What PMS or requirement does the NAMP require for your portable electrical tools and equipment? If you don't follow NSTM 300 or PMS, then what requirement and direction was followed to ensure the equipment is safe for operation on CVN ungrounded electrical systems

The presumed question from INSURV will be: why is aeronautical equipment exempt from the safety checks required by the NSTM 300/320?

**NSTM 300, page 3:**

300-1.2.6 PLANNED MAINTENANCE SYSTEM (PMS). PMS was developed to provide each ship, department, and supervisor with the means to effectively plan, schedule, and control shipboard maintenance. When installed, the PMS supersedes any existing preventive maintenance programs and conflicting technical directives for equipments covered. Equipments not covered are to be maintained in accordance with existing procedures. The PMS is fully described in OPNAVINST 4790.4, Ships Maintenance and Material Management (3-M) Manual.

**The OPNAVINST 4790.4, Page 2, para 4.c:**

"The Ship's 3-M system does not apply to nuclear propulsion plants and associated test equipment under the cognizance of Commander, Naval Sea Systems Command (COMNAVSEASYSCOM) (SEA 08), fleet ballistic missile systems, or aeronautical support equipment covered in the Naval Aviation Maintenance Program."

In a nut shell, (1) 4790.4 says the Ship's 3-M system is not applicable to aeronautical equipment because aeronautical equipment is covered by the NAMP, and (2) NSTM 300 says aeronautical equipment must be covered by existing procedures, which the NAMP covers. What does the NAMP say these existing procedures are that make aeronautical equipment electrically safe for use? In the SE PMS section, section 10.17, the NAMP says:

"Preoperational inspections shall be conducted on SE/AWSE prior to the first anticipated use each day and prior to each use as specified in applicable MRCs...Inspections include visual and functional verification that a unit is properly serviced and ready for use...Periodic inspections/preoperational inspections are prescribed by COMNAVAIRSYSCOM MRCs identified in NAVAIR 00-500A, NAVSUP Publication 2003, MIMs, or COMNAVSEASYSCOM and manufacturers' publications."

So what are the applicable COMNAVAIRSYSCOM MRCs identified in NAVAIR 00-500A that would make aeronautical equipment electrically safe for use? The answer is not so much about just identifying which NAVAIR 00-500A prescribed MRCs apply to electrical safety of aeronautical equipment. The answer is really about identifying the baseline engineering specs, standards and handbooks upon which these MRCs are based. It is really the combination of design practice, which is guided by these baseline engineering specs, standards and handbooks, and good PM, which is directed by the NAVAIR 00-50A MRCs that ensure material condition of
the equipment is sufficient to maintain compliance with the design specs/standards. The MRCs and pre-ops are written to ensure that original design features and performance are still in place (e.g. guards are not missing, wires are not frayed, etc.)

The baseline documents for each category of aeronautical equipment follow:

(1) GPETE/electrical hand tools-->This category of equipment is mainly COTS, bought open purchase or by GSA, and is common for both aeronautical and shipboard use. NAMP section 10.17 covers SE that is common to both aviation and surface requirements, and directs use of COMNAVSEASYSCOM MRCs for scheduled maintenance for items without COMNAVAIRSYSCOM MRCs because COMNAVSEASYSCOM approved MRCs apply to SE that is common to both surface and aviation activities. Accordingly, AIMD will stand up an electrical tool issue room, apply the appropriate COMNAVSEASYSCOM MRCs, inventory all the equipment that falls into the common use category, load each piece of equipment into OMMS-NG SKED, and perform the COMNAVSEASYSCOM MRCs through our electrical tool issue room.

(2) NAVAIR calibration standards-->Cal stds fall under the same category as aeronautical support equipment, as referenced in the Ships Maintenance and Material Management (3-M) Manual. They are SERD'ed in the same manner as aeronautical support equipment, except that they are classified as CS (Calibration Standards). Rich McCallum at CNAF N423 and Senior Lee at CNAF N421 stated a yet-to-be-released version of the NA 17-35QAL-15 will reinforce that cal stds are exempt from electrical safety checks (per the 4790.4). Because most NAVAIR cal stds are COTS or developmental buys, MIL-PRF-28800 is the spec requirement used for cal std acquisition. It deals with all classes of equipment, types of procurements, specification invoked based on class, specification and testing requirements and controls, safety, vibration, shipping, etc. MIL-PRF-28800, Section 3.10, states:

Safety. The equipment shall comply with the safety requirements of IEC 1010. For safety ground all accessible surfaces of the equipment shall be at ground potential. The power cable shall include a safety ground conductor. This is also true of drawer assemblies; disconnecting the safety ground shall also disconnect the power conductors.

(3) Non-ATE/CSE-->SE and SE installations meet the design requirements referenced in NSTM 300 and 320 through Mil-HDBK-454, General Guidelines for Electronic Equipment; Mil-STD-1310, Grounding Requirements; Mil-STD-1399, Shipboard AC Power Interface; and Mil-STD-704, Aircraft Power Interface. Non-ATE/CSE ship installations are developed by NAVSEA Shipyards through SCDs, which are reviewed and approved by NAVSEA shipyard engineering and checked by the Ship's Engineering.

(4) ATE--> Each Ship Alt addresses power and loading requirements. Also, MRC decks require checking the station grounding strap. WRT CASS, the station itself does asset testing upon power up, checking the health status of each instrument. Station Maintenance and Test (SMAT) is run at the end of each shift to verify the integrity of the ATE. Additionally, the CASS B1 SPEC says equipment design shall conform to MIL-STD-454J, MIL-STD-1472C and
MIL-T-28800C requirements for the elimination or acceptable control of hazards to personnel and equipment. Compatibility of material and other equipment/system protection shall be provided as specified in MIL-T-288800C for type I equipment safety. (Kevin, I assume similar statements can be made about the build spec for other non-CASS ATE?)

(5) OTPSs-->TPS test programs are developed in compliance with MIL-454. This safety standard mandates the scenarios in which warning and danger messages, guards, barriers, safety covers and interlocking are required within the Test Programs. It also includes requirements for discharging of power. The MIL-454 standard is invoked within a standard red-team procurement, incorporating lessons learned and common messaging to ensure all TPSs have the same look and feel. TPSs are designed per MIL-PRF-32070, which requires each TPS to incorporate a Safe-to-Turn On test that checks for shorts and opens.

(6) ATE/TPS Ancillary-->TPS ancillary equipment would be things like power controllers and power supplies (PSE) that are used when testing specific TMS Avionics systems on the ATE. This type of equipment is specific to an Aircraft Type and TPS and is covered by the STTO test within the TPS (STTO = Safe To Turn On). Some of the other TPS ancillary equipment are basically the same type of items used at the squadron level (O-Level) and would include things like the MLVS, ADTS, TTU-205. IL-HDBK-454A, GUIDELINE 1, SAFETY DESIGN CRITERIA - PERSONNEL HAZARDS is the document that applies to this type of equipment. This guideline would cover any ATE and TPS Ancillary equipment whether it was PSE, O-Level gear used at an I-Level on ATE, or COTS. Pages 11-12 covers guideline 1 and some of the excerpts are:

1. Purpose. This guideline establishes safety design criteria and provides guidelines for personnel protection.

2. Applicable Documents. MIL-STD-1310 Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety:

4.1 Commercial off-the-shelf (COTS) equipment. Commercial off-the-shelf equipment that has been listed or certified to an appropriate commercial standard by a Nationally Recognized Test Laboratory (NRTL) (e.g., Underwriters Laboratories (UL), Canadian Standards Association (CSA), or TUV Rheinland (TUV)) should be considered as having met the provisions of this requirement and from a product safety perspective, should be accepted for use without further modification. COTS equipment which has any modifications and is required to meet commercial standards requires recertification by a NRTL.

4.2 Fail-safe. The design and development of all military electronic equipment should provide fail-safe features for safety of personnel during the installation, operation, maintenance, and repair or interchanging of a complete equipment assembly or component parts thereof.

4.5 Electrical. The design should incorporate methods to protect personnel from inadvertent contact with voltages capable of producing shock hazards.
4.5.1 Power. Means should be provided so that power may be cut off while installing, replacing, or interchanging a complete equipment, assembly, or part thereof. Interface with electrical power sources should be in accordance with the applicable regulations or requirements. If a main power switch is provided, it should be clearly labeled as such and should cut off all power to the complete equipment. Equipment that utilizes Uninterruptible Power Supplies (UPS) should have provisions to isolate the supply from the equipment.

4.5.2 Ground. The design and construction of equipment, excluding self-powered equipment, should insure that all external parts, surfaces, and shields, exclusive of antenna and transmission line terminals, are at ground potential at all times during normal operation. The design should include consideration of ground currents and voltage limits (possible arcing) established on a basis of hazardous location. Antenna and transmission line terminals should be at ground potential, except for Radio Frequency (rf) energy on their external surfaces.

(7) General use IMRL/IT support equipment-->One example is the oil analysis spectrometer. It is SERDed as IMRL, and was spec'd to meet Mil-STD-1399, Shipboard AC Power Interface. Generally, this type of equipment would conform to the requirements in IL-HDBK-454A, GUIDELINE 1, SAFETY DESIGN CRITERIA - PERSONNEL HAZARDS is the document that is applied to this type of equipment. Pages 11-12 covers guideline 1 and some of the excerpts are:

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