



Client Perspective: Implementing C2SIM in a Client

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LS-141 - C2 to Simulation Interoperability (C2SIM)



Topics

- Why use C2SIM (MSDL & C-BML)
- The Crawl, Walk, Run Implementation Approach
- An Coalition Example

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- Client Side Lessons Learned & Related Core Capabilities
- Future C2SIM Architecture





Client-Side Experience

- US Simulation System Development
 - OneSAF MSDL & C-BML Capability Development

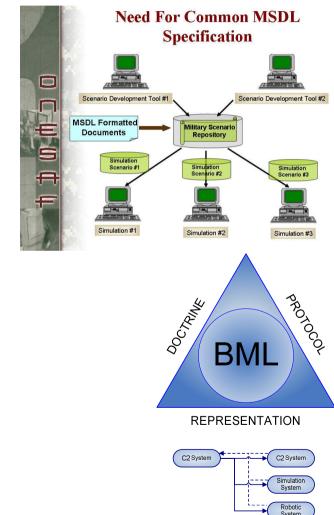
• Standards Development

- MSDL & C-BML standards development leadership and participation
- NATO MSG-085 Coalition Wide Scenario Collaboration & Demonstrations
 - ➢ ITEC 2011, 2013
 - ➢ I/ITSEC 2011, 2012, 2013
 - Ft Leavenworth Final Demo Dec 2013



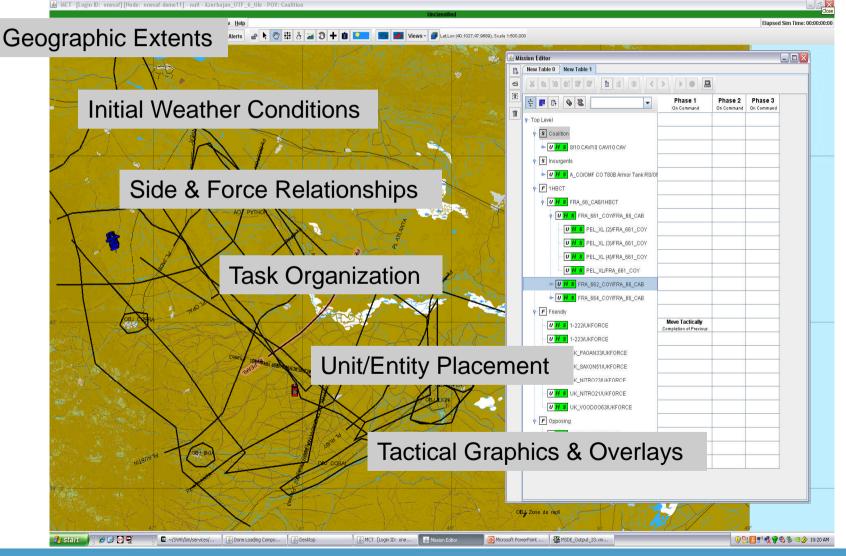
Why Use MSDL & CBML Data Format

- Import format versus native format
 - Allows standard formats (MSDL & C-BML) and specific simulation initialization & order, tasking, & reporting native formats to evolve at their own pace
 - Allows simulations to define specific information needs
 - Allows standard format for scenario start data and runtime order-based exchanges for all participating systems





What the MSDL Data Model Provides



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What the C-BML Data Model Provides

- C-BML provides a standard data model (XML) for automated sharing of military and non-military orders, reports, and tasks
 - > Who: Identifies commanders & subordinate (unit or individual)
 - What: Identifies task to be performed (i.e. occupy area)
 - Why: Identifies rational for performing the task (defend, defeat, suppress, etc.)
 - > When: Identifies the time frame for performing the task
 - Where: Identifies the location of the task





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2010/2011 - Crawl Stage 1/3

SCIENCE AND TECHNOLOGY ORGANIZATION

NORTH ATLANTIC TREATY ORGANIZATION

Development timeline 3 month time-box

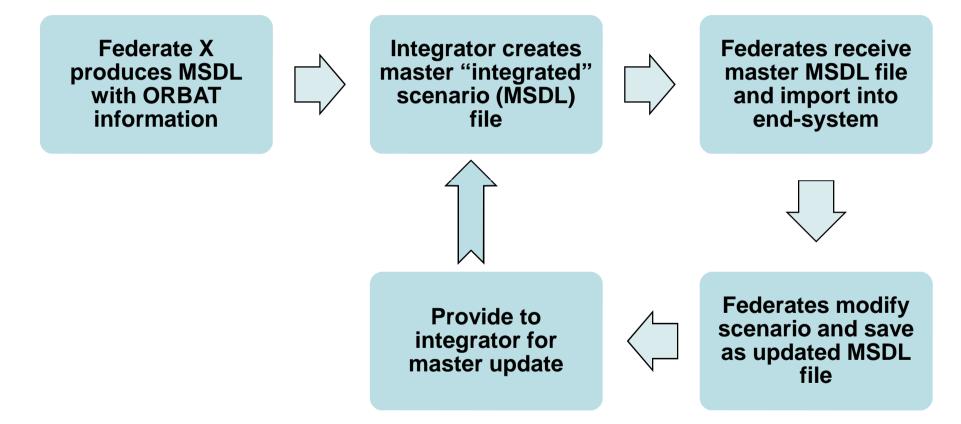
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- Multi-federate initialization from common MSDL file
 - Consistent unit/entity mapping
 - Initial locations
 - Tactical graphics
 - Geographic extents
- Initial battle book development
 - Combined spreadsheet
- Initial participants
 - DEU, ESP, GBR, FRA, SWE, USA





Crawling: Initialization Process





Crawling: Initialization Integrator 3/3

• Integration tools – current & evolving

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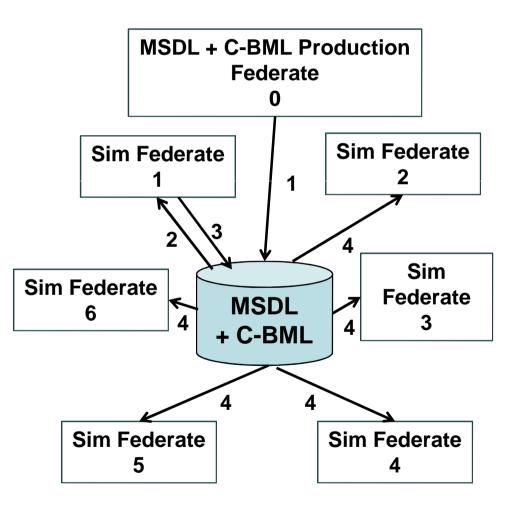
- Excel to list, identify, and manage all contributed data
- Notepad++ for edit, cut-andpaste
- Visual Basic scripting
- Coordinating decisions
 - XML namespace
 - ScenarioID information
 - Coordinate system
 - Environment extents
 - Sides and Forces
 - Mixed ORBAT

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2011/2012 - Walking 1/3

- Transition federation from initialization to running state
 - Provide link to planned set of C-BML orders referencing MSDL units, entities, and tactical graphics
- Formalize round trip initialization process
 - Initialize mission planning system with original MSDL
 - Save MPS output in MSDL and C-BML formats
 - Use files to initialize remaining federates





Walking 2/3

- More complex initialization-based federation agreements
 - Introduce unique identifier federate ranges for important items units, entities, messages, reports, etc.
 - Introduce standards-based entity & unit name conventions (e.g. DIS enumerations)
 - Create or locate MSDL element to house enumeration or code list
 - Identify FOM for future integrated HLA federation activities
 - Introduce multiple terrain extents
 - Formalize sequence for drawing tactical graphics
 - Continue integrator tool development to prove early, preinitialization-time federate feedback

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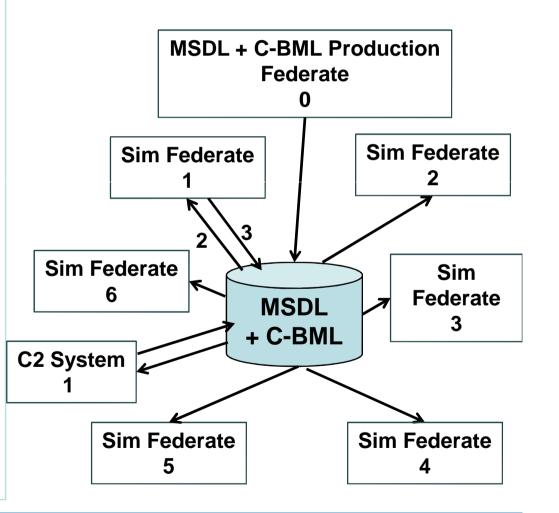


Walking 3/3

• Introduce C2 systems

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- Simple C2 Initialization of the Joint Advanced Deep Operational Coordination System (JADOCS) with friendly ORBAT
- Initialize GMU webservices with MSDL
- Extend MSDL participation with enhanced battle book
- Provide feedback to C2SIM PDG





2013/2014 - Running

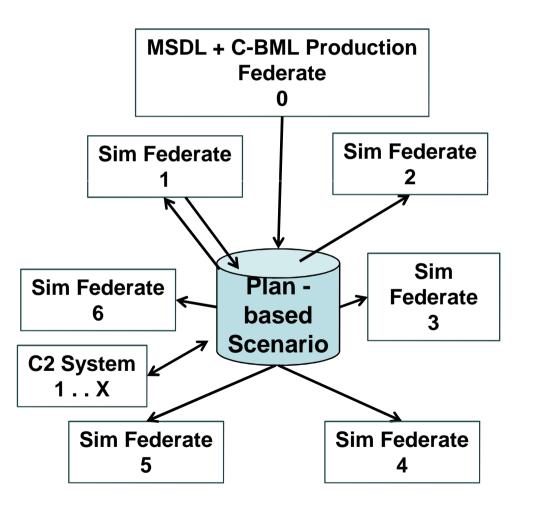
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• Multi-simulation and C2 coalition initialization process

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- Fully integrated MSDL and C-BML
- Demonstrate in operationally useful event
- Extend participant list
- Feedback to SISO
- Increase coalition speed and agility





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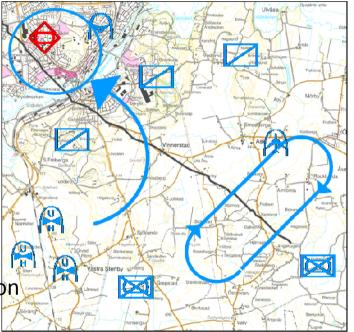


ITEC 2013 AIR-LAND VIGNETTE: SWEDEN, UK & USA

- Operational Thread and Capability Demonstrated
 - Recce/integrated Air-Land vignette w BOGALAND Scenario
 - Ground force Recce cues UAV & CAS mission
 - Insertion of troops by helicopter
 - > Enables mission planning & rehearsal & C2 training
- Technical Capability

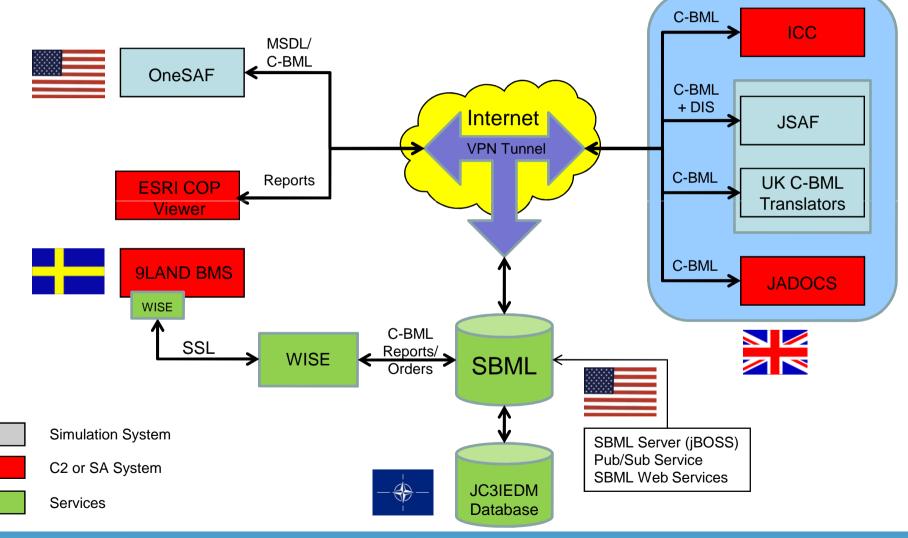
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- MSDL/C-BML infrastructure information
- MSDL toolset/population mechanism for initialization
- Scripted BML Server 2.5 bridges multiple schema version
- ➢ WISE (SAAB)/SBML server and populating 9LandBMS
- Use of Esri Tracking server for visualization
- C2 systems: ICC, JADOCS using JSAF and OneSAF
- WAN-based distribution



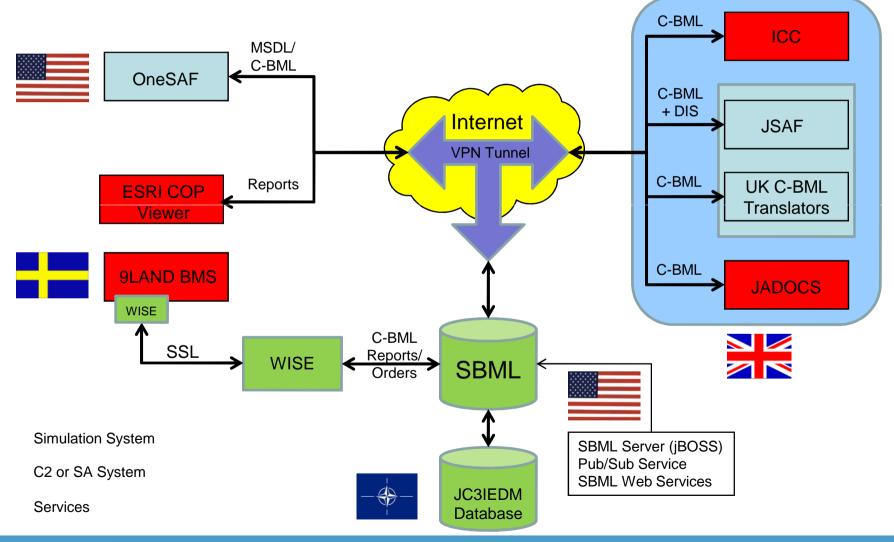


DEMO – TECHNICAL ARCHITECTURE

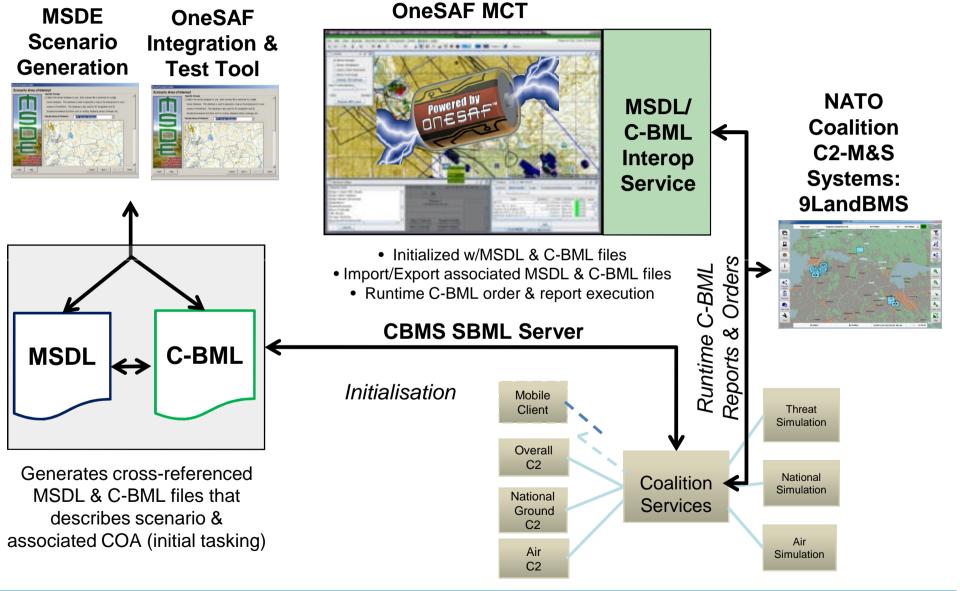




DEMO – TECHNICAL ARCHITECTURE











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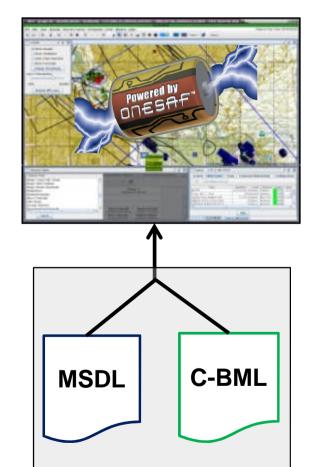


Lessons Learned Core Capabilities – Import (1/2)

- Read/Write MSDL & C-BML scenario data
 - Leverage standardized XML read/write libraries
 - Support local and web-enabled subscription-based scenario data stores/servers

• Validate MSDL& C-BML scenario data

- Provide status/error detail on import
- Provide tools to clean and store MSDL
- Map to or dynamically create model representations of MSDL & C-BML content
 - Instantiate units and entities
 - Assign orders, tasks to units
 - Build entity/unit perceptions from reports





Lessons Learned Core Capabilities – Import (2/2)

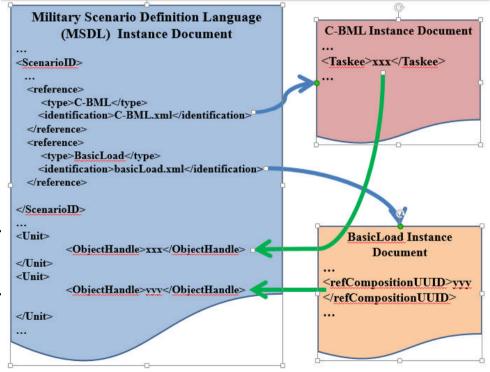
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 Reference other files (orders, planning, and other data) external to MSDL file

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- Use MSDL Reference field to hold reference file name and other metadata
- Provide XML schema with externally referenced file
- Associated with MSDL data using MSDL data element Unique Identifier to relate external data to MSDL Unit or Equipment item
- Technique has been shown to work for C-BML files, unit and equipment supply data, and communications information







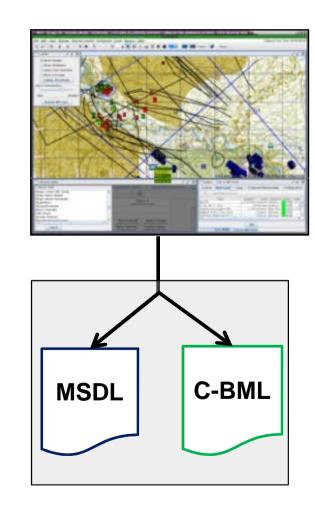
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Lessons Learned Core Capabilities - Export

- Write MSDL & C-BML formatted scenario data
- Validate MSDL & C-BML scenario data
 - Provide detail on export
 - Provide tools to export valid MSDL for pre-run, run, or post run
 - Provide detail scenario report of MSDL contents
- Write referenced file information for order and other referenced data
 - Technique has been shown to work for C-BML files, unit and equipment supply data, and communications information

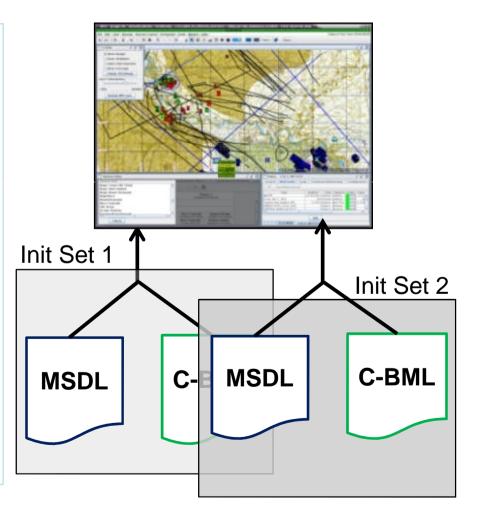




Lessons Learned Core Capabilities – Merge

• Merge scenario data sets

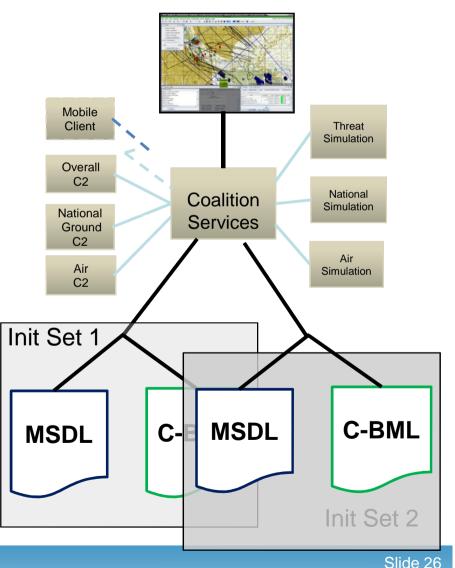
- Establish rules for automated merge and add as server-side capability
- Allow choices during merge process
- Allow configured defaults for fully automated merge
- Report outcome of merge process with traceability to source files and Unique Identifiers
- Support reference file updates
- Produce valid MSDL and C-BML files and other local Reference data sets





Lessons Learned – Server Side Automation

- Potential Server-Side Capabilities
 - Ingest and serve MSDL & C-BML independent or linked data
 - Merge and serve MSDL & C-BML data
 - Allow tool access to create, modify, delete, and manage MSDL & C-BML data
 - Manage Coalition access to initialization and runtime MSDL and C-BML data
 - Report MSDL and C-BML accessible data



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Future C2SIM Standards Development

• MSDL and C-BML Integration

- > Develop Consistent comprehensive "core" logical data model
- Supporting process and tools to automatically generate platform specific runtime data models
- Consider support for multiple runtime formats JSON, XML, FOM modules, etc.
- Ballot the standard and guidelines within 3 years of Fall 2014
- Provide compatibility with existing MSDL & C-BML standards
- Demonstrate value in support of C2SIM STANAG
 - Continued NATO engagement and feedback to SISO C2SIM PDG
 - Formalized C2SIM SISO Standard as starting point for C2SIM STANAG