MICHIGAN STATE UNIVERSITY

Project Plan

Super Synoptics

The Capstone Experience

Team GE Aviation

Nick Rafalski
Shawn Henry Adams
Adam Breece

Department of Computer Science and Engineering
Michigan State University

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From Students…
…to Professionals

Project Overview

- Super Synoptics will replace portions of the flight deck instrumentation with Synoptic displays.
- The goal is to reduce crew errors by simplifying the decision making process
- The interface must be intuitive and creative; superior to current crew alerting systems
- The system will present solutions and consequences to a given problem situation

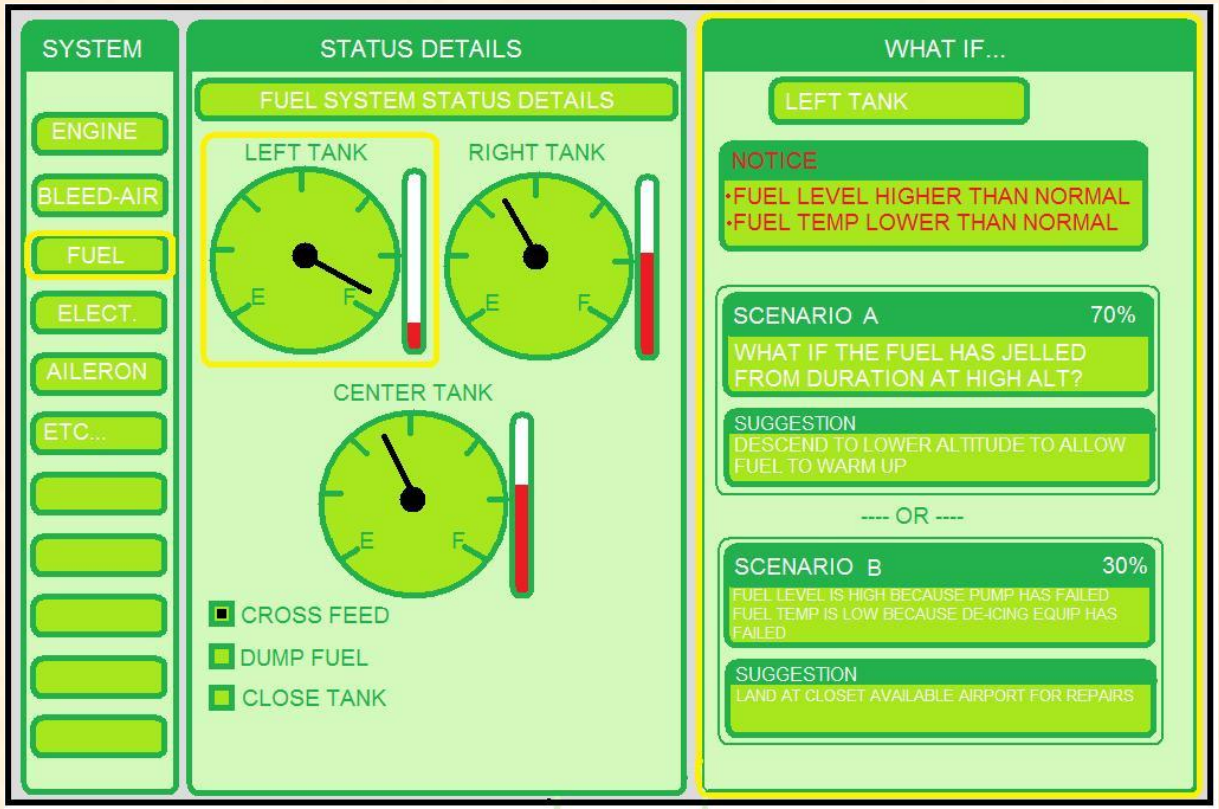
Functional Specifications

- “Synoptics Display” has 3 main windows: Navigation, System Details Page and Problem Alerting System window
- System will include input schemes that are reliable and easy to use in turbulence, etc.
- X-Plane Instructor station will be used, in addition to macros, to simulate the plane state, including failures and other problems

Design Specifications

- The System Details Pages will include intuitive widgets to present information, as opposed to current esoteric/specialized widgets
- The System Details Pages will initially include a reduced set of instrumentation for clarity, with the ability to overlay specific details
- The Synoptics Display will be navigated by an MP3-esque scheme for cleanliness
- Instructor Station will simulate historic crew-error situations

Screen Mockups

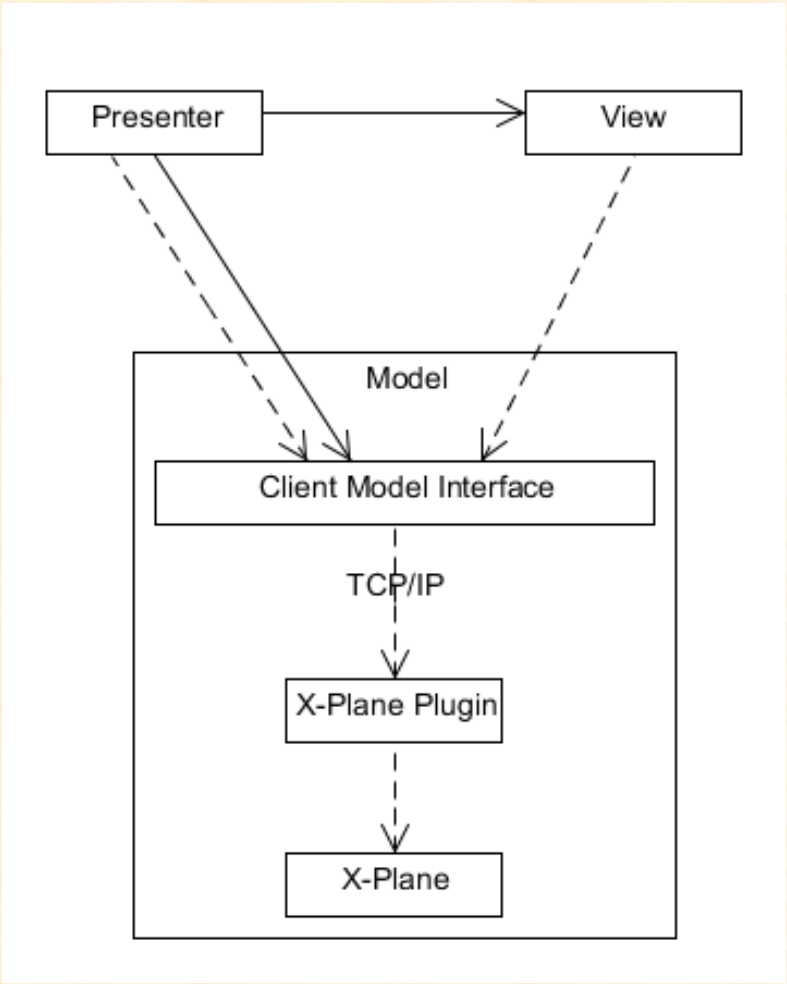


- 3 Windows
- Intuitive widgets
- Clean navigation

Technical Specifications

- The Synoptics Display GUI will be written in C++ with OpenGL.
- The GUI will use the libnUI library, taking advantage of CSS/XML for easy design
- The X-Plane Plugin will be written in C/C++ while building off past Capstones' code
- The Communication between the 2 applications will be maintained through TCP packets

System Architecture



Model – View – Presenter Design Pattern

- Network interface to X-Plane
  - X-Plane plugin and client code
- Synoptics Display GUI
- Synoptics Logic

System Components

- Hardware Platforms
  - Client and Server PCs
- Software Platforms / Technologies
  - C++
  - OpenGL
  - libnUI
  - X-Plane

Testing

- Usability testing
  - Fresh eyes are important!
- Data synchronization

Risks

- Lack of X-Plane familiarity
  - Look at past Capstones
- Necessity to determine solutions to complex aviation problems (Lack of Aviation Knowledge)
  - Independent research and GE communication
- Pressure to improve on current crew alerting systems
  - Iterative approach to GUI design