

DUMAND—Deep Underwater Muon and Neutrino Detection

Steering Committee, 1980

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Hawaii DUMAND Center
University of Hawaii
2505 Correa Rd.
Honolulu, HI 96822
808 - 948-7391

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Hawaii DUMAND Note 80-9

MEMORANDUM

TO: DUMAND Group

FROM: John Learned

SUBJECT: DECEMBER DEPLOYMENT WORKSHOP IN SAN DIEGO

I would like to open discussion of the deployment workshop with suggestions for the goals and arrays to be evaluated and ground rules to be given to the engineers.

- Goals:
- Derive an updated cost estimate for several arrays.
 - Reexamine deployment in light of new technology/ideas for cost savings and increased reliability.
 - Come up with some general design principles to feed back to array designers (physicists) for iteration of design (e.g., principles might be such things as: modules must always be buoyant, the additional cost of modules which cannot be supported in air is such-and-such, the maximum towable array subunit size is so-and-so, the pedestal cost of installing any array cabled to shore from 4 km depth is some amount, etc.).

Test Arrays:

- I) 1000 element array with 50 m spacing. Preferred shape is 10x10x10 cubic but may be varied depending upon engineering input. Array has fixed sensitivity
 - a) with Urchins, 6 m in diameter or
 - b) with a large area PMT module taken as 20" diameter by 60" long cylinder with hemispherical end caps (either containing hot dog tubes or two 20" hemispherical tubes).
- II) 1000 element array with 10 m spacing. Module is to be 13" hemispherical PMT inside 16" spherical housing.

Ground Rules:

- Physicists supply module as "black box," giving engineers geometry, buoyancy, air weight, handling constraints, power and data link requirements, and module estimated cost as delivered, assembled, and tested to the array assembly point.
- Data network to be selected for maximum data rate to shore, minimum in-water connections.
- Topology of array to be chosen within constraints above, and with on-line iteration from physicists.
- Array location defined as Keahole site with 100 m tare height.
- Number of elements variable $\pm 10\%$ to fit geometry. Spacing variable by $\pm 10\%$ same. May be cubic or hex closest packed. Could be slightly (10%) asymmetric; this to be negotiated & tested on-line with Monte Carlo.
- Array spacing must be recordable at sufficient rate so that detector locations are continuously known to < 1 m.
- Installation plan to be developed with multiple abort points and as much continuous system monitoring as possible.
- Special consideration to be given to reducing high cost of cable breakouts.