Pioneer Array Micro-siting Meeting

June 7, 2011
Coastal Institute
University of Rhode Island
PIONEER ARRAY MICRO-SITING MEETING AGENDA

• Welcome, Introduction
• Pioneer Array Timeline
• Pioneer Array
  – Description
  – Revisions and rationale
• Report on written comments
• Update on Pioneer Array schedule & activities
• Opportunity for questions and answers

June 7, 2011
PIONEER ARRAY TIMELINE

- Programmatic EA: June 2008
- FONSI PEA: February 2009
- Draft Site Specific EA: August 2010
- Final EA & FONSI: January 2011
- Micro-siting Public Meetings: October 2010, November 2010, June 2011
- Test Deployment: September 2011 – April 2012 (pending)
- USACE & USCG Permits: Winter/Spring 2012

June 7, 2011
Pioneer Array Design

Figure courtesy of WHOI
Surface Mooring

• Instrumented buoy
  – Surface meteorology, waves
  – Carbon dioxide (air and sea)
• Subsurface instrument frame
  – Temperature and salinity
  – Dissolved oxygen, pH
  – Currents
  – Optical properties
  – Chlorophyll, organic matter, Nitrate
• Multi-Function Node
  – Temperature and salinity
  – Dissolved oxygen
  – Currents
  – Optical properties
  – Acoustic zooplankton sensor
  – Connection for additional sensors
• AUV dock
  – Inshore and Offshore sites only
  – Offload data and recharge AUV
Moored (wire-following) Profiler

- **Telemetry buoy**
  - Satellite telemetry to shore
- **Subsurface sphere**
  - Maintains taut wire
- **Subsurface profiling body**
  - Temperature and salinity
  - Dissolved oxygen
  - Currents
  - Optical properties
  - Chlorophyll, organic matter
- **Subsurface instrument frame**
  - Water-column currents
Winched (surface-piercing) Profiler

• Profiling Body
  – Telemetry to shore
  – Temperature and salinity
  – Dissolved oxygen
  – Dissolved carbon dioxide
  – Currents
  – Optical properties
  – Chlorophyll, organic matter
  – Nitrate

• Bottom frame
  – Water column currents
Representative Buoys

Instrumented Buoy

Winched Profiler
Representative Buoys

Telemetry Buoy
Gliders and AUVs

• Gliders and AUVs
  – Temperature, salinity and pressure
  – Dissolved oxygen
  – Currents
  – Optical properties
  – Chlorophyll, organic matter
  – Nutrients (AUVs only)
### Pioneer Array Installation Schedule

<table>
<thead>
<tr>
<th>OOI Installation Schedule</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal Array</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pioneer</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
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<tr>
<td></td>
<td>JFM</td>
<td>AMJ</td>
<td>JAS</td>
<td>OND</td>
</tr>
</tbody>
</table>

#### Legend
- **Installation**
- **Data Flow**
- **Commissioning**
- **Glider Deployed**
- **AUVs Deployed**

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**June 7, 2011**
Pioneer Array: Micro-siting Revisions
Pioneer Array (Nov 2010)

Moored Array
15 nm x 5 nm

AUV Operations
43 nm x 59 nm

Glider Operations
70 nm x 81 nm
Revised Pioneer Array (April 2011)

Moored Array
25 nm x 5 nm

AUV Operations
43 nm x 59 nm

Glider Operations
70 nm x 100 nm
North/South extent 15 nm
East/West extent 5 nm

Distance between moorings 3.5 nm to 6 nm

Buffer Zone Radius 0.5nm

Distance between Buffer Zones 2.5 nm to 5 nm (see chart)
Revised Moored Array (April 2011)

North/South extent 25 nm
East/West extent 5 nm

Distance between moorings 4.5 nm to 8 nm

Buffer Zone Radius 0.5 nm

Distance between Buffer Zones 3.5 nm to 7 nm (see chart)

* Crosses indicate representative locations only; precise locations are not yet determined
Navigation Safety

Pioneer Array buoys will follow U.S. Coast Guard Private Aids to Navigation (PATON) regulations:

• Reflective panel and designation letter on hull
• USCG approved lighting (strobed marine lantern)
• Passive Radar reflector (on all buoys)
• Contact information on buoy hull
• Inclusion on the Notice to Mariners, Local Notice to Mariners, and Light List,
• Location marked on NOAA digital charts
In addition, OOI will also provide:

- Active radar pinger (on some buoys)
- Recommended Area to be Avoided (voluntary buffer zone of 0.5 nm radius around each mooring site)
- Guard buoys to delineate Area to be Avoided for sites shallower than 250 fm.
- Boat Trax (broadcasts buoy positions to nearby, receiver-equipped boats)
Guard Buoys in the Revised Array

Sites with Guard Buoys

49 fm

52 fm

52 fm

82 fm

52 fm

40°N

50°N

71°W

50°W

AUV Boundary

Plueddemann (WHOI)
<table>
<thead>
<tr>
<th>Site</th>
<th>Name</th>
<th>Location of Site Center</th>
<th>Depth fm (meters)</th>
<th>Surface Mooring</th>
<th>Moored Profiler</th>
<th>Winched Profiler</th>
<th>Guard Buoy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Upstream Inshore</td>
<td>40°20.7’N 70°41.0’W</td>
<td>52 (95)</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
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<tr>
<td>2</td>
<td>Inshore</td>
<td>40°21.0’N, 70°47.5’W</td>
<td>52 (95)</td>
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<td>3</td>
<td>Central Inshore</td>
<td>40°13.0’N, 70°47.5’W</td>
<td>68 (125)</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>4</td>
<td>Central</td>
<td>40°08.5’N, 70°47.5’W</td>
<td>74 (135)</td>
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<td>0</td>
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<td>1</td>
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<tr>
<td>5</td>
<td>Central Offshore</td>
<td>40°04.0’N, 70°47.5’W</td>
<td>82 (150)</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
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<tr>
<td>6</td>
<td>Offshore</td>
<td>39°56.0’N, 70°47.5’W</td>
<td>252 (480)</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td>7</td>
<td>Upstream Offshore</td>
<td>39°55.1’N 70°41.0’W</td>
<td>252 (480)</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Science Moorings (10) 3 5 2 --
Guard Buoys (8) -- -- -- 8

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Ocean Observatories Initiative

Test Deployments

What, When, Where
OOI Test Deployments: 2011-2012

- **Shelfbreak site, 39° 55.0’ N, 70° 47.5’ W**
  - two moorings at 285 fm (520 m)
  - Surface mooring
  - Moored profiler

- **Deep Ocean site, 39° 30.0’ N, 70° 47.5’ W**
  - one mooring at 1356 fm (2480 m)
  - Moored profiler (hybrid type)

- **Time frame**
  - Deploy September 2011
  - Recover April 2012
Test Deployment Locations

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• SEE MATRIX
PIioneer Array Schedule and Activities

• Science Outreach Day at Whaling Museum
  – September 17th – 10am to 2pm
  – Specific Session for Test Update and Q&A

• Test Moorings Deployed – September 22, 2011
• Apply for permit – Winter/Spring 2012
• Meeting in June 2012 to update everyone on test lessons learned and any modifications
• Deploy Gliders – June 2012
• Pioneer Moorings Deployed – 2013, 2014
PIONEER ARRAY Q&A

• Questions & Answers

• Info
  – Monthly emails
  – Meetings
  – We respond to phone calls and emails
    • [Jmcgover@nsf.gov](mailto:Jmcgover@nsf.gov)  703-292-7591