



FK180119 30-day Post Cruise Report

1. **Ship name:** Falkor
2. **Cruise Dates - Day Departed:** 1/20/2018
3. **Cruise Dates - Day Returned:** 2/7/2018
4. **Cruise Number:** FK180119
5. **Departure Port:** Honolulu, HI, USA
6. **Arrival Port:** Honolulu, HI, USA
7. **Mid-Cruise Port Call (if any):** Honolulu, HI, USA
8. **Mid-Cruise Port Call (if any):** None
9. **Participating Organizations, Institutions, Foundations, Government Agencies, etc.:**
University of Sydney, University of Rhode Island, Woods Hole Oceanographic Institution, University of Michigan, Massachusetts Institute of Technology, Greybits, Evologics
10. **Funding Sources:** National Science Foundation (award number 1452793), WHOI/NASA (prime award number NNX16AL08G) COOPERATIVE EXPLORATION WITH UNDER-ACTUATED autonomous vehicles in hazardous environments, and CMU/Department of Energy (prime award number DE-EM0004383), University of Sydney (DVCR equipment grants U8035, U8010), URI Council for Research, "High resolution optical imaging system development and testing of shallow water Lagrangian floats in a riverine salt wedge" ONR N00014-17-1-2467, Integrated Marine Observing System (IMOS) AUV Facility NCRIS-2017-22, AUTONOMOUS SYSTEM FOR DEEP SEA HYDROCARBONS - Exxon (MIT 6933399)
11. **Describe all of the geographical area(s) where the science occurred:** Au' Au channel (west of Maui) and NW Hawaii Island
12. **Name of Chief Scientist:** Oscar Pizarro
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13. **Cruise Objectives:** Demonstrate the coordinated operation of multiple autonomous underwater and surface vehicles in the context of benthic imaging and adaptive habitat mapping along a previously studied area of the Au'Au channel. This is an engineering development cruise that will operate in a region with substantial prior information to assist decision making and assessment of adaptive sampling techniques. The focus is in advancing and characterizing robotic survey operations rather than oceanographic exploration.

14. **Cruise Summary:**

21-29 JAN: operating with UMich Iver, URI Float and WHOI Glider in the Au'Au channel. Falkor multibeam surveys at night.

31 JAN-06 FEB: Same platforms in addition to ACFR Sirius and NextGen AUVs on NW shore of Hawaii Island.

Collected over 2TB georeferenced stereo imagery with UMich Iver3, URI Lagrangian float and ACFR Sirius. Sites were partially selected based on bathymetric features derived from the high resolution bathymetry collected by Falkor at night. Sites were selected in areas expected to contain mesophotic coral reefs. Together with the bathymetry these surveys will be used to test habitat prediction and adaptive sampling techniques. Operations required extensive use of small boats (glider, Iver3 and Iver2, Lagrangian float) and were limited to daylight hours. Sirius was deployed from the aft deck in similar fashion to the Scott Reef cruise in 2015.

The shipment from Australia was delayed two weeks through clerical errors in handling carnets and payments by the agent. We only had access to ACFR vehicles for the last week of the cruise off Hawaii Island. Fortunately Atreyu could be used as a second acoustic tracking platform (complementing Falkor) with a USBL pole designed for FK150321. In the week remaining, we managed some preliminary testing of AUV NextGen. The ASV WAM-V assembly took longer than expected and was ready for deployment late in the cruise and given prevailing conditions was tested once back in Honolulu.

15. **Did you collect Measurements or Samples, including biological specimens?** Images, CT, Fluorometer, optical backscatter, and CDOM

16. **Did you deploy and/or recover any Moorings, Bottom Mounted Gear, or Drifting Systems?** Yes

17. **Equipment Used:** ACFR AUV Sirius, AUV Iver2 Holt, AUV NextGen, ASV WAM-V, URI Lagrangian photo float, UMich AUV Iver3, WHOI Slocum glider. MIT automated scheduling and multi-vehicle planning tools, Greypoints Maptracker web-based mission progress visualization.

18. **Station Plots:**

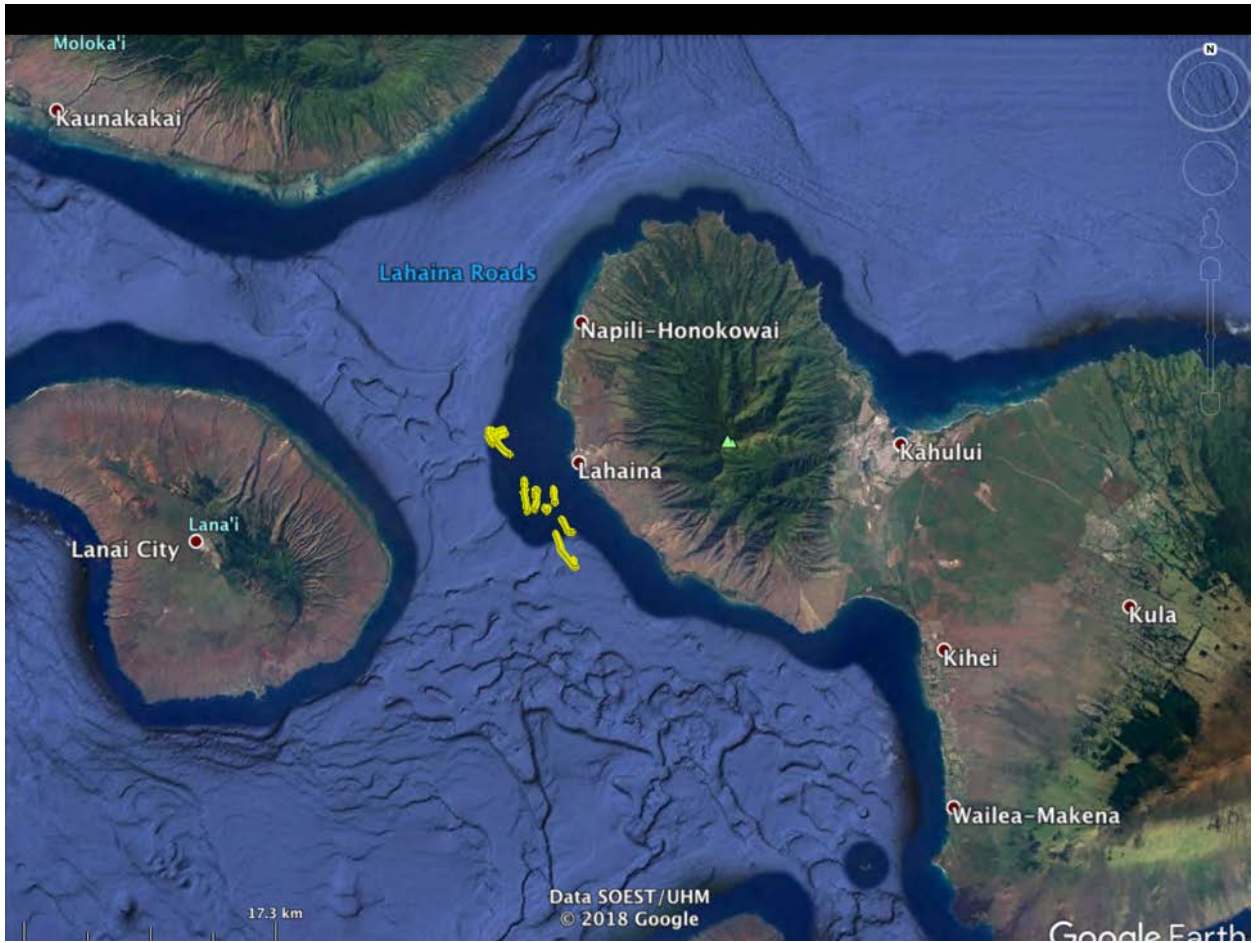


Figure 1: Operating area in the Au'au Channel, west of Maui