

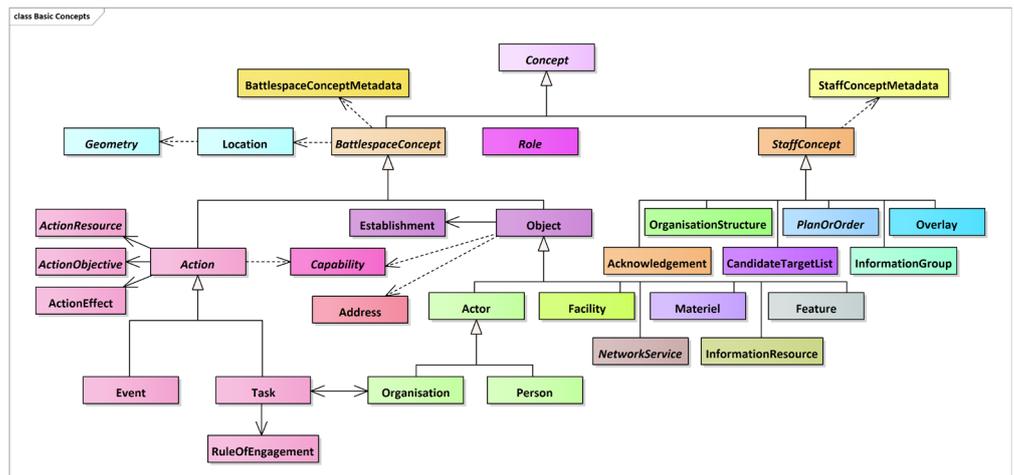


MIP Information Model

The Multilateral Interoperability Programme (MIP), a military standardization body comprising 23 member nations and NATO, aims in this brochure to explain to a non-technical audience what the MIP Information Model (MIM) is and how it helps achieve Command and Control interoperability. *Last Update: May 2022*

Scope, Objectives, and Principles

The MIP Information Model (MIM) provides the semantic foundation for information exchange in the Command and Control (C2) domain. Its development is driven by the needs of the warfighter and its scope is defined by military information exchange requirements for multiple echelons in joint/combined operations.



The MIM embodies the operational concepts of the Joint C3 Information Exchange Data Model (JC3IEDM). Based on a few basic notions, such as «Object», «Action», and «Metadata», the model provides semantically rich taxonomies of militarily relevant concepts. The programme has designed the MIM with regard to readability, modularity, extensibility, semantic strictness, and model consistency. As the result of several years of development, it supports the service design for Federated Mission Networking (FMN), data modelling efforts within NATO, and specific communities and organisations within and related to the C2 domain.

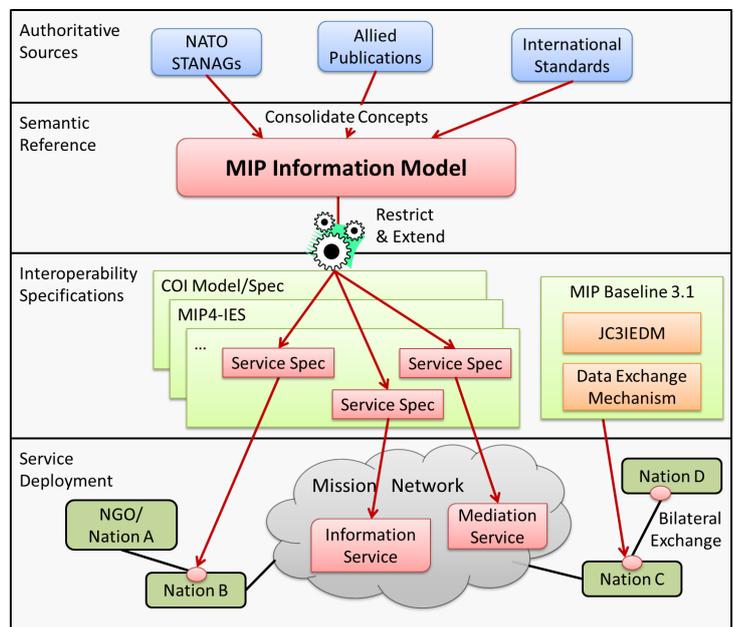
The MIM employs state-of-the-art modelling techniques and tools based on open standards and industry best practices. The model is platform-independent, i.e., it is not tied to a specific exchange technology. It supports the Model-Driven Architecture (MDA) approach, which facilitates the efficient development of data exchange schemas. At the same time, the semantic reference model enables communication between and among operational subject matter experts and system engineers.

Semantic Reference for a Service-Oriented Architecture

The MIM consolidates concepts from authoritative sources such as NATO standards to produce a «semantic reference» for the C2 domain. It allows the generation of diverse exchange specifications allowing its reuse across systems, interfaces and Communities of Interest (COIs).

The MIM is the basis for the MIP 4 Information Exchange Specification (MIP4-IES). Unlike the JC3IEDM, which is an integral part of the MIP Baseline 3.1, the MIM is separate from a specific interoperability specification, as can be seen in the diagram on the right. Instead, it focuses on describing operational concepts.

COIs can reuse selected subsets of the MIM for developing interoperability specifications in support of their specific processes. MIM-based information exchange services can be used in multiple ways, for example

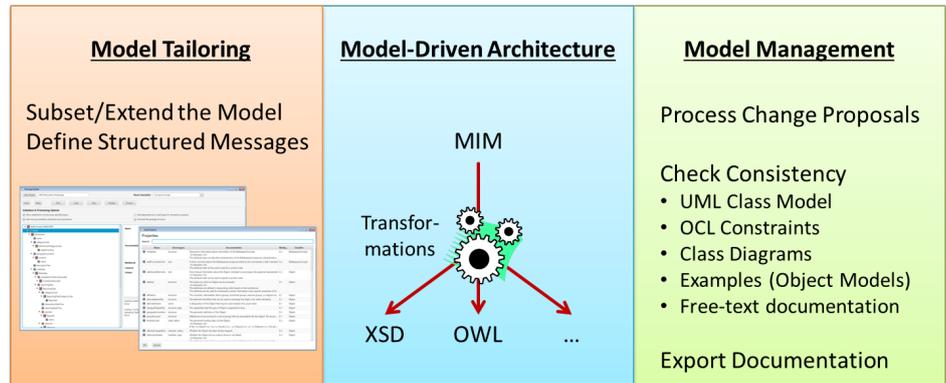


bilateral nation-to-nation and nation-to-NGO information exchange, or for information and mediation services as part of a coalition mission network.

The MIM can be considered as a toolbox: by following a tool-supported process, traceability from the service specifications back to the MIM is guaranteed. As a common semantic reference, the MIM ensures that different services make use of the same operational concepts and information can be shared easily even across them. The ability to couple services when needed is a significant improvement to the traditional way of defining individual messages/services.

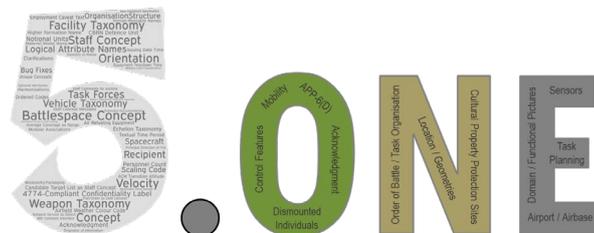
MIM Tool Suite

The MIM is complemented with a comprehensive suite of software tools that make the adoption and adaptation of the MIM as easy as possible. In order to customize the MIM for a specific capability or service, dedicated tools allow the user to define submodels and messages, which are structurally compliant with the MIM. MDA is supported by a library of model transformations that allow deriving platform-specific models from the MIM automatically. To ensure that all pieces of the information model fit together, tools have been developed for model management. All tools are built on top of Sparx Enterprise Architect, the UML modelling tool used for MIM. The tools are supported by an active group of developers and written in Java. They are available as open source software for MIP members and interested parties.



Roadmap and Cooperation with NATO

In October 2020, MIP released version 5.1 of its information model and made it available to other COIs. Based on key concepts and structures introduced in former versions – such as the distinction between «BattlespaceConcept» and «Staff-Concept» - it includes, e.g., new taxonomies for sensors and cultural property protection sites, additional concepts to describe airports/airbases and dismantled individuals, and a refined overlay concept. A completely revised «Location» model, the harmonization of concepts, and new mapping rules facilitate the use of the MIM in combination with NATO's Joint Military Symbology standard APP-6(D).



The MIM 5.1 provides the semantic foundation for the MIP 4.3 Information Exchange Specification (MIP4.3-IES), which has been

adopted by Federated Mission Networking (FMN) as the standard for Land C2 information exchange in FMN Spiral 4. Due to its broad coverage of information exchange requirements, also from the maritime and air domain, the MIM is used as a semantic reference model in the NATO Core Data Framework (NCDF) that aims at cross-COI information exchange. A proposal for a MIM cover STANAG (5643) is currently under discussion.

The next version of the MIM is scheduled for summer 2023. Among other things, it will provide new capabilities for specifying and linking Information and Communication Technology (ICT) services, support additional air force requirements, provide an extended weapon taxonomy, and have an even better alignment with APP-6(D).

Join the MIM Community

All MIM-related products can be found at <https://www.mimworld.org>. The website hosts introductory documentation, the information model in Sparx Enterprise Architect format, services to browse the model online, and the tool suite as binary installer and source code. Interested parties are invited to provide feedback via the MIM portal. For general information on the Multilateral Interoperability Programme (MIP), please see <https://www.mip-interop.org>.

