

**MICHIGAN STATE**  
**UNIVERSITY**

**Project Plan**  
**Flight Simulator Suite**  
**The Capstone Experience**

**Team Boeing**

Chris Ek

Michael Marinetti

Stephi Stumpos

Department of Computer Science and Engineering  
Michigan State University

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*From Students...*  
*...to Professionals*

# Project Overview

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- Flight Gear open source flight simulator
- Add new GUI
- Add new network capabilities
- Enhance existing graphics



# Functional Specifications

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- Implement wxPython GUI within FG's C++ source code
- Use peer-to-peer networking model along with OpenMQ to implement multiplayer
- Improve FG's aerodynamics calculations



# Design Specifications

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- Python GUI
  - Toolbar that includes: Multiplayer, Flight Plan, etc.
  - Child windows depicting alternate views
- Networking
  - GUI for opening session to other players



# Screen Mockup: GUI - Multiplayer



# Screen Mockup: Flight Plan



# Screen Mockup: GPS



# Screen Mockup: Log





# Screen Mockup: Other Flights



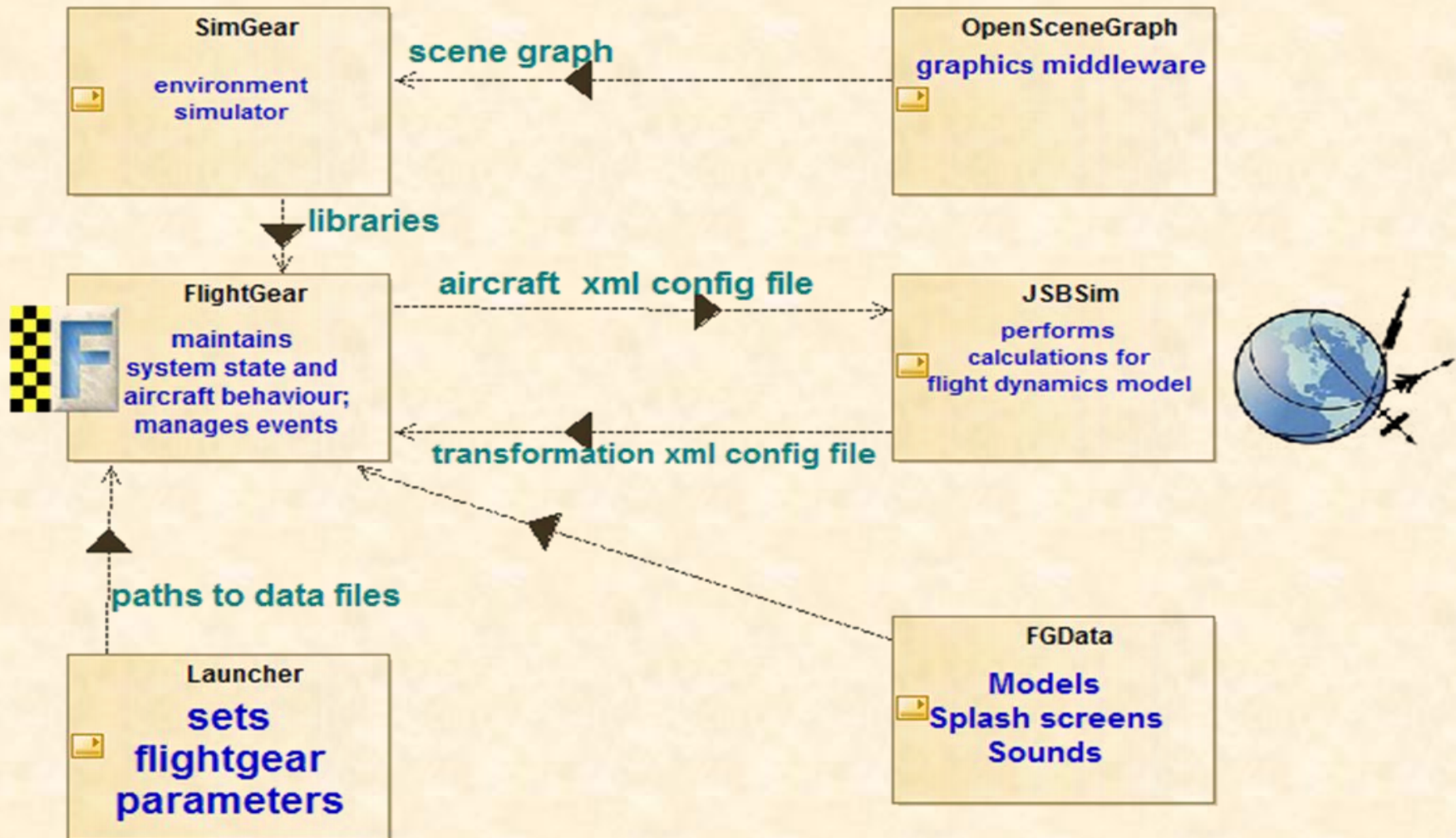
# Technical Specifications

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- Embedding Python into existing C++
- Use OpenMQ to implement peer-to-peer multiplayer networking
- Implement multidomain spectral method (C++)
  - FG already has ODE solver (RK4)
  - Choose basis functions



# System Architecture



# System Components

- Hardware Platforms
  - Lab machines
- Software Platforms / Technologies
  - Windows 7
  - Visual Studio 2010
  - GitHub
  - Source code associated with Flight Gear
  - OpenMQ
  - wxPython



# Testing

- Networking
  - Send message between clients
  - Integrate messages with GUI
  - Display other aircraft
  - Update other aircraft
- GUI
  - Create basic widgets
  - Integrate networking
  - Display advanced informations
- Graphics
  - Simulate historical event and compare
  - Add crosshair to select particles in grid



# Risks

- Networking
  - Little experience with multiplayer and OpenMQ
  - Mitigation: Observe current multiplayer, research OpenMQ
- Python GUI
  - Interfacing Python with C++
  - Mitigation: Researching interfacing and experimenting
- Graphics
  - Complexity – are the calculations too expensive? Will they affect frame rate?

