

## Future Areas of Inquiry

The panelists identified several future areas of inquiry that NSF should consider during the next phases of the SOR development, detail design and construction of the RCRV. These suggestions are listed below for each of the technical elements.

### **1. Scientific Outfit and Handling Systems - [REDACTED] (Lead)**

- The group was unanimously concerned about the limited useable main deck space when two vans are housed on the ship.
- Details are required on the mechanism to mate the vans to the ship's superstructure.
- Concern was expressed about the lack of direct access between the computer lab, which will host the control computers for most deck operations (e.g., CTD rosette casts, winch readouts), and the working deck.
- There is a desire for stern (A-frame) deployment of 0.322 inch EM conducting wire.
- If adequate accessible space cannot be found for the incubators, it may be economically wise to forgo the incubator space reservation and cost of incubator seawater plumbing and drainage in the final design.
- The hospital should be converted into a stateroom or lounge independent from the ADA stateroom.
- Details on the berthing plan should be better defined in the SOR (e.g., number of bunks in ADA stateroom, preference for a lounge even when a ADA scientist is aboard, unnecessary hospital).
- A major effort should be undertaken to specify and scrutinize all science handling systems and requirements.
- The Scientific Electronic Systems requirements need to be scrutinized and a detailed plan presented.
- Meteorological sensor advances demand reassessment and definition of optimal placement.

- The placement and requirements for satellite communication antennas need to be detailed.
- There is concern that scientific sample storage space (both room temperature, refrigerated, and frozen) may be inadequate.

## **2. Hull, Structure and Stability - [REDACTED] (Lead)**

- The issue of the RCRV being underpowered is critical to the successful operation of the vessel. It will affect the vessel's maneuverability and could make the vessel impractical for science and safety purposes. The requirements in the SOR for sizing the power plant and the resultant horsepower (HP) ratings of the engines should be revisited.
- The amount of open aft deck space should be seriously reconsidered when 2 vans are carried on the vessel.
- Reconsider the need for a hospital on this size vessel.
- D0 ice strengthening requirements should not be ubiquitous throughout the fleet and needs to be reconsidered for the RCRV with regard to the areas the vessel will operate.
- Bulbous bow design needs to be reconsidered due to the serious impact this feature will have on bubble sweepdown.
- A rigorous model-testing program should be incorporated into the design process, including realistic sea states, wave action and vessel motions.
- It is recommended that a larger ship be considered – maybe as much as a 20-foot increase in vessel length – in order to produce a more efficient scientific platform.

## **3. Integrated Propulsion (IPS) and Major Machinery - [REDACTED] (Lead)**

- Both designs may be underpowered and may be slow to respond in maneuvering situations. Although the design cruising speed of 10 knots is adequate, there is very little reserve power available for operating in higher sea states or for performing quick maneuvers. Recommend future inquiry into increasing the horsepower of the design.
- The current design requirements call for no ABS dynamic positioning certification. The system as provided would meet DP-1, which does not provide redundancy for

computer or sensor failures. Failure of a single point can result in damage to over-the-side packages or damage to the ship if operated in close proximity to other vessels or platforms. Recommend future inquiry into whether requiring a DP-2 certification would be cost effective considering the type of work the RCRV will undertake.

- The bow thruster sizes of both designs appear marginal to meet DP requirements. Both designs meet the DP criteria in the SOR. However, based on experience with similarly sized vessels in the fleet, panel members felt that the RCRV thruster size would not be adequate for DP operations in moderate seas. Recommend future inquiry into increasing the bow thruster size or redefining the DP requirements.
- Reconsider the need for an incinerator on this size vessel.

#### **4. Noise and Vibration Control - [REDACTED] (Lead)**

- The design requirement of a bulbous hull will cause significant problems with bubble sweepdown and will degrade sonar performance. A more traditional monohull design needs to be considered.
- It is recommended that the oceanographic research fleet adopt new radiated noise level requirements, instead of the ICES criteria. ICES are developing new criteria for general oceanographic research vessels, while the AGOR Ocean Class Vessel will have its own criteria.
- It is recommended that in the future predicted radiated and airborne noise criteria include deck and scientific equipment to provide more realistic noise level expectations.

#### **5. Other - Panel Members**

- The RCRV should incorporate clean (aka "green") and scientific technologies that will minimize harm to the environment and ocean life.