1 Scope

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

1.1 Identification

This Interface Requirements Specification (IRS) specifies the requirements for the interface for the Computer Software Configuration Item (CSCI) identified as Ordnance Server (OS), CSCI 3 of the Ada Distributed Interactive Simulation (ADIS) system. Table 1.1-1 shows the interfaces of the OS CSCI.

Table 1.1-1
Interfaces of the OS CSCI

Interface Name	Project-Unique Identifier
External Fly-Out Model Interface	OS-EI-1
Terrain Database	OS-EI-2
DIS Gateway Interface	DG-EI-1
DIS Library Interface	DL-EI-1

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 will allow 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 architcture concepts for DIS are the following:

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

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

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

1.3 Document Overview

The purpose of this document is to specify the interface requirements for the OS CSCI. This IRS identifies interface requirements, including the graphical user interface. This IRS also identifies data requirements, such as source, destination, units, limits/ranges.

2 Applicable Documents

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

2.1 Government Documents

The following documents of the exact issue shown form a part of this specification to

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

Document Number	Title
DOD-STD-2167A	Defense System Software Development
DI-MCCR-80026A	Interface Requirements Specification
	Statement of Work - Ada Distributed Interactive Simulation Support

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

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

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

Document Number	Title	Source
IST-CR-93-15	IEEE Standard P1278.1 Standard for Information Technology - Protocols for Distributed Interactive Simulation Applications Version 2.0, Third Draft	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-149-DL.SRM	Software Reference Manual for the DIS Library (DL) CSCI 2 of the Ada Distributed Interactive Simulation Support (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 Interface Specifications

This section specifies the requirements for the OS CSCI interface.

3.1 Interface Diagrams

Figure 3.1-1 depicts the interfaces between the OS CSCI defined in this document and the other CSCIs in the system. Each interface depicted in this figure is identified by name and project unique identifier.

µ §

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

3.2 External Fly-Out Model Interface (OS-EI-1)tc "3.2 External Fly-Out Model Interface"§

The purpose for the External Fly-Out Model Interface is to allow the OS CSCI to implement external fly-out models with minimal modification.

3.2.1 External Fly-Out Model Interface Requirementstc "3.2.1 External Fly-Out Model Interface Requirements"§

There are no interface requirements associated with the External Fly-Out Model Interface.

3.2.2 External Fly-Out Model Interface Data Requirementstc "3.2.2 External Fly-Out Model Interface Data Requirements"§

The data requirements for the External Fly-Out Model interface are documented in the OS Software Reference Manual in Chapter 3.

3.3 Terrain Database Interface (OS-EI-2)
tc "3.3 Terrain Database Interface"§

The purpose for the Terrain Database Interface is to provide the OS CSCI with altitude information to facilitate fly-out of surface munitions and determination of surface detonations.

3.3.1 Terrain Database Interface Requirements
tc "3.3.1 Terrain Database Interface Requirements"§

There are no interface requirements associated with the Terrain Database Interface.

3.3.2 Terrain Database Interface Data Requirements
tc "3.3.2 Terrain Database Interface Data Requirements"§

Table 3.3.2-1 contains the data along with its constraints required by the Terrrain Database Interface.

Table 3.3.2-1
Data Requirements for the Terrain Databasetc "3.3.2-1 Data Requirements for the Terrain Database" \f t§

Identifier	Element Name	Description	Unit of Measure	Data Type	Field Size (Bits)
OS-D-3.1	Origin	Origin of the database in the world coordinate system	m	Floating Point	64
OS-D-3.2	Location	X, Y, and Z position of munition in the local coordinate system	m	Floating Point	64
OS-D-3.3	Altitude	Height of munition above the ground	m	Floating Point	64

3.4 DIS Gateway Interface (DG-EI-1)
tc "3.4 DIS Gateway Interface"§

The purpose for the DG/OS Interface is to provide the OS CSCI with entity data and events and to transmit entity data and events to the network for the OS CSCI. As an example, the DG CSCI will complete the OS CSCI's DIS interface by performing dead reckoning calculations and adding timestamps to the outgoing PDUs.

3.4.1 DIS Gateway Interface Requirements
tc "3.4.1 DIS Gateway Interface Requirements"§

These requirements are specified in the DG IRS.

3.4.2 DIS Gateway Interface Data Requirements
tc "3.4.2 DIS Gateway Interface Data Requirements"§

These requirements are specified in the DG IRS.

3.5 DIS Library Interface (DL-EI-1)
tc "3.5 DIS Filter Library Interface"§

The purpose for the DL/OS Interface is to provide the OS CSCI with routines to perform filtering.

3.5.1 DIS Library Interface Requirements
tc "3 5.1 DIS Filter Library Interface Requirements"§

These requirements are specified in the DL IRS.

3.5.2 DIS Library Interface Data Requirements
tc "3.5.2 DIS Filter Library Interface Data Requirements"§

These requirements are specified in the DL IRS.

4 Quality Assurance
tc "4 Quality Assurance"§

Not applicable.

5 Preparation for Delivery
tc "5 Preparation for Delivery"§

Not applicable.

6 Notes
tc "6 Notes"§

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

6.1 Keyword Usage
tc "6.1 Keyword Usage"§

This IRS adheres to the following word usage:

> *Shall* has been used only where a particular feature, capability, or method of operation is mandatory.
>
> *Should* has been used only where a particular feature, capability, or method of operation is recommended.
>
> *May* and *need not* have been used only where a particular feature, capability, or method of operation is optimal or to suggest a possible design approach to a requirement.
>
> *Will* has been used to indicate futurity, never to indicate any degree of requirement.

6.2 Acronyms and Abbreviations
tc "6.2 Acronyms and Abbreviations"§

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

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

Acronym/ Abbreviation	Meaning
ACETEF	Air Combat Environment Test and Evaluation Facility
ADIS	Ada Distributed Interactive Simulation
AJPO	Ada Joint Program Office
ARPA	Advanced Research Project Agency
CSCI	Computer Software Configuration Item
DARPA	Defense Advanced Research Project Agency
DL	DIS Library
DG	DIS Gateway
DIS	Distributed Interactive Simulation
DON	Department of the Navy
FTEG	Flight Test and Engineering Group
IEEE	Institute of Electrical and Electronics Engineers
IRS	Interface Requirements Specification

MFS	Manned Flight Simulator
NAWCAD	Naval Air Warfare Center, Aircraft Division
OS	Ordnance Server
SETD	Systems Engineering Test Directorate
SIMNET	Simulation Networking
SRS	Software Requirements Specification

JFT-145-OS.IRS-V1, 30-Sept-94

Rev. B, 30-Sept-94

INTERFACE REQUIREMENTS SPECIFICATION

FOR THE

ORDNANCE SERVER (OS) CSCI 3

OF THE

ADA DISTRIBUTED INTERACTIVE SIMULATION (ADIS) PROJECT

CONTRACT NO. N00421-92-D-0028

CDRL SEQUENCE NO. A007

Prepared for:

Naval Air Warfare Center, Aircraft Division
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(Date)	(Date)

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