

Resources for Military, Space and Other High-Reliability Standards

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Here is some basic information on standards, with an emphasis on where to find the necessary detailed information when required by your work

High-reliability standards are essential for critical products and systems in military, aerospace, automotive and medical systems. For the RF/microwave industry, the

most common of these standards are military and space. This article provides some background information, and a list of references where additional information can be obtained.

tions and Standards (DODISS), as its name implies, is a comprehensive index of Federal and Military specifications and standards, guide specifications, military handbooks and bulletins, Commercial Item Descriptions, adopted non-government standards, and other related standardization documents used by the Department of Defense.

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The DODSSP issues complete revisions of the DODISS every other month, and several formats are available. It is available from the Superintendent of Documents [1] on CD-ROM, in PDF form, and this product can be ordered either in single issue or as a yearly subscription with bi-monthly issues. The

MIL Standards

Department of Defense Index of Specifica-

MIL-STD-188	A series related to telecommunications
MIL-STD-202	Quality standards for electronic parts
MIL-STD-285	Attenuation measurements for enclosures
MIL-STD-498	On software development and documentation
MIL-STD 461	Requirements for the control of electromagnetic interference characteristics
MIL-STD-462D	Measurement of electromagnetic interference characteristics
MIL-STD-464	Electromagnetic environmental effects requirements for systems
MIL-STD 790	Product assurance program
MIL-STD-810	Test methods for determining the environmental effects on equipment
MIL-STD-883	Test method standard for microcircuits
MIL-STD-1397	Input/output interfaces, standard digital data, for Navy systems
MIL-STD-1553	A digital communications bus
MIL-STD-1686B	Electrostatic discharge control and protection program
MIL-STD-1760	Smart-weapons interface derived from MIL-STD-1553
MIL-STD-1788A	Avionics interface design
MIL-STD-1815	Ada programming language
MIL-STD-1835D	Military standard electronic case outlines
MIL-STD-2196	Pertains to optical fiber communications
MIL-STD-2218	Thermal design, analysis and test criteria for airborne electronic equipment
MIL-PRF-38534	General specification for hybrid microcircuits
MIL-PRF-38535	General specification for integrated circuits (microcircuits) manufacturing

Table 1 · Major military standards affecting high frequency electronics. (Not intended to be a comprehensive listing—see References.)

DODISS is also offered in printed form. The DODISS is available on-line as a part of the ASSIST Standardization Document Management Database [2], and can be ordered with a paid ASSIST subscription. Key document descriptions [3] include the following:

MIL-STD Defense Standard—A document that establishes uniform engineering and technical requirements for military-unique or substantially modified commercial processes, procedures, practices, and methods. The five types of defense standards are: interface standards, design criteria standards, manufacturing process standards, standard practices, and test method standards. Table 1 lists major MIL-STDs that apply to high frequency/high speed technology.

MIL-HDBK Defense Handbook—A guidance document containing standard procedural, technical, engineering, or design information about the materiel, processes, practices, and methods covered by the DSP.

MIL-SPEC Defense Specification—A document that describes the essential technical requirements for purchased material that is military unique or substantially modified commercial items.

MIL-PRF Performance Specification—A performance specification states requirements in terms of the required results with criteria for verifying compliance, but without stating the methods for achieving the required results. It defines the functional requirements for the item, the environment in which it must operate, and interface and interchangeability characteristics.

MIL-DTL Detail Specification—A specification that specifies design requirements, such as materials to be used, how a requirement is to be achieved, or how an item is to be fabricated or constructed. A specification that contains both performance and detail requirements is still considered a detail specification.

Department of Defense Single Stock Point (DoDSSP) [3] was created to centralize the control, distribution, and access to the extensive collection of Military Specifications, Standards, and related standardization documents either prepared by or adopted by the DoD. The responsibilities of the DODSSP include electronic document storage, indexing, cataloging, maintenance, publish-on-demand, distribution, and sale of Military Specifications, Standards, and related documents and publications comprising the DODSSP Collection.

Space Standards

The NASA Technical Standards Program (NTSP) [5] is sponsored by the Office of the NASA Chief Engineer. The primary mission is the enhancement of NASA's engineering capabilities by providing technical standards required to meet the needs of the Agency. As noted on the NASA web site, the NTSP provides these standards to the Agency by: supporting the development of non-

Government standards, developing NASA technical standards, providing NASA-wide access to standards developed by national and international organizations, and providing single point access to technical information, tools, and best practices needed to achieve technical excellence and further mission success.

A similar function is performed in Europe by the European Space Agency's Directorate of Quality and Management (TEC) [6], which provides engineering advice and assistance to ESA programs and projects. The European Cooperation for Space Standardization [7] was established to develop a coherent, single set of user-friendly standards for use in all European space activities, including ESA and other national aerospace agencies.

Some Additional High-Reliability Standards

Another important standards organization is ASTM International [8], a century-old voluntary standards organization involved in standards for materials testing, construction, energy, consumer and medical equipment. In particular, ASTM material testing standards are common in many high reliability product specifications.

Certain aspects of other industry standards—from IEEE, IEC, SAE and others—may address high reliability issues. A thorough examination of engineering specifications and the related standards is required to identify requirements that go beyond basic operating function.

Summary

It is impossible to provide more than a cursory overview of this wide-ranging subject in any magazine article, but the references below provide a beginning for an information search.

When these standards are involved in your work, there is no substitute for experience. Your most important resources will be people with long experience working with high-rel standards.

References

1. Part of the Government Printing Office, <http://www.gpo.gov/>
2. ASSIST information can be found via: <http://dodssp.daps.dla.mil/>
3. Adapted from Wikipedia, http://en.wikipedia.org/wiki/United_States_Military_Standard
4. Department of Defense Single Stock Point (DoDSSP); <http://www.dodssp.daps.mil>
5. NASA Standards; <http://standards.nasa.gov>
6. European Space Agency, Space Engineering; http://www.esa.int/SPECIALS/Space_Engineering/index.html
7. The European Cooperation for Space Standardization (ECSS); <http://www.ecss.nl>
8. ASTM International (formerly known as American Society for Testing Materials); <http://www.astm.org>