DATE: May 17, 2002

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TO: A. Habayeb

CC: Lance Arsenault, John Kelso, Fernando das Neves, and Chris Logie

SUBJECT: NAVCIITI Quarterly Report 19

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

SOW 2.1a. 8: Evaluate and modify NUWC CONRAY mod:, ***May 02***

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 Reconfigurable-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.

Activities redefined: On February 5, 2001 NUWC, NRL and VT agreed to coordinate efforts in a task break down which was described in the previous quarterly report #16. This effort has now evolved into the 3D Visualization project called SUBV. The SUBV Team is NUWC: K. Lima, R. Shell, S. Aguiar, Todd Drury, NRL: L. Rosenblum, D. Maxwell, VT: F. das Neves, C. Logie, L. Arsenault, J. Kelso. The “core” SUBV Team members (Shell, Maxwell, Kelso, das Neves, Logie) has met every two months at NRL, NUWC, or VT campus and participated in conference phone calls every two weeks.

Discoveries, Accomplishments, and Test Results as they relate to NAVCIITI SOW 2.1a.8

- SubVE now takes data in an ICE-compatible format. ICE is a software library developed at NUWC that can read sensors data and feed it to sensor data consumers, like SuBVE. This will facilitate testing and deployment in a real scenario, and allows to use data from the navy's current system.

- SubVE can now deal with multiple contacts of multiple types, and show different visual information depending on the contact type (weapons, unidentified contacts, ships etc) and the type of contact information (either a precise position or bounded by an area of uncertainty).

- Time can be rolled back for better analysis, and advance/step back one step at a time. When needed, it is possible to immediately jump to the current tactical situation.

- TALOSS can now export a 3D snapshot of the current situation, that can be stored and viewed independently.

- Modification to allow dynamic change of vertical exaggeration and own-ship or map-centered visualization are in place.

Many UI issues resolved:

- Render area and bezel now are fully integrated. Changing the selection in one will update the representation in the other.

- The trace of all objects on screen is now visible as a line, instead of just discrete markers. This improved the understanding of complex scenes with many contacts.
- All objects on screen are now labeled with the contact name.

Plans for Next Quarter:
2.1a.9*: Create interfaces (DSOs) for HMDs, IWBs, and desktop flat panel displays, across heterogeneous operating systems: IRIX, Linux, HP-UX, Windows,* ***August 02***

What's next:
- Handle continuous terrain, instead of just one fixed area. The system will be able to slide through vast areas of the ocean and coastal areas, with a zoom level selected by the user.
- More improvement in usability of SubVE in the areas of scene tactical display, and user interaction with the scene.
- Integrating SubVE with Diverse DGL for projection inmersive displays. This item was originally scheduled for Feb 2002. There was a mutual agreement with NUWC that improvement in data compatibility with current systems, user interaction and map visualization had to take priority over expanding SubVE to work in virtual environments. Nevertherless, steady progress has been made in Diverse DGL, and work is being performed to wrap Open Inventor (the scene graph used in this project) to allow it to work with DGL in a multi processor machine (an Open Inventor limitation) As the map task is finished, we will advance on the expansion of SubVE to work with VEs. As a proof of this, a performed-based prototype of SubVE working with DIVERSE is currently available at NUWC, working in their 3D wall visualization system..

NUWC will coordinate NUWC and NRL efforts and interact with VT as required. VT will maintain regular communications with NUWC regarding the development of the SUBV interface

Outstanding Issues: none, we are on schedule

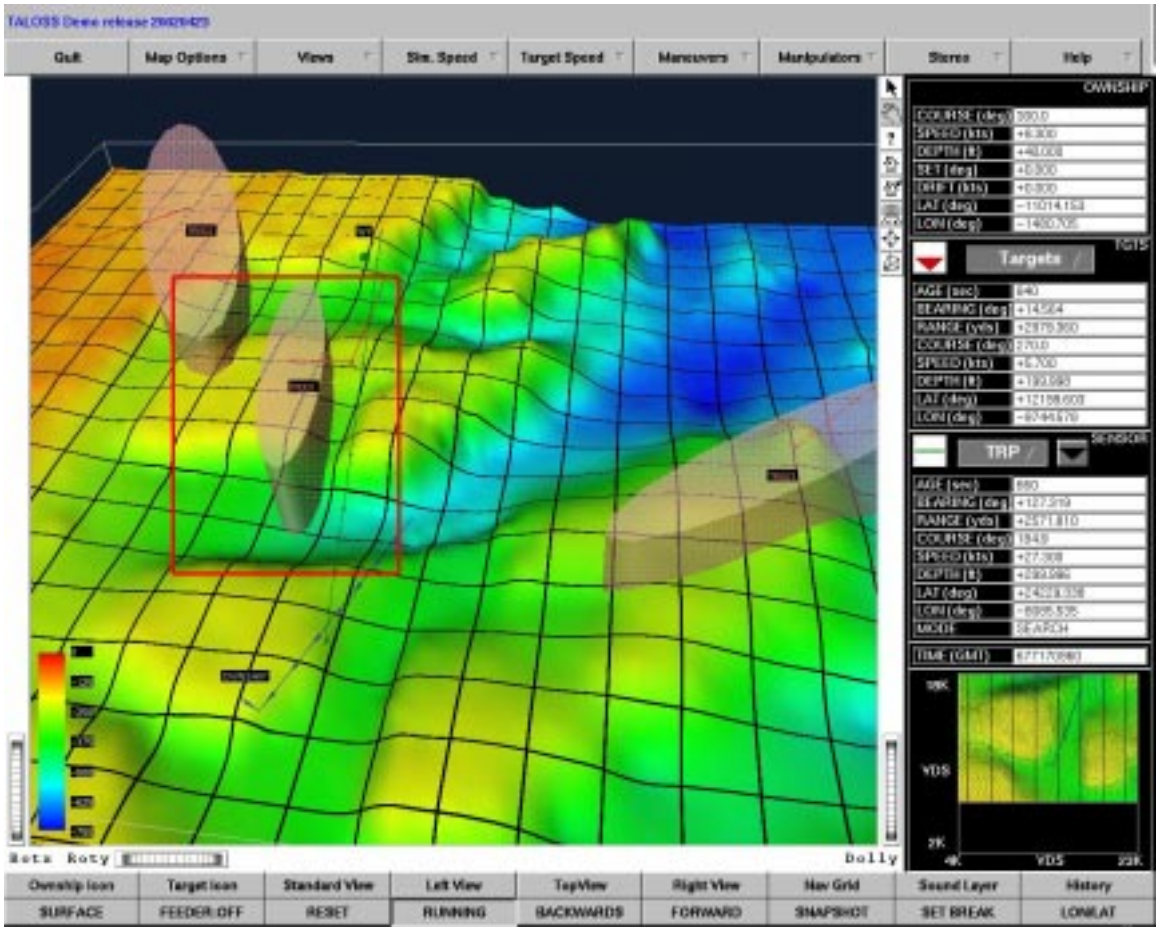

Figure 1. NRL, NUWC, and VT -- SUBV Interface, May 17, 2002
