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Proposed Testing Program for Sea Urchin Modules

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The development of the Sea Urchin Module as a cheaper, more efficient sensor is still incomplete; in particular we do not have as yet any information on the quantum efficiency of the presently used WLS fluors. Important details of construction are still unsettled as well; but we propose to proceed on the assumption that all such questions will be answered. In that case it will be necessary to conduct test on the Sea Urchin on several levels. Following is a proposed test program.

1. Tests in a water tank. These are primarily aimed at completing the mechanical design, and measuring the sensitivity of the module. The comparison to be made is between the response of a PMT to tank illumination and that of the Sea Urchin. This will yield the desired sensitivity measurement. The test will actually be carried out on a (partial) half-scale model, which requires a 10-ft water tank. A full-scale model would require a 20-ft tank, which would not fit into any available laboratory space at the University. The tank is now nearing completion. The term "partial" means that not all the spines will be in place.

The tank can also be used to test out proposed methods for supporting the spines, and of keeping them in contact with the glass sphere.

2. Following these tests, the construction of a full-scale model can be undertaken. A tank large enough to test it in has been offered for our use by the Naval Ocean Systems Lab in Kailua, through the offices of G. Wilkins. We need to verify on a full-scale model the lessons learned on the half-scale model.

3. Further work is needed to make the system pressure-tolerant. In particular, the spine design must allow for the compression of the solvent, and the interior design of the sphere for its compression.

4. After a single full-scale Sea Urchin has been constructed and tested, and modified as needed, a next step will be the construction of a number of modules - perhaps 5 to 10, the budget permitting. If possible, it would be highly desirable to construct as well the container (submarine) to be used for packaging such a unit as a string. After separate testing of the package, the entire unit could be assembled for a deployment test.

5. At the same time, we should commission a small but dedicated group somewhere to design the communication, data, and power system for such a string, so that when we are ready for a deployment test, we will have available the signal-processing and power equipment as well. Not all these problems need to be solved in the final manner; temporary solutions are admissible. The important thing is to make the string test, even with temporary procedures.

Since, with the available personnel, the above program will take at least a year, I have not projected the test program any further at this time. The extension at that time will depend on what course DUMAND is taking then.

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