BML-Related Research in Germany

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Dr. Ulrich Schade
FGAN-FKIE
GERMANY
schade@fgan.de

Dr. Eckehard Neugebauer
IABG
GERMANY
neugebauer@iabg.de

Content

1. An overview of BML-related research in Germany
2. Grammar extensions for communication in Complex Endeavors
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BML-related research in Germany

coordinated by the

Federal Office of the Bundeswehr
for Information Management
and Information Technology
Modeling and Simulation Branch

POC: Major Thomas Orichel

Contributions to NATO RTO MSG 048 “Coalition BML”

Command and Control Lexical Grammar (C2LG)
developed in cooperation with

especially with Dr. Michael R. Hieb

The C2LG defines a BML that allows expressing orders
(assignment of tasks to units + command intent),
requests and reports.
Command and Control Lexical Grammar (C2LG)

The BML defined by the C2LG allows users to formulate orders, requests and reports taking advantage of their military knowledge.

Example: A orders B to occupy a specific building:

occupy $A$ $B$ Building2109 at Melkar Square
start at now label-r-4828;

Contributions to NATO RTO MSG 048 “Coalition BML”


some papers about C2LG
BML-related research in Germany

Contributions to NATO RTO MSG 048 “Coalition BML”

Orders, requests, and reports that follow the C2LG can be formulated with the help of the C2LG-GUI.

This GUI has been connected to the Dutch C2 system ISIS and the Norwegian C2 system NORTaC for the MSG 048 demonstrations presented at I/ITSEC 07 and I/ITSEC 08 in Orlando, Florida.

C2LG-GUI – snapshot
BML-related research in Germany

Contributions to NATO RTO MSG 048 “Coalition BML”

Papers about the I/ITSEC presentations:

**BML-related research in Germany**

The Fraunhofer institute IAIS developed a multi-agent simulation system (ITSimBw). A version of BML based on the C2LG was used in this system for **inter-agent communication**.

**Advantage:**
Simulated units (agents) can easily be substituted by real units (and vice versa) without changing their communication behavior.


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**BML Projects in Germany**

There are three more projects in progress that include BML aspects:

- **in National Project VSimFü** C2LG is used to task Simulated Units for Future Concept Development

- **in Coalition Project COMELEC** C2LG is used to task French and German Simulated Units

- **in National Project AUGE** C2LG is used as a representation language for the analysis of HUMINT Reports
BML Projects in Germany

Project VSimFü

POC: Dr. Probst
Bodo.Probst@esg.de

BML Projects in Germany

German Contributions to Project COMELEC (2009)
BML Projects in Germany

Project

Analyst's Interface

Threat Model

Threat Recognizer

Indicators

Content in BML

Report

POC: Mr. Ziegler
ZieglerJ@iabg.de

Grammar Extensions for Complex Endeavors

Purely Military Communications do not work in a Complex Endeavor.

In a military operation, orders are used to assign tasks to subordinate units. “Order” incorporates the meaning that the one who gives the order can expect the one who receives it will execute it without question.

In the context of a Complex Endeavor, orders cannot be used to assign tasks to other organizations.
Grammar Extensions for Complex Endeavors

A **Directive** is a speech act that has the purpose of having the receiver perform a task.

Directives

<table>
<thead>
<tr>
<th>Orders</th>
<th>typical for military operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taskings</td>
<td>typical for complex endeavors</td>
</tr>
<tr>
<td>Requests</td>
<td>typical for complex endeavors</td>
</tr>
</tbody>
</table>

*also*

Pleas
Challenges

Orders: The right to direct the receiver results from military organizational hierarchy. (The receiver is subordinate to the sender.)

Tasking: The right to direct the receiver results from some organizational hierarchy. (The sender coordinates the endeavor.)

Requests:
The right to direct the receiver does not result from a organizational hierarchy, but derives from the common intent. The requested action would help to achieve a common goal (as agreed upon in the common intent).
Grammar Extensions for Complex Endeavors

Orders
The recipient of an order executes the ordered task without question.

Taskings / Requests
The recipient of a request may not execute the requested task. However, the requester needs to know whether the requested task will be executed. Thus, the receiver of a request must confirm that the request was received and – if the receiver will execute the requested task – he has to commit himself to do so.

Grammar Extensions for Complex Endeavors

To handle the communication between Military Organizations, Civil Organizations and NGOs, the language (BML) must include

Confirmations
and
Commissives / Declinations.

These types of expressions serve as coordination tools in the multi-agent context of Complex Endeavors.
Example:

A $\rightarrow$ B
tasking: **evacuate** A B Building2109 **at** Melkar Square **start at** now […] label-r-4828;

B $\rightarrow$ A
tasking-confirmation: label-r-4828;
commission: **evacuate** B Building2109 **at** Melkar Square **start at** now […] regarding label-r-4828 label-com-4835;

[declination: label-r-4828;]

Papers about the C2LG adaptation for Complex Endeavors:


The GeoBML process determines Tactical Spatial Objects (TSO).

There are several situations in which these TSO have to be communicated. For example:

1. Information Sharing
   Informs about the existence of the TSO.
2. Reference:
   Designating the TSO in a Directive.

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Tactical Spatial Objects (TSO) Information Sharing

Suggested Format:

doctrinal statement: Sender TSO TSO-type TSO-ID Label

Example:

doctrinal statement: PzGrenBde37 TSO CheckPoint Pi label-ds-17;

More information about Pi will be in the database. The ID Pi can be hyperlinked to that information.
Tactical Spatial Objects (TSO) Reference

Suggested Format:
C_S → TSO-type TSO-ID Owner [User] StartWhen (EndWhen) Label

Example:
area of interest Alpha PzGrenBde37 PzGrenBtl372
start at TP1 label-tso-29;

Again, more information about Alpha will be in the database.
The statement is mostly about when the TSO is to be used by whom.

Conclusions

Germany is using BML (C2LG) in many different projects for representing Orders and Reports.

FGAN is developing infrastructure for NATO MSG 048 and collaborating with IABG on several Projects.

Several other organizations in Germany are also involved in BML Projects.

FGAN has a continuing research initiative with GMU to develop Formal Languages for BML.
Conclusions

The language the C2LG defines can easily be complemented with means to

- communicate Command Intent;
- communicate in a complex endeavor including means for turn taking, e.g., confirmations and commitments;
- communicate geo-information including means for introducing, exchanging, and ordering Tactical Spatial Objects.