OSSE09

Preliminary Test Plan for AUV operations
v.1

Participants

1. MIT – On-board autonomy (Back-seat driver) and Ocean Model
2. NUWC – IVER AUV (Hammerhead)
3. Cal.Poly – IVER2 AUV
4. JPL – Mission planning, EO-1 and Ocean Model
5. Rutgers – REMUS AUV, SLOCUM gliders, MODIS, AVHRR and Ocean Model, R/V Arabella
6. UMass – Ocean Model
7. Stevens – Ocean Model
8. UNC – Ocean Model

Introduction

This trial is scheduled for the period of Nov. 4 – 6, 2009 in the mid-Atlantic bite region to demonstrate the planning and prosecution sub-system under the OOI-CI.

Objectives

1. Deployment of mobile assets to capture an Ocean feature. Identification of the Ocean feature based on Ocean models and plan missions to deploy a fleet of mobile assets.
2. Feed data from the field nodes back to the models
3. Demonstrate the on-board autonomy of the mobile assets for adaptive ocean sampling
4. Demonstrate the cluster autonomy capabilities of the mobile assets in an acoustic communication network for adaptive ocean sampling.

Field Operations

Datum: Latitude $39^o\ 25^/\ 06.82^{//}$N, Longitude $74^o\ 11^/\ 55.08^{//}$W
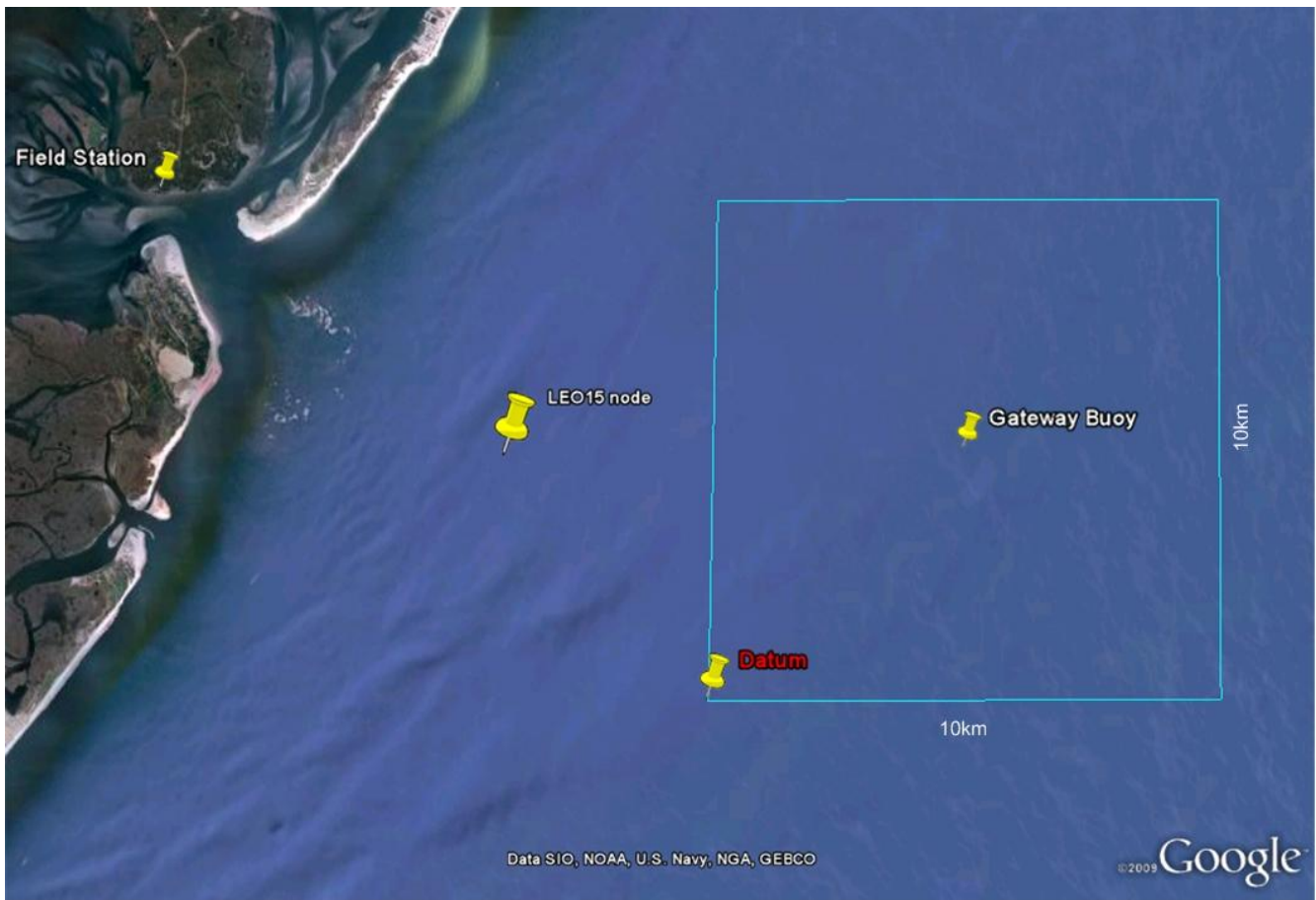Gateway Buoy: Latitude $39^o\ 27^/\ 46.17^{//}$N, Longitude $74^o\ 08^/\ 23.20^{//}$W

Fig. 1: AUV operation area 10km x 10km box

Communication Infrastructure

All the AUVs are equipped with a WHOI micro-modem. R/V Arabella will have a modem on a side connected to the top-side command and control station. Top-side command and control station consist of a display tracking all the mobile assets in operations and this view can be shared through the Google Earth. It also has a control panel to re-direct all the assets including commands for adaptive ocean sampling. In addition to the modem on the side, Arabella will have a RF link to the gateway buoy for wider acoustic communication coverage.

Day by day operations

Date	Operations
11/04/09	Operations near the field station. Setup the lab and command and control station on Arabella. Check the vehicle status and run couple of front seat missions around the field station to check the low-level controllers and sensors. Check on acoustic communication links. Run back-seat missions. On recovery upload data to MIT server.
11/05/09	Go out to sea deploy the gateway buoy and run missions in the box in Fig. 1. Deploy the assets to the loiter points determined by ASPEN/CASPER. Check track-trail behaviors on IVERs for collaborative missions with REMUS. Run a collaborative sampling mission with REMUS running a grid box and IVERS trailing it. REMUS will do a race-track out of the box and back and IVERS will re-acquire REMUS. Run thermo-cline missions using IVERS to demonstrate the adaptive ocean sampling capabilities. There will be few virtual vehicles simulated on board the ship collaborating with the real AUVs to test cluster autonomy behaviors. On recovery transfer data for analysis.
11/06/09	Half day ops at sea running similar missions as on 11/05/09. After lunch recover the gateway buoy and get back to shore for unloading.