



SFC Paul Ray Smith Simulation & Training Technology Center (STTC)



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**Modeling Architecture for Technology, Research, & EXperimentation (MATREX)
Simulation Interoperability Workshop (SIW) Tools on Parade Presentation**

21 September 2009

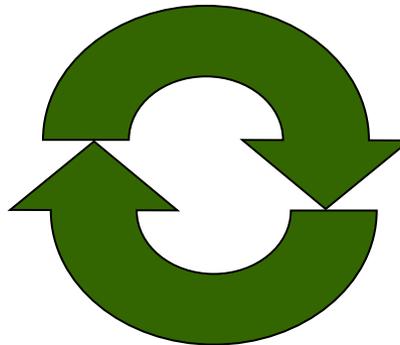
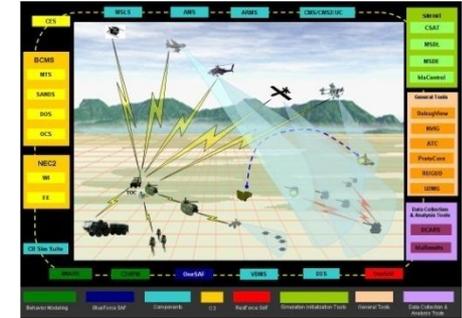
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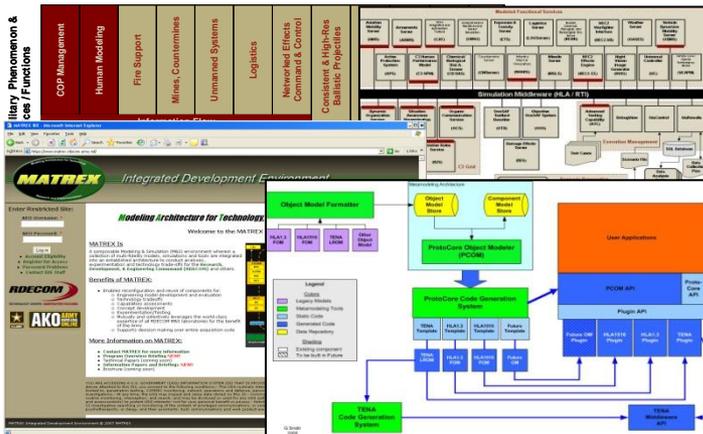
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Primary Elements of MATREX

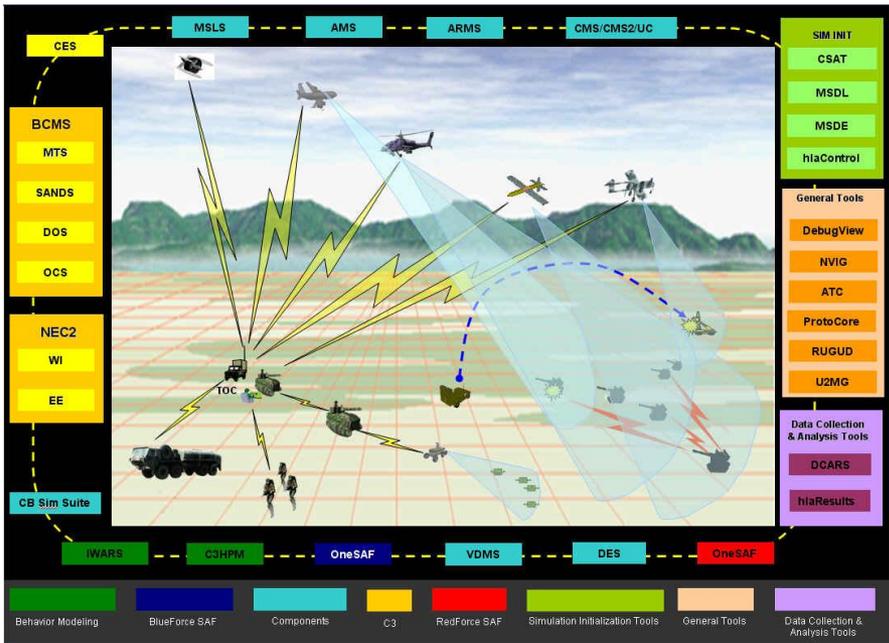
- Architecture / Environment
- Model & Simulations
- **Tools**
- Interoperability
- Collaboration



M&S R&D Made Real
Community use informs R&D



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Purpose:

To develop a composable M&S environment wherein a collection of multi-fidelity models, simulations **and tools** can be integrated and mapped to an established architecture for conducting analysis, experimentation and technology trade-offs for RDECOM and others.

Benefits:

- Enables reconfiguration and reuse of components for:
 - Engineering model development and evaluation
 - Technology tradeoffs
 - Capability assessments
 - Concept development
 - Experimentation
 - Testing
 - Training
- Mutually and collectively leverages the world-class expertise of all RDECOM M&S laboratories for the benefit of the Army as well as Joint services
- Supports decision making over entire acquisition cycle

Primary Partners and Customers:

- RDECOM HQ, RDECs, and Labs
- PM FCS (BCT) MSO / FCS LSI
- TRADOC (BLCSE)
- ATEC (OTC)
- 3CE (Cross Command Collaboration Effort)
- Other Army PMs and PEOs

Critical M&S capabilities necessary to support Network Centric Warfare representation and analysis

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MATREX Tools & Capabilities Enable a Common Integrated Architecture



Lowens the barrier to entry for utilization of MATREX High-Level Architecture (HLA) and widely used ATEC, RDECOM, and TRADOC M&S and tools

<p>Federation Object Model (FOM)</p> <ol style="list-style-type: none"> 1. In-common data structures, operations, and communication between federates 2. Describes which HLA services are used, how they are used, & how they are tied to events 3. Co-managed with FCS LSI, providing basis for commonality in FCS M&S community, RDECOM, TRADOC, ATEC, etc. 	<p>Run-Time Infrastructure (RTI)</p> <ol style="list-style-type: none"> 1. Enables M&S interoperation over a network, including distributed 2. Embedded functionally to support entity-level analysis 3. Provided as GFX by MATREX, supported by MATREX
<p>ProtoCore</p> <ol style="list-style-type: none"> 1. M&S interoperability without gateways 2. Provided as GFX by MATREX with support & training available 3. Interoperability includes HLA RTI 1.3NGmatrex, IEEE 1516, & TENA 6.0 4. Built using C++,with libraries in C++ and JAVA 	<p>Distributed Virtual Lab (DVL) network</p> <ol style="list-style-type: none"> 1. Securely interconnects RDECOM M&S users/developers via DREN 2. Connected to ATEC, TRADOC, and FCS LSI 3. Maintained by MATREX and the Centers/Labs
<p>Battle Command Management Services (BCMS)</p> <ol style="list-style-type: none"> 1. Supports entity-level communications and SA dissemination for Battle Command 2. Interconnects comms effects, sensor fusion, human behavior, network, human decision-making, OneSAF, & High-Fidelity M&S 3. Components include MTS, OCS, DOS, & SANDS 4. Built using JAVA and runs select LINUX and Windows Platforms 	<p>Integrated Development Environment (IDE)</p> <ol style="list-style-type: none"> 1. MATREX distributed engineering and communication capability over Internet 2. Linked and mapped content mgt system for requirements, design, coding, & execution 3. Program Configuration Management mechanism
<p>Configuration and Systems Administration Tool (CSAT)</p> <ol style="list-style-type: none"> 1. With OneSAF MSDE, complete scenario development process & tool set to improve Simulation Initialization capabilities as part of MATREX Event Management effort 2. Helps with remote creation of federates and force structure lay-down. 3. Provided as GFX by MATREX with support & training available for both MSDE and CSAT 4. Built using JAVA and runs on select LINUX and Windows Platforms 	<p>Advanced Testing Capability (ATC)</p> <ol style="list-style-type: none"> 1. Unit, integration, and federation-level testing of M&S applications 2. Automated test case development, mapped to requirements 3. Provided as GFX by MATREX with support & training available 4. RTI and Object Model (OM) agile, simple test cases to vignettes (HLA, 1516, or TENA) 5. Enables executable architecture 6. Built using JAVA and runs on select LINUX and Windows Platforms

*** Note: Current versions of Tools and specific details can be provided by Tool SME's**

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- **MATREX is working with its Customer base to build an Army solution for M&S experimentation applicable across the acquisition life cycle**
 - Ensures interoperability and composability across Army M&S capabilities
 - Enables more integrated and collaborative analysis so PMs can ensure that all parts of their R&D investment work together across the acquisition lifecycle
- **Supports M&S design, development, test, integration, and applications**
 - Core program is focused on architecture, processes and *tools*
 - Processes involve all elements of RDECOM
- **MATREX architecture, processes, *tools* and models are maturing to support Unified Battle Command modeling and analysis in a distributed environment**
 - Provides unique capability to model both information & decision making processes
- **One Page MATREX Tools Information Papers are available at the back of the room and a few SME's are on-hand if you want to discuss specific details**

MATREX is a “*tool*” available for *your* use

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Comments/Questions?

Additional Overview Information Can Be Found At:
www.matrex.rdecom.army.mil

- 3CE – Cross-Command Collaborative Effort
- ACS – Aerial Common Sensor
- AKO – Army Knowledge On-Line
- ALCES - Aggregate Level Communications Effects Service
- AMS – Aviation Mobility Service
- AMSWG – (OSD) Acquisition Modeling & Simulation Working Group
- ARMS – Armaments Service
- ATC – Automated Test Capability
- ATEC – Army Test and Evaluation Command
- ATIN – ATEC Test Integration Network
- AUTL – Army Universal Task List
- BCT – Brigade Combat Team
- BLCSE – Battle Lab Collaborative Simulation Environment
- C3HPM – Command, Control, & Communications Human Performance Model
- C3GRID – Command & Control, Computer GRID
- CES – Communications Effects Server
- CMS – Countermine Server
- CMS2 – Comprehensive Munitions & Sensor Server
- CSAT – C4ISR Static Analysis Tool
- C4ISR – Command & Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
- DCARS – Data Collection, Analysis & Reporting System
- DCA – Data Collection & Analysis
- DCAT – Data Collection & Analysis Tool
- DES – Damage Effects Server
- DOTMLPF – Doctrine, Organization, Training, Materiel, Leadership, Personnel & Facilities
- DOS – Dynamic Organization Service
- DTC – Developmental Test Command
- DTE – Distributed Test Event
- DT&E – Developmental Test and Evaluation
- DVL – Distributed Virtual Laboratory
- EE – Effects Engine
- FCS – Future Combat Systems
- FOC – Full Operational Capability
- FOM – Federation Object Model
- FRP – Full Rate Production
- FSE – FCS Simulation Environment
- HLA - RTI – High Level Architecture – Run Time Interface
- HC-NEBC – Human Centric – Network Enabled Battle Command
- HPM – Human Performance Model
- IDE – Integrated Development Environment
- IOC – Initial Operational Capability
- IOT&E – Initial Operational Test and Evaluation
- IER – Information Exchange Requirement
- IP03 – Integrated Process 03, Networked Fires
- IPT – Integrated Process Team
- IWARS/DI – Infantry Warrior Simulation/Dismounted Infantry
- JCAS – Joint Close Air Support
- JCIDS – Joint Combat Integrated Defense System
- JROC – Joint Requirements Oversight Council
- JSBE – Joint Service Battlespace Environment
- KPP – Key Performance Parameters
- LSI – Lead Systems Integrator (FCS)
- LVC – Live Virtual Constructive
- LVCI - Live Virtual Constructive Interoperability
- LVS – Lethality/Vulnerability Service
- MATREX – Modeling Architecture for Technology, Research, & EXperimentation
- MC2 – Mobile Command & Control
- MDA – Model Driven Architecture
- MMIC – MATREX Middleware Independence Capability
- MOE – Measures of Effectiveness
- MOP – Measures of Performance
- M&S – Modeling and Simulation
- MSDE – Military Scenario Development Environment
- MSDL – Military Scenario Definition Language
- MSLS – Missile Service
- MSO – PM FCS (BCT) Modeling & Simulation Office
- MTS – Message Transceiver Service
- NCW – Network Centric Warfare
- NCW – Networked Centric Warfare
- NEC2 – Networked Effects Command & Control
- NVIG – Night Vision Image Generator
- OCS – Organic Communications Service
- OneSAF – One Semi-Automated Forces
- OOS – OneSAF Objective System
- OTB – OneSAF Testbed Baseline
- OTC – Operational Test Command
- PEO – Program Executive Office
- PM – Product, or Program or Project Manager
- R2S – Relative Roles Server
- RDECOM – Research, Development, & Engineering Command
- RDEC – Research, Development & Engineering Center
- S3E – Systems Engineering, Experimentation, and Enterprise
- SANDS – Situational Awareness Normalization & Dissemination Service
- SE – Systems Engineering
- Sim Init – Simulation Initialization
- SNE – Synthetic Natural Environment
- SoS – System of System
- SoSE – System of System Engineering
- SOSCOE – System of Systems Common Operating Environment
- STEM – Science and Technology Enterprise Management
- S&T – Science and Technology
- TENA – Test & Training Enabling Architecture
- TIE – Technical Integration Event
- TRADOC – Training & Doctrine Command
- UAV – Unmanned Aerial Vehicle
- UC – Universal Controller
- UJTL – Universal Joint Task List
- USAF – United States Air Force
- USMC – United States Marine Corps
- VDMS – Vehicle Dynamics & Mobility Service
- V&V – Verification and Validation
- VV&A – Verification, Validation & Accreditation
- WECM – Warfighter Electronic Collection and Mapping
- WI – Warfighter Interface