

MSG-079 C-BML Workshop

Farnborough UK, Feb 24-25 2010

Lessons Learned from MSG-048



MSG-048

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE FEB 2010	2. REPORT TYPE N/A	3. DATES COVERED -	
4. TITLE AND SUBTITLE Lessons Learned from MSG-048		5a. CONTRACT NUMBER	
		5b. GRANT NUMBER	
		5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)		5d. PROJECT NUMBER	
		5e. TASK NUMBER	
		5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) NATO/RTO		8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)	
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited			
13. SUPPLEMENTARY NOTES See also ADA564685. 2010 Coalition Battle Management Language Workshop (Atelier 2010 sur le langage de gestion du champ de bataille pour les operations en coalition). RTO-MP-MSG-079			
14. ABSTRACT			
15. SUBJECT TERMS			
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	
19a. NAME OF RESPONSIBLE PERSON			

e

d

- OUTLINE f
 - Background r
 - Technical Lessons Learned o
 - Operational Lessons Learned m
 - Conclusions

M

S

G

Lessons Learned from MSG-048

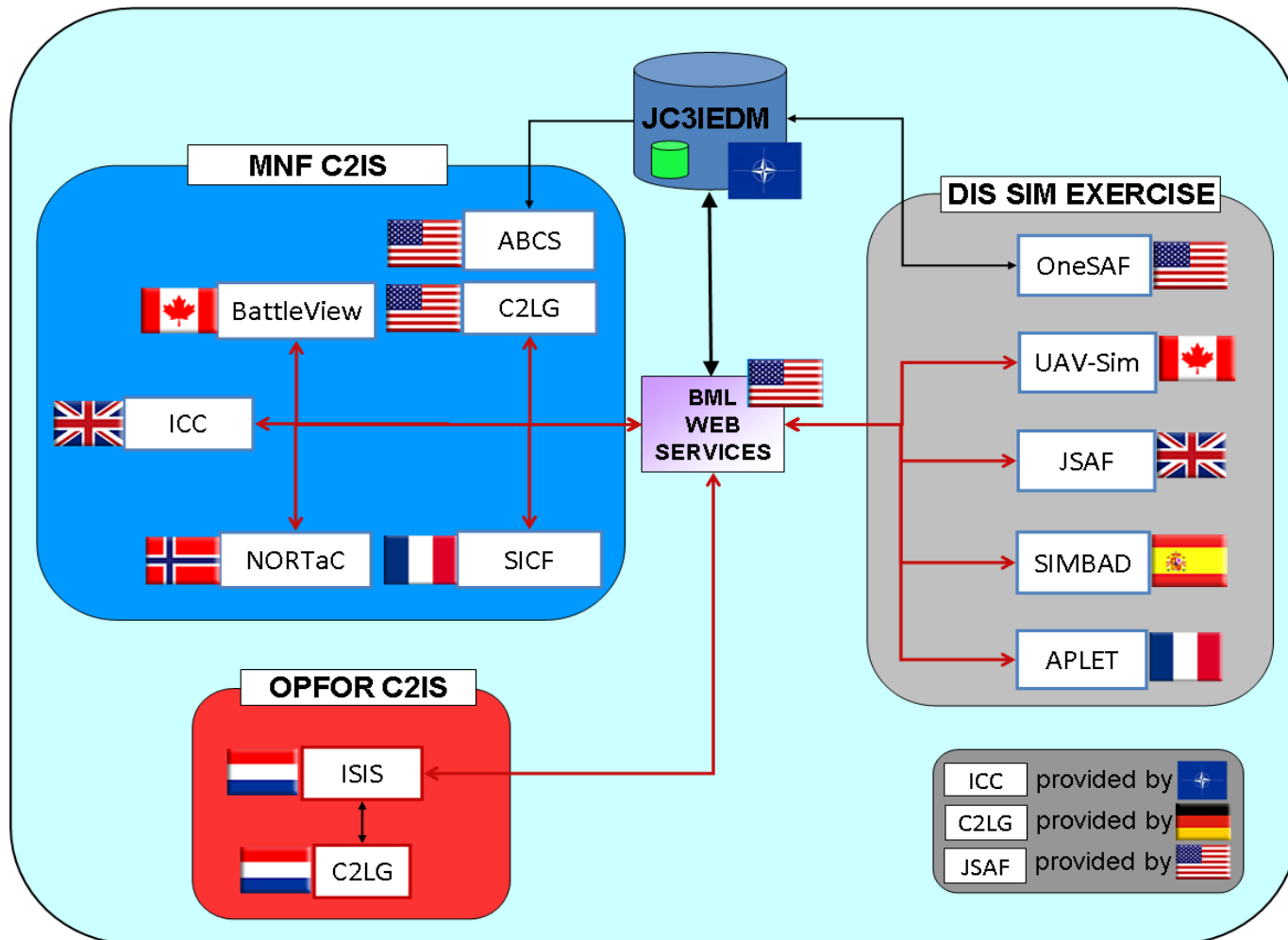
Background

- Three-year experimentation programme
- Many discussions, papers and reports
- Input from final 2009 experimentation event
 - Internal, MSG-048 discussions
 - External, Operational SME Feedback

Lessons Learned from MSG-048

Background

MSG-048 2009 Experimentation Architecture



Lessons Learned from MSG-048

- OUTLINE
 - Background
 - **Technical Lessons Learned**
 - Operational Lessons Learned
 - Conclusions

Lessons Learned from MSG-048

BML - Language Constructs

- Basic support for reports and orders:
 - Reports, Position/Contact, General/Op Status, Task Status
 - Bundled (instead of single) reports - for performance
 - Tasking
 - Multiple-task orders
 - Temporal associations
 - FRAGOs
- Relatively simple schema, yet
 - Significant enabler for C2-simulation interoperability
 - Encouraging for future, more complete versions
 - **Much work yet to be done.**

Lessons Learned from MSG-048

BML Infrastructure

- Experienced high reporting rates during scenarios
 - Created load on BML infrastructure (e.g. Server)
 - Contribute to information overload of
 - BML clients & infrastructure
 - **High throughput rates must be assumed**
- Made judicious use of Publish & Subscribe
 - Previous experimentation (e.g. 2008) used only client-server architecture
 - Subsequent polling led to information bottlenecks
 - **Combined Web Service/Publish & Subscribe (e.g. 2009) greatly improved information flow**

Lessons Learned from MSG-048

BML Infrastructure

- Validation
 - C-BML expression correctness
 - Transaction success
- Persistence functionality required for:
 - Record & Playback
 - Continuation of an exercise

Lessons Learned from MSG-048

BML Infrastructure

- BML Gateways/Translators are necessary – for now
 - External or non-intrusive interfacing to C2IS has significant advantages (e.g. Using actual C2IS as-is)
- In order to fully exploit BML-enabled capabilities , C2 and simulation systems will have to evolve
 - Integrate BML constructs into the applications

Lessons Learned from MSG-048

BML Infrastructure

- Scenario Initialization Needs (C2 & simulation systems)
 - Confirmed the need for a scenario definition language
 - e.g. Military Scenario Definition Language (MSDL)
 - Scenario initialization mechanism
 - Also need to coordinate the start-up sequence
- Run-time Scenario Management Needs
 - Late joiners
 - Re-joiners (e.g. following system failure, communication disruption)
 - Pause, Start, Re-start, Stop, Record & Playback

Lessons Learned from MSG-048

Requirements for BML-enabled Systems

- Characteristic Time Scales (e.g. publishing, processing)
 - C2 & Simulation Systems do not always have same characteristic time-scale
 - Simulations vary \sim from 10^{-2} to 1 S
 - C2IS \sim 1 S
- Some simulation systems run faster than real-time
 - May need to process reports before sending to C2IS
 - Simulation result can be used differently by C2IS
 - Common Operational Picture
 - COA evaluation

Can create a data producer/consumer issue!
Need to control the simulation reporting rates.

Lessons Learned from MSG-048

Requirements for BML-enabled Systems

- Information overload
 - Higher levels of automation and increased digitization of military information are factors that can contribute to the generalized situation of information overload at:
 - Network level
 - System level
 - Operator level
- Addressing information overload will likely require
 - Further development of interest management mechanisms, (e.g. more “smart-push”)
 - Further work on automated information processing technologies
 - e.g. Intelligent agents, Intelligent Adaptive Interfaces

Lessons Learned from MSG-048

Requirements for BML-enabled Systems

- UAV Simulation provided encouraging results concerning the applicability of BML to controlling robotic systems
 - Introduced semi-automated level of autonomy
 - Utilized same interface as actual UAV Ground Control Station
 - BML input
 - STANAG 4586 output
 - **Successfully used prototype “command agent” approach**

Lessons Learned from MSG-048

- OUTLINE
 - Background
 - Technical Lessons Learned
 - **Operational Lessons Learned**
 - Conclusions

Lessons Learned from MSG-048

Operational Lessons Learned

- The following operational lessons learned are based, in large part, on feedback from SMEs at MSG-048 Final Experimentation in Manassas VA, Nov 2009
 - Questionnaires
 - Interviews
 - Discussions

Lessons Learned from MSG-048

Operational Lessons Learned

- SME Overall Impression
 - All operational participants strongly believed in BML concept
 - BML considered a valuable enabler to interoperability within coalition forces
 - Stronger applicability demonstrated for training, planning and mission rehearsal, than for mission execution

Further experimentation and work is required

Lessons Learned from MSG-048

BML Challenges

- Simulation Model Requirements vary depending on:
 - Model domain
 - Echelon
 - Complexity
 - Level of automation
 - Level of detail
 - Nation-specific data (e.g. Tactics & procedures)

Systems need to ensure that information is used in a manner that is consistent with their internal models (i.e. pragmatic interoperability)

Lessons Learned from MSG-048

BML Challenges

- Need for increased Coordination of Tasks
 - Temporal associations
 - Control measures
 - Among participating units (e.g. Brigade operations)
- Operational Relevance
 - **Need to consult with the MIP** concerning operational relevance of BML as it relates to the JC3IEDM

Lessons Learned from MSG-048

BML Challenges

- Using BML for Tactical Command
 - Ensuring a consistent Common Relevant Operational Picture (CROP) across various C2IS fed by several reporting simulations
- Identified obstacles for future adoption of BML
 - Technical
 - Cultural
 - **Development of BML standard**

Lessons Learned from MSG-048

BML Challenges

- Many C2IS not designed to create/change plans rapidly during planning in order to exploit BML capabilities
 - COA Analysis (e.g. within a few minutes)
- Many C2IS not designed to receive reports at high rates
 - Need to limit system data production rates
 - Bundling of reports improved situation
 - Interest management is required (e.g. Subscription mechanism)

Lessons Learned from MSG-048

- **OUTLINE**
 - Background
 - Technical Lessons Learned
 - Operational Lessons Learned
 - **Conclusions**

Lessons Learned from MSG-048

Conclusions

- This presentation highlighted the technical and operational lessons learned during the MSG-048 technical activity.
- Does not include the final recommendations – currently being elaborated as part of the MSG-048 Final Report.
- BML has demonstrated much promise as an enabler for interoperability between C2, simulation and robotic systems.
- Work is still required to bring BML closer to operational deployment – especially work on standardization
- MSG-085 to start in 2010 as a continuation of the work done in MSG-048

Lessons Learned from MSG-048



MINISTÈRE DE LA DÉFENSE



DÉLÉGATION GÉNÉRALE POUR L'ARMEMENT



Isdefe



MINISTERIO DE DEFENSA



DGAM
Direccion General de Armamento y Material



QinetiQ



THALES



Defence Research and Development Canada

Recherche et développement pour la défense Canada



FFI Forsvarets forskningsinstitutt
Norwegian Defence Research Establishment



FGAN



MSG-048



Lessons Learned from MSG-048

Questions ?