

DATE: February 12, 2002

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SUBJECT: NAVCIITI Quarterly Report 23

RE: - Project 2.0 Visualization HCI and Collaboration
- Task 2.1: Command and Control Visualization

SOW 2.1a.2: Demonstrate Virtual TALOSS software, February 03

Background: Our objective is to provide a distributed collaborative network of graphical and device independent tools in a shared virtual environment, which can be used by Command and Control (C&C) personnel to gain a strategic advantage. Specifically we focus on the mission critical C&C interpretation of acoustic undersea data from towed arrays for the Naval Undersea Weapons Center (NUWC) using the CONRAY simulation models. These simulation models can be extended to "real-time" data acquisition systems. Under the direction of personnel from NUWC and the Naval Research Laboratory (NRL) we have identified a working prototype which we have successfully incorporated into our Device Independent Virtual Environment Re-configurable-Scalable-Extensible (DIVERSE) tool that works in stereo in the (C)AVE Automated Virtual Environment (CAVE), Immersive Work Bench (IWB), Immersive Desk (I-Desk), desktop workstation simulator, and Head Mounted Display (HMD) systems at the Virginia Tech Center for Virtual Environments and Visualization (CVEV). This effort has evolved and become part of the 3D Visualization Project called TALOSS, which was originally called SubVE.

Discoveries, Accomplishments, and Test Results as they relate to NAVCIITI SOW 2.1a.2

During this period the work has been concentrated on two areas:

1. Dynamic coloring of 3D icons and tracks
2. Compatibility between DGL (Diverse GL), Inventor and TALOSS

1. Our NUWC contact asked for all 3D icons to be dynamically changed as more data about the type of contact arrives, plus coloring the icon following the standard armed forced coloring for threat level: red for hostile, blue for friend, and yellow for neutral. We adapted the code to keep a list of 3D icons and their associated vehicle type, and to change the icon when the available information indicates to do so. We also wrote the code necessary to change a 3D object to a single color, without affecting the brightness levels. In this way a US torpedo, with a green body and a dark grey head, is be colored blue, but the torpedo head is colored in a tone of blue that corresponds to the luminance level of the original color for the head. We can do this dynamically across all color components (diffuse, reflective, and emissive) and the results are quite satisfying visually. Doing dynamically simplifies the usage of 3D icons, because there is no need to write and test one version of the icon for each coloring needed.

2. NUWC is also very interested in running TALOSS in stereo mode, both in a monitor and in the stereo 3D wall they possess. TALOSS is the first application that will use DGL, and it stresses DGL because it also uses a standard GUI that limits the screen space, and a scene graph (Inventor) that limits the freedom of DGL to assume it has complete control. TALOSS is now working as a

testbed for needed modifications to DGL, and work to complete the use of DGL in TALOSS is currently under way.

Plans for Next Quarter: 2.1a.3: Complete DGL in TALOSS: Final Report.

What's next: finish it up

Three figures demonstrate the final TALOSS interface:

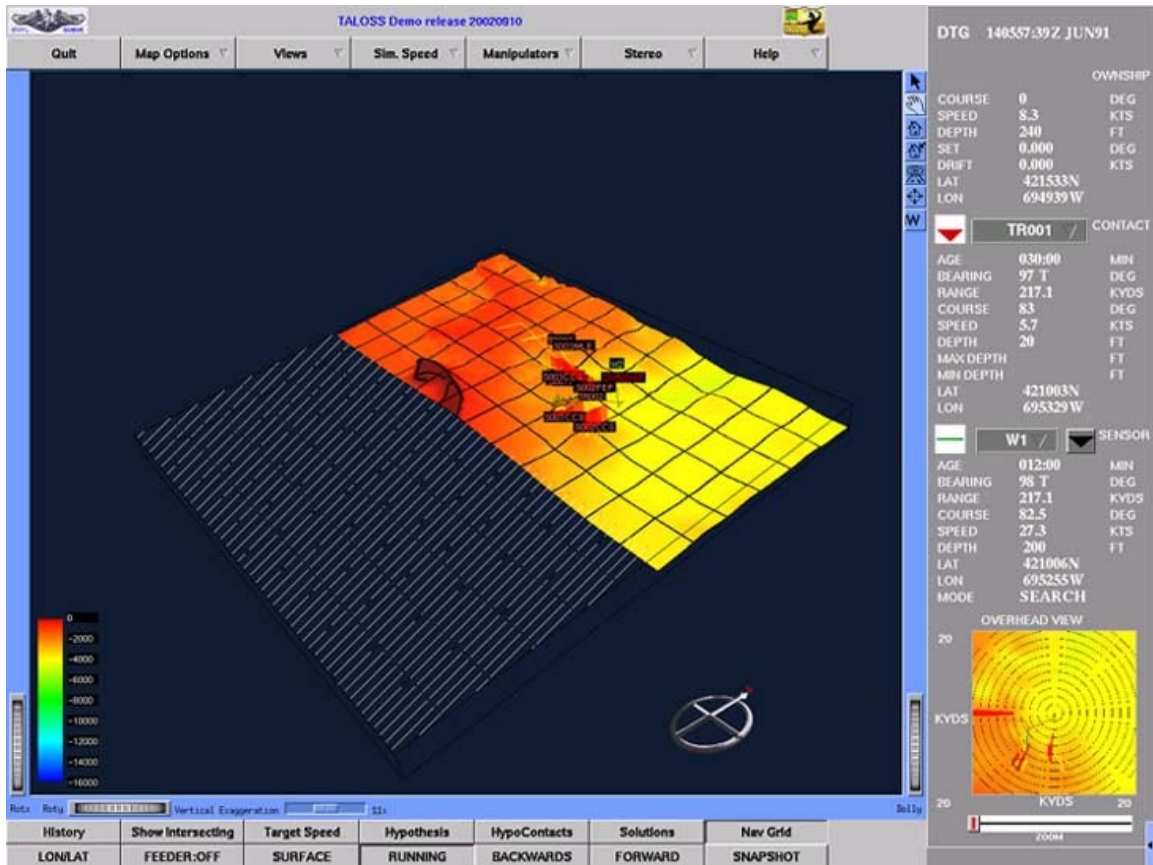


Figure 1. General view, showing coordinate grid. The area marked with the line pattern is an area for which there is no bathymetry available. 3D icons for contact are now colored according to threat level (friendly, hostile, unknown) and that color changes dynamically as the threat level changes.

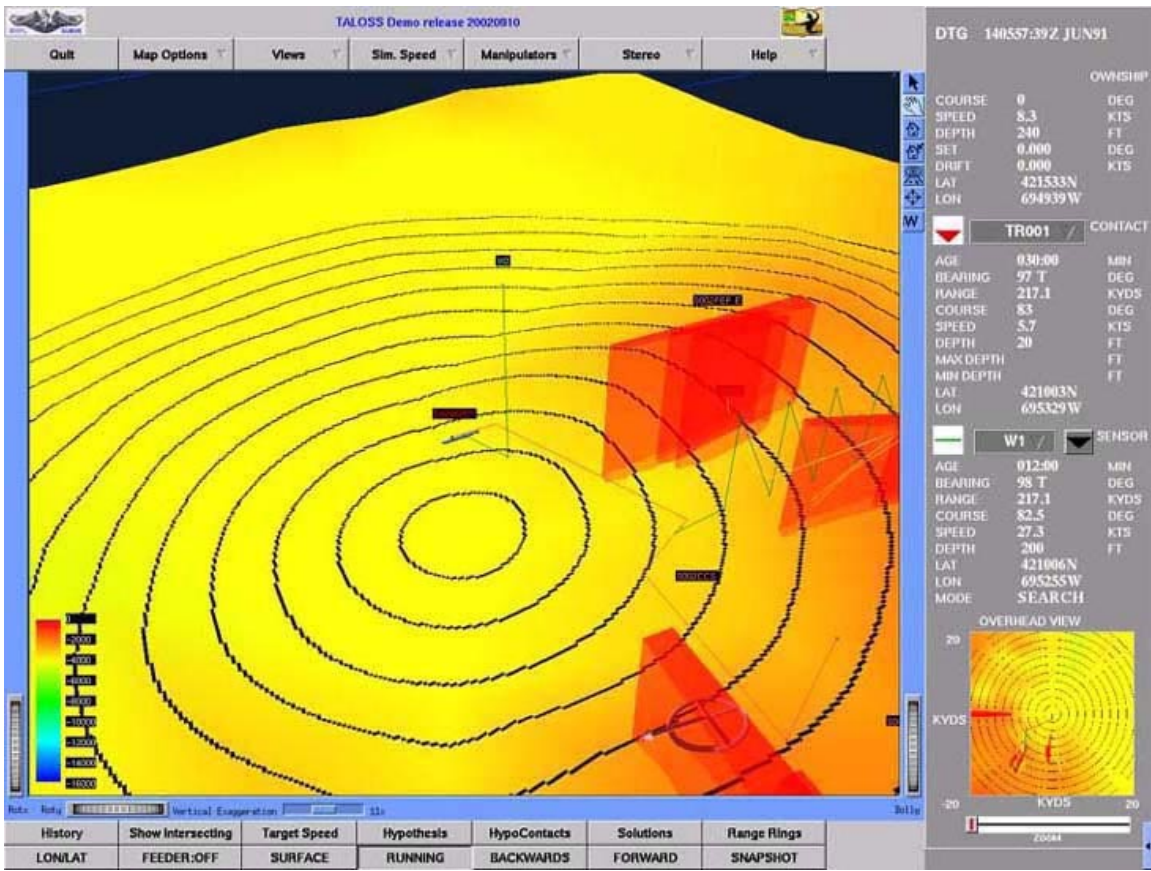


Figure 2. A close up view of Fig. 1 showing range rings from own ship.

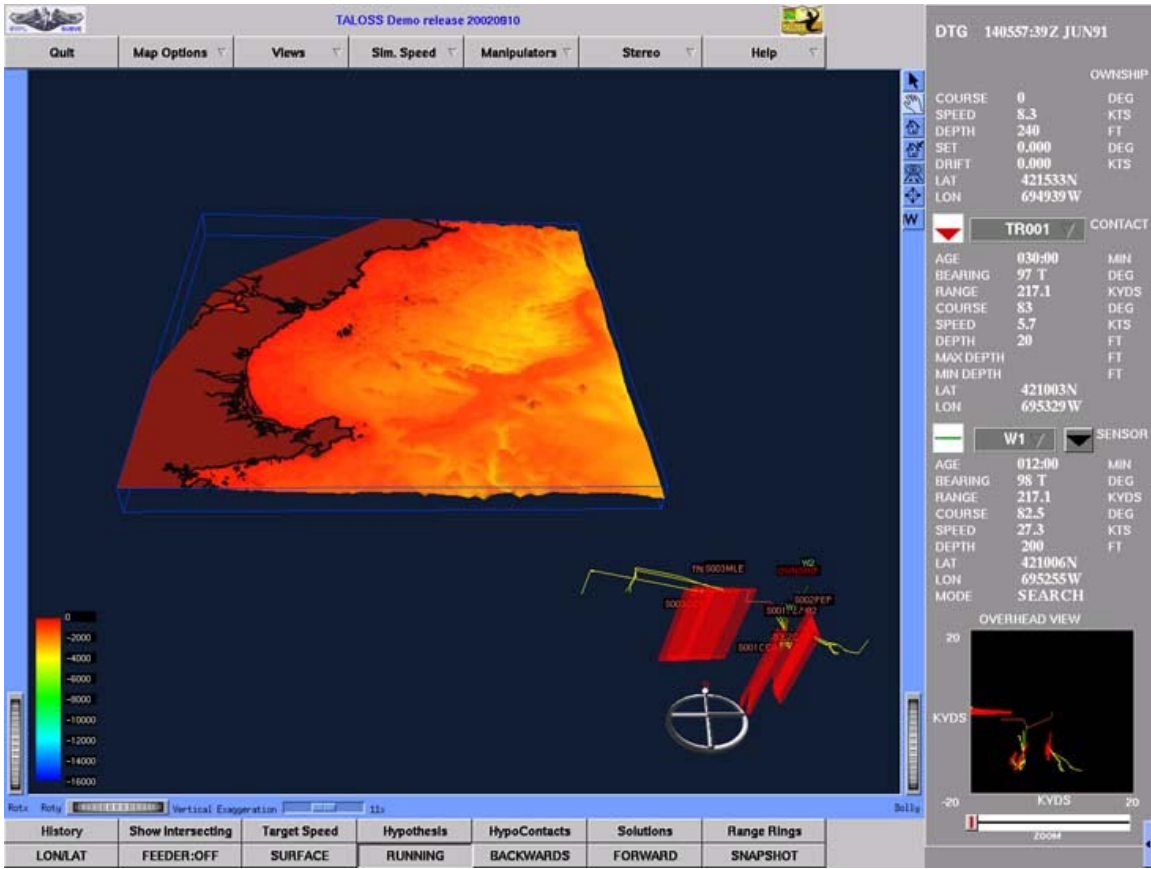


Figure 3. Shows that it is possible to “slide” the visible area across the bathymetry, and all contact will be shown in the correct relative position