and laboratory and safety equipment.

Library $2,000 – Reference books, resources, and subscriptions to professional materials.

Indirect Costs – Administrative and financial costs associated with operating the Program. —For LDEO, indirect costs at 53% are assessed on all charges except permanent equipment.

6.4.3 CDEX

Salary and Fringe – Salaries for managers and staff.

Supplies – *Chikyu* lab supplies

Shipping – Transportation costs for Core from *Chikyu* to core laboratories

Contractual Services – Funds for LWD/wireline operations, including data processing ($3,300,000); Laboratory Technical Services (Marine Technical staff) ($3,105,715); Logistics Support ($30,000).

6.4.4 ESO

Salaries and fringes – Portions of salaries at standard institution rates, including overheads for implementation of the offshore New Jersey Shallow Shelf Expedition and preparation for the Great Barrier Reef Environmental Changes Expedition, which impose a considerable workload onto ESO.

Most BGS costs are split 50/50 between POCs and SOCs, except for non-scientific work, which is fully allocated to POCs. SOC – All Bremen and EPC costs.

Travel – Scoping, planning and preparation will require a variety of meetings among ESO staff, with co-chiefs and scientists, scoping groups, discussion with actual or potential contractors, for contractual issues and staff exchanges.

Supplies – Analytical consumables, D-tubes to allow for preparation for the New Jersey Onshore Party. Note that this is not the total cost of this item as some costs are deferred to FY2010.

Shipping – Shipping of science containers for offshore operation and shipping of previous MSP expedition cores.

Communication – Couriers, includes microbiology sample courier.

Contractual Services – Logging contracts for both New Jersey Shallow Shelf and Great Barrier Reef Environmental Changes Expeditions.

Other Direct Costs – Bremen University laboratory upkeep and certification.

7 Engineering Development

7.1 Goals

Utilize the SAS-derived IODP Technology Roadmap as the primary guide for the acquisition of existing or latent technology required for IODP to meet the science objectives described in the Initial Science Plan.

7.2 Deliverables in FY2009

The FY2009 engineering plan represents the first integrated engineering effort within the IODP structure. The process began in FY2006 with the creation of a procedure to receive, review, group and execute engineering development proposals. Ten unsolicited proposals were received by IODP-MI on April 15, 2007. Four proposals were forwarded to the Engineering Development Panel (EDP) for review. The EDP reviewed the forwarded four proposals, and then sent their advice to IODP-MI. IODP-MI received the advice regarding implementation from EDP and created a draft engineering plan for presentation to SPC and EDP. The plan presented to EDP and SPC included four projects.

A. Continuation of the Long Term Borehole Monitoring System (LTBMS)
    - Build and test
B. Motion Decoupled Hydraulic Delivery System (MDHDS)
    - Design and build
C. Sediment CORK (S-CORK)
    - High-level design only
D. Simple Cabled Instrument for Measuring Parameters In-Situ (SCIMPI)
    - High-level design only

Both SPC and EDP approved the IODP-MI plan (Specific consensus items shown below).

> **EDP Recommendation 0801-15:** EDP endorses the FY2009 engineering plan as presented at the EDP Meeting #6 by IODPMI.
>
> **SPC Consensus 0708-18:** The SPC endorses the FY2009 engineering development plan including development of borehole measurement tools, and specifically a phased approach (starting with high level system design) for the development of the SCIMPI (Simple Cabled Instrument for Measuring Parameters In-situ) and S-CORK (Sediment-CORK) tools.

In addition to the four projects listed above, IODP-MI is requesting funds to continue an engineering study that began in FY2008 (Core Quality and Quantity).

E. Core Quality and Quantity Study
    - Conduct analyses of case studies

7.2.1 Long-Term Borehole Monitoring System (LTBMS)

In FY2006, a feasibility study conducted by CDEX and reviewed by IODP-MI and EDP was completed and reviewed that indicated that the design, construction and deployment of a long-term borehole monitoring system was feasible. Subsequent to the feasibility study, IODP-MI's Engineering Task Force reviewed the high-level design of the system and provided comment, which was utilized in the creation of a proposal by CDEX to design and build the LTBMS. The detailed design of the system was commissioned in FY2007 and completed. The continuation of the LTBMS project in FY2008 consisted of beginning construction of the first LTBMS prototype.

FY2009 is the final year of the LTBMS Fabrication Phase in which an experimental prototype (EXP) will be completed and a field test conducted in a terrestrial test well in Akita Prefecture, Japan (**Fig. APP-12**). The purposes of the field test are a) to ensure the design meets the specifications, b) to identify all unseen problems in the design, and c) study the installation procedures. The hardware for EXP field test will be assembled and tested in the first half of the fiscal year, while the latter half of the year will be spent for field test and high temperature life test.

FY2009 LTBMS Deliverables

1) Laboratory EXP Test Report containing the findings and suggestions for further improvement.
2) Environmental System Evaluation Test Report describing the plan and interim results of the destructive test i.e., shock test and high temperature life test.
3) EXP Telemetry System for Field Test
4) EXP system for the field test should be built as well as the final design documents and operation manual of the EXP system. This will include the system function block diagrams, circuit diagrams, and drawings.
5) EXP Field Test Report including the objectives, test items, test procedures, and results of the EXP field test. It should also contain findings, lessons learned, and suggestions for further improvement.
6) Action items for engineering prototype (ENP) which corresponds to the "Revised Project Plan" delivered end of each fiscal year during the fabrication phase. All findings, lessons learned, and suggestions obtained through the EXP development, integration test, and field test are summarized in this report. This report will detail the future direction of the ENP development.

The FY2009 costs for the LTBMS project are $2,988,200. Total SOC expenditures for the project will be approximately $7,000,000. In FY2010, the LTBMS project will be funded through POC as the project moves into the implementation phase. FY2010 costs are estimated to be $3,500,000.

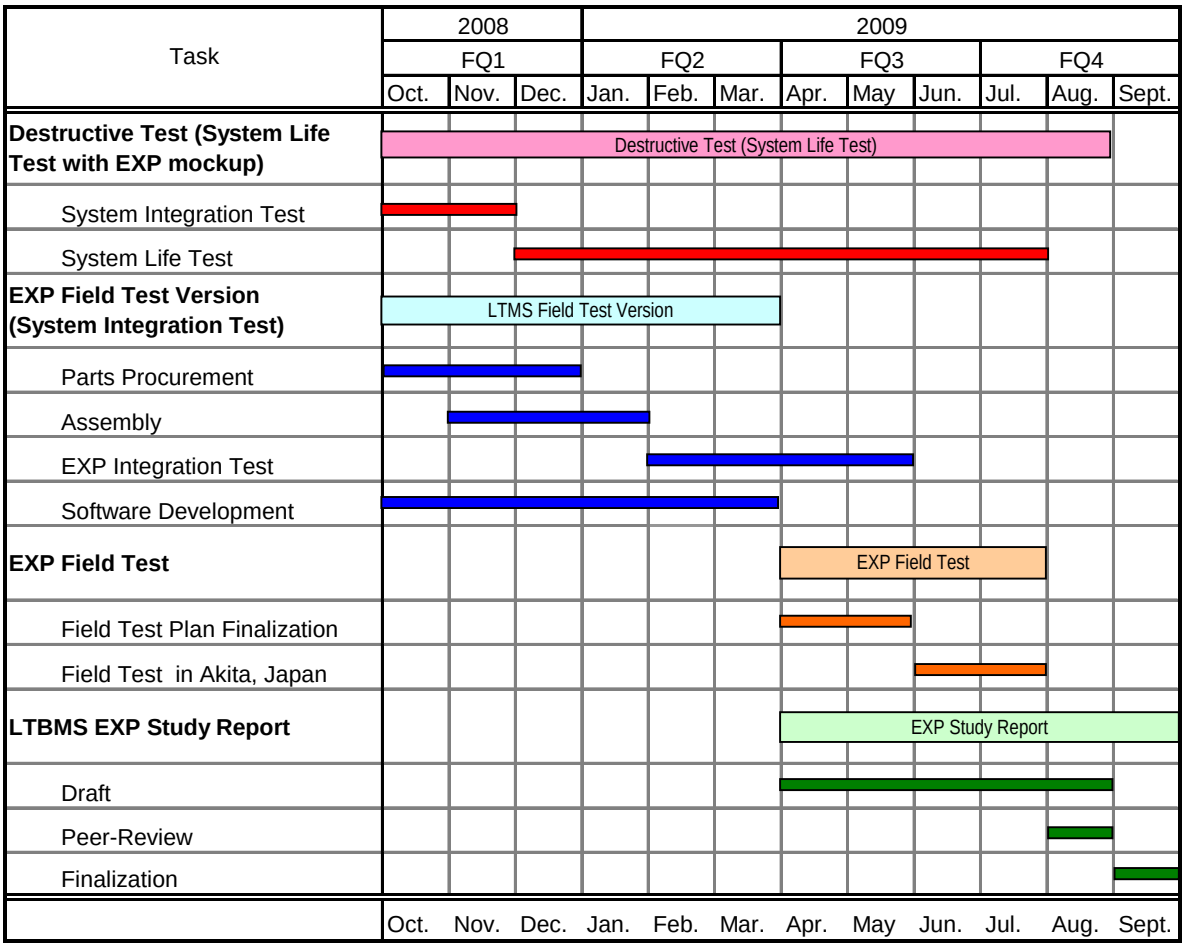

Figure APP- 12: *LBTMS development plan for FY2009.*

7.2.2 Motion Decoupled Hydraulic Delivery System (MDHDS)

The University of Texas has proposed to design and build a replacement for the colletted delivery system. The new system will facilitate the acquisition of accurate in-situ pressure measurements by decoupling the heave-induced motion of the bottom-hole assembly from the logging cable deployed measurement device. A real-time telemetry system will be utilized for communicating with the measurement device to quickly ascertain system status. The project is a two-year development focusing on design and fabrication of the bottom-hole assembly components in the first year, and system testing and documentation in the second year. The system will be deployable from any platform utilizing IODP drillpipe and bottom-hole assembly components. The USIO and Stress Engineering will be providing the design and fabrication services for the system as assisting with the testing and deployment.

The total two-year cost for this project is $547,602. However, the University of Texas has agreed to provide cost-sharing funds for the project. As such, the first year (FY2009) SOC funding request is $212,851. The second-year (FY2010) SOC request will be $164,876. The total two-year SOC funding request is $377,727.

Task	F Year -1						F Year 2					
	O	D	F	A	J	A	O	D	F	A	J	A
Motion Decoupled Hydraulic Deployment System												
Detailed design												
Task 1) lower latch mechanism subassembly												
Task 2) upper latch mechanism subassembly												
Task 3) T2P Piston Rod subassembly												
Task 4) Design the hot line connect												
Task 5) Integrate Deployment Tool assembly												
Fabrication												
Task 6) Fabrication Drawings Package												
Task 7) Technical Manual for Deployment												
Task 8) Fabrication of prototype tool												
Task 9) Inspection, Assembly, Bench Test												
Field Trials and Data Evaluation												
Task 10) Field Testing												
Task 11) Space-out design												
Task 12) Analysis of Field Data												
Reports and Deliverables												
Task 13) Drafting												
Task 14) Performance Analysis												
Task 15) Operations manuals												

Figure APP- 13: ***Motion Decoupled Hydraulic Delivery System*** *(MDHDS) two-year development plan. The MDHDS development will consist of the design and fabrication of bottom-hole assembly components to allow in-situ measurements to be made accurately from a heaving drillship, an operation in the past that has had low success rates. Real-time data communications will also be featured to ascertain proper coupling between the sensor and formation.*

7.2.3 Simple Observatory Initiative (Sediment-CORK and Simple Cabled Instrument for Measuring Parameters In-situ)

Two proposals were received for simple, low-cost observatories that could be used in boreholes penetrating unconsolidated or weakly consolidated sediments: the Sediment-Cork and the Simple, Cabled Instrument for Measuring Parameters in Situ (SCIMPI). As proposed, the SCIMPI device will be capable of deploying a wide range of sensors, but will require configuration prior to the expedition. The Sediment CORK's proposed design is for making only temperature and pressure measurements without any downhole electronics, thus allowing for rapid configuration and assembly during an expedition.

Based upon advice from EDP and SPC, IODP-MI decided to proceed in parallel with high-level design projects for each system in FY2008. Both proponents agreed to this approach. In addition, subsequent discussions between IODP-MI and the proponents have led to the understanding that both systems can utilize the same deployment system. Thus, IODP-MI has decided to move forward with building a common deployment system, rather than two separate (and more costly) deployment systems.

SCIMPI High-Level Design - $176,625

The SCIMPI high-level design document will yield specifications, drawings, and deployment plans that can be utilized in a possible fabrication phase in the future. Approximately $410,000 will be required to build the SCIMPI instrument, if requested for FY2010 (see discussion below).

S-CORK High Level Design - $0

The high-level design of the S-CORK instrument has been completed this fiscal year with non-IODP funds. The project is now awaiting funds for construction of the instrument in the amount of roughly $190,000 if requested for FY2010 (see discussion below).

Simple Observatory Common Deployment System - $144,562

The proposed common deployment system included in the S-CORK proposal is suitable for both the S-CORK and SCIMPI instruments. Funds in the amount of $44,136 were earmarked in FY2008 to complete the design of the common deployment system. IODP-MI proposes that the fabrication of the deployment system proceed in FY2009. This fabrication *will not* include any hardware needed for the S-CORK and SCIMPI downhole instruments.

Following the completion of the FY2009 simple observatory efforts (high-level design and Common Deployment System), IODP-MI will evaluate the high-level designs for each observatory and determine the next steps for this observatory initiative. The outcome might be to request funding for one or both instruments. This decision will be based on science drivers (utility in submitted drilling proposals), technical readiness, and cost. IODP-MI will work with both proponents to identify cost-sharing opportunities.

Tentative Multiyear Plan for the Simple Observatory Initiative

TASK	Year 1 (FY2008)				Year 2 (FY2009)				Year 3 (FY2010)				Year 4 (FY2011)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Common Deployment System																
Begin design																
Finalize design																
Fabrication																
SCIMPI																
High level design																
Detailed design																
Prototyping																
Fabrication																
Testing																
Simple CORK																
High level design																
Detailed design																
Prototyping																
Fabrication																
Testing																

Figure APP- 14: *The tentative multi-year development plan includes three main elements, the Common Deployment System, the SCIMPI instrument, and the Simple CORK instrument (see text for details). The Common Deployment System can be used for both the SCIMPI and Simple CORK systems. Funding for the prototype, fabrication, and testing phases of SCIMPI and/or Simple CORK in out-years will depend upon evaluation of the high-level designs. The decision on which instrument to build (or perhaps a decision to build both) will depend upon science drivers, technical readiness, and cost. Opportunities to integrate technologies will be considered during all phases.*

7.2.4 Core Quality and Quantity Analysis

In FY2008, IODP-MI personnel initiated the first phase of a study to quantitatively evaluate coring results in an effort to identify, and ultimately remediate, factors that affect the quantity and quality of recovered core. This work identified several areas for more detailed analyses, including coring through medium-hard materials, through materials transitioning from medium-hard to hard, and coring through alternating soft and hard materials. In FY2009, IODP-MI personnel will coordinate three specific case studies to help identify factors controlling the quantity and quality of core in these three environmental conditions, which have been particularly challenging to the drilling program in the past. The aim of these proposed case studies and the overall project is to provide a series of recommendations on how IODP can improve core quality and quantity in challenging drilling and coring environments through improvement of existing procedures, or by development or implementation of new technologies.

7.3 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	SIO	Total
Salary and Fringes	249,629	-	114,000	-	-	-	$ 363,629
Travel	46,600	-	-	-	-	-	$ 46,600
Supplies	-	-	-	-	-	-	$ -
Shipping	-	-	-	-	-	-	$ -
Communication	-	-	-	-	-	-	$ -
Contractual Services	562,038	-	2,840,000	-	-	-	$ 3,402,038
Equipment	-	-	-	-	-	-	$ -
Other Direct Costs	-	-	-	-	-	-	$ -
Total Direct Costs	858,267	-	2,954,000	-	-	-	$ 3,812,267
Modified Direct Costs (If applicable)	-	-	114,000	-	-	-	$ 114,000
Indirect Costs/Administrative Fee	134,683	-	34,200	-	-	-	$ 168,883
Total	$ 992,950	$ -	$ 2,988,200	$ -	$ -	$ -	$ 3,981,150

Table APP- 6: *Engineering Development Budget.*

7.4 Justification

7.4.1 IODP-MI

Salary and Fringes – Direct salaries for IODP-MI personnel leading IODP engineering development.

Travel – Travel costs for engineering development personnel required to attend science advisory structure panel meetings, contractor oversight and workshops as needed.

Contractual Services – For FY2009, IODP-MI is requesting $562,038 for subcontracts to complete the MDHDS and Simple Observatory work detailed above and the second year of the Core Quality and Quantity Study. The first year of the MDHDS project will be subcontracted to the University of Texas in the amount of $212,851. These costs are based on the proposal submitted to IODP-MI. A second contractual award will be made to the University of Rhode Island to conduct the high level design for the SCIMPI device. The award to URI will be in amount of $176,625 based on the submitted proposal. A third contract will be issued for the fabrication of the simple observatory common deployment system in the amount of $144,562. Lastly, $28,000 is requested to retain and engineering/drilling consultant for assistance conducting the case study analyses of Core Quality and Quantity Study.

Indirect Costs - Finance, administration, IT and legal expenditure are consolidated into an indirect cost pool. Total allowable indirect costs are allocated based on total direct salaries.

7.4.2 CDEX

Salary and Fringes – Salary and fringe for Managers and staff associated with LTBMS project

Contractual Services – Experimental prototype fabrication, field testing operations, and wellhead penetration tests

7.4.3 ESO

No budget for ESO is requested

7.4.4 USIO

No budget for the USIO is requested

8 Core Curation

8.1 Goals

The major goal associated with this Work Breakdown Element is to provide services in support of IODP core sampling and curation of the core collection archive. IODP supports operations at three core repositories: the Gulf Coast Repository (GCR) operated by the USIO, the Kochi Core Center Repository (KCC) operated by CDEX, and the Bremen Core Repository operated by Bremen University (**Table APP-7**).

Repository	Institution	Geographic Location
GCR	Texas A&M University	Pacific Ocean (east of western trench boundaries); Caribbean Sea and Gulf of Mexico; Southern Ocean (>60ºS, except Kerguelan Plateau)
BCR	University of Bremen	Atlantic Ocean, Mediterranean Sea, Arctic Ocean (north of Bering Strait)
KCC	Kochi University	Western Pacific Ocean (west of trench boundaries); Indian Ocean, Kerguelan Plateau; Bering Sea

Table APP- 7: Engineering Development for FY2009.

8.2 Deliverables in FY2009

The primary deliverables for the repositories during FY2009 are listed below.

- Policy and Procedures: Work with other IOs, the Science Advisory Committee (SAS), and the IODP central management office (IODP-MI) to 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 specific expeditions identified in Section 4 of this Annual Program Plan and review all shipboard and moratorium-related requests in coordination with the other members of the Sample Allocation Committee (SAC) for each expedition.
- Sample Requests: Respond to post-moratorium sample requests from the scientific community.
- Core Curation: Conduct all responsibilities associated with curation of core collections.
- Use of Core Collection: Promote the outreach use of the core collection in collaboration with Implementing Organization (IO) and IODP-MI education/outreach personnel by providing materials for display at meetings or museums, as well as conducting tours and supporting other program outreach activities.
- Meetings: Host and/or participate an annual IODP curatorial staff meeting. Act as IO liaison for meetings with the other IOs, IODP-MI, and the SAS, as appropriate.

- Prepare legacy documentation for sampling activities.

8.3 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	SIO	Total
Salary and Fringes	-	354,967	186,600	60,300	179,521	-	$ 781,388
Travel	-	46,371	-	7,000	11,050	-	$ 64,421
Supplies	-	9,051	30,000	2,000	12,765	-	$ 53,816
Shipping	-	13,000	25,000	10,000	28,514	-	$ 76,514
Communication	-	3,315	1,000	-	-	-	$ 4,315
Contractual Services	-	-	216,429	-	-	-	$ 216,429
Equipment	-	-	-	-	-	-	$ -
Other Direct Costs	-	5,115	10,000	-	-	-	$ 15,115
Total Direct Costs	-	431,819	469,029	79,300	231,850	-	$ 1,211,998
Modified Direct Costs (If applicable)	-	-	252,600	-	-	-	$ 252,600
Indirect Costs/Administrative Fee	-	-	75,780	-	92,740	-	$ 168,520
Total	$ -	$ 431,819	$ 544,809	$ 79,300	$ 324,590	$ -	$ 1,380,518

Table APP- 8: Core Curation Budget for FY2009.

8.4 Justification

8.4.1 IODP-MI

None budgeted.

8.4.2 USIO

Salaries and Fringes —Salaries, fringes, and sea pay, including an anticipated cost-of-living allowance and estimated fringe benefits rate.

Travel —Transportation, per diem, lodging, and other associated costs for IODP meetings and workshops, other IO and USIO meetings including an annual IODP

Curators meeting, and travel costs for TAMU staff who will sail on the first transit, and/or sail on FY2009 expeditions and the first FY2010 expedition.

Supplies – Office and operational supplies. General office supplies, printer supplies, general laboratory supplies, specialized supplies for sampling and curatorial tasks, and supplies for packing extra-large shipments or hydrate shipments and hosting sampling parties.

Shipping – Postage, express mail, and freight. Postage for regular correspondence, regular-sized sample shipments to scientists, and three extra-large sample shipments for FY2009 (for frozen hydrates, U-channels, or whole core sections for scanning) at an average cost of $2,000 each.

Other Direct Costs – Costs not covered in other categories:

> ***Training*** $2,115 – Registration, transportation, per diem, and lodging expenses related to professional training.
>
> ***Business Conferences*** $400 - Incidental expenses associated with meetings hosted by USIO (sampling parties at the GCR).
>
> ***Services*** $600 – Annual physical examinations for seagoing personnel.
>
> ***Maintenance and Repair*** $2,000 - Repairs and maintenance for storage buildings; refrigeration units; laboratory, repository, and office equipment; forklift; and shrink-wrap machine.

8.4.3 CDEX

Salary and Fringes – Salaries for Managers, staff and part-time workers

Supplies – Laboratory Curation and office supplies

Shipping – Sample shipping (DHL, FedEx, UPS, etc)

Communication **-** Telephone, etc.

Contractual Services – Curatorial Technical Services ($171,429); Waste treatment ($10,000); Core management system maintenance ($15,000); Forklift rental ($10,000); Brochures, novelties ($10,000).

Other Direct Costs **-** Core school.

8.4.4 ESO

Salaries and fringes **-** Portions of salaries at standard institution rates, including overheads.

Travel - This category is an estimated projection for travel to meetings related to IODP curatorial topics. It may include visits to the Gulf Coast and Kochi Repositories for technical and training exchange, as well as cooperative work.

Supplies - The bulk of this category is for materials related to sampling needs. This includes plastic scoops and tubes, u-channels, Pmag cubes, Styrofoam plugs, sample bags, shipping boxes, labels and ink bands for the printers; tape for the d-tubes and for packing, etc. The amount is loosely based on past needs for MSP core sampling, but future sampling activity levels are difficult to assess.

Shipping-These costs are primarily for courier shipping of samples (including u-channels, and archive core halves for non-destructive measurements requests) worldwide to the requesting investigators. The amount is loosely based on past needs for MSP core sampling, but future sampling activity levels are difficult to assess.

8.4.5 Bremen

Salary and Fringes **-** This category is the equivalent of 1.6 FTE positions, and is used to cover 80% of the salaries of W. Hale and A. Wülbers.

Travel- This category is an estimated projection for travel to meetings related to IODP curatorial topics. It may include visits to the Gulf Coast and Kochi Repositories for technical and training exchange, as well as cooperative work.

Supplies-The bulk of this category is for materials related to sampling needs. This includes plastic scoops and tubes, u-channels, Pmag cubes, Styrofoam plugs, sample bags, shipping boxes, labels and ink bands for the printers; tape for the d-tubes and for packing, etc. The amount is loosely based on past needs, but future sampling activity levels are difficult to assess. We can only assume that sampling levels will increase as the size of our collection increases.

Shipping-These costs are primarily for courier shipping of samples worldwide to the requesting investigators. As with the Supplies category, the amount depends on the amount of sampling activity, which certainly will continue to increase with the size of our collection

9 Data Management

9.1 Goals

The goals of data management include: management of data supporting IODP activities, management of expedition and post-expedition data, long-term archiving, access to data, IT support services, and the IODP Site Survey Data Bank.

9.2 Deliverables in FY2009

The IOs are responsible for capturing and storing all drilling-related data generated during shipboard operations. They use their own specific protocols and databases for this. The system used by the USIO will be a customized LIMS (Laboratory Information Management System) data system for all data generated in FY2009, whether it is derived from new drilling activities or from new analysis of sample materials collection prior to FY2009. The JANUS system will be transitioned to an archival system. Updates to JANUS will hereafter be limited to corrections of inaccurate data. LIMS is still under development and is expected to be ready for shipboard use in the beginning of 2009. The system to be used by CDEX is the J-CORES system and is currently being modified to accommodate sample data access and metadata harvesting at a more granular level. For expedition use (shipboard and shore-based core description), ESO is using a modified version of the DIS developed for the International Continental Drilling Program (ICDP). ESO-generated expedition data are subsequently legacy-stored in the World Data Center (WDC) PANGAEA system. In FY2009, each IO is responsible for providing access to metadata describing data stored in their respective databases, providing access to persistent citable data, and providing an interface for web service access to their databases. The Scientific Drilling Information Service (SEDIS) will provide central access to the distributed IO databases (see **Fig. APP-13**) by harvesting metadata from each IO. SEDIS will also serve as a registry of web services data access to IOs data. Sample requests and related core repository data will be handled by the Sample Materials Curation Management System (SMCS). Development of SMCS and SEDIS will continue in FY2009, with the implementation of the SEDIS Phase III and system enhancements.

SEDIS will continue to be a strong focus of data management development in FY2009. The SEDIS Phase I portal is currently online and serves as a central data discovery site for the scientific community. Each IO will continue to be responsible for capturing and storing all drilling-related data generated during expeditions, and will provide metadata compliant with the ISO 19115 international standard. SEDIS will continue to harvest the metadata and provide central access to all DSDP, ODP, and IODP data.

In 2008, SEDIS Phase II is expected to be completed (FY2008 funds). This phase of SEDIS development will provide full text search functionality for all IODP scientific publications, including DSDP and ODP and provide links between publications and related data. A citation database will also be part of SEDIS Phase II. SEDIS Phase II development will also include a Publication Obligation Tracking System (POTS) to assist curators and others in evaluating compliance with publication obligations.

SEDIS Phase III commenced in FY2008. Phase III of SEDIS will extend the existing access to IO's data sets to enable users to dynamically compile data from the distributed IOs data systems. The main features will be initial parameterized query function, data transformation services, and data export services. Enhancements to the SEDIS system will be made during FY2009 to update SEDIS integration with changes to the IOs source data systems and to provide data access in additional formats.

The initial version SMCS Sample Materials Request Systems (SRMS) was implemented in FY2008. Completion of the SMCS Central Inventory will be completed in FY2009. The completed SMCS will improve management and coordination of sample requests between the three IODP core repositories.

The IODP Central Registry LDAP system is currently operational. Maintenance of the Central Registry, including integration with other IODP systems, is expected during FY2009.

Further details of IO data management activities are included in **Appendices B** to **D**.

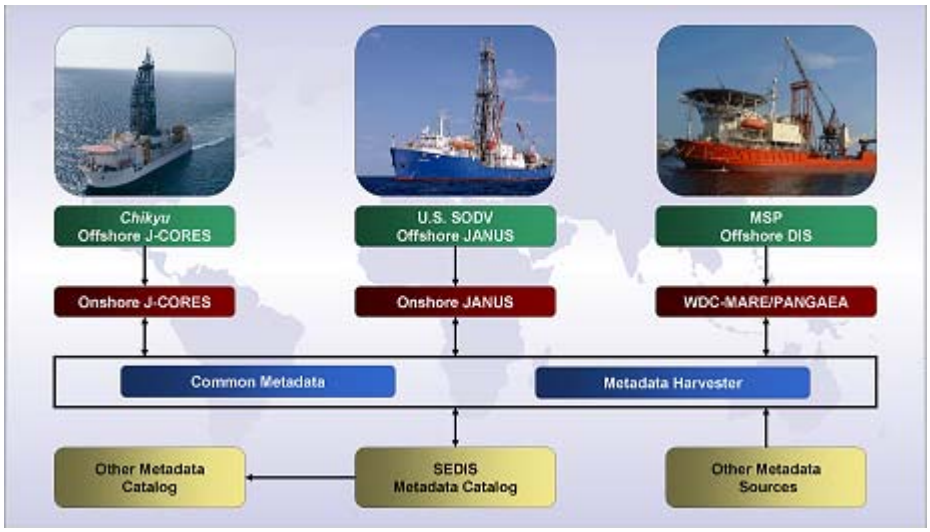

Figure APP- 15*: Major Aspects of IODP Data Management.*

9.2.1 Expedition Data

Maintain and manage databases supporting expedition-planning data. Operate and maintain data management and harvesting systems (including QA/QC) for storage and archiving of expedition and post-expedition data, including core and sample tracking.

a. ***Completion of data access services:*** CDEX is currently modifying J-CORES database to accommodate data access at a more granular level and for the creation and harvesting of related metadata for SEDIS. SEDIS Phase III will make J-CORES data via SEDIS as a web services during FY2009. USIO is currently implementing LIMS. SEDIS Phase III will make persistent data and web services data from JANUS and LIMS available via SEDIS during FY2009. ESO will continue to use the DIS system for collection of data and the WDC-PANGEA for access to data sets and web services via SEDIS.

b. ***Acquisition of core and logging data***: Each IO is responsible for capturing the scientific data that will be collected during the scheduled expeditions for FY2009 and arranging for storage of the data in a database so it is accessible to the expedition participants and to the scientific communities via SEDIS.

9.2.2 Program-wide access portal

Provide program-wide access portal including supporting metadata.

a. Metadata access from each IO: Each IO is responsible for providing metadata describing the datasets they have in their own databases. This metadata will continue to be regularly harvested by SEDIS to provide central access to the program data by the scientific community.
b. SEDIS Phase II: Publication search engine linked to data discovery: SEDIS Phase II development is expected to be completed by end of calendar year 2008 (all costs in FY2008).
c. SEDIS Phase III strategies: Parameterized Querying, Data Delivery and Data Services: SEDIS Phase III commenced during FY2008. Contract(s) for SEDIS Phase III development services (FY2008 funds) were issued during the 4th quarter of FY2008 and development is expected to be completed during FY2009. Enhancements to and maintenance of SEDIS (e.g., Web services, query services) are planned for FY2009.

9.2.3 Operation and maintenance

Provide operation and maintenance of computer and network systems.

a. Evaluation, maintenance, and possible enhancements: The systems developed in FY2008 will need to be closely monitored and maintained in FY2009. This could require some minor adjustments and enhancements.
b. Continuing operation of the SSDB: No development is expected in FY2009. The SSDB is now mature and should only require normal operation and maintenance tasks from Scripps.

9.2.4 Common vocabularies and terminology within IODP

This is an important aspect of data management within IODP. The process will continue during FY2009 with development of consistent and common vocabularies and terminologies for specific disciplines to be coordinated by IODP-MI.

9.3 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	SIO	Total
Salary and Fringes	-	1,490,797	304,850	248,000	-	144,830	$ 2,188,477
Travel	18,500	77,141	-	72,000	-	-	$ 167,641
Supplies	-	36,162	12,000	5,000	-	5,300	$ 58,462
Shipping	-	1,869	-	-	-	-	$ 1,869
Communication	-	14,321	-	-	-	5,927	$ 20,248
Contractual Services	117,000	-	20,000	55,000	-	-	$ 192,000
Equipment	-	71,935	-	32,000	-	-	$ 103,935
Other Direct Costs	235,465	439,468	-	-	-	18,700	$ 693,633
Total Direct Costs	370,965	2,131,693	336,850	412,000	-	174,757	$ 3,426,265
Modified Direct Costs (If applicable)	-	488,354	316,850	-	-	-	$ 805,204
Indirect Costs/Administrative Fee	-	258,828	95,055	-	-	95,243	$ 449,126
Total	$ 370,965	$ 2,390,521	$ 431,905	$ 412,000	$ -	$ 270,000	$ 3,875,391

Table APP- 9: Data Management Budget for FY2009.

9.4 Justification

9.4.1 IODP-MI

Travel – Travel cost for staff attending data management coordination and task force meetings, visits to vendors and professional meetings

Contractual Services – The Data Management budget for FY2009 will be mainly used for the maintenance and enhancements of SEDIS. The completed SEDIS system will need to be maintained, enhanced, and hosted. The proposal database, user registry, and other IODP-MI applications (e.g., Google Earth data layers) will also need to be maintained and hosted in FY2009. As part of SEDIS publications index and search system, an annual fee for digital object identifier (DOI) and access to the American Geological Institute (AGI) citation database are required. Development of additional components of and maintenance for the Sample Material Curation System (SMCS) will take place during FY2009.

Other Direct Costs – Salaries and fringes of staff supporting data management (AESTO subcontract; see **Appendix G**).

9.4.2 USIO

Salaries and Fringes – Salaries, etc.

Travel— IODP meetings and travel costs for USIO staff who will work at port calls, sail on the first transit, and/or sail on FY2009 expeditions and TAMU staff who will sail on the first FY2010 expedition. Also includes LDEO travel to professional training courses and meetings.

Supplies – Office and operational supplies.

Shipping – Postage for regular correspondence and small packages, data and photo requests, and other shipping needs.

Communication – Telephone and fax charges.

Equipment — Procurement, upgrading or fabrication of equipment with an acquisition cost of more than $5,000.

Other Direct Costs — Costs not covered in the other categories:

Training $34,012 - Registration, transportation, per diem, and lodging expenses related to professional training.

Business Conferences $220 - Incidental expenses associated with meetings hosted by USIO.

Software $70,466 - Software subscriptions, volume licensing agreements, and concurrent usage software agreements used in support of continuing activities and systems maintenance for the entire enterprise (TAMU).

Services $164,120 - Expert assistance, rental for storage of paper prime data, annual physical examinations for seagoing personnel, TAMU Physical Plant services, IT expert assistance services, copier services, external copying and printing services, safe deposit box rentals, and back-up services.

Maintenance and Repair $169,394 – Maintenance agreements and equipment repair such as for IT computer software and hardware.

Library $1,256 – Books, journals, and other resources.

Indirect Costs – Administrative and financial costs associated with operating the Program.

9.4.3 CDEX

Salary and Fringes – Salaries for manager and staff.

Supplies — Computer supplies

Contractual Services – J-CORES maintenance.

9.4.4 ESO

Salaries and Fringes – Portion of salaries including overheads.

Travel – ESO database group meetings, Data Management Coordination Group meetings and data management liaison.

Supplies – Computer consumables.

Contractual Services – Offshore DIS support and developments; continuous upgrading is planned in line with IODP-MI requirements, including VCD development.

Equipment – ESO computer infrastructure upgrade and maintenance, and Bremen computer infrastructure upgrade and maintenance. BSCW license for communication and data transfer.

9.4.5 Scripps Institution of Oceanography

Salary and Fringes – Salaries, etc. for SOC.

Supplies – Materials and supplies.

Communication – Communications, network charges, mailing, faxing, copying and phones.

Other Direct Costs – INT Viewer Seismic Viewer software; Computer services at SDSC.

10 Publication

10.1 Goals

The goals of IODP Publications are editing, production, and distribution of IODP scientific drilling expedition results and program activities.

IODP Publications fall into four categories: Reports, IODP *Proceedings*, publications in open literature, and the *Scientific Drilling* journal published jointly with ICDP (**Fig. APP-14**):

- Documentation of IO-specific technology and data (Technical Notes);
- Proper scientific documentation of all drilling expeditions (Scientific Prospectus);
- Rapid documentation and publications of major findings (Preliminary Reports);
- Wide community distribution of IODP science achievements and program activities (*Scientific Drilling*) in a journal-type fashion;
- Extensive legacy documentation of all expedition results (Expedition Reports of the *Proceedings*); and
- Peer-reviewed publication of post-expedition research results (open literature and data reports in *Proceedings*).

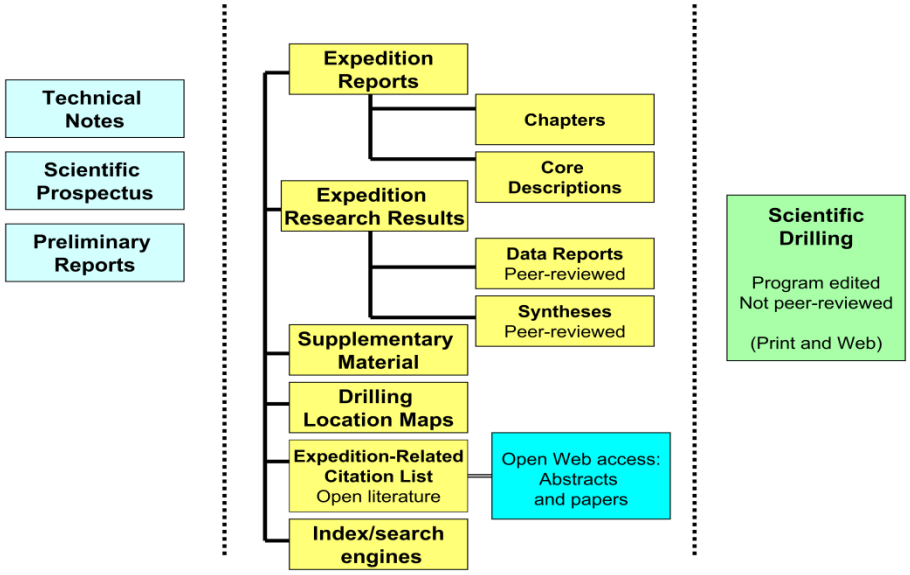

Figure APP- 16: *IODP Main Publications.*

10.2 Deliverables in FY2009

The following major deliverables are covered by the FY2009 APP:

- Approximately nine Scientific Prospectuses for FY 2009/2010 expeditions;
- Approximately six Preliminary Reports;
- Four Proceedings of the IODP volumes covering expedition reports
- Ten Proceedings volume covering expeditions research content
- Two issues of the journal *Scientific Drilling*
- Publications specialist support for seven expeditions (four USIO, three CDEX)
- Recording publication citations and post-expedition research submissions

IODP-MI oversees all publication activities and is the program publisher. However, except for *Scientific Drilling*, actual editing, production and distribution is outsourced to the IOs. *Scientific Drilling* is produced and published by IODP-MI in cooperation with ICDP. Each IO is contractually responsible for the production of the Technical Notes. Scientific Prospectus, Preliminary Reports and the *Proceedings* on each respective expedition; thematically related expeditions conducted within a short period of time may be considered one single project for which an integrated set of *Proceedings* is produced. Scientific Prospectus is due six months pre-expedition. Preliminary Reports are due two months post-expedition and *Proceedings* 12 months post-expedition. As in FY2008, in FY2009 the final editing and production of all IODP Reports and *Proceedings* is provided by the USIO in order to secure cross-program consistency in appearance. CDEX and ESO will deliver the edited draft material, including all necessary content and scientific editing. Tracking of IODP scientific publications in the open literature for inclusion in the *Proceedings* volume is in FY2009 provided by the USIO. *Scientific Drilling* is delivered in both print and electronic format on the Web. Printed copies (c. 5,500) are distributed by IODP-MI to funding agencies, member institutions, libraries, the PMOs, the IODP scientific community, and to ICDP (for further distribution).

Technical Notes, Scientific Prospectus, Preliminary Reports and *Proceedings* are all published electronically on the Web in html and PDF formats. Volumes of electronic Proceedings are also available on DVD in PDF format. The latter is supplied to funding agencies, libraries, expedition members and also used for scientific outreach.

10.3 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	SIO	Total
Salary and Fringes	-	1,234,733	-	-	-	-	$ 1,234,733
Travel	6,000	60,816	-	-	-	-	$ 66,816
Supplies	-	34,095	-	-	-	-	$ 34,095
Shipping	13,000	6,886	-	-	-	-	$ 19,886
Communication	-	8,000	-	-	-	-	$ 8,000
Contractual Services	47,000	-	-	-	-	-	$ 47,000
Equipment	-	-	-	-	-	-	$ -
Other Direct Costs	84,859	39,209	-	-	-	-	$ 124,068
Total Direct Costs	150,859	1,383,739	-	-	-	-	$ 1,534,598
Modified Direct Costs (If applicable)	-	-	-	-	-	-	$ -
Indirect Costs/Administrative Fee	-	-	-	-	-	-	$ -
Total	$ 150,859	$ 1,383,739	$ -	$ -	$ -	$ -	$ 1,534,598

Table APP- 10: Publication Budget for FY2009.

10.4 Justification

10.4.1 IODP-MI

Travel – Travel costs for staff providing publications support.

Shipping – Shipping cost for *Scientific Drilling*.

Contractual Services – Services for publishing *Scientific Drilling (IODP contribution - excluding ICDP support)*.

Other Direct Costs – Salaries and fringes of IODP-MI staff providing publication support (AESTO subcontract; see **Appendix G**).

10.4.2 USIO

Salaries and Fringes — USIO staff providing support for IODP publications

Travel — Travel costs for IO and USIO meetings, to bring off-site USIO staff to participate in onsite meetings, and for TAMU staff who will work at port calls and/or sail on FY2009 and the first FY2010 expedition.

Supplies – General office supplies.

Shipping—Postage and shipping for regular correspondence and IODP scientific reports, and freight charges for bulk shipments from publication warehouse.

Communication – Telephone and fax charges.

Other Direct Costs – Costs not covered in the other categories:

> ***Training*** $18,815 - Registration, transportation, per diem, lodging expenses, and membership dues related to professional training.
>
> ***Business Conferences*** $2,475 - Expenses associated with meetings hosted by USIO-TAMU.
>
> ***Services*** $10,557 - Payments to IODP Editorial Review Board members; duplication costs for producing *Proceeding of the Integrated Ocean Drilling Program* Volume DVD with Expedition Reports content; and annual physical examinations for seagoing personnel.
>
> ***Equipment Rental*** $286 - Water cooler.
>
> ***Maintenance and Repair*** $5,063 - Copier, typewriter, and forklift maintenance agreements and annual maintenance of the Ocean Drilling Citation Database (prepared by AGI).
>
> ***Library*** *$2,013* - Reference books and subscriptions.

10.4.3 CDEX

None budgeted under this WBE. Initial preparation of publication documents under TESS.

10.4.4 ESO

None budgeted under this WBE. Initial preparation of publication documents under TESS.

11 Outreach

11.1 Goals

Working collaboratively as an integrated outreach team, continue branding IODP as a cutting-edge international Earth science research program, targeting scientists, engineers, national and

industry leaders, and the media to attract and raise positive awareness about IODP investigations, scientific findings, community activities, informational resources, and achievements.

11.2 Deliverables in FY2009

11.2.1 Outreach material

Communications plans, news releases, newsletters, expedition and program materials, web-based content, video footage.

11.2.2 Exhibit booths

High-profile exhibits at internationally important scientific conferences, including AGU, EGU, and JPGU, and communications plans.

11.2.3 Town Hall Meetings

To be held at major science conferences, including AGU, EGU, and JPGU, to facilitate direct outreach to stakeholders in the IODP community.

11.2.4 Heightened public and media awareness

Enhance positive visibility for IODP in the greater scientific community by using existing program communication vehicles and through strategic news placements with scientific and elite general media worldwide.

11.3 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	SIO	Total
Salary and Fringes	219,187	20,227	90,700	126,200	-	-	$ 456,314
Travel	27,500	6,000	-	34,000	-	-	$ 67,500
Supplies	-	-	5,000	4,000	-	-	$ 9,000
Shipping	-	-	10,000	-	-	-	$ 10,000
Communication	-	-	-	-	-	-	$ -
Contractual Services	138,870	14,250	160,000	-	-	-	$ 313,120
Equipment	-	-	-	-	-	-	$ -
Other Direct Costs	83,200	-	10,000	-	-	-	$ 93,200
Total Direct Costs	468,757	40,477	275,700	164,200	-	-	$ 949,134
Modified Direct Costs (If applicable)	-	-	115,700	-	-	-	$ 115,700
Indirect Costs/Administrative Fee	118,258	13,762	34,710	-	-	-	$ 166,730
Total	$ 587,015	$ 54,239	$ 310,410	$ 164,200	$ -	$ -	$ 1,115,864

Table APP- 11: Outreach Budget for FY2009.

11.4 Justification

The total Outreach budget integrates the resources of the three IOs and IODP-MI to maximize outreach opportunities and conduct effective communications to primary target audiences: the greater scientific community (academic, government), the active/participant IODP community (stakeholders), emerging generations of researchers, related professional audiences (commercial/ industry engineers, petrologists, geophysicists, etc.), and the media (general and special interest/science) Deliverables are tied to these target audiences and to the shared goals

of expanding awareness about the value of scientific ocean drilling and generating a public currency and heightened interest in IODP activities.

11.4.1 IODP-MI

Salaries and Fringes - Direct salaries and Fringes for IODP-MI Outreach staff.
Travel - Travel costs for IODP-MI Outreach staff to meetings (one Task Force meeting per year) and to conferences where booths must be staffed.
Contractual Services - Web maintenance including CMS migration ($91,800), video production for news outreach to scientists and media ($48,000)
Other direct Costs - Exhibition booths (space rental etc.) at international conferences ($43,000), Town Hall meetings, production of materials etc. that support outreach to the scientific community and to the media
Indirect Costs - Finance, administration, IT and legal expenditure are consolidated into an indirect cost pool. Total allowable indirect costs are allocated based on total direct salaries.

11.4.2 USIO

Salaries and Fringes - Salaries and fringes for staff supporting the UISO
Travel - Portion of the participation in outreach to stakeholders, press events, media training, and staffing of booths at national and international meetings.
Contractual Services - Platform enrichment activities, including preparation of public relations materials, posters, and videos; media awareness training; and booth rentals and associated costs at national meetings.
Indirect Costs - Administrative and financial costs associated with operating the Program (Ocean Leadreship).

11.4.3 CDEX

Salaries and Fringes - Salaries for Outreach staff
Supplies - Office/field work supplies
Shipping - Shipping costs associated with JPGU, AOGS, AGU, EGU etc.
Contractual Services - Exhibition Booth Design, Translator etc. ($55,000); Expedition filming/editing ($50,000): Outreach publications, novelties ($40,000); WEB Maintenance ($10,000); "Sand for Students" supports ($5,000).
Other Direct Costs - Conference Booth Fee

11.4.4 ESO

Salaries and Fringes - Portions of salaries including overheads.
Travel - Attend planning meeting associated with the New Jersey Shallow Shelf and Great Barrier Reef Environmental Changes expeditions, conferences (EGU, AGU, IGU) and other Outreach activities.
Supplies - Printing brochures for expeditions, support of booths, materials etc.

Addendum

This addendum is for updating the schedule of the Great Barrier Reef Environmental Changes Expedition conducted by ESO and for providing some additional information on the preparation activities for it. This addendum supersedes any descriptions in other part of this FY2009 Annual Program Plan for the Integrated Ocean Drilling and its appendices, if they are contradictory to this addendum.

ESO is close to agreeing a contract for drilling service for the Great Barrier Reef Environmental Changes Expedition, and the operational plans are now clearer. The expedition will now start in mid- to late September in Singapore, and all preparations for the expedition will take place prior to that in FY2009.

Some additional information for SOC-related preparations for GBR to justify the FY2009 budget is the following:

Logging operations:

Engineer's salary for three months prior to expedition starting in mid-late September
Maintenance and testing of logging tools (July- September)
Purchase of tools (July- September)
Container shipping of logging related equipment: MSCL and winches (August-September)
Air-freight for logging tools to Singapore (September)
Tool insurance (September)
Insurance for Logging Engineers (September)
Purchase of analytical consumables and supplies for offshore work (June-August).
Shipping of containerized laboratories from New Jersey to Singapore (August-September).