

MIL-S-19491F
 5 November 1985
 SUPERSEDING
 MIL-S-19491E
 1 March 1977

MILITARY SPECIFICATION
 SEMICONDUCTOR DEVICES, PACKAGING OF

This specification is approved for use by all Departments and Agencies of the Department of Defense

1. SCOPE

1.1 Scope. This specification covers the requirements for the preservation, packing and container marking of all types of semiconductor devices (such as microwave diodes, junction field effect transistors and light emitting diode fiber optic sources) in FSC's 5961 and 6030 and associated accessories in FSC 5999 (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards 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 supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

QQ-S-781	- Strapping, Steel, and Seals.
PPP-B-566	- Boxes, Folding, Paperboard.
PPP-B-601	- Boxes, Wood, Cleated-Plywood.
PPP-B-621	- Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636	- Boxes, Shipping, Fiberboard.
PPP-B-676	- Boxes, Setup.
PPP-C-795	- Cushioning Material, Flexible, Cellular, Plastic Film for Packaging Applications.
PPP-C-1752	- Cushioning Material, Packaging, Unicellular Polyethylene Foam, Flexible.
PPP-C-1797	- Cushioning Material, Resilient, Low Density, Unicellular, Polypropylene Foam.
PPP-C-1842	- Cushioning Material, Plastic, Open Cell (for Packaging Applications).

MILITARY

MIL-P-116	- Preservation, Methods of.
MIL-B-117	- Bags, Sleeves and Tubing - Interior Packaging.
MIL-S-19500	- Semiconductor Devices, General Specification for.
MIL-B-81705	- Barrier Materials, Flexible, Electrostatic-Free, Heat Sealable.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Space and Naval Warfare Systems Command, ATTN: Code 8111, Department of the Navy, Washington, DC 20363, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MIL-S-19491F

STANDARDS

FEDERAL

FED-STD-123 - Marking for Shipment (Civil Agencies).

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
 MIL-STD-129 - Marking for Shipment and Storage.
 MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
 MIL-STD-750 - Test Methods for Semiconductor Devices.
 MIL-STD-794 - Parts and Equipment, Procedures for Packaging of.
 MIL-STD-45662 - Calibration Systems Requirements.

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

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 General. The packaging terms used herein shall be in accordance with the definitions listed in MIL-STD-794. The following general requirements apply, as applicable, to levels A, B, and C.

3.1.1 Pairs and sets. Semiconductor devices furnished in pairs or sets under one national stock number (NSN) shall be unit packaged as one pair or one set, as applicable. When specified in a detail specification, matched diodes shall be packaged with a statement to that effect.

3.1.2 Hardware. Hardware accompanying semiconductor devices shall be protected and enclosed within the unit pack in a manner that will not damage the device or pack. When practical or when the semiconductor devices are not otherwise protected, the hardware should be mounted on each device.

3.1.3 Physical protection. Semiconductor devices and accessories shall be packaged in a manner that will ensure compliance with the applicable requirements of MIL-P-116 and this specification.

3.1.3.1 Lead and terminal protection. Leads and terminals less than 0.03 inch (0.762 mm) in smallest dimension shall be protected by container design, die-cut inserts, vials or suitable noncorrosive supporting materials or devices. Leads or terminals shall extend outward and be maintained in a configuration as manufactured without causing undue loads or stresses capable of causing damage to the devices. Materials used to maintain item position and lead configuration shall permit item removal and replacement without bending the leads.

3.1.3.2 Wrapping and cushioning. All semiconductor devices shall be wrapped or cushioned with noncorrosive materials which shall not crumble, flake, powder or shed. In addition, nonstatic generating materials shall be used for semiconductor devices susceptible to environmental field force damage (see 3.1.4). For these susceptible devices, materials conforming to type II of MIL-B-81705 or small bags conforming to MIL-B-117, type I, class A, style 2 shall be used as wraps or small pouches, respectively. Alternatively, cushioning materials conforming to PPP-C-795, class 2; PPP-C-1752, type VII, class 4; PPP-C-1797, type II; or PPP-C-1842, type III may be used. Cushioning is not required for accessories.

MIL-S-19491F

3.1.4 Environmental field force protection (shielding). Susceptible semiconductor devices shall be protected by the procedures specified herein to prevent damage to these devices from electrostatic and electromagnetic forces during handling, shipment and storage from time of manufacture until point of use (see 3.1.4.1). When specified in the contract (see 6.2), shielding from magnetic or radioactive fields shall also be required (see 3.1.4.2 and 3.1.4.3).

3.1.4.1 Electrostatic and electromagnetic protection. Electrostatic and electromagnetic protection (as well as protection from corrosion, contamination and thermal shock) shall be provided by placing the wrapped or cushioned semiconductor devices in heat sealed bags or envelopes fabricated with material conforming to MIL-B-81705, type I. To avoid capacitor effects, each bag or envelope shall be fabricated from one continuous piece of barrier material. For immediate use applications and for those instances where no exposure to electrostatic or electromagnetic fields is anticipated, barrier material conforming to type II of MIL-B-81705 may be used to meet level C protection requirements. Electrostatic and electromagnetic protection is mandatory for all:

- a. Microwave diodes.
- b. Insulated gate field effect transistors (metal oxide semiconductor field effect transistors or MOSFET's).
- c. Junction field effect transistors.
- d. Silicon controlled rectifiers.
- e. Hybrid semiconductors.
- f. Small signal Schottky diodes.
- g. Semiconductor devices not otherwise named which operate at a frequency above one gigahertz.

3.1.4.2 Magnetic protection. Protection from simple magnetic fields (as opposed to RF or electromagnetic radiation) shall be accomplished by completely enclosing the semiconductor devices in metals or ferritic compositions of sufficient thickness to provide the degree of protection required.

3.1.4.3 Radioactive protection. Protection against radioactivity shall be accomplished by completely enclosing the semiconductor devices in lead or lead filled compositions of sufficient thickness to provide the degree of protection desired.

3.1.5 Exterior containers. Exterior containers shall be of minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered or otherwise designated items to the greatest extent practicable (see 3.3).

3.1.6 Army acquisitions.

3.1.6.1 Levels A and B intermediate packs. Intermediate containers shall not exceed 40 pounds (18.144 kilograms) net weight, or a maximum size of 1.5 cubic feet (0.04248 cubic meter) with at least two dimensions not exceeding 16 inches (40.64 centimeters). Intermediate containers shall not be required when the total quantity to be shipped will result in only one intermediate pack per shipping container (see 3.2.1.4 and 3.2.1.5). Intermediate containers shall conform to PPP-B-636, class weather-resistant.

3.2 Preservation. Preservation shall be in accordance with level A, B or C, as specified (see 6.2).

3.2.1 Level A.

3.2.1.1 Cleaning. Semiconductor devices and accessories shall be cleaned in accordance with MIL-P-116, process C-1.

MIL-S-19491F

3.2.1.2 Drying. Semiconductor devices and accessories shall be dried in accordance with MIL-P-116.

3.2.1.3 Preservatives. Contact preservatives shall not be used.

3.2.1.4 Unit packs.

3.2.1.4.1 Semiconductor devices. Each semiconductor device, protected as required under 3.1, shall be individually unit packed in accordance with submethod IA-8 of MIL-P-116. Bags or envelopes conforming to MIL-B-117, type I, class F, style 1 shall be used for those semiconductor devices specified in 3.1.4.1.

3.2.1.4.2 Accessories (when separately acquired). Accessories, such as insulator disks and mounting pads, shall be unit packed in accordance with MIL-P-116, method III. Unit pack quantities for other than five each shall be as specified (see 6.2).

3.2.1.5 Intermediate packs. Semiconductor devices, unit packed as specified in 3.2.1.4.1, shall be placed in intermediate containers conforming to variety 2 of PPP-B-566 or PPP-B-676. Intermediate containers shall be uniform in size, shape, and quantities, shall be of minimum tare and cube, and shall contain multiples of five unit packs not to exceed 100 unit packs. No intermediate packs are required when the total quantity shipped to a single destination is less than 100 unit packs.

3.2.2 Level B. The level B preservation for semiconductor devices and accessories shall be identical to that specified for level A except that submethod IC-1 or IC-3 shall be used to meet the unit pack requirements for those semiconductor devices not specified in 3.1.4.1.

3.2.3 Level C. In addition to the applicable provisions of 3.1, the level C preservation for semiconductor devices and accessories shall conform to the MIL-STD-794 requirements for this level. Unless otherwise specified in the contract (see 6.2), the quantity per unit pack shall be at the option of the supplier.

3.3 Packing. Packing shall be level A, B or C, as specified (see 3.1 and 6.2).

3.3.1 Level A. Semiconductor devices and accessories, preserved as specified in 3.2, shall be packed in wood containers conforming to PPP-B-601, overseas type or PPP-B-621, class 2. Closure and strapping shall be in accordance with the applicable container specification except that metal strapping shall conform to QQ-S-781, type I, finish A. The requirements for level B packing shall be used when the total quantity of a stock numbered semiconductor device or accessory for a single destination does not exceed a packed volume of one cubic foot.

3.3.2 Level B. Semiconductor devices and accessories, preserved as specified in 3.2, shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant, style optional, special requirements. The requirements for box closure, waterproofing and reinforcing shall be in accordance with method V of the PPP-B-636 appendix.

3.3.3 Level C. Semiconductor devices and accessories, preserved as specified in 3.2, shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirements. Closures shall be in accordance with the PPP-B-636 appendix.

3.4 Marking.

3.4.1 Standard marking. In addition to any special or other identification marking required by the contract (see 6.2), each unit, intermediate, and exterior container and unitized load shall be marked in accordance with MIL-STD-129. The complete military or contractor's type or part number, as applicable, (including the FSCM), shall be marked on all unit and intermediate packs in accordance with the identification marking provisions of MIL-STD-129. When specified in the contract (see 6.2), the marking of domestic shipments for civil agencies shall be in accordance with FED-STD-123.

MIL-S-19491F

3.4.2 Special marking. In addition to the marking requirements of 3.4.1 and regardless of the level or type of packaging specified, all of the unit intermediate, and exterior containers for those semiconductor devices specified in 3.1.4.1 shall be marked as specified for sensitive electronic devices in MIL-STD-129.

3.4.3 Additional unit pack marking of MIL-S-19500 semiconductor devices. The unit packs of those semiconductor devices, acquired in conformance with MIL-S-19500, shall be additionally marked with the following:

- a. JAN prefix.
- b. Manufacturers designating symbol.
- c. Assembly plant code.
- d. Lot identification code.
- e. Inspection date.
- f. Reinspection date (if reinspection is applicable).
- g. Country of origin.

Serialization may be included as a serialization range of individual serialized semiconductor devices.

3.5 First article and quality conformance inspections. First article and quality conformance inspections and tests shall be required as specified in 4.4 and 4.5, respectively. Samples for these tests shall be furnished in accordance with the procedures outlined in 4.4 and 4.5. The performance of the visual and dimensional inspections, rough handling tests, and leakage tests shall conform to the inspections and tests outlined in 4.6.1, 4.6.2.1, and 4.6.2.2, respectively.

3.5.1 Functional requirements.

3.5.1.1 Rough handling test (when specified, see 6.2). When packs have been tested in accordance with 4.6.2.1, all materials and components comprising each pack shall be free from damage or evidence of misplacement which might affect the utility of the preservation method or pack. The semiconductor devices and associated accessories within the tested packs shall show no visible signs of damage. When specified in the contract (see 6.2), functional tests in accordance with the group A inspection requirements of MIL-S-19500 shall be conducted on those semiconductor devices subjected to the rough handling test to determine freedom from operational malfunction. The examination of the devices tested under this group A inspection shall be in accordance with the visual and mechanical inspection requirements specified in method 2071 of MIL-STD-750.

3.5.1.2 Leakage test (when applicable). When a barrier enclosed unit pack has been tested in accordance with 4.6.2.2, there shall be no evidence of moisture within the unit pack.

3.6 Workmanship. The quality of workmanship shall assure acceptance of the completed preservation, packing, and marking requirements in accordance with the inspections specified in section 4.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract (see 6.2), the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the 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.

MIL-S-19491F

4.1.1 Responsibility for compliance. All items must meet all requirements of section 3. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the 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.

4.1.2 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with MIL-STD-45662.

4.1.3 Inspection conditions. All inspections shall be performed in accordance with the test conditions specified in the general requirements of MIL-STD-202.

4.2 Classification of inspections. The inspections specified herein are classified as follows:

- a. Materials inspection (see 4.3).
- b. First article inspection (see 4.4).
- c. Quality conformance inspection (see 4.5).

4.3 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials used are in accordance with the applicable requirements specified herein.

4.4 First article inspection. When specified (see 6.2), first article inspection shall be performed by the contractor, after award of contract and prior to production at a time and location acceptable to the Government. First article inspection shall not be required:

- a. When there have been no changes in materials, processes, or packaging design that will not adversely affect item protection since the last recorded inspection.
- b. When detailed packaging instructions are furnished by the acquisition activity.
- c. When level C protection is specified.
- d. When a prior successful inspection was conducted on a like item and pack (subject to the approval of the administrative contracting officer).

4.4.1 Sample size. One sample unit consisting of a level A or level B, as applicable, fully packed shipping container shall be submitted for first article inspection. The sample for the rough handling test shall consist of the pack selected for first article inspection. The sample for the leakage test shall be five unit packs selected at random from the first article exterior pack (shipping container).

4.4.2 Inspection routine. The sample shall be subjected to the inspections specified in tables I and II. The leakage test, when applicable, shall follow the rough handling test.

4.4.3 Failures. One or more failures shall be cause for refusal to grant first article approval.

4.4.4 Resubmission of first article sample. If the sample fails to pass first article inspection, the contractor shall change the preservation and packing processes to correct the cause of the deficiency. First article inspection shall be performed on a corrected sample to prove that the corrective action is acceptable.

MIL-S-19491F

TABLE I. Visual and dimensional inspections.

Major defects	Requirement paragraph	Method paragraph
Packaging materials not conforming to referenced specification requirements- - - - -	Section 3	
Insufficient field force protection (shielding)-	3.1.4	
Punctured or improperly fabricated barrier bag-	3.1.4.1, 3.2.1.4.1, and 3.2.2	
Uncleaned or improperly cleaned items- - - - -	3.2.1.1 and 3.2.1.2	4.6.1
Incorrect preservation method- - - - -	3.2.1.4.1, 3.2.1.4.2 and 3.2.2	
Wrong quantity per unit pack - - - - -	3.2.1.4.1, 3.2.1.4.2, and 3.2.3	
Nonuse or incorrect applications of intermediate containers - - - - -	3.2.1.5	
Improper box closures- - - - -	3.3.1, 3.3.2, and 3.3.3	
Omitted, incorrect, or illegible marking - - - -	3.4	

TABLE II. Functional inspections.

Major defects	Requirement paragraph	Method paragraph
Rough handling (when specified)- - - - -	3.5.1.1	4.6.2.1
Leakage (when applicable)- - - - -	3.5.1.2	4.6.2.2

4.5 Quality conformance inspection. This inspection shall consist of the inspections and tests specified in tables I and II, respectively.

4.5.1 Inspection lot. An inspection lot, as far as practicable, shall consist of unit or exterior (shipping) packs produced under essentially the same conditions and offered for inspection at one time. For the purpose of selecting samples to be inspected and tested for compliance with the requirements of this specification, either items in process or completed packs except as stated herein, may be combined into lots without regard to individual items, contracts, or the quantities therein. Unit packs of the same size and made from the same packaging materials may be grouped together except when item complexity, item value, or the complexity of the preservation method warrants that the inspection of such items be performed on a separate basis. A separate application of the sampling or inspection procedure shall be made on these items. The combination of items to be subjected to inspection shall be determined by either the Government or the contractor, subject to the approval of the Government.

4.5.2 Visual and dimensional inspection. Visual and dimensional inspection shall consist of those inspections specified in table I.

4.5.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for special inspection level S-4. The acceptable quality level (AQL) shall be 4.0 percent defective for all inspections of table I combined.

4.5.2.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

MIL-S-19491F

4.5.2.3 Disposition of sample units. Sample units which have passed all the inspections specified in table I may be delivered on the contract, provided the lot is accepted.

4.5.3 Functional inspection. Functional inspection shall consist of the tests specified in table II.

4.5.3.1 Sampling plan. Sampling plans shall be as follows:

- a. One sample unit for the rough handling test shall be selected whenever the design of the item or packaging is changed.
- b. For unit packs requiring waterproof or water-vaporproof barriers, five sample units for the leakage test shall be selected daily at random from the first lot processed each day. Five additional samples shall be selected at random from the day's total production.
- c. The leakage test shall also be performed following the rough handling test on unit packs requiring waterproof or water-vaporproof barriers. Five sample units or the number of units contained within the shipping container (if less than five) shall be selected.

4.5.3.2 Failures. One or more failures shall be cause for rejection of the lot.

4.5.3.3 Disposition of sample units. Sample units which have passed the inspections specified in table II may be delivered on the contract if the lot is accepted and opened packs have been reprocessed.

4.5.3.4 Noncompliance. If a sample fails to pass the inspections specified in table II, the contractor shall take corrective action on the materials or processes or both, as warranted, on all unit, intermediate, and exterior (shipping) packs which can be corrected and which were processed under essentially the same conditions, with essentially the same materials, and which are considered subject to the same failure. Acceptance of the unit, intermediate, and exterior packs shall be discontinued until corrective action has been taken and the applicable inspections specified in table II have been repeated on additional sample units. (All inspections or the inspection which the original sample failed shall be at the option of the Government.) Inspections specified in table II may be reinstated; however, final acceptance shall be withheld until the reinspection in accordance with table II has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and corrective action taken shall be furnished to the administrative contracting officer.

4.6 Methods of inspection and tests.

4.6.1 Visual and dimensional inspections. Unit, intermediate, and exterior packs shall be examined to verify that the materials, designs, methods, physical limitations, marking, and workmanship are in accordance with the applicable requirements (see 3.1 through 3.6).

4.6.2 Functional tests.

4.6.2.1 Rough handling. Packs shall be subjected to the applicable rough handling tests and the interpretation of results or cause for rejection as specified in 3.5.1.1 and MIL-P-116.

4.6.2.2 Leakage. When a waterproof or water-vaporproof barrier is required, the unit pack shall be subjected to the applicable leakage test and interpretation of results specified in 3.5.1.2 and MIL-P-116.

5. PACKAGING

This section is not applicable to this specification.

MIL-S-19491F

6. NOTES

6.1 Intended use. The preservation, packing, and marking specified herein are intended for direct shipments to the Government. However, this specification may also be used for the preparation of semiconductor devices and accessories for shipment from the parts contractor to the original equipment manufacturer.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. If shielding from magnetic or radioactive fields is required (see 3.1.4).
- c. Levels of preservation and packing (see 3.2 and 3.3).
- d. Quantity per unit pack, if other than specified (see 3.2.1.4.2 and 3.2.3).
- e. Whether any other standard or special marking is required (see 3.4).
- f. If FED-STD-123 is required for civil agency marking (see 3.4.1).
- g. Whether a rough handling test is required (see 3.5.1.1).
- h. Whether semiconductor device functional tests are required (see 3.5.1.1).
- i. Whether the contractor is not responsible for the performance of all inspection requirements (see 4.1).
- j. Whether first article inspection is required (see 4.4).

6.3 First article. The sample pack submitted for first article inspection (when satisfactorily performed as specified in 4.4) will serve as the production standard for subsequent packaging operations. The contractor should inform the acquisition activity or the activity administering the contract of the time and location of this specification so that the Government representative will have an opportunity to witness the tests.

6.4 Conditions for use of level B preservation. When level B preservation is specified (see 3.2), this level of protection should be reserved for the acquisition of semiconductor devices and accessories for resupply worldwide under known favorable handling, transportation and storage conditions (see 3.2.2).

6.5 Subject term (key word) listing.

Diodes
 Electromagnetic protection
 Electrostatic protection
 Environmental field force protection
 Field force protection
 Magnetic protection
 Microwave diodes
 MIL-S-19500 semiconductor devices
 Packaging
 Physical protection
 Radioactive protection
 Semiconductors
 Semiconductor devices
 Sensitive electronic devices
 Shielding
 Special marking
 Transistors

MIL-S-19491F

6.6 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:

Army - CR
Navy - EC
Air Force - 99
DLA - ES

Review activities:

Army - AR, MI
Navy - OS, SH
Air Force - 17, 69, 71, 85

User activities:

Army - None
Navy - AS, CG, MC, SA
Air Force - 11

Civil agency coordinating activity:

NASA - NA

Preparing activity:

Navy - EC

Agent:

DLA - ES

(Project PACK-0783)

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.

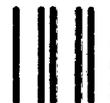
NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend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

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE NAVY

Space and Naval Warfare System Command
Washington, DC 20363



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 12503 WASHINGTON D. C.

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

Commander
Space and Naval Warfare Systems Command
Department of the Navy
Washington, DC 20363
ATTN: SPAWAR 8111



