

Whale Tracking Multi- Sensor Challenge 2021

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NW Tech Bridge Whale Tracking Challenge 2021

Challenge Statement:

- Develop a marine mammal (Orca) detection system to be placed onboard Navy and commercial vessels and displayed on the bridge in real time.
- The data should be of sufficiently high quality with the potential of interface with the standard vessel navigation displays and potentially AIS.
- To allow a ship captain to identify an Orca whale in sufficient time to make a course correction to avoid a whale strike at speeds of 37 knots (new high speed ferry operating speeds) in any light conditions.



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Current Activities:

- Secured partnership with NSIN and its commitment to funds
- Beginning establish Challenge management team
- Technical Requirements Document; in progress

- Ongoing discussions with potential stakeholders

Pacific Fleet	State Government	NAVSEA
Industry	PNNL	Maritime Blue
NSIN	ONR	Alaska Native Corporation
Federally recognized Tribes and Nations	Offshore Wind Community	Kitsap Transit
Port of Bremerton	Port of Seattle	Quiet Sound
Universities/Labs	APL	DOE
NUWC Keyport	Navy Region Northwest	NSWC Port Hueneme



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Current Challenge Drivers:

- Increasing Maritime Traffic in the Puget Sound
 - **In addition to the currently established high speed ferry routes to Seattle from Kingston, Bremerton, and Southworth, the following additional routes are being considered: Port Townsend– Downtown Seattle Port Townsend– Bellingham Orcas Island–Bellingham Camano Island–Everett Tacoma– Olympia: Source PSRC Passenger Only Ferry Study, January 2021.*
- Current whale strike mitigation measures are dependent on human observers/ watch standers.
- There is currently no system for manned or unmanned vessels to track marine mammals and make navigational decisions
- Other parts of the country/world have struggling with similar problem
 - Northeast Seaboard: Right whale transit areas conflict with Offshore wind farm vessel traffic.
 - US Navy Pacific test areas overlap whale habitat and transit areas



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Preliminary Functional Requirements:

System Objectives:

- A prototype marine mammal (Orca) detection system onboard Navy and commercial vessels and displaying real time mammal location on the bridge.
- Adaptable to both unmanned or manned vehicles transiting open-ocean or inland seas.
- May include vector sensors, low-power hull mounted sonar, hydrophones, IR, camera and then processes the outputs through data fusion and advanced sensor processing.
- Output provided as a single Common Operating Picture (COP) to the Mariner through a clear User Interface (UI).
- Provide clear information on bearing and range for real-time navigational decision making.
- A detection system that could cross-share real-time data through local AIS or other means with vessels or Mariners in the area.



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Preliminary Functional Requirements(cont'd):

Assumptions, Constraints and Dependencies:

- Technologies shall be capable of deployment without the need for any EPA studies (EIS).
- The system shall not afford non-US governmental entities the ability to track Navy vessel traffic movements.
- The system shall be capable of real time bridge display critical to local 37 knot ferry operation providing to sufficient time to avoid a whale strike at speeds of 37 knots in any light conditions.



NW Tech Bridge Whale Tracking Multi- Sensor Challenge 2021 - Acquisition Effort

Hardware

Existing
Gliders w/
Classifiers
w/
hydrophone

New Vector
Sensors,
EO/IO,
Biometrics

Software

Existing
Data Sets
NIWC PAC,
ORCASOUND,
IBM Acoustic
Insights
Program,
MCST, Arete
(400GB visual
data), AI/ML,
M3R

New
Acoustic
collection
AI/ML
(unsupervised
learning)

EO/IO

Integration

Consortium (Organize Resources):

- EPA (\$), NOAA, Tribes, States, DON, Non Profits, Industry (Research of IBM, Microsoft, Google...) Orca Sound, Quiet Sound (Port of Vancouver, WA State, etc), UW, URI, (university led- interdisciplinary)

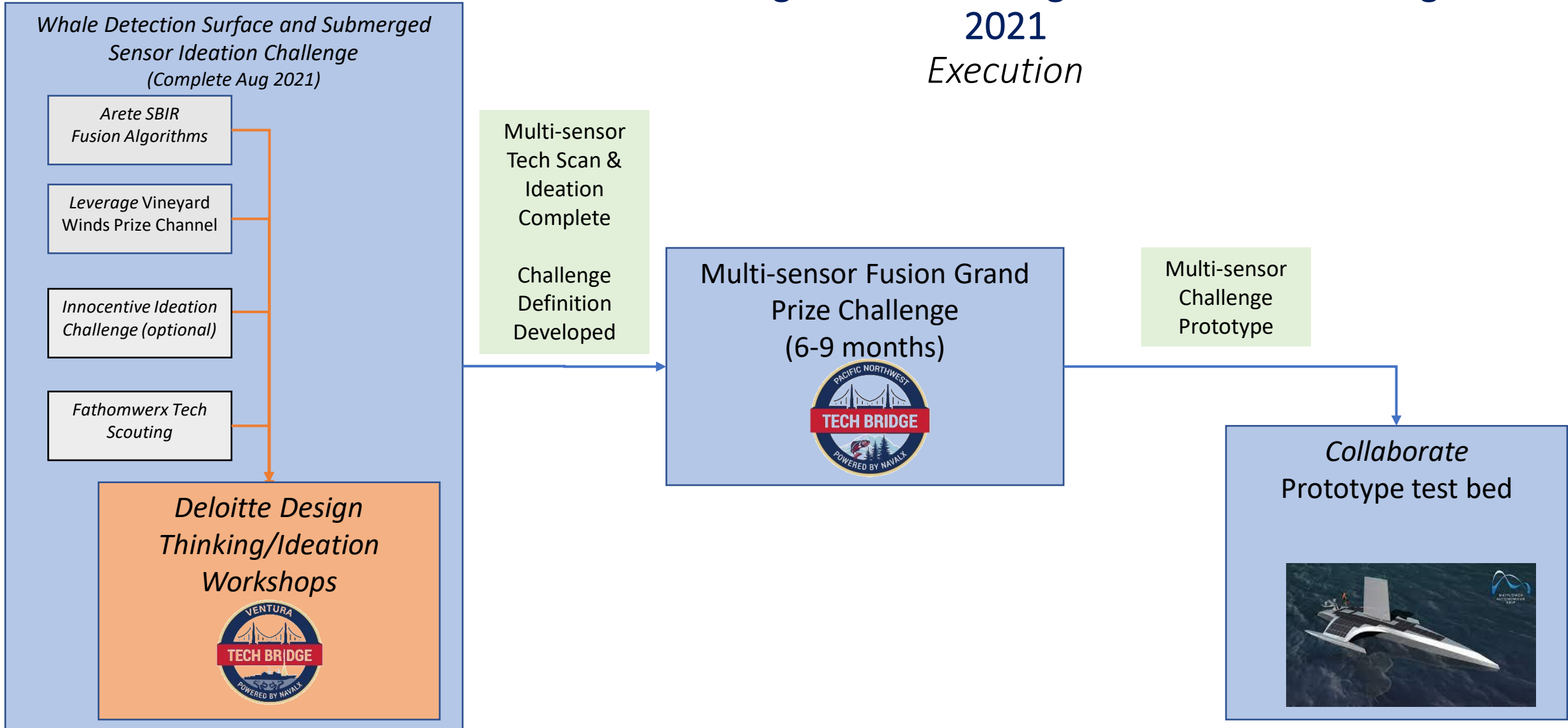
Whale
Detection,
Surface and
Submerged
Sensor
Ideation
Challenge

Fusion and Integration Prize
Challenge

Running the prize challenge
(401 TB)

Coordinating the
efforts – Arete,
NPT, KPT, PHE,
etc

NW Tech Bridge Whale Tracking Multi-Sensor Challenge 2021 Execution





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Thank You!