Program Office Overview of the Ocean Observatories Initiative

OOI Preliminary Design Review
December 4-7, 2007
Arlington, VA

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Director, Ocean Observing Activities
Consortium for Ocean Leadership

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This Talk

- Science Areas, Science Traceability, and Baseline Design
- Cost and Schedule Summary
- Project Organization and Management Structure
- Advisory Structure
- Engaging the Community
- Remaining Presentations Today

Science Areas,
Science Traceability,
Baseline Design

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OOI Science Areas

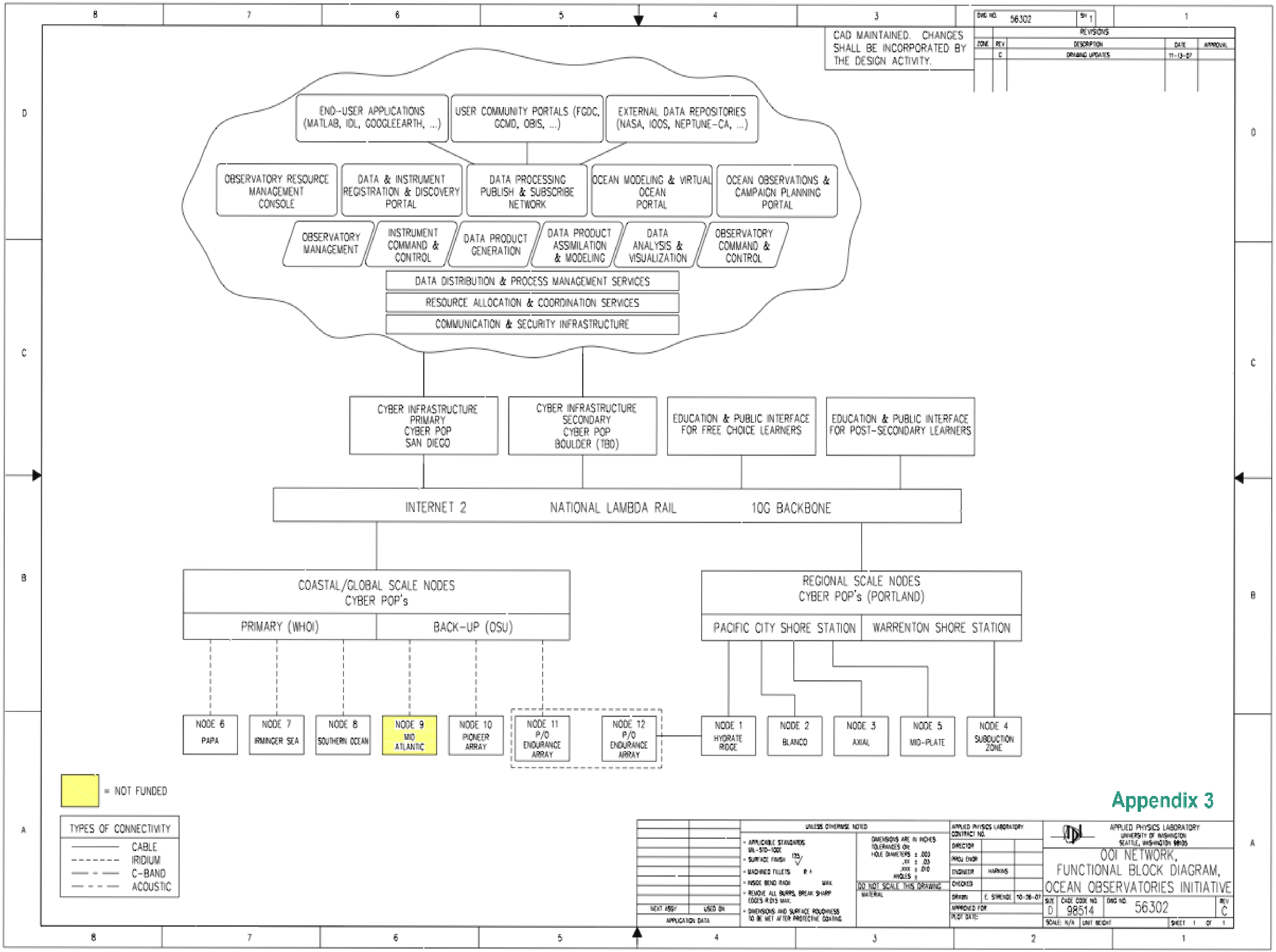
1. Ocean-Atmosphere Exchange
2. Climate Variability, Ocean Circulation, and Ecosystems
3. Turbulent Mixing and Biophysical Interactions
4. Costal Ocean Dynamics and Ecosystems
5. Fluid-Rock Interaction and the Subseafloor Biosphere
6. Plate-scale and Ocean Geodynamics

Traceability Matrix

A graphic representation showing the logical flow from high-level science questions to infrastructure elements

- Science Questions
  - Processes to be observed
    - Spatial Scale
      - Temporal Scale
        - Measurements Required
          - Sensors Required (core sensors in bold font)
            - Sampling Requirements
              - Site(s) Required for Science
                - Experiment Description – infrastructure and capabilities required to support measurements.

Appendix 3



CAD MAINTAINED. CHANGES SHALL BE INCORPORATED BY THE DESIGN ACTIVITY.
DWG NO. 56302
REVISIONS
ZONE REV DESCRIPTION DATE APPROVAL
C DRAWING UPDATES 11-13-07
END-USER APPLICATIONS (MATLAB, IDL, GOOGLEEARTH, ...)
USER COMMUNITY PORTALS (FGDC, GCMD, OBIS, ...)
EXTERNAL DATA REPOSITORIES (NASA, IOOS, NEPTUNE-CA, ...)
OBSERVATORY RESOURCE MANAGEMENT CONSOLE
DATA & INSTRUMENT REGISTRATION & DISCOVERY PORTAL
DATA PROCESSING PUBLISH & SUBSCRIBE NETWORK
OCEAN MODELING & VIRTUAL OCEAN PORTAL
OCEAN OBSERVATIONS & CAMPAIGN PLANNING PORTAL
OBSERVATORY MANAGEMENT
INSTRUMENT COMMAND & CONTROL
DATA PRODUCT GENERATION
DATA PRODUCT ASSIMILATION & MODELING
DATA ANALYSIS & VISUALIZATION
OBSERVATORY COMMAND & CONTROL
DATA DISTRIBUTION & PROCESS MANAGEMENT SERVICES
RESOURCE ALLOCATION & COORDINATION SERVICES
COMMUNICATION & SECURITY INFRASTRUCTURE
CYBER INFRASTRUCTURE PRIMARY CYBER POP SAN DIEGO
CYBER INFRASTRUCTURE SECONDARY CYBER POP BOULDER (TBD)
EDUCATION & PUBLIC INTERFACE FOR FREE CHOICE LEARNERS
EDUCATION & PUBLIC INTERFACE FOR POST-SECONDARY LEARNERS
INTERNET 2
NATIONAL LAMBDA RAIL
10G BACKBONE
COASTAL/GLOBAL SCALE NODES CYBER POP's
PRIMARY (WHOI)
BACK-UP (OSU)
REGIONAL SCALE NODES CYBER POP's (PORTLAND)
PACIFIC CITY SHORE STATION
WARRENTON SHORE STATION
NODE 6 PAPA
NODE 7 IRMINGER SEA
NODE 8 SOUTHERN OCEAN
NODE 9 MID ATLANTIC
NODE 10 PIONEER ARRAY
NODE 11 P/O ENDURANCE ARRAY
NODE 12 P/O ENDURANCE ARRAY
NODE 1 HYDRATE RIDGE
NODE 2 BLANCO
NODE 3 AXIAL
NODE 5 MID-PLATE
NODE 4 SUBDUCTION ZONE
= NOT FUNDED
TYPES OF CONNECTIVITY
CABLE
IRIDIUM
C-BAND
ACOUSTIC
UNLESS OTHERWISE NOTED
DO NOT SCALE THIS DRAWING
APPLIED PHYSICS LABORATORY
UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98105
OOI NETWORK,
FUNCTIONAL BLOCK DIAGRAM,
OCEAN OBSERVATORIES INITIATIVE
SIZE D
CAGE CODE NO. 98514
DWG NO. 56302
REV C
SCALE: N/A
SHEET 1 OF 1

- 3 Global scale nodes in Southern Ocean,Ocean Station Papa, Irminger Sea
- 5 Regional scale nodes in NE Pacific, cabled plate-scale observatory
- Coastal scale assets in Mid- Atlantic Bight shelf-break (Pioneer Array) and NE Pacific continental slope (Endurance line)
- Each scale incorporates mobile assets
- Unifying cyberinfrastructure to allow adaptive sampling, custom observatory view, collaborative analysis
- Interfaces for education users

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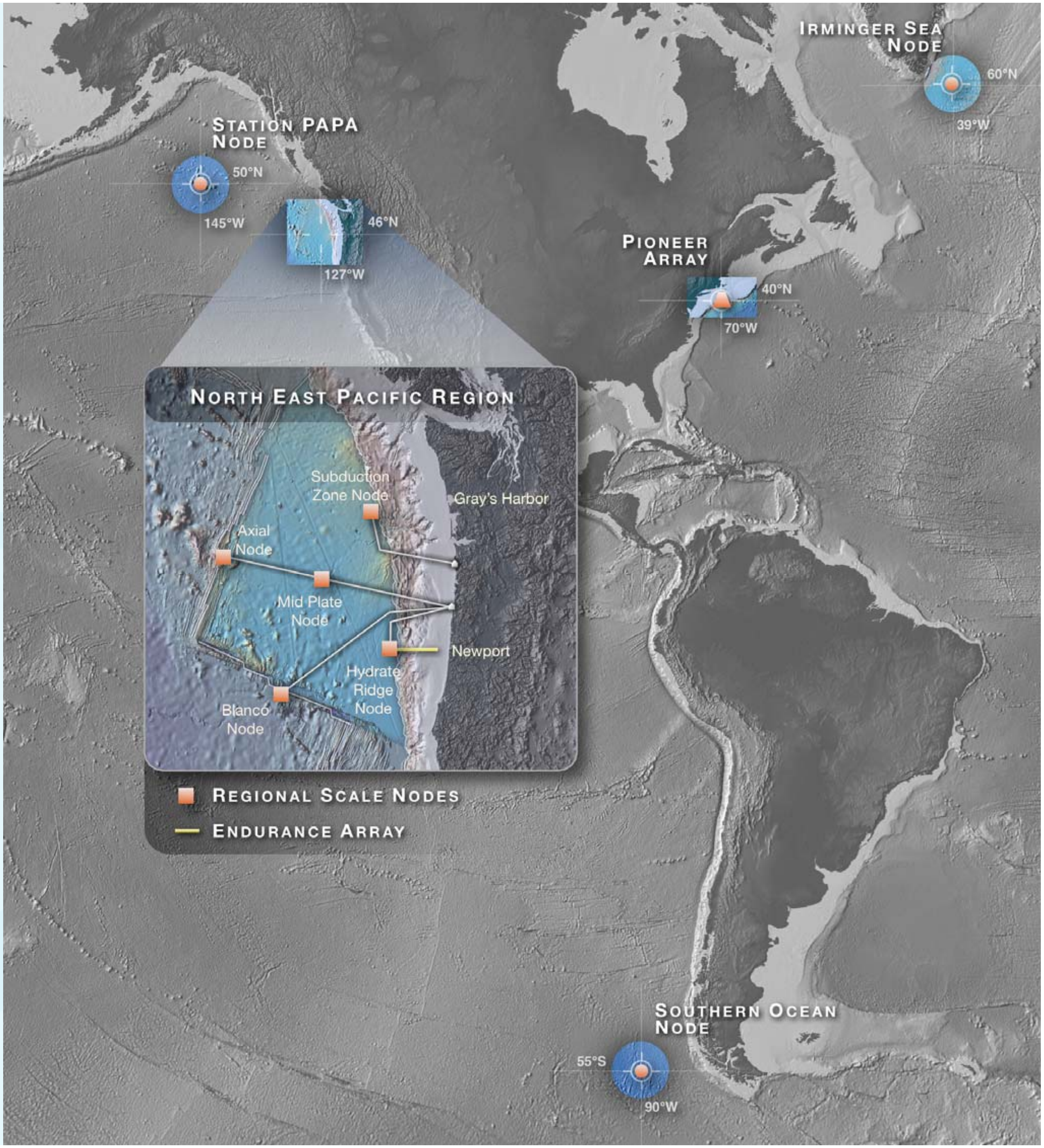

Design Evolution since Conceptual Design Review (August 2006)

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Design Steps since Conceptual Design Review

Conceptual Design for CDR, August 2006

- Consideration of financial constraints within OSC, Sept-Dec 2006
- Revised Conceptual Network Design Infrastructure Plan, March 2007
- NSF Proposed Changes and Community Comments, April 2007
- Tiger Team discussions, May/June 2007
- iOSC makes recommendations and Guiding Principles, June 2007
- Integrated Team Meetings begin, August 2007
- CGSN Ad Hoc Team report, October 2007
- Science Prospectus review, October 2007
- NSF Guidance of Baseline + Up-Scope, October 2007
- Final costing for Preliminary Network Design, November 2007
- iOSC considers Baseline Design, November 2007

Baseline Design and Up-Scope for PDR, November 2007

iOSC Guiding Principles, June 2007

- Power and communications capabilities exceeding those of traditional ocean observing platforms are the leading transformative aspect of the OOI
- The OOI should emphasize fewer, more capable nodes over more numerous, less capable nodes (i.e. with traditional capability)
- A mix of fixed platform and mobile assets is needed to address the science goals of the OOI
- Integration across three scales (coastal, regional, global) should be exploited to the extent possible for appropriate science questions
- The OOI is a research platform that will enable future experiments / capabilities beyond those included in the initial configuration
- The OOI Network should achieve a balance between enabling science “out of the box,” and designing infrastructure to support separately funded PI experiments

Cost and Schedule Summary

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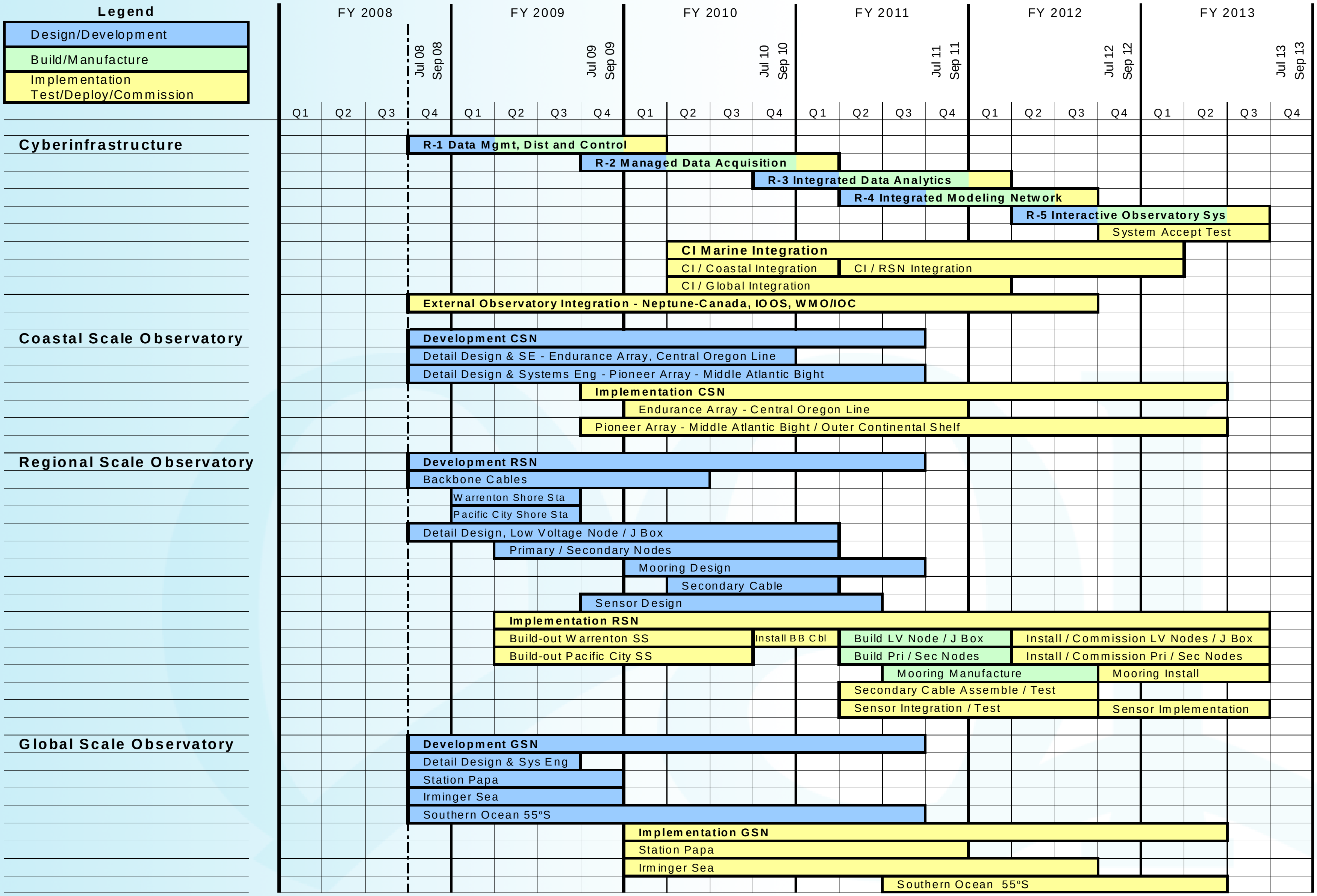
Schedule



Legend
Design/Development
Build/Manufacture
Implementation Test/Deploy/Commission
FY 2008
FY 2009
FY 2010
FY 2011
FY 2012
FY 2013
Jul 08 Sep 08
Jul 09 Sep 09
Jul 10 Sep 10
Jul 11 Sep 11
Jul 12 Sep 12
Jul 13 Sep 13
Q1 Q2 Q3 Q4
Cyberinfrastructure
R-1 Data Mgmt, Dist and Control
R-2 Managed Data Acquisition
R-3 Integrated Data Analytics
R-4 Integrated Modeling Network
R-5 Interactive Observatory Sys
System Accept Test
CI Marine Integration
CI / Coastal Integration
CI / RSN Integration
CI / Global Integration
External Observatory Integration - Neptune-Canada, IOOS, WMO/IOC
Coastal Scale Observatory
Development CSN
Detail Design & SE - Endurance Array, Central Oregon Line
Detail Design & Systems Eng - Pioneer Array - Middle Atlantic Bight
Implementation CSN
Endurance Array - Central Oregon Line
Pioneer Array - Middle Atlantic Bight / Outer Continental Shelf
Regional Scale Observatory
Development RSN
Backbone Cables
Warrenton Shore Sta
Pacific City Shore Sta
Detail Design, Low Voltage Node / J Box
Primary / Secondary Nodes
Mooring Design
Secondary Cable
Sensor Design
Implementation RSN
Build-out Warrenton SS
Install BB Cbl
Build LV Node / J Box
Install / Commission LV Nodes / J Box
Build-out Pacific City SS
Build Pri / Sec Nodes
Install / Commission Pri / Sec Nodes
Mooring Manufacture
Mooring Install
Secondary Cable Assemble / Test
Sensor Integration / Test
Sensor Implementation
Global Scale Observatory
Development GSN
Detail Design & Sys Eng
Station Papa
Irminger Sea
Southern Ocean 55°S
Implementation GSN
Station Papa
Irminger Sea
Southern Ocean 55°S

Project Organization and Management Structure

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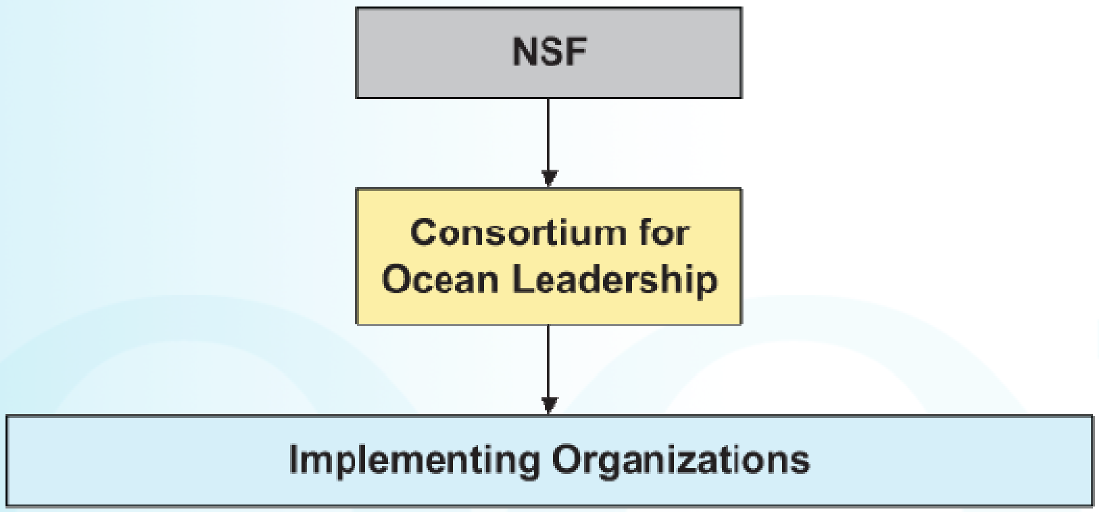
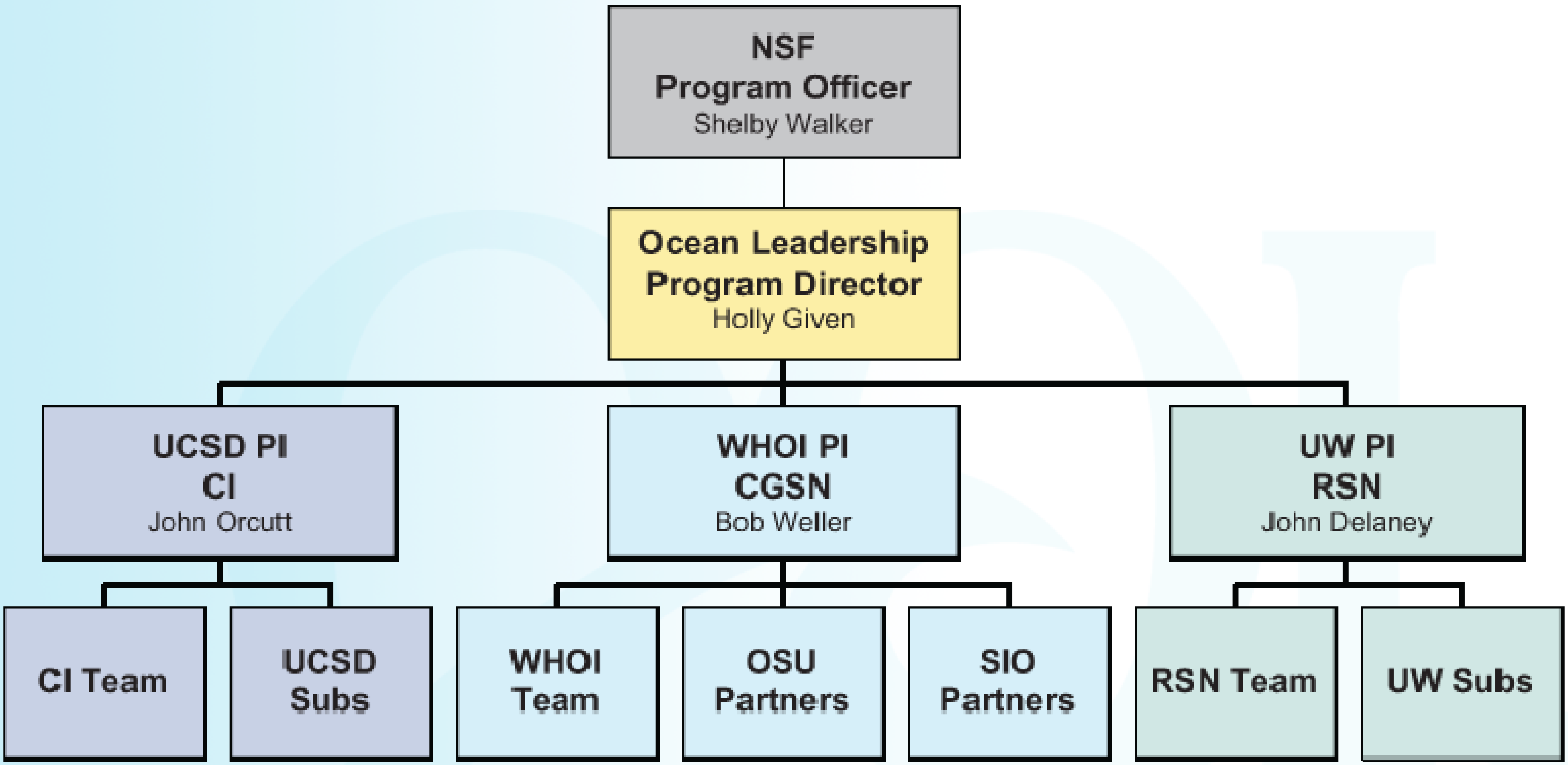
Management Structure



- University of Washington: Regional Scale Nodes: March 2007
- Univ of California San Diego: Cyberinfrastructure: May 2007
- Woods Hole Oceanographic Inst and partners: Coastal and Global Scale Nodes: August 2007

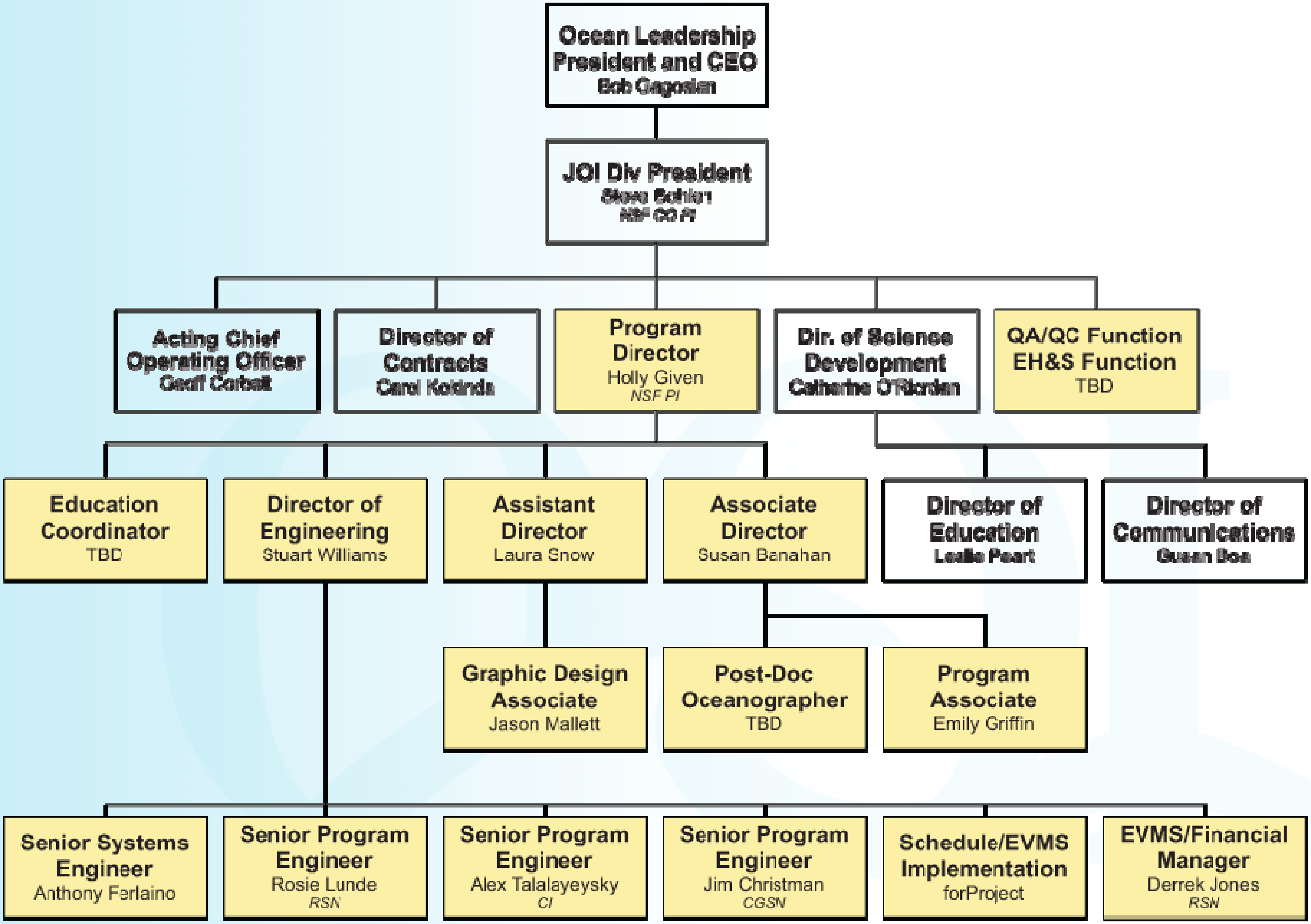
Technical Responsibility



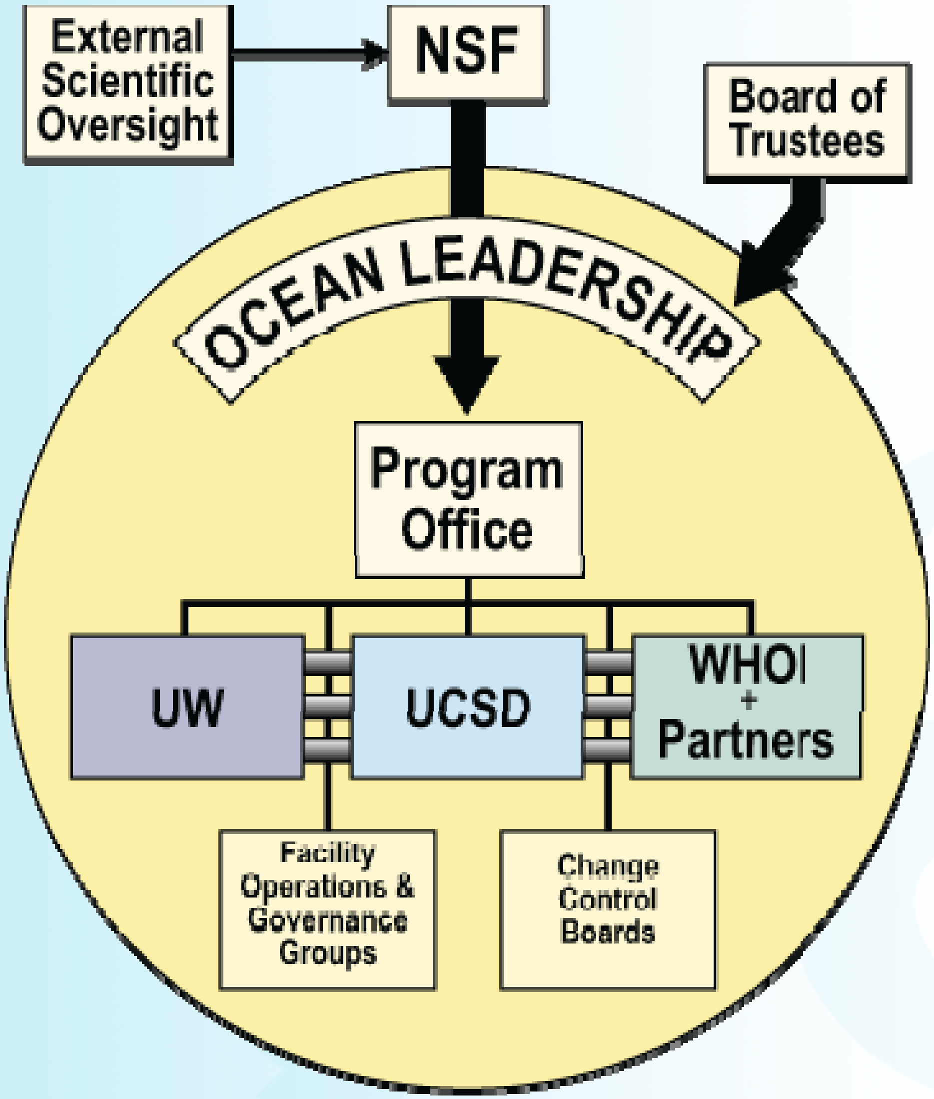
IO Subawards

- Reporting Requirements/Deliverables identified in Annual Work Plans
- Contracting Officer’s Technical Representative (COTR) monitors performance against deliverables
- Awards are incrementally funded; funding can be withheld if work is deficient or untimely
- IO performance is reported monthly to NSF
- After MREFC starts, COTRs will monitor variance against Planned Value

Program Office



Management Structure Summary



- Encourages collaborative management
- Regular cross-cutting meetings
- Approx 1/3 of advisory structure now within mgmt team

Advisory Structure

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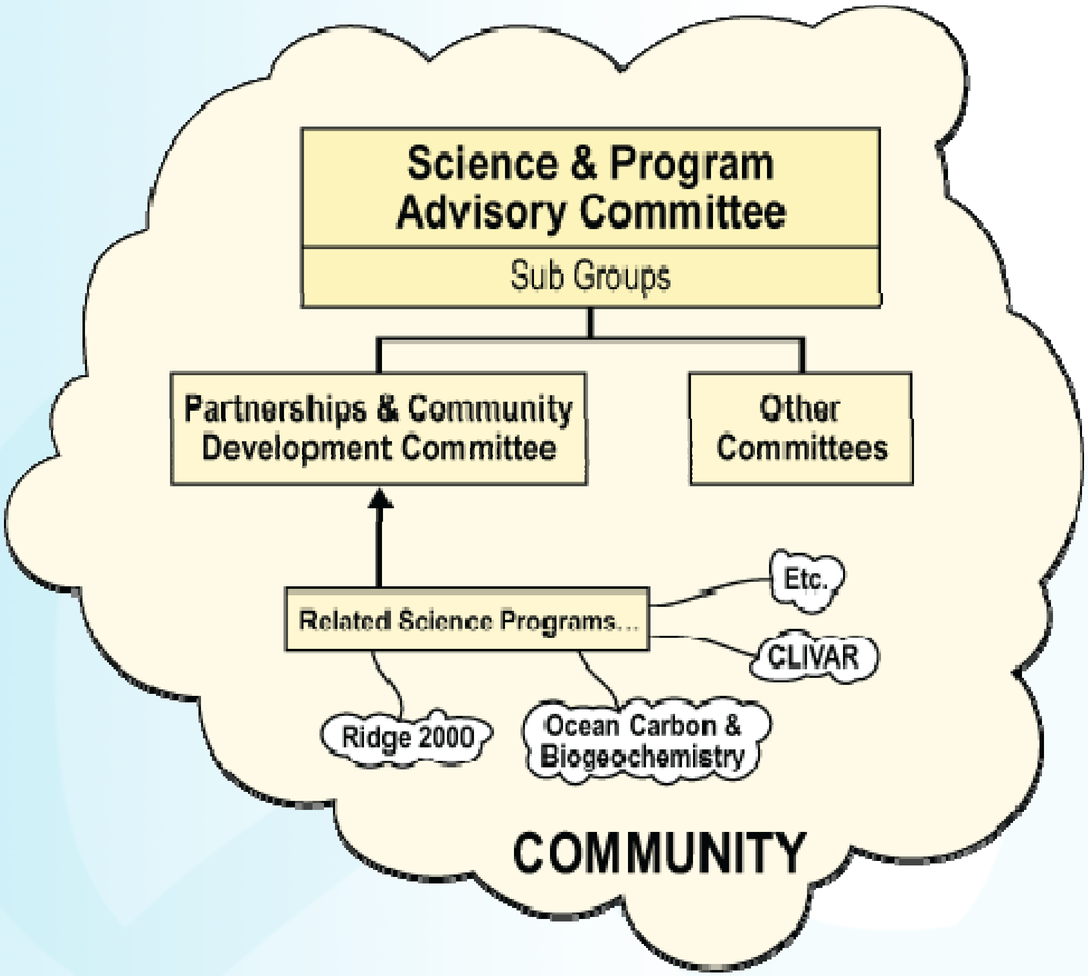
Advisory Structure

- First phase of 6 committees, ~ 80 advisors brought the program through the conceptual design phase
- Project is transitioning to a new Advisory Structure for implementation phase
- Nominating Committee will be approved by NSF/OCE and Ocean Leadership Board; goal of first committee meetings in February
- Interim Observatory Steering Committee will remain constituted until then

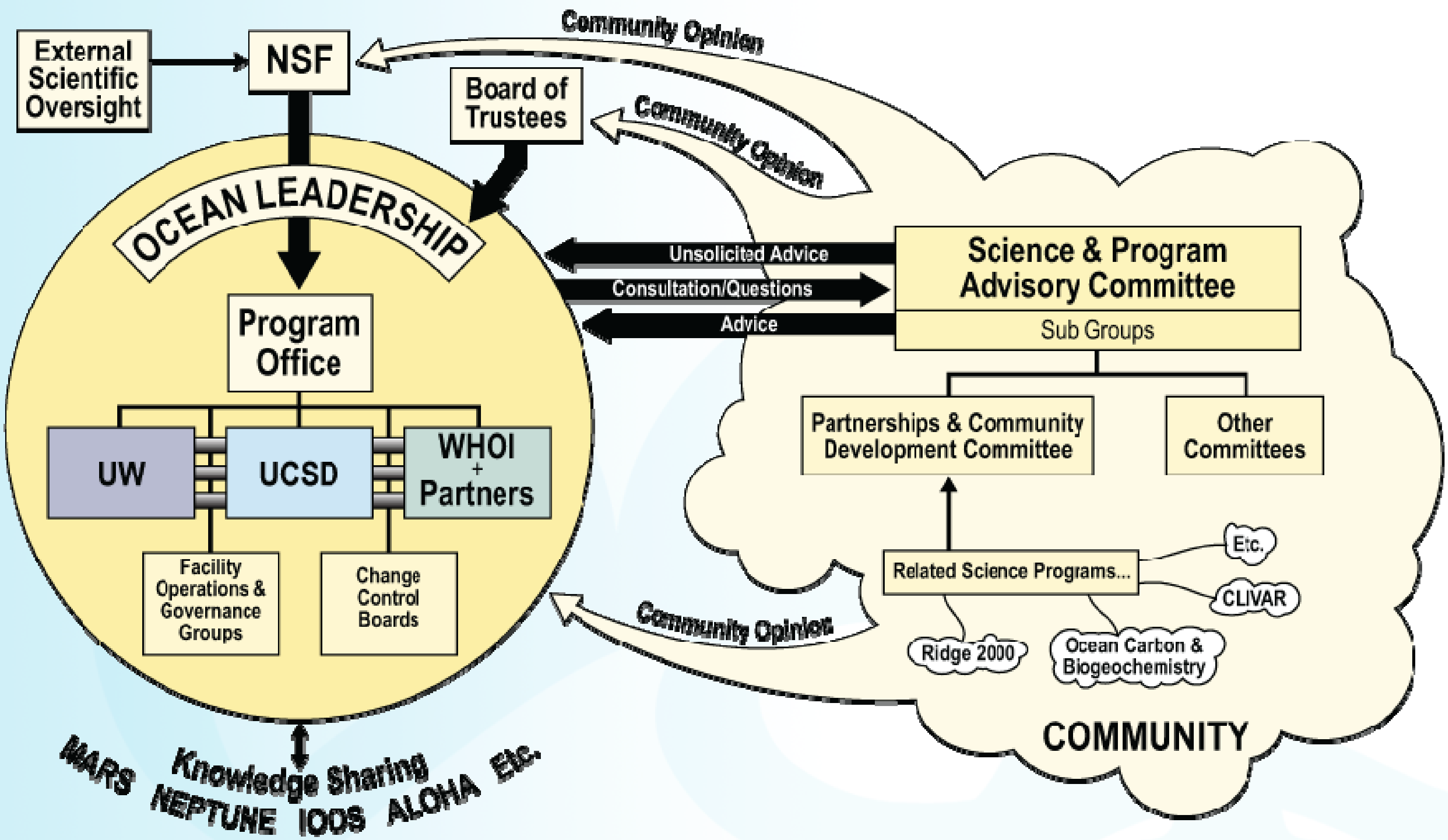
Interim Observatory Steering Committee

- Antonio Baptista - Oregon Health & Science University
- Suzanne Carbotte - Lamont Doherty Earth Observatory
- Paula Coble - University of South Florida
- Bob Cowen - University of Miami
- Percy Donaghay - University of Rhode Island
- Rick Jahnke - Skidaway Institute of Oceanography
- Cindy Lee – SUNY, Stony Brook
- Steven Lohrenz – University of Southern Mississippi
- Doug Luther – University of Hawaii
- Larry Mayer – University of New Hampshire
- Mark Moline – California Polytechnic
- Mary Jane Perry – University of Maine
- Cisco Werner – University of North Carolina
- Mairi Best - Liaison, NEPTUNE Canada

Implementation-Phase Advisory Structure



Management and Advisory Structures



Engaging the Community

Science Users

- The Partnerships and Community Development Committee will devise methods to broadly engage the science community
- Establish user group meetings
- Consider owners/agents for core sensors
- Develop up-scope study groups
- Plan for the most likely externally funded experiments
- Integrate the experience of MARS testbed, VENUS, and other observing systems

Education Planning

- $5M OOI MREFC funds designated for education infrastructure
- Use concepts from ORION EPAC Plan
- Develop interface for free-choice learners and post-secondary training
- In-kind contributions from IO’s

Communications

- IOs and Program Office each have communications expertise
- Coordination by Program Office
- Consistent messaging and visual identity under development
- Outreach Website under development

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Remaining Presentations Today

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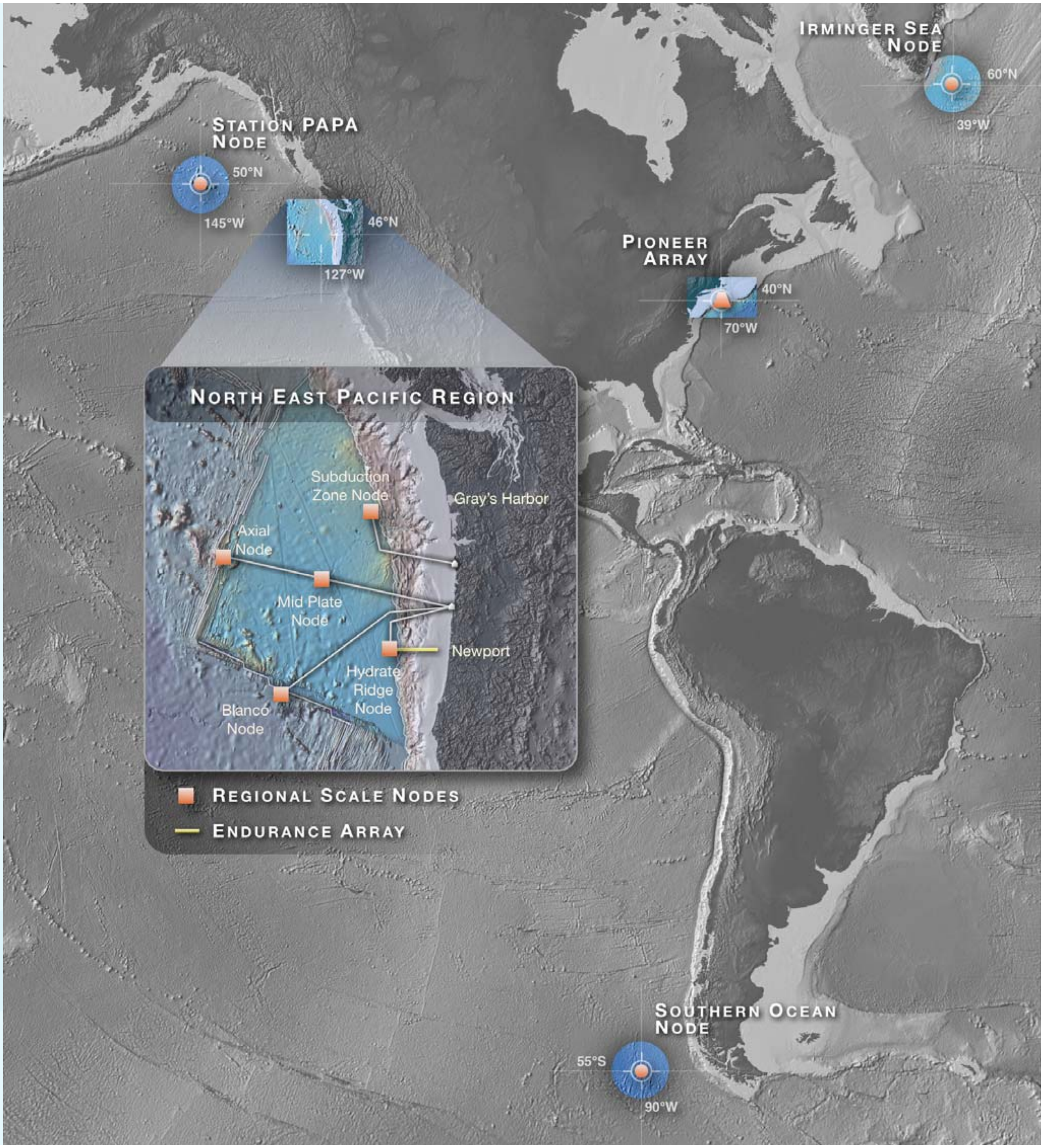
- Stu Williams: Cost, Schedule, Network Integration
- IO Overview Presentations:
  - John Delaney and Pete Barletto: Regional Scale Nodes
  - Bob Weller and Libby Signell: Coastal and Global Scale Nodes
  - John Orcutt and Matthew Arrott: Cyberinfrastructure
- IO overviews will address:
  - Science drivers and infrastructure
  - Internal Management
  - Institutional Synergies
  - Cost and Schedule
  - Transition to O&M
- Rosie Lunde: Network Operations Plan



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iOSC views on Up-Scope Criteria

- Up-scope elements will maximize both incorporation of the science themes identified in the OOI Science Plan and the size of the research community benefiting from the inclusion
- The anticipated scientific impact will be significant relative to the up-scope investment (e.g., a small additional investment in OOI infrastructure will likely result in a disproportionately large research benefit)
- The balance between near-term research success versus long-term vision will be maintained by the inclusion of up-scope elements
- Inclusion of up-scope elements will improve the OOI's capacity to provide observations that integrate across broad time and space scales