ALGORITHMS FOR RUN TIME TERRAIN DEFORMATION

STATUS REPORT

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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.

• *Previously Completed Work*

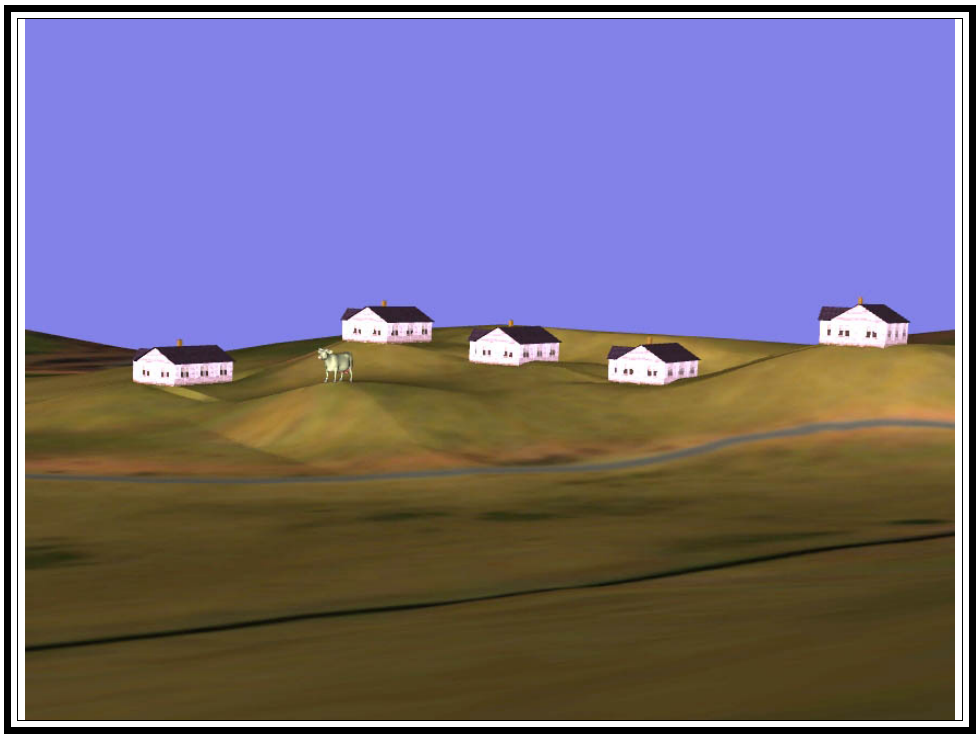
The Phase II contract was signed on April 8, 2005 and work started immediately. ▪ A kickoff meeting was held in May '05, and the program plans were reviewed. ▪ Don Burns, one of the originators of Open Scene Graph was added to the project team. ▪ Completed the first draft PDL that links to OSG and deals 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*

The first interim summary report has been modified based upon comments received and has been made final for submission. The changes to the draft were minor.

The paper proposed for the IMAGE Society Conference was accepted. The paper presents the algorithms developed for this project. It will be presented in the Database session. The first draft of the paper is due this month.
Testing of the dynamic terrain algorithms in OpenSceneGraph continued. The image below, extracted from the Interim Report, shows both the correction function and recursive subdivision

functioning correctly. The correction function modifies the terrain to match it to the inserted targets (houses for the test) and the subdivision algorithm ensures that inserted the hills and valleys created are smooth.



While substantial work remains to implement all of the different types of targets, the present demonstration means that the majority of the technical risk has been surmounted.

Code clean up and documentation was also a focus of the past month's efforts.

• ***Summary of Status***

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

ID	Description	9/8/05
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	65%
Task 4	Develop a web site for the release of open source code	60%
Task 5	Examine the compatibility of the open source code with the existing IG hardware	30%
Task 6	Demonstrate the prototype	16%
Task 7	Write Interim Report(s)	44%

Task 8 Write Final Report and Summary Report 0% 0%

• Problems

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

• Interim Results

The first interim non-proprietary summary report was made final and 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 draft IMAGE Society paper is planned to be completed. The next phase of implementation is for line and areal targets.