# Workshop Goals

- Provide science needs framework to inform the vessel replacement process
- Identify approaches that may be used to address science questions over next two decades
- Identify platform capabilities required to meet science needs
- Examine role of vessels and trends in vessel use in context of other observational platforms

# Major Science Themes (as examples)

- Better Observations in Selected Environments
  - Coastal Oceans
  - Ice-edge, ice-covered
  - High-latitude Open Ocean
  - Sea floor: mapping, spreading centers, sediments
  - Air-Sea Interactions
  - Benthic Boundary Layers

# Major Science Themes (as examples)

- Interdisciplinary Studies
  - Expeditionary Scale Research
  - Mesoscale/Finescale/High Resolution (time and space)
  - Biodiversity
  - Coupled observation-modeling systems
- Perturbation Experiments
  - Natural and/or Deliberate
- Fixed Location Observations/Experiments
  - Long time series

**Scientific needs** (observational and experimental) of ocean science over the next two decades require the implementation of:

**Remote observational systems with robust sensor suites (limited to a few variables)**

Satellites (color, temp, winds, currents, etc)
Long-term moorings
Drifting (single depth and vertically cycling) platforms
Autonomous vehicles

(this is already moving quickly to meet the needs of the next two decades)

## Science Needs, continued

**Vessels to provide deployment/recovery/service for moorings, drifters, vehicles**

- Improved capabilities for handling untethered objects
- Acoustically quiet
- Improved heavy weather capabilities
- Increased use of AUVs, ROVs and submersibles

(some new vessel construction probably needed here)

## Science Needs, continued

**Vessels that function as primary observational and experimental platforms**

Improved capabilities for handling untethered objects

Acoustically quiet

Improved heavy weather capabilities

Undisturbed sampling in/around air-sea interface

Increased use of AUVs, ROVs and submersibles

(some new vessel construction probably needed here)

# Science Needs, continued

**Vessels that can meet the expanded needs of the marine geology community**

increased coring capacity (expanded site survey needs)

sea flooring mapping

seismic systems

increased use of AUVs, ROVs and submersibles

(some new vessel construction needed here)

## Science Needs, continued

**Global high-bandwidth communication capability (transition from cell phones to internet)**

Between remote sensor suites and land-based or ship-based laboratories

Vessel-vessel and vessel-laboratory data communications

(commercial technological advances can be moved quickly into ocean science —already in progress)

# Science Needs, continued

**Rapid response capability within the oceanographic fleet (5 yrs out?)**

Have vessels/remote systems that are available to respond to events detected by observational program

Implies excess capacity will be available

(Places a new set of challenges on ship scheduling system)

# Expected Trends/Implications

- New observational tools (AUVs, etc) extend the reach of the fleet — they will not replace nor reduce the fleet
- May need sets of specialized vessels — general purpose vessels cannot meet the expected science needs
- Expanded time/space scales of resolution of observations will lead to science demand for event-scale studies of ocean processes — particularly as coupled models lead to better predictions/forecasts