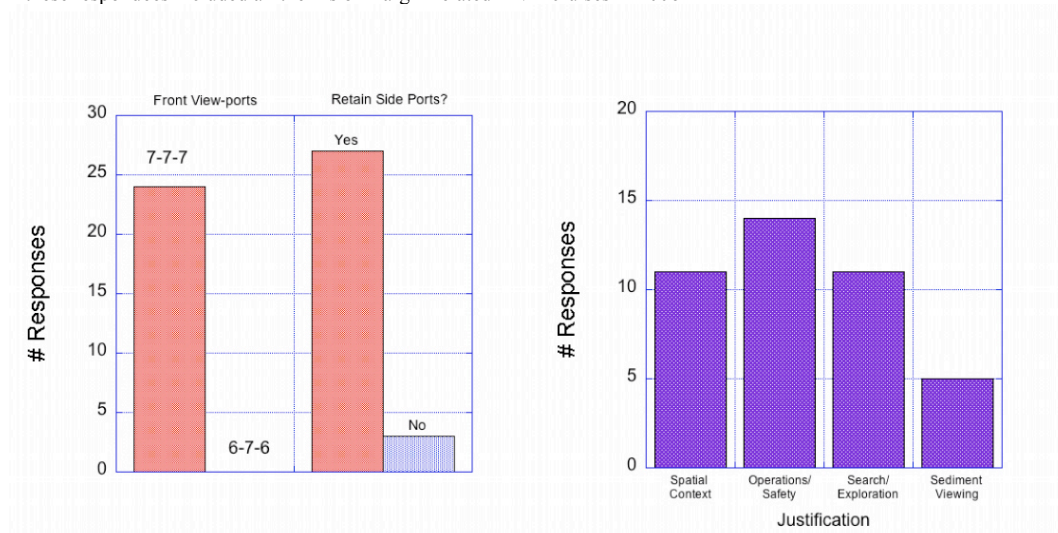


RHOC Discussions on Viewport Configurations for the RHOV

Briefing document – Chris German – Dec 19th 2006

- A questionnaire was issued to the US deep-submergence science community on Nov. 17th 2006 concerning requirements for view-ports in the RHOV, with a follow-up reminder to provide feedback issued on November 27th.
- As of December 18th, 31 scientists had responded by e-mail to Chris German, Chief Scientist for Deep Submergence at WHOI, as had 4 Alvin pilots/ops staff.
- Of the 31 science-users who responded, 24 expressed a clear opinion on what they would prefer for the forward-looking viewports. All 24 respondees expressed a unanimous preference for all 7” windows, none preferred 6-7-6.
- Among the same 31 science users, 27 argued to retain the side view-ports as well, 3 voted to do away with the side-ports and there was one abstention (“let the pilots decide”). Of the 27 scientists wanting to retain the side viewports, 20 justified their requests with rationales falling into 4 categories as follows:-
 - a) 11 mentioned their importance to provide the 3-D spatial context for their work.
 - b) 14 discussed their importance for operations in tight spaces (vents, science gear)
 - c) 11 discussed their importance for exploration and/or search operations
 - d) 5 discussed their importance for working in sedimented environments*

* these respondees included all the PIs of margin-related Alvin cruises in 2006



- Pilot and ops team responses on the desirability of the side view-ports were almost exactly split, 50:50. Those against saw them as points of vulnerability in the hull and were concerned that their positioning would render them inconvenient for science use, physically obscured by science personnel to prevent ready use by the pilot and, consequently, un-monitored weak-spots. Those in favor saw the peripheral vision they afforded as valuable while recognising the need for extra vigilance to maintain safety.

- To address these operational concerns, Bob Brown & Chris German convened a meeting of WHOI's internal Deep Submergence Advisory Committee on the morning of Dec 19th to address the issue of side view-port placement and usefulness using the mock-up submersible on-site. German plus two pairs of scientists investigated the working environment within the closed sphere and made the following observations:-

- a) it is quite feasible for two scientists to kneel in the well, back-to-back, between the observer benches and utilise BOTH side ports, in their current recommended positions, simultaneously and without impacting on the position of the pilot in their operating position. Thus it IS feasible for the sideports to be utilised in one of the modes argued for by the science community, in dedicated search/exploration mode.
- b) if the two side-ports were migrated forward approximately 6 inches, it would also be feasible for each observer to utilise their side view-port whilst seated or kneeling on all fours on their observer bench AS WELL AS by kneeling in the well between the two benches – still without impinging on the pilot. By moving from a kneeling to prone viewing position and back, an observer could then change readily between viewing through the side and forward viewports – potentially useful when developing a 3-D perspective of the setting and context of (e.g.) samples being collected at the front of the submersible.
- c) When lying prone on their observer benches, the bodies of the scientists are lower than the side view ports and do not obstruct them – i.e. the pilot can see over the backs of the scientists and out of the side view-ports as well as all three forward-looking viewports. Thus, the pilot can have at-a-glance vision of the seafloor around the submersible to both sides, as well as in front, at all times. This would be further enhanced if the height of the observer benches were lowered from their current positions to make use of the forward view-ports more comfortable.
- d) There is also space for each observer to sit on their bench away from the side-ports if anything more than a reconnaissance view is needed by the pilot from either side viewport.

- The principal conclusions of the DSAC group were:

- 1) the scientific justifications made for retaining the side viewports were entirely consistent with the currently proposed configuration for viewports and observer benches; the side-ports would not normally be obscured by scientists' bodies.
- 2) If the side viewports were migrated forward approximately 6 inches on each side the means for scientists to use the side ports would be improved significantly: kneel in the well; kneel on the bench; or sit on the bench and lean forward.
- 3) Lowering the observer benches would optimise the position for forward viewing and further secure the ability for the pilot to routinely view through the side-ports.