Representability of METT-TC Factors in JC3IEDM

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Talk Outline

- What is METT-TC?

- What is meant by "representability"?

- What is JC3IEDM?

- Representation of METT-TC Factors in JC3IEDM

- JC3IEDM deficiencies for METT-TC representation

What is METT-TC?

- Information that is gathered as part of the Intelligence Preparation of the Battlefield (IPB) process
- Acronym for several factors:
  - *Mission*
  - *Enemy*
  - *Troops*
  - *Terrain and Weather*
  - *Time available*
  - *Civilian Considerations*
- Defines the "context" in which intelligence analysis is carried out during a military operation

Representability in a KR

- If a statement can be translated into an equivalent KR statement it is *representable.*
- If only into unstructured text, *weakly representable.*
    - *E.g. English -> French*
- If the KR has a formal semantics, it is *formally representable.*
    - *E.g. English -> FOL*
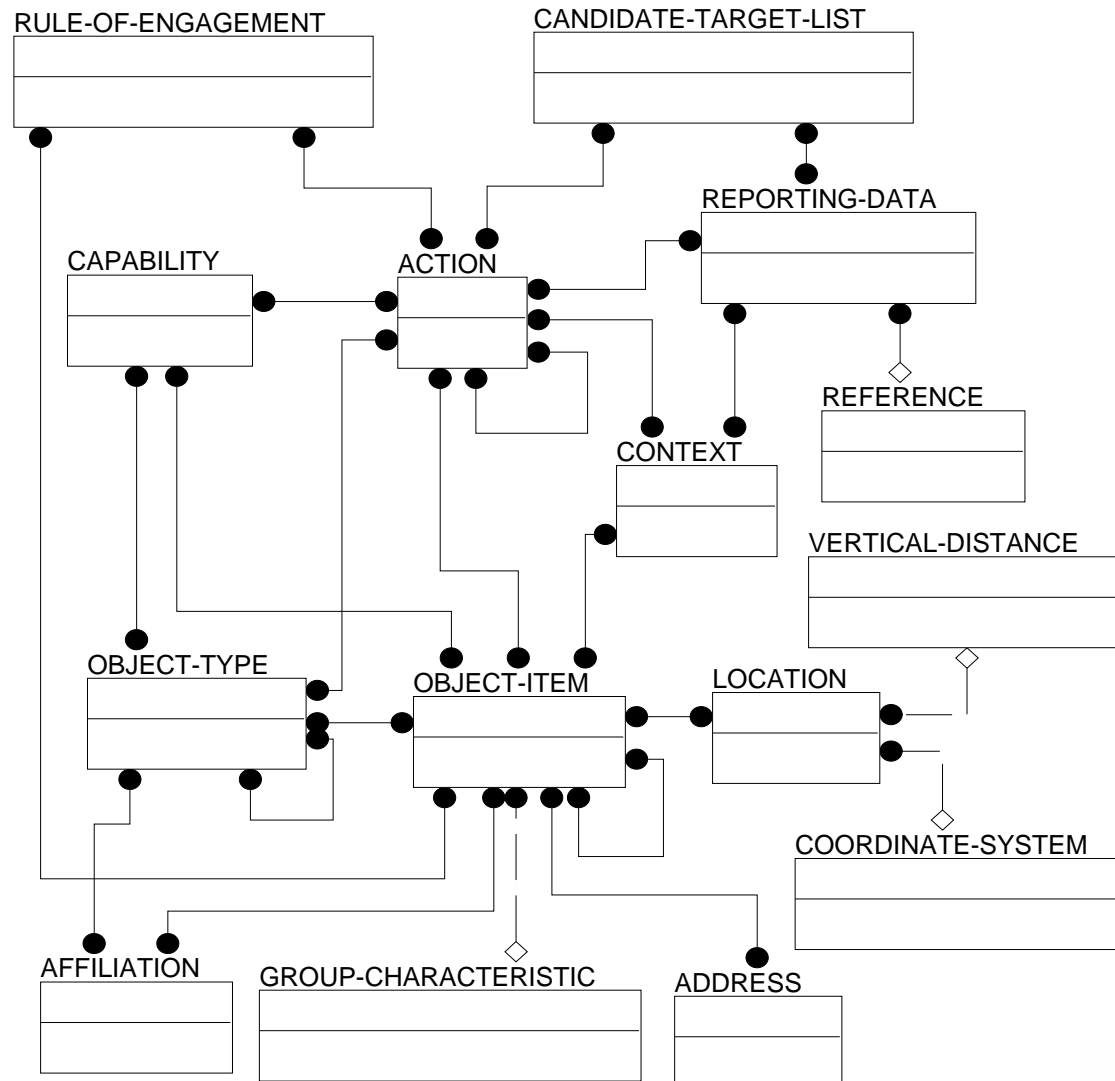   - *Permits automated inferencing. Ax & Bx => Ax*

What is JC3IEDM?

- Joint Consultation, Command & Control Information Exchange Data Model (JC3IEDM)
  - *Generic Hub -> Land C2IEDM -> C2IEDM -> JC3IEDM*
- Developed by the Multinational Interoperability Programme (MIP)
  - *NATO organization*
  - *Goal: international interoperability of C2IS to support multinational (NATO) combined and joint operations*
- Relational Data Model for Information Exchange
  - *289 entities*
  - *396 relationships between entities*
  - *1729 entity attributes*
  - *nearly 7000 value codes*

JC3IEDM High-level Entities

Representability of METT-TC in JC3IEDM
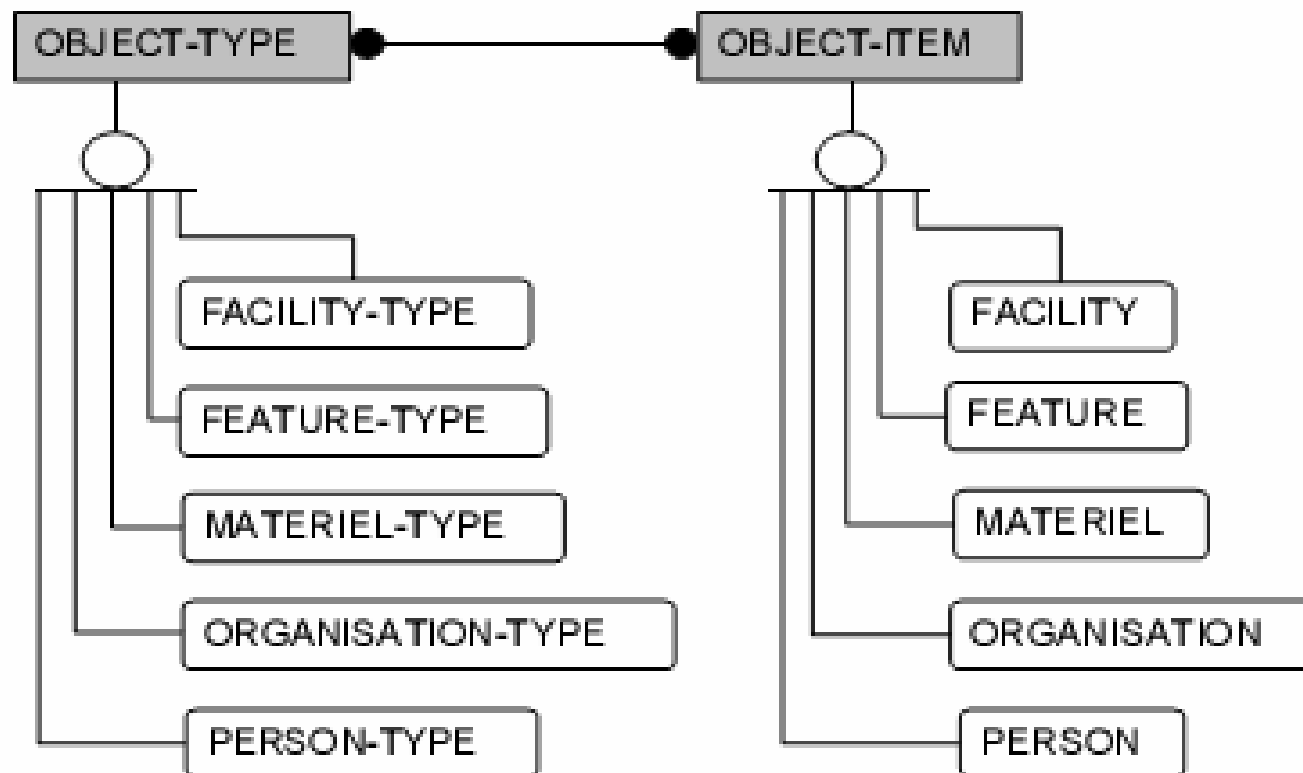
Objects in JC3IEDM

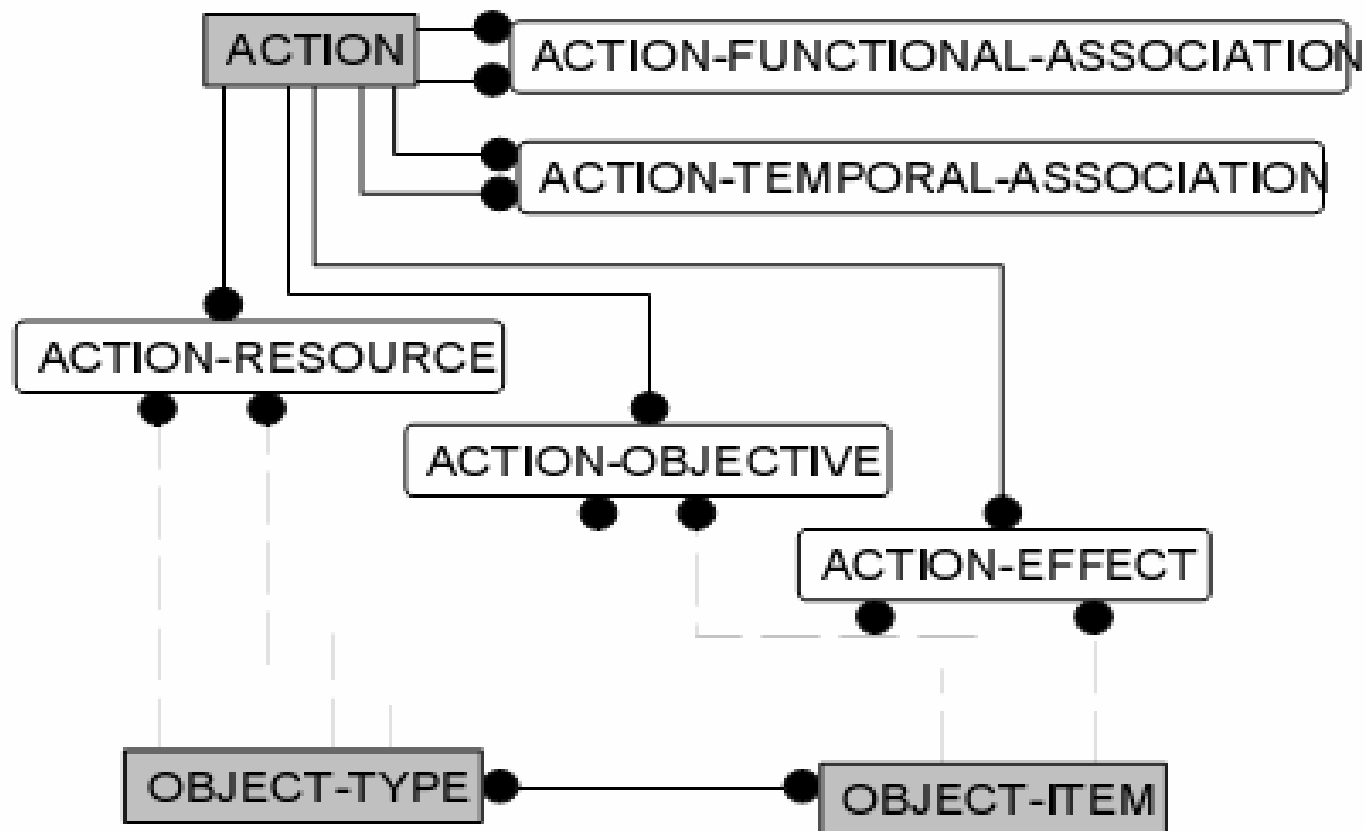Figure 3. First Level Subtyping of OBJECT-TYPE and OBJECT-ITEM

Actions

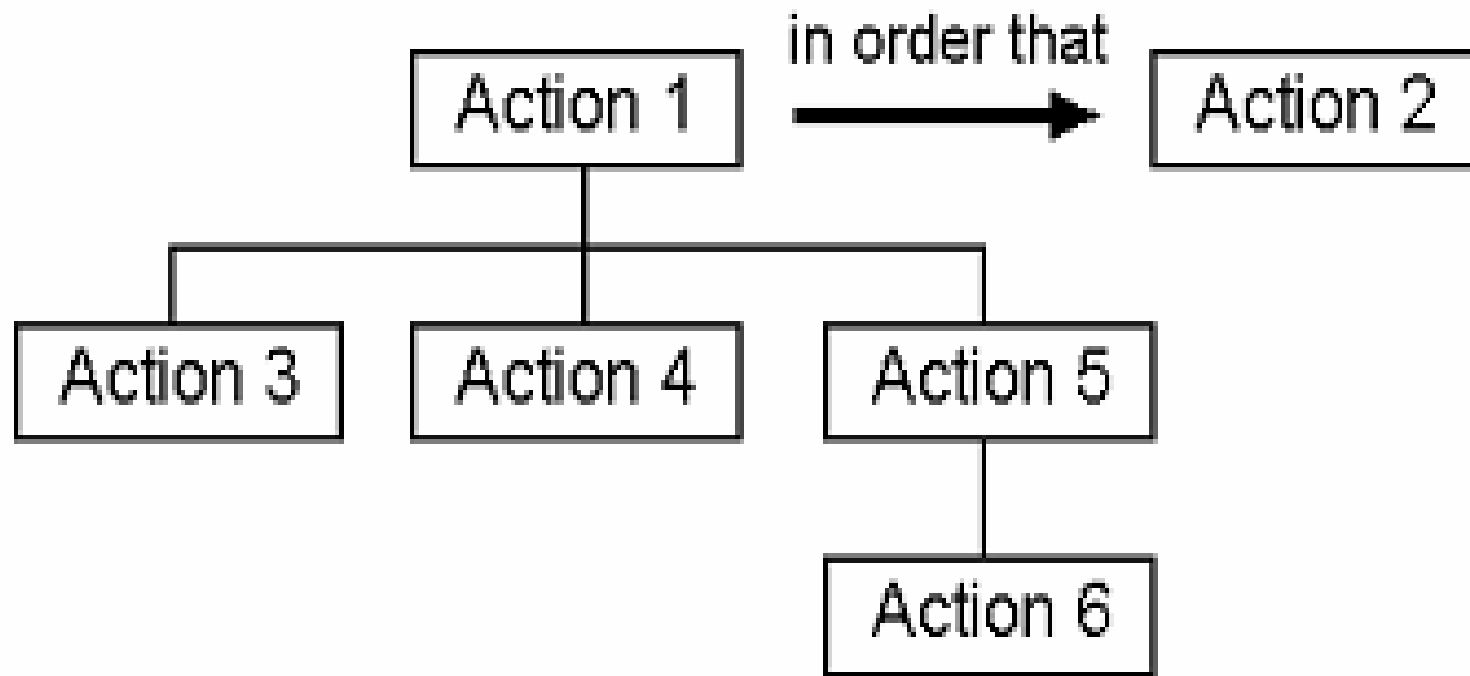Figure 20. Basic ACTION Structure

Representing Complex Actions

Figure 21. An Example of ACTION Hierarchy

Mission/Time Available

What	Ordered (Sequence of) ACTION-TASKs and subtasks
How	RULE-OF-ENGAGEMENT (Unstructured text)
Who	ACTION-RESOURCE UNIT
When (Time Available)	Absolute or Relative Expected Start/End Time
Where	LOCATION
Why	ACTION-RESOURCE intent-text (unstructured text)

Enemy/Troops

Organization, strength, location and tactical mobility	UNIT, LOCATION, MOBILITY-CAPABILITY
Equipment	EQUIPMENT
Capabilities	CAPABILITY
Doctrine	Assumed ACTION-TASK (citing REFERENCE)
Vulnerabilities	Possible X ACTION-TASK On/At Y
Probable COAs	Likely ACTION-TASK

Terrain & Weather

Observation	X observes Y
Fields of Fire	Zone-of-Fire
Cover	X is-protected-by Y
Concealment	
Obstacles	Type of CONTROL-FEATURE
Key/Decisive Terrain	FEATURES, FACILITIES
Avenues of Approach	ROUTE, with subtypes
Weather	METEOROLOGIC-FEATURE, Fog, Haze, etc.

Civil Considerations

Areas	Bounded LOCATIONS with AFFILIATIONs
Structures	FACILITIES, at building level. Little capacity for detail.
Organizations (non-military)	GROUP-ORGANISATION
People	PERSON (GROUP has-as-member, is-under-command-of)
Events	(Limited) ACTION-EVENT e.g. no religious holidays

JC3IEDM: METT-TC Deficiencies

- Mission Intent and Rules of Engagement can only be represented as unstructured text.

- Concealment relations are not expressible at all.

- Civil events can only be represented as national holidays.

- The relationship of various groups of the population to one another is not easily represented.

- The needs and intentions of groups (and, by inference, the persons that belong to them), can only be represented as unstructured text.

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Questions?