

## Fact Sheet

# Abyss-Lite\*

## An altimeter for geodesy and mesoscale oceanography

### Method

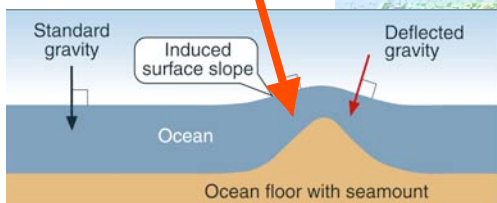
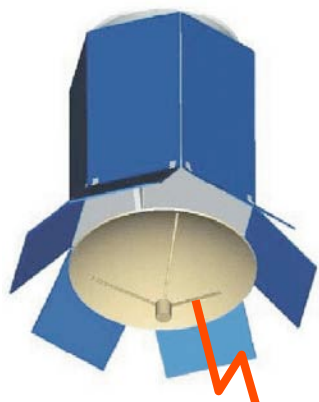
- Radar measurement of sea surface slope reveals gravity anomalies & ocean flows

### Themes

- The fine-scale (200-km to 5-km) ocean shape yields bathymetry, gravity anomalies, and deflections of the vertical (VD) unavailable by other means
- The non-repeat orbit monitors ocean currents and eddies unseen by other missions

### Complements Related Missions

- GRACE, Champ and GOCE sense gravity at orbital altitude, where resolution is limited to ~200 km; Abyss-Lite measures gravity at sea level, where resolution down to ~5 km is available.
- Abyss-Lite's drifting orbit fills holes in the exact-repeat orbits covered by TOPEX/Poseidon, GFO, Envisat, and Jason-1, enabling fine-scale geodesy and detailed recovery of mesoscale eddies.



### Implementation

- ~800-km orbit, inclination ~125° (preferred) or ~50°, non-repeat, ~22-day near-repeat
- Fine measurement precision, near-shore tracking, resistance to “wave noise” implies a Delay-Doppler radar altimeter, small s/c, on-board processing
- Geodesy and mesoscale oceanography; 6-y mission

### Science

- Ocean bottom shape and roughness control tsunami propagation, steering of flows, mixing rates, heat transport, global climate & sea level.
- Ocean floor structure answers fundamental science questions about Earth's magma budget, volcanism tectonics, and seismic hazards.

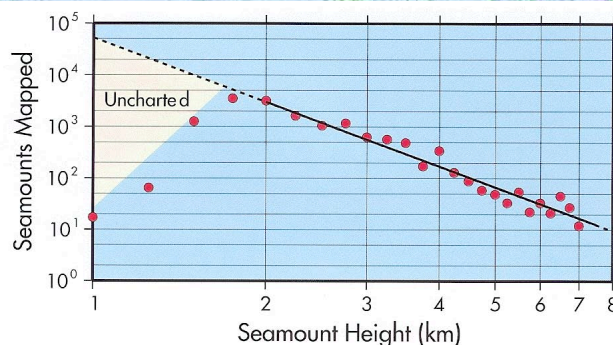
### Applications

- Bathymetry aids habitat management, ecology, cable and pipeline routing, & Law of the Sea.
- Gravity field details enable precision inertial navigation and resource exploration.
- Real-time sea level anomaly observations enable operational oceanography.

### Cost and Schedule

\$75M (2-string altimeter, WVR, bus, integration and test)  
Phase A/B FY 2006, Phase C/D FY 2007-9, Launch CY 2009

\* A White Paper submitted to the NRC Decadal Study



A new Bathymetry from Space mission should find 50,000 unmapped seamounts (yellow area). A 2-fold improvement in seamount height precision should increase the total number of seamounts mapped by 18-fold. The proposed mission will yield a 20-fold improvement in areal resolution of the marine gravity field and bathymetry.

### Participants and Endorsers

National Oceanic and Atmospheric Administration  
University of California (San Diego)-Scripps  
Johns Hopkins University Applied Physics Laboratory  
~100 signatories from academia, civilian and military operational agencies, and international organizations

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