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| **World Meteorological Organization &**  **Intergovernmental Oceanographic Commission (of UNESCO)**  **GLOBAL OCEAN OBSERVING SYSTEM/OBSERVATIONS COORDINATION GEORP**  **Ship Observations Team Eleventh Session**  Virtual Session, 13-16 September 2021 | Image result for ioc logo unesco  **SOT-11/Doc. 3.3** |
| Submitted by: Shawn R. Smith  20.08.2021  **DRAFT 1** |

**AGENDA ITEM 3: Industry/Partner Presentations**

**AGENDA ITEM 3.3: Science RoCS**

# SUMMARY

1. **SUMMARY:**

Science Research on Commercial Ships (Science RoCS) is an ad-hoc group of scientists, technicians, data managers and other parties that are seeking to build partnerships with international commercial shippers to improve the Science Community's ability to observe and characterize ocean physics, dynamics, chemistry, and biology. Overall program objectives are to (1) develop a global program to continually scan the ocean’s sub-surface velocities at high horizontal resolution, (2) collect multiple data streams, including ocean currents and weather, with “Integrated Observing Platforms” hosted on commercial ships, and (3) partner with existing global programs to provide (a) deployment opportunities and (b) a portal to connect to industry for easier commercial ship access to remote regions and routes of high scientific value.

Since many of the measurements planned by RoCS are of specific interest to SOT, and more broadly for GOOS, the RoCS team seeks opportunities to collaborate with SOT. Specifically, RoCS plans to distribute observations in real-time to support operational users but needs input from the VOS and SOOP panels regarding data and metadata exchange protocols. Would it be preferrable for RoCS vessels to work through NMHS or use newer data exchange services (e.g., OpenGTS initiative)? Connecting members of the RoCS team to OceanOPS should promote a dialog on metadata standards to support GOOS and provide OceanOPS with contacts to commercial shipping companies when they are looking for ocean platform deployment opportunities. There is an opportunity for SOT and OceanOPS to leverage and contribute to the development of tools envisioned by Science RoCS to coordinated deployment requests.

Finally, one key component of Science RoCS is routine measurement of upper ocean velocities using Acoustic Doppler Current Profilers (ADCP). Presently, there is no coordinated international data management of shipboard ADCP observations; however, there is an emerging community of modelers that are seeking to assimilate upper ocean currents into forecast systems. There is a need to develop a unified approach to ADCP data and RoCS is asking whether SOT can provide guidance or support to developing a coordinated international shipboard ADCP program?

### B. ACTIONS/DECISIONS/RECOMMENDATIONS REQUIRED:

(a) Adopt draft Action[[1]](#footnote-1) [3.3.0/1](#_Draft_Decision_X.X.X(X)/1) — To review the planned RoCS activities and open dialog between RoCS, OceanOPS, and appropriate SOT panels and task teams to leverage these activities to support SOT members **(action: SOT Chair, VOSP Chair, SOOP Chair, TC)***.*

Adopt draft Action 3.3.0/2 — To provide RoCS with recommendations, procedures, and documentation on how to provide real-time weather and ocean observations (and associated metadata) to meet the needs of SOT members **(action: VOSP Chair, SOOP Chair)***.*

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# C. BACKGROUND INFORMATION:

### References:

1. *M. Andres, K. Strom, and L. McRaven, 2021: Transforming Ocean Science: Fostering a Network for Cooperative Science Research on Commercial Ships (Science RoCS), Marine Technology Society Journal, 55(3), 126-127.*

### Overview

Science Research on Commercial Ships (Science RoCS), envisions a future where scientific data collection on commercial ships is the new industry standard, providing repeatable measurements in under-sampled, remote regions, on scales not otherwise accessible to the Scientific Community. The overarching goal of Science RoCS is to transform ocean science through partnerships with international commercial shippers, dramatically improving the Science Community's ability to observe and characterize ocean physics, dynamics, chemistry, and biology on unprecedented scales, building new time series for prediction, and spurring a new generation of ocean-sensing technologies. Overall program objectives are to (1) develop a global program to continually scan the ocean’s sub-surface velocities at high horizontal resolution, (2) collect multiple data streams, including ocean currents and weather, with “Integrated Observing Platforms” hosted on commercial ships, and (3) partner with existing global programs to provide (a) deployment opportunities and (b) a portal to connect to industry for easier commercial ship access to remote regions and routes of high scientific value.

The unique research capability afforded by Science RoCS fills a community-identified need for in situ oceanographic, meteorological and seabed data. The science drivers that motivate the proposed effort to acquire and disseminate data span disciplines and include sustained observations for and/or study of: oceanic state estimation, weather and climate variability and prediction, current and boundary current trends and variability, air-sea interactions (fluxes), process studies such as bio-physical and chemical couplings, joint satellite and upper-ocean monitoring (including ground-truth), satellite and model validation, and advancing the state-of-the-art integrated atmospheric and ocean instrumentation that can be monitored and managed remotely (much like satellites orbiting the Earth). Importantly, Science RoCS will provide the motivation and framework for developing sensor technologies optimized for use on commercial vessels - a capability that is sorely lacking today. Science RoCS plans to support broad dissemination of observations and metadata according to the principles of Findability, Accessibility, Interoperability, and Reusability (i.e. “FAIR data'').

### Potential SOT collaboration

There are several areas for potential collaboration between Science RoCS and the SOT. Since many of the planned RoCS observations (meteorology, thermosalinographs, XBT, pC02) are presently coordinated by the VOS and SOOP panels of SOT, there needs to be coordination between RoCS and SOT to ensure maximum benefit to the operational and research communities from RoCS observations. Additionally, RoCS plans routine shipboard ADCP and bathymetry measurements which provide several essential ocean variables desired by GOOS. Although not emerging technologies, there are roadblocks to ensuring ADCP and bathymetry measurements from commercial ships are made available to the user communities. Finally, RoCS plans to develop tools to support communication between scientists interested in deploying ocean observing technology (including floats, drifters, etc.) and the commercial shipping community. Improving these communication channels has long been a mission of SOT and OceanOPS, with a vision to streamline the requests made of commercial operators and ensure some centralized workflow from request to actual sensor/platform deployment.

1. An Action/Decision is an item directly related to SOT and on which SOT can action or decide directly. Details on rational for the action/decision should be included in the Background section. [↑](#footnote-ref-1)