

AUV Sentry Update

Exploring the Deep Ocean
NATIONAL DEEP SUBMERGENCE FACILITY VEHICLES

Alvin
Human Occupied Vehicle
Accommodates: 1 Pilot and 2 Scientists
Depth Capability: 4500m (14,764 feet)

Jason
Remotely Operated Vehicle
Depth Capability: 6500m (21,450 feet)

ABE
Autonomous Underwater Vehicle
Depth Capability: 4,500m (14,764 feet)

RHOV
Human Occupied Vehicle
Accommodates: 1 Pilot and 5 Scientists
Depth Capability: 6500m (21,450 feet)

Sentry
Autonomous Underwater Vehicle
Depth Capability: 6000m (20,000 feet)

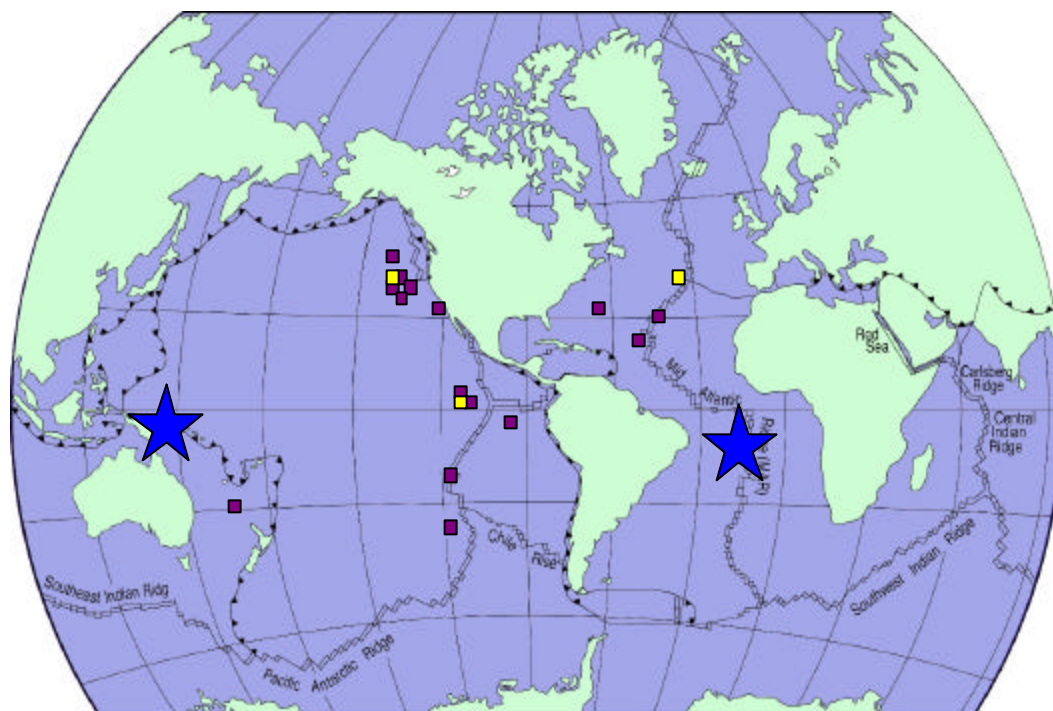
Logos: Woods Hole Oceanographic Institution, NSF, NOAA, ONR, Navy, US Coast Guard

***ABE admitted to
NDSF in 2006***

***Sentry to replace
ABE in 2008***



ABE Operations 2006



- **SMAR (Koschinsky, German):**
joint with Quest (NOAA OE)
- **PNG (Tivey, Bach, Seewald):**
joint with *Jason* (NSF, Private)

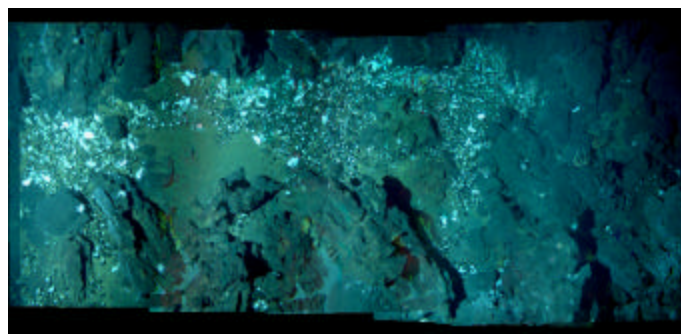
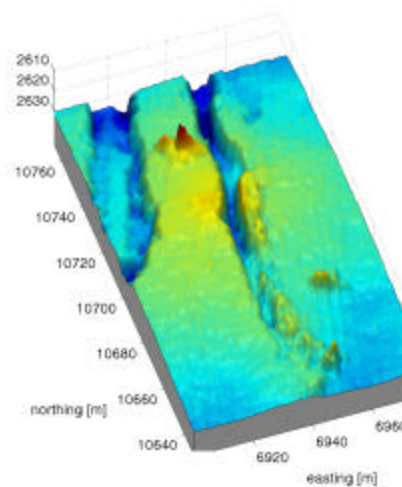
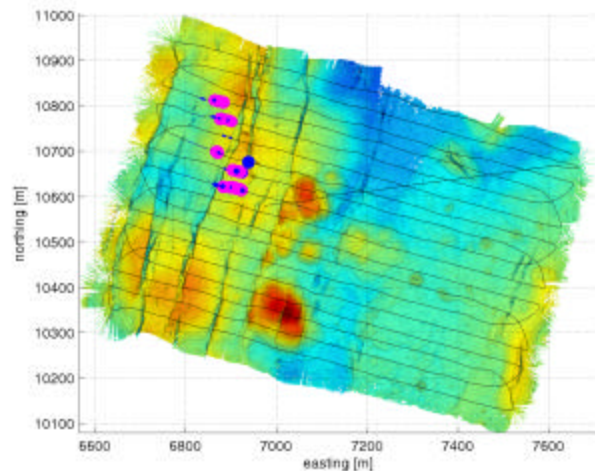
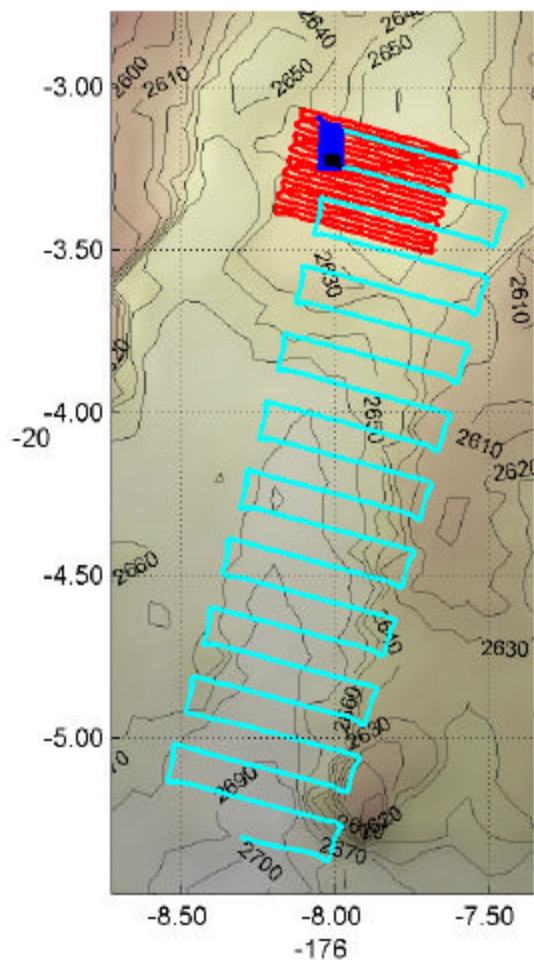


Joint AUV-ROV operations

- **SMAR ops with Quest ROV**
 - Vehicles operated one at a time
 - *ABE* mapping results used within hours by Quest team
- **PNG ops with *Jason***
 - Vehicles often in the water simultaneously
 - *ABE* anchored at end of dive, doesn't interrupt the ROV dive
 - *ABE* mapping results used with real-time display by *Jason* team



ABE 3-Phase Surveys



Sentry AUV

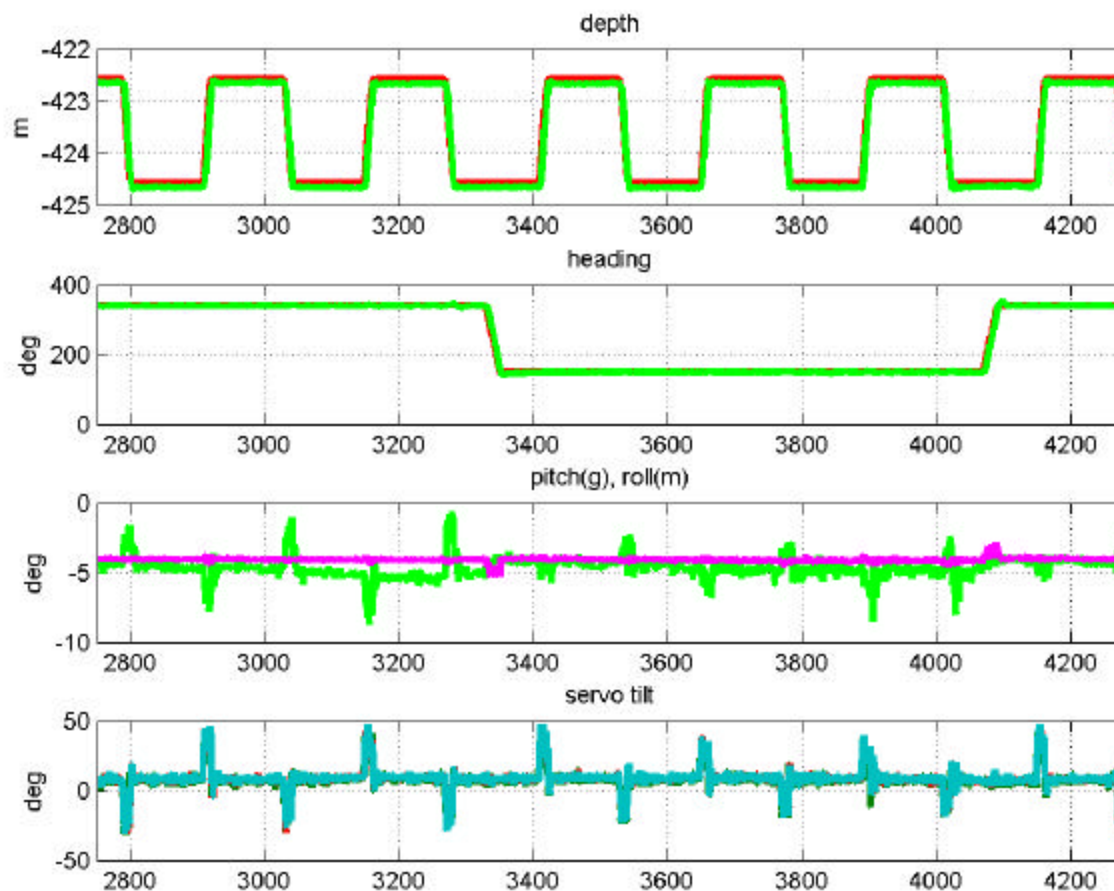


Sentry Upgrades

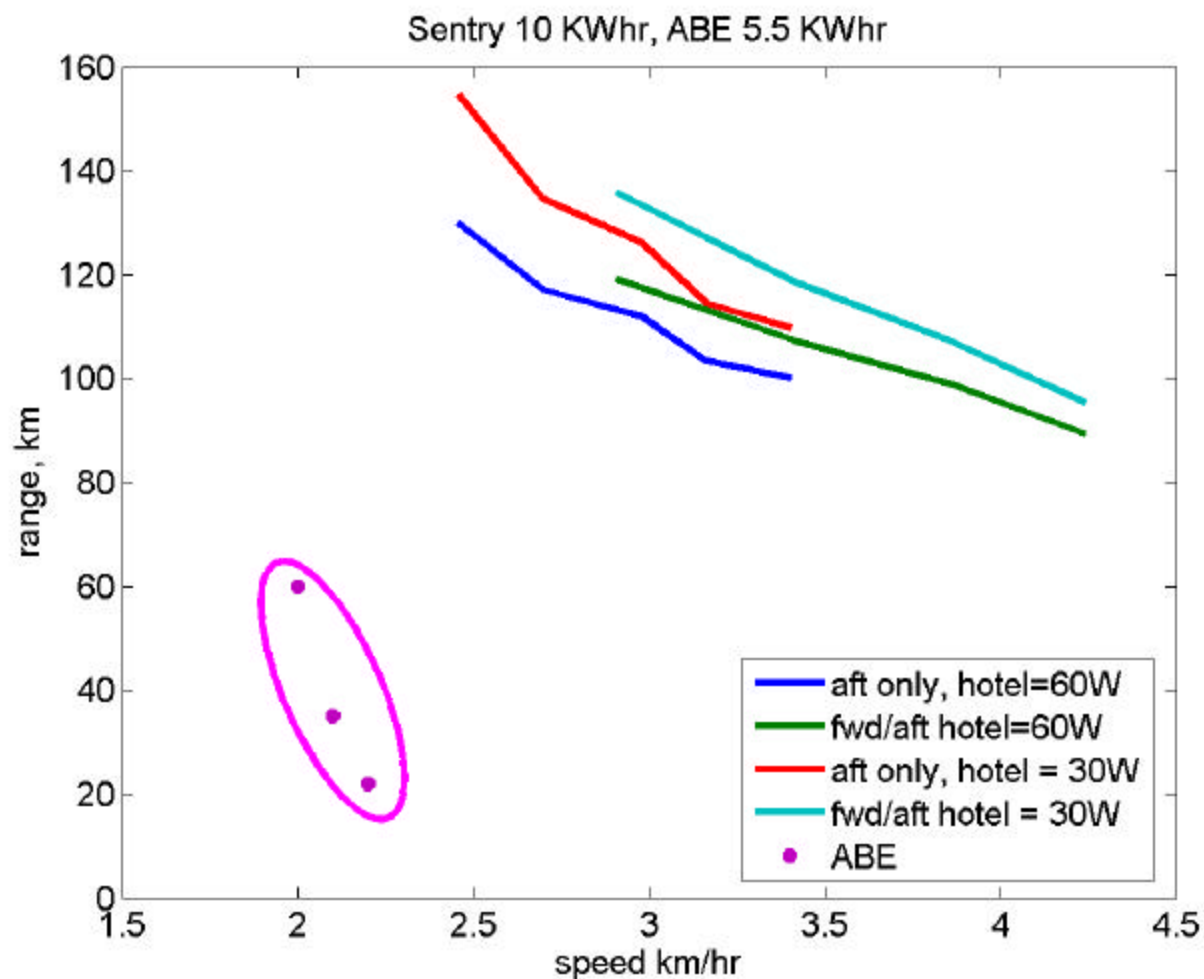
- **Demonstrated in deep water trials:**
 - Improved control system performance
 - Improved speed and endurance
- **Recently funded (NSF and Foundation funds):**
 - Improved mapping sonar - Reson 7125
 - INS (Phins) installation and testing
 - Improved batteries- Nereus packs
 - Magnetic gradiometry
 - Digital still camera
- **In planning:**
 - DSL120 on *Sentry*



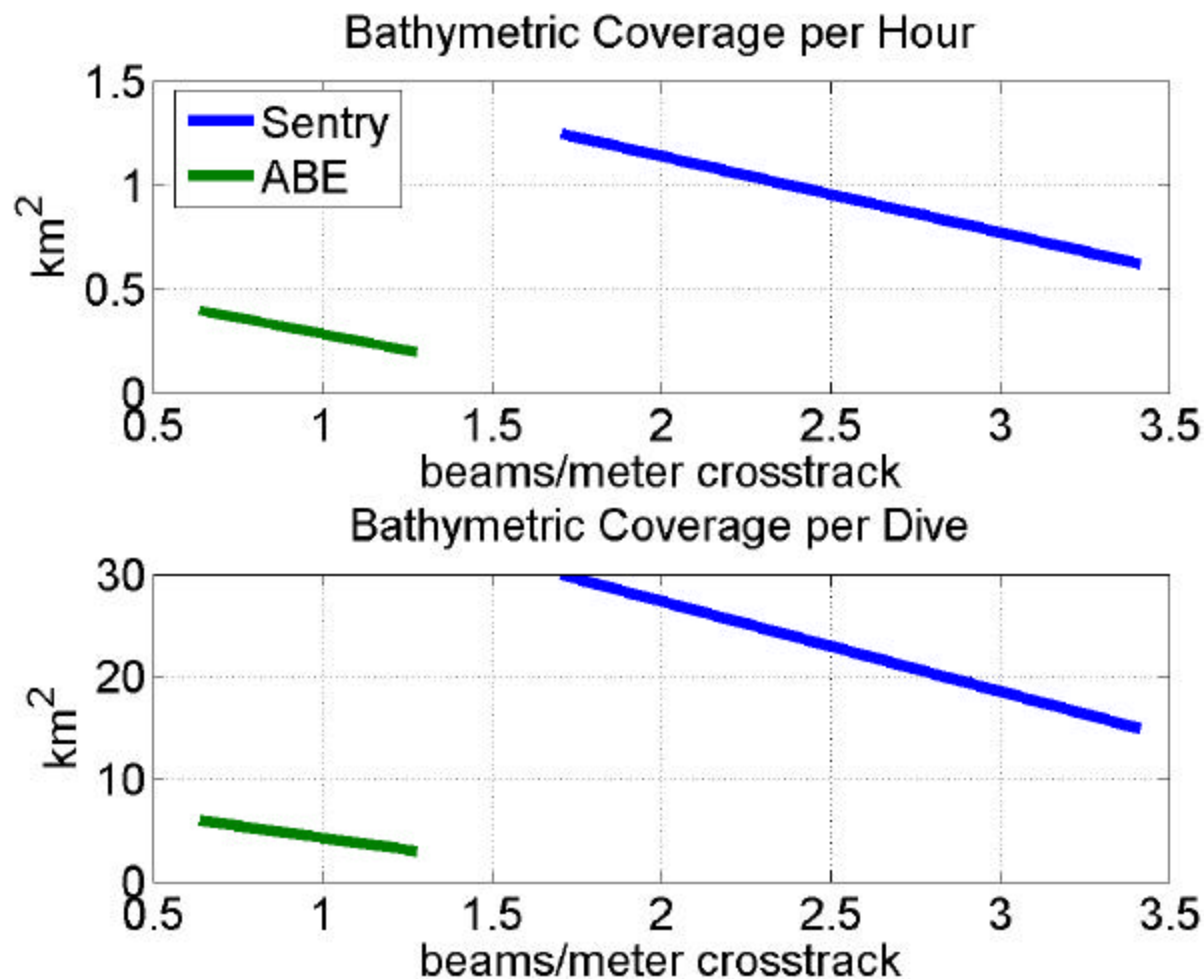
Control System Results from *Sentry* Trials



Sentry Projected Range vs. Speed



Projected *Sentry* Bathymetry Coverage and Resolution



Other *Sentry* Upgrades

- **Replace lead-acid batteries with Nereus packs (~10 kwhr)**
 - Present *ABE* packs are 5.5 kwhr
 - Reduce vehicle air weight by >1,300 lb
 - Opens large amount of space in lower half of vehicle
 - Vehicle will have >300 lb science payload
- **Addition of Inertial Navigation System (INS)**
 - Phins, tested on JHU ROV and SeaBED, also used on *Autosub*
 - Decreased reliance on LBL transponder navigation

