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MIL-HDBK-338B
1 October 1998

SUPERSEDING
MIL-HDBK-338A
12 October 1988

MILITARY HANDBOOK

ELECTRONIC RELIABILITY DESIGN HANDBOOK

This handbook is for guidance only. Do not cite this document as a requirement

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FOREWORD

1. This handbook is approved for use by all Departments and Agencies of the Department of Defense (DoD). It was developed by the DoD with the assistance of the military departments, federal agencies, and industry and replaces in its entirety MIL-HDBK-338A. The handbook is written for reliability managers and engineers and provides guidance in developing and implementing a sound reliability program for all types of products.

2. This Handbook is for guidance only. This Handbook cannot be cited as a requirement. If it is, the contractor does not have to comply.

3. Reliability is a discipline that continues to increase in importance as systems become more complex, support costs increase, and defense budgets decrease. Reliability has been a recognized performance factor for at least 50 years. During World War II, the V-1 missile team, led by Dr. Wernher von Braun, developed what was probably the first reliability model. The model was based on a theory advanced by Eric Pieruschka that if the probability of survival of an element is 1/x, then the probability that a set of n identical elements will survive is (1/x)n . The formula derived from this theory is sometimes called Lusser's law (Robert Lusser is considered a pioneer of reliability) but is more frequently known as the formula for the reliability of a series system: Rs = R1 x R2 x . . x Rn.

4. Despite the long gestation period for reliability, achieving the high levels needed in military systems is too often an elusive goal. System complexity, competing performance requirements, the rush to incorporate promising but immature technologies, and the pressures of acquisition budget and schedule contribute to this elusiveness. In the commercial sector, high levels of reliability are also necessary. Recently, American products once shunned in favor of foreign alternatives have made or are making a comeback. This shift in consumer preferences is directly attributable to significant improvements in the reliability and quality of the American products.

5. Noting these improvements, and facing a shrinking defense budget, the Department of Defense began the process of changing its acquisition policies to buy more commercial off-the-shelf products and to use commercial specifications and standards. The objective is to capitalize on the "best practices" that American business has developed or adopted, primarily in response to foreign competitive pressures. When combined with the knowledge and expertise of military contractors in building complex and effective military systems (soundly demonstrated during the conflict with Iraq), it is hoped that these commercial practices will allow the Department of Defense to acquire world-class systems on time and within budget.

FOREWORD

6. The information in this Handbook reflects the move within the military to incorporate best commercial practices and the lessons learned over many years of acquiring weapon systems “by the book”. Military as well as commercial standards and handbooks are cited for reference because they are familiar to both military and commercial companies. Many of the military documents are being rescinded, so copies may be difficult to obtain. For those who have copies or can obtain them, the military documents provide a wealth of valuable information.

7. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be useful in improving this document should be addressed to: Air Force Research Laboratory/IFTB, 525 Brooks Road, Rome, NY 13441-4505. Comments should be submitted using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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