Schedule of Construction

Project Management and Control

Anthony Ferlaino
OOI Project Manager
Process Controls of a Large Facilities Project

- Scope
- Work Breakdown Structure
- Resources and Materials
- Time Phasing
- Integrated Schedule
- Funding Budget
- Program Policies and Procedures
- Change Control
- Construction
<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Import Export Demo 1</td>
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<tr>
<td>L2 Common Requirements</td>
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<td>L2 Cyber-User Requirements</td>
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<td>L2 Operational Requirements</td>
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<tr>
<td>L2 Science Questions</td>
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**DOORS Database: /L2 OOI Program - DOORS**

**File**  
**Edit**  
**View**  
**Favorites**  
**Tools**  
**Help**

- **Favorites**
- **Location** /L2 OOI Program

**DOORS Database**

- **Archive**
  - **L2 OOI**
    - **L3 System**
      - CG System
      - CG-CI Interface Agreement
      - C1 System
      - CI-RSN Interface Agreement
      - RSN System
      - RSN-CG Interface Agreement
    - **L4 Subsystem**
      - CG Autonomous Underwater Vehicle
      - CG Data Concentrator
      - CG Glider
      - CG Instrument Package
      - CG Moorings
      - CG Multi-function Nodes
      - CG Platform Control
      - CG Power Systems
      - CG Profiler
      - CG Shore Station
      - CG Surface Bouys
      - CG Telemetry Systems
      - C1 Analysis and Synthesis
      - C1 Common Execution Infrastructure
      - C1 Common Operating Infrastructure
      - C1 Data Management
      - C1 Planning and Prosecution
      - C1 Sensing and Acquisition
      - RSN Backhaul
      - RSN Extension Cable
      - RSN Instrument Package
      - RSN JBox
      - RSN LV Node
      - RSN Observatory Mgmt System
      - RSN Primary Infrastructure
      - RSN Profilers
      - RSN Shore Station
      - RSN Vertical Mooring

**Username:** aferlaino  
**User type:** Standard  

Science Community Workshop 1
WBS as an Integrator
Policies, Process, Plans and Tools

- Systems Engineering Management Plan
- Configuration Management Plan
- Risk Management Plan
- Earned Value Management Plan
- Schedule Management Plan
- Cost Book Database, Cost Estimating Plan
- Property Management Plan
- Collaborative Tools
  - Confluence, WebEx
  - Alfresco
  - JIRA
  - Subversion
  - DOORS
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<td>L4-RSN Shore Station</td>
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Construction

Build Something Already!
Systems Engineering “V” Model

- Iteration 1
  - Acquirer Needs & Expectations
  - Acquirer Requirements
  - Other Stakeholder Requirements
  - System Technical Requirements
  - Logical Solution Representations
  - Physical Solution Representations
  - Specified Requirements
  - Software & Hardware Implementation
  - OOI Commissioning
  - End Product Formal Acceptance Testing
  - System-of-Systems Integration & Test
  - System Integration & Test
  - Subsystem Integration & Test
  - Element Integration & Testing

- Iteration 2
  - Iteration N

Decomposition & Definition
Validation
Verification
Integration & Verification
Acquisition & Supply / Technical Management / Technical Evaluation

OL IOs
Progressive Test and Acceptance

- Component Level Testing
  - Connectors, LVNs, MVNs, AUVs, Gliders, Sensors, FATs, etc.
- Subsystem / System Integration Tests (Hardware/Software)
  - Software functionality
  - Control and Data integration, Data throughput, Data quality
  - FATs
- Sub-System / System Readiness Testing
  - Primary and Secondary Infrastructure inspections and tests
  - Software release testing
  - AUVs, Gliders etc.
  - FATs
- System Acceptance Tests (Transfer of Ownership)
  - Primary/secondary Infrastructure with nodes, software and communications
  - Buoys, moorings, sensors, equipment and software and telecommunication
  - Pioneer and Endurance buoys, moorings, sensors equipment, software and communications
  - Shore stations
- Culminate in Commissioning at Array Level
  - Acceptance transfers property ownership to OL
  - Begin Operations domain control of systems
  - Starts insurance
Progressive Test and Acceptance

• System Acceptance Tests (Transfer of Ownership)
  – Primary/secondary Infrastructure with nodes, software and communications
  – Buoys, moorings, sensors, equipment and software and telecommunication
  – Pioneer and Endurance buoys, moorings, sensors equipment, software and communications
  – Shore stations
  – Providing Data As Available
    • Subject to Testing Needs
    • Demonstration of Integrated Steady-State Capabilities

• Culminate in Commissioning at Array Level
  – Acceptance transfers property ownership to OL
  – Full Support and Logistics Systems Available and Operating
  – Begin Operations Domain control of systems
  – Starts insurance
  – Available for
Configuration Management

- Standards and Conventions
  - Naming, Numbering, Drawing
- Responsibilities and Authority
- Controlled vs Non-controlled
- Details on Technical Documents
- Document Management, Types, Stages
- Collaboration Applications
- Configuration Control Structure and Process. Change Control Boards (CCB)
  - IO Change Control Board
  - System Level Change Control Board
  - OOI Change Control Board
CCB Benefits

• Use change control process to manage project baselines, requirements, guiding principles (hierarchical decision tree)
• The CCB process is required to ensure product quality, schedule, budget and business commitments
• Controlled process to estimate Impact of changes
• Communication that authorizes changes to a baseline release
Classes of Changes

Class I Changes:
• Change to a controlled design document, controlled policy/plan document, statement of work or contract and one or more of the following statements apply:
  – Affects any physical or functional requirement in approved configuration
  – Affects any approved functional, allocated or product configuration documentation, cost, warranties, or contract milestones,
  – Affects approved product configuration documentation and one or more of the following:
    • safety, correction of a hazard or conformance to applicable design standards,
    • compatibility, interoperability, interfaces, or logistic support, retrofit of tested or delivered units, interchangeability, substitutability, or replace ability of any item down to non-repairable subassemblies, sources on a source control drawing
  – Affects system configuration to the extent that retrofit (replacement of components) action would be taken on a formally tested or commissioned component.
Classes of Changes

Class II Changes:

- Change to a controlled item and not categorized as class 1, such as:
  - Cost of change is below specified threshold
  - EVM items, Task level or lower, under the management of a CAM
  - Correction of typographical errors
Board Levels

- IO Level
- System Level – Interfaces with other subsystems/systems or IOs
- OOI Level – Science Scope, Baseline Budget / Schedule
- NSF Program Manager Review – CA and CSA Thresholds

- Each with specified core membership, authority and reporting structure
Construction

Build Something Already! Really!
Schedule Graphic
Construction

The Beginning.