NOTE: The cover page of this standard has been changed for administrative reasons. There are no other changes to this document.

NOT MEASUREMENT SENSITIVE

MIL-STD-2220(AS)
11 February 1988

DEPARTMENT OF DEFENSE

INTERFACE STANDARD

SPECIFICATION FORMAT FOR TARGET AUXILIARY AND AUGMENTATION SYSTEMS

AMSC N/A FSC 1550

DEPARTMENT OF DEFENSE
Washington, DC 20301-1900

Target Auxiliary and Augmentation Systems, Preparation of Interface Specifications for

MIL-STD-2220(AS)

1. This standard is approved for use by the Naval Air Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Air Engineering Center, Systems Engineering and Standardization Department (SESD) Code 53, Lakehurst, NJ 08733-5100, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

This military standard sets forth NAVAIR requirements, guidelines and instructions for the preparation of interface specifications for the control and definition of the interface and installation characteristics of target auxiliary and augmentation systems that are required to be functionally and physically interchangeable between two or more types of NAVAIR targets managed by the Target Systems Program Coordinating Office, APC-208.

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1. SCOPE

1.1 Purpose. The purpose of this standard is to standardize the preparation of Target Auxiliary/Augmentation Systems (TA/AS) interface specifications.

1.2 Scope. This standard establishes the format, content, and procedures for the preparation of TA/AS interface specifications.

1.2.1 Application guidance. An interface specification will be mandatory whenever the mission essential target item will be required to be functionally and physically interchangeable between two or more types of NAVAIR targets, or when the item is only used in one target type and is intended for breakout as competitively procured Government equipment to be furnished to the target contractor.

1.2.2 Tailoring. Tailoring of Appendix A to suit unique requirements of the TA/AS shall be accomplished as follows:

a. Requirements that do not properly fall under a given title or paragraph will be included as an additional paragraph in the appropriate section of the interface specification.

b. Conversely, the notation "not applicable" shall be entered after each paragraph or title that is not applicable.

1.2.3 Method of reference. The Navy activity responsible for procurement of the TA/AS item will be responsible for referencing this standard in the contract solicitation statement of work, and for preparing a DD Form 1423 Contract Data Requirements List which incorporates the Data Item Description listed in 6.2.

1.2.4 Classification. The mission essential target items to be classified as TA/AS hereunder will be determined and designated by the NAVAIR Target Systems Program Coordination Office, APC-208.

2. REFERENCED DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this standard to the extent specified herein.

MILITARY STANDARDS

MIL-STD-961 Military Specifications and Associated Documents, Preparation of

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specified procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. DEFINITIONS

3.1 NAVAIR. NAVAIR as used in the context of this standard is defined as Naval Air Systems Command, Target Systems Program Coordinating Office, APC-208, Washington, D.C.

4. GENERAL REQUIREMENTS

4.1 Interface specification preparation. Unless otherwise specified on the Contract Data Requirements List (CDRL), DD Form 1423, included in the contract for the TA/AS item, a preliminary draft of the Interface Specification shall be prepared and submitted to the Government for review and comment. Dependent upon the complexity in responding to the Government comments, two additional Interface Specification issues shall be required, a smooth draft and a final issue with change pages as required to obtain NAVAIR approval.

5. DETAIL REQUIREMENTS

5.1 Criteria. The detail requirements for the preparation and development of the interface specification shall be as contained in APPENDIX A and APPENDIX B.

6. NOTES

6.1 Intended use. This standard is intended for use in obtaining a TA/AS Interface Specification or revisions which will serve as the official NAVAIR document for interfacing TA/AS equipment with NAVAIR target systems.

6.2 Data requirements list and cross-reference. When this standard is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirement List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in

accordance with the approved CDRL incorporated into the contract. When the provisions of the DOD FAR clause on data requirements (currently DOD FAR Supplement 52.227-7031) are invoked, and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this standard is cited in the following paragraphs.

Task paragraph	Data requirements	Applicable DID	Options
1.2.3	Military Specification	DI-MISC-80001	-----

(Data item descriptions related to this standard, and identified in section 6 will be approved and listed as such in DoD 5010.12L, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.3 Subject term (key word) listing.

Interface Specification, Format and Preparation of

Custodian:
NAVY - AS

Preparing Activity:
NAVY - AS

(Project 1550-N006)

APPENDIX A

REQUIREMENTS FOR PREPARATION OF INTERFACE SPECIFICATIONS FOR TARGET AUXILIARY AND AUGMENTATION SYSTEMS

10. GENERAL

10.1 Scope. This appendix identifies the content and format for the preparation of interface specifications for Target Auxiliary and Augmentation Systems (TA/AS). The guidelines delineated herein are mandatory for use in preparing the interface specification.

20. REFERENCED DOCUMENTS

20.1 Government documents.

20.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation form a part of this standard to the extent specified herein.

MILITARY STANDARD

MIL-STD-961 Military Specifications and Associated Documents, Preparation of

30. DEFINITIONS: Not applicable.

40. GENERAL REQUIREMENTS

40.1 Format organization. The format of the interface specification standard has been organized within the format guidance of MIL-STD-961, to identify TA/AS characteristics as either a functional interface control feature (i.e. a TA/AS interface performance characteristic) which must be controlled to establish functional stability requirements with the interfacing systems, or as an installation control feature (i.e., a TA/AS operating characteristic such as EMI, or a physical characteristic such as weight) which must be controlled for TA/AS installation into a Target. Accordingly, additions to the format (see 1.2.2) to include characteristics peculiar to each TA/AS item shall be in accordance with the aforementioned organization of the standard format.

50. DETAILED REQUIREMENTS

50.1 Section 2.0 preparation. Section 2.0 of the interface specification titled Applicable Documents shall be prepared in accordance with the guidance and requirements of MIL-STD-961.

APPENDIX A

50.2 Standard statements. When the standard interface specification paragraph begins with, "This paragraph shall state that,", the succeeding standard statement shall be repeated in its entirety in the TA/AS interface specification, unless otherwise directed via Government comments.

50.3 U.S. standard vs metric units. Weights and measures shall be expressed in U.S. Standard units, except that when U.S. Standard equipment interfaces with metric equipment, the interfacing parameters shall be shown in both systems of units.

50.4 Figures, drawings, illustrations. Refer to MIL-STD-961 for guidance relative to figures, drawings and illustrations which shall comply with the following:

a. Each one shall have a title, a number, a page number, and an interface specification identification number.

b. Each one shall be compatible with the line contrast of the printed text to ensure good reproduction.

c. Each one shall be located on or following the page of reference.

d. When necessary, page reductions are preferred to folding. However, foldouts are acceptable for technical clarity.

50.5 Interface specification numbering. Each TA/AS item interface specification shall be assigned a NAVAIR "AD" number which will be requested by the procuring activity from NAVAIR (AIR-51122) after contract award. The number will be assigned upon submittal of the first draft to AIR-51122 for a format review.

APPENDIX B
SPECIFICATION FORMAT

(AD Number)
(DATE)

NAVAL AIR SYSTEM COMMAND
INTERFACE SPECIFICATION
(Insert model designation of TA/AS)

1. SCOPE

1.1 General. The guidelines delineated herein are mandatory for use in preparing the interface specification. This paragraph shall state that, this Interface Specification controls the interface requirements for the enter type of Target Auxiliary/Augmentation Systems (TA/AS) equipment . This Interface Specification includes the interfaces with the target avionics and the ground control station (when applicable), and installation interfaces.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplemental thereto, cited in the solicitation.

MILITARY SPECIFICATIONS

MIL-B-5087	Bonding, Electrical, and Lightning Protection, For Aerospace Systems
MIL-W-5088	Wiring, Aerospace Vehicle
MIL-E-5400	Electronic Equipment, Airborne, General Specification For
MIL-T-5422	Testing, Environmental, Airborne Electronic and Associated Equipment
MIL-E-6051	Electromagnetic Compatibility Requirements, System

MILITARY STANDARDS

MIL-STD-461	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference

(Copies of specifications, standards, handbooks, drawings, publications, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

APPENDIX B

(AD Number)
(DATE)

3. REQUIREMENTS

3.1 Description.

3.1.1 TA/AS item. In this paragraph, identify the TA/AS item for which interface requirements will be given. Provide a comprehensive description of the functional characteristics of the TA/AS items. Also, include reference to the specification that defines the TA/AS item characteristics.

3.1.2 Target. This paragraph shall state that the target will be the vehicular platform for the internal or external installation of the TA/AS item.

3.1.3 TA/AS item ground control console. When applicable, this paragraph shall describe the relationship between a ground control console and the TA/AS item (i.e., the surface terminal of a command control and telemetry link between a ground station and a TA/AS transponder). Identify any additional source data relating to the ground station by reference in the Section 6.0 notes.

3.1.4 TA/AS antenna. This paragraph shall state that installation of any target antennas, RF transmission lines and microwave components which are required to complete the installation of the target antenna system for the TA/AS item shall be Contractor Furnished Equipment (CFE).

3.1.5 Functional diagram. This paragraph shall be used to show a functional diagram of the TA/AS. The diagram shall depict the location of salient features and denote the part numbers of external configuration of the electrical connectors and disclose any other features that affect the interface with the electrical connectors.

3.2 Government equipment. This paragraph shall state that the government equipment to be furnished or loaned to the contractor will be specified by the procuring activity.

3.3 Interface control.

3.3.1 TA/AS item/ground station interface. This paragraph and related subparagraphs shall be used to describe in detail the requirements necessary to interface the TA/AS item with a ground control station. Provide in these paragraphs the detailed interfacing requirements to the installation contractor or activity. Data of an informative nature shall be included to give the installation contractor or activity a thorough understanding of the nature of the interface involved.

3.3.1.1 Ground-to-air interface characteristics (uplink). If applicable, this paragraph shall provide the installation contractor or activity with specific interface details between the ground control station and the TA/AS item. Include items such as command formats, target address formats, antenna requirements and characteristics, software requirements, cabling requirements and configuration management requirements. Use figure and table formats where it will aid in conveying information to the installation contractor or activity needed to complete the interface function. The ground-to-air interface may be complex or it may be simple. In the simple case, the interface may reduce to a single wire command function originating in the command link transponder of the target. It would then be sufficient to identify the appropriate connector and pin(s) where the interface takes place.

3.3.1.2 Air-to-ground interface characterstics (downlink). If applicable, this paragraph shall provide the installation contractor or activity with specific interface details between the TA/AS item and a ground control station. It will include items such as: telemetry formats, antenna requirements and characteristics, software requirements, cabling requirements and configuration management requirements. Use figures and table formats where it will aid in conveying information to the installation contractor or activity needed to complete the interface function. The air-to-ground interface may be complex or it may be simple. In the simple case, the intware requirements, cabling requirements and configuration management requirements. Use figure and table formats where it will aid in conveying information to the installation contractor or activity needed to complete the interface function.

3.3.2 TA/AS item/target avionics interface. This paragraph and related subparagraphs shall be used to describe in detail the requirements necessary to interface the TA/AS item with the avionics systems of the target. Provide the installation contractor or activity with the information and direction necessary to complete the interface between the TA/AS item and the target avionics. Data of an informative nature shall be included to give the installation contractor or activity a thorough understanding of the nature of the interface involved.

3.3.2.1 TA/AS item outputs to target avionics. If applicable, this paragraph shall provide the installation contractor or activity with the detailed information required to interface the output functions of the TA/AS item with the components of the target avionics system. Identify the output functions, related synchronizing signals, state logic levels and current sourcing and sinking limits, impedances and other applicable characteristics pertinent to establishing the interface. Use table formats and diagrams as required to clarify the interface requirements.

3.3.2.2 Target avionics inputs to TA/AS item. If applicable, this paragraph shall provide the installation contractor or activity with the detailed information required to interface the input functions from the target avionics system to the TA/AS item. Identify the input functions, related synchronizing signals, state input voltage and current levels, impedance levels and other applicable characteristics pertinent to establishing the interface. Provide tables and diagrams as required to clarify the interface requirements.

3.3.3 TA/AS item/weapon or gunnery system interface. This paragraph and related paragraphs shall be used to describe in detail the TA/AS item characteristics necessary to complete the interface, active or passive, with projectiles, and weapon systems. Data of an informative nature shall be included to give the installation contractor or activity a thorough understanding of the characteristics of the interface involved.

3.3.3.1 TA/AS item outputs to weapons or gunnery systems. If applicable, this paragraph shall provide the installation contractor with detailed information pertinent to establishing the output functions and characteristics of the TA/AS item to interface with projectiles, missiles or other air vehicles. Use table and diagrams, as required, to clarify the interface requirements.

3.3.3.2 Weapons or gunnery systems inputs to TA/AS item. If applicable, this paragraph shall provide the installation contractor or activity the detailed characteristics of the input functions, active or passive, from projectiles, missiles or other air vehicles to the TA/AS item. Provide tables and diagrams, as required, to clarify the interface requirements.

3.4 Installation control. Subparagraphs hereof shall specify the installation requirements of the TA/AS item under the stated conditions and environment when inspected, tested and demonstrated in accordance with Section 4.0.

3.4.1 Modularization. Provide in this paragraph, the detailed information relating to multiple modular configurations of the TA/AS item when the TA/AS item is capable of being modularly disassembled for installation into a target.

3.4.2 Orientation. This paragraph shall describe to the installation contractor or activity any general restrictions and precautions for installation, access or removal to be considered in the location and orientation of the TA/AS item (e.g., orientation of the TA/AS item control panel to allow accessibility for operation).

3.4.3 Physical characteristics. Subparagraphs hereof shall specify the physical characteristics of the TA/AS item.

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(DATE)

3.4.3.1 Dimensions and mounting provisions. This paragraph shall identify the TA/AS item dimensions and mounting provisions and shall be shown in a drawing or figure with a table of tolerances.

3.4.3.2 Weights. This paragraph shall provide the weight of the TA/AS item and state that, the weight of any installation contractor furnished antennas and cabling will not be included.

3.4.3.3 Center of gravity. This paragraph shall provide the TA/AS item center of gravity location or state that it is located on the TA/AS item drawing or figure or paragraph 3.4.3.1.

3.4.4 Electrical power. This paragraph shall specify in detail the electrical power requirements of the TA/AS item. The voltages and currents required by the TA/AS item shall be specified. Voltage or current tolerances required for interfacing shall be specified.

3.4.4.1 Electrical connectors. This paragraph shall cover the following requirements. A list of the TA/AS item connectors or equivalents shall be provided. The pin assignments shall be documented in tabular format.

3.4.4.2 Cabling. This paragraph shall state that the cabling shall be fabricated and installed in accordance with MIL-W-5088. The cabling shall be unshielded, except that a minimum number of individual wires shall be shielded, as required, to meet controlled electromagnetic interference limits. As applicable, this paragraph shall state that the TA/AS item interface cabling does not include installation contractor cabling to connect the TA/AS item with the target.

3.4.4.3 Reverse voltage protection. Reverse voltage protection is the required design approach. This paragraph shall provide data to identify reverse voltage polarity protection to avoid damage in a case of reverse voltage application.

3.4.4.4 Bonding. The TA/AS equipment contractor shall provide in this paragraph sufficient data applicable to the design of the TA/AS item for the installation contractor or activity to include antennas and cabling in the target in accordance with MIL-B-5087, Class A and B, and other appropriate classes.

3.4.5 Electromagnetic Interference (EMI) limits. This paragraph shall specify the TA/AS item EMI design limits in accordance with MIL-STD-461 requirements.

3.4.5.1 RF characteristics. In this paragraph, the TA/AS contractor shall provide a tabular format of RF information to support the preparation of a

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(DATE)

Electromagnetic Compatability (EMC) test plan by the installation contractor or activity to meet MIL-E-6051 requirements.

3.4.6 Temperature limits. This paragraph shall include the operating temperature limitations of the TA/AS item when operating in the target and exposed to the temperature extremes of MIL-E-5400. Define the mounting baseplate temperature limitation.

3.4.7 Environmental compatibility. This paragraph shall specify the TA/AS item environmental requirements in accordance with MIL-E-5400. The TA/AS data shall specify performance requirements after exposure to temperature, altitude, humidity, rain, ice, hail, snow, lightning, salt fog, salt spray and dust, shock, vibration and noise as required by MIL-T-5422.

3.4.8 Warm up. In this paragraph, provide the required period for the TA/AS item to reach stable performance prior to operation under normal and extreme conditions.

3.4.9 Safety. This paragraph shall incorporate provisions to minimize dangers to personnel, equipment and facilities. The provisions shall also include indications of dangerous overheating.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the TA/AS contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the TA/AS contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of Sections 3. The inspection set forth in this interface specification shall become a part of the TA/AS contractor's overall inspection system or quality program. The absence of any inspection requirements in the interface specification shall not relieve the TA/AS contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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(AD Number)
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4.2 Classification of tests. This paragraph shall include the classification of the types of test the TA/AS item will be subjected to, as identified in 4.6.

4.3 Conditions and precautions. In this paragraph, identify any nonstandard testing conditions and necessary precautions to avoid damage during installation and testing.

4.4 Common Support Equipment (CSE). This paragraph shall identify the functional and physical interface relationships required between the TA/AS item and Common Support Equipment (CSE) if required.

4.5 Peculiar Support Equipment (PSE). This paragraph shall identify the functional and physical interface relationships between the TA/AS item and any Peculiar Support Equipment (PSE) if required.

4.6 Test procedures. This paragraph shall identify documentation which discloses operational test procedures for the TA/AS item.

4.6.1 Operational test procedure. In this paragraph, the TA/AS contractor/manufacturer shall provide the test procedure for operational tests. The tests will be sufficient to check the TA/AS characteristics to assure that the TA/AS item to be installed in a target is operational and has not been damaged in delivery. Describe the functional characteristics, such as operational or fault isolation and specific tests required, such as data bits, receiver signal strength, supply voltages and timing waveforms which would be tested by common support equipment.

5. PACKAGING: This heading shall state, "Not applicable to this interface specification."

6. NOTES

The contents of this section are not contractually binding. Any information which should be made known as background information or as instructions shall be included herein.

6.1 Intended use. This paragraph shall state that, this Interface Specification is intended to be used by the TA/AS installation contractor or activity for integration of the TA/AS equipment into a target. In the event that any TA/AS interface or installation characteristics controlled by the Interface Specification becomes a candidate for revision, approval for change control will be through the NAVAIR (APC 208) Engineering Change Proposal (ECP) process.

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(AD Number)
(DATE)

6.2 Definitions.

6.2.1 "Shall" and "will" discriminators. The term "shall" specifies a contractor requirement, and the term "will" identifies Government intent.

6.2.2 "TA/AS contractor", "installation contractor" and "installation activity". The term "TA/AS Contractor" refers to the TA/AS equipment manufacturer or the manufacturer's representative. The term "Installation Contractor" refers to the contractor who will physically install/integrate the TA/AS equipment into a target. An "Installation Activity" is any government agency who physically installs/integrates the TA/AS equipment into a target.

6.2.3 Contractor Furnished Equipment (CFE). The term "Contractor Furnished Equipment" (CFE) refers to the equipment furnished by the installation contractor to interface the TA/AS equipment with the vehicles as directed by the government contracting activity.

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document*(s)* or to amend contractual requirements.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-STD-2220(AS)	Interface Specifications for Target Auxiliary & Augmentation

3a. NAME OF SUBMITTING ORGANIZATION Systems, Preparation of	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
	☐ USER
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ MANUFACTURER
	☐ OTHER *(Specify)*:

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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