HUGO: The Hawaii Undersea Geo-Observatory

Fred Duennebier, David Harris, Jackie Caplan-Auerbach
fred@soest,hawaii.edu, dharris@soest,hawaii.edu@soest.hawaii.edu, jackie@soest.hawaii.edu
SOEST, Univ. of Hawaii

The Hawaii Undersea Observatory was in September, 1997, at the summit of Loihi submarine volcano located about 30 km south east of the Island of Hawaii. The observatory consists of a 47 km electro-optical cable connecting a junction box and experiments on the summit to a recording station on Hawaii. Continuous operation of the observatory was interrupted on April 27, 1998, by an electrical fault in the cable to shore. During more than three months of continuous operation, a large variety of signals were observed on a broad-band hydrophone sampled at 64 kHz. These signals include earthquake body and surface waves, earthquake T-phases, eruptive sounds, submarine landslides, whales, air guns, and submersible activities. In the next version of HUGO, we plan to incorporate the lessons learned from our first attempt, and from work with the Hawaii-2 Observatory. These lessons include 1) using only armored cable through the volcanic environment; 2) not using optical submersible-mateable connectors; 3) making the cable termination as simple as possible and easily disconnected; and 4) isolating component packages and cables with underwater mateable connectors. Servicing observatory components is expensive, and considerable effort should be made to insure reliability and redundancy. Where this is not possible, cost and risk involved in component repair and replacement is greatly reduced if components are easily removed for servicing. This requires that components be designed for recovery by submersible, and that connectors allow for easy separation from the observatory system.