

INCH-POUND

MIL-DTL-25971C
7 January 2009
SUPERSEDING
MIL-L-25971B
29 May 1967

DETAIL SPECIFICATION

LIGHT, AIRPORT TRAFFIC CONTROL, SDU-4/U

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

1. SCOPE

1.1 Scope. This specification covers one type of airport traffic control light designated SDU-4/U.

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 of the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

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 cited in the solicitation or contract.

FEDERAL SPECIFICATION

W-C-596

- Connector, Electrical, Power, General Specification
for

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Richmond, ATTN: DSCR-VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616, or e-mailed to STDZNMGT@dla.mil . Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at http://assist.daps.dla.mil/ .

MIL-DTL-25971C

DEPARTMENT OF DEFENSE SPECIFICATIONS

- | | |
|---------------|--|
| MS3102 | - Connector, Receptacle, Electrical, Box Mounting, Solder Contacts, AN Type |
| MIL-DTL-7989 | - Covers, Light-Transmitting, for Aeronautical Lights, General Specification for |
| MIL-DTL-14072 | - Finishes for Ground Based Electronic Equipment |
| MIL-PRF-24712 | - Coatings, Powder (Metric) |

DEPARTMENT OF DEFENSE STANDARDS

- | | |
|--------------|---|
| MIL-STD-130 | - Identification Marking of U.S. Military Property |
| MIL-STD-810 | - Environmental Engineering Considerations and Laboratory Tests |
| MIL-STD-889 | - Dissimilar Metals |
| MIL-STD-1916 | - DOD Preferred Methods for Acceptance of Product |

DEPARTMENT OF DEFENSE HANDBOOK

- | | |
|--------------|-------------------------------|
| MIL-HDBK-831 | - Preparation of Test Reports |
|--------------|-------------------------------|

(Copies of these documents are available online at <http://assist.daps.dla.mil/> or 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 or contract.

FEDERAL AVIATION ADMINISTRATION

- | | |
|-------------------------------|---------------------------------------|
| FAA-E-2214 | - Gun, Signal Light, Portable |
| Drawings D-5056-1 through -12 | - Portable Signal Light Gun, Type W-1 |

(Copies of these documents are available from the Federal Aviation Administration, 800 Independence Avenue, SW, Room 700W, AJW-281, Attn: NAS Documentation Control Center (DCC), Washington, D.C. 20591.)

2.3 Non-government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASME

- | | |
|--------------|---------------------------------|
| ASME Y14.100 | - Engineering Drawing Practices |
|--------------|---------------------------------|

MIL-DTL-25971C

(Copies of this document are available online at <http://www.asme.org/> or from ASME, Three Park Avenue, New York, NY 10016-5990.)

SAE INTERNATIONAL

SAE AS25050	- Colors, Aeronautical Lights and Lighting Equipment, General Requirements for
SAE AS5756	- Cable, Power, Electrical, Portable General Specification for

(Copies of these documents are available from <http://www.sae.org/> or from SAE International, 400 Commonwealth Drive, Warrendale PA 15096-0001.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Materials.

3.2.1 Fungus-proof materials. Materials that are nutrients for fungi shall not be used where it is practical to avoid them. When used and not hermetically sealed, they shall be treated with a fungicidal agent acceptable to the procuring activity. However, if they will be used in a hermetically sealed enclosure, fungicidal treatment will not be necessary.

3.2.2 Metals. The metals shall be as specified herein. Unless otherwise specified, metals shall be of the corrosion-resistant type or suitably treated to resist corrosion due to fuels, salt spray, atmospheric conditions or chemical reaction when installed. The use of dissimilar metals shall be avoided where practicable. When used, dissimilar metals shall be in accordance with MIL-STD-889.

3.3 Design and construction. The light shall be designed and constructed in accordance with FAA Drawings D-5056-1 through -12, and shall provide equivalent performance to the light specified in FAA-E-2214. The light shall be designed to be held, aimed, and operated with one hand.

3.3.1 The light shall be constructed to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation, and service. The light shall be so constructed that any necessary repairs or maintenance can be readily made by the personnel of operating units or overhaul bases without the use of special tools.

MIL-DTL-25971C

3.4 Components. The light shall consist of the following major components:

<u>Item no.</u>	<u>Quantity</u>	<u>Description</u>	<u>Requirement Paragraph</u>
1	1	Housing	3.4.1.1
2	1	Principal reflector	3.4.1.2
3	1	Auxiliary reflector	3.4.1.3
4	1	Lamp	3.4.1.4
5	2	Colored filters	3.4.1.5
6	1	Cover	3.4.1.6
7	1	Color indicator	3.4.1.7
8	1	Sighting device	3.4.1.8
9	1	Handle	3.4.1.9
10	1	Hanger	3.4.1.11
11	1	Transformer	3.4.1.12
12	1	Primary lead	3.4.1.12.2
13	1	Secondary lead	3.4.1.12.3
14	1	Auxiliary lead	3.4.1.13

3.4.1 Details of components.

3.4.1.1 Housing. The optical system shall be enclosed in a dustproof housing fabricated of aluminum. The housing shall be rigid and strong enough to protect and support components mounted on or within the housing. Housing dimensions shall be as specified in 3.7.

3.4.1.2 Principal reflector. The principal reflector shall be parabolic precision mirror of silver-backed glass. The silver coating shall be protected by backing material and coats of paint. The reflector shall be so mounted that it is not subjected to undue strains and is protected from contact with metal.

3.4.1.3 Auxiliary reflector. A metal spherical reflector shall be so mounted in the light that the focus of the spherical reflector falls on the axis of the lamp. The overall diameter and the position of the spherical reflector and mounting shall be such that no direct light from the lamp is emitted. The spherical reflector shall be no longer than necessary to prevent emission of direct light.

3.4.1.4 Lamp. The light shall use a 50 candelas, 6-8V, RP-11 clear bulb, C-6 filament, 200-hour life, 7/8-inch light center length, 2-1/4-inch maximum overall length, single-contact prefocused base lamp, American Standards Association Trade No. 1501. The lamp shall be accurately positioned at the focus of the principal reflector and securely held in the light by a socket of the prefocus type. Unless otherwise specified, the lamp shall be installed and furnished with the light.

3.4.1.5 Colored filters. The light shall be provided with one aviation red and one aviation green color filter. The filters shall be of class B, heat-resistant glass in accordance with MIL-DTL-7989. The color transmission of the filters shall be type I, grade A, in accordance with SAE AS25050. The filters shall be correctly positioned and firmly held in the light by a

MIL-DTL-25971C

holder designed to minimize breakage of the filters. When either filter is positioned between the lamp and principal reflector, all light from the lamp incident upon the reflector shall pass through the filter. There shall be no direct light from the lamp.

3.4.1.6 Cover. A clear cover shall be provided at the front of the housing. The cover shall be class D plastic in accordance with MIL-DTL-7989. The color and transmission of the cover shall be type I, grade D, aviation white ware in accordance with SAE AS25050.

3.4.1.6.1 The cover shall be firmly held in a holder designed to fit on the front of the housing. This holder and cover assembly shall allow quick removal of the assembly without the use of tools.

3.4.1.7 Color indicator. A plastic prism device shall be provided at the front of the light to redirect a small part of the main beam to the operator's eye. The color indicator shall be of sufficient brightness that an operator with normal vision can distinguish the color of the filter in use in bright daylight. A dimming method shall be provided to regulate this color indicating beam when the redirected light is too bright for comfortable use at night.

3.4.1.8 Sighting device. A sighting device with front and rear sights shall be provided along the top of the light so that the light can be properly aimed. The centerline of the sight shall be parallel to the optical axis of the light.

3.4.1.9 Handle. The light shall be provided with a handle of such design that the light can be held, aimed, and operated by one hand. The handle and associate controls shall be equal to those defined by FAA-E-2214 and FAA Drawings D-5056-1 through -12, except as specified in 3.7. The following controls shall be provided:

- a. A trigger button for turning the light on and flashing it.
- b. A trigger level for selection and positioning the red or green color filter. The red filter shall be properly positioned to provide a red signal beam when the trigger lever is in its normal, unpressed position.
- c. A trigger lever for selecting a clear signal.

3.4.1.9.1 A handle with components different from those defined above will be considered satisfactory if performance is equivalent and the design is approved by procuring activity.

3.4.1.10 Receptacle. An MS3102A-10SL-4P receptacle shall be provided on the side of the light for attaching the power lead.

3.4.1.11 Hanger. A yoke-type hanger or other means shall be provided so that the light can be suspended from an overhead wire. The axis of the housing shall be essentially parallel to the ground when the light is hanging from the overhead wire. If a yoke-type hanger or similar device is used, it shall be readily removable from the light.

MIL-DTL-25971C

3.4.1.12 Transformer. A two-coil isolating transformer shall be provided as a separate unit in order that the light can be operated from a commercial 60-cycle, 120V source. The transformer shall have a minimum rating of 50 va and shall be weatherproof. With 120V, 60-cycle current applied to the primary, and with the specified lamp and lead installed, the transformer shall supply a voltage of $7 \pm 0.1V$ at the lamp. The transformer case shall have at least two holes for 1/4-inch mounting bolts.

3.4.1.12.1 Fuse. A small fuse, enclosed so that it is waterproof, shall be provided in the transformer secondary circuit. The fuse shall be rated at 32V, 10 amp. The fuse shall be easily accessible for changing.

3.4.1.12.2 Primary lead. The primary lead of the transformer shall be 3 feet in length and shall be permanently connected to the transformer. The cable in the lead shall be two-conductor, 16 AWG in accordance with SAE AS5756. The lead shall terminate in a two-pole, parallel blade, attachment plug cap in accordance with W-C-596.

3.4.1.12.3 Secondary lead. The secondary lead from the transformer to the light shall be 20 feet in length, permanently connected to the transformer and shall terminate in a female angle plug which matches the receptacle on the light. The cable in the lead shall be two-conductor, 16 AWG in accordance with SAE AS5756.

3.4.1.13 Auxiliary lead. An auxiliary lead, 10 feet in length, shall be furnished for emergency operation of the light from a battery. One end of this lead shall terminate in a female angle plug which matches the receptacle on the light. At the other end, the cable sheath shall be removed freeing a 12-inch length of the two insulated conductors. Each conductor shall terminate in a spring clip capable of being connected to the terminals of a storage battery. The cable in the lead shall be two-conductor, 16 AWG in accordance with SAE AS5756.

3.4.1.14 Optical. The optical system shall be of the fixed, prefocus type requiring no focusing by personnel of the operating units. Provisions for making adjustments during manufacture may be used if the adjustments are rigidly locked in place and will not be disturbed during routine maintenance. All components of the optical system shall be properly braced and supported to prevent their getting out of alignment.

3.4.1.15 Wiring. The light shall be completely wired and ready for operation upon attachment of the poser leads.

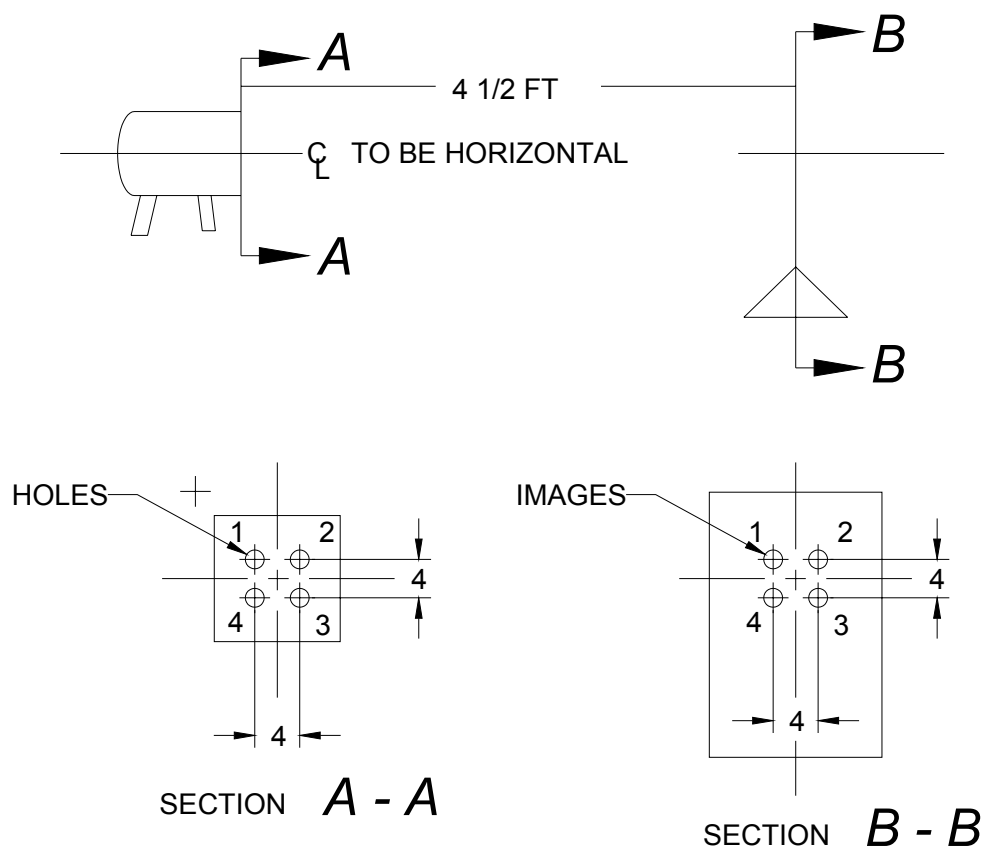
3.5 Performance.

3.5.1 Operation. When tested as specified in 4.4.2, the light shall operate satisfactory, all controls shall work freely, and the color filters and color indicator shall be positioned correctly. Any sticking, jamming, or malfunction shall be cause for rejection.

3.5.2 Sights. When tested as specified in 4.4.3, the axis of the sight shall be no more than 1 foot from the center of the target when the target is at 400 feet, or the equivalent of 1 foot in 400 feet when the target is at another distance.

MIL-DTL-25971C

3.5.3 Focus. When tested as specified in 4.4.4, the center of the image as shown on figure 1 shall have the same spacing as the holes in the screen.



Unless otherwise specified, dimensions in inches.

FIGURE 1. Focus test.

3.5.4 Photometry. When tested as specified in 4.4.5, the signal beam emitted from the light shall be of a circular cross section. The spread of the beam in any plane through the axis shall be not less than 1/2 degree at 180,000 candelas when the specified lamp is operated at 90 spherical candelas without a color filter but with the clear cover in place. The spread of the beam shall not exceed 2 degrees at 50,000 candelas. The filter colors shall meet the requirements of 3.4.1.5.

3.5.5 High temperature. When tested as specified in 4.4.6.1, there shall be no evidence of damage and the light shall operate satisfactorily at the conclusion of the test.

3.5.6 Low temperature. When tested as specified in 4.4.6.2, there shall be no evidence of damage and the light shall operate satisfactorily at the conclusion of the test.

3.5.7 Humidity. When tested as specified in 4.4.6.3, there shall be no evidence of damage and the light shall operate satisfactorily at the conclusion of the test.

MIL-DTL-25971C

3.5.8 Sand and dust. When tested as specified in 4.4.6.4, there shall be no evidence of damage and the light shall operate satisfactorily at the conclusion of the test.

3.5.9 Transformer temperature rise. When tested as specified in 4.4.7, the temperature rise shall not exceed 65 °C, and there shall be no damage to the transformer.

3.5.10 Transformer individual. When tested as specified in 4.4.8, the insulation resistance shall be not less than 30 megohms, and the output voltage shall be $7 \pm 0.1V$.

3.6 Interchangeability. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The drawing number requirements of ASME Y14.100 shall govern the changes in the manufacturer's part numbers.

3.7 Dimensions. The overall length of the housing shall not exceed 15 inches and the diameter shall not exceed 9 inches. The overall height, from top of the housing to the bottom of the pistol grip, shall not exceed 16-1/2 inches

3.8 Weight. The weight of the light, without leads and transformer, shall not exceed 8 pounds.

3.9 Finishes and protective coatings.

3.9.1 Corrosion protection. Unless fabricated from corrosion-resistant material, all metal parts shall be protected against corrosion with a type I finish conforming to MIL-DTL-14072. The following finishes shall be provided.

3.9.2 Housing exterior. The exterior surface of the housing shall be finished with powder coating conforming to MIL-PRF-24712, type 1, class 2, color No. 37038 black.

3.9.3 Housing, interior and supporting parts. The interior area of the housing and metal parts supporting the lamp and auxiliary reflector shall be finished with lusterless black enamel conforming to MIL-DTL-14072, type I, film designation B.

3.10 Operation markings. An instruction plate shall be permanently attached to the outside of the housing. Brief instructions on the lamp to be used, method of changing color of the signal light, method of aiming, etc, shall be permanently and legibly printed on the plate.

3.11 Identification of product. Equipment, assemblies, and parts shall be marked for identification in accordance with MIL-STD-130.

3.12 Workmanship. The light assembly, including all parts and accessories, shall be fabricated and finished in a workmanlike manner. Particular attention shall be given to freedom from blemishes, defects, burrs, and sharp edges; accuracy of dimensions, radii of fillets, and marking of parts and assemblies; thoroughness of soldering, welding, brazing, painting, wiring, and riveting; alignment of parts and tightness of assembly screws and bolts, etc.

MIL-DTL-25971C

3.13 Cleaning. The light assembly shall be thoroughly cleaned and loose, spattered, or excess solder, metal chips, and other foreign material removed during and after final assembly.

4. VERIFICATION

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

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 First article inspection.

4.2.1 First article sample. One sample unit shall be fabricated using the same components, materials, and production processes as will be used in normal production.

4.2.2 Tests. First article inspection shall consist of all the examination and tests specified in 4.4.

4.2.3 First article test report. After the contractor completes the first article inspection, he shall prepare a first article test report and furnish a copy of the report to the government procuring activity. The contractor may refer to the guidelines outlined in MIL-HDBK-831 for preparing the report.

4.3 Conformance inspection. Conformance inspection shall consist of individual and sampling tests.

4.3.1 Individual tests. Each light shall be subjected to examination of product, operation, sights, focus, and transformer individual tests.

4.3.2 Sampling tests.

4.3.2.1 Lot. The lot definition, formation, and size shall be in accordance with MIL-STD-1916.

4.3.2.2 Sampling plan. One light shall be selected at random from each lot of 100 or fraction thereof produced and subjected to the photometric test (4.4.5). The transformer component shall be subjected to the transformer temperature rise test (4.4.7).

4.4 Inspection methods.

4.4.1 Examination of product. The light shall be inspected to determine compliance with the requirements specified herein with respect to material, workmanship, and marking.

MIL-DTL-25971C

4.4.2 Operation. The light shall be operated to determine that all controls work properly and the color filters and color indicator are positioned correctly.

4.4.3 Sights. The accuracy of the sighting device of each light shall be checked by centering the light beam upon a 3 by 3 foot target not less than 400 feet from the light, or any other combination of target and distance which presents the same angular relationship between the target and the light, and observing the alignment of the sights.

4.4.4 Focus. Each light shall be tested to determine the accuracy of the focusing of the parabolic and spherical reflectors. A plate with four holes, as shown on [figure 1](#), shall be placed over the end of the light, and a blank screen shall be placed 4-1/2 feet from the plate. If the focusing is correct, the images as shown on [figure 1](#) shall have the same spacing as the holes in the plate. At each point on the screen, two images shall be superimposed, one of which is caused by the spherical reflector and the other by the parabolic reflector. If the two sets of images are not superimposed with the correct spacing, the focusing is incorrect and the light shall be rejected.

4.4.5 Photometry. The light shall be operated to determine photometric compliance with light distribution requirements of [3.5.4](#) and color and filter requirements of [3.4.1.5](#).

4.4.6 Environmental. The light will be subjected to tests in accordance with the following specified procedures of MIL-STD-810 to determine proper operation and freedom from adverse effects resulting from environmental exposure.

4.4.6.1 High temperatures. The light shall be subjected to high temperature test Method 501, Procedure II, except at a temperature of $55\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 4 hours. Controls shall be operated at this temperature to determine that there is no binding of parts or other malfunctioning.

4.4.6.2 Low temperature. The light shall be subjected to low temperature test Method 502, Procedure I, for 12 hours, followed immediately by operation of controls.

4.4.6.3 Humidity. The light shall be subjected to humidity test Method 507, Procedure I, except that the 6-hour high temperature phase shall be conducted at $40\text{ }^{\circ}\text{C}$ and the relative humidity shall be held at 100 percent during the 6 hour period.

4.4.6.4 Sand and dust. The light shall be subjected to sand and dust test Method 510, Procedure I.

4.4.7 Transformer temperature rise. When subjected to a heat rise test, conducted by connecting the primary to a 120-volt, 60-cps power source and loading the secondary with a resistive load drawing 7.0 ± 0.1 amperes current, the temperature rise after 1 hour continuous operation, determined by the resistance method, shall not exceed the requirement as specified in [3.5.9](#).

MIL-DTL-25971C

4.4.8 Transformer individual. The secondary output voltage at the lamp shall be checked to determine that it is within the tolerance specified in 3.5.10. The dielectric strength of the transformer shall be tested by applying a potential of 1,000V rms, 60 cycles for 1 minute between windings and between each winding and core, and measuring the insulation resistance.

4.4.9 Inspection for delivery. The lights shall be inspected to determine that preservation, packaging, packing, and marking are in accordance with section 5.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. 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 that may be helpful, but is not mandatory.)

6.1 Intended use. The lights are intended to be used in permanent or mobile air-traffic control towers to control air traffic in the event radio transmission is not available.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. When first article inspection is required (see 3.1).
- c. Packaging requirements (see 5.1).

6.3 Subject term (key word) listing.

Bulb
Colored filters
Lamp
Optical
Sighting device

6.4 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.

MIL-DTL-25971C

Custodians:

Navy - AS
Air Force - 99

Preparing Activity:

DLA - GS2

(Project 6210-2009-001)

Review Activity:

Air Force - 11

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST database at <http://assist.daps.dla.mil/>.