DATE: August 8, 2003

FROM: Ronald D. Kriz

TO: A. Habayeb

CC: Fernando das Neves and Andrew Ray

SUBJECT: NAVCIITI Quarterly Report 25

RE: - Project 2.0 Common Tactical Environment (CTE), and Visualization
- Task 2.1: Command and Control Visualization: Implementation of DGL version of DIVERSE API for development of TALOSS

SOW 2.1.1**: Implement DGL into TALOSS: conversion strategy formulated,* ***May 03
SOW 2.1.2**: Implement DGL into TALOSS: conversion operates in multiple VR environments,* ***July 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.

Accomplishments:

The past quarter has been productive for the DIVERSE API. DIVERSE has been redesigned to have a portable architecture that eases application development, provides portability to different platforms, and adds support for several different open source graphical toolkits. A new website has been developed, along with more documentation to help show users how to most effectively use DIVERSE. As a result DIVERSE is more accessible to the end user and provides several different options for them. Before, DIVERSE only supported graphics using the proprietary OpenGL Performer package from SGI. Now DIVERSE supports several open source graphics packages along with pure OpenGL support. The open source packages we currently have support for are Open Scene Graph and Coin. These two packages support common graphics operations, OpenInventor and VRML 2.0. Since users have so many choices now new documentation had to be created. It was decided that a website would be the best way to disseminate this information to the outside world. The new website (http://diverse.sourceforge.net) provides DIVERSE an outlet to the world. On the website there is more documentation for the end user that will help in both out of the box use along with application development. There are several tutorials that go along with the documentation so that developers and users can actually see working examples to aid with the use of DIVERSE.

Because of the new DIVERSE architecture Windows and Mac OS X support are now possible. There are a couple of prerequisites that are required for DIVERSE on these platforms, but this prevents re-inventing the wheel.

Our work concentrated on synchronizing DIVERSE and TALOSS. The DIVERSE API works as a software platform to allow device-independence and TALOSS works as a real-life application testing the DIVERSE API. Since DIVERSE design changed by the end of May 2003, we worked on two parallel versions, one working on the 'old' DIVERSE API, while a new one was being adapted to the new DIVERSE API. TALOSS running on the old DIVERSE API was ready to run by the ONR review in July 2003. The version of TALOSS running on the new DIVERSE API is still not complete, mostly due to the programmer in charge needing to get acquainted with the changes of the completely redesigned API. It is however expected to be running by the end of August 2003. Since Open Inventor (the scene graph used in TALOSS) has not multiprocessor capabilities, we have hit a limit on the usability of TALOSS from an interaction point of view, when running in a VR display like a CAVE. We expect to move to COIN, a scene graph that is source-compatible with Inventor, but unlike Inventor it has multi-CPU capabilities, allowing to allocate separate CPUs for rendering and sonar input processing.

Importance of the task to the Navy:

What this means for navy researchers using DIVERSE is that DIVERSE is much more accessible and allows the Navy more choices when developing their applications. It also reduces the workload for developers. One example is that a program used by another NAVCITTI researcher written with the new version of DIVERSE reduced the total size of the program by one third of its original size. This is a clear reduction of time and effort to implement the same program.

This has been a productive quarter for DIVERSE and many new opportunities are on the horizon. With support for Windows and Mac OS X many more systems can take advantage of DIVERSE. The new graphics packages that DIVERSE supports will allow many new development options and will reduce the cost to the navy dramatically. The new website allows for quick access to information about DIVERSE.

Activities during the quarter: publications, conferences, demonstrations, visitors:

In preparation for SOW 2.1.3, the DIVERSE API and TALOSS programming team visited NUWC Monday August 4, 2003. The team installed the current DIVERSE 3.0 (DGL) on the NUWC Simulation Based Design (SBD) Wall.

Planes for next quarter:

SOW 2.1.3: Implement DGL into TALOSS: convert software to operate on Linux & SGI.

Issues if any:

Fernando das Neves will be leaving our group September 15, 2003. Before he leaves he will complete SOW 2.1.3 and have TALOSS running in the ‘new’ version of DIVERSE running on a single wall in the Virginia Tech CAVE and the Wall at NUWC. We are currently looking to replace Fernando to complete the SOWs related to future TALOSS development in DGL and found several qualified candidates.