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SOFTWARE DESIGN DOCUMENT

FOR THE

ORDNANCE SERVER (OS) CSCI 3

OF THE

ADA DISTRIBUTED INTERACTIVE SIMULATION (ADIS) PROJECT

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1 Scope

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

1.1 Identification

This Software Design Document (SDD) describes the design for the CSCI identified as Ordnance Server (OS), CSCI 3 of the Ada Distributed Interactive Simulation (ADIS) project. The requirements for this CSCI design are detailed in the *Software Requirements Specification for the Ordnance Server (OS) CSCI 3 of the Ada Distributed Interactive Simulation (ADIS) Project* and the *Interface Requirements Specification for the Ordnance Server (OS) CSCI 3 of the Ada Distributed Interactive Simulation (ADIS) Project*.

1.2 System 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:

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 are to be made 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 Distributed Interactive Simulation (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 Overviewtc "1.3 Document Overview"§

The purpose of this document is to describe the preliminary as well as the detailed design of the OS CSCI. This SDD describes the CSCI as composed of Computer Software Components (CSCs) and Computer Software Units (CSUs).

2 Applicable Documentstc "2 Applicable Documents"§

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

2.1 Government Documentstc "2.1 Government Documents"§

The following documents of the exact issue shown form a part of this document to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this document, the contents of this document 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-80012A	Software Design Document

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 document to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this document, the contents of this document shall be considered a superseding requirement.

Document Number	Title	Source
IST-CR-93-15	IEEE Standard for Information Technology - Protocols for Distributed Interactive Simulation Applications Version 2.0	Institute for Simulation and Training
IST-CR-93-19	Enumeration and Bit Encoded Values for Use with Protocols for Distributed Interactive Simulation Applications	Institute for Simulation and Training
JFT-145-OS.SRS	Software Requirements Specification for the Ordnance Server (OS) CSCI 3 of the Ada Distributed Interactive Simulation (ADIS) Project	J. F. Taylor, Inc.
JFT-145-OS.IRS	Interface Requirements Specification for the Ordnance Server (OS) CSCI 3 of the Ada Distributed Interactive Simulation (ADIS) Project	J. F. Taylor, Inc.

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 Preliminary Design

The following paragraphs will provide an overview of the OS CSCI of the ADIS project as well as a detailed description of each CSC within the CSCI. The overview will discuss the CSCI architecture and the available system states. The overview will be followed by the CSC design descriptions.

3.1 OS CSCI Overview

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. Some fly-out models, to handle the flight of the munitions, will be available and incorporation of additional fly-out models will be easily performed. The OS CSCI will handle all PDUs related to the flight and detonation of each munition. The external interfaces for this CSCI are summarized in Table 3.1-1. The system architecture diagram in Figure 3.1-1 shows the relationships between this CSCI and other CIs (CSCIs and/or HWCIs) in the system.

Table 3.1-1
External Interfaces for the OS CSCI

Interface Name	Project-Unique Identifier	Purpose
Graphical User Interface (GUI)	OS-EI-1	Allows user to control inputs
Terrain Database Interface	OS-EI-2	Calculates height above terrain based on munition location
DIS Gateway Interface	DG-EI-1	Completes the DIS interface by receiving and transmitting entity data and events
DIS Library Interface	DL-EI-1	Provides routines to perform filtering

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Figure 3.1-1

System Architecture: OS To Other CIstc "3.1-1 System Architecture: OS To Other CIs" \f f§

3.1.1 OS CSCI Architecture

There are 5 CSCs and 3 sub-level CSCs that comprise the OS CSCI. The purpose of each of the CSCs is described in Table 3.1.1-1. Non-developmental software was not incorporated into the design of this CSCI.

Table 3.1.1-1
CSCs Defined for the OS CSCItc "3.1.1-1 CSCs Defined for the OS CSCI" \f t§

CSC	Identifier	Purpose
Active/Frozen Lists (AFL)	OS-CSC-1	Maintains a list of active munitions and a list of frozen munitions, including associated information for each munition on the list
Gateway Interface (GI)	OS-CSC-2	Provide the OS CSCI with access to the DIS Gateway (DG) CSCI
Simulation Control (SC)	OS-CSC-3	Manages the operation states of the simulation and entities within the simulation
Terrain Database Interface (TDI)	OS-CSC-4	Allows height above terrain data to be determined for the specified position of an entity
Munition	OS-CSC-5	Controls all aspects of a munition's flight, from the moment fired through detonation
Target Tracking (TT)	OS-CSC-6	Acquires, maintains and loses lock on a target for each munition active in the simulation and under the control of the OS CSCI
Fly-Out Model (FOM)	OS-CSC-7	Moves each munition along its trajectory
Detonation Event (DE)	OS-CSC-8	Determines when and what type of detonation occurs for each munition under the control of the OS CSCI

3.1.2 System States

There are five simulation (system) states for the ADIS system. These are Halt, Stop/Freeze, Start/Resume, Clear/Reset and Single Step. Halt ends all execution and exits the OS CSCI. During the Stop/Freeze state, all processing within the OS CSCI ceases; however, the DG CSCI continues processing so data for the entities coming in from the network will be current when the OS CSCI resumes processing. The user inputs all data to the Graphical User Interface while the simulation is in the Stop/Freeze state. The Start/Resume state begins normal operation. The Clear/Reset state returns the simulation to the initial conditions and then places the simulation in the Stop/Freeze state. The Single Step mode is basically a debugging mode because only one loop of processing is completed and then the simulation enters the Stop/Freeze state. The simulation remains in the Stop/Freeze state until a Start/Resume command initiates another single step. The Single Step mode can be exited only by a Clear/Reset. Table 3.1.2-1 details the states and the activity that occurs during each one.

Table 3.1.2-1
State/CSC Execution Tabletc "3.1.2-1 State/CSC Execution Table" \f t§

CSC	Stop / Freeze	Start / Resume	Clear / Reset	Single Step
Gateway Interface (GI)	X	X	X	X
Simulation Control (SC)	X	X	X	X
Active/Frozen Lists (AFL)		X	X	X
Terrain Database Interface (TDI)		X		X
Munition		X		X
Target Tracking (TT)		X		X
Fly-Out Model (FOM)		X		X
Detonation Event (DE)		X		X

3.2 OS CSCI Design Description tc "3.2 OS CSCI Design Description"§

The following paragraphs provide a design description for each CSC of the OS CSCI of the ADIS system.

3.2.1 Active/Frozen Lists CSC (OS-CSC-1) tc "3.2.1 Active/Frozen Lists CSC (OS-CSC-1)"§

The Active/Frozen Lists (AFL) CSC maintains a list of active munitions and a list of frozen munitions. Both lists also include associated information for each munition on the list.

3.2.2 Gateway Interface CSC (OS-CSC-2)tc "3.2.2 Gateway Interface CSC (OS-CSC-2)"§

The Gateway Interface (GI) CSC provides the OS CSCI with access to the DIS Gateway (DG) CSCI. This interface allows the passage of DIS PDUs between these two CSCIs. The DG CSCI passes incoming PDUs to the OS CSCI to be processed and the OS CSCI passes outgoing PDUs to the DG CSCI to be placed on the network.

3.2.3 Simulation Control CSC (OS-CSC-3)tc "3.2.3 Simulation Control CSC (OS-CSC-3)"§

The Simulation Control (SC) CSC manages the operation states of the simulation and entities within the simulation.

3.2.4 Terrain Database Interface CSC (OS-CSC-4)tc "3.2.4 Terrain Database Interface CSC (OS-CSC-4)"§

The Terrain Database Interface (TDI) CSC allows height above terrain data to be determined for the specified position of an entity.

3.2.5 Munition CSC (OS-CSC-5)tc "3.2.5 Munition CSC (OS-CSC-5)"§

The Munition CSC controls all aspects of a munition's flight from the moment fired through detonation.

3.2.6 Target Tracking CSC (OS-CSC-6)tc "3.2.6 Target Tracking CSC (OS-CSC-6)"§

The Target Tracking (TT) CSC is responsible for acquiring, maintaining and losing lock on a target for each munition active in the simulation and under the control of the OS CSCI.

3.2.7 Fly-Out Model CSC (OS-CSC-7)tc "3.2.7 Fly-Out Model CSC (OS-CSC-7)"§

The Fly-Out Model (FOM) CSC is responsible for moving each munition along its trajectory.

3.2.8 Detonation Event CSC (OS-CSC-8)tc "3.2.8 Detonation Event CSC (OS-CSC-8)"§

The Detonation Event (DE) CSC is responsible for determining when and what type of detonation occurs for each munition under the control of the OS CSCI.

4 Detailed Design

4.1 Active/Frozen List (AFL) CSC (OS-CSC-1)

There are seven CSUs for the Active/Frozen List (AFL) CSC. Figure 4.1-1 shows the execution control between these units. If a particular CSU is invoked by (or invokes a unit in) another CSC (other than the AFL CSC), the CSC will be identified by a dashed circle and the execution control line will be a dashed line as well (If the CSC is part of a different CSCI, the CSCI name will also be specified inside of the dashed circle). The data flow between the CSUs is described in Figure 4.1-2. The external CSU interfaces are designated by dashed lines.

Figure 4.1-1
Execution Control for the AFL CSC Units

Figure 4.1-2
Data Flow for the AFL CSC Units

4.1.1 Link Munition (LM) CSU (OS-CSU-1.1)

The Link Munition (LM) CSU of the AFL CSC is responsible for linking a munition to either the active munition list or the frozen munition list, as specified. The following subparagraphs provide the design information for this CSU.

4.1.1.1 LM CSU Design Specification/Constraints

There are no design constraints for the LM CSU.

4.1.1.2 LM CSU Design

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the LM CSU.

4.1.1.2.1 LM CSU Input/Output Data Elements

Table 4.1.1.2.1-1 identifies and states the purpose of each input and output data element of the LM CSU.

Table 4.1.1.2.1-1
LM CSU Input/Output Data Elementstc "4.1.1.2.1-1 LM CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Top of List Pointer	X		Points to the head of the list to which the munition is to be linked
Munition Data Pointer	X		Points to data to be placed on the list
Status		X	Indicates whether this unit executed without encountering an error condition

4.1.1.2.2 LM CSU Local Data Elementstc "4.1.1.2.2 LM CSU Local Data Elements"§

Table 4.1.1.2.2-1 identifies and states the purpose of each data element that originates in the LM CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements. The specific local and shared data structures (i.e. for records) are described in Section 4.1.1.2.4.

Table 4.1.1.2.2-1
LM CSU Local Data Elementstc "4.1.1.2.2-1 LM CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
New Node	Pointer to new entry for list	Pointer to Linked List Entry Record (see Table 4.1.1.2.4-1)	32	N/A	N/A

4.1.1.2.3 LM CSU Global Data Elementstc "4.1.1.2.3 LM CSU Global Data Elements"§

There are no global data elements for the LM CSU.

4.1.1.2.4 LM CSU Local and Shared Data Structurestc "4.1.1.2.4 LM CSU Local and Shared Data Structures"§

The following tables describe the local and shared data structures used by the LM CSU.

Table 4.1.1.2.4-1
LINKED_LIST_ENTRY_RECORD Type Descriptiontc "Table 4.1.1.2.4-1 LINKED_LIST_ENTRY_RECORD Type Description" \f t§

Data Element	Data Type	Size	Units	Range
Next	Address	32	N/A	N/A
Munition	Munition List Record	See Table 4.1.1.2.4-2		

Table 4.1.1.2.4-2
MUNITION_LIST_RECORD Type Descriptiontc "Table 4.1.1.2.4-2 MUNITION_LIST_RECORD Type Description" \f t§

Data Element	Data Type	Size	Units	Range
Hashing Index	Unsigned Integer	32	N/A	varies[1]
Entity ID	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Entity Type	Entity Type Record	See IST-CR-93-15, Para. 5.3.10 and IST-CR-93-19, Para. 6		

4.1.1.2.5 LM CSU Interrupts and Signalstc "4.1.1.2.5 LM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the LM CSU.

1The limits of the Hashing Index will be from zero to the size of the table input by the user.

4.1.1.2.6 LM CSU Error Handlingtc "4.1.1.2.6 LM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.1.1.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.1.1.2.7 LM CSU Use of Other Elementstc "4.1.1.2.7 LM CSU Use of Other Elements"§

There are no system service routines called by the LM CSU.

There are no input and output buffers for the LM CSU.

4.1.1.2.8 LM CSU Logic Flowtc "4.1.1.2.8 LM CSU Logic Flow"§

The LM CSU is invoked by the Activate Munition (AM) CSU, Freeze Munition (FM) CSU, and Resume Munition (RM) CSU when a munition needs to be linked to either the active munition list or the frozen munition list. The following flowchart, Figure 4.1.1.2.8-1, describes the logic flow for the LM CSU:

Figure 4.1.1.2.8-1
Flowchart for the LM CSUtc "Figure 4.1.1.2.8-1 Flowchart for the LM CSU" \f f§

4.1.1.2.9 LM CSU Algorithmstc "4.1.1.2.9 LM CSU Algorithms"§

There are no algorithms used by the LM CSU.

4.1.1.2.10 LM CSU Local Data Files Or Databasestc "4.1.1.2.10LM CSU Local Data Files Or Databases"§

There are no local data files or databases used by the LM CSU.

4.1.1.2.11 LM CSU Limitationstc "4.1.1.2.11 LM CSU Limitations"§

There are no limitations or unusual features in the LM CSU.

4.1.2 Unlink Munition (UM) CSU (OS-CSU-1.2)tc "4.1.2 Unlink Munition (UM) CSU (OS-CSU-1.2)"§

The Unlink Munition (UM) CSU of the AFL CSC is responsible for unlinking a munition from either the active munition list or the frozen munition list, as specified. The following subparagraphs provide the design information for this CSU.

4.1.2.1 UM CSU Design Specification/Constraintstc "4.1.2.1UM CSU Design Specifications/Constraints"§

There are no design constraints for the UM CSU.

4.1.2.2 UM CSU Designtc "4.1.2.2 UM CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the UM CSU.

4.1.2.2.1 UM CSU Input/Output Data Elementstc "4.1.2.2.1 UM CSU Input/Output Data Elements"§

Table 4.1.2.2.1-1 identifies and states the purpose of each input and output data element of the UM CSU.

Table 4.1.2.2.1-1
UM CSU Input/Output Data Elementstc "Table 4.1.2.2.1-1 UM CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Top of List Pointer	X		Points to the head of the list to which the munition is to be unlinked
Entity ID	X		Specifies the entity to be removed from the list
Munition Data Pointer		X	Points to data being removed from the list
Status		X	Indicates whether this unit executed without encountering an error condition

4.1.2.2.2 UM CSU Local Data Elementstc "4.1.2.2.2 UM CSU Local Data Elements"§

Table 4.1.2.2.2-1 identifies and states the purpose of each data element that originates in the UM CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.1.2.2.2-1
UM CSU Local Data Elementstc "Table 4.1.2.2.2-1 UM CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Current Pointer	Pointer to the node being operated on	Pointer to Linked List Entry Record (see Table 4.1.1.2.4-1)	32	N/A	N/A
Free Pointer	Pointer to the node to be freed	Pointer to Linked List Entry Record (see Table 4.1.1.2.4-1)	32	N/A	N/A
Previous Pointer	Pointer to the node most recently operated on	Pointer to Linked List Entry Record (see Table 4.1.1.2.4-1)	32	N/A	N/A

4.1.2.2.3 UM CSU Global Data Elementstc "4.1.2.2.3UM CSU Global Data Elements"§

There are no global data elements for the UM CSU.

4.1.2.2.4 UM CSU Local and Shared Data Structurestc "4.1.2.2.4 UM CSU Local and Shared Data Structures"§

The UM CSU does not implement any new local or shared data structures.

4.1.2.2.5 UM CSU Interrupts and Signalstc "4.1.2.2.5 UM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the UM CSU.

4.1.2.2.6 UM CSU Error Handlingtc "4.1.2.2.6 UM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.1.2.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.1.2.2.7 UM CSU Use of Other Elementstc "4.1.2.2.7 UM CSU Use of Other Elements"§

There are no system service routines called by the UM CSU.

There are no input and output buffers for the UM CSU.

4.1.2.2.8 UM CSU Logic Flowtc "4.1.2.2.8 UM CSU Logic Flow"§

The UM CSU is invoked by the Deactivate Munition (DM) CSU, Freeze Munition (FM) CSU and Resume Munition (RM) CSU when a munition needs to be unlinked from either the active munition list or the frozen munition list. If the munition is not found, the Munition Data Pointer will remain null. The following flowchart, Figure 4.1.2.2.8-1 and Figure 4.1.2.2.8-2, describes the logic flow for the UM CSU:

Figure 4.1.2.2.8-1
Flowchart for the UM CSUtc "Figure 4.1.2.2.8-1 Flowchart for the UM CSU" \f f§

Figure 4.1.2.2.8-2
Flowchart for the UM CSU (cont.)tc "Figure 4.1.2.2.8-2 Flowchart for the UM CSU (cont.)" \f f§

4.1.2.2.9 UM CSU Algorithmstc "4.1.2.2.9 UM CSU Algorithms"§

There are no algorithms used by the UM CSU.

4.1.2.2.10 UM CSU Local Data Files Or Databasestc "4.1.2.2.10 UM CSU Local Data Files Or Databases"§

There are no local data files or databases used by the UM CSU.

4.1.2.2.11 UM CSU Limitationstc "4.1.2.2.11 UM CSU Limitations"§

There are no limitations or unusual features in the UM CSU.

4.1.3 Activate Munition (AM) CSU (OS-CSU-1.3)tc "4.1.3 Activate Munition (AM) CSU (OS-CSU-1.3)"§

The Activate Munition (AM) CSU of the AFL CSC instantiates a new munition and places the munition on the active munition list to be managed by the OS CSCI. The following subparagraphs provide the design information for this CSU.

4.1.3.1 AM CSU Design Specification/Constraintstc "4.1.3.1AM CSU Design Specifications/Constraints"§

There are no design constraints for the AM CSU.

4.1.3.2 AM CSU Designtc "4.1.3.2 AM CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the AM CSU.

4.1.3.2.1 AM CSU Input/Output Data Elementstc "4.1.3.2.1 AM CSU Input/Output Data Elements"§

Table 4.1.3.2.1-1 identifies and states the purpose of each input and output data element of the AM CSU.

Table 4.1.3.2.1-1
AM CSU Input/Output Data Elementstc "Table 4.1.3.2.1-1 AM CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity ID	X		Specifies the munition to be activated
Entity Type	X		Specifies the type of munition which corresponds to the given Entity ID
Hashing Index	X		Represents the location of an entry in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.1.3.2.2 AM CSU Local Data Elementstc "4.1.3.2.2 AM CSU Local Data Elements"§

Table 4.1.3.2.2-1 identifies and states the purpose of each data element that originates in the AM CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements. The specific local and shared data structures (i.e. for records) are described in Section 4.1.3.2.4.

Table 4.1.3.2.2-1
AM CSU Local Data Elementstc "Table 4.1.3.2.2-1 AM CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Munition Data Pointer	Pointer to data to be placed on the list	Pointer to Munition List Record (See Table 4.1.1.2.4-2)	32	N/A	N/A

4.1.3.2.3 AM CSU Global Data Elementstc "4.1.3.2.3AM CSU Global Data Elements"§

Table 4.1.3.2.3-1 identifies and states the purpose of each data element that is used by the AM CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.1.3.2.3-1
AM CSU Global Data Elementstc "Table 4.1.3.2.3-1 AM CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Top of Active List Pointer	Pointer to the head of the active list	Pointer to Linked List Entry Record (See Table 4.1.1.2.4-1)	32	N/A	N/A

4.1.3.2.4 AM CSU Local and Shared Data Structurestc "4.1.3.2.4 AM CSU Local and Shared Data Structures"§

The AM CSU does not implement any new local or shared data structures.

4.1.3.2.5 AM CSU Interrupts and Signalstc "4.1.3.2.5 AM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the AM CSU.

4.1.3.2.6 AM CSU Error Handlingtc "4.1.3.2.6 AM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.1.3.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.1.3.2.7 AM CSU Use of Other Elementstc "4.1.3.2.7 AM CSU Use of Other Elements"§

There are no system service routines called by the AM CSU.

There are no input and output buffers for the AM CSU.

4.1.3.2.8 AM CSU Logic Flowtc "4.1.3.2.8 AM CSU Logic Flow"§

The AM CSU is invoked by the Gateway Interface (GI) CSC when a Fire PDU is received for a munition which is to be managed by the OS CSCI. The following flowchart, Figure 4.1.3.2.8-1, describes the logic flow for the AM CSU:

Figure 4.1.3.2.8-1
Flowchart for the AM CSUtc "Figure 4.1.3.2.8-1

4.1.3.2.9 AM CSU Algorithmstc "4.1.3.2.9 AM CSU Algorithms"§

There are no algorithms used by the AM CSU.

4.1.3.2.10 AM CSU Local Data Files Or Databasestc "4.1.3.2.10 AM CSU Local Data Files Or Databases"§

There are no local data files or databases used by the AM CSU.

4.1.3.2.11 AM CSU Limitationstc "4.1.3.2.11 AM CSU Limitations"§

There are no limitations or unusual features in the AM CSU.

4.1.4 Deactivate Munition (DM) CSU (OS-CSU-1.4)tc "4.1.4 Deactivate Munition (DM) CSU (OS-CSU-1.4)"§

The Deactivate Munition (DM) CSU of the AFL CSC eliminates a munition such that it is no longer managed by the OS CSCI. A munition is usually only deactivated once it has been detonated. The following subparagraphs provide the design information for this CSU.

4.1.4.1 DM CSU Design Specification/Constraintstc "4.1.4.1DM CSU Design Specifications/Constraints"§

There are no design constraints for the DM CSU.

4.1.4.2 DM CSU Designtc "4.1.4.2 DM CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the DM CSU.

4.1.4.2.1 DM CSU Input/Output Data Elementstc "4.1.4.2.1 DM CSU Input/Output Data Elements"§

Table 4.1.4.2.1-1 identifies and states the purpose of each input and output data element of the DM CSU.

Table 4.1.4.2.1-1
DM CSU Input/Output Data Elementstc "Table 4.1.4.2.1-1 DM CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity ID	X		Specifies the munition to be deactivated
Status		X	Indicates whether this unit executed without encountering an error condition

4.1.4.2.2 DM CSU Local Data Elementstc "4.1.4.2.2 DM CSU Local Data Elements"§

There are no local data elements for the DM CSU.

4.1.4.2.3 DM CSU Global Data Elementstc "4.1.4.2.3DM CSU Global Data Elements"§

Table 4.1.4.2.3-1 identifies and states the purpose of each data element that is used by the DM CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.1.4.2.3-1
DM CSU Global Data Elementstc "Table 4.1.4.2.3-1 DM CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Top of Active List Pointer	Pointer to the head of the active list	Pointer to Linked List Entry Record (See Table 4.1.1.2.4-1)	32	N/A	N/A
Top of Frozen List Pointer	Pointer to the head of the frozen list	Pointer to Linked List Entry Record (See Table 4.1.1.2.4-1)	32	N/A	N/A

4.1.4.2.4 DM CSU Local and Shared Data Structurestc "4.1.4.2.4 DM CSU Local and Shared Data Structures"§

The DM CSU does not implement any new local or shared data structures.

4.1.4.2.5 DM CSU Interrupts and Signalstc "4.1.4.2.5 DM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the DM CSU.

4.1.4.2.6 DM CSU Error Handlingtc "4.1.4.2.6 DM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.1.4.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.1.4.2.7 DM CSU Use of Other Elementstc "4.1.4.2.7 DM CSU Use of Other Elements"§

There are no system service routines called by the DM CSU.

There are no input and output buffers for the DM CSU.

4.1.4.2.8 DM CSU Logic Flowtc "4.1.4.2.8 DM CSU Logic Flow"§

The DM CSU is invoked by the Detonation Event (DE) CSC when a Detonation PDU is issued for a munition which was managed by the OS CSCI, and by the Gateway Interface (GI) CSC when a request to remove an entity is received. First, the DM CSU attempts to unlink the munition from the active list. If the munition is not found on the active list, the Munition Data Pointer is null and the DM CSU then attempts to unlink the munition from the frozen list. The following flowchart, Figure 4.1.4.2.8-1, describes the logic flow for the DM CSU:

Figure 4.1.4.2.8-1
Flowchart for the DM CSUtc "Figure 4.1.4.2.8-1 Flowchart for the DM CSU" \f f§

4.1.4.2.9 DM CSU Algorithmstc "4.1.4.2.9 DM CSU Algorithms"§

There are no algorithms used by the DM CSU.

4.1.4.2.10 DM CSU Local Data Files Or Databasestc "4.1.4.2.10 DM CSU Local Data Files Or Databases"§

There are no local data files or databases used by the DM CSU.

4.1.4.2.11 DM CSU Limitationstc "4.1.4.2.11 DM CSU Limitations"§

There are no limitations or unusual features in the DM CSU.

4.1.5 Freeze Munition (FM) CSU (OS-CSU-1.5)tc "4.1.5 Freeze Munition (FM) CSU (OS-CSU-1.5)"§

The Freeze Munition (FM) CSU of the AFL CSC moves a munition from the active munition list to the frozen munition list when a Stop/Freeze PDU is received which applies to the munition. Data related to the munition is saved in the event that a Start/Resume PDU for the munition would be received. No other actions related to this munition are processed while the munition is frozen. The following subparagraphs provide the design information for this CSU.

4.1.5.1 FM CSU Design Specification/Constraintstc "4.1.5.1 FM CSU Design Specifications/Constraints"§

There are no design constraints for the FM CSU.

4.1.5.2 FM CSU Designtc "4.1.5.2 FM CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the FM CSU.

4.1.5.2.1 FM CSU Input/Output Data Elementstc "4.1.5.2.1 FM CSU Input/Output Data Elements"§

Table 4.1.5.2.1-1 identifies and states the purpose of each input and output data element of the FM CSU.

Table 4.1.5.2.1-1
FM CSU Input/Output Data Elementstc "Table 4.1.5.2.1-1 FM CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity ID	X		Specifies the munition to be frozen
Status		X	Indicates whether this unit executed without encountering an error condition

4.1.5.2.2 FM CSU Local Data Elementstc "4.1.5.2.2 FM CSU Local Data Elements"§

Table 4.1.5.2.2-1 identifies and states the purpose of each data element that originates in the FM CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.1.5.2.2-1
FM CSU Local Data Elementstc "Table 4.1.5.2.2-1 FM CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Munition Data Pointer	Pointer to data removed from the active list and placed on the frozen list	Pointer to Munition List Record (See Table 4.1.1.2.4-2)	32	N/A	N/A

4.1.5.2.3 FM CSU Global Data Elementstc "4.1.5.2.3 FM CSU Global Data Elements"§

Table 4.1.5.2.3-1 identifies and states the purpose of each data element that is used by the FM CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.1.5.2.3-1
FM CSU Global Data Elementstc "Table 4.1.5.2.3-1 FM CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Top of Active List Pointer	Pointer to the head of the active list	Pointer to Linked List Entry Record (See Table 4.1.1.2.4-1)	32	N/A	N/A
Top of Frozen List Pointer	Pointer to the head of the frozen list	Pointer to Linked List Entry Record (See Table 4.1.1.2.4-1)	32	N/A	N/A

4.1.5.2.4 FM CSU Local and Shared Data Structurestc "4.1.5.2.4 FM CSU Local and Shared Data Structures"§

The FM CSU does not implement any new local or shared data structures.

4.1.5.2.5 FM CSU Interrupts and Signalstc "4.1.5.2.5 FM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the FM CSU.

4.1.5.2.6 FM CSU Error Handlingtc "4.1.5.2.6 FM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.1.5.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.1.5.2.7 FM CSU Use of Other Elementstc "4.1.5.2.7 FM CSU Use of Other Elements"§

There are no system service routines called by the FM CSU.

There are no input and output buffers for the FM CSU.

4.1.5.2.8 FM CSU Logic Flowtc "4.1.5.2.8 FM CSU Logic Flow"§

The FM CSU is invoked by the Gateway Interface (GI) CSC when a Stop/Freeze PDU which applies to an entity is received. The following flowchart, Figure 4.1.5.2.8-1, describes the logic flow for the FM CSU:

Figure 4.1.5.2.8-1
Flowchart for the FM CSUtc "Figure 4.1.5.2.8-1 Flowchart for the FM CSU" \f f§

4.1.5.2.9 FM CSU Algorithmstc "4.1.5.2.9 FM CSU Algorithms"§

There are no algorithms used by the FM CSU.

4.1.5.2.10 FM CSU Local Data Files Or Databasestc "4.1.5.2.10 FM CSU Local Data Files Or Databases"§

There are no local data files or databases used by the FM CSU.

4.1.5.2.11 FM CSU Limitationstc "4.1.5.2.11 FM CSU Limitations"§

There are no limitations or unusual features in the FM CSU.

4.1.6 Resume Munition (RM) CSU (OS-CSU-1.6)tc "4.1.6 Resume Munition (RM) CSU (OS-CSU-1.6)"§

The Resume Munition (RM) CSU of the AFL CSC moves a munition from the frozen munition list to the active munition list when a Start/Resume PDU is received which applies to the munition. Data related to the munition is recalled to allow the munition to continue as if the freeze state never occurred. Depending upon the duration of the freeze state, a new target may need to be acquired. The following subparagraphs provide the design information for this CSU.

4.1.6.1 RM CSU Design Specification/Constraintstc "4.1.6.1RM CSU Design Specifications/Constraints"§

There are no design constraints for the RM CSU.

4.1.6.2 RM CSU Designtc "4.1.6.2 RM CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the RM CSU.

4.1.6.2.1 RM CSU Input/Output Data Elementstc "4.1.6.2.1 RM CSU Input/Output Data Elements"§

Table 4.1.6.2.1-1 identifies and states the purpose of each input and output data element of the RM CSU.

Table 4.1.6.2.1-1
RM CSU Input/Output Data Elementstc "Table 4.1.6.2.1-1 RM CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity ID	X		Specifies the munition to be resumed
Status		X	Indicates whether this unit executed without encountering an error condition

4.1.6.2.2 RM CSU Local Data Elementstc "4.1.6.2.2 RM CSU Local Data Elements"§

Table 4.1.6.2.2-1 identifies and states the purpose of each data element that originates in the RM CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.1.6.2.2-1
RM CSU Local Data Elementstc "Table 4.1.6.2.2-1 RM CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Munition Data Pointer	Pointer to data removed from the active list and placed on the frozen list	Pointer to Munition List Record (See Table 4.1.1.2.4-2)	32	N/A	N/A

4.1.6.2.3 RM CSU Global Data Elementstc "4.1.6.2.3RM CSU Global Data Elements"§

Table 4.1.6.2.3-1 identifies and states the purpose of each data element that is used by the RM CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.1.6.2.3-1
RM CSU Global Data Elementstc "Table 4.1.6.2.3-1 RM CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Top of Active List Pointer	Pointer to the head of the active list	Pointer to Linked List Entry Record (See Table 4.1.1.2.4-1)	32	N/A	N/A
Top of Frozen List Pointer	Pointer to the head of the frozen list	Pointer to Linked List Entry Record (See Table 4.1.1.2.4-1)	32	N/A	N/A

4.1.6.2.4 RM CSU Local and Shared Data Structurestc "4.1.6.2.4 RM CSU Local and Shared Data Structures"§

The RM CSU does not implement any new local or shared data structures.

4.1.6.2.5 RM CSU Interrupts and Signalstc "4.1.6.2.5 RM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the RM CSU.

4.1.6.2.6 RM CSU Error Handlingtc "4.1.6.2.6 RM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.1.6.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.1.6.2.7 RM CSU Use of Other Elementstc "4.1.6.2.7 RM CSU Use of Other Elements"§

There are no system service routines called by the RM CSU.

There are no input and output buffers for the RM CSU.

4.1.6.2.8 RM CSU Logic Flowtc "4.1.6.2.8 RM CSU Logic Flow"§

The RM CSU is invoked by the Gateway Interface (GI) CSC when a Start/Resume PDU which applies to an entity is received. The following flowchart, Figure 4.1.6.2.8-1, describes the logic flow for the RM CSU:

Figure 4.1.6.2.8-1
Flowchart for the RM CSUtc "Figure 4.1.6.2.8-1 Flowchart for the RM CSU" \f f§

4.1.6.2.9 RM CSU Algorithmstc "4.1.6.2.9 RM CSU Algorithms"§

There are no algorithms used by the RM CSU.

4.1.6.2.10 RM CSU Local Data Files Or Databasestc "4.1.6.2.10 RM CSU Local Data Files Or Databases"§

There are no local data files or databases used by the RM CSU.

4.1.6.2.11 RM CSU Limitationstc "4.1.6.2.11 RM CSU Limitations"§

There are no limitations or unusual features in the RM CSU.

4.1.7 Clear Lists (CL) CSU (OS-CSU-1.7)tc "4.1.7 Clear Lists (CL) CSU (OS-CSU-1.7)"§

The Clear Lists (CL) CSU of the AFL CSC eliminates all munitions from both the active munition list and the frozen munition list, usually because the simulation is being restarted. The following subparagraphs provide the design information for this CSU.

4.1.7.1 CL CSU Design Specification/Constraintstc "4.1.7.1 CL CSU Design Specifications/Constraints"§

There are no design constraints for the CL CSU.

4.1.7.2 CL CSU Designtc "4.1.7.2 CL CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the CL CSU.

4.1.7.2.1 CL CSU Input/Output Data Elementstc "4.1.7.2.1 CL CSU Input/Output Data Elements"§

Table 4.1.7.2.1-1 identifies and states the purpose of each input and output data element of the CL CSU.

Table 4.1.7.2.1-1
CL CSU Input/Output Data Elementstc "Table 4.1.7.2.1-1 CL CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Status		X	Indicates whether this unit executed without encountering an error condition

4.1.7.2.2 CL CSU Local Data Elementstc "4.1.7.2.2 CL CSU Local Data Elements"§

Table 4.1.7.2.2-1 identifies and states the purpose of each data element that originates in the CL CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.1.7.2.2-1
CL CSU Local Data Elementstc "Table 4.1.7.2.2-1 CL CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Munition Data Pointer	Pointer to data removed from the active list and placed on the frozen list	Pointer to Munition List Record (See Table 4.1.1.2.4-2)	32	N/A	N/A

4.1.7.2.3 CL CSU Global Data Elementstc "4.1.7.2.3 CL CSU Global Data Elements"§

Table 4.1.7.2.3-1 identifies and states the purpose of each data element that is used by the CL CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.1.7.2.3-1
CL CSU Global Data Elementstc "Table 4.1.7.2.3-1 CL CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Top of Active List Pointer	Pointer to the head of the active list	Pointer to Linked List Entry Record (See Table 4.1.1.2.4-1)	32	N/A	N/A
Top of Frozen List Pointer	Pointer to the head of the frozen list	Pointer to Linked List Entry Record (See Table 4.1.1.2.4-1)	32	N/A	N/A

4.1.7.2.4 CL CSU Local and Shared Data Structurestc "4.1.7.2.4 CL CSU Local and Shared Data Structures"§

The CL CSU does not implement any new local or shared data structures.

4.1.7.2.5 CL CSU Interrupts and Signalstc "4.1.7.2.5 CL CSU Interrupts and Signals"§

There are no interrupts or signals handled by the CL CSU.

4.1.7.2.6 CL CSU Error Handlingtc "4.1.7.2.6 CL CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.1.7.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.1.7.2.7 CL CSU Use of Other Elementstc "4.1.7.2.7 CL CSU Use of Other Elements"§

There are no system service routines called by the CL CSU.

There are no input and output buffers for the CL CSU.

4.1.7.2.8 CL CSU Logic Flowtc "4.1.7.2.8 CL CSU Logic Flow"§

The CL CSU is invoked by the Simulation Control (SC) CSC when the simulation is being reset. The following flowchart, Figure 4.1.7.2.8-1, describes the logic flow for the CL CSU:

Figure 4.1.7.2.8-1
Flowchart for the CL CSUtc "Figure 4.1.7.2.8-1 Flowchart for the CL CSU" \f f§

4.1.7.2.9 CL CSU Algorithmstc "4.1.7.2.9 CL CSU Algorithms"§

There are no algorithms used by the CL CSU.

4.1.7.2.10 CL CSU Local Data Files Or Databasestc "4.1.7.2.10 CL CSU Local Data Files Or Databases"§

There are no local data files or databases used by the CL CSU.

4.1.7.2.11 CL CSU Limitationstc "4.1.7.2.11 CL CSU Limitations"§

There are no limitations or unusual features in the CL CSU.

4.2 Gateway Interface (GI) CSC (OS-CSC-2)tc "4.2 Gateway Interface (GI) CSC (OS-CSC-2)"§

There are sixteen CSUs for the Gateway Interface (GI) CSC. Figure 4.2-1 shows the execution control between these units. If a particular CSU is invoked by (or invokes a unit in) another CSC (other than the GI CSC), the CSC will be identified by a dashed circle and the execution control line will be a dashed line as well (If the CSC is part of a different CSCI, the CSCI name will also be specified inside of the dashed circle). The external CSU interfaces are designated by dashed lines.

Figure 4.2-1
Execution Control for the GI CSC Unitstc "Figure 4.2-1 Execution Control for the GI CSC Units" \f f§

4.2.1 Get Entity State Data (GESD) CSU (OS-CSU-2.1)tc "4.2.1 Get Entity State Data (GESD) CSU (OS-CSU-2.1)"§

The Get Entity State Data (GESD) CSU of the GI CSC requests a pointer to data on a specified entity. The following subparagraphs provide the design information for this CSU.

4.2.1.1 GESD CSU Design Specification/Constraintstc "4.2.1.1 GESD CSU Design Specifications/Constraints"§

There are no design constraints for the GESD CSU.

4.2.1.2 GESD CSU Designtc "4.2.1.2 GESD CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the GESD CSU.

4.2.1.2.1 GESD CSU Input/Output Data Elementstc "4.2.1.2.1 GESD CSU Input/Output Data Elements"§

Table 4.2.1.2.1-1 identifies and states the purpose of each input and output data element of the GESD CSU.

Table 4.2.1.2.1-1
GESD CSU Input/Output Data Elementstc "Table 4.2.1.2.1-1 GESD CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity ID	X		Specifies the entity about which data is desired
Entity State PDU Pointer		X	Points to the Entity State PDU containing the requested data
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.1.2.2 GESD CSU Local Data Elementstc "4.2.1.2.2 GESD CSU Local Data Elements"§

There are no local data elements for the GESD CSU.

4.2.1.2.3 GESD CSU Global Data Elementstc "4.2.1.2.3 GESD CSU Global Data Elements"§

There are no global data elements for the GESD CSU.

4.2.1.2.4 GESD CSU Local and Shared Data Structurestc "4.2.1.2.4 GESD CSU Local and Shared Data Structures"§

The GESD CSU does not implement any new local or shared data structures.

4.2.1.2.5 GESD CSU Interrupts and Signalstc "4.2.1.2.5 GESD CSU Interrupts and Signals"§

There are no interrupts or signals handled by the GESD CSU.

4.2.1.2.6 GESD CSU Error Handlingtc "4.2.1.2.6 GESD CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.1.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.1.2.7 GESD CSU Use of Other Elementstc "4.2.1.2.7 GESD CSU Use of Other Elements"§

There are no system service routines called by the GESD CSU.

There are no input and output buffers for the GESD CSU.

4.2.1.2.8 GESD CSU Logic Flowtc "4.2.1.2.8 GESD CSU Logic Flow"§

The GESD CSU is invoked by the Target Tracking (TT) CSC when data about a target entity is needed and by the Process Fire PDU when the Force ID of the firing entity. The following flowchart, Figure 4.2.1.2.8-1, describes the logic flow for the GESD CSU:

Figure 4.2.1.2.8-1
Flowchart for the GESD CSUtc "Figure 4.2.1.2.8-1 Flowchart for the GESD CSU" \f f§

4.2.1.2.9 GESD CSU Algorithmstc "4.2.1.2.9 GESD CSU Algorithms"§

There are no algorithms used by this CSU.

4.2.1.2.10 GESD CSU Local Data Files Or Databasestc "4.2.1.2.10 GESD CSU Local Data Files Or Databases"§

There are no local data files or databases used by the GESD CSU.

4.2.1.2.11 GESD CSU Limitationstc "4.2.1.2.11 GESD CSU Limitations"§

There are no limitations or unusual features in the GESD CSU.

4.2.2 Get Events (GE) CSU (OS-CSU-2.2)tc "4.2.2 Get Events (GE) CSU (OS-CSU-2.2)"§

The Get Events (GE) CSU of the GI CSC allows incoming events to be processed. The following subparagraphs provide the design information for this CSU.

4.2.2.1 GE CSU Design Specification/Constraintstc "4.2.2.1 GE CSU Design Specifications/Constraints"§

There are no design constraints for the GE CSU.

4.2.2.2 GE CSU Designtc "4.2.2.2 GE CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the GE CSU.

4.2.2.2.1 GE CSU Input/Output Data Elementstc "4.2.2.2.1 GE CSU Input/Output Data Elements"§

Table 4.2.2.2.1-1 identifies and states the purpose of each input and output data element of the GE CSU.

Table 4.2.2.2.1-1
GE CSU Input/Output Data Elementstc "Table 4.2.2.2.1-1 GE CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.2.2.2 GE CSU Local Data Elementstc "4.2.2.2.2 GE CSU Local Data Elements"§

Table 4.2.2.2.2-1 identifies and states the purpose of each data element that originates in the GE CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.2.2.2-1
GE CSU Local Data Elementstc "Table 4.2.2.2.2-1 GE CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Event PDU Pointer	Pointer to the event PDU to be processed	Pointer to a generic PDU	See DG CSCI IRS		
Time Remaining	Flag indicating whether the time to process events has expired	BOOLEAN	8	N/A	False, True

4.2.2.2.3 GE CSU Global Data Elementstc "4.2.2.2.3 GE CSU Global Data Elements"§

Table 4.2.2.2.3-1 identifies and states the purpose of each data element that is used by the GE CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.2.2.2.3-1
GE CSU Global Data Elementstc "Table 4.2.2.2.3-1 GE CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Simulation State	Operation state of the OS CSCI	See Simulation Parameters in Section 5, Table 5-7			

4.2.2.2.4 GE CSU Local and Shared Data Structurestc "4.2.2.2.4 GE CSU Local and Shared Data Structures"§

The GE CSU does not implement any new local or shared data structures.

4.2.2.2.5 GE CSU Interrupts and Signalstc "4.2.2.2.5GE CSU Interrupts and Signals"§

There are no interrupts or signals handled by the GE CSU.

4.2.2.2.6 GE CSU Error Handlingtc "4.2.2.2.6 GE CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.2.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.2.2.7 GE CSU Use of Other Elementstc "4.2.2.2.7GE CSU Use of Other Elements"§

There are no system service routines called by the GE CSU.

There are no input and output buffers for the GE CSU.

4.2.2.2.8 GE CSU Logic Flowtc "4.2.2.2.8 GE CSU Logic Flow"§

The GE CSU is invoked by the Simulation Control (SC) CSC once per timeslice to process the incoming events. The following flowchart, Figure 4.2.2.2.8-1 and Figure 4.2.2.2.8-2, describes the logic flow for the GE CSU:

Figure 4.2.2.2.8-1
Flowchart for the GE CSUtc "Figure 4.2.2.2.8-1 Flowchart for the GE CSU" \f f§

Figure 4.2.2.2.8-2
Flowchart for the GE CSU (cont.)tc "Figure 4.2.2.2.8-2 Flowchart for the GE CSU (cont.)" \f f§

4.2.2.2.9 GE CSU Algorithmstc "4.2.2.2.9 GE CSU Algorithms"§

There are no algorithms used by the GE CSU.

4.2.2.2.10 GE CSU Local Data Files Or Databasestc "4.2.2.2.10 GE CSU Local Data Files Or Databases"§

There are no local data files or databases used by the GE CSU.

4.2.2.2.11 GE CSU Limitationstc "4.2.2.2.11 GE CSU Limitations"§

There are no limitations or unusual features in the GE CSU.

4.2.3 Process Collision PDU (PCPDU) CSU (OS-CSU-2.3)tc "4.2.3 Process Collision PDU (PCPDU) CSU (OS-CSU-2.3)"§

The Process Collision PDU (PCPDU) CSU of the GI CSC processes incoming Collision PDUs to incorporate the effects of the collisions. The following subparagraphs provide the design information for this CSU.

4.2.3.1 PCPDU CSU Design Specification/Constraintstc "4.2.3.1 PCPDU CSU Design Specifications/Constraints"§

There are no design constraints for the PCPDU CSU.

4.2.3.2 PCPDU CSU Designtc "4.2.3.2 PCPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the PCPDU CSU.

4.2.3.2.1 PCPDU CSU Input/Output Data Elementstc "4.2.3.2.1 PCPDU CSU Input/Output Data Elements"§

Table 4.2.3.2.1-1 identifies and states the purpose of each input and output data element of the PCPDU CSU.

Table 4.2.3.2.1-1
PCPDU CSU Input/Output Data Elementstc "Table 4.2.3.2.1-1 PCPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Collision PDU Pointer	X		Points to the Collision PDU to be processed
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.3.2.2 PCPDU CSU Local Data Elementstc "4.2.3.2.2 PCPDU CSU Local Data Elements"§

Table 4.2.3.2.2-1 identifies and states the purpose of each data element that originates in the PCPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.3.2.2-1
PCPDU CSU Local Data Elementstc "Table 4.2.3.2.2-1 PCPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Detonation Location	Location of the detonation in the target's entity coordinate system	Entity Coordinate Vector	See IST-CR-93-15, Para. 5.3.20.1		
Detonation Result	Type of detonation which occurred	Detonation Result Type	See IST-CR-93-19, Para. 4.3.1.3		

4.2.3.2.3 PCPDU CSU Global Data Elementstc "4.2.3.2.3 PCPDU CSU Global Data Elements"§

There are no global data elements for the PCPDU CSU.

4.2.3.2.4 PCPDU CSU Local and Shared Data Structurestc "4.2.3.2.4 PCPDU CSU Local and Shared Data Structures"§

The PCPDU CSU does not implement any new local or shared data structures.

4.2.3.2.5 PCPDU CSU Interrupts and Signalstc "4.2.3.2.5 PCPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the PCPDU CSU.

4.2.3.2.6 PCPDU CSU Error Handlingtc "4.2.3.2.6 PCPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.3.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.3.2.7 PCPDU CSU Use of Other Elementstc "4.2.3.2.7 PCPDU CSU Use of Other Elements"§

There are no system service routines called by the PCPDU CSU.

There are no input and output buffers for the PCPDU CSU.

4.2.3.2.8 PCPDU CSU Logic Flowtc "4.2.3.2.8 PCPDU CSU Logic Flow"§

The PCPDU CSU is invoked by the Get Events (GE) CSU when the incoming event corresponds to a Collision PDU. The following flowchart, Figure 4.2.3.2.8-1 and Figure 4.2.3.2.8-2, describes the logic flow for the PCPDU CSU:

Figure 4.2.3.2.8-1
Flowchart for the PCPDU CSUtc "Figure 4.2.3.2.8-1 Flowchart for the PCPDU CSU" \f f§

Figure 4.2.3.2.8-2
Flowchart for the PCPDU CSU (cont.)tc "Figure 4.2.3.2.8-2 Flowchart for the PCPDU CSU (cont.)" \f f§

4.2.3.2.9 PCPDU CSU Algorithmstc "4.2.3.2.9 PCPDU CSU Algorithms"§

There are no algorithms used by the PCPDU CSU.

4.2.3.2.10 PCPDU CSU Local Data Files Or Databasestc "4.2.3.2.10 PCPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the PCPDU CSU.

4.2.3.2.11 PCPDU CSU Limitationstc "4.2.3.2.11 PCPDU CSU Limitations"§

There are no limitations or unusual features in the PCPDU CSU.

4.2.4 Process Detonation PDU (PDPDU) CSU (OS-CSU-2.4)tc "4.2.4 Process Detonation PDU (PDPDU) CSU (OS-CSU-2.4)"§

The Process Detonation PDU (PDPDU) CSU of the GI CSC processes incoming Detonation PDUs to incorporate the effects of the detonations. The following subparagraphs provide the design information for this CSU.

4.2.4.1 PDPDU CSU Design Specification/Constraintstc "4.2.4.1 PDPDU CSU Design Specifications/Constraints"§

There are no design constraints for the PDPDU CSU.

4.2.4.2 PDPDU CSU Designtc "4.2.4.2 PDPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the PDPDU CSU.

4.2.4.2.1 PDPDU CSU Input/Output Data Elementstc "4.2.4.2.1 PDPDU CSU Input/Output Data Elements"§

Table 4.2.4.2.1-1 identifies and states the purpose of each input and output data element of the PDPDU CSU.

Table 4.2.4.2.1-1
PDPDU CSU Input/Output Data Elementstc "Table 4.2.4.2.1-1 PDPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Detonation PDU Pointer	X		Points to the Detonation PDU to be processed
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.4.2.2 PDPDU CSU Local Data Elementstc "4.2.4.2.2 PDPDU CSU Local Data Elements"§

Table 4.2.4.2.2-1 identifies and states the purpose of each data element that originates in the PDPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.4.2.2-1
PDPDU CSU Local Data Elementstc "Table 4.2.4.2.2-1 PDPDU CSU Local Data Elements" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Detonation Location	Location of the detonation in the target's entity coordinate system	Entity Coordinate Vector	See IST-CR-93-15, Para. 5.3.20.1		
Detonation Result	Type of detonation which occurred	Detonation Result Type	See IST-CR-93-19, Para. 4.3.1.3		

4.2.4.2.3 PDPDU CSU Global Data Elementstc "4.2.4.2.3 PDPDU CSU Global Data Elements"§

Table 4.2.4.2.3-1 identifies and states the purpose of each data element that is used by the PDPDU CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.2.4.2.3-1
PDPDU CSU Global Data Elementstc "Table 4.2.4.2.3-1 PDPDU CSU Global Data Elements" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Contact Threshold	Distance from center of entity in which contact is considered to have been made	FLOAT	64	m	N/A
Detonation Proximity Distance	Distance from an entity in which a particular proximity fuse will detonate	FLOAT	64	m	N/A

4.2.4.2.4 PDPDU CSU Local and Shared Data Structurestc "4.2.4.2.4 PDPDU CSU Local and Shared Data Structures"§

The PDPDU CSU does not implement any new local or shared data structures.

4.2.4.2.5 PDPDU CSU Interrupts and Signalstc "4.2.4.2.5 PDPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the PDPDU CSU.

4.2.4.2.6 PDPDU CSU Error Handlingtc "4.2.4.2.6 PDPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.4.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.4.2.7 PDPDU CSU Use of Other Elementstc "4.2.4.2.7 PDPDU CSU Use of Other Elements"§

There are no system service routines called by the PDPDU CSU.

There are no input and output buffers for the PDPDU CSU.

4.2.4.2.8 PDPDU CSU Logic Flowtc "4.2.4.2.8 PDPDU CSU Logic Flow"§

The PDPDU CSU is invoked by the Get Events (GE) CSU when the incoming event corresponds to a Detonation PDU. The following flowchart, Figure 4.2.4.2.8-1 and Figure 4.2.4.2.8-2, describes the logic flow for the PDPDU CSU:

Figure 4.2.4.2.8-1
Flowchart for the PDPDU CSUtc "Figure 4.2.4.2.8-1 Flowchart for the PDPDU CSU" \f f§

Figure 4.2.4.2.8-2
Flowchart for the PDPDU CSU (cont.)tc "Figure 4.2.4.2.8-2 Flowchart for the PDPDU CSU (cont.)" \f f§

4.2.4.2.9 PDPDU CSU Algorithmstc "4.2.4.2.9 PDPDU CSU Algorithms"§

There are no algorithms used by the PDPDU CSU.

4.2.4.2.10 PDPDU CSU Local Data Files Or Databasestc "4.2.4.2.10 PDPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the PDPDU CSU.

4.2.4.2.11 PDPDU CSU Limitationstc "4.2.4.2.11 PDPDU CSU Limitations"§

There are no limitations or unusual features in the PDPDU CSU.

4.2.5 Process Fire PDU (PFPDU) CSU (OS-CSU-2.5)tc "4.2.5 Process Fire PDU (PFPDU) CSU (OS-CSU-2.5)"§

The Process Fire PDU (PFPDU) CSU of the GI CSC processes incoming PDUs to determine whether a munition should be activated. Fire PDUs must be correlated to a parent entity before a munition will be fired. The following subparagraphs provide the design information for this CSU.

4.2.5.1 PFPDU CSU Design Specification/Constraintstc "4.2.5.1 PFPDU CSU Design Specifications/Constraints"§

There are no design constraints for the PFPDU CSU.

4.2.5.2 PFPDU CSU Designtc "4.2.5.2 PFPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the PFPDU CSU.

4.2.5.2.1 PFPDU CSU Input/Output Data Elementstc "4.2.5.2.1PFPDU CSU Input/Output Data Elements"§

Table 4.2.5.2.1-1 identifies and states the purpose of each input and output data element of the PFPDU CSU.

Table 4.2.5.2.1-1
PFPDU CSU Input/Output Data Elementstc "Table 4.2.5.2.1-1 PFPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Fire PDU Pointer	X		Points to the Fire PDU to be processed
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.5.2.2 PFPDU CSU Local Data Elementstc "4.2.5.2.2 PFPDU CSU Local Data Elements"§

Table 4.2.5.2.2-1 identifies and states the purpose of each data element that originates in the PFPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.5.2.2-1
PFPDU CSU Local Data Elementstc "Table 4.2.5.2.2-1 PFPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Entity ID	Entity which was fired	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
ESPDU Pointer	Pointer to an Entity State PDU	Pointer to ESPDU Record	See IST-CR-93-15, Para. 5.4.3.1		
Entity Type	Type of munition which corresponds to the given entity ID	Entity Type Record	See IST-CR-93-15, Para. 5.3.10 and IST-CR-93-19, Para. 6		
Force ID	Affiliation of the entity based on the parent entity	Force Type	See IST-CR-93-19, Para. 4.3.1.5		
Hashing Index	Location of an entry in a hash table	Unsigned Integer	32	N/A	varies[1]

4.2.5.2.3 PFPDU CSU Global Data Elementstc "4.2.5.2.3 PFPDU CSU Global Data Elements"§

Table 4.2.5.2.3-1 identifies and states the purpose of each data element that is used by the PFPDU CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

1The limits of the Hashing Index will be from zero to the size of the table input by the user.

Table 4.2.5.2.3-1
PFPDU CSU Global Data Elementstc "Table 4.2.5.2.3-1 PFPDU CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Parent Entity ID	Entity for which the OS CSCI maintains munition models	Entity Identifier Record	See Simulation Parameters in Section 5, Table 5-7		

4.2.5.2.4 PFPDU CSU Local and Shared Data Structurestc "4.2.5.2.4 PFPDU CSU Local and Shared Data Structures"§

The PFPDU CSU does not implement any new local or shared data structures.

4.2.5.2.5 PFPDU CSU Interrupts and Signalstc "4.2.5.2.5 PFPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the PFPDU CSU.

4.2.5.2.6 PFPDU CSU Error Handlingtc "4.2.5.2.6 PFPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.5.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.5.2.7 PFPDU CSU Use of Other Elementstc "4.2.5.2.7 PFPDU CSU Use of Other Elements"§

There are no system service routines called by the PFPDU CSU.

There are no input and output buffers for the PFPDU CSU.

4.2.5.2.8 PFPDU CSU Logic Flowtc "4.2.5.2.8 PFPDU CSU Logic Flow"§

The PFPDU CSU is invoked by the Get Events (GE) CSU when the incoming event corresponds to a Fire PDU. The following flowchart, Figure 4.2.5.2.8-1, describes the logic flow for the PFPDU CSU:

Figure 4.2.5.2.8-1
Flowchart for the PFPDU CSUtc "Figure 4.2.5.2.8-1 Flowchart for the PFPDU CSU" \f f§

4.2.5.2.9 PFPDU CSU Algorithmstc "4.2.5.2.9PFPDU CSU Algorithms"§

There are no algorithms used by the PFPDU CSU.

4.2.5.2.10 PFPDU CSU Local Data Files Or Databasestc "4.2.5.2.10 PFPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the PFPDU CSU.

4.2.5.2.11 PFPDU CSU Limitationstc "4.2.5.2.11 PFPDU CSU Limitations"§

There are no limitations or unusual features in the PFPDU CSU.

4.2.6 Process Simulation Management PDU (PSMPDU) CSU (OS-CSU-2.6)tc "4.2.6 Process Simulation Management PDU (PSMPDU) CSU (OS-CSU-2.6)"§

The Process Simulation Management PDU (PSMPDU) CSU of the GI CSC processes Simulation Management PDUs allowing the state of the simulation or the state of a single simulation to change. The following subparagraphs provide the design information for this CSU.

4.2.6.1 PSMPDU CSU Design Specification/Constraintstc "4.2.6.1 PSMPDU CSU Design Specifications/Constraints"§

There are no design constraints for the PSMPDU CSU.

4.2.6.2 PSMPDU CSU Designtc "4.2.6.2 PSMPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the PSMPDU CSU.

4.2.6.2.1 PSMPDU CSU Input/Output Data Elementstc "4.2.6.2.1 PSMPDU CSU Input/Output Data Elements"§

Table 4.2.6.2.1-1 identifies and states the purpose of each input and output data element of the PSMPDU CSU.

Table 4.2.6.2.1-1
PSMPDU CSU Input/Output Data Elementstc "Table 4.2.6.2.1-1 PSMPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Simulation Management Pointer	X		Points to the Simulation Management PDU to be processed
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.6.2.2 PSMPDU CSU Local Data Elementstc "4.2.6.2.2 PSMPDU CSU Local Data Elements"§

Table 4.2.6.2.2-1 identifies and states the purpose of each data element that originates in the PSMPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.6.2.2-1
PSMPDU CSU Local Data Elementstc "Table 4.2.6.2.2-1 PSMPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Acknowledge Flag	Flag indicating the type of PDU being acknowledged	Acknowledge Flag Type	See IST-CR-93-19, Para. 4.3.1.11		
Originating Entity ID	Entity originating the Acknowledge PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Receiving Entity ID	Entity which issued the Create Entity PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Response Flag	Flag indicating	Response Flag	See IST-CR-93-15,		

	whether the entity was created	Type	Para. 5.4.5.6

4.2.6.2.3 PSMPDU CSU Global Data Elementstc "4.2.6.2.3 PSMPDU CSU Global Data Elements"§

Table 4.2.6.2.3-1 identifies and states the purpose of each data element that is used by the PSMPDU CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.2.6.2.3-1
PSMPDU CSU Global Data Elementstc "Table 4.2.6.2.3-1 PSMPDU CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Parent Entity ID.Application ID	Application of the Parent Entity/Entities	See Simulation Parameters in Section 5, Table 5-7			
Parent Entity ID.Site ID	Site of the Parent Entity/Entities	See Simulation Parameters in Section 5, Table 5-7			

4.2.6.2.4 PSMPDU CSU Local and Shared Data Structurestc "4.2.6.2.4 PSMPDU CSU Local and Shared Data Structures"§

The PSMPDU CSU does not implement any new local or shared data structures.

4.2.6.2.5 PSMPDU CSU Interrupts and Signalstc "4.2.6.2.5 PSMPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the PSMPDU CSU.

4.2.6.2.6 PSMPDU CSU Error Handlingtc "4.2.6.2.6 PSMPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.6.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.6.2.7 PSMPDU CSU Use of Other Elementstc "4.2.6.2.7 PSMPDU CSU Use of Other Elements"§

There are no system service routines called by the PSMPDU CSU.

There are no input and output buffers for the PSMPDU CSU.

4.2.6.2.8 PSMPDU CSU Logic Flowtc "4.2.6.2.8 PSMPDU CSU Logic Flow"§

The PSMPDU CSU is invoked by the Get Events (GE) CSU when the incoming event corresponds to a Simulation Management PDU. The PSMPDU CSU determines how to handle the Simulation Management PDU based on the specific PDU type. The following flowchart, Figure 4.2.6.2.8-1 and Figure 4.2.6.2.8-2, describes the logic flow for the PSMPDU CSU:

Figure 4.2.6.2.8-1
Flowchart for the PSMPDU CSUtc "Figure 4.2.6.2.8-1 Flowchart for the PSMPDU CSU" \f f§

Figure 4.2.6.2.8-2
Flowchart for the PSMPDU CSU (cont.)tc "Figure 4.2.6.2.8-2 Flowchart for the PSMPDU CSU (cont.)" \f f§

4.2.6.2.9 PSMPDU CSU Algorithmstc "4.2.6.2.9 PSMPDU CSU Algorithms"§

There are no algorithms used by the PSMPDU CSU.

4.2.6.2.10 PSMPDU CSU Local Data Files Or Databasestc "4.2.6.2.10 PSMPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the PSMPDU CSU.

4.2.6.2.11 PSMPDU CSU Limitationstc "4.2.6.2.11 PSMPDU CSU Limitations"§

The enumerations for the Response Flag are not defined in any current standard; therefore, the Response Flag will be defaulted to zero. Usually a zero indicates the affirmative or expected response; in this case, an erroneous indication is made to avoid crashing other systems by trying to predict the values for the Response Flag in future standards.

4.2.7 Process Start/Resume Simulation PDU (PSRSPDU) CSU (OS-CSU-2.7)tc "4.2.7 Process Start/Resume Simulation PDU (PSRSPDU) CSU (OS-CSU-2.7)"§

The Process Start/Resume Simulation PDU (PSRSPDU) CSU of the GI CSC processes a Start/Resume PDU which applies to the entire simulation. The following subparagraphs provide the design information for this CSU.

4.2.7.1 PSRSPDU CSU Design Specification/Constraintstc "4.2.7.1 PSRSPDU CSU Design Specifications/Constraints"§

There are no design constraints for the PSRSPDU CSU.

4.2.7.2 PSRSPDU CSU Designtc "4.2.7.2 PSRSPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the PSRSPDU CSU.

4.2.7.2.1 PSRSPDU CSU Input/Output Data Elementstc "4.2.7.2.1 PSRSPDU CSU Input/Output Data Elements"§

Table 4.2.7.2.1-1 identifies and states the purpose of each input and output data element of the PSRSPDU CSU.

Table 4.2.7.2.1-1
PSRSPDU CSU Input/Output Data Elementstc "Table 4.2.7.2.1-1 PSRSPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Start/Resume PDU Pointer	X		Points to the Start/Resume PDU to be processed
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.7.2.2 PSRSPDU CSU Local Data Elementstc "4.2.7.2.2 PSRSPDU CSU Local Data Elements"§

Table 4.2.7.2.2-1 identifies and states the purpose of each data element that originates in the PSRSPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.7.2.2-1
PSRSPDU CSU Local Data Elementstc "Table 4.2.7.2.2-1 PSRSPDU CSU Local Data Elements" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Acknowledge Flag	Flag indicating the type of PDU being acknowledged	Acknowledge Flag Type	See IST-CR-93-19, Para. 4.3.1.11		
Originating Entity ID	Entity originating the Acknowledge PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Receiving Entity ID	Entity which issued the Start/Resume PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Response Flag	Flag indicating whether the entity was resumed	Response Flag Type	See IST-CR-93-15, Para. 5.4.5.6		

4.2.7.2.3 PSRSPDU CSU Global Data Elementstc "4.2.7.2.3 PSRSPDU CSU Global Data Elements"§

Table 4.2.7.2.3-1 identifies and states the purpose of each data element that is used by the PSRSPDU CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.2.7.2.3-1
PSRSPDU CSU Global Data Elementstc "Table 4.2.7.2.3-1 PSRSPDU CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Simulation State	State set to Run by Start/Resume PDU	See Simulation Parameters in Section 5, Table 5-7			

4.2.7.2.4 PSRSPDU CSU Local and Shared Data Structurestc "4.2.7.2.4 PSRSPDU CSU Local and Shared Data Structures"§

The PSRSPDU CSU does not implement any new local or shared data structures.

4.2.7.2.5 PSRSPDU CSU Interrupts and Signalstc "4.2.7.2.5PSRSPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the PSRSPDU CSU.

4.2.7.2.6 PSRSPDU CSU Error Handlingtc "4.2.7.2.6 PSRSPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.7.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.7.2.7 PSRSPDU CSU Use of Other Elementstc "4.2.7.2.7 PSRSPDU CSU Use of Other Elements"§

There are no system service routines called by the PSRSPDU CSU.

There are no input and output buffers for the PSRSPDU CSU.

4.2.7.2.8 PSRSPDU CSU Logic Flowtc "4.2.7.2.8 PSRSPDU CSU Logic Flow"§

The PSRSPDU CSU is invoked by the Process Simulation Management PDU (PSMPDU) CSU when the incoming Simulation Management PDU corresponds to a Stop/Resume PDU which applies to the entire simulation. The following flowchart, Figure 4.2.7.2.8-1, describes the logic flow for the PSRSPDU CSU:

Figure 4.2.7.2.8-1
Flowchart for the PSRSPDU CSUtc "Figure 4.2.7.2.8-1 Flowchart for the PSRSPDU CSU" \f f§

4.2.7.2.9 PSRSPDU CSU Algorithmstc "4.2.7.2.9 PSRSPDU CSU Algorithms"§

There are no algorithms used by the PSRSPDU CSU.

4.2.7.2.10 PSRSPDU CSU Local Data Files Or Databasestc "4.2.7.2.10 PSRSPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the PSRSPDU CSU.

4.2.7.2.11 PSRSPDU CSU Limitationstc "4.2.7.2.11 PSRSPDU CSU Limitations"§

The enumerations for the Response Flag are not defined in any current standard; therefore, the Response Flag will be defaulted to zero.

4.2.8 Process Stop/Freeze Simulation PDU (PSFSPDU) CSU (OS-CSU-2.8)tc "4.2.8 Process Stop/Freeze Simulation PDU (PSFSPDU) CSU (OS-CSU-2.8)"§

The Process Stop/Freeze Simulation PDU (PSFSPDU) CSU of the GI CSC processes a Stop/Freeze PDU which applies to an entire simulation. The following subparagraphs provide the design information for this CSU.

4.2.8.1 PSFSPDU CSU Design Specification/Constraintstc "4.2.8.1 PSFSPDU CSU Design Specifications/Constraints"§

There are no design constraints for the PSFSPDU CSU.

4.2.8.2 PSFSPDU CSU Designtc "4.2.8.2 PSFSPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the PSFSPDU CSU.

4.2.8.2.1 PSFSPDU CSU Input/Output Data Elementstc "4.2.8.2.1 PSFSPDU CSU Input/Output Data Elements"§

Table 4.2.8.2.1-1 identifies and states the purpose of each input and output data element of the PSFSPDU CSU.

Table 4.2.8.2.1-1
PSFSPDU CSU Input/Output Data Elementstc "Table 4.2.8.2.1-1 PSFSPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Stop/Freeze PDU Pointer	X		Points to the Stop/Freeze PDU to be processed
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.8.2.2 PSFSPDU CSU Local Data Elementstc "4.2.8.2.2 PSFSPDU CSU Local Data Elements"§

Table 4.2.8.2.2-1 identifies and states the purpose of each data element that originates in the PSFSPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.8.2.2-1
PSFSPDU CSU Local Data Elementstc "Table 4.2.8.2.2-1 PSFSPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Acknowledge Flag	Flag indicating the type of PDU being acknowledged	Acknowledge Flag Type	See IST-CR-93-19, Para. 4.3.1.11		
Originating Entity ID	Entity originating the Acknowledge PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Receiving Entity ID	Entity which issued the Stop/Freeze Entity PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Response Flag	Flag indicating whether the entity was	Response Flag Type	See IST-CR-93-15,		

	frozen		Para. 5.4.5.6

4.2.8.2.3 PSFSPDU CSU Global Data Elementstc "4.2.8.2.3 PSFSPDU CSU Global Data Elements"§

Table 4.2.8.2.3-1 identifies and states the purpose of each data element that is used by the PSFSPDU CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.2.8.2.3-1
PSFSPDU CSU Global Data Elementstc "Table 4.2.8.2.3-1 PSFSPDU CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Simulation State	State set to FREEZE by Stop/Freeze PDU	See Simulation Parameters in Section 5, Table 5-7			

4.2.8.2.4 PSFSPDU CSU Local and Shared Data Structurestc "4.2.8.2.4 PSFSPDU CSU Local and Shared Data Structures"§

The PSFSPDU CSU does not implement any new local or shared data structures.

4.2.8.2.5 PSFSPDU CSU Interrupts and Signalstc "4.2.8.2.5 PSFSPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the PSFSPDU CSU.

4.2.8.2.6 PSFSPDU CSU Error Handlingtc "4.2.8.2.6 PSFSPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.8.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.8.2.7 PSFSPDU CSU Use of Other Elementstc "4.2.8.2.7 PSFSPDU CSU Use of Other Elements"§

There are no system service routines called by the PSFSPDU CSU.

There are no input and output buffers for the PSFSPDU CSU.

4.2.8.2.8 PSFSPDU CSU Logic Flowtc "4.2.8.2.8 PSFSPDU CSU Logic Flow"§

The PSFSPDU CSU is invoked by the Process Simulation Management PDU (PSMPDU) CSU when the incoming Simulation Management PDU corresponds to a Stop/Freeze PDU which applies to the entire simulation. The following flowchart, Figure 4.2.8.2.8-1, describes the logic flow for the PSFSPDU CSU:

Figure 4.2.8.2.8-1
Flowchart for the PSFSPDU CSUtc "Figure 4.2.8.2.8-1 Flowchart for the PSFSPDU CSU" \f f§

4.2.8.2.9 PSFSPDU CSU Algorithmstc "4.2.8.2.9 PSFSPDU CSU Algorithms"§

There are no algorithms used by the PSFSPDU CSU.

4.2.8.2.10 PSFSPDU CSU Local Data Files Or Databasestc "4.2.8.2.10 PSFSPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the PSFSPDU CSU.

4.2.8.2.11 PSFSPDU CSU Limitationstc "4.2.8.2.11 PSFSPDU CSU Limitations"§

The enumerations for the Response Flag are not defined in any current standard; therefore, the Response Flag will be defaulted to zero.

4.2.9 Process Start/Resume Entity PDU (PSREPDU) CSU (OS-CSU-2.9)tc "4.2.9 Process Start/Resume Entity PDU (PSREPDU) CSU (OS-CSU-2.9)"§

The Process Start/Resume Entity PDU (PSREPDU) CSU of the GI CSC processes a Start/Resume PDU which applies to a single entity. The following subparagraphs provide the design information for this CSU.

4.2.9.1 PSREPDU CSU Design Specification/Constraintstc "4.2.9.1 PSREPDU CSU Design Specifications/Constraints"§

There are no design constraints for the PSREPDU CSU.

4.2.9.2 PSREPDU CSU Designtc "4.2.9.2 PSREPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the PSREPDU CSU.

4.2.9.2.1 PSREPDU CSU Input/Output Data Elementstc "4.2.9.2.1 PSREPDU CSU Input/Output Data Elements"§

Table 4.2.9.2.1-1 identifies and states the purpose of each input and output data element of the PSREPDU CSU.

Table 4.2.9.2.1-1
PSREPDU CSU Input/Output Data Elementstc "Table 4.2.9.2.1-1 PSREPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Start/Resume PDU Pointer	X		Points to the Start/Resume PDU to be processed
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.9.2.2 PSREPDU CSU Local Data Elementstc "4.2.9.2.2 PSREPDU CSU Local Data Elements"§

Table 4.2.9.2.2-1 identifies and states the purpose of each data element that originates in the PSREPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.9.2.2-1
PSREPDU CSU Local Data Elementstc "Table 4.2.9.2.2-1 PSREPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Acknowledge Flag	Flag indicating the type of PDU being acknowledged	Acknowledge Flag Type	See IST-CR-93-19, Para. 4.3.1.11		
Originating Entity ID	Entity originating the Acknowledge PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Receiving Entity ID	Entity which issued the Start/Resume Entity PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Response Flag	Flag indicating whether the entity was	Response Type Type	See IST-CR-93-15,		

	resumed		Para. 5.4.5.6

4.2.9.2.3 PSREPDU CSU Global Data Elementstc "4.2.9.2.3 PSREPDU CSU Global Data Elements"§

There are no global data elements for the PSREPDU CSU.

4.2.9.2.4 PSREPDU CSU Local and Shared Data Structurestc "4.2.9.2.4 PSREPDU CSU Local and Shared Data Structures"§

The PSREPDU CSU does not implement any new local or shared data structures.

4.2.9.2.5 PSREPDU CSU Interrupts and Signalstc "4.2.9.2.5 PSREPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the PSREPDU CSU.

4.2.9.2.6 PSREPDU CSU Error Handlingtc "4.2.9.2.6 PSREPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.9.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.9.2.7 PSREPDU CSU Use of Other Elementstc "4.2.9.2.7 PSREPDU CSU Use of Other Elements"§

There are no system service routines called by the PSREPDU CSU.

There are no input and output buffers for the PSREPDU CSU.

4.2.9.2.8 PSREPDU CSU Logic Flowtc "4.2.9.2.8 PSREPDU CSU Logic Flow"§

The PSREPDU CSU is invoked by the Process Simulation Management PDU (PSMPDU) when the incoming Simulation Management PDU corresponds to a Start/Resume PDU which applies to an entity. The following flowchart, Figure 4.2.9.2.8-1, describes the logic flow for the PSREPDU CSU:

Figure 4.2.9.2.8-1
Flowchart for the PSREPDU CSUtc "Figure 4.2.9.2.8-1 Flowchart for the PSREPDU CSU" \f f§

4.2.9.2.9 PSREPDU CSU Algorithmstc "4.2.9.2.9 PSREPDU CSU Algorithms"§

There are no algorithms used by the PSREPDU CSU.

4.2.9.2.10 PSREPDU CSU Local Data Files Or Databasestc "4.2.9.2.10PSREPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the PSREPDU CSU.

4.2.9.2.11 PSREPDU CSU Limitationstc "4.2.9.2.11 PSREPDU CSU Limitations"§

The enumerations for the Response Flag are not defined in any current standard; therefore, the Response Flag will be defaulted to zero.

4.2.10 Process Stop/Freeze Entity PDU (PSFEPDU) CSU (OS-CSU-2.10)tc "4.2.10 Process Stop/Freeze Entity PDU (PSFEPDU) CSU (OS-CSU-2.10)"§

The Process Stop/Freeze Entity PDU (PSFEPDU) CSU of the GI CSC processes a Stop/Freeze PDU which applies to an entity. The following subparagraphs provide the design information for this CSU.

4.2.10.1 PSFEPDU CSU Design Specification/Constraintstc "4.2.10.1 PSFEPDU CSU Design Specifications/Constraints"§

There are no design constraints for the PSFEPDU CSU.

4.2.10.2 PSFEPDU CSU Designtc "4.2.10.2 PSFEPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the PSFEPDU CSU.

4.2.10.2.1 PSFEPDU CSU Input/Output Data Elementstc "4.2.10.2.1 PSFEPDU CSU Input/Output Data Elements"§

Table 4.2.10.2.1-1 identifies and states the purpose of each input and output data element of the PSFEPDU CSU.

Table 4.2.10.2.1-1
PSFEPDU CSU Input/Output Data Elementstc "Table 4.2.10.2.1-1 PSFEPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Stop/Freeze PDU Pointer	X		Points to the Stop/Freeze PDU to be processed
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.10.2.2 PSFEPDU CSU Local Data Elementstc "4.2.10.2.2 PSFEPDU CSU Local Data Elements"§

Table 4.2.10.2.2-1 identifies and states the purpose of each data element that originates in the PSFEPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.10.2.2-1
PSFEPDU CSU Local Data Elementstc "Table 4.2.10.2.2-1 PSFEPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Acknowledge Flag	Flag indicating the type of PDU being acknowledged	Acknowledge Flag Type	See IST-CR-93-19, Para. 4.3.1.11		
Originating Entity ID	Entity originating the Acknowledge PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Receiving Entity ID	Entity which issued the Stop/Freeze Entity PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Response Flag	Flag indicating whether the entity was frozen	Response Flag Type	See IST-CR-93-15, Para. 5.4.5.6		

4.2.10.2.3 PSFEPDU CSU Global Data Elementstc "4.2.10.2.3 PSFEPDU CSU Global Data Elements"§

There are no global data elements for the PSFEPDU CSU.

4.2.10.2.4 PSFEPDU CSU Local and Shared Data Structurestc "4.2.10.2.4PSFEPDU CSU Local and Shared Data Structures"§

The PSFEPDU CSU does not implement any new local or shared data structures.

4.2.10.2.5 PSFEPDU CSU Interrupts and Signalstc "4.2.10.2.5 PSFEPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the PSFEPDU CSU.

4.2.10.2.6 PSFEPDU CSU Error Handlingtc "4.2.10.2.6 PSFEPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.10.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.10.2.7 PSFEPDU CSU Use of Other Elementstc "4.2.10.2.7 PSFEPDU CSU Use of Other Elements"§

There are no system service routines called by the PSFEPDU CSU.

There are no input and output buffers for the PSFEPDU CSU.

4.2.10.2.8 PSFEPDU CSU Logic Flowtc "4.2.10.2.8 PSFEPDU CSU Logic Flow"§

The PSFEPDU CSU is invoked by the Process Simulation Management PDU (PSMPDU) CSU when the incoming Simulation Management PDU corresponds to a Stop/Freeze PDU which applies to an entity. The following flowchart, Figure 4.2.10.2.8-1, describes the logic flow for the PSFEPDU CSU:

Figure 4.2.10.2.8-1
Flowchart for the PSFEPDU CSUtc "Figure 4.2.10.2.8-1 Flowchart for the PSFEPDU CSU" \f f§

4.2.10.2.9 PSFEPDU CSU Algorithmstc "4.2.10.2.9 PSFEPDU CSU Algorithms"§

There are no algorithms used by the PSFEPDU CSU.

4.2.10.2.10 PSFEPDU CSU Local Data Files Or Databasestc "4.2.10.2.10 PSFEPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the PSFEPDU CSU.

4.2.10.2.11 PSFEPDU CSU Limitationstc "4.2.10.2.11 PSFEPDU CSU Limitations"§

The enumerations for the Response Flag are not defined in any current standard; therefore, the Response Flag will be defaulted to zero.

4.2.11 Process Remove Entity PDU (PREPDU) CSU (OS-CSU-2.11)tc "4.2.11 Process Remove Entity PDU (PREPDU) CSU (OS-CSU-2.11)"§

The Process Remove Entity PDU (PREPDU) CSU of the GI CSC processes a Remove Entity PDU. The following subparagraphs provide the design information for this CSU.

4.2.11.1 PREPDU CSU Design Specification/Constraintstc "4.2.11.1 PREPDU CSU Design Specifications/Constraints"§

There are no design constraints for the PREPDU CSU.

4.2.11.2 PREPDU CSU Designtc "4.2.11.2 PREPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the PREPDU CSU.

4.2.11.2.1 PREPDU CSU Input/Output Data Elementstc "4.2.11.2.1 PREPDU CSU Input/Output Data Elements"§

Table 4.2.11.2.1-1 identifies and states the purpose of each input and output data element of the PREPDU CSU.

Table 4.2.11.2.1-1
PREPDU CSU Input/Output Data Elementstc "Table 4.2.11.2.1-1 PREPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Remove Entity PDU Pointer	X		Points to the Remove Entity PDU to be processed
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.11.2.2 PREPDU CSU Local Data Elementstc "4.2.11.2.2 PREPDU CSU Local Data Elements"§

Table 4.2.11.2.2-1 identifies and states the purpose of each data element that originates in the PREPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.11.2.2-1
PREPDU CSU Local Data Elementstc "Table 4.2.11.2.2-1 PREPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Acknowledge Flag	Flag indicating the type of PDU being acknowledged	Acknowledge Flag Type	See IST-CR-93-19, Para. 4.3.1.11		
Originating Entity ID	Entity originating the Acknowledge PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Receiving Entity ID	Entity which issued the Remove Entity PDU	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Response Flag	Flag indicating whether the entity was removed	Response Flag Type	See IST-CR-93-15, Para. 5.4.5.6		

4.2.11.2.3 PREPDU CSU Global Data Elementstc "4.2.11.2.3 PREPDU CSU Global Data Elements"§

There are no global data elements for the PREPDU CSU.

4.2.11.2.4 PREPDU CSU Local and Shared Data Structurestc "4.2.11.2.4 PREPDU CSU Local and Shared Data Structures"§

The PREPDU CSU does not implement any new local or shared data structures.

4.2.11.2.5 PREPDU CSU Interrupts and Signalstc "4.2.11.2.5 PREPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the PREPDU CSU.

4.2.11.2.6 PREPDU CSU Error Handlingtc "4.2.11.2.6 PREPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.11.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.11.2.7 PREPDU CSU Use of Other Elementstc "4.2.11.2.7 PREPDU CSU Use of Other Elements"§

There are no system service routines called by the PREPDU CSU.

There are no input and output buffers for the PREPDU CSU.

4.2.11.2.8 PREPDU CSU Logic Flowtc "4.2.11.2.8 PREPDU CSU Logic Flow"§

The PREPDU CSU is invoked by the Process Simulation Management PDU (PSMPDU) CSU when the incoming Simulation Management PDU corresponds to a Remove Entity PDU. The following flowchart, Figure 4.2.11.2.8-1, describes the logic flow for the PREPDU CSU:

Figure 4.2.11.2.8-1
Flowchart for the PREPDU CSUtc "Figure 4.2.11.2.8-1 Flowchart for the PREPDU CSU" \f f§

4.2.11.2.9 PREPDU CSU Algorithmstc "4.2.11.2.9 PREPDU CSU Algorithms"§

There are no algorithms used by the PREPDU CSU.

4.2.11.2.10 PREPDU CSU Local Data Files Or Databasestc "4.2.11.2.10 PREPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the PREPDU CSU.

4.2.11.2.11 PREPDU CSU Limitationstc "4.2.11.2.11 PREPDU CSU Limitations"§

The enumerations for the Response Flag are not defined in any current standard; therefore, the Response Flag will be defaulted to zero.

4.2.12 Issue Acknowlegde PDU (IAPDU) CSU (OS-CSU-2.12)tc "4.2.12 Issue Acknowlegde PDU (IAPDU) CSU (OS-CSU-2.12)"§

The Issue Acknowlegde PDU (IAPDU) CSU of the GI CSC generates an Acknowledge PDU which it then passes to the DG CSCI. The following subparagraphs provide the design information for this CSU.

4.2.12.1 IAPDU CSU Design Specification/Constraintstc "4.2.12.1 IAPDU CSU Design Specifications/Constraints"§

There are no design constraints for the IAPDU CSU.

4.2.12.2 IAPDU CSU Designtc "4.2.12.2 IAPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the IAPDU CSU.

4.2.12.2.1 IAPDU CSU Input/Output Data Elementstc "4.2.12.2.1 IAPDU CSU Input/Output Data Elements"§

Table 4.2.12.2.1-1 identifies and states the purpose of each input and output data element of the IAPDU CSU.

Table 4.2.12.2.1-1
IAPDU CSU Input/Output Data Elementstc "Table 4.2.12.2.1-1 IAPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Acknowledge Flag	X		Specifies the type of PDU being acknowledged
Originating Entity ID	X		Indicates the entity which originates the Acknowledge PDU
Receiving Entity ID	X		Indicates the intended receiving entity
Response Flag	X		Indicates whether compliance with the request occurred
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.12.2.2 IAPDU CSU Local Data Elementstc "4.2.12.2.2 IAPDU CSU Local Data Elements"§

Table 4.2.12.2.2-1 identifies and states the purpose of each data element that originates in the IAPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.12.2.2-1
IAPDU CSU Local Data Elementstc "Table 4.2.12.2.2-1 IAPDU CSU Local Data Elements" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Acknowledge PDU	PDU containing information about the response to a Simulation Management PDU	Acknowledge PDU Type	See IST-CR-93-15 Para. 5.4.5.6		

4.2.12.2.3 IAPDU CSU Global Data Elementstc "4.2.12.2.3 IAPDU CSU Global Data Elements"§

There are no global data elements for the IAPDU CSU.

4.2.12.2.4 IAPDU CSU Local and Shared Data Structurestc "4.2.12.2.4 IAPDU CSU Local and Shared Data Structures"§

The IAPDU CSU does not implement any new local or shared data structures.

4.2.12.2.5 IAPDU CSU Interrupts and Signalstc "4.2.12.2.5 IAPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the IAPDU CSU.

4.2.12.2.6 IAPDU CSU Error Handlingtc "4.2.12.2.6 IAPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.12.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.12.2.7 IAPDU CSU Use of Other Elementstc "4.2.12.2.7 IAPDU CSU Use of Other Elements"§

There are no system service routines called by the IAPDU CSU.

There are no input and output buffers for the IAPDU CSU.

4.2.12.2.8 IAPDU CSU Logic Flowtc "4.2.12.2.8 IAPDU CSU Logic Flow"§

The IAPDU CSU is invoked by the Process Simulation Management PDU (PSMPDU) CSU, Process Start/Resume Simulation (PSRSPDU) PDU CSU, Process Stop/Freeze Simulation PDU (PSFSPDU) CSU, Process Start/Resume Entity PDU (PSREPDU) CSU, Process Stop/Freeze Entity PDU (PSFEPDU) CSU, and Process Remove Entity PDU PREPDU) CSU when a Simulation Management PDU is processed to acknowledge the PDU and indicate whether the requested action was taken. The following flowchart, Figure 4.2.12.2.8-1, describes the logic flow for the IAPDU CSU:

Figure 4.2.12.2.8-1
Flowchart for the IAPDU CSUtc "Figure 4.2.12.2.8-1 Flowchart for the IAPDU CSU" \f f§

4.2.12.2.9 IAPDU CSU Algorithmstc "4.2.12.2.9 IAPDU CSU Algorithms"§

There are no algorithms used by the IAPDU CSU.

4.2.12.2.10 IAPDU CSU Local Data Files Or Databasestc "4.2.12.2.10 IAPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the IAPDU CSU.

4.2.12.2.11 IAPDU CSU Limitationstc "4.2.12.2.11 IAPDU CSU Limitations"§

The enumerations for the Response Flag are not defined in any current standard; therefore, the Response Flag will be defaulted to zero.

4.2.13 Issue Detonation PDU (IDPDU) CSU (OS-CSU-2.13)tc "4.2.13 Issue Detonation PDU (IDPDU) CSU (OS-CSU-2.13)"§

The Issue Detonation PDU (IDPDU) CSU of the GI CSC generates a Detonation PDU which it then passes to the DG CSCI. The following subparagraphs provide the design information for this CSU.

4.2.13.1 IDPDU CSU Design Specification/Constraintstc "4.2.13.1 IDPDU CSU Design Specifications/Constraints"§

There are no design constraints for the IDPDU CSU.

4.2.13.2 IDPDU CSU Designtc "4.2.13.2 IDPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the IDPDU CSU.

4.2.13.2.1 IDPDU CSU Input/Output Data Elementstc "4.2.13.2.1 IDPDU CSU Input/Output Data Elements"§

Table 4.2.13.2.1-1 identifies and states the purpose of each input and output data element of the IDPDU CSU.

Table 4.2.13.2.1-1
IDPDU CSU Input/Output Data Elementstc "Table 4.2.13.2.1-1 IDPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Hashing Index	X		Represents the location of an entity in a hash table
Detonation Location	X		Specifies the location of the detonation in the target's entity coordinate system
Detonation Result	X		Indicates the type of detonation which occurred
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.13.2.2 IDPDU CSU Local Data Elementstc "4.2.13.2.2 IDPDU CSU Local Data Elements"§

Table 4.2.13.2.2-1 identifies and states the purpose of each data element that originates in the IDPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.13.2.2-1
IDPDU CSU Local Data Elementstc "Table 4.2.13.2.2-1 IDPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Detonation PDU	PDU containing information about a detonation	Detonation PDU Type	See IST-CR-93-15, Para. 5.4.4.1.2		

4.2.13.2.3 IDPDU CSU Global Data Elementstc "4.2.13.2.3 IDPDU CSU Global Data Elements"§

There are no global data elements for the IDPDU CSU.

4.2.13.2.4 IDPDU CSU Local and Shared Data Structurestc "4.2.13.2.4 IDPDU CSU Local and Shared Data Structures"§

The IDPDU CSU does not implement any new local or shared data structures.

4.2.13.2.5 IDPDU CSU Interrupts and Signalstc "4.2.13.2.5 IDPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the IDPDU CSU.

4.2.13.2.6 IDPDU CSU Error Handlingtc "4.2.13.2.6 IDPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.13.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.13.2.7 IDPDU CSU Use of Other Elementstc "4.2.13.2.7 IDPDU CSU Use of Other Elements"§

There are no system service routines called by the IDPDU CSU.

There are no input and output buffers for the IDPDU CSU.

4.2.13.2.8 IDPDU CSU Logic Flowtc "4.2.13.2.8 IDPDU CSU Logic Flow"§

The IDPDU CSU is invoked by the Process Detonation PDU (PDPDU) CSU and the Detonation Event (DE) CSC when a munition is detonated, even if the detonation result is NONE. The following flowchart, Figure 4.2.13.2.8-1 and Figure 4.2.13.2.8-2, describes the logic flow for the IDPDU CSU:

µ §

Figure 4.2.13.2.8-1
Flowchart for the IDPDU CSUtc "Figure 4.2.13.2.8-1 Flowchart for the IDPDU CSU" \f f§

µ §

Figure 4.2.13.2.8-2
Flowchart for the IDPDU CSU (cont.)tc "Figure 4.2.13.2.8-12 Flowchart for the IDPDU CSU (cont.)" \f f§

4.2.13.2.9 IDPDU CSU Algorithmstc "4.2.13.2.9 IDPDU CSU Algorithms"§

There are no algorithms used by the IDPDU CSU.

4.2.13.2.10 IDPDU CSU Local Data Files Or Databasestc "4.2.13.2.10 IDPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the IDPDU CSU.

4.2.13.2.11 IDPDU CSU Limitationstc "4.2.13.2.11 IDPDU CSU Limitations"§

There are no limitations or unusual features in the IDPDU CSU.

4.2.14 Issue Emission PDU (IEPDU) CSU (OS-CSU-2.14)tc "4.2.14Issue Emission PDU (IEPDU) CSU (OS-CSU-2.14)"§

The Issue Emission PDU (IEPDU) CSU of the GI CSC generates an Emission PDU which it then passes to the DG CSCI. The following subparagraphs provide the design information for this CSU.

4.2.14.1 IEPDU CSU Design Specification/Constraintstc "4.2.14.1 IEPDU CSU Design Specifications/Constraints"§

There are no design constraints for the IEPDU CSU.

4.2.14.2 IEPDU CSU Designtc "4.2.14.2 IEPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the IEPDU CSU.

4.2.14.2.1 IEPDU CSU Input/Output Data Elementstc "4.2.14.2.1 IEPDU CSU Input/Output Data Elements"§

Table 4.2.14.2.1-1 identifies and states the purpose of each input and output data element of the IEPDU CSU.

Table 4.2.14.2.1-1
IEPDU CSU Input/Output Data Elementstc "Table 4.2.14.2.1-1 IEPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Hashing Index	X		Represent the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.14.2.2 IEPDU CSU Local Data Elementstc "4.2.14.2.2 IEPDU CSU Local Data Elements"§

Table 4.2.14.2.2-1 identifies and states the purpose of each data element that originates in the IEPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements. The specific local and shared data structures (i.e. for records) are described in Section 4.2.14.2.4.

Table 4.2.14.2.2-1
IEPDU CSU Local Data Elementstc "Table 4.2.14.2.2-1 IEPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Emission PDU	PDU containing information about an emitter on a munition	Emission PDU Type	See IST-CR-93-15, Para. 5.4.6.2		

4.2.14.2.3 IEPDU CSU Global Data Elementstc "4.2.14.2.3 IEPDU CSU Global Data Elements"§

There are no global data elements for the IEPDU CSU.

4.2.14.2.4 IEPDU CSU Local and Shared Data Structurestc "4.2.14.2.4 IEPDU CSU Local and Shared Data Structures"§

The IEPDU CSU does not implement any new local or shared data structures.

4.2.14.2.5 IEPDU CSU Interrupts and Signalstc "4.2.14.2.5 IEPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the IEPDU CSU.

4.2.14.2.6 IEPDU CSU Error Handlingtc "4.2.14.2.6 IEPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.14.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.14.2.7 IEPDU CSU Use of Other Elementstc "4.2.14.2.7 IEPDU CSU Use of Other Elements"§

There are no system service routines called by the IEPDU CSU.

There are no input and output buffers for the IEPDU CSU.

4.2.14.2.8 IEPDU CSU Logic Flowtc "4.2.14.2.8 IEPDU CSU Logic Flow"§

The following flowchart, Figure 4.2.14.2.8-1, Figure 4.2.14.2.8-2 and Figure 4.2.14.2.8-3, describes the logic flow for the IEPDU CSU:

Figure 4.2.14.2.8-1
Flowchart for the IEPDU CSUtc "Figure 4.2.14.2.8-1 Flowchart for the IEPDU CSU" \f f§

Figure 4.2.14.2.8-2
Flowchart for the IEPDU CSU (cont.)tc "Figure 4.2.14.2.8-2 Flowchart for the IEPDU CSU (cont.)" \f f§

Figure 4.2.14.2.8-3
Flowchart for the IEPDU CSU (cont.)tc "Figure 4.2.14.2.8-3 Flowchart for the IEPDU CSU (cont.)" \f f§

4.2.14.2.9 IEPDU CSU Algorithmstc "4.2.14.2.9 IEPDU CSU Algorithms"§

There are no algorithms used by the IEPDU CSU.

4.2.14.2.10 IEPDU CSU Local Data Files Or Databasestc "4.2.14.2.10 IEPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the IEPDU CSU.

4.2.14.2.11 IEPDU CSU Limitationstc "4.2.14.2.11 IEPDU CSU Limitations"§

There are no limitations or unusual features in the IEPDU CSU.

4.2.15 Issue Entity State PDU (IESPDU) CSU (OS-CSU-2.15)tc "4.2.15 Issue Entity State PDU (IESPDU) CSU (OS-CSU-2.15)"§

The Issue Entity State PDU (IESPDU) CSU of the GI CSC generates an Entity State PDU which it then passes to the DG CSCI. The following subparagraphs provide the design information for this CSU.

4.2.15.1 IESPDU CSU Design Specification/Constraintstc "4.2.15.1IESPDU CSU Design Specifications/Constraints"§

There are no design constraints for the IESPDU CSU.

4.2.15.2 IESPDU CSU Designtc "4.2.15.2 IESPDU CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the IESPDU CSU.

4.2.15.2.1 IESPDU CSU Input/Output Data Elementstc "4.2.15.2.1 IESPDU CSU Input/Output Data Elements"§

Table 4.2.15.2.1-1 identifies and states the purpose of each input and output data element of the IESPDU CSU.

Table 4.2.15.2.1-1
IESPDU CSU Input/Output Data Elementstc "Table 4.2.15.2.1-1 IESPDU CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.2.15.2.2 IESPDU CSU Local Data Elementstc "4.2.15.2.2 IESPDU CSU Local Data Elements"§

Table 4.2.15.2.2-1 identifies and states the purpose of each data element that originates in the IESPDU CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.2.15.2.2-1
IESPDU CSU Local Data Elementstc "Table 4.2.15.2.2-1 IESPDU CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Entity State PDU	PDU containing information about the current description of an entity	Entity State PDU Type	See IST-CR-93-15, Para. 5.4.3.1		

4.2.15.2.3 IESPDU CSU Global Data Elementstc "4.2.15.2.3IESPDU CSU Global Data Elements"§

There are no global data elements for the IESPDU CSU.

4.2.15.2.4 IESPDU CSU Local and Shared Data Structurestc "4.2.15.2.4 IESPDU CSU Local and Shared Data Structures"§

The IESPDU CSU does not implement any new local or shared data structures.

4.2.15.2.5 IESPDU CSU Interrupts and Signalstc "4.2.15.2.5 IESPDU CSU Interrupts and Signals"§

There are no interrupts or signals handled by the IESPDU CSU.

4.2.15.2.6 IESPDU CSU Error Handlingtc "4.2.15.2.6 IESPDU CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.15.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.15.2.7 IESPDU CSU Use of Other Elementstc "4.2.15.2.7 IESPDU CSU Use of Other Elements"§

There are no system service routines called by the IESPDU CSU.

There are no input and output buffers for the IESPDU CSU.

4.2.15.2.8 IESPDU CSU Logic Flowtc "4.2.15.2.8 IESPDU CSU Logic Flow"§

The IESPDU CSU is invoked by the Munition CSC when a munition's position and velocity have been updated. The following flowchart, Figure 4.2.15.2.8-1 and Figure 4.2.15.2.8-2, describes the logic flow for the IESPDU CSU:

Figure 4.2.15.2.8-1
Flowchart for the IESPDU CSUtc "Figure 4.2.15.2.8-1 Flowchart for the IESPDU CSU" \f f§

Figure 4.2.15.2.8-2
Flowchart for the IESPDU CSU (cont.)tc "Figure 4.2.15.2.8-2 Flowchart for the IESPDU CSU (cont.)" \f f§

4.2.15.2.9 IESPDU CSU Algorithmstc "4.2.15.2.9 IESPDU CSU Algorithms"§

There are no algorithms used by the IESPDU CSU.

4.2.15.2.10 IESPDU CSU Local Data Files Or Databasestc "4.2.15.2.10 IESPDU CSU Local Data Files Or Databases"§

There are no local data files or databases used by the IESPDU CSU.

4.2.15.2.11 IESPDU CSU Limitationstc "4.2.15.2.11 IESPDU CSU Limitations"§

There are no limitations or unusual features in the IESPDU CSU.

4.2.16 Initialize Network Parameters (INP) CSU (OS-CSU-2.16)tc "4.2.16 Initialize Network Parameters (INP) CSU (OS-CSU-2.16)"§

The Initialize Network Parameters (INP) CSU of the GI CSC places data related to PDUs in a hash table by copying the relevant data from the Fire PDU when a Fire PDU from a parent entity is received. Additional PDU data will be available from the user through the GUI. The following subparagraphs provide the design information for this CSU.

4.2.16.1 INP CSU Design Specification/Constraintstc "4.2.16.1 INP CSU Design Specifications/Constraints"§

There are no design constraints for the INP CSU.

4.2.16.2 INP CSU Designtc "4.2.16.2 INP CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the INP CSU.

4.2.16.2.1 INP CSU Input/Output Data Elementstc "4.2.16.2.1 INP CSU Input/Output Data Elements"§

Table 4.2.16.2.1-1 identifies and states the purpose of each input and output data element of the INP CSU.

Table 4.2.16.2.1-1
INP CSU Input/Output Data Elementstc "Table 4.2.16.2.1-1 INP CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Fire PDU Pointer	X		Points to the Fire PDU containing the relevant data to be stored in the hash table
Force ID	X		Specifies the force of the parent to be assigned to the munition
Hashing Index		X	Represents the location of an entity in a hash table
Status		X	Indicates whether the unit executed without encountering an error condition

4.2.16.2.2 INP CSU Local Data Elementstc "4.2.16.2.2 INP CSU Local Data Elements"§

There are no local data elements for the INP CSU.

4.2.16.2.3 INP CSU Global Data Elementstc "4.2.16.2.3 INP CSU Global Data Elements"§

Table 4.2.16.2.3-1 identifies and states the purpose of each data element that is used by the INP CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.2.16.2.3-1
INP CSU Global Data Elementstc "Table 4.2.16.2.3-1 INP CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
General Parameters	Record of user selected parameters	See General Parameters in Section 5, Table 5-2			
Network Parameters	Record of network parameters	See Network Parameters in Section 5, Table 5-2			

4.2.16.2.4 INP CSU Local and Shared Data Structurestc "4.2.16.2.4 INP CSU Local and Shared Data Structures"§

The INP CSU does not implement any new local or shared data structures.

4.2.16.2.5 INP CSU Interrupts and Signalstc "4.2.16.2.5 INP CSU Interrupts and Signals"§

There are no interrupts or signals handled by the INP CSU.

4.2.16.2.6 INP CSU Error Handlingtc "4.2.16.2.6 INP CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.2.16.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.2.16.2.7 INP CSU Use of Other Elementstc "4.2.16.2.7 INP CSU Use of Other Elements"§

There are no system service routines called by the INP CSU.

There are no input and output buffers for the INP CSU.

4.2.16.2.8 INP CSU Logic Flowtc "4.2.16.2.8 INP CSU Logic Flow"§

The INP CSU is invoked by the Process Fire PDU (PFPDU) CSU when a parent entity fires a munition. The following flowchart, Figure 4.2.16.2.8-1, describes the logic flow for the INP CSU:

Figure 4.2.16.2.8-1
Flowchart for the INP CSUtc "Figure 4.2.16.2.8-1 Flowchart for the INP CSU" \f f§

4.2.16.2.9 INP CSU Algorithmstc "4.2.16.2.9 INP CSU Algorithms"§

There are no algorithms used by the INP CSU.

4.2.16.2.10 INP CSU Local Data Files Or Databasestc "4.2.16.2.10 INP CSU Local Data Files Or Databases"§

There are no local data files or databases used by the INP CSU.

4.2.16.2.11 INP CSU Limitationstc "4.2.16.2.11 INP CSU Limitations"§

There are no limitations or unusual features in the INP CSU.

4.3 Simulation Control (SC) CSC (OS-CSC-3)tc "4.3Simulation Control (SC) CSC (OS-CSC-3)"§

There is one CSU for the Simulation Control (SC) CSC. Figure 4.3-1 shows the execution control between these units. If a particular CSU is invoked by (or invokes a unit in) another CSC (other than the SC CSC), the CSC will be identified by a dashed circle and the execution control line will be a dashed line as well (If the CSC is part of a different CSCI, the CSCI name will also be specified inside of the dashed circle). The data flow between the CSUs is described in Figure 4.3-2. The external CSU interfaces are designated by dashed lines.

Figure 4.3-1
Execution Control for the SC CSC Unitstc "Figure 4.3-1 Execution Control for the SC CSC Units" \f f§

Figure 4.3-2
Data Flow for the SC CSC Unitstc "Figure 4.3-2 Data Flow for the SC CSC Units" \f

f§

4.3.1 Initialize OS (IOS) CSU (OS-CSU-3.1)tc "4.3.1 Initialize OS (IOS) CSU (OS-CSU-3.1)"§

The Initialize OS (IOS) CSU of the SC CSC provides all set up functions to the OS CSCI and controls operation through simulation states. The following subparagraphs provide the design information for this CSU.

4.3.1.1 IOS CSU Design Specification/Constraintstc "4.3.1.1 IOS CSU Design Specifications/Constraints"§

There are no design constraints for the IOS CSU.

4.3.1.2 IOS CSU Designtc "4.3.1.2 IOS CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the IOS CSU.

4.3.1.2.1 IOS CSU Input/Output Data Elementstc "4.3.1.2.1 IOS CSU Input/Output Data Elements"§

This CSU has no input or output data elements.

4.3.1.2.2 IOS CSU Local Data Elementstc "4.3.1.2.2 IOS CSU Local Data Elements"§

Table 4.3.1.2.2-1 identifies and states the purpose of each data element that originates in the IOS CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.3.1.2.2-1
IOS CSU Local Data Elementstc "Table 4.3.1.2.2-1 IOS CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Time Remaining	Flag indicating whether time for processing is remaining	BOOLEAN	8	N/A	False, True

4.3.1.2.3 IOS CSU Global Data Elementstc "4.3.1.2.3IOS CSU Global Data Elements"§

Table 4.3.1.2.3-1 identifies and states the purpose of each data element that is used by the IOS CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.3.1.2.3-1
IOS CSU Global Data Elementstc "Table 4.3.1.2.3-1 IOS CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Simulation State	Operation state of the OS CSCI	See Simulation Parameters in Section 5, Table 5-7			

4.3.1.2.4 IOS CSU Local and Shared Data Structurestc "4.3.1.2.4 IOS CSU Local and Shared Data Structures"§

The IOS CSU does not implement any new local or shared data structures.

4.3.1.2.5 IOS CSU Interrupts and Signalstc "4.3.1.2.5 IOS CSU Interrupts and Signals"§

There are no interrupts or signals handled by the IOS CSU.

4.3.1.2.6 IOS CSU Error Handlingtc "4.3.1.2.6 IOS CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.3.1.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.3.1.2.7 IOS CSU Use of Other Elementstc "4.3.1.2.7 IOS CSU Use of Other Elements"§

There are no system service routines called by the IOS CSU.

There are no input and output buffers for the IOS CSU.

4.3.1.2.8 IOS CSU Logic Flowtc "4.3.1.2.8 IOS CSU Logic Flow"§

The IOS CSU is invoked by the operating system when the user executes the program. The following flowchart, Figure 4.3.1.2.8-1 and Figure 4.3.1.2.8-2, describes the logic flow for the IOS CSU:

Figure 4.3.1.2.8-1
Flowchart for the IOS CSUtc "Figure 4.3.1.2.8-1 Flowchart for the IOS CSU" \f f§

Figure 4.3.1.2.8-2
Flowchart for the IOS CSU (cont.)tc "Figure 4.3.1.2.8-2 Flowchart for the IOS CSU (cont.)" \f f§

4.3.1.2.9 IOS CSU Algorithmstc "4.3.1.2.9 IOS CSU Algorithms"§

There are no algorithms used by the IOS CSU.

4.3.1.2.10 IOS CSU Local Data Files Or Databasestc "4.3.1.2.10 IOS CSU Local Data Files Or Databases"§

There are no local data files or databases used by the IOS CSU.

4.3.1.2.11 IOS CSU Limitationstc "4.3.1.2.11 IOS CSU Limitations"§

There are no limitations or unusual features in the IOS CSU.

4.4 Terrain Database Interface (TDI) CSC (OS-CSC-4)tc "4.4 Terrain Database Interface (TDI) CSC (OS-CSC-4)"§

There is one CSU for the Terrain Database Interface (TDI) CSC. Figure 4.4-1 shows the execution control between these units. If a particular CSU is invoked by (or invokes a unit in) another CSC (other than the TDI CSC), the CSC will be identified by a dashed circle and the execution control line will be a dashed line as well (If the CSC is part of a different CSCI, the CSCI name will also be specified inside of the dashed circle). The data flow between the CSUs is described in Figure 4.4-2. The external CSU interfaces are designated by dashed lines.

Figure 4.4-1
Execution Control for the TDI CSC Unitstc "Figure 4.4-1 Execution Control for the TDI CSC Units" \f f§

Figure 4.4-2
Data Flow for the TDI CSC Unitstc "Figure 4.4-2 Data Flow for the TDI CSC Units" \f f§

4.4.1 Get Height Above Terrain (GHAT) CSU (OS-CSU-4.1)tc "4.4.1 Get Height Above Terrain (GHAT) CSU (OS-CSU-4.1)"§

The Get Height Above Terrain (GHAT) CSU of the TDI CSC requests the height relative to the terrain of the specified entity from the terrain database. The following subparagraphs provide the design information for this CSU.

4.4.1.1 GHAT CSU Design Specification/Constraintstc "4.4.1.1 GHAT CSU Design Specifications/Constraints"§

There are no design constraints for the GHAT CSU.

4.4.1.2 GHAT CSU Designtc "4.4.1.2 GHAT CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the GHAT CSU.

4.4.1.2.1 GHAT CSU Input/Output Data Elementstc "4.4.1.2.1 GHAT CSU Input/Output Data Elements"§

Table 4.4.1.2.1-1 identifies and states the purpose of each input and output data element of the GHAT CSU.

Table 4.4.1.2.1-1
GHAT CSU Input/Output Data Elementstc "Table 4.4.1.2.1-1 GHAT CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Database Origin	X		Identifies latitude and longitude of the point corresponding to the origin of the database
Location in WorldC	X		Specifies X, Y, and Z entity position in the world coordinate system (in meters)
Height Above Terrain		X	Specifies entity's height above terrain at the specified position
Status		X	Indicates whether this unit executed without encountering an error condition

4.4.1.2.2 GHAT CSU Local Data Elementstc "4.4.1.2.2 GHAT CSU Local Data Elements"§

There are no local data elements for the GHAT CSU.

4.4.1.2.3 GHAT CSU Global Data Elementstc "4.4.1.2.3 GHAT CSU Global Data Elements"§

There are no global data elements for the GHAT CSU.

4.4.1.2.4 GHAT CSU Local and Shared Data Structurestc "4.4.1.2.4 GHAT CSU Local and Shared Data Structures"§

The GHAT CSU does not implement any new local or shared data structures.

4.4.1.2.5 GHAT CSU Interrupts and Signalstc "4.4.1.2.5GHAT CSU Interrupts and Signals"§

There are no interrupts or signals handled by the GHAT CSU.

4.4.1.2.6 GHAT CSU Error Handlingtc "4.4.1.2.6 GHAT CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.4.1.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.4.1.2.7 GHAT CSU Use of Other Elementstc "4.4.1.2.7GHAT CSU Use of Other Elements"§

There are no system service routines called by the GHAT CSU.

There are no input and output buffers for the GHAT CSU.

4.4.1.2.8 GHAT CSU Logic Flowtc "4.4.1.2.8 GHAT CSU Logic Flow"§

The GHAT CSU is invoked by the Detonation Event (DE) CSC when determining a fuse ignition or ground detonation. The following flowchart, Figure 4.4.1.2.8-1, describes the logic flow for the GHAT CSU:

Figure 4.4.1.2.8-1
Flowchart for the GHAT CSUtc "Figure 4.4.1.2.8-1 Flowchart for the GHAT CSU" \f f§

4.4.1.2.9 GHAT CSU Algorithmstc "4.4.1.2.9 GHAT CSU Algorithms"§

If latitude and longitude are required as inputs to the local terrain database, a call may be made to the Conversion CSU within the DL CSCI with the Location in WorldC and Database Origin as inputs. The Location in WorldC is in meters; therefore, if the terrain database operates in feet or fractions of feet, a conversion will be required.

4.4.1.2.10 GHAT CSU Local Data Files Or Databasestc "4.4.1.2.10 GHAT CSU Local Data Files Or Databases"§

There are no local data files or databases used by the GHAT CSU.

4.4.1.2.11 GHAT CSU Limitationstc "4.4.1.2.11 GHAT CSU Limitations"§

This CSU is provided as a stub for interfacing to the local terrain database.

4.5 Munition CSC (OS-CSC-5)tc "4.5 Munition CSC (OS-CSC-5)"§

There are two CSUs for the Munition CSC. Figure 4.5-1 shows the execution control between these units. If a particular CSU is invoked by (or invokes a unit in) another CSC (other than the Munition CSC), the CSC will be identified by a dashed circle and the execution control line will be a dashed line as well (If the CSC is part of a different CSCI, the CSCI name will also be specified inside of the dashed circle). The data flow between the CSUs is described in Figure 4.5-2. The external CSU interfaces are designated by dashed lines.

Figure 4.5-1
Execution Control for the Munition CSC Unitstc "Figure 4.5-1 Execution Control for the Munition CSC Units" \f f§

Figure 4.5-2
Data Flow for the Munition CSC Unitstc "Figure 4.5-2 Data Flow for the Munition CSC Units" \f f§

4.5.1 Instantiate Munition (IM) CSU (OS-CSU-5.1)tc "4.5.1 Instantiate Munition (IM) CSU (OS-CSU-5.1)"§

The Instantiate Munition (IM) CSU of the Munition CSC initiates processes to define all parameters for the specified munition based on user-selected data and firing data. The following subparagraphs provide the design information for this CSU.

4.5.1.1 IM CSU Design Specification/Constraintstc "4.5.1.1 IM CSU Design Specifications/Constraints"§

There are no design constraints for the IM CSU.

4.5.1.2 IM CSU Designtc "4.5.1.2 IM CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the IM CSU.

4.5.1.2.1 IM CSU Input/Output Data Elementstc "4.5.1.2.1 IM CSU Input/Output Data Elements"§

Table 4.5.1.2.1-1 identifies and states the purpose of each input and output data element of the IM CSU.

Table 4.5.1.2.1-1
IM CSU Input/Output Data Elementstc "Table 4.5.1.2.1-1 IM CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity Type	X		Indicates the type of entity which corresponds to the munition being instantiated
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.5.1.2.2 IM CSU Local Data Elementstc "4.5.1.2.2 IM CSU Local Data Elements"§

There are no local data elements for the IM CSU.

4.5.1.2.3 IM CSU Global Data Elementstc "4.5.1.2.3 IM CSU Global Data Elements"§

Table 4.5.1.2.3-1 identifies and states the purpose of each data element that is used by the IM CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.5.1.2.3-1
IM CSU Global Data Elementstc "Table 4.5.1.2.3-1 IM CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Fly-Out Model ID	Method of modeling to be used for the munition's flight	See General Parameters in Section 5, Table 5-2			

4.5.1.2.4 IM CSU Local and Shared Data Structurestc "4.5.1.2.4 IM CSU Local and Shared Data Structures"§

The IM CSU does not implement any new local or shared data structures.

4.5.1.2.5 IM CSU Interrupts and Signalstc "4.5.1.2.5 IM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the IM CSU

4.5.1.2.6 IM CSU Error Handlingtc "4.5.1.2.6IM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.5.1.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.5.1.2.7 IM CSU Use of Other Elementstc "4.5.1.2.7 IM CSU Use of Other Elements"§

There are no system service routines called by the IM CSU.

There are no input and output buffers for the IM CSU.

4.5.1.2.8 IM CSU Logic Flowtc "4.5.1.2.8 IM CSU Logic Flow"§

The IM CSU is invoked by the Active/Frozen Lists (AFL) CSC when a munition is fired. The following flowchart, Figure 4.5.1.2.8-1, describes the logic flow for the IM CSU:

Figure 4.5.1.2.8-1
Flowchart for the IM CSUtc "Figure 4.5.1.2.8-1 Flowchart for the IM CSU" \f f§

4.5.1.2.9 IM CSU Algorithmstc "4.5.1.2.9 IM CSU Algorithms"§

There are no algorithms used by the IM CSU.

4.5.1.2.10 IM CSU Local Data Files Or Databasestc "4.5.1.2.10 IM CSU Local Data Files Or Databases"§

There are no local data files or databases used by the IM CSU.

4.5.1.2.11 IM CSU Limitationstc "4.5.1.2.11 IM CSU Limitations"§

There are no limitations or unusual features in the IM CSU.

4.5.2 Find Related Entity Data (FRED) CSU (OS-CSU-5.2)tc "4.5.2 Find Related Entity Data (FRED) CSU (OS-CSU-5.2)"§

The Find Related Entity Data (FRED) CSU of the Munition CSC searches through the General Parameters list to find the closest match, if one exists, to the entity type being instantiated. The following subparagraphs provide the design information for this CSU.

4.5.2.1 FRED CSU Design Specification/Constraintstc "4.5.2.1 FRED CSU Design Specifications/Constraints"§

There are no design constraints for the FRED CSU.

4.5.2.2 FRED CSU Designtc "4.5.2.2 FRED CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the FRED CSU.

4.5.2.2.1 FRED CSU Input/Output Data Elementstc "4.5.2.2.1 FRED CSU Input/Output Data Elements"§

Table 4.5.2.2.1-1 identifies and states the purpose of each input and output data element of the FRED CSU.

Table 4.5.2.2.1-1
FRED CSU Input/Output Data Elementstc "Table 4.5.2.2.1-1 FRED CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity Type	X		Indicates the type of entity which corresponds to the munition being instantiated
General Parameters Record		X	Contains all the user-defined parameters needed by the IM CSU to complete instantiation
Status		X	Indicates whether this unit executed without encountering an error condition

4.5.2.2.2 FRED CSU Local Data Elementstc "4.5.2.2.2 FRED CSU Local Data Elements"§

Table 4.5.2.2.2-1 identifies and states the purpose of each data element that originates in the FRED CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.5.2.2.2-1
FRED CSU Local Data Elementstc "Table 4.5.2.2.2-1 FRED CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Current Pointer	Pointer to the record being operated on	Pointer to General Parameters Record (see Section 5,	32	N/A	N/A

		Table 5-2)		

4.5.2.2.3 FRED CSU Global Data Elementstc "4.5.2.2.3 FRED CSU Global Data Elements"§

Table 4.5.2.2.3-1 identifies and states the purpose of each data element that is used by the FRED CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.5.2.2.3-1
FRED CSU Global Data Elementstc "Table 4.5.2.2.3-1 FRED CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Top of List Pointer	Pointer to the top of the General Parameters list	Pointer to General Parameters Record (see Section 5, Table 5-2)	32	N/A	N/A

4.5.2.2.4 FRED CSU Local and Shared Data Structurestc "4.5.2.2.4 FRED CSU Local and Shared Data Structures"§

The FRED CSU does not implement any new local or shared data structures.

4.5.2.2.5 FRED CSU Interrupts and Signalstc "4.5.2.2.5 FRED CSU Interrupts and Signals"§

There are no interrupts or signals handled by the FRED CSU.

4.5.2.2.6 FRED CSU Error Handlingtc "4.5.2.2.6 FRED CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.5.2.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred. If a match for the incoming entity type is not found the Status output parameter is set to TYPE_DNE_ERROR.

4.5.2.2.7 FRED CSU Use of Other Elementstc "4.5.2.2.7 FRED CSU Use of Other Elements"§

There are no system service routines called by the FRED CSU.

There are no input and output buffers for the FRED CSU.

4.5.2.2.8 FRED CSU Logic Flowtc "4.5.2.2.8 FRED CSU Logic Flow"§

The FRED CSU is invoked by the IM CSU when a new munition is being instantiated. The following flowchart, Figure 4.5.2.2.8-1, describes the logic flow for the FRED CSU:

Figure 4.5.2.2.8-1
Flowchart for the FRED CSUtc "Figure 4.5.2.2.8-1 Flowchart for the FRED CSU" \f f§

4.5.2.2.9 FRED CSU Algorithmstc "4.5.2.2.9 FRED CSU Algorithms"§

The FRED CSU performs two comparisions when determining whether a match exists between the current entity type and the entity type being compared to from the General Parameters list. These comparisons include the following operations:

Eq'n 1: Perform a one-to-one comparison for each element in the Entity Type Record. Is the Entity Type element greater than the Current Pointer.Entity Type element?

Eq'n 2: Does the Current Pointer.Entity Type element equal zero?

4.5.2.2.10 FRED CSU Local Data Files Or Databasestc "4.5.2.2.10 FRED CSU Local Data Files Or Databases"§

There are no local data files or databases used by the FRED CSU.

4.5.2.2.11 FRED CSU Limitationstc "4.5.2.2.11 FRED CSU Limitations"§

There are no limitations or unusual features in the FRED CSU.

4.5.3 Update Munition (UPM) CSU (OS-CSU-5.3)tc "4.5.3 Update Munition (UPM) CSU (OS-CSU-5.3)"§

The Update Munition (UPM) CSU of the Munition CSC manages all activity of each munition for the current timeslice. The following subparagraphs provide the design information for this CSU.

4.5.3.1 UPM CSU Design Specification/Constraintstc "4.5.3.1 UPM CSU Design Specifications/Constraints"§

There are no design constraints for the UPM CSU.

4.5.3.2 UPM CSU Designtc "4.5.3.2 UPM CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the UPM CSU.

4.5.3.2.1 UPM CSU Input/Output Data Elementstc "4.5.3.2.1 UPM CSU Input/Output Data Elements"§

Table 4.5.3.2.1-1 identifies and states the purpose of each input and output data element of the UPM CSU.

Table 4.5.3.2.1-1
UPM CSU Input/Output Data Elementstc "Table 4.5.3.2.1-1 UPM CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.5.3.2.2 UPM CSU Local Data Elementstc "4.5.3.2.2 UPM CSU Local Data Elements"§

There are no local data elements for the UPM CSU.

4.5.3.2.3 UPM CSU Global Data Elementstc "4.5.3.2.3 UPM CSU Global Data Elements"§

There are no global data elements for the UPM CSU.

4.5.3.2.4 UPM CSU Local and Shared Data Structurestc "4.5.3.2.4 UPM CSU Local and Shared Data Structures"§

The UPM CSU does not implement any new local or shared data structures.

4.5.3.2.5 UPM CSU Interrupts and Signalstc "4.5.3.2.5 UPM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the UPM CSU.

4.5.3.2.6 UPM CSU Error Handlingtc "4.5.3.2.6 UPM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.5.3.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.5.3.2.7 UPM CSU Use of Other Elementstc "4.5.3.2.7 UPM CSU Use of Other Elements"§

There are no system service routines called by the UPM CSU.

There are no input and output buffers for the UPM CSU.

4.5.3.2.8 UPM CSU Logic Flowtc "4.5.3.2.8 UPM CSU Logic Flow"§

The UPM CSU is invoked by the Simulation Control (SC) CSC when the OS CSCI is in a run state and the active munition list is not empty. The following flowchart, Figure 4.5.3.2.8-1, describes the logic flow for the UPM CSU:

Figure 4.5.3.2.8-1
Flowchart for the UPM CSUtc "Figure 4.5.3.2.8-1 Flowchart for the UPM CSU" \f f§

4.5.3.2.9 UPM CSU Algorithmstc "4.5.3.2.9 UPM CSU Algorithms"§

There are no algorithms used by the UPM CSU.

4.5.3.2.10 UPM CSU Local Data Files Or Databasestc "4.5.3.2.10 UPM CSU Local Data Files Or Databases"§

There are no local data files or databases used by the UPM CSU.

4.5.3.2.11 UPM CSU Limitationstc "4.5.3.2.11 UPM CSU Limitations"§

There are no limitations or unusual features in the UPM CSU.

4.6 Target Tracking (TT) CSC (OS-CSC-6)tc "4.6 Target Tracking (TT) CSC (OS-CSC-6)"§

There are two CSUs for the Target Tracking (TT) CSC. Figure 4.6-1 shows the execution control between these units. If a particular CSU is invoked by (or invokes a unit in) another CSC (other than the TT CSC), the CSC will be identified by a dashed circle and the execution control line will be a dashed line as well (If the CSC is part of a different CSCI, the CSCI name will also be specified inside of the dashed circle). The data flow between the CSUs is described in Figure 4.6-2. The external CSU interfaces are designated by dashed lines.

Figure 4.6-1
Execution Control for the TT CSC Unitstc "Figure 4.6-1 Execution Control for the TT CSC Units" \f f§

Figure 4.6-2
Data Flow for the TT CSC Unitstc "Figure 4.6-2 Data Flow for the TT CSC Units" \f f§

4.6.1 Update Target (UT) CSU (OS-CSU-6.1)tc "4.6.1 Update Target (UT) CSU (OS-CSU-6.1)"§

The Update Target (UT) CSU of the TT CSC makes a call for the most recent position and velocity of the target and then determines whether this entity is still a reasonable target entity. If not, a call is made to find a new target and the target's entity ID is updated. The following subparagraphs provide the design information for this CSU.

4.6.1.1 UT CSU Design Specification/Constraintstc "4.6.1.1 UT CSU Design Specifications/Constraints"§

There are no design constraints for the UT CSU.

4.6.1.2 UT CSU Designtc "4.6.1.2 UT CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the UT CSU.

4.6.1.2.1 UT CSU Input/Output Data Elementstc "4.6.1.2.1 UT CSU Input/Output Data Elements"§

Table 4.6.1.2.1-1 identifies and states the purpose of each input and output data element of the UT CSU.

Table 4.6.1.2.1-1
UT CSU Input/Output Data Elementstc "Table 4.6.1.2.1-1 UT CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.6.1.2.2 UT CSU Local Data Elementstc "4.6.1.2.2 UT CSU Local Data Elements"§

Table 4.6.1.2.2-1 identifies and states the purpose of each data element that originates in the UT CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.6.1.2.2-1
UT CSU Local Data Elementstc "Table 4.6.1.2.2-1 UT CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Target ID	Entity identified as a target of the munition	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		

4.6.1.2.3 UT CSU Global Data Elementstc "4.6.1.2.3 UT CSU Global Data Elements"§

Table 4.6.1.2.3-1 identifies and states the purpose of each data element that is used by the UT CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.6.1.2.3-1
UT CSU Global Data Elementstc "Table 4.6.1.2.3-1 UT CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Target Entity ID	Entity selected as a target for a particular munition	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		

4.6.1.2.4 UT CSU Local and Shared Data Structurestc "4.6.1.2.4 UT CSU Local and Shared Data Structures"§

The UT CSU does not implement any new local or shared data structures.

4.6.1.2.5 UT CSU Interrupts and Signalstc "4.6.1.2.5 UT CSU Interrupts and Signals"§

There are no interrupts or signals handled by the UT CSU.

4.6.1.2.6 UT CSU Error Handlingtc "4.6.1.2.6 UT CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.6.1.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.6.1.2.7 UT CSU Use of Other Elementstc "4.6.1.2.7UT CSU Use of Other Elements"§

There are no system service routines called by the UT CSU.

There are no input and output buffers for the UT CSU.

4.6.1.2.8 UT CSU Logic Flowtc "4.6.1.2.8 UT CSU Logic Flow"§

The UT CSU is invoked by the Munition CSC before a munition's position is updated to allow the target's new position to influence the munition's flight. The following flowchart, Figure 4.6.1.2.8-1, describes the logic flow for the UT CSU:

Figure 4.6.1.2.8-1
Flowchart for the UT CSUtc "Figure 4.6.1.2.8-1 Flowchart for the UT CSU" \f f§

4.6.1.2.9 UT CSU Algorithmstc "4.6.1.2.9 UT CSU Algorithms"§

There are no algorithms used by the UT CSU.

4.6.1.2.10 UT CSU Local Data Files Or Databasestc "4.6.1.2.10 UT CSU Local Data Files Or Databases"§

There are no local data files or databases used by the UT CSU.

4.6.1.2.11 UT CSU Limitationstc "4.6.1.2.11 UT CSU Limitations"§

There are no limitations or unusual features in the UT CSU.

4.6.2 Search for Target (SFT) CSU (OS-CSU-6.2)tc "4.6.2 Search for Target (SFT) CSU (OS-CSU-6.2)"§

The Search for Target (SFT) CSU of the TT CSC looks for a new target. The target must be within the cone of detection for the munition and within line of sight. The following subparagraphs provide the design information for this CSU.

4.6.2.1 SFT CSU Design Specification/Constraintstc "4.6.2.1 SFT CSU Design Specifications/Constraints"§

There are no design constraints for the SFT CSU.

4.6.2.2 SFT CSU Designtc "4.6.2.2 SFT CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the SFT CSU.

4.6.2.2.1 SFT CSU Input/Output Data Elementstc "4.6.2.2.1SFT CSU Input/Output Data Elements"§

Table 4.6.2.2.1-1 identifies and states the purpose of each input and output data element of the SFT CSU.

Table 4.6.2.2.1-1
SFT CSU Input/Output Data Elementstc "Table 4.6.2.2.1-1 SFT CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.6.2.2.2 SFT CSU Local Data Elementstc "4.6.2.2.2 SFT CSU Local Data Elements"§

Table 4.6.2.2.2-1 identifies and states the purpose of each data element that originates in the SFT CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.6.2.2.2-1
SFT CSU Local Data Elementstc "Table 4.6.2.2.2-1 SFT CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Entity ID	Entity being considered as a target	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		

4.6.2.2.3 SFT CSU Global Data Elementstc "4.6.2.2.3 SFT CSU Global Data Elements"§

Table 4.6.2.2.3-1 identifies and states the purpose of each data element that is used by the SFT CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.6.2.2.3-1
SFT CSU Global Data Elementstc "Table 4.6.2.2.3-1 SFT CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Target Entity ID	Entity selected as a target for a particular munition	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		

4.6.2.2.4 SFT CSU Local and Shared Data Structurestc "4.6.2.2.4 SFT CSU Local and Shared Data Structures"§

The SFT CSU does not implement any new local or shared data structures.

4.6.2.2.5 SFT CSU Interrupts and Signalstc "4.6.2.2.5 SFT CSU Interrupts and Signals"§

There are no interrupts or signals handled by the SFT CSU.

4.6.2.2.6 SFT CSU Error Handlingtc "4.6.2.2.6 SFT CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.6.2.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.6.2.2.7 SFT CSU Use of Other Elementstc "4.6.2.2.7 SFT CSU Use of Other Elements"§

There are no system service routines called by the SFT CSU.

There are no input and output buffers for the SFT CSU.

4.6.2.2.8 SFT CSU Logic Flowtc "4.6.2.2.8SFT CSU Logic Flow"§

The SFT CSU is invoked by the Update Target (UT) CSU when the former target no longer lies within the cone of detection or within the line of sight. The following flowchart, Figure 4.6.2.2.8-1, describes the logic flow for the SFT CSU:

Figure 4.6.2.2.8-1
Flowchart for the SFT CSUtc "Figure 4.6.2.2.8-1 Flowchart for the SFT CSU" \f f§

4.6.2.2.9 SFT CSU Algorithmstc "4.6.2.2.9 SFT CSU Algorithms"§

There are no algorithms used by the SFT CSU.

4.6.2.2.10 SFT CSU Local Data Files Or Databasestc "4.6.2.2.10 SFT CSU Local Data Files Or Databases"§

There are no local data files or databases used by the SFT CSU.

4.6.2.2.11 SFT CSU Limitationstc "4.6.2.2.11 SFT CSU Limitations"§

There are no limitations or unusual features in the SFT CSU.

4.7 Fly-Out Model (FOM) CSC (OS-CSC-7)tc "4.7 Fly-Out Model (FOM) CSC (OS-CSC-7)"§

There are four CSUs for the Fly-Out Model (FOM) CSC. Figure 4.7-1 shows the execution control between these units. If a particular CSU is invoked by (or invokes a unit in) another CSC (other than the FOM CSC), the CSC will be identified by a dashed circle and the execution control line will be a dashed line as well (If the CSC is part of a different CSCI, the CSCI name will also be specified inside of the dashed circle). The data flow between the CSUs is described in Figure 4.7-2. The external CSU interfaces are designated by dashed lines.

Figure 4.7-1
Execution Control for the FOM CSC Unitstc "Figure 4.7-1 Execution Control for the FOM CSC Units" \f f§

Figure 4.7-2
Data Flow for the FOM CSC Unitstc "Figure 4.7-2 Data Flow for the FOM CSC Units" \f f§

4.7.1 Instantiate Fly-Out Model (IFOM) CSU (OS-CSU-7.1)tc "4.7.1 Instantiate Fly-Out Model (IFOM) CSU (OS-CSU-7.1)"§

The Instantiate Fly-Out Model (IFOM) CSU of the FOM CSC applies the Fly-Out Model ID and the flight and aerodynamic parameters of the corresponding munition type to the particular munition being instantiated. The following subparagraphs provide the design information for this CSU.

4.7.1.1 IFOM CSU Design Specification/Constraintstc "4.7.1.1 IFOM CSU Design Specifications/Constraints"§

There are no design constraints for the IFOM CSU.

4.7.1.2 IFOM CSU Designtc "4.7.1.2 IFOM CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the IFOM CSU.

4.7.1.2.1 IFOM CSU Input/Output Data Elements

Table 4.7.1.2.1-1 identifies and states the purpose of each input and output data element of the IFOM CSU.

Table 4.7.1.2.1-1
IFOM CSU Input/Output Data Elements

Data Element	Input	Output	Purpose
Hashing Index	X		Specifies the type of munition which corresponds to the given Entity ID
Entity Type	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.7.1.2.2 IFOM CSU Local Data Elements

There are no local data elements for the IFOM CSU.

4.7.1.2.3 IFOM CSU Global Data Elements

Table 4.7.1.2.3-1 identifies and states the purpose of each data element that is used by the IFOM CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.7.1.2.3-1
IFOM CSU Global Data Elementstc "Table 4.7.1.2.3-1 IFOM CSU Global Data Elements" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Fly-Out Model ID	Name of the particular fly-out model to be used to model the specified munition type	Fly-Out Model Identifier Type		N/A	
Location in EntC	Location of the entity in the entity coordinate system	Entity Coordinate Vector	See IST-CR-93-15, Para. 5.3.20.1		
Velocity in EntC	Velocity of the entity in the entity coordinate system	Linear Velocity Vector	See IST-CR-93-15, Para. 5.3.20.3		

4.7.1.2.4 IFOM CSU Local and Shared Data Structurestc "4.7.1.2.4 IFOM CSU Local and Shared Data Structures"§

The IFOM CSU does not implement any new local or shared data structures.

4.7.1.2.5 IFOM CSU Interrupts and Signalstc "4.7.1.2.5 IFOM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the IFOM CSU.

4.7.1.2.6 IFOM CSU Error Handlingtc "4.7.1.2.6 IFOM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.7.1.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.7.1.2.7 IFOM CSU Use of Other Elementstc "4.7.1.2.7 IFOM CSU Use of Other Elements"§

There are no system service routines called by the IFOM CSU.

There are no input and output buffers for the IFOM CSU.

4.7.1.2.8 IFOM CSU Logic Flowtc "4.7.1.2.8 IFOM CSU Logic Flow"§

The IFOM CSU is invoked by the Munition CSC when a new munition becomes active. The following flowchart, Figure 4.7.1.2.8-1, describes the logic flow for the IFOM CSU:

Figure 4.7.1.2.8-1
Flowchart for the IFOM CSUtc "Figure 4.7.1.2.8-1 Flowchart for the IFOM CSU" \f f§

4.7.1.2.9 IFOM CSU Algorithmstc "4.7.1.2.9 IFOM CSU Algorithms"§

There are no algorithms used by the IFOM CSU.

4.7.1.2.10 IFOM CSU Local Data Files Or Databasestc "4.7.1.2.10 IFOM CSU Local Data Files Or Databases"§

There are no local data files or databases used by the IFOM CSU.

4.7.1.2.11 IFOM CSU Limitationstc "4.7.1.2.11 IFOM CSU Limitations"§

There are no limitations or unusual features in the IFOM CSU.

4.7.2 Initialize Aerodynamic Parameters (IAP) CSU (OS-CSU-7.2)tc "4.7.2 Initialize Aerodynamic Parameters (IAP) CSU (OS-CSU-7.2)"§

The Initialize Aerodynamic Parameters (IAP) CSU of the FOM CSC places aerodynamic data for a new munition in a hash table based on the munition's entity type. The following subparagraphs provide the design information for this CSU.

4.7.2.1 IAP CSU Design Specification/Constraintstc "4.7.2.1 IAP CSU Design Specifications/Constraints"§

There are no design constraints for the IAP CSU.

4.7.2.2 IAP CSU Designtc "4.7.2.2 IAP CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the IAP CSU.

4.7.2.2.1 IAP CSU Input/Output Data Elementstc "4.7.2.2.1 IAP CSU Input/Output Data Elements"§

Table 4.7.2.2.1-1 identifies and states the purpose of each input and output data element of the IAP CSU.

Table 4.7.2.2.1-1
IAP CSU Input/Output Data Elementstc "Table 4.7.2.2.1-1 IAP CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity Type	X		Specifies the type of munition which corresponds to the given Entity ID
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.7.2.2.2 IAP CSU Local Data Elementstc "4.7.2.2.2 IAP CSU Local Data Elements"§

There are no local data elements for the IAP CSU.

4.7.2.2.3 IAP CSU Global Data Elementstc "4.7.2.2.3IAP CSU Global Data Elements"§

Table 4.7.2.2.3-1 identifies and states the purpose of each data element that is used by the IAP CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.7.2.2.3-1
IAP CSU Global Data Elementstc "Table 4.7.2.2.3-1 IAP CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Aerodynamic Parameters	Record of aerodynamic parameters	See Aerodynamic Parameters in Section 5, Table 5-3			
General Parameters	Record of user selected parameters	See General Parameters in Section 5, Table 5-2			

4.7.2.2.4 IAP CSU Local and Shared Data Structurestc "4.7.2.2.4 IAP CSU Local and Shared Data Structures"§

The IAP CSU does not implement any new local or shared data structures.

4.7.2.2.5 IAP CSU Interrupts and Signalstc "4.7.2.2.5 IAP CSU Interrupts and Signals"§

There are no interrupts or signals handled by the IAP CSU.

4.7.2.2.6 IAP CSU Error Handlingtc "4.7.2.2.6 IAP CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.7.2.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.7.2.2.7 IAP CSU Use of Other Elementstc "4.7.2.2.7 IAP CSU Use of Other Elements"§

There are no system service routines called by the IAP CSU.

There are no input and output buffers for the IAP CSU.

4.7.2.2.8 IAP CSU Logic Flowtc "4.7.2.2.8 IAP CSU Logic Flow"§

The IAP CSU is invoked by the IFOM CSU when instantiating a new munition. The following flowchart, Figure 4.7.2.2.8-1, describes the logic flow for the IAP CSU:

Figure 4.7.2.2.8-1
Flowchart for the IAP CSUtc "Figure 4.7.2.2.8-1 Flowchart for the IAP CSU" \f f§

4.7.2.2.9 IAP CSU Algorithmstc "4.7.2.2.9IAP CSU Algorithms"§
There are no algorithms used by the IAP CSU.

4.7.2.2.10 IAP CSU Local Data Files Or Databasestc "4.7.2.2.10 IAP CSU Local Data Files Or Databases"§
There are no local data files or databases used by the IAP CSU.

4.7.2.2.11 IAP CSU Limitationstc "4.7.2.2.11 IAP CSU Limitations"§
There are no limitations or unusual features in the IAP CSU.

4.7.3 Initialize Flight Parameters (IFP) CSU (OS-CSU-7.3)tc "4.7.3 Initialize Flight Parameters (IFP) CSU (OS-CSU-7.3)"§
The Initialize Flight Parameters (IFP) CSU of the FOM CSC places fly-out model ID for a new munition in a hash table based on the munition's entity type. The following subparagraphs provide the design information for this CSU.

4.7.3.1 IFP CSU Design Specification/Constraintstc "4.7.3.1IFP CSU Design Specifications/Constraints"§
There are no design constraints for the IFP CSU.

4.7.3.2 IFP CSU Designtc "4.7.3.2 IFP CSU Design"§
The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the IFP CSU.

4.7.3.2.1 IFP CSU Input/Output Data Elementstc "4.7.3.2.1 IFP CSU Input/Output Data Elements"§
Table 4.7.3.2.1-1 identifies and states the purpose of each input and output data element of the IFP CSU.

Table 4.7.3.2.1-1
IFP CSU Input/Output Data Elementstc "Table 4.7.3.2.1-1 IFP CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity Type	X		Specifies the type of munition which corresponds to the given Entity ID
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.7.3.2.2 IFP CSU Local Data Elementstc "4.7.3.2.2 IFP CSU Local Data Elements"§

There are no local data elements for the IFP CSU.

4.7.3.2.3 IFP CSU Global Data Elementstc "4.7.3.2.3 IFP CSU Global Data Elements"§

Table 4.7.3.2.3-1 identifies and states the purpose of each data element that is used by the IFP CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.7.3.2.3-1
IFP CSU Global Data Elementstc "Table 4.7.3.2.3-1 IFP CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Flight Parameters	Record of flight parameters	See Flight Parameters in Section 5, Table 5-4			
General Parameters	Record of user selected parameters	See General Parameters in Section 5, Table 5-2			

4.7.3.2.4 IFP CSU Local and Shared Data Structurestc "4.7.3.2.4 IFP CSU Local and Shared Data Structures"§

The IFP CSU does not implement any new local or shared data structures.

4.7.3.2.5 IFP CSU Interrupts and Signalstc "4.7.3.2.5 IFP CSU Interrupts and Signals"§

There are no interrupts or signals handled by the IFP CSU.

4.7.3.2.6 IFP CSU Error Handlingtc "4.7.3.2.6 IFP CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.7.3.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.7.3.2.7 IFP CSU Use of Other Elementstc "4.7.3.2.7 IFP CSU Use of Other Elements"§

There are no system service routines called by the IFP CSU.

There are no input and output buffers for the IFP CSU.

4.7.3.2.8 IFP CSU Logic Flowtc "4.7.3.2.8 IFP CSU Logic Flow"§

The IFP CSU is invoked by the IFOM CSU when instantiating a new munition. The following flowchart, Figure 4.7.3.2.8-1, describes the logic flow for the IFP CSU:

Figure 4.7.3.2.8-1
Flowchart for the IFP CSUtc "Figure 4.7.3.2.8-1 Flowchart for the IFP CSU" \f f§

4.7.3.2.9 IFP CSU Algorithmstc "4.7.3.2.9 IFP CSU Algorithms"§

There are no algorithms used by the IFP CSU.

4.7.3.2.10 IFP CSU Local Data Files Or Databasestc "4.7.3.2.10IFP CSU Local Data Files Or Databases"§

There are no local data files or databases used by the IFP CSU.

4.7.3.2.11 IFP CSU Limitationstc "4.7.3.2.11 IFP CSU Limitations"§

There are no limitations or unusual features in the IFP CSU.

4.7.4 Move Munition (MM) CSU (OS-CSU-7.4)tc "4.7.4 Move Munition (MM) CSU (OS-CSU-7.4)"§

The Move Munition (MM) CSU of the FOM CSC is responsible for invoking the assigned fly-out model to advance the munition's position. The following subparagraphs provide the design information for this CSU.

4.7.4.1 MM CSU Design Specification/Constraintstc "4.7.4.1 MM CSU Design Specifications/Constraints"§

There are no design constraints for the MM CSU.

4.7.4.2 MM CSU Designtc "4.7.4.2 MM CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the MM CSU.

4.7.4.2.1 MM CSU Input/Output Data Elementstc "4.7.4.2.1 MM CSU Input/Output Data Elements"§

Table 4.7.4.2.1-1 identifies and states the purpose of each input and output data element of the MM CSU.

Table 4.7.4.2.1-1
MM CSU Input/Output Data Elementstc "Table 4.7.4.2.1-1 MM CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without

encountering an error condition

4.7.4.2.2 MM CSU Local Data Elementstc "4.7.4.2.2 MM CSU Local Data Elements"§

Table 4.7.4.2.2-1 identifies and states the purpose of each data element that originates in the MM CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.7.4.2.2-1
MM CSU Local Data Elementstc "Table 4.7.4.2.2-1 MM CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Cross Product	Cross-product of Range to Target and velocity vectors	FLOAT	64	N/A	N/A
Delta Heading	Change in heading	FLOAT	64		N/A
Delta Mass	Change in mass	FLOAT	64	kg	N/A
Delta Velocity	Change in velocity due to net propulsive force	Linear Velocity Record	See IST-CR-93-15, Para. 5.3.20.3		
Desired Munition Azimuth Heading	Desired change in muntion's azimuth	FLOAT	64	deg	N/A
Desired Munition Elevation Heading	Desired change in munition's elevation	FLOAT	64	deg	N/A
Drag Coefficients	Drag coefficients related to Mach Number	FLOAT	64	N/A	N/A

Ground Track Range	Range in the X-Y plane	FLOAT	64	m	N/A
Mach Number	Current Mach number of the munition	FLOAT	64	N/A	N/A
Relative Location	Distance between the munition and its target in X, Y, Z components	Entity Coordinate Vector	See IST-CR-93-15, Para. 5.3.20.1		
Thrust	Force generated by the engine	FLOAT	64	N	N/A

4.7.4.2.3 MM CSU Global Data Elementstc "4.7.4.2.3 MM CSU Global Data Elements"§

Table 4.7.4.2.3-1 identifies and states the purpose of each data element that is used by the MM CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.7.4.2.3-1
MM CSU Global Data Elementstc "Table 4.7.4.2.3-1 MM CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Flight Parameters	Parameters related to the fly-out model for each entity under the OS CSCI's control	See Flight Parameters in Section 5, Table 5-4			

4.7.4.2.4 MM CSU Local and Shared Data Structurestc "4.7.4.2.4 MM CSU Local and Shared Data Structures"§

The MM CSU does not implement any new local or shared data structures.

4.7.4.2.5 MM CSU Interrupts and Signalstc "4.7.4.2.5 MM CSU Interrupts and Signals"§

There are no interrupts or signals handled by the MM CSU.

4.7.4.2.6 MM CSU Error Handlingtc "4.7.4.2.6 MM CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.7.4.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.7.4.2.7 MM CSU Use of Other Elementstc "4.7.4.2.7 MM CSU Use of Other Elements"§

There are no system service routines called by the MM CSU.

There are no input and output buffers for the MM CSU.

4.7.4.2.8 MM CSU Logic Flowtc "4.7.4.2.8 MM CSU Logic Flow"§

The MM CSU is invoked by the Munition CSC when a munition is being updated. The following flowchart, Figure 4.7.4.2.8-1, Figure 4.7.4.2.8-2 and Figure 4.7.4.2.8-3, describes the logic flow for the MM CSU:

Figure 4.7.4.2.8-1
Flowchart for the MM CSUtc "Figure 4.7.4.2.8-1 Flowchart for the MM CSU" \f f§

Figure 4.7.4.2.8-2
Flowchart for the MM CSU (cont.)tc "Figure 4.7.4.2.8-2 Flowchart for the MM CSU (cont.)" \f f§

Figure 4.7.4.2.8-3
Flowchart for the MM CSU (cont.)tc "Figure 4.7.4.2.8-3 Flowchart for the MM CSU (cont.)" \f f§

4.7.4.2.9 MM CSU Algorithmstc "4.7.4.2.9 MM CSU Algorithms"§
Several algorithms from the MCAIR Training Systems MDC B0679 Part I Revision C Document are used to for various guidance models: pursuit, collision and three point (beam rider).

4.7.4.2.10 MM CSU Local Data Files Or Databasestc "4.7.4.2.10 MM CSU Local Data Files Or Databases"§
There are no local data files or databases used by the MM CSU.

4.7.4.2.11 MM CSU Limitationstc "4.7.4.2.11 MM CSU Limitations"§
There are no limitations or unusual features in the MM CSU.

4.8 Detonation Event (DE) CSC (OS-CSC-8)tc "4.8 Detonation Event (DE) CSC (OS-CSC-8)"§
There are three CSUs for the Detonation Event (DE) CSC. Figure 4.8-1 shows the execution control between these units. If a particular CSU is invoked by (or invokes a unit in) another CSC (other than the DE CSC), the CSC will be identified by a dashed circle and the execution control line will be a dashed line as well (if the CSC is part of a different CSCI, the CSCI name will also be specified inside of the dashed circle). The data flow between the CSUs is described in Figure 4.8-2. The external CSU interfaces are designated by dashed lines.

Figure 4.8-1
Execution Control for the DE CSC Unitstc "Figure 4.8-1 Execution Control for the DE CSC Units" \f f§

Figure 4.8-2
Data Flow for the DE CSC Unitstc "Figure 4.8-2 Data Flow for the DE CSC Units" \f f§

4.8.1 Initialize Termination Parameters (ITP) CSU (OS-CSU-8.1)tc "4.8.1Initialize Termination Parameters (ITP) CSU (OS-CSU-8.1)"§

The Initialize Termination Parameters (ITP) CSU of the DE CSC applies the termination parameters of the corresponding munition type to the particular munition being instantiated. The following subparagraphs provide the design information for this CSU.

4.8.1.1 ITP CSU Design Specification/Constraintstc "4.8.1.1ITP CSU Design Specifications/Constraints"§

There are no design constraints for the ITP CSU.

4.8.1.2 ITP CSU Designtc "4.8.1.2 ITP CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the ITP CSU.

4.8.1.2.1 ITP CSU Input/Output Data Elementstc "4.8.1.2.1 ITP CSU Input/Output Data Elements"§

Table 4.8.1.2.1-1 identifies and states the purpose of each input and output data element of the ITP CSU.

Table 4.8.1.2.1-1
ITP CSU Input/Output Data Elementstc "Table 4.8.1.2.1-1 ITP CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Entity Type	X		Specifies the type of munition which corresponds to the given Entity ID
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.8.1.2.2 ITP CSU Local Data Elementstc "4.8.1.2.2 ITP CSU Local Data Elements"§

There are no local data elements for the ITP CSU.

4.8.1.2.3 ITP CSU Global Data Elementstc "4.8.1.2.3ITP CSU Global Data Elements"§

Table 4.8.1.2.3-1 identifies and states the purpose of each data element that is used by the ITP CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.8.1.2.3-1
ITP CSU Global Data Elementstc "Table 4.8.1.2.3-1 ITP CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
General Parameters	General information about an entity type used to instantiate a munition	See General Parameters in Section 5, Table 5-2			
Termination Parameters	Parameters related to detonation for each entity under the OS CSCI's control	See Termination Parameters in Section 5, Table 5-6			

4.8.1.2.4 ITP CSU Local and Shared Data Structurestc "4.8.1.2.4 ITP CSU Local and Shared Data Structures"§

The ITP CSU does not implement any new local or shared data structures.

4.8.1.2.5 ITP CSU Interrupts and Signalstc "4.8.1.2.5 ITP CSU Interrupts and Signals"§

There are no interrupts or signals handled by the ITP CSU.

4.8.1.2.6 ITP CSU Error Handlingtc "4.8.1.2.6 ITP CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.8.1.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.8.1.2.7 ITP CSU Use of Other Elementstc "4.8.1.2.7 ITP CSU Use of Other Elements"§

There are no system service routines called by the ITP CSU.

There are no input and output buffers for the ITP CSU.

4.8.1.2.8 ITP CSU Logic Flowtc "4.8.1.2.8 ITP CSU Logic Flow"§

The ITP CSU is invoked by the Munition CSC to initialize the termination parameters according to the user-selected data for a new munition which has become active. The following flowchart, Figure 4.8.1.2.8-1, describes the logic flow for the ITP CSU:

Figure 4.8.1.2.8-1
Flowchart for the ITP CSUtc "Figure 4.8.1.2.8-1 Flowchart for the ITP CSU" \f f§

4.8.1.2.9 ITP CSU Algorithmstc "4.8.1.2.9 ITP CSU Algorithms"§

There are no algorithms used by the ITP CSU.

4.8.1.2.10 ITP CSU Local Data Files Or Databasestc "4.8.1.2.10 ITP CSU Local Data Files Or Databases"§

There are no local data files or databases used by the ITP CSU.

4.8.1.2.11 ITP CSU Limitationstc "4.8.1.2.11 ITP CSU Limitations"§

There are no limitations or unusual features in the ITP CSU.

4.8.2 Check for Detonation (CFD) CSU (OS-CSU-8.2)tc "4.8.2 Check for Detonation (CFD) CSU (OS-CSU-8.2)"§

The Check for Detonation (CFD) CSU of the DE CSC performs tests to determine whether a detonation should occur and then initiates the detonation if one is required. The following subparagraphs provide the design information for this CSU.

4.8.2.1 CFD CSU Design Specification/Constraintstc "4.8.2.1 CFD CSU Design Specifications/Constraints"§

There are no design constraints for the CFD CSU.

4.8.2.2 CFD CSU Designtc "4.8.2.2 CFD CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the CFD CSU.

4.8.2.2.1 CFD CSU Input/Output Data Elementstc "4.8.2.2.1 CFD CSU Input/Output Data Elements"§

Table 4.8.2.2.1-1 identifies and states the purpose of each input and output data element of the CFD CSU.

Table 4.8.2.2.1-1
CFD CSU Input/Output Data Elementstc "Table 4.8.2.2.1-1 CFD CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.8.2.2.2 CFD CSU Local Data Elementstc "4.8.2.2.2 CFD CSU Local Data Elements"§

Table 4.8.2.2.2-1 identifies and states the purpose of each data element that originates in the CFD CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.8.2.2.2-1
CFD CSU Local Data Elementstc "Table 4.8.2.2.2-1 CFD CSU Local Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Detonation Location	Location of the detonation in the target's entity coordinate system	Entity Coordinate Vector	See IST-CR-93-15, Para. 5.3.20.1		
Detonation Result	Type of detonation which occured	Detonation Result Type	See IST-CR-93-19, Para. 4.3.1.3		
Height Above Terrain	Entity's altitude relative to the terrain	FLOAT	64	m	N/A
Height Relative to Sea Level	Entity's altitude relative to sea level	FLOAT	64	m	N/A
Target Location	Location of the target in the world coordinate system	World Coordinates Record	See IST-CR-93-15, Para. 5.3.21		
Temp Range	Storage for Range when performing an update	FLOAT	64	m	N/A

4.8.2.2.3 CFD CSU Global Data Elementstc "4.8.2.2.3 CFD CSU Global Data Elements"§

Table 4.8.2.2.3-1 identifies and states the purpose of each data element that is used by the CFD CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.8.2.2.3-1
CFD CSU Global Data Elementstc "Table 4.8.2.2.3-1 CFD CSU Global Data Elements" \f t§

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Contact Threshold	Buffer defined by user to be equivalent to making contact	See Simulation Parameters in Section 5, Table 5-7			
Cycle Time	Length of time for which a munition's flight is updated	See Simulation Parameters in Section 5, Table 5-7			
Database Origin	Origin of the database in latitude and longitude	Database Origin Record	See Simulation Parameters in Section 5, Table 5-7		
Entity ID	Entity which may have detonated	Entity Identifier Record	See Network Parameters in Section 5, Table 5-5		
Location in WorldC	Entity's position in the world coordinate system	World Coordinates Record	See Network Parameters in Section 5, Table 5-5		
Target Entity ID	Entity identified as the target of the munition	Entity Identifier Record	See Network Parameters in Section 5, Table 5-5		
Termination Parameters	Termination parameters for a particular entity	See Termination Parameters in Section 5, Table 5-1			

Time in Flight	Length of time since the munition was fired	See Flight Parameters in Section 5, Table 5-4
Velocity Magnitude	Speed of an entity	See Flight Parameters in Section 5, Table 5-4

4.8.2.2.4 CFD CSU Local and Shared Data Structurestc "4.8.2.2.4 CFD CSU Local and Shared Data Structures"§

The CFD CSU does not implement any new local or shared data structures.

4.8.2.2.5 CFD CSU Interrupts and Signalstc "4.8.2.2.5 CFD CSU Interrupts and Signals"§

There are no interrupts or signals handled by the CFD CSU.

4.8.2.2.6 CFD CSU Error Handlingtc "4.8.2.2.6 CFD CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.8.2.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.8.2.2.7 CFD CSU Use of Other Elementstc "4.8.2.2.7 CFD CSU Use of Other Elements"§

There are no system service routines called by the CFD CSU.

There are no input and output buffers for the CFD CSU.

4.8.2.2.8 CFD CSU Logic Flowtc "4.8.2.2.8 CFD CSU Logic Flow"§

The CFD CSU is invoked by the Munition CSC when a munition's position is updated. The following flowchart, Figure 4.8.2.2.8-1, Figure 4.8.2.2.8-2 and Figure 4.8.2.2.8-3, describes the logic flow for the CFD CSU:

Figure 4.8.2.2.8-1
Flowchart for the CFD CSUtc "Figure 4.8.2.2.8-1 Flowchart for the CFD CSU" \f f§

Figure 4.8.2.2.8-2
Flowchart for the CFD CSU (cont.)tc "Figure 4.8.2.2.8-2 Flowchart for the CFD CSU (cont.)" \f f§

Figure 4.8.2.2.8-3
Flowchart for the CFD CSU (cont.)tc "Figure 4.8.2.2.8-3 Flowchart for the CFD CSU (cont.)" \f f§

4.8.2.2.9 CFD CSU Algorithmstc "4.8.2.2.9 CFD CSU Algorithms"§

The CFD CSU performs several comparisons and calculations when determining fuse ignition. These comparisons and calculations include the following equations:

Eq'n 1A: Temp Range = Termination Parameters(Hashing Index).Range

Eq'n 1B: Termination Parameters(Hashing Index).Range
= Termination Parameters(Hashing Index).Previous Range
+ Flight Parameters(Hashing Index).Velocity Magnitude
* Simulation Parameters.Cycle Time

Eq'n 1C: Termination Parameters(Hashing Index).Previous Range
= Temp Range

Eq'n 2: Network Parameters(Hashing Index).Location in WorldC
- Simulation Parameters.Contact Threshold
< Target Location
< Network Parameters(Hashing Index).Location in WorldC
+ Simulation Parameters.Contact Threshold

Eq'n 3: Flight Parameters(Hashing Index).Time in Flight
> Termination Parameters(Hashing Index).Time to Detonation

Eq'n 4: Flight Parameters(Hashing Index).Range to Target
< Termination Parameters(Hashing Index).Detonation Proximity Distance

Eq'n 5: Height Relative to Sea Level
> Termination Parameters(Hashing Index).Height Relative to Sea Level to

Detonate

4.8.2.2.10 CFD CSU Local Data Files Or Databasestc "4.8.2.2.10 CFD CSU Local Data Files Or Databases"§

There are no local data files or databases used by the CFD CSU.

4.8.2.2.11 CFD CSU Limitationstc "4.8.2.2.11 CFD CSU Limitations"§

There are no limitations or unusual features in the CFD CSU.

4.8.3 Determine Detonation Result (DDR) CSU (OS-CSU-8.3)tc "4.8.3 Determine Detonation Result (DDR) CSU (OS-CSU-8.3)"§

The Determine Detonation Result (DDR) CSU of the DE CSC determines the result of the detonation. The following subparagraphs provide the design information for this CSU.

4.8.3.1 DDR CSU Design Specification/Constraintstc "4.8.3.1 DDR CSU Design Specifications/Constraints"§

There are no design constraints for the DDR CSU.

4.8.3.2 DDR CSU Designtc "4.8.3.2 DDR CSU Design"§

The following subparagraphs describe the input/output data, local and global data, local and shared data structures, interrupts, error handling, logic flow, algorithms, local files and databases, limitations, and use of other elements for the DDR CSU.

4.8.3.2.1 DDR CSU Input/Output Data Elementstc "4.8.3.2.1 DDR CSU Input/Output Data Elements"§

Table 4.8.3.2.1-1 identifies and states the purpose of each input and output data element of the DDR CSU.

Table 4.8.3.2.1-1
DDR CSU Input/Output Data Elementstc "Table 4.8.3.2.1-1 DDR CSU Input/Output Data Elements" \f t§

Data Element	Input	Output	Purpose
Hashing Index	X		Represents the location of an entity in a hash table
Status		X	Indicates whether this unit executed without encountering an error condition

4.8.3.2.2 DDR CSU Local Data Elementstc "4.8.3.2.2DDR CSU Local Data Elements"§

Table 4.8.3.2.2-1 identifies and states the purpose of each data element that originates in the DDR CSU and is not used by any other CSU. This table also describes the size, units, and range for each of the local data elements.

Table 4.8.3.2.2-1
DDR CSU Local Data Elementstc "Table 4.8.3.2.2-1 DDR CSU Local Data Elements" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Detonation Location	Location of the detonation in the target's entity coordinate system	Entity Coordinate Record	See IST-CR-93-15, Para. 5.3.20.1		
Detonation Result	Type of detonation which occured	Detonate Result Type	See IST-CR-93-19, Para. 4.3.1.3		
Distance to Target	Distance between the munition and the target	FLOAT	64	m	N/A
Entity Impact Occurred	Flag indicating whether an impact with an entity was detected	BOOLEAN	1	N/A	False, True
Height Above Terrain	Entity's altitude relative to the terrain	FLOAT	64	m	N/A
Target Location	Location of the target in the world coordinate system	World Coordinates Record	See IST-CR-93-19, Para. 5.3.21		

4.8.3.2.3 DDR CSU Global Data Elements

Table 4.8.3.2.3-1 identifies and states the purpose of each data element that is used by the DDR CSU and by any other CSU. This table also describes the size, units, and range for each of the global data elements.

Table 4.8.3.2.3-1
DDR CSU Global Data Elementstc "Table 4.8.3.2.3-1 DDR CSU Global Data Elements" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Database Origin	Origin of the database in latitude and longitude	Database Origin Record	See Simulation Parameters in Section 5, Table 5-7		
Entity ID	Entity which has detonated	Entity Identifier Record	See Network Parameters in Section 5, Table 5-5		
Hard Kill	Radius at which warhead will cause major damage to other entities	See Termination Parameters in Section 5, Table 5-6			
Location in WorldC	X, Y, and Z entity position in the world coordinate system	World Coordinates Record	See Network Parameters in Section 5, Table 5-5		
Range to Damage	Radius at which a warhead will cause some damage to other entities	See Termination Parameters in Section 5, Table 5-6			
Range to Target	Distance between the munition and its target	See Flight Parameters in Section 5, Table 5-4			
Target Entity ID	Site ID, Application ID, and Entity ID for target of the input munition	Entity Identifier Record	See Network Parameters in Section 5, Table 5-5		

4.8.3.2.4 DDR CSU Local and Shared Data Structurestc "4.8.3.2.4 DDR CSU Local and Shared Data Structures"§

The DDR CSU does not implement any new local or shared data structures.

4.8.3.2.5 DDR CSU Interrupts and Signalstc "4.8.3.2.5 DDR CSU Interrupts and Signals"§

There are no interrupts or signals handled by the DDR CSU.

4.8.3.2.6 DDR CSU Error Handlingtc "4.8.3.2.6 DDR CSU Error Handling"§

This CSU contains an exception block to trap any unexpected errors. The Status output parameter (see Table 4.8.3.2.1-1) is either set to SUCCESS (if no error occurs in this CSU) or to a value indicating the unit in which the error occurred.

4.8.3.2.7 DDR CSU Use of Other Elementstc "4.8.3.2.7 DDR CSU Use of Other Elements"§

There are no system service routines called by the DDR CSU.

There are no input and output buffers for the DDR CSU.

4.8.3.2.8 DDR CSU Logic Flowtc "4.8.3.2.8 DDR CSU Logic Flow"§

The DDR CSU is invoked by the Check for Detonation (CFD) CSU when a detonation is detected. The following flowchart, Figure 4.8.3.2.8-1 and Figure 4.8.3.2.8-2, describes the logic flow for the DDR CSU:

Figure 4.8.3.2.8-1
Flowchart for the DDR CSUtc "Figure 4.8.3.2.8-1 Flowchart for the DDR CSU" \f f§

Figure 4.8.3.2.8-2
Flowchart for the DDR CSU (cont.)tc "Figure 4.8.3.2.8-2 Flowchart for the DDR CSU (cont.)" \f f§

4.8.3.2.9 DDR CSU Algorithmstc "4.8.3.2.9 DDR CSU Algorithms"§

There are no algorithms used by the DDR CSU.

4.8.3.2.10 DDR CSU Local Data Files Or Databasestc "4.8.3.2.10 DDR CSU Local Data Files Or Databases"§

There are no local data files or databases used by the DDR CSU.

4.8.3.2.11 DDR CSU Limitations

There are no limitations or unusual features in the DDR CSU.

5 OS Data

Table 5-1 through Table 5-7 identify and state the purpose of each global data element that is used by the OS CSCI. This table also describes the size, units, and range for each of the global data elements. Table 5-8 states which CSUs modify or use the global data. The data elements of the OS CSCI's external interfaces are identified in Table 5-9.

Table 5-1
OS CSCI Global Data

Name	Description	Data Type	Size (Bits)	Units	Limit/ Range
Aerodynamic Parameters	Parameters related to the aerodynamics model for each entity under the OS CSCI's control	Array of Aerodynamic Parameters	(Hash Table Size) x (Array Size)	N/A	N/A
Flight Parameters	Parameters related to the fly-out model for each entity under the OS CSCI's control	Array of Flight Parameters	(Hash Table Size) x (Array Size)	N/A	N/A
General Parameters	Parameters related to the type of munition being modeled	List of General Parameters Records	Depends upon number of types defined	N/A	N/A
Network Parameters	Parameters related to the network for each entity under the OS CSCI's control	Array of Network Parameters Records	(Hash Table Size) x (Array Size)	N/A	N/A
Termination Parameters	Parameters related to detonation for each entity under the OS CSCI's control	Array of Termination Parameters	(Hash Table Size) x (Array Size)	N/A	N/A

Table 5-2
OS CSCI Global General Parameters Recordtc "Table 5-2 OS CSCI Global General Parameters Record" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Aerodynamic Parameters	Parameters related to the aerodynamics model for each entity under the OS CSCI's control	Aerodynamic Parameters Record	See Table 5-3		
Dead Reckoning Algorithm	Low fidelity method used to model the path of an entity	Dead Reckoning Algorithm Type	See IST-CR-93-19, Para. 7.3		
Entity Type	Type of munition which corresponds to a given entity ID	Entity Type Record	See IST-CR-93-15, Para. 5.3.9 and IST-CR-93-19, Section 6		
Fly-Out Model ID	Identifier for the fly-out model to be used	ENUMERATION	8	N/A	N/A
Termination Parameters	Parameters related to detonation for each entity under the OS CSCI's control	Termination Parameters Record	See Table 5-6		

Table 5-3
OS CSCI Global Aerodynamic Parameters Recordtc "Table 5-3OS CSCI Global Aerodynamic Parameters Record" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Burn Rate	Rate at which the engine burns fuel	FLOAT	64	kg/sec	N/A
Burn Time	Amount of time required to completely expend the fuel	FLOAT	64	sec	N/A
Azimuth Detection Angle	Angle measured in the X-Y plane from centerline of munition where seeking is performed	FLOAT	64	deg	5 - 180
Elevation Detection Angle	Angle measured in the X- plane from centerline of munition where seeking is performed	FLOAT	64	deg	5 - 180
Drag	Force resisting forward movement	FLOAT	64	N/A	N/A
Frontal Area	Effective area of the front of the munition	FLOAT	64	m^2	N/A
G-Gain		FLOAT	64	N/A	N/A
Greq	G-loading required to move as desired	FLOAT	64	N/A	N/A
Guidance	Method of guiding a munition	ENUMERATION	64	N/A	Pursuit, Collision, Beam-Rider (Laser-

					Guided)
Initial Mass	Mass of the munition upon firing	FLOAT	64	kg	N/A
Max Gs	Highest number of Gs a munition can pull	FLOAT	64	N/A	N/A
Max Speed	Highest velocity magnitude of which a munition is capable	FLOAT	64	m/sec	N/A
Max Turn	Sharpest turn of which a munition is capable	FLOAT	64	deg/sec	N/A
Thrust	Propulsive force	FLOAT	64	N	N/A

Table 5-4
OS CSCI Global Flight Parameters Recordtc "Table 5-4 OS CSCI Global Flight Parameters Record" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Current Mass	Mass of the munition for the current timeslice	FLOAT	64	kg	N/A
Fly-Out Model ID	Identifier for the fly-out model to be used	ENUMERATION	8	N/A	N/A
Location in EntC	X, Y, and Z position in the entity coordinate system	Entity Coordinate Vector	See IST-CR-93-15, Para 5.3.20.1		
Munition Azimuth Heading	Azimuth of the munition	FLOAT	64	deg	
Munition Elevation Heading	Elevation of the munition	FLOAT	64	deg	
Range to Target	Distance between the munition and its target	FLOAT	64	m	N/A
Time in Flight	Time the munition has been in flight	FLOAT	64	sec	N/A
Velocity in EntC	X, Y, and Z velocity components in the entity coordinate system	Linear Velocity Record	See IST-CR-93-15, Para. 5.3.20.3		
Velocity	Speed of an entity	FLOAT	64	m/sec	N/A

Magnitude				

Table 5-5
OS CSCI Global Network Parameters Recordtc "Table 5-5 OS CSCI Global Network Parameters Record" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Alternate Entity Type	Entity type which would be recognized by opposing forces	Entity Type Record	See IST-CR-93-15, Para. 5.3.9		
Burst Descriptor	Type of entity and information about its detonation qualities	Burst Descriptor Record	See IST-CR-93-15, Para. 5.3.5		
Capabilities	Capabilities of an entity (not defined in DIS 2.0.3)	Entity Capabilities Record	See IST-CR-93-15, Para. 5.3.7		
Dead Reckoning Parameters	Data required to maintain a low fidelity model of an entity	Dead Reckoning Parameters Record	See IST-CR-93-15, Para. 5.4.3.1 (11)		
Entity Appearance	Dynamic changes to the entity's appearance attributes	Entity Appearance Record	See IST-CR-93-19, Para. 3.3		
Entity ID	Number assigned to an entity to uniquely identify it	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Entity Marking	String of characters displayed on an entity	Entity Marking Record	See IST-CR-93-15, Para. 5.3.9		
Entity	Attitude of the entity	Euler Angles	See IST-CR-93-15,		

Orientation		Record	Para. 5.3.11
Event ID	Number associating related events	Event Identifier Record	See IST-CR-93-15, Para. 5.3.12
Firing Entity ID	Entity which fired a munition	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8
Force ID	Force to which an entity belongs	Force ID Type	See IST-CR-93-19, Para. 4.3.1.5
Location in WorldC	X, Y, and Z position in the world coordinate system	World Coordinates Record	See IST-CR-93-15, Para. 5.3.21
Target Entity ID	Entity selected as a target for a particular munition	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8
Velocity in WorldC	X, Y, and Z velocity components in the world coordinate system	Linear Velocity Vector	See IST-CR-93-15, Para. 5.3.20.3

Table 5-6
OS CSCI Global Termination Parameters Recordtc "Table 5-6 OS CSCI Global Termination Parameters Record" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Detonation Proximity	Distance to another object at which a proximity fuse is ignited	FLOAT	64	m	N/A
Fuse	Type of fuse on specified munition	Fuse Type	See IST-CR-93-19, Para. 1.3.1		
Hard Kill	Radius at which warhead will cause major damage to other entities	FLOAT	64	m	N/A
Height Relative to Sea Level to Detonate	Altitude (depth, if negative) at which an altitude (depth) fuse is ignited	FLOAT	64	m	N/A
Max Range	Range at which a munition is no longer effective	FLOAT	64	m	N/A
Previous Range	Distance the munition had travelled at the time of the last update	FLOAT	64	m	N/A
Range	Distance the munition has travelled	FLOAT	64	m	N/A
Range to Damage	Radius at which a warhead will cause some damage to other entities	FLOAT	64	m	N/A
Time to Detonation	Elapsed time at which a timed fuse is ignited	FLOAT	64	sec	N/A
Warhead	Type of warhead on	Warhead Type	See IST-CR-93-19,		

	specified munition		Para. 1.3.1

Table 5-7
OS CSCI Global Simulation Parameters Recordtc "Table 5-7 OS CSCI Global Simulation Parameters Record" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Contact Threshold	Buffer defined by user to be equivalent to making contact	FLOAT	64	m	N/A
Cycle Time	Length of time for a loop to complete processing	FLOAT	64	sec	N/A
Database Origin	Origin of the database in latitude and longitude	Database Origin Record	See Table 5-8		
Exercise ID	Identifier for the simulation exercise	Exercise Identifier Record	See IST-CR-93-15, Para. 5.3.13		
Hash Table Size	User-selected number of entries in hash table	INTEGER	64	N/A	N/A
Parent Entity ID	Entity whose munitions are maintained by the OS CSCI	Entity Identifier Record	See IST-CR-93-15, Para. 5.3.8		
Protocol Version	Version of the DIS Standard Protocol implemented	Version Type	See IST-CR-93-15, Para. 5.3.15		
Simulation State	Operation state of the simulation	ENUMERATION	8	N/A	Freeze, Halt, Reset, Run, Single Step

Table 5-8
DATABASE_ORIGIN_RECORD Type Descriptiontc "Table 5-8 DATABASE_ORIGIN_RECORD Type Description" \f t§

Name	**Description**	**Data Type**	**Size (Bits)**	**Units**	**Limit/ Range**
Latitude	Entity's latitude in decimal degrees	FLOAT	64	deg	-90 .. 90
Longitude	Entity's longitude in decimal degrees	FLOAT	64	deg	-180 .. 180

6 OS Data Files**s**tc "6 OS CSCI Data Files"§

The OS CSCI does not use any data files.