

# *Air Force Life Cycle Management Center*

*Providing the Warfighter's Edge*

## *Advanced Simulation Platform for Experimentation (ASPEX)*



Controlled by: AFLCMC/XA

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# Topics



- **Need**
- **What is ASPEX?**
- **EAAGLES**
- **ASPEX Status**
- **Infrastructure**
- **ASPEX Teams**
- **XA Experimentation**
- **POCs**



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# Need Statement



- Experimentation capabilities within the Joint Simulation Environment (JSE) specifically supporting emerging requirements and/or capabilities
- Ability to incorporate models from emerging platforms/capabilities in JSE to shape Fighter-in-a-Box (FIAB) development and/or requirements
- Analysis supporting product integration within JSE – what are the limits?
- Continued evolution of AF JSE knowledge base
  - SW development growth
  - GRID integration experience
  - Government-owned expertise supporting AF JSE development



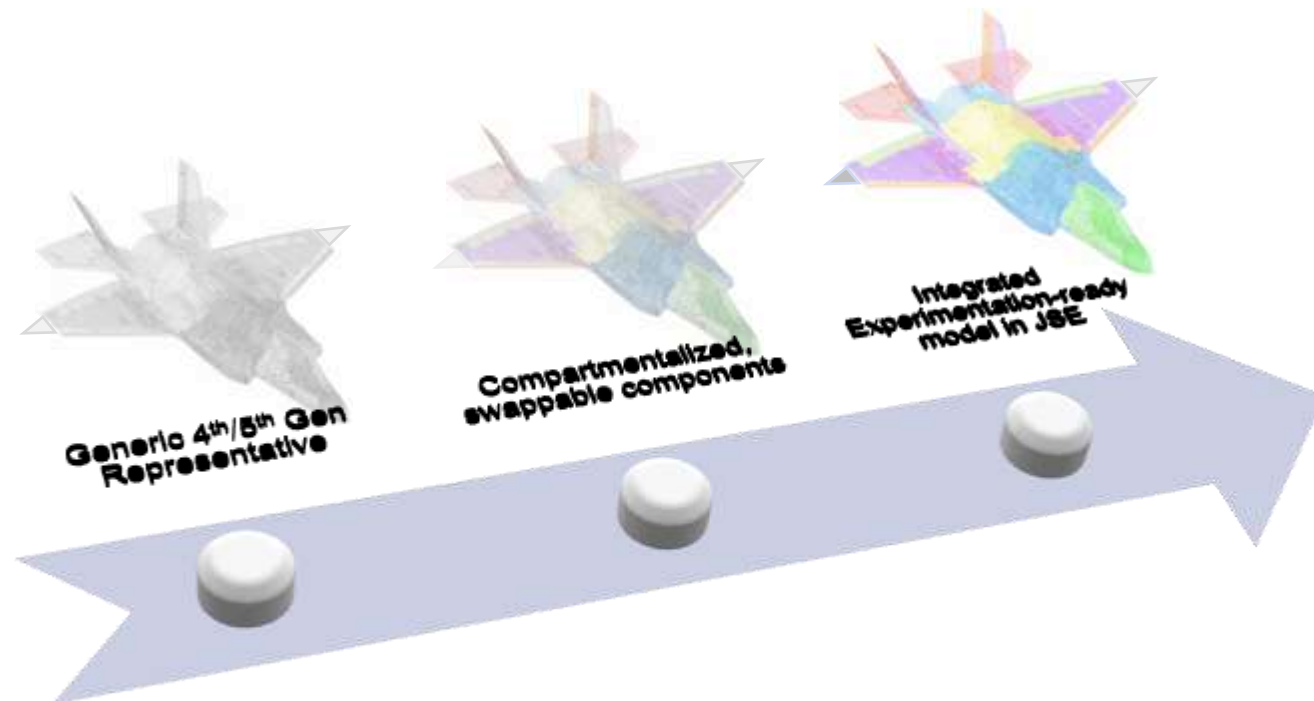
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# What is ASPEX?



- What is the Advanced Simulation Platform for Experimentation (ASPEX)?
  - Blue capability can represent 5<sup>th</sup> Gen and beyond
  - Compartmentalized EAAGLES-based product with swappable components
  - Supports high-fidelity model integration into JSE
  - “Pre-FIAB” JSE integration for emerging capabilities



**High Fidelity representation in JSE; early analysis/integration and requirements shaping**

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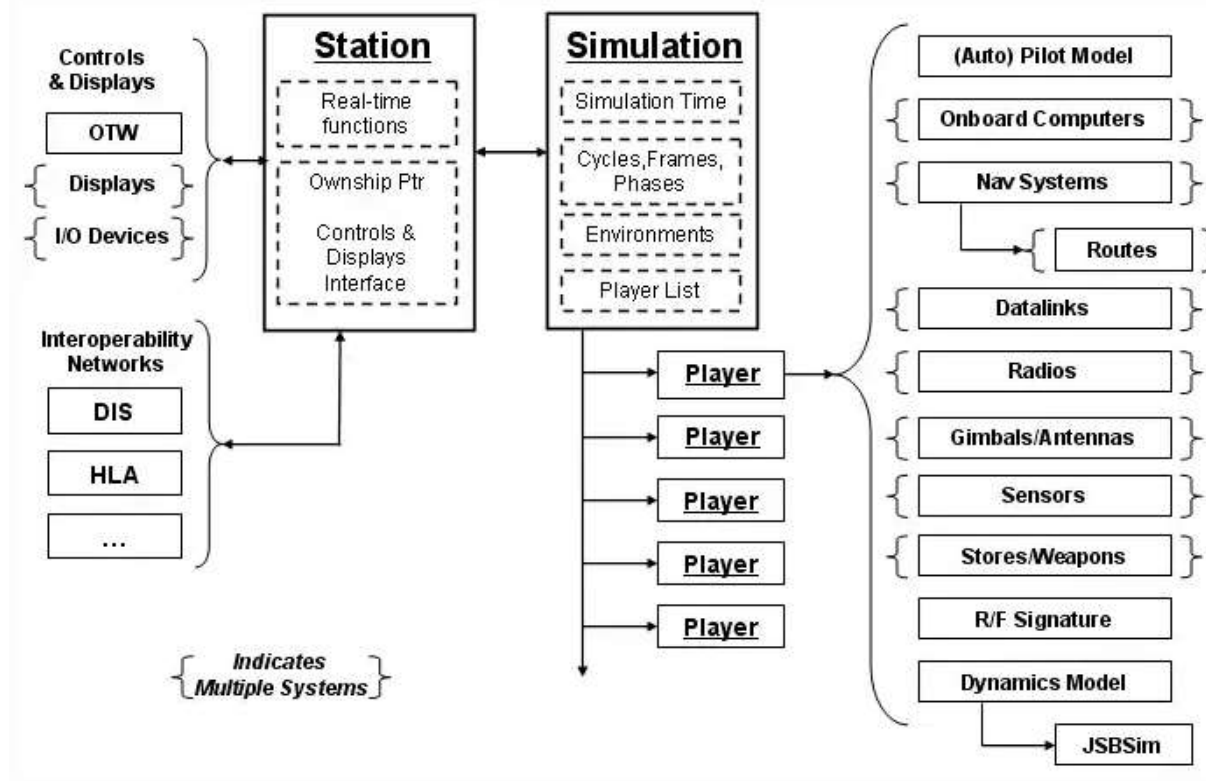
# EAAGLES



## EAAGLES: Extensible Architecture for the Analysis and Generation of LinkEd Simulations

- Managed by AFLCMC/XA
- Framework that underpins multiple Man-in-the-Loop applications, including ASPEX

Serving as a simulation design pattern it provides a structure for constructing simulation applications. The framework aids the design of robust, scalable, virtual, constructive, stand-alone, and distributed simulation applications. It leverages modern object-oriented software design principles while incorporating fundamental real-time system design techniques to meet human interaction requirements.





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# ASPEX – status



- **Platform-agnostic blue model integrated in GRID and available for use**
  - Registers as a GRID entity / Publishes Entity State
  - Utilizes GRID LOS Service
  - Works with GRID RF Service / GRID RCS Service
  - 5<sup>th</sup> Gen-representative, platform agnostic platform available for: 1) use in JSE, and 2) advanced capability experimentation/integration
  - Compartmentalized models with pull-and-replace capabilities
  - Agile capabilities to identify potential integration challenges early in the acquisition process
- Complete unclassified GRID integration
  - GRID Environment Services
  - GRID Zones
  - GRID Laser
  - GRID Designator
  - GRID Endgame
  - GRID IR
- Full Integration and test with GSI Testbed 1.0



**Platform-agnostic Blue  
capability; integrated in GRID  
by Spring 2023**

## ASPEX – status (cont.)



Providing future platforms and capabilities with “first-look” JSE capabilities

- **Supporting emerging platforms/capabilities: pre-FIAB JSE integration and experimentation**
  - “Early look” in JSE
  - What are potential barriers to success?
  - Analysis supports requirements; shapes environment needs
  - Provides platforms with JSE-integrated early system models; can be leveraged for FIAB development and/or integration
  - Opportunities: high fidelity modeling in JSE; positioned to provide “first look” capabilities



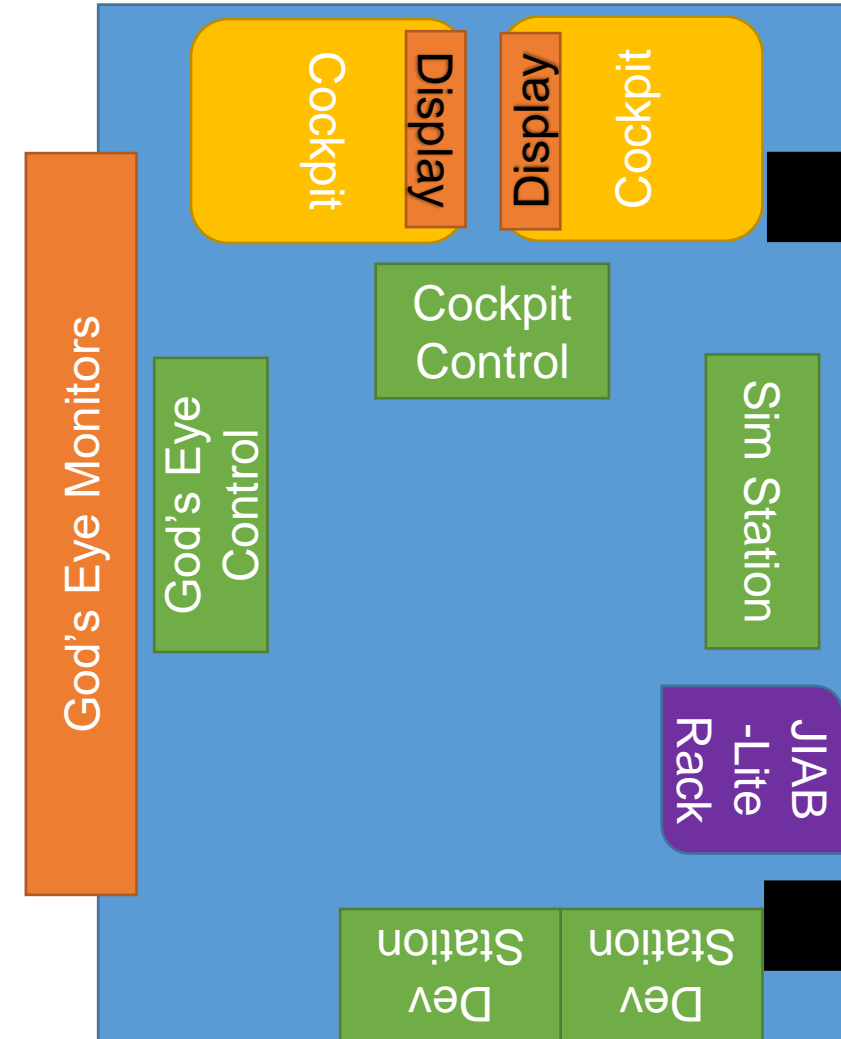
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# Experimentation Lab Overview

- Two cockpits are main test / deploy assets
  - 4k touchscreens
  - HOTASes
  - Mixed reality headsets
- God's Eye is for Situational Awareness / Debug Displays
- Sim Stations for Development Test
- Dev Stations for developer debug / non piloted assets
- Supports ASPEX Development & Test



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# ASPEX Development Teams

## EAAGLES Management Team



Manage Simulation Framework  
Core capability shared across applications  
Time based, real-time, faster than real time  
Enables shared performance and capability gains,  
compartmentalization of models

## ASPEX Team 1



Generic 5th Gen type fighter  
GRID integration / GSI  
conformance  
Ready for Early JSE integration  
JSE force multiplier  
MITL Blue Model

## Pipeline Management



DevSecOps Pipeline ensuring CI/CD & code security  
Details and implementation of ASPEX pipeline

## ASPEX Team 2



Integrated Model Capabilities for Experimentation GRID integration / GSI conformance SPO support	Early JSE integration understanding & support JSE force multiplier Capability analysis Weapon interfacing / test EW/RF experimentation
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## GRID Install, Test, Integration



Register as GRID entity Utilizes GRID LOS Service Works with GRID RF Service / GRID RCS Service GRID IR Service	GRID Environment Services GRID Zones GRID Laser GRID Designator GRID Endgame
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## Data Links



Expanding into emerging datalinks  
Capabilities for Datalink experimentation  
Full-featured multi-datalink models and simulation



# XA Experimentation

- Established space, HW, systems and personnel to perform **analysis, prototyping and Proof of Concept activities for platforms in development**
- Experimentation wants to know: **on platforms, what are potential barriers to success?**
- Strategies employed to provide early analysis **before** aircraft vendors have “FIABs”
- Experimentation outputs inform **investment decisions for environment development, evolution (as well as platform modeling)**
- Establishment and exercise of the DoD-Mandated DSO process for software development; utilization of the XA DSO Distillery for unclassified software development and MBSE
- Advancement of the Extensible Architecture for the Analysis and Generation of LinkEd Simulations (EAAGLES) simulation software framework for cross-cutting JSE utilities – **emulative platforms, data links, integration capabilities**
- Full GRID compliance, including GSI test bed and exercising JSE-native applications

***Working with platforms to model capabilities within JSE; identify potential integration challenges & solutions early in acquisition process***



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