

INCH-POUND

MIL-PRF-18494E(AS)

27 July 1999

SUPERSEDING

MIL-L-18494D(AS)

18 December 1986

PERFORMANCE SPECIFICATION

LIFE RAFTS, INFLATABLE, MULTI-PLACE

This specification 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.

1. SCOPE

1.1 Scope. This specification covers the requirements for inflatable life rafts of 8-man, 12-man, and 20-man capacity.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Air Warfare Center Aircraft Division, Code 414100B120-3, Highway 547, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter

AMSC N/A

FSC 4220

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-810 - Environmental Engineering Considerations
and Laboratory Tests.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

PUBLICATIONS

FEDERAL AVIATION ADMINISTRATION (FAA)

FAA TSO-C70a - Liferafts (Reversible and Nonreversible).

(Copies of FAA publications are available from the Department of Transportation, Federal Aviation Administration, Office of Airworthiness, Washington, D.C., 20402.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

3.1 General. The life raft assembly shall consist of the following components:

- a. A reduced volume packed life raft.
- b. An attached survival item/accessory container.
- c. A carrying case.

The rafts shall be constructed with heat sealed seams. The life raft shall be manufactured and designed to endure a 5 year repack cycle beginning from the date of initial packing (see 6.2). The life rafts shall meet the requirements of FAA TSO-C70a, be capable of FAA TSO-C70a certification, and meet all the requirements specified herein.

3.2 Qualification. Life rafts furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.3).

3.3 Inflation system. The inflation system shall be a zero-leak system preventing any of the gas to leak before actuation. The inflation gas shall be contained in a non-shatterable vessel. The vessel shall have a 5 year service life from the date of life raft packing (see 6.2).

3.4 Self-erecting canopy. The life raft design shall incorporate a self-erecting inflatable canopy system to provide aircrew protection from sea spray and extreme weather conditions. Raft buoyancy shall not be affected by the integrity of the canopy system.

3.4.1 Rain water collection. A means shall be provided for the collection and retention of rain water from the external surface of the canopy.

3.4.2 Reflective strips. The exterior of the life raft and canopy shall incorporate removeable, flexible reflective external surfaces to enhance the effectiveness of search and rescue operations.

3.5 Floor insulation. Provision shall be made to insulate those areas of the floor which are in contact with the occupants of the life raft.

3.6 Capacity. The rated and overload capacities of a life raft shall be based on not less than the following usable sitting areas on the deck of the life raft:

Rated capacity - 4.5 ft² per person
Overload capacity - 3 ft² per person

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3.7 Buoyancy. Loaded to its rated capacity and using an average occupant weight of not less than 200 pounds, the life raft shall have a freeboard of at least 12 inches. The life raft loaded to its overload capacity shall have a freeboard of at least 6 inches.

3.8 Containers.

3.8.1 Reduced volume packaging. The life raft shall be sealed in reduced volume packaging. The seal shall provide protection and preservation for the raft in an aircraft environment. The life raft shall be sealed in such a way as to guarantee verification of airtight packaging by visual methods.

3.8.2 Survival item/accessory container. Each life raft assembly shall include a survival item/accessory container capable of holding all the appropriate items for the aircrewmembers. Quantity, size, and weight information for these survival items is listed in table I. The accessory container shall be securely attached to the life raft and shall remain attached after inflation. The container shall be designed to keep the survival items secure during raft deployment. There shall be a provision for tiedown capability of four survival items. This container shall be easily accessible for maintenance inspection of time sensitive survival items without unpacking the life raft.

3.8.3 Carrying case. An outer carrying case shall be provided which properly fits the reduced volume packed life raft and accessory container. The life raft in its carrying case shall be capable of being properly stowed on the aircraft. Carrying case materials shall be flame resistant, fungus proof, and resistant to aircraft fuels and other fluids. The carrying case shall provide chafe protection to the life raft. The carrying case shall also provide protection for the life raft in an aircraft environment including protection against fluid intrusion. Easily distinguishable handles shall be provided so that the raft can be carried by one person, carried by two persons in tandem, or dragged by either end; none of these carrying operations shall tend to pull the carrying case open. Each handle shall be easily grasped, and its strength shall be at least four times the total weight of the life raft assembly. The design of the carrying case shall allow easy verification of the integrity of the raft seal. A remote actuation device shall be incorporated to the exterior of the carrying case. The maximum pull force required for remote actuation shall not exceed 32 lbs. The raft shall be protected against inadvertent actuation. Location of and instructions for use of the remote actuation device shall be clearly identified and marked on the carrying case surface.

3.9 Weight. The weight of the life raft assemblies minus the accessory container items shall not exceed the following:

- 8-man - 62 lbs.
- 12-man - 83 lbs.
- 20-man - 104 lbs.

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3.10 Size. The life raft assemblies including table I items shall be deployable through a 22" x 22" escape hatch.

TABLE I. Multi-place life raft survival items.

<u>DESCRIPTION</u>	<u>DIMENSIONS</u>	<u>WEIGHT</u>	<u>QUANTITY</u>		
			<u>8-MAN</u>	<u>12-MAN</u>	<u>20-MAN</u>
Desalter Kit, Sea water	5 x 4 x 2	1.49	(5)	(6)	(10)
Sea Dye Marker	3 x 3.5 x 1.25	.28	(4)	(5)	(8)
Distress Signal	5.38 x 1.69 Dia	.48	(7)	(8)	(10)
Water Storage bag	1/8 x 20.5	.21	(3)	(4)	(7)
Water Drinking, bagged	6 x 4.5 x .5	.28	(20)	(30)	(50)
First Aid Kit	8 x 3.25 x 5	1.48	(1)	(1)	(2)
Manual Reverse Osmosis Device (MROD)	23 x 5 x 6	8.60	(1)	(1)	(1)
Sunburn Cream	1.75 Dia x 1	.18	(1)	(2)	(3)
Food Packet, Liferaft	2 x 3.5 x 1	.17	(8)	(12)	(20)
Bailing sponge	5.5 x 3.25 x .25	.06	(1)	(4)	(6)
Combat Blanket	8.50 x 6 x 2.50	.70	(1)	(2)	(3)
Hand Generated Light	5 x 3 x 1	.80	(1)	(1)	(1)
Flare Gun Mk 79 Mod 0	5 x 3 x .75	.40	(1)	(1)	(2)
Strobe Light	5 x 2.50 x 1	.46	(1)	(1)	(1)
Light, Chemical	6 x .50 Dia	.15	(2)	(2)	(2)
Signal Mirror	3.75 x 2 x .25	.35	(1)	(1)	(1)
Radio PRT-5	18 x 5.5 Dia	13.50	(1)	(1)	(1)
Radio PRC-90	7 x 3 x 1.75	1.32	(1)	(1)	(1)
Battery, Radio	1 Dia x 3.5	.18	(1)	(1)	(1)
Whistle Type II	2 x 1	.06	(1)	(1)	(1)
Compass	1.75 Dia x 1	.08	(1)	(1)	(1)
Pocket Knife	1 x 5	.21	(1)	(1)	(1)
Cord, Nylon 50Ft.	2 x 6	.05	(1)	(1)	(1)
Commodity growth	+10% of total vol.				
		31.49 Total			

NOTES:

1. All dimensions are in inches.
2. Weight is in pounds, for one of each item.
3. Code card not listed (flat plastic, coated paper).
4. In cases where substitute items may be used, dimension/weight for larger item listed.
5. Survival item container shall incorporate a 10 percent "growth" factor, (total volume plus 10%).

3.11 Function/operation. The life raft shall inflate at the required pull force for its design shape in not more than 60 seconds when tested as specified in 4.9. During the inflation, the life raft shall be observed for impediment or blockage of the flow of gas, loss of gas to the ambient air, or restriction by any component or accessory. There shall be no evidence of structural or

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material failure in any respect. All the sealed areas, seams, seam tapes, and attachments shall remain intact and shall show no indication of separation. The floor shall not be distorted and there shall not be a difference in the rise between the sides of the raft. The raft shall be easily boarded by a subject wearing standard aviation life support equipment including a flight suit, survival vest, inflated life preserver, and flight boots.

3.12 Environmental.

3.12.1 Temperature extremes.

3.12.1.1 Low temperature. The life raft shall inflate into a boardable shape within 3 minutes at 0 °F (-18 °C) when tested as specified in 4.10.1.1. Inflation shall be without any hindrance to the flow of gas or restriction by any component or accessory. All the seams, seam tapes, sealed areas and attachments shall remain perfectly intact and shall show no evidence of separation. There shall be no evidence of constructional or material failure in any respect.

3.12.1.2 High temperature. The life raft shall inflate to design shape within 60 seconds at 160 °F (71 °C) when tested as specified in 4.10.1.2. Inflation shall be without any hindrance to the flow of gas or restriction by any component or accessory. All the seams, seam tapes, sealed areas and attachments shall remain perfectly intact and shall show no evidence of separation. There shall be no evidence of constructional or material failure in any respect.

3.12.2 Low pressure (altitude). The packed life raft contained in its carrying case shall withstand a low pressure environment, and rapid pressure changes when tested as specified in 4.10.2. The life raft shall show no leakage of gases and no rupture or failure of sealed packaging.

3.12.3 Sand and dust. The packed life raft contained in its carrying case shall resist the effects of an airborne sand and dust environment when tested as specified in 4.10.3. The life raft shall show no rupture or failure of sealed packaging.

3.12.4 Vibration. The packed life raft contained in its carrying case shall resist the effects of aircraft vibration when tested as specified in 4.10.4. The life raft shall show no rupture or failure of sealed packaging.

3.13 Markings. Each life raft shall be identified by name of manufacturer, contract no., date of manufacturer, and serial number. The serial number shall be assigned by the manufacturer and shall be by a block of consecutive numbers to cover the entire acquisition quantity. All markings shall be legible, durable, permanent, and thoroughly dry prior to packaging and packing.

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4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Qualification inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 Qualification inspection. The qualification inspection of the life rafts shall consist of all the examinations and tests specified in table II. The examinations and tests shall be performed in the sequence listed.

TABLE II. Qualification examinations and tests.

Inspection	Requirement	Test Method
Weight	3.9	4.6
Size	3.8, 3.10	4.7
Actuation pull force test	3.8.3	4.8
Operational test	3.6, 3.7, 3.11	4.9
Visual examination	3.3-3.5, 3.13	4.5
Temperature extremes test	3.12.1	4.10.1
Low pressure (altitude) test	3.12.2	4.10.2
Sand and dust test	3.12.3	4.10.3
Vibration test	3.12.4	4.10.4

4.2.1 Qualification samples. The qualification samples shall consist of three rafts of each capacity. Samples shall be forwarded as specified in the correspondence authorizing submission of samples for qualification testing (see table II and 6.2). Additionally, each sample shall be plainly identified by securely attached tags containing the following information:

Qualification Inspection Samples
 Life Raft Capacity
 Manufacturer's Designation
 Manufacturer's name and CAGE
 Serial Number

4.3 Conformance inspection. Production lot testing shall be accomplished in accordance with the procurement contract. The conformance inspection shall consist of the tests and examinations specified in table III (see 6.2).

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TABLE III. Conformance examinations and tests.

Inspection	Requirement	Test Method
Weight	3.9	4.6
Size	3.8, 3.10	4.7
Actuation pull force test <u>1/</u>	3.8.3	4.8
Operational test <u>1/</u>	3.6, 3.7, 3.11	4.9
Visual examination	3.3-3.5, 3.13	4.5
Temperature extremes test <u>1/</u>	3.12.1	4.10.1
Low pressure (altitude) test <u>1/</u>	3.12.2	4.10.2
Sand and dust test <u>1/</u>	3.12.3	4.10.3
Vibration test <u>1/</u>	3.12.4	4.10.4

Note: 1/ Examination/test shall be performed only when required by the contract.

4.4 Inspection conditions.

4.4.1 Atmospheric conditions. Unless otherwise specified in the contract, all inspections required by this specification shall be conducted at a barometric pressure of 28 to 32 inches of mercury and at a temperature of 77 ± 18 °F (25 ± 10 °C). If the final values of the ambient temperature or barometric pressure at the end of the four-hour air pressure inspection are different from the initial values recorded at the start of the inspection, the following corrections should be made to the final pressure readings in psig.

4.4.2 Temperature correction. For each degree Fahrenheit rise in temperature, 0.031 psig shall be subtracted from the final pressure reading. For each degree Fahrenheit drop in temperature, 0.031 psig shall be added to the final pressure reading. The corresponding correction per degree Celsius is 0.056 psig.

4.4.3 Barometric pressure correction. For each 0.1 inch of mercury rise in barometric pressure, 0.049 psig shall be added to the final temperature-corrected pressure reading. For each 0.1 inch of mercury drop in barometric pressure, 0.049 psig shall be subtracted to the final temperature-corrected pressure reading.

4.5 Visual examination. The visual examination shall be performed to verify conformance to the requirements specified in TSO-C70a and section 3. Table IV shall be used to classify and enumerate the defects.

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TABLE IV. Classification of defects for visual examination of the life rafts.

Critical	Minor
1. Any hole, cut, tear, patch, or burn	201. Any spot or stain. <u>1/</u>
2. Any fabric damaged, bruised, abraded, containing imperfections, or otherwise defective. <u>1/</u>	202. Any cut edge of uncoated nonfibrous material not seared or containing sharp edges.
3. Any stitching in the inflatable section of the life raft.	203. Any slide fastener improperly installed or inoperable.
4. Attachment of the floor or canopy to the inflatable tube not reinforced or not attached.	204. Stitching damaged or defective.
5. Inflation assembly or manifold stem assembly not in accordance with requirements, or inoperable.	205. Any pile or hook tape damaged or defective.
6. Any seam separating in the inflatable section.	206. Oral inflation assembly or components not as specified; oral valve not locked in the closed position.
7. An inflatable section seam construction which does not meet the specified minimum requirements.	207. Any required markings, illegible, incomplete, incorrect, or improperly located.
8. Any channels or voids in any seam on the inflatable section.	208. Color of any component, not as specified.
9. Topping-off valve damaged or in the open position.	209. Accessory or other container not closed.
10. Any metal component improperly finished or containing nicks, burrs, dents, sharp edges or rough surfaces. <u>1/</u>	210. Life raft improperly folded.
11. Any component, component part, or required operation omitted; or any operation improperly performed, not herein classified. <u>1/</u>	211. Any wrinkles, channels, or voids in any seam, patch or attachment on the inflatable section. <u>1/</u>
12. Any component not as specified, or any defect of a component or assembly not herein classified. <u>1/</u>	212. Cement on the cloth surfaces around patches or attachments.
	213. Any clot or mass of adhesive.
	214. Overlap of any seam tape in excess of requirements.
	215. Any seam tape, patch or attachment separating. <u>1/</u>

1/ The defect shall be classified Critical when it seriously affects serviceability or function; otherwise, it is to be classified Minor.

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4.6 Weight. The weight of the life raft shall conform to the requirements of 3.9.

4.7 Size.

4.7.1 Life raft assembly. The outer dimensions of the life raft assembly including table I items shall be measured and conform to the requirements of 3.10.

4.7.2 Accessory container. The accessory container shall be packed with the applicable survival items (see table I) and checked for its conformance to the requirements of 3.8.2. The ability to tie in 4 items shall be demonstrated.

4.7.3 Carrying case. The outer carrying case shall be checked for its conformance to the requirements of 3.8.3. Resistance to flame, fungus, aircraft fuels, and other fluids shall be verified by conformance to FAA TSO-C70a.

4.8 Actuation pull force. The actuation pull force shall be checked for its conformance to the requirements of 3.8.3.

4.9 Operational tests. In either a controlled pool, fresh water, or at sea, the life raft operation shall be demonstrated as follows:

Both rated and overload capacities established in accordance with the requirements of paragraph 3.6 shall be demonstrated with inflation tubes at minimum operating pressure. The resultant freeboard shall meet the requirements of TSO-C70a and 3.7. The required life raft equipment shall be aboard the life raft. The life raft shall be evaluated for its conformance to the requirements of TSO-C70a and as specified in section 3.

4.10 Environmental tests.

4.10.1 Temperature extremes test.

4.10.1.1 Low temperature test. The life raft shall be conditioned at 0 ± 2 °F (-18 ± 1 °C) for not less than 48 hours. The raft shall then be removed to the inspection area and placed on a table or on the floor. The inflation equipment shall be immediately actuated. The life raft shall be observed for conformance to the requirements of 3.12.1.1.

4.10.1.2 High temperature test. The test procedures set forth in 4.10.1.1 shall be repeated, except the raft shall be conditioned at 160 ± 2 °F (71 ± 1 °C) instead of 0 °F, for not less than 48 hours. The raft shall be observed for conformance to the requirements of 3.12.1.2.

4.10.2 Low pressure (altitude) test. The packed life raft contained in its carrying case shall be tested in a low pressure environment in accordance with MIL-STD-810, Method 500.3. At

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the completion of the test, the raft shall be removed from the low pressure environment and observed for its conformance to the requirements of 3.12.2.

4.10.3 Sand and dust test. The packed life raft contained in its carrying case shall be tested in an airborne sand and dust environment in accordance with MIL-STD-810, Method 510.3. At the completion of the test, the raft shall be removed from the airborne sand and dust environment and observed for its conformance to the requirements of 3.12.3.

4.10.4 Vibration test. The packed life raft contained in its carrying case shall be tested for its ability to withstand aircraft vibration in accordance with MIL-STD-810, Method 514.4. At the completion of the vibration test, the life raft shall be observed for its conformance to the requirements of 3.12.4.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department of Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. The rafts are intended for use as emergency equipment by military aircrews forced down at sea. Commercial life rafts do not meet the reduced volume packaging and container requirements necessary for military aircraft use.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2).
- c. Certificate of compliance for the age of the materials and components (see 3.1 and 3.3).

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- d. Qualification samples (see 4.2.1).
- e. Name and address of the conformance verification inspection facility (see 4.3); and the name and address of the Government activity responsible for conducting the conformance verification inspection program (see 4.3).
- f. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL-18494 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for Qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Naval Air Warfare Center, Aircraft Division, Code 4.6.1.2, Patuxent River, MD, 20670.

6.4 Subject term (key word) listing.

Accessory container
Canopy
Heat sealed

6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

CONCLUDING MATERIAL

Custodians:
Navy – AS

Preparing Activity:
Navy – AS

(Project 4220-0446)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of 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.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-18494E(AS)	2. DOCUMENT DATE (YYYYMMDD) 19990722
3. DOCUMENT TITLE LIFE RAFTS, INFLATABLE, MULTI-PLACE		
4. NATURE OF CHANGE (<i>Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.</i>)		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME (<i>Last, First, Middle Initial</i>)	b. ORGANIZATION	
c. ADDRESS (<i>Include ZIP Code</i>)	d. TELEPHONE (<i>Include Area Code</i>) (1) Commercial (2) DSN (<i>If applicable</i>)	7. DATE SUBMITTED (YYYYMMDD)
8. PREPARING ACTIVITY		
a. NAME COMMANDER NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION	b. TELEPHONE (<i>Include Area Code</i>) (1) Commercial (732) 323-2947 (2) DSN 624-2947	
c. ADDRESS (<i>Include ZIP Code</i>) CODE 414100B120-3 HIGHWAY 547 LAKEHURST, NJ 08733-5100	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703) 767-6888 DSN 427-6888	