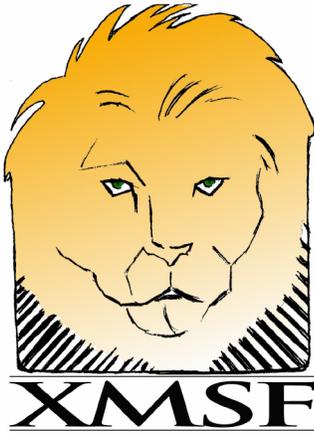


Project Overview—

Extensible Modeling and Simulation Framework (XMSF)



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The Department of Defense (DoD) is engaged in a massive transformation of its warfighting and peacekeeping capabilities. In turn, DoD Modeling and Simulation (M&S) must undergo a similar transformation to provide direct tactical relevance to warfighters. Today there is only one software application environment that has proven composable and scalable on a global scope -- namely, the World Wide Web.

An extensible Web-based framework shows great promise in giving M&S systems the scalability and composability to meet the broad needs of training, analysis, acquisition, and the operational warfighter. By embracing commercial Web technologies as a shared-communications platform and a ubiquitous-delivery framework, DoD M&S can fully leverage mainstream practices for enterprise-wide software development and deployment.

Web-based technologies can support interoperability for the full spectrum of M&S applications, including constructive, virtual, and live environments. Web-based technologies can integrate legacy simulation frameworks and distance-learning technologies, which are becoming increasingly important for reaching warfighters distributed across the globe.

The Extensible Modeling and Simulation Framework (XMSF) is intended to create a basis and initial requirements for transformational interoperability, founded on the following:

- Web-based technologies applied within an extensible framework will enable a new generation of M&S applications to emerge, develop and interoperate.
- Support for operational tactical systems is a missing essential for existing M&S applications frameworks.
- An extensible XML-based framework can provide a bridge between forthcoming M&S requirements and open/commercial Web standards.
- Compatible, complementary technical approaches are possible for model definition, simulation execution, network-based education and training, network scalability, and 2D/3D graphics.
- A Web approach for technology, software, content, and broad use provides best business cases from an enterprise-wide (meaning DoD-wise) perspective.

XMSF must enable simulations to interact directly and scalably over a highly distributed network—which can be achieved through compatibility with Web frameworks and technologies—and must be equally usable by humans and software agents. XMSF must therefore support composable,

reusable model components. The Extensible Markup Language (XML) is the cross-cutting technology for root data structure representations, with Resource Description Framework (RDF) and ontology-tagset support for semantics.

The following are primary challenges for XMSF:

- Using Web-based technologies for cheap and powerful government-wide networking, serving, client-side rendering, and user interaction
- Providing open, affordable, extensible M&S capabilities for tactical scenarios that can be used directly by those engaged in conflict and peace operations
- Employing mainstream practices of enterprise-wide software development
- Improving speed of development and use, fueling rapid growth of interoperable simulations
- Providing support for all types and domains of M&S (constructive, live, virtual, and analytical)
- Reflecting reality—M&S must match tactical requirements for rehearsal, reality and replay to meet today's operational needs.

Three key events will engage government, industry, and academia participation in XMSF:

- A technical-opportunities workshop in August 2002 at NPS, establishing the technical basis and business case for exploiting Web-based technologies for future M&S systems
- A strategic-opportunities symposium in September 2002 at George Mason University for government planners and decision makers
- XMSF proof-of-concept demonstrations at the December 2002 I/ITSEC conference in Orlando.

An ambitious examination of the potential of Web-based technologies will yield not only immediate answers to problems in the field, but broad strategies for implementing all manner of interoperable defense M&S solutions.

XMSF team—

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