

First Triennium Review
(US FY2004-FY2006)

of

Integrated Ocean Drilling Program
Management International (IODP-MI)

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Executive Summary

The Integrated Ocean Drilling Program (IODP), an ambitious program of scientific ocean drilling and exploration that currently involves 21 nations, commenced on 1 October 2003. The IODP's central management organization, IODP Management International (IODP-MI), began functioning on 1 January 2004. This First Triennium Review of IODP-MI focuses on IODP accomplishments and IODP-MI management performance during the first three years of IODP operations, and briefly addresses the IODP Science Advisory Structure (SAS).

The First Triennium Review Committee (FTRC) makes the ensuing major findings and recommendations on the basis of 1) a self-evaluation undertaken by IODP-MI, 2) user community and IODP-MI subcontractor input solicited for the review, 3) site visits to the Washington and Sapporo IODP-MI offices, including individual and group interviews with IODP-MI staff, and 4) review of both public and confidential IODP-MI-related documents. A comprehensive list of all recommendations constitutes the final section of this report.

IODP Accomplishments: Findings

Major achievements of IODP-MI include:

- Establishment of IODP-MI as the central management organization of the IODP.
- Robust support of the goals of the IODP science plan and of long-range scientific planning.
- Effective and transparent scientific planning and proposal handling, including the nurturing, evaluation, and ranking process.
- Effective, flexible management of drilling platforms, interaction with the Implementing Organizations (IOs) on operational issues, and coordination of the IOs.

Other accomplishments include:

- Effective management and coordination of publications and data, and progress towards a virtual IODP information services center.
- Progress towards implementing scientific assessment of expeditions and scientific themes.
- Positive reconstitution of the executive authority of the Science Advisory Structure.
- Progress towards implementing a roadmap for integrated engineering development in the IODP.
- Progress in establishing an identity for the IODP and producing outreach materials.
- Progress towards closer cooperation between the IODP and the International Continental Scientific Drilling Program (ICDP).
- Sound financial and accounting management.

IODP-MI Performance: Recommendations

Recommendations for the IODP and IODP-MI include (see section 5.0, Summary of Recommendations, for a complete list):

- Vigorous pursuit of additional financial and intellectual resources for the IODP.
- Development of IODP-MI vision and mission statements.
- Definition of roles, responsibilities, and performance metrics for all IODP-MI positions.
- Consistent annual reviews for all IODP-MI staff.

- Long-term consolidation of two IODP-MI offices into one and/or relocation of the U.S. office.
- Frequent *dedicated* meetings of the IODP-MI senior management team.
- Consideration of changes in management if irreconcilable differences within IODP-MI are adversely affecting the IODP.
- Articulation of the roles and responsibilities of all task forces, and, as appropriate, involvement of relevant IODP components in developing their terms of reference.
- Proactive policy and procedure development engaging all involved parties.
- Collation of all IODP policies and procedures into a manual and at www.iodp.org.
- Availability of an IODP primer at www.iodp.org.
- Development, involving all stakeholders, and implementation of a comprehensive, integrated outreach and communication strategy.
- Involvement of user community and both IODP-MI offices in redesigns, beta-testing, and further development of www.iodp.org.
- Devolution of education to individual IODP member nations and/or consortia.
- Continued efforts for increased diversity and involvement of young scientists in the IODP.
- Integrated IODP-ICDP scientific evaluation of drilling proposals and longer term merger of the two programs.
- Reengagement of IODP-MI and the IODP Science Advisory Structure with the International Ocean Network, InterMARGINS, InterRIDGE, International Marine Past Global Changes Study, and ocean observatory communities.
- Development and implementation of a comprehensive, multi-faceted plan for IODP industry cooperation.
- Coordination and support of the IODP Science Advisory Structure and IODP-sponsored workshops from a single IODP-MI office.
- Comprehensive evaluation of the IODP Science Advisory Structure.
- Clarification of the role of the IODP Council.
- Integrated drill site characterization and drilling.
- Maximum openness, transparency, and accountability of IODP-MI activities.
- Collaborative engagement of all stakeholders in IODP-MI activities.

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Acronyms and Abbreviations

AESTO Advanced Earth Science Technology Organization (Japan)
APP Annual Program Plan
BCR Bremen Core Repository
BGS British Geological Society
BoG Board of Governors
CDEX Center for Deep Earth Exploration
CAMCR Center for Advanced Marine Core Research (Kochi University)
CMO Central Management Office
COI Conflict of Interest
DPG Detailed Planning Group
DSDP Deep Sea Drilling Program
E&O Education and Outreach
ECORD European Consortium for Ocean Research Drilling
EDP Engineering Development Panel
EMA ECORD Management Agency
EPC European Petrophysical Consortium
EPSP Environmental Protection and Safety Panel
ESO ECORD Science Operator
ESSAC ECORD Science Support and Advisory Committee
FY Fiscal Year
GCR Gulf Coast Repository
HG-DPG Hotspot Geodynamics Detailed Planning Group
HSE Health, Safety and Environment
ICDP International Continental Scientific Drilling Program
IIS-PPG Industry-IODP Science Program Planning Group
IO(s) Implementing Organization(s)
IODP Integrated Ocean Drilling Program
IODP-MI Integrated Ocean Drilling Program Management International, Inc.
ISC Information Service Center
ISP Initial Science Plan
ISP Theme I Deep Biosphere and Subseafloor Ocean
ISP Theme II Environmental Change, Processes and Effects
ISP Theme III Solid Earth Cycles and Geodynamics
JAMSTEC Japan Agency for Marine-Earth Science and Technology
J-DESC Japanese Earth Drilling Science Consortium
JOI Joint Oceanographic Institutions, Inc.
JOI Alliance Joint Oceanographic Institutions Alliance
JOIDES Joint Oceanographic Institutions Deep Earth Sampling
JPIO Japanese Implementing Organization
KCC Kochi Core Center Repository
LDEO Lamont Doherty Earth Observatory
LUBR Leicester University Borehole Group
MEXT Ministry of Education, Culture, Sports, Science and Technology (Japan)
MOST Ministry of Science and Technology (People's Republic of China)
MSP Mission Specific Platform
NERC Natural Environment Research Council (UK)
NSF National Science Foundation (USA)
ODP Ocean Drilling Program
OTF Operations Task Force
PMO Program Member Office
PMT Project Management Team
POC Platform Operation Cost
PSG Project Scoping Group
RFP Request-for-proposal
SAS Science Advisory Structure
SASEC Science Advisory Executive Committee
SDSC San Diego Super Computer Center
SEDIS Scientific Earth Drilling Information System

SIO Scripps Institution of Oceanography
SOC Science Operation Cost
SODV Scientific Ocean Drilling Vessel
SPC Science Planning Committee
SPPOC Science Planning and Policy Oversight Committee
SSDB Site Survey Data Bank
SSEP Science Steering and Evaluation Panel
SSP Site Survey Panel
STP Scientific Technology Panel
TAMU Texas A & M University
USIO United States Implementing Organization
USAC United States Advisory Committee for Scientific Ocean Drilling

1.0 Introduction and Background

The Integrated Ocean Drilling Program (IODP), initiated on 1 October 2003, is the most ambitious program of scientific ocean drilling and exploration ever conceived. Co-led by Japan and the United States, with significant support from the European Consortium for Ocean Research Drilling (ECORD) involving 17 nations, and additional support from China and South Korea, the IODP is a truly international research endeavor aimed at understanding the Earth system. To date, 12 IODP expeditions involving 329 scientists (some repeat) have been completed. However, in many respects, the first three years of IODP may be regarded as the program's **start-up phase**. The IODP's central management organization, IODP Management International (IODP-MI), officially became functional when its president assumed office on 1 January 2004, but the corporation's senior management team was not complete until April 2004, significantly after the program had started. Also, during the first three years of the IODP, only two of the planned trio of drilling platforms were in operation.

The IODP-MI First Triennium Review Committee (hereafter referred to as the 'FTRC') was formed by the IODP-MI Board of Governors (IODP-MI BoG) at the behest of the lead agencies, the U.S. National Science Foundation (NSF) and the Japan Ministry of Education, Culture, Sports, Science, and Technology (MEXT), to assess (see **Appendices A and B** for complete documentation):

- IODP accomplishments during the first three years
- IODP-MI management performance
- IODP Scientific Advisory Structure 'structure'

The IODP-MI First Triennium Review is a contractual requirement between the lead agencies and IODP-MI that is included in the FY07 IODP Annual Program Plan. It is important to note that the FTRC's purview was to evaluate function, not personnel.

The IODP-MI Board of Governors organized the First Triennium Review in August 2006, at which time the FTRC commenced its work. The FTRC, selected by the IODP-MI Board of Governors, consists of 10 members (**Appendices C and D**), eight of whom have a high degree of familiarity with the IODP, and two of whom were regarded by the IODP-MI Board of Governors as 'external' to the IODP. Of the first eight, four are members of the IODP-MI Board of Governors, and three represent IODP Implementing Organizations (IOs, or drilling platform operators/core repositories), which receive subcontracts from IODP-MI. Thus, the FTRC includes both IODP-MI overseers (IODP-MI Board of Governor members) and IODP-MI subcontractors (Implementing Organization representatives), as well as scientists with significant experience in scientific drilling both in the oceans and on land.

The structure of this report is as follows. First, the FTRC's methodology and the IODP's overall structure are outlined. Second, the IODP's main accomplishments during the first three years of the program are summarized. Third, IODP-MI's management performance is assessed. Fourth, the IODP Science Advisory Structure (SAS) is considered briefly. Fifth, the FTRC's major recommendations are summarized. Throughout, all FTRC recommendations are numbered sequentially.

1.1 Methodology

The FTRC considered a broad range of information and data in conducting its work, analogous to 360° reviews common in the for-profit corporate sector. Internal and external assessments of IODP-MI, IODP data and statistics, and copious background information were examined. The FTRC met twice, visiting the Washington (19-20 October 2006) and Sapporo (5-6 November 2006) offices of IODP-MI, where both individual and group interviews were conducted with all IODP-MI senior managers and other selected IODP-MI personnel.

The FTRC's work incorporated assessments from three major and distinct components: the FTRC itself, IODP-MI, and the IODP 'community'. At the request of the FTRC in August 2006, IODP-MI undertook a self-evaluation (**Appendix E**) that was provided to the FTRC in early October, prior to the site visits. Also in August, the FTRC solicited community input on the list of review topics (**Appendix B**); input was still arriving as this report was being finalized. Specifically, community input (**Appendix F**) was provided by IODP Planning Sub-Committee (IPSC) members who originally proposed and outlined the central management organization, or IODP-MI; the Implementing Organizations (or IOs, including parent organizations); IODP Science Advisory Structure (SAS) committee and panel chairs; the national/consortia programs, or program member offices (PMOs); IODP Expedition 301-312 co-chief scientists; industry representatives; and International Continental Scientific Drilling Program (ICDP) leaders.

Furthermore, the FTRC requested, obtained, and examined data and statistics on expedition participants (**Appendix G**) from the Implementing Organizations and IODP-MI, and on proposals (**Appendix H**) and the Science Advisory Structure (**Appendix I**) from IODP-MI. Relevant background information considered by the FTRC included both public material available at www.iodp.org, and confidential documents made available by IODP-MI (**Appendix J**).

The report of the final performance evaluation of the Ocean Drilling Program (Performance Evaluation Committee VI, Humphris et al., 2004; **Appendix K**) includes a series of recommendations for the IODP. The FTRC found the report highly useful in conducting its work.

1.2 IODP Structure and Functions

The structure of the IODP is complex, influenced by scientific, political, cultural, and historical considerations. Experience gained from two previous scientific drilling programs, the Deep Sea Drilling Project (DSDP, 1968-1983) and the Ocean Drilling Program (ODP, 1985-2003), played a large role in the design of the IODP. The description of IODP structure and functions below assembles information from the memoranda of cooperation and participation in the IODP among the member nations and consortia and from the by-laws of IODP-MI, all available at www.iodp.org, and the IODP FY2004-FY2007 annual program plans. The IODP consists of three major components:

- a central management office (CMO) that is the not-for-profit corporation IODP Management International (IODP-MI);
- drilling platform and core repository operators that are known as Implementing Organizations (IOs); and

- the IODP Science Advisory Structure (SAS).

IODP-MI has a 10-year contract from the lead agencies, NSF and MEXT, to function as the CMO. The three Implementing Organizations are:

- the Center for Deep Earth Exploration (CDEX, Japan) operating the riser vessel *Chikyu* and the Kochi Core Repository;
- the Joint Oceanographic Institutions (JOI) Alliance (USA) operating the refurbished JOIDES Resolution and the TAMU Core Repository; and
- the European Consortium for Ocean Research Drilling (ECORD) Science Operator that is responsible for mission-specific platforms (MSPs). A separate contract with the University of Bremen supports the Bremen Core Repository.

According to the principles upon which the IODP was founded, IODP “Science Operations Costs” (SOCs) are collected from IODP members, commingled by NSF, and provided through contract to IODP-MI (Figure 1). In turn, IODP-MI distributes SOCs to the Implementing

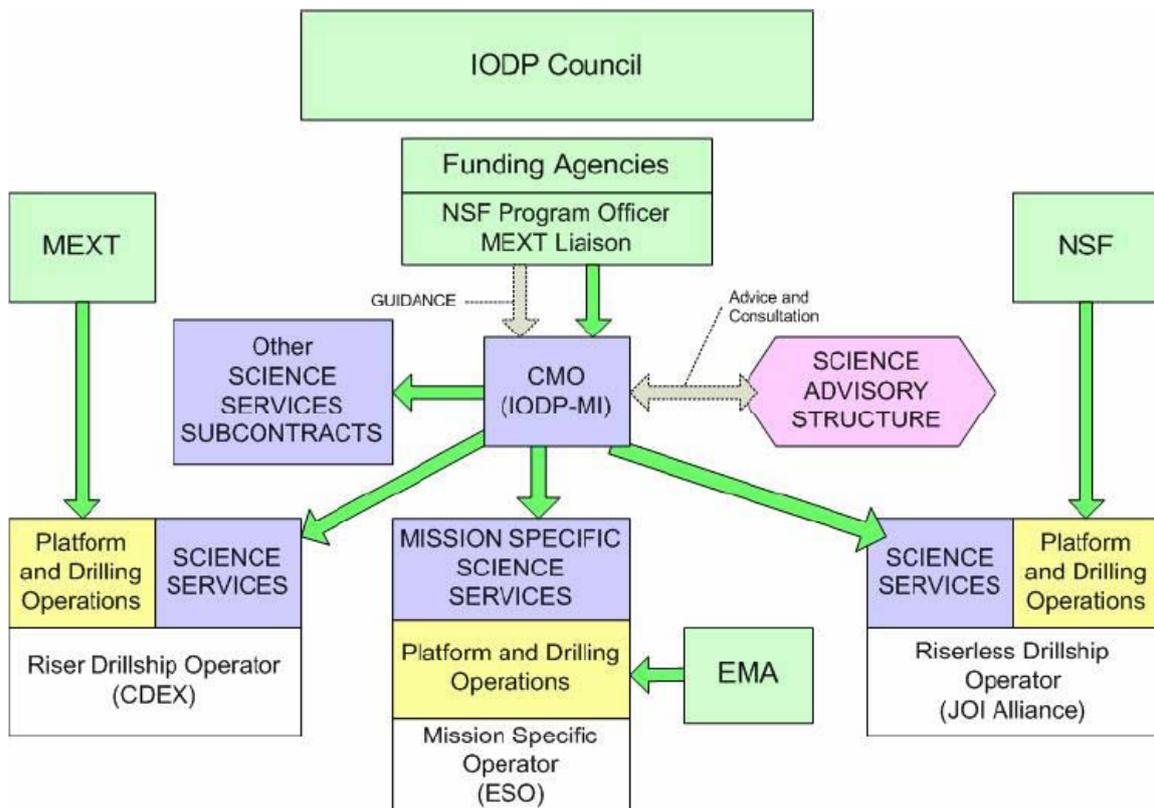


Figure 1. IODP management structure. The funding agencies consist of NSF and MEXT as the Lead Agencies; the ECORD Management Agency (EMA) as a contributing member; and the Ministry of Science and Technology (MOST, the People’s Republic of China) and the Interim Asian Consortium as associate members. Solid arrows indicate flow of funds. Dotted arrows indicate flow of advice.

Organizations and to other subcontractors according to the budgets outlined in IODP Annual Program Plans (APPs). Currently, IODP members are:

- the USA, represented by NSF;
- Japan, represented by MEXT;

- ECORD, represented by the ECORD Management Agency (EMA);
- the People’s Republic of China, 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).

NSF and MEXT are designated as Lead Agencies, the EMA is a Contributing Member, and the People’s Republic of China’s MOST and the Interim Asian Consortium are associate members.

IODP-MI has overall central management tasks and responsibilities for science operations. The Science Advisory Structure, supported by a planning office at IODP-MI, provides scientific advice. CDEX, the JOI Alliance, and the ESO manage their respective platform and drilling operations as well as core repositories, except for the Bremen Core Repository that is managed by the University of Bremen.

A fourth component of the IODP is the IODP Council, which provides governmental oversight for all IODP activities; assures effective planning, management, and operation of the IODP; and encourages and promotes broad international participation in the IODP. The Council serves as a consultative body reviewing financial, managerial, and other matters involving the overall support of the IODP.

1.2.1 IODP-MI – The Central Management Organization

The purpose of IODP-MI is to provide centralized, independent, unbiased, and cost-effective management, operations, and related activities for the IODP and to oversee, support, and approve the science plan of the IODP.

Governance and general management of the affairs, funds, and property of IODP-MI is vested in the IODP-MI Board of Governors. The Board has the power to authorize action on behalf of IODP-MI; make rules and regulations for IODP-MI’s management; create additional offices or special committees; and select, employ, or remove IODP-MI’s employees. The Board is responsible for approval and implementation of the IODP Annual Program Plan. The Board approves all grants and contracts.

IODP-MI is a single organization with two offices (**Figure 2**). The primary IODP-MI Office is located in Washington, DC, and serves as the headquarters and corporate office. The Sapporo IODP-MI Office, headed by the IODP-MI Vice President for Science Planning, is located in Japan. The Sapporo IODP-MI office is supported, in large part, via a subcontract to Japan’s Advanced Earth Science and Technology Organization (AESTO).

The *IODP-MI President* is responsible for all IODP-MI employees (senior personnel report to him directly) and the overall IODP-MI relationship with SAS, the IOs and the national/consortia program offices. He serves (non-voting) on the IODP-MI Board of Governors and SASEC, the executive committee of SAS. He constructs the IODP Annual Program Plan, obtains approvals from SASEC and the IODP-MI Board of Governors, negotiates the contract for its implementation with NSF (on behalf of NSF/MEXT), and is ultimately responsible for its execution.

The *VP for Science Operations* is responsible for oversight of IODP field operations and planning. The VP for Science Operations works closely with the IOs to develop implementation strategies to achieve the science objectives of the IODP. He chairs or co-chairs a number of Task Forces associated with Operations.

The *VP for Science Planning* is head of the Sapporo Office. He oversees the SAS Support group, is responsible for Data Management and Publications and is Editor-in-Chief of the journal *Scientific Drilling*. Together with the President, the Vice President for Science Planning represents the main interface between the international science community and the IODP. Advice on scientific matters related to SAS Executive Committee will be sought from the Vice President for Science Planning. He serves as an advisor to the Science Planning Committee (SPC) Chair. He oversees the AESTO subcontract for the Sapporo office and a number of subcontracts in data management. He chairs or co-chairs a number of Task Forces and coordination groups.

The *Senior Advisor to the President* has the role of advising the President with regard to liaison with MEXT, NSF, and other IODP funding agencies. The Senior Advisor also works closely with the President to encourage other nations to join the IODP and establish liaisons with other geoscience programs.

IODP-MI develops and manages IODP science operations and implementation plans (**Figure 2**). IODP-MI receives advice and recommendations from the Science Advisory Structure

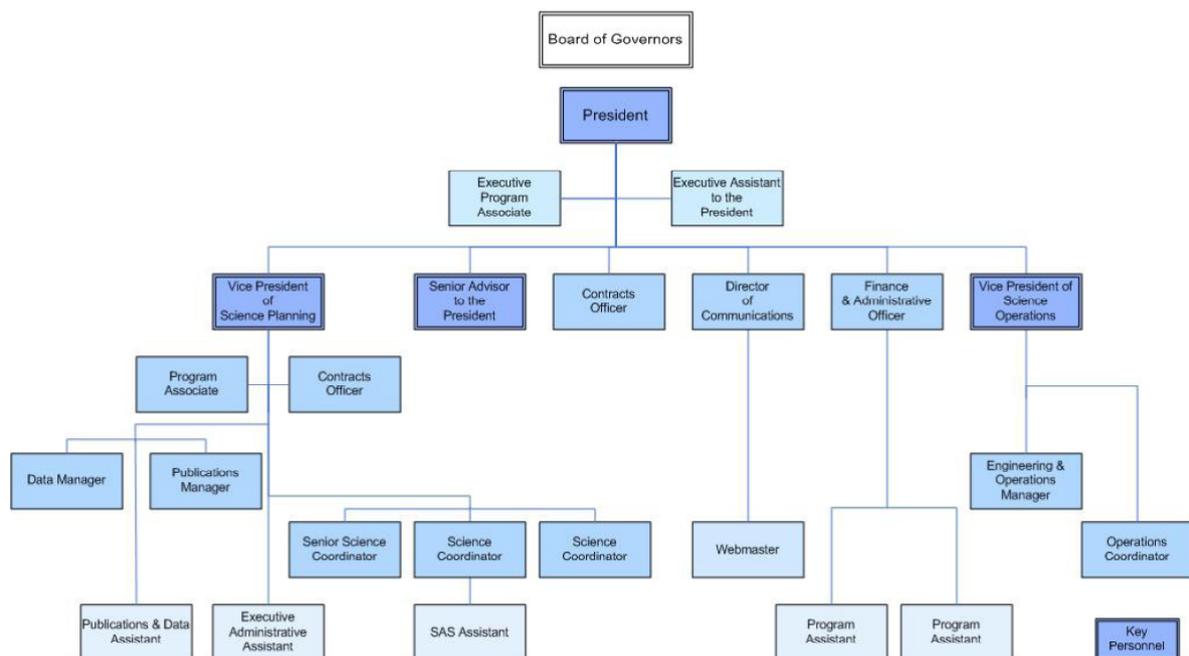


Figure 2. IODP-MI organizational structure.

(SAS) on scientific priorities and plans; requests plans from the Implementing Organizations in response to this advice; and works with the Implementing Organizations (IOs) and the Science Advisory Structure (SAS) to produce an integrated IODP Annual Program Plan (**Figure 3**).

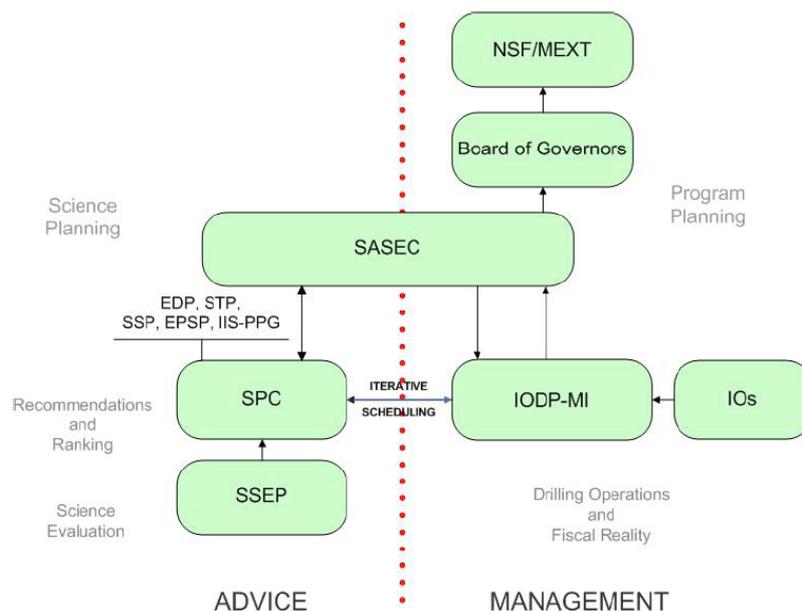


Figure 3. The flow of scientific advice towards expedition scheduling. Scientific advice to the IODP management structure occurs via advisory panels and committees. A Science Advisory Structure (SAS) led by the Science Planning Committee (SPC) provides scientific planning for the IODP. IODP-Management International, Inc. (IODP-MI) is the Central Management Organization (CMO) that will translate the scientific priorities of the ocean drilling community into program plans to carry out scientific IODP operations. It will do so based on advice from the international IODP SAS, and in consultation with drilling platform operators, or Implementing Organizations (IOs).

IODP-MI submits the IODP’s Annual Program Plan to the Science Advisory Structure Executive Committee (SASEC), which is the executive authority of the Science Advisory Structure (SAS) and a committee of the IODP-MI Board of Governors (BoG), for review and approval prior to consideration by the IODP-MI BoG and Lead Agencies. The NSF has responsibility for contractual approval of the Annual Program Plan, in consultation with MEXT. After approval by the Lead Agencies, 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 SASEC and the Implementing Organizations (IOs), as appropriate.

The Annual Program Plan includes a breakdown of total program costs, which include both SOCs and POCs. The Annual Program Plan is to be consistent with budget guidance provided to IODP-MI by the Lead Agencies for SOCs, and guidance from NSF, MEXT, and the ECORD Management Agency (EMA) for POCs. IODP-MI manages SOC funds provided under contract with the NSF. The NSF is expected to administer the contract with due consideration to the interests of MEXT and all other IODP funding agencies. POCs are supplied directly from individual funding agencies of the countries or consortia operating IODP drilling platforms (**Figure 1**): from MEXT to CDEX for operation of the riser vessel *Chikyu*, from NSF to the Joint Oceanographic Institutions (JOI) Alliance (JOI, Inc., Texas A&M University [TAMU], Lamont-Doherty Earth Observatory [LDEO] of Columbia University) for operation of the riserless vessel *JOIDES Resolution*, and from the EMA to

the ECORD Science Operator (ESO) for mission-specific platform (MSP) operations.

It is important to note that while IODP-MI plays a central and critical role in managing and coordinating the IODP, the proportion of IODP Annual Program Plan budgets that IODP-MI manages, i.e., SOCs, has been typically less than that for which IODP-MI doesn't manage, i.e., POCs. To date, SOCs have constituted 39% (FY04), 37% (FY05), 47% (FY06), and 50% (FY07) of the total Annual Program Plan budgets.

1.2.2 Implementing Organizations

Riser-equipped drilling capability by way of the vessel *Chikyu* is supplied by MEXT to the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), of which CDEX is a component. CDEX provides associated services and functions such as expedition staffing, logistics, program-specific engineering development and operations, shipboard laboratories, and geophysical and geochemical logging services aboard the riser vessel, involving acquisition, processing and interpretation of logging data. CDEX also provides administrative services to the Kochi University Center for Advanced Marine Core Research (CAMCR) repository.

Riserless drilling capability is supplied by NSF through a contract to the JOI Alliance, consisting of JOI, Inc. (prime contractor and overall management); Texas A&M University (TAMU) (subcontractor that operates a riserless drill ship 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 (geophysical and geochemical logging services aboard the riserless vessel, involving acquisition, processing and interpretation of logging data).

Mission-specific platform (MSP) drilling, sampling, and logging capability is supplied by the ESO, a consortium led by the British Geological Survey (BGS) (management, MSP operations and program-specific engineering development); the European Petrophysics Consortium (EPC) (petrophysical services) and the University of Bremen (analytical and repository services for MSP samples and cores). The ESO, through the National Environmental Research Council (NERC) / British Geological Survey (BGS), has a contractual arrangement with the EMA, affiliated with France's Centre Nationale de la Recherche Scientifique (CNRS), which collects funds from ECORD member countries. The University of Bremen manages the IODP core archive at the Bremen Core Repository (BCR) under a separate contract.

1.2.3 Science Advisory Structure (SAS)

The Science Advisory Structure (SAS) provides long-term guidance on 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), and several advisory panels and groups (**Figure 4**), which currently involve ~160 scientists from the international geoscience community in IODP member countries and consortia.

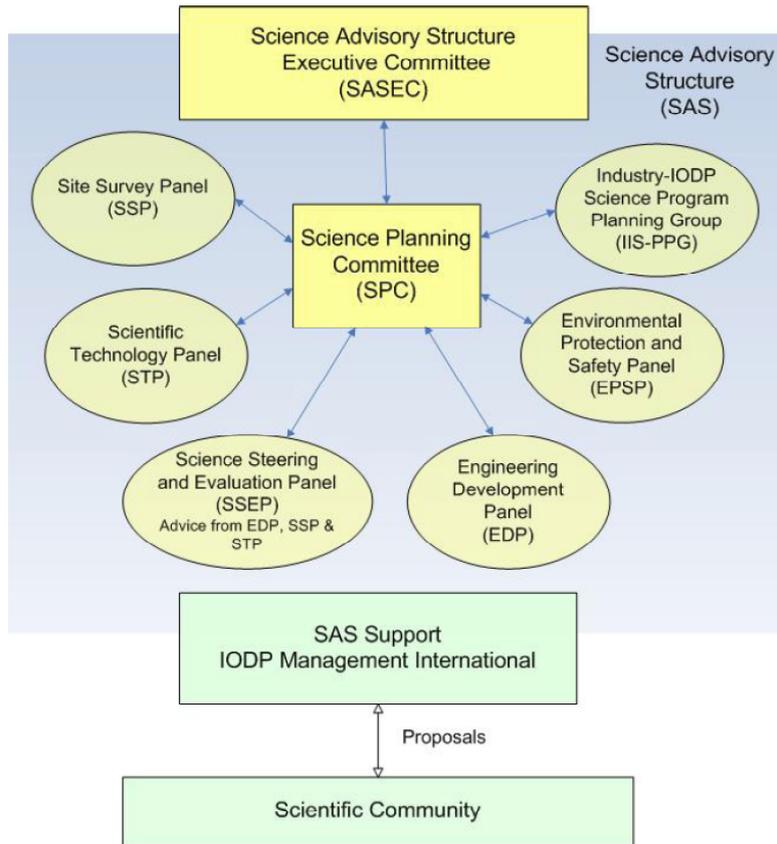


Figure 4. The IODP Science Advisory Structure (SAS).

The Science Advisory Structure Executive Committee (SASEC) is the Executive Authority of the Science Advisory Structure (SAS) and is composed of representatives from scientific organizations in IODP member countries. SASEC is also a committee of the IODP-MI Board of Governors (BoG). SASEC provides scientific oversight and long term planning. An important responsibility of the Science Planning Committee (SPC) is to prioritize the recommendations for the drilling sites. It considers recommendations from the various SAS advisory panels and is the focus of scientific planning for the IODP.

2.0 IODP Accomplishments

The first IODP expedition (Juan de Fuca Hydrogeology, Expedition 301) started on 27 June 2004, and the most recent expedition (Superfast Spreading Rate Crust 3, Expedition 312) finished on 29 December 2005. All 12 IODP expeditions to date, with objectives ranging from hydrogeology to oceanic crustal stratigraphy/tectonics to paleoceanography to sea level to gas hydrates, have been scientifically and operationally successful. As such, they are tributes to the community, the Science Advisory Structure (SAS), the Implementing Organizations (IOs), and IODP-MI. *Nature*, *Science*, and other international high-profile journals have already published key results arising from several expeditions. The FTTC anticipates that the ambitions of the IODP will be matched by the program's scientific achievements in the years to come *only* if program budgets grow to an adequate level.

Focusing on IODP-MI's performance, the FTTC identified numerous significant accomplishments. Outstanding achievements of IODP-MI include:

- **Establishment of IODP-MI as the central management organization of the IODP.** Starting from scratch less than three years ago, with senior personnel being hired over its first four months of existence, IODP-MI had important responsibilities and tasks in drilling platform management, SAS support, and scientific planning to fulfill from its inception. The establishment of IODP-MI is a testament to the efforts of dedicated IODP-MI management and staff.
- **Robust support of the goals of the IODP science plan and of long-range scientific planning.** Proposal-driven scientific planning workshops, strongly supported by IODP-MI, are focusing community attention and efforts on major scientific initiatives of the IODP science plan as well as developing long-range scientific plans. Management forums sponsored by IODP-MI are generating constructive ideas to advance IODP science, most notably the mission concept.
- **Effective and transparent scientific planning and proposal handling, including the nurturing, evaluation, and ranking process.** The proposal-driven, bottom-up nature of the IODP requires community cooperation and satisfaction with the entire proposal handling process, and IODP-MI has been effective in supporting and coordinating the entire scientific planning process and Science Advisory Structure. Notable contributions include establishment of a digital site survey data bank, development of an improved proposal database, and sponsorship of scientific planning workshops addressing high-priority themes of the IODP science plan.
- **Effective, flexible management of drilling platforms, interaction with the Implementing Organizations (IOs) on operational issues, and coordination of the Implementing Organizations.** In particular, the Operations Task Force (expedition scheduling) and Operations Review Task Force (post-expedition operational assessment), and Implementing Organization (IO) meetings (technical coordination) have been highly effective both in realizing their specific goals and in fostering integration of the IODP. The introduction of multiple-expedition programs and variable length expeditions are significant new and positive developments for the scientific ocean drilling community.

Other achievements include:

- **Effective management and coordination of publications and data, and progress towards a virtual IODP information services center.** The primary legacy of scientific ocean drilling is data and publications. IODP-MI responded to community advice on publications by implementing a publications policy, overseen by the Publications Coordination Group, that has achieved general community satisfaction. The initiation and production of the journal *Scientific Drilling* is a significant achievement. The implementation of a Sample, Data, and Obligations Policy, the establishment of a digital Site Survey Data Bank, and the development of the Scientific Earth Drilling Information Service (SEDIS) and a new IODP proposal data base, together with ongoing work of the Data Management Task Force and Data Management Coordination Group are making significant strides towards user-friendly, state-of-the-art access to all IODP data.
- **Progress towards implementing scientific assessment of expeditions and scientific themes.** Through close, interactive collaboration, IODP-MI and the Science Advisory Structure (SAS) have developed and are implementing formal scientific assessment for the first time in the history of scientific ocean drilling.
- **Positive reconstitution of the executive authority of the Science Advisory Structure.** Replacement of the Science Planning and Policy Oversight Committee with the smaller, more focused Science Advisory Structure Executive Committee has contributed to increased effectiveness and efficiency of the executive authority.
- **Progress towards implementing a roadmap for integrated engineering development in the IODP.** Through close cooperation and interaction with the Science Advisory Structure (SAS) Engineering Development Panel, IODP-MI is moving toward effective implementation of an engineering development strategy with the new Engineering Development Task Force.
- **Progress in establishing an identity for the IODP and producing outreach materials.** The introduction of an IODP logo, establishment of an IODP web site, sponsorship of a booth at major international scientific meetings, issuing of press releases, and initiation of a distinguished scientist lecture program are all positive developments for disseminating IODP scientific results to the broader scientific community, raising awareness of the program to the general public, and giving an integrated profile to the IODP.
- **Progress towards closer cooperation between the IODP and the International Continental Scientific Drilling Program (ICDP).** Establishment of the journal *Scientific Drilling*, jointly published by the IODP and ICDP, has fostered greatly increased IODP-ICDP communication. Co-sponsorship of two scientific planning workshops, fault drilling and Chicxulub, in FY06, has brought the respective communities closer together, and joint funding of the New Jersey Shallow Shelf expedition in 2007 is a highly positive development.
- **Sound financial and accounting management.** It is critical for a not-for-profit corporation to adhere to the highest standards of internal fiscal and accounting controls, and IODP-MI's clean record of multiple audits constitutes a testament to its excellent management of these areas.

3.0 IODP-MI Performance

The initiation of IODP-MI on 1 January 2004 after the IODP commenced in 2003, the geopolitical necessity at the time of establishing IODP-MI offices in both the United States and Japan without overlap of normal working hours, the complex international nature of the IODP, the legacies of previous scientific ocean drilling programs, and the requirement for IODP-MI to be functional at its inception have combined to produce major challenges for IODP-MI during its first three years of operation, which can be viewed as a **start-up phase**.

As noted in the previous section, IODP-MI has accomplished much since its inception, yet at the same time, performance can be significantly improved in several key areas over the short term, which could be considered a **consolidation phase**. As the IODP enters full operations with three platforms, IODP-MI approaches and tasks will change out of necessity.

The IODP is a large, complex program, and IODP-MI is a relatively small corporation. The FTRC believes that the full depth and breadth of scientific and administrative experience of IODP-MI Board of Governors members should be utilized in addressing strategic IODP issues and in overseeing IODP-MI.

Below, the FTRC details outstanding issues, findings, and recommendations, all with constructive intent. The FTRC recognizes that many of these issues have been or are being addressed by IODP-MI, as described in the IODP-MI self-evaluation (**Appendix E**). In such cases, the recommendations signify that the FTRC considers it particularly important that they be addressed with vigor during IODP-MI's **consolidation phase**.

3.1 IODP Funding

The single most important challenge to the success of the IODP involves program funding. Full implementation of the IODP's platform capabilities will have taken approximately four years from the inception of the program, primarily because funding delays and limitations, and it is not known if budgets from FY08 onward will support year-round operations of both riser and non-riser platforms. More importantly, highly nurtured, evaluated, and ranked scientific components have been scaled back, eliminated, or otherwise compromised from the majority of the first 12 IODP expeditions due to funding shortfalls. Current funding levels are not commensurate with achieving the goals of the IODP Initial Science Plan. Nevertheless, community and indeed global expectations for the IODP remain high despite the lack of financial resources that were anticipated prior to the start of the program. Increased financial and intellectual resources for the program are both highly desirable and critically needed. Non-traditional opportunities such as corporate sponsorships, industry (e.g., technology, resource, biotechnology, pharmaceutical) partnerships, and charitable foundations should be investigated.

<p>FTRC Recommendation 1: IODP-MI, in concert with the program's funding agencies, should pursue additional financial and intellectual resources for the IODP, including non-traditional opportunities, vigorously.</p>
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3.2 Mission, Organization, and Management

The FTTC devoted considerable attention to the mission, organization, and management of IODP-MI, in particular management styles; roles, responsibilities, and evaluation of personnel; the two offices; and task forces, forums, and groups. The FTTC is cognizant of the respective roles of the IODP-MI Board of Governors and the IODP-MI, i.e., that the Board has primarily strategic and oversight functions, whereas IODP implementation, management, coordination, and integration are responsibilities of IODP-MI. During the **start-up phase** of the IODP, the FTTC realizes that accomplishing critical tasks was the highest priority for IODP-MI. As a new organization, testing of different organizational and management models and modes was to be expected. Against this backdrop, the FTTC makes the following recommendations for IODP-MI's **consolidation phase**.

3.2.1 IODP-MI Vision and Mission

It is important both for the outside world and for all IODP-MI personnel to understand IODP-MI's purpose and goals. To that end, IODP-MI should have vision and mission statements.

FTTC Recommendation 2: Corporate vision and mission statements should be developed for IODP-MI, in conjunction with the IODP-MI Board of Governors.

3.2.2 Roles and Responsibilities

In a relatively small, dual-office organization with many tasks and responsibilities, it is important for everyone to understand their roles in the organization, and it is important for the outside world to perceive IODP-MI as a seamless organization. The FTTC favors formal, consistent systems of position analysis, position evaluations, performance evaluations, and upward mobility. The roles and responsibilities of IODP-MI staff must be codified in position descriptions, as the brief IODP-MI position outlines in annual program plans (e.g., **Appendix E**) are inadequate. Such codification does not impact flexibility. A consistent, formal annual performance review process for all IODP-MI personnel should be implemented. On the basis of these findings and input from IODP-MI staff in both offices, the FTTC believes that such improvements in IODP-MI human resources practices will benefit the entire program.

FTTC Recommendation 3: The roles, responsibilities, and performance metrics for all IODP-MI positions, and especially those for senior management positions, should be clearly and formally defined, and redefined whenever roles, responsibilities, and performance metrics change.

FTTC Recommendation 4: IODP-MI should implement a consistent, formal annual review process of all personnel.

3.2.3 Two IODP-MI Offices: Washington and Sapporo

IODP-MI is a single corporation with two offices, which were apparently established for geopolitical reasons as opposed to efficient management practice. Managing and coordinating a program as large and complex as the IODP from the two offices require well-defined management responsibilities and clear communication. The community perception, as well as the realization among IODP-MI personnel in both offices, that the offices function

independently, at times at cross-purposes with one another, is borne out by the FTTC's work. Poor communication between the offices appears to be a serious problem that threatens the effectiveness of the IODP. The FTTC believes that the IODP-MI, the Implementing Organizations (IOs), the Science Advisory Structure (SAS), and the greater IODP community would benefit from more consistent and integrated IODP-MI management, including clearly defined management responsibilities. Management must be improved for significantly better mutual understanding, team building, and communication.

The FTTC's recommendations encompass both long-term and short-term approaches to resolving problems. Dedicated annual senior management team meetings and/or retreats constitute a short-term approach, and the FTTC suggests that a single corporate electronic mailing list for all staff in both offices, taking advantage of all opportunities for face-to-face meetings of IODP-MI staff, and personnel visits and/or exchanges between offices may also improve communication.

FTTC Recommendation 5: Long-term consolidation of the two IODP-MI offices into one office and/or relocation of the U.S. office to a location with overlapping normal working hours with Japan should be seriously considered.

FTTC Recommendation 6: Frequent *dedicated* meetings of the IODP-MI senior management team are essential to address long-term IODP-MI vision and strategy; refine corporate goals; build corporate identity; clarify roles and responsibilities; assess accomplishment of mission; and foster team-building.

FTTC Recommendation 7: If irreconcilable differences within IODP-MI are adversely affecting the IODP following implementation of the FTTC's recommendations, changes in management should be considered.

3.2.4 IODP-MI Task Forces, Forums, and Groups

Task forces are constituted by IODP-MI to develop implementation plans on the basis of IODP needs. Some are standing and some are transient; some have well-defined tasks and others don't. Some have been highly successful, some less so. Considerable uncertainty and confusion persists in the community, including this FTTC, regarding IODP Science Advisory Structure committees, panels, and groups vis-à-vis IODP-MI task forces, forums, and groups.

FTTC Recommendation 8: The roles and responsibilities of all task forces should be clear to the community through public availability of detailed terms of reference. As appropriate, IODP Science Advisory Structure and Implementing Organization representatives should be involved in developing terms of reference for task forces, forums, and groups to ensure a sense of engagement and ownership.

3.3 Policies and Procedures

The three IODP Implementing Organizations and the global IODP scientific community have different histories, experiences, structures, cultures, languages, behaviors, styles, customs, frames of reference, assumed rules, beliefs, and values. Therefore, it is of the utmost importance for the IODP to have clear policies and procedures, both within the community that IODP serves and to the outside world. For example, problems arising in the request-for-

proposal (RFP) process may be attributed to lack of an IODP-MI conflict-of-interest policy. The FTRC is aware of IODP-MI's conflict-of-interest declaration form, but it has not proven adequate for some major subcontracting processes. It is also important that a relatively succinct, but comprehensive guide to the IODP be available to the community and the outside world. The FTRC strongly endorses IODP-MI's FY07 tasks of developing and preparing manuals for IODP policies and procedures and an IODP primer.

FTRC Recommendation 9: Proactive policy and procedure development engaging all involved parties (Implementing Organizations, Science Advisory Structure, external advice) is needed, e.g., for health and safety, media relations, expedition scientist guidelines, and conflict-of-interest for the request-for-proposal (RFP) and subcontracting processes.

FTRC Recommendation 10: IODP policies and procedures should be collated, and made publicly available in a manual and at www.iodp.org.

FTRC Recommendation 11: A succinct, yet comprehensive primer for the IODP should be publicly available at www.iodp.org.

3.4 Outreach and Education

Outreach and education are vital for sustaining and enhancing community and public support of scientific ocean drilling, and IODP-MI plays a critical role in integrating outreach. As the largest international program in the geosciences, and among the largest international programs in any scientific discipline, the IODP bears a strong responsibility to stakeholders in particular and the taxpayers of its 21 member nations in general. The FTRC recognizes IODP-MI's achievements in outreach, yet at the same time believes that it deserves more emphasis. Importantly, IODP-MI management of outreach should be more participatory/consultative and consensus building, and less authoritative. Aside from young scientist involvement in the IODP, the FTRC views education as primarily a national issue.

3.4.1 Outreach and Communication

A number of important outreach and communication tasks have been accomplished, such as inaugurating the journal *Scientific Drilling*, establishing a corporate identity for IODP-MI, instituting an IODP website, and having a presence at major international scientific meetings. However, the FTRC believes that current outreach and communication activities are not commensurate with the size and importance of the IODP. Potential synergies resulting from involvement and contributions of all IODP stakeholders could be much better realized in outreach and communications, hence the following recommendations.

FTRC Recommendation 12: A comprehensive, integrated outreach and communication strategy, with clearly defined and appropriate responsibilities for the two IODP-MI offices, Implementing Organizations, Science Advisory Structure, expedition scientists, and funding agencies, needs to be developed with the involvement of all stakeholders, and then implemented by IODP-MI.

The IODP website, as the primary portal to the world for the program, bears a first-order role in outreach and communication. Close involvement of both IODP-MI offices and the major website user constituencies throughout website redesign, beta testing, and further

development will both improve the website and increase a sense of community engagement and ownership.

FTRC Recommendation 13: Representatives across the spectrum of the user community and both IODP-MI offices should be solicited for input and fully engaged from the start in redesigns of www.iodp.org, beta testing, and further development of the web site.

3.4.2 Education

Education and outreach have different goals, and should be decoupled in the IODP. Each requires substantial resources, but education is primarily a national issue, as the 21 member countries of the IODP have distinct educational systems and unique educational requirements. The FTRC recommends devolving IODP education to the member countries, as was also suggested by the Ocean Drilling Program Performance Evaluation Committee VI in 2004 (**Appendix K**).

FTRC Recommendation 14: While outreach should be coordinated by IODP-MI, IODP member nations and/or consortia should handle education individually.

3.4.3 Student and Young Scientist Involvement and Diversity

Nurturing and encouragement of young scientists, including students, and promoting diversity are of great importance to a program the size of the IODP. The first 12 IODP expeditions have had strong young scientist contingents and diverse scientific parties (**Appendix G**), as have had the four scientific planning workshops sponsored by IODP-MI in FY06. Diversity, however, lags in the Science Advisory Structure (**Appendix I**).

FTRC Recommendation 15: IODP-MI, the Implementing Organizations, and Program Member Offices, and the Science Advisory Structure should continue to work together to foster increased diversity and involvement of young scientists in the IODP.

3.5 IODP and Other International Scientific Programs

The scientific goals of the IODP overlap with those of other international scientific programs, especially those of the International Continental Scientific Drilling Program (ICDP). Synergies with other relevant international scientific program should be realized. With respect to the ICDP in particular, solutions to fundamental geologic problems require drilling both offshore and onshore, and IODP-MI and the IODP Science Advisory Structure (SAS) have taken several significant steps (*Scientific Drilling*, joint workshops, joint funding of New Jersey Shallow Shelf expedition) that are fostering closer collaboration between the land and marine scientific drilling communities; much more, however, remains to be done.

FTRC Recommendation 16: The IODP and ICDP should integrate scientific evaluation of drilling proposals in the near future, and consider merging over the long term.

FTRC Recommendation 17: IODP-MI and the IODP Science Advisory Structure (SAS) should reengage with the International Ocean Network (ION), InterMARGINS, InterRIDGE, International Marine Past Global Changes Study (IMAGES), and ocean observatory communities.

3.6 IODP and Industry

IODP and industry share major interests involving science, technology, and education/training. Nevertheless, cooperation and collaboration between the IODP and industry is at a relatively low level, similar to the level of interactions between industry and previous scientific ocean drilling programs. IODP-MI has not yet devoted significant effort to improving IODP-industry interaction, and important potential synergies are not being realized.

Outreach to industry may be undertaken at different levels. One way is to connect with exploration and production management. The FTRC supports IODP-MI's suggestion of associate membership for industry in the IODP as a potential vehicle for engagement, possibly including an annual IODP-industry day. Another approach is to enhance interaction via IODP representation at major industry oriented conferences, e.g., American Association of Drilling Engineers (AADE), American Association of Petroleum Geologists (AAPG), Deep Offshore Technology Conference (DOT), European Association of Geoscientists & Engineers (EAGE), Offshore Technology Conference (OTC), Petroleum Exploration Conference & Exhibition (PETEX), Society of Exploration Geophysicists (SEG), Society of Petroleum Engineers (SPE). Industry representatives should be better integrated into scientific planning, engineering development, and operational planning. Despite significant differences between industry and IODP timelines, all potential avenues for IODP-industry interaction should be explored.

<p>FTRC Recommendation 18: IODP-MI should place significantly more emphasis on improving IODP-industry interactions. A comprehensive, multi-faceted plan for IODP-industry cooperation, including soliciting associate membership, needs to be developed and implemented by IODP-MI.</p>

4.0 IODP Science Advisory Structure

The IODP Science Advisory Structure (SAS) is composed of scientists and engineers designated by and representing IODP members. Its purpose is to provide long-term guidance on scientific planning for the IODP, and to recommend annual science and engineering plans based on proposals from the international science community. Community-based science advice has been a core component of scientific ocean drilling since 1968, and organization of the structure supplying that advice has evolved significantly in the ensuing four decades. Nevertheless, the size and complexity of the IODP dwarf those of the DSDP and ODP, and these aspects, together with experience gained during the IODP's **start-up phase**, suggest that further evolution may be required for effective, efficient provision of advice to meet IODP demands when the program is fully operational.

The IODP SAS currently has 158 members, representing 21 nations, who serve on two committees, five panels, one program planning group, and one detailed planning group (**Figures 4, 5**). Each Science Advisory Structure (SAS) committee, panel, and group typically meets for 1.5 to 4 days twice a year; IODP-MI personnel, IO representatives, funding agency representatives, and other non-members generally attend each Science Advisory Structure (SAS) meeting.

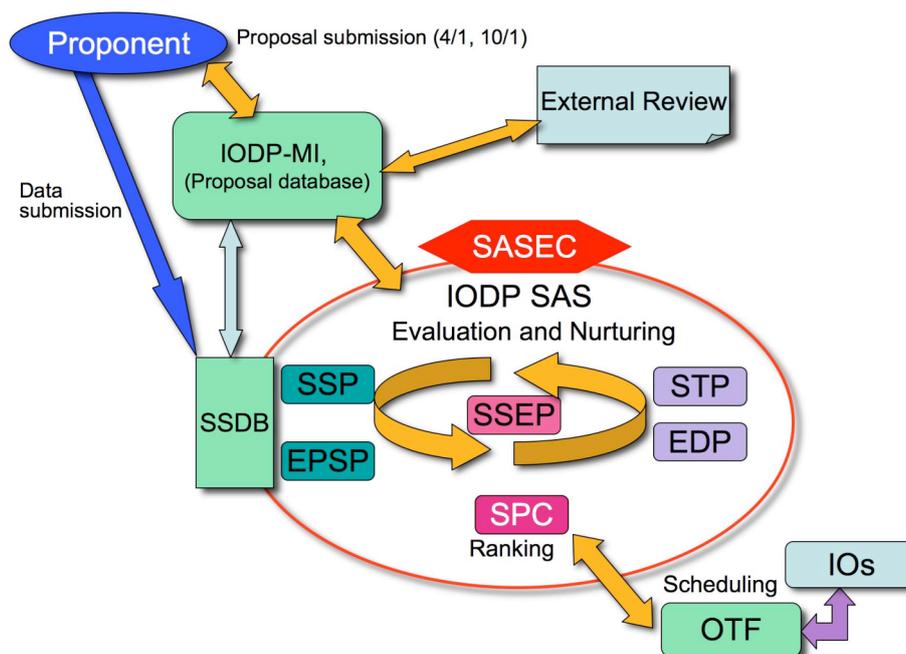


Figure 5. The IODP proposal handling process. SAS: Science Advisory Structure; SSEP: Science Steering and Evaluation Panel; SPC: Science Planning Committee; SASEC: Science Advisory Structure Executive Committee; SSP: Site Survey Panel; EPSP: Environmental Protection and Safety Panel; STP: Scientific Technology Panel; EDP: Engineering Development Panel; SSDB: Site Survey Data Bank; OTF: Operations Task Force; IOs: Implementing Organizations. See **Appendices G, H, and I** for expedition, proposal, and Science Advisory Structure statistics, respectively.

In FY06, 16 Science Advisory Structure (SAS) meetings had 604 total attendees, both members and non-members. Taking into account the lengths of each meeting and a day of travel on each side, but no preparation time for each meeting, human resource requirements for the Science Advisory Structure (SAS) in FY06 totaled 3207 person-days. Assuming an average salary/fringe/benefit figure of \$450/workday/person, the total FY06 human resource

cost of the Science Advisory Structure (SAS) was \$1.4 million. Assuming an average transportation/lodging/meals/incidentals figure of \$2000 per person per meeting, the total FY06 travel cost of the SAS was \$1.2 million. Thus, an estimated \$2.6 million of resources are allocated to the Science Advisory Structure (SAS) annually, the bulk of which is not contained in IODP Annual Program Plan budgets, because the Science Advisory Structure (SAS) is dominantly funded by the national programs (travel) and individual SAS member institutions (salary) of the 21 IODP member nations.

4.1 Scientific Advisory Structure Coordination

The committees, panels, and planning groups of the IODP Science Advisory Structure (SAS), as well as workshops sponsored by IODP, are closely linked, thereby requiring close coordination. Until early 2006, the Sapporo office supported all coordination; during 2006, Science Advisory Structure Executive Committee (SASEC) and IODP-MI workshop support and coordination were established in the Washington office. The FTRC believes that this division of responsibilities for scientific planning is not in the best interests of the IODP, as integrated scientific planning lies at the heart of the IODP.

FTRC Recommendation 19: Coordination and support of IODP Science Advisory Structure committees, panels, planning groups, and IODP-sponsored workshops should be undertaken from the same office.

4.2 Scientific Advisory Structure Review

The FTRC, cognizant of the ongoing work of the Science Advisory Structure Executive Committee (SASEC) Science Advisory Structure (SAS) Working Group and of ongoing discussions for a more thorough evaluation and review of the SAS further in the future, did not focus significant attention on the SAS. Nevertheless, given the complicated, non-linear proposal nurturing and evaluation process involving many scientists (**Figure 5**), the potential for increased efficiency and effectiveness, as well as for improved cost:benefit, of the SAS appears to be high. However, the FTRC believes that it is vital for that IODP that both the major tangible and intangible benefits of the SAS, such as community education and building, are sustained to the greatest extent possible.

FTRC Recommendation 20: A dedicated review committee that includes a significant number of external members should comprehensively evaluate the efficiency, effectiveness, and cost:benefit of the IODP Science Advisory Structure.

5.0 IODP Council

The IODP Council has oversight and consultative roles in the IODP, and occupies a prominent position in diagrams of overall program management structure (e.g., **Figure 1**). In contrast to IODP-MI, which manages a minority proportion of total program costs that are commingled Science Operating Costs (SOCs), the IODP Council represents the funding sources for 100% of total program costs, i.e., SOCs, Platform Operating Costs (POCs), and the national/consortia programs. This suggests that the roles and responsibilities of the IODP Council in the overall program could be better defined.

<p>FTRC Recommendation 21: Given the relative fiscal responsibilities of IODP-MI and the IODP Council in the overall program, the roles and responsibilities of the IODP Council in the program, particularly with respect to Annual Program Plan approval, should be clarified.</p>

6.0 Persistent and Overarching Scientific Drilling Issues

The FTRC identified several long-standing challenges and issues that were also faced by the ODP and DSDP. While the FTRC realizes that IODP-MI cannot resolve these issues alone, and is making efforts to address them, the FTRC also believes that significantly more focus could be placed on each.

6.1 Integrated Site Characterization and Drilling

Integration of drill site characterization, primarily from geophysical data, with drilling, sampling, and logging is mandatory in industry. A rule of thumb is that 10% of an integrated characterization-drilling project budget is allocated to characterization, because only integration affords optimal drill site location selection and allows maximum scientific as well as economic payoff from drilling. With the IODP, however, as in previous scientific ocean drilling programs, geophysical site characterization typically is not integrated with drilling, sampling, logging, and observatories. Integration of drill site characterization with drilling is long overdue in scientific ocean drilling.

FTRC Recommendation 22: Drill site characterization and drilling should be integrated within the IODP; IODP-MI should provide financial support for integrated site characterization and drilling in addressing high-priority scientific themes and initiatives of the IODP.

6.2 Openness, Transparency, and Accountability

The culture of scientific ocean drilling, developed over more than 35 years of the Deep Sea Drilling Project (DSDP), Ocean Drilling Program (ODP), and Integrated Ocean Drilling Program (IODP), is one of openness, transparency, and accountability. The proposal-driven nature of the IODP requires the community the program serves to have high degrees of confidence in scientific planning, the IODP proposal process, pre-expedition planning, expedition execution, and post-expedition assessment. Openness, transparency, and accountability throughout the IODP are critical to sustain such confidence and support.

FTRC Recommendation 23: IODP-MI should strive for maximum openness, transparency, and accountability in all of its management, facilitation, coordination, and integration activities.

6.3 Management, Facilitation, Coordination, and Integration

IODP-MI manages a minority proportion of total resources allocated to the IODP; therefore, much of its role in the IODP involves facilitation, coordination, and integration via consensus building. During the **start-up phase** of IODP, IODP-MI has employed varying management styles with the Implementing Organizations (IOs) and the Science Advisory Structure (SAS). As the IODP moves into a **consolidation phase**, the most effective management styles, i.e., those involving consultation, participation, and consensus building, should be utilized to the maximum possible extent. IODP-MI should strive to broker solutions harmoniously and collaboratively, while engaging all involved parties, via enlightened leadership.

FTRC Recommendation 24: IODP-MI should endeavor to engage all stakeholders collaboratively via consensus building in all of its management, facilitation, coordination, and integration activities.

7.0 Summary of Recommendations

IODP Funding

FTRC Recommendation 1: IODP-MI, in concert with the program’s funding agencies, should pursue additional financial and intellectual resources for the IODP, including non-traditional opportunities, vigorously.

IODP-MI Vision and Mission

FTRC Recommendation 2: Corporate vision and mission statements should be developed for IODP-MI, in conjunction with the IODP-MI Board of Governors.

Roles and Responsibilities

FTRC Recommendation 3: The roles, responsibilities, and performance metrics for all IODP-MI positions, and especially those for senior management positions, should be clearly and formally defined, and redefined whenever roles, responsibilities, and performance metrics change.

FTRC Recommendation 4: IODP-MI should implement a consistent, formal annual review process of all personnel.

Two IODP-MI Offices: Washington and Sapporo

FTRC Recommendation 5: Long-term consolidation of the two IODP-MI offices into one office and/or relocation of the U.S. office to a location with overlapping normal working hours with Japan should be seriously considered.

FTRC Recommendation 6: Frequent *dedicated* meetings of the IODP-MI senior management team are essential to address long-term IODP-MI vision and strategy; refine corporate goals; build corporate identity; clarify roles and responsibilities; assess accomplishment of mission; and foster team-building.

FTRC Recommendation 7: If irreconcilable differences within IODP-MI are adversely affecting the IODP following implementation of the FTRC’s recommendations, changes in management should be considered.

IODP-MI Task Forces, Forums, and Groups

FTRC Recommendation 8: The roles and responsibilities of all task forces should be clear to the community through public availability of detailed terms of reference. As appropriate, IODP Science Advisory Structure and Implementing Organization representatives should be involved in developing terms of reference for task forces, forums, and groups to ensure a sense of engagement and ownership.

Policies and Procedures

FTRC Recommendation 9: Proactive policy and procedure development engaging all involved parties (Implementing Organizations, Science Advisory Structure, external advice) is needed, e.g., for health and safety, media relations, expedition scientist guidelines, and conflict-of-interest for the request-for-proposal (RFP) and subcontracting processes.

FTRC Recommendation 10: IODP policies and procedures should be collated, and made publicly available in a manual and at www.iodp.org.

FTRC Recommendation 11: A succinct, yet comprehensive primer for the IODP should be publicly available at www.iodp.org.

Outreach and Communication

FTRC Recommendation 12: A comprehensive, integrated outreach and communication strategy, with clearly defined and appropriate responsibilities for the two IODP-MI offices, Implementing Organizations, Science Advisory Structure, expedition scientists, and funding agencies, needs to be developed with the involvement of all stakeholders, and then implemented by IODP-MI.

FTRC Recommendation 13: Representatives across the spectrum of the user community and both IODP-MI offices should be solicited for input and fully engaged from the start in redesigns of www.iodp.org, beta testing, and further development of the web site.

Education

FTRC Recommendation 14: While outreach should be coordinated by IODP-MI, IODP member nations and/or consortia should handle education individually.

Student and Young Scientist Involvement and Diversity

FTRC Recommendation 15: IODP-MI, the Implementing Organizations, the Program Member Offices, and the Science Advisory Structure should continue to work together to foster increased diversity and involvement of young scientists in the IODP.

IODP and Other International Scientific Programs

FTRC Recommendation 16: The IODP and ICDP should integrate scientific evaluation of drilling proposals in the near future, and consider merging over the long term.

FTRC Recommendation 17: IODP-MI and the IODP Science Advisory Structure (SAS) should reengage with the International Ocean Network (ION), InterMARGINS, InterRIDGE, International Marine Past Global Changes Study (IMAGES), and ocean observatory communities.

IODP and Industry

FTRC Recommendation 18: IODP-MI should place significantly more emphasis on improving IODP-industry interactions. A comprehensive, multi-faceted plan for IODP-industry cooperation, including soliciting associate membership, needs to be developed and implemented by IODP-MI.

Scientific Advisory Structure Coordination

FTRC Recommendation 19: Coordination and support of IODP Science Advisory Structure committees, panels, planning groups, and IODP-sponsored workshops should be undertaken from the same office.

Scientific Advisory Structure Review

FTRC Recommendation 20: A dedicated review committee that includes a significant number of external members should comprehensively evaluate the efficiency, effectiveness, and cost:benefit of the IODP Science Advisory Structure.

IODP Council

FTRC Recommendation 21: Given the relative fiscal responsibilities of IODP-MI and the IODP Council in the overall program, the role of the IODP Council in the program, particular with respect to Annual Program Plan approval, should be clarified.

Integrated Site Characterization and Drilling

FTRC Recommendation 22: Drill site characterization and drilling should be integrated within the IODP; IODP-MI should provide financial support for integrated site characterization and drilling in addressing high-priority scientific themes and initiatives of the IODP.

Openness, Transparency, and Accountability

FTRC Recommendation 23: IODP-MI should strive for maximum openness, transparency, and accountability in all of its management, facilitation, coordination, and integration activities.

Management, Facilitation, Coordination, and Integration

FTRC Recommendation 24: IODP-MI should endeavor to engage all stakeholders collaboratively via consensus building in all of its management, facilitation, coordination, and integration activities.

Acknowledgements

The FTTC thanks IODP-MI, the Implementing Organizations, the Science Advisory Structure, and the scientific community for their cooperation and assistance with this review. The cordiality and hospitality of IODP-MI staff in Washington and Sapporo are gratefully acknowledged.

Appendices

Appendix A. Lead Agency (U.S. National Science Foundation (NSF) and Japan Ministry of Education, Culture, Sports, Science, and Technology (MEXT)) guidance for the First Triennium Review.

IODP-MI FY06 Three Year Review Overview

Objective

- Report on first 3 years of operations

Term

- Period of Review: FY2004-FY2006
- Review Process Timetable
 - Starts August/September 2006, ends December 2006
 - Contractually-required report delivered March 1, 2007 to NSF with immediate delivery to MEXT

Evaluation Committee

- Committee reports to IODP-MI BOG
- IODP-MI BOG sets specific procedures
- 7-10 members, none IODP-MI employees
- Some members external to IODP-MI BOG and IODP SAS

Suggested subjects

- IODP accomplishments during first three years, including lessons learned
- IODP-MI Management Performance
 - Corporate and management cooperation between Washington and Sapporo Offices
 - IODP-MI management of and cooperation with Implementing Organizations and other subcontractors
 - IODP-MI support of SAS
- SAS Structure

Appendix B. Topics for the First Triennium Review.

IODP-MI First Triennium (FY2004-2006) Review

REVIEW TOPICS

The committee will:

1. Evaluate major IODP-MI accomplishments.
2. Evaluate major lessons learned from IODP-MI activities.
3. Evaluate and suggest improvements in overall IODP-MI performance, including integration, efficiency, effectiveness, and cost:benefit.
4. Evaluate and suggest improvements in IODP-MI interactions with the Implementing Organizations (IOs) and Science Advisory Structure (SAS) where relevant, including:
 - 4.1. Operations task force.
 - 4.2. Definition of deliverables, contracting procedures, status, and lessons learned.
 - 4.3. Operations review task forces.
 - 4.4. Engineering/technology development.
 - 4.5. IO meetings.
 - 4.6. Project scoping groups.
 - 4.7. IODP management forum.
5. Evaluate and suggest improvements in IODP-MI interactions with other subcontractors, including:
 - 5.1. Site Survey Data Bank, including definition of deliverables, solicitation process, contracting procedures, status, and lessons learned.
 - 5.2. Data management, including definition of deliverables, solicitation process, contracting procedures, status, and lessons learned.
 - 5.3. Engineering/technology development, including definition of deliverables, solicitation process, contracting procedures, status, and lessons learned.
 - 5.4. Publications, both expedition-related and *Scientific Drilling*, including definition of deliverables, solicitation process, contracting procedures, status, and lessons learned.
6. Evaluate and suggest improvements in IODP-MI interactions with and support of the SAS, including:
 - 6.1. Scientific planning and coordination.
 - 6.2. Site characterization and approval.
 - 6.3. Engineering development.
 - 6.4. Scientific technology.
 - 6.5. Scientific assessment of expeditions.
 - 6.6. Policy development.

7. Evaluate and suggest improvement in IODP-MI interactions with the press and general public, including:
 - 7.1. www.iodp.org
 - 7.2. Education.
 - 7.3. Outreach.
 - 7.4. Cooperation with the IOs.
8. Evaluate and suggest improvements in IODP-MI policies and procedures/guidelines, including:
 - 8.1. Proposals.
 - 8.2. Conflict-of-interest.
 - 8.3. Environmental.
 - 8.4. Sample, data, and obligations.
 - 8.5. Staffing.
 - 8.6. IODP measurements.
 - 8.7. 3rd party tools.
 - 8.8. 2nd post-expedition meeting.
9. Evaluate and suggest improvement in overall SAS performance, including efficiency, effectiveness, cost:benefit, and comparisons with the International Continental Scientific Drilling Program (ICDP) and other international models.
10. Evaluate and suggest improvements in IODP-MI interactions with Program Member Offices (PMOs), including:
 - 10.1. Populating the SAS.
 - 10.2. Staffing expeditions.

In addition, to address IODP-wide issues, the committee will:

- A. Evaluate and suggest improvements in the IODP and pre-drilling site characterization activities.
- B. Evaluate and suggest improvements in cooperation between:
 - B.1. IODP and ICDP.
 - B.2. IODP and other international scientific programs.
 - B.3. IODP and industry.

Appendix C. Brief biographies of First Triennium Review Committee members.

Millard F. Coffin (Chair) is a marine geophysicist with interests in large igneous provinces, continental breakup, and subduction initiation. He has been involved in scientific ocean drilling since the 1980s, having sailed on ODP Legs 120, 183 (Co-Chief Scientist), and 192. Coffin has served as a member of the JOIDES North Atlantic Rifted Margins Detailed Planning Group (1991), JOIDES Lithosphere Panel (1992-1995), and the JOIDES Science Committee (1998-2001), and as inaugural Chair of the IODP Science Planning Committee (2003-2005). He also co-chaired the working group responsible for the IODP Initial Science Plan *Earth, Oceans, and Life*.

Olav Eldholm is a marine geophysicist with interests in large igneous provinces, passive continental margins, and plate tectonics. He has been involved in scientific ocean drilling since the late 1970s, having sailed on ODP Leg 104 (Co-Chief Scientist). Eldholm was a founding member of the 12-member European Science Foundation Consortium on ODP in 1986, and chaired its first Science Committee and Science Office. He has been a member of several panels and working groups, including the JOIDES Planning Committee (1986-1989) and JOIDES Executive Committee (1995-1998). Eldholm currently serves on the IODP-MI Board of Governors and Executive Committee.

Dan Evans is a marine geoscientist specializing in continental margin research, both geophysical and shallow drilling. He has been manager of the European Consortium for Ocean Research Drilling (ECORD) Science Operator (ESO) since 2003.

Jeff Fox is a marine geologist/geophysicist with interests in the tectonic processes that characterize the world encircling, mid-oceanic ridge system, and that creates the distinctive architecture of the oceanic crust. He has served on numerous panels and committees that have shaped the direction of scientific ocean drilling for more than 30 years. From June 1995 to September 2003, Fox served as the Director of Science Services for the Ocean Drilling Program at Texas A&M University. From October 2003 to the present, he has served as the Director of Science Services at Texas A&M University in support of the U.S. riserless drilling vessel in the IODP.

Yoshihisa Kawamura is a nuclear physicist who jumped to the hydrocarbon industry as a wireline logging engineer. He learned basic drilling, geology, geophysics, petrophysics, and multinational communication while working offshore. Since 2001 he has worked at the Center for Deep Earth Exploration at the Japan Agency for Marine-Earth Science and Technology, most recently as director of the Science and Planning Department.

Toshiyasu Nagao is a geophysicist who specializes in seismology and electromagnetism, focusing on earthquake prediction. He has been involved in scientific ocean drilling since the 1980s, having sailed on ODP Leg 113. Nagao has served as a member of the JOIDES Sedimented Ridges Detailed Planning Group (1988-1989), and currently serves on the IODP-MI Board of Governors, the IODP Science Advisory Structure Executive Committee, and the Japan Drilling Earth Science Consortium Executive Board.

Hisatake Okada is a paleoceanographer with interests in biogeography and ecology of calcareous nannoplankton, the Quaternary paleoceanography of the Pacific and Indian oceans, and Cretaceous oceanic anoxic events. He has been involved in scientific ocean drilling since the 1970s, having sailed on DSDP Legs 43 and 58, and ODP Legs 115 and 164.

Okada has served as a member of the JOIDES Atlantic Regional Panel (1986-1988) and Ocean History Panel (1990-1993).

Steve Scott is a geologist specializing in seafloor hydrothermal deposits and their analogous base and precious metal ores on land. He has been involved in scientific ocean drilling since the 1980s, having sailed on ODP Legs 128 and 193. Scott has served on the JOIDES Western Pacific Panel (1986-1989) and Planning Committee (1995-1999). He also directed the Canadian Secretariat of CanadaODP (1994-1999) and the Australia-Canada-Chinese Taipei-Korea (PacRim) ODP Consortium (1997-1999).

Eli Silver is a geoscientist with interests in marine geology & geophysics, active tectonics and remote sensing, collapse and associated tsunami generation of island arc volcanoes, and the modern tectonic setting of northern Papua New Guinea. He has been involved with scientific since the 1980s, having sailed on ODP Legs 124 and 170 (Co-Chief Scientist on both). Silver serves on the IODP-MI Board of Governors, the IODP Science Advisory Structure Executive Committee, and the Joint Oceanographic Institutions Board of Governors.

Mark Zoback is a geophysicist with interests in the forces that act within the earth's crust and their influence on processes related to plate tectonics, earthquakes, and oil and gas reservoirs. He has served as chair of the International Continental Scientific Drilling Program (ICDP) Science Advisory Group (2000-2006). Zoback is a Principal Investigator of the San Andreas Fault Observatory at Depth (SAFOD) project, which is part of the U.S. National Science Foundation's EarthScope Program.

Appendix D. Conflicts-of-interest for First Triennium Review Committee members.

Millard F. Coffin is lead proponent on IODP proposal 706, and co-proponent on proposals 623 and 709. He is lead proponent of the funded IODP-MI proposal for a workshop on ‘Large Igneous Provinces’ in 2007, and co-chaired the IODP-InterMARGINS workshop on Continental Breakup and Sedimentary Basin Formation in 2006.

Olav Eldholm is a member of the IODP-MI Board of Governors and of the IODP-MI Board of Governors Executive Committee, and chairs the IODP-MI Audit Committee.

Dan Evans works for the European Consortium for Ocean Research Drilling (ECORD) Implementing Organization, the ECORD Science Operator (ESO), as Science Manager, within the British Geological Survey (BGS).

Jeff Fox works for the United States Implementing Organization (USIO), the Joint Oceanographic Institutions Alliance, as Director, USIO Science Services, Texas A&M University.

Yoshihisa Kawamura works for the Japan Implementing Organization (JPIO), as Director of the Science and Planning Department, Center for Deep Earth Exploration (CDEX), Japan Agency for Marine-Earth Science and Technology (JAMSTEC).

Toshiyasu Nagao is a member of the IODP-MI Board of Governors and the IODP Science Advisory Committee Executive Committee (SASEC).

Hisatake Okada is Vice-Chair of the IODP-MI Board of Governors and a member of the IODP-MI Board of Governors Executive Committee.

Steve Scott is a co-proponent on IODP proposal 584.

Eli Silver is a member of the IODP-MI Board of Governors and the IODP Science Advisory Committee Executive Committee (SASEC). He is a co-proponent of the funded IODP-MI proposal for a workshop on ‘Addressing Geologic Hazards through Ocean Drilling’ in 2007.

Mark Zoback has no conflict-of-interest issues.

Appendix E. *Accomplishments, Lessons Learned, and Suggested Improvements*, prepared by IODP-MI for IODP-MI Review Committee Meetings in response to the following Review Committee request.

“...the committee requests that IODP-MI provide the results of an internal self-study or self-evaluation as part of the package. The results of the self-study, keyed to the list of review topics, will acquaint members of the committee with the composition and functions of IODP-MI as well as help IODP-MI appraise its strengths, weaknesses, goals, and future directions. The information should provide the information necessary for the review committee to provide an assessment of how successful IODP-MI is in fulfilling the IODP’s mission, how well it functions as an organization, the appropriateness of IODP-MI’s strategic vision of its future directions in the context of the IODP’s Initial Science Plan, and how IODP-MI intends to move to a higher level of achievement. Additionally, IODP-MI should address such questions as:

- Why does IODP-MI undertake its activities in the ways it currently does?
- Are current IODP-MI activities done in the best ways?
- Are all of IODP-MI’s current activities necessary?
- Do IODP-MI activities match up with any specified standards, metrics, or performance levels?
- What uncertainties and/or opportunities exist?
- In what directions is IODP-MI moving?
- Is IODP-MI providing the best management and coordination that it can?
- Is IODP-MI making the best use of available talents and resources?
- Is IODP-MI responsive to change?
- What are the limitations on improvements that IODP-MI wishes to make?

The above list should not be regarded as exhaustive or exclusive of any other major questions that IODP-MI may wish to address and for which to seek comment and advice.

The committee would very much appreciate receiving the results self-study in relatively concise form, ideally starting with brief introductions/overviews of the IODP/IODP-MI, their management/administrative/coordination systems, and their decision-making processes, a minimum of two weeks before the committee’s first meeting...”

IODP-MI First Triennium Review (FY2004-06)

Accomplishments, Lessons Learned, and Suggested Improvements



**Prepared by IODP-MI for IODP-MI Review Committee
Meetings**

**October 19-20, 2006, Washington, DC
November 5-6, 2006, Sapporo, Japan**

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1 OVERVIEW

IODP is a very exciting program, but it is complex. Complexities arise in a number of different ways. IODP is one of the very few international programs in which funding (from the U.S. and Japan, and also from the European Consortium, China, and South Korea) is not separately applied by each country or consortium to the program, but is commingled. To apply commingled funds in a way that satisfies the objectives of the different countries is a formidable and complex task. Another complexity is that the Funding Agencies, the Science Advisory Structure (SAS), the Implementing Organizations (IOs), and the various subcontractors all play vital roles in the program. IODP-MI's role as a central management organization has the task to put together a Program Plan, which must be responsive to the objectives and capabilities of all these entities. Thus, we have a matrix of complexity with the different supporting nations along one axis, and the different entities running the program along the other axis.

IODP was based on the foundation of DSDP, and more importantly, on the foundation of ODP. These have provided enormously useful platforms upon which IODP can base its activities. Almost all the members of the Science Advisory Structure (SAS) panels are ODP veterans, and the expertise they have provided, based on the previous experience of the U.S. Implementing Organization (USIO), has been invaluable.

At the same time, IODP is not ODP; it is an integrated program involving many international partners. To evolve ODP into IODP has not been a straightforward task. It has involved incorporating multiple cultures and methodologies, and on an operational level, ensuring that there are no inequities in dealing with the different Implementing Organizations.

In discussing the accomplishments of IODP-MI, we have taken the ODP activities as a base level and have principally described the accomplishments over and beyond what was routine in ODP activities. Also, IODP-MI cannot by itself claim all the accomplishments. These are accomplishments of all the IODP entities working together.

One of the most important tasks IODP-MI faced was establishing a mechanism for developing the Annual Science Plan (the schedule for drilling operations), which is the principal part of the Annual Program Plan. This has been done successfully by setting up an Operations Task Force (OTF), which is led by IODP-MI and which includes representatives from the Implementing Organizations and the SAS. OTF is tasked with obtaining advice on scientific priorities from the SAS, budgetary guidance from the funding agencies, information on logistical and technical capabilities from the Implementing Organizations, and then molding those elements into Annual Science Plans. By all accounts, OTF has very successfully incorporated the views and interests of all parties concerned.

Complementary to the Operations Task Force is the Review Task Force, which reviews each expedition's operations to focus on "lessons learned," and makes suggestions for improvement. It is generally recognized that the reviews undertaken by the Review Task

Force have been carefully studied by the IOs and have been of great benefit in the planning of future expeditions.

1.1 Long-Term Planning

Long-term planning is essential for a program with a decadal life. It is needed to fulfill the commitments of the Initial Science Plan and also to look for new and exciting directions. The Science Planning and Policy Oversight Committee (SPPOC), which was responsible for long-term planning, was hampered by lack of funds and staff support. IODP-MI stepped into the breach with a number of initiatives. Its Management Forum, at its May 2005 meeting, conceived the Mission concept, which has subsequently been refined and formulated. The Mission Implementation plan finally has been accepted (or is nearing acceptance) by the various program entities. Missions would be planned to highlight expeditions or groups of expeditions that the scientific community believes represent the most exciting and important scientific areas to which drilling can contribute. Mission planning has two additional objectives: 1) To include scientists who, for various reasons including cultural ones, are reluctant to propose an expedition on their own, but who would participate under the umbrella of a mission; and 2) to extend understanding of the Mission goals to the general public, and subsequently gain public support.

The Science Planning and Oversight Committee (SPPOC) had outlined several scientific topics for long-term planning, but did not have any specific plans on how to pursue those topics. IODP-MI, in its belief that Missions should have broad community support, proposed workshops to enlist such support. Each workshop was developed as a group that could potentially lead a mission. With this in mind, IODP proposed budgeting for four workshops in FY 2006, subsequently approved by the Lead Agencies. All of the workshops were cosponsored and cofunded by other entities. The Fault Zone workshop was cosponsored by ICDP and successfully held in Miyazaki, Japan; the Subseafloor Life workshop was recently held in Vancouver and was cofunded by JOI; the Mission Moho workshop was held in Portland, Oregon; and the Continental Break-Up workshop held in Pontresina, Switzerland, also had cosponsors. It remains to be seen how many of these workshops will lead to mission proposals, but a pattern is being set to enlist community support for missions (expeditions based on nonmission proposals will continue as before).

The workshops were approved by SPPOC and implemented by IODP-MI. This procedure opened a path through which the new Science Advisory Structure Executive Committee (SASEC) and IODP-MI can cooperate to further the program. In IODP-MI's approved FY07 budget, there are provisions for two more workshops, an International Distinguished Scientist Program, and two topical symposia. For all these, the approvals and selection of personnel will be in SASEC's court and the actual implementation will be IODP-MI's responsibility. We believe that this procedure is very healthy for the program and incorporates a method by which science priorities as outlined by SASEC will actually be implemented.

We also consider a number of other initiatives to be very important. These include integrated data management, which will involve making drilling data available at a single portal, regardless of which system an Implementing Organization used to generate and store the data. In addition, a new and all-digital site survey data bank has been established; an initiative to migrate legacy site survey data into this has been started, and a new proposal database is in the offing.

A new and entirely electronic format of IODP *Proceedings* has been defined and implemented, digital object identifiers implemented across all publications, and a new journal, *Scientific Drilling* has been published jointly with ICDP.

We also consider Education & Outreach to be a very important part of this program. Among other tasks, much effort has been expended in generating a website which not only provides information regarding IODP, but has links to websites of all the other IODP entities. The establishment (or continuation) of three core repositories located at College Station, Texas; Bremen, Germany; and Kochi, Japan was confirmed. Cores, including legacy cores (from DSDP and ODP), will be stored at these repositories; distribution will be on a geographical basis.

IODP-MI provides Science Operations Costs (SOC) funds to the Implementing Organizations. Although Work Breakdown Elements (WBEs) provide some degree of commonality, the disparities in the financial and administrative structures of the three organizations provide a big challenge. We are moving toward treating the three organizations in as uniform a manner as possible. A meeting involving the IOs in mid-November is expected to move the budgeting and work efforts toward further integration.

1.2 Implementation Mechanisms

IODP-MI is a relatively small organization, and can provide expertise only in a limited number of areas. For this reason, IODP-MI, in carrying out its tasks, has used the mechanism of “Task Forces.” These can be ephemeral or long-lived; they can have all permanent members, or a few permanent members, and the rest of the membership can be temporary. They can invite membership from various sources, including the IOs, SAS, industry and other experts. We have mentioned two of these task forces earlier; Operations Task Force and Review Task Force. In addition we have an Education & Outreach Task Force, a Data Management Task Force, and a Core Advisory Board, which functions as a task force. Two other task forces are in the process of being set up: Engineering Development/Borehole Observatories, as well as Quality Assurance/Quality Control (QA/QC). A Publications Task Force helped us setting up the new IODP Publications schema in 2004-05 and was subsequently dissolved. We have two IO–IODP-MI coordination groups that deal with data management and publications, respectively. Three additional coordination-group meetings on depth scale, VCD/Lithology, and micropaleontology were recently held by IODP-MI.

One task force deserving special mention is the Management Forum, which consists of the heads of the Implementing Organizations, the Program Member Offices (USAC, ESSAC, J-DESC), the chairs of SASEC and SPC, and key personnel of IODP-MI. The purpose of setting up this task force is to bring together the heads of the various entities involved in IODP to look at the program in an integrated fashion, rather than from the perspective of each separate organization. Funding agency members are invited to attend the Management Forum meetings as observers. The first meeting of the Management Forum held in Frascati, Italy was very successful. It conceived the Mission concept of proposing drilling expeditions.

1.3 Challenges Faced

We believe that starting from scratch, going through a trial-and-error process, and possibly making some mistakes, IODP-MI has put IODP management on a stable basis. However, a number of important challenges remain. In the following text, we discuss these challenges, “Lessons Learned,” and suggestions for improvement. We emphasize that these items concern not only IODP-MI, but all the IODP entities.

1. Perhaps the biggest challenge that IODP-MI faces, and perhaps all of IODP faces (SAS, IOs , PMOs), is reaching out to the broader scientific community in a number of disciplines. The participation of the broader scientific community as IODP develops further is vital, because in the end, the objective is not just to drill holes, but to solve scientific problems.
2. Clearly, the Implementing Organizations want to maintain their identities, but at the same time they are parts of an integrated program. This fact poses challenges in a number of areas, including platform operations, tools, data management, education and outreach, budgeting, etc. IODP-MI has successfully brought the IOs together in many of these areas, but much more needs to be accomplished. A meeting of IODP-MI and IOs in mid-November is scheduled to address the budgeting and work plan inconsistencies that have occurred in the past. .
3. Overall financing is in the province of the funding agencies. However, the increased price of oil, and consequently, other drillship-related requirements threaten to exclude expensive but important expeditions from the program. The possibility that one or both drillships may not be able to function for the entire year threatens the vitality of IODP. IODP-MI can offer to work with the funding agencies to look for other funding sources.
4. Currently, IODP-MI has two offices, one in Washington, DC, and one in Sapporo, Japan. There have been difficulties owing to the distance between the two, especially with regard to time zones. Differing management styles further contribute to an overall impression of two separate organizations. For IODP-MI to succeed, however, it is vital that these two offices work as a single organization, with a single method of operation.

5. Relationship with industry has been specifically mentioned in the Initial Science Plan, both at the participating scientist level and at the management level. Although industry scientists have participated in a few expeditions, IODP-MI has not yet established a meaningful relationship with management in industry. To do so is an important goal.
6. IODP-MI has just begun to take meaningful steps in engineering development, in serious discussions with the SAS Engineering Development Panel (EDP) and with the establishment of an Engineering Task Force (EFT). As IODP takes on Complex Drilling Projects as part of Missions, the role of engineering development involving IODP-MI, EDP, and the IOs is going to become increasingly challenging.
7. USIO, CDEX, and ESO use different data management systems. A start has been made to devise metadata systems by which data obtained through drilling will be available at a single portal. Much progress needs to be made in order to make this goal a reality.
8. An important new step has been taken with the start of a new journal, *Scientific Drilling*, published in cooperation with ICDP. Steps to have the scientific articles peer-reviewed need to be taken, which will greatly increase the importance of this journal.
9. Harmonizing the E&O activities of the various entities has proven exceedingly frustrating, in part because the E&O officers serve the outreach agendas of two masters--their own institutions and IODP-MI. We realize that informing the scientific community and the general public – quickly, unambiguously, and accurately in three continents and in multiple languages – is an ambitious goal, but one that needs to be achieved.
10. Navigating the Conflict of Interest (COI) waters can be extremely treacherous. We need to be very careful that the entities that provide us with advice and get involved in the writing of RFPs do not end up responding to those same RFPs. We have had to do some back-tracking in the past, but have hitherto avoided COI situations and need to continue doing so in the future.
11. IODP membership extends to a limited number of countries. However, extremely talented scientists reside in other countries that choose not to become members of IODP or cannot afford to do so. We are seeking mechanisms through which we can involve these scientists in IODP panels and expeditions without reducing the rights and privileges of scientists from the paying countries. Extending IODP membership to other nations has met limited success up to now, but we continue to work at it.

These are some of the lessons learned, which give rise to future challenges and directions. The follow text provides more detailed reporting on IODP-MI activities and achievements.

2 IODP-MI ORGANIZATION AND STRUCTURE

IODP-MI is a single organization with two offices. The *primary IODP-MI Office* is located in Washington, DC, and serves as the headquarters and corporate office. The *Sapporo IODP-MI Office*, headed by the IODP-MI Vice President for Science Planning, is located in Sapporo, Japan. The Sapporo IODP-MI office is supported, in large part, via a subcontract to Japan's Advanced Earth Science and Technology Organization (AESTO).

2.1 Personnel and Their Responsibilities

The *IODP-MI President* is responsible for all IODP-MI employees (senior personnel report to him directly) and the overall IODP-MI relationship with SAS, the IOs, and the national/consortia program offices. He serves on the IODP-MI Board of Governors, and on the Executive Committee of SAS, known as SASEC. He constructs the IODP Annual Program Plan, obtains approvals from SASEC and the IODP-MI Board of Governors, negotiates the contract for its implementation with NSF (on behalf of NSF/MEXT), and is ultimately responsible for its execution.

The *VP for Science Operations* is responsible for oversight of IODP field operations and planning, engineering development, core repository operations. The VP for Science Operations works closely with the IOs to develop implementation strategies to achieve the science objectives of IODP. He chairs or co-chairs a number of Task Forces and meetings associated with operations and engineering development including the Operations Task Force, the Operations Review Task Force, the Observatory Task Force, the Engineering Task Force, Project Scoping Groups, and the annual IO/IODP-MI meeting.

The *VP for Science Planning* is head of the Sapporo Office. He oversees the SAS Support group, is responsible for Data Management and Publications and is Editor in Chief of the journal, *Scientific Drilling*. With the President, he represents the main interface between the international science community and IODP. He provides advice on scientific matters related to the SAS Executive Committee; serves as an advisor to the Science Planning Committee (SPC) chair; oversees the AESTO subcontract for the Sapporo office and a number of subcontracts in data management; and chairs or co-chairs a number of Task Forces and coordination groups.

The *Senior Advisor to the President* has the role of advising the President with regard to liaison with MEXT, NSF, and other IODP funding agencies. The Senior Advisor also works closely with the President to encourage other nations to join IODP and to establish liaisons with other geoscience programs.

The *Director of Communications* is responsible for coordinating Education & Outreach with the IOs and the national organizations involved in IODP. The Director's tasks also include developing and monitoring the principal IODP web site, arranging IODP outreach events, cultivating media contacts, writing and coordinating press releases, and publishing IODP brochures. She oversees the webmaster and chairs the E&O Task Force.

The *Finance and Administrative Officer* is responsible for all aspects of accounting, human resources, office management, and in-house information technology needs. She is responsible for interacting with the independent auditors and works closely with the Contracts Officer on procurement and monitoring of contracts.

The *Contracts Officer* is responsible for the NSF contract, all subcontracts and managing RFP processes as needed. The Contracts Officer monitors reporting requirements for the NSF contract and all subcontracts, regulatory changes, and approves reimbursement requests under subcontracts.

The *Executive Program Associate* (DC) assists the President in scientific matters, including the preparation of presentations, liaison with the scientific community, and assembling information on activities related to, but lying outside IODP. In liaison with SASEC, she will be responsible for implementing IODP workshops, symposia, and the IODP Distinguished Scientist Lecture Program.

The *Executive Program Associate* (Sapporo) is the prime office liaison for all domestic activities and contacts, serves as the E & O liaison to the D.C.- based Director of Communications, assists the Vice President of Science Planning in performing his duties, including oversight of work flow, and assisting with planning and coordination of meetings, and Task Force meetings conducted by Sapporo-based staff.

The *Engineering and Operations Manager* assists the Vice President for Science Operations, particularly in coordinating and overseeing engineering development. He will also head the Project Scoping Groups.

The *Publications Manager* implements and oversees IODP policies in the area of publications; chairs the publications coordination group; administers related digital object identifiers (DOI). The publications manager is the managing editor of *Scientific Drilling* and is responsible for all aspects of production of the journal, including collaborative agreement with ICDP.

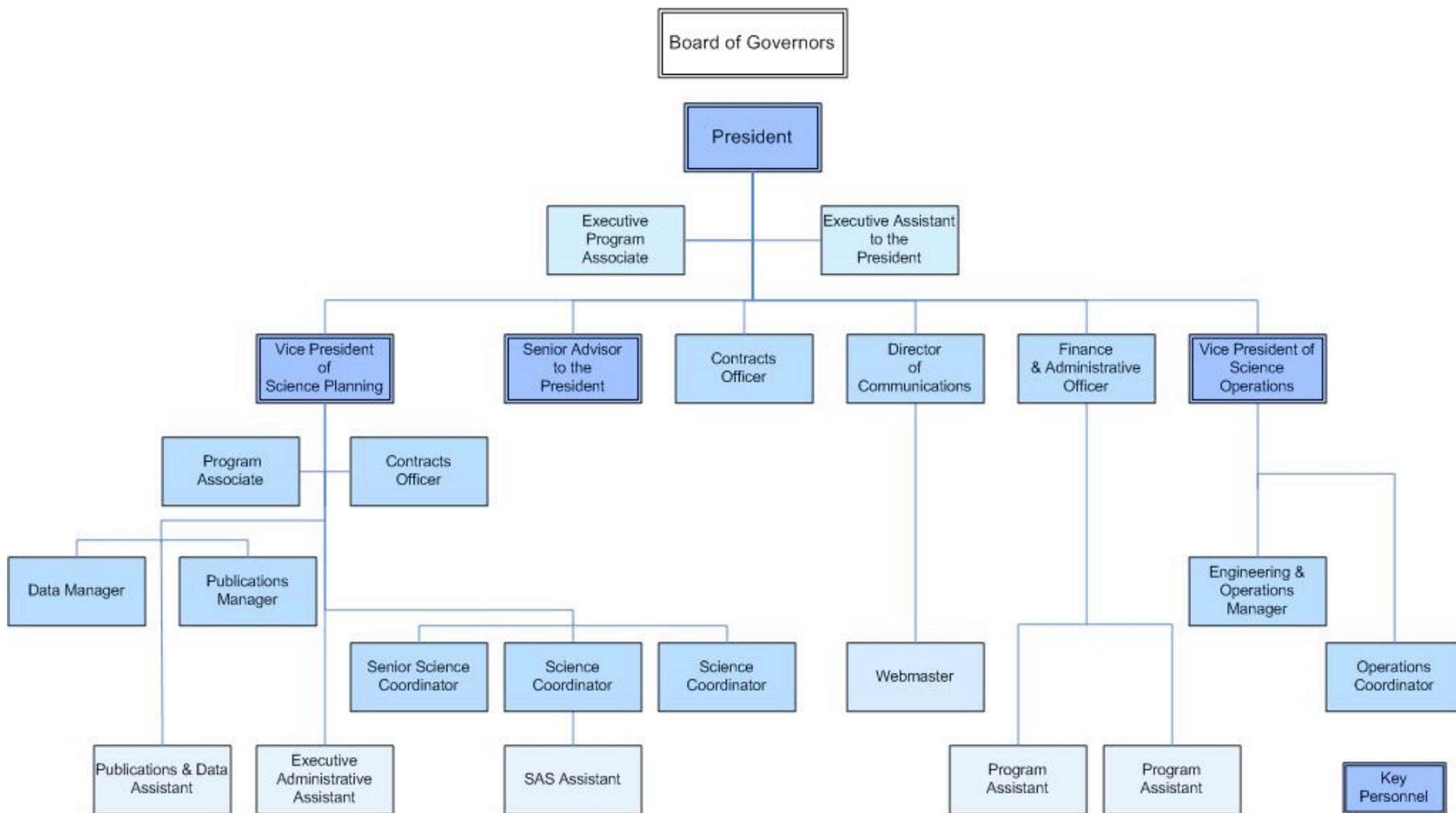
The *Data Manager* oversees and directs development of data management systems that meet IODP requests in this area and oversees proper maintenance of data archival (legacy) functions at the IOs. The data manager also provides specifications for RFPs regarding data management and leads the development of the program data portal including links between IODP data management systems and other large databases in Earth sciences. He also chairs task forces and coordination groups in data management.

The *Science Coordinators* provide SPC with support in all areas of SAS Support activities including, but not limited to: meeting coordination, meeting logistics, meeting approvals, drafting of agendas, preparing agenda books, providing meeting minutes. The coordinators also are responsible for the handling of drilling proposals, including receiving, filing, maintaining the proposal database, generating proposal statistics (theme, nationality), arranging for external peer review, summarizing panel reviews, and communications with proponents.

The *Operations Coordinator* supports the *VP for Science Operations* (a new position employed from FY2007) provides support for Operations and Engineering Development, including Task Force coordination, research, handling engineering development proposals, communication with IOs, and coordination of engineering and development budgets, tracking and reporting.

The *Webmaster* is responsible for day-to-day maintenance of the IODP web portal. She builds new content in coordination with staff managers, coordinators, and the Director of Communications, tracks web traffic, troubleshoots online operations, and provides regular updates to both online content and the web-based IT systems.

2.2 IODP-MI Organizational Structure



3 MANAGEMENT AND ADMINISTRATION

3.1 Finance and Administration

3.1.1 Accomplishments

Human Resources – The staffing of the Washington, DC office began with the hiring of the President and CEO, Manik Talwani, on January 1, 2004. At the end of FY 2006, IODP-MI has 14 positions, 13 in Washington, DC, and one in Sapporo, Japan. One position is filled with an outside contractor. Staff members in Japan (10 positions) are provided through a contract with AESTO.

A human resources manual was created. Benefits, such as health and dental insurance, a 401K plan and disability and life insurance were established during the first three years as the organization became eligible.

Finance – Dues from member entities funded operations for the first three months until the contract with NSF was signed and began on April 1, 2004. An accounting policies and procedures manual was created. An accounting software package was purchased and implemented.

Annual audits for FY 2004 and FY 2005 were completed by an independent audit firm selected through a bidding process. IODP-MI received unqualified opinions for both years. Four NSF quarterly reviews performed by DCAA have been completed with no findings.

Office Administration – IODP-MI established its office in Washington, DC in February 2004. After an extensive search and renovation of the new space, IODP-MI moved into its permanent office on October 1, 2004. With assistance from the University of Hokkaido, the office in Sapporo, Japan was established in April 2004.

Information Technology – Due to the small size of the office, IODP-MI determined that outsourcing the information technology function was the most cost-effective approach. IODP-MI contracts with an outside firm to provide remote assistance as needed and onsite assistance once every other week. The firm also provided the initial set-up of the onsite server for intraoffice networking and e-mail.

3.1.2 Lessons Learned

Based on input from independent auditors during the FY 2004 audit, we made several improvements to our internal controls. With such a small staff, it can be difficult to institute sufficient controls, but by utilizing staff not normally involved in the finance process, we have been able to establish strong procedures and internal controls.

Over the past year, we have done significant cross-training of staff in all four areas. In addition, we created “how to” manuals on the Finance and Administrative Officer’s position. In a small office environment, it is easy to rely on one person for numerous functions. Although this was time- consuming, the organization benefits from ensuring there is organizational knowledge of processes and procedures in case of staff absences or turnover.

3.1.3 Suggested Improvements

IODP-MI needs to continue working on improving fringe benefits for the staff. It is often difficult with our staff size to find vendors willing to cover the organization, as well as provide the best coverage. In addition, IODP-MI could improve its information technology documentation and disaster-recovery plan.

3.2 Contracts

3.2.1 Accomplishments

The U.S. National Science Foundation officially awarded the prime contract (OCE 0432224) to IODP-MI on March 31, 2004. The balance of the year witnessed the implementation of the first phase of the international partnerships between the NSF, MEXT, and other member countries that are sponsoring support for IODP-MI.

Within the first few weeks following the awarding of the prime contract, IODP-MI issued a subcontract to the Advanced Earth Science & Technology Organization (AESTO) to assist in the start-up, operation, and management of the IODP-MI office in Sapporo.

In November 2004, IODP-MI signed a pre-contract Memorandum of Understanding (MOU) with JAMSTEC. This MOU established a formal framework for the purpose of planning, coordinating, and implementing IODP-JAMSTEC pre-contracting activities until the SOC contract is signed with CDEX in FY07.

IODP-MI signed a subcontract with Bremen University in October 2004 to provide core repository services for IODP. While Bremen continues to be responsible for curating a number of the legacy DSDP and ODP cores made available from the NSF, new IODP core will be added to Bremen University’s repository for curation from Mission-Specific Platforms (MSP) and other IODP platforms as the program unfolds over the coming years.

In early 2005, IODP-MI concluded contractual negotiations with two other Implementing Organizations: the British Geological Survey (BGS) and the Joint Oceanographic Institutions (JOI). BGS undertakes MSP science operations on behalf of IODP; JOI – as the USIO – manages, coordinates, and performs activities and services necessary to support the

scientific research operations associated with the program.

Also in 2005, IODP-MI conducted a competitive procurement via a Request for Proposals (RFP) entitled, “Management of the IODP Site Survey Data Bank (SSDB).” SSDB’s fundamental mission is to receive, catalog, store, and distribute data necessary to support and review drilling proposals and to conduct drilling operations safely and efficiently. Following evaluation of the proposals received in response to the RFP, the Scripps Institution of Oceanography was selected as the SSDB contractor.

In 2006, IODP-MI issued a contract to CDEX to conduct the “Feasibility Phase” of the Long-Term Monitoring System. The final work product was delivered as scheduled on September 30, 2006.

In monitoring the performance of the above contracts and the host of lesser-dollar contracts IODP-MI has awarded to vendors, IODP-MI is primarily interested in progress toward successful completion of the specified requirements of the Annual Program Plan (APP) and the financial status of each sub-award.

Monitoring is an element of all major IODP-MI subcontracts and is done to ensure:

- Compliance with relevant federal government and NSF statutes, regulations, policies, and guidelines;
- Compliance with the terms and conditions of the subcontract;
- Responsible oversight of awarded funds;
- Efficient implementation of APP objectives, tasks, time-lines, budgets, and schedules;
- Identification of issues and problems that may impede APP or subcontract performance;
- Implementation of subcontract change orders or modifications as approved by IODP-MI.

The Contracts Officer (CO), in coordination with and work support from the Finance and Administrative Officer (FAO), primarily carries out the programmatic monitoring aspects of the subcontracts awarded by IODP-MI. According to the terms of IODP-MI sub-awards, contractors are required to submit periodic progress reports that summarize project activities in order to aid the central management organization in carrying out its responsibilities.

The CO is responsible for ensuring that subcontractors submit timely progress and financial status reports and contacts the subcontractor if reports are delinquent. Both the CO and the FAO monitor the fiscal aspects of all IODP-MI-awarded subcontracts.

The CO is the gatekeeper of all progress reports, financial reports, and subcontractor invoices. Reports, invoices, and supporting documentation are reviewed for programmatic and fiscal compliance, sent forward to the relevant IODP-MI program managers, and saved

to the master files (both electronic and hard copies).

Monitoring information is collected using such techniques as telephone calls, annual reviews of A-133 audit reports, site visits, and desk reviews (to ensure that the contract files are complete and the subcontractor is in compliance).

During the course of performance of every major subcontract (those recipients holding an IODP-MI subcontract directly pertinent to the APP process), IODP-MI reserves the right to make site visits to inspect or review the progress of work or the management control systems of the subcontractor or its lower-tier subcontractors.

IODP-MI conducts post-award site visits to all major IODP-MI subcontractors (Implementing Organizations, IODP-MI Sapporo operations, the Bremen Core Repository, and the manager of the Site Survey Data Bank).

Site visits are conducted to:

- monitor a subcontractor's administrative and financial capabilities;
- perform onsite programmatic and/or financial reviews;
- discuss any issues of concern and provide technical assistance that may be needed;
- tour the subcontracting facility; and
- receive a briefing on the status of the deliverables required under the APP.

Site visits also will assist IODP-MI in evaluating the success of the program and in identifying potential future modifications. Subcontractors will receive at least two weeks advance notice of a site visit from the IODP-MI Contracts Officer.

Once a visit is completed and assistance is provided, the CO will prepare a site visit report for the IODP-MI President.

3.2.2 Lessons Learned

Seamless communication and coordination are critical elements of the IODP-MI finance function. Both administrative functions are critical to success within the scheme of managing a major federal contract and maintaining tight and proper internal controls. This cohesive working relationship is never more apparent than at audit time. In both its FY04 and FY05 A-133 audits, the independent auditors found no reportable conditions in the internal controls over contract compliance, issued no findings relative to this major NSF award, and discovered no questionable costs during the course of both audits.

Additionally in 2006, IODP-MI was subject to a separate auditing process through NSF by the Defense Contract Audit Agency (DCAA). Since the majority of IODP-MI's financial transactions are contractual in nature, the results of the DCAA audit also indicate solid internal controls and highlight the synchronized relationship among IODP-MI's contracting,

administrative, and financial functions. As is the case with our A-133 audits, DCAA also did not disclose any findings or question any costs.

3.2.3 *Suggested Improvements*

The one improvement suggested here is a more consistent and coordinated line of communication with the funding agency regarding contracts and financial data. This applies primarily to the generation and maintenance of separate contract budgets by several managers in differing formats. Multiple lines of communication have the potential of conveying incorrect contractual and financial data points to the Lead Agencies, and tend to indicate a lack of internal coordination within the prime contractor's organization.

3.3 SAS Support

SAS support is provided in two parts: Support to the SAS Executive Committee is provided by the Executive Program Associate; Support to SPC and the various science panels and to the Site Survey Data Bank is provided by the VP for Science Planning and the Science Coordinators.

3.3.1 *SASEC Support*

The Science Planning and Policy Oversight Committee (SPPOC) was officially dissolved in early 2006 and replaced by the smaller Science Advisory Structure Executive Committee (SASEC).

SASEC convened for the first time July 11-12, 2006, in Washington, DC. (Chair, Susan Humphris; Vice Chair, Yoshi Tatsumi). Kelly Kryc, Executive Program Associate, provides support to SASEC.

3.3.1.1 Accomplishments

1. Approval of the FY2007 IODP-MI Annual Program Plan
2. A plan to review the scientific accomplishments of IODP
3. A plan to review the IODP Science Advisory Structure
4. A SASEC representative to the Mission implementation team was named. This team was to finalize the Mission Implementation Plan.
5. A plan to update the IODP Initial Science Plan by 2008
6. A geohazards workshop was approved for 2007.
7. North Atlantic climate change was selected as the first topical symposia to be held in 2007 in Bremen, Germany.

8. A small group was designated to conceptualize an IODP Distinguished Scientist Lecture Series

3.3.1.2 Lessons Learned

Coordination between SASEC and IODP-MI is essential and off to a good start.

3.3.1.3 Suggested Improvements

As SASEC is still in its infancy, there are very few improvements to recommend at this time regarding its functionality.

3.3.2 *SPC and Technical Panels*

3.3.2.1 Accomplishments

The VP of Science Planning and the science coordinators work closely with the SPC chair to plan and oversee meeting agenda development, prepare timely and informative minutes, track the flow of advice and recommendations, organize scientific reviews of expeditions, and address other SAS issues. The science coordinators attend all SAS meetings, oversee SAS membership, provide advice on program policies, procedures, and protocols, manage the entire proposal submission and review process, liaise between the SAS and the Site Survey Data Bank, and serve as the communication link between the SAS and the international scientific drilling community. More specific accomplishments include:

1. Transition from the interim Science Advisory Structure (iSAS) to the permanent SAS, formation of SAS support group with three science coordinators including expanded responsibility to oversee and handle site survey data within the IODP-MI Sapporo office by April 1, 2004.
2. Coordination and support of 45 meetings of SAS committees, panels, and planning groups including proposal distribution for 25 meetings, handling of 450 SAS proposal reviews and handling of nominations for co-chief scientists for 12 IODP expeditions.
3. Implemented and supported scientific review of eight IODP expeditions. This includes two steps: an IODP-MI reviewed assessment chapter within the Preliminary Reports and a joint SPC-IODP-MI review package based on SPC presentation by co-chief scientists and support documents.
4. Implemented procedures for authorizing SAS meetings and second post-expedition

meetings, and established schedule of membership rotation for SAS panels to maintain appropriate balance of experience and expertise within the framework of the IODP membership agreements (MoUs).

5. Organized two meetings with PMO representatives to engage the national groups/consortia in the more complex IODP.
6. Received and handled 194 new, revised, or updated drilling proposals; updated proposal submission guidelines; instituted a new site summary form with images of essential site-survey data to support reviews by SAS panels and external reviewers. Instituted a regular call for drilling proposals with notices in *EOS* in coordination with the IODP-MI Communications Director.
7. Provided online access to drilling proposals and other confidential documents through secure ftp server.
8. Initiated development of a new proposal database system that will include a MATRIX function advising proponents on site survey requirements; improved management of proposal and reviews archive; and underpin linkages to the SSDB and integration of site-survey data the proposal review process.
9. Established the new electronic SSDB as an online repository of scientific data supporting drilling proposals and expeditions, and initiated project to produce digital copies of old analog data holdings.

3.3.2.2 Lessons Learned

Integration of the handling of site survey data and proposal handling by the three science coordinators has proven very useful, and provided enhanced ability to advise proponents and the SAS on the site-survey status of individual proposals.

It has been successful to integrate SAS support, data management, and publications in one office to provide for a broader professional working environment of related fields of work and a better foundation for supporting the SAS and the science community.

The presence of three science coordinators at SSEP meetings has been well received by SAS and enables each of them to follow and assist in the discussion in the break-out groups and report to the VP of Science Planning.

The scientific review and nurturing process of proposals seems to work well in the current SAS and with a smooth and efficient interaction with IODP-MI. It has been more challenging to take full advantage of the technical panels, an issue that in part was addressed by the reorganization of the SAS in 2005.

Both steps within scientific review process (i.e., Preliminary Report section and SPC hearing) of expeditions results is useful, but the SPC hearing could be improved by delaying this to around/follow the second post-expedition meeting when the longer-term results start to emerge more clearly.

3.3.2.3 Suggested Improvements

The expedition co-chief scientists should present expedition results to SPC soon after the second post-expedition meeting and the presentation should include lists of planned studies/papers. A package of review documents (SPC comments, other comments, if applicable, ‘reprint’ of *Scientific Drilling* report) should be compiled on the IODP Web site

There is need for improvement in the coordination of proposal ranking and site survey readiness. The new proposal and site survey databases can support this need. The mechanics of this process should be included in the ongoing SAS review.

3.4 **Operations**

3.4.1 *Operations Task Force*

3.4.1.1 Accomplishments

The IODP-MI Operations Task Force’s (OTF, formerly known as OPCOM) primary function is to formulate the most logistically, fiscally effective operational plans to meet the objectives set forth in IODP’s 10-year science plan, prioritized by the SPC. Task Force members include IODP-MI Vice Presidents of Science Operations and Science Planning, three SPC members, IO representatives, and outside experts, as needed.

The scheduling strategy involves: (1) examining science plans for each proposal; (2) determining operational and environmental constraints; (3) developing a matrix that combines the SPC science plan with operational and environmental constraints and risk, operational days at sea, and transits; and (4) adding fiscal reality to viable options forwarded to the SPC. The Task Force meets two to three times a year with its major scheduling meeting occurring in June (following the spring SPC proposal rankings). OTF works closely with SPC to ensure that the scheduling option always represents highly ranked science.

At its yearly scheduling meeting, the OTF develops detailed scheduling options (i.e., specific dates of operation, port calls, transits, drilling options, etc.) for the fiscal year beginning ~16 months from the time of the meeting and a conceptual science plan (i.e., what proposals will most likely be scheduled but without specific dates, port calls, etc.) for

the fiscal year beginning ~28 months from the time of the meeting. This scheduling plan provides the IOs increased lead time to plan for long-term acquisitions and properly budget for the expeditions. For example, during its June meeting in 2007, the OTF will develop a detailed schedule for FY2009 and a conceptual schedule for FY2010.

3.4.1.2 Lessons Learned

The most difficult challenge for OTF was moving from a scientist-based and chaired operations panel (OPCOM) to one overseen by management. Considerable effort and discussion was required to develop a format that respected the priorities of the scientific community but allowed management to insert the realities of funding, logistics, and risk/benefit considerations into the scheduling process to ensure that the Annual Program Plan can be successfully implemented.

3.4.1.3 Suggested Improvements

OTF appears to be functioning well; no suggestions for major improvements are readily apparent from the IODP-MI viewpoint. Some minor changes with respect to meeting preparation and planning are needed. Now that we are in a mode where all platforms will be scheduled on a routine basis, it is important the IOs prepare and present the required information (schedule options, risks, benefits, transits, costs, etc.) in a similar format in order for OTF to properly compare and contrast operations, especially if it must determine which platform is most applicable for an expedition

3.4.2 *Project Scoping*

3.4.2.1 Accomplishments

Some proposals need Project Scoping Groups (PSGs) to *assess the state of readiness* of the drilling plans, tool and engineering development, engineering site surveys, etc. The OTF determines the level of scoping needed for an expedition or series of expeditions (e.g., Complex Drilling Proposals or Missions) and designates a formal PSG. Each scoping group consists of the IODP-MI Vice President of Operations or the IODP-MI Engineering & Operations Manager as head, one or two designated “Chief Project Scientists” and several project proponents to provide the scientific leadership necessary to plan aspects of the project. This PSG also has formal liaisons from the IOs and SAS and utilizes outside expertise (e.g., engineers) as needed. The PSG reports to the OTF on the state of readiness of the CDP.

If, after initial scoping the project is placed on the IODP operational schedule by the OTF, the PSG then becomes a formal Project Management Team (PMT), which *plans and coordinates* the project through its (usually) multi-year operations. Each PMT has a “core

membership” of either the Vice President of Science Operations or the Engineering and Operations Manager as the chair, one or two designated “Chief Project Scientists,” proposal proponents, IO representatives (engineers, staff scientists), SAS representatives, E&O representation, and outside engineers (as required). The PMT reports to the OTF on planning and implementation issues addressed by the team.

The OTF has established one PSG to date, the NanTroSEIZE Project Scoping Group. This group has now evolved into the NanTroSEIZE Project Management Team and is coordinating the joint NanTroSEIZE operations between CDEX and the USIO. This PSG/PMT has been instrumental in moving the multi-platform, multi-year NanTroSEIZE operation forward in a timely manner.

3.4.2.2 Lessons Learned

The NanTroSEIZE PSG/PMT process has been quite successful to date. Of critical importance to the process are: (1) the identification of key proponents willing and able to put in the time and effort to oversee this planning process in what can be a multi-year effort (2) providing resources (salary and travel support) for these Chief Project scientists so that they can allocate time to the project, and (3) identifying the PSG/PMTs far enough in advance to ensure the funds for support of all personnel and travel for not only the proponents but for IO, CMO, and SAS representatives.

3.4.2.3 Suggested Improvements

The NanTroSEIZE experience has provided IODP-MI with valuable experience in conducting these PSG/PMTs. Currently, financial support for proponents comes from a mixture of Program Member Offices and IODP-MI. Future PSG/PMTs could benefit by placing the funding responsibility for these PSG/PMTs directly with IODP-MI to streamline operational oversight and responsibilities.

3.4.3 *Operations Review Task Force*

3.4.3.1 Accomplishments

IODP-MI has initiated a formal review process for expedition Operations. The operations review is conducted by the IODP-MI Operations Review Task Force, generally around six months post expedition. Each Operations Review Task Force meeting consists of IODP-MI personnel (the President of IODP-MI and the Vice President of Science Operations), the expedition co-chiefs, representatives of the operators, three industry experts, and three

non-expedition scientists knowledgeable about the expedition objectives or goals. The Task Force review is based upon confidential reports submitted by the IO and expedition co-chief scientists. These operational reviews focus on "lessons learned" and "how do we do things better in the future?" Areas of discussion include pre-expedition planning, syn-expedition drilling operations, communications between scientists and operators, roles and responsibilities of scientists and operators, general procedures and policies (e.g., curation, communications), laboratory operations, etc.

Operations reviews for all IODP expeditions to date (except Expedition 311) have been completed. Each of these operational reviews results in recommendations that are compiled into a short summary report, which is posted on the IODP website. The operations review for Expedition 311 will be conducted via e-mail. Initial discussions with the Expedition 311 IO (USIO) and the co-chief scientists suggest that the majority of issues have been addressed at previous reviews. Once the confidential reports for this expedition are received (Oct 30, 2006), IODP-MI will review them to ensure major issues have been addressed. If not, IODP-MI may conduct a formal review for this expedition in the near future.

3.4.3.2 Lessons Learned

The reviews to date have concentrated on the USIO and ESO. The USIO operations were all very successful as they were able to build upon lessons learned from over 100 previous expeditions. However, numerous issues arose during these Phase 1 expeditions, with the majority related primarily to: (1) normal start-up issues associated with a new program, and (2) the short lead times associated with scheduling and planning for expeditions in Phase 1. These new start-up issues and short lead times had impacts on operations planning, technology development, staffing, laboratory operations, and in some cases, post-expedition sampling, publications, and media interaction. The USIO has begun to implement the recommendations arising from the operational reviews (and in many cases have already addressed them entirely).

ESO did not have the benefit of ~100 previous expeditions, and thus the first expedition (ACEX), while a major success, revealed a number of deficiencies in the ESO planning process and its interaction with the scientific community. The operations review of the second ESO expedition (Tahiti Sea Level) showed that ESO rectified the majority of the issues raised in the first review and that the "operations review process" was successful in identifying and correcting problems.

Clearly, the major lessons learned from the Operations Review process in this first phase of IODP operations have been the need to insure a proper planning period after the scheduling of operations and the need to formalize a myriad of IODP policies and procedures so that all entities, management, IOs and scientific community are fully aware of expectations placed upon them.

3.4.3.3 Suggested Improvements

The overall process used for the operations reviews appears to work well. IODP-MI has solicited input from each Review Task Force to identify areas where the process could be improved. Some of these changes are identified below:

- 1) Prior to each meeting, IODP-MI will evaluate the co-chief and operator reports and then write a preamble for the “briefing book” that identifies main issues from the reports and puts them into a context of relevant Task Force recommendations from previous reviews.
- 2) IODP-MI will include appropriate members of SAS (e.g., STP chair) when issues in either the co-chief or operator report clearly require input from SAS, or when potential recommendations might concern the SAS.
- 3) Establish a more formal follow-up procedure to assess how well the recommendations have been implemented.

3.4.4 *Observatory Task Force*

3.4.4.1 Accomplishments

The Ocean Bottom Observatory Task Force will (1) provide oversight of IODP borehole/observatory management; (2) develop observatory data usage and distribution protocols; and (3) provide advice on specific engineering/equipment issues. The Task Force will consist of IODP-MI personnel, community scientists involved in observatory science and management, equipment specialists/engineers, and will meet two times per year. This Task Force will also interact (e.g., liaise) with specific groups (e.g., the PSGs) involved in the implementation of CDPs.

Personnel for this Task Force have been identified and invitations to participate will be sent to prospective participants very soon. The Task Force should be in operation during the Fall of 2006.

3.4.4.2 Lessons Learned

None to date – task force not in operation yet.

3.4.4.3 Suggested Improvements

None to date – task force not in operation yet.

4 ENGINEERING DEVELOPMENT

4.1 Accomplishments

IODP-MI has limited resources in the area of Engineering Development, and therefore, outsources the actual development of all projects. IODP-MI has worked closely with the SAS, IOs, and Lead Agencies to develop a proposal-based, science priority-driven process for handling engineering development proposals for review, tracking, and possible funding utilizing the existing definitions, plans and recommendations that have been previously endorsed by the Lead Agencies and the Science Advisory Structure (SAS). This process will be in place Fall 2007.

The first IODP-MI Engineering Task Force meeting was held October 2-3, 2006, at the IODP-MI Washington D.C. office. This Task Forces provides IODP-MI with advice for the implementation of high-priority engineering development proposals.

The only major engineering development currently in the implementation phase is the Long-Term Monitoring System (LTMS) feasibility study (by CDEX). This feasibility study has just been completed by CDEX and evaluated by the IODP-MI Engineering Task Force. Recommendations for the future LTMS development (e.g., scope of work, potential budgets, RFP process and subsequent vendor, etc.) will be forthcoming shortly.

4.2 Lessons Learned

Until the IODP-MI engineering development proposal process has been fully implemented and engineering development projects have moved completely through the system it is difficult to determine what has gone wrong/right and what lessons can be learned from the process.

4.3 Suggested Improvements

Until the Engineering Development Proposal Process has been fully implemented and Engineering Development projects have moved completely through the system it is difficult to suggest improvements at this stage.

5 CORE CURATION

5.1 IODP Core Curation

5.1.1 Accomplishments

The IODP repositories (except the Kochi Core Center [KCC]) have been functional since the start of the program. The Bremen and Gulf Coast Repositories have received cores according to the geographic model developed by the OTF and approved by SAS. The East Coast Repository (ECR) and West Coast Repository (WCR) are not currently receiving core and plans are in process for them to close (see below). The KCC will begin to receive core in FY2007 as part of the ODP/DSDP core redistribution project.

A Core Curation Task Force has been established and consists of the IODP-MI Vice Presidents and three STP scientists. This Task Force provides input on curatorial policy to IODP and also acts as the review/advisory board for sampling disputes.

IODP-MI has coordinated training for CDEX curatorial personnel (ship-based and shore-based) by USIO and ESO personnel. All curatorial personnel will meet annually to discuss operational issues.

5.1.2 Lessons Learned

Fully integrated IODP operations will not begin until late 2007/early 2008. No significant operational issues have arisen that can not be addressed through the normal course of events and current IODP structure.

5.1.3 Suggested Improvements

No suggested improvements at this time.

5.2 DSDP/ODP Core Redistribution

5.2.1 Accomplishments

The DSDP/ODP Core Redistribution Project is underway. This project, which provides for the geographic redistribution of DSDP/ODP cores according to the same model prescribed for IODP cores, will most likely be finished in early FY2008. When finished, the West Coast Repository (WCR) at Scripps Institute of Oceanography, East Coast Repository (ECR) at LDEO, Columbia University will be closed and the BCR, GCR, and KCC will be

the three primary IODP core repositories.

5.2.2 *Lessons Learned*

No operational issues have arisen that could not be addressed through the normal course of events and current IODP structure.

5.2.3 *Suggested Improvements*

None at this time

6 DATA MANAGEMENT

6.1 Accomplishments

The main tasks related to data management are to integrate access to data collected by the IOs, provide integrated access to program publications, and to provide support for proposal and site survey data submissions and data (sample) collection at core repositories. The Scientific Earth Drilling and Information Service (SEDIS) will be the main deliverable as a web portal for accessing, searching, analyzing, and viewing distributed data for IODP and legacy data (ODP and DSDP). Specific accomplishments include:

- Creation of a Data Management Coordination Group (DMCG), consisting of representatives from all Implementing Organizations;
- Improving communications between the IOs and coordinating data management efforts;
- The Site Survey Data Bank (SSDB) development by Scripps Institute of Oceanography (SIO) and the San Diego Supercomputer Center (SDSC), managed by IODP-MI;
- Transfer of all site survey data archived at Lamont-Doherty Earth Observatory (LDEO) to SIO/SDSC, managed by IODP-MI;
- Oversight of two J-CORES tests by participants from the implementing organizations, one onboard the *JOIDES Resolution*;
- Creation of the Sample Materials Curation System (SMCS) requirements with all the IOs. The USIO is currently developing the system.

- Creation of a Data Management Task Force (DMTF), consisting of external expert members and IODP-MI staff with IOs liaisons. The DMTF provides advice about data management issues to IODP-MI projects.
- Creation of SEDIS Phase I requirements, presentations at international conferences, public hearing, request for proposals, proposals review and contract award (being processed now).
- Creation of the IODP metadata profile (ISO 19115 and 19139 compliant) and IODP metadata guide.
- Creation of the IODP measurements lists in collaboration with STP and IOs.
- Creation of the SEDIS Phase II and III requirements (in progress).
- Creation of the IODP user registry requirements to be developed by kk+w.
- Creation of new proposal database requirements and management of development by kk+w. First version being tested now.
- Creation of the MATRIX prototype by IODP-MI and requirements for site survey data expectation with site characterization; to be implemented by kk+w..
- Maintenance of a database of all DSDP, ODP, IODP drill hole locations and proposed IODP drill sites with links to their respective data and publications. Display results using Google Earth.
- Oversight of Depth Scale, VCD/Lithology and Paleontology meetings at TAMU, College Station and Houston (September 2006)

Subcontracts currently being managed by IODP-MI

- IO contracts (APP) for data managements issues;
- SSDB, continuing development by SIO/SDSC and testing by IODP-MI;
- New proposal database by kk+w, first version available in October 2007;
- IODP user registry, development by kk+w to start in October 2007;
- SEDIS, development starting in October 2007, expected online May/June 2007.

6.2 Lessons Learned

We have gained important experiences with regards to procuring proposals in the area of

data management (e.g., the SSDB, Proposal data base and SEDIS). Given the complex nature of both the subject and the program, this is not a trivial issue. We have to follow a process for open competitive RFPs that recognizes the input and the needs of all the partners (e.g., IOs, community, other programs), and at the same time honors the legal requirements for contract procurement, with attention to conflict of interest (COI) issues in particular. For example: In defining the needs and parameters for the overarching SEDIS portal, the IOs needed to be involved at a rather technical level to ensure compatibility with the data harvesting format applied by SEDIS. Consequently, IO liaisons to the Data Management Task Force reviewed these parameters and other work requirements that eventually were included in the RFP written by IODP-MI. This could have been perceived as a COI for the IOs.

The public hearing period was introduced in order to remove any perceived COI that could arise from the fact that the IOs had access to more detailed information prior to publication than other potential vendors. During the public hearing period, a draft RFP was published to enable everyone to review and make comments on it. Eventually, four bids (none from the IOs) were received in response to the SEDIS Phase I RFP.

The SSDB contract was procured through an open competitive bidding process based on a RFP, written and issued by IODP-MI. In preparing for this, IODP-MI took advice from the SAS in defining the parameters for the RFP. Three bids were received and reviewed by a group of unconflicted reviewers reporting their assessment to IODP-MI based on guidelines issued by IODP-MI and the four main success criteria stated in the RFP. For the recent SEDIS Phase I RFP a more expanded process was followed because of the potential COI problem outlined above:

- Internal requirements developed in cooperation with the IOs;
- Conference presentations;
- Data Management Task Force consultation about requirements;
- Public hearing of a draft RFP;
- RFP edits and publication of final RFP;
- Review of proposals by committee with majority of external and unconflicted members.
- Report to IODP-MI Vice-president for Science Planning (VP-SP)
- Final recommendation to the IODP-MI President from VP-SP and Contract Officer.
- President's approval followed by contract negotiation.
- Developmental start and supervision by IODP-MI.

Other challenges observed in the area of data management:

- Communication between the IOs and IODP-MI: Tying in management with the technical level within the IOs. Significant progress has been made through clarifying the ‘roadmap’ of communication within the IOs
- Different cultural and technical background/experience of the IOs posing a potential risk for slow progress. However, an environment of mutually beneficial exchange of expertise between the IOs is being established through IODP-MI initiatives such as coordination groups meetings (e.g., recent Depth scale, VCD/Lithology, Palaeontology meetings, September 2006)
- Coordination of the data management efforts between IOs is a significant challenge for IODP-MI, in part because of its very limited technical staff compared to the IOs, and in part because of de facto limited management power. Management essentially has to define the goals, seek consensus, and implement an overarching data portal.
- Complex development projects should be associated with statement of work that allow for detailed quarterly review of technical progress.
- How to ensure the maximum benefits of potential community/vendor resources within the process of procuring specific work contracts.

6.3 Suggested Improvements

The role of IOs and other advisors in formulating specifications for RFP needs close attention to avoid any situation of perceived or direct COI. Also, communication between IODP-MI, the technical and management levels at IOs will require continued attention, but no (further) structural changes are suggested in this area, provided face-to-face meetings at technical level continue to be pursued and attended/overseen by management at both IOs and IODP-MI.

While it is easier to get commitment from outstanding community members for a mail review process (RFP or proposals responding to RFPs), projects and/or proposals may require a face-to-face meeting of the review committee and IODP-MI. IODP-MI is planning to have at least two meetings of the Data Management Task Force to prepare for and review SEDIS Phase II and III development plans.

7 PUBLICATION

7.1 Accomplishments

IODP-MI as the program publisher, defines the publications policy (based on SAS advice) and oversees all scientific publication activities. Except for the journal *Scientific Drilling*,

IODP's scientific publications are produced and edited by the IODP Implementing Organizations, based on contracts with IODP-MI. *Scientific Drilling* is produced by IODP-MI and published with the International Continental Scientific Drilling Program (ICDP). The editorial board consists of four editors; three from IODP-MI and one from the ICDP. Specific accomplishments include:

- Formation of a Publication Task Force to provide advice on IODP publications;
- Established the format and structure of the IODP scientific publications, including the change to full electronic and web-based publication as well as publication of post-expedition research in the open, peer-reviewed literature.
- Formation of a Publication Coordination Group (IO and IODP-MI);
- Implementation of a publication production procedure that centralizes final editing and web posting of all scientific program publications in one place to increase efficiency and ensure consistency across IOs.
- Implementation a science review section in the *Preliminary Reports* series as part of continuous programmatic scientific review;
- Membership in CrossRef, implementation and management of digital object identifiers (DOI) in IODP publications;
- Development and implementation of the journal *Scientific Drilling* in conjunction with ICDP; *Scientific Drilling* is issued in print and online in PDF format twice per year. Three issues have been published as of September 2006 (7400 printed copies distributed).

7.2 Lessons Learned

Implementation of the IODP publications structure in principle has been smooth, in part due to the many years of publication experience provided by the USIO. However, it is too early to fully assess how successful the structure will be in the long term, in particular if there are any negative consequences of the shift to paperless publication of the IODP *Proceedings* and the shift to publication of all post-expedition research papers to the open literature. The latter potentially could impact capture of post-expedition research, in the worst case, the work itself.

Publication of scientific expedition reports from IODP in *Scientific Drilling* is increasing the visibility of IODP science to the broader community and has proven a useful background for the scientific assessment of expeditions by the SAS and IODP-MI. *Scientific Drilling* also has proven a strong vehicle for community building and may serve

as a model for data sharing and other joint services.

7.3 Suggested Improvements

IODP scientific publications continue to incorporate and expand on web-based information technology that increases reader access and allows stronger integration of text-based publications and data objects in distributed data repositories. The DOI system improves accessibility to scientific publications and provides a method to link directly to others online publications. IODP-MI intends to further integrate publications with program-generated data through the Scientific Earth Drilling Information System (SEDIS). Pending acceptance from other publishers, it may also allow program-based publications to be accessed directly from the IODP web portal.

IODP-MI is planning a one-server solution for all IODP publications. Currently publications are posted at various IO servers. This is another step towards a uniform IODP publication concept underpinning integration of publications with program-generated data; application of the XML format to publications is currently under investigation. The single, generic server also will remove the need for the parallel formation of full editorial and publication departments at each IO.

The IODP-MI Publications Task Force resolved that peer-review of program publications would not remove the notion of gray literature. However, given the success of *Scientific Drilling* and the partnership with ICDP, the pro and cons for expanding the editorship/review process for scientific contributions to *Scientific Drilling* should be reexamined. An external review board possibly could increase the scientific recognition of the journal. The issue has not yet been raised with our (journal) partner, ICDP.

8 EDUCATION & OUTREACH

8.1 Accomplishments

Numerous objectives identified by early Education & Outreach (E & O) planning workshops (Austin, Feb. 2004) were realized during this start-up period. All short-term recommendations were completed; more than half the functions identified as long-term objectives have been met or are underway. The following IODP-MI accomplishments represent fundamental communications building blocks for IODP:

- **Created program identity:** designed and adopted a program logo that has become a strong, recognizable symbol of IODP, widely used by program partners in newsletters, partner web sites, and other outreach materials.
- **Coordinated message development:** 1) developed program mission statement and

stock paragraph about IODP used in all IODP news releases and by most program offices to consistently represent the program; 2) provided common content resources to E & O staff for daily use and reference (online).

- **Developed and launched the IODP web portal** to comprehensively present IODP online. It connects many institutions and program resources that are extensions of IODP; creates a virtual meeting place and one-stop resource for scientists; serves as a reference and news source for scientists-at-large, the media, and the public. Special features such as a search engine and work rooms add value and make the site a destination. The web portal's growth has been so robust that a second re-design is currently in development to create new "doorways" based on site traffic, to customize the portal's content for targeted audiences who are frequent visitors.
- **Coordinated network of E & O specialists** to synchronize expedition promotion, news release, web content, and outreach to scientists. Have convened two annual meetings of this group (IODP-MI E & O Task Force), with a third in the offing (Oct. 12-13, 2006). This core group works as a unit and is responsible for outreach worldwide.
- **Facilitate regular communication to scientists**, (1) through the development of a bimonthly electronic newsletter for scientists, *IODP E-News*; (2) through highly visible outreach at scientific conferences: a) IODP exhibition booth at major scientific conferences was procured and used in cosponsorship with all three IOs. Strong IO demand for the booth structure has resulted in another structure being commissioned, so there are enough pieces to share and use simultaneously. Twice as many exhibitions are planned for FY07; b) two annual Town Hall Meetings, presented by IODP-MI, have been well-attended.
- **Built infrastructure to support media outreach worldwide**; introduced hundreds of journalists to IODP. The program went from an unnamed, unknown entity in news stories to a headline-making research organization in the space of 2 years. Use commercial web-based database to target media internationally, several online news distribution services targeted to science writers, send communications via e-mail and post to journalists regularly, and pitch stories in news rooms at science conferences.
- **Began measuring E & O initiatives and performance**: 1) track media coverage on a daily basis, 2) post weekly coverage reports online; 3) track web statistics to aid in planning growth and targeting users.
- **Initiated international program activities**: in addition to the integrated web site and the worldwide exhibitions; **began production of film documentary** about IODP to be completed in 2007; project has resulted in the completion of several short program DVDs that have been used at exhibitions and streamed online. It also expanded IODP's role in creating content for a world-class museum exhibition project-- that could lead to a second-tier museum outreach program.

8.2 Lessons Learned

- Very few people conduct IODP E & O worldwide and the skill sets and staff infrastructures that do exist vary greatly from IO to IO. This disparity creates difficulty in setting and reaching consistent outreach goals.
- E & O specialists wear many hats and are beholden to many masters, both within and outside IODP. This results in operations with highs and lows, little institutional memory of E & O resources, procedures, and style; and identifiable gaps in outreach.
- Scientists active in the program rarely identify themselves as IODP scientists or discuss the program with media representatives.
- Comparatively speaking, the IODP community is reticent about media outreach and most of its members are not well prepared to handle routine media interactions.
- E & O liaisons, as non-scientists, have not had direct or easy access to key groups of scientists, i.e. science parties and staff scientists, who are key to achieving success in program messaging and media relations.
- Each IO brings its own organizational agenda into the IODP tent. It has been difficult to sustain a team approach to E & O.
- Traditionally used communications tools such as standard media procedures and communications “trees” are not readily accepted by this scientific community. New strategies are required to eliminate reluctance towards mainstream communications tactics.
- It is difficult for many scientists involved in IODP to break away from ODP ways of doing things and to be open to new ways of handling program outreach, particularly in relation to media outreach.

8.3 Suggested Improvements

- IO management must ensure that each IO has in place the qualified personnel required to achieve E & O goals: in most cases, this means a trained/experienced communications professional with deep understanding of both the media and communications industries in their respective region/nation, and a commitment to achieving outreach success working collaboratively in an international program.

- Earmark enough funds so that each IO has both a communications and an education specialist. The two disciplines complement one another but are not the same.
- IODP leaders must make their E & O managers accountable for E & O performance as detailed in the APP. Lower performance than what is detailed in the APP or IO contracts should carry consequences to that partner's share of benefits in the program.
- As a general rule, have IODP leaders at IOs model collaboration and a team approach to integrated program plans.

9 ADDITIONAL INITIATIVES

9.1 Quality Assurance / Quality Control (QA/QC) Task Force

9.1.1 Accomplishments

In response to the SAS Scientific Technology Panel (STP) Recommendation 0601-05: STP recommends that IODP-MI coordinate QA/QC efforts across all platforms in cooperation with the IOs. IODP-MI has allocated resources to support a QA/QC Task Force.

Specifically, the Task Force is charged with defining a suite of laboratory guidelines to be implemented by the IOs for all IODP measurements, including but not limited to: ensuring that all data generated by IODP platforms are reproducible; defining the accuracy and precision thresholds for the data; establishing the calibration protocols for IODP laboratory instrumentation; and identifying appropriate Standard Reference Materials (SRMs) to use program-wide.

The QA/QC Task Force will consist of IODP-MI personnel (co-chaired by the IODP-MI Executive Program Associate), representatives from each of the IOs, scientific community stakeholders (including SAS representatives), and independent QA/QC experts. The Task Force will convene as often as required in FY2007 to accomplish their mandate prior to August 2007, when *Chikyu* and *SODV* commence IODP operations.

9.1.2 Lessons Learned

The task force has not yet met, and hence, no lessons learned.

9.1.3 Suggested Improvements

As the QA/QC Task Force has not yet met, there is very little to report on potential improvements - other than maintaining close communication between IODP-MI, SAS, and the IOs with respect to this critical topic.

9.2 Industry Liaisons

9.2.1 Accomplishments

The Initial Science Plan (ISP) prescribes the following, “The strategy for developing IODP partnerships with industry is focused in two areas. The first is to begin working with industry researchers to develop drilling proposals that address the high priority science objectives of IODP, as well as meet industries’ high priority research needs. The second is to establish regular communication with the executive levels of industry to ensure a long-term and sustainable participation of industry researchers in IODP.”

While the first of these areas has been carried out to a limited extent by having industry researchers participate in IODP drilling expeditions, the second area has not been realized.

The Industry Liaison Panel (ILP), which was to liaise with industry in two areas was dissolved by SPPOC in early 2005. It was replaced by the Industry-IODP Science Program Planning Group (IIS-PPG), which aimed solely at having industry researchers partner in drilling proposals, and ultimately, drilling expeditions. This PPG has been in existence only a few months, and it remains to be seen how successful it will be. A possible breakthrough was achieved at the Continental Rifting Workshop in Pontresina, Switzerland, in September 2006, when a number of industry representatives agreed to join in a Mission proposal that would include drilling in South Atlantic Margins.

All in all, it would be fair to say that we have not had any major accomplishments in the area of relations with industry.

9.2.2 Lessons Learned

Partnering with industry at the management level has been difficult. There are two obvious reasons for this. One, that drilling objectives of industry and academia differ, and the time interval between submissions of IODP proposals and actual drilling is too long in most cases to be of value to industry. In spite of these differences, there are intersecting objectives for industry and academia. If these could be identified and emphasized, there is real possibility of partnership between industry management and IODP. At an industry

workshop held in Houston in May 2005, industry representatives put forward encouraging responses and also enunciated the challenges in working together. While this workshop led to some progress in working with industry, especially in getting industry representatives to participate in IODP task forces, serious partnership with industry at a management level still remains to be achieved.

9.2.3 Suggested Improvements

We are making several moves to partner with industry at a management level. One move which has been approved by the IODP-MI Board of Governors is to offer Associate Membership in IODP-MI to industry companies. Also in the FY2007 APP, a provision has been approved to hire a consultant (who is well acquainted with both industry and academia) to help us forge partnerships with industry management.

There is a crucial question with regard to any partnering with industry. The question concerns the availability and advisability of funding from industry. What are the kinds of partnerships that should be pursued in which intersecting industry and academic objectives are fulfilled, but not at the cost of the scientific integrity of the program? The partnership has to be blessed by all the entities involved in IODP: Funding agencies, the Science Advisory Structure, and the Implementing Organizations.

9.3 Management Forum

9.3.1 Accomplishments

One task force deserves special mention. It is the Management Forum, which consists of the heads of the Implementing Organizations, the National Committees (USAC, ESSAC, J-DESC), the chairpersons of SASEC and SPC, and key personnel of IODP-MI. The purpose of setting up this task force is to bring together the heads of the various entities involved in IODP and bring them to look at the program in an integrated fashion, rather than from the perspective of each separate organization. Funding Agency members are invited to attend the Management Forum meetings as observers. The first meeting of the Management Forum held in Frascati, Italy was very successful. It conceived the Mission concept of proposing drilling expeditions.

9.3.2 Lessons learned

Adequate preparation in advance of the meetings, which would consist of selecting perhaps a single topic and asking members to write papers on that topic, would increase the useful output at the meeting.

9.3.3 Suggested Improvements

No special improvements are suggested.

9.4 New Membership

9.4.1 Accomplishments

Since the international partnership represents a vital element of this program, IODP-MI has been working with the Lead Agencies to invite new members to IODP. From FY2004 to FY2006, IODP-MI has contacted several countries and there were significant developments in three countries; Republic of Korea, Australia and India.

The Interim Asian Consortium

The Korean Institute of Geoscience and Mineral Resources (KIGAM) is the Korean research institute that secured the budget and took the initiative to join IODP. After preliminary discussions with Lead Agencies, IODP-MI visited Korea twice and agreed on the basic concept of the Interim Asian Consortium, represented by KIGAM. The negotiations between KIGAM and Lead Agencies started in the spring of 2005 and a Memorandum of Understanding was signed in June 2006. While Republic of Korea is only one member of the consortium at this moment, KIGAM is encouraged and expected to invite additional consortium members.

Australia

A number of Australian scientists established MARGO, the Office to Promote Marine Geoscience in Australia. In February 2005, MARGO made a proposal to join IODP with funding from National Collaborative Research Infrastructure in Australia (NCRS). IODP-MI worked with MARGO to prepare the proposal. The proposal, which included the Exposure Draft of NCRS Strategic Roadmap, was well received, but unfortunately it was not included in the final list of initiatives that were to be funded. IODP-MI and MARGO continue to work in seeking Australian participation in IODP.

India

IODP-MI has been in contact with the Indian government, including the Department of Earth and Science and the Indian Embassy in Washington, DC. In March 2006, the Prime Minister of India expressed national interest in IODP in his joint statement with the President of the United States. The IODP-MI President visited India and met with a group of high level people representing government agencies, including the Secretary of the Department of Earth and Science. IODP-MI continues discussions with India, in close contact with Lead Agencies.

Mechanism for new membership

IODP-MI has agreed on a new initiative with Lead Agencies to facilitate new membership, including:

- A mechanism to allow a limited number of scientists from non-member countries onboard IODP expeditions;
- Workshops to introduce IODP activities; and
- Port Call activities.

The details of the initiative are being developed. The first workshop is planned for January 2007 and will include invitations to Australia, India, Brazil, Chinese Taipei, New Zealand, and Russia, as well as other countries.

9.4.2 Lessons Learned

Two things are indispensable to new IODP memberships:

- A sufficient number of active scientists, who are keen to join IODP; and
- An appropriate governmental agency, which secures the minimum budget for participation, and is prepared to negotiate with Lead Agencies on a Memorandum of Understanding for participation.

It takes time in many cases to find who the key persons in the scientists group are, and which organization is likely to become the agency representing the government. Once they are recognized, contacts with these key persons must be maintained.

9.4.3 Suggested Improvements

The planned workshop to secure new membership could be very useful. All countries, which potentially can join IODP, will meet and receive information regarding major IODP activities, and will be motivated to join the program.

Other IODP initiative such as Distinguished Scientist Lecture Program can be effectively coordinated with the new membership initiative.

Meetings at a high level such as IODP-MI President's meeting with Indian government officials can be effective.

9.5 Policies and Procedures

9.5.1 Accomplishments

Over the first few years of IODP, program-wide policies (and the procedures required to implement those policies) have been developed on an “as-needed” basis. This delivery style, while not ideal, was dictated in part by the slow ramp-up of staff within IODP-MI and the myriad of “start-up” issues associated with the beginning of IODP.

Many over-arching IODP policies, though, have been developed and implemented, including the Conflict of Interest; Health, Safety, and Environment; and Sample, Data, and Obligations policies. In addition, numerous over-arching implementation procedures and guidelines have been developed including staffing procedures, co-chief agreements, IODP minimum measurements, third-party tools, and post-expedition meeting guidelines.

9.5.2 Lessons Learned

In this multi-platform, multi-IO program, it is more important than ever to have clear set of policies and procedures to provide for equal treatment of all entities to insure that the scientific community and IOs know what is expected of them, and what they can expect from others. The previous ODP Policies and Procedures manual is not very applicable to IODP in that it was developed for a single platform with one IO that essentially oversaw most logistical issues. Thus, a NEW clear, concise, web-based publication of overarching IODP policies, the procedures used to implement those policies and the links to specific IO policies (and associated IO implementation procedures) is required.

9.5.3 Suggested Improvements

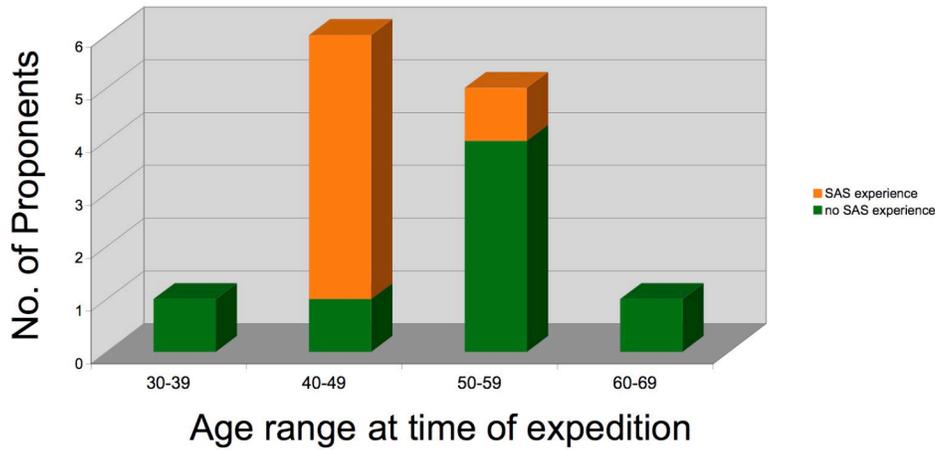
In consultation with the IOs and Program Member Offices, IODP-MI will develop and prepare a more coherent and comprehensive set of IODP-wide policies and associated procedures. These documents will be essentially complete by the end of FY07, if not sooner. In addition, IODP-MI will work with the IOs to ensure individual IO policies (and associated procedures for implementing those policies) are also developed in a timely manner.

Appendix F. Community input to the First Triennium Review

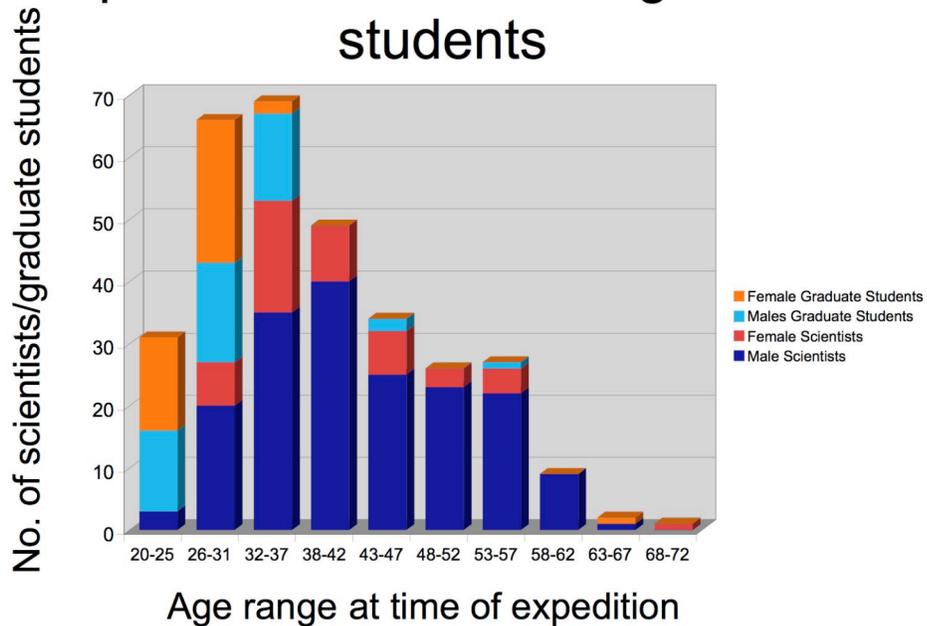
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Appendix G. FY2004-FY2006 expedition statistics.

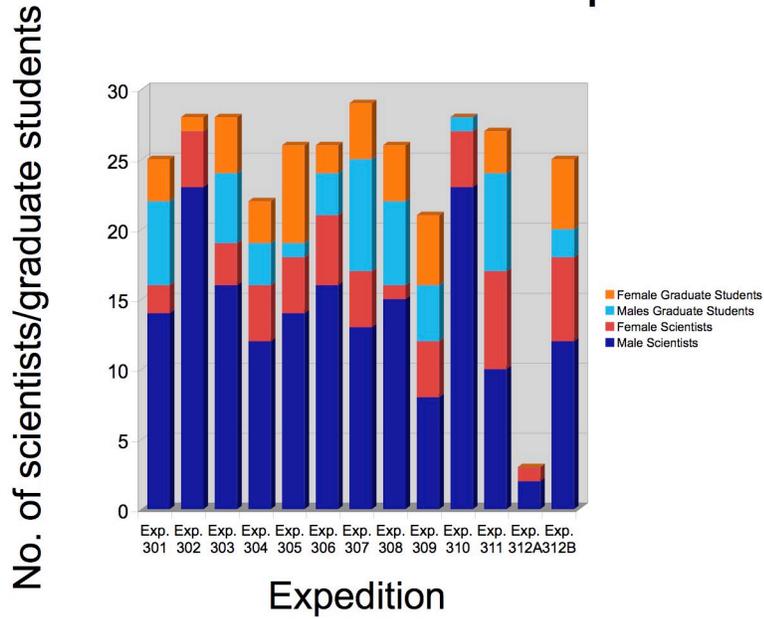
Age range and SAS experience of lead proponent at time of expedition



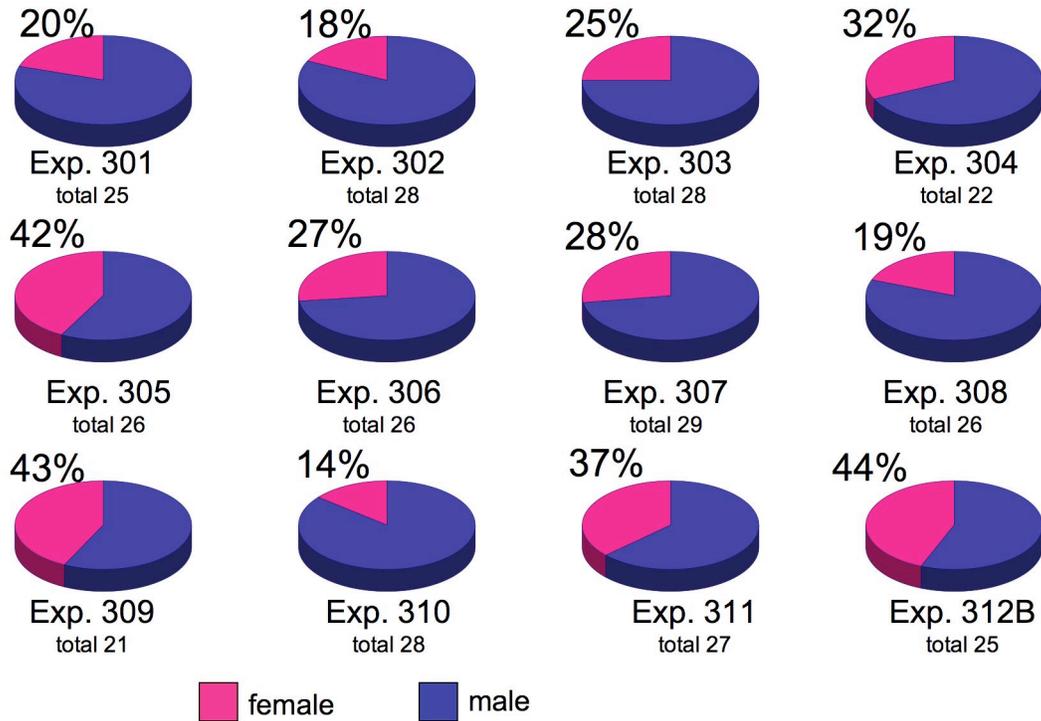
Age range and gender balance of shipboard scientists and graduate students



Gender and scientists/graduate student balance of expeditions

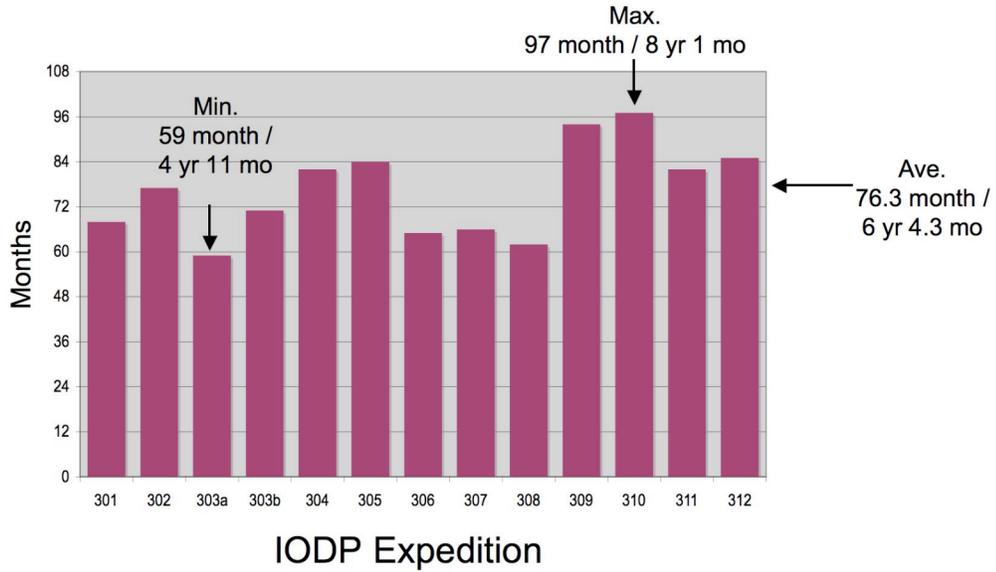


Expedition Gender Balance

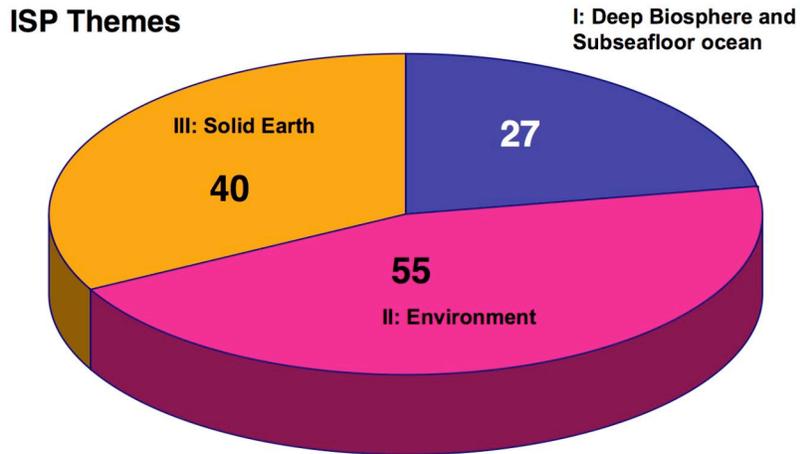


Appendix H. IODP proposal statistics.

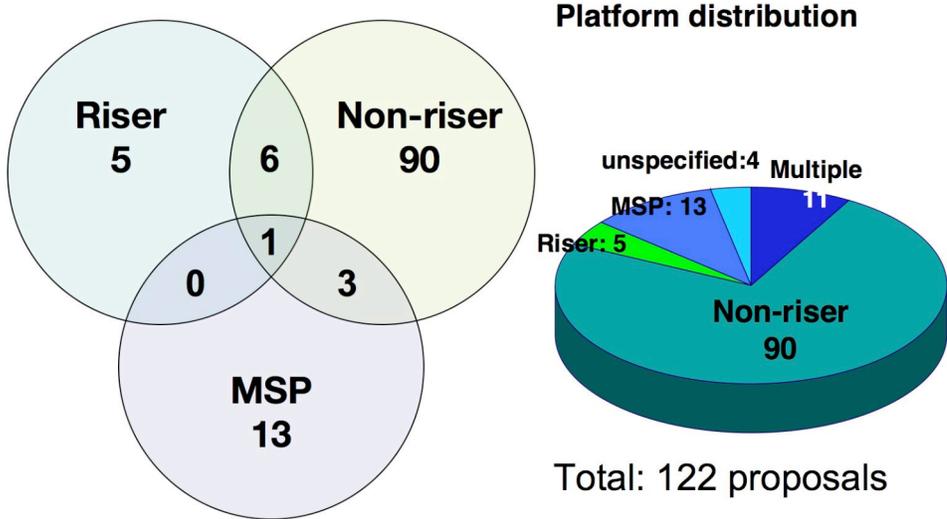
Interval between submission and expedition



Active Proposals: 122 (as of Oct. 2006)

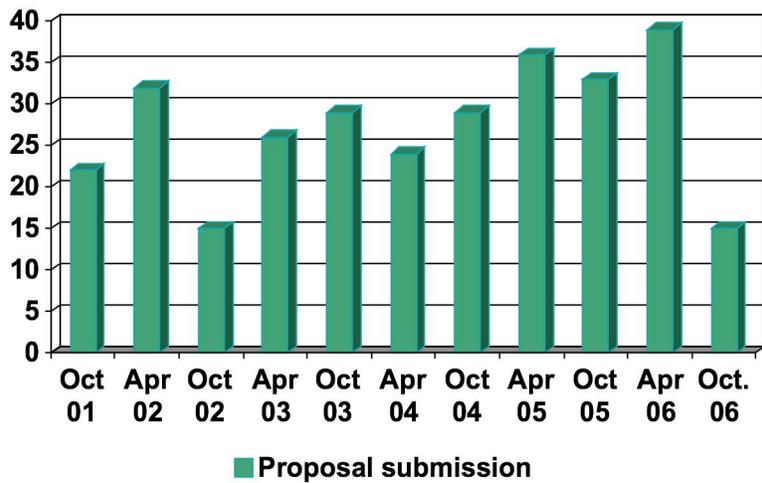


Drilling Platforms for Active Proposals



Proposal submissions (total)

11 submission deadlines

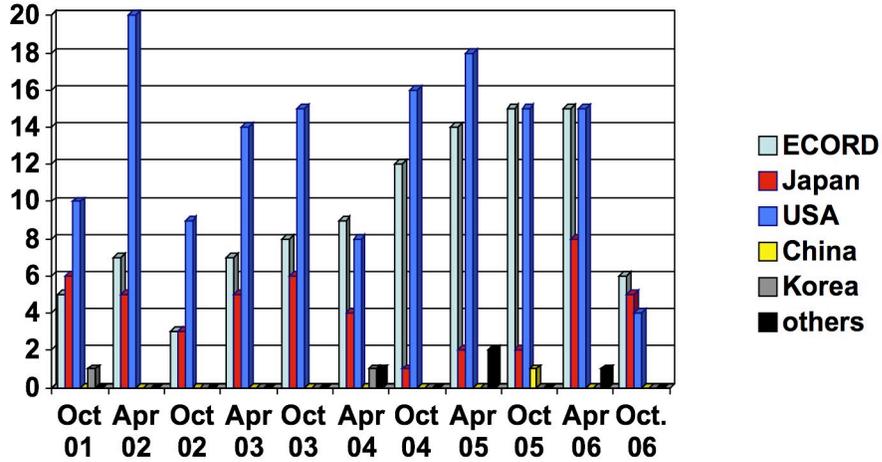


Appendix K. Executive Summary, including recommendations for IODP, of the *Sixth Performance Evaluation of the Ocean Drilling Program* (Humphris et al., 2004).

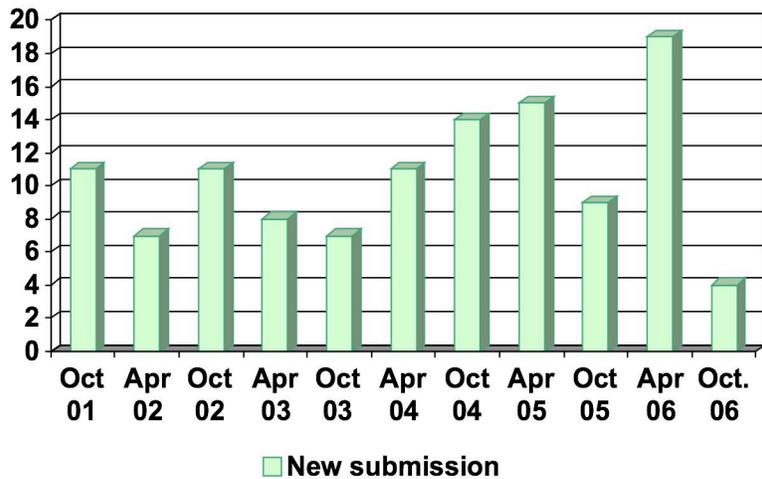
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Proposal submissions (by member)

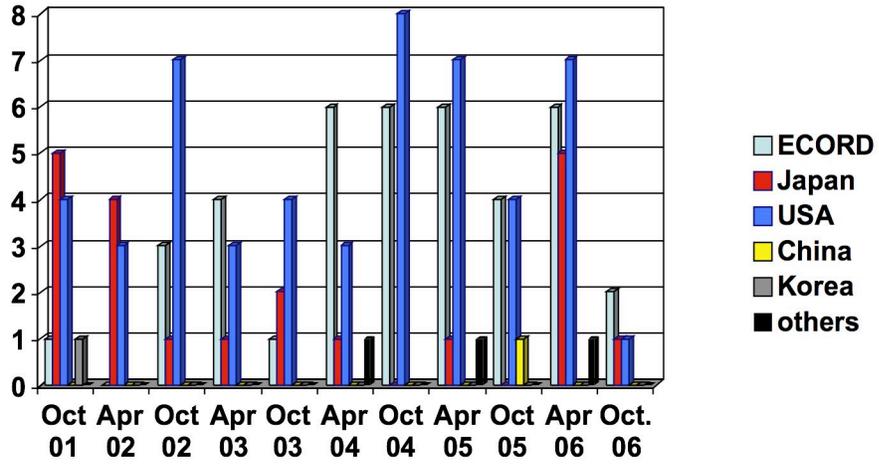
11 submission deadlines



New proposal submissions (total)

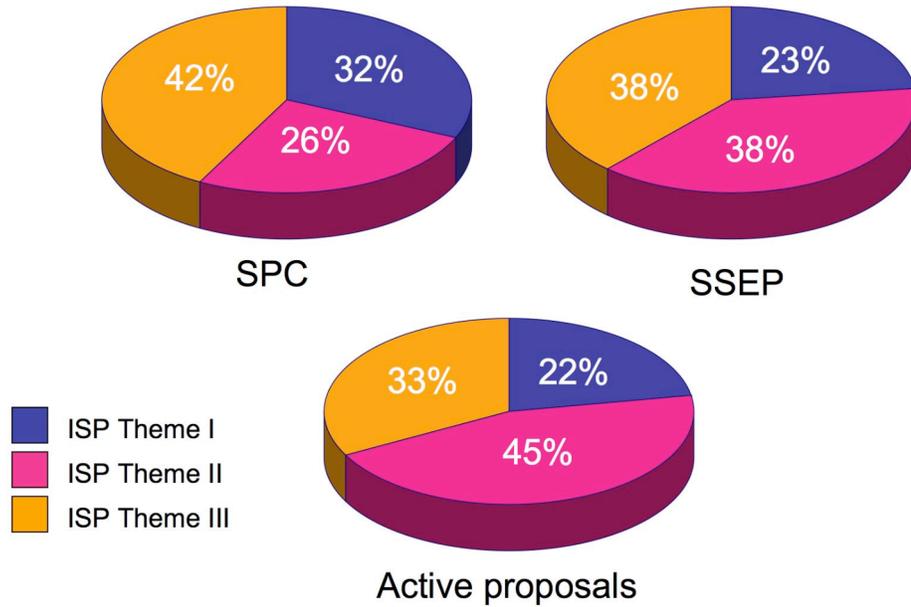


New proposal submissions (by member)

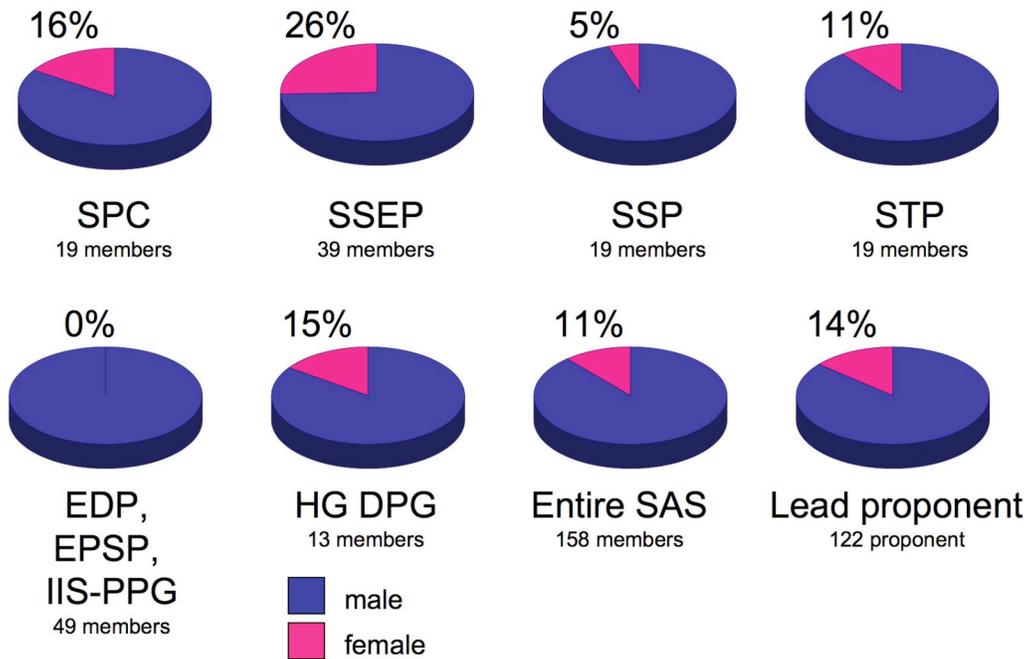


Appendix I. IODP Science Advisory Structure (SAS) statistics.

Expertise balance



SAS Gender Balance



Appendix J. List of non-public documents made available for examination by the Committee.

CONFIDENTIAL MATERIAL DELETED FOR INTERNET POSTING

Integrated Ocean Drilling Program
Management International (IODP-MI)

Response to the
First Triennium Review
(US FY2004-FY2006)

Dear Jamie and Toshi

We give below our detailed response to the recommendations of the triennium review.

In giving our response we would particularly like to call your attention to two items.

The first item relates to their recommendation 1. We totally agree with the review committee that additional funding and intellectual resources should be pursued vigorously. This is a task not only for IODP-MI but also for the IOs, the SAS and the Lead Agencies.

Secondly while we believe strongly in coordination with the IOs, the SAS and the PMOs, a point that has been made repeatedly by the review committee, we would like to emphasize that IODP is not just a coordinated program, it is an integrated program. For an integrated program a strong role of the CMO is absolutely essential. Management by consensus has its limits particularly when faced with difficult fiscal restraints which could seriously diminish IODP's management options.

Regards

Manik

RESPONSES TO RECOMMENDATIONS

<p>FTRC Recommendation 1: IODP-MI, in concert with the program's funding agencies, should pursue additional financial and intellectual resources for the IODP, including non-traditional opportunities, vigorously.</p>
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IODP-MI is pursuing additional financial and intellectual resources for the IODP.

Additional IODP membership is an obvious possible financial resource. IODP-MI has been in touch with governments and scientists in India, Australia, Brazil and Russia with a view to enlarging IODP membership. I believe that our efforts with

India and Australia are going to be successful and we are continuing discussions with Brazil and Russia. In addition we are holding a meeting in Washington, DC on May 16 to which representatives from a number of countries have been invited. The objective of this meeting is to familiarize these representatives with IODP with a view towards attracting them to become members of IODP.

The other possible source of funding is from other countries and from industry. Both the JOIDES RESOLUTION and the CHIKYU are going to be funded by NSF and MEXT for only 7-8 months each year for IODP drilling (in the foreseeable future) and there is evident interest both by industry and other entities to use the remaining time on both ships. While “off IODP” use may be the easiest to negotiate for either ship, use in the “hybrid mode” in which cooperative use of the drill ships is envisaged, will be, by far, the most advantageous for the scientific community. IODP-MI is in favor of use in this mode but it will need strong support from the IOs, SAS, and the Lead Agencies to promote the use of the ships in this manner. We do understand that there are many complications in implementing the “hybrid mode”, but we urge all IODP entities to support this mode and to vigorously help seek opportunities for use in this mode for the benefit of the scientific community. If the “hybrid mode” is put into practice, the scientific community will not only have full use of the drill ships for 7-8 months each year but also could have some use of the drill ships for the remaining months.

In order to pursue intellectual resources, we are taking two kinds of steps. In conjunction with SASEC, we are implementing IODP Workshops, Topical Symposia, and a Distinguished Scientist Program. Secondly, we are forming a “Friends of IODP” group which has representation from the following scientific organizations: American Geophysical Union (AGU), Geological Society of America (GSA), Society of Exploration Geophysicists (SEG), American Association of Petroleum Geologists AAPG) (representative, yet to be named), European Geophysical Union (EGU) and Japan Geophysical Union (JGU). In working with these representatives from the scientific societies, we expect to bring the IODP opportunities to members of these societies through IODP booths and IODP sessions. These efforts are designe to increase the intellectual support for IODP.

FTRC Recommendation 2: Corporate vision and mission statements should be developed for IODP-MI, in conjunction with the IODP-MI Board of Governors.

We believe that vision and mission for IODP-MI is inextricably lengthened with vision and mission for IODP as a whole. At the recent Management Forum meeting IODP vision and mission statements were developed, and they are as follows:

Vision:

Through scientific ocean drilling, IODP explores the vast world under the ocean to solve the mysteries of Earth as a living and dynamic planet.

Mission:

- IODP deploys state-of-the-art ocean drilling technologies as the essential tool of discovery.
- IODP unifies the international research community to explore Earth as a system.
- IODP advances future research and discovery through dissemination of data and samples from global archives.

- IODP provides scientific context for global awareness of geohazards and environmental change.

FTRC Recommendation 3: The roles, responsibilities, and performance metrics for all IODP-MI positions, and especially those for senior management positions, should be clearly and formally defined and redefined whenever roles, responsibilities, and performance metrics change.

In attachment #1 we are outlining the roles and responsibilities of senior IODP-MI personnel in necessary detail.

FTRC Recommendation 4: IODP-MI should implement a consistent, formal annual review process of all personnel.

We are implementing a consistent formal annual review process of all personnel. The process will be the same in Sapporo as it is in Washington, DC.

FTRC Recommendation 5: Long-term consolidation of the two IODP-MI offices into one office and/or relocation of the U.S. office to a location with overlapping normal working hours with Japan should be seriously considered.

Consolidation of the two IODP-MI offices will obviously work toward greater efficiency however there are several other factors which come into play for such a consolidation. These factors include: financial implications, the effects of disruption of personnel, and the fact that IODP had adopted the basic premise of having two offices, one in Japan and one in the U.S. The implications of all of these factors will be discussed at the upcoming meeting of the IODP-MI Board of Governors.

FTRC Recommendation 6: Frequent *dedicated* meetings of the IODP-MI senior management team are essential to address long-term IODP-MI vision and strategy; refine corporate goals; build corporate identity; clarify roles and responsibilities; assess accomplishment of mission; and foster team-building.

We are taking steps towards implementing this recommendation. IODP-MI president visited the Sapporo office after the Management Forum meeting and the Vice President for Planning has made several visits to the Washington office. We will arrange further joint staff visits as conditions permit.

FTRC Recommendation 7: If irreconcilable differences within IODP-MI are adversely affecting the IODP following implementation of the FTRC's recommendations, changes in management should be considered.

When management problems arise within IODP-MI, it is the responsibility of the president to take the necessary corrective action.

FTRC Recommendation 8: The roles and responsibilities of all task forces should be clear to the community through public availability of detailed terms of reference. As appropriate, IODP Science Advisory Structure and Implementing Organization representatives should be involved in developing terms of reference for task forces, forums, and groups to ensure a sense of engagement and ownership.

The roles and responsibilities of all task forces and terms of reference of the IODP-MI task forces are posted on the IODP-MI website. While IODP-MI always includes IOs, SAS members and others, within the task forces, the terms of reference of the task forces need to be established by IODP-MI.

FTRC Recommendation 9: Proactive policy and procedure development engaging all involved parties (Implementing Organizations, Science Advisory Structure, external advice) is needed, e.g., for health and safety, media relations, expedition scientist guidelines, and conflict-of-interest for the request-for-proposal (RFP) and subcontracting processes.

It is IODP-MI policy to develop clear policies and procedures engaging all involved parties. IODP-MI cannot develop these policies and procedures in a vacuum, and we believe we have been very consistent in engaging all relevant parties in developing policy and procedures.

FTRC Recommendation 10: IODP policies and procedures should be collated, and made publicly available in a manual and at www.iodp.org.

As a part of the Annual Program Plan for FY 2007, IODP is collating all policies and procedures.

FTRC Recommendation 11: A succinct, yet comprehensive primer for the IODP should be publicly available at www.iodp.org.

A draft primer for IODP has been submitted to the Lead Agencies.

FTRC Recommendation 12: A comprehensive, integrated outreach and communication strategy, with clearly defined and appropriate responsibilities for the two IODP-MI offices, Implementing Organizations, Science Advisory Structure, expedition scientists, and funding agencies, needs to be developed with the involvement of all stakeholders, and then implemented by IODP-MI.

Using the guidance provided by the Lead Agencies, a meeting has been scheduled for June, 2007 to develop roles and responsibilities for the various IODP entities with respect to Outreach. Interaction with the Lead Agencies will also be discussed at this meeting. The output of this meeting will be a response to this recommendation.

FTRC Recommendation 13: Representatives across the spectrum of the user community and both IODP-MI offices should be solicited for input and fully engaged from the start in redesigns of www.iodp.org, beta testing, and further development of the web site.

The redesign of the IODP-MI website went through extensive beta testing- more than fifty people participated. Input was also obtained from 116 scientists at the AGU meeting. All the input has been used to construct the modified website.

FTRC Recommendation 14: While outreach should be coordinated by IODP-MI, IODP member nations and/or consortia should handle education individually.

IODP-MI FY 2008 budget will not include education activities.

FTRC Recommendation 15: IODP-MI, the Implementing Organizations, the Program Member Offices, and the Science Advisory Structure should continue to work together to foster increased diversity and involvement of young scientists in the IODP.

We will work together with the IOs, Program Member Offices and Science Advisory Structure to foster increased diversity and involvement of young scientists whenever possible.

FTRC Recommendation 16: The IODP and ICDP should integrate scientific evaluation of drilling proposals in the near future, and consider merging over the long term.

IODP and ICDP scientists have jointly considered the integration of scientific evaluations of drilling proposals, and their report is given in attachment #2.

FTRC Recommendation 17: IODP-MI and the IODP Science Advisory Structure (SAS) should reengage with the International Ocean Network (ION), InterMARGINS, InterRIDGE, International Marine Past Global Changes Study (IMAGES), and ocean observatory communities.

IODP-MI clearly sees the advantage of engaging with various relevant international organizations. We will discuss the mechanism for doing so with the Scientific Advisory Structure.

FTRC Recommendation 18: IODP-MI should place significantly more emphasis on improving IODP-industry interactions. A comprehensive, multi-faceted plan for IODP-industry cooperation, including soliciting associate membership, needs to be developed and implemented by IODP-MI.

IODP-MI by laws have a provision for Associate membership and IODP-MI is in the process of inviting industry corporations to become associate members. IODP-MI has recently hired Jamie Austin as an advisor to promote interactions with industry. Very active cooperation and encouragement both from the Science Advisory Structure and the Lead Agencies is necessary if industry is to be engaged in a meaningful way.

FTRC Recommendation 19: Coordination and support of IODP Science Advisory Structure committees, panels, planning groups, and IODP-sponsored workshops should be undertaken from the same office.

All SAS related activities will be in the Sapporo office FY2008 on.

FTRC Recommendation 20: A dedicated review committee that includes a significant number of external members should comprehensively evaluate the efficiency, effectiveness, and cost: benefit of the IODP Science Advisory Structure.

One of the recommendations of the Management Forum (ref to web site) is dedicated to enhancing the effectiveness of the IODP Science Advisory Structure and to reducing costs.

FTRC Recommendation 21: Given the relative fiscal responsibilities of IODP-MI and the IODP Council in the overall program, the role of the IODP Council in the program, particular with respect to Annual Program Plan approval, should be clarified.

FTRC Recommendation 22: Drill site characterization and drilling should be integrated within the IODP; IODP-MI should provide financial support for integrated site characterization and drilling in addressing high-priority scientific themes and initiatives of the IODP.

It would be nice if drill site characterization and drilling could be integrated within IODP, however, it is not possible to do so within the present financing structure of IODP-MI.

IODP-MI has taken steps to make existing site survey data more accessible by listing them in the Scientific Prospectus and to be publicly available post expedition. This limited initiative is currently the best that IODP-MI can do in this regard.

FTRC Recommendation 23: IODP-MI should strive for maximum openness, transparency, and accountability in all of its management, facilitation, coordination, and integration activities.

IODP-MI does strive for maximum transparency. The only serious complaints that we have had with regard to transparency were about confidential reports two co-chief scientists sent to us after the expedition. Since we received the report with a promise of confidentiality, we could not release the reports, but we told the co-chief scientists that they could on their own, release the reports. However, for reasons unknown, they chose not to do so.

FTRC Recommendation 24: IODP-MI should endeavor to engage all stakeholders collaboratively via consensus building in all of its management, facilitation, coordination, and integration activities.

IODP-MI will certainly endeavor to engage all stakeholders as per this recommendation. However it should be noted that management by consensus has its limits particularly when faced with difficult fiscal restraints which could seriously diminish IODP-MI's management options.