

Amendments To Science Mission Requirements

A review of the published Science Mission Requirements (SMR) undertaken at the meeting of 11 September 2000 resulted in some requirements being modified. Those modifications having the most significant impact on the vessel design are summarized below. The summary of significant modifications to the SMR follows:

- **Propulsion**

The goal of attaining a “quiet” vessel in accordance with the recommendations of ICES Report #209 will preclude the use of direct drive diesels in favor of raft mounted, diesel electric propulsion. Twin azimuthing thrusters (either Z-drives or Azipods) are suggested for enhanced maneuvering and trackline capability and for flexibility in ice operations. The ability of these types of thrusters to meet the noise criteria is being investigated.

- **Science Accommodations**

The number of science berths was increased from 20 to 24.

- **Seakeeping Requirements**

A refined set of sea-keeping criteria based on acceptable accelerations at speeds between 0 and 10 knots in seastate 5 is proposed as follows:

Maximum vertical accelerations at work stations	0.20 g
Maximum lateral accelerations at work stations	0.10 g

Work station locations:

- ❑ Aft outermost edge of aft working deck
- ❑ At side Baltic room door
- ❑ At starboard ship control console on bridge
- ❑ At the center of the main lab

- **Maneuvering, Stationkeeping And Trackline Requirements**

A goal of the ARRV design is compatibility with some elements of the new NOAA FRV-40 functional requirements. In this regard, it is suggested that the maneuvering and trackline criteria established for the FRV-40 is adopted for the ARRV:

Maneuverability

- ❑ Ship to be capable of achieving a tactical diameter of less than 3 ship lengths in either direction at 13 knots, free route, at full load condition in calm water without the use of a bow thruster
- ❑ Ship to be capable of rotating about midships at zero forward speed in seas up to 8.2-ft. significant wave height, in a 2.5-knot current and 30 knot wind.

Stationkeeping

- ❑ Ship to be capable of keeping station within a watch circle of one ship length diameter, on best heading, in seas up to 8.2 ft. significant wave height, wind speeds up to 35 knots, and current up to 3 knots, acting simultaneously. Wind and waves shall be considered to act in the same direction. The requirement shall be satisfied with the angle between current direction and wind/wave direction from zero to at least 180 degrees. The Bretschneider short crested spectrum shall be used with modal periods of 7, 9, 11 and 13 seconds to be considered minimum.

Precision Trackline

- ❑ Wind, waves and current shall be considered acting in the same direction.
- ❑ Crab angle shall be considered the angle between the track and the ship's centerline.
- ❑ Environmental angle shall be considered the angle between the track and the environment, such that when the environmental angle is 0, the environment is opposite the trackline heading.
- ❑ All ship speeds shall be through the water.

➤ Acoustic Survey Trackline

The ship shall be capable of automatically and manually maintaining track within a track error of 160 ft. either side of the track, while performing hydroacoustic surveys at speeds up to and including 11 knots, in seas up to 8.2 ft. significant wave height, 3 knot current and 35 knot winds, for all environmental angles between 0 and 180 degrees port or starboard.

➤ Towing Trackline

The ship shall be capable of automatically and manually maintaining a trackline within 330 ft. with a crab angle less than or equal to 45 degrees at a speed of up to 3 knots, with a towing resistance of 36,000 lbs. parallel to the track, in seas up to 8.2 ft. significant wave height, 3 knot current and 35 knot winds, for all environmental angles between 0 and 45 degrees port and starboard.

➤ Slow Speed Trackline for Small Samplers and Towed Devices

The ship shall be capable of automatically and manually maintaining a trackline within 35 ft. with no restriction on crab angle at a speed of 1.0 knot, with a towing resistance of 4,000 lbs., in seas up to 8.2 ft. significant wave height, 3 knot current and 35 knot winds, for all environmental angles between 0 and 180 degrees port and starboard.

- **Draft restriction**

Inshore operations in coastal waters of Alaska provide a strong incentive for shallow draft. With this in mind, a maximum draft of 15 feet has been established. This maximum draft is also conducive to existing draft limitations at the small boat harbor in Seward, one protected mooring site under consideration for this vessel.

The feasibility of a dual draft vessel, e.g., 15 to 17 feet, is being considered.

- **Helicopter**

Vessel operations in remote areas for extended periods will necessitate helicopter landing and refueling capability to facilitate transfer of personnel and emergency medical evacuations. The ability to land and refuel the USCG's HH-65A "Dolphin" and HH-60 "Jayhawk" (currently deployed in Alaska) is desired. The vessel will not be required to hangar the helicopters and accommodation for helicopter crew and technicians will come out of the science berths as required.

- **Trawling Layout**

The trawlway dimension, i.e. the distance from the top of the stern ramp to the centerline of the net reel, specified for the NOAA FRV-40 is 47 ft. This will require a larger aft deck area to accommodate.

- **Additional Spaces**

The following additional spaces and approximate areas have been identified:

Electronics workshop	150 ft ²
Hazmat locker(s)	50 ft ²
Incinerator/trash room	120 ft ²
Aft control room	200 ft ²