Environment Versatility

Smart Park feature is the ability to “hide” and provide safety against:

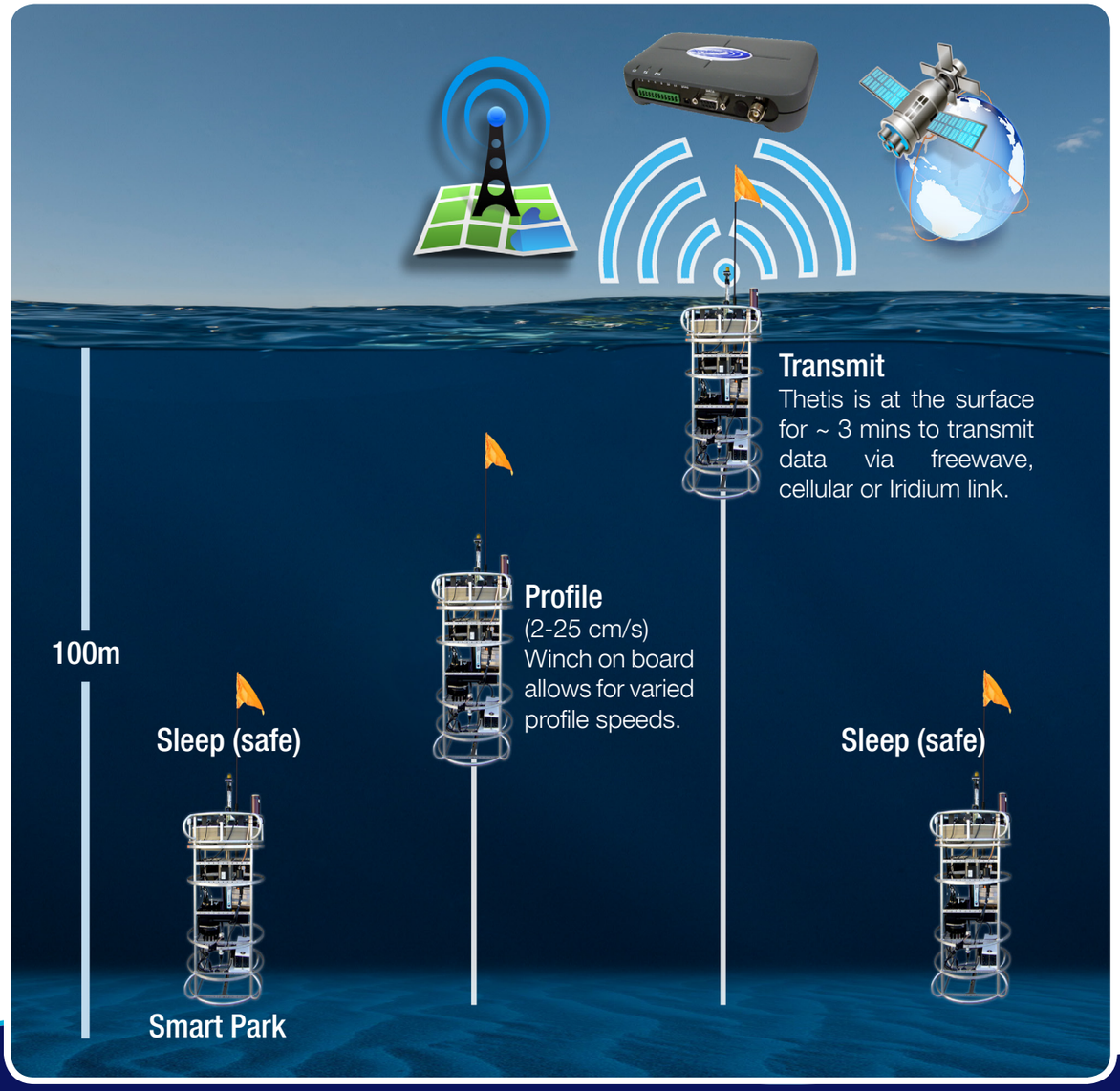
Ice

Storms/sea swells

Vandalism

Shipping traffic

Profiling Operations



OCT 2014

SEA-BIRD SCIENTIFIC

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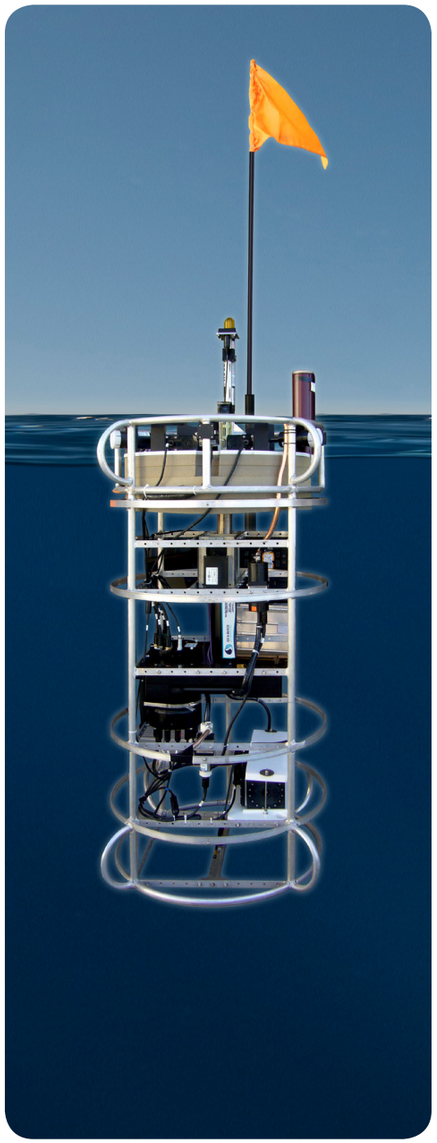
Thetis Autonomous Moored Profiler

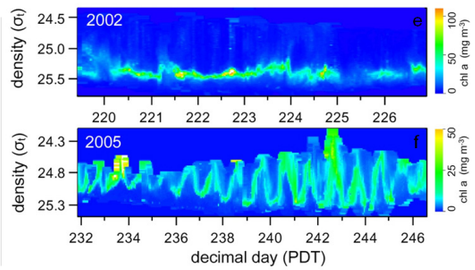
Sea-Bird Scientific introduces the first surface piercing moored profiler for use in coastal marine and fresh water environments.



Thetis Offers:

- Real-time sampling of physical, biological, chemical and optical water properties
- Unlimited mission flexibility
- cm scale vertical resolution from sea-floor to surface
- Large number of sensors supported
- Integrated control with on-board winch and power systems
- Multiple telemetry options
- Small boat deployable
- Integrated GPS system
- Independant beacon for detection of a break-away
- Smart Park
- Depth ranging from 5m to 100m

Science Impact



Above: The two panels are color contour plots of chlorophyll concentration plotted as a function of density for years 2002 and 2005 in Monterey Bay.

In a comprehensive three-year study, examining the biology, optics and physics of Monterey Bay (California), Sullivan *et al.* (2010) strove to elucidate the role that species specific properties play in phytoplankton thin layer dynamics.

These thin layers were found to be dominated by non-motile diatoms from the genus *Pseudo-nitzschia* and included toxin-producing (domoic acid) species. Domoic acid poisoning in marine mammals was prevalent along the central California coast during this time period.

Figure and text adapted from: Sullivan, J. M., P. L. Donaghay & J. E. B. Rines (2010) - Coastal thin layer dynamics: consequences to biology and optics. Continental Shelf Research, 30(1): 50-65.

	Measurement	Instruments								Purpose
		ECO Family	ac-s	C-Star	Radiometer Family	SBE 49	SUNA V2	SBE 43/63	Nortek Aquadopp	
Base Model Measurements	Chlorophyll a	●								Estimate of chlorophyll a concentration Proxy for phytoplankton biomass Ocean color chlorophyll product validation Primary productivity models
	Backscattering	●								Estimate of particle concentration Proxy for particulate organic carbon Information on particle size distribution Ocean color validation
	CDOM	●								Dissolved organic matter cycling Water mass characterization Ocean color satellite product validation
	PAR				●					Dredge monitoring Light availability and utilization Euphotic calculation
	Conductivity, Temperature, Depth					●				Vertical mixing Transport dynamics Flow Density Climate change
Optional Model Measurements (Thetis can expand to a total of 8 sensors)	Spectral absorption and attenuation		●							Spectral "fingerprinting" Deconvolution analysis Monitoring of HABs
	Beam attenuation		●	●						Estimate of particulate organic carbon Carbon flux index Net community production Bi-refringent inorganic particles
	Downwelling irradiance				●					Spectral distribution of light flux Remote sensing reflectance and water leaving radiance Diffuse attenuation coefficient PAR
	Upwelling radiance				●					Nitrogen cycling New production
	Nitrate						●			
	Dissolved oxygen							●		Net community production/respiration Air/sea gas transfer
	Current velocity								●	3D current on time scales Event driven dynamics

Operational Savings

As a completely self-contained platform, deployment and recovery are greatly simplified and maintenance costs are significantly reduced. Operational efficiency and stability are the primary criteria of the Thetis Profiler, resulting in a system that can be operated successfully long-term.

- One-stop system support
- Single point warranty coverage
- Maintenance saving through proven anti-fouling technologies
- Small vessel deployable/ recoverable
- Break-away detection and Iridium tracking
- Mission flexibility to avoid high stress wave environments