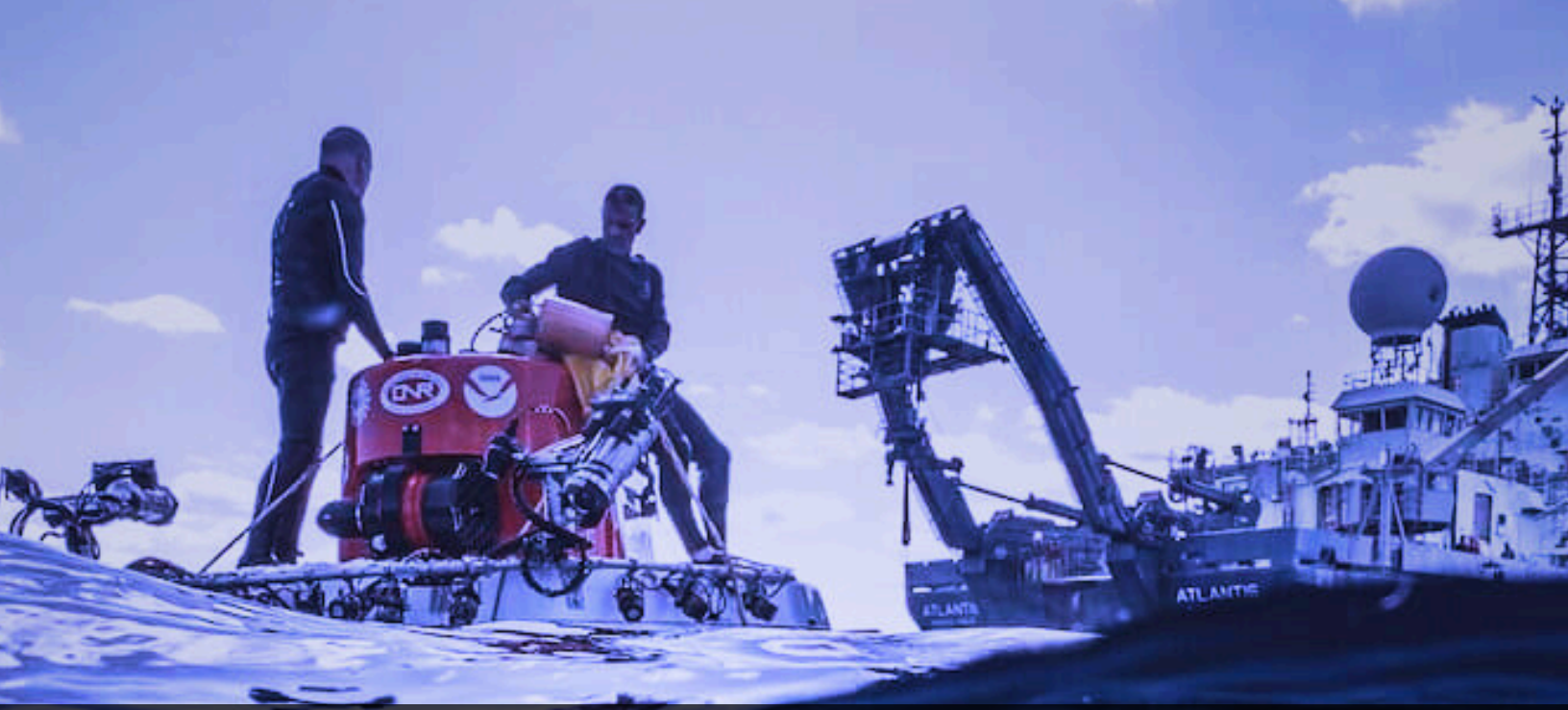
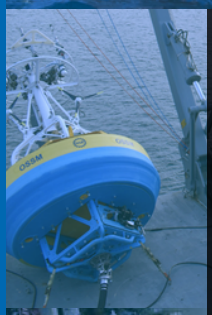


WOODS HOLE OCEANOGRAPHIC INSTITUTION

Business Services Operations Research Event
King Philip Regional High School
201 Franklin St, Wrentham, MA 02093
Tyler Walker
April 8th, 2025



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I. Executive Summary

Overview Of Organization

Woods Hole Oceanographic Institution (**WHOI**) is a world-class, independent organization headquartered in **Woods Hole, Massachusetts.** Founded in 1930 through a collaboration between Frank R. Lillie, the Director of the Marine Biological Laboratory, and Wickliffe Rose, the President of the Rockefeller Foundation's General Education Board, **WHOI was established as a non-profit organization** "to position the United States as a leader in global oceanographic research" (**WHOI**). Their mission is laser-focused on **ocean research, technology, and education.** **WHOI** has been revolutionary in advancements in marine biology, but with massive amounts of data flooding the facility every day, threats to our oceans increasing, and data analysis wasting human resources, it is time to aid in their next steps by incorporating AI to improve their efficiency.

Figure 1a: Woods Hole Oceanographic Institution (WHOI), located in Woods Hole and Falmouth, Massachusetts

Objective Of Plan

Project OCEAN is a **proposed strategic plan** aimed at enhancing operations at **WHOI**'s facility. By integrating AI into routine workflows, employees can address **ocean-related** challenges more swiftly, allowing them to free up time to focus more on their passion for discovery rather than being overwhelmed by mundane tasks.

Target Market

Primary Donor

- Government Agencies
- Need in Ocean research and technology
- Supports Ocean Science

Secondary Donor

- Lives on the coast regions
- Involved in Ocean related activities
- Disposable income

Research Methods Used In the Study

PRIMARY RESEARCH

Email

Significant and ongoing email communication with WHOI employees was essential in determining the main areas of inefficiency and potential AI usage.

Employee Interviews

Online interviews over Zoom allowed for a more personal connection and immediate follow-up in assessing specific operation limitations.

AI Company Interviews

Online interviews with AI companies identified in secondary research revealed how their technology could be utilized at WHOI.

Boston Dynamics

Collaborating with Boston Dynamics, a prestigious AI company, offered valuable comparisons and realistic feedback on Project OCEAN.

In-Person Visits

Critical meetings, tours, and further interviews occurred on site allowing for observations of the facility's operations and tools.

SECONDARY RESEARCH

*Secondary research was conducted to **explore insights** from **primary research** on AI that could benefit WHOI and establish a foundation for **PROJECT OCEAN**.*

(WHOI Reports) About Company

(AI Algorithms) Targeted Solutions

(AI Companies) Innovative Leaders

(Industry Trends) Company Fit

Research Timeline

June 2024 ⟷ **Jan 2025**

- **WHOI Reports** — Jun 26th – Jul 25th
- **Emails** — Jul 25th – Sep 21st
- **Employee Interviews** — Sep 21st – Nov 20th
- **In-Person Visits** — Nov 12th
- **AI Algorithms** — Nov 12th – Nov 30th
- **AI Companies** — Nov 12th – Nov 30th
- **Industry Trends** — Nov 12th – Nov 30th
- **Boston Dynamics** — Jan 23rd
- **AI Interviews** — Jan 11th – Jan 25th

Findings And Conclusions of the Study

FINDINGS	CONCLUSIONS
#1 *Comprehensive ocean monitoring is lacking, and limited to specific global sectors due to insufficient global research technology.*	#1 *A dire need for globally accessible satellite data that can be reached from anywhere in the world to address these monitoring issues.*
#2 *WHOI's current calculation processes cost lengthy hours due to manual work being more efficient than weak calculation technology.*	#2 *WHOI requires an ethical AI tool to process large statistics using advanced algorithms, aiming to minimize mundane calculation tasks.*
#3 *Current non-reactive simulation within WHOI's current VR technology renders their VR system less valuable, leading to ineffective use.*	#3 *Implementing reactive AI in WHOI's VR will enhance testing technology and improve safety procedures in realistic scenarios.*
#4 *Complex moorings and buoys require burdensome 12-hour weekly checks to avoid malfunctions and check solar battery charge.*	#4 *Using autonomous AI will minimize human error, making check-ups more efficient and timely for buoys and moors, only when errors are indicated.*
#5 *Research reports often require 5-6 drafts for timely release, leading to a stressful, rushed, and disorganized process.*	#5 *WHOI must utilize an organizational tool that aligns with WHOI employees' concerns, improve drafts, reduce stress, and enhance workflow.*

S.W.O.T

S	W	O	T
• Ethical organization • Strong leadership • Positive work culture • Supported non-profit funding	• Advanced technology is challenging. • Long reports • Unsafe research • Human error	• Improved global monitoring • Faster calculations • VR tech upgrade • Automated buoys • Organization tools	• Funding issues • Harsh weather • Dangerous ocean conditions • Environmental changes • Staffing challenges

Proposed Strategic Plan

*After extensive research, I am proposing a five-part strategic plan, **Project OCEAN**, that will address issues faced by **Woods Hole Oceanographic Institution**. This will integrate AI platforms seamlessly into daily operations, improving efficiency, increasing safety, reducing human error, and enhancing their ability to study and save our oceans.*

Oceanic Observations

Combine **SkyTruth's Cerulean technology** with WHOI researchers to utilize satellite imagery for quicker and more effective global ocean protection in parts of the world researchers previously couldn't access.

Computed Statistics

Address the needs of WHOI employees in data analysis and future plans by integrating **Alteryx** generative and predictive platforms used by big corporations, creating more efficient funding and report calculations.

Experiential Simulation

Move beyond the current VR capabilities that are offered at WHOI and combine the current hardware with **NVIDIA Omniverse** experiential simulation technology- an exciting advancement in VR programming.

Adaptive Automation

Use **IBM's adaptive automation** and Boston Dynamics' sensors to improve energy efficiency and error detection in solar-powered buoys and moors, significantly reducing check-up time.

NER Analysis

Aid the science analysts at WHOI in deciphering and organizing massive amounts of analytical data reports by using **Lexalytics NER Analysis** AI platforms to categorize and organize by customizable entities.

Timeline

Project OCEAN's implementation *will occur in* ***three stages*** *from January to December 2026:* ***Trial Stage****: Testing AI.* ***Progression Stage****: Implementation process of AI technology.* ***Final Stage****: Finalizing Implementation into* ***WHOI****. Key Metrics are determined the year following as* ***Project OCEAN*** *will be fully implemented into* ***WHOI*** *operations.*

Thirds	Trial Stage (2026)			Progression Stage (2026)						Final Stage (2026)		
Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
O	Establish Relationship With SkyTruth					Integrate Satellites into Operations						
				Test Technology					Finalize AI Technology Usage			
C	Test Alteryx With WHOI Statistical Spreadsheets					Use Platform With All Data Calculations (Including Funding)						
				Use Platform With Small Data Calculations In Reports								
E	Meet Nvidia Programmers				Program Nvidia Omniverse To Meet WHOI OCEANUS VR							
				Integrate Nvidia RTX GPU's into OCEANUS VR					Have Employees Use VR Tech			
A	Test Sensors & IBM's Automation AI				Trial And Error Testing				Full Implementation			
				Observe Programming With Buoys & Moors For Errors				Slow Integration				
N	Trial Lexalytics				Progress In Smaller Reports							
				Collaborate & Customize Lexalytics For WHOI Reports				Use Lexalytics NER In All Analytical Data				

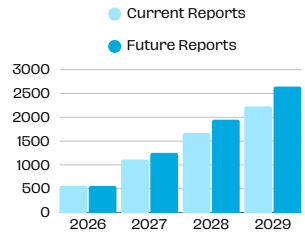
Key Metrics

Above 80% | ***Satisfaction:*** Measured by survey NPS scores

More Than 2 hours | ***Time Saved:*** Measured by survey responses

Above 80% | ***Accuracy:*** Measured by human error changes

Decreased 60% | ***Injuries:*** Measured by injury differences



EXPLANATION OF REPORT GROWTH

Projected efficiency gains from Project OCEAN would boost efficiency in **25%** of **WHOI** operations, allowing researchers to focus on reports instead of repetitive tasks, resulting in a 25% growth in report output (**557 to 696 reports**) from more freed time.

Arrows show the link between metric and ROI of completed reports.

Proposed Budget

Project OCEAN is estimated to cost ***$1,019,920*** *for implementation and* ***$264,920*** *ongoing, as confirmed by Axalta's IT Director* ***Chris DelVecchio, Sr.*** *and Fidelty VP in Financing,* ***Mark McManus****.* **WHOI***, a non-profit, could see an* ***8785.9%*** *ROI through improved research efficiency and a* ***25%*** *increase in reports. However, due to funding constraints, a* ***2% report increase*** *is realistic, resulting in a stabilized ROI of* ***610.7%****, equating to* ***$4.3 million*** *in increased funds per year.*

Oceanic Observations	Computed Statistics	Experiential Simulation	Adaptive Automation	NER Analysis	-Objective
$49,920	$15,000	$240,000	$550,000	$165,000	-Year 1
$49,920	$15,000	$90,000	$50,000	$60,000	-Ongoing

Total Implementation Costs

$1,019,920

Total Ongoing Costs

$264,920

4 year ROI

610.7%

Years	Cumulative Investment	Cumulative Revenue	NET Gain	ROI
2026	$1,019,920	$0	-$1,019,920	-100%
2027	$1,284,840	$4,300,000	+$3,015,160	+264.5%
2028	$1,549,760	$8,600,000	+$7,050,240	+455.0%
2029	$1,814,680	$12,900,000	+$11,085,320	+610.7%

557 to 668 Reports Completed Each Year

All Related Funding In 2020 $215 Million

25% Report Growth 8785.9% ROI

2% Report Growth 610.7% ROI