OCEANSCOPE

A SCOR/IAPSO-sponsored Study

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This talk updates the presentation to JCOMM/SOT two years ago when we sought your views on a proposal we were thinking of submitting to SCOR.

The idea was to develop a new paradigm for the systematic and sustained observation of the ocean through close collaboration with the merchant marine industry.

With encouragement from you and other groups, including SCOR, the Ocean Studies Board at the NAS, and a ‘Town Hall meeting’ at the AGU Ocean Sciences meeting last year the proposal was submitted to SCOR and accepted last fall. It will be co-sponsored by IAPSO.

The first meeting of the working group will take place July 17-19 in Montreal, just in advance of the IAPSO meeting.

A Proposed Vision Statement:

"In partnership with the merchant marine shipping industry we will develop an integrated approach to the observation of the global ocean on a regular and sustainable basis. This effort, entitled 'OceanScope' will equip commercial ships with fully automated instrumentation to accurately measure and report upon both the currents and the physical, chemical and biological characteristics of the water column throughout the world ocean. These data will in time become a fundamental resource for studies of the climate and health of our planet."

The Terms of Reference for the Working Group are:

1. Identify ocean observation and scientific needs with respect to parameters and geographic location.

2. Given these needs identify and prioritize marine routes for sustained ocean observation.

3. Classify and identify commercial vessel types suitable for sustained observation.

4. Identify available technologies that can enhance vessel capability for ocean observation.

The Terms of Reference for the Working Group are:

5. Identify and prioritize instrumentation needs to meet *future* mission requirements.

6. Identify and develop procedures (hardware and software) to meet communication needs.

7. Develop procedures and algorithms for managing data flow, handling, and archival. Address related issues of data ownership (e.g. when routes occur within national within Exclusive Economic Zones), data availability and data dissemination. In general, the expectation is that the data would be made freely and widely available to all interested users.

The terms of reference provide the guiding framework for the working group, the product which will be an Implementation Plan.

We have been asked to focus on and develop these first 7 ToRs which are primarily technical and fact-finding, because with a clear vision of a future OceanScope program the hope is it will be easier to develop a framework for its implementation.

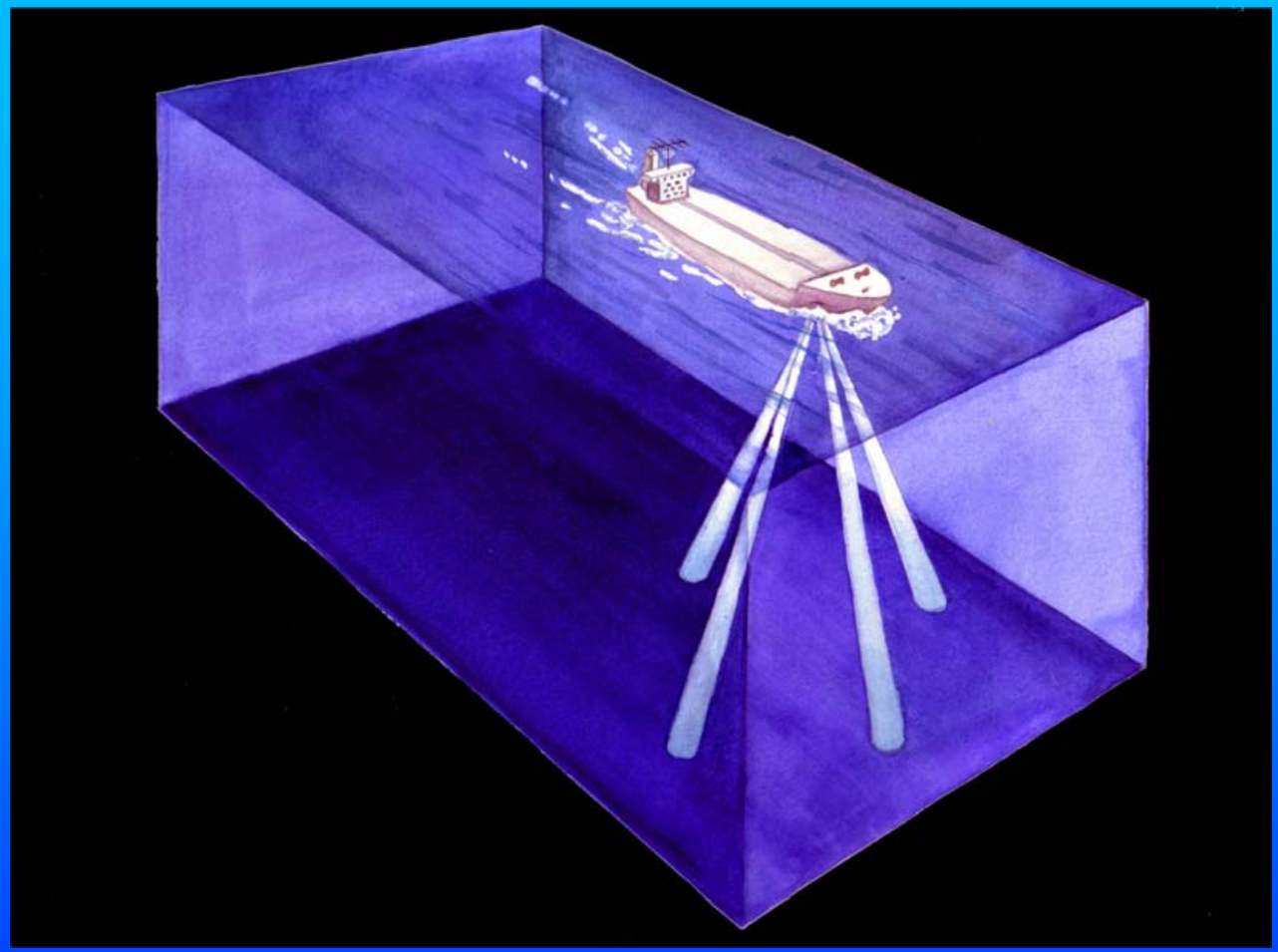
The last ToR addresses how one might actually proceed. Here we can come up with some recommendations, but it will involve a very different process of engaging international agencies to develop the funding.

The Terms of Reference for the Working Group are:

8. Address what kind(s) of organizational structure(s) will best serve to initiate, implement and sustain an integrated international merchant-marine based ocean observation program, linked closely to existing ocean observing systems and programs with access to appropriate and sufficient long term funding sources – e.g., an “Ocean (or Interior) Space Center”- hereafter termed an OSC.

The 3 next slides illustrate technologies of interest:
remote sensing (acoustic and optical)
expendable probe technology (acoustic telemetry)
towed systems

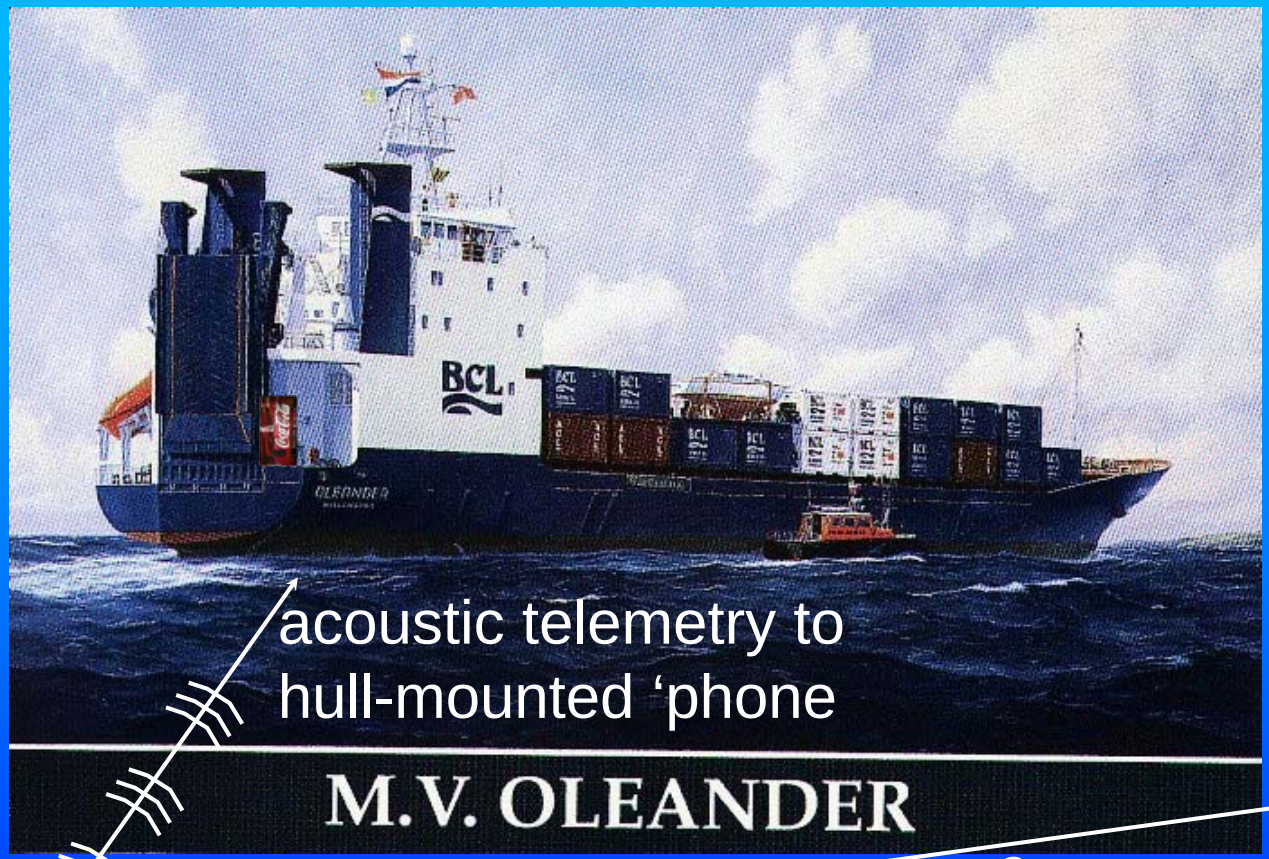
Technologies: Remote sensing



Acoustic techniques for currents, nekton and zooplankton

Optical techniques for phytoplankton, particulate matter

Technologies: Expendable probes



acoustic telemetry to hull-mounted ‘phone

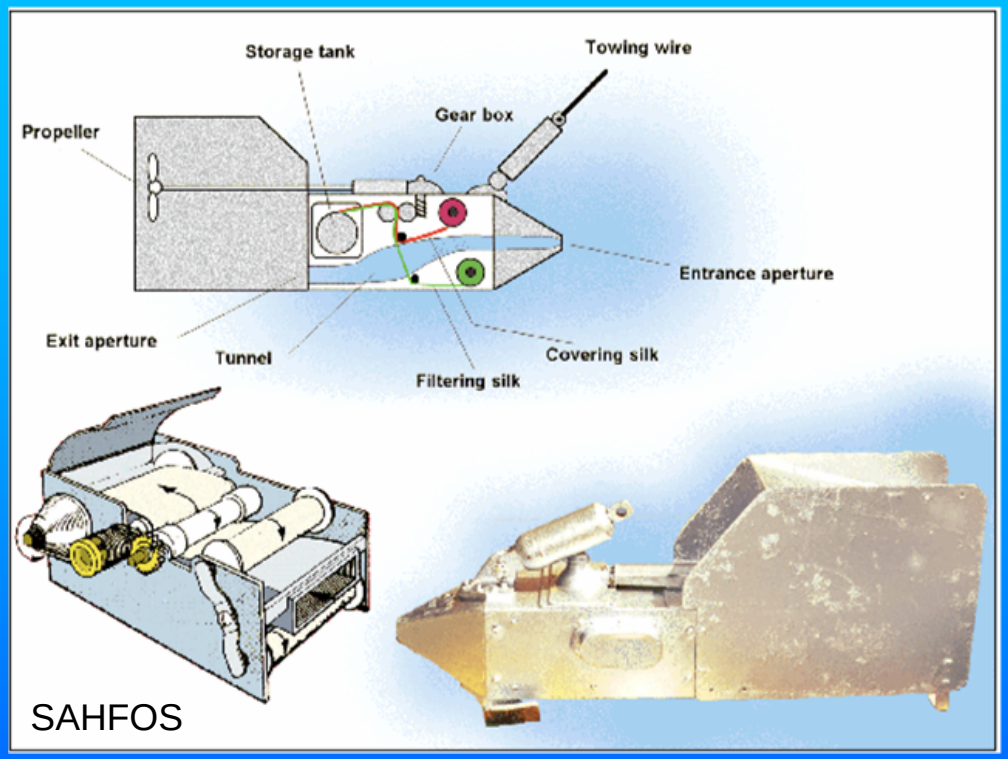
T

TSO_2

probe release

Probes of different types stored in a magazine. Released on schedule or command, it telemeters back acoustically

Technologies: Towed systems



The longstanding success of the CPR (left) points to towed systems for remote sensing (less noise, no vessel shadow, no magnetics) and telemetry from x-probes. Pumped water for regular profiling of nutrients and CO_2 to below mixed layer?

Timeline and activities of the OceanScope Working Group (assuming a once/year meeting schedule)

Year 1:

- Review and adjust as necessary the TOR
- Produce three-year work/action plan for the Working Group
- Complete tasks as defined at first meeting
- Begin discussion and conceptual design of an appropriate organizational structure
- Review organizational paradigms in relation to existing ocean observing systems
- Explore funding sources/structures

Year 2:

- Complete and distribute first interim report
- Review and develop as necessary the Work Plan for years 2 and 3.
- Complete a proposal for the implementing body (e.g. an OSC).
- Develop funding (prepare and submit proposals to various national and international agencies and private sources based upon the interim report)

Year 3 (with or without WG meeting at this time; TBD):

- Issue final report
- Complete and submit a series of papers for a special edition of a journal or book.
- Revise – as appropriate – the implementation proposal
- Explore further funding sources. It is hoped by this stage that some funding will be in place to initiate the program including a startup of the final implementing body, and preliminary funding for commercial instrument and software development.
- Review and decide what structures will need to be put in place to carry forward the deliberations and plans of the Working Group into the future.

Expected July working group members:

Tom Rossby (USA, Kuh Kim (Korea) co-chairs
Peter Hinchliffe (UK), David Hydes (UK),
Markku Kanerva (Finland), Peter Ortner (USA),
Chris Reid (UK), Ute Schuster (UK),
Fred Soons (Netherlands), Javier Valladares
(Argentina),
Yasuo Yoshimura (Japan)

Richard Burt (UK), Jim Churnside (USA),Rich
Findley (USA), Charlie Flagg (USA),
Arnold Furlong (Canada), Jim Hannon (USA),
Paul Holthus (USA), Jules Hummon
(USA),Robert Luke (USA), Jerry Mullison (USA),
Glenn Pezzoli (USA), Steve Piotrowicz (USA),
Tom Sanford (USA), Corinna Schrum (Norway),
Peter Sigray (Sweden), Satheesh Shenoi (India),
Darryl Symonds (USA), Mike Twardowski (USA),
Doug Wallace (Germany)

SUMMARY

The key point here is to recognize that the MM is an available global resource for probing the interior of the ocean on a repeat and regular basis - the domain that has been and continues to be very difficult to access, especially at high resolution to resolve the fine-structure we are only dimly aware of, and at a repeat rate in order for the mean fields and their variability to emerge a quantitatively useful way.

The OceanScope working group thinking is based on a partnership with the MM. This would encourage the pooling of resources to develop the technologies including sensors, software and communications for regular, repeat and sustained observation of the ocean interior. In short, a way forward to track an ocean we still know very little about.

Proposed Vision of OceanScope

- Partnership with merchant marine shipping industry
- integrated approach t
- observations of the global ocean on a regular and sustainable basis
- Equipment of commercial ships with
- fully automated instrumentation for
- accurately measure currents, physical chemical and biological characteristics of the water column throughout the world ocean
- data will become a fundamental resource for studies of climate and health of our planet.