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Provide Support And Assistance Task 3.1.2.1.: Year 1 Report

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Provide Support and Assistance Task 3.1.2.1 Year 1 Report

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Provide Support and Assistance Task 3.1.2.1 Year 1 Report

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Prepared For:
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1 Introduction

This report describes the efforts undertaken by the Institute For Simulation and Training's (IST's) Distributed Interactive Simulation (DIS) Testbed team to assist organizations in the implementation of DIS.

1.1 Purpose of Document

This report is a deliverable item, CDRL A005, under subtask 3.1.2.1, "Provide Support and Assistance," for the U.S. Army Simulation, Training, and Instrumentation Command (STRICOM) contract #N61339-94-C-0024, entitled "TRIDIS: Testbed For Research In Distributed Interactive Simulation."

1.2 List of Acronyms

CGF - Computer Generated Forces

DIS - Distributed Interactive Simulation

ECP - Extended Cost Proposal

I/ITSEC - Interservice/Industry Training Systems and Education Conference

IST - Institute For Simulation And Training

JITC - Joint Interoperability Test Center

NAWC TSD - Naval Air Warfare Center - Training Systems Division

PDU - Protocol Data Unit

PEGASUS - Programmable Environment: Ground, Air, Sea, Universal Simulator

PVD - Plan View Display

STRICOM - U.S. Army Simulation, Training, and Instrumentation Command

TRAC - TRADOC Analysis Center

TRIDIS - Testbed For Research In Distributed Interactive Simulation

TWSTIAC - Tactical Warfare Simulation and Technology Information Analysis Center

1.3 Background

The Testbed was established as an environment where organizations could connect their DIS systems, either remotely or directly in-house, to a variety of working DIS simulations and support applications. Prior to the establishment of the Testbed, DIS developers had few tools and methods to help them with development and debugging of their applications.

The initial need for this environment evolved from the lessons learned from the first DIS demonstration at the 1992 Interservice/Industry Training Systems and Education Conference (I/ITSEC). Under STRICOM contract N61339-91-C-0103, "Investigation of OSI Protocols For DIS," IST was responsible for coordinating this first demonstration and working with the participants to ensure consistent implementations so that interoperability between the simulations would result. IST drafted the first Test Procedures, modified a DIS Data Logger to allow for analyzing the network traffic, and assisted the organizations with debugging their applications. The end result, after many hours of testing and debugging, was the first DIS demonstration.

After this first demonstration, IST continued to research the creation of testing and development

tools to assist DIS developers. The IST Computer Generated Forces (CGF) simulator was enhanced to produce non-realistic behavior of DIS entities. The Data Logger and Playback utilities were refined and updated to match the latest version of the emerging DIS Protocol Data Unit (PDU) draft standard. To address the difficulty of analyzing the network traffic, a new tool, the Scanner, was created. The Scanner takes a logged file as input and allows the user to traverse the file, forward and backward, and view the contents of a PDU, whose data is converted to decimal, hexadecimal, and text strings when recognized. The Scanner allowed the user to quickly find problems with DIS PDUs.

All of these tools were PC based. This set of tools was used to support the 1993 I/ITSEC DIS demonstration and were available free to government approved requesters. IST was again responsible for coordinating and organizing the demonstration and provided testing of participants to ensure interoperability. Testing was done with the above set of tools.

After I/ITSEC '93, IST saw the need to enhance the test tools for easier use and more automation. In order to better assist DIS developers with system development, IST also recommended the concept of a Testbed where a DIS system could be connected to every possible type of DIS device and network traffic to totally bullet-proof the application. These new requirements were reflected in several tasks on the TRIDIS proposal to enhance the test tools and to increase the capabilities of the Testbed. With this environment, IST could provide support and assistance to all DIS users for either application development and debugging, compliance testing to the various DIS standards, and assisting with exercise planning and execution.

2 Description of Task

This task was defined as a flexible level-of-effort to provide support and assistance as requested and approved to DIS developers and exercise planners. This included using IST expertise, the Testbed facilities, and the Testbed tools. This task (and this report) did not address support provided during testing for the 1994/1995 I/ITSEC DIS demonstrations.

2.1 Goal

The goal of this subtask, as outlined in the TRIDIS Annual Workplan Report V1.1, subtask section 3.1.2.1 "Provide Support and Assistance," was to utilize TRIDIS personnel, equipment, software, procedures, and capabilities to support organizations and projects requiring testing or assistance in developing or validating DIS systems and components.

2.2 Approach

To accomplish this task, IST would accept the request for assistance and either act immediately or, if the request was felt to be outside of the scope of what IST could address, the request was forwarded to STRICOM for approval. Upon approval, IST would provide the requested assistance.

3 Use of the TESTBED for Support and Assistance

3.1 On-Site Testing

On-site testing involved TRIDIS staff traveling to the site of the requesting organization and either doing the testing or assisting requesting personnel to do testing.

3.2 In-House Testing

In-house testing is defined as testing done at IST where an organization would bring their system to IST and connect directly to the Testbed facilities. It was not always cost effective to do in-house testing because of the cost of transporting equipment and personnel.

3.3 DIS Certification Training

There was a need to train individuals in the science/art of compliance testing. Classes were offered by TRIDIS personnel to STRICOM, Naval Air Warfare Center -Training Systems Division (NAWC-TSD), Joint Interoperability Test Center (JITC), TRADOC Analysis Center (TRAC) and non-TRIDIS IST personnel from other DoD sponsored tasks.

3.4 Support via Telephone and Electronic Mail

A major part of the support provided by the TRIDIS project was accomplished through electronic mail and telephone conversations. Each month during the reporting period e-mail messages and phone calls were received by the TRIDIS staff. Inquiries mostly concerned where the individuals could get DIS compliance tested. If the calls or messages were not concerned with the 1994 IITSEC demonstration, they were referred to STRICOM.

Any calls requesting information about the IST DIS test tools were referred to the Tactical Warfare Simulation and Technology Information Analysis Center (TWSTIAC, shortened to IAC) and if the problem was too difficult, IAC staff would come back to TRIDIS for an explanation. The TRIDIS staff answered a variety of questions from individuals requesting information on use of the IST DIS test tools. If TRIDIS couldn't answer the questions, the person was referred to someone who could. Telephone assistance was provided for organizations which were setting up the DIS test tools. Most questions related to DIS connections to the network driver and how much memory was required to conduct testing.

Assistance was also provided for specific help through e-mail. For instance, a detailed discussion concerning the format for generation of logistics PDUs, simulation management PDUs and correct enumerations were carried out through e-mail discussions between TRIDIS personnel and other organizations.

4 Software and Hardware Support

4.1 Software Support Provided

The goal for this task was to utilize software to support projects in developing DIS simulation systems and components. Below are descriptions of support provided by TRIDIS in this area.

1. Curtis Lisle of IST's Visual System Lab requested a 15 minute "scenario" with entities and detonations for their Dynamic Terrain project, to be extracted from the IDEMO 93 data. Sandra Cheung generated the data using the data analysis software. The following week Sandra had to decline another request from Curt because Sandra was overloaded.
2. Shawn Hart produced a two-minute scenario of DIS Dismounted Infantry PDUs for Doug Reece, Principal Investigator of the NAWC-TSD sponsored TTES project.
3. The test tools (CGF, Logger, and Scanner) were provided to Mark McAuliffe in support of testing for the STOW-E. A copy of the Scanner was also provided to the DIS Standards project.
4. JITC continued to utilize the IST test tools (PC version of the IST CGF and the X-Windows based Scanner Management System) to conduct DIS compliance testing and requested assistance for installation and running of the tools.
5. The IST CGF Simulation Management implementation code was provided to John O'Keefe of the US Army Natick RD&E Center as requested after the 12th DIS Standards Workshop. TRIDIS also supplied the code that had been used to build a terrain database of the IST building and vicinity, which was developed under the Live Device task.
6. Darren Humphrey assisted Steve Lewis and Derrick Franchesini in debugging DIS radios which run on Motorola hardware. This work was an ECP to the DIS Standards Project.
7. The TRIDIS Test Tools were given to the TWSTIAC for distribution. TRIDIS staff provided support and assistance to anyone using the tools by answering questions asked by TWSTIAC staff or the originator of the question. TRIDIS provided updates of the software to the TWSTIAC as it was released.

4.2 Hardware Support Provided

TRIDIS supported various projects with hardware issues during this reporting period:

1. TRIDIS loaned the Technology Systems Inc monitor to the Visual Systems Laboratory of IST for three days.
2. TRIDIS time was spent explaining IST CGF Hardware requirements to BTE government systems.
3. TRIDIS loaned a Motorola system to be used for development of the DIS radio that was an ECP to the DIS Standards project.

5 Support for Various Demonstrations

The TRIDIS project supported various demonstrations during this reporting period including ITEC, a SINCGARS Radio demonstration, a DIS demonstration at the University of Central Florida Engineering Expo and a demo of TRIDIS's PEGASUS (Programmable Environment: Ground, Air, Sea, Universal Simulator) for the FOX television network. More detailed information is provided in the following paragraphs.

5.1 ITEC

The Testbed was directed by STRICOM to provide testing support for the ITEC DIS demonstration to be held in the Hague in late April of 1994. Before he transferred to the team, Bill Andrews had been "borrowed" from another project at IST in order to support the Dutch organization TNO in organizing the Demo. Bill was tasked to assist the Dutch in compliance testing in the week before the conference. To prepare for this, he attended a DIS Compliance Testing class given by Sandra Cheung.

During the week of April 11, Bill provided DIS support at the TNO site in the Netherlands under the TRIDIS contract tasks 3.1.2.1 and 3.1.2.3. This support included the use of DIS testbed software tools rev 6.700. Under agreements made with the TRIDIS COTR, no software source code was taken to the site and terrain database files were not provided. Although a full set of test tools, rev 6.700, was taken to site, no TNO personnel requested copies of these tools or expressed any interest in using any IST products other than the data logger.

Although Bill was able to lend assistance to several entities at the TNO site, he was not able to perform more than the most basic of testing. With the exception of TNO, none of the companies present were prepared for testing as of his departure. This brought Bill to believe that either a low managerial motivation level or poor understanding of the difficulty of DIS related work, existed in that part of the simulation community. Considering the number of participants that withdrew from the demonstration, there was concern with regard to the future of DIS in that sphere. Issues involving the use of IST tools also concerned Bill. The IST CGF was of limited help due to issues involving terrain and coordinate selection. Apparently, political considerations were involved in the selection of base coordinates that were of a contrary nature both to IST tools as well as most the other participants. Bill had no way to verify that TNO testing tools and coordinate processing routines were actually valid, but given the time and level of preparedness of the other players, matching TNO configurations was the only alternative. Database origins, placements and coordinate orientations need to be addressed in DIS committees if these types of problems are to be prevented in the future.

5.2 SINCGAR

Andy Cox worked with Mike Garnsey of STRICOM and Nicholas DiPatri of MITRE to conduct the SINCGARS Radio demonstration that took place 12 October 1994 at IST. A Silicon Graphics Indy belonging to TRIDIS was delivered and configured in the DIS Lab. Software for the SINCGARS model was installed on the Indy, with plans to interact across the DSI with MITRE. Problems with the DSI connection precluded DSI access, but a second radio model was set up within IST to allow the demonstration to proceed with success across the local network.

5.3 UCF Engineering Expo

The IST CGF was used in support of a DIS demonstration conducted at the UCF Engineering Expo on Thursday, 23 February 1994. Motorola and NAWC-TSD conducted a DIS exercise across a wireless ethernet connection between their two sites at the expo. To support the exercise, Andy Cox set up a TRIDIS PC with the current version of the CGF to provide OPFOR entities. The ITSEC 94 Hunter Liggett terrain database was used by all participants. A script file was written to generate ground (5 T72 tanks, moving west to east) and air (3 MIG-29 aircraft flying overhead) targets for the exercise. The scenario was repeated throughout the day. Comments from the Motorola and NAWC-TSD were extremely favorable. Motorola, flying the MITL NASNET Simulator, was able to engage and destroy the CGF entities. NAWC-TSD used their Stealth Display to attach to IST entities and provide different perspectives of the battlefield. Personnel viewing the demonstration were able to visualize the event on the NAWC-TSD Stealth, Plan View Display (PVD), or the IST CGF PVD.

There were no network statistics gathered, nor any logging of data to do any analysis. IST's participation was hastily arranged the evening prior to the expo. Andy set up a PC at Motorola's site, wrote a couple of scripted scenarios to be replayed throughout the day, and picked up the equipment at the end of the expo.

As to the performance of the CGF, Motorola said that it worked very well for the demo, and that students got a thrill out of watching the IST CGF Plan View Display to see someone fly the NASNET F-18 simulator and shoot down CGF targets. NAWC-TSD used their stealth to attach to IST tanks and aircraft and provide a stealth-display of the battlefield. Many people also watched the NAWC-TSD stealth for a better view of the action. There were zero conflicts with respect to interoperability, which is pretty good for four systems thrown together at the last second with no coordination.

5.4 PEGASUS Demonstration

The PEGASUS was demonstrated for a live broadcast on the show *F/X* for the FOX network. Bill Andrews coordinated the demo and Darren Humphrey, Jim Diaz, Ray Giroux and Bill Andrews spent time preparing for it. The scenarios for the *F/X* demo were used for subsequent demonstrations during the week.

6 Conclusions

This report describes in detail some of the support provided to organizations in the development and testing of DIS systems. By using IST expertise gained through subsequent years of support of the I/ITSEC demonstrations and the TRIDIS testbed facilities and tools, IST was able to assist many projects during the period of the first year of the TRIDIS contract. More details on assistance are available in the monthly reports submitted to STRICOM.

