

**FOR PUBLIC
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Project Overview—

Extensible
Modeling and Simulation
Framework (XMSF)



<http://www.MovesInstitute.org/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,

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XMSF Schedule IITSEC 2002

Daily 1000-1800
XMSF Project Demonstrations
Booths 120, 1340 on show floor.

Monday 1300-1500
Tutorial: X3D Virtual Environments
for Web. Continuing-ed credit.
Room 209AC.

Tuesday 1700-1800
XMSF Collaboration Opportunities.
"Government" Room 307CD.

Wednesday 1700-1800
XMSF Sponsorship Opportunities.
"Government" Room 307CD.

Wednesday 1530-1700
Paper: Emerging Web-Based 3D
Graphics for Education and
Experimentation.
Room 304GH.



**George Mason
University**



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—

NPS: Professors Don Brutzman and Michael Zyda, Research Associate Curtis Blais

George Mason University: Professor Mark Pullen

SAIC: Dr. Katherine Morse