

**SISO-STD-001.1-2015**

**Standard for  
Real-time Platform Reference  
Federation Object Model**

**Version 2.0**

**10 August 2015**

**Prepared by  
Real-time Platform Reference  
Federation Object Model  
Product Development Group**

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### Revision History

| Version | Section | Date<br>(MM/DD/YYYY) | Description                       |
|---------|---------|----------------------|-----------------------------------|
| 2.0     |         | 08/10/2015           | Support for IEEE Std 1278.1™-1998 |
| 1.0     |         | 08/24/1999           | Support for IEEE Std 1278.1™-1995 |

## **Participants**

SISO-STD-001.1-2015, Standard for Real-time Platform Reference Federation Object Model (RPR FOM 2.0) and SISO-STD-001-2015, Standard for Guidance, Rationale, and Interoperability Modalities for the Real-time Platform Reference Federation Object Model (GRIM 2.0) were together created as a community effort by the Real-time Platform Reference Federation Object Model 2.0 Product Development Group (PDG). The RPR FOM 2.0 development consisted of two separate efforts separated by a period of years. The *initial effort* occurred between 2000 and 2008 and the *final effort* between 2012 and 2015.

### **RPR FOM 2.0 PDG Initial Effort (2000 - 2008)**

The initial RPR FOM 2.0 effort occurred between 2000 and 2008 and included a round of balloting without being approved. The RPR FOM PDG became inactive in 2005, although an additional draft was later produced in 2007, which was followed by another attempt to restart the group in 2008. In 2009 the formal process to dissolve the RPR FOM PDG was approved by the SISO Standards Activity Committee (SAC) and Executive Committee. However, the dissolution never became official due to an administrative technicality.

The hard work of those who participated in the initial effort is greatly appreciated as they produced good drafts that were able to support the balloting process.

### **Product Development Group Officers**

Former Chairpersons: Graham Shanks, Richard Schaffer, Jim Gregg, Jim Kogler  
Former Vice-Chair: *vacant*  
Former Secretary: Douglas Wood

### **Drafting Group**

Former GRIM Editors: Steve Dix, Mark Rybka, Sean Reilly, Keith Briggs  
Former Associate GRIM Editors: Jeff Fisher, Ron Bertin

Former FOM Editors: Graham Shanks, Michael O'Connor  
Former Associate FOM Editor: Mark Rybka

Technical Area Director: Paul Lowe

### **RPR FOM PDG Members**

|                  |                  |                     |
|------------------|------------------|---------------------|
| Wayne Belanger   | Reed Little      | Richard Schaffer    |
| Ron Bertin       | Robert Lutz      | Steve Seidensticker |
| Keith Briggs     | Paul Metzger     | Graham Shanks       |
| Andy Cox         | Steve Monson     | Steven Sheasby      |
| Steve Dix        | Michael O'Connor | Jack Sheehan        |
| Adam Faier       | Beth Pettit      | Chris Turrell       |
| Jeff Fischer     | Sean Reilly      | Grant Tudor         |
| Sibylle Gonzales | Ed Roberts       | Jeff Wicks          |
| Len Granowetter  | Peter Ryan       | Earl Williamson     |
| Jim Gregg        | Mark Rybka       | Chris Winters       |
| Carl Ito         | Jerry Sanders    | Douglas Wood        |
| Jim Kogler       | Randy Saunders   |                     |

### **RPR FOM 2.0 PDG Final Effort (2012 - 2015)**

The final effort occurred from 2012 to 2013. This effort was initiated by Björn Möller who asked the SAC to reactivate the RPR FOM PDG to complete the effort to produce a SISO Standard for RPR FOM 2.0. The Product Nomination (PN) was updated and approved by the SAC and active work resumed on RPR FOM 2.0 in 2012.

At the time this product was submitted to the SAC for approval, the RPR FOM 2 PDG had the following membership and was assigned the following SAC Technical Area Director:

#### **Product Development Group Officers**

Chairperson: Björn Möller  
Vice-Chair: Paul E. Murtha, Stephen Chappell  
Secretary: Michael Heffernan  
Technical Area Director: Thom McLean

#### **Drafting Group**

GRIM Editors: Aaron Dubois, Steven Sheasby  
FOM Editors: René Verhage, Patrice Le Leydour  
DG Recording Secretary: Aaron Dubois

#### **RPR FOM PDG Members**

|                  |                     |                   |
|------------------|---------------------|-------------------|
| Fredrik Antelius | Roger Jansen*       | Lennart Olsson*   |
| Andy Bowers*     | Stephen Jones*      | Peter Ross        |
| Andy Ceranowicz* | Patrice Le Leydour* | Chris Rouget      |
| Tony Darlington  | Farid Mamaghani     | Peter Ryan*       |
| Aaron Dubois*    | Lance Marrou        | Graham Shanks*    |
| Åsa Falkenjack*  | Björn Möller*       | Steven Sheasby*   |
| Michael Gagliano | Mike Montgomery*    | Brett Terry*      |
| Frank Hill*      | Robert Murray       | Tom van den Berg* |
| Kyle Isakson*    | Shagoto Nandi       | René Verhage*     |

*\*denotes a Drafting Group member*

NATO Modelling and Simulation Group Task Group 068, NATO Education and Training Network, and Task Group 106, Enhanced CAX Architecture, Design and Methodology – SPHINX also made valuable contributions to the RPR FOM PDG.

The following individuals comprised the ballot group for this product.

#### **Ballot Group**

|                   |                    |                  |
|-------------------|--------------------|------------------|
| Fredrik Antelius  | Frank Hill         | Michael O'Connor |
| Curtis Blais      | Kyle Isakson       | Lennart Olsson   |
| Andy Bowers       | Roger Jansen       | Tim Pokorny      |
| Veronica Charlton | Patrice Le Leydour | Félix Rodríguez  |
| Ann Clark         | Paul Lowe          | Peter Ross       |
| Mark Crnarich     | Lance Marrou       | Peter Ryan       |
| Uwe Dobrindt      | Mark McCall        | Graham Shanks    |
| Aaron Dubois      | Björn Möller       | Steven Sheasby   |
| Michael Gagliano  | David Murray       | Tom van den Berg |
| Michael Heffernan | Shagoto Nandi      | René Verhage     |

When the SAC approved this product on 21 July 2015, it had the following membership:

**Standards Activity Committee**

Jeff Abbott (Chair)  
Marcy Stutzman (Vice Chair / Secretary)

Grant Bailey  
Curt Blais  
Peggy Gravitz  
Kevin Gup-ton  
Jean-Louis Igarza  
Bob Lutz

Lance Marrou  
Lana McGlynn  
Thom McLean  
William Oates  
Simone Youngblood

When the Executive Committee approved this product on 10 August 2015, it had the following membership:

**Executive Committee**

Michael O'Connor (Chair)  
James Coolahan (Vice Chair)  
Jane Bachman (Secretary)

Jeff Abbott  
John Daly  
John Diem  
David Graham  
Paul Gustavson

Shel Ocasio  
Roy Scrudder  
Robert Siegfried  
Eric Whittington

## Introduction

The Real-time Platform Reference Federation Object Model 2.0 (RPR FOM 2.0) defines a hierarchy of object and interaction classes for the High Level Architecture (HLA) that provides the capabilities defined in IEEE Std 1278.1<sup>TM</sup>-1995, IEEE Standard for Distributed Interactive Simulation — Application Protocols, and its supplement, IEEE Std 1278.1a<sup>TM</sup>-1998, IEEE Standard for Distributed Interactive Simulation — Application Protocols. RPR FOM 2.0 is designed to link simulations of discrete physical entities into complex virtual worlds. Its capabilities include representations of:

- Physical entities such as vehicles, lifeforms, cultural features, munitions, and collisions between them.
- Collections of individual entities collected as a single aggregate entity.
- Environmental objects and processes.
- Minefields.
- Communications between entities.
- Emissions generated by entities.
- Underwater acoustics.
- Weapon fire and detonations.
- Logistics, including repair and resupply.

SISO-STD-001-2015, Standard for Guidance, Rationale, and Interoperability Modalities for the Real-time Platform Reference Federation Object Model encapsulates guidance in the use of RPR FOM 2.0. It provides descriptions of FOM classes and datatypes and the relationship between the Distributive Interactive Simulation and the HLA-based RPR FOM, as well as rules for accomplishing specific distributed simulation tasks.

Changes from RPR FOM 1.0 made in RPR FOM 2.0 fall into one of the following categories, depending on the reason for the change:

- Support of IEEE Std 1278.1a<sup>TM</sup>-1998 extensions – this resulted in new object and interaction classes, added attributes and parameters, new complex datatypes and enumerations.
- Representation of Spatial entity information was changed from separate attributes to a single attribute consisting of a variant-record.
- Changes to radio-related object and interaction classes were made due to community comments. The changes were made to support improved performance.
- The ModulationStruct complex datatype was removed because the functionality was moved to the SpreadSpectrumStruct complex datatype.
- Padding fields were added to complex datatypes to comply with the IEEE Std 1516.2<sup>TM</sup>-2010 , IEEE Standard for Modeling and Simulation High Level Architecture – Object Model Template Specification default encoding.
- Updated enumerated datatypes based on SISO-REF-010, Reference for Enumerations for Simulation Interoperability, version 00v20-0.

Appendix A of the GRIM lists all of the new, changed, and deleted structures for RPR FOM 2.0 versus RPR FOM 1.0.

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## Annex A: The RPR FOM (Normative)

(Normative)

These FOM Modules, specified according to IEEE Std 1516.2™-2010, constitute the RPR FOM standard.

| Module Name                                  | File Name                  |
|--|----------------------------|
| Foundation FOM Module                        | RPR-Foundation_v2.0.xml    |
| Enumerations FOM Module                      | RPR-Enumerations_v2.0.xml  |
| Base FOM Module                              | RPR-Base_v2.0.xml          |
| Physical FOM Module                          | RPR-Physical_v2.0.xml      |
| Aggregate FOM Module                         | RPR-Aggregate_v2.0.xml     |
| Synthetic Environment FOM Module             | RPR-SE_v2.0.xml            |
| Minefield FOM Module                         | RPR-Minefield_v2.0.xml     |
| Communication FOM Module                     | RPR-Communication_v2.0.xml |
| Distributed Emission Regeneration FOM Module | RPR-DER_v2.0.xml           |
| Underwater Acoustics FOM Module              | RPR-UA_v2.0.xml            |
| Warfare FOM Module                           | RPR-Warfare_v2.0.xml       |
| Logistics FOM Module                         | RPR-Logistics_v2.0.xml     |
| Simulation Management FOM Module             | RPR-SIMAN_v2.0.xml         |
| Switches FOM Module                          | RPR-Switches_v2.0.xml      |

These files are normative parts of the specification and can be downloaded from:

[https://www.sisostds.org/Digital-Library?Command=Core\\_Download&EntryId=43284](https://www.sisostds.org/Digital-Library?Command=Core_Download&EntryId=43284)

## Annex B: The RPR FOM in Additional Formats

(Informative)

For the convenience of users of HLA 1.3, HLA 2000 and the monolithic HLA 2010 formats, the RPR FOM, as specified in Annex A has been converted to these formats. It has also been converted into a hyperlinked PDF format, for easier reading.

| Description                                    | File Name                  |
|--|----------------------------|
| RPR FOM 2.0 in HLA 1.3 FED format              | RPR_FOM_v2.0_1.3.fed       |
| RPR FOM 2.0 in HLA 1.3 OMT format              | RPR_FOM_v2.0_1.3.omt       |
| RPR FOM 2.0 in HLA 1516-2000 format            | RPR_FOM_v2.0_1516-2000.xml |
| RPR FOM 2.0 in HLA 1516-2010 monolithic format | RPR_FOM_v2.0_1516-2010.xml |
| RPR FOM 2.0 in PDF format                      | RPR_FOM_v2.0.pdf           |

These files are informative part of the specification and can be downloaded from:

[https://www.sisostds.org/Digital-Library?Command=Core\\_Download&EntryId=43285](https://www.sisostds.org/Digital-Library?Command=Core_Download&EntryId=43285)