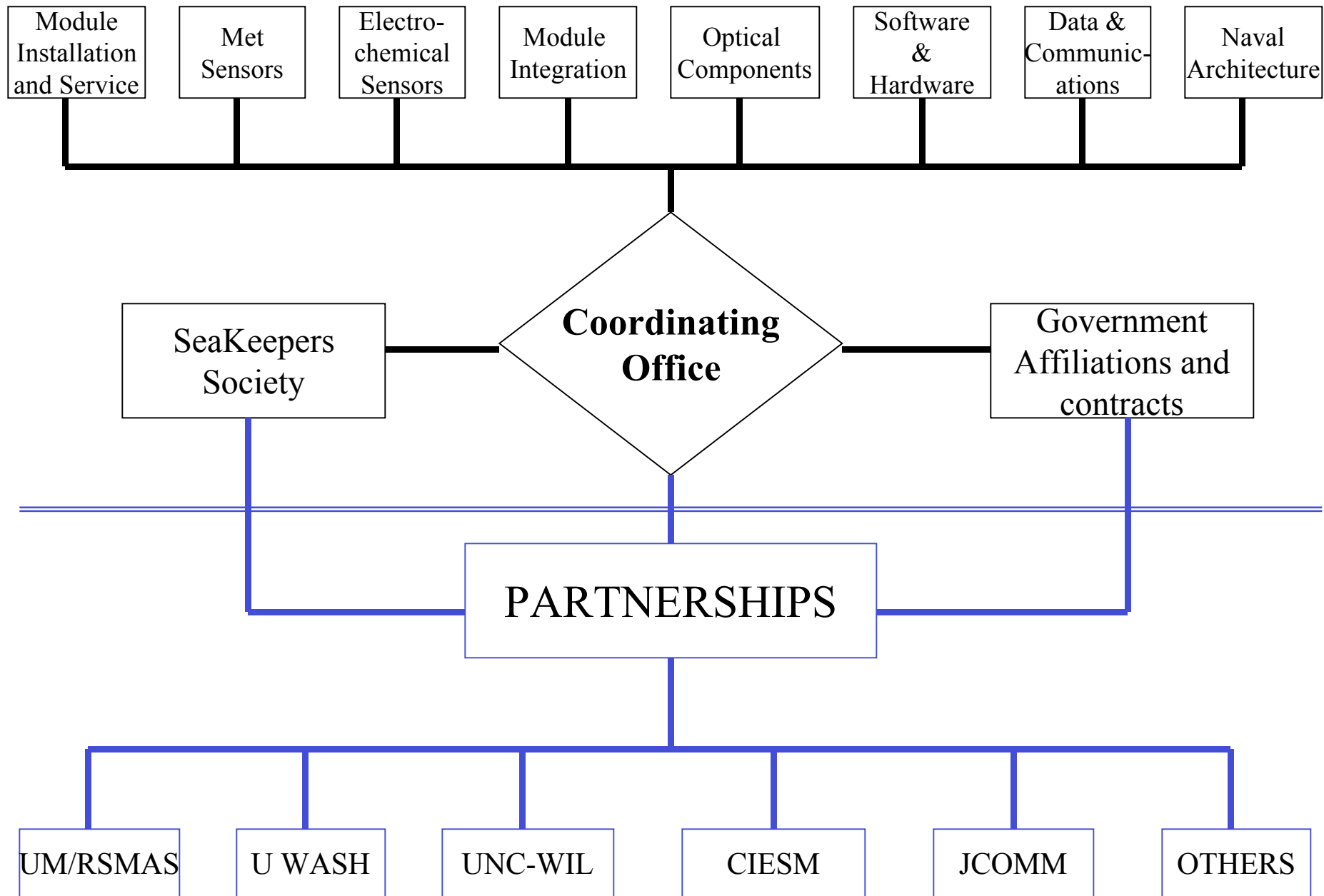


## General Goals & Objectives of the International SeaKeepers Society

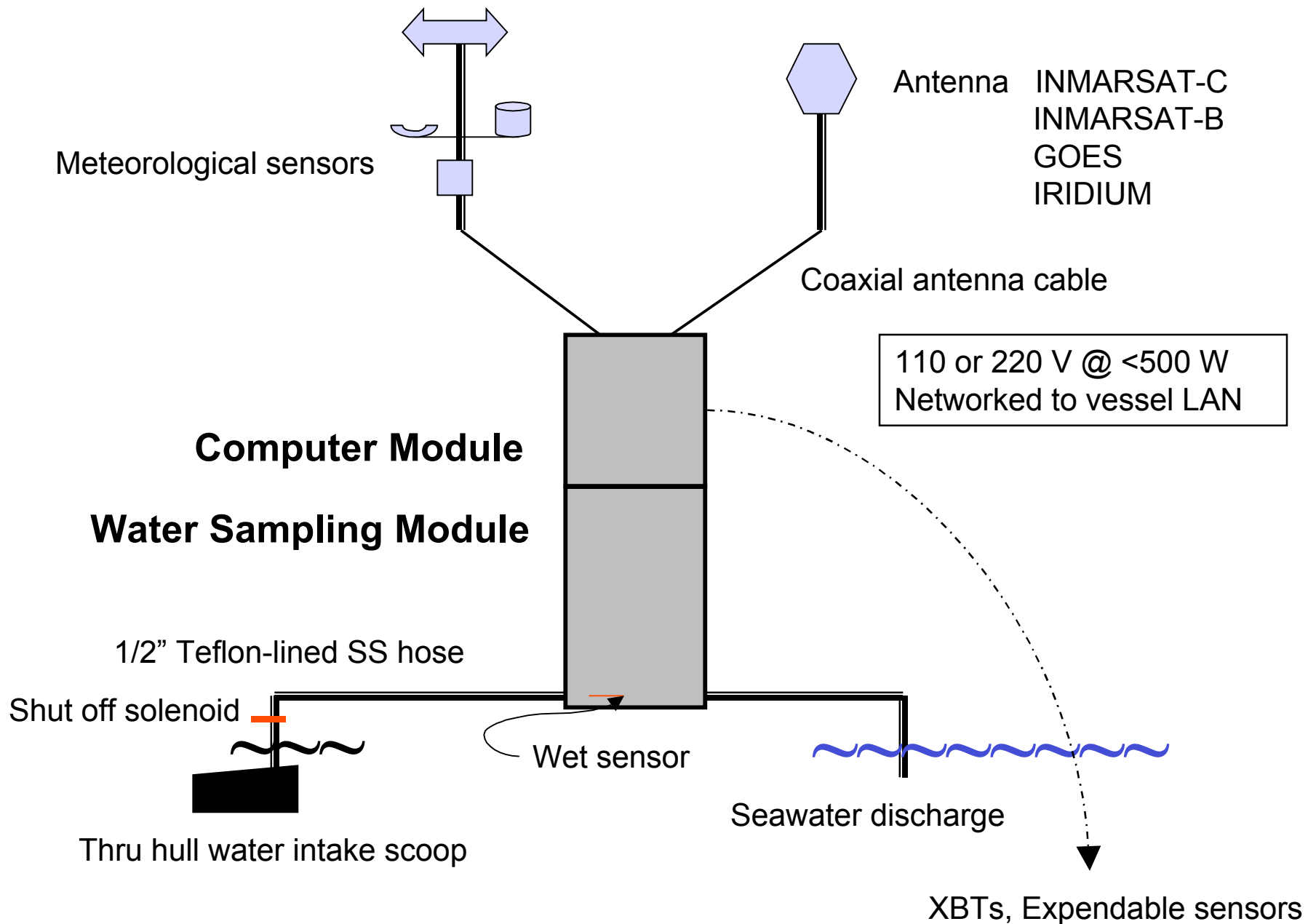
- I. Develop a working model for a Global Ocean Observing System that is a true public/private partnership
- II. Gather & distribute critically needed data on the health of the oceans and global climate change. □ Develop & deploy efficient, low cost, and accurate ocean & atmospheric sensors.
  - Provide a fleet of “research” vessels covering the globe and travelling to remote areas.
  - Provide a means for 2<sup>nd</sup> & 3<sup>rd</sup> world countries to begin monitoring coastlines for sustainability.
- III. Create an organization of truly international significance to help build scientific, programmatic & business bridges across international boundaries.
- IV. Bring leading scientists (from around the world) together to work on joint projects to study and protect the oceans.
- V. Improving public awareness of local and global environmental issues through outreach and education

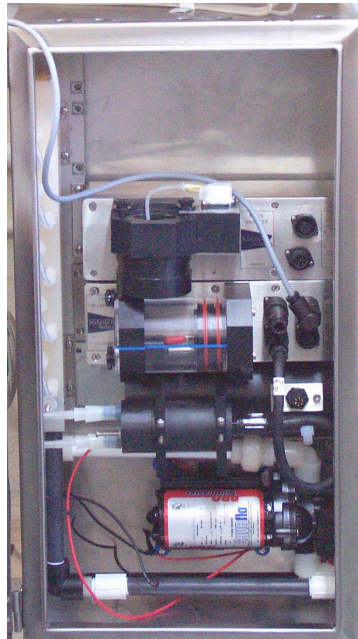






# SEAKEEPERS SYSTEM COMPONENT SCHEMATIC





**Weather sensors**

**SeaKeepers Ocean & Atmospheric Monitoring Module Components**



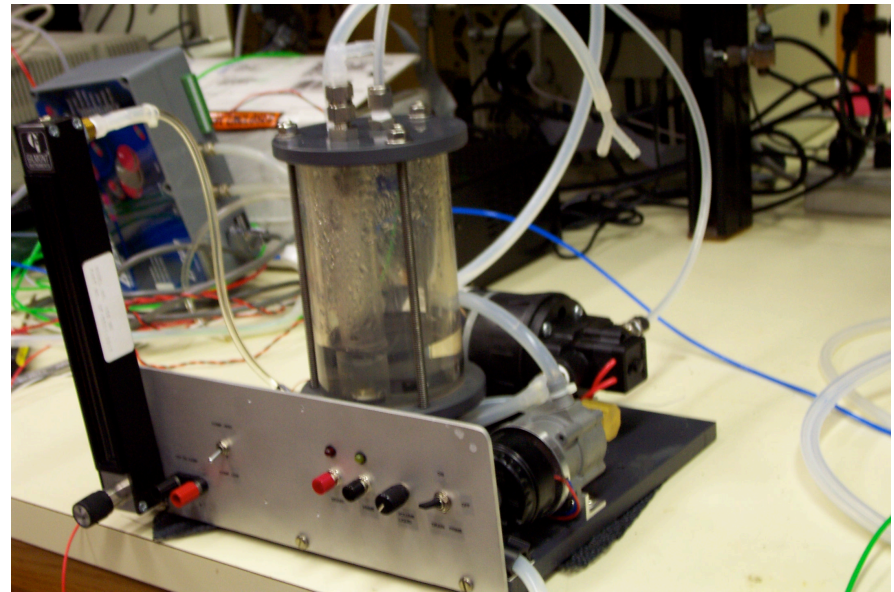
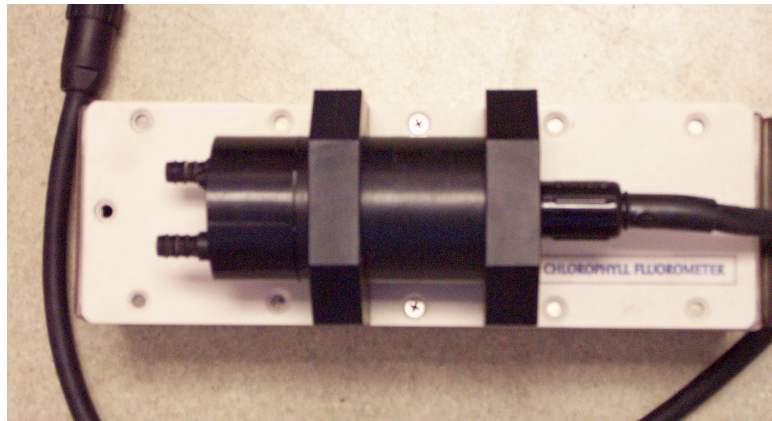
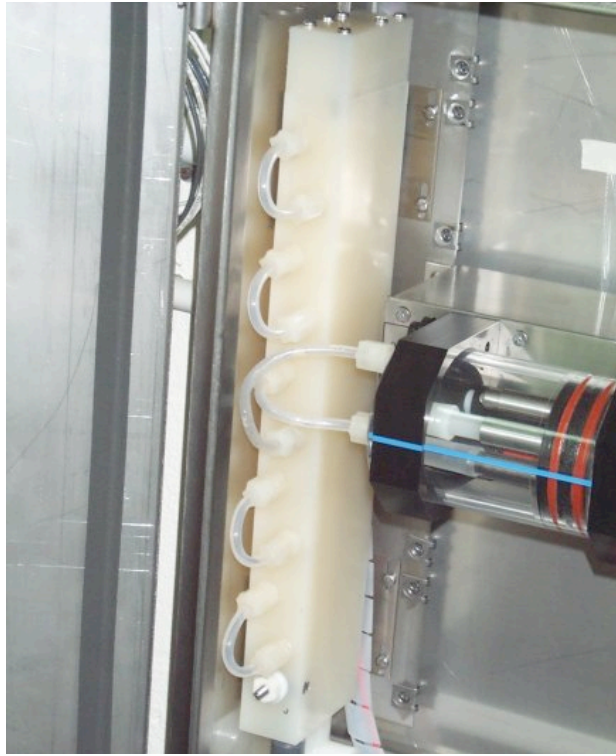


## Ultrasonic Anemometer

Wind speed: 0 -40 m/s (0-90 mph)  
+/- 0.01 m/s

Wind direction: 0 -360 degrees  
+/- 2 degrees ( 1- 30 m/s)  
+/- 5 degrees ( 30 - 40 m/s)





# SeaKeepers Modular Sensors

## SeaKeepers System

### Weather

Air temperature

Wind speed

Wind direction

Relative Humidity

Barometric pressure

Compass heading

### Oceanographic, standard

Temperature

Conductivity

calculated Salinity

Sea Surface Temperature

### Optional sensors

Dissolved Oxygen

pH

Eh

## Sensor Development

### Prototype and testing

CDOM Fluorescence

Turbidity

Chlorophyll-a Fluorescence

Optical Attenuation

Reflectance Radiometer

pCO<sub>2</sub> & Total CO<sub>2</sub>

Nutrients (Nitrate, Silicate,  
Phosphate, Ammonia)

Trace metals

Micro-Sensors (“Chemistry on a  
chip”)

# SeaKeepers Data Modes

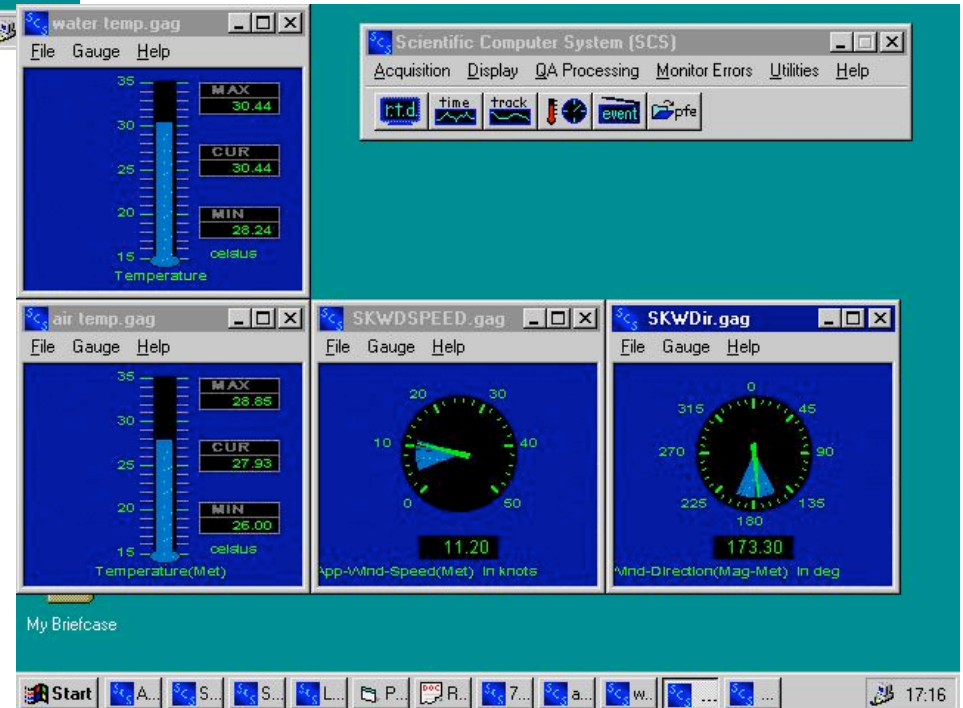
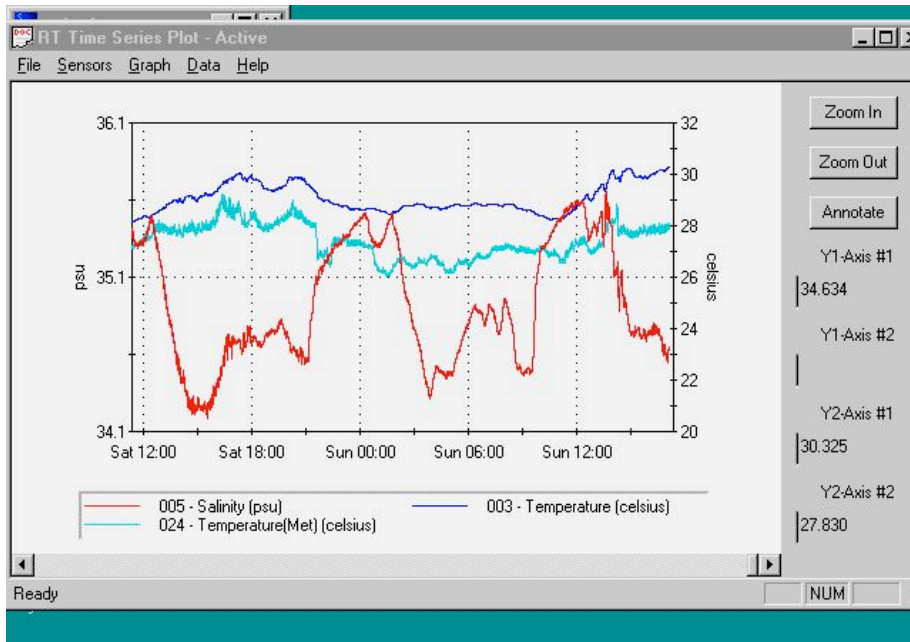
Real-Time Display

Regularly Transmitted

Transmitted Intermittently on Request or Alert Message

Long-Term Record

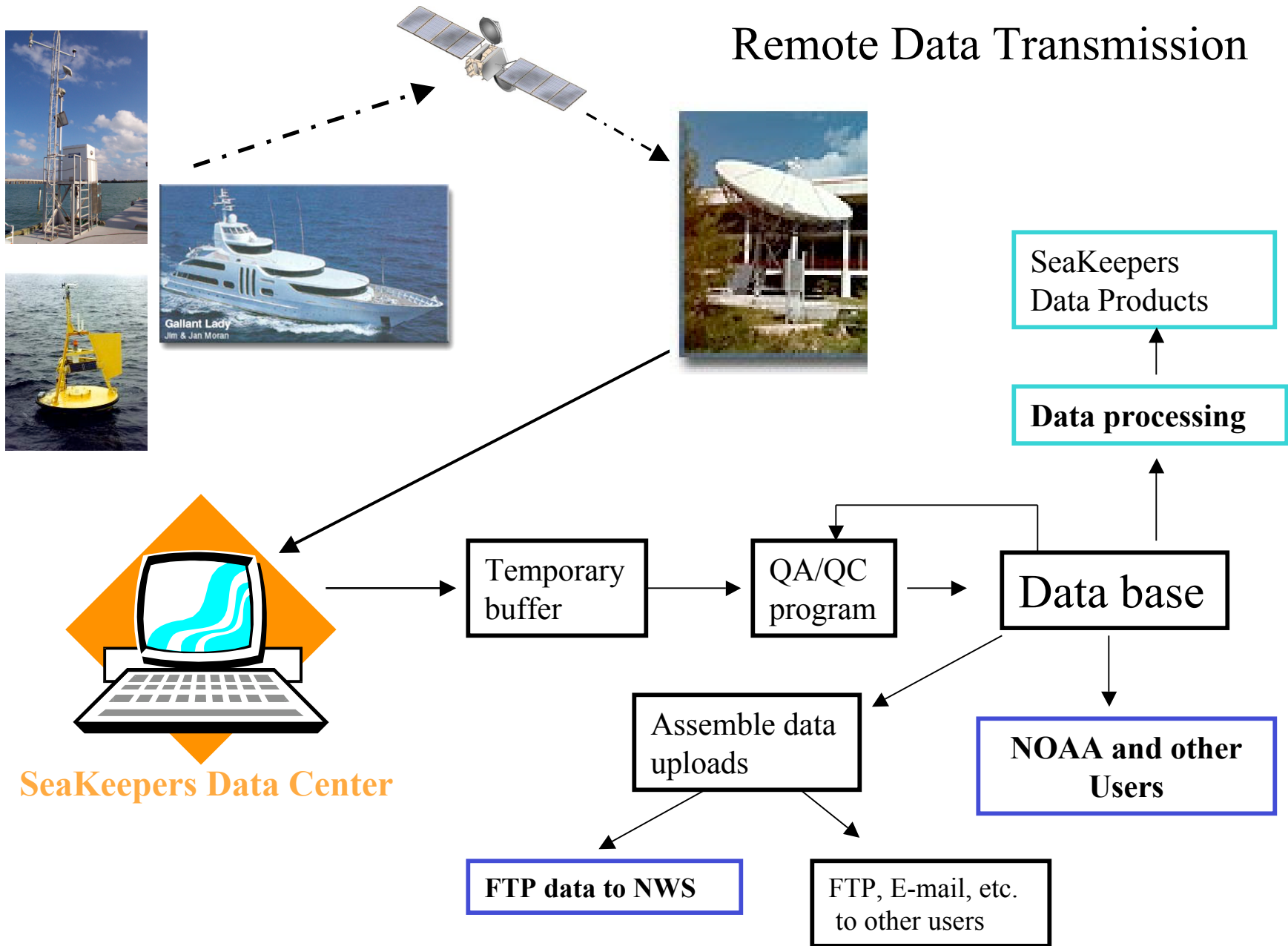




Customizable real-time displays for the SeaKeepers vessel's network

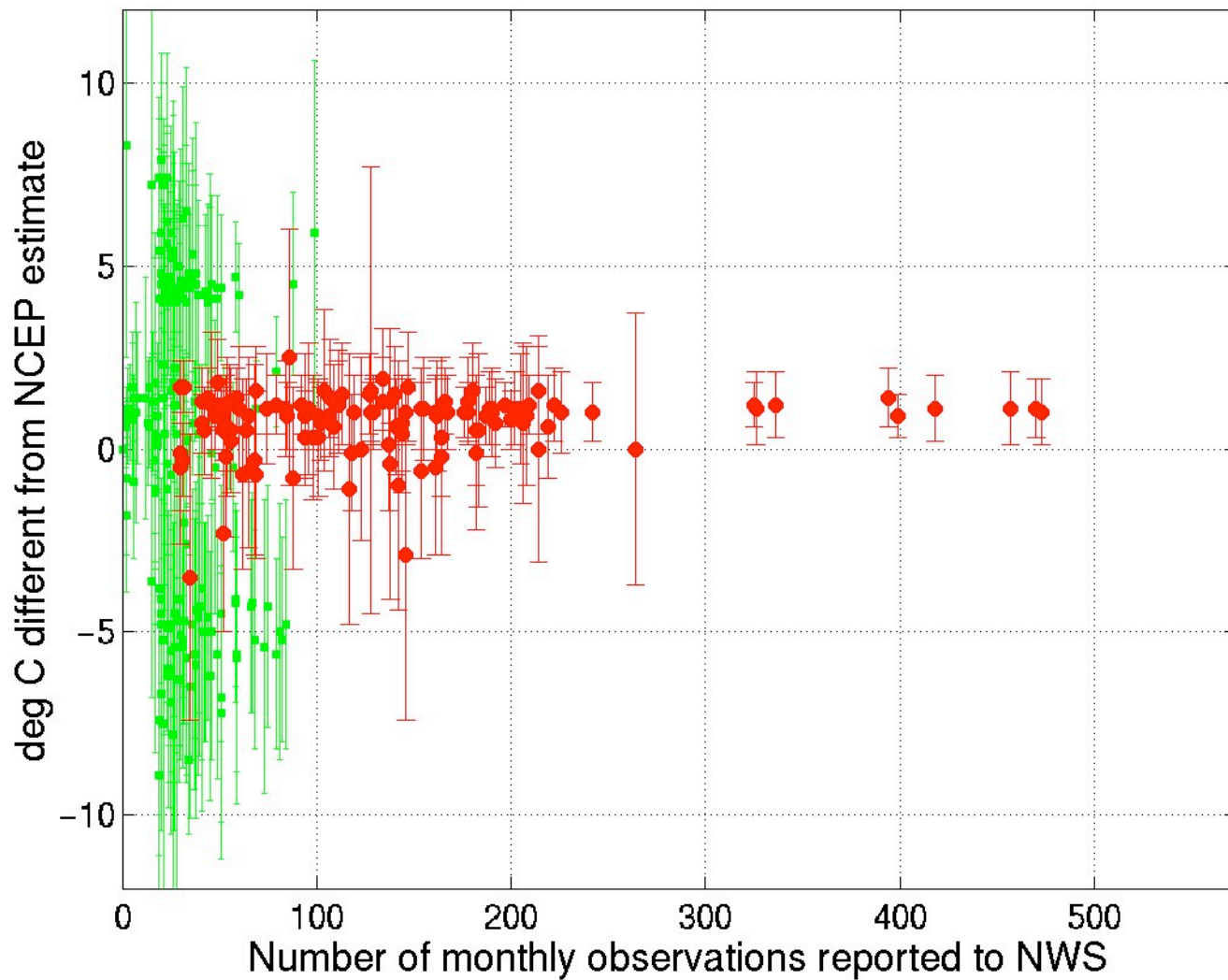


# Remote Data Transmission

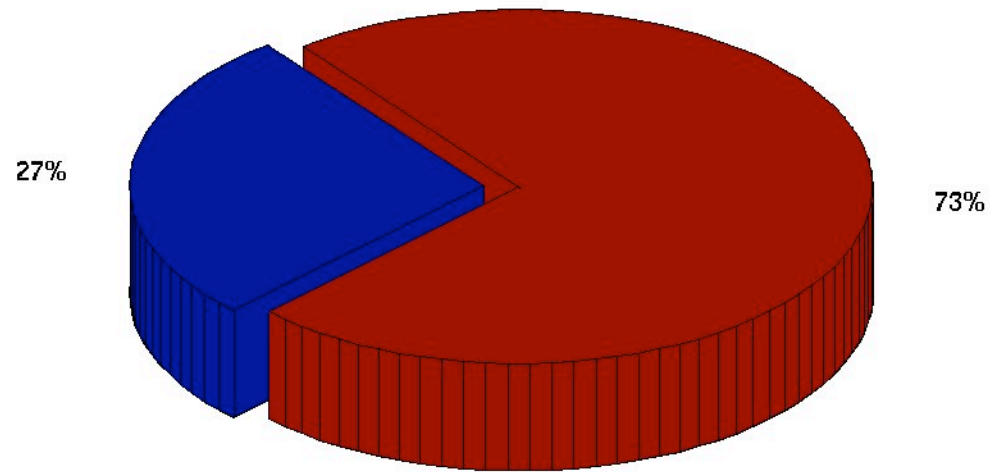




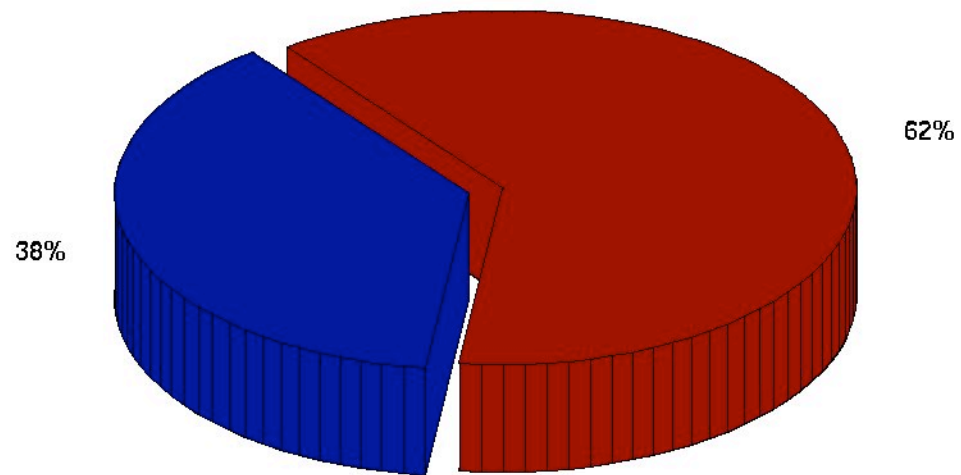
SeaKeeper monthly air temperature difference for 2001–2002

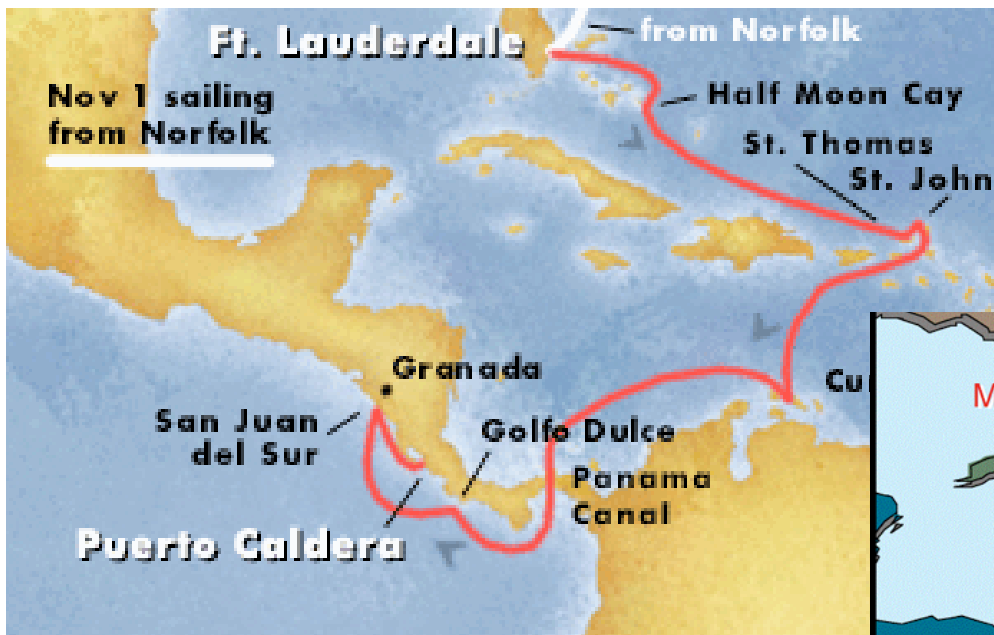


Number of Good Reports  
VOS fleet versus SeaKeepers  
air temperature

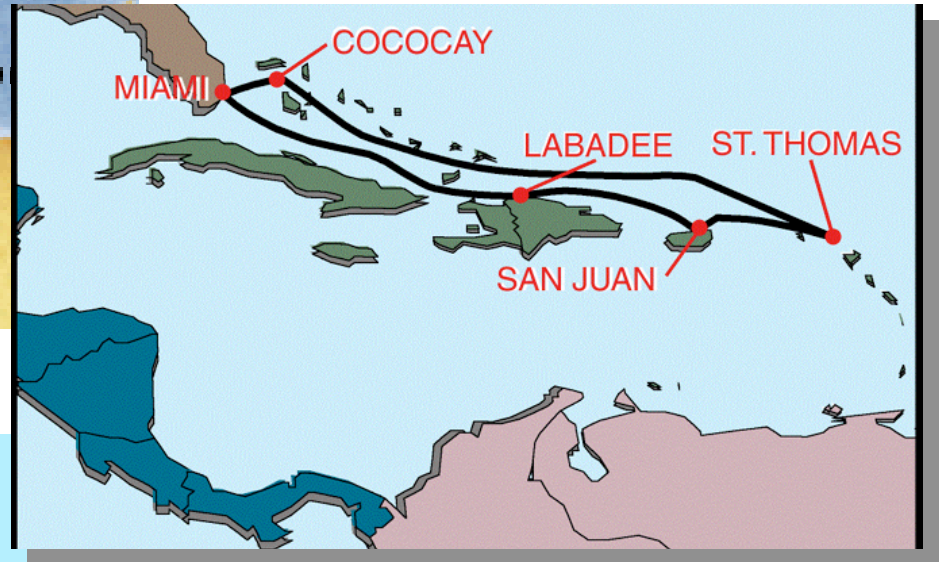


Number of Good Reports  
VOS fleet versus SeaKeepers  
wind speed





Royal Caribbean Explorer of the Seas



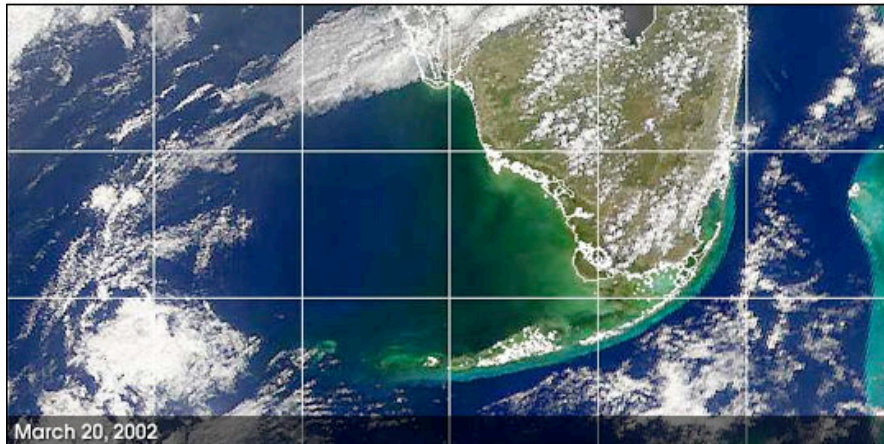
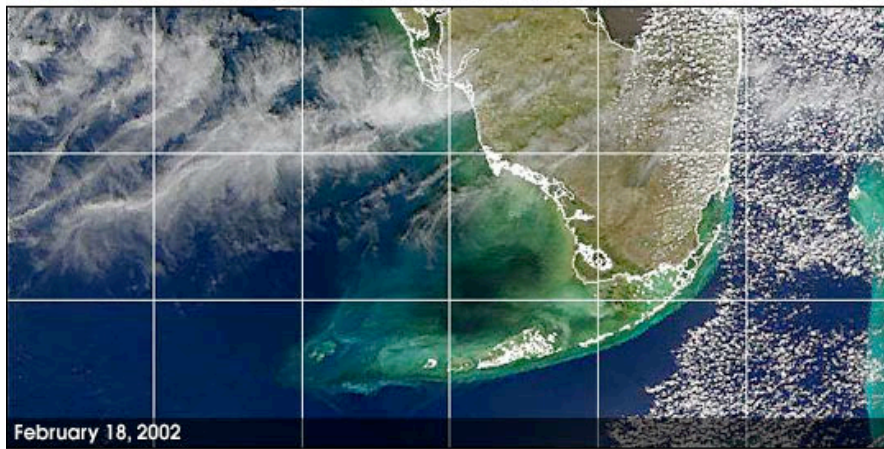
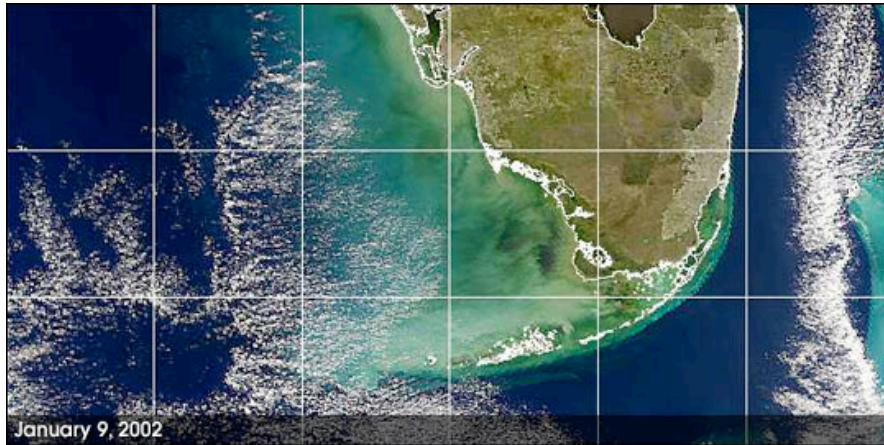
Holland-America Amsterdam

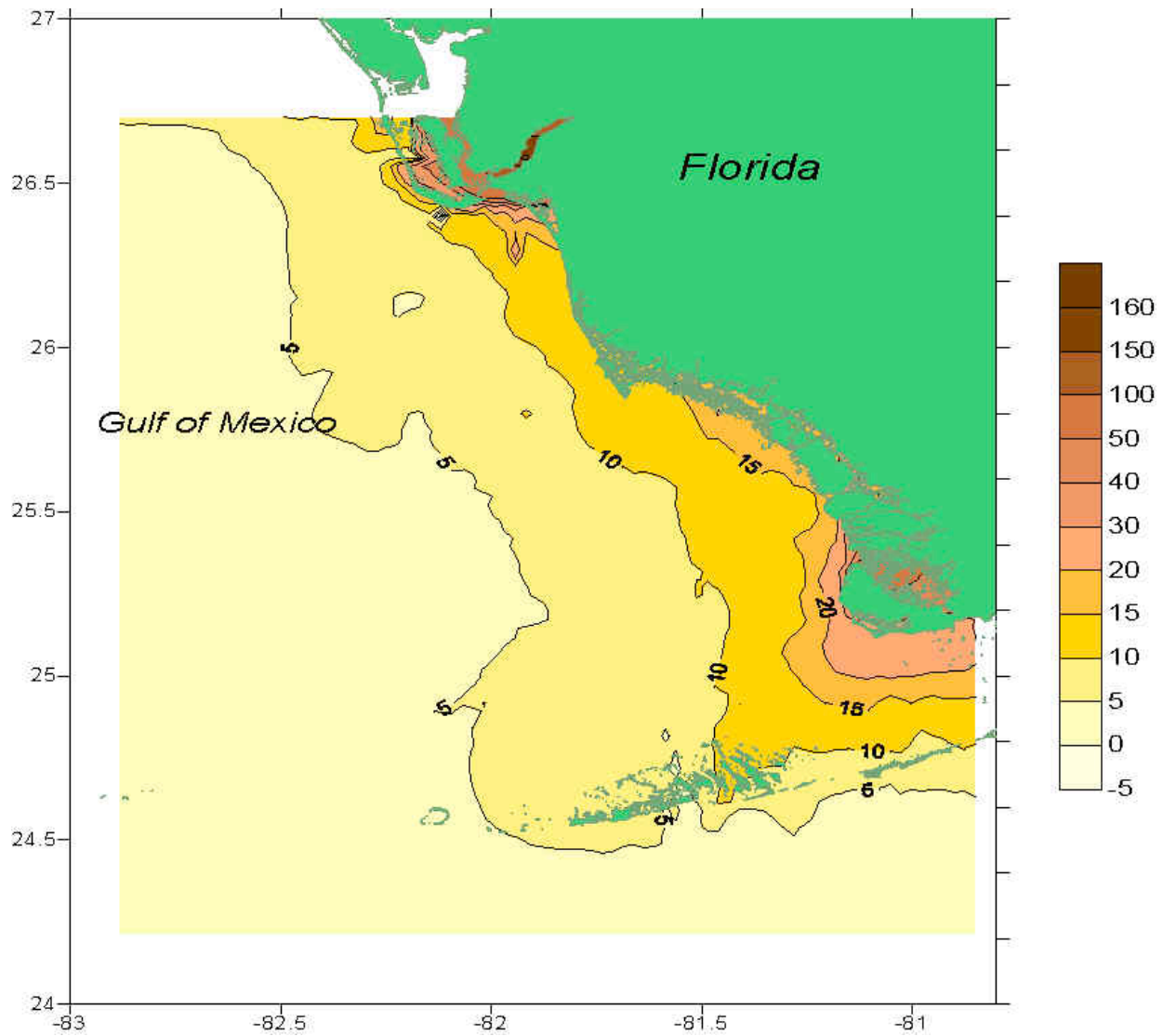


Carnival Triumph

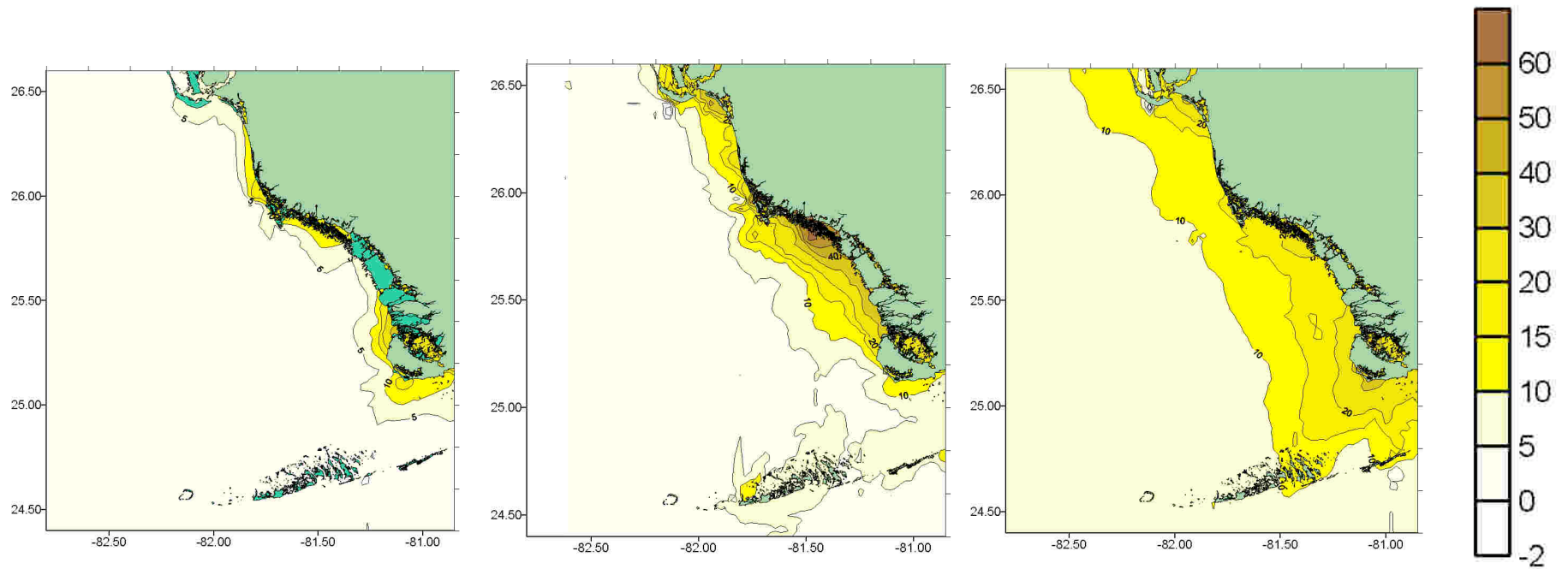


# Florida Bay





CDOM in QS units WS0121, November 2001

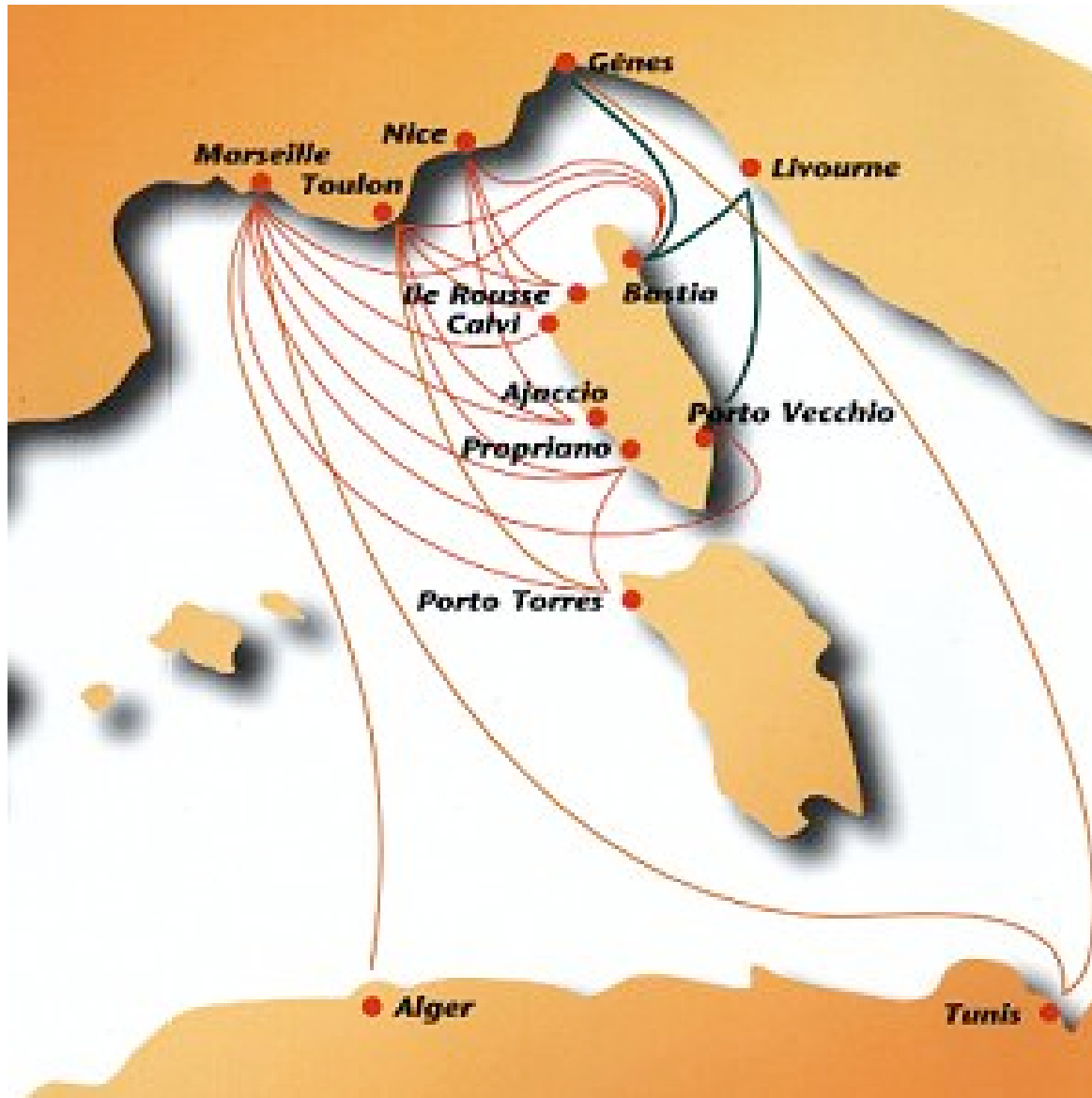


June

Sept

Nov

CDOM on the Southwest Florida Shelf, 2001



Ferry routes for the central Mediterranean; example *SNM*





## Expanding Applications for SeaKeepers Data

Weather Forecasting

Climate Change

Satellite Ground-truthing

Pollution and Health Alerts

Education: GLOBE, Cruise ships, Special Activities

Aquaculture monitoring

Specific Research Studies

- VOS Carbon Dioxide Measurements
- Changes in Solar Ultraviolet radiation stresses on coral reefs
- Better algorithms for satellite observations
- Long-term monitoring of ecosystems changes in the Pacific, Mediterranean, Florida coastal waters and Amazon River outflow