

Analysis Customer Success



Air Force Research Lab Munitions Directorate Uses FLAMES

Concept Evaluation Tool

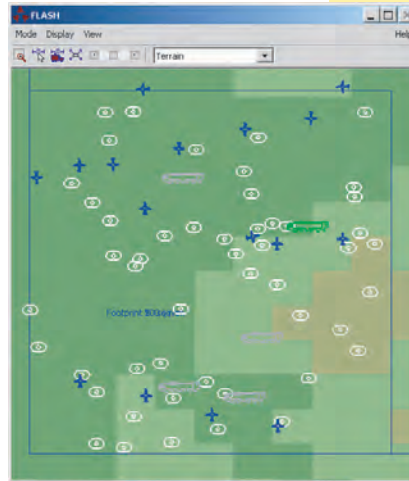
The Air Force Research Lab's Munitions Directorate (AFRL/RW) uses modeling and simulation to better study advanced, conceptual weapon systems. These weapon systems are actually a system-of-systems that use many technologies not yet developed. As budgets shrink, the efficient use of resources becomes critical. Applied Research Associates (ARA) is developing system-of-systems simulation models to represent these conceptual weapon systems and providing analysis that enables the AFRL/RW to make better investment decisions in both effort and funding.

Based on experience, warfighters identify abilities that would allow them to better accomplish their missions. Recent examples include the ability to attack deeply buried targets and the ability to detect and destroy mobile launchers that come out of hiding over an extended period of time. Engineers then devise conceptual weapon systems based on existing and/or future technologies to meet the warfighters' needs. Since developing and transitioning these conceptual weapon systems requires a tremendous amount of resources, these concepts must be evaluated in terms of viability, cost, and risk. Furthermore, as the concepts advance in maturity, analysis can determine sensitivities to technology development.

Using the FLAMES® architecture, ARA is supporting the AFRL/RW in developing weapon systems for the next decade. FLAMES enabled ARA to develop system-of-systems simulation models very quickly and efficiently. In particular, the FLAMES architecture supports independent equipment modeling, allowing ARA to build models for various communications equipment, sensors, and munitions being considered for the conceptual weapon system. These equipment models can then be "plugged" into the system-of-systems simulation for sensitivity analysis of their impact.

In addition to specific equipment models, ARA has learned the tremendous importance and impact of cognitive models for conceptual weapon systems. Cognitive models represent how the weapon system is employed, how the systems interact with each other within the system-of-systems, how the equipment interacts within a system, and how information is utilized. The FLAMES architecture fully supports the development of cognitive models, a key feature not found in other simulation architectures.

Since the weapon systems designed and considered by the AFRL/RW are conceptual, how the weapon systems are best employed is not known. The technologies these system-of-systems weapon systems bring to the warfighter represent a paradigm shift in capabilities and concept of operations. Applied Research Associates is able to support the development of not only the technologies used by advanced system-of-systems weapon systems, but also how the advanced weapon systems use the technology and how to employ such a weapon system.



An example of an advanced system-of-systems weapon system involves many vehicles loitering over a battlefield waiting to strike time-critical targets once they appear, such as this mobile missile launcher. Besides the analysis of equipment technologies, FLAMES also supports the analysis of CONOPS.

(Note: the white icons represent clutter that the sensors must deal with.)

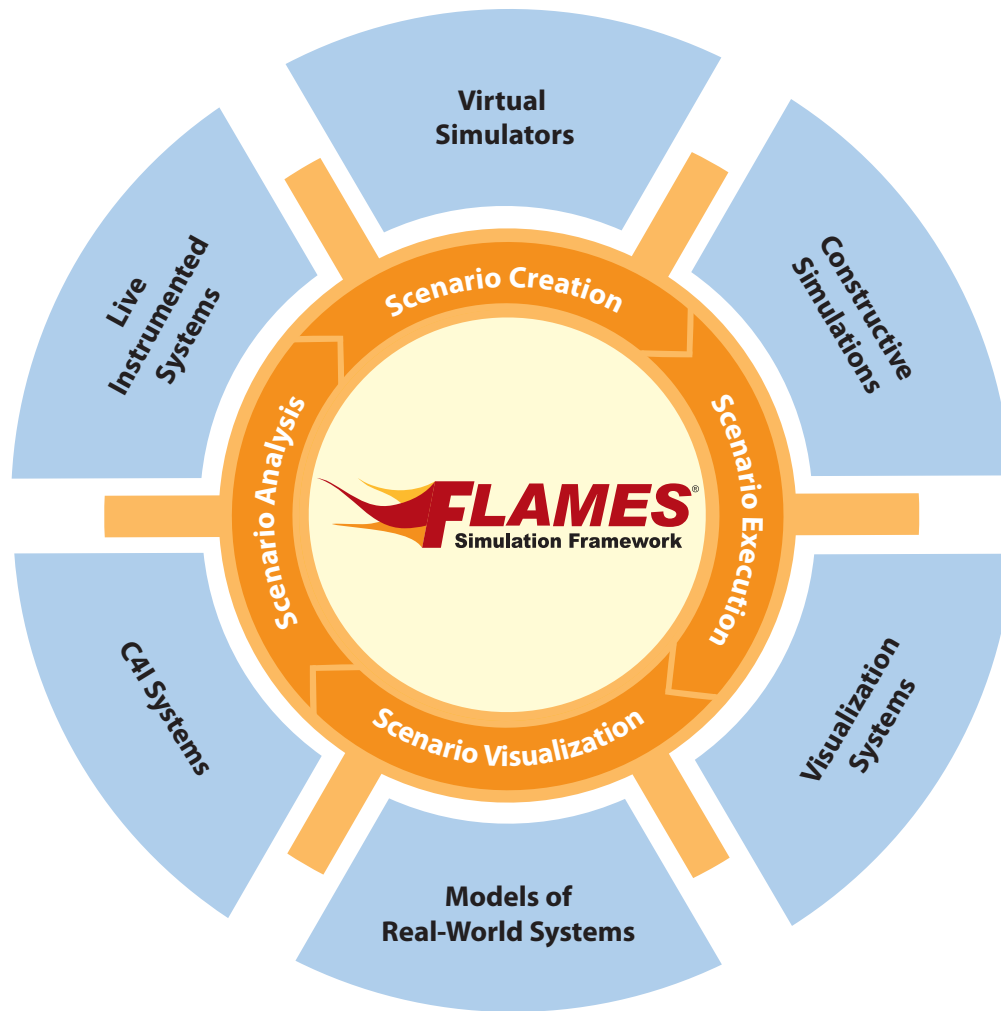
About AFRL/RW

The mission of the Air Force Research Lab's Munitions Directorate is to develop, integrate, and transition science and technology for air-launched munitions with the purpose of defeating ground-fixed, mobile/relocatable, air, and space targets, hereby assuring the preeminence of the U.S.

About ARA

Applied Research Associates is an employee research company that has grown steadily since 1979 and has offices throughout the United States and Canada. Its primary mission is to provide in-depth and diversified research, engineering, and technical support services. Its goal is to develop innovative, cost-effective solutions to important national problems in engineering and the physical sciences.





FLAMES-Based Simulation System

FLAMES is a powerful simulation framework that addresses all aspects of constructive simulation development and use, including customizable scenario creation, execution, visualization, and analysis, as well as interfaces to live, virtual, and constructive systems. FLAMES minimizes the amount of software development needed to get a full-featured, working simulation. At the same time, the open, object-oriented architecture of FLAMES gives you the flexibility to modify or enhance your simulation as necessary to meet your specific requirements. Get the simulation you need, when you need it, with FLAMES.

Since 1989, Ternion® Corporation has provided quality commercial simulation products and custom software development and support services to government and commercial organizations worldwide. Ternion is a privately held, employee-owned company located in high-tech Huntsville, Alabama.

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