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SOFTWARE REQUIREMENTS SPECIFICATION

FOR THE

ORDNANCE SERVER (OS) CSCI 3

OF THE

ADA DISTRIBUTED INTERACTIVE SIMULATION (ADIS) PROJECT

CONTRACT NO. N00421-92-D-0028

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1 Scope

The following paragraphs will identify the CSCI, provide an overview of the system, and describe the purpose and contents of this document.

1.1 Identification

This Software Requirements Specification (SRS) specifies the engineering and qualification requirements for the Computer Software Configuration Item (CSCI) identified as Ordnance Server (OS), CSCI 3 of the Ada Distributed Interactive Simulation (ADIS) system.

1.2 CSCI Overview

The Naval Air Warfare Center Aircraft Division (NAWCAD) Flight Test and Engineering Group (FTEG) develops and maintains a state-of-the-art, high-fidelity flight test simulation facility, the Manned Flight Simulator (MFS). This facility supports a number of Department of the Navy (DON) programs and is a key element of the Air Combat Environment Test and Evaluation Facility (ACETEF). The MFS has worked extensively with integration of a new standard in inter-simulation communications, the Distributed Interactive Simulation (DIS) standard which allows the MFS to communicate with other simulation facilities.

DIS is a time and space coherent synthetic representation of world environments designed for linking the interactive, free play activities of people in operational exercises. The synthetic environment is created through real-time exchange of data units between distributed, computationally autonomous simulation applications in the form of simulations, simulators, and instrumented equipment interconnected through standard computer communicative services. The computational simulation entities may be present in one location or may be distributed geographically.

The basic architecture concepts of DIS are an extension of the Simulator Networking (SIMNET) program developed by Defense Advanced Research Project Agency (DARPA), now named Advanced Research Project Agency (ARPA). The basic architecture concepts for DIS are the following:

1. No central computer controls the entire simulation exercise.
2. Autonomous simulation applications are responsible for maintaining the state of one or more simulation entities.
3. A standard protocol is used for communicating "ground truth" data.
4. Changes in the state of an entity are communicated by simulation applications.
5. Perception of events or other entities is determined by the receiving application.
6. Dead reckoning algorithms are used to reduce communications processing.

The MFS has been tasked by the Ada Joint Program Office (AJPO) to develop and demonstrate Ada bindings and tools to interface with a DIS gateway. These bindings and tools will become part of the AJPO's publicly available Ada repository upon project completion. This project is referenced as the Ada Distributed Interactive Simulation (ADIS) project and will provide the Ada community with access to DIS technology.

The ADIS system supports compatibility with the DIS protocol. The OS CSCI enables simulations to drop, shoot, and fire ordnance in a DIS environment. The OS CSCI starts simulations of missiles, bombs, rockets, and other projectiles as commanded from a simulation host and then completes these simulations based on predefined detonation criteria.

1.3 Document Overview

The purpose of this document is to describe the engineering and qualification requirements of the OS CSCI. This SRS identifies engineering requirements, including external interfaces of this CSCI, capabilities of this CSCI, internal interfaces between these capabilities, adaptation requirements, installation-dependent data, operational parameters, sizing and timing requirements, safety requirements, security requirements, design constraints, software quality factors, human performance/human engineering requirements, and requirements traceability. This SRS also identifies qualification requirements, including qualification methods and special qualification requirements. Finally, this SRS specifies the delivery requirements for the CSCI.

2 Applicable Documents

The following paragraphs describe those documents which form a part of this specification.

2.1 Government Documents

The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

Document Number	Title
DOD-STD-2167A	Defense System Software Development
	Statement of Work: Ada Distributed Interactive Simulation Support
DI-MCCR-80025A	Software Requirements Specification

Copies of specifications, standards, drawings, and publications required by suppliers in connection with specified procurement functions should be obtained from the contracting agency or as directed by the contracting officer.

2.2 Non-Government Documentstc "2.2 Non-Government Documents"§

The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

Document Number	Title	Source
IST-CR-93-15	IEEE Standard P1278.1 Standard for Information Technology - Protocols for Distributed Interactive Simulation Applications Version 2.0	Institute for Simulation and Training

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal Agencies. Other sources for the non-government documents listed are the following:

Institute for Simulation and Training
12424 Research Parkway, Suite 300
Orlando, FL 32826

J. F. Taylor, Inc.
P.O. Box 760
Lexington Park, MD 20653

3 Engineering Requirementstc "3 Engineering Requirements"§

The following paragraphs and subparagraphs specify the engineering requirements necessary to ensure proper development of the OS CSCI. Requirements to be included herein shall be allocated or derived from requirements established by the applicable Statement of Work.

3.1 CSCI External Interface Requirementstc "3.1 CSCI External Interface Requirements"§

Table 3.1-1 identifies and describes each external interface of the OS CSCI. Figure 3.1-1 depicts the relationships between these interfaces, the OS CSCI, and the other ADIS CSCIs.

Table 3.1-1
External Interfaces of the OS CSCItc "3.1-1 External Interfaces of the OS CSCI" \f t§

Interface Name	Project-Unique Identifier	Description	Document
Graphical User Interface (GUI)	OS-EI-1	Allows user to control inputs	OS IRS
External Fly-Out Model Interface	OS-EI-2	Provides a means of implementing additional fly-out models	OS IRS
Terrain Database Interface	OS-EI-3	Calculates height above terrain based on munition location	OS IRS
DIS Gateway Interface	DG-EI-1	Completes the DIS interface by receiving and transmitting entity data and events	DG IRS
DIS Library Interface	DL-EI-1	Provides routines to perform filtering, conversions, etc.	DL IRS

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Figure 3.1-1
OS CSCI External Interface Requirementstc "3.1-1 OS CSCI External Interface Requirements" \f f§

3.2 CSCI Capability Requirementstc "3.2 CSCI Capability Requirements"§

The following subparagraphs identify all of the capability requirements that the OS CSCI satisfies. Figures 3.2-1 through 3.2-7 are hierarchical representations of the capabilities and subcapabilities. Table 3.2-1 correlates each of these capabilities to the ADIS simulation states.

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Figure 3.2-1
OS CSCI Capability Hierarchytc "3.2-1 OS CSCI Capability Hierarchy" \f f§

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Figure 3.2-2
Fire PDU Capability Hierarchytc "3.2-2 Fire PDU Capability Hierarchy" \f f§

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Figure 3.2-3
Detonation PDU Capability Hierarchytc "3.2-3 Detonation PDU Capability Hierarchy" \f f§

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Figure 3.2-4
Entity State PDU Capability Hierarchytc "3.2-4 Entity State PDU Capability Hierarchy" \f f§

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Figure 3.2-5
User Interface Capability Hierarchytc "3.2-5 User Interface Capability Hierarchy" \f f§

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Figure 3.2-6
Fly-Out Model Capability Hierarchytc "3.2-6 Fly-Out Model Capability Hierarchy" \f f§

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Figure 3.2-7
Operation States Capability Hierarchytc "3.2-7 Operation States Capability Hierarchy" \f f§

Table 3.2-1
Correlation of Capabilities to Operation Statestc "3.2-1 Correlation of Capabilities to Operation States" \f t§

Capability	Stop / Freeze	Start / Run	Clear / Reset	Single Step
Fire PDU		X		X
Detonation PDU		X		X
Entity State PDU		X		X
User Interface		X		X
Multiple Target Resolution		X		X
Fly-Out Model		X		X
Terrain Database		X		X
Operation State	X	X	X	X

3.2.1 Fire PDU Capability (OS-C-1)tc "3.2.1 Fire PDU Capability (OS-C-1)"§

The OS CSCI shall initiate a munition simulation for each Fire PDU from each parent entity located at the specified simulation site. (A parent entity is an entity carrying munitions and responsible for issuing Fire PDUs for those munitions.)

3.2.1.1 Accept Fire PDU Capability (OS-C-1.1)tc "3.2.1.1 Accept Fire PDU Capability (OS-C-1.1)"§

The OS CSCI shall have the capability to determine that a Fire PDU originated from a parent entity at the specified simulation site. Table 3.2.1.1-1 shows the inputs and outputs of this capability.

Table 3.2.1.1-1
Inputs and Outputs for the Accept Fire PDU Capabilitytc "3.2.1.1-1 Inputs and Outputs for the Accept Fire PDU Capability" \f t§

Element	Input/Output	Description
Fire PDU	Input	PDU describing information about munition fired, the entity which fired the munition and the target
Munition ID	Output	Means of identifying munition fired

3.2.1.2 Activate Munition Capability (OS-C-1.2)tc "3.2.1.2 Activate Munition Capability (OS-C-1.2)"§

The OS CSCI shall maintain a list of munitions modeled by the OS CSCI. The munition being fired must be added to this list of munitions being flown out. Table 3.2.1.2-1 shows the inputs and outputs of this capability.

Table 3.2.1.2-1
Inputs and Outputs for the Activate Munition Capabilitytc "3.2.1.2-1 Inputs and Outputs for the Activate Munition Capability" \f t§

Element	Input/Output	Description
Munition ID	Input	Means of identifying munition fired

3.2.2 Detonation PDU Capability (OS-C-2)tc "3.2.2 Detonation PDU Capability (OS-C-2)"§

The OS CSCI shall create a Detonation PDU and pass the Detonation PDU to the DG CSCI to be sent onto the network.

3.2.2.1 Issue Detonation Result Capability (OS-C-2.1)tc "3.2.2.1 Issue Detonation Result Capability (OS-C-2.1)"§

The Detonation PDU shall include the type of detonation which occurred based on proximity of the munition to the target or the ground. A detonation result of "NONE" may be appropriate in some cases (i.e., for representing a dud missile). Table 3.2.2.1-1 shows the inputs and outputs of this capability.

Table 3.2.2.1-1
Inputs and Outputs for the Issue Detonation Result Capabilitytc "3.2.2.1-1 Inputs and Outputs for the Issue Detonation Result Capability" \f t§

Element	Input/Output	Description
Munition ID	Input	Means of identifying munition being detonated
Munition Location	Input	Location of the munition at the point of detonation
Height Above Terrain	Input	Height of the munition above the terrain used to determine ground impact
Target Location	Input	Location of the target in world coordinates
Detonation Result	Output	Description of detonation regarding impact with ground or an entity, general detonation or no detonation

3.2.2.2 Issue Detonation PDU Capability (OS-C-2.2)tc "3.2.2.2 Issue Detonation PDU Capability (OS-C-2.2)"§

A Detonation PDU shall be created for each munition activated by a Fire PDU within this OS CSCI for each tracked or untracked munition. Table 3.2.2.2-1 shows the inputs and outputs of this capability.

Table 3.2.2.2-1
Inputs and Outputs for the Issue Detonation PDU Capabilitytc "3.2.2.2-1 Inputs and Outputs for the Issue Detonation PDU Capability" \f t§

Element	Input/Output	Description
Detonation Result	Input	Description of detonation regarding impact with ground or an entity, general detonation or no detonation
Munition ID	Output	Means of identifying munition detonated

3.2.2.3 Deactivate Munition Capability (OS-C-2.3)tc "3.2.2.3 Deactivate Munition Capability (OS-C-2.3)"§

The OS CSCI shall deactivate a munition immediately after a Detonation PDU for that munition has been issued Table 3.2.2.3-1 shows the inputs and outputs of this capability.

Table 3.2.2.3-1
Inputs and Outputs for the Deactivate Munition Capabilitytc "3.2.2.3-1 Inputs and Outputs for the Deactivate Munition Capability" \f t§

Element	Input/Output	Description
Munition ID	Input	Means of identifying munition detonated

3.2.3 Entity State PDU Capability (OS-C-3)tc "3.2.3 Entity State PDU Capability (OS-C-3)"§

The OS CSCI shall contain the capability to create an Entity State PDU for tracked munitions.

3.2.3.1 Identify Tracked Munitions Capability (OS-C-3.1)tc "3.2.3.1 Identify Tracked Munitions Capability (OS-C-3.1)"§

The OS CSCI shall distinguish tracked munitions from untracked munitions (i.e., bullets). All munitions must be flown out and detonated; however, Entity State PDUs shall only be generated for tracked munitions. Table 3.2.3.1-1 shows the inputs and outputs of this capability.

Table 3.2.3.1-1
Inputs and Outputs for the Identify Tracked Munitions Capabilitytc "3.2.3.1-1 Inputs and Outputs for the Identify Tracked Munitions Capability" \f t§

Element	Input/Output	Description
Munition ID	Input	Means of identifying munition being flown out
Tracked Munition ID	Output	Site ID, Application ID and Entity ID for the munition

3.2.3.2 Identify Dead Reckoning Algorithm Capability (OS-C-3.2)tc "3.2.3.2 Identify Dead Reckoning Algorithm Capability (OS-C-3.2)"§

The Dead Reckoning Algorithm shall be input by the user and shall be used in the corresponding field of Entity State PDUs output by the OS CSCI. Table 3.2.3.2-1 shows the inputs and outputs of this capability.

Table 3.2.3.2-1
Inputs and Outputs for the Identify Dead Reckoning Algorithm Capabilitytc "3.2.3.2-1 Inputs and Outputs for the Identify Dead Reckoning Algorithm Capability" \f t§

Element	Input/Output	Description
Dead Reckoning Algorithm	Input	Dead Reckoning Algorithm requested by the user
Dead Reckoning Algorithm	Output	Dead Reckoning Algorithm to be used (default if none was requested)

3.2.3.3 Issue Entity State PDU Capability (OS-C-3.3)tc "3.2.3.3 Issue Entity State PDU Capability (OS-C-3.3)"§

The OS CSCI shall create Entity State PDUs for each update of each tracked munition. The OS CSCI shall pass each Entity State PDU generated to the DG CSCI. Table 3.2.3.3-1 shows the inputs and outputs of this capability.

Table 3.2.3.3-1
Inputs and Outputs for the Issue Entity State PDU Capabilitytc "3.2.3.3-1 Inputs and Outputs for the Issue Entity State PDU Capability" \f t§

Element	Input/Output	Description
Tracked Munition ID	Input/Output	Site ID, Application ID, and Entity ID for the munition
Munition Parameters	Input	All information required to represent and fly-out the munition
Entity State PDU	Output	PDU containing updated information for the munition

3.2.4 User Interface Capability (OS-C-4)tc "3.2.4 User Interface Capability (OS-C-4)"§

The OS CSCI shall allow the user to select the type of munition and its DIS representation. The OS CSCI shall also contain the capability to allow the user to select increasingly specific information for that munition, including fly-out model, dead reckoning algorithm, aerodynamic parameters, and termination parameters.

3.2.4.1 Correlate Munition Capability (OS-C-4.1)tc "3.2.4.1 Correlate Munition Capability (OS-C-4.1)"§

Each munition shall be correlated to a DIS entity and uniquely named. This process shall include assigning entity kind, country code, domain, and data to specify the exact type of entity (i.e., AIM-9L vs. AIM-9M). Table 3.2.4.1-1 shows the inputs and outputs of this capability.

Table 3.2.4.1-1
Inputs and Outputs for the Correlate Munition Capabilitytc "3.2.4.1-1 Inputs and Outputs for the Correlate Munition Capability" \f t§

Element	Input/Output	Description
Entity Kind, Country, Domain, Category and Sub-Category	Input	Detailed description of the exact munition being flown out (this information will be incorporated with the munition parameters)
Munition Parameters	Input	All physical information required for the munition fly-out (i.e. drag, thrust, max. range, max. speed, burn time, guidance, etc.)
Munition Parameters	Output	All information required to represent and fly-out the munition

3.2.4.2 Dead Reckon Capability (OS-C-4.2)tc "3.2.4.2 Dead Reckon Capability (OS-C-4.2)"§

The OS CSCI shall allow the user to input the Dead Reckoning Algorithm to be used for each munition. The required parameters for the selected dead reckoning algorithm will be supplied in the Entity State PDUs for each munition. A default algorithm shall exist for cases in which an algorithm is not selected. Table 3.2.4.2-1 shows the inputs and outputs of this capability.

Table 3.2.4.2-1
Inputs and Outputs for the Dead Reckon Capabilitytc "3.2.4.2-1 Inputs and Outputs for the Dead Reckon Capability" \f t§

Element	Input/Output	Description
Dead Reckoning Algorithm	Input	Dead Reckoning Algorithm requested by the user
Dead Reckoning Algorithm	Output	Dead Reckoning Algorithm to be used (default if none was requested)

3.2.4.3 Select Munition Parameters Capability (OS-C-4.3)tc "3.2.4.3 Select Munition Parameters Capability (OS-C-4.3)"§

Munition parameters shall have default values which may be modified before being accepted or used explicitly. Table 3.2.4.3-1 shows the inputs and outputs of this capability.

Table 3.2.4.3-1
Inputs and Outputs for the Select Munition Parameters Capabilitytc "3.2.4.3-1 Inputs and Outputs for the Select Munition Parameters Capability" \f t§

Element	Input/Output	Description
Munition Parameters	Input	All information required to represent and fly-out the munition
Munition Parameters	Output	All information required to represent and fly-out the munition

3.2.4.4 Select Fly-Out Model Capability (OS-C-4.4)tc "3.2.4.4 Select Fly-Out Model Capability (OS-C-4.4)"§

The OS CSCI shall implement the fly-out model for each munition which was selected by the user. The fly-out model may be an internal generic model or an external model. Table 3.2.4.4-1 shows the inputs and outputs of this capability.

Table 3.2.4.4-1
Inputs and Outputs for the Select Fly-Out Model Capabilitytc "3.2.4.4-1 Inputs and Outputs for the Select Fly-Out Model Capability" \f t§

Element	Input/Output	Description
Fly-Out Model ID	Input	Identification for a set of equations for modeling the trajectory of a munition
Fly-Out Model ID	Output	Identification for a set of equations for modeling the trajectory of a munition

3.2.4.5 Store Munition Parameters Capability (OS-C-4.5)tc "3.2.4.5 Store Munition Parameters Capability (OS-C-4.5)"§

The OS CSCI shall store the information input by the user for each munition. This information shall be used during the simulation and be available for use in future simulations. Table 3.2.4.5-1 shows the inputs and outputs of this capability.

Table 3.2.4.5-1
Inputs and Outputs for the Store Munition Parameters Capabilitytc "3.2.4.5-1 Inputs and Outputs for the Store Munition Parameters Capability" \f t§

Element	Input/Output	Description
Munition Parameters	Input	All information required to represent and fly-out the munition
Fly-Out Model ID	Input	Identification for a set of equations for modeling the trajectory of a munition

3.2.5 Multiple Target Resolution Capability (OS-C-5)tc "3.2.5 Multiple Target Resolution Capability (OS-C-5)"§

Parameters defining multiple target resolution behaviors shall be modifiable by the user. The OS CSCI shall assign a new target based on these selected multiple target resolution parameters and selected seeker and guidance models. The OS CSCI shall eliminate tracking of targets outside of the parent entity's defined target area for munitions using semi-active radar homing. Table 3.2.5-1 shows the inputs and outputs of this capability.

Table 3.2.5-1
Inputs and Outputs for the Multiple Target Resolution Capabilitytc "3.2.5-1 Inputs and Outputs for the Multiple Target Resolution Capability" \f t§

Element	Input/Output	Description
Target Location	Input	Location of the target in world coordinates
Munition Location	Input	Location of the munition at the point of detonation
Munition Parameters	Input	Parameters defining multiple target resolution behaviors

Target ID	Output	Site ID, Application ID and Entity ID for the target

3.2.6 Fly-Out Model Capability (OS-C-6)tc "3.2.6 Fly-Out Model Capability (OS-C-6)"§

The OS CSCI shall maintain a model of the munition's flight path. The internal models will have higher fidelity than the dead reckoning algorithms. This model will be referred to as the Fly-Out Model. Table 3.2.6-1 shows the inputs and outputs of this capability.

Table 3.2.6-1
Inputs and Outputs for the Fly-Out Model Capabilitytc "3.2.6-1 Inputs and Outputs for the Fly-Out Model Capability" \f t§

Element	Input/Output	Description
Munition Parameters	Input/Output	All information required to represent and fly-out the munition
Active Munitions	Input	List of which munitions are currently in flight
Fly-Out Models	Input	Set of equations for modeling the trajectory of a munition
Laser PDUs	Input	PDU supplying information about laser transmissions
Emission PDUs	Input	PDU supplying information about emissions

3.2.6.1 Provide Generic Fly-Out Model Capability (OS-C-6.1)tc "3.2.6.1 Provide Generic Fly-Out Model Capability (OS-C-6.1)"§

Generic Fly-Out Models shall be provided within the OS CSCI. These generic Fly-Out Models shall perform fly-outs for air-to-air missiles (AAMs), air-to-surface missiles (ASMs), and surface-to-air missiles (SAMs); bombs; and rockets. The capability to add other types of munitions as desired shall exist through modification of the configuration files.

3.2.6.2 Fly Simultaneous Munitions Capability (OS-C-6.2)tc "3.2.6.2 Fly Simultaneous Munitions Capability (OS-C-6.2)"§

Multiple munitions shall be flown out simultaneously as needed.

3.2.6.3 Incorporate Multiple Guidance Systems Capability (OS-C-6.3)tc "3.2.6.3 Incorporate Multiple Guidance Systems Capability (OS-C-6.3)"§

Multiple guidance systems shall be available for use within the generic Fly-Out Models including pursuit, collision, and beam-rider.

3.2.6.4 Incorporate Multiple Seeker Systems Capability (OS-C-6.4)tc "3.2.6.4 Incorporate Multiple Seeker Systems Capability (OS-C-6.4)"§

Multiple seeker systems shall be available for use including radar.

3.2.6.5 Support Emission and Laser PDUs Capability (OS-C-6.5)tc "3.2.6.5 Support Emission and Laser PDUs Capability (OS-C-6.5)"§

Emission and Laser PDUs shall be used to provide the necessary data to model the beam-rider guidance model.

3.2.6.6 Incorporate External Fly-Out Models Capability (OS-C-6.6)tc "3.2.6.6 Incorporate External Fly-Out Models Capability (OS-C-6.6)"§

The OS CSCI shall contain the capability to incorporate external Fly-Out Models with minimal modification.

3.2.7 Terrain Database Capability (OS-C-7)tc "3.2.7 Terrain Database Capability (OS-C-7)"§

The OS CSCI shall contain the capability to interface with a terrain database to acquire height above terrain information for each munition location. Table 3.2.7-1 shows the inputs and outputs of this capability.

Table 3.2.7-1
Inputs and Outputs for the Terrain Database Capabilitytc "3.2.7-1 Inputs and Outputs for the Terrain Database Capability" \f t§

Element	Input/Output	Description
Munition Location	Output	Location of the munition at the point of detonation
Height Above Terrain	Input	Height of the munition above the terrain used to determine ground impact

3.2.8 Operation States Capability (OS-C-8)tc "3.2.8 Operation States Capability (OS-C-8)"§

The OS CSCI shall contain the capability to change operation states.

3.2.8.1 Stop/Freeze Capability (OS-C-8.1)tc "3.2.8.1 Stop/Freeze Capability (OS-C-8.1)"§

The OS CSCI shall contain the capability to handle stop and freeze states. Requests to stop or freeze may come from the user or through the Stop/Freeze PDUs. Table 3.2.8.1-1 shows the inputs and outputs of this capability.

Table 3.2.8.1-1
Inputs and Outputs for the Stop/Freeze Capabilitytc "3.2.8.1-1 Inputs and Outputs for the Stop/Freeze Capability" \f t§

Element	Input/Output	Description
User Change Request	Input	Request from the user through the GUI to stop/freeze the simulation of an entity or an entire simulation
Stop/Freeze PDU	Input	PDU signaling the stopping or freezing of the simulation of an entity
Acknowledge PDU	Output	Message to the DG CSCI that the simulation of an entity is stopped or frozen

3.2.8.2 Start/Run Capability (OS-C-8.2)tc "3.2.8.2 Start/Run Capability (OS-C-8.2)"§

The OS CSCI shall contain the capability to handle start and run states. Requests to start or run may come from the user or through the Start/Run PDUs. Table 3.2.8.2-1 shows the inputs and outputs of this capability.

Table 3.2.8.2-1
Inputs and Outputs for the Start/Run Capabilitytc "3.2.8.2-1 Inputs and Outputs for the Start/Run Capability" \f t§

Element	Input/Output	Description
User Change Request	Input	Request from the user through the GUI to start/run the simulation of an entity or the entire simulation
Stop/Freeze PDU	Input	PDU signaling the starting or running of the simulation of an entity
Acknowledge PDU	Output	Message to the DG CSCI that the simulation of an entity is started or running

3.2.8.3 Clear/Reset Capability (OS-C-8.3)tc "3.2.8.3 Clear/Reset Capability (OS-C-8.3)"§

The OS CSCI shall contain the capability to clear and reset states. Requests to clear or reset may come from the user. Once a state is cleared or reset, the OS CSCI shall go into a stop/freeze state until another state command is issued. Table 3.2.8.3-1 shows the inputs and outputs of this capability.

Table 3.2.8.3-1
Inputs and Outputs for the Clear/Reset Capabilitytc "3.2.8.3-1 Inputs and Outputs for the Clear/Reset Capability" \f t§

Element	Input/Output	Description
User Change Request	Input	Request from the user through the GUI to clear/reset the simulation of an entity or an entire simulation
System State	Output	Flag indicating the simulation of an entity or an entire simulation is cleared or reset and waiting in the freeze mode

3.2.8.4 Single Step Capability (OS-C-8.4)tc "3.2.8.4 Single Step Capability (OS-C-8.4)"§

The OS CSCI shall contain the capability to cycle through one timeslice loop at a time (single step mode). This capability is similar to a debugging mode. Requests to operate in single step mode may come from the user. Once in single step mode, the OS CSCI shall accept any other state command. Table 3.2.8.4-1 shows the inputs and outputs of this capability.

Table 3.2.8.4-1
Inputs and Outputs for the Single Step Capabilitytc "3.2.8.4-1 Inputs and Outputs for the Single Step Capability" \f t§

Element	Input/Output	Description
User Change Request	Input	Request from the user through the GUI to cycle through one loop of the simulation and then wait for a continue command
Continue	Input	Request to cycle through the next loop
System State	Output	Flag causing a freeze state at the end of each loop

3.3 CSCI Internal Interfacestc "3.3 CSCI Internal Interfaces"§

Figure 3.3-1 illustrates the internal interfaces for the OS CSCI. Solid lines represent interfaces internal to the OS CSCI. Dashed lines represent interfaces external to the OS CSCI.

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Figure 3.3-1
Internal Interfaces for the OS CSCItc "3.3-1 Internal Interfaces for the OS CSCI" \f f§

3.4 CSCI Data Element Requirementstc "3.4 CSCI Data Element Requirements"§

This section was tailored out.

3.5 Adaptation Requirementstc "3.5 Adaptation Requirements"§

The following subparagraphs specify the requirements for adapting the OS CSCI to site-unique conditions and to changes in the system environment. The fly-out models require parameter inputs to tailor the model to a specific munition. A list of these parameters is also specified below.

3.5.1 Installation-Dependent Datatc "3.5.1 Installation-Dependent Data"§

The OS CSCI will require terrain database information for low-level operations. The terrain database must provide height above terrain for the munition location. The Site ID and the Application ID must be provided to allow for proper identification in the DIS protocol data units (PDUs).

3.5.2 Operational Parameterstc "3.5.2 Operational Parameters"§

There are no operational parameters identified for the OS CSCI.

3.6 Sizing and Timing Requirementstc "3.6 Sizing and Timing Requirements"§

This section was tailored out.

3.7 Safety Requirementstc "3.7 Safety Requirements"§

This section was tailored out.

3.8 Security Requirementstc "3.8 Security Requirements"§

The OS CSCI shall be completely unclassified; however, the OS CSCI shall be able to run classified external fly-out models in a classified mode.

3.9 Design Constraintstc "3.9 Design Constraints"§

The OS CSCI shall be written entirely in Ada and shall conform to DIS Version 2.0 Third Draft. The Graphical User Interface shall incorporate X-Windows and Motif for control inputs. The OS shall run independent of the type of simulation control environment. The OS CSCI shall support either a single parent entity or a single application at a single site. The OS CSCI shall utilize the DL CSCI and the DG CSCI.

3.10 Software Quality Factorstc "3.10 Software Quality Factors"§

This section was tailored out.

3.11 Human Performance/Human Engineering Requirementstc "3.11 Human Performance/Human Engineering Requirements"§

This section was tailored out.

4 Qualification Requirementstc "4 Qualification Requirements"§

The following subparagraphs specify the qualification methods and special qualification requirements necessary to establish that the CSCI satisfies the requirements of sections 3 and 5.

4.1 Qualification Methodstc "4.1 Qualification Methods"§

The OS CSCI shall be integrated with the DL CSCI and DG CSCI and demonstrated within the MFS laboratory.

The demonstrations of the OS CSCI will include initiating fly-out models in response to Fire PDUs, issuing Entity State PDUs for tracked munitions, and issuing Detonation PDUs with the proper detonation result. The flight paths will be monitored for accuracy using a plan view display. One test will involve simultaneous fly-out of multiple missile types using different guidance systems. The missiles must be initiated in the correct

sequence to demonstrate proper correlation of munitions with DIS entities. One missile must be assigned a target (by the Fire PDU) which will move out of the missile's detection angle causing loss of lock. Another missile must have the line of sight to the target interrupted by another possible target and then must successfully acquire the new target.

One test must include responding to a stop or freeze command and then resuming the normal run state. The terrain database will be tested by completing the interface for the ModSAF database and using this database to acquire height above terrain information for each of the munitions requiring height above terrain data.

4.2 Special Qualification Requirementstc "4.2 Special Qualification Requirements"§

This section was tailored out.

5 Preparation for Deliverytc "5 Preparation for Delivery"§

All code for this CSCI shall be developed on the Silicon Graphics, Inc. machines belonging to NAWCAD Systems Engineering Test Directorate (SETD). On-line documentation shall be included with the code. The code and documentation shall also be provided on magnetic tape.

6 Notestc "6 Notes"§

The following subparagraphs contain general information to aid in understanding this specification, including usage of specific keywords and a list of acronyms/abbreviations and their meanings.

6.1 Keyword Usagetc "6.1 Keyword Usage"§

This System Requirements Specification adheres to the following word usage:

Shall has been used only where a particular feature, capability, or method of operation is mandatory.

Should has been used only where a particular feature, capability, or method of operation is recommended.

May and *need not* have been used only where a particular feature, capability, or method of operation is optimal or to suggest a possible design approach to a requirement.

Will has been used to indicate futurity, never to indicate any degree of requirement.

6.2 Acronyms and Abbreviationstc "6.2 Acronyms and Abbreviations"§

Table 6.2-1 contains a list of all acronyms and abbreviations used in this SRS and their meanings as used in this document.

Table 6.2-1
Acronyms and Abbreviationstc "6.2-1 Acronyms and Abbreviations" \f t§

Acronym/ Abbreviation	Meaning
AAM	Air-to-Air Missile
ACETEF	Air Combat Environment Test and Evaluation Facility
ADIS	Ada Distributed Interactive Simulation
AJPO	Ada Joint Program Office
ARPA	Advanced Research Project Agency
ASM	Air-to-Surface Missile
CSCI	Computer Software Configuration Item
DARPA	Defense Advanced Research Project Agency
DL	DIS Library
DG	DIS Gateway
DIS	Distributed Interactive Simulation
DON	Department of the Navy
FTEG	Flight Test and Engineering Group

GFE	Government Furnished Equipment
GUI	Graphical User Interface
MFS	Manned Flight Simulator
NAWCAD	Naval Air Warfare Center, Aircraft Division
PDU	Protocol Data Unit
SAM	Surface-to-Air Missile
SETD	Systems Engineering Test Directorate
SIMNET	Simulator Networking
SRS	Software Requirements Specification