

ALGORITHMS FOR RUN TIME TERRAIN DEFORMATION

STATUS REPORT

SBIR Phase II Contract FA8650-05-C-6537 Topic AF04-064 **May 8, 2006**
Prepared for AFRL/HEAE, Air Force Research Laboratory
Attn: Steve Stephens, 6030 South Kent Street, Mesa, AZ 85212-6061
Tel: (480) 988-6561 ext. 146 e-mail: steve.stephens@mesa.afmc.af.mil

Prepared by Computer Graphics Systems Development Corp.
Attn: Roy Latham, 2483 Old Middlefield Way #140, Mtn. View CA 94043
Tel: 650-903-4922 Fax: 650-967-5252 e-mail: rwl@cgsd.com SkypeID: rlatham001

Project Abstract

The goals of Phase II are to develop and implement algorithms for a real time mission rehearsal simulation which will deform the terrain database to match target data. A correction function $c(x,y)$ that is added to every vertex in view. The correction function must (1) adjust the terrain surface to meet the specified features, (2) appear smooth and continuous so that the adjustments appear natural, and (3) do not distort aspects of the database that must be preserved. The implementation is to be in C++ and compatible with Open Scene Graph. The code will be placed in the public domain in keeping with an open source philosophy.

ALL DATA CONTAINED IN THIS REPORT IS PROPRIETARY TO CGSD CORPORATION AND MAY NOT BE DISCLOSED OUTSIDE OF THE US GOVERNMENT WITHOUT PERMISSION OF CGSD.

• *Previously Completed Work*

The Phase II contract was signed on April 8, 2005 and work started immediately. ▪ A kickoff meeting was held in May '05, and the program plans were reviewed. ▪ Don Burns, one of the originators of Open Scene Graph was added to the project team. ▪ Completed the first draft PDL that links to OSG and deals with database layers and tiles. ▪ The SHAPE file input software was written and debugged. An algorithm to find the shape of the object contact to the terrain was devised and programmed, with the terrain modified abruptly. ▪ The comprehensive algorithm for real time terrain modification was completed and documented. ▪ The correction function and recursive subdivision algorithms have been implemented and demonstrated.

• *Work Accomplished This Reporting Period*

Comments were received on the IMAGE Society paper, the paper was revised and formatted to the conference specifications, submitted, and accepted. A copy of the final paper is included with this report.

Programming continued with more work on the animations used to illustrate the algorithms. These will be show at the IMAGE conference as part of the paper presentation. The development of the code for areal objects was started.

Preparations have been made for recording and transcribing Don Burns lectures this month. The lectures will be edited into documentation for the Project.

• Summary of Status

The project is on schedule. The status of tasks is summarized below:

ID	Description	04/06
Task 1	Research & verify the timeliness of the full-scale Algorithm/technique	100%
Task 2	Verify the accuracy of the full-scale algorithm or technique	100%
Task 3	Design, code and test the full-scale algorithm	75%
Task 4	Develop a web site for the release of open source code	70%
Task 5	Examine the compatibility of the open source code with the existing IG hardware	50%
Task 6	Demonstrate the prototype	24%
Task 7	Write Interim Report(s)	52%
Task 8	Write Final Report and Summary Report	0%

• Problems

No significant problems or information that might impact schedule have been encountered in this reporting period.

• Interim Results

The final IMAGE Society paper is attached.

• Recommendations and Proposals

There are no recommendations or proposals as a result of efforts in this reporting period.

• Summary of Future Plans

Code clean up and documentation will continue. The next phase of implementation is for line and areal targets. A documentation effort is planned to start in mid-May.