

Space Reference Federation Object Model (SpaceFOM) Federate Compliance Document (FCD) for the *⟨Federate Name⟩*

The information that appears in red text is intended to be editorial and directive content. It is not intended to appear in the finished document. This text can be hidden by commenting out or deleting the

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line in this document's *.tex file. The *blue italic text* represents example text and is intended to be replaced with the Federate specific text. When complete, the document should not have any red or blue text, other than hypelinked text.

The Space Reference Federation Object Model (SpaceFOM) Federate Compliance Declaration (FCD) is a document that provides specific configuration data necessary to achieve interoperability based on the SpaceFOM. Several rules in the SpaceFOM put requirements on what data need to be recorded in the FCD. In general, The FCD describes which capabilities a federate has and which roles it can play in a SpaceFOM-compliant federation execution. This template establishes the standard format and content so that all SpaceFOM FCD products contain the same basic information and have the same basic look.

Purpose

This section of the FCD template will provide the general purpose and description of this specific SpaceFOM-compliant federate. This should include intended scenarios and other information that describes the nature of the federate's capabilities and compliance as a SpaceFOM-compliant federate. Federate providers should provide a federate compliance declarations to facilitate the assessment of the suitability of a federate in a specific federation execution. [2, 1, 3]

Identification

This section of the FCD template provides the general identifying information associates with this federate.

General name identifying this federate, this should match the ⟨Federate Name⟩ in the title above but not necessarily the name used when the federate joins an HLA federation execution (see “HLA Federation Execution Join Name” below).

Name: *This Federate's Name*

Specify the federate version identification.

Version: *Version Tag*

Information pertaining to the principal point of contact for this FCD.

Point of Contact:

Name: *POC Name*
Phone: *POC Phone Number*
Email: *POC Email Address*
Address: *POC Physical Address*

The HLA name used by this federate when joining an HLA federation execution, not necessarily the identification name from above. Specify the name here if it is fixed or indicate the means for setting if it can be configured at runtime.

HLA Federation Execution Join Name: *Federate Instance Join Name*

SpaceFOM Federate Roles Supported

This section of the FCD template provides information on the SpaceFOM roles that this federate can support.

Statement that this federate can fulfill the role of the Master Federate in a SpaceFOM-compliant federation execution. This is a yes or no question.

Can act as Master Federate: *(yes/no)*

Statement that this federate can fulfill the role of the Pacing Federate in a SpaceFOM-compliant federation execution. This is a yes or no question.

Can act as Pacing Federate: *(yes/no)*

Statement that this federate can fulfill the role of the Root Reference Frame Publisher (RRFP) federate in a SpaceFOM-compliant federation execution. This is a yes or no question.

Can act as Root Reference Frame Publisher: *(yes/no)*

Time Management

This section of the FCD template provides the general time management information associates with this federate.

Specify the earliest and latest valid operating Simulation Scenario Time (SST) dates and times for this federate. This can be given as a calendar date and time but will ultimately have to be converted into the Terrestrial Time (TT) scale in Truncated Julian Date (TJD) format.

Valid Operating Time Frame:

Earliest: *Earliest Date* (TT scale in TJD format)
Latest: *Latest Date* (TT scale in TJD format)

Specify the minimum, nominal, and maximum HLA Logical Time (HLT) step in microseconds supported by this federate. These time step capabilities will inform the Least Common Time Step (LCTS) calculation for any federation execution that this federate joins.

Time Step Support:

Minimum: *Smallest time step* (microseconds)
Nominal: *Normal time step* (microseconds)
Maximum: *Largest time step* (microseconds)

Indication that this federate supports being an Early Joiner federate. This is a yes or no question.

Supports Early Joining: *(yes/no)*

Indication that this federate supports being a Late Joiner federate. This is a yes or no question.

Supports Late Joining: *(yes/no)*

Specify if this federate can or should be a time regulating federate.

Time Regulating: *(required/optional/no)*

Specify if this federate can or should be a time constrained federate.

Time Constrained: *(required/optional/no)*

Identify the supported time management type for this federate. These are yes or no questions.

Supported Time Management Types:

No Pacing:	<u><i>(yes/no)</i></u>
Scaled Pacing:	<u><i>(yes/no)</i></u>
Real-time Pacing with Unlimited Overruns:	<u><i>(yes/no)</i></u>
Real-time Pacing with Limited Overruns:	<u><i>(yes/no)</i></u>
Strict/Conservative Real-time Pacing:	<u><i>(yes/no)</i></u>

If any of the real-time pacing options are supported, then include a section that describes limitations and how those overruns are handled.

Overrun handling: *Description of how overruns are handled.*

Indication that this federate requires support for Central Timing Equipment (CTE) to control its time advance. This is a yes or no question.

Requires CTE: *(yes/no)*

References to any document(s) that describes the implementation and configuration details for any CTE. Add additional document references as necessary. Just mark (N/A) if CTE is not required.

CTE specification document(s): *(yes/no)*

1. *CTE reference document 1.*
2. *CTE reference document 2.*

Reference Frames

This section of the FCD template provides the names and descriptions of the principal reference frames published by or required by this federate.

If this federate can publish a root reference frame, then this is the name and brief description of the reference frame that represents the common base (root) reference frame for a SpaceFOM-compliant reference frame tree. If this federate cannot publish a root reference frame, then this entry should be omitted.

Root Reference Frame:

Name	Description
<i>Root Frame Name</i>	<i>A short description of the root reference frame. If not apparent from the name and short description, a reference should be provided.[4]</i>

The name, parent, and brief description of any reference frames published by this federate. Add additional lines as necessary.

Published Reference Frames:

Name	Parent	Description
<i>Frame name</i>	<i>Name of parent frame</i>	<i>Description of this federate's reference frame.</i>
<i>etc.</i>	<i>Name of parent frame</i>	<i>etc.</i>

The name, parent, and brief description of any reference frames required by this federate. Add additional lines as necessary.

Required Reference Frames:

Name	Description
<i>Root frame name</i>	<i>Description of the frame dependency.</i>
<i>EarthCenteredInertial</i>	<i>All DynamicalEntity states are expressed in this frame.</i>
<i>etc.</i>	<i>etc.</i>

Object Management

This section of the FCD template provides the general object management information associated with the federate. The information in this section will inform the overall object management strategy for a federation execution in which this federate participates.

List the type strings associated with any **PhysicalEntity** object's "type" attribute used in this federate. List both the string (tag) values and a description of each tag.

Physical Entity Object Type Strings:

Type String (Tag)	Description
<i>Tag 1</i>	<i>The description of the tag.</i>
<i>Tag 2</i>	<i>The description of the tag.</i>
<i>etc.</i>	

List the status strings associated with any **PhysicalEntity** object's "status" attribute used in this federate. List both the string (tag) values and a description of each tag.

Physical Entity Object Status Strings:

Status String (Tag)	Description
<i>String 1</i>	<i>The description of the string.</i>
<i>String 2</i>	<i>The description of the string.</i>
<i>etc.</i>	

A brief description of the canonical naming convention used to distinguish **PhysicalInterface** object instances from one another. Add additional lines as necessary.

Physical Interface Instance Naming Convention:

*Provide a detailed explanation of the **PhysicalInterface** instance naming convention used to uniquely identify the interfaces to **PhysicalEntities**.*

List the name and brief description of all **PhysicalInterface** instances. Add additional lines as necessary.

Physical Interface Instances:

Interface Instance Name	Description
<i>Instance Name 1</i>	<i>The description of the string.</i>
<i>Instance Name 2</i>	<i>The description of the string.</i>
<i>etc.</i>	

List the name, type, and brief description of any published object instances. Add additional lines as necessary.

Published Object Instances:

Name	Type	Description
<i>Instance Name 1</i>	<i>ObjectType</i>	<i>The description of the string.</i>
<i>Instance Name 2</i>	<i>ObjectType</i>	<i>The description of the string.</i>
<i>etc.</i>		

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List the name, type, and brief description of any required object instances. Add additional lines as necessary.

Required Object Instances:

Name	Type	Description
<i>Instance Name 1</i>	<i>ObjectType</i>	<i>The description of the string.</i>
<i>Instance Name 2</i>	<i>ObjectType</i>	<i>The description of the string.</i>
<i>etc.</i>		

List the name and description of any additional FOM modules need by this federate. Add additional lines as necessary.

Additional FOM Modules:

FOM Module Name	Description
<i>Module Name 1</i>	<i>The description of the FOM module.</i>
<i>Module Name 2</i>	<i>The description of the FOM module.</i>
<i>etc.</i>	

Initialization

This section of the FCD template provides the information associates with the initialization policy and approach use by this federate. It specifically focuses on the details of its multiphase initialization process. The information in this section will inform the overall MPI strategy for a federation execution in which this federate participates.

Indication for the use of multiphase initialization (MPI). This is a yes or no question.

MPI Used: *(yes/no)*

The MPI specification can consist of an inline description of the MPI approach. Alternately, list references to any document(s) that describes the implementation and configuration details for any MPI used in the startup of the federation execution. Add additional document references as necessary. Just mark (N/A) if no MPI is used.

MPI Specification:

1. *MPI reference document 1.*
2. *MPI reference document 2.*

Additional Technical Information

This section of the FCD template provides any additional technical information needed by this federate. This section may be marked (N/A) or omitted if there is no additional technical information.

List or describe any additional data sources and/or databases required to support this federate. Add additional lines as necessary. Just mark (N/A) or omit if no additional data sources are needed.

Additional Data and/or Databases:

Data Source	Data Description
<i>Source 1</i>	<i>The description of the data.</i>
<i>Source 2</i>	<i>The description of the data.</i>
<i>etc.</i>	

References to any additional technical document. Add additional document references as necessary. Just mark (N/A) or omit if none.

Additional Technical Documents:

1. *Technical reference document 1.*
2. *Technical reference document 2.*

Compliance Statement

This is the general acknowledgement that this federate complies with the Space Reference FOM standard. This is a yes or no question.

This federate fulfills all relevant requirements in the SpaceFOM version 1.0: (yes/no)

If the answer to the compliance question above is “no”, then an explanatory note can be provided here.

The next section is automatically generated by L^AT_EX using the BibLaTeX package and Biber program. A bibliography will be generated from L^AT_EX citations that occur in the document.

References

- [1] Simulation Interoperability Standards Organization/ Standards Activities Committee (SISO/SAC). IEEE Standard for Modeling and Simulation (M&S) High Level Architecture (HLA) - Federate Interface Specification. Tech. rep. IEEE-1516.1-2010. 3 Park Avenue, New York, NY 10016-5997: The Institute of Electrical and Electronics Engineers, Aug. 2010.
- [2] Simulation Interoperability Standards Organization/ Standards Activities Committee (SISO/SAC). IEEE Standard for Modeling and Simulation (M&S) High Level Architecture (HLA) - Framework and Rules. Tech. rep. IEEE-1516-2010. 2 Park Avenue, New York, NY 10016-5997: The Institute of Electrical and Electronics Engineers, Aug. 2010.
- [3] Simulation Interoperability Standards Organization/ Standards Activities Committee (SISO/SAC). IEEE Standard for Modeling and Simulation (M&S) High Level Architecture (HLA) - Object Model Template (OMT) Specification. Tech. rep. IEEE-1516.2-2010. 3 Park Avenue, New York, NY 10016-5997: The Institute of Electrical and Electronics Engineers, Aug. 2010.
- [4] D.A. Vallado. *Fundamentals of Astrodynamics and Applications*. 2nd. El Segundo, California: Microcosm Press, 2001.