Using GeoVRML for 3D Oceanographic Data Visualizations

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Overview

Update of paper presented at Web3D 2002 Symposium in Tempe, AZ

- More general implementation using GeoVRML
  - *Works for all dive areas*
  - *Full test of most all GeoVRML nodes, including a few new ones*
- System is in production - over 3,000 dives in database
- User evaluation

MBARI

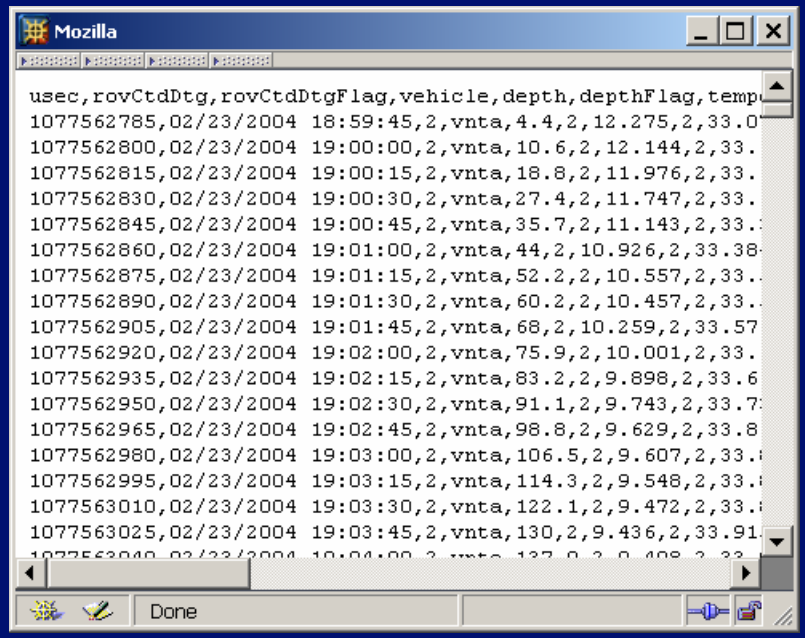
Monterey Bay Aquarium Research Institute

- Private non-profit oceanographic research institution
- Located in Moss Landing, CA
- 200+ employees
- 3 Ships, 3 underwater robots
- Acquire a lot of data

Data Archives

15 year database of daily explorations

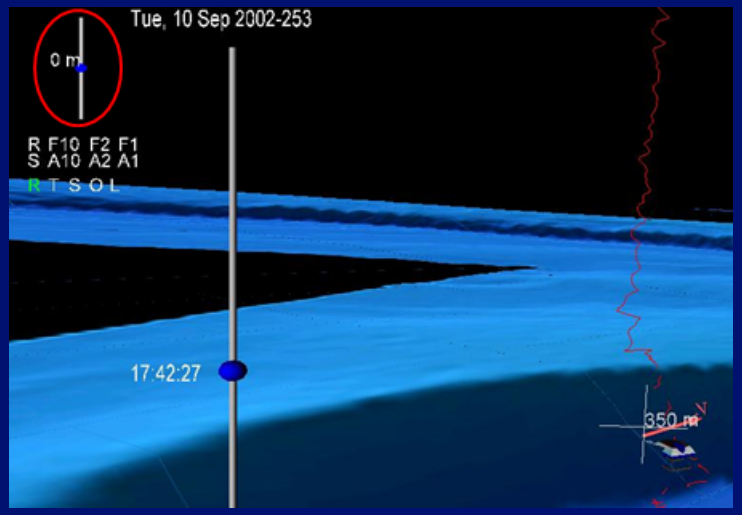
- Vehicle navigation (Ship & ROV)
- Bathymetric maps (Terrain)
- Environmental data (CTD)
- Video still images
- Video annotations
- Sample archive database
- ...new sensors



GeoTransform node

Needed in 3D Replay to translate GeoCoordinate geometry normal to the ellipsoid

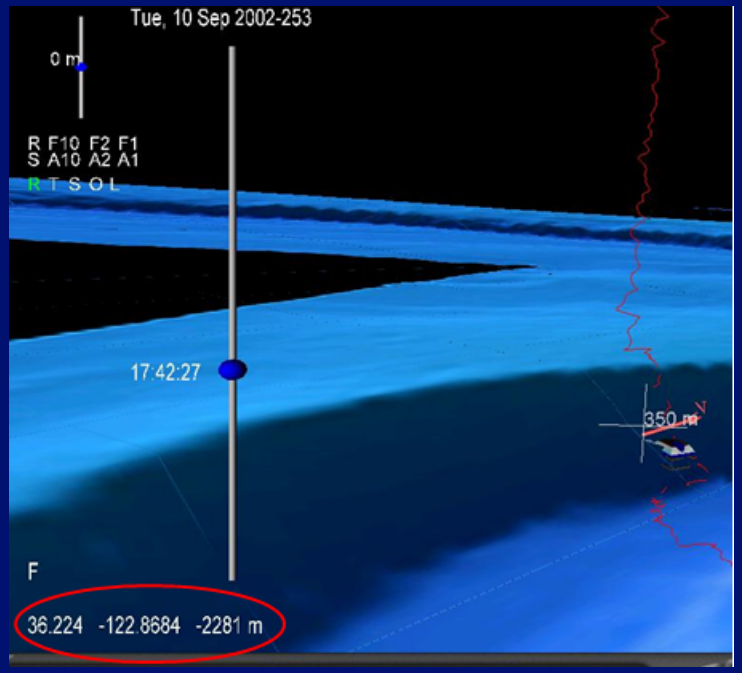
- Use like VRML97 Transform
- Lets us see dive data that may be obscured by terrain model
- Example in GeoVRML 1.1 installer



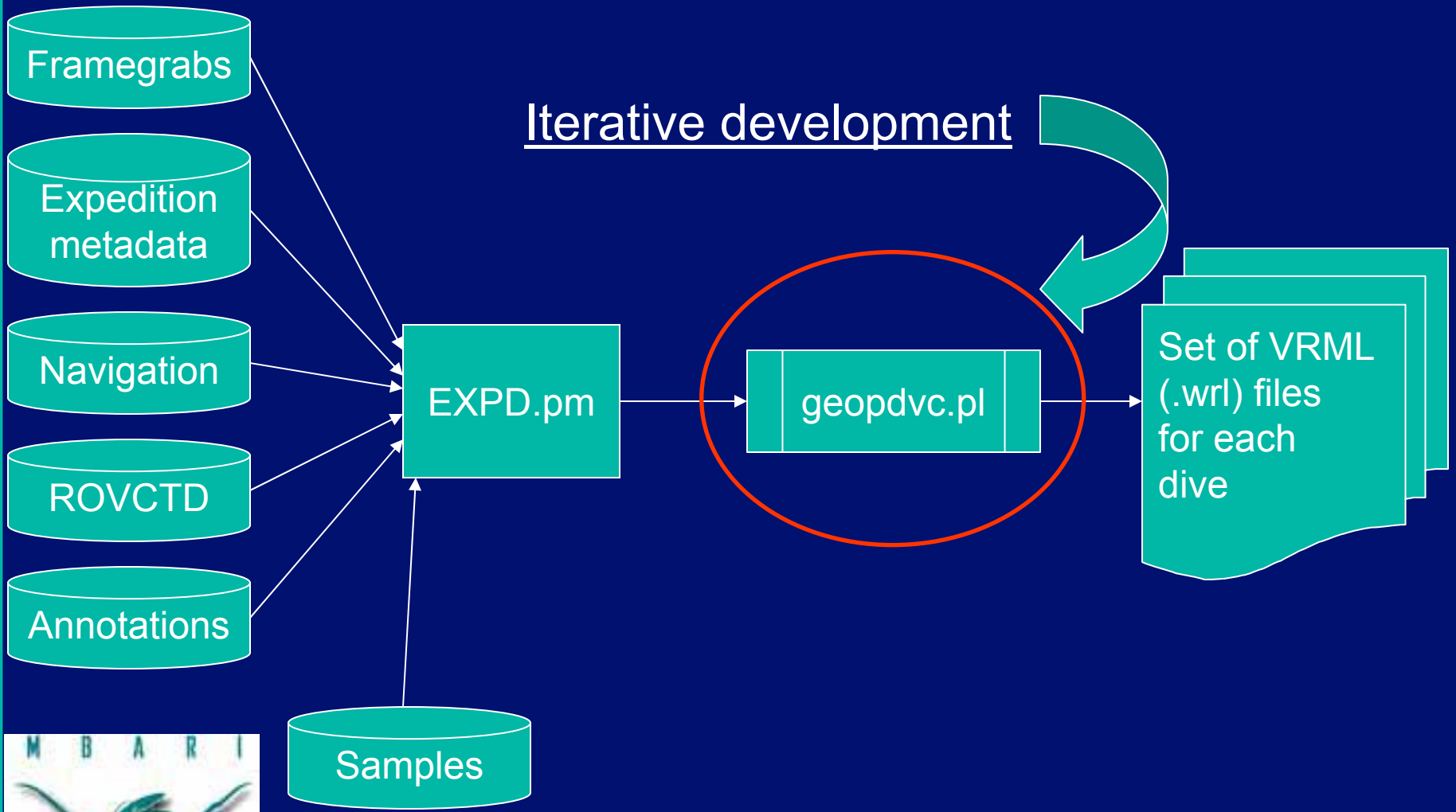
GeoProximitySensor node

Needed in 3D Replay to give user feedback on geographic position of viewpoint

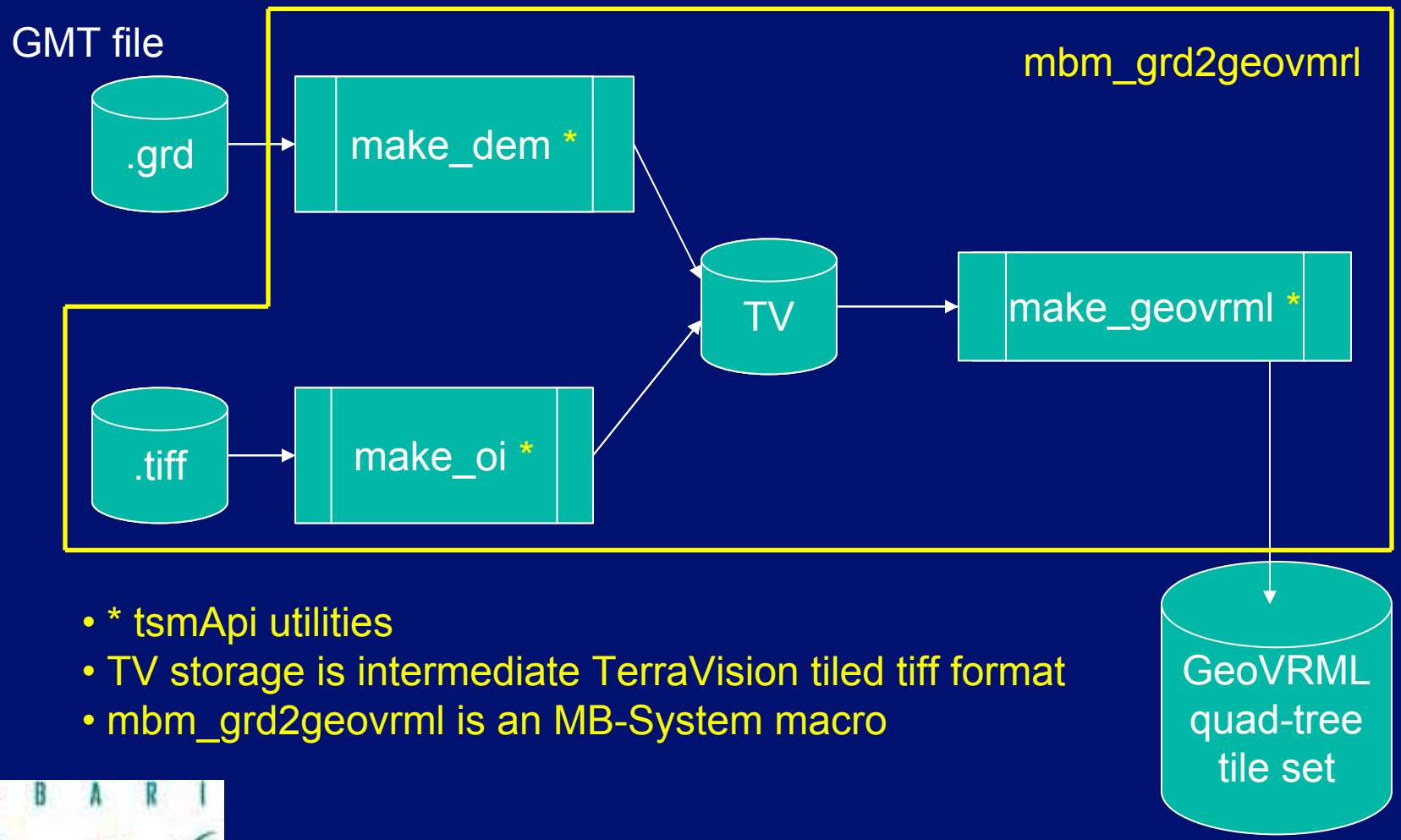
- Use like VRML97 ProximitySensor
- Position displayed in HUD
- Example in GeoVRML 1.1 installer



ROV Dive Data Flow



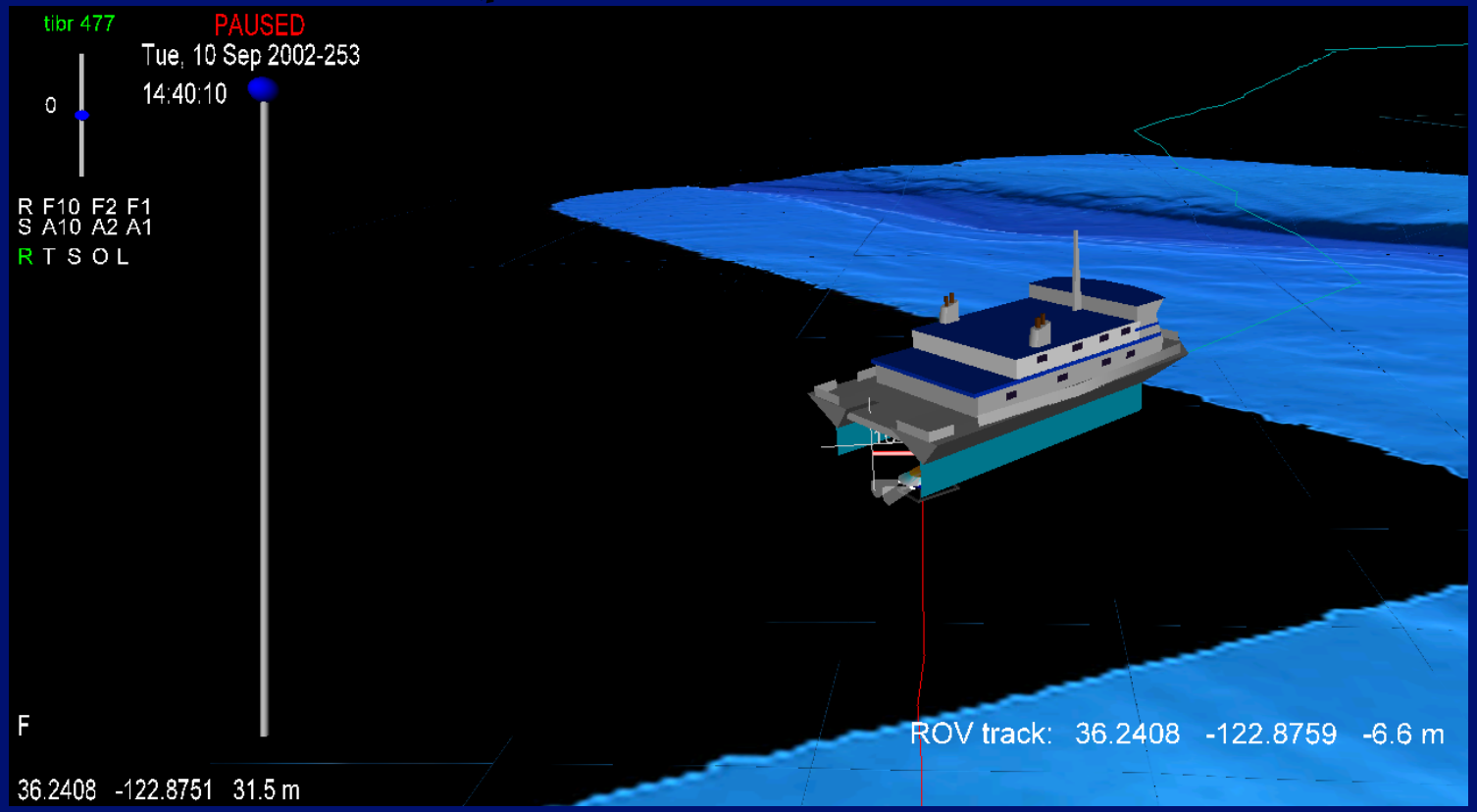
Terrain Data Flow



- * tsmApi utilities
- TV storage is intermediate TerraVision tiled tiff format
- mbm_grd2geovrml is an MB-System macro

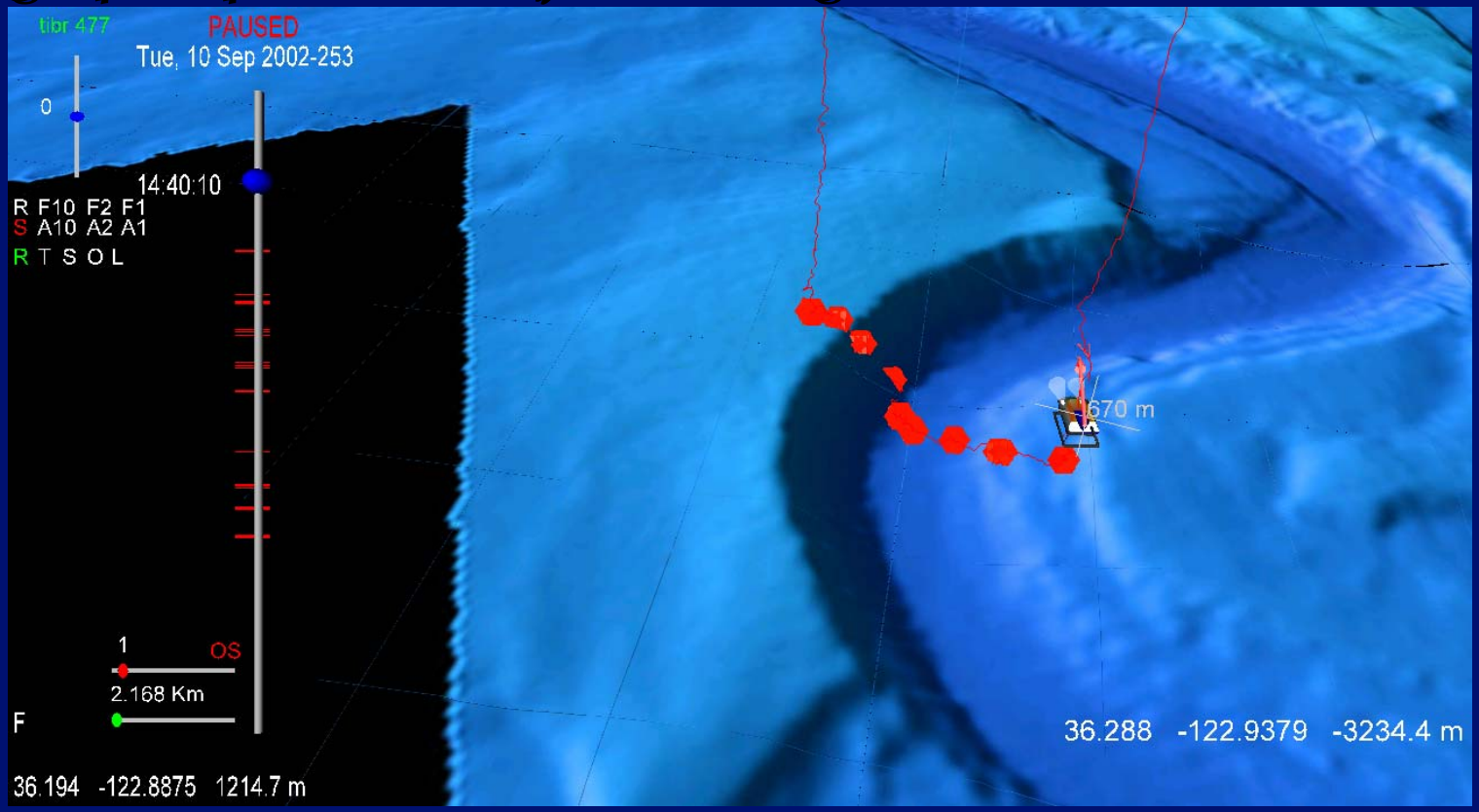
GeoPowerDivePlayback node

HUD controls to Interpolator and Load Controls

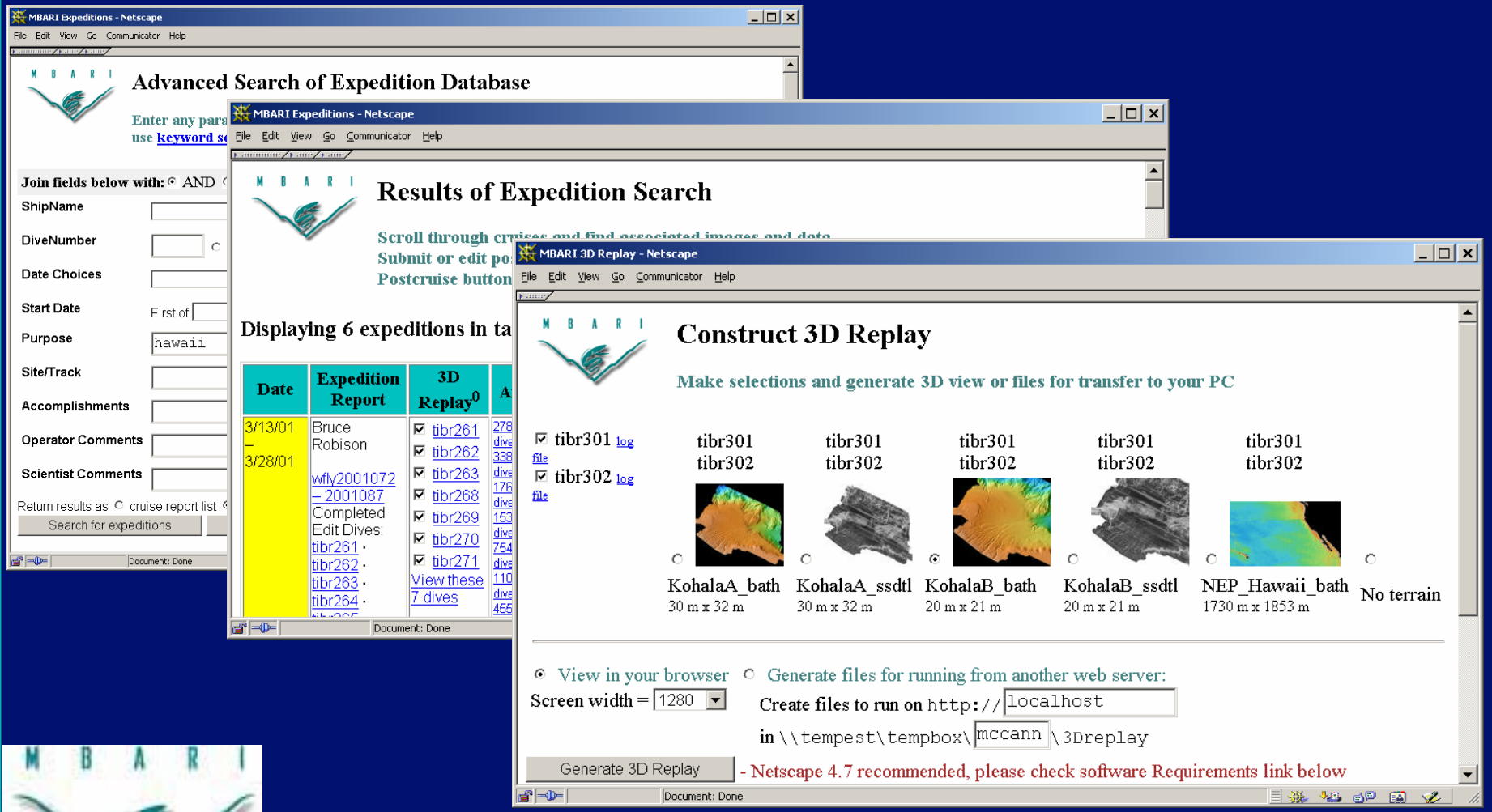


GeoIconImage node

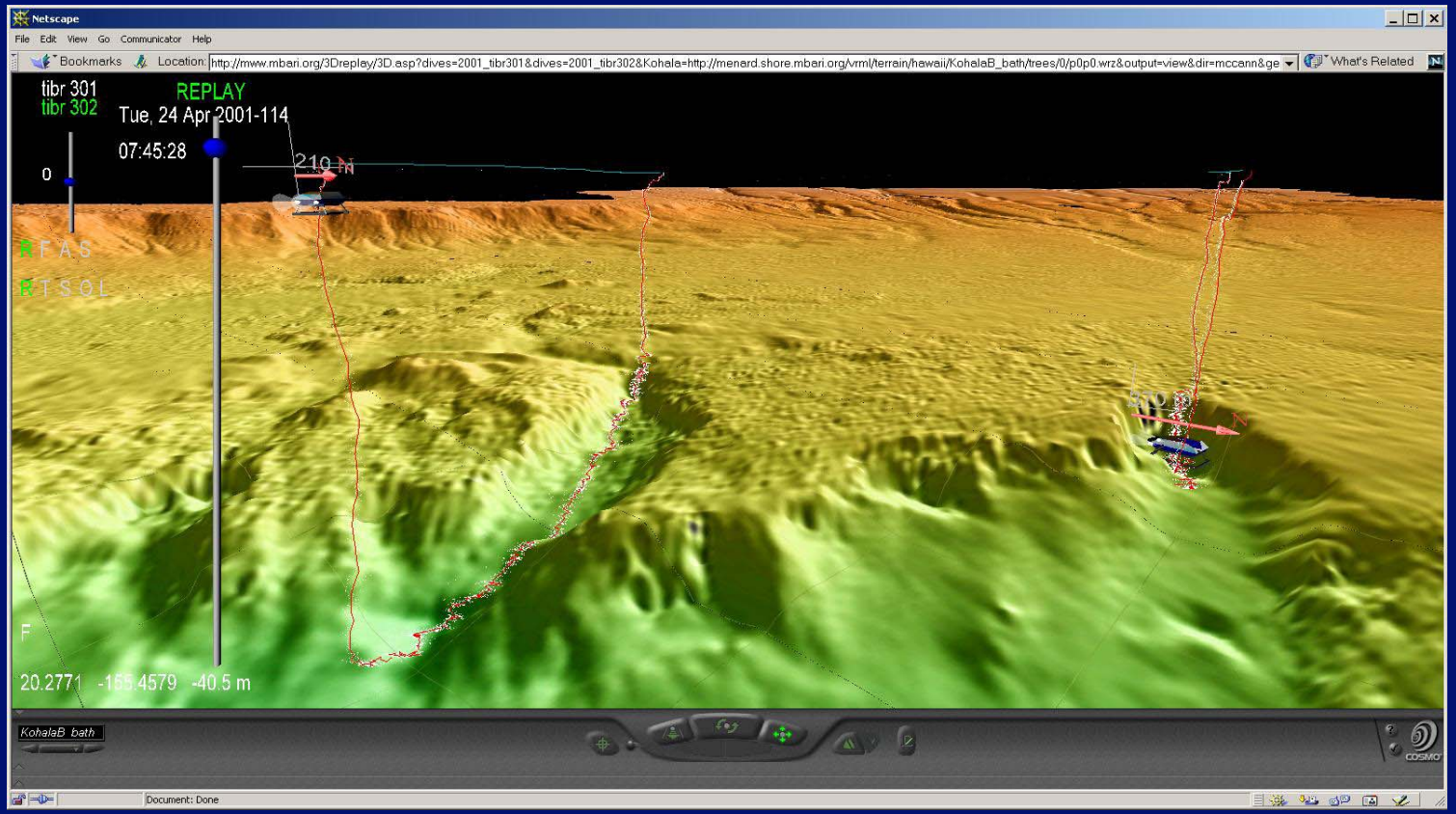
Geographic placement of icon/image



ExpeditionDatabase query



3D Replay Data Visualization



Evaluation

System has been in production for 18 months

- Over 200 uses
- 3D navigation is difficult for novice users
- Excitement at MBARI following a project update
  - *deployed on R/V* Western Flyer
  - *mixed results for operational use*
- Users suggestions for improvement
  - *A video inset window*
  - *retuning of terrain tiling to take advantage of faster GPUs*

Conclusion

GeoVRML solves real problems

- GeoTransform and GeoProximitySensor should be added to the spec
- 3D navigation on the desktop needs attention
- Look forward to results from the GeoSpatial working group