Project Overview

What is a SVD?

– LCD-like display in cockpit
– Displays computer generated terrain
– Provides navigational symbols
– Presents basic flight information
– Features that increase a pilot’s situational awareness
Project Overview

Why?

Imagine trying to land in this:
Project Overview

Why?

– Assist in low visibility situations
– Reduce pilot workload
– Affirm pilot decisions
– Increase situational awareness
– Provide proper information based on situation
Project Overview

How?

– Use X-Plane as terrain database and flight data generator for simulation
– Sending flight data via UDP
– Sending terrain meshes via TCP
– Rendering everything using OpenGL
Architecture Illustrated

Before:

X-Plane Process

X-Plane

Raw Flight Data

X-Plane Plug-in

DSF File
010110010010110011011001001011010101010

Binary Terrain Data

DAT File (ASCII)

Runway Data

DSFParser

Network Serializer

Mesh Data

Runway Data

Converted Flight Data

Now:

X-Plane Process

X-Plane

Aircraft Location

Flight Data

X-Plane Plug-in

DSF File
010110010010110011011001001011010101010

Binary Terrain Data

DAT File (ASCII)

Runway Data

DSFParser

Network Serializer

Flight Data

Flight Data Plug-in

Flight Data Serialzer

Mesh Data

Runway Data

Flight Data (UDP)
Architecture Illustrated

Before:

Synthetic Vision Display

Meshes

Network Deserializer

Runway Data

Flight Data

Rendering Engine

Rendered Display
Architecture Illustrated

Now:

Synthetic Vision Display

- Mesh Packets (TCP)
- Runway Data Packets (TCP)
- Flight Data Packets (UDP)

Network Deserializer
Flight Data Deserializer

- Meshes
- Runway Data
- Flight Data

Rendering Engine

Rendered Display
Screen Shot
Screen Shot
Screen Shot
Screen Shot
What’s left to do?

Terrain Data

- Transfer terrain data over TCP vs. reading from a file
- Smart algorithm to decide when to parse and send
- Need to access runway and navigation data
What’s left to do?

Rendering Engine

- Caching algorithm and handling of terrain mesh
- Optimizing our OpenGL calls
- Implement features: HITS, terrain intersection, top-down view, proximity shading
- Draw runways and other navigational symbols