

C2-Agents and Low-level BML

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Low-level BML is a language for controlling computer generated entities



Objective



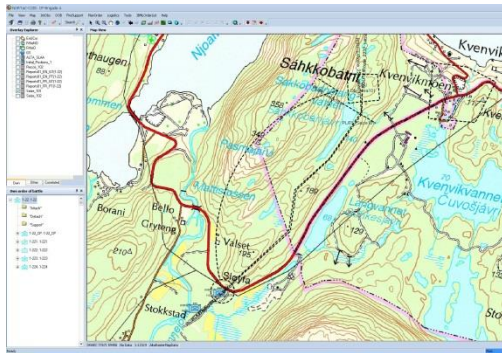
Our simulation system

| Scenario management | Commands | Reports |
|---------------------|-------------------------|---------------------|
| Create entity | Wait | Spot report |
| Create aggregate | Move to location | Under fire |
| Create area | Move along route | Task completed |
| Create phase line | Move into formation | Entity fuel |
| Create route | Follow entity | Entity ammunition |
| | Set rules of engagement | Entity in area |
| | Set camouflage on/off | Entity crossed line |
| | Subscribe to reports | |

Low-level BML

Our main objective is to make a simulation system which understands C-BML and MSDL

C2IS

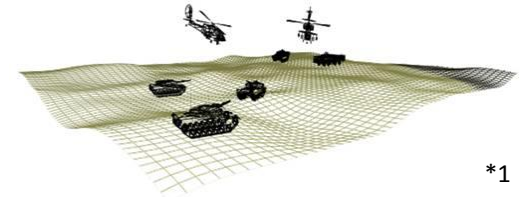


MSDL: Scenario init

C-BML: Order

C-BML: Reports

Simulation system / CGF tool



*1

C2IS: Command & Control Information System

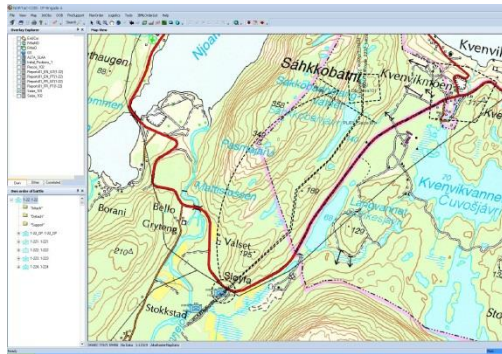
MSDL: Military Scenario Definition Language

C-BML: Coalition Battle Management Language

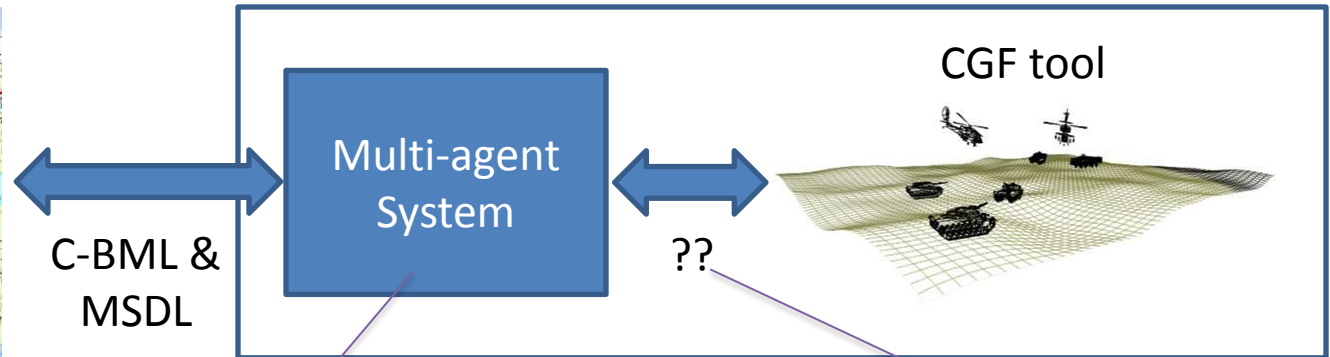
*1: Figure copied from open source briefings under <http://www.onesaf.net/community/>

The simulation system consist of a multi-agent system together with a CGF tool

C2IS



Simulation system

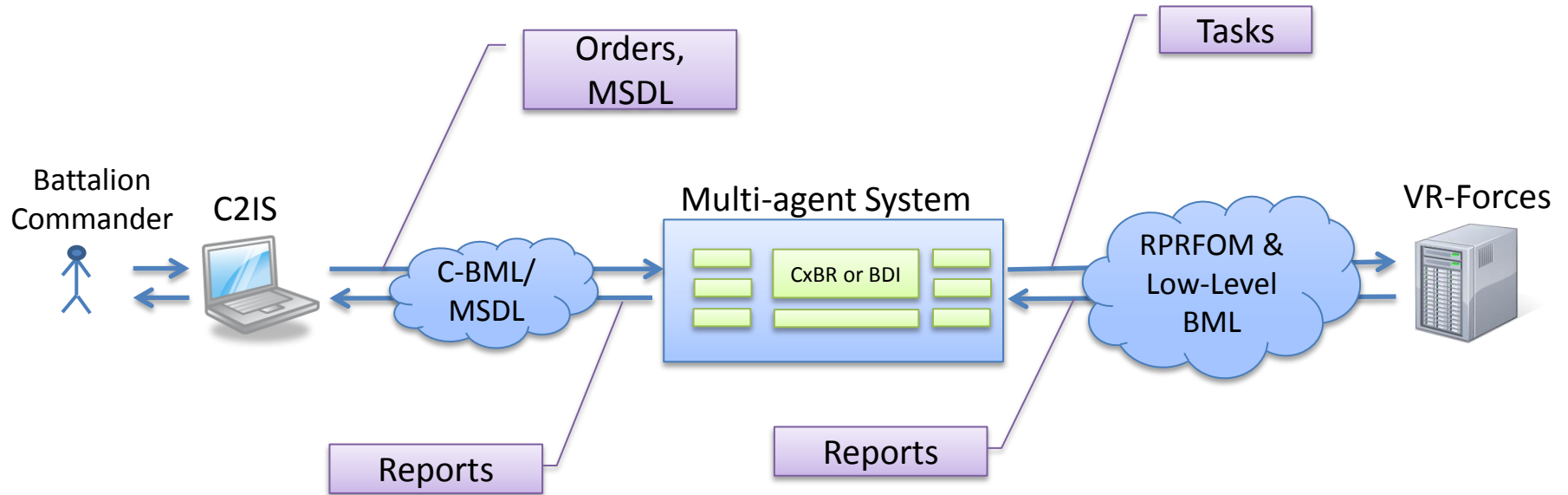


Country specific military doctrine and tactics

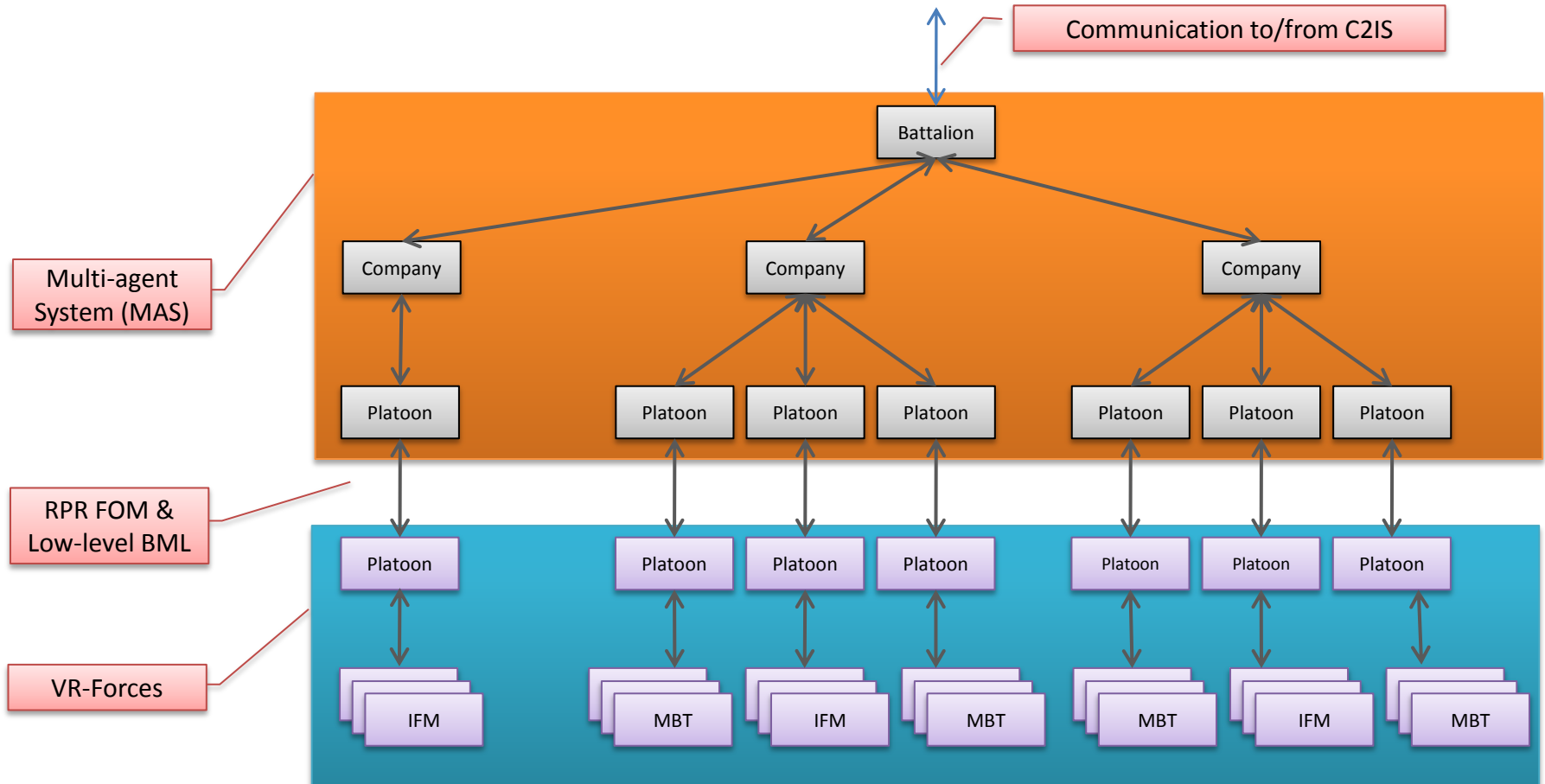
True state: RPR FOM

Tasks, reports, scenario management: Low-level BML

Experiment Setup

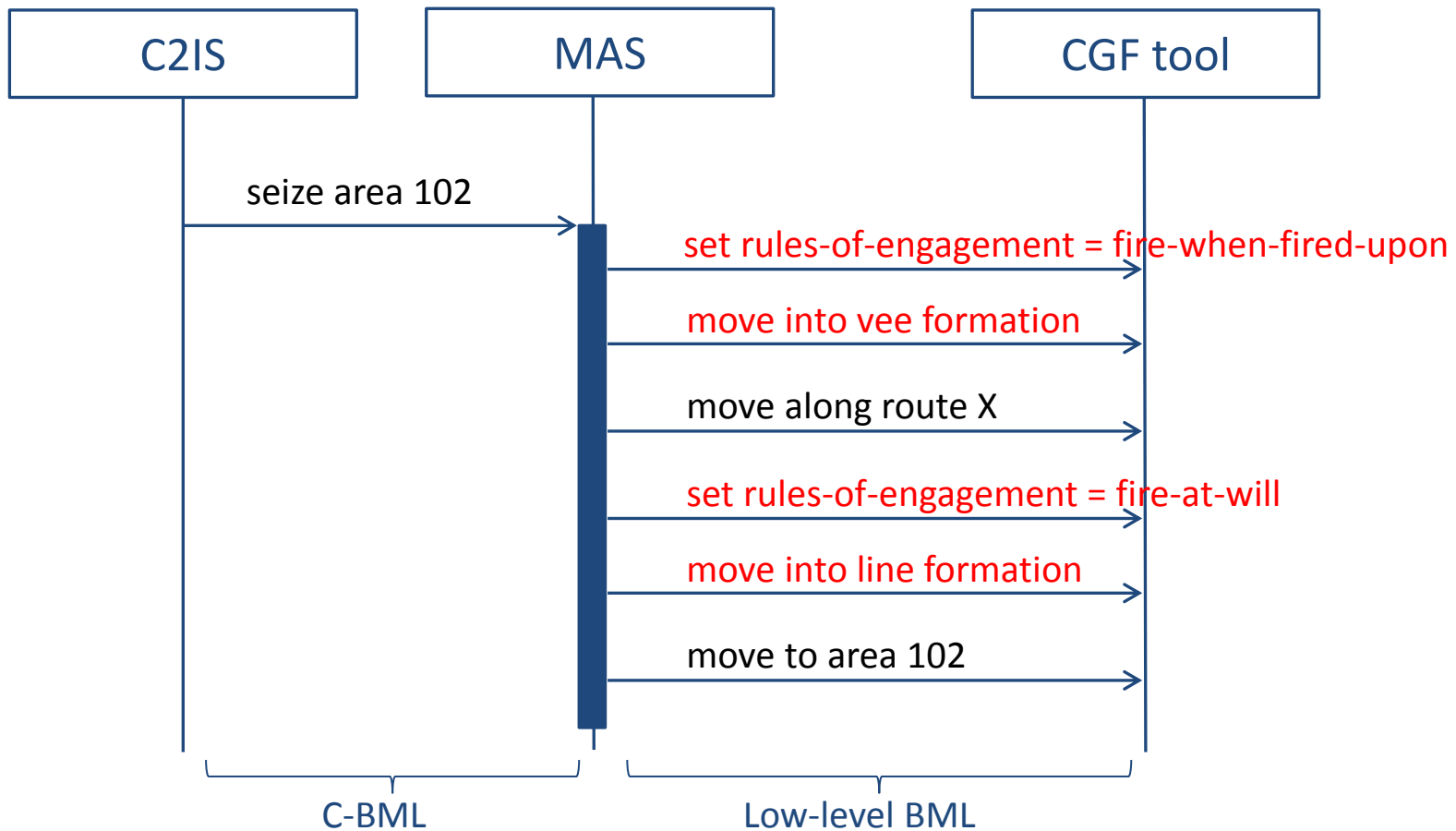


The multi-agent system use a hierarchy of agents to decompose a C-BML order



IFM: Infantry Fighting Vehicle
MBT: Main Battle Tank

C-BML is not suitable for controlling computer generated entities



We suggest Low-level BML as a standard language for controlling entities

- Independent of CGF tool and multi-agent system
- Reflect capabilities commonly found in COTS CGF tools
- Compact low-level commands easily interpreted by CGF tool
- Independent of doctrine and tactics
- Logistic reports and entity status reports
- Usable with HLA and/or DIS

Language Constructs

| Scenario management | Commands | Reports |
|---------------------|-------------------------|---------------------|
| Create entity | Wait | Spot report |
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We have represented Low-level BML with two different encodings

Extension of the RPR FOM / FOM module

- Standardized way for defining new FOM structures

Wrap Low-level BML messages in existing *Application Specific Radio Signal* (RPR FOM / PDU)

- Serialization of BML messages
- Works with DIS and HLA

Low level BML approach will be used in NATO MSG-106

MSG-106

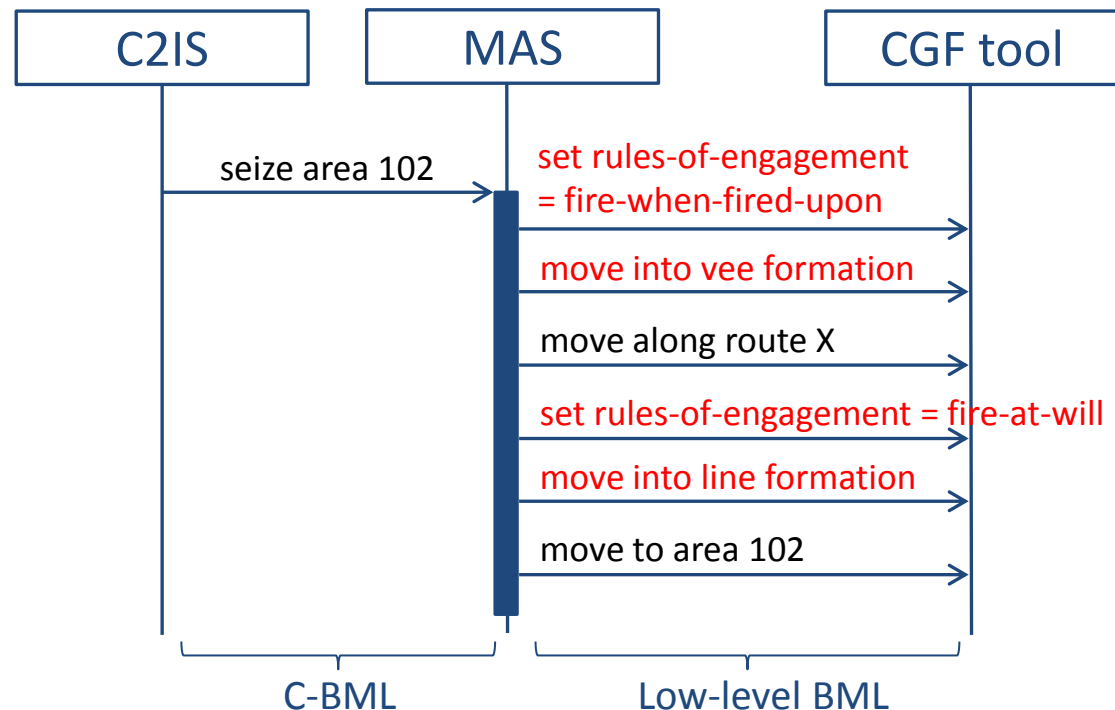
- Aim: Developing a handbook for guiding a planner to organize and manage a CAX
- by doing experiments
- and implementing and extending current standards aimed at SIM-SIM interoperability and C2-SIM interoperability
 - LLBML will be adopted in MSG-106

We suggest Low-level BML as a language for controlling entities independent of CGF tool

We have made simulation systems which understand C-BML and MSDL.

The simulation systems consist of a multi-agent system together with a CGF tool.

C-BML is not suitable for controlling low-level computer generated entities.



Questions?