MIP Information Model

The Multilateral Interoperability Programme (MIP), a military standardization body comprising 24 member nations, NATO, and EDA, 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.

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 warfighters and its scope is defined by military information exchange requirements for multiple echelons in joint/combined operations.

The MIM embodies all 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 MIP has designed the MIM with regard to readability, modularity, extensibility, semantic strictness, and model consistency. As the result of several years of development, it represents a valuable contribution to 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, focusing on semantic aspects eases 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 MIP’s service-oriented interoperability specification. Unlike the JC3IEDM, which is an integral part of the MIP Baseline 3.1 specification, the MIM is separate from an interoperability specification, as can be seen in the diagram on the right. Instead, it focuses on describing operational concepts.

COIs can also 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 in the background, the MIM ensures that information exchanged by the resulting services will be consistent and composeable. 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, a dedicated tool allows defining a subset of the MIM, which is structurally compliant with the overall model. MDA is supported by a library of model transformations that allow deriving platform-specific models from the MIM automatically. Standard representations for «XML Schema Definition» (XSD) and «Web Ontology Language» (OWL) are immediately usable. 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**

The MIP considers data modelling as a continuous and agile process that must quickly respond to new operational requirements. At the same time, standardization requires stable releases. MIP plans a 12 to 18 month timeframe between major releases of the MIM, with minor and critical operational updates published when needed.

In July 2016, MIP released the MIP Information Model 4.0.1 and made it available to other COIs. It features an improved object taxonomy (with focus on land units), a new concept for semantic traceability across different model versions, a simplified mapping on standards for tactical symbols, and an XML schema. Minor updates are scheduled in support of the MIP 4 Information Exchange Specification. Future work will also address COI extensions and additional joint requirements.

MIP has submitted a proposal for a new cover STANAG to the NATO C3 Board. It recommends using the MIP Information Model for the definition of information exchange specifications to aid full interoperability of NATO Forces. MIP is also seeking to add the MIM to the NATO Interoperability Standards and Profiles (NISP), the NATO FMN Implementation Plan (NFIP), and the NATO Core Data Framework (NCDF) as the semantic reference model for future exchange specifications.

**Join the MIM Community**

All MIM-related products can be found at [https://www.mimworld.org](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 [http://www.mip-interop.org](http://www.mip-interop.org).