



Memo

To: Stacey Snell, Planning Manager
From: Geo Solutions
CC: Dr. Yongmei Lu
Date: 4/9/2012
Re: Airport Project Progress Report



The following document contains a progress report regarding the New Braunfels Airport 3D Visualization Project. Overall, the project is going well and we expect to have it completed as scheduled. Please feel free to contact the Geo Solutions team if you have any questions or concerns. Our Point of Contact, Tory Carpenter can be reached by phone at 972.849.1902 or by email at tc1237@txstate.edu.

Airport 3D Visualization Progress Report

Prepared by Geo Solutions, Inc.

for

The City of New Braunfels Planning Department

4/2/2012



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Introduction

As discussed at our last meeting, we are writing to inform you of the progress the Geo Solutions team is making on the New Braunfels Airport Visualization Project. Immediately following the February 22 acceptance of our team's bid to develop visual representation of restricted airspace zones, we began working simultaneously on all aspects of the project. In this report we will provide an update of the project, including the work we have completed so far, tasks currently in progress and remaining work left to do. Furthermore, we will discuss any changes to the original proposal and an overall assessment of the project.

Project Description

The following is a review of the purpose and scope of the project.

Purpose

The key to an economically progressive and viable airport is protecting the land around it and especially the airspace. To protect the safety of incoming planes as well as the people underneath, the Federal Aviation Administration created the Airport High Hazard Zoning Districts, limiting the height of structures in critical areas around airports. Unfortunately, these zoning districts have a complex geometry making it difficult to calculate the maximum building height at a specified point; and even more difficult to

visualize the zones in real life. This project was designed to create visual representation of the restricted airspace zones so they may be easily understood by city staff and the public.

Scope

As presented in the project proposal, we identified 3 principal objectives for fulfilling the Planning Departments visualization needs:

- (1) Create a 3D model of restricted airspace zones.
- (2) Develop an interactive mapping tool to be used by city staff to identify maximum building heights at any given point.
- (3) Turn the 3D model into a web-based, interactive tool that can be used by the general public

Project Tasks

Task 1: 3D Model

Our previous method for creating a 3-dimensional model proved not to work as well as we had hoped, so we have changed our methodology some. We will now be using ArcGlobe, instead of ArcScene, for the 3D model. With this method, we no longer have to render a Digital Elevation Model (DEM) because a 30 meter DEM is provided in ArcGlobe already. We have also added DEMs from Comal and Guadalupe counties to see if they may give us a more accurate representation of the elevation.

Completed

- The initial task of creating a terrain in ArcGlobe has been completed.
- Individual polygons of the restricted zones have been created in Google SketchUp based on their respective geometries in real life (See Figure 1 and Figure 2).

In Progress

- Currently, we are in the process of merging polygons to establish heights of lowest value. In other words, in the case of overlapping zones, we want to make sure that the height restriction is based on the zone with the lowest height value.

Work Scheduled

- The Google SketchUp model containing the individual zone polygons will be imported into ArcGlobe so that they may be seen over the terrain.
- A fly-through animation will be created in ArcGlobe.
- As a final deliverable we will provide the City of New Braunfels with the file so that it may be viewed on the CONB website.

Task 2: Interactive Mapping Tool

We did have a bit of a rocky start on this particular task. Although, fundamentally nothing has changed about our methodology here, we did encounter some trial and error regarding our initial approach. For example, we thought the first step was to convert the data from vector to raster format, but quickly realized that didn't work. Ultimately, we decided the first step was to assign z-values, or height values, to the "restricted zone" polygons.

Completed

- We have successfully identified and collected the necessary data, including:
 - Airport Restriction Zones
 - Comal and Guadalupe County DEMs
 - Land Use
 - County Boundaries
 - Transportation (Major Highways)

- We have assigned z-values to each “zone” polygon so that we may create a continuous slope surface for each zone. This process is shown in Figure 3, where each point on the conical zone represents a newly created height value, shown in the right hand column.

In Progress

- We are currently in the process of creating the slope surfaces for each zone (Figure 4).

Work Scheduled

- Create a TIN surface from the new height values.
- Rasterize the TIN surface.
- Configure restricted zones to show lowest value for overlapping zones.
- Assign a building restriction height to each cell using Raster Calculator.
- Complete the graduated color map.
- Complete and test the interactive mapping tool.

Task 3: Online, Interactive 3D Model

As discussed in our original proposal, we have continued to research ways to make the 3D model interactive on the New Braunfels website. We have found the only way to do this without purchasing costly software is to provide the Planning Department with a Google Earth file, containing the 3D model. If the Planning Department makes the file available on the City of New Braunfels (CONB) website, then anyone who already has, or chooses to download Google Earth, can open the 3D model in Google Earth and use it interactively. This will allow the user to navigate over, under and through the restricted zones as they please. Figures 5 and 6 provide examples of how this will look to the user.

Work Scheduled

- Export the Google SketchUp model as a Google Earth file.
- As a final deliverable we will provide instructions for users to follow in order to view the 3D model in Google Earth. These instructions may be posted on the CONB website along with the Google Earth file.

Task 4: Geo Solutions Website

Since submitting our proposal, we have also been hard at work developing our project-based team website (Figure7)

Work Completed

- We have completed the basic layout of the site.
- All of the initial layers have been uploaded into Manifold.
- The Project Proposal PowerPoint Presentation has been uploaded.

In Progress

- We are currently working on getting the site onto the C-drive.

Work Scheduled

- We still need to upload all other completed work, including the:
 - Project Proposal
 - Progress Report
 - Progress Report PowerPoint Presentation
 - Manifold Layers

Revised Timeline

Table 1: Revised Timeline

| Week 6 April 2 - 6 | Week 7 April 9 - 13 | Week 8 April 16 - 20 | Week 9 April 23 - 27 | Week 10 April 30 – May 4 |
|-----------------------|------------------------|-------------------------|-------------------------|-----------------------------|
| Data Analysis | | Testing | Final Deliverables | |

Conclusion and Overall Assessment

The City of New Braunfels Airport 3D Visualization Project is coming along very well. Aside from some minor bumps in the road, the Geo Solutions team has not encountered any major problems. As shown in Table 1, our timeline has changed a little. We have modified the previously designated "Website Integration" time slot to allow for an additional week of data analysis. This will help make up for the time we lost to trial and error in the beginning. We have also dedicated a week to testing so that we can be sure both the Google Earth file and the Interactive Mapping Tool are working correctly. We do not anticipate any more delays in the foreseeable future and fully expect to have all final deliverables completed as scheduled.

Appendix: Figures

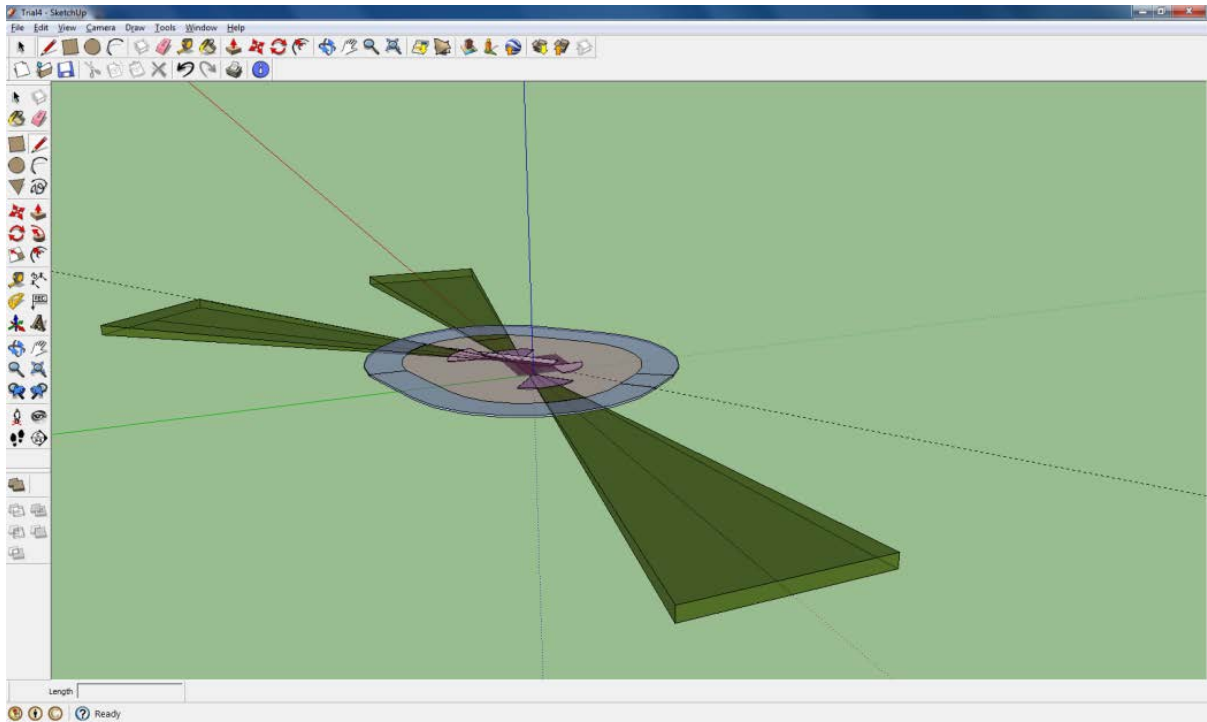


Figure 1

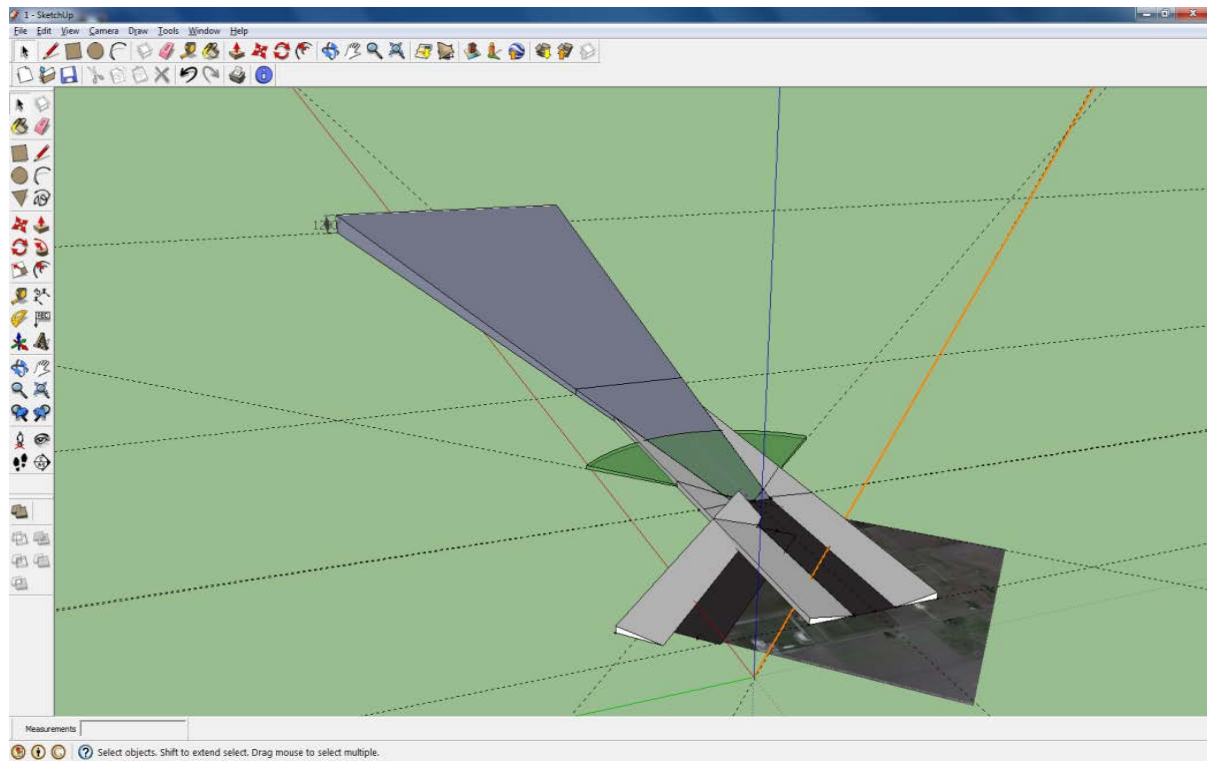


Figure 2

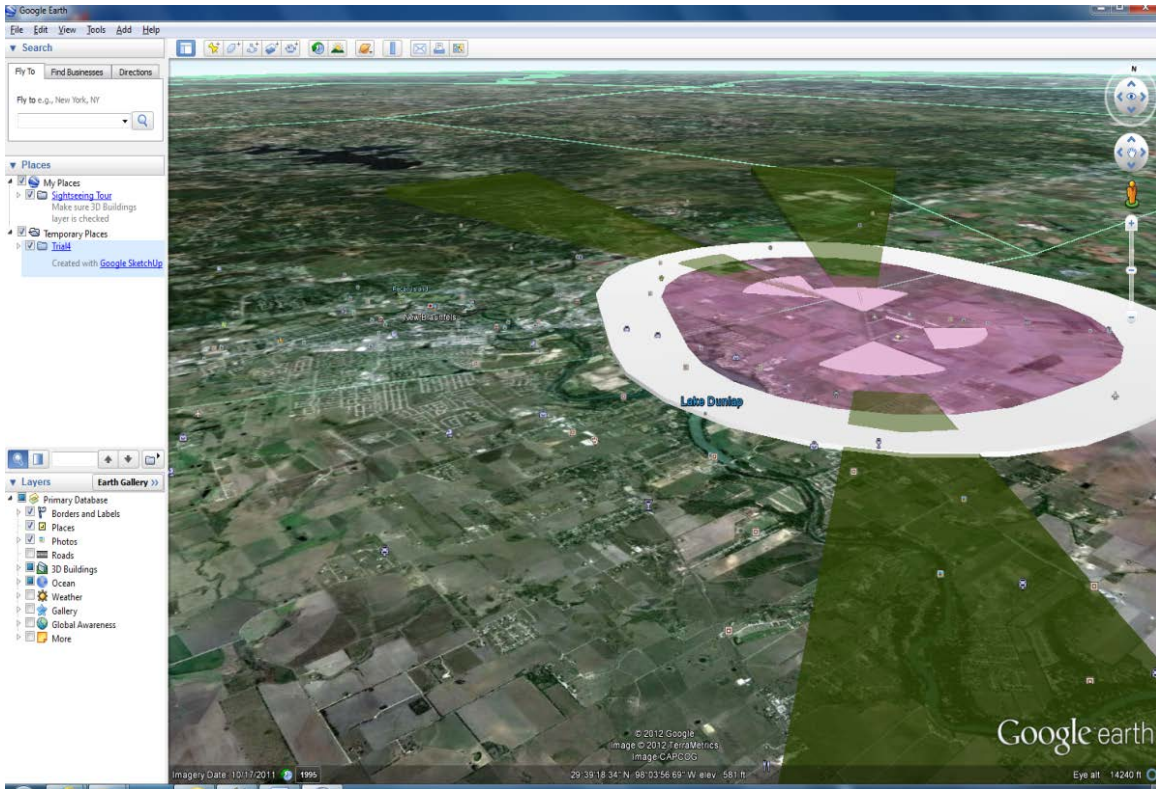


Figure 5

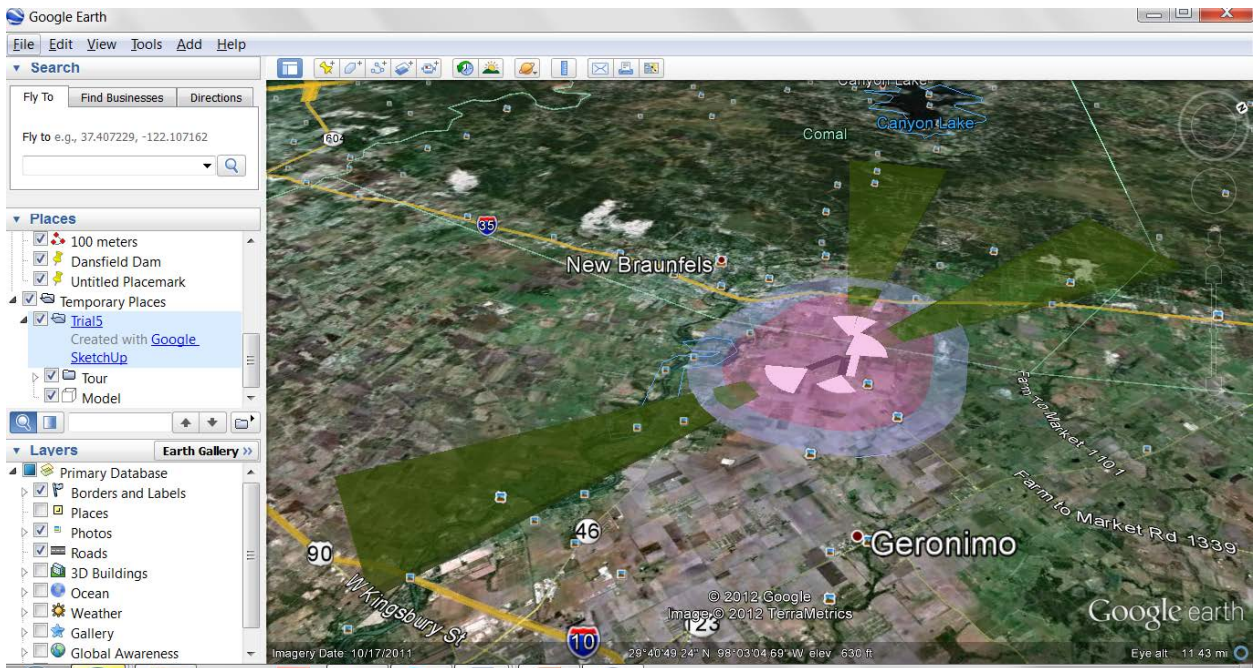


Figure 6

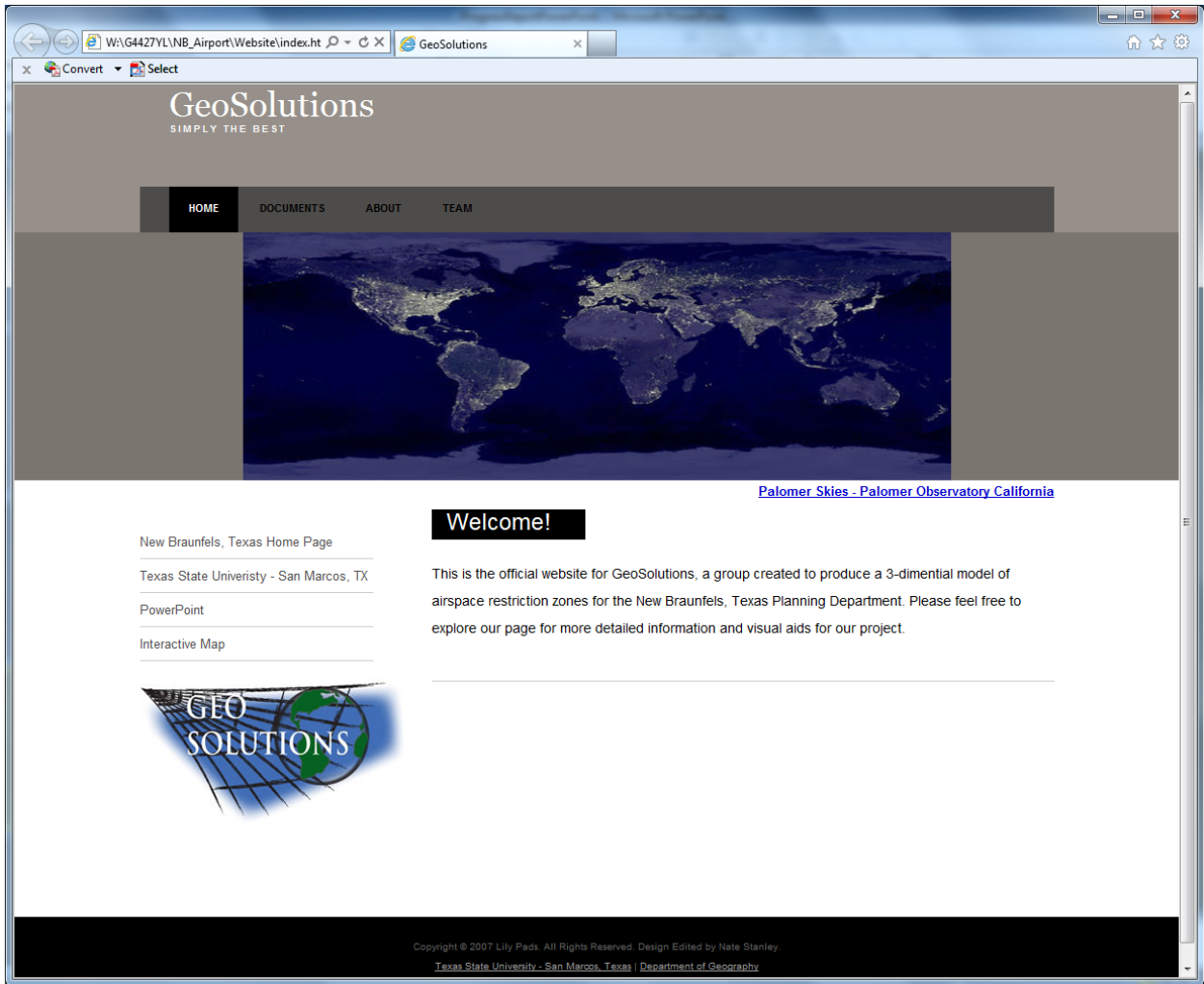


Figure 7

Participation

| | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Crystal May | Worked with Cameron on the Interactive Mapping Tool Edited and organized final draft of the progress report |
| Nate Stanley | Worked on development of team website Worked on 3D model in ArcGlobe Put together the Progress Report PowerPoint Presentation |
| Tory Carpenter | Worked on 3D model in Google Sketch and Google Earth Provided screen shots of completed work |
| Cameron Frere | Worked on the Interactive Mapping Tool Provided screen shots for Progress Report Presentation |