MMS-EASE *Lite:* IEC61850 for Embedded Systems

MMS-EASE *Lite*

MMS-EASE *Lite* is a source code package for the Manufacturing Message Specification (MMS) protocols, and IEC61850 (UCA™ V2.0) that has been optimized for use in Intelligent Electronic Devices (IEDs) such as RTUs, reclosers, PLCs, meters and other resource constrained embedded applications. MMS-EASE *Lite* gives the OEM a jump start on developing IEC61850 and MMS compliant devices by significantly reducing the engineering effort it takes to build a compatible device interface. MMS-EASE *Lite* is an efficient and portable implementation of the following protocols that are ready to adapt into your IED:

- **UCA** - per **IEC61850** with support for GOOSE, GSSE, and SCL including parts 6-1, 7-2, 7-3, 7-4, and 8-1.

- **MMS** - per ISO 9506 Version 1 and 2

- **ACSE** - Association Control Service Elements per ISO 8650

- **Presentation** layer per ISO 8823 and ISO9576

- **Session** layer per ISO 8327 and ISO9548

- **Transport** - Connection Oriented Class 4 Transport per ISO 8073 and ISO connectionless transport protocol per ISO 8602

- **Network** - ISO Connectionless Network Protocol per (CLNP) per ISO 8473 and End-System to Intermediate-System (ES-IS) routing protocol per ISO 9542

- **LLC** - Logical Link Control class 1 per ISO 8802

- **TCP/IP** - using RFC1006 (TCP/IP not included)

- **IEEE802.3** - Ethernet

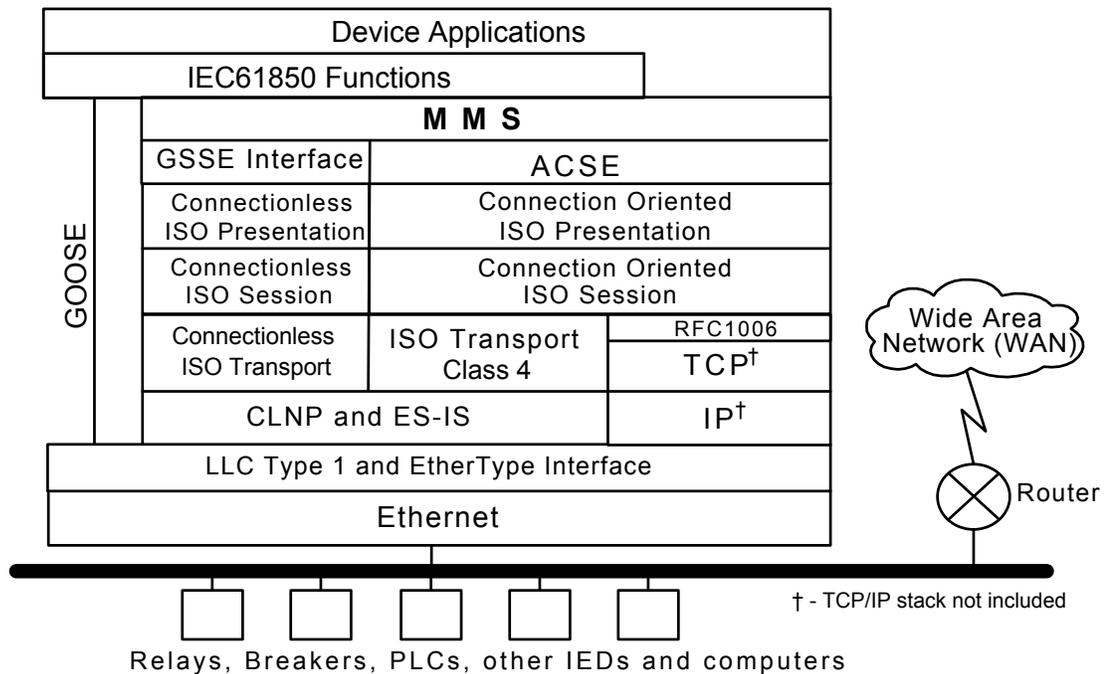MMS-EASE *Lite* for Embedded Systems
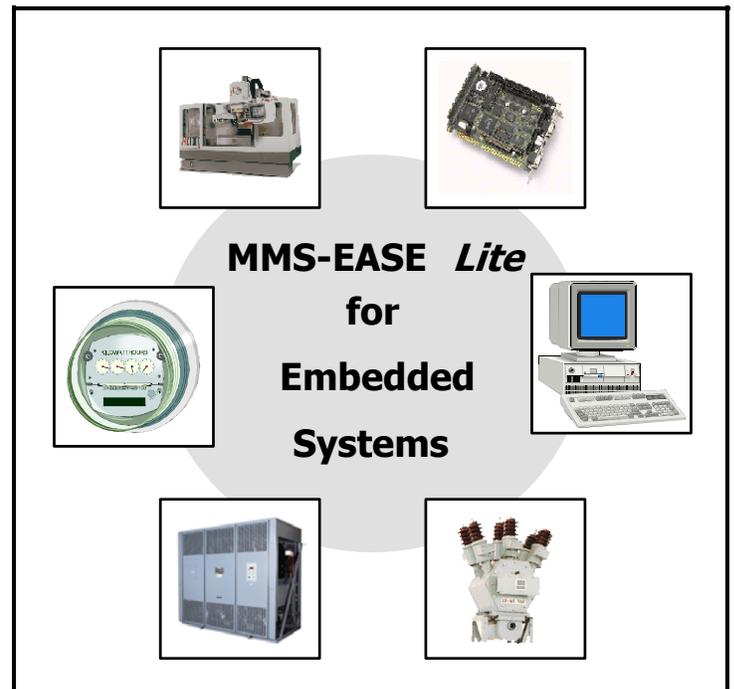
Benefits

- Field Proven implementation reduces development risk, minimizes development effort and shortens time to market.

- MMS Object Foundry automates much of the programming needed to implement IEC61850 compliant devices and objects.

- Designed specifically for embedded environments to minimize CPU and memory requirements and to maximize performance.

- ANSI C source code is provided for all functions to facilitate portation to virtually any environment.

- Flexible licensing options available to satisfy the diverse needs of the OEM developer.

Apr 03

MMS-EASE *Lite* Features/Specifications
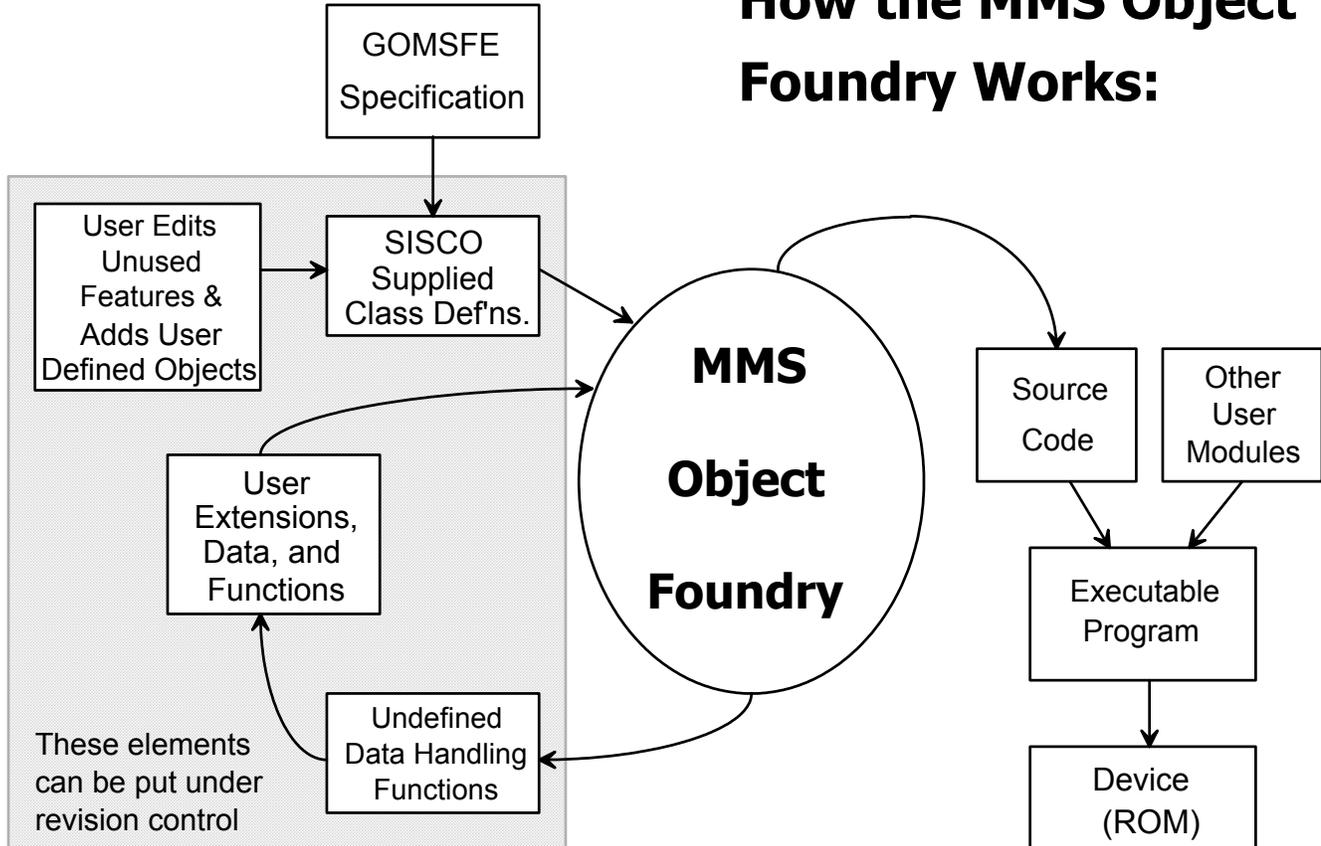
- **KEY TECHNICAL FEATURES:**
  - ► Synchronous and asynchronous message processing supported
  - ► Connection oriented profiles support up to 1000 associations.
  - ► Supports static object definition via the exclusive SISCO MMS Object Foundry.
  - ► Supports dynamic (run-time) object creation via Substation Configuration Language (SCL per IEC61850-6-1) encoded XML.
  - ► Supports IEC61850 data, logical node and object definitions per parts 7-2, 7-3, & 7-4.
  - ► Supports IEC61850 Abstract Communication Service Interface (ACSI) functions per part 7-2.
  - ► Support for UCA V2.0 Common Application Service Model (CASM) and Generic Object Models for Substation and Feeder Equipment (GOMSFE) per IEEE TR1550.
  - ► Supports all MMS services for both client and server per ISO 9506 Version 1 (1988).
  - ► Supports all MMS ISO9506 Version 2 features required for IEC61850.
  - ► "Minimal" implementation techniques provide highly efficient memory usage.

- MMS-EASE *Lite* includes a MMS Virtual Lite (MVL) framework that helps ease the development effort by providing functions for:
  - ► Automation of common MMS message processing for commonly used services.
  - ► Translating to/from local data formats.
  - ► GOOSE/GSSE multi-cast messages.
  - ► Handling IEC61850 buffered and un-buffered reporting.

- MMS Object Foundry can be used to automatically generate MVL code for objects and devices conforming to IEC61850-7-3, 7-4 and UCA Generic Object Models for Substation and Feeder Equipment (GOMSFE).

- Source code and other files used by MMS-EASE *Lite* can be used with existing revision control systems and other development tools.

- Source code is user manageable and modifiable. Users of MMS-EASE *Lite* are not dependent on SISCO for changes.

- Complete, well commented, and human readable source code is provided for all supported functions using standard ANSI C constructs and function prototypes.

- Software is modular to facilitate portation to other environments. SISCO, or existing users of MMS-EASE *Lite*, have ported to PharLap ETS, QNX, VxWorks, pSOS, Linux, "Home-Brew" O/S. Portable to any O/S supporting ANSI C compiler

- Portation services to other environments are available from SISCO upon request.

- Flexible memory management architecture:
  - ► Supports ROM based systems.
  - ► Static user-managed memory pool or dynamic memory allocation.

- Available in two separate communications bundles to meet differing needs:
  - ► With upper layers only for TCP/IP (does not include GOOSE/GSSE)
  - ► Complete support for both ISO/OSI and TCP/IP transport with GOOSE/GSSE.

- Flexible source code licensing:
  - ► Royalty based license
  - ► Single project license
  - ► Paid-up, no royalty license
  - ► Steep quantity discounts on royalties

- Consulting/training programs get your development team productive quickly.

- Comprehensive product support and maintenance package included for the first year. Yearly renewal available.

Device Applications

IEC61850 Functions			

M M S

	GSSE Interface	ACSE	
G O O S E	Connectionless ISO Presentation	Connection Oriented ISO Presentation	
	Connectionless ISO Session	Connection Oriented ISO Session	
	Connectionless ISO Transport	ISO Transport Class 4	RFC1006 / TCP†
	CLNP and ES-IS		IP†

LLC Type 1 and EtherType Interface

Ethernet

Wide Area Network (WAN)

⊗ Router

† - TCP/IP stack not included

Relays, Breakers, PLCs, other IEDs and computers

MMS-EASE *Lite* Architecture and Application

How the MMS Object Foundry Works:

GOMSFE Specification

User Edits Unused Features & Adds User Defined Objects

SISCO Supplied Class Def'ns.

MMS Object Foundry

Source Code

Other User Modules

User Extensions, Data, and Functions

Executable Program

These elements can be put under revision control

Undefined Data Handling Functions

Device (ROM)

3-Apr 03

Other products from SISCO

- **ICCP-TASE.2 Extensions for MMS-EASE *Lite*** adds support for the Intercontrol Center Communications Protocol (ICCP per IEC60870-6 TASE.2) to MMS-EASE *Lite*. Enables simultaneous communications with MMS, IEC61850, and ICCP-TASE.2 over the same physical network connection.

- **AX-S4 MMS** ("access for MMS") is an IEC61850 client application that provides "plug-in" access to IEC61850 for any Windows compatible application that supports an OLE for Process Control (OPC) interface. AX-S4 MMS includes SISCO's MMS Object Explorer that allows you to visually interact with IEC61850/MMS devices and objects. AX-S4 MMS can be combined with off-the-shelf Windows based SCADA/HMI and testing products to both test your MMS-EASE *Lite* based device and provide a low-cost method for your customers to integrate your IEC61850 devices and applications in their systems.

About SISCO

SISCO is a supplier of real-time communications technology for clients in the energy utility industries. SISCO works in partnership with many of the leading OEMs in these industries to deliver cost-effective, robust, standards based real-time communications solutions for their customers. SISCO capabilities include:

- MMS technology supporting substation automation per IEC61850.

- Intercontrol Center Communications Protocol (ICCP) per IEC 60870-6 TASE.2

- Support for the Common Information Model (CIM) and the Generic Interface Definition (GID) per IEC61970 and IEC61968 for a model driven application integration architecture via the Utility Integration Bus (UIB).

- Add-on products for the OSIsoft™ PI enterprise data server product line.

- Application development and product customization, training and integration services

NOTES: 1.) Specifications presented herein are thought to be accurate at time of publication but are subject to change without notice. NO WARRANTIES OF ANY KIND ARE IMPLIED ON THE INFORMATION CONTAINED IN THIS DOCUMENT. 2.) UCA is a trademark of the Electric Power Research Institute. All other company names, tradenames and trademarks are trademarks or registered trademarks of their respective companies. 3.) SISCO software products are available through SISCO directly or OEMs and/or distributors world-wide. Contact SISCO for the location of your representative. 4.) TCP/IP stack not included with MMS-EASE *Lite*.

4-Apr 03

Represented By:

SISCO

Systems Integration Specialists Company, Inc.
6605 19½ Mile Road, Sterling Hts, MI 48314 USA
Tel: +586-254-0020, Fax: +586-254-0053
E-Mail: info@sisconet.com, http://www.sisconet.com