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**Semantic Interoperability: Revisiting the Theory of Signs and Ontology  
Alignment Principles**

Coalition Interoperability, Ontology alignment, Semantic distance

Eric Dorion and Stéphane Fortin

POC: Eric Dorion  
Defence R&D Canada – Valcartier  
2459 Pie-XI Blvd. North  
Quebec, Quebec  
G3J 1X5, CANADA  
Phone: (418) 844-4000 ext.: 4257  
Fax: (418) 844-4538  
Email: [Eric.Dorion@drdc-rddc.gc.ca](mailto:Eric.Dorion@drdc-rddc.gc.ca)

## **Abstract**

The necessity to conduct military operations in coalition has been established many times throughout history. It is a sociological, political and technological requirement. From a technology point of view, having the militaries work together in coalition imposes technical interoperability requirements on their respective supporting C2 information systems (C2ISs). Since these C2ISs are not developed concurrently, it ensues that while the semantic concepts they handle are similar, they are not expressed with the same data structures. To technologically enable the military coalition at the semantic level, there are 2 possible solutions: Either through promoting usage of a single semantic representation or ontology, or through a translation or mapping of the concepts from one data representation to the other. The latter approach is termed ontology alignment. This paper addresses this approach from an ontology engineering perspective. We explain the challenges of aligning ontologies, the possible consequences and means to assess the semantic distance between them. To this effect, we will revisit semiotic – the theory of signs – as a philosophical foundation to support the ontological engineer in aligning ontologies.