



# STANDARDIZING MILITARY MEANING

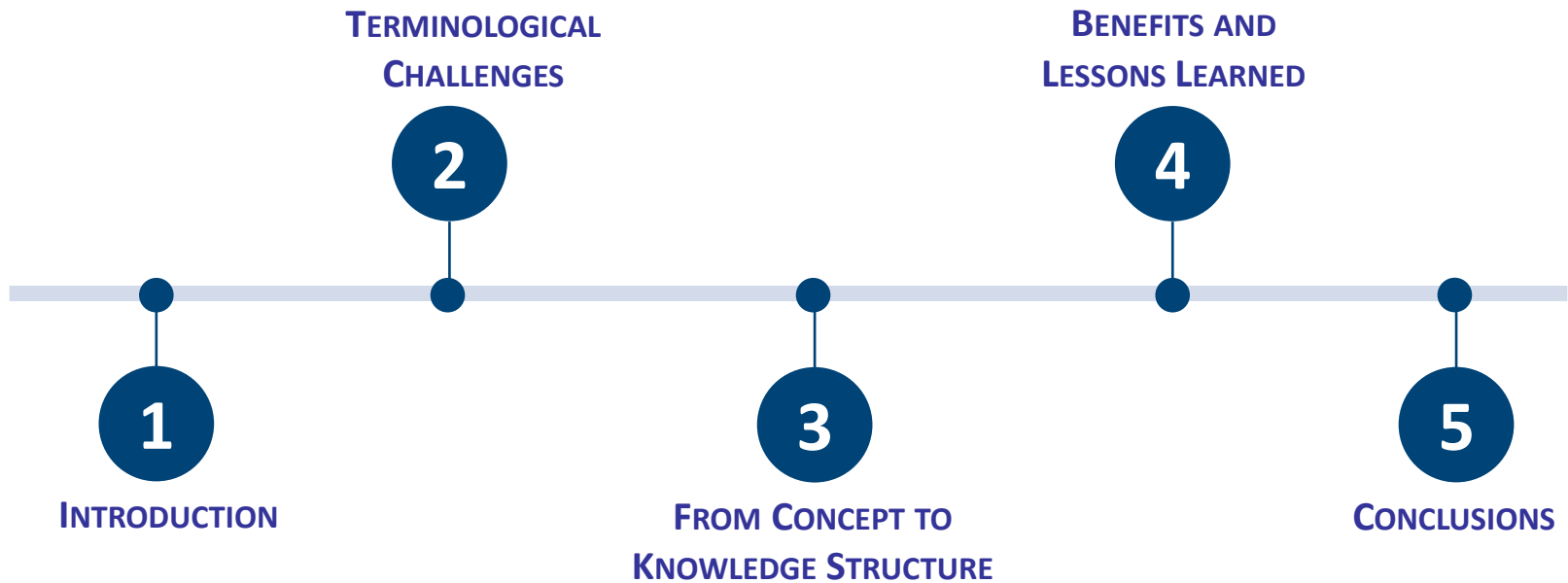
## HOW ONTOLOGIES AND KNOWLEDGE GRAPHS SUPPORT TERMINOLOGY UNIFICATION IN MULTINATIONAL FORCES

Beate Kuhl, Federal Office of Languages, Germany

NATO BILC MILITARY TERMINOLOGY CONFERENCE, Warsaw, 13-17 April 2026



# AGENDA





### Higher federal authority subordinate to the FMOD

- Part of educational and qualification landscape of the Bw and the FMOD's Directorate-general for Augmentation

#### Language Training

#### Linguistic Services



### Locations

- More than 70 locations in Germany and abroad
- Close to customers



### Translation Services in Figures

- ~ 400 translators, revisors, interpreters, language assistants, terminologists
- ~ 20 languages
- ~ 15.000 translation requests a year
- ~ 200,000 translated and revised pages a year
- ~ 33,000 interpreting hours
- ~ 70% English, 20% Russian, 8% French





# TERMINOLOGICAL CHALLENGES

- Multiple languages
- Different language traditions
- Varying terminology systems





# TERMINOLOGICAL CHALLENGES

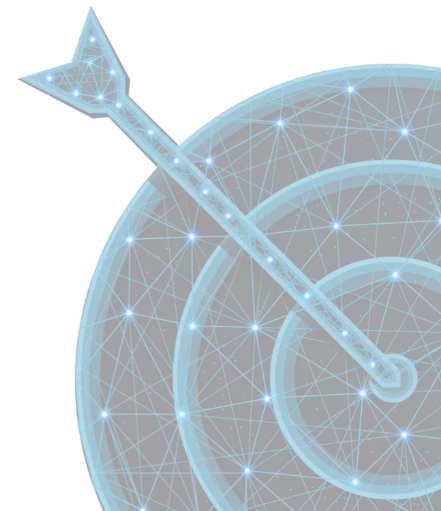
## Consequences

- Misunderstandings (synonymy, polysemy)
- Inconsistent documentation
- Translation errors
- Inefficient communication





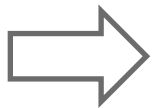
# HOW CAN WE SYSTEMATICALLY STRUCTURE TERMINOLOGY AND USE IT EFFECTIVELY?





## LIMITATIONS OF TRADITIONAL TERMINOLOGY SYSTEMS

- ✓ Contain structured terminology
- ✓ Are multilingual
- ✓ Store concepts and terms
- ✓ Contain definitions
- ✓ Contain foreign-language equivalents
- ✗ Limited semantics
- ✗ Non-formalized relationships
- ✗ Lack of context
- ✗ Not machine-readable
- ✗ Difficult to integrate into other systems

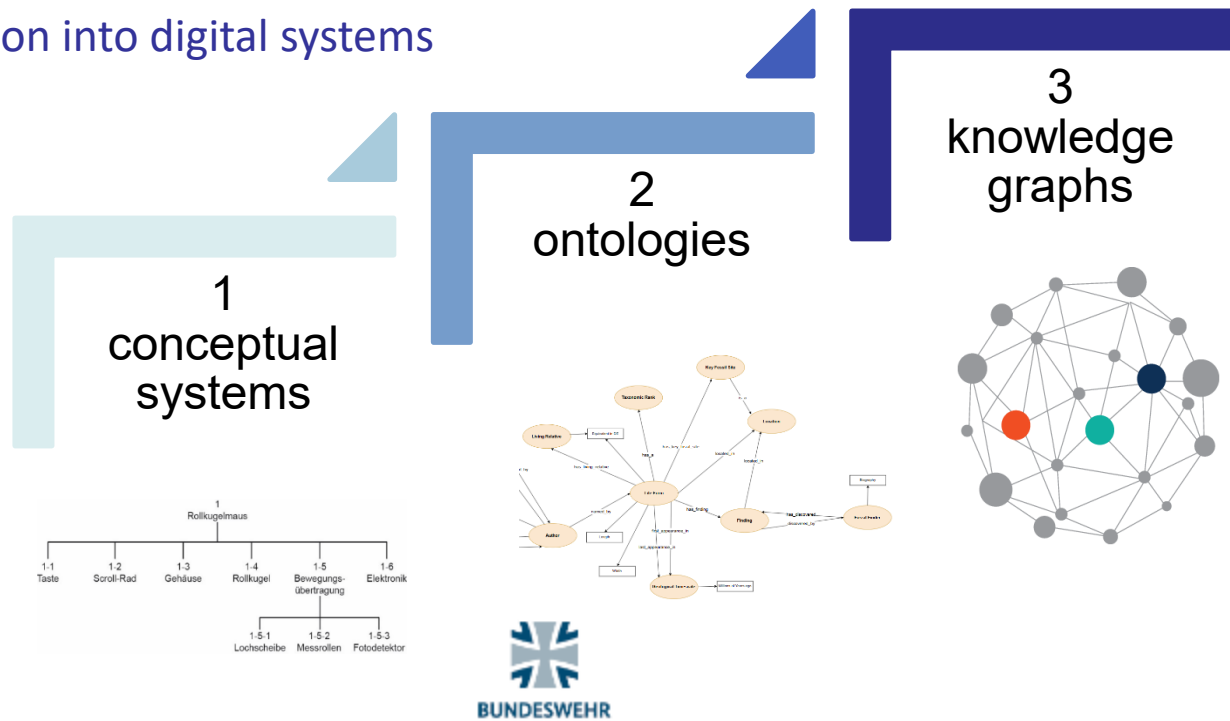


Terminological knowledge is **isolated**.



# FROM CONCEPT TO KNOWLEDGE STRUCTURE

- Conceptual modeling
- Explicit relationships between concepts
- Machine-readable semantics
- Integration into digital systems

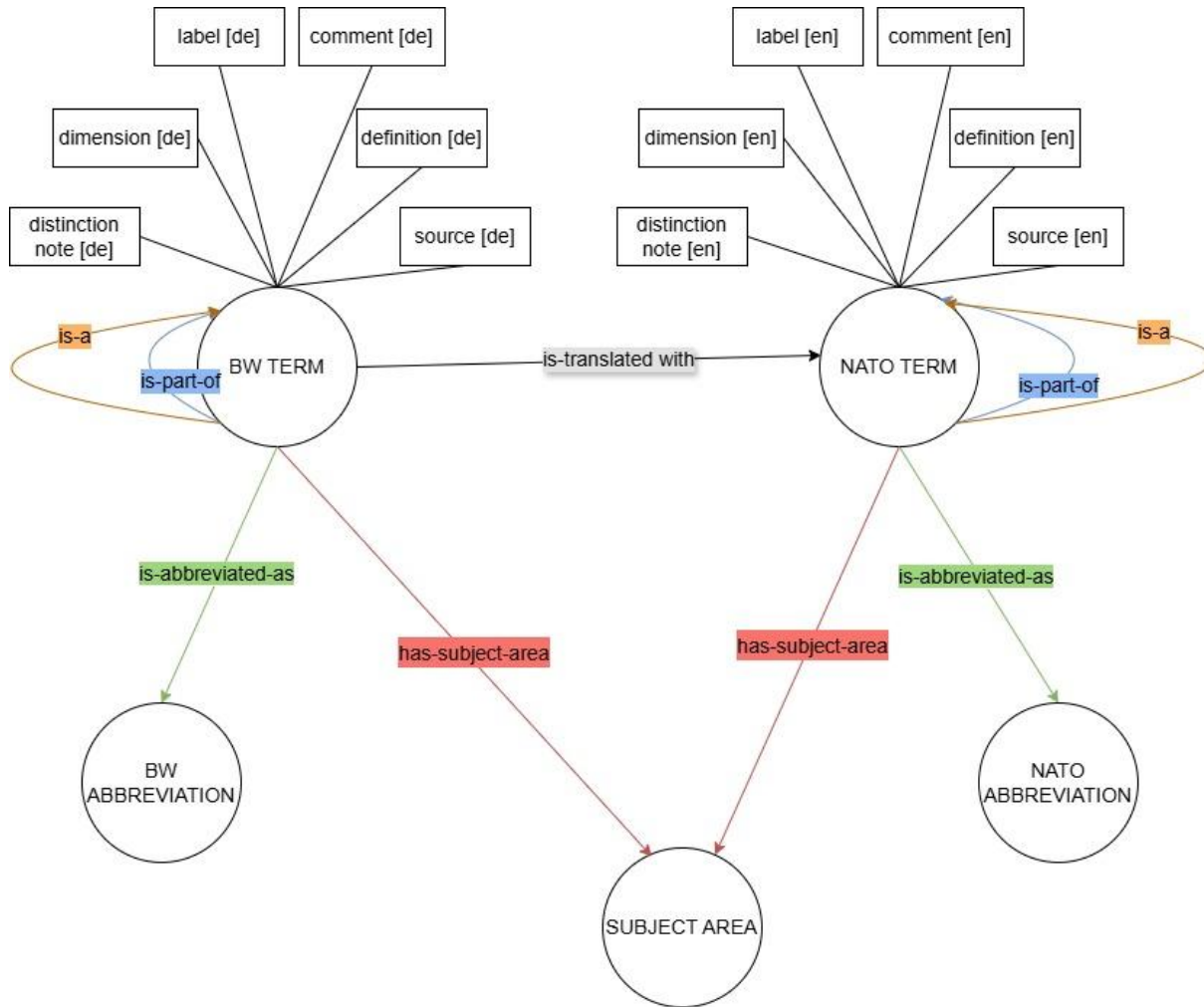




# ONTOLOGY

- Defined data model
- Describes structured and unstructured information
- Consists of classes, properties and relations
- Domain model in machine- and human-readable format
- Requires deep understanding of knowledge domain
- Resource for graph-based knowledge modeling







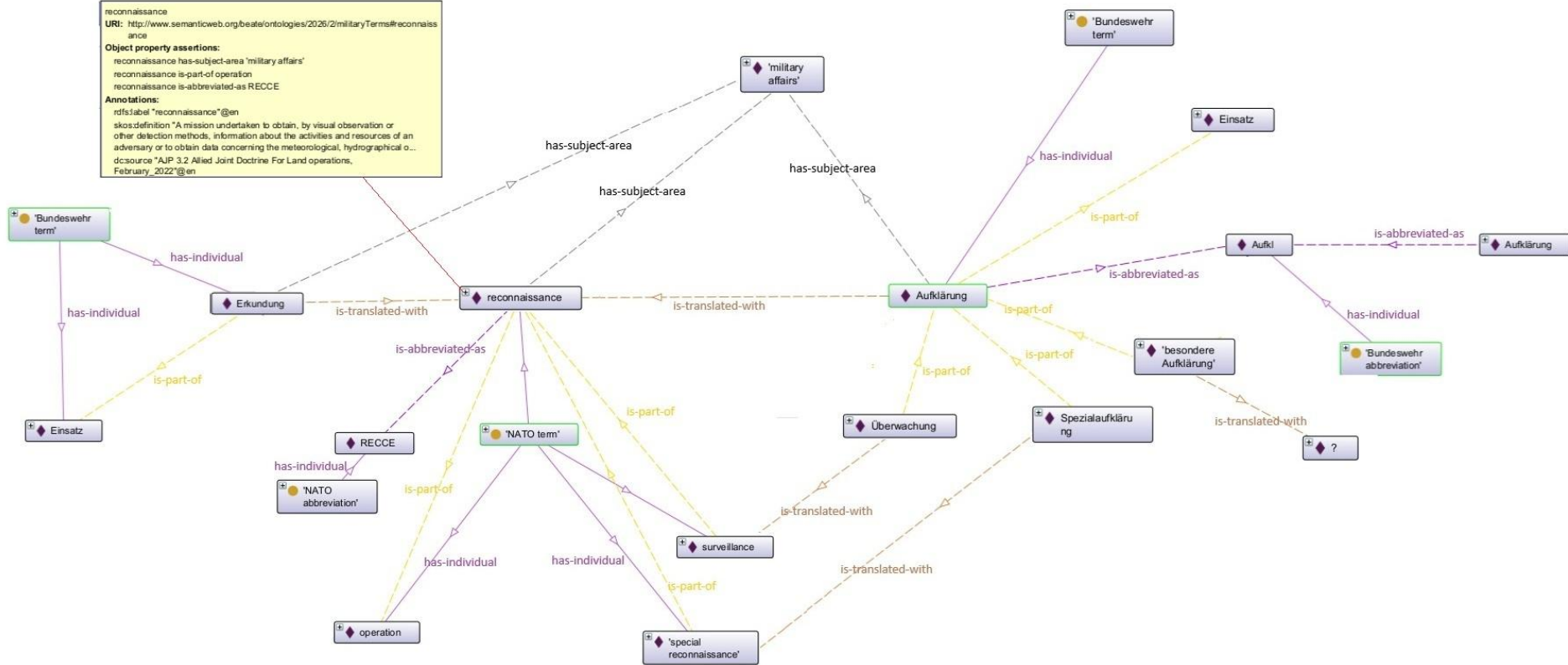
# KNOWLEDGE GRAPH

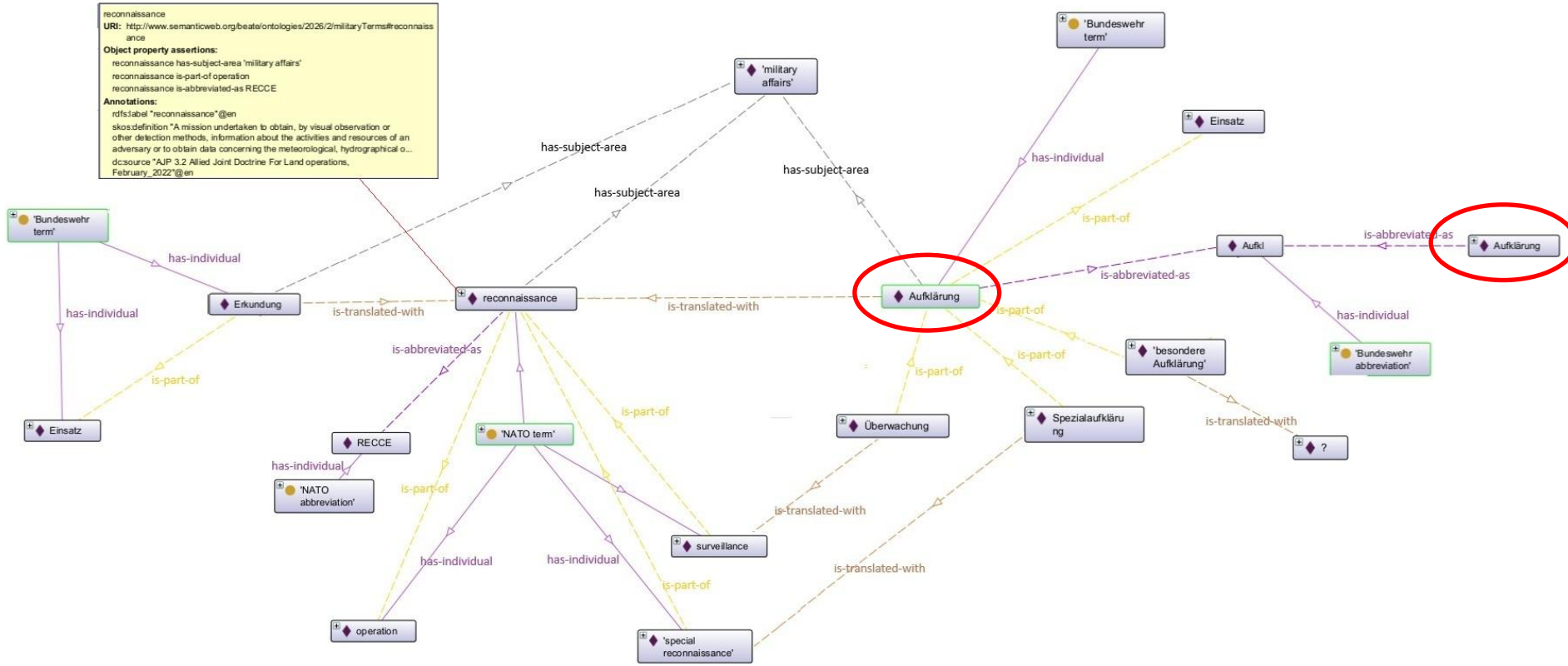
- Combination of an ontology and content or data
- Made up of interlinked real-world entities described in a formal structure
- Determines data structure and instances
- Forms a network of semantic statements
- Allows a representation, visualization, querying, and reasoning of domain(s).
- Used in information retrieval and deep learning





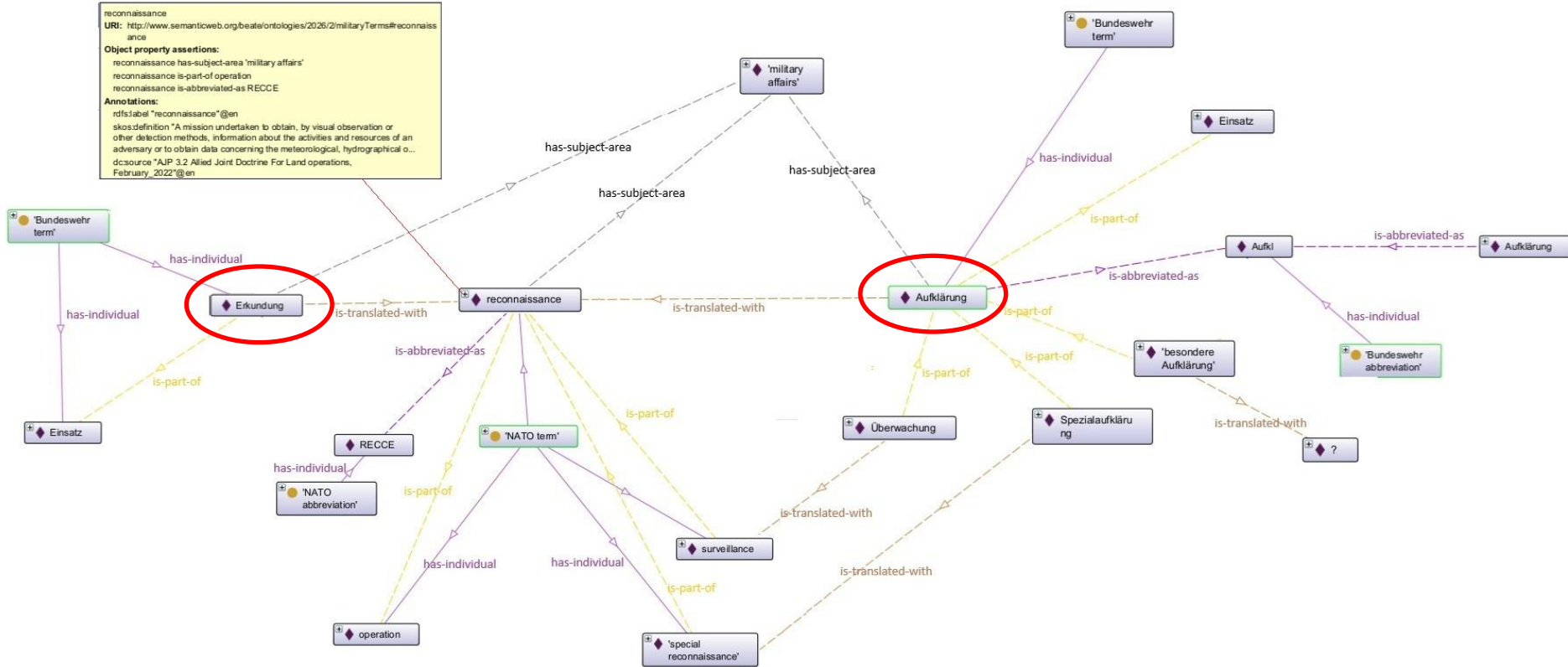
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 Object property assertions:  
 reconnaissance has-subject-area 'military affairs'  
 reconnaissance is-part-of operation  
 reconnaissance is-abbreviated-as RECCE  
 Annotations:  
 rdfs:label "reconnaissance"@en  
 skos:definition "A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an adversary or to obtain data concerning the meteorological, hydrographical o..."  
 dcs:source "AJP 3.2 Allied Joint Doctrine For Land operations, February, 2022"@en







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# MACHINE-READABLE FORMATS

- Knowledge representation languages:  
RDF, OWL, TURTLE, JSON ...
- Knowledge organization systems:  
SKOS, DCTERMS, SCHEMA, RDFS, ...
- Query languages:  
SPARQL, Cypher, ...

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## BENEFITS

- Joint terminology repository
- Automatic term linking
- Semantic search
- Foundation for AI applications
- TermRAG
- Consistent documentation
- Efficient translation processes
- Better communication
- Improved knowledge integration



# SYSTEM INTEGRATION

- Terminology management systems
- Translation memory systems
- Content management systems
- AI systems
- Automated terminology extraction
- AI-supported ontology and knowledge graph creation
- Automatic context search
- Chatbots
- Organization-wide knowledge graphs
- Automated creation of user-specific trainings
- ...





## LESSONS LEARNED

- Automate (parts of) the process
- Model only one (small) conceptual framework in a single view
- Always work from a specific perspective
- Formulate competence questions
- Initiate shift in mindset of terminologists
- Look for interdisciplinary collaboration
- Implement terminological governance
- Establish maintenance processes

**THERE IS NO ONE CORRECT WAY TO  
MODEL AN ONTOLOGY/A KNOWLEDGE  
GRAPH!**

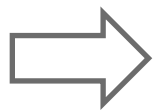


# CONCLUSIONS

Terminology = Part of the knowledge infrastructure of multinational forces

Ontologies and knowledge graphs enable:

- ✓ Structured, concept-oriented terminology
- ✓ Formal knowledge representation
- ✓ Integration into digital systems
- ✓ Semantic interoperability



Different systems and actors assign the same meaning to exchanged data.



# QUESTIONS?

