

MIL-STD-461B AND THE ENVIRONMENT

In ITEM 81, we reported that Notice 1 to MIL-STD-461B was in preparation and would be circulated within government circles during 1981. As of February 1982, Notice 1 to MIL-STD-461B was still in preparation and yet to be circulated. The delay was due to several factors, including the incorporation of a number of recommended modifications issued by the Air Force. The circulation of Notice 1 is now scheduled during the first half of 1982. Notices 5 and 6 of MIL-STD-462, corresponding to Navy and Air Force modifications, will be circulated at the same time. Due to the delays, the official issuance of the Notices are not likely to take place before the end of 1982. Rather than to speculate at this time, we will report on their significant contents in ITEM 83.

E³ Program

It is important to realize that MIL-STD-461 is only one part of the government's electromagnetic environment effects (E³) program. E³ encompasses all electromagnetic environmental disciplines including:

- Electromagnetic Interference (EMI)
- Electromagnetic Vulnerability (EMV)
- Electromagnetic Pulse (EMP)
- Electronic Counter Counter Measures (ECCM)
- Hazards of Electromagnetic Radiation to Ordnance (HERO)
- Radiation Hazards (RADHAZ)

The E³ definition includes all of the electromagnetic environments which must be considered and controlled in order to achieve full system electromagnetic compatibility (EMC). The acronym is widely used within the Navy and is accepted by the Air Force. The E³ definition is also included in the NATO list of terms and definitions. The Army's use of E³ is not clear to the author at this time.

There are many documents, in addition to MIL-STD-461B, which are part of the overall E³ program. These include the familiar MIL-B-5087 covering aircraft bonding, as well as lightning and precipitation static protection, and MIL-E-6051 which deals with system EMC. Both of these are currently being revised and updated. Less familiar and equally important are MIL-HDBK-235A and MIL-HDBK-237A.

MIL-HDBK-235A

This Handbook defines the electromagnetic environments that systems and equipment will be exposed to during deployment and operation. It defines the electromagnetic environments aboard weather decks of ships, at ground stations, and aboard aircraft. This information is to be used by a government procuring activity to define and tailor the RSO3 requirements of MIL-STD-461B.

This Handbook is published in four volumes. Volume 1 is unclassified and describes how to define the electromagnetic environment at a given location or aboard a platform. Volume 2 contains the specific environments of the United States military vehicles and ground locations. Specific power levels, frequencies and other pertinent information is included. Volume 3 contains the same type of information, but defines what is referred to as "hostile" environments. Both Volumes 2 and 3 are classified SECRET and are only available through your contracting officer when the need-to-know has been established. Volume 4 is non-existing, but, is reserved for future Army use.

MIL-HDBK-237A

MIL-HDBK-237A provides guidance for establishing an effective E³ control program throughout a system's life cycle. It is to be applied by procuring agencies, and by the development and operations activities at

appropriate times during a system's life cycle. As an example, MIL-HDBK-237A should be applied during acquisition to assure the visibility, accountability and controllability of the E³ control effort, as well as its integration into the overall program. It should also be used during the design process to assure a coherent design, management awareness and cost effective tailoring of E³ standards and requirements. MIL-HDBK-237 may be used and applied by contractors as a guide for establishing and implementing an EMC program.

To assure early consideration of EMC as well as to provide the necessary continuity for achieving and monitoring the required EMC, the guide follows the framework of the life cycle for platforms, systems, and equipments. Section 4 of the Handbook describes the overall approach which should be taken during the life cycle for EMC. Section 5 describes actions which must be taken by the manager to implement the approach in Section 4. The appendices describe in greater detail the various aspects of EMC which are to be implemented by the program manager.

The Handbook specifies the preparation of an EMC Program Plan (EMCPP) as defined in Data Item Description (DID) DI-R-7096 dated 30 January 1981. This document is prepared by the government program manager and represents the top level E³ and EMC management document. It places emphasis on policy, philosophy, management, analysis techniques and general design guidance. Specific tasks and milestones are documented and the tailoring of the EMC effort defined.

Among the many other subjects, the structure and junction of a system EMC Advisory Board (EMCAB) is described. A description of the EMCAB actually used in the development of the Trident submarine is included. (MIL-E-6051, when revised, will also describe a similar EMCAB.) The responsibilities of the EMCAB include assisting the program manager in preparing the EMCPP, assist in identifying and resolving potential electromagnetic problems, and participate in scheduled design reviews during the development phase.

Summary

The E³ program for system EMC is vast and all encompassing. MIL-STD-461B is only a small part of this program, but a major part from an equipment manufacturer's point of view. When entering into a government contract incorporating MIL-STD-461B, you should be cognizant that different procuring activities can apply the standard in varied degrees. The following guidelines are recommended for contractors:

1. The government is responsible for defining the applicable parts of the standard. There are 10 parts and only Part I applies to all contracts.
2. If radiated electric field susceptibility requirements apply (RSO3), check to see if the provisions of MIL-HDBK-235 are applicable. If so, the government must define these environments. (Note that testing to the environments of MIL-HDBK-235 can be very difficult and costly. Do not enter into this obligation blindly.)
3. If MIL-STD-461A or predecessor documents are specified on repro procurements, do not automatically assume that MIL-STD-461B is applicable. Production contracts to build per GFE drawings are not likely to produce equipment that will comply with MIL-STD-461B.
4. If the contract is issued by the Navy, or for Air Force avionics, the E³ philosophy, as outlined herein, should apply. For other procurements, it is best to discuss the EMC requirements in detail with the customer prior to signing on the dotted line.
5. For Navy procurements, request permission to attend one of the Navy's E³ awareness seminars sponsored by NAVELEX 832.