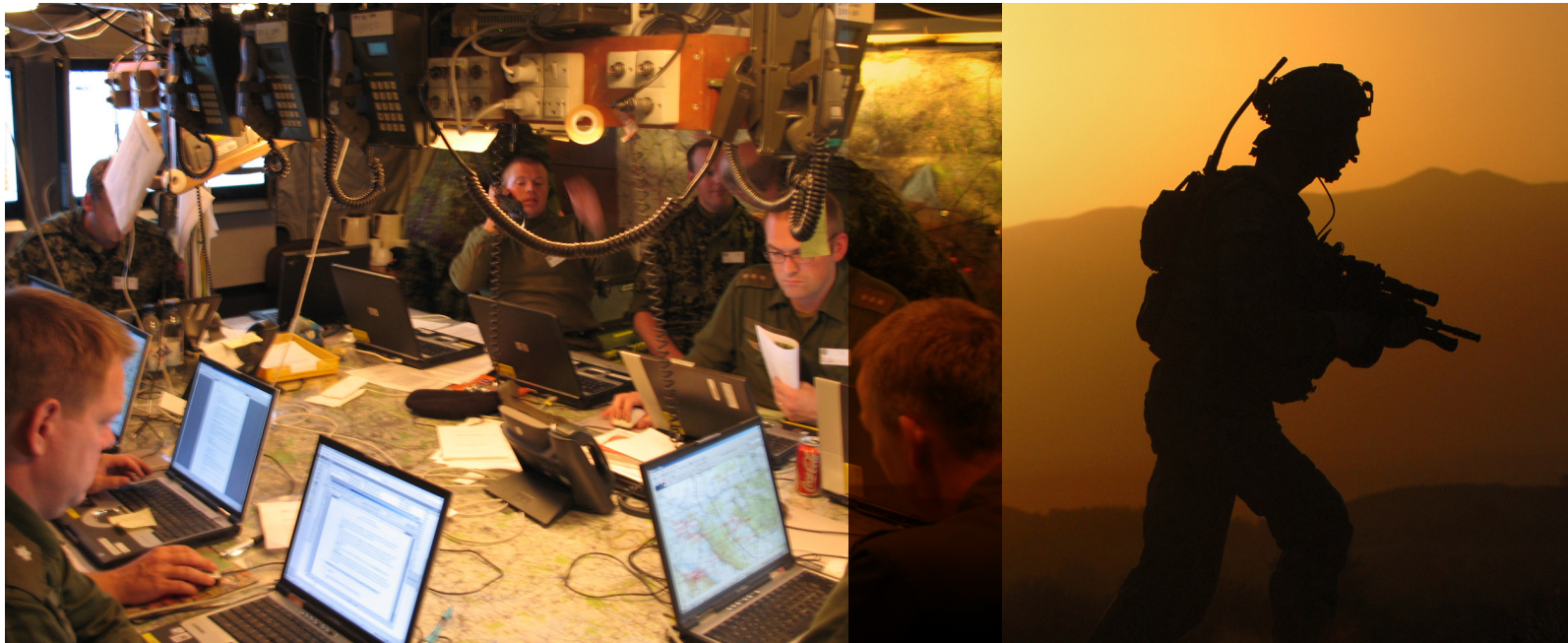


MIP PRODUCT SUITE

– INTEROPERABILITY MADE EASY



PROVIDING EFFECTIVE **INTEROPERABILITY**



Interoperability, the ability of forces and systems of different nations to train, exercise and operate coherently and efficiently together, is an ever growing concern. The Multilateral Interoperability Programme's (MIP) standard is recognized as a leading standard to achieve international interoperability of Command and Control (C2) systems at all levels. The MIP standard is increasingly used in all parts of the world to enable the exchange of key peace supporting and war fighter information between national C2 systems (see <http://mipsite.lsec.dnd.ca/>).

The offer from Saab contains two main parts:

- 1 MIP Product Suite (Software suite)
- 2 Training and Support

The MIP Product Suite is a cost-effective solution to achieve MIP compliance for national C2 systems. It enables organisations – military as well as civilian – to incorporate MIP based interoperability without significant changes to their current C2 System.

The training and support package can be tailored to the customer needs. Saab has been active in the MIP Community since 1999, influencing the MIP standard with experience gained defining and developing C2 systems and has successfully delivered MIP related services and MIP compliant systems to several organisations.

KEY BENEFITS OF USING THE MIP PRODUCT SUITE:

- Development time is dramatically reduced
- Upgrading to future versions of the MIP standard is easy
- Customer need for specialist MIP competency can be reduced
- Does not affect the internal architecture of the existing C2 system
- Is independent of MIP baseline



MIP PRODUCT SUITE

The MIP Product Suite from Saab is a software package that drastically reduces the time and risk creating MIP compliant C2 systems. The software has been developed and refined over several years to solve the needs identified in customer organisations.

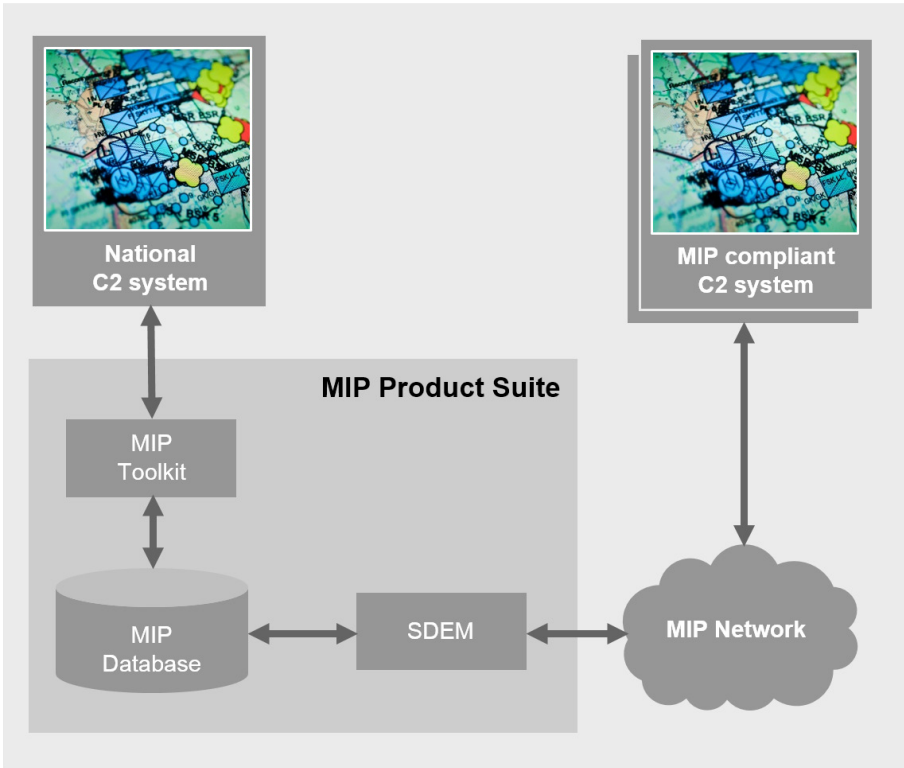
MIP Product Suite is a well proven solution, successfully implemented and actively used by several customers around the globe. MIP Product Suite is the underlying solution for Saab's own 9Land BMS (Battlefield Management System) used by the Swedish armed forces.

All components of the MIP Product Suite have been thoroughly verified in international environments. The Suite has been part of different systems at exercises or coalition testing like CWIX, Combined Endeavor and Aqua Terra (ABCA).



THE MIP PRODUCT SUITE CONSISTS OF THREE PARTS:

- 1 MIP Toolkit – Comprising a runtime part and a development part
The runtime part is the engine for interfacing the MIP Database from the C2 system
The development part (MIP Toolkit SDK) is used at design time to define mappings or translations between MIP compliant data and native C2 system data
- 2 SDEM – Saab Data Exchange Mechanism, the MIP based data exchange mechanism provides a MIP replication capability with an easy-to-use management interface
- 3 MIP Database – a high performance physical implementation of the logical MIP data exchange model



Runtime view of the MIP Product Suite

MIP TOOLKIT



The MIP Toolkit is a C2 system integration framework that enables implementation of MIP based interoperability without significant change to the C2 systems. The MIP Toolkit is used by software developers, providing an abstraction layer covering the detailed elements of the MIP standard with its complex data model objects and business and implementation rules. The use of the toolkit substantially reduces the effort and level of MIP expertise required to achieve MIP compliance of systems. The MIP Toolkit cornerstone is the concept of views that are used to abstract the information model of MIP into pieces of data that can be handled in a well-designed and standardised way.

The toolkit consists of two main parts:

- MIP Toolkit Runtime
- MIP Toolkit SDK (Software Development Kit)

MIP TOOLKIT RUNTIME

The runtime part of the toolkit comprises the Mapping Service and the Connector.

THE MAPPING SERVICE

The Mapping Service is the core of the toolkit. It handles mappings between a MIP database and the national C2 system's native data model. It ensures that the MIP standard business rules are followed. The Mapping Service has several additional functions, including data filtering, key generation, transaction handling and handling of notification of new data. It also acts as a Web server hosting the Web Service interface.

THE CONNECTOR

The Connector is a generic client for the Mapping Service, implemented as a DLL for .NET or a JAR-file for Java. It can either be used directly by an application or through classes generated from the Code Generator. This simplifies creation of client applications by not having to implement the actual communication with the Mapping Service.

MIP TOOLKIT SDK

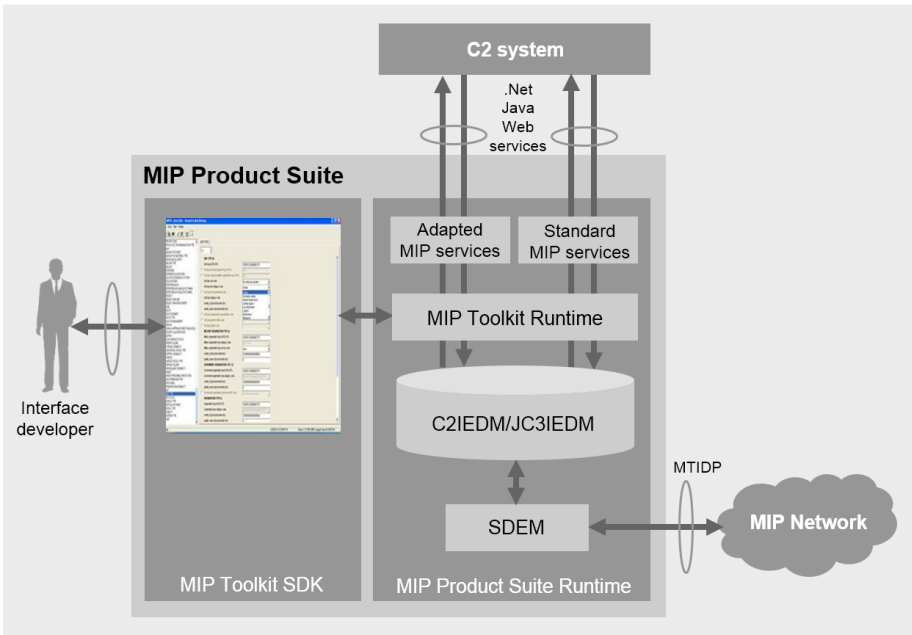
The SDK is used to design, develop and test the solutions before they are fielded. It comprises the Code Generator and the Data Editor.

THE CODE GENERATOR

The Code Generator is used for generating classes from the view files used by the Mapping Service thus saving considerable effort in implementation. It hides the MIP data model from the client application and allows a developer to access the MIP database without the need to construe the full complexity of the MIP standard. Code generation is based on the MIP Toolkit views and are available for .NET and Java classes and Web Service interface in the form of WSDL files.

THE DATA EDITOR

The Data Editor is a graphical user interface used to manipulate information in a MIP database, regardless of data model used. The editor can also be used as a dictionary to look up information about the data model. Information can be displayed on entities, attributes or domain values. Finally, the Data Editor provides a graphical interface for specification and generation of views. Alternatively views can be specified in XML.



The image above illustrates how the MIP Toolkit can be used as a whole having both the SDK and the runtime part. The MIP Toolkit Runtime interfaces with the database server hosting the operational database (C2IEDM/JC3IEDM). The MIP Toolkit SDK is used at design time to create configurations that are deployed on a runtime environment.

The C2 system can be connected to the MIP Toolkit using different mechanisms:

- Via a Web Service interface
- Via a proxy that is available as a .NET assembly library or as a Java library that can easily be integrated in the IDE
- Via a low level interface (socket)

With the Runtime license, a default package is included with a standard configuration for the MIP Toolkit. It is a basic configuration covering limited portions of the MIP model. For more tailored solutions, different configurations can be developed using the Adapted MIP Services. They are developed with Saab MIP Toolkit SDK to accommodate the suitable data for the integration with the C2 systems. MIP Toolkit views could also be configured to indicate whether to use certain plugins that will then be invoked from the Mapping Service. A number of plugins are included in the MIP Toolkit installation by default. The MIP Toolkit also provides a .NET API for developing custom plug-ins.

ACRONYMS

C2IEDM: Command & Control Information Exchange Data Model. The official information exchange model of MIP Baseline 2.
JC3IEDM: Joint Consultation, Command & Control Information Exchange Data Model. The official information exchange model of MIP Baseline 3.
MTIDP: MIP Technical Interface Design Plan. The official specification for the Data Exchange Mechanism of MIP.
SDEM: Saab Data Exchange Mechanism. Saab's own implementation of MIP's data exchange specification.

SDEM (DATA EXCHANGE MECHANISM)

A key capability regarding MIP is the ability to exchange data according to the MIP DEM (Data Exchange Mechanism) specification. This is fully supported by the SDEM. The SDEM is a platform independent data exchange mechanism that reliably and efficiently transfers data to/from other MIP compliant systems according to the MIP standard. The SDEM has full support of both

MIP Baseline 2, MIP Baseline 3 and MIP Baseline 3.1. The product has followed the official MIP Test Schedule. Management and monitoring of the replication is done either through the integrated System Management tool or through the open programmatic Web Service based interfaces available for each component in the system.

SDEM IS AVAILABLE ON THESE PLATFORMS

- Windows (MS SQL Server, Oracle or PostgreSQL)
- Linux (Oracle or PostgreSQL)

MIP DATABASE

The MIP Database is intended for storage of operationally relevant information which is targeted for replication to and from a national C2 system. The MIP Database is based on the logical exchange model specified by the MIP Standard: JC3IEDM for MIP Block 3.1 and MIP Block 3 or C2IEDM for MIP Block 2. The logical model has been

transformed into a physical database model ready to be installed and run on a number of database management systems and platforms (e.g. MS SQL Server, Oracle and PostgreSQL); support to others can easily be added.

TRAINING AND SUPPORT



When procuring the MIP Product Suite or any of the integral parts, Saab will create a suitable training and support package based on the specific customer needs. A key prerequisite to successfully implement a MIP compliant system is detailed knowledge about both MIP and the core requirements of a C2 system. Saab has in depth knowledge of both these aspects. Our competence, has been built up by many years of work within the C2 area as well as in MIP, is seen as one of our most valuable parts.

A SELECTION OF MIP TRAINING AND SUPPORT OFFERS

Training

- MIP Products – Introduction and hands on training on our respective products, everything from installation to operation and development against public interfaces
- MIP Programme – An overview of the MIP Programme for organisations which are not involved in the MIP community work
- JC3IEDM – An introduction to the data model, its basic principles, how to use it and how to get more information

Support

- C2 to MIP Integration – analysis, design and implementation
- Application & Data Management – includes consultancy on how to identify and address issues which are prerequisites for a successful MIP implementation but which are not addressed by the MIP standard itself – examples are data lifetime & archiving, performance, time synchronization, backup and disaster recovery
- Participation in MIP Work Groups and CP (Change Proposal) definition and impact analysis

DOING BUSINESS WITH SAAB

The MIP standard is increasingly used in all parts of the world to enable the exchange of key peace supporting and war fighter information between C2 systems. Saab offers the MIP Product Suite as a cost-effective, risk minimizing solution to achieve interoperable C2 systems. There are two standardised offers, but Saab can if desired tailor a solution to customer specific needs:

- Procure appropriate number of “MIP Product Suite Runtime licenses”, and combine with services from Saab where skilled personnel will help you in development of appropriate “Adapted MIP Services” to your C2 system
- Procure appropriate number of “MIP Product Suite Runtime licenses” and at least one “MIP Toolkit SDK license” and combine with courses and services enabling your own organization to be able to develop “Adapted MIP Services” to your C2 system

