Sea Engineering, Inc.

40 YEARS OF MARINE OPERATIONS
&
ENGINEERING IN HAWAII

Makai Research Pier, Waimanalo, Hawaii

863 N. Nimitz Hwy, Honolulu Harbor

Santa Cruz, California

www.seaengineering.com

ABOUT US

- Sea Engineering, Inc. was founded in 1973 by University of Hawaii graduate students to provide marine-related engineering, construction and diving services.
- Today, we have three office locations in Hawaii and California and 35 employees.
- 9 of 12 engineers and scientists are University of Hawaii graduates
- Our clients include professional, business and industrial firms; marine contractors; government agencies and research institutions.

WHAT WE DO

- Coastal Engineering
- Oceanographic Studies
- Marine Environmental Studies
- Hydrographic & Geophysical Surveying
- Marine Construction
- Diving Services
- Boat Services
- Renewable Energy

Sea Engineering has been providing coastal engineering services in the dynamic ocean environment for over 40 years.

CAPABILITIES

Coastal Engineering

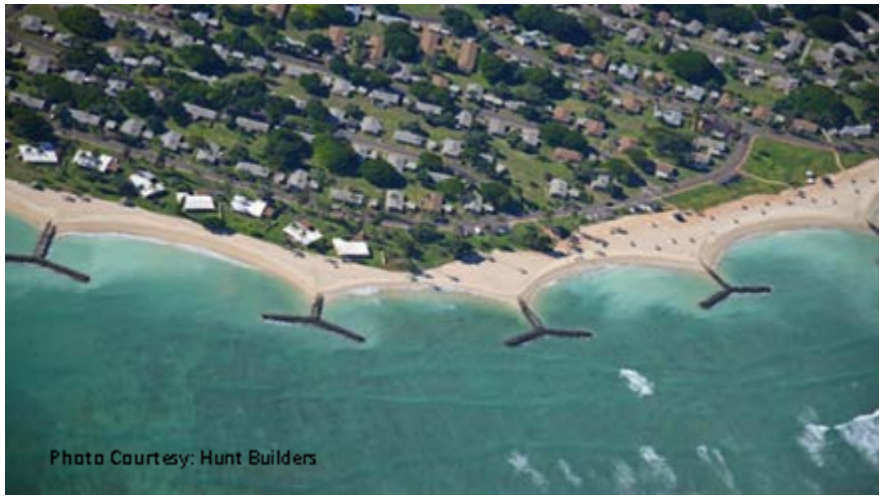
- Marina and harbor planning and design
- Beach nourishment analysis and design
- Dredge planning and analysis
- Shoreline design and assessment of coastal structures for erosion control
- Storm wave runup and inundation analysis
- Beach erosion studies
- Numerical modeling of waves and circulation
- Field installation, maintenance and recovery of oceanographic instrumentation

Kaumalapau Harbor Breakwater Repair Project

"ASCE Hawaii Section Outstanding Civil Engineering Project of the Year Award 2008"
Sea Engineering, Inc. - Designers

Coastal Engineering

CAPABILITIES



- Dredging, placement of 95,000 cubic yards of sand
- Construction of 9 T-head groins

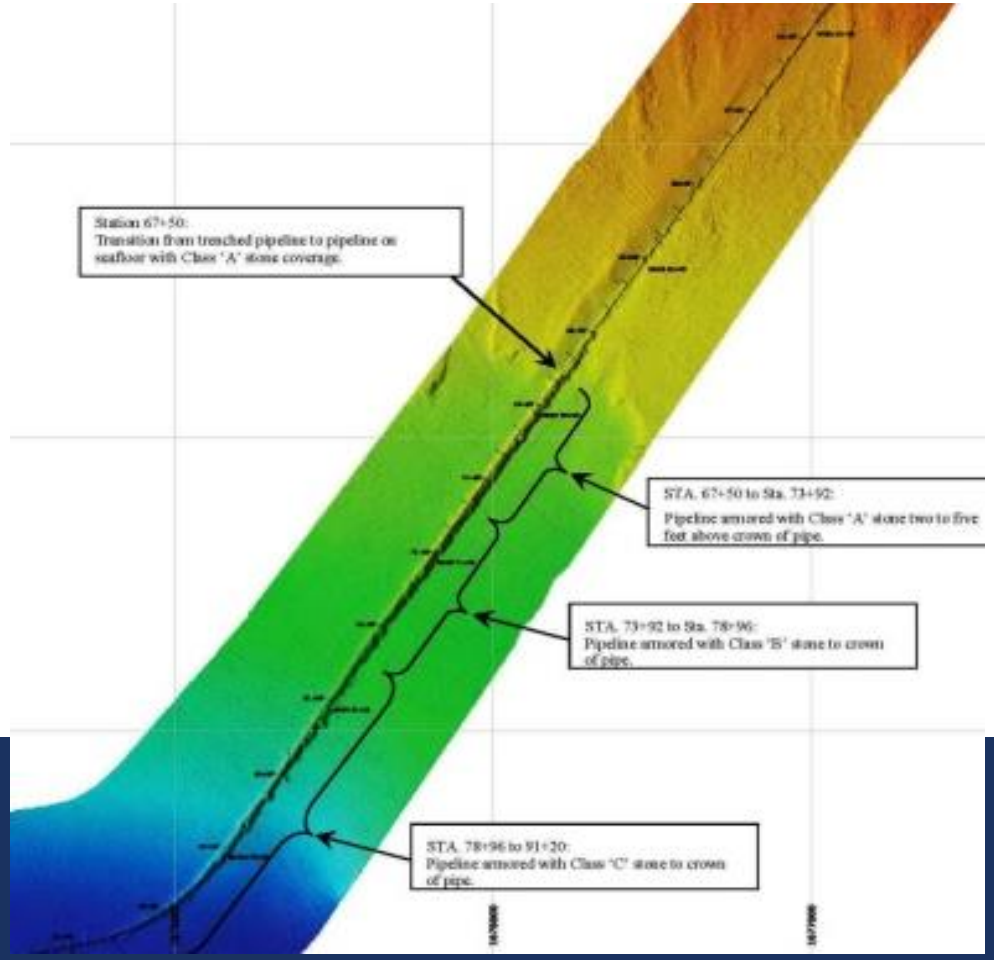
Iroquois Point Beach Restoration – Ford Island Properties, LLC., U.S. Navy

2014 ASBPA Best Restored Beach Award

CAPABILITIES

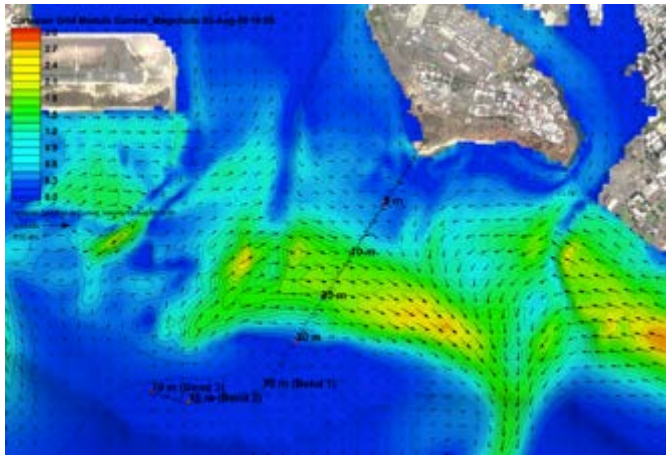
Oceanographic Studies

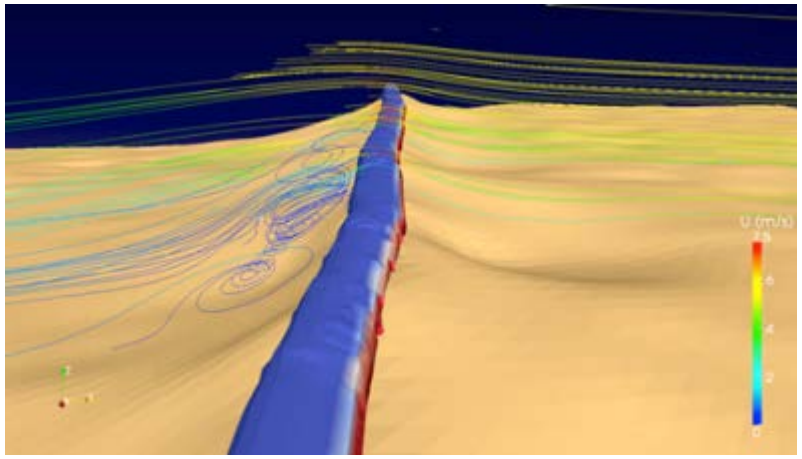
- Current measurement and analysis
- Wave measurement and analysis
- Water quality & oil spill monitoring
- Numerical circulation and sediment transport modeling
- Wave modeling and forecasting
- Determination of oceanographic design criteria
- Ocean outfall planning
- Site assessment



CAPABILITIES

Oceanographic Studies



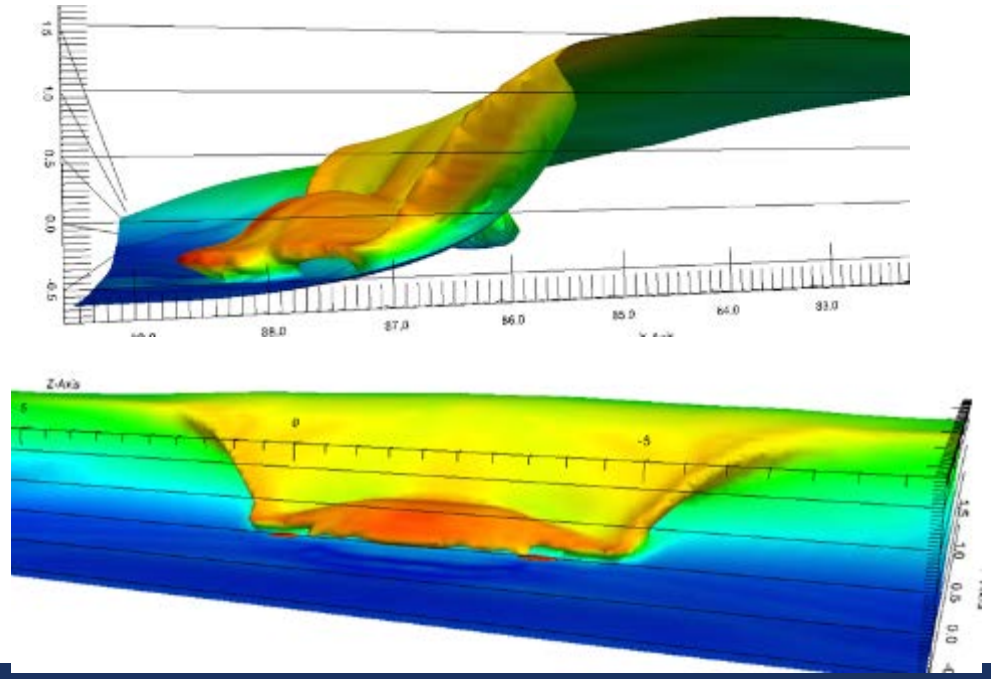


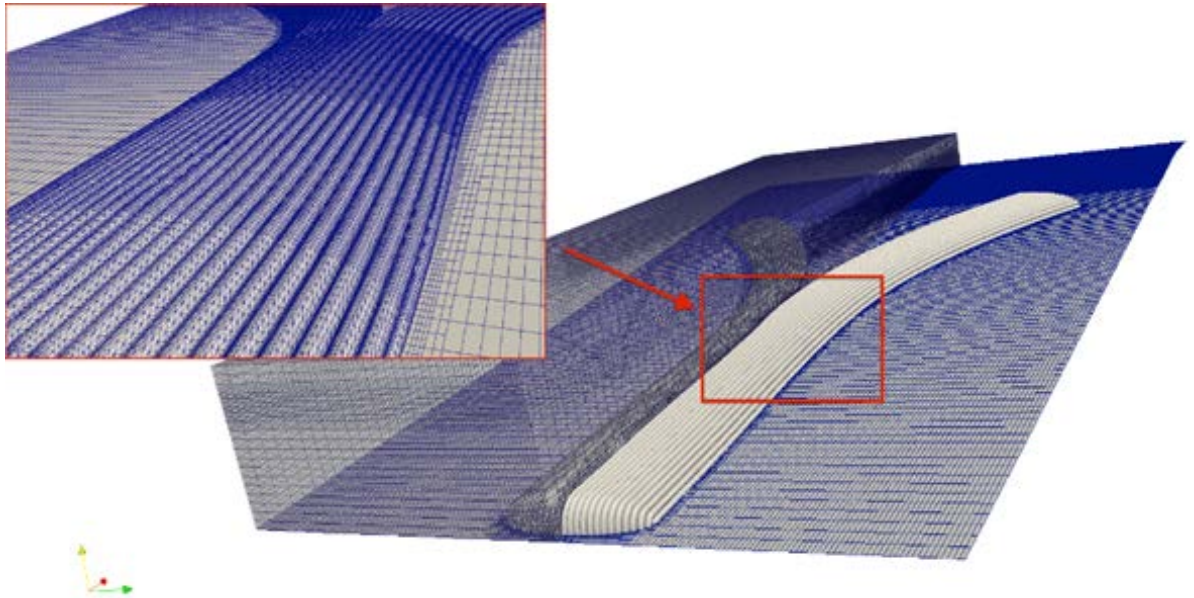
- Water quality data analysis
- High resolution multibeam
- Diver, ROV, HURL submersible inspections
- Hurricane modeling of wave forces

Sand Island Ocean Outfall Investigations

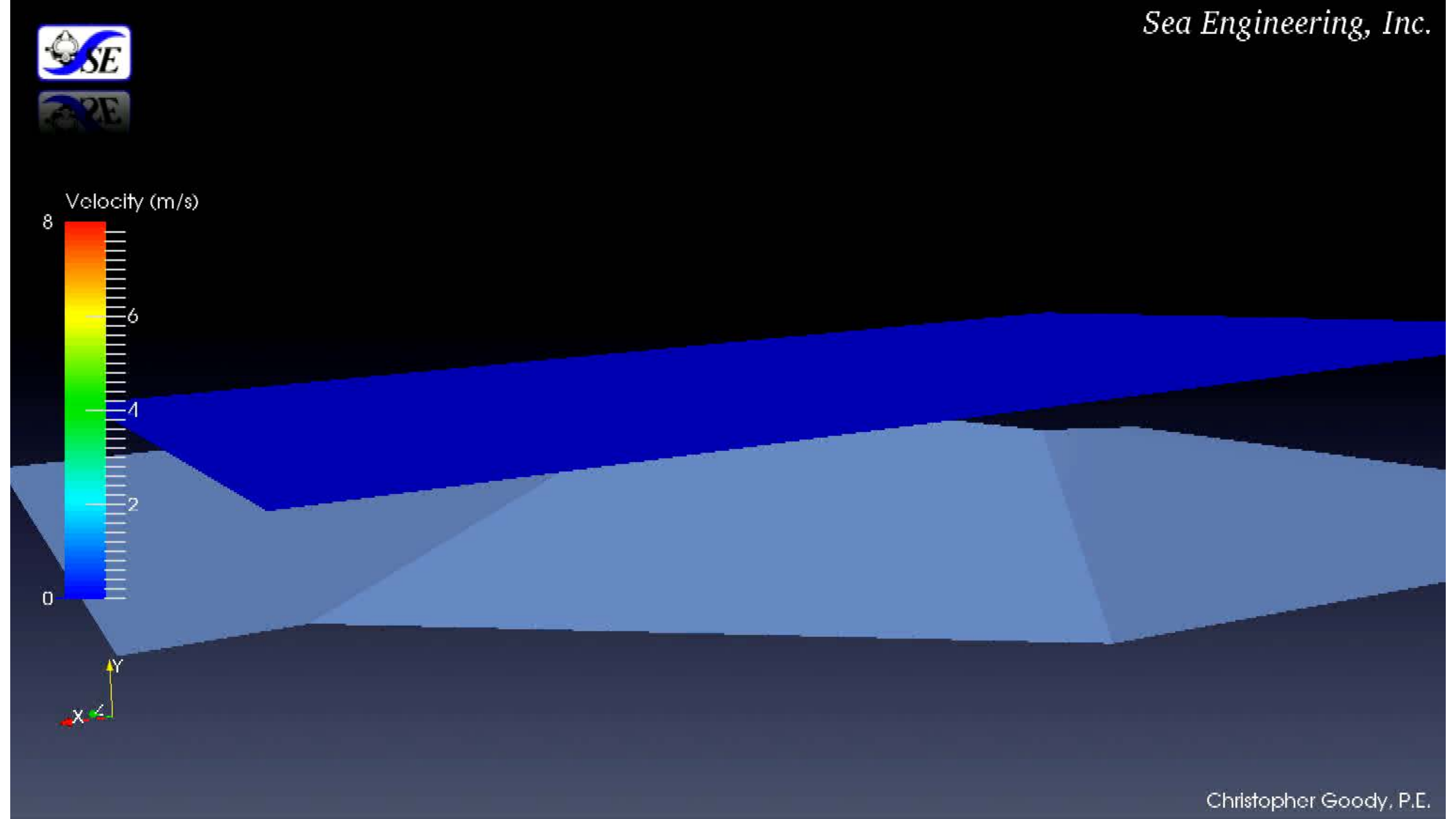
CAPABILITIES

CFD Analyses





- Wave forces on structures
- Wave park and reef analysis


Sea Engineering, Inc.
Velocity (m/s)
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6
4
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Christopher Goody, P.E.

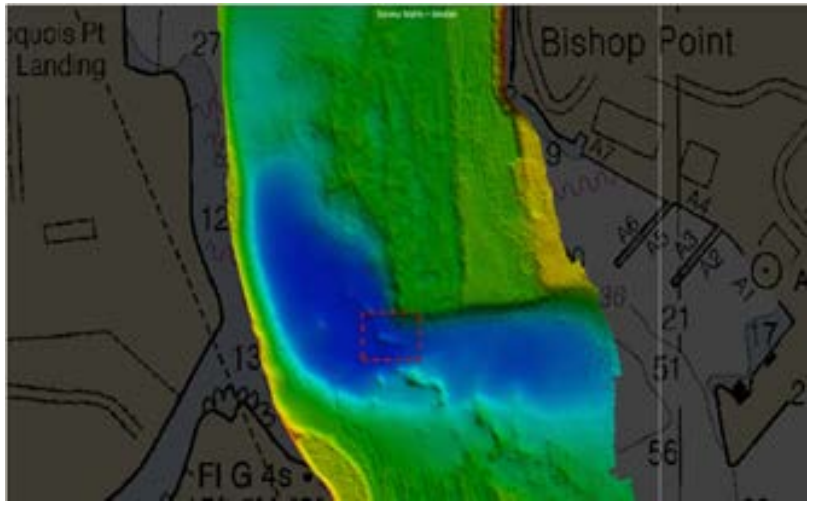
CAPABILITIES

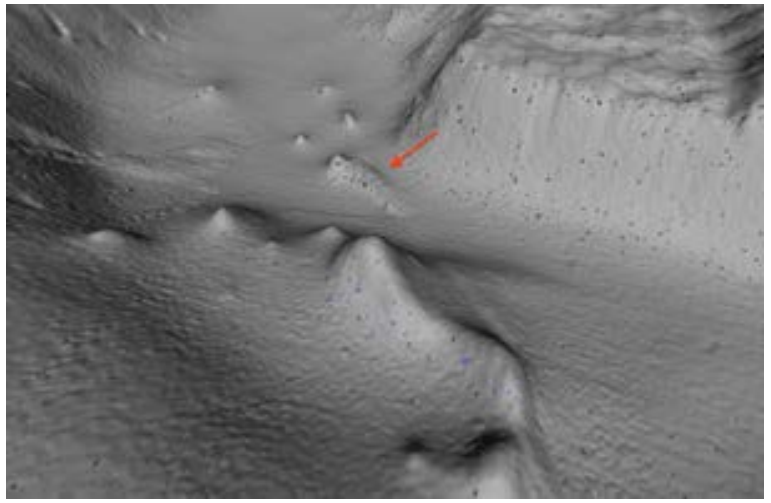
Marine Environmental Studies

- 2- and 3-dimensional sediment and contaminant plume transport modeling studies
- Current, wave, and suspended solids measurement instrumentation including platforms for deployment
- Turbidity analysis
- Sediment sampling, seafloor mapping
- Federal, State and City permit applications
- Environmental assessments and impact statements

Marine Environmental Studies

CAPABILITIES





- High resolution multibeam survey
- Backscatter, roughness analysis for bottom mapping
- Diver bottom surveys

- ADCP current measurement
- Dredging plume modeling

Studies of the Benthic Structure and Marine Resources of the main Pearl harbor Shipping Channel
U.S. Navy

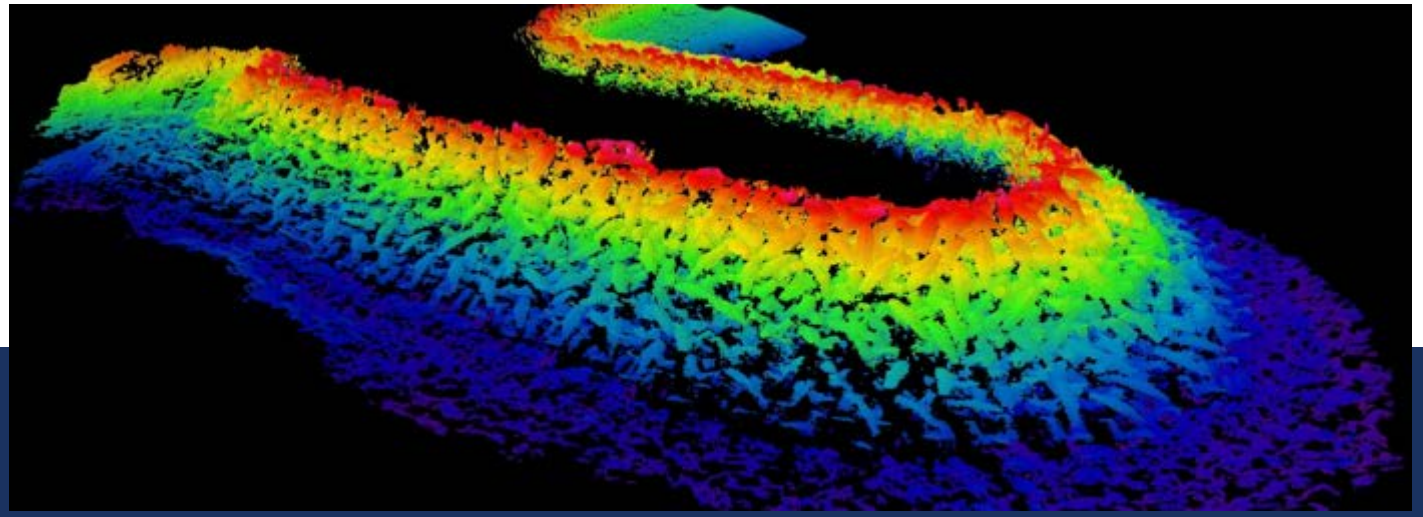
Hydrographic & Geophysical Surveys

CAPABILITIES

- MBES and SBES bathymetry
- Sub-bottom profiling
- Sidescan sonar surveys
- Magnetometer surveys
- ROV inspections
- DGPS Navigation

Project Experience

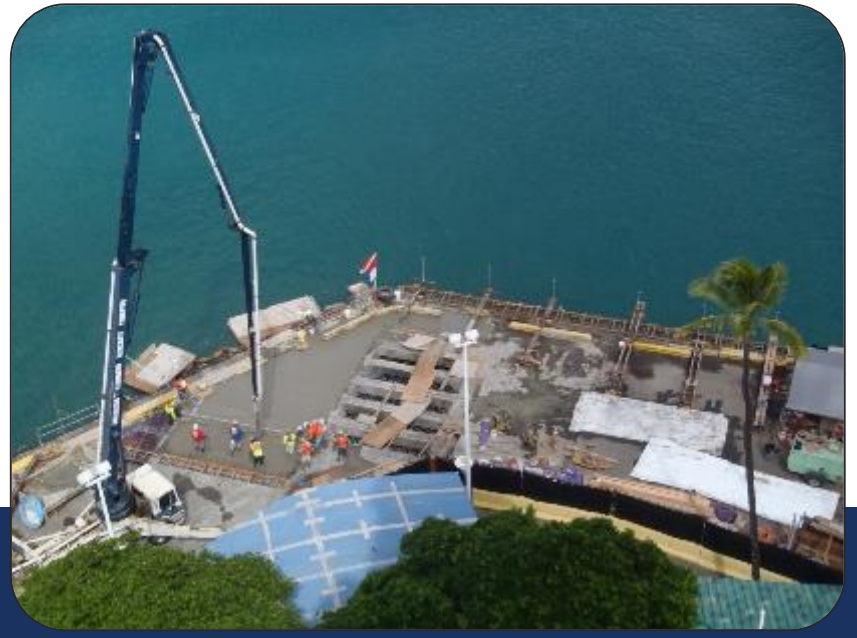
- West Loch Pearl Harbor Dredging Surveys
- Madagascar /Sithe East Africa Cable Route Surveys
- Apra Harbor, Guam Multibeam Surveys
- Kaumalapau, Lanai Breakwater Monitoring Multibeam Survey
- Beckoning Point, Oahu Geophysical Survey
- Costa Rica PAC Cable System Route Surveys



CAPABILITIES

Marine Construction

- Concrete repair and restoration
- Structural repair and demolition
- Dock and pier repair
- Dredging, debris removal and excavation



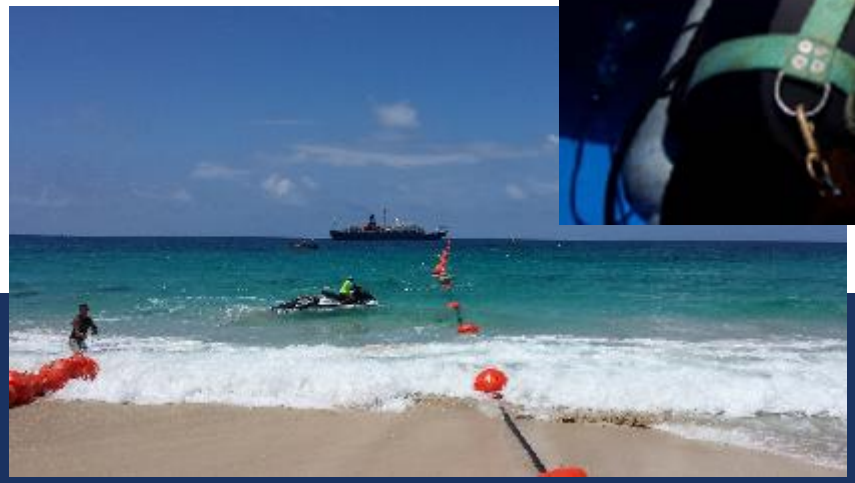
January 28, 2013

February 11, 2014

CAPABILITIES

Diving Services

- Commercial diving
- Heavy construction & rigging
- Underwater wet welding & burning
- Certified underwater bridge inspections
- Waste water treatment plant inspection and maintenance
- Pipeline and fiber optic cable installation and repairs
- Power plant maintenance
- Underwater demolition
- Salvage
- Underwater surveys and inspections, including Photo and video



Marine Operations

CAPABILITIES

74-foot modified landing craft
Full galley, 4 crew berths
4-point mooring system
10,000 lb. crane
Built-in dive stations. Cargo capacity 120000lbs.
Full diving locker with recompression chambers

HUKI PAU

43-foot Delta
Large cab, 4 crew berths
Articulating stern A-Frame

Small Support Vessels from 17 to 30 ft.

HUKI PONO

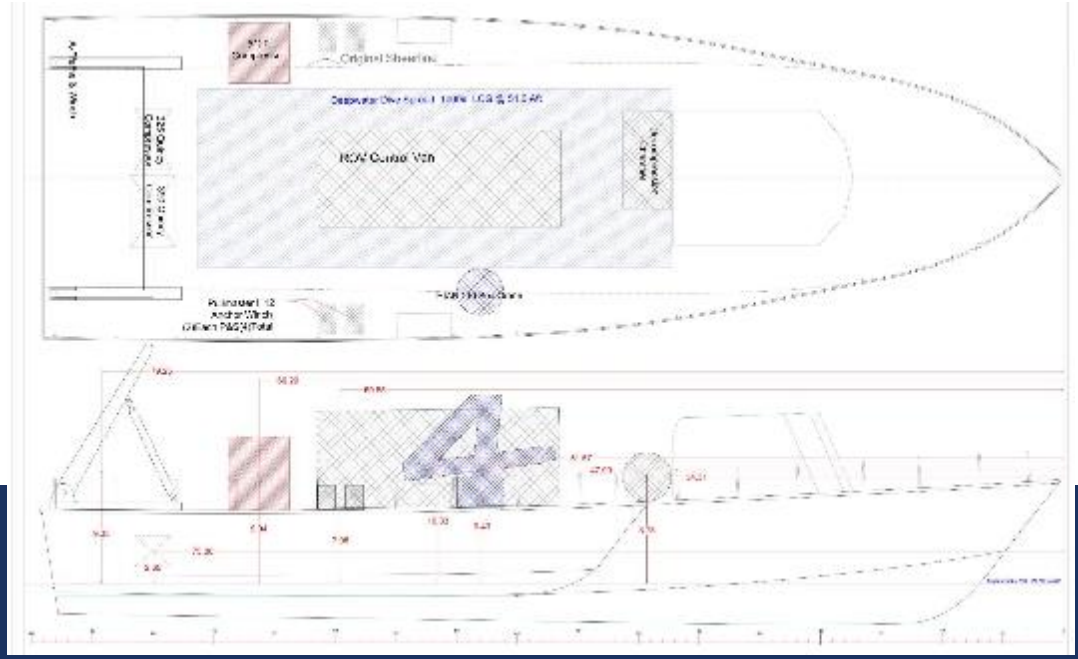
CAPABILITIES

Marine Operations

84-ft Torpedo Weapons Retriever
Full galley, 4 crew berths

Modified to Support SEI Renewable Energy Operataions

Vessel Modification to Widen 8 ft
Addition of 4-Point Anchor/Mooring System
Deepwater Dive Spread
5-Ton Deck Crane
10-Ton A-Frame

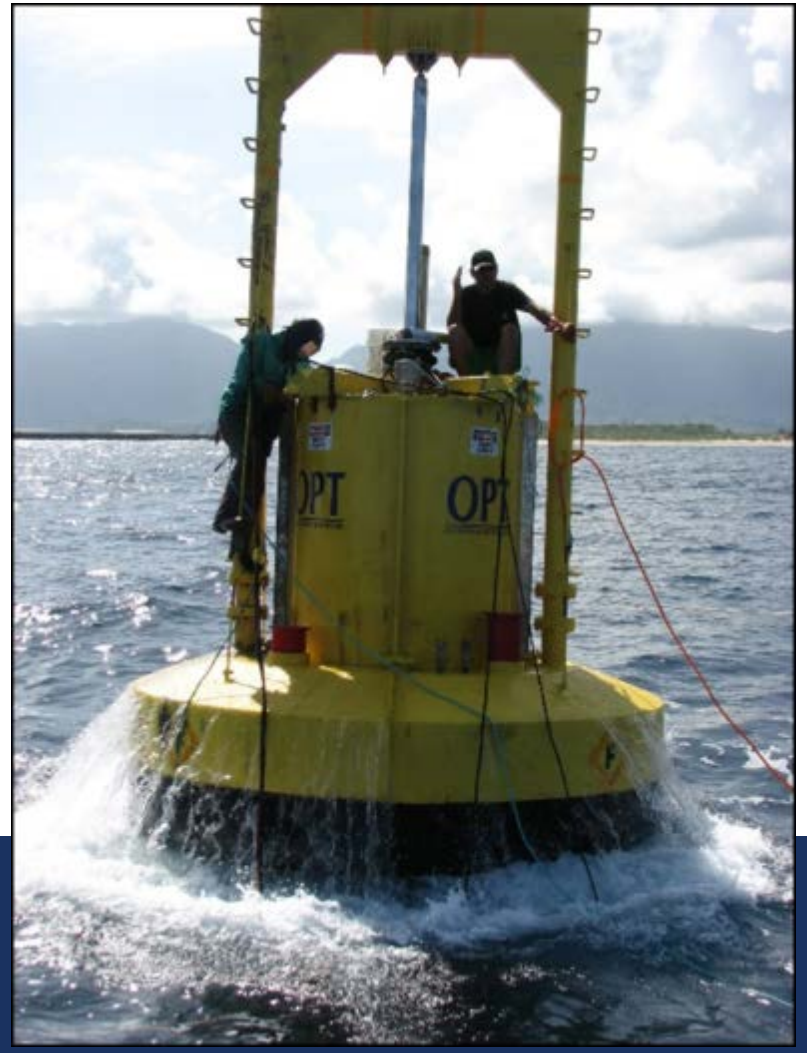


CAPABILITIES

Renewable Energy

Project Experience

- OPT Wave Energy Conversion Buoy, KMCBH
- Oceanlinx Wave Study, Maui
- Hawaii Ocean Current Energy Resource Assessment
- WETS Geophysical Surveys
- NWEI Azura Buoy installation, inspections, maintenance
- WETS Environmental Studies



- Site assessment and permitting
- Current, wave and tidal energy studies
- Installation and maintenance of renewable energy systems

Renewable Energy

- Providing engineering, diving, installation and maintenance support since 2001.
- Over 5 buoy installations for various developers
- **SEI work has included:**
  site assessment
  bathymetry, side scan and diving surveys
  route selection
  calculation of wave forces on electrical cable
  buoy and powercable installation and recovery
  buoy inspections and maintenance

CAPABILITIES

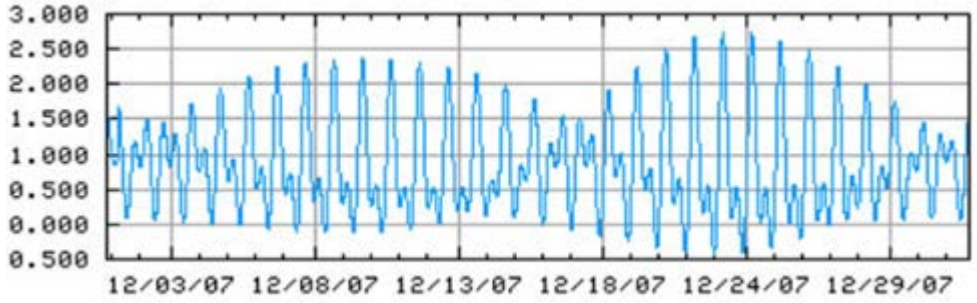
Ocean Power Technology Wave Energy Conversion Buoy, KMCBH

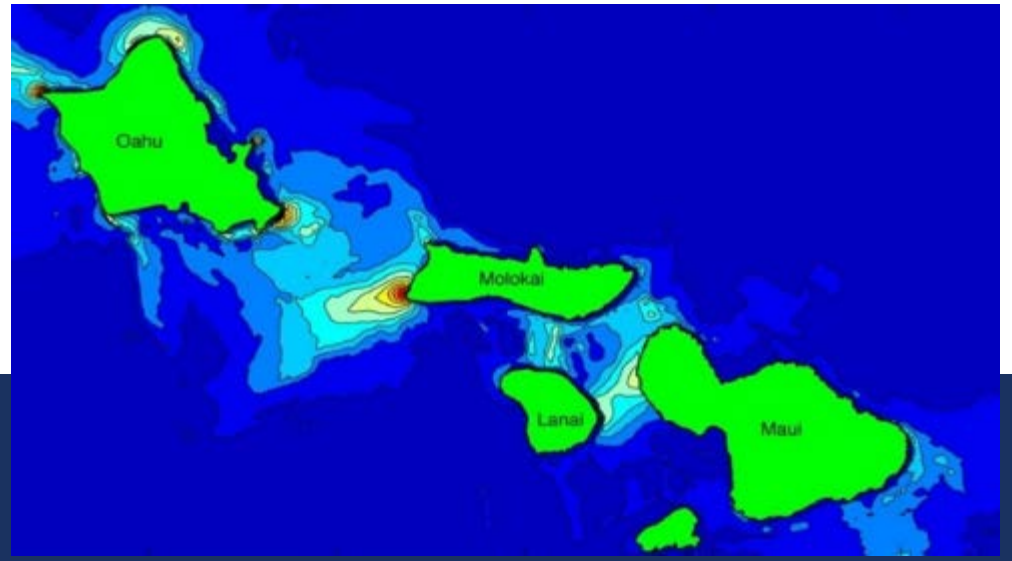
CAPABILITIES

Hawaii Ocean Current Energy Resource Assessment

Work Included:

- Application of a state-of-the-art tidal circulation model developed by the University of Hawaii (UH) to assess tidal current speeds.
- Assessment of the present state of underwater turbine development
- Determination of the potential applicability of the technology in Hawaii.

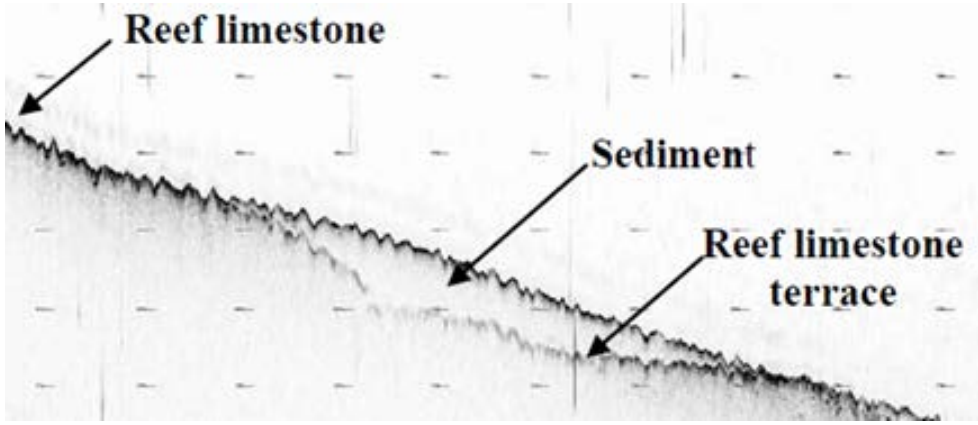


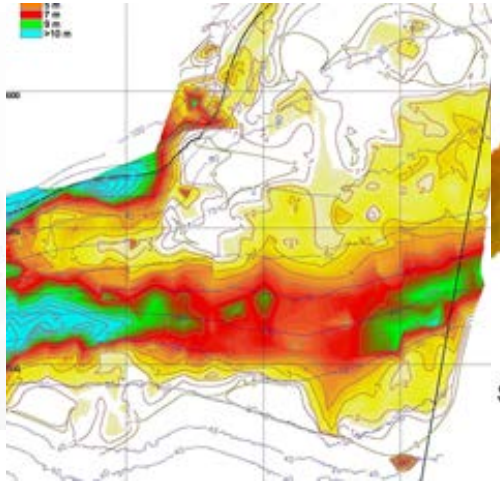


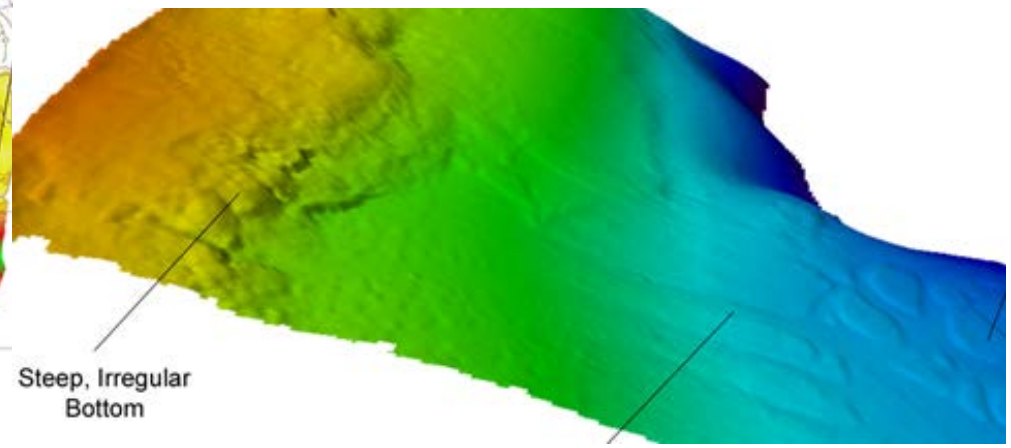
Sea Engineering, Inc. was contracted by HECO to assess Hawaii's ocean current energy resource.

Renewable Energy

CAPABILITIES







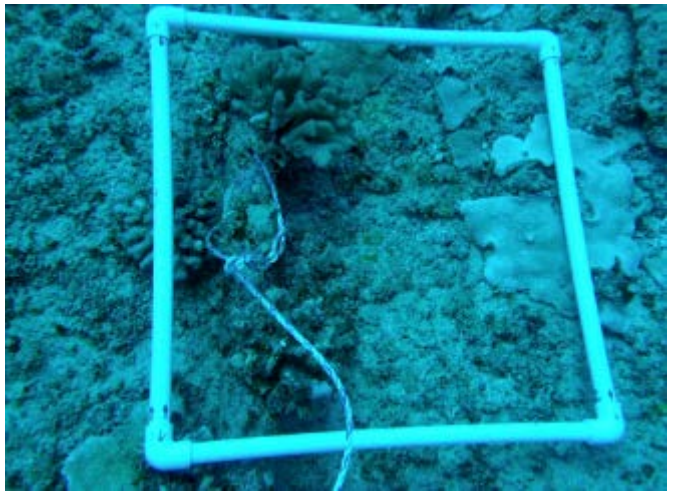
- Multibeam bathymetry
- Side-scan sonar
- Sub-bottom profiling
- ROV video surveys
- Vibracore sediment sampling

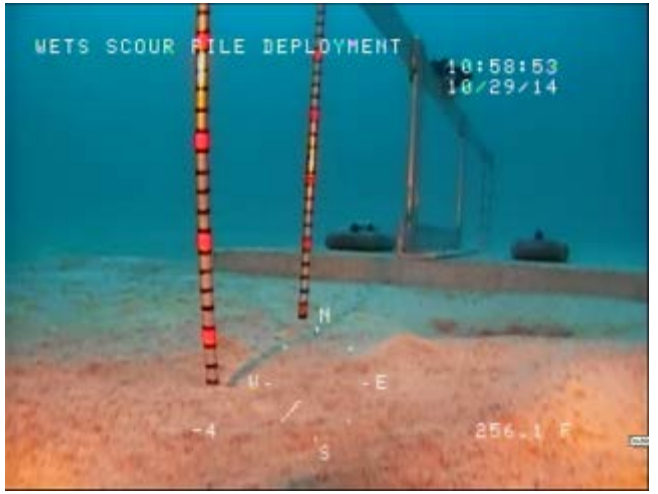
Geophysical Surveys of the Wave Energy Test Site (WETS)

Hawaii National Renewable Energy Center and Department of Energy

Renewable Energy

CAPABILITIES





- Acoustic Monitoring
- ADCP measurements
- Sediment transport monitoring
- Ecological and water quality surveys

WETS Environmental Studies

CAPABILITIES

Renewable Energy

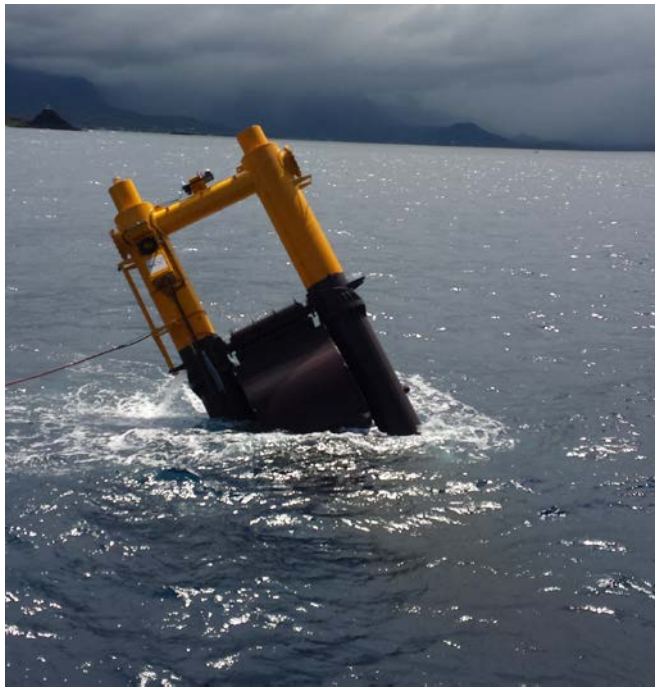
- Engineering Support for Preliminary and Final System Designs
- Preliminary WETS Deepwater Installation Plans
- Thirty Meter Mooring Anchor Inspections
- Thirty Meter Mooring Anchor Load Tests
- Shorecable Inspection
- Shorecable Electrical and Fiber Optic Testing
- Thirty meter Test Site Berth Characterization

Wave Energy Test Site Engineering Services and Support

Sound and Sea Technology

Renewable Energy

CAPABILITIES



NWEI Azura Wave Energy Conversion Buoy, MCBH