



# Workshop Goals


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- ¥ 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
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# Major Science Themes (as examples)

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- ¥ Better Observations in Selected Environments
    - n Coastal Oceans
    - n Ice-edge, ice-covered
    - n High-latitude Open Ocean
    - n Sea floor: mapping, spreading centers, sediments
    - n Air-Sea Interactions
    - n Benthic Boundary Layers
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# Major Science Themes (as examples)

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## ¥ Interdisciplinary Studies

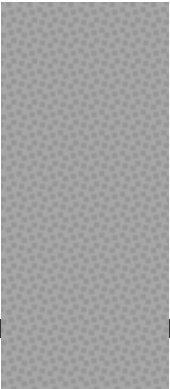
- n Expeditionary Scale Research
- n Mesoscale/Finescale/High Resolution (time and space)
- n Biodiversity
- n Coupled observation-modeling systems

## ¥ Perturbation Experiments

- n Natural and/or Deliberate

## ¥ Fixed Location Observations/Experiments

- n Long time series
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**Scientific needs** (observational and experimental) of ocean science over the next two decades require the implementation of:

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**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)

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## **Science Needs, continued**

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### **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)

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## **Science Needs, continued**

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### **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)

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## **Science Needs, continued**

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### **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**

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### **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)

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## **Science Needs, continued**

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### **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)

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## Expected Trends/Implications

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- ¥ 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
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