Offshore Wind Farm Contributions to a Regional Environmental and Ecological Monitoring System to Address Multi-User Needs a New Jersey RMI Project

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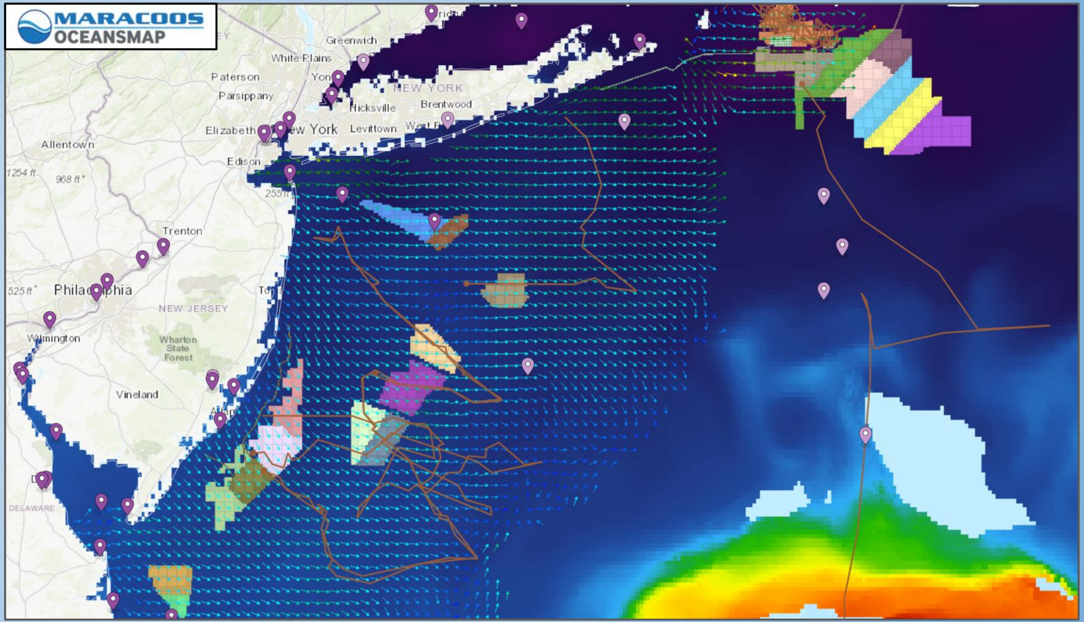


Center for Ocean Observing Leadership

Offshore Wind Developers and OEMs Meeting: Engineering Focused Discussion

Agenda:

11:30	Welcome & Introductions* - Kris Ohleth, SIOW
11:45	Topic Background - Tony MacDonald, Monmouth University
	RMI Project Overview & Timeline - Josh Kohut, Rutgers University
11:55	Examples of Offshore Sensors - Doug Zemeckis, Rutgers University
12:05	Existing Technology Databases - Cris Hein & Kristen Ampela, NREL
12:15	Brief Q&A - Doug Zemeckis, Rutgers University
12:20	Facilitated Discussion & Next Steps - Kris Ohleth

******Participants will be initially muted during presentations. Please unmute during introductions and facilitated discussion. Please add questions for Q&A into chat during presentations.***

Topic Background
Tony MacDonald, Monmouth University

RMI Project Overview & Timeline
Josh Kohut, Rutgers University

- **Task 1 -** Provide recommended language on monitoring requirements/guidance to be included in the third NJ OREC solicitation.

- **Task 2 -** Develop a Conceptual Plan for individual wind energy area contribution to a Regionally-Based Environmental and Ecological Monitoring System

Visit our project website for more information:

Research and Monitoring Initiative (RMI)

Center for Ocean Observing Leadership

Conceptual Plan Development & Project Timeline (Task 2)

Topic 1) Statement of Observing Network Objectives

April 2024: Introductory webinar and survey launch
Mid-May 2024: Survey deadline and presentation of preliminary results at RMI Symposium
End of May 2024: Webinar to present final survey results and summarized objectives

Topic 2 & 3) Description of the Observing System Components and Recommended Deployment Methodology

June-August 2024: Dissemination of Instrumentation List
July 2024: State of the Science, State of the Technology side meeting
October 2024: Developer and OEM meeting: engineering focus

Topic 4) Description of the Recommended Data Quality and Management Standards

July 2024: State of the Science, State of the Technology side meeting
November 2024: Engage data managers

Monitoring and Observing Objectives

- ➔ **Ecological and Environmental Research**

  Climate Impacts

  OSW Specific Impacts

- ➔ **Management of Living Marine Resources**

- ➔ **Other Guiding Objectives including:**

  Weather forecasting

  Technology Innovation

Topics 2 and 3 - Observing Systems Components and Deployment Methods

State of the Science Workshop (July)

State of the Technology side meeting takeaways:

- ➔ Standardization is a priority - multisensor, all-inclusive, standardized platform or network.
- ➔ More clarity on budget and schedule parameters - at what point/s can sensors be integrated?
- ➔ Collaboration and discussions with engineers to understand opportunities and challenges.

2024 State of the Science Workshop

2024 State of the Science Workshop on Offshore Wind Energy, Wildlife, and Fisheries

MTS marine technology society Opportunity runs deep™

RWSC Regional Wildlife Science Collaborative for Offshore Wind

Examples of Offshore Oceanographic Sensors

Dissolved Oxygen
5-14 VDC, 0.12 kg

Water Temp & Salinity
32x5", 9-28 VDC, 7.3kg

Plankton Imagery
24-36VDC, 35 Watts
1x0.26m, 32kg

Currents and waves
21x14cm, 12-48W, 2.2kg

Avian/Bat Radar
22x25", 25 lbs, 200-300W

Representative Sensor Specifications:

- ➔ **Size:** ~ 10cm to 2m
- ➔ **Weight:** ~0.2-30 kg
- ➔ **Power:** ~5-40 VDC; 10-50W (Radar: 300W)

Examples of Offshore Ecological Sensors

Acoustic Telemetry

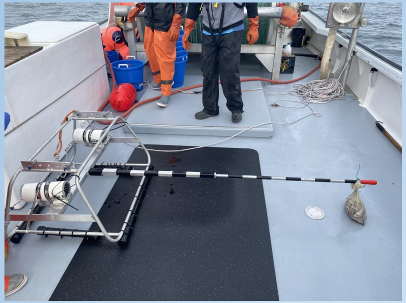


Telemetry Receiver
Lithium Battery ~ 13 months
73 mm diameter, 308 mm length

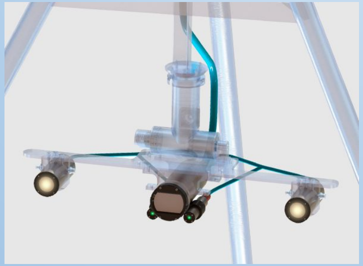
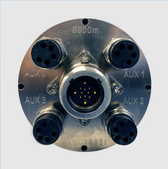
Cabled Receiver
Power Supply DC 10-24 V
51 mm diameter, 327 mm length

The Atlantic Cooperative Telemetry Network

Visual Surveys

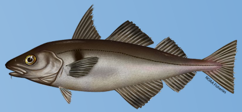



Baited Remote Underwater Video (BRUV)
GoPro Cameras, Lithium Batteries

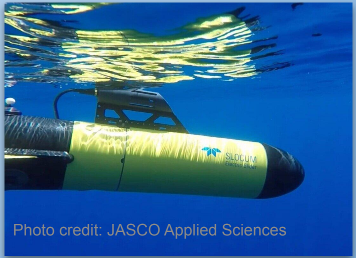



SubC Imaging
Observatory Camera System
Voltage 18-32 Vdc

Passive Acoustic Monitoring


Digital Acoustic Monitoring “DMON” Buoy



AUV PAM
220 mm diameter
1.5 m length

Existing Technology Databases
Cris Hein & Kristen Ampela, NREL

NREL
Transforming ENERGY

- **National Offshore Wind Research & Development Consortium**
  Developed by Worley Consulting & BRI
  - https://nationaloffshorewind.org/projects/technology-development-priorities-for-scientifically-robust-and-operationally-compatible-wildlife-monitoring-and-adaptive-management/

- Technology Databases-Birds & Marine Mammals
- Downloadable excel files
- In depth information on each type of technology (e.g., passive acoustics, satellite tags) & on specific technologies (e.g., Soundtrap ST600HF)
- Static with no plans for future updates

- Accompanied by 5 technical reports & 1 publication

NATIONAL OFFSHORE WIND
RESEARCH & DEVELOPMENT CONSORTIUM

- “Broad” table example

Technology Type	If other Technology Type, specify	Species/species group	Availability	System Overview	Geographical scale	Current development stage	Real time or Archival
Passive Acoustics	Bottom mounted PAM systems	Marine Mammal	Commercially-available; Custom; Contact developer for access	Bottom mounted recorders that can collect acoustic signals continuously or on duty cycle or be triggered by events (calls/clicks)	MESO/medium (several turbines)	Validated; currently deployed/used	Archival
Autonomous Underwater Vehicle (AUV)	Include surface and underwater	Marine Mammal	Commercially-available; Lease; Custom	The autonomous underwater vehicle (AUV) category includes Remotely Operated Vehicles (ROVs), and two types of Gliders: sea surface and underwater. AUVs are platforms that can collect a wide range of data (acoustic, oceanographic etc.). Gliders are wave or sola operated and can operate over large distances/periods of time where as ROVs tend to be battery or fuel powered.	MESO/medium (several turbines); MACRO/large (entire OSW farm)	Currently deployed/used	Both

- “Detailed” table example

Technology Type	Name	Model	Temporal Scale: Duty Cycle	Current Deployment Stage	Availability	Location	If on Turbine, specify where
Passive Acoustics	DMON/LFDCS	**NA**	Continuous, Triggered Event	Implemented	Custom	Water column	NA
Autonomous Underwater Vehicle (AUV)	Slocum glider	**G3**	Can be adjusted	Tested but not for OSW, Tested for OSW	Commercially-available	Independent System	NA

- **Wind Energy Monitoring & Mitigation Technologies Tool**
  - Developed by IEA Wind Task 34: WREN
  - https://tethys.pnnl.gov/wind-energy-monitoring-mitigation-technologies-tool

- Technology Database-Land-based & Offshore Wind / All Environmental Interactions
- Searchable interactive Tool or downloadable excel file
- Higher level descriptions on specific technologies
- Evergreen, updated quarterly
- Available publications & reports linked to each technology
- Links to technology website

WREN
Working Together to Resolve Environmental Effects of Wind Energy

- Interactive Tool

Category: - Any -
Hierarchy: - Any -
Industry: - Any -
Implementation Phase: - Any -
Stressor: - Any -
Receptor: Choose some options
Development Status: - Any -
Research Status: - Any -
Search:
Apply

Type	Stressor & Receptor	Technology	Description	Placement & Integration	Research Summary	Citations
Monitoring Offshore Planning, Operation	Displacement Birds, Bats	**3Bird** **3Bird Radar Offshore System**	3Bird Stabilized Offshore Radar System - stabilized ornithological radar for marine research on migrating birds detects automatically birds and bats on the open sea. 3Bird Radar has its own independent self-levelling system....**Read more**	Radar equipment are placed on vessels' decks.		No available documents.
Monitoring, Mitigation Land-based Planning, Operation	Turbine Collision Birds, Bats	**Accipiter Radar Corp.** **Accipiter NM1-8A Avian Radar System**	The Accipiter® NM1-8A Avian Radar System is a software-definable, 2D surveillance radar specifically designed to detect and track birds and bats....**Read more**	Mounted near wind farm	**Small-Scale Field Study** Brand et al. (2011) tested and compared multiple types of radars. Criteria included automatic tracking, sampling protocols, data streaming, data integration, and data fusion....**Read more**	**Brand et al. 2011**

Q & A

Discussion

- ➔ What is the typical interaction between developers and turbine suppliers regarding sensor deployment re: design, engineering, etc?
- ➔ When in the design process would sensor inclusion be an opportunity step?
- ➔ Discuss the dynamic between regulators recommending vs requiring sensors.

Discussion

- ➔ Could there be a physical placeholder on turbines as a standard space for inclusion of sensors? Dedicated communications lines? Power supply?
- ➔ What are the biggest impediments and limiting factors to the implementation of this type of request?
- ➔ Is it preferable to have a baseline required/recommended set of sensors for all East Coast projects? Or to require on a project-by-project basis?
- ➔ Other areas for discussion – legal, HSE, logistics, etc

Next Steps

Your continued feedback is important!

- ➔ Where are the gaps?
- ➔ What did we not capture in this discussion?
- ➔ **Please feel free to add your additional thoughts/comments to the Qualtrics Form linked in the Chat.**
- ➔ We will be setting up bilateral meetings to address gaps as needed. Please let us know if there are others in your organization we should connect with on these important questions.

Thank you for your participation.