

**Cruise Summary for R/V *Kilo Moana* KM-19-13:
ALOHA Cabled Observatory Service
and
ONR Kauai Cable
9 – 16 July 2019**

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16 July 2019

The two objectives of this cruise on the R/V *Kilo Moana* funded by NSF and ONR were to:

- Service infrastructure and instrumentation on the ALOHA Cabled Observatory (ACO) north of Oahu, and
- Diagnose a cable fault on a seafloor instrumentation cable on the north side of Kauai.

The cruise was successful. Essentially all objectives were met.

ACO is the deepest operating plug and play cabled observatory on the planet. On this cruise specifically, the following was accomplished:

- A new basic sensor package (BSP4, CTDO₂, pressure, temperature, fluorometer and turbidity, acoustic modem) was installed; all instruments are functional;
- BSP2 (CTDO₂, pressure, fluorometer and turbidity) was recovered, repaired, and redeployed, all instruments are functional;
- CAM2 (video camera, 2 lights, hydrophone) was recovered for service;
- BSP3 (hydrophone) was recovered for service; and
- Some but not all housekeeping tasks were accomplished. LIGHT1 was not recovered.

Having two BSPs with redundant basic oceanographic sensors measuring Essential Ocean Variables has been a long term goal, finally achieved.

During the second part of the cruise off the north shore of Kauai, two tasks were accomplished:

- An instrument on the seaward end of a cable was visually inspected using the ROV; it appears to be in fine shape with little or no corrosion; and
- Mid-way along the cable, the ROV attached a lift line that was used to bring the cable up to the ship. The cable was cut, diagnostics performed, spliced back together and redeployed. The diagnostics revealed the cable seaward to the instrument is intact, the instrument is functional and the location of the seaward end of the faulted shore-end section was determined.

With this information, planning for the cable repair can proceed.

Support from the ship's crew and the ROV *Lu'ukai* team was exemplary. Difficult operations were accomplished successfully because of the highly experienced personnel. ROV *Lu'ukai* proved again it has the endurance to operate without technical fault; Dive LK-114 was 29 hours long with 23 hours on the bottom at 4728 m water depth, setting a record for itself.