

Task 2.1 Command and Control Visualization: Implementation of DGL version of DIVERSE API for development of TALOSS  
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***SOW2.1.6:** Demonstrate netted/distributed 3D Visualization on Wall/CAVE, November 03*

***SOW2.1.7:** Adapt modified TALOSS to 3D models of SBD Designs: scalable/kinematic, February 04*

## **2.0 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:

*TALOSS:* The TALOSS project has ceased the active development phase here at Virginia Tech and has entered the support and deployment phase due to the lifetime of the NAVCITTI grant. We are now fully supporting NUWC with installation and usage of the TALOSS system on a day to day basis. The personnel at NUWC are currently using TALOSS powered by desktop Linux systems along with their existing SGI hardware.

Interest has been expressed over the usage of TALOSS for training. There are multiple different angles as to which this could be approached. All of them are not feasible in the time frame of the NAVCITTI grant though. However, there are possible opportunities to continue the project depending on funding specifically for developing training support for submarines. If this opportunity does present itself the development of TALOSS will continue otherwise future development will continue solely at NUWC.

*DIVERSE API:* The past quarter has been extremely productive for the DIVERSE API. After the analysis mentioned in the last quarterly report it was determined that it would be best to develop additional support for the existing API versus developing a brand new one.

Due to this analysis initial support for raw OpenGL should be possible by the end of the NAVCITTI grant lifetime. This will enable task 2.1a to leverage more of the DIVERSE API's power. Also, this will allow the usage of many popular VR content toolkits that are currently available. For the navy this will mean that they will have many choices as to how it wants to display content in a virtual environment.

Initial support for using DIVERSE on commodity hardware to replace monolithic SGI hardware has been investigated. The solution has produced initial satisfactory results and given more time and funding it will be possible to develop a complete replacement that runs on commodity hardware.

## 5.0 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. 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:

N/A

### **Plans for next quarter:**

*2.1.7: SBD demonstration of moving towed array, **March 04***

*2.1.7: Final report, **April 04***

*2.1.7: Documentation of Enhanced TALOSS software, **April 04***

*2.1.7: Documentation to netted/distributed software upgrade to DTK, **April 04***

### **Issues if any:**

None