

Achieving situation awareness of emergency response teams

- Inputs to the situation awareness concept
 - Human situation awareness: Endsley model
 - Situation semantics: Barwise and many others
 - Information fusion: JDL model
- Implementing situation awareness
 - Ontologies for situation awareness
 - Logical reasoning about situations and context
 - Uncertainty reasoning

Situation Awareness

- Situation awareness (SAW) is “knowing what is going on around oneself.”
 - More precisely, SAW is the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future (Endsley & Garland).
- SAW occurs at level 2 of the JDL model.

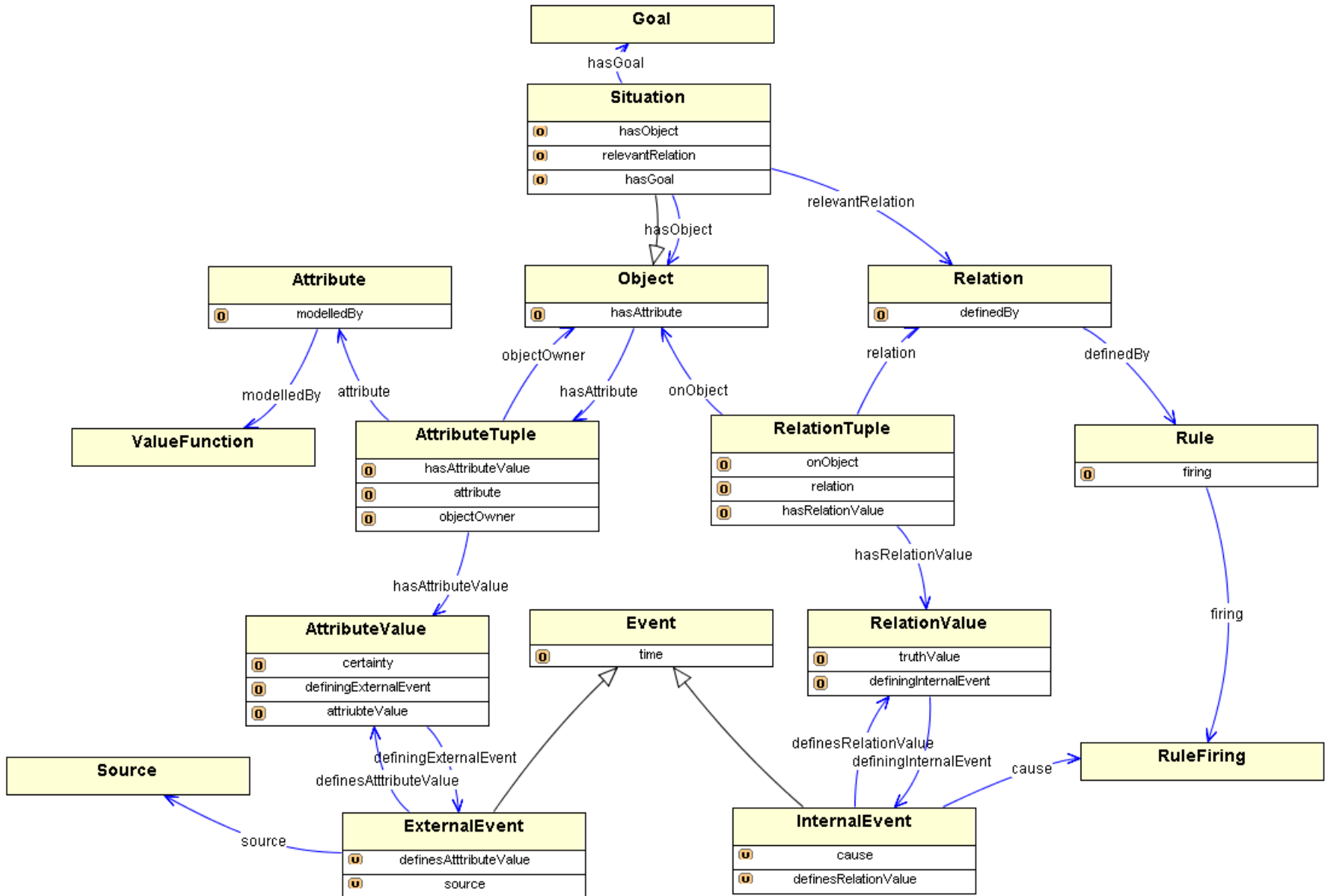
The Joint Defense Laboratories (JDL) model is the standard for information fusion systems.

Level	Name	Process	Endsley Model
3	Impact Assessment	Evaluation	Projection
2	Situation Assessment	Relationships	Comprehension
1	Object Assessment	Identify objects	Perception
0	Signal Assessment	Identify features	

Situation semantics

- Situations are limited contexts for reasoning.
 - Barwise notation: situation \models info
 - Inference uses subsumption on situation classes:
 $S_1 \Rightarrow S_2$
- Situations are themselves perceived objects.
 - The same observations can be interpreted in different ways.
 - One can reason about these differences.

SAW Core Ontology



The Semantic Web and Uncertainty

- There are many sources of uncertainty, such as measurements, unmodeled variables, and subjectivity.
- The Semantic Web is based on formal logic for which one can only assert facts that are unambiguously certain.
- The Bayesian Web is a proposal to add reasoning about certainty to the Semantic Web.
- The basis for the Bayesian Web is the concept of a Bayesian network.

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