

Introduction

One of the most challenging frontiers in geophysics is obtaining long-term geophysical observations on the seafloor with immediate access; in particular broadband seismic and geodetic observations from remote ocean locations in order to obtain complete global network coverage. Such coverage is crucially important to address fundamental concepts in plate tectonics, such as the origin and geometry of oceanic mantle plumes and the location and character of earthquakes. Thanks to recent technological advances, however, long-term, telemetered, high-quality geophysical observatories in the remote ocean are now possible.

Realization of an Ocean-Bottom Global Seismic Observatory

We have designed a system to meet the requirements of the Global Seismographic Network (Lay, et al., 2002, which includes the means to deliver online seafloor seismic observations from the Earth's remote oceans without the need for a seafloor cable. Through the use of a wave glider, a transformative new technology, the ROOSSO system, equipped with other sensors, can also provide a new tool for a variety of oceanographic research.

Our concept for a Remote Ocean Online Sea**f**loor Seismic Observatory (ROOSSO), illustrated in Figure 1, will:

- Provide shielding of the seismometer from seafloor turbulence;
- Provide continuous near-real time streaming of sensor data sampled at one sample per second or faster from the seafloor to land with a latency of less than a few minutes;
- Reduce data latency when a significant event is detected
- Provide higher sample-rate data segments telemetered upon request;
- Provide enough stored energy for at least a two-year service interval while streaming continuous data at one sample per second (sps) plus about 1400 hours of 40 sps data on-request.

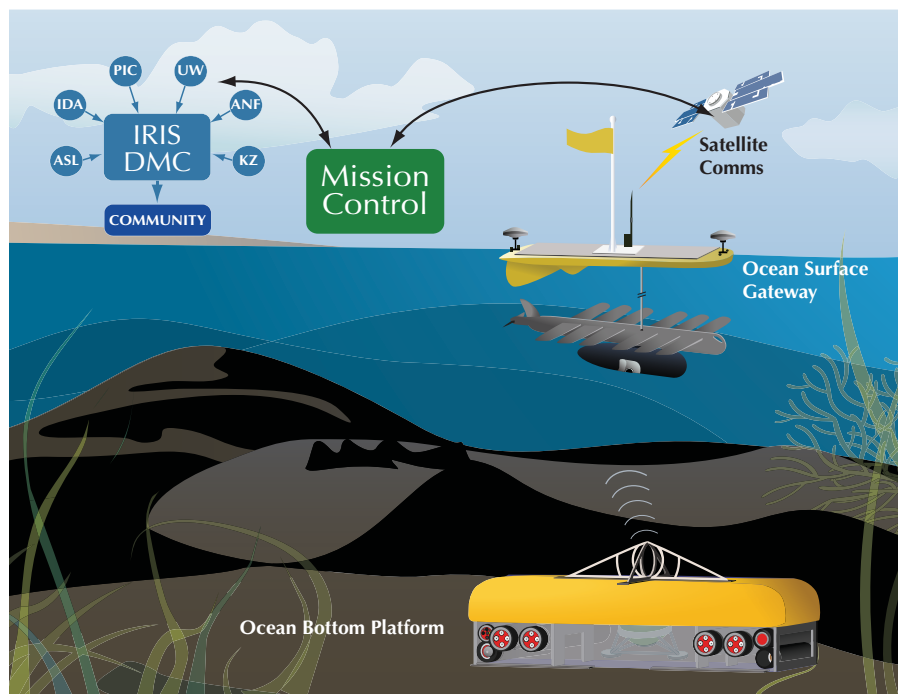


Figure 1. ROOSSO System Concept. The ocean bottom package sitting on the seafloor telemeters sensor data through the ocean column to a free-floating Ocean Surface Gateway (OSG) hovering above the Ocean Bottom Platform (OBP). The OSG re-transmits the data via satellite to the shore while it holds station over the OBP.