

# MSDL and C-BML Working Together for NATO MSG-085

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# Presentation Overview

- MSDL background
- C-BML background
- MSDL/C-BML convergence
- MSG-085 requirements
- Server software
- Client implementations
  - ICC, JADOCS, JSAF, NORTaC-C2IS, OneSAF
- Way forward for MSG-085 and MSDL/C-BML

# SISO Standards for C2-Simulation Interoperability

- Military Scenario Definition Language (MSDL)
  - Standardizes initialization of simulation systems
  - Recently shown also to be useful with C2 systems
- Coalition Battle Management Language (C-BML)
  - Orders, Requests, and Reports among C2 systems and simulations
  - Building block: Task (who/what/when/where/why) and its status
  - Intended for use by international coalitions
- The two must work together
  - This paper addresses their convergence in NATO context

# MSDL Background

- Grew out of need US Army OneSAF program
  - Reduce scenario development time
  - Re-use resulting scenarios
- XML-based military scenario format
  - Designed for use by current and evolving simulations
  - Prototyped within OneSAF 2001-2004
  - Spawned SISO Study Group
  - Product Development Group chartered 2006
  - SISO MSDL v1.0 standard approved 2008



# MSDL Data Components

- Geographic Region of Interest
- Force/Sides
- Units
- Equipment
- Installations
- Overlays
- Graphics

# BML: Definition

BML - an unambiguous language to:

Command and control live and simulated forces conducting military operations, and

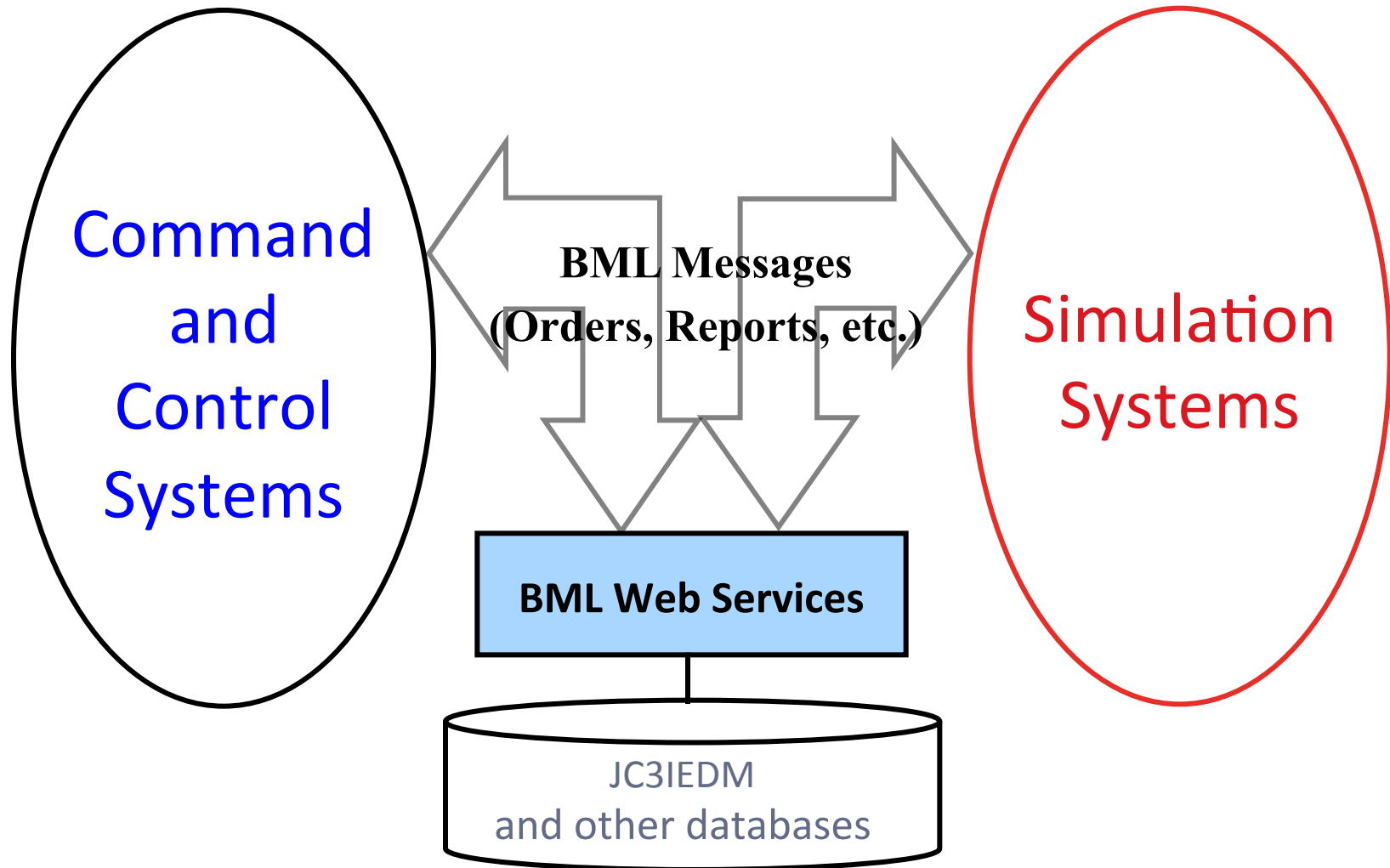
Provide for situational awareness and a shared, common operational picture.

*Shared Semantics between C2 and M&S via a Common Tasking Description*

# C-BML Background

- Purpose: provide a common, agreed-to format for exchange of Orders/Requests/Reports between C2 and simulation systems
- Implemented using a repository where participating systems post and retrieve XML documents
  - Extended to publish/subscribe for efficiency
- SISO study group 2005
- Product development group chartered 2007
  - Phase 1 Standard package to be balloted soon
- Development informed by NATO Technical Activities MSG-048 and MSG-085

# Generic BML Architecture



# MSDL/C-BML Convergence 1

- Task Organization definition
  - Also called Order of Battle (ORBAT)
  - Multiple competing formats exist
    - Including MSDL and C-BML
  - MSDL has a standard and implementations
  - C-BML does not address in Phase 1 Standard
    - Should use MSDL
  - Alternative: define units in JC3IEDM
- Requirements:
  - Name and type of each unit (including map icon)
  - Identify superior/subordinate unit relationships

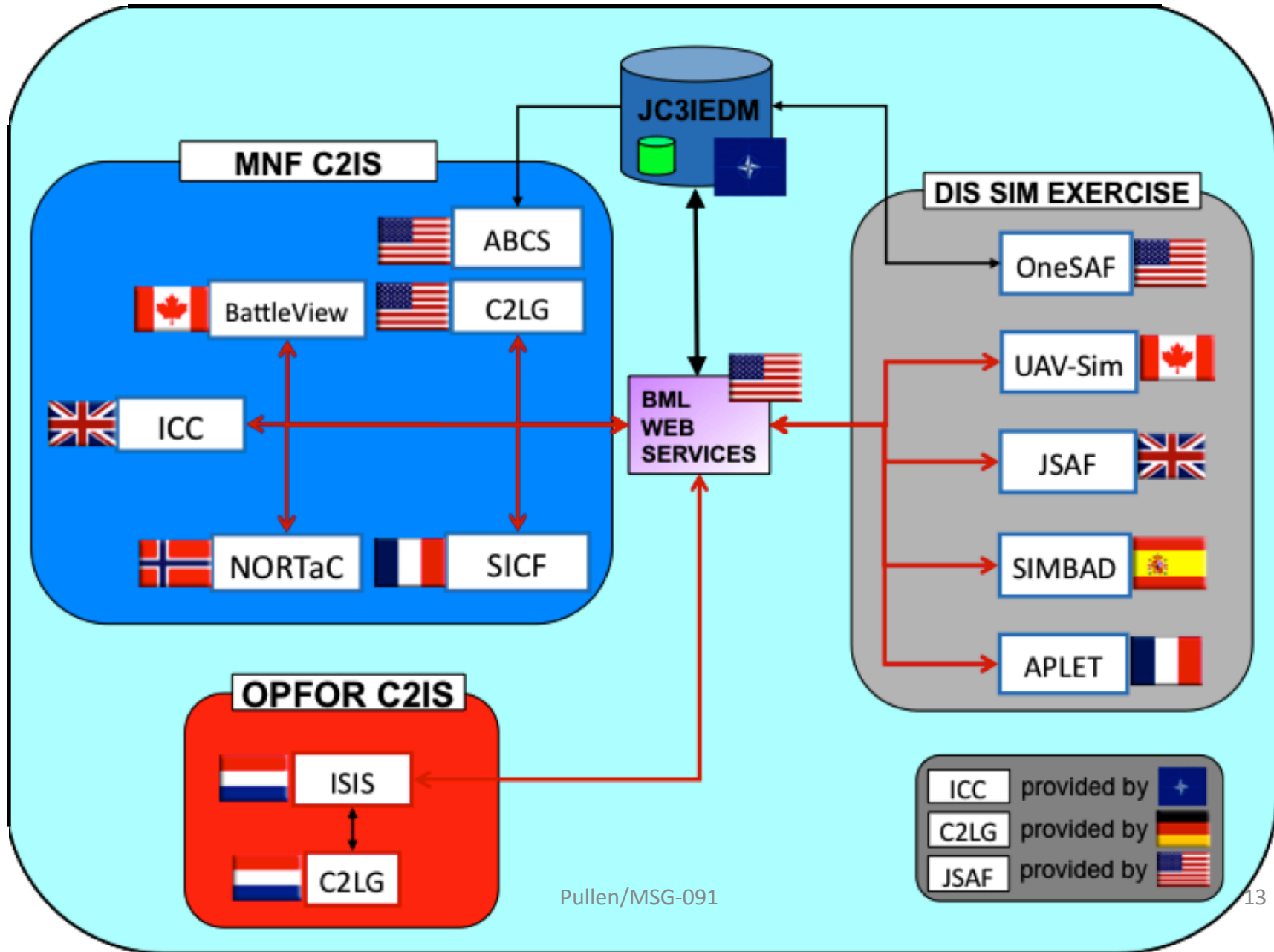
# MSDL/C-BML Convergence 2

- Tasking definition
  - Describes actions to be carried out
  - With their interrelations
  - And control measures
- C-BML has well-developed draft based on MSG-048 experience
  - MSDL has only a placeholder; should use C-BML
- Tactical Graphics: icon and descriptive data
  - Existing MIL STD 2525C and NATO APP-6C are adequate - MSDL and C-BML should use

# BML in NATO Modeling and Simulation Group (MSG)

- MSG has been nexus for BML cooperation
- US Joint BML project with France Aplet
  - Early demonstration 2006
  - Led to Exploratory Team 16
- MSG-048 Technical Activity started 2007
  - Demonstrations at I/ITSEC 2007 and 2008
  - One-week experimentation 2009 (9 nations)
- MSG-085 Technical Activity started 2010
  - Goal: operational use of MSDL/C-BML (12 nations)

# MSG-048 2009 Architecture



# MSG-085 MISSION STATEMENT

*“Assess the **operational relevance** of \*C-BML while contributing to C2-Simulation standardization and assist in increasing the **Technical Readiness Level** of \*C-BML technology to a level consistent with **operational employment** by stakeholders.”*

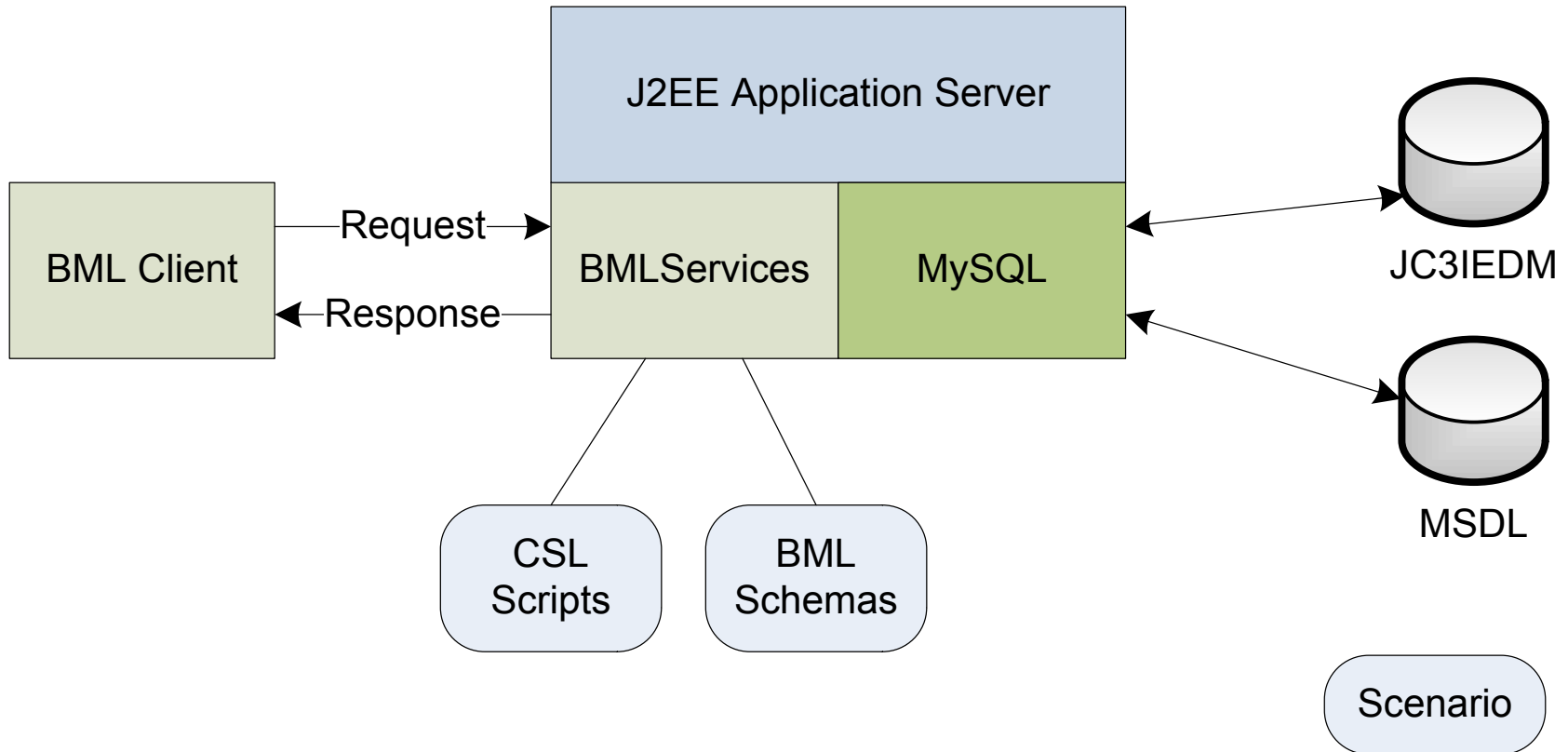
*\*Including the complementary use of MSDL for initialization*

# Supporting Server Software

# Scripted BML (SBML) Server

- Developed by GMU C4I Center to support coalition activities such as MSG-048
  - Open source
  - Reference implementation for SISO C-BML
- Scripted server concept
  - New constructs can be implemented rapidly
  - Changes to BML and JC3IEDM applied quickly
  - Reduced cost for experimentation prototyping
  - Script provides a concise definition of BML to data model mappings

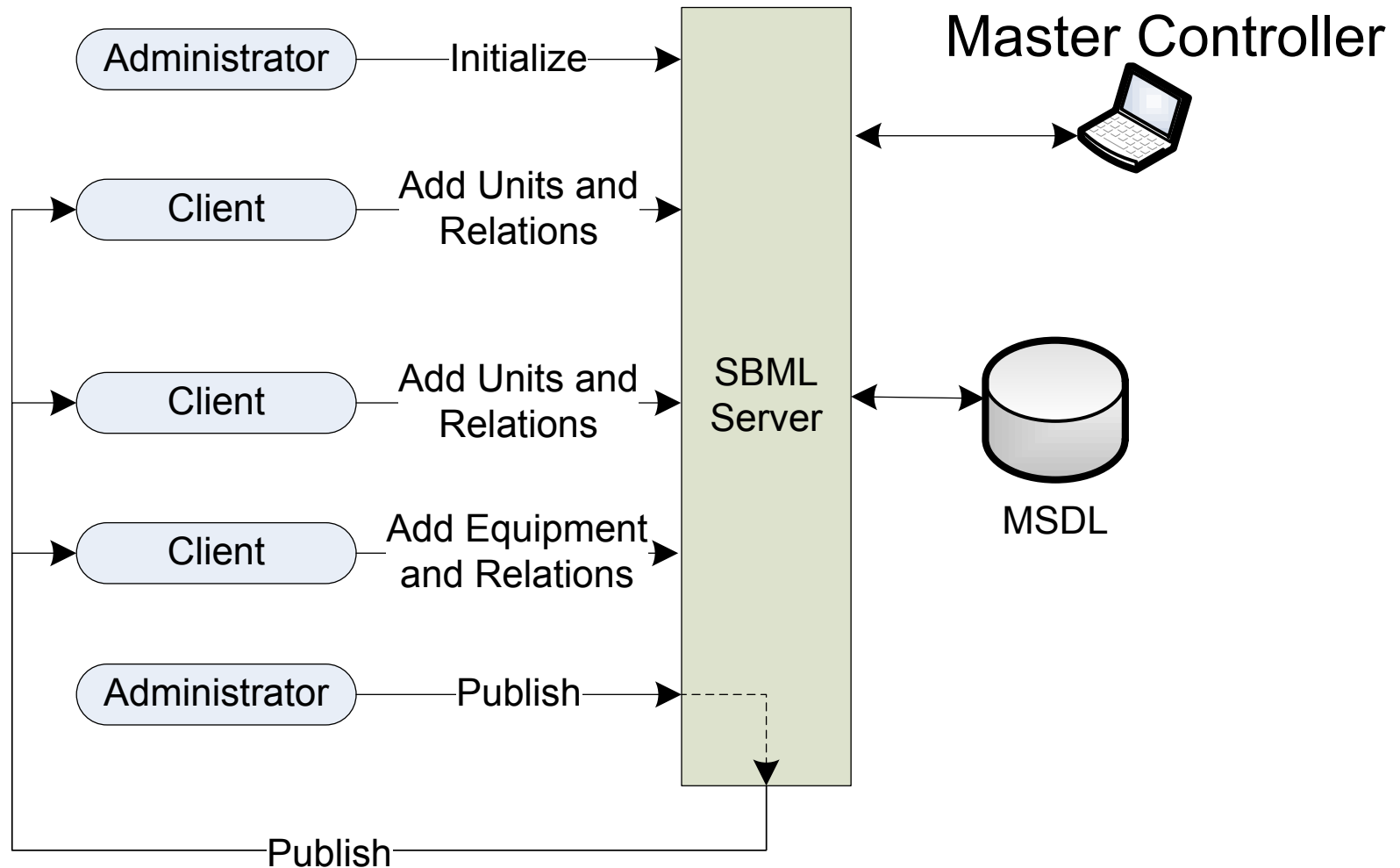
# SBML Architecture



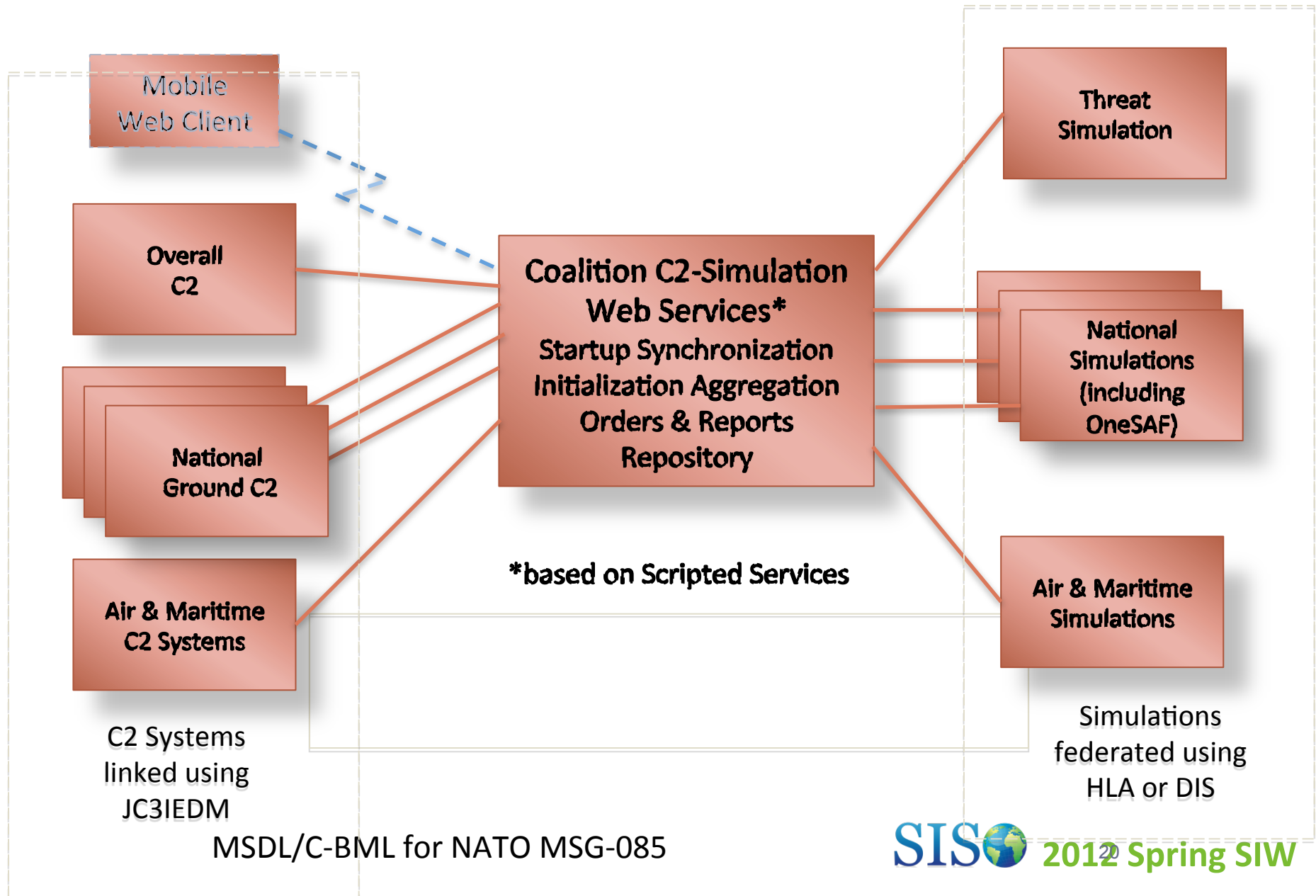
# Using SBML to Support MSDL

- When multiple systems participate in a coalition their MSDL files must be merged
- Previously this has been done by hand
- GMU C4I team created a script to do it
  - Required one new script primitive
- Participating systems submit their MSDL prior to initialization
- Server merges it and publishes on command

# MSDL Server Operation



# Coalition C2-Simulation Architecture



# New Demands on SBMLserver from MSG-085

- Publish/subscribe for C-BML and MSDL
- Dynamic publish/subscribe based on XPATH
- Multithreaded RESTful service for increased performance
- Translation between dialects of BML
  - MSG-048 IBML and SISO C-BML
  - Others possible using common JC3IEDM database

# Status Monitoring and Control

- Lesson learned in MSG-048:
  - It is impractical to coordinate multiple interoperating C2 and simulation systems with only spoken communication
- Solution: a coordinating webpage
  - Shows possible states of each coalition system
  - Master Controller provides coordinating guidance
  - Inputs can come from webpage interface
  - Or Web service client

# MSG-085 Status Monitor

## MASTER CONTROLLER STATUS

Scenario: DH1

Current Order: **stop**

Scenario MSDL status: not started

Number of observers: 2

Change current order:  stop  initialize  run  pause

Log out client/observers:

Publish MSDL

Reset All

Master log out

## CURRENT CLIENT STATUS

	STOPPED	INITIALIZING	READY	RUNNING	PAUSED
C2IS1 rpt1		setting-up			
C2IS2 rpt2	<b>stopped</b>				
C2IS3 rpt3		MSDL Rec'd			
C2IS4 rpt4		Processing MSDL			
C2IS5 rpt5			ready		
C2IS6 rpt6		MSDL Pushed			
C2IS7 rpt7		setting-up			

# MSDL/C-BML Client Implementations as Employed for MSG-085 Demonstration I/ITSEC 2011

# MSG-085 I/ITSEC 2011 DEMONSTRATION

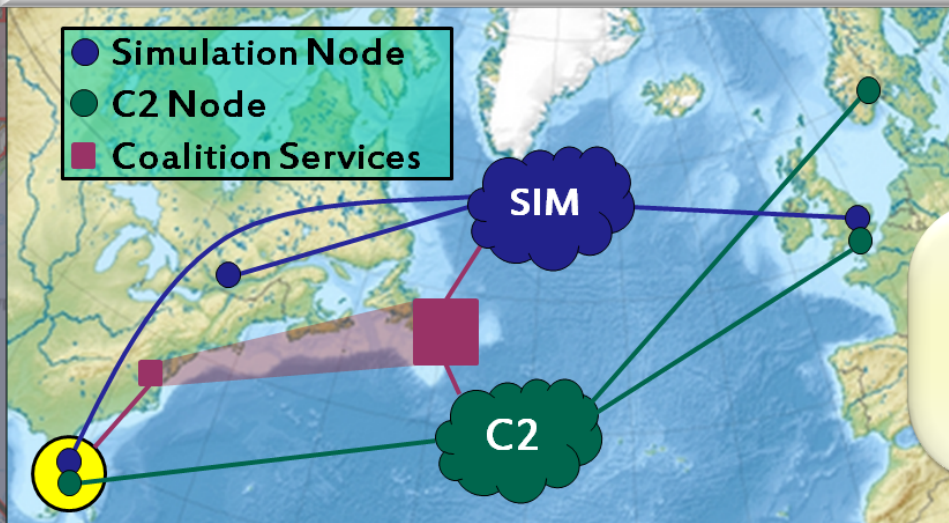
*MSDL for initialization, C-BML for execution*  
*Demo Harness 1: NOR, UK, US*

## COALITION TRAINING CAPABILITIES

Combined C2-Simulation Initialization  
Automated Order Execution  
Automated Reporting

## DISTRIBUTED TRAINING

- Simulation Node
- C2 Node
- Coalition Services



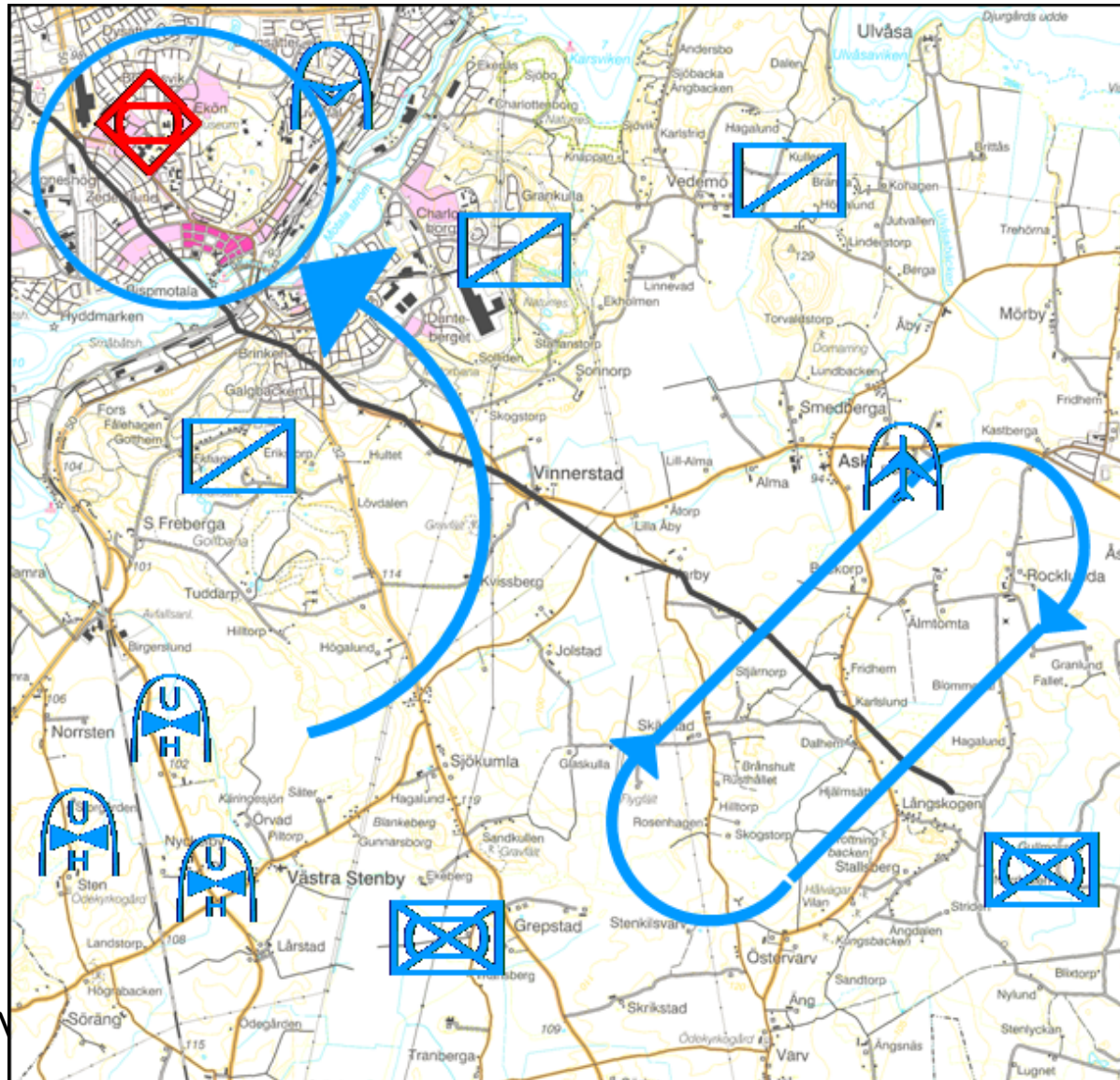
## TRAINING VIGNETTES

Air Reconnaissance  
Combined Ops with Logistics  
Ground Maneuver

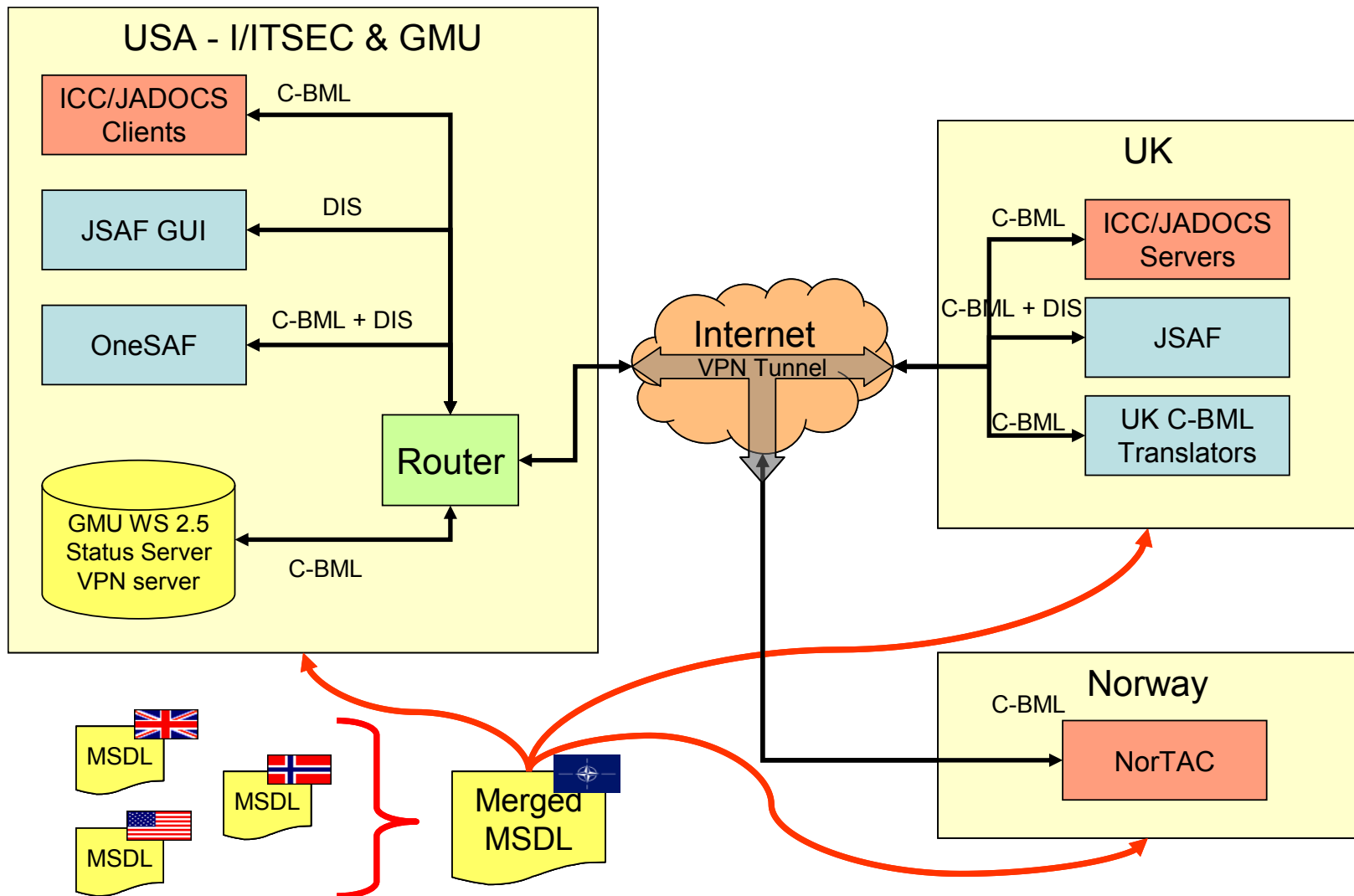
MSDL/C-BML for NATO MSG-085

# MSG-085 I/ITSEC'11

## Recce Vignette: Operational View



# System Architecture for I/ITSEC 2011 DH1



MSDL/C-BML for NATO MSG-085

# UK Operated Systems

- Located in Farnborough, England
- NATO Integrated Command and Control System (ICC)
  - Air component C2
- Joint Automated Deep Coordination System (JADOCS)
  - Joint battlespace C2 (linked to MSDL)
- JSAF entity level constructive simulation
  - Air simulation and perceived truth sensor

# Norway Operated System

- Located in Kjeller, Norway
- Norwegian Tactical Command and Control Information System (NORTaC-C2IS)
  - Ground C2 for reconnaissance units
  - Issued Order as MSG-048 IBML
  - JC3IEDM-based
  - MSDL-capable for initialization
    - Extracts static task organization, equipment, location
  - Mapping from JC3IEDM to MSDL symbol IDs proved to be complicated

# Reconnaissance Task in NORTaC-C2IS

The screenshot displays the NORTaC-C2IS software interface. The main window is titled "NORTaC-C2IS: 1-22\_CP". The menu bar includes File, View, Map, IntObs, OOB, FireSupport, PlanOrder, Logistics, Tools, JBMLOrderList, and Help. The toolbar contains various navigation and tool icons. The interface is divided into several panels:

- OverlayExplorer:** A list of map overlays including Initial\_Positions\_NOR, MOTALA\_PH\_1, MOTALA\_PH\_2, Recce\_MOTALA (checked), Reports01\_1-66\_GT(1-22), Reports01\_1-66\_PT(1-22), Reports01\_EN\_GT(1-22), and Reports01 EN PT(1-22). It also has tabs for Own, Other, and Correlated.
- MapView:** A map of the Motala region in Sweden, showing roads, water bodies, and various reconnaissance tasks represented by blue icons with 'X' marks. The tasks are labeled with alphanumeric codes like 1-221, 1-222, 1-223, etc.
- Own order of battle:** A hierarchical tree view showing the structure of the force, including units like 1-22, 1-221, 1-222, 1-223, and 1-229, with sub-entries for "Attach", "Detach", and "Support".
- PlanOrderTool:** A panel at the bottom left, currently empty.
- Task Properties:** A dialog box open over the map, showing details for a task named "RECCE\_PH4".

The "Task Properties" dialog box has tabs for General, Details, Status, Grid, and Resourc. The "General" tab is active, showing the following information:

Name	RECCE_PH4
Task	Reconnaissance
Hostility	Friend
Last Update	181410Z
Reporting Org	1-22_CP
Tasker	1-2213
Intent Text	Recce Motala south of city

At the bottom of the window, the status bar shows coordinates "N58.5653 E014.9980", "No Data", "1:79482", and "MotalaMapData". The bottom right corner has buttons for "ain", "FireSupport", "Messaging", "CAP", "NUM", and "SCRL".

# US Operated System

- Located in Orlando, Florida
- OneSAF entity-level constructive simulation
- Lead system for “crawl, walk, run” development of MSDL/C-BML integration
- Challenges:
  - OneSAF-specific MSDL schema modified
  - Generalize One-SAF specific MSDL tags
  - No existing server access mechanism
  - No support to relate C-BML Orders/Reports to MSDL
  - No support to task OneSAF units

# The Way Forward for MSDL/C-BML

- MSG-085 continues to be a driving force for development of SISO standards
  - I/ITSEC 2011 is only one of several activities
  - Experimentation planned for 2012
- Path to MSDL/C-BML convergence is (mostly) clear
  - Use MSDL Task Organization
  - Use C-BML Tasking
  - Use standard tactical graphics (JC3IEDM role TBD)
- SISO should follow MSG-085 developments closely as indicators for
  - MSDL and C-BML requirements
  - Effective, implementable techniques