Project Plan
Lateral Map Display

Team  GE Aviation
CSE 498, Collaborative Design

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Project Overview

• Lateral Map Display
  – Top down view of aircraft’s position
  – Aids in navigation
  – Multiple layers that can be toggled on/off

• Control Panel
  – Buttons to change active layer(s)
  – Insert/delete waypoints
  – Dials to change map mode, zoom in/out
  – Utilize controls in X-Plane to update external control panel
Functional Specifications

- Lateral Map Display
  - Display information pertaining to aircraft’s situation
  - Show possible risks including air traffic, hazardous terrain, and inclement weather

- Control Panel
  - Include buttons for weather, traffic, waypoints, airports, VORs, terrain, etc.

- Optional Extended Functionality
  - Display horizontal view of surrounding terrain (Vertical Situation Display)
  - 3D tilting view to see terrain elevations
Design Specifications

• Terrain data transmitted over network and rendered using C and OpenGL
• Lateral Map Display created using OpenGL and GLUT in Visual Studio
• Flight data sent over network using separate plug-in
• Rendering component receives flight data and displays icons as 2D overlays
Screen Mockups
Technical Specifications

• Main Machine:
  – Runs X-Plane and plug-ins, sends flight and terrain data over network
  – DSF parser converts terrain data to be rendered by the client

• Secondary Machine:
  – Runs rendering component, receives data from X-Plane
  – Displays Synthetic Vision Display, Lateral Map Display, Control Panel, and Vertical Situation Display
Architecture Illustrated

User Input → X-Plane → Terrain Plugin → Renderer → Lateral Map Display

- User Input
- Terrain Data
- Flight Data
- Weather Data

DSF File

X-Plane

Terrain Plugin

Data Plugin

Renderer

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System Components

• Hardware Platforms
  – One machine running X-Plane and custom installed plugins
  – One machine running client rendering program
  – Machines networked to stream data

• Software Platforms / Technologies
  – X-Plane
    • Realistic flight simulator to be used as data source to drive the Lateral Map Display
  – Visual Studio, GL Studio
  – OpenGL, GLUT
Testing

• Data Output
  – Plug-ins will be tested to ensure that data being exported is correct

• Data Parsing
  – Make sure that data read by rendering software is equivalent to data in X-Plane

• Data Display
  – Ensure that data displayed in Lateral Map Display is consistent with that shown in X-Plane monitors

• Code
  – Avoid memory leaks and inefficiencies
Risks

- Maximize compatibility with previous code
  - Port code to ANSI C, add features to flight data plug-in
- Performance
  - Utilize POSIX threads to avoid lag in X-Plane
- Weather data
  - Determine where to obtain up-to-date weather data that can be displayed in a radar map