

Breakfast with Ternion

November 28, 2023

Brad Spearing
Co-Founder and President
FLAMES Product Manager

Introductions

Others here with Ternion

- **Gena Spearing**, Brad's Wife
- **Joel Haythorn**, Director, Engineering Services
- **Corey Downing**, Software Engineer
- **Ryan Jones**, Software Engineer
- **Erin Stokes**, Software Engineer
- **Rachel Williams**, Software Engineer
- **B.K. Stover**, Peraton, Project Manager, C2WSPTT Support

Presentation Outline

- Ternion Overview
- FLAMES[®] Overview
- FLAMES Unreal Engine Option
- Ternion Demonstration and Exhibit Overview

Ternion Overview

Ternion was founded to satisfy the ever-growing requirement for constructive simulations

- **Founded in April of 1989 in Huntsville, Alabama**
- **Developers of FLAMES[®] (FLexible Analysis, Modeling and Exercise System), a commercial off-the-shelf (COTS) simulation framework**
- **Developers of simulations based on FLAMES**

FLAMES Overview

Types of Simulation

There are three types of simulation
(from one point of view)

Live: Real humans – Real equipment

Virtual: Real humans – Simulated equipment

Constructive: Simulated humans – Simulated equipment

FLAMES is a framework for constructive AND virtual simulations and for interfaces between live, virtual, and constructive simulations

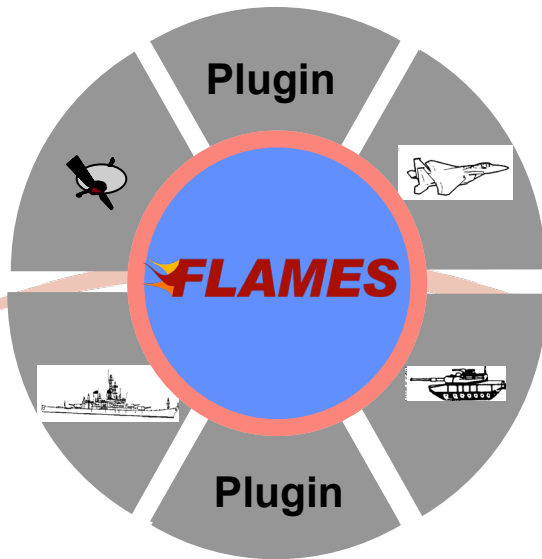
What Is FLAMES?

FLAMES is a family of commercial off-the-shelf (COTS) software products that support the development of custom simulations tailored to specific requirements

- **FLAMES is NOT a simulation**
- **More than 100 different simulations have been developed using FLAMES**
- **All are properly called “FLAMES-based” simulations**
- **All simulations are developed on the FLAMES “framework”**

The FLAMES Framework

FLAMES is a “framework” for developing custom simulations



**FLAMES-Based
Simulation**

- The FLAMES “framework” includes all infrastructure software and no modeling software
- The framework includes “plugin” interfaces that support almost any type of model
- All models are implemented as plugins that are external to the framework
- Different simulations are created by developing new plugins

Typical Simulations

Typical simulations are composed of 100% unique, simulation-specific code



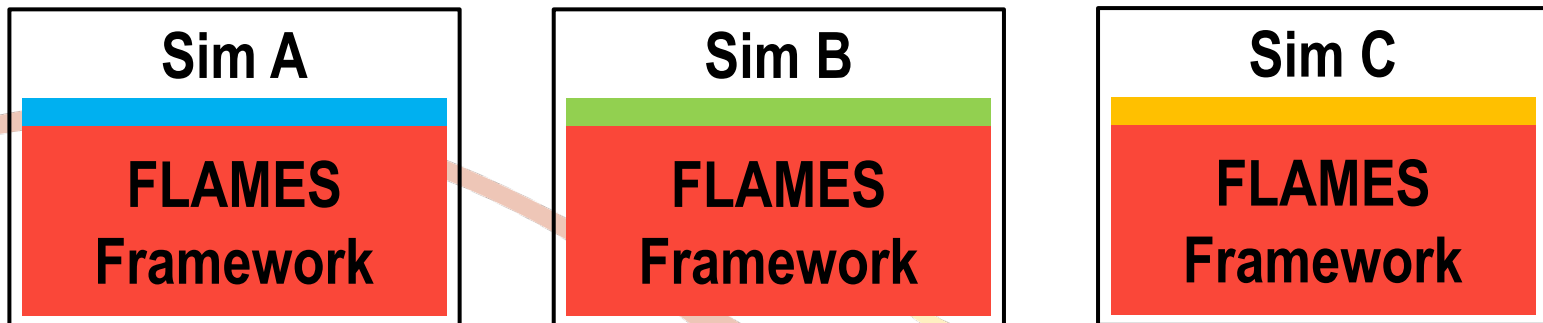
Sim A

Sim B

Sim C

FLAMES-Based Simulations

In FLAMES-based simulations, the vast majority of the code is the same and is provided by FLAMES



Why FLAMES?

FLAMES exists to save time, save money, and deliver more capable simulations

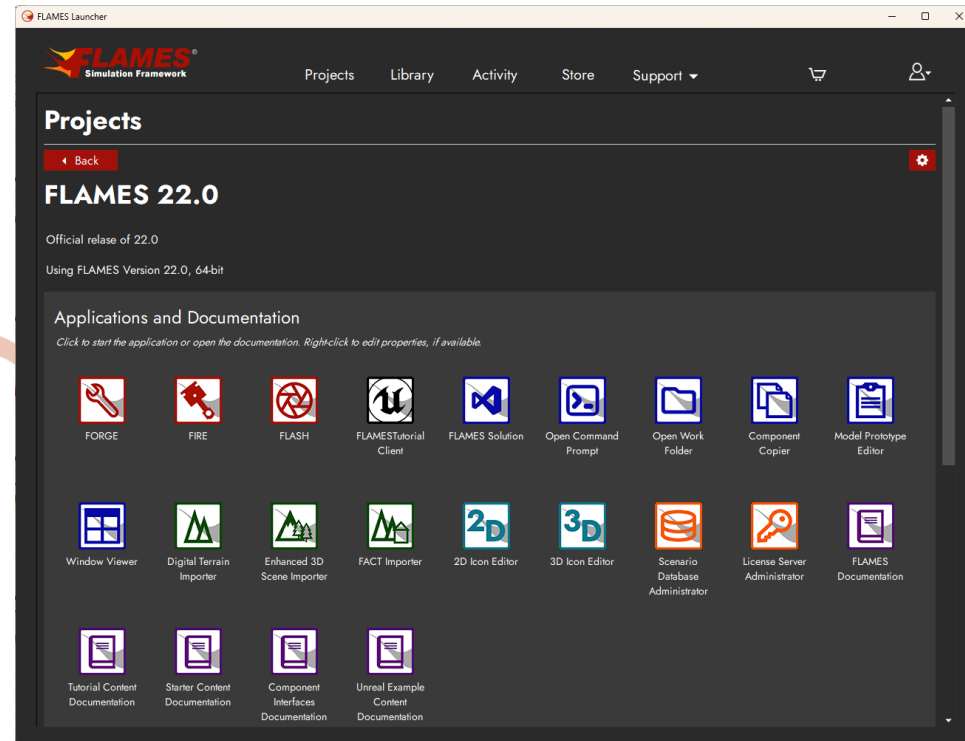
- **Simplifies simulation design**
- **Reduces the amount of software you need to develop**
- **Simplifies the software you do need to develop**
- **Reduces risk**
- **Allows true software reuse**
- **Delivers simulations with more capabilities**

What's Included in FLAMES?

FLAMES Launcher

The Launcher streamlines installing and using FLAMES

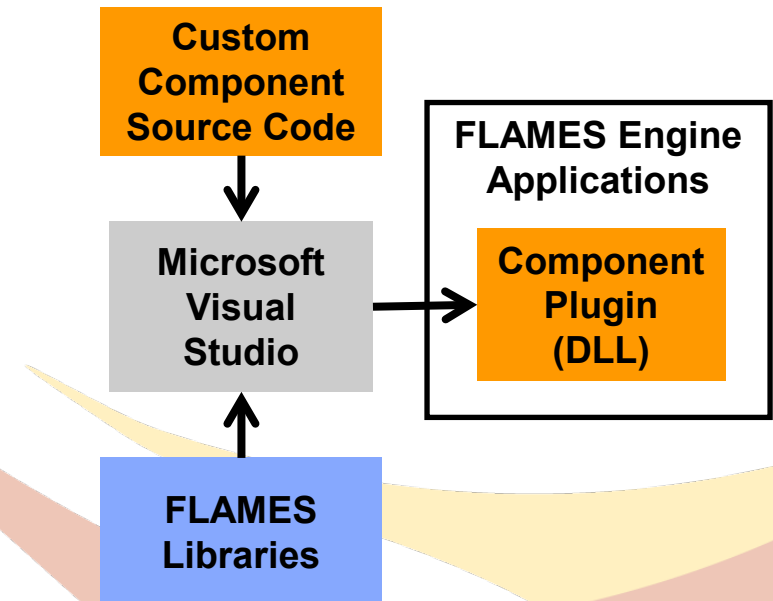
Store
Library
Projects



FLAMES Developer

Software development kit (SDK) and tools to develop custom FLAMES plugins

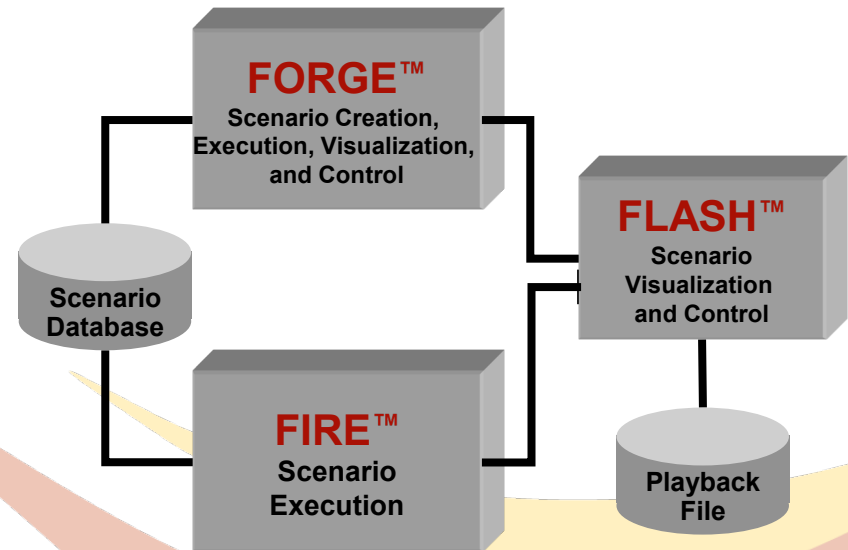
- Base classes for all custom component classes
- Immense library of functions
- Code generation tools
- Uses Microsoft Visual Studio
- Licenses available for FREE



FLAMES Engine

Full-featured applications to create, execute, visualize, and control FLAMES scenarios

- Complete – no software development required
- Automatically loads specified set of plugins
- “Scenarios” defined in data stored in Scenario Database
- Trial Version available for FREE



FLAMES Options

Options add features to the FLAMES Engine

Enhanced Analysis Option – Perform automated parametric trades studies, Monte-Carlo analysis, and sensor coverage

Checkpoint/Restart Option – Restart a scenario execution from the data stored in a checkpoint file.

Network Database Option – Host a scenario database on a network server and collaborate scenario editing

DIS and HLA Options – Communicate with other simulations using DIS and HLA

More FLAMES Options

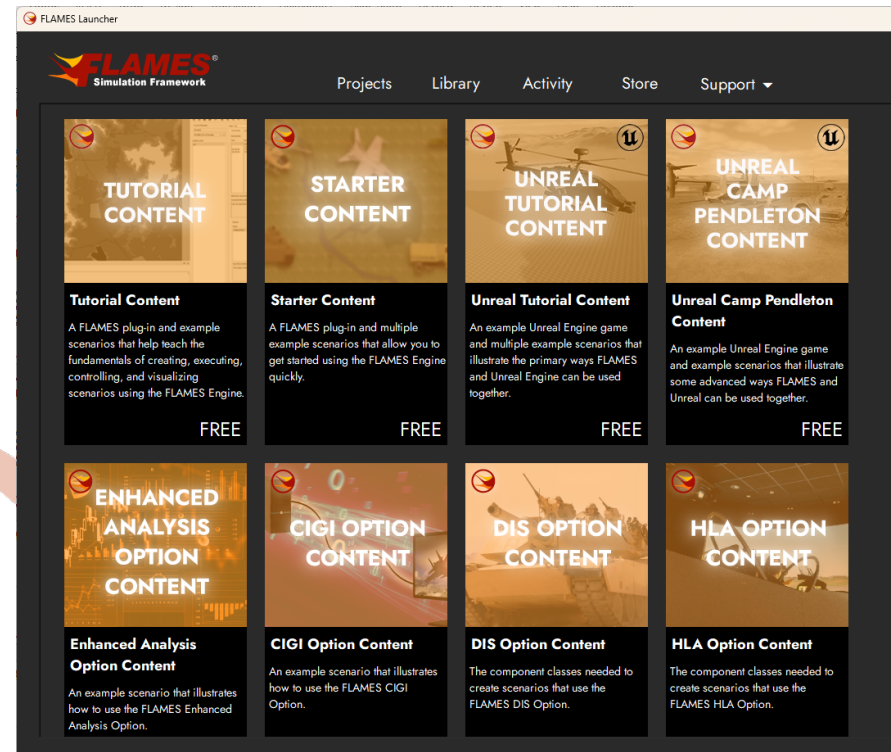
More options for the FLAMES Engine

CIGI Option – Communicate with image generators using the Common Image Generator Interface (CIGI).

Unreal Engine Option – Integrates an Unreal Engine game directly into FLAMES (new in version 22.0)

Become productive using FLAMES without any software development

- Available for **FREE** in the **FLAMES Store**
- **Plugins, scenarios, and documentation**
- **Packaged Unreal games**



FLAMES Content Source

All the source code to the plugins and Unreal games in the FLAMES content is available for FREE

- **Source code is available in GitHub repositories**
- **Most code written in C++**
- **Complete Unreal projects are available for games**
- **Modify or use to start custom development**

Documentation and Training Videos

FLAMES is supplied with abundant documentation and FREE training videos

- **User documentation for FLAMES Engine and options**
- **Documentation for developing components and plugins**
- **Access documentation from the Launcher and from application context**
- **Dozens of FREE user and developer training videos available on flamesframework.com website**

Some FLAMES-Based Simulations

Examples of FLAMES-based simulations developed by Ternion

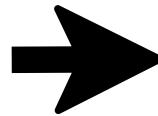
- **NATO Combined Air Operations Centers (CAOCs) Integrated Training Capability (ITC)**
- **USAF Air Operations Center (AOC) Command and Control Weapon System Part Task Trainer (C2WSPTT)**
- **USMC Common Aviation Command and Control System (CAC2S) Training Simulation (FAST™)**
- **Taiwan, Republic of China, Air Force Distributed Wargaming System – Enhanced (DWS-E)**

FLAMES Unreal Engine Option

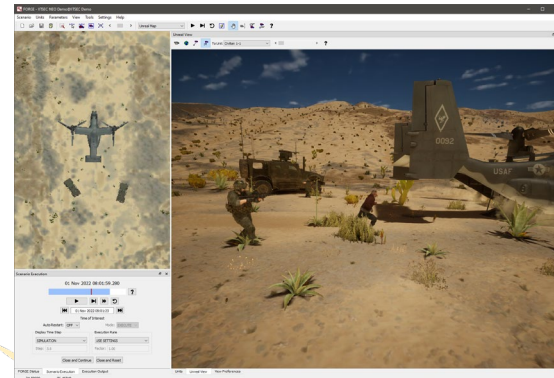
FLAMES Unreal Engine Option

New option integrates Unreal Engine directly into FLAMES

Unreal Editor



FORGE



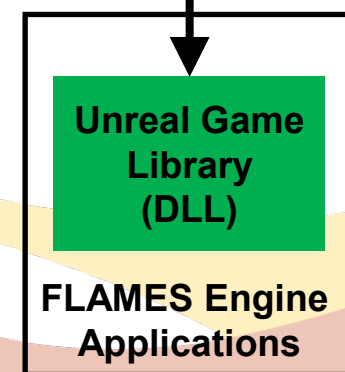
The ultimate framework for creating serious games and 3D, entity-level constructive and virtual simulations

Unreal Game Integration Process

FLAMES integrates Unreal games packaged as “libraries”

- Start from a game project in the FLAMES Store
OR
Start from almost any Unreal game and add the FLAMES plugin for Unreal and other “hooks”
- Normally, create only actor classes (actors are created in FLAMES)
- Package the game as a “library”
- Tell FLAMES where the library is located
- FLAMES automatically integrates the game

Unreal Editor



What Unreal Engine Brings to FLAMES

Nearly every feature of Unreal is available when a game is integrated into FLAMES

- Powerful 3D content editor
- Mind-blowing 3D rendering
- Fantastic motion/physics modeling
- Multiplayer gaming architecture
- FREE and open game development
- Abundant content and plugins available

Unreal Editor



What FLAMES Brings to Unreal Engine

Nearly every feature of FLAMES is available when an Unreal game is integrated

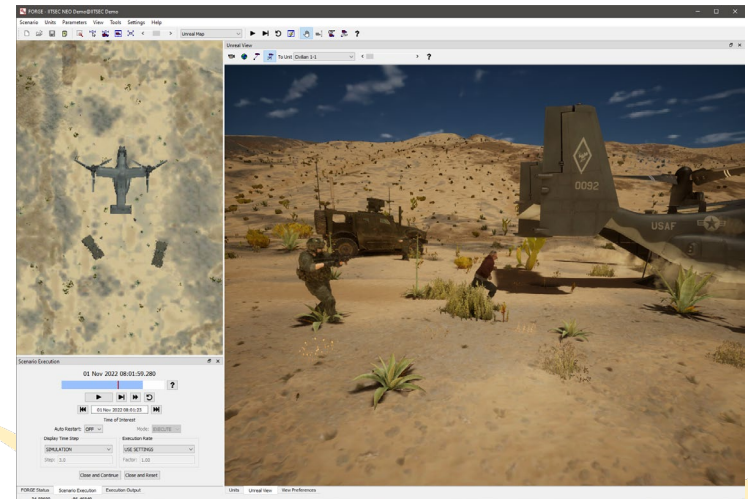
- Powerful support for cognition, command and control, sensor, weapon system, communications, and electronic warfare modeling
- Interactive, collaborative scenario editing without having to rebuild the Unreal game
- Interfaces to live, virtual, and constructive (LVC) systems and simulations
- FREE and open software development
- Library of content and source code

FLAMES and Unreal Engine

More features of the FLAMES Unreal Engine option

- The Unreal game world defines the FLAMES terrain (no “terrain correlation” issues)
- Simultaneous 2D and 3D visualization performed by Unreal during scenario editing and scenario execution
- Full support for Unreal multiplayer architecture

FORGE



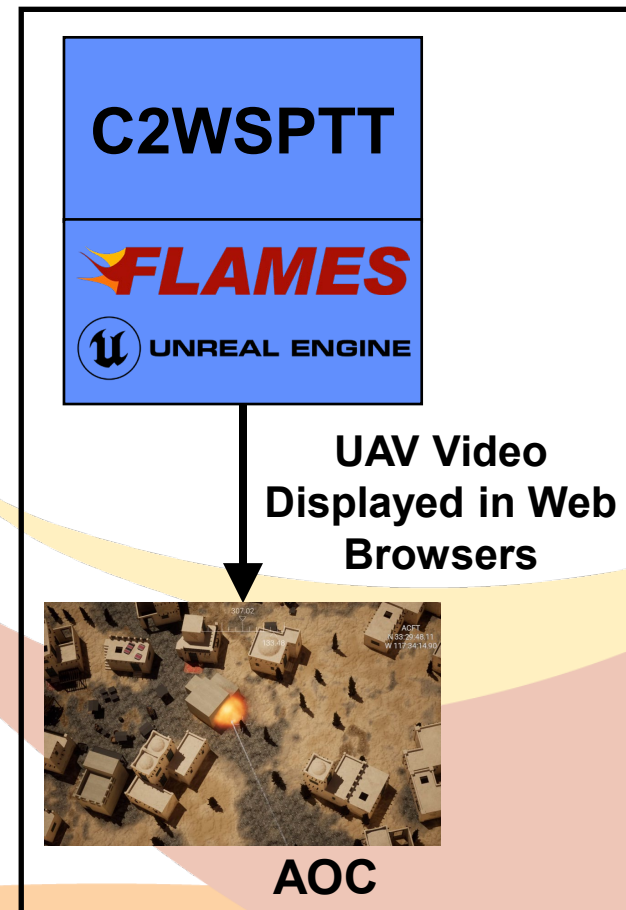
Ternion Exhibit Overview

Booth 2220

C2WSPTT Integrated UAV Video

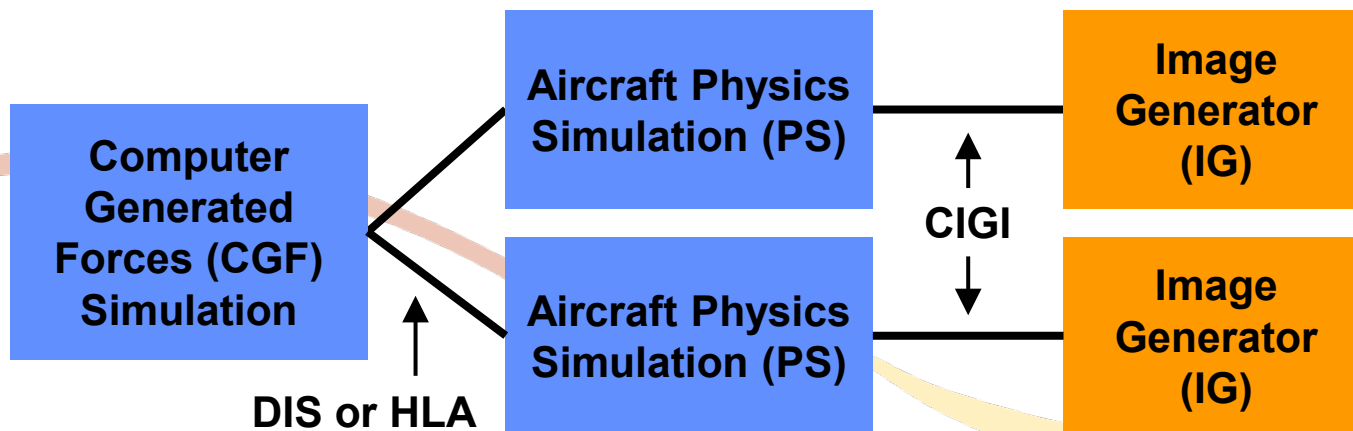
Enhancements will allow UAV video streams to be generated directly from the simulation

- The Command and Control Weapon System Part Task Trainer (C2WSPTT) is the embedded training simulation for the USAF Air Operations Center
- UAV video displays what is actually happening in the simulation
- Video includes weapons effects
- No extra hardware or software is required in the AOC



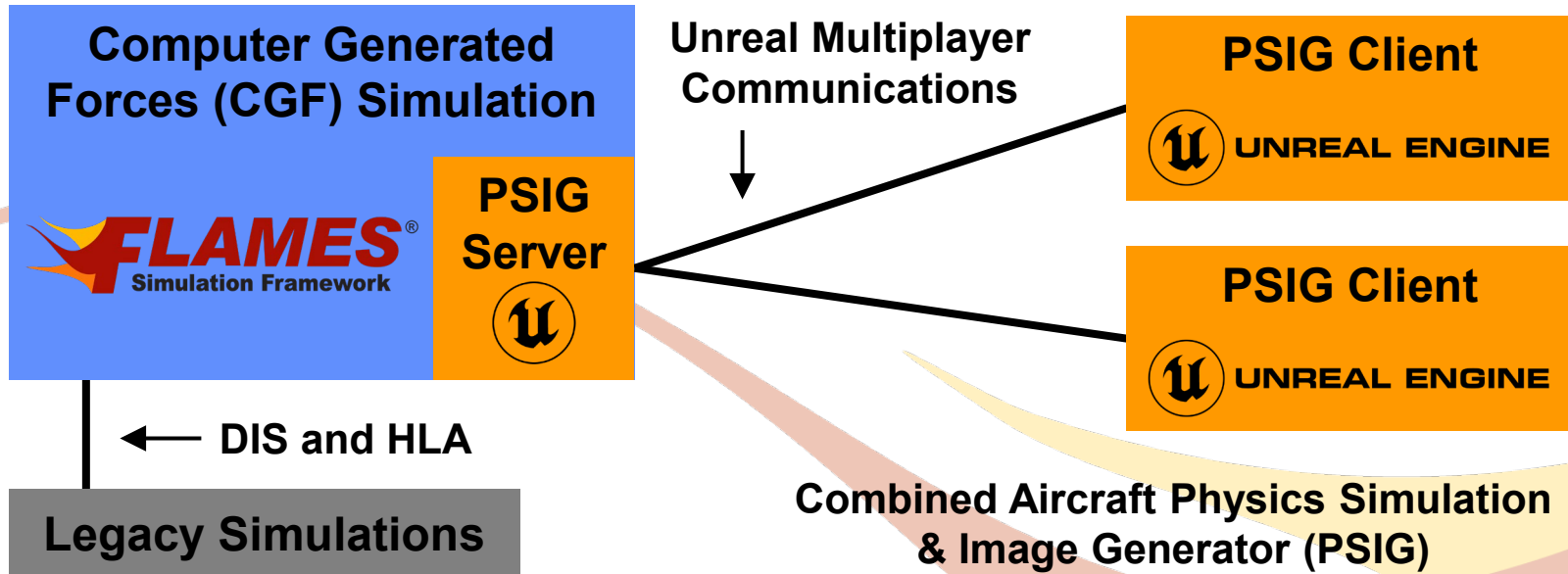
Typical Aircraft Simulator

Typical aircraft simulator architecture based on legacy technology



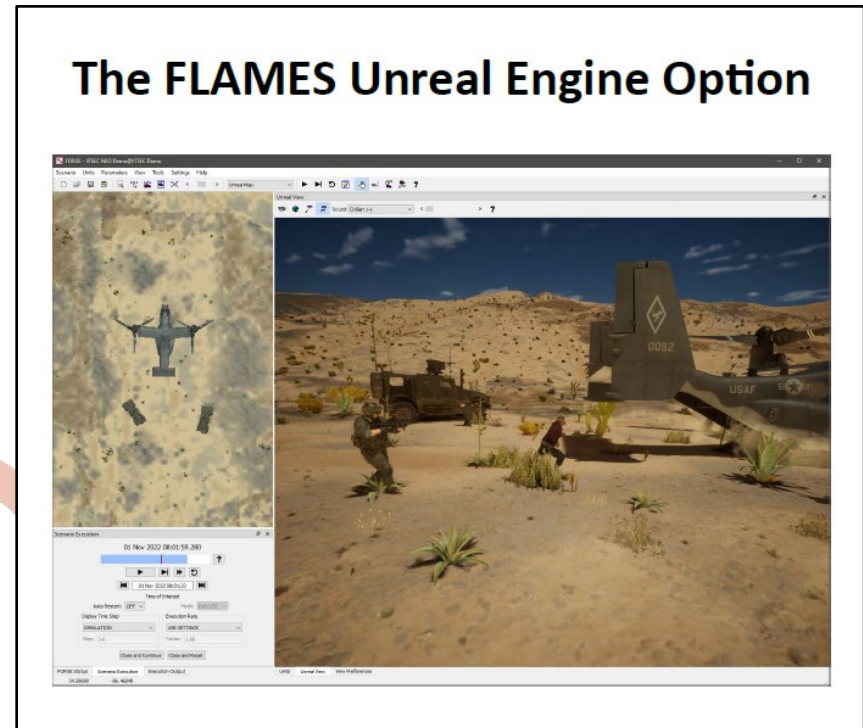
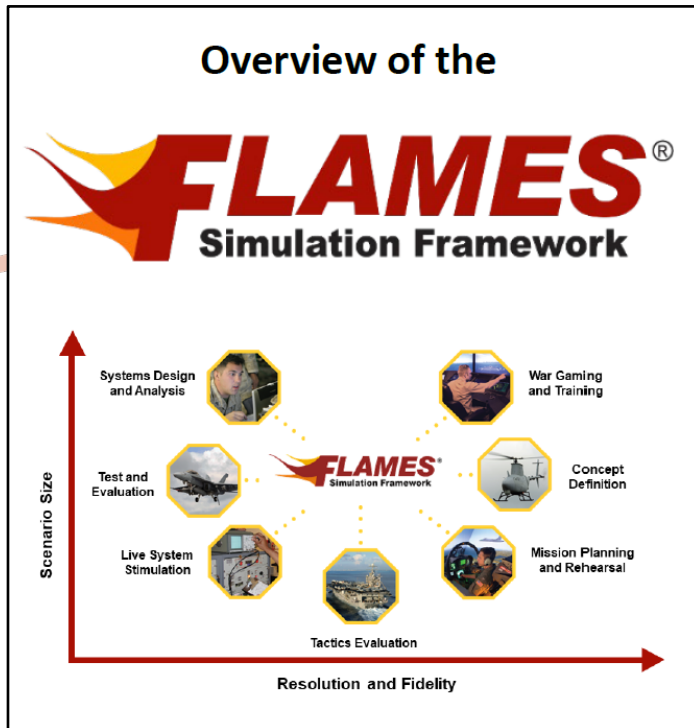
Ternion Demonstration Aircraft Simulator

Ternion's aircraft simulator demonstrates a new architecture with unparalleled capabilities



Ternion Whitepapers – Booth 2220

Get Ternion whitepapers for detailed information



Ternion Whitepapers – Booth 2220

More whitepapers on Ternion demonstrations

An Aircraft Simulator Unlike ANY
You Have Ever Seen!



Generating UAV Video from the
Air Operations Center Training Simulation



For More Information

- Download the **FREE FLAMES Developer**
- Visit us at I/ITSEC Booth 2008
- Schedule a meeting in Ternion's booth
- **FLAMES web site: flamesframework.com**
- Stay to ask questions

**Thanks for joining us.
Have a great day!**