



WOODS HOLE OCEANOGRAPHIC INSTITUTION

Atlantis Propulsion Issues



Removal of Port Motor on *Atlantis*

- **Motors developed grounds**
 - **Ground fault system did not protect**
- **Motors removed, renovated**
- **Corrective actions in place**
 - **Electrician hired**
 - **New brushes to reduce carbon dust**
 - **Extensive preventive maintenance**
 - **Several design options being evaluated**



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A-Frame System Reliability Background

- **New in 1982**
 - **Metric**
 - **Marine and non-marine features**
 - **Many one-off custom parts**

- **“Reconditioned” and moved to *Atlantis* in 1996**
 - **Limited to surface treatment**
 - **New hydraulic power package**
 - **Electric over hydraulic controls added**



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Recent A-Frame Failures

- **Anti-swing cylinder**
 - **Found during in-port checkout**
 - **By-passed as recommended by manufacturer**
 - **Long lead time to repair, longer to replace**

- **Leaking main cylinder adaptors (elbows)**
 - **Custom built**
 - **Repaired over a weekend**
 - **New ones fabricated and sent to Puntarenas, Costa Rica**



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Revised Maintenance Plan

- **Monthly maintenance inspections**
 - **Early identification of problems**
 - **Source for crew/shipyard work lists**
- **Independent professional assessment (Jan. 2003)**
 - **Caley or independent consultant**
 - **Require NDT testing**
- **Shipyard Repair Emphasis**
 - **Repair and preservation**



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Chief Scientist for Deep Submergence

- **An internal review, chaired by Fred Sayles, is underway.**
 - **The committee is addressing this subject inter alia.**
- **Dan Fornari has agreed to stay on while the process is ongoing (thank you).**
- **We will then move forward.**
- **We are looking inside and outside. First inside, then ...**

DESCEND Report

(Developing Submergence Science for the Next Decade)

Key Recommendations

- **Develop new sensors and tools**
- **Accelerate development of autonomous underwater vehicles (AUVs)**
- **Construct a new, state-of-the-art, deep diving (> 6000 meter) occupied submersible**
- **Plan for a new, robust deep-diving (> 7000 meter) ROV for science**
- **Increase access to submergence vehicles and tools**
- **Convene a submergence technology meeting**