The School of Ocean and Earth Science and Technology (SOEST) at the University of Hawai‘i at Mānoa (UHM) has a new 6000 meter-capable remotely operated vehicle (ROV), designed and constructed by Deep Ocean Exploration and Research (DOER). Named Lu‘ukai (sea diver), the DOER Marine H6000 ROV complements the capabilities of the existing fleet of UH manned, remotely operated, and autonomous underwater vehicles and will allow investigators to access the seabed of the majority of the Pacific Ocean. The new vehicle provides operational support and complements the science carried out by the human operated vehicles (HOV) Pisces IV and Pisces V. Designed for maximum maneuverability and mission flexibility, the Lu‘ukai has the ability to collect specimens; characterize substrates; capture video and still images of activities and surveys; monitor water column properties; install, connect and test seafloor equipment; and perform other specialized tasks.

Science Support Capabilities
- Supports operations at the ALOHA Cabled Observatory (ACO)
- Enhances submersible operations on R/V Ka‘imikai-O-Kanaloa (R/V KOK)
- Provides submersible capability for research on R/V Kilo Moana (R/V KM)
Vehicle Specifications

- **Size:** 78.5”L x 55”W x 66”H (including skids)
- **Weight:** 3000 lbs (1360 kg)
- **Payload:** 150 lbs (68 kg) minimum
- **Depth Rating:** 6000 m
- **Hydraulics:** 25 shaft hp; 2800 psi @ 12.5 GPM
- **Power:** 4 horizontal thrusters, 200 lbs forward thrust, 100 lbs aft
  3 vertical thrusters, 237 lbs upward thrust, 117 lbs down
- **Piloting Cameras:** Up to 4 Deepsea Power and Light Nano SeaCam and Multi-SeaCam cameras
- **Lights:** 4 LED lights, dimmable in pairs. Additional pair can be added.
- **Two manipulator arms:** Schilling Orion 7P and Sea Mantis 5 function proportional
- **Navigation:** NavQuest 600 Micro Doppler velocity log (DVL); heading, roll, pitch and pressure depth; USBL responder link.
- Tritech Seaking scanning sonar
- Novatech xenon strobe locating beacon

Scientific Equipment

- **High Definition (HD) video camera:** 1 Insite Pacific mini Zeus on pan and tilt mount with zoom and focus control.
- Falmouth Scientific MicroCTD (conductivity, temperature, depth)
- Science manifold providing spare bulkhead connections with power and communication links
  - 12, 24 and 48 VDC, up to 150 W each.
  - Two serial channels (RS-232 and RS-485) and one Ethernet (1 GB/s)
  - One spare fiber channel for custom applications
- 5 mW red lasers aligned with 15 cm separation. Housing allows for lasers of different color or power.

Supporting Equipment

- **Control van:** 20 ft; with graphical user interface-based control system: controls all ROV functions, provides pilot with system status on vehicle components, and allows for user-determined visual and audible alarm thresholds. Accommodates 3 ROV operators and several scientific observers.
- **Workshop van:** 20 ft; for vehicle maintenance and spare supplies; power distribution unit; space for ROV shipping
- **Umbilical:** Standard UNOLS 0.681 electro-fiber-mechanical cable transmits power, and provides data and communications links with vehicle
- **Neutrally-buoyant tether:** Tether Management System (TMS) with capstan and slip ring winch drum for managing tether. TMS is deployed via the umbilical and is equipped with altimeter, compass, cameras, lights and USBL responder link. TMS is fitted with 110m of tether and can accommodate up to 200m.
- **Telemetry:** 1 GB Ethernet; all vehicle telemetry and HD video are transmitted via a single fiber (this can support a variety of sensors including new-generation imaging multi-beams sonar). Spare fiber available for custom applications.
- **Underwater navigation:** Sonardyne Ranger 2 ultrashort baseline (USBL) navigation system to 6000m; TrackLink 5000 USBL available for shallower operations.
- Capable of being deployed from UH research vessels R/V KM and R/V KOK.

For more information, contact Scott Ferguson, Director of Marine Technical Services, at (808) 832-3081 or rovops@soest.hawaii.edu.