Using Coalition Battle Management Language

DS RT 11 Briefing

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C2-Simulation Example Uses

- Stimulate real and simulated tactical communication systems
- Understand the problems of exchanging tactical information and data in a Network Enabled Battlespace
- Training with operational Command and Control applications
- Using simulations to support low level controllers in distributed staff training exercise
C-BML Permits

• C2-Simulation interoperability – standards-based
• Complex, multi-national federations to be designed and implemented
• Training with integrated C2
  – Planning
  – Communication
  – Exchange of tactical information
  – Coordination
  – Reporting
C-BML – Coalition Battle Management Language

• Formally specified way of describing military C2 data:
  – plans, orders, reports, etc

• Permits C2 information to be exchanged between:
  – C2 systems – planning tools, reporting applications
  – M&S systems
  – Robotic forces

• Shared semantics between C2 and M&S systems via a common tasking and reporting description
Need for C-BML (Galvin, Khimeche)

- M&S requires a standardised community approach to scenario initialization and scripting.
- Point to Point solutions have inherent disadvantages:
  - Cost of developing individual languages.
  - Cost of developing translations between individual languages.
  - Inhibits the ability of military users to use tools interchangeably.
  - Manual and error prone process – “Swivel Chair” effect.
- No common solution to enable automated C2 to simulation interoperability.
C-BML Principles

- BML must be unambiguous
- BML must not constrain the expression of a commander’s intent
- BML must use standardized data representations
- BML must allow forces to communicate information pertaining to their mission, their status and their environment
SISO C-BML Specification Overview

System A generates as per C-BML Expression transferred as per C-BML Information Exchange Structure & Content Specification C-BML Services Specification
MSG-048 Experimentation 2009 – Experimentation Overview
C-BML Information Flows

- C2 system
- C-BML Order Generator
- Simulation
- Middleware WS + DB
- Orders
- Reports
- C-BML Report Translator
- Other C-BML Systems
Air Tasking Order

• ADatP3 F058 ATO

EXER/UK C-BML Demo/
MSGID/ATO/UK Air Gp Cmd/0/
AKNLDG/NO/
AIRTASK/ATO A/3510N 07901W/LOCATION OF COALITION AIR BASE/

TASKUNIT/23SQN/
AMSDAT/AM01/-/ZZ/MC/JCP/-/BAT/
AMSNLOC/141325Z FEB/142000Z FEB/AWACS ORBIT/350/1A/LATM: 3510N 07901W/NAME: PT ALPHA/

TASKUNIT/617SQN/
AMSDAT/AM02/-/ZZ/MC/EW/-/BAT/
GTGLOC/P/TOT: 141325Z FEB/NET: 141320Z FEB/TOF: 141325Z FEB/MOBILE COMMAND POST/ID: B1234F12345/CP/-/DMPID: 351025.3N 0790125.7W/W84/

6ROUTE
1/3510N 07901W/IP/141400Z/450KTS/300
2/3520N 07908W/TRN/142000Z/450KTS/300
3/3530N 07914W/TRN/142500Z/450KTS/200
4/3560N 07918W/RP/143000Z/450KTS/5/
ATO as C-BML

Who – Taskee
What – Mission type
Where – AtWhere
When – Start
Who – Tasker
TaskOrg
Control Measures

Why

Task
Military Scenario Definition Language

- 9 Primary Elements including reuse schema components from:
  - Base Object Model SISO Standard and
  - JC3IEDM MIP Standard
- OneSAF-Based Elements that were not consider for balloting:
  - Plan
  - Course of Action
  - Threats
  - Units and equipment Enumerations
- XML Representation allows for:
  - Structure and type Validation
  - Business rule validation (under investigation) using assertion-based tools such as Schematron

XML Representation

Initialisation Using MSDL (Wittman)
MSDL Initialisation Variants

1. Simulation System → MSDL → C2IS
2. C2IS → MSDL → Simulation System
3. C2IS → MSDL → C2IS
4. Simulation System → MSDL → Simulation System
5. Tool → MSDL → MSDL-Compliant System
JSAF Initialisation Using MSDL

- JSAF initialized using imported MSDL data showing:
  - Entities on map display
  - Unit table
  - Unit hierarchy ready to receive tasking

- MSDL import & export possible
- Imported units/entities are simulated locally, they are not proxies
- Work being undertaken on using MSDL to initialize UK C2 systems
C-BML vs MSDL

- C-BML – *Dynamic* tasking & reporting
  - Who
  - What
  - Why
  - Where
  - When

- MSDL – *Static* initialisation, scenario save/reload
  - Scenario
  - Options
  - Environment
  - Force sides
  - Organisation
  - Overlays
  - Installations
  - Tactical graphics
  - MOOTW graphics
C-BML Middleware

• GMU C-BML Web Services
  – JMS-based
  – Uses JC3IEDM data-base
  – Publish/subscribe and Push/pull
  – Being extended (Aug 2011) to include MSDL initialisation services

• ODU/VMASC CBMS
  – Persistent XML Document-based storage/retrieval (e.g. C-BML, MSDL, C2 Core, JC3IEDM)
  – RESTful* web service, HTTP methods, Expression subscriptions

• Saab WISE-based Infrastructure + Scemanta (MSDL editor)
  – Commercial interoperability framework being extended to support C-BML & MSDL

* REST - Representational State Transfer
C-BML Translators – Interface methods

• C2 Systems
  – Message-based
  – Direct data-base connection
  – CORBA objects
  – Shared memory
  – Native capability – possibly plug-in
• M&S Systems
  – C2 Adaptor
  – HLA
  – Embedded capability
C-BML Schema Status

• NATO MSG-048 Schema
  - An early, simplified schema encompassing the basic ‘5Ws’
  - Based on JBML + SIMCI IBML

• SISO Product Development Group
  - Phase 1 schema available since early 2011 for evaluation (August 2011)
  - Phase 1 includes a ‘LITE’ schema based on the MSG-048 version
  - Phase 2 to add ontology, grammar rules, data dictionary, guidelines, support processes, etc
  - Phase 2 preliminary schemas to be published autumn 2011

• SISO C-BML & MSDL PDGs
  - Aim to align the two standards, resolving incompatibilities, duplications, etc
Real World and Simulated Taskees

• Real world taskees, generally human or groups of humans, but possibly automata, are able to execute orders in the context of their:
  – Training
  – Skill
  – Experience
  – Perception, etc

• Simulated taskees do not necessarily have all these capabilities and require behavioural agents of some form to execute their orders

• Sometimes it is necessary to augment information expressed in C-BML with extra information to execute orders, e.g.
  – To set speeds for unit movement – orders are unlikely to specify these
  – With route planning information
Tactical Graphics

Mil-Std 2525C Symbol with definition points
SID code: G*T*Z-----****X

JC3IEDM definition (SEIZE / Seize)
To clear a designated area and obtain control of it.

- Approx 500 graphics codes defined in Mil-Std 2525C
- Widely used in C2 applications
- Exist in MSDL and need to be included in C-BML standards
Observations

- Internet testing is invaluable for developing coalition systems
- Initialisation is challenging
- Using C-BML to task simulations is non-trivial, however the complexity of handling reports should not be under-estimated
- Consultation with military SMEs should be begun at the earliest possibility
- Reports need to be made easier to process, e.g. better report headers
- TRL of C-BML-enabled system should be raised
- ‘Dialects’ of C-BML develop and the standardisation process needs to ensure that common core capabilities are maintained
- Approaches to support legacy systems need to be developed
- Exercise management tools and processes need to be developed for C-BML systems
Conclusions

• C-BML is a very effective way of achieving exchanges of digital plans, orders and reports between heterogeneous C2 and simulation systems

• C-BML standards are applicable across domains:
  – Military and civil
  – Land, air and maritime

• Reliable middleware is essential

• Open standards such as C-BML, MSDL and numerous IT standards are essential for the development of these systems
  – Closed, proprietary standards do not provide the flexibility and are expensive to develop