



Discovering the Depths with GIS in the Deep Sea

WHOI – Dr. Stace Beaulieu

CA Dep of Fish and Game - Yuko Yokozawa

New Age Systems, Inc. – John Ruppel, Ruth Warner

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About This Presentation

- This presentation outlines a true event where GIS provided critical “real time” support for a deep sea search-and-recovery mission
- About the Presenter:
 - John Ruppel of NASINC has been providing deep sea navigation and operational services to ROV Teams and Scientists for over 14 years
 - While enlisted in the Navy, he was released to WHOI’s DSL team for key expeditions
 - NASINC has been providing deep sea services and support since 1998



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Situation

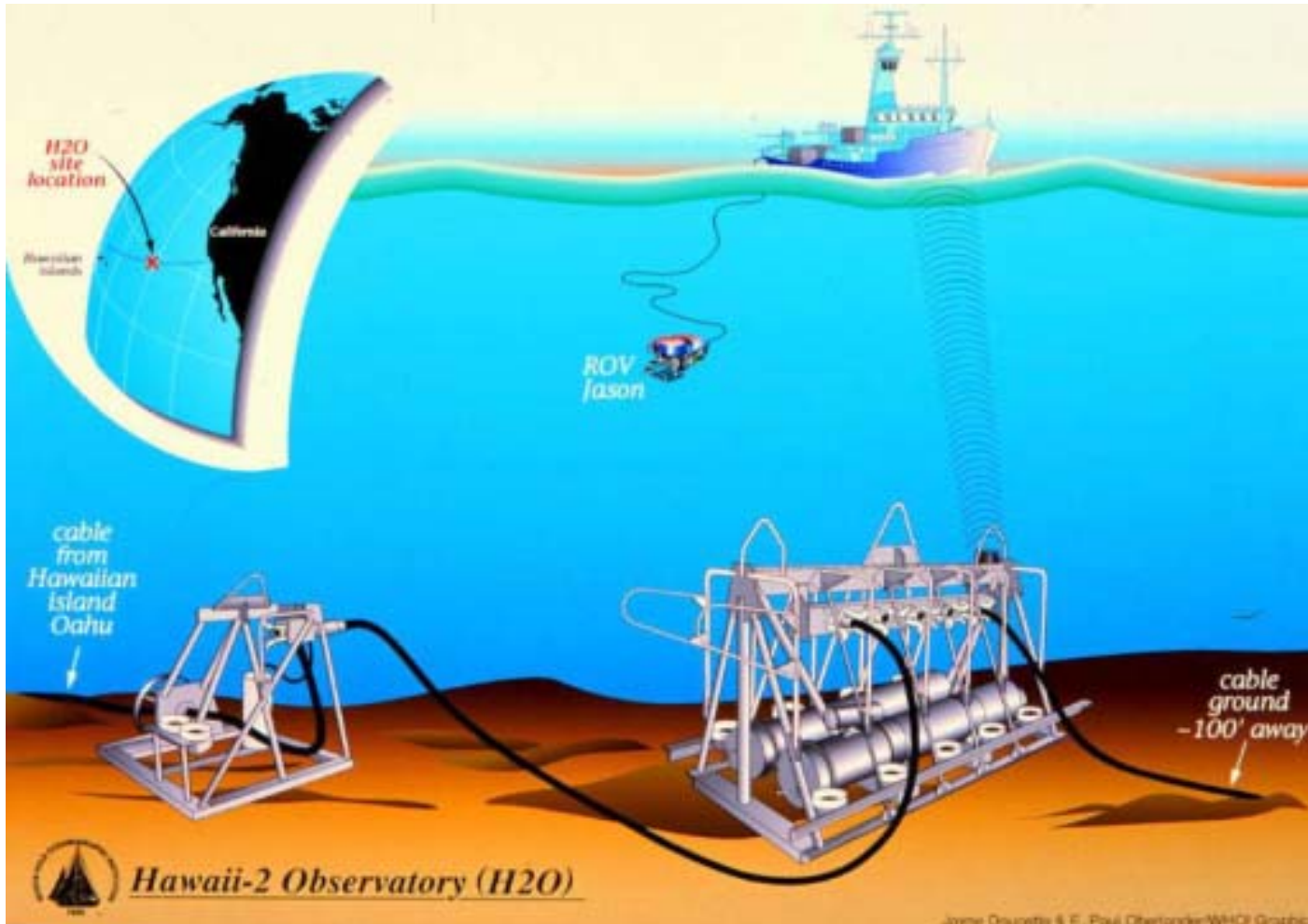
- ESRI's GIS software became a critical component of a search-and-recovery mission in the deep sea, 3 miles down, at the H2O study site
- While being lowered to the bottom of the ocean, the junction box broke loose



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Graphic of H2O Site



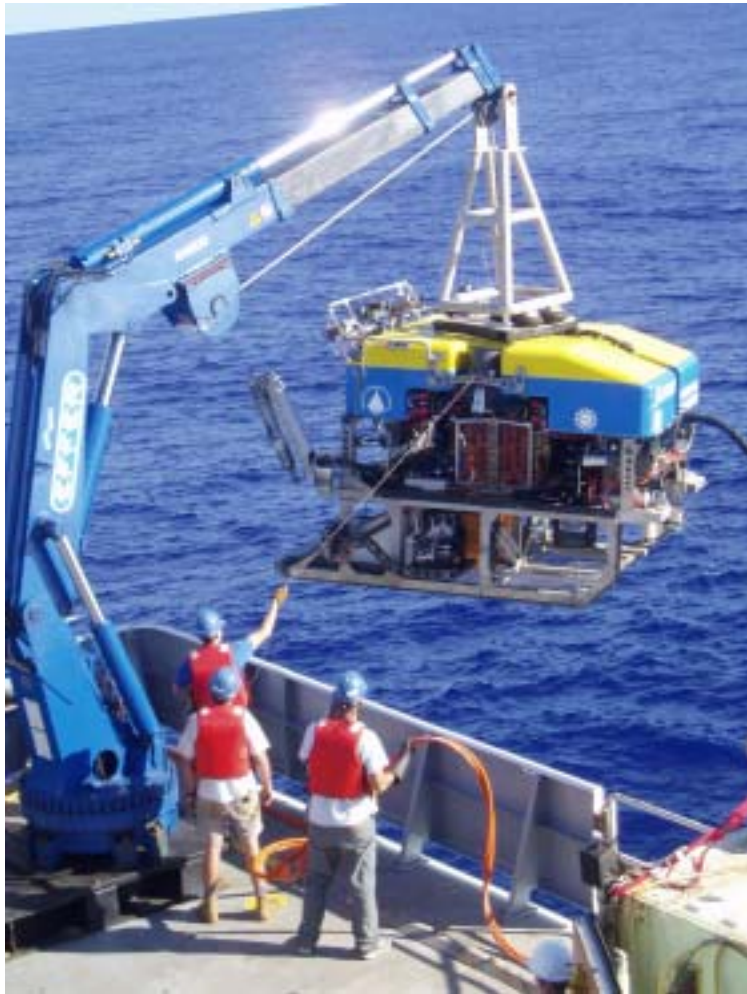
Research at the
H2O Observatory
is sponsored by
the National
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Foundation



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GIS Solution



- Dive ROV Jason II and visualize the track with GIS
- Add 30M swath to indicate visual range
- Add 60M swath to indicate sonar range
- Drive Jason II for 100% swath coverage of the search area



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Solution Results

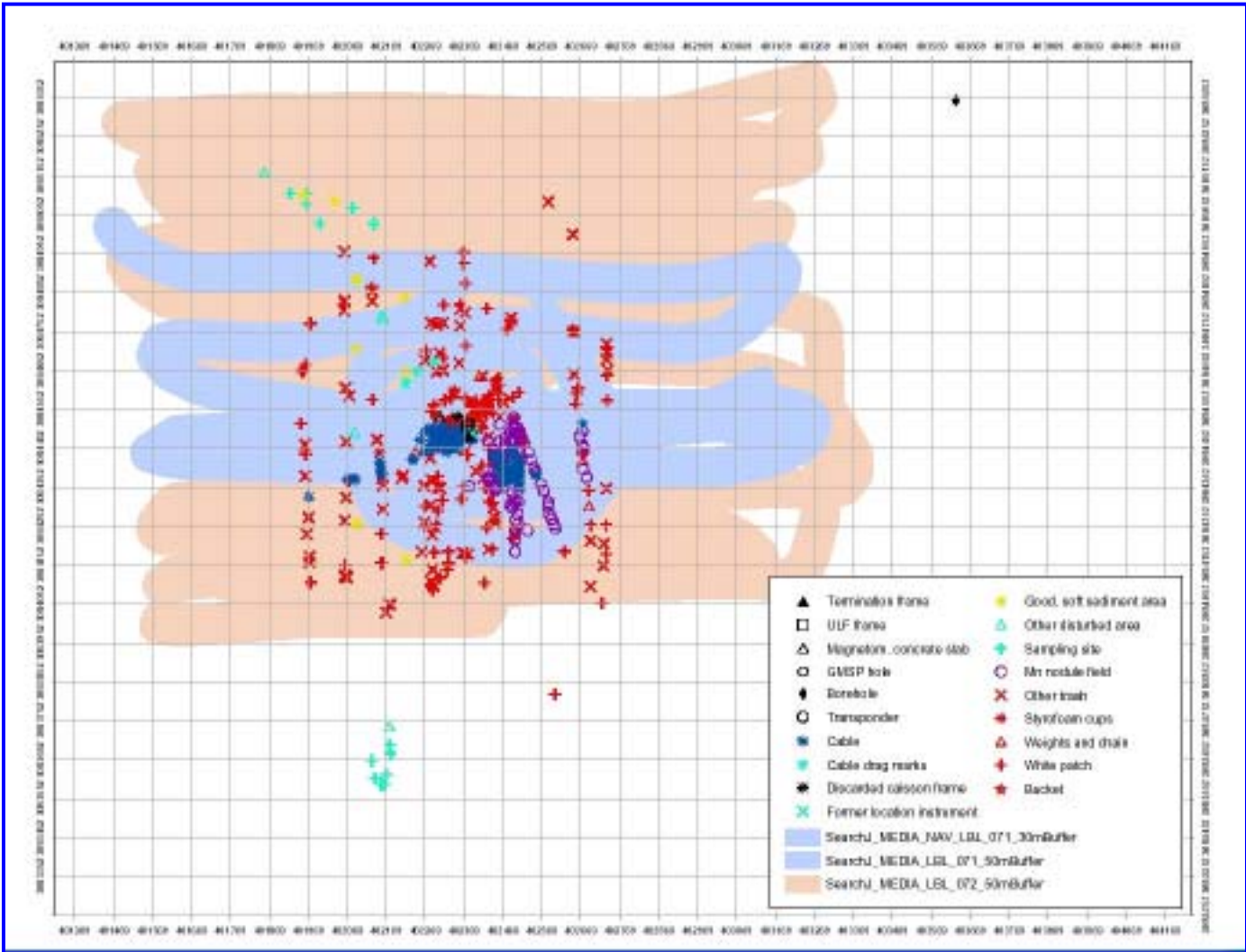
- “*real time*” visual and sonar sensor coverage was readily available for “*real time*” search decisions
- The junction box was found



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Solution Results



Composite visual of swaths and various bottom targets at H2O site



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GIS in Real Time

- The ability to visualize Jason II's track, adding the sensor's coverage was critical for "real time" decision making
 - Prevented redundancy and overlap during the search
 - Allowed for adjustments in driving the vehicle to prevent gaps in search pattern
 - Allowed for timely search decisions
 - Saved time



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Value Add of GIS

- Collaboration between the Scientific and Jason II teams
 - This importance cannot be understated
- Integration of data sets from 1998 to 2003 for the H2O research site
- Collaboration between geologists and biologists, multi-disciplinary data



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Positive Results & Impacts

- For the GIS community, this solution appears simple and basic, however, for the scientists, this was a “huge” experience of what is GIS and real time examples of how GIS can help them in their work
- The result and impact of this understanding is:
 - GIS continuance for supporting the H2O site
 - multiple funding submissions into NSF for “GIS” projects for 2005 and beyond
 - expanding of GIS usage into multi-year, international research sites as the foundation framework for data distribution and usage
 - Buy-in and support of GIS by Scientists



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Future Insight

- *“We anticipate that ArcGIS will become a very important and commonly-used tool on research cruises in the future. Quickly integrating and displaying data for navigation, bathymetry, images and observations of the seafloor will be critical for efficient use of ship-time at deep-sea observatories planned by the international oceanographic community.”*

Dr. Stace Beaulieu, Research Specialist, Woods Hole
Oceanographic Institution



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Thank You

Questions?



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References

- Dr. Alan Chave, Senior Scientist in the Deep Submergence Laboratory at Woods Hole Oceanographic Institution, was Chief Scientist for the Sep/Oct 2003 cruise to H2O.
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