

OOI Project Baseline Schedule, Cost Network Integration

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

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Consortium for Ocean Leadership

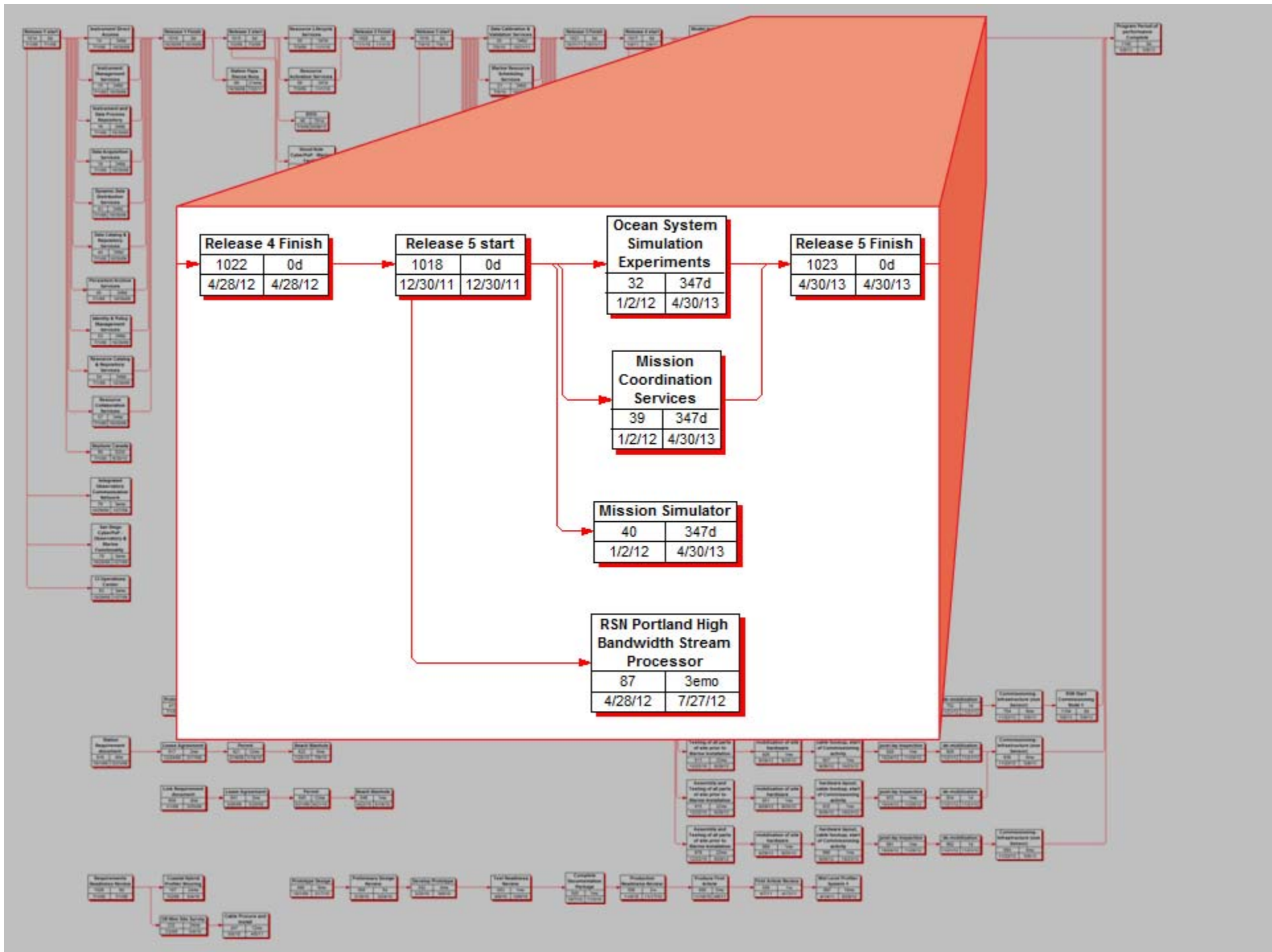


Schedule Management

- Schedule duration developed at the work package level
 - some at lower levels / finer detail
- Integrated schedule created
 - total project duration determined by longest path, the CI development
- Initial set of Baseline Milestones selected to provide progressive tracking of key subsystems (description in PEP)
- Managed by process and configuration control
 - tiered approval
 - formal change control process
- Schedule risk is addressed in the risk contingency
- MSPProject integrated schedule management application

Critical Path Management

- Developing a distributed network of nodes allows some flexibility in when nodes are completed
- Critical path follows CI releases
 - Releases 1-3 build out core OOI infrastructure capabilities
 - Releases 4-5 focus outward providing user access functionality
- Schedule “float” will be used to schedule work around weather windows for node installation
- Cost contingency can be used to keep schedule
 - procure resources, add staffing



OOI Schedule - Baseline Milestones

- Approximately 40 milestones
 - selected for the Baseline from the large number shown at the WP level
 - imbedded in the master program schedule and as an appendix to the PEP
- Milestones carefully selected to focus on first articles and key events
 - software releases
 - major hardware subsystems
- IOs and JOI Division will be managing at lower levels of the WBS and schedule
 - larger number of interim milestones and tasks

OOI Project Schedule Baseline:

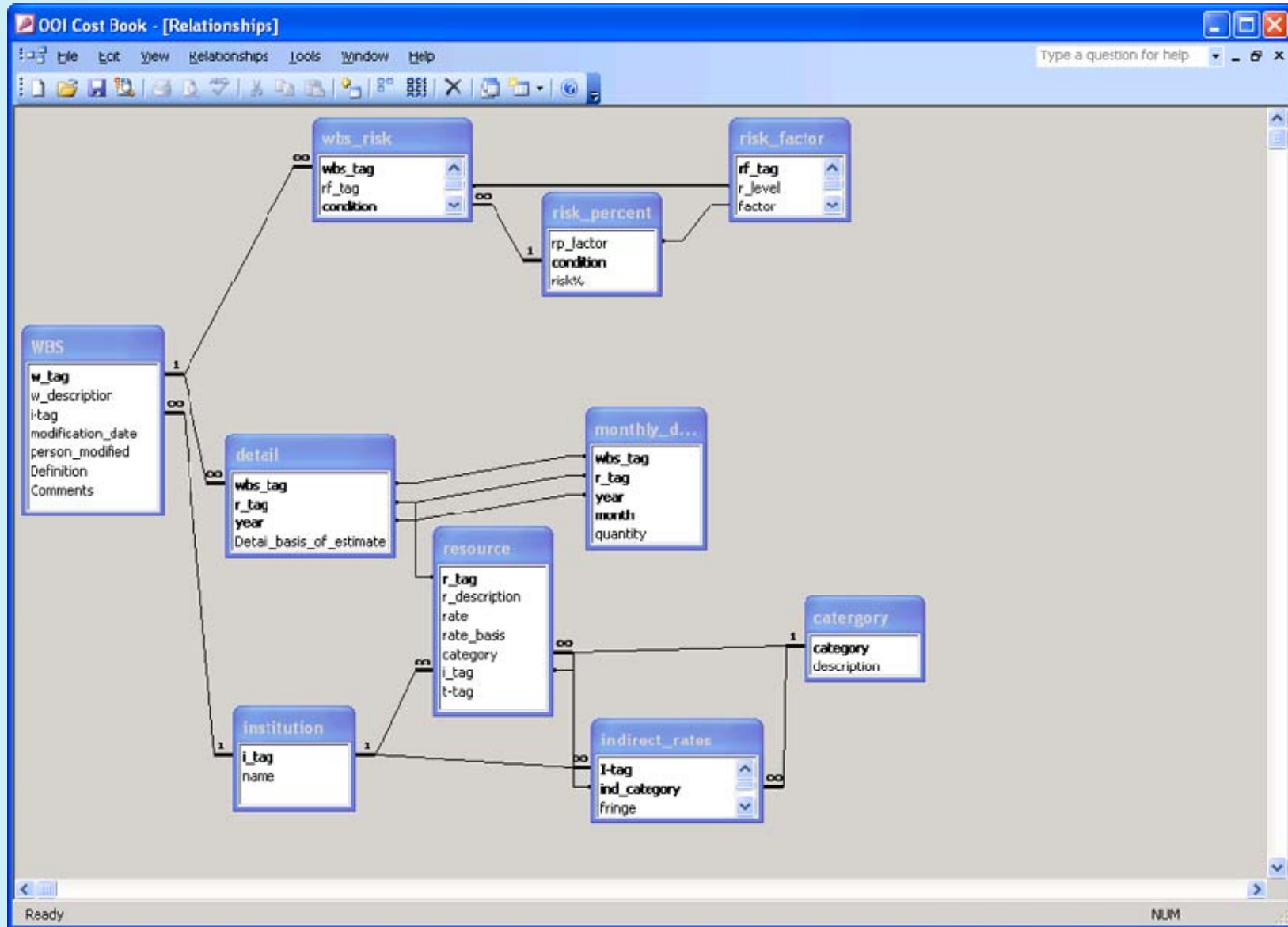
Item	Task Name	Finish
1	OOI Construction Project Baseline and U.S. National Science Board Construction Funding Approval	Jul, 2008
2	RSN Authorization to Proceed	Jul, 2008
3	RSN Requirements Readiness Review	Jul, 2008
4	RSN Cable Plant Award	Oct, 2008
5	Release RFP for education	Mar, 2009
6	CI System Software "Release-1" Complete	Nov, 2009
7	Contract Award - Education Infrastructure Facility	Jun, 2009
8	RSN Shore Stations Build Out Complete build out complete	Aug, 2009
9	Pioneer Coastal Profiler CDR	Aug, 2009
10	Education Infrastructure Requirements Workshop	Nov, 2009
11	Station Papa CDR	Nov, 2009
12	Irminger Sea CDR	Nov, 2009
13	PNW Uncabled Array CDR	Nov, 2009
14	Coastal Gliders CDR	Nov, 2009
15	RSN Backbone / Cable Construction Complete	Mar, 2010
16	CI System Software "Release-2" Complete	Feb, 2011
17	PNW Cabled Endurance Array CDR	May, 2010
18	Issue Infrastructure System Engineering Plan	May, 2010
19	RSN Low Voltage Node Design complete	Jun, 2010
20	RSN Junction Box Design complete	Jun, 2010
21	Shore Station Design Complete	Jul, 2010
22	Pioneer Coastal Profiler Installation Readiness Review / PCA	Jul, 2010
23	RSN Secondary Cable Design Complete	Aug, 2010
24	RSN Mooring Design Complete	Oct, 2010
25	RSN Secondary Cable First Article Review	Dec, 2010
26	RSN Junction Box First Article Review	Dec, 2010
27	PNW Endurance Array Installation Readiness Review / PCA - Gliders	Jan, 2011
28	Pioneer Coastal Gliders Installation Readiness Review / PCA	Jan, 2011
29	Southern Ocean CDR	Apr, 2011
30	PNW P1 - P4 CDR	Jul, 2011
31	35 PNW Endurance Array Installation Readiness Review/ PCA - Uncabled	Jul, 2011
32		
33		
34		
35		
36	PNW Endurance Array Installation Readiness Review/ PCA - Cabled	Jul, 2011
37	Irminger Sea Installation Readiness Review/ PCA	Feb, 2012
38	Beta Test - Free Choice Learning and Post-Secondary Training Environments	May, 2012
39	CI System Software "Release-4" Complete	Oct, 2012
40	Pioneer P1 - P4 Installation Readiness Review / PCA	Aug, 2012
41	Southern Ocean Installation Readiness Review / PCA	Nov, 2012
42	ALV Installation Readiness Review / PCA	Nov, 2012
43	CI System Software "Release-5" Complete	Jun, 2013
44	Education Infrastructure Operational	Jun, 2013
45	RSN Start Commissioning Node 1	May, 2013
46	OOI Complete	July, 2013

OOI Schedule - Baseline Milestones

Cost

- Standard Method for estimating costs
 - OOI Cost Estimating Plan
- Bottoms up estimate follows WBS
 - IO subject matter experts in areas of specialty: cable systems, moorings, profilers, etc...
- Estimates integrated into the OOI Cost Book
- Cost Book provides contingency calculation based on a risk assessment, Access Database
- Cost Book links to MS Project to generate resource loading
- Basis of Estimate (BOE) categorized
 - CP - COTS Catalog
 - HD - Historic Data
 - VQ - Vendor Quote
 - EE - Engineering Estimate

Cost Book Entity Relationship Diagram



WBS Report 1.4.3.1.4

U of Washington Installation and check-out on Submarine wet plant NMS

Modified

Date Person

Definition:

Comments:

Risk Summary

Risk factor	Condition	Risk	Assessment
technical	manufacturing	12.00%	New design different from established product line. Existing technology
schedule	schedule	4.00%	Delays completion of noncritical path subsystem item
cost	material	6.00%	In-house estimate for item with minimal company experience but related to existing capabilities

Category	Resource	Quantity	Rate	Basis	Cost	Indirect/Fringe	Cost Plus	Risk Adjustment
labor					10,601		24,682	5,430
	UW_APL_ 2010 UW APL Software Engineer 3	20.00	\$47.00	hour	940	17.00% 99.00%	2,189	481
	UW_APL_ 2010 UW APL Sr. Software Engineer	20.00	\$59.00	hour	1,180	17.00% 99.00%	2,747	604
	UW_APL_ 2011 UW APL Software Engineer 3	80.01	\$47.00	hour	3,760	17.00% 99.00%	8,756	1,926
	UW_APL_ 2011 UW APL Sr. Software Engineer	80.01	\$59.00	hour	4,721	17.00% 99.00%	10,991	2,418
travel					11,400		13,338	2,934
	UW_APL_ 2010 UW APL US Travel	1.71	\$1,900.00	trip	3,257	17.00% 0.00%	3,811	838
	UW_APL_ 2011 UW APL US Travel	4.29	\$1,900.00	trip	8,143	17.00% 0.00%	9,527	2,096

WBS Report 1.4.3.1.4

U of Washington Installation and checkout of Submarine weapon

Modified Date

Definition:

Comments:

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Risk Adjusted
\$44

Category Resource

labor

Category	Resource	Quantity	Rate	Unit	Cost	Start	End	Duration	Value	Weight
UW_APL_2010	UW APL Engineer								5,430	
UW_APL_2010	UW APL Sr. Software Engineer	20.00	\$59.00	hour	1,180	17.00%	99.00%	2,747	604	
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WBS Report 1.4.3.1.4

U of Washington Installation and check-out on Submarine wet plant NMS

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Modified

Date Person

Risk Adjusted Total

\$46,384.95

WBS SubTotals

Cost

22,001

Cost + Indirects

38,020

Risk

22.00%

8,364

		Engineer 3							
UW_APL_ 2010	UW APL Sr. Software Engineer	20.00	\$59.00	hour	1,180	17.00%	99.00%	2,747	604
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Contingency Estimate and Management

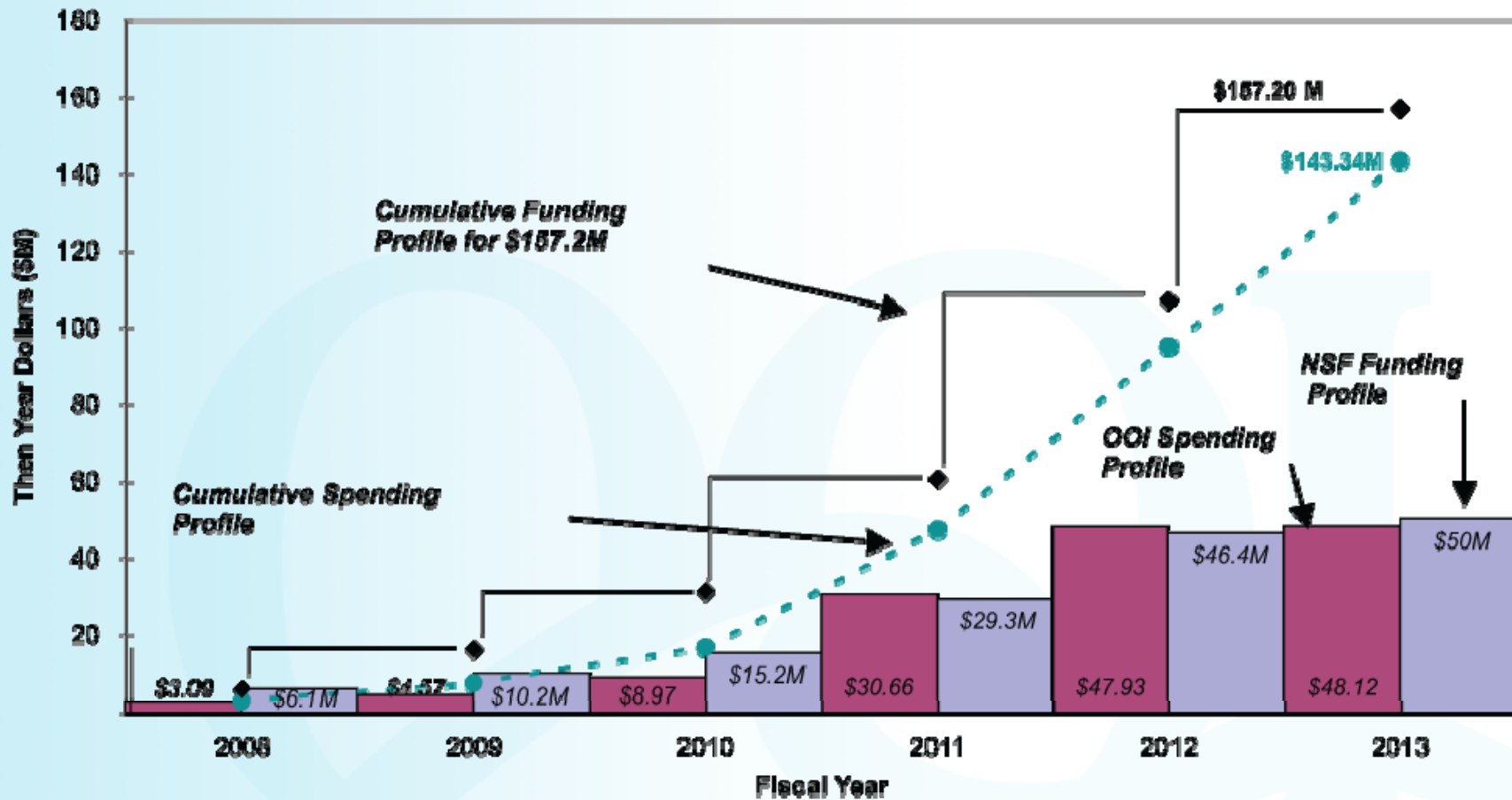
- Contingency 18% at the project level
 - Developed bottoms-up
- Contingency at BOE levels range from 5% to 58%
- Contingency held at Project Office
- Managed in accordance with the Configuration Management Plan
- NSF holding \$10 million in Management Reserve (~3%)

O&M Cost Projection

Fiscal Year	2008	2009	2010	2011	2012	2013	Total
Project Office	1.29	1.59	2.13	2.59	3.19	3.69	14.47
Cyber IO	.53	.66	1.18	1.31	1.63	2.88	8.18
Coastal/Global IO	0.0	0.0	1.32	20.79	29.40	27.40	78.91
Regional IO	1.27	2.32	4.34	5.97	13.72	14.15	41.77
Total OOI	3.09	4.57	8.97	30.66	47.93	48.12	143.33

\$ Millions

OOI O&M Funding



Cost Estimate Summary

- Current / Preliminary cost estimate formally prepared by OOI-savvy estimators using standard estimating process
- Base estimates developed with MARS knowledge
- Contingency is based on methodical risk evaluation process
- Contingency level appropriate for a system based significantly on commercial off the shelf designs and components
- Interval between PDR and MREFC funding (July 2008) will be used to continue to mature and add detail to the BOEs and risk assessments

Network Integration

- Science User Requirements and the System Requirements Document (SRD) set the stage for an integrated system with high level requirements for an integrated global system
- SE Team developed initial Interface Requirements Agreement (IRA)
 - Cyberinfrastructure to Coastal Global Scale Nodes
 - Cyberinfrastructure to Regional Scale Nodes
 - Regional Scale Nodes to Coastal Global Scale Nodes
- IRA defines the responsibilities, physical and logical interfaces between Cyberinfrastructure and the Marine Observatories
- IRA defines the integration requirements between Coastal and Regional systems for the Coastal Endurance Array connection to the Regional system

Network Integration

- Each IO created their design to deliver the sensing systems needed to satisfy the Science User Requirements and the system requirements.
- Preliminary Network Design document describes the integrated system and subsystems to be delivered to meet these requirements
- Network integration via the Cyberinfrastructure will be documented via the requirements data base and the design as it is implemented Release by Release. Formal integration testing is part of the CI approach based on a test acceptance criteria and verified by a commissioning process

Summary

- Bottoms-up cost book completed per a Cost Estimating Plan.
- Integrated, resource loaded schedule with critical path assessment has been developed that meets the NSF funding profile
- Network integration is documented in a set of Interface Requirements Agreements, requirements documents and technical data diagrams and is integral to CI development

Good Collaborative Working Environment between
Ocean Leadership and the Implementing Organizations