Component-Based Simulation Development

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FLAMES®
Constructive Simulation Framework

Ternion History

Ternion was founded to satisfy the growing requirement for simulation

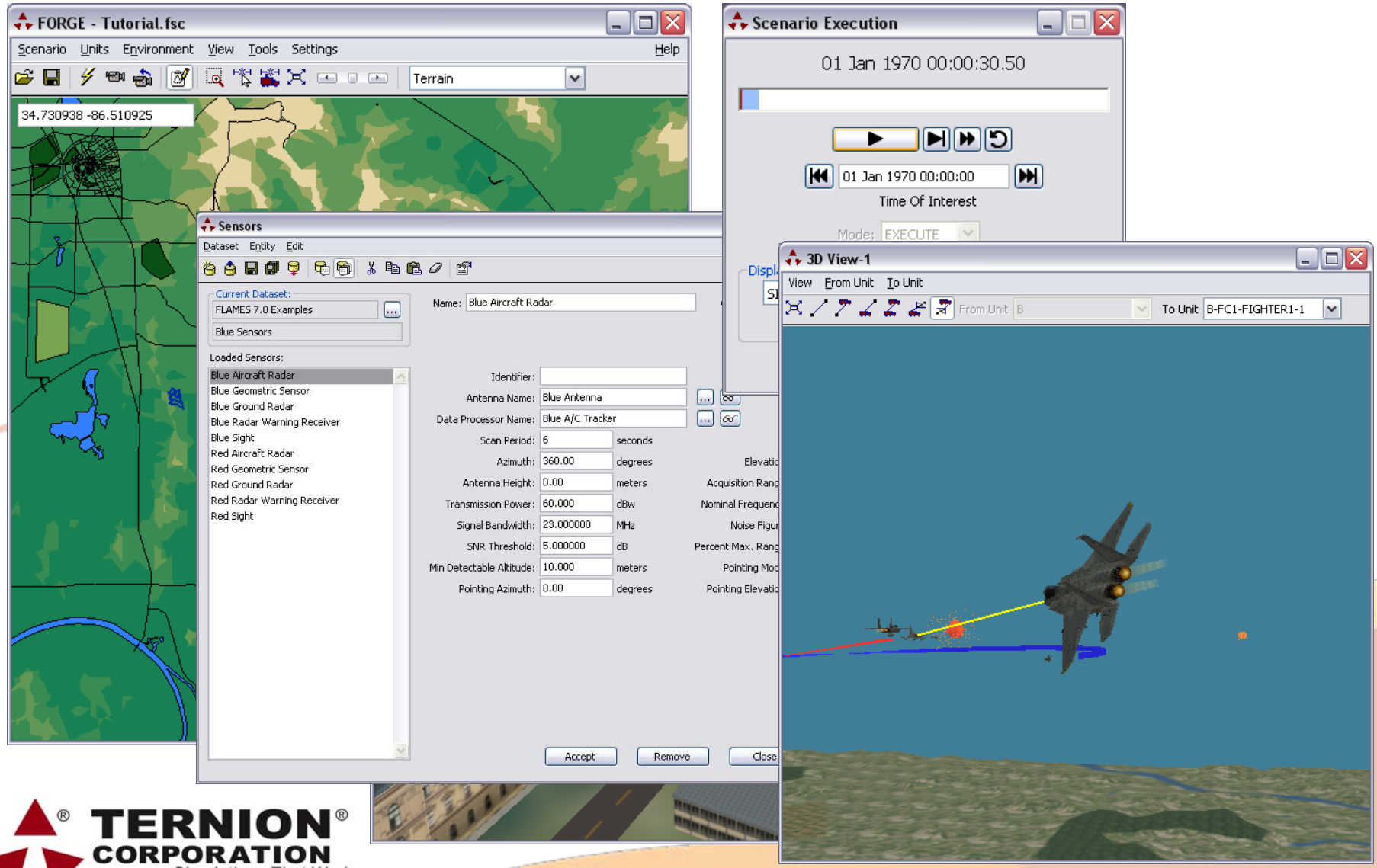
- Founded in April of 1989 in Huntsville, Alabama
- Single product line is the FLexible Analysis Modeling and Exercise System (FLAMES®)
- Ternion also helps customers develop FLAMES-based simulations

Some of Ternion's Customers

Ternion's products and services support simulations that are used around the world

- United States Air Force, Army, Navy, and Marine Corps and NATO
- Militaries of Canada, Finland, France, Greece, Israel, Italy, Japan, Germany, Republic of China (Taiwan), Republic of Korea, Spain, Sweden, Turkey, the United Arab Emirate, and the United Kingdom
- Numerous U.S. and foreign commercial organizations

Simple FLAMES-based Simulation



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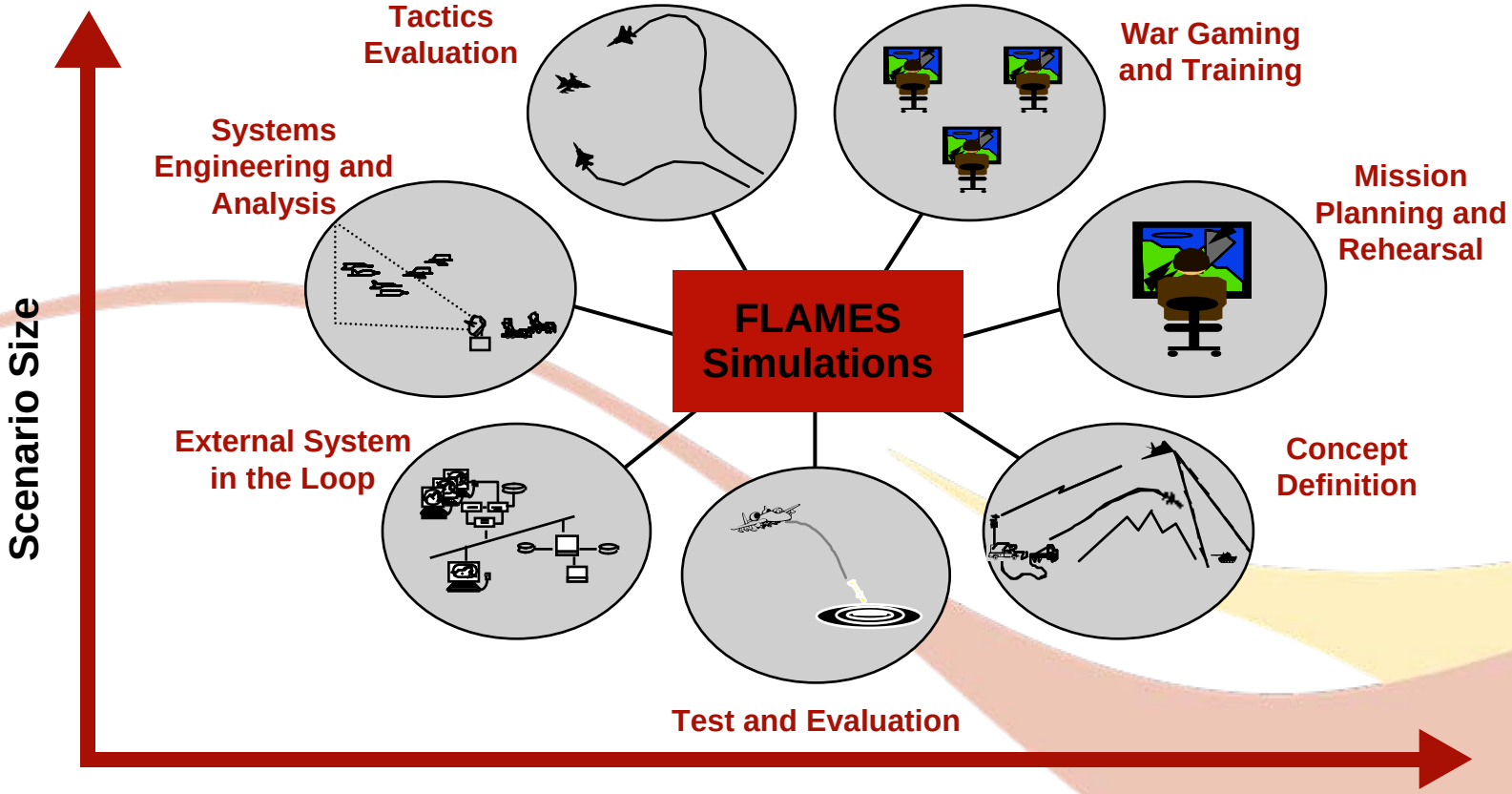
Types of FLAMES-based simulations

Simulations have been developed using FLAMES to support nearly every requirement



FLAMES Simulation Framework

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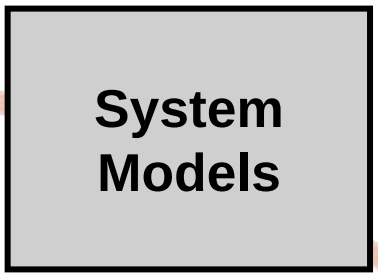
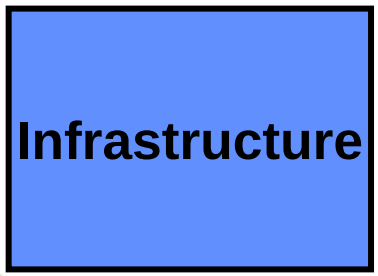
Typical Simulation Architecture

Simulation software can be divided into two categories



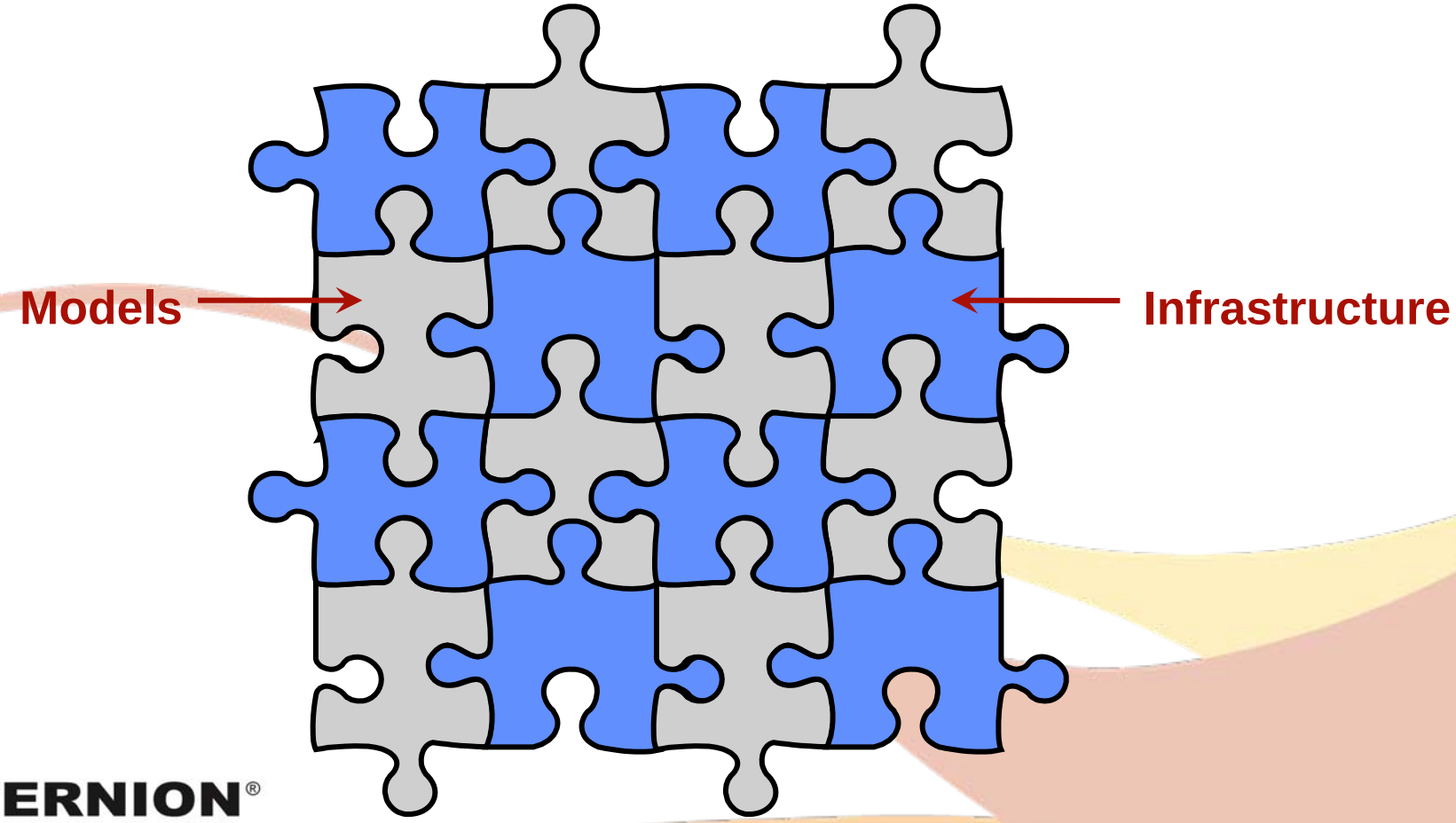
Humans, equipment, and the environment (simulation specific)



Simulation management and support software (necessary for all simulations)

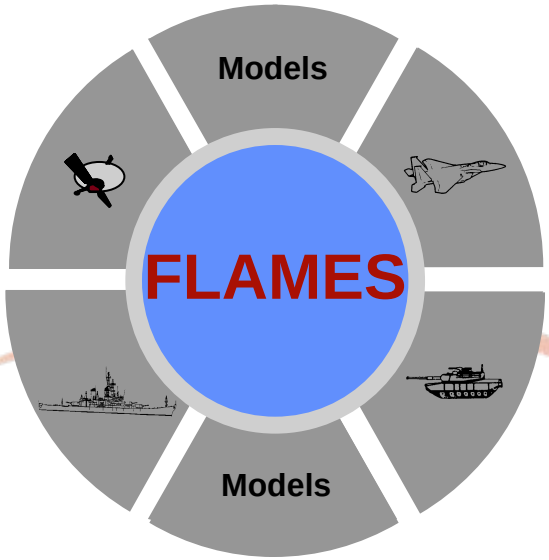
Typical Simulation Architecture

Most simulations make no clear distinction between model and infrastructure software



The FLAMES Approach

FLAMES is a framework for composable, object-oriented, component-based simulations

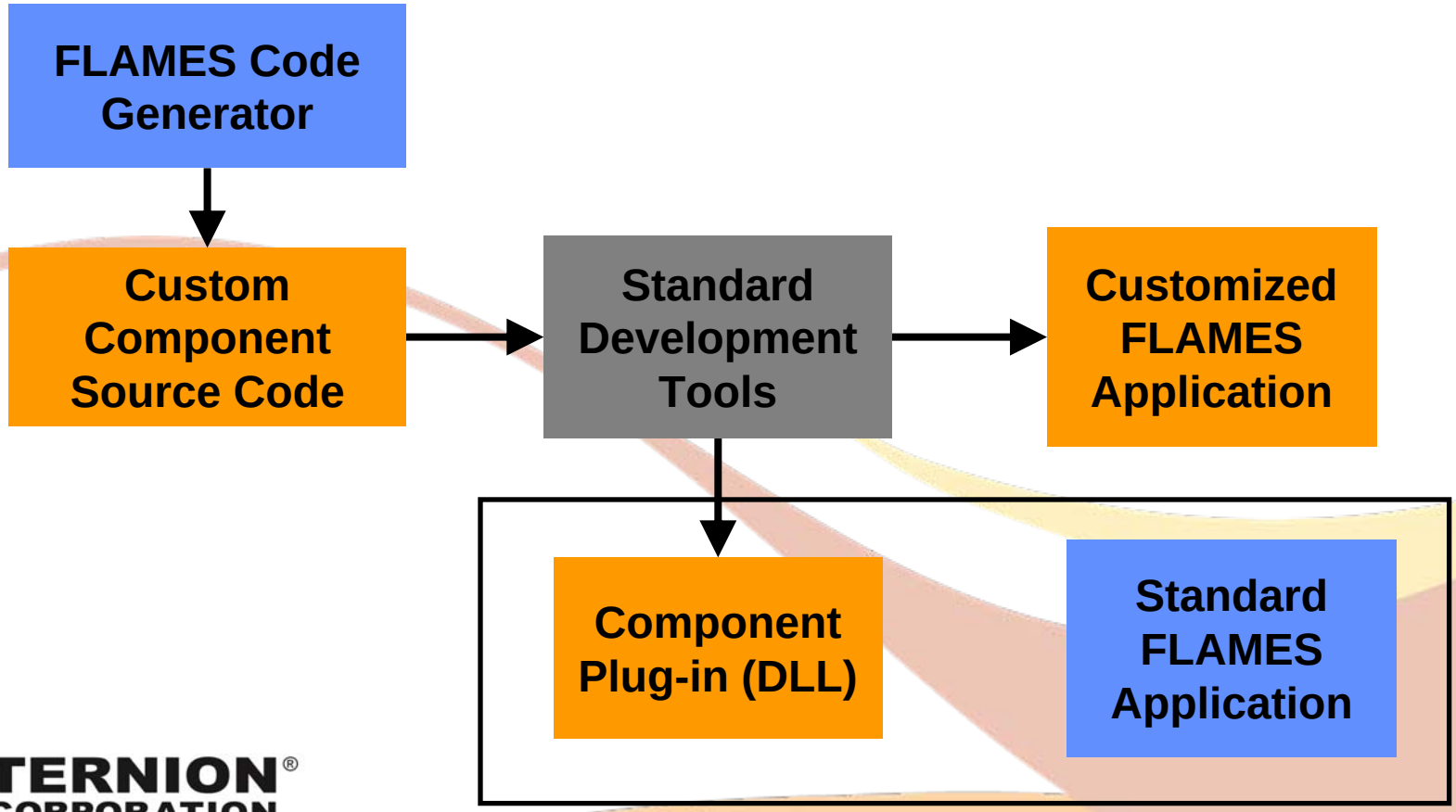


FLAMES-Based Simulation

- FLAMES provides modern, feature-rich infrastructure and model interface software
- Real-world system models (components) are completely external to and independent of FLAMES
- Components “plug” into FLAMES and are automatically recognized by FLAMES
- New components can be developed quickly and inexpensively

Component Development Process

New FLAMES components can be developed and integrated easily



FLAMES Components

Many types of components can be developed for FLAMES-based simulations

- Physical Device (Equipment) Models
- Human Cognition Models
- Communications/Message Models
- Weapon Effects Models
- Atmosphere and Weather Models
- Management Services
- 2D and 3D Custom Visualization
- Interfaces to external live and virtual systems

Engineering and Analysis Simulation

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Engineering and Analysis Simulation

FLAMES readily supports non-interactive, engineering design and analysis simulations

1 *Configure the Scenario*

- System Concepts
- Design Parameters
- Rules of Engagement
- Tactics and Plans

2 *Execute the Scenario*

3 *Analyze the Results*

- Automated Parametric Trade Studies
- Monte Carlo Analysis
- Proof of Concept
- System Demonstrations

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Using Scenario Variables

Almost any input parameter can be specified using a Scenario Variable (Enhanced Analysis option)

Sensor Parameters as Constants

RANGE = 300

AZIMUTH = 90

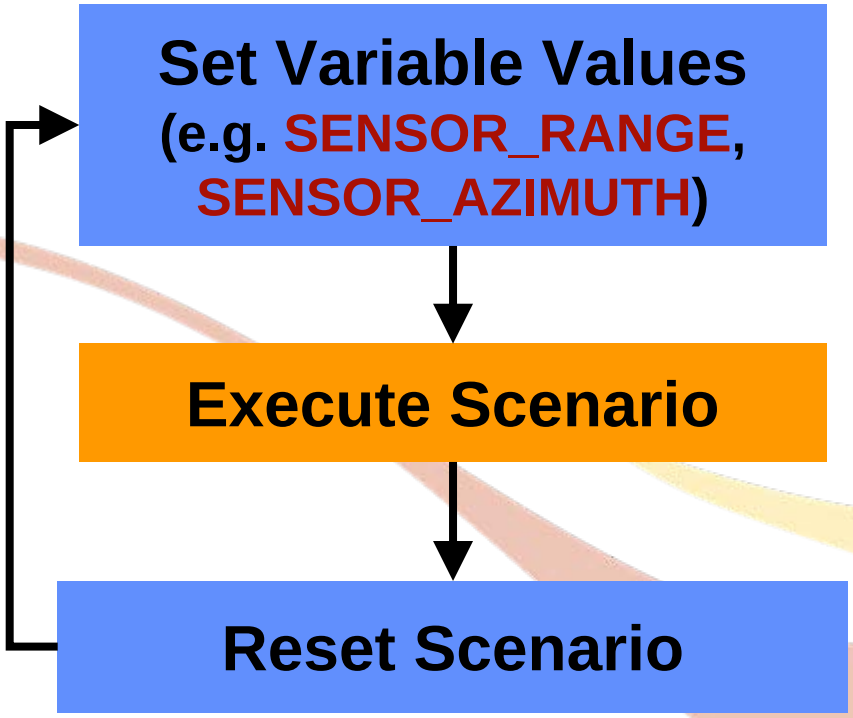
Sensor Parameters as Scenario Variables

RANGE = &SENSOR_RANGE

AZIMUTH = &SENSOR_AZIMUTH

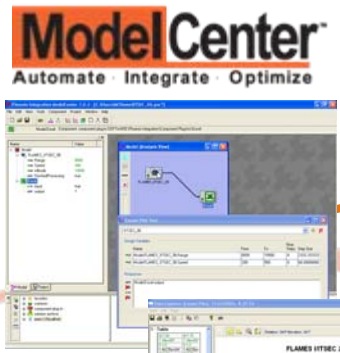
Scenario Multiple Execution

A scenario can be executed multiple times with different scenario variable values



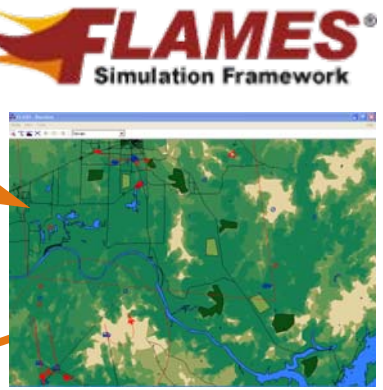
FLAMES and ModelCenter

ModelCenter can specify variable values, control FLAMES execution, and analyze scenario results



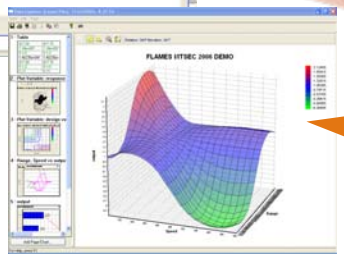
Specify experiment inputs

Scenario Variable Values



Execute the scenario

Scenario Results



Plot and analyze the results

PHOENIX INTEGRATION

The ModelCenter interface development was sponsored by the US Air Force

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More Information

More information on Ternion and FLAMES is available in the following places

www.ternion.com

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Questions?


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