Space Reference Federation Object Model (SpaceFOM) Federation Execution Specific Federation Agreement (FESFA)

for the

⟨Federation Execution Title⟩

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

`\DefCurrentAudience{editorial}`

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

The Space Reference Federation Object Model (SpaceFOM) Federation Execution Specific Federation Agreement (FESFA) 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 FESFA. This template establishes the standard format and content so that all SpaceFOM FESFA products contain the same basic information and have the same basic look.

Purpose

This section of the FESFA template will provide the general purpose and description of this specific SpaceFOM-compliant federation execution. This should include intended scenarios and other information that describes the nature of the federates participating in a federation execution compliant with this FESFA.[2, 1, 3]

Identification

This section of the FESFA template provides the general identifying information associates with the federation execution.

General name identifying the federation execution, this should match the ⟨Federation Execution Title⟩ in the title above but not necessarily the "HLA Federation Execution Name" below.

Federation Execution Title: *Your Federation Execution Title Here*

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

Point of Contact:

Name: *Your Name*
Phone: *Your Phone Number*
Email: *Your Email Address*
Address: *Your Phydical Address*

Real world time frame (calendar dates) for proposed federation executions, not to be confused with federation execution scenario dates.

Planned Execution Time Frame:

From: *Earliest Date*
To: *Latest Date*

HLA federation execution name, not necessarily the identification name from above.

HLA Federation Execution Name: *The Federation Execution Name*

Federation Composition

This section of the FESFA template provides the identifying information associates with the composition of the federation execution.

Information on the federate providing the role of the Master Federate for this federation execution.

Master Federate: *Federate Name*

Information on the federate providing the role of the Pacing Federate for this federation execution.

Pacing Federate: *Federate Name*

Information on the federate providing the role of the Root Reference Frame Publisher (RRFP) federate for this federation execution.

Root Reference Frame Publisher (RRFP): *Federate Name*

List the names and descriptions of any additional required federates for this federation execution. Add additional lines as needed.

Additional required federates:

Name	Description
Federate Name 1	*Potentially lengthy multiline description. This could be really long long long long long long long long.*
Federate Name 2	*Potentially lengthy multiline description.*
etc.	

Time Management

This section of the FESFA template provides the general time management information associates with the federation execution. All participating time managed federates will need this information. Some of this information is published by the Master Federate in the Execution Control Object (ExCO).

The starting date for the federation execution federation scenario time (FST_0). 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, in seconds.

Epoch: *Starting date and time.* (TT scale in TJD format)

The federation execution's nominal HLA Logical Time (HLT) step in microseconds.

Federation HLT step: *numerical time step* (microseconds)

The federation execution's Least Common Time Step (LCTS) in microseconds. This is the least common value of all the federate time steps for the time regulating federates in a federation execution.

Federation LCTS: *numerical time step* (microseconds)

Identify the supported time management type for this federation execution.

Supported Time Management Types:

No Pacing:	*(yes/no)*
Scaled Pacing:	*(yes/no)*
Real-time Pacing with Unlimited Overruns:	*(yes/no)*
Real-time Pacing with Limited Overruns:	*(yes/no)*
Strict/Conservative Real-time Pacing:	*(yes/no)*

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 of the existence of Central Timing Equipment (CTE) to control the federation execution

time advance for real-time hardware-in-the-loop (HwITL) simulations. This is a yes or no question.

CTE federates exists: *(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 no CTE is used.

CTE specification document(s):

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

Reference Frames

This section of the FESFA template provides the names and descriptions of the principal reference frames published during a federation execution. It should be sufficient to understand the principal topology of the federation execution's reference frame tree.

The name and brief description of the reference frame that represents the common base (root) reference frame for the federation execution's reference frame tree.

Root Reference Frame:

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

The name, parent, and brief description of any additional reference frame that play an important role in the federation execution's reference frame tree. Any reference frames published by or subscribed to by required federates should be listed here. This list should represent the union of all reference frames listed in the FCDs of the required federates. It may also include reference frames of other potential federates. Add additional lines as necessary.

Additional Reference Frames:

Name	Parent	Description
EarthCentericInertial	*Root Frame Name*	*Description of the Earth centered inertial reference frame.*
EarthCentericFixed	*EarthCenteredInertial*	*Description of the Earth centered planet fixed frame.*
MoonCentricInertial	*Root Frame Name*	*Description of the Moon centered inertial reference frame.*

Object Management

This section of the FESFA template provides the general object management information associated with the federation execution. Most participating federates will need this information.

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

Physical Entity Object Type Strings:

Type String (Tag)	Description
Tag 1	*The description of the tag.*
Tag 2	*The description of the tag.*
etc.	

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

Physical Entity Object Status Strings:

Status String (Tag)	Description
String 1	*The description of the string.*
String 2	*The description of the string.*
etc.	

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 explaination of the `PhysicalInterface` *instance naming convention used to uniquely identify the interfaces to* `PhysicalEntities`*.*

The name, type, and brief description of any key object instances that play an important role in the federation execution. Add additional lines as necessary.

Key Object Instances:

Name	Object Class	Description
Instance Name 1	`ObjectType`	*The description of the string.*
Instance Name 2	`ObjectType`	*The description of the string.*
etc.		

List the name and description of any additional FOM modules need by this federation execution. This should be the union of all FOM modules listed in the FCDs of the required federates. It may also include other FOM modules of other potential federates. Add additional lines as necessary.

Additional FOM Modules:

FOM Module Name	Description
Module Name 1	*The description of the FOM module.*
Module Name 2	*The description of the FOM module.*
etc.	

Initialization

This section of the FESFA template provides the information associates with the initialization policy and approach use in the federation execution. It specifically focuses on the details of any multiphase initialization. All Early Joiner federates participating in the multiphase initialization process will need this information.

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 FESFA template provides any additional technical information needed by federates participating in the federation execution. This section may be marked (N/A) or omitted if there is no additional technical information.

Specify any non-standard switches settings required to configure the RTI for this federation execution. For instance, this is where the behavior of the Auto-Provide switch would be documented if enabled. Add additional lines as necessary. Just mark (N/A) or omit if none.

Non-standard Switches Settings:

Switch	Value	Description
Switch	`Value`	*The description of the switch setting.*
Switch	`Value`	*The description of the switch setting.*
etc.		

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

Additional Common Data and/or Databases:

Data Source	Data Description
Source 1	*The description of the data.*
Source 2	*The description of the data.*
etc.	

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.*

The next section is automatically generated by LaTeXusing the BibLaTeX pacakge and Biber program. A bibliography will be generated from LaTeXcitations 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 Inferface 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.