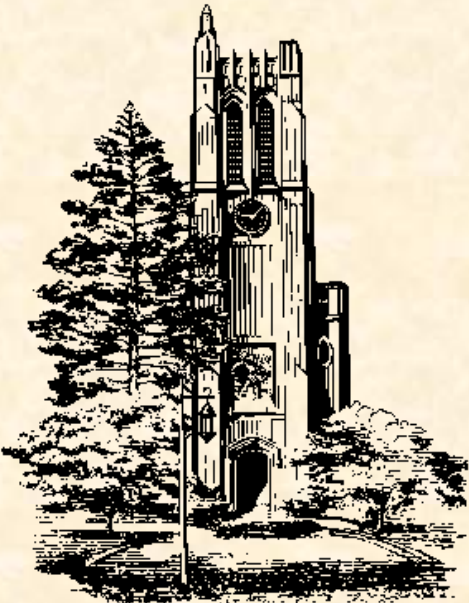# MICHIGAN STATE
U N I V E R S I T Y

Project Plan
Synthetic Vision Display

Team 3. GE Aviation
CSE 498, Collaborative Design

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Project Overview

- PFD Design
  - Keep design similar to existing PFDs
  - Display standard information such as elevation, speed and horizon view
  - Additional functionality such as Highway in the Sky
- Terrain Data
  - Change the standard 2 color horizon view to show accurately modeled terrain
  - Main feature of project
  - Information needed to be sent over network from X-Plane client

Functional Specifications

- PFD Requirements
  - Basic PFD with terrain data in use
  - Location of nearby airports with approach paths
- Terrain Data Requirements
  - Accurate 3D rendering of data
  - Applied color tint to show relative elevation to plane
- Send data over network from X-Plane to PFD
- Additional functionality (optional)
  - Highway in the Sky
 - Projected crash location based on flight vector

Design Specifications

- X-Plane plugin to parse data and send over network to client

- Client receives terrain data from network and renders it in OpenGL

- PFD created in client using GLStudio to easily create OpenGL code

- Other data sent from X-Plane to be used in instrumentation in PFD

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Screen Mockups
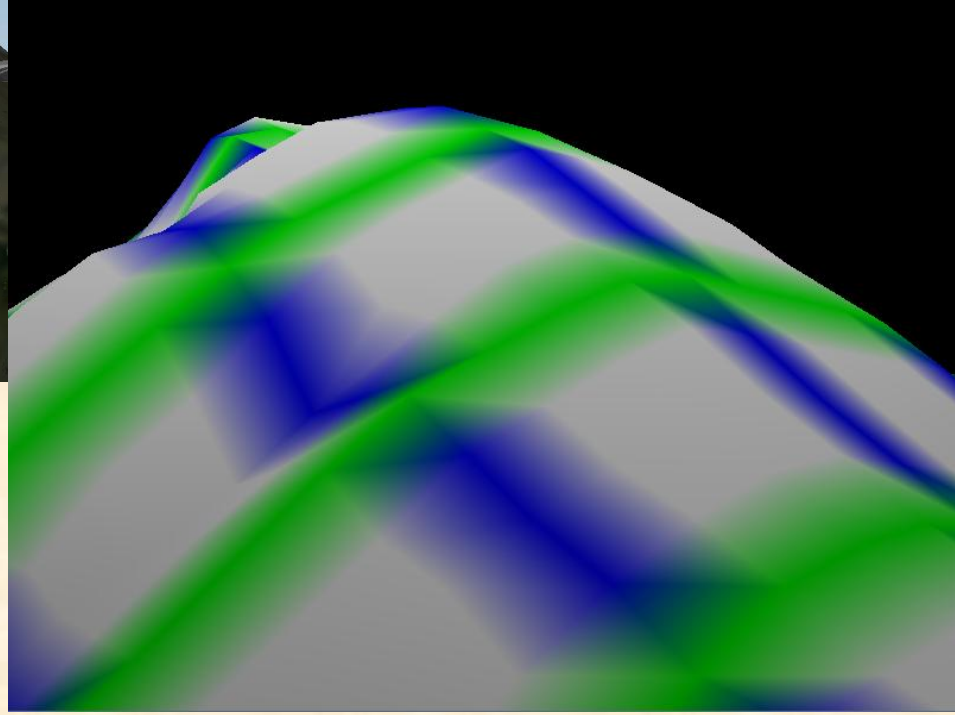
Technical Specifications

- Machine 1:
  - X-Plane running with the plane actually being flown here
  - X-Plane plugin created to send terrain/flight data across network to client
  - DSF file parser to allow rendering of the terrain data in client
- Machine 2:
  - Client rendering terrain data and PFD instrumentation

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Architecture Illustrated
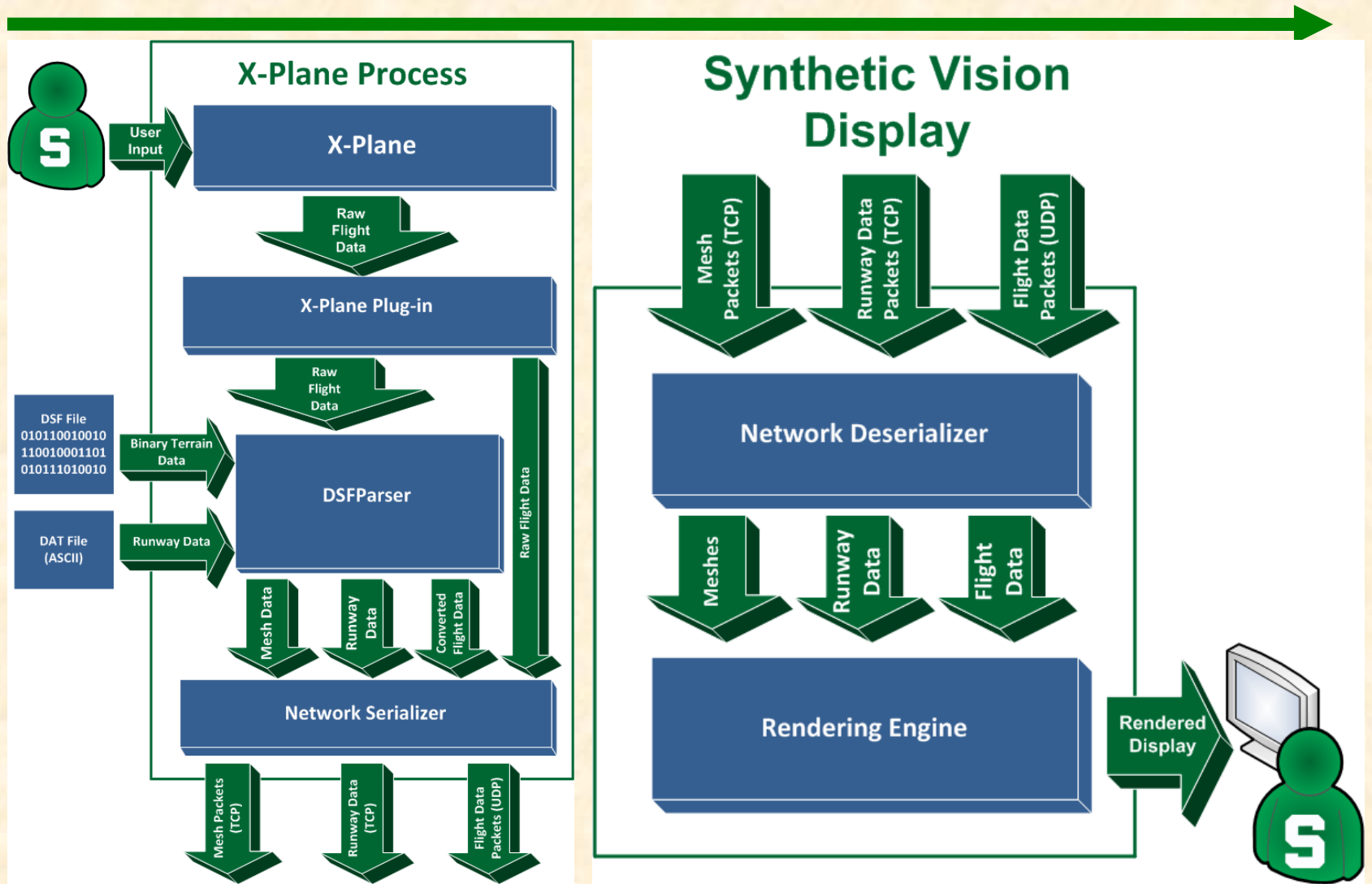
System Components

- Hardware Platforms
  - Machine set up to run X-Plane with custom plugin installed
  - Another machine set up to run client program
  - Machines networked to allow streaming data
- Software Platforms / Technologies
  - X-Plane
    - Flight simulator program
  - GLStudio
    - Development software to aid production of PFD instrumentation

Testing

• Testing will be done to make sure each component of our product functions correctly after each revision, before testing the product as a whole.

• **Pre-Networked Data**
  - Data will be output to a file and checked against X-Planes data for validity as well as ability to be used by renderer.

• **Post-Networked Data**
  - Data will be checked in part for continuity between sending over and receiving from network to ensure our protocol maintains data integrity.

Risks

- Performance and Optimization
  - Network transfer speeds of terrain data files
  - Graphics card intensive program on both ends of network
- Terrain Textures stored separately
  - Textures for the terrain may not be stored in the same file as the mesh data
  - Possible it cannot be taken and parsed while still being usable.

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