i-Nord

An Integrated System for Monitoring and Management of Resources in Artic Waters

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SINTEF-ICT
NNN-New nerve system for Northern Waters
An Integrated System for Monitoring and Management of Resources in Arctic Waters
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- Environmental Monitoring
- Marine Ecosystems
- Fisheries and Aquaculture
- Resource Management System
- Real Time Data Bases
- Background Data Bases
- Atmospheric Forcing (Air/Sea Interaction)
- Oil and Gas Exploration
- Marine Operations
- Vessel Traffic Monitoring
- National Security Monitoring
- Crisis Management
Sensor network
Generic Marine Sensor Unit (GMSU)

Signal processing module:
- Data conditioning and storage
- Data reduction
- Storage for retrieval

Acoustic module:
- Echo sounder for fish and plankton
- Wireless underwater communication

Sensor module and interface:
- Temperature, Depth, (pressure), Salinity
- Optical
- Hydrocarbon
- Other sensors specific for the mission

Batteries

Acoustic transducer
- Radio link (?)
- GPS module (?)

Antenna for surface recovery

Ballast tank
Future developments in marine environmental surveillance

- Autonomous sensors
- Acoustic underwater sensor network
- Linked to terrestrial data network
New possibilities in marine science
What needs to be done?

• Recent developments in information technology and communication technology give new possibilities for observation and surveillance of the marine ecosystem.

• The challenge is to make use of new sensor and communication technology in marine observation systems.

• R&D objective: Adapt new ICT technology for observation and surveillance of the marine ecosystem.
Main areas for R&D

- Methods and models for optimal use of data
  - Develop methods for efficient extraction and storage of large amount of data
  - Enable key data to users
  - Develop model based sampling methods that utilizes the data flow according to the optimal usage of the infrastructure

- Telecommunication over and under water.
  - Acoustic systems for underwater communication
  - Radio system for onshore communication
  - Integration of radio and acoustic systems
  - Further development of acoustic systems with respect to increased data rate, longer coverage and improved security. Model based adaptive systems,

- Sensor technology
  - Oceanographical parameters: Temperature, salinity, oxygen, currents etc.
  - Environmental parameters, PCB, radioactivity, hydrocarbon, ....
  - Acoustic and optical sensors for measurements of fish and plankton.
  - Smart sensors

- Energy, storage and harvesting
  - Low power electronics and sensors
  - Battery technology
  - Energy harvesting from the environment, vibrations, waves, temperature gradients etc