	EVENT	TS SHORT	TS LONG	GLOBAL	EXPEDITIONARY
VEHICLES	Existing 4500m sub AUVs with limited manipulation (maybe simple releasable tools) ROVs: dexterity (fine-scale and delicate samples) "smart" rocks	Existing 4500m sub Deep 6500+ sub	Existing 4500m sub Generic vehicles Observatories Robust ROV (heavy lift, long bottom time) Generic interfaces (so can use various vehicles for same task.) Dedicated AUVs (docked) Flexibility (can download at various data rates) Take up power and interact with control system/vehicles.	Existing 4500m sub Vehicles that match to tasks Both water column and seafloor vehicles - benthic crawlers - AUVs in water column - 6000+m capability - 2000m efficiency - wide range time and distance - exploratory (cheap, small, simple) - specialized -	Existing 4500m sub ROVs with inter-mediate resolution mapping capability More portable ROVs and tow sleds AUVs: - long range (gliders, solar power) - Air dropped (new nav) - Multiple - AUVs with sampling - With fiber or acoustic tether - More intelligent - Expendable Portable observatories
IMAGING	High res	- High definition digital video and telemetry - Elect. Digital still cams - red light ops		High definition video and photog	
MANIPULATORS	- Delicate sampling insitu experiments - Programmable	- More precise control for delicate work - Programmable	Generic manipulators Dexterity	Improved	

	EVENT	TS SHORT	TS LONG	GLOBAL	EXPEDITIONARY
PAYLOAD	Versatility				
SENSORS	- Insitu: optical, chem, gradients, hi temp, heat flow, long term non degradable (H2, pH,EH metals, sulfides, DNA) - survey compatibilities - bathy, grav mag, backscatter, subbottom, CTD-optical, photomasaics	- chemical and physical (may need 2+ yr grants) - porewater flow - smooth var spd pan and tilt - computer controlled sed profilers - gas-type manifold for water column sampling	-minimum suites of sensors (so all are similar?)	- presure,temp, grav mag, lights, multi spectral (low freq radiation) - current and flow - chem (both long range and detailed site specific) - acoustic and optical - insitu xray	- molecular and biochem probes and sensors - insitu mass spec
SAMPLERS	- Softside and sand/rock coring - sample preservations - fauna/larvae (slurp pump) fluid samplers(small to large volume)	- standardized tools (shareable) - coring improvement (vibracorer?) - drilling capability (subs and rigs) - standardized shareable tools	generic tools	- cores, seds - drills, rocks, etc - water (sml vol/multiple) - geol samples - biology - avoid cross-contain - preserve insitu contam - multiple chamber suction collectors - “enclosure” for delicate	

	EVENT	TS SHORT	TS LONG	GLOBAL	EXPEDITIONARY
NAVIGATION	Meter or better Simultaneous vehicles Self-contained for AUVs			Short baseline for some may be better option	Improvement
DATA	Storage			Better communication or data transfer	More rigorous data sets
POWER	Advance battery technology				
OTHER			Benchmarks needed	- environ extremes - tech training and infrastructure	