https://youtu.be/flQi998XAMo

# CMPE322/326 A2: CONCRETE ARCHITECTURE

Group 20:

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# INTRO

- Previously determined FlightGear had hybrid architecture with Flight Dynamics Model (FDM) Server at its core.

- Open-source nature leads to better performance and easier maintenance.

- This presentation focuses on analysis on code-level implementation and structure.

# OVERVIEW

High-Level Architecture

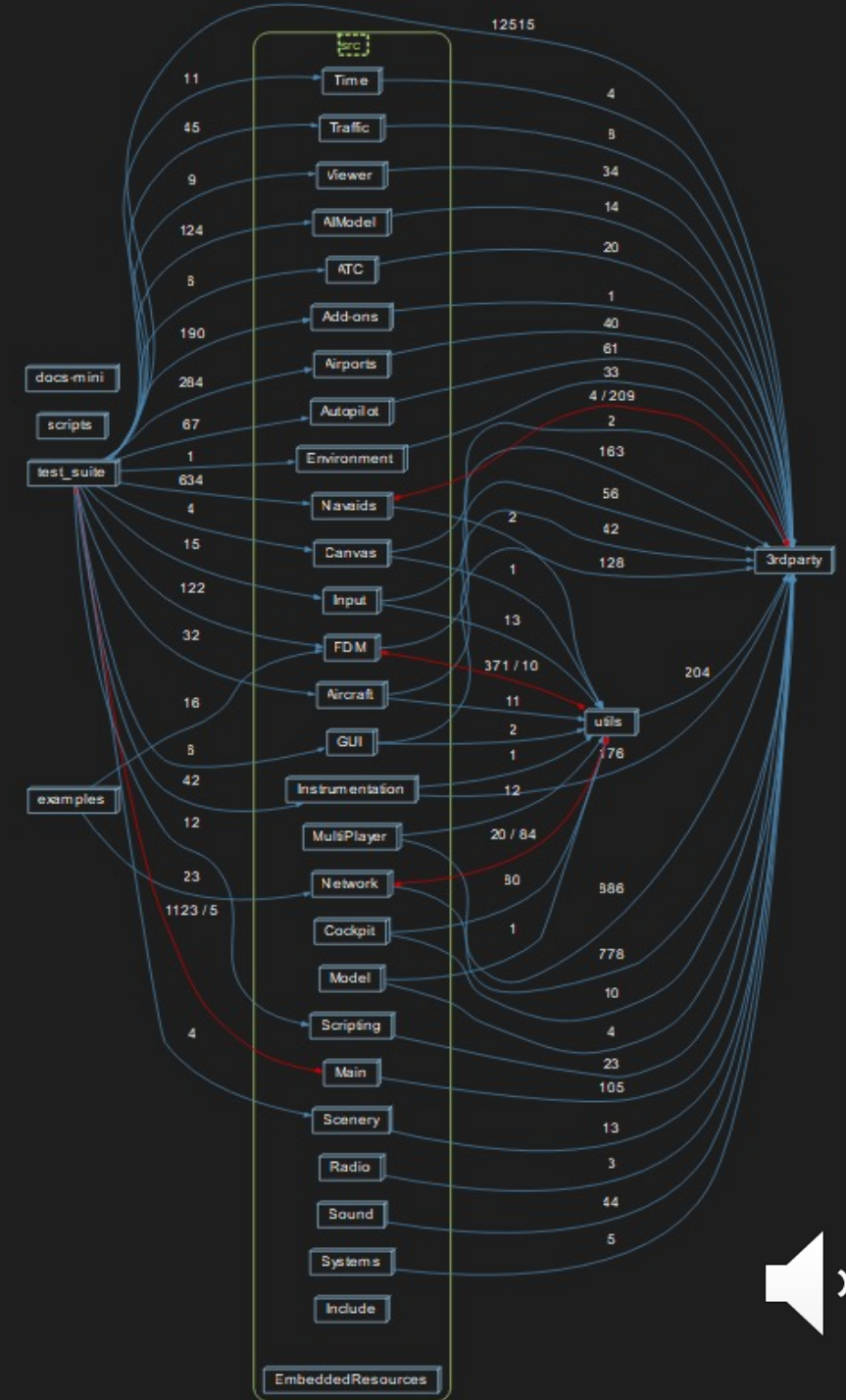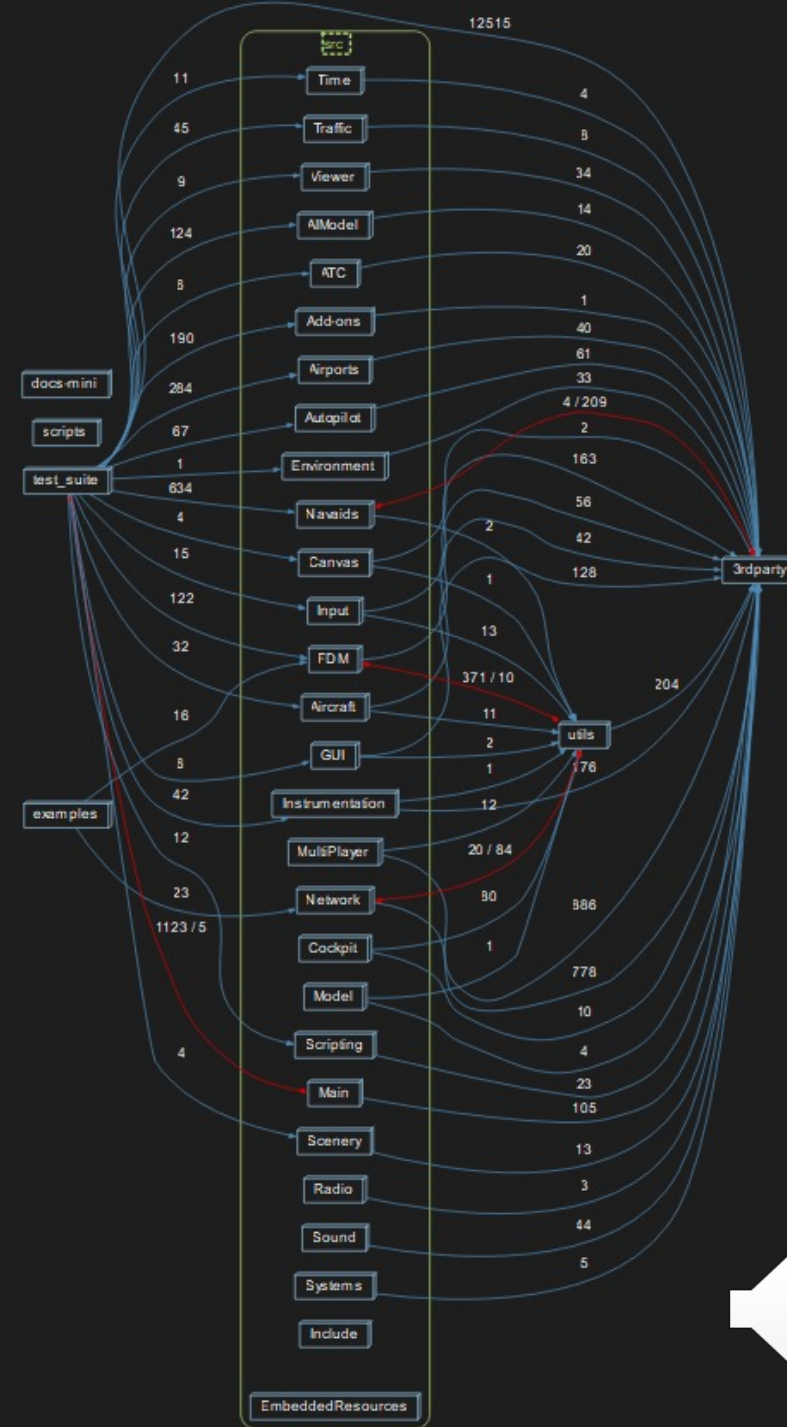Inner Architecture

Reflexion Analysis

Sequence Diagrams

# HIGH-LEVEL ARCHITECTURE

- INVOLVES VARIOUS SUBSYSTEMS, INCLUDING
- FDM, VIEWER/GUI, AIRCRAFT, AUTOPILOT, ENVIRONMENT/SCENERY, INPUT/SYSTEMS, NETWORK, SOUND, ADD-ONS/SCRIPTING
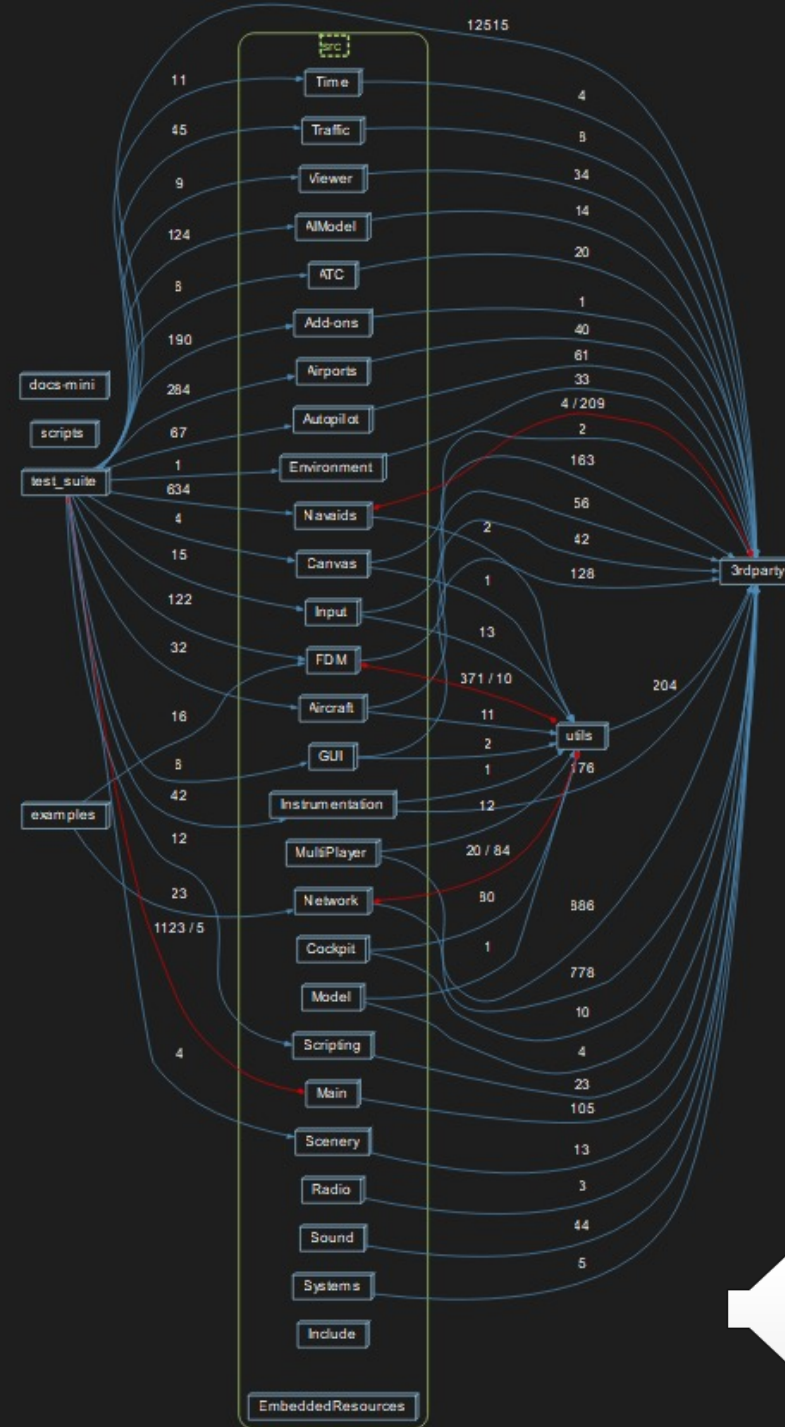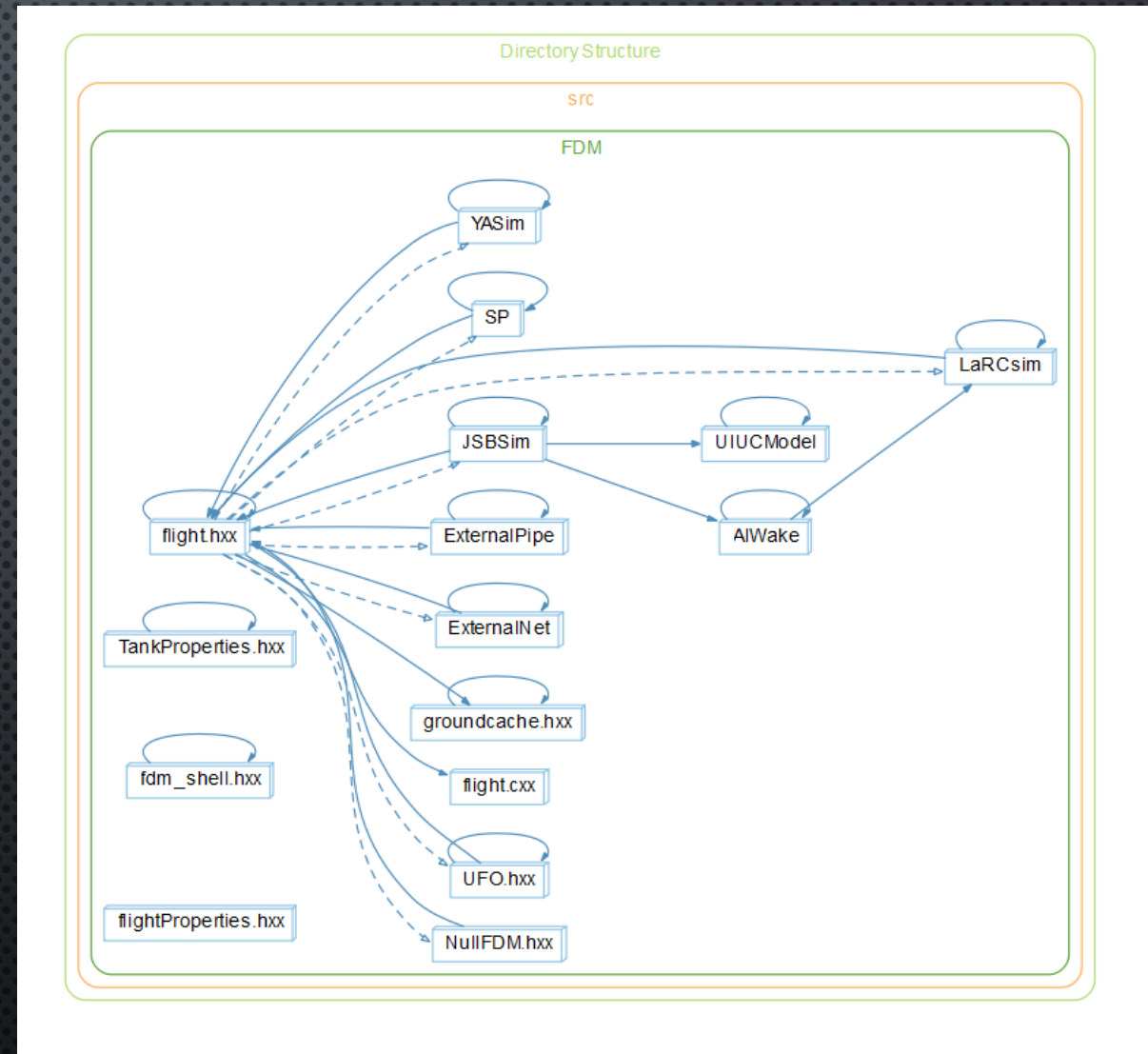
# AUTOPILOT

# ENVIRONMENT AND SCENERY

INPUT AND SYSTEMS

NETWORK

# SOUND

# ADDONS AND SCRIPTING
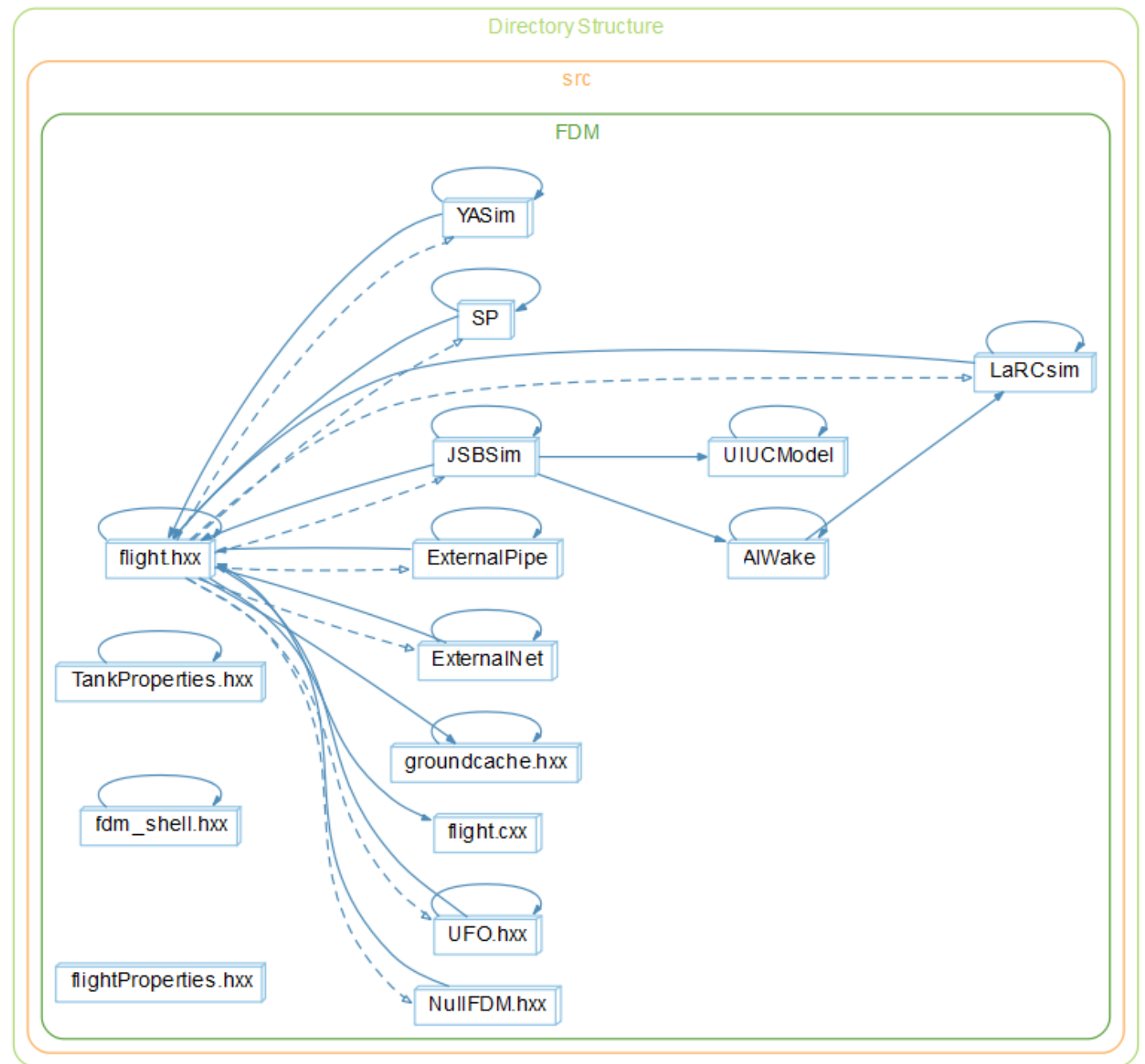
# INNER ARCHITECTURE OF FDM

- **Source code was examined using SciTools Understand**
- **Includes various FDM options (JSBSim, YASim, LaRCsim, UIUCModel)**
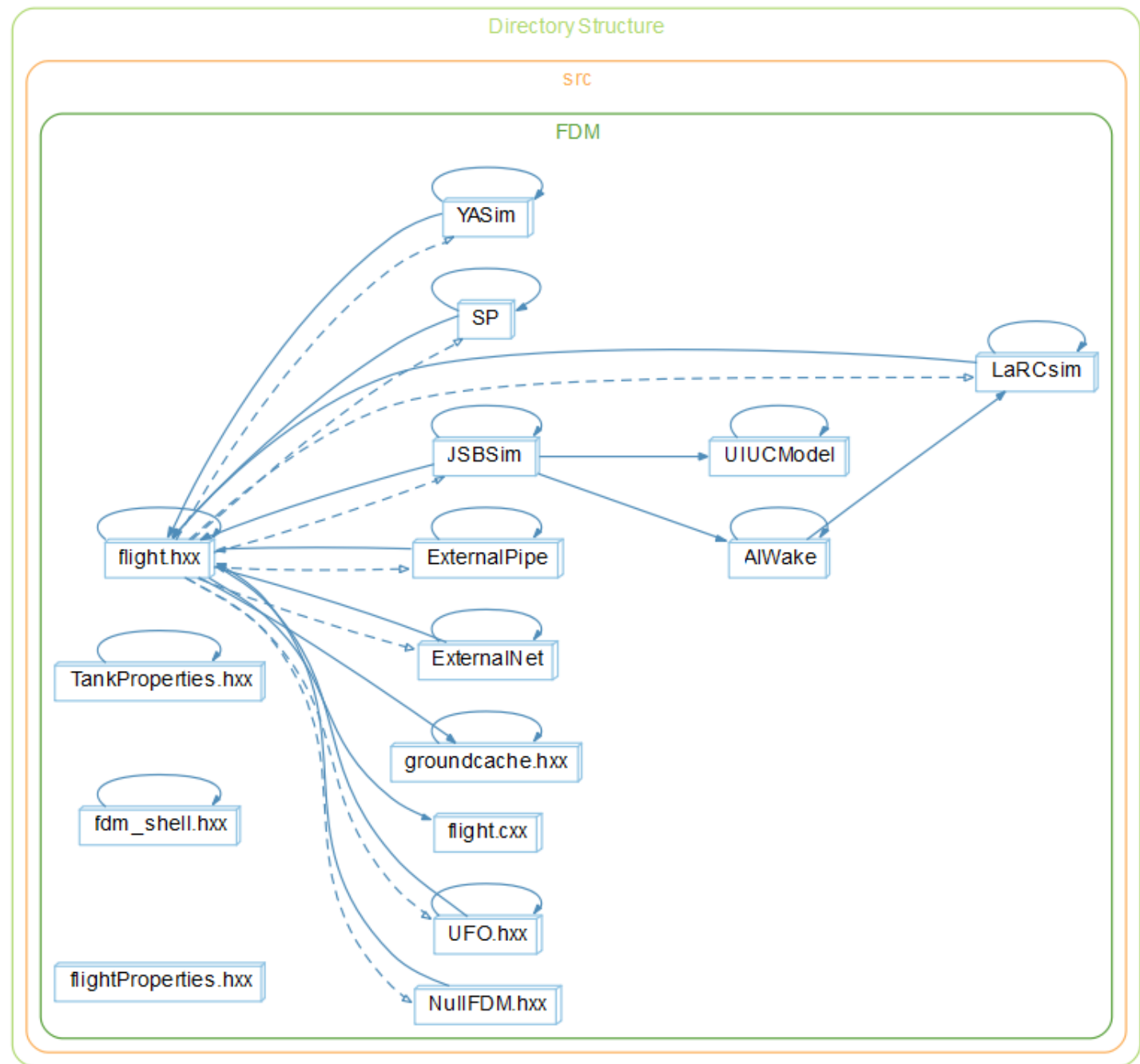- **Also includes other simulators/integrations**



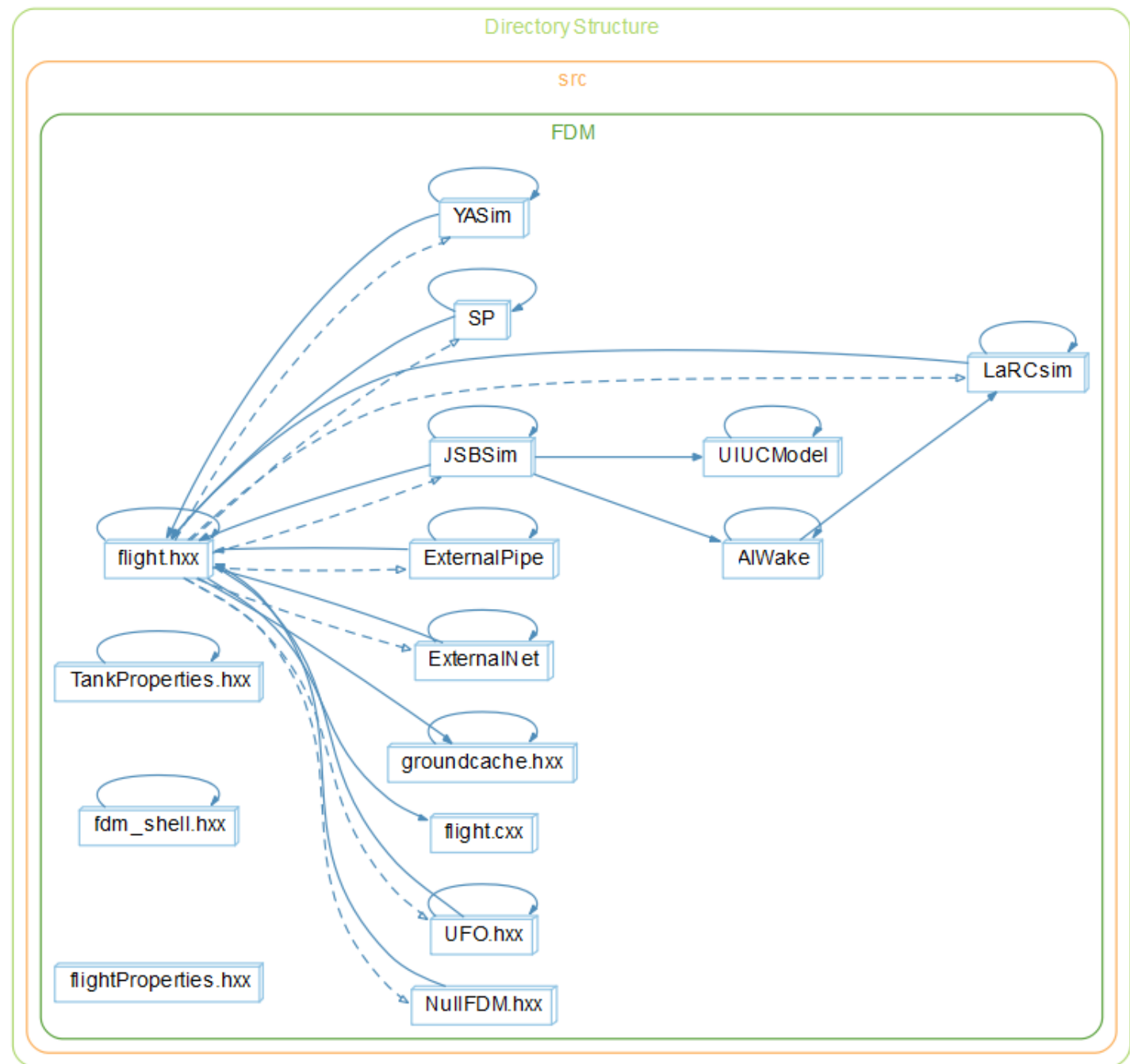*Graphical View of the FDM architecture and all its components.*

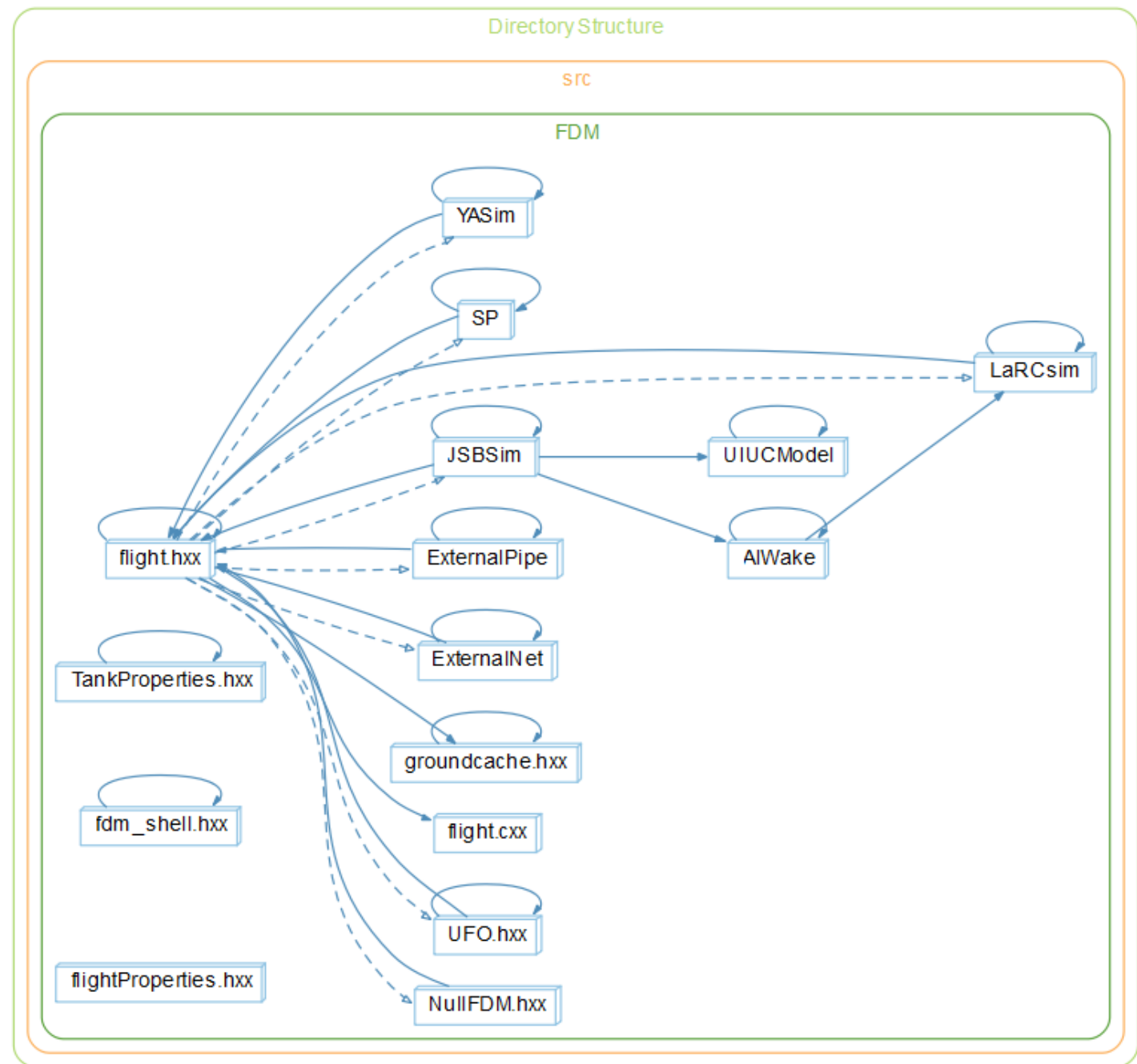# JSBSIM, YASIM, LARCSIM, UIUC MODEL

# EXTERNAL PIPE, EXTERNAL NET

# SPECIAL PURPOSE INTEGRATION
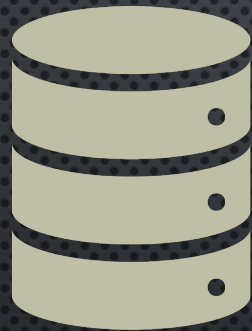
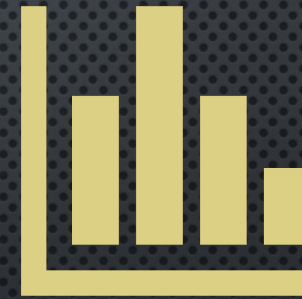# FLIGHT.CXX, HEADER FILES

# DERIVATION PROCESS

- Provided FlightGear source code was examined through Understand

- Consider performance and maintainability of project

- Looked in src/ directory to see dependencies

# INVESTIGATIONS OF THE DISCREPANCIES

Reflexion analysis of high-level architecture

Reflexion analysis of FDM 2$^{nd}$ level architecture

# HIGH-LEVEL ARCHITECTURE REFLEXION ANALYSIS

- Components within FDM server still are not interconnected

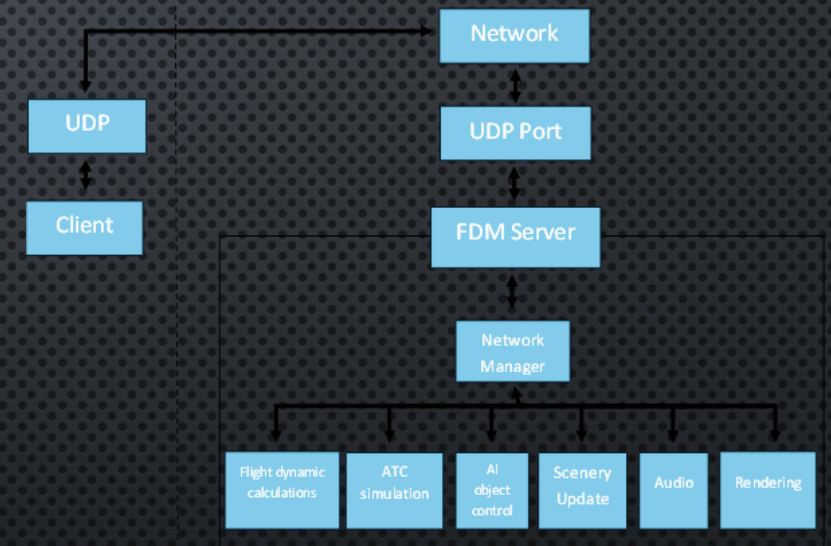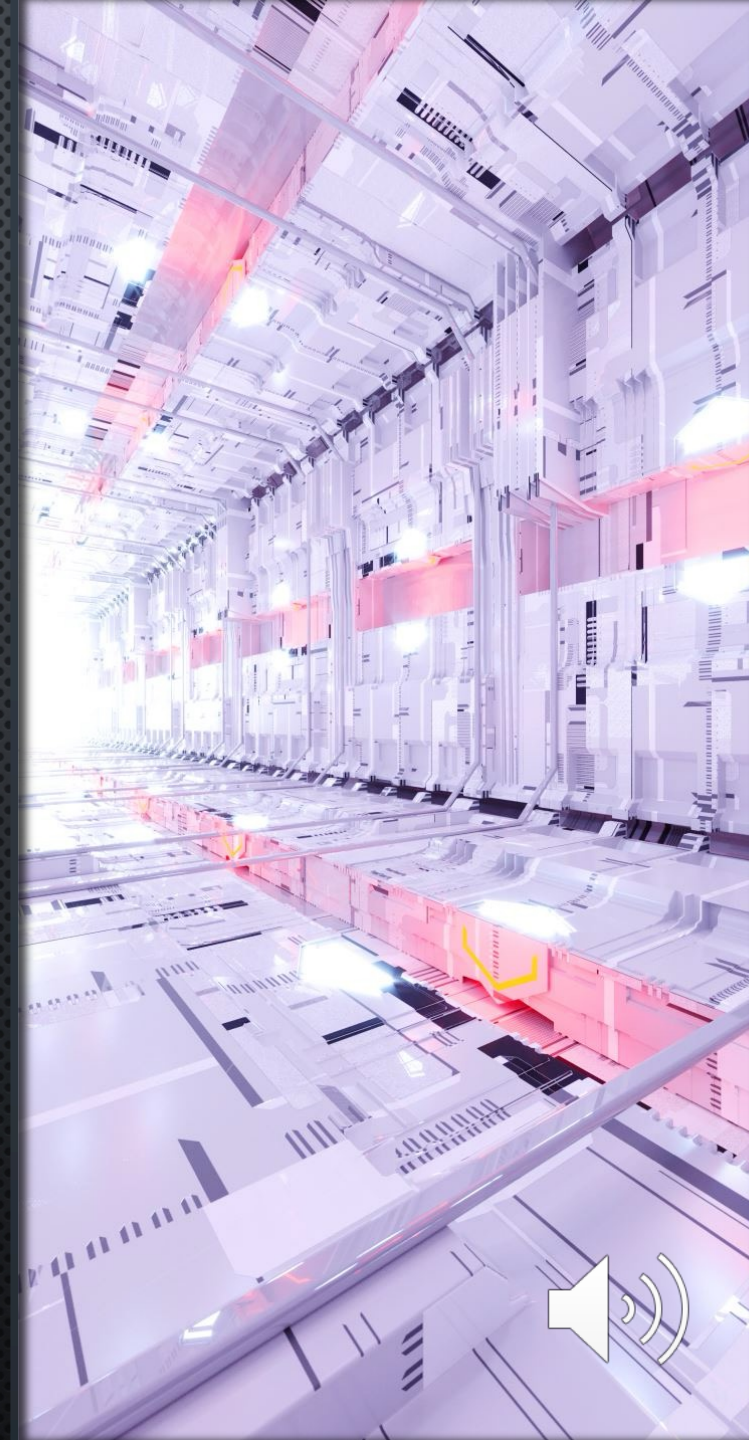- Subsystems use 3rdparty instead of network manager to relay information



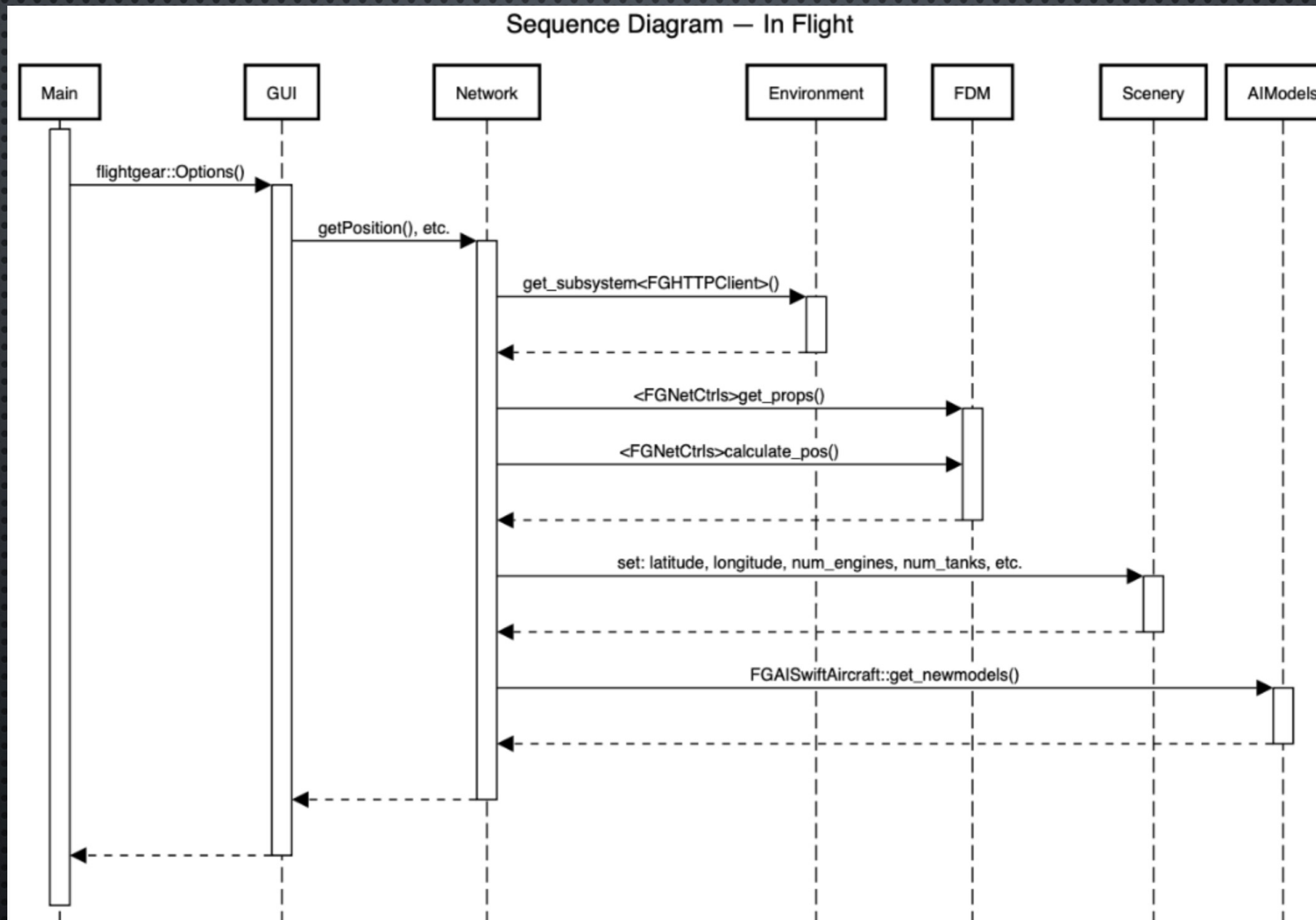*Figure 3: Conceptual Architecture of FlightGear from a previous report*

# FDM SERVER REFLEXION ANALYSIS

- Original conceptual architecture thought FDM included ATC, scenery, rendering, etc.

- FDM in conceptual architecture maps to SRC in concrete architecture

*Sequence diagram for aircraft currently in flight.*

# CONCLUSION

Utilized SciTools Understand to examine source code and dependencies

Analyzed concrete architecture with focus on FDM subsystem

Convergence and divergence from conceptual architecture analyzed using reflexion analysis

# LESSONS LEARNED

Managing lines/dependencies in Understand architecture

Difficult to create flexible visualization