

Munitions Disposed in Hawaii's Pacific Paradise

Margo Edwards, Roy Wilkens,
Mark Rognstad, Chris Kelley, Eric DeCarlo
School of Ocean and Earth Science and Technology, University of Hawai'i

Brian Bingham
Naval Postgraduate School

Sonia Shjegstad, Martine Bissonnette,
Christian Briggs, Shelby Koide,
Lukas Sheild, Deserie Bala, Jeff Silva
Environet Incorporated

Chris Mah
Smithsonian Institution

Dan Fornari, Rich Camilli
Woods Hole Oceanographic Institution

Carter DuVal
University of Delaware

J.C. King
*Headquarters Department of the Army
Office of the Deputy Assistant Secretary (ESOH)*

Geoff Carton
CALIBRE Systems

07 Feb 2019
DAIMON Open Day
Bremerhaven

Lunar Eclipse in O'ahu, January 2019



History of Munitions in Hawai'i



Schofield Barracks
Oahu Pre-WWII



no 27

SBKOD 411.6/100-3

Leakage of Mustard Agent



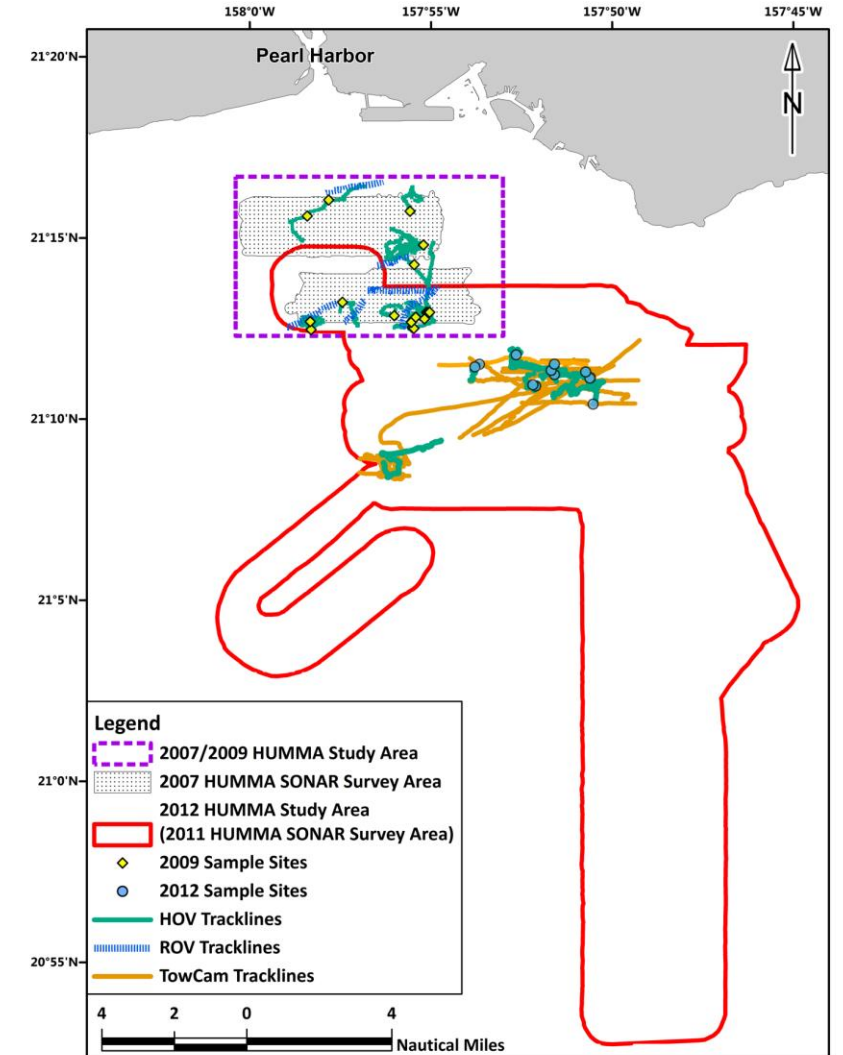
Sea-Disposal around
Hawai'i circa 1944

Conventional/Chemical Munitions Disposed in Deep Water: Hawai'i Undersea Military Munitions Assessment

HUMMA Site characteristics:

- south of Oahu, Hawai'i (Pearl Harbor)
- 5-26 km from shore
- water 300-600m deep
- ambient T of 5°C
- almost no coral growth
- sea life limited to shrimp, anemones, starfish and other bottom dwellers with occasional visits from sharks, rays and mid-water species

This area is not typically fished, in part because it is in an active shipping lane.



Summary of HUMMA Field Programs

2007 Sonar Mapping Survey

2009 Sampling and Analysis:
Human Occupied Vehicles

2011 Sonar Mapping Survey

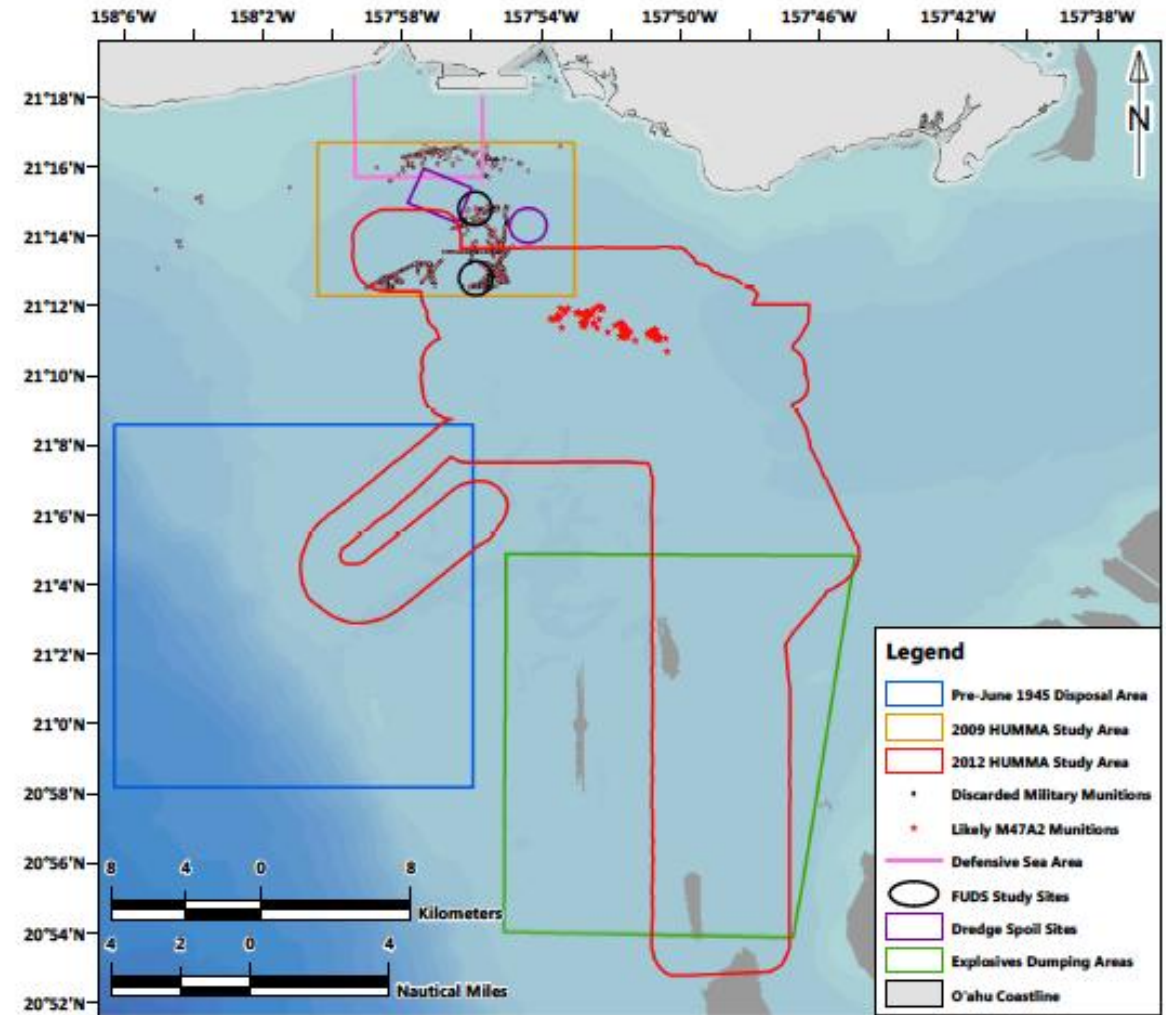
2012 Sampling and Analysis:
Human Occupied Vehicles

2014 Sampling and Analysis:
*Remotely Operated Vehicle
JASON 2 (WHOI)*

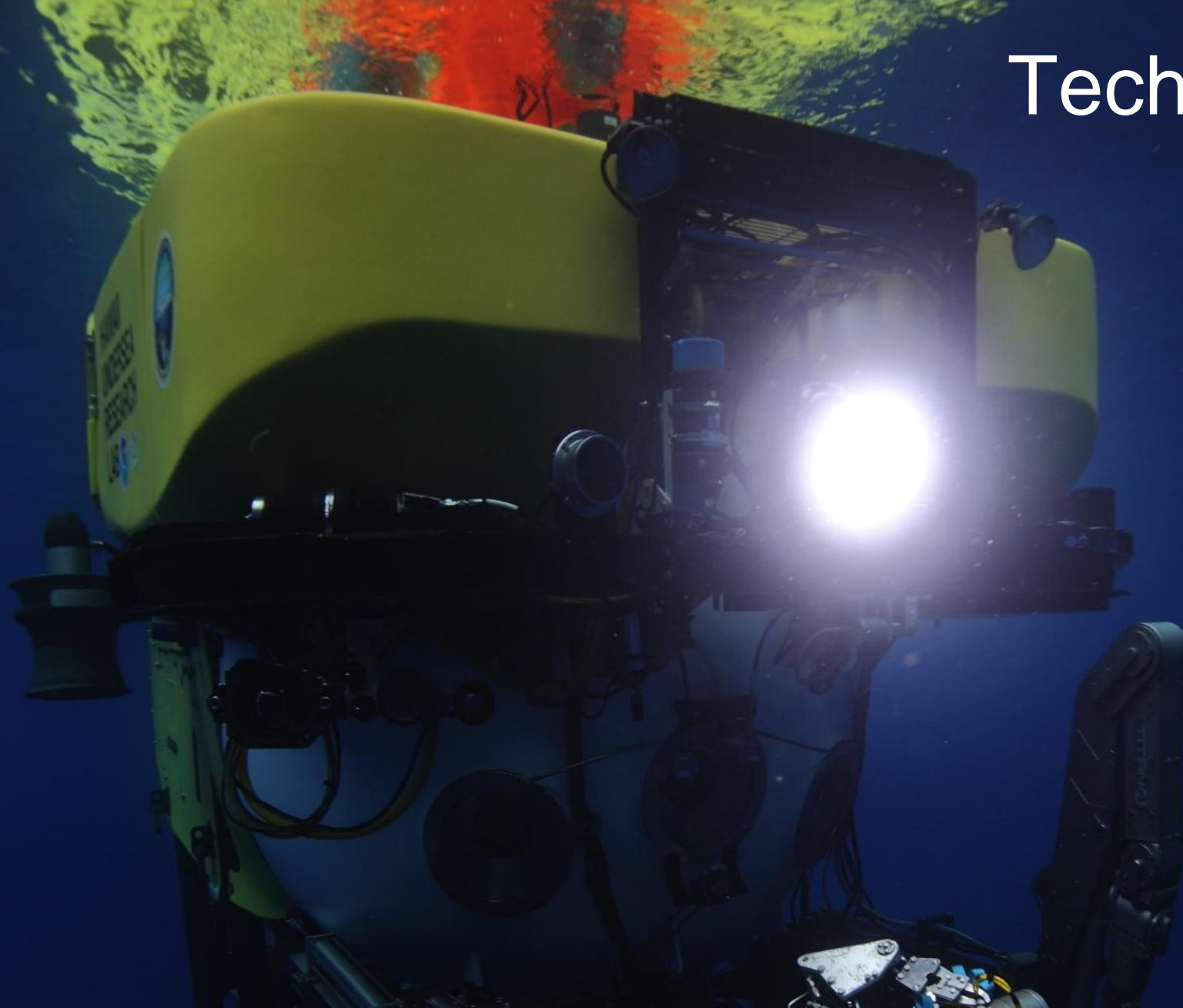
Total field programs: 5

Total days at sea: 45

Total cost: \$US 7.5M



Technologies Used for HUMMA



HUMMA Instrumentation - Mapping Tools: R/V Kilo Moana Hull-Mounted 95 kHz SONAR System



HMRG and R/V Kilo Moana participants:
Steve Tottori, Roger Davis, Les Kajiwara;
Captain Gray Drewery and crew.



IMI-120 Towed Sidescan Sonar
towed at 50-75m altitude
~1.5km swath width

HUMMA Instrumentation - Sampling Tools: HURL's *Pisces IV* and *V* Submersibles



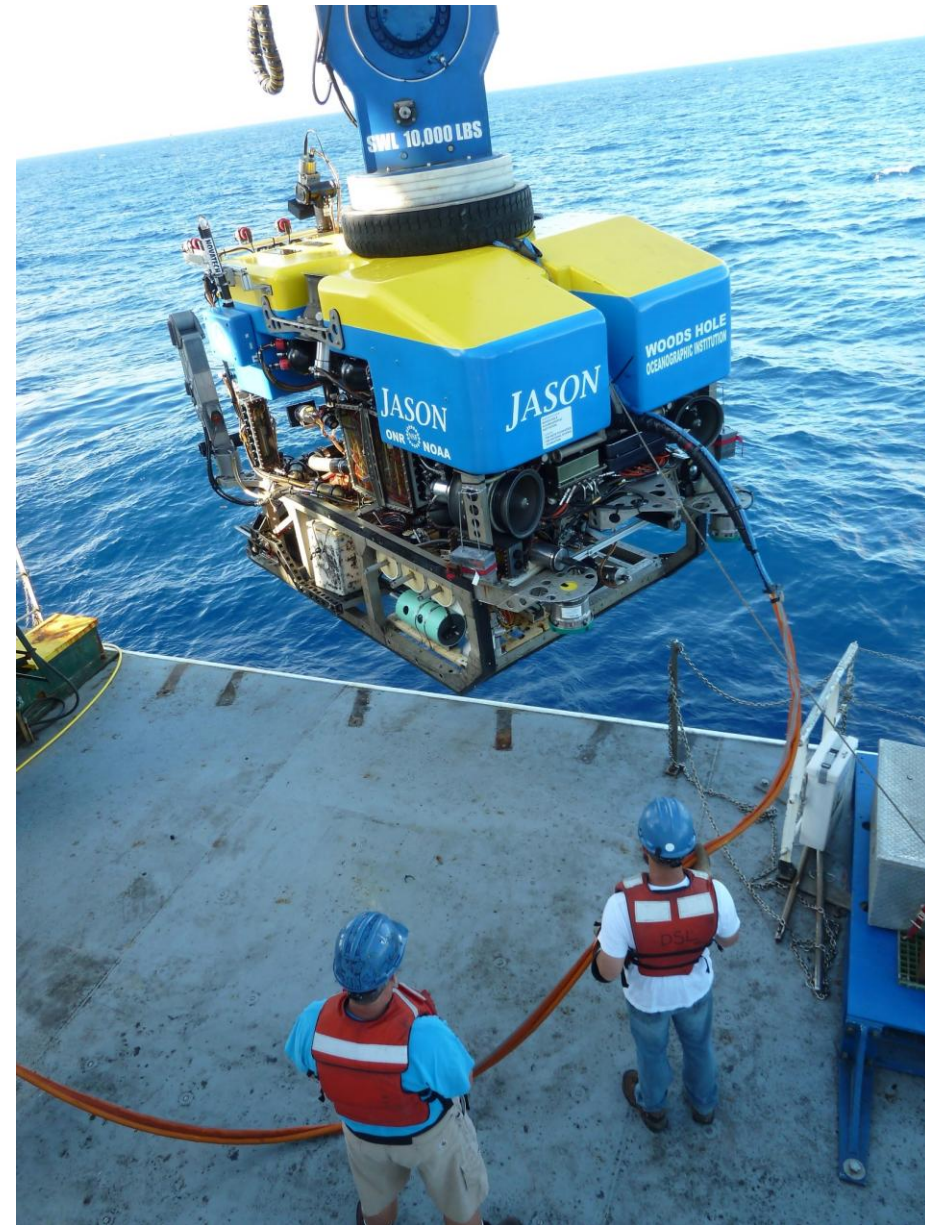
HURL and Ka'imiki-o-Kanaloa participants:
Terry Kerby, Max Cremer, Steve Price, Doug
Bloedorn, Colin Wollerman, Dan Greeson,
Pete Townsend; Captains Ross Barnes, Clary
Gutzeit and crews.

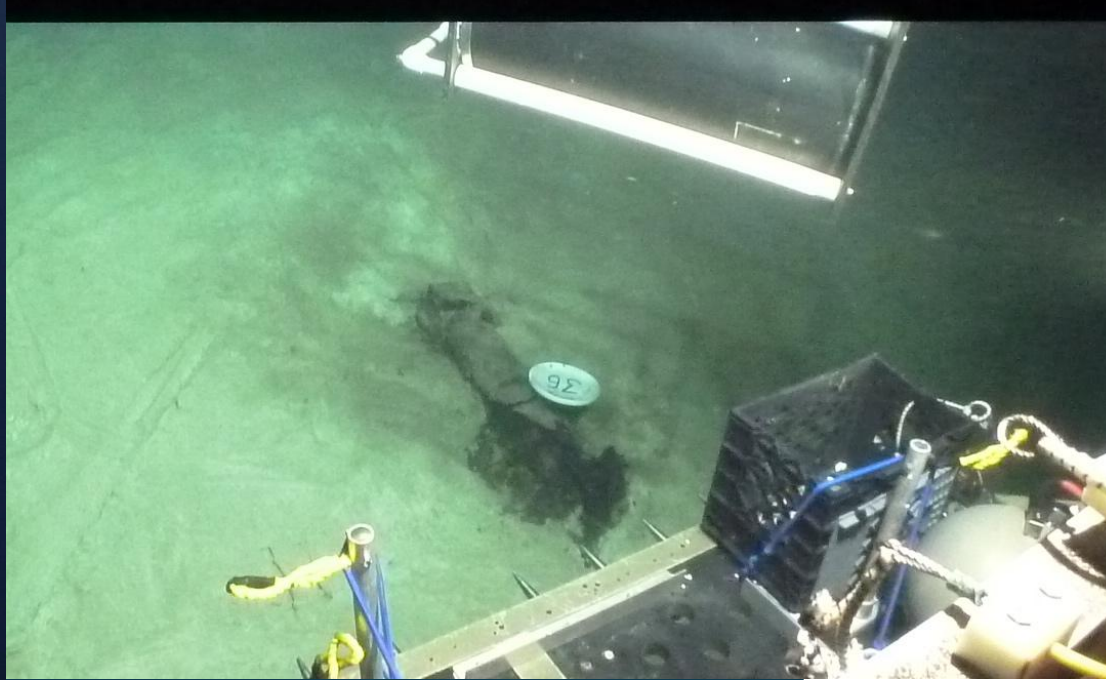
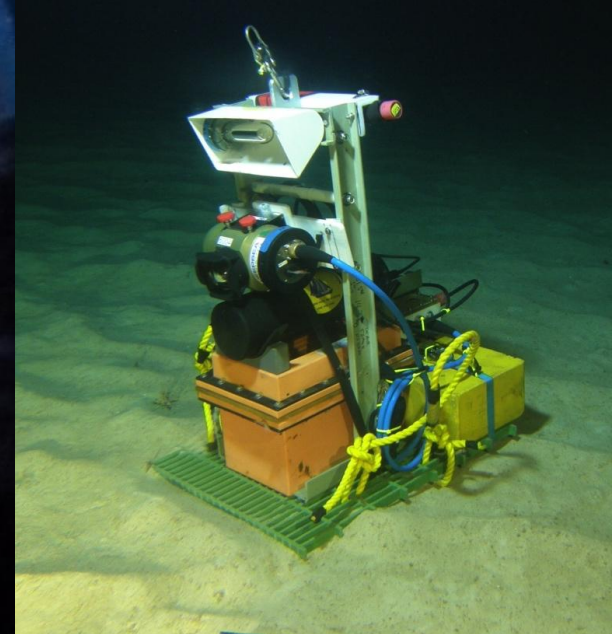
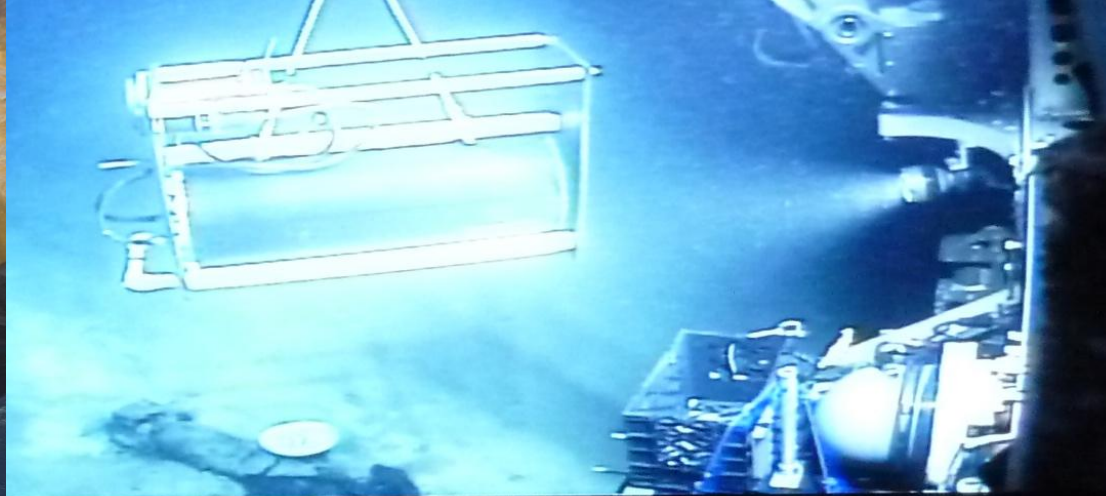


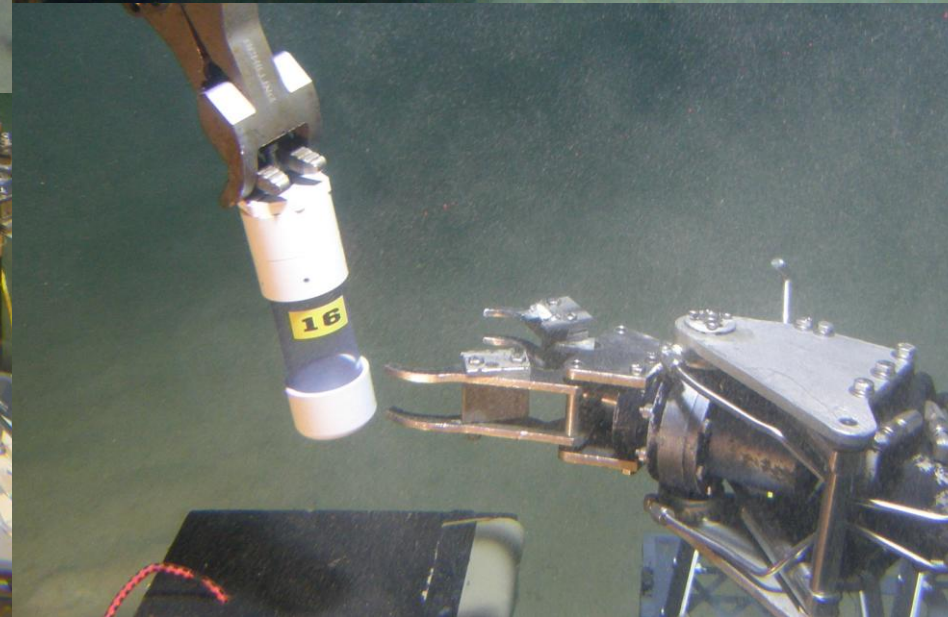
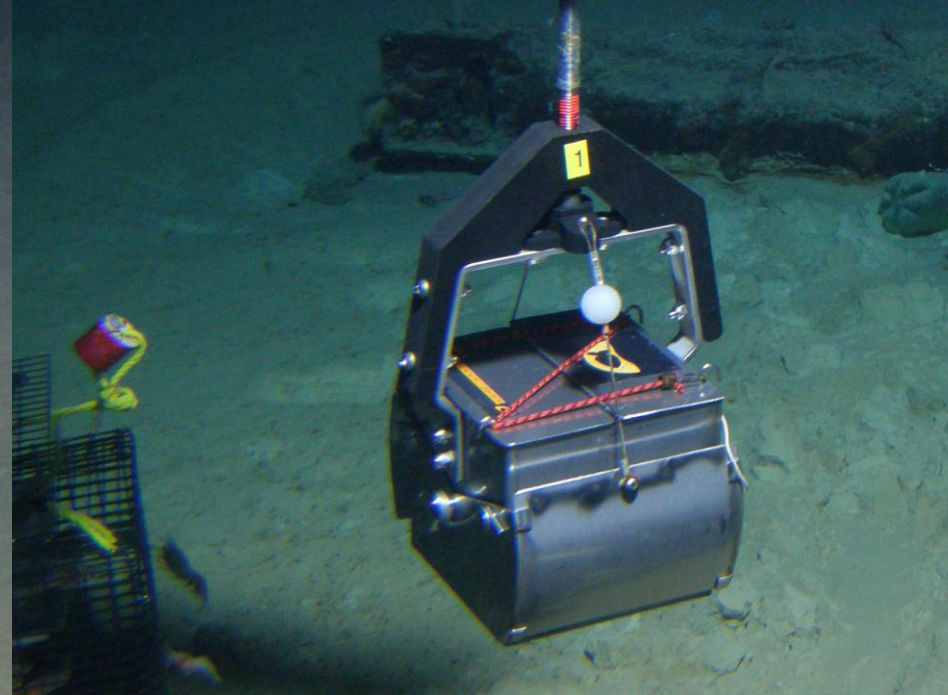
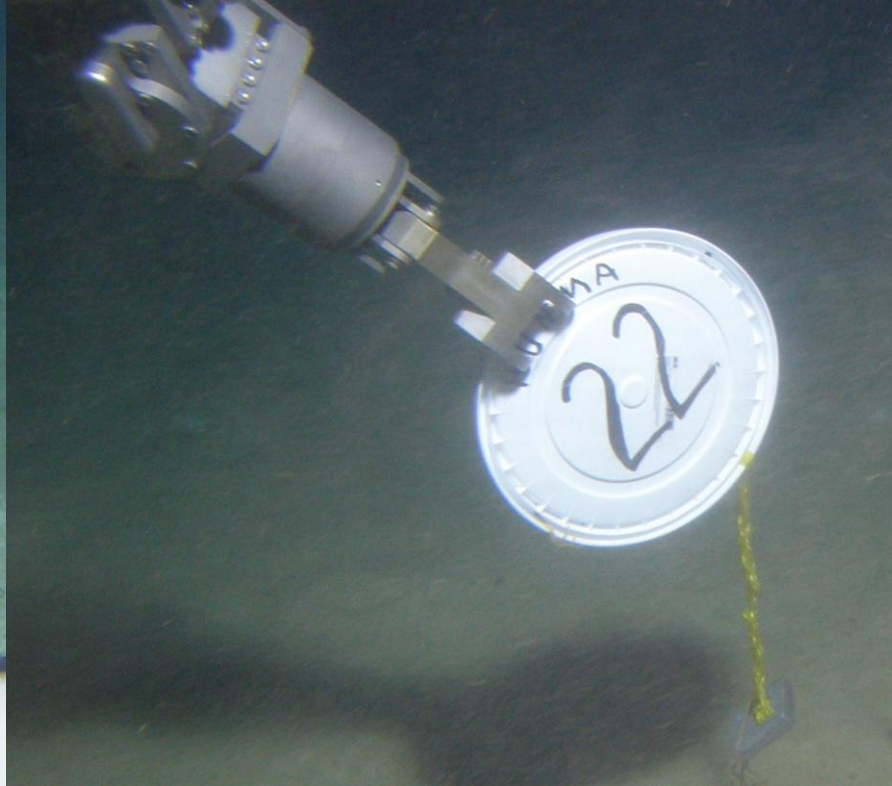
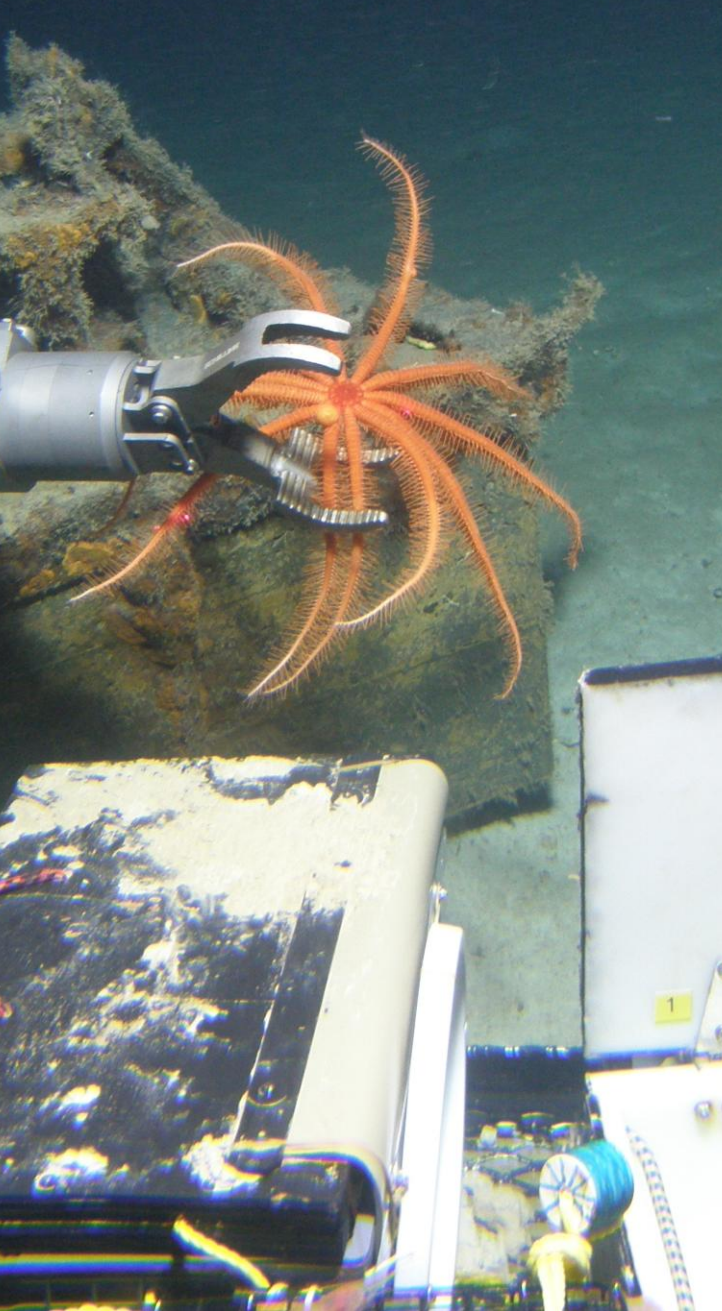
HUMMA Instrumentation - Sampling Tools: WHOI's *JASON* 2 Remotely Operated Vehicle



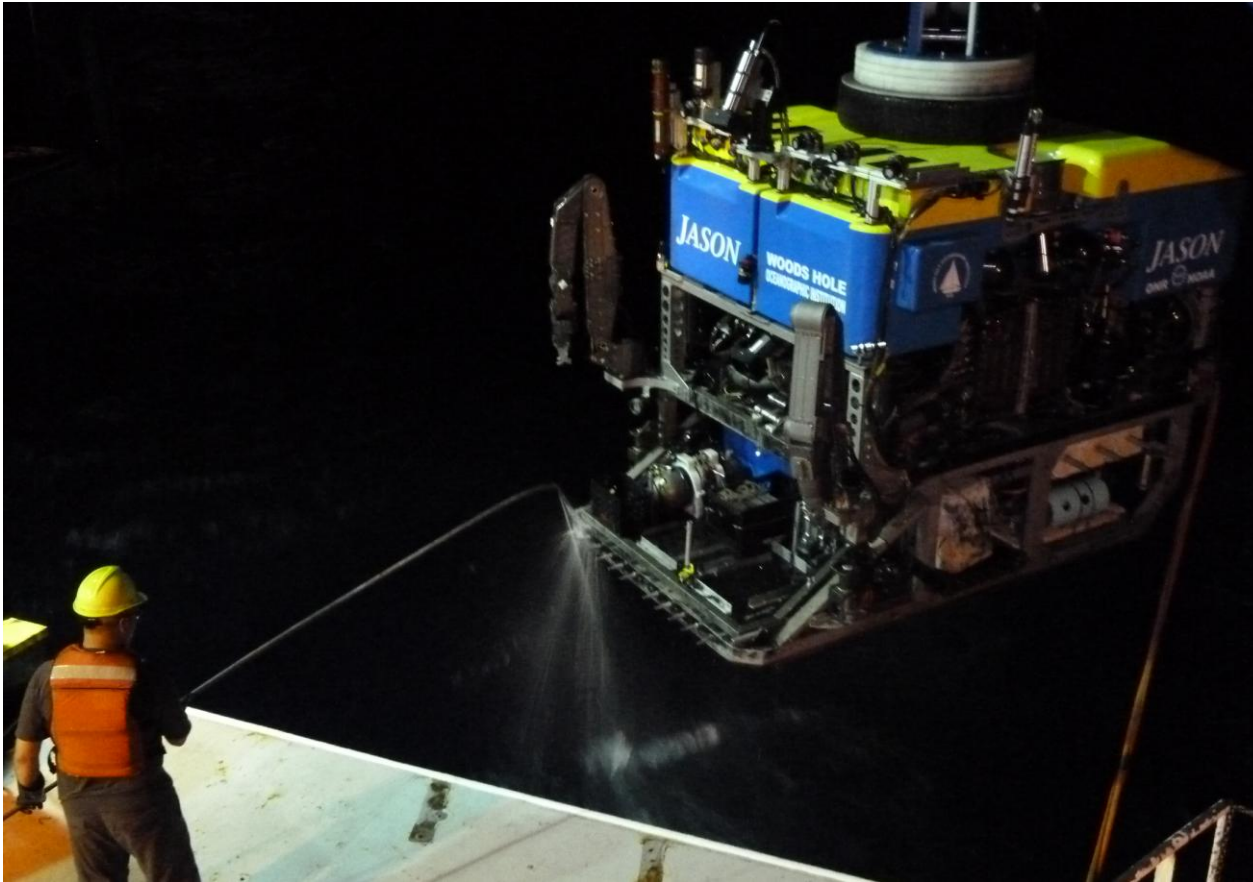
WHOI *JASON* 2 participants: Tito Collasius, Jim Varnum, Casey Agee, Jon Howland, Lisa Borden, Korey Verhein, Scotty McCue, Hugh Popenoe, Scot Hansen and James Pelowski.







HUMMA Safety Procedures – Edgewood Chemical Biological Center



ECBC participants:
Tim Blades, Mike Knudsen, Chris Hagler, Wendy
Smith, Jim Swank, Mike Glorioso, Lou Alvano and
John Schwarz

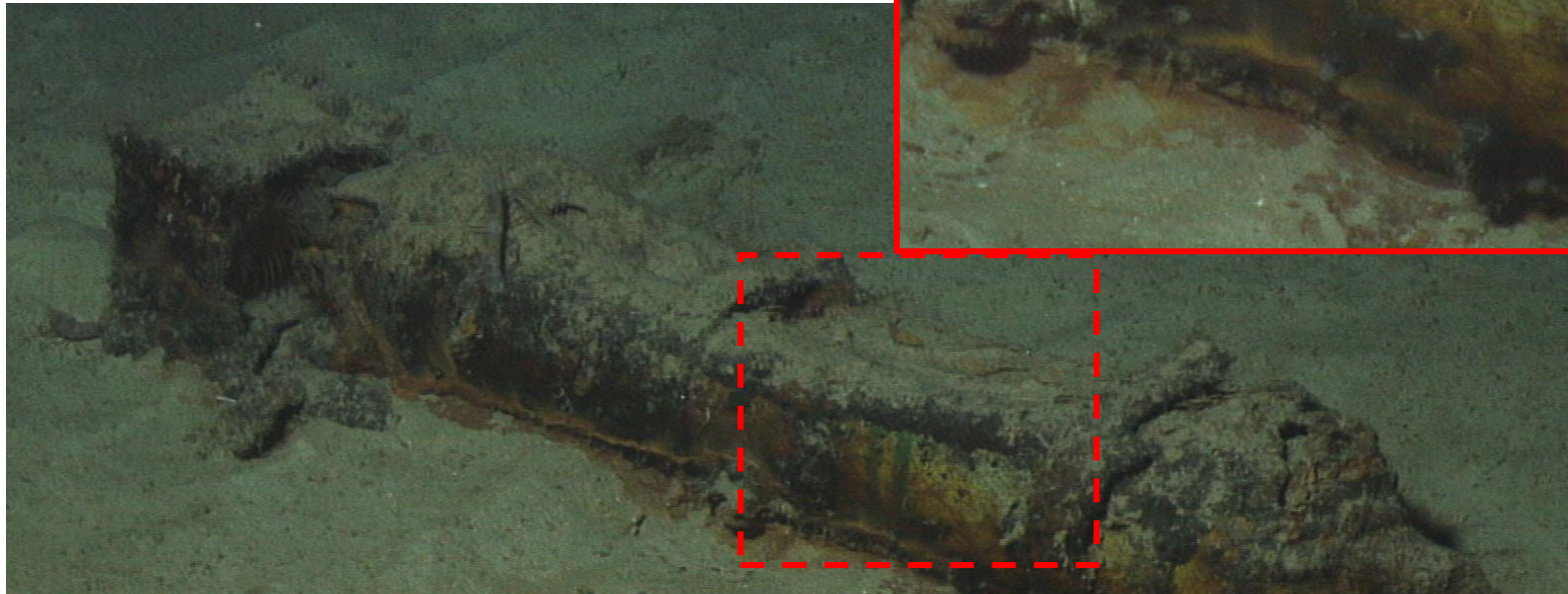
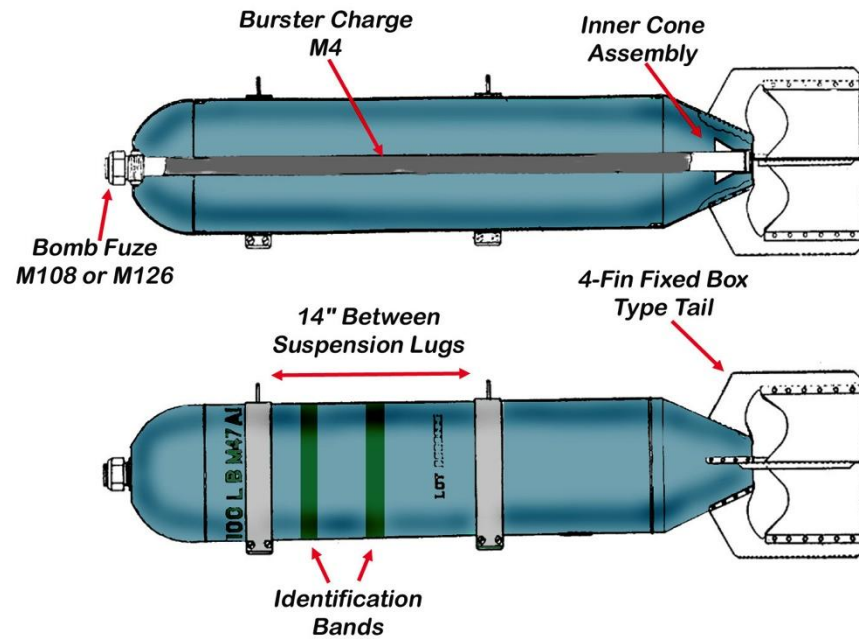
Results





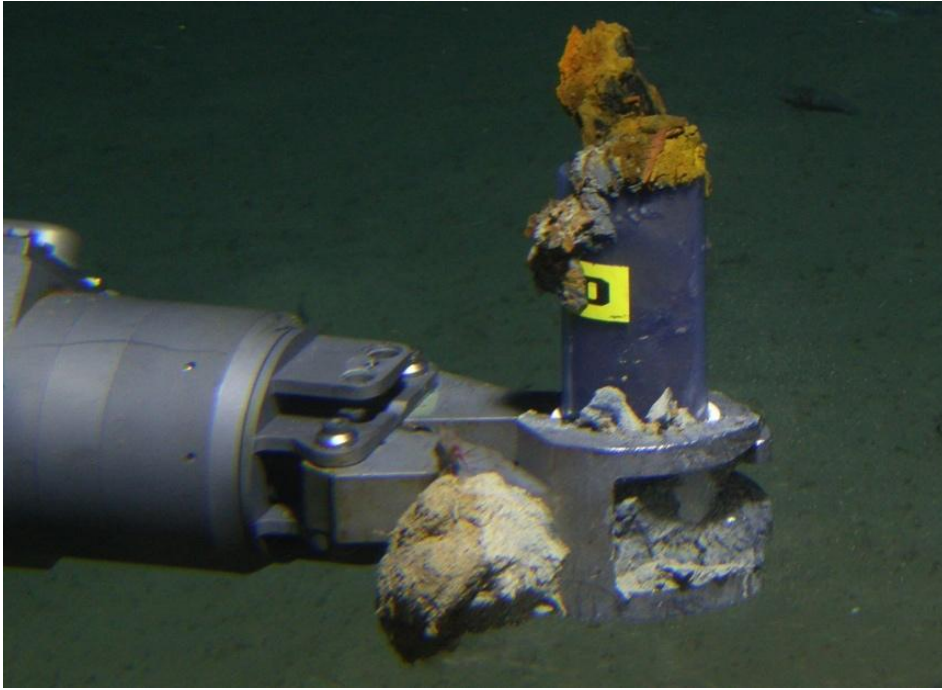


Result: Evidence of Chemical Munitions



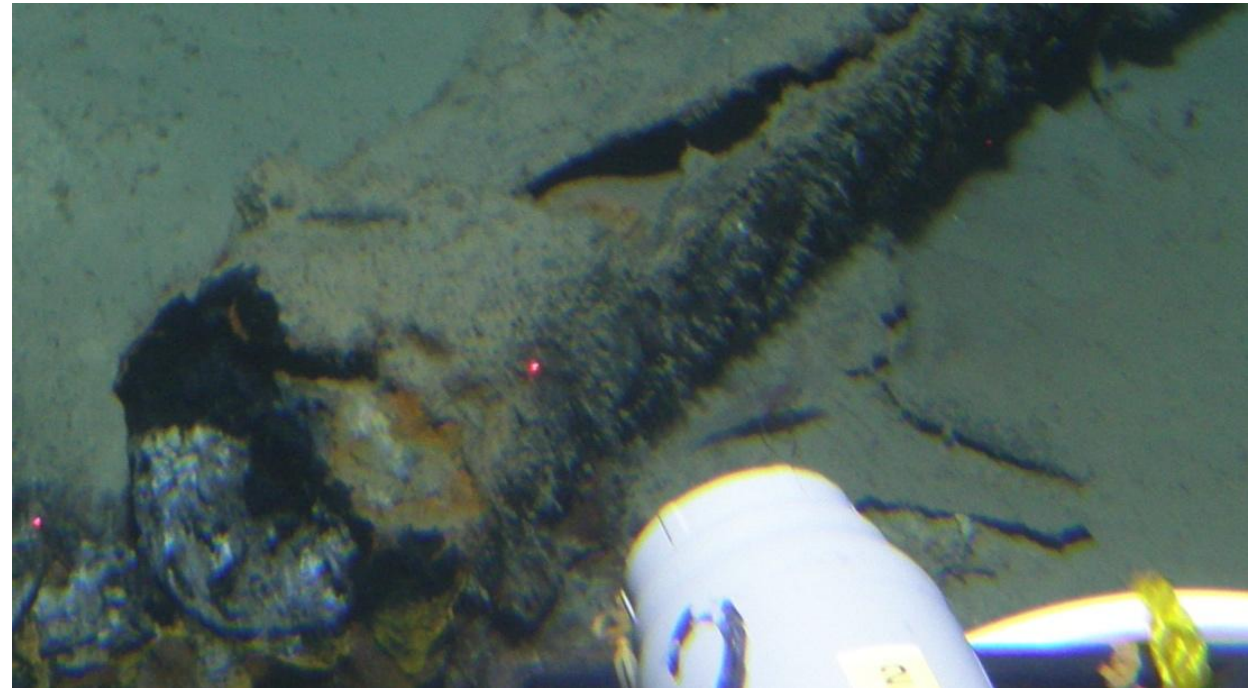


Result: Detection Amounts for Mustard were Low



Highest detection:

- 15 ppb mustard
- 2100 ppb 1,4-dithiane
- 87 ppb 1,4-thiozane

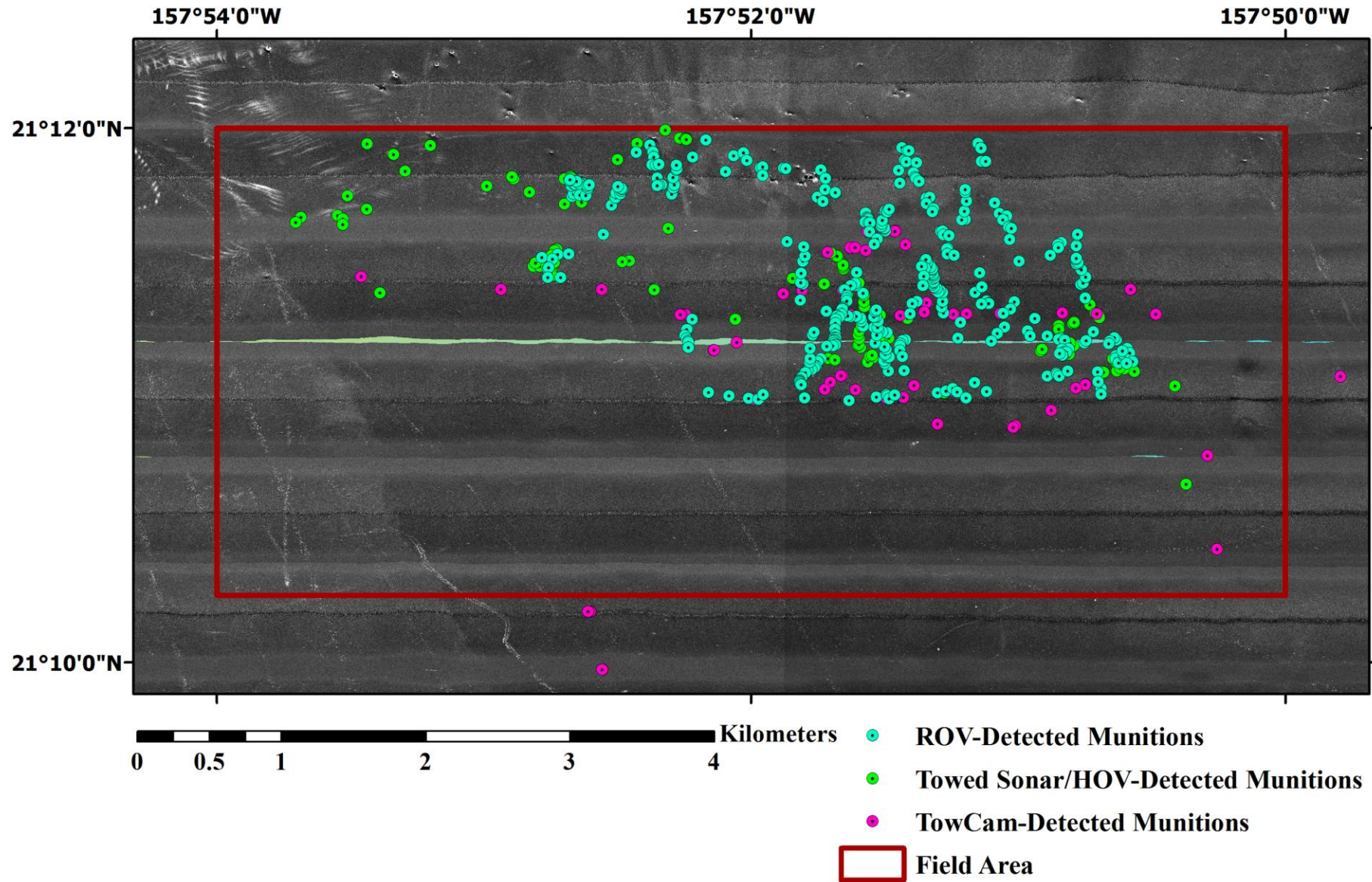


Result: Fauna are in Direct Contact with
Chemical Munitions



Result: Munitions are Habitats





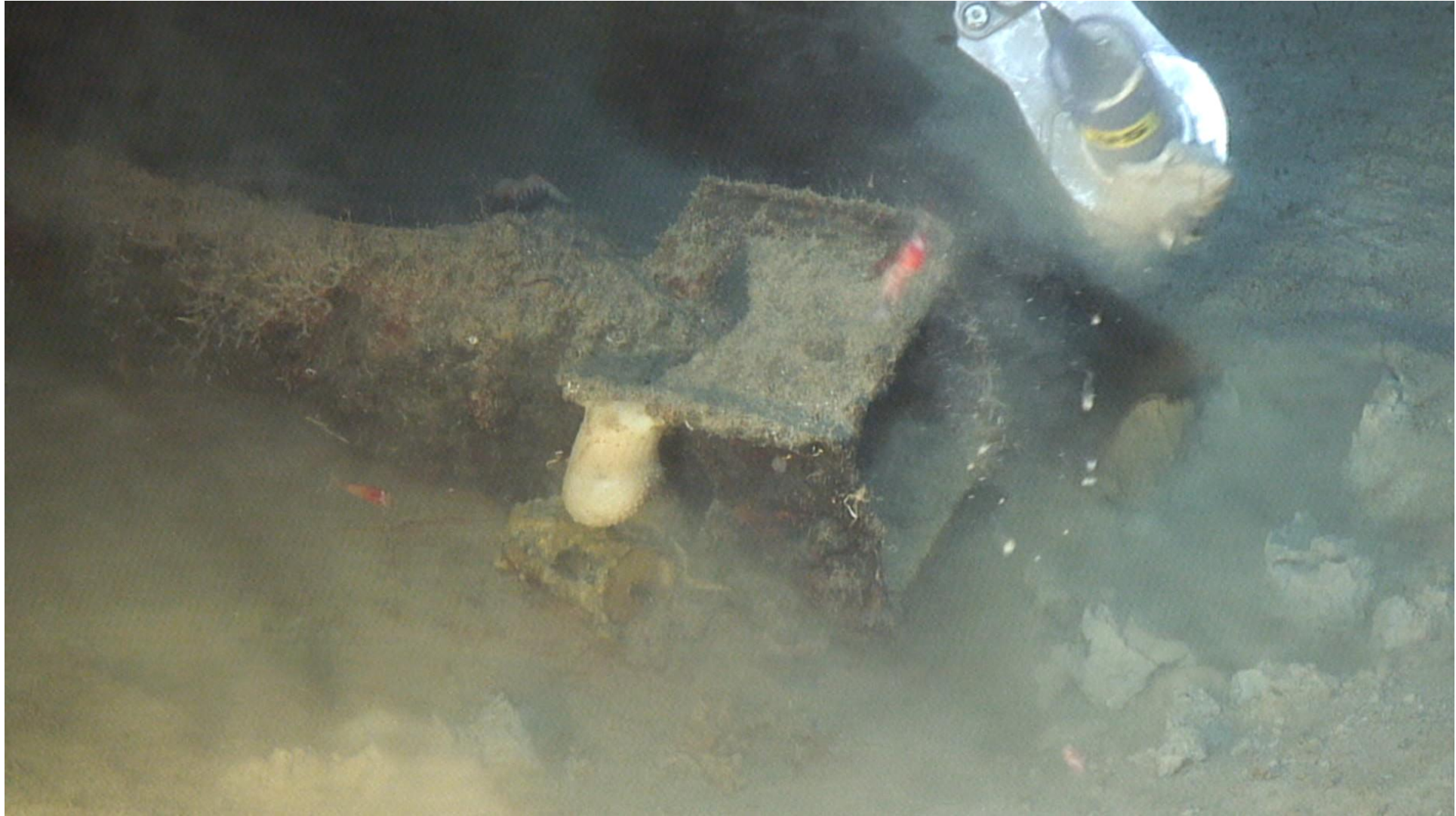
Demonstrated ability to
return to (monitor) sites



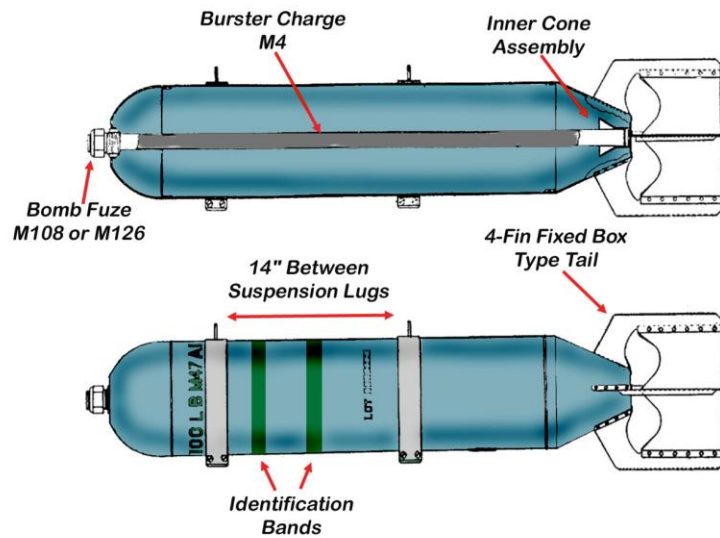
What We Know, Think and Need to Know

- Low detection of mustard in HAWAI'I
- Hydrolysis probably occurred during disposal when casings imploded
- Small sample size – more data is needed
- Shallower disposal sites may have different results
- At what depth did the casings implode?
- No evidence of mustard affecting fauna
- Sea stars can move, but don't leave munitions habitat
- Is this typical faunal behavior?
- Are there other faunal interactions that were not documented?

Remediation: When is the Solution Worse than the Problem?



The 1,000 Word Picture – What is Natural Deterioration?



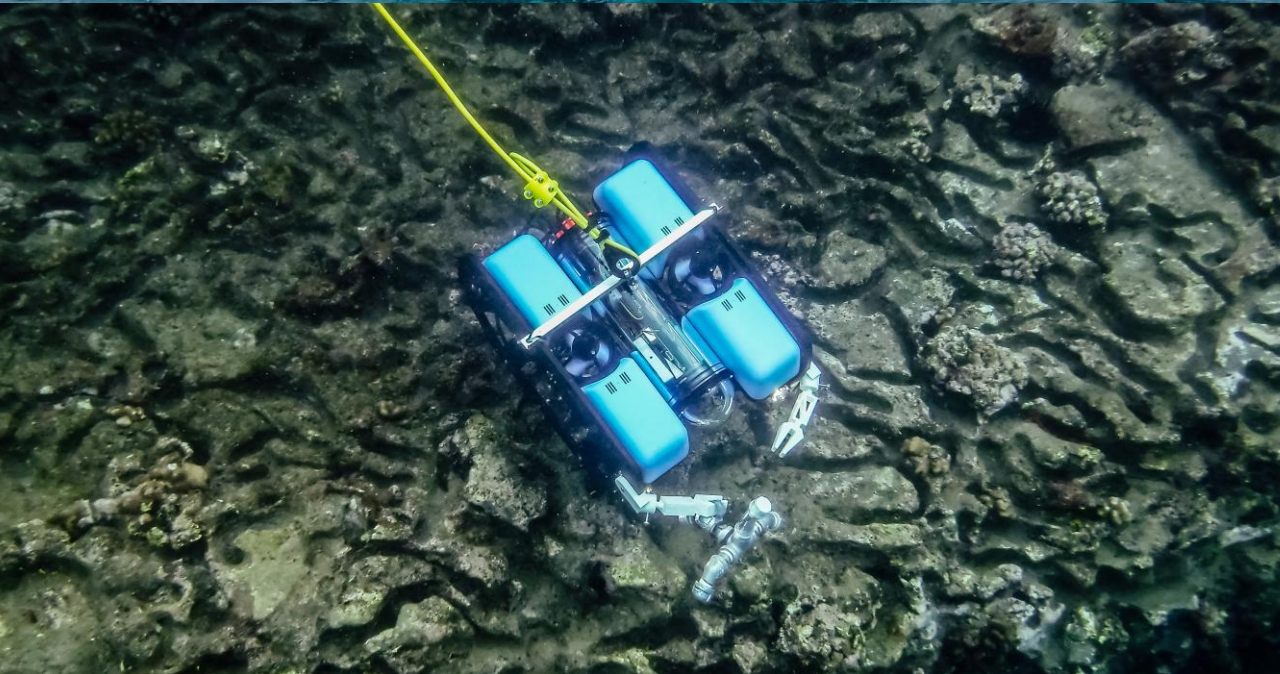
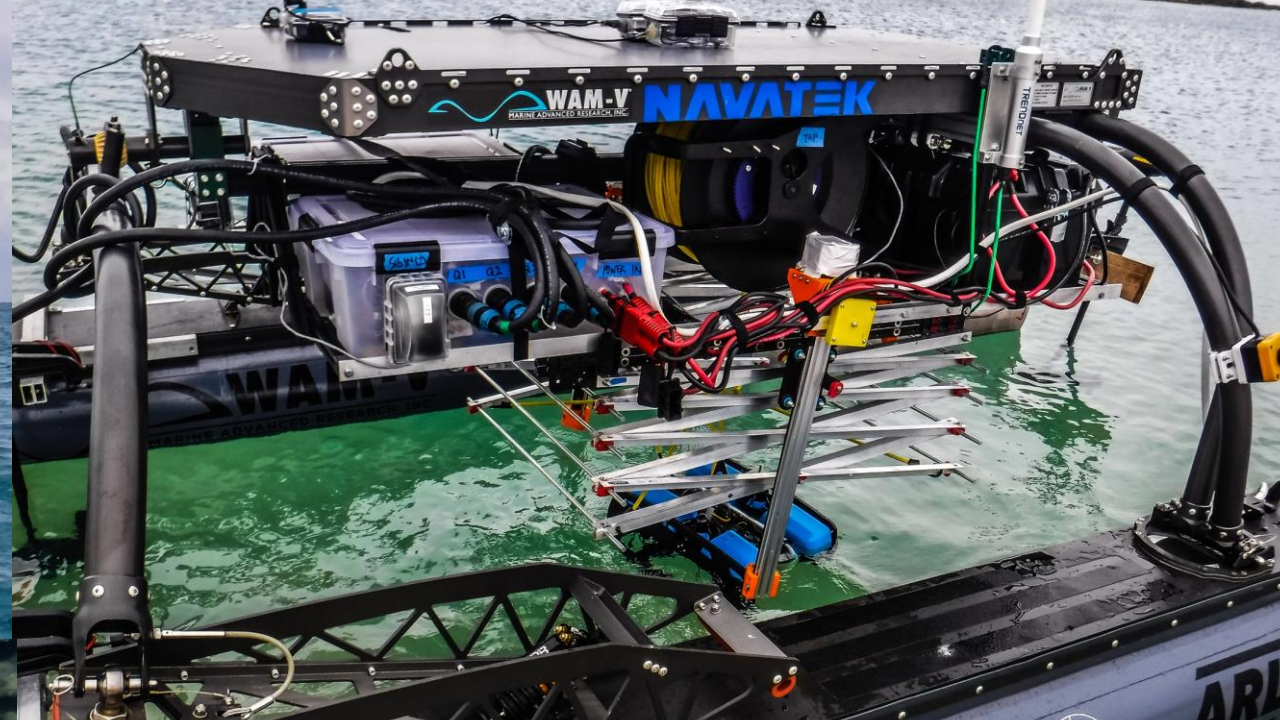
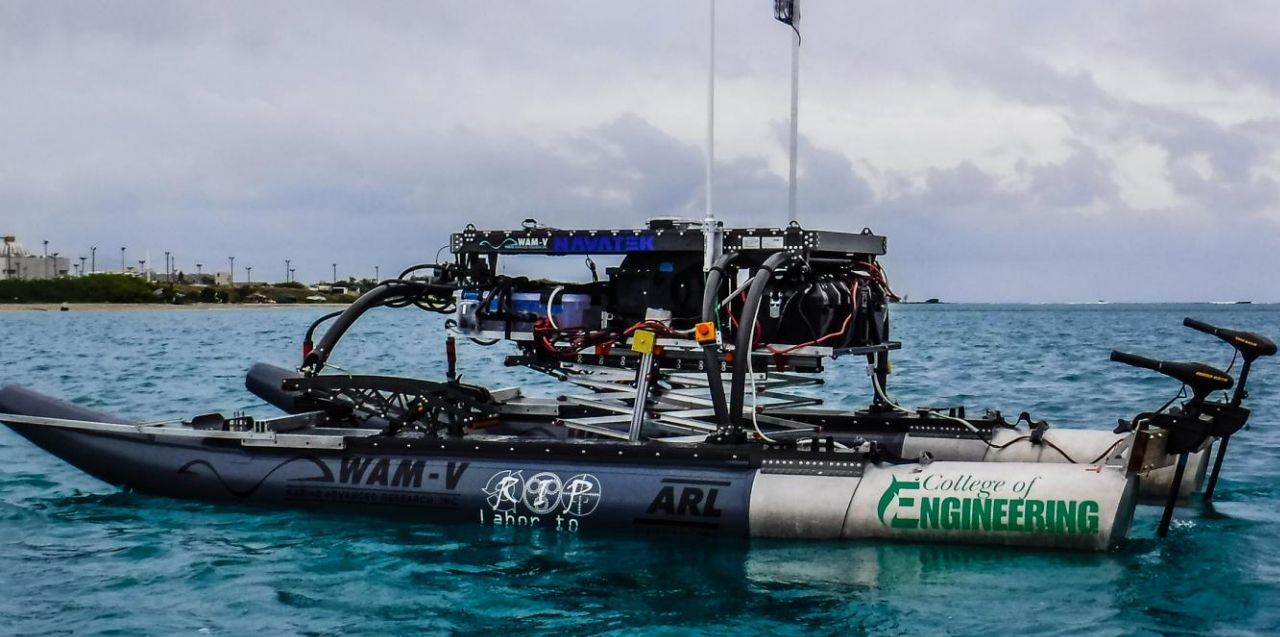
Moving Forward: Conventional Munitions Disposed in Shallow Water (Ordnance Reef)

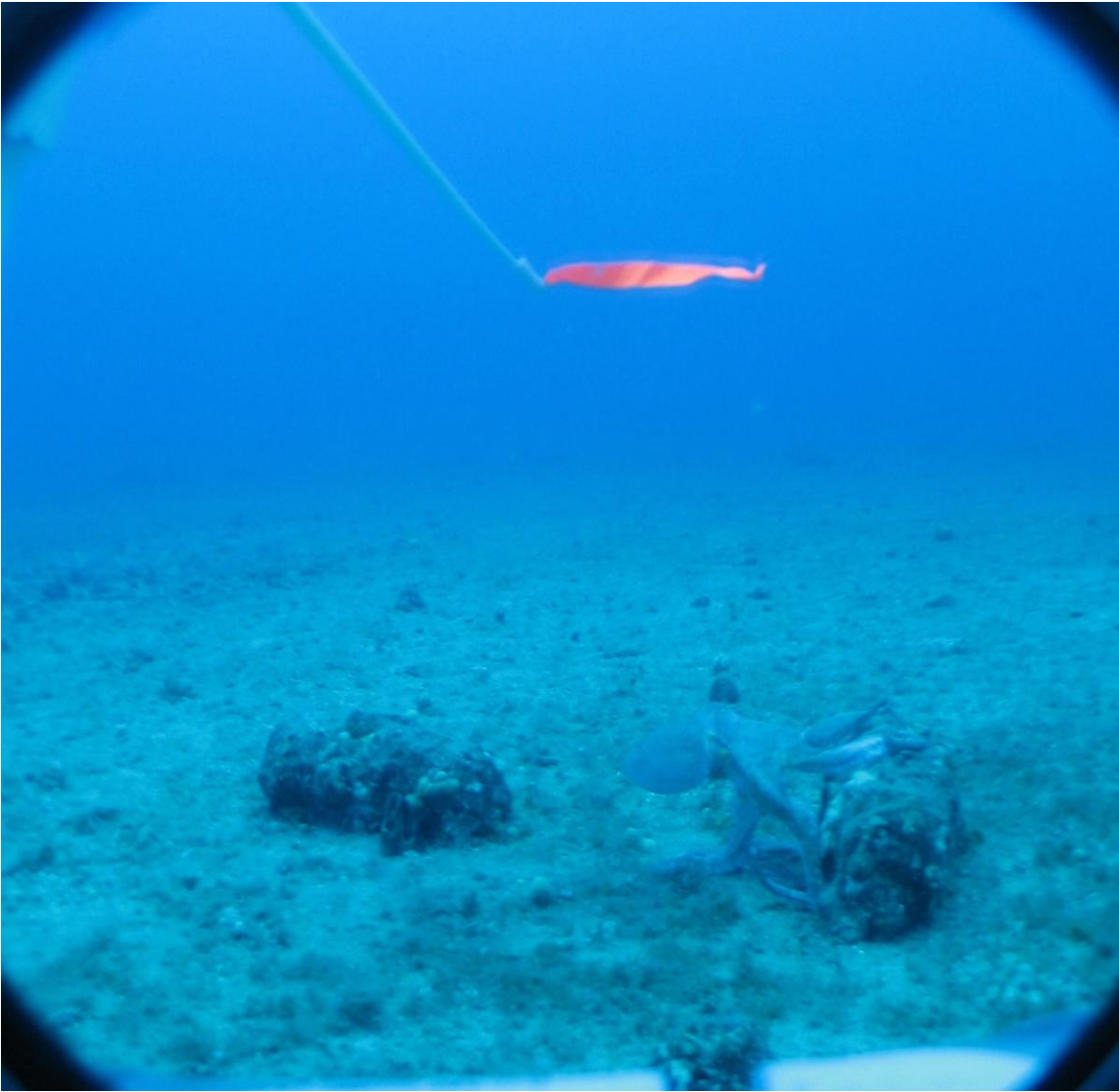
Ordnance Reef Site characteristics:

- west of Oahu, Hawai'i
- less than 4 km from shore
- water depths of 10-100 m
- ambient temperature of 20°C
- abundant coral growth on munitions
- teeming with sea life

Eric DeCarlo leads the Ordnance Reef project



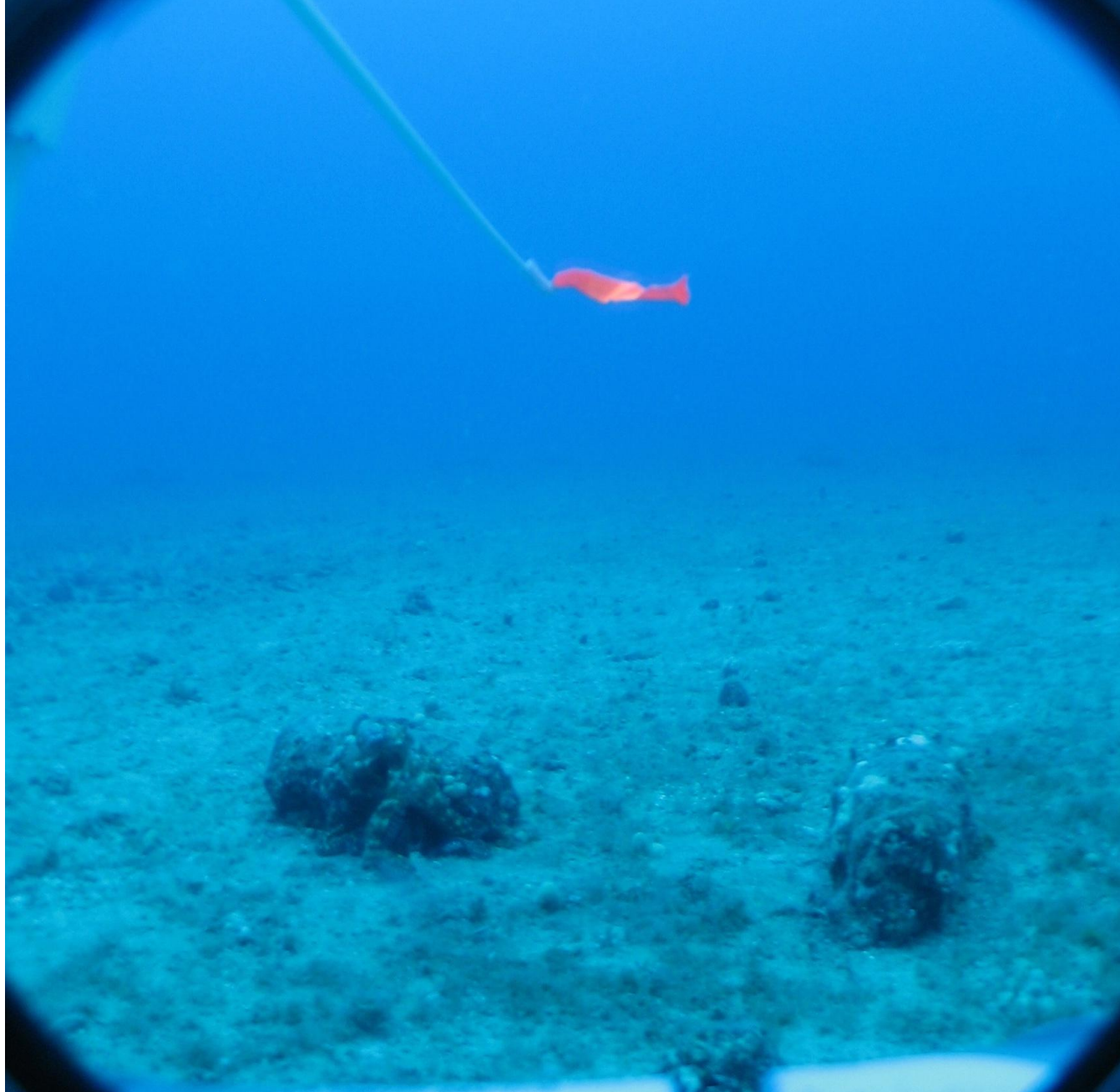


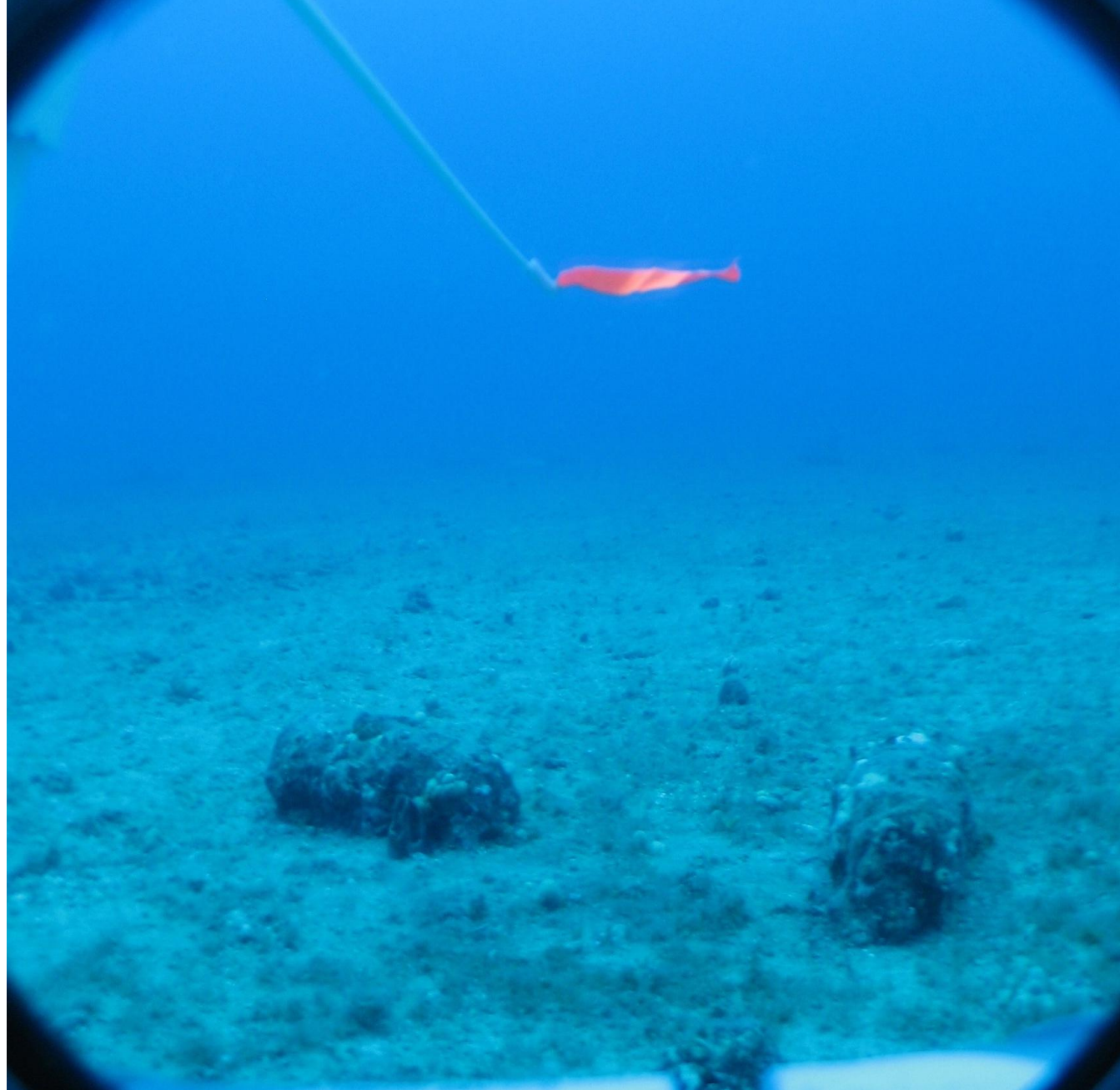


Time-Lapse Photography to Address:

1. Which animals interact with munitions?
2. How?
3. When?
4. For how long?
5. What happens during remediation?









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HURL's Pisces V submersible prepares to collect samples

E komo mai – Welcome to the HUMMA Project website

Since 2007 the University of Hawai'i at Manoa (UHM) has been awarded approximately \$7.5 million to conduct the Hawai'i Undersea Military Munitions Assessment (HUMMA). HUMMA focuses on evaluating the potential risk to human health and the environment of an historic munitions disposal site located south of Pearl Harbor in waters from 300-600 meters deep. Over the past seven years UHM has mounted four field programs, using advanced technologies, to locate and assess the condition of munitions and their surroundings, including animals living near or on the munitions. The fifth and final field program departs on October 21, 2014 and is designed to showcase the capabilities of underwater robots in assessing disposal sites.

Funding for HUMMA has been made possible through the efforts of Hawai'i's Congressional delegation and by the DoD (Office of the Deputy Assistant Secretary of the Army for Environment Safety and Occupational Health (ODASA-ESOH)) through its National Defense Center for Energy and the Environment as well as the U.S. Army's Night Vision and Electronic Sensors Directorate.

Currently Being Remodeled

www.hummaproject.com

Mahalo!