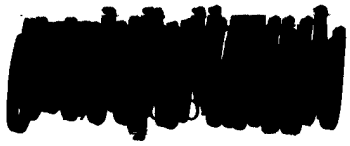
RELIABILITY SOURCEBOOK

Reliability Analysis Center

P.O. Box 4700 • Rome, NY 13440-8200 • (315) 337-0900

The Reliability Analysis Center is a DoD Information Analysis Center operated by IIT Research Institute, Rome, New York



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RELIABILITY SOURCEBOOK

1990

Prepared by:
Reliability Analysis Center

Under contract to:
Rome Air Development Center
Griffiss AFB, NY 13441-5700

[redacted]

The Reliability Analysis Center (RAC) is a Department of Defense Information Analysis Center sponsored by the Defense Logistics Agency, managed by the Rome Air Development Center (RADC), and operated at RADC by IIT Research Institute (IITRI). RAC is chartered to collect, analyze and disseminate reliability information pertaining to systems and parts used therein. The present scope includes integrated circuits, hybrids, discrete semiconductors, microwave devices, optoelectronics and nonelectronic parts employed in military, space and commercial applications. In addition to data collection and analysis attributes, RAC is also chartered as being a center for all aspects of reliability engineering and related disciplines including reliability, Testability, Statistical Process Control, Electrostatic Discharge, and Total Quality Management.

Data are collected on a continuous basis from a broad range of sources, including testing laboratories, device and equipment manufacturers, government laboratories and equipment users (government and non-government). Automatic distribution lists, voluntary data submittals and field failure reporting systems supplement an intensive data solicitation program.

Reliability data and analysis documents covering most of the device types mentioned above are available from the RAC. Also, RAC provides reliability consulting, training, technical and bibliographic inquiry services which are noted at the end of this document.

REQUESTS FOR TECHNICAL ASSISTANCE AND INFORMATION ON AVAILABLE RAC SERVICES AND PUBLICATIONS MAY BE DIRECTED TO:	**Reliability Analysis Center** **P.O. Box 4700** **Rome, NY 13440-8200** **Non-Technical Inquiries: (315) 330-4151** **(315) 339-0900** **Total Quality Management: (800) 526-4804** **Telefax: (315) 337-9932**
ALL OTHER REQUESTS SHOULD BE DIRECTED TO:	**Rome Air Development Center** **RBE/Duane A. Gilmour** **Griffiss AFB, NY 13441-5700** **Telephone: (315) 330-2540** **Autovon: 587-2540**

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13. ABSTRACT (Maximum 200 words)

This publication was developed to fill the need for a single, consolidated reference to sources of reliability data and information. Many of the inquiries received by the Reliability Analysis Center (RAC) are concerned with whether a certain type of reliability data exists and how and where it can be obtained. While various bibliographic publications do exist, there has been no convenient source document consolidating information about all types of data sources - books, periodicals, organizations, on-line databases, etc. - covering both military and industrial/commercial arenas. This publication is intended to provide a ready source for this type of information.

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FOREWORD

This publication was developed to fill the need for a single, consolidated reference to sources of reliability data and information. Many of the inquiries received by the Reliability Analysis Center (RAC) are concerned with whether a certain type of reliability data exists and how and where it can be obtained. While various bibliographic publications do exist, there has been no convenient source document consolidating information about all *types* of data sources – books, periodicals, organizations, on-line databases, etc. – covering both military and industrial/commercial arenas. This publication is intended to provide a ready source for this type of information.

While it would be virtually impossible to identify *all* sources of reliability information and data, an attempt has been made in this publication to identify those sources which are the most readily available and the most helpful to the reliability practitioner.

This document is organized into four chapters:

Chapter 1	Organizations – Government, military, professional, and educational groups which support reliability and quality disciplines.
Chapter 2	Publications – Proceedings, journals, newsletters, periodicals, and books containing reliability data and information.
Chapter 3	Databases – Automated and semi-automated databases containing component and system reliability data.
Chapter 4	Electronic Bulletin Boards – On-line resources for reliability information exchange.

The data sources listed cover a broad spectrum. Some focus on DoD needs; others serve a limited segment of the industrial community. Access to some data sources is restricted, while others are open to any and all users. Some sources are available at no cost to the user, where others charge the user for their information. Where possible these distinctions have been made in the text.

Table of Contents

Chapter One - Organizations

DoD Information Analysis Centers

Twenty-one IACs are supported by the Department of Defense. These centers are generally contractor-operated and managed. Base funding is provided by the Defense Logistics Agency (DLA), the Defense Technical Information Center (DTIC), or other DoD activities and supplemented by user fees. Each IAC receives technical guidance from one or more DoD laboratories or agencies with leading competence in the center's particular field of science and technology.

The centers generally offer the following types of products and services for their particular field of specialization:

- Abstracts, indexes, and bibliographic searches of technical documents.
- Authoritative responses to user technical inquiries.
- Preparation and distribution of technical documents, including data compilations, engineering handbooks, reports on new technologies, and other reference works.
- Publication of periodic newsletters and reviews to improve the current awareness of the technical community.
- Execution of special studies and tasks as specified and funded by users.
- Administrative and technical support to technical committees and conferences to solve problems, coordinate technology programs, and promote technical information exchange.

Reliability Analysis Center (RAC)

The Reliability Analysis Center (RAC), publisher of this document, is one of 21 Information Analysis Centers supported by the Department of Defense. Each center serves as a clearinghouse for available information pertaining to a particular specialized technical subject area of concern to the military and to industry. (See below for more information on the IAC program.) The Reliability Analysis Center focuses on reliability, maintainability, and quality.

RAC personnel collect, analyze, synthesize, format and disseminate reliability information on electronic systems and on the microcircuit, discrete semiconductor, and electromechanical components that make up these systems. System and component design, the manufacturing process, and logistics support are addressed to improve the reliability and quality of fielded systems. RAC activities span the entire system life cycle:

- Application of reliability physics knowledge, design assessment and predictive techniques, and component history information to system design.

- Assessment of designed-in testability and maintainability in light of a system's proposed maintenance support structure.
- Assistance with Total Quality Management to optimize manufacturing.
- Collection, organization, and analysis of qualification test and field failure data.
- Feedback of field experience to bring about needed engineering changes and improved logistics support.

Critically analyzed and evaluated reliability experience information is distributed through reliability data compilations, technical handbooks, and special publications. RAC instructors present standard or specially-tailored training courses in both open-enrollment and closed sessions. In addition, RAC provides engineering consulting under service charge arrangements directly to government agencies, defense contractors, and other interested parties, bringing RAC's accumulated reliability experience to bear on specific customer problems.

Contact:

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

Nondestructive Testing Information Analysis Center (NTIAC)

NTIAC is a DoD-supported Information Analysis Center. (See above for general information on the IAC program.) This center addresses all Nondestructive Testing and/or evaluation techniques and processes. This includes all material-energy interaction phenomena such as radiographic, holographic, acoustic, magnetic, etc. NTIAC also examines economic considerations in selection of techniques and processes and industry trends in applying current non-destructive evaluation technologies in research and development, production, maintenance, safety monitoring, failure prevention of in-service material, and life assurance.

Contact:

NTIAC
Texas Research Institute
9063 Bee Caves Road
Austin, TX 78733

Telephone: (512) 263-2101

Other Governmental Organizations

Government-Industry Data Exchange Program (GIDEP)

GIDEP is a cooperative program between the federal government and industry to provide a means to exchange technical information. Its primary objectives are to enhance equipment quality and reliability, productivity in design and manufacturing, operator safety, and logistics support. GIDEP seeks to save participants' time and money by providing a central, on-line database for storage of engineering, reliability, and failure experience data. This data is essential in the research, design, development, production and operational phases of the life cycle of systems and equipment. While its primary function is to operate these databases, GIDEP is also active in promoting other forms of data interchange, standardization efforts, etc.

Contact:

GIDEP Operations Center
Corona, CA 91720

Telephone: (714) 736-4677; Autovon 933-4677

National Technical Information Service (NTIS)

NTIS is the central source for research, development, and engineering documents prepared by Federal agencies, their contractors or grantees, or by special technology groups. NTIS operates on a cost recovery basis and consequently charges a nominal fee for its publications. Services and products are available without restriction. Documents are ordered by a unique "AD" number. An on-line bibliographic search capability for NTIS documents is available from several commercial on-line data services.

NTIS provides subscribers with a periodic bulletin containing abstracts of new reports or documents of continuing interest. A free product and services catalog is available; order number PR-827.

Contact:

National Technical Information Service
U. S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161-2171

Telephone:
General Information (703) 487-4600
To place an order: (703) 487-4650
Abstract subscription service: (703) 487-4630

Defense Technical Information Center (DTIC)

DTIC serves as a clearinghouse for technical reports generated or contracted for by DoD agencies. DTIC also handles documents received from NASA, Department of Energy, Department of Transportation, by voluntary contribution, or by special agreement with foreign governments.

DTIC acquires, stores, retrieves, and disseminates scientific and technical information to support DoD research, development, engineering, and studies programs. DTIC services are available to the DoD and its contractors and to other U. S. government organizations and their contractors. Organizations may also be eligible for services under various special programs for academic or equal opportunity business support.

Detailed information on how to register to receive DTIC notices and to obtain access to its products and services is given in DTIC document DTICH 4185.1, *Handbook for Users*, APRIL 1989. Also available is a directory of DoD Information Analysis Centers (IACs).

An on-line interactive query capability is available to qualified users.

Contact:

Defense Technical Information Center
Cameron Station
Alexandria, VA 22304-6145

Telephone:
General information: (202) 276-6434; Autovon 284-6434
On-line support: (202) 274-7709; Autovon 284-7709
To receive an information packet about DTIC services:
(202) 274-6871; Autovon 284-6871

Defense Logistics Studies Information Exchange (DLSIE)

DLSIE collects, organizes, stores, and disseminates information relating to logistics studies, models, management information, and any related documentation which may be of benefit to the DoD logistics management and research community. DLSIE maintains a data repository and a computerized database, and also offers periodic publications and reports.

Contact:

Defense Logistics Studies Information Exchange
U. S. Army Logistics Management College
Fort Lee, VA 23801-6043

Telephone: (804) 734-4546; Autovon 687-4546; FTS 775-4546

Naval Publications and Forms Center

The Naval Publications and Forms Center is the central DoD source for:

- Military and Federal Specifications
- Military and Federal Standards
- Military Handbooks
- QPLs, QMLs, etc.
- DoD adopted Industrial Documents (Issued to DoD only)
- DoD Index of Specifications and Standards (DODISS)

Contact:

Naval Publications and Forms Center
5801 Tabor Ave.
Philadelphia, PA 19120-5099

Telephone: General assistance (215) 697-2179
Ordering documents: (215) 697-3321; TELEX 834295; Autovon 442-3321

DoD Agencies

Air Force Special Assistant for Reliability and Maintainability

This office sponsors and supervises reliability and maintainability programs for the Air Force, including R & M 2000 (see below). The Air Force Special Assistant for R & M determines trends and sets priorities for improving Air Force systems reliability; for example, recently attention has been focused on software reliability and improvement of Electronic Warfare (EW) systems.

Contact:

Brigadier General William E. Collins
AF Special Assistant for R&M
Headquarters USAF/LE-RD
Washington, DC 20330-5130

Telephone: (202) 695-9836; Autovon 225-9836

Air Force "R&M 2000" Program

R & M 2000 is a program within the Air Force dedicated to improving the *operational performance over time* of weapons systems by procuring systems designed to fail less often and be easier to repair and return to service. This program had its origin in 1984 and was institutionalized by Air Force top management in 1986.

Contact:

Brigadier General William E. Collins
AF Special Assistant for R&M
Headquarters USAF/LE-RD
Washington, DC 20330-5130

Telephone: (202) 695-9836; Autovon 225-9836

Rome Air Development Center (RADC) Reliability Directorate (RB)

The Rome Air Development Center is a major Air Force R & D facility. Within RADC the Reliability directorate coordinates or participates in many Air Force reliability-related programs, including reliability standards and specification development efforts, reliability data collection and failure analysis for Air Force systems, development and publication of technical reports and handbooks, reliability support for system design and procurement programs, etc.

Contact:

Col. Raymond White
RADC/RB
Griffiss AFB, NY 13441-5700

Telephone: (315) 330-3064; Autovon 587-3064

U. S. Air Force Avionics Systems Division

This Avionics Systems Division office is the central point of contact for the Avionic/Electronic Integrity Program (AVIP). The purpose of this program is to improve the reliability of aircraft avionics systems by specifying life cycle requirements such as environments, material characteristics, design criteria, damage tolerance, maintenance conditions, and quality engineering. These guidelines are described in MIL-A-87244A, "Avionic/Electronic Integrity Program Requirements."

Contact:

Dr. John Halpin
ASD/EN (PA)
Wright-Patterson AFB, OH 45433

Telephone: (513) 255-5874

Navy "Best Practices" Program Office

The Best Practices Approach is a thrust within the Navy to improve the effectiveness of technical procurements, as described in a book called "Best Practices" published by the program office. The entire life cycle of a system development is addressed, including design, test, production, and logistics.

Contact:

W. J. Willoughby Jr.
U. S. Navy
Crystal Plaza #5, Rm 348
OASN(RDL)
Washington, D. C. 20360-5000

Army "Reliability Initiatives" Program Office

This Army office coordinates programs to improve the reliability of Army systems.

Contact:

Seymour Lorber
HQ U. S. Army Material Command
Washington, DC 20310

Professional Organizations

Institute of Electrical and Electronic Engineers (IEEE) Reliability Society

The Reliability Society is an organization of IEEE members with a professional interest in product assurance operating within the IEEE framework. The Society is concerned with reliability and quality, the effectiveness of processes, hardware, systems, and software, and related topics such as product liability. Any IEEE member can become a member of the Reliability Society by paying an annual membership fee of $8.00. Members automatically receive the IEEE Transactions on Reliability and the annual proceedings for both the R&M Symposium and the Reliability Physics Symposium.

Contact:

IEEE Headquarters
345 East 47 St.
New York, NY10017-2394

Telephone: (212) 705-7900

or:

IEEE Service Center
P.O. Box 1331
Piscataway, NJ 08855-1331

Telephone: (201) 981-0060

American Society for Quality Control (ASQC) Electronics and Reliability Divisions

The American Society for Quality Control is the world's oldest and largest professional organization devoted specifically to the advancement of quality. The ASQC offers a formal professional certification program in five quality-related areas including reliability. Any ASQC member can become a member of the Reliability or the Electronics Division by paying the annual Division membership fee of $8.00. Members receive the IEEE Transactions on Reliability and the annual proceedings for both the R&M Symposium and the Reliability Physics Symposium.

Contact:

American Society for Quality Control
310 West Wisconsin Ave.
Milwaukee, WI 53203

Telephone: (800) 272-1946; in Wisconsin (414) 272-8575

Electrical Overstress/Electrostatic Discharge (EOS/ESD) Association

The primary field of interest of the EOS/ESD Association is the advancement of the theory and practice of electrical overstress avoidance, with emphasis on electrical discharge phenomena. The organization promotes the exchange of technical information and develops and promulgates standards for testing, materials, protective devices and procedures.

Contact:

EOS/ESD Association, Inc.
Norstar Building
200 Liberty Plaza
Romé, NY 13440

Telephone: (315) 339-6937

Society of Reliability Engineers (SRE)

Contact:

Society of Reliability Engineers
P.O. Box 131
Crum Lynne, PA 19022

Society of Logistics Engineers (SOLE)

Reliability, maintainability, and quality are of key importance during operation and maintenance of a fielded system. This area is a major concern of the Society of Logistics Engineers.

Contact:

Society of Logistics Engineers
Suite 201
125 West Park Loop
Huntsville, AL 35806

Telephone: (205) 837-1092

Society of Automotive Engineers (SAE)

Automotive applications put electronic systems and components in an inhospitable environment with high reliability requirements. Reliability of automotive electronics is one thrust of this respected professional organization.

Contact:

Society of Automotive Engineers
400 Commonwealth Dr.
Warrendale, PA 15096

Institute of Environmental Sciences (IES)

The Institute of Environmental Sciences is a professional society of engineers, scientists, and educators simulating, testing, controlling and teaching about the environments of earth and space. The IES is known for its support of environmental testing and evaluation of methods for testing at the piece part and assembly level.

Contact:

Institute of Environmental Sciences
940 East Northwest Highway
Mount Prospect, IL 60056

Telephone: (708) 255-1561

International Electrotechnical Commission (IEC)

The IEC is the world-wide authority for electrical and electronic engineering standards. The IEC works in cooperation with the International Standards Organization (ISO) which covers non-electrical fields. Together these organizations represent countries comprising over 80% of the world's population. Of special interest to the reliability community is IEC Technical Committee 56 on Reliability and Maintainability.

Contact in the USA

American National Standards Institute, Inc.
1430 Broadway
New York, NY 10018

Telephone: (212) 354-3361

Contact in Europe and the rest of the world:

International Electrotechnical Commission
Central Office
3, rue de Varembe
Geneva, Switzerland

Electrical Power Research Institute (EPRI)

The mission of EPRI is to transfer innovations in science and technology to applications in the utility industry by:

- Creating, integrating, and interpreting scientific and technical information and databases.
- Accelerating the commercial availability of products and system response to the needs of the industry.
- Providing technical support to member organizations in the planning, procurement, operation and maintenance of electrical supply systems.

Contact:

EPRI Corporate Communications
P.O. Box 10412
Palo Alto, CA 94303

Telephone: (415) 934-4212 or (415) 855-2411

Commercial Organizations

Global Information Services - Global Engineering Documents

Global Engineering Documents is a licensed reprinting facility for domestic, foreign national, and international societies and institutions. Among other services offered, Global sells the same DoD documents that are available from Naval Publications, but guarantees much faster delivery. Next day delivery and facsimile service is available. All specifications and standards are available in microfilm or microfiche form as well as in hard copy.

Contact:

Global Engineering Documents
1990 M Street N.W., Suite 400
Washington, DC 20036

Telephone: (800) 854-7179 or (714) 261-1455

INFONORME - London Information

INFONORME - London Information is the European distributor for a number of U. S. publishers and government agencies including Department of Defense (DoD), National Technical Information Service (NTIS), American National Standards Institute (ANSI), Institute of Electrical and Electronic Engineers (IEEE), American Society of Mechanical Engineers (ASME), and the Reliability Analysis Center (RAC). There are over 70,000 different titles in stock. The organization also maintains a database, available on CD-ROM, containing bibliographic details of all the western world's standards. About 155,000 standards are included from all major issuing authorities in the U. S., together with all major industrialized countries, including Japan, Canada, Australia, and all European countries.

Contact:

Peregrine Rowse, Director
INFONORME - London Information
Index House Ascot
Berks SL5 7EU, United Kingdom

Universities with an R & M Curriculum

University of Maryland

A program leading to M.S. and Ph.D. degrees in Reliability Engineering is offered. A broad range of interdisciplinary research activities are also available.

Contact:

Dr. Marvin Rousch
Director, Reliability Engineering Program
Materials and Nuclear Engineering Unit
University of Maryland
College Park, MD 20742-2115

Telephone: (301) 454-2431

University of Arizona

This university has long offered a M.S. Degree in Reliability Engineering. The University's Videocampus Division provides videotapes of most courses, enabling candidates to satisfy most degree requirements within their own organizations.

Contact:

Dr. Dimitri Kececioglu
College of Engineering and Mines
Aerospace and Mechanical Engineering Dept., Bldg No. 16
University of Arizona
Tucson, AZ 85721-0663

Telephone: (602) 621-2495 or (602) 621-6120

New Jersey Institute of Technology

This institution has a long standing graduate program in reliability engineering.

Contact:

Raj Misra, PhD.,
Professor of Electrical Engineering and Reliability
New Jersey Institute of Technology
Newark, NJ 07102

Telephone: (201) 596-3511

Air Force Institute Of Technology (AFIT)

AFIT offers a Systems Engineering Masters Degree with a reliability specialization. The institute also offers 16 hours of engineering post graduate study in Professional Specialized Education for R&M, as well as an assortment of graduate and Professional Continuing Education reliability courses in engineering and management. Courses

offered are primarily for DoD personnel, but contractor personnel may attend on a space-available basis if attendance is certified as beneficial to the DoD.

Contact:

Dr. Ben Williams, Director
Center of Excellence for R & M
Air Force Institute Of Technology
AFIT/XP
Wright-Patterson AFB, OH 45433-6583

Telephone: (513) 255-2321; Autovon 785-2321

U. S. Army Management Engineering Training Activity (AMETA)

Reliability and Maintainability courses are offered, although AMETA does not offer a degree program. Courses are primarily for DoD personnel, but contractor personnel may attend on a space-available basis if attendance is certified as beneficial to the DoD.

Contact:

U. S. Army Management Engineering Training Activity (AMETA)
Director, AMXOM/PMR
Rock Island, IL 61299-7040

Telephone: (309) 782-0489; Autovon 793-0489

Chapter Two - Publications

Symposiums with Published Proceedings

Reliability and Maintainability Symposium (RAMS) – IEEE/ASQC

The annual R&M Symposium is the premier forum for system and equipment level R&M information exchange. It is sponsored by 10 different professional societies and is held at various locations throughout the U. S. in late January. The symposium also includes tutorial sessions.

Contact the IEEE Reliability Society at:

IEEE Service Center
P.O. Box 1331
Piscataway, NJ 08855-1331

Telephone: (201) 981-0060

or contact the ASQC Electronics or Reliability Division at:

American Society for Quality Control
310 West Wisconsin Ave.
Milwaukee, WI 53203

Telephone: (800) 272-1946; in Wisconsin (414) 272-8575

Back copies of symposium proceedings can be ordered from:

RAMS c/o Evans Associates
804 Vickers Ave.
Durham, NC 27701

International Reliability Physics Symposium – IEEE

The International Reliability Physics Symposium (IRPS) emphasizes device reliability as a dominating influence in the development of new part technologies and circuit designs. The symposium concentrates on the role of design, processing, packaging, and testing for building in high reliability and focuses on new techniques and tools for failure analysis. The symposium is held at various locations throughout the U. S. in late March or April. Tutorial sessions are also included.

For proceedings or information contact the IEEE Reliability Society at:

IEEE Service Center
P.O. Box 1331
Piscataway, NJ 08855-1331

Telephone: (201) 981-0060

Annual Technical Meeting – IES

The Institute of Environmental Sciences annual technical meeting and equipment exposition is held each May. IES also holds periodic workshops on Environmental Stress Screening and publishes proceedings from these workshops.

Contact:

Institute of Environmental Sciences
940 East Northwest Highway
Mount Prospect, IL 60056

Telephone: (708) 255-1561

"Reliability and Maintainability in Computer-Aided Engineering" – IEEE Reliability Society Workshop

This annual workshop, held each fall, is aimed at assuring that reliability and maintainability needs are adequately addressed when the capabilities of engineering workstations are being defined. CAE capabilities are needed by design engineers to design in features satisfying R&M requirements during the design process. CAE is also used by R&M specialists for independent reliability analyses and reviews.

Contact the IEEE Reliability Society at:

IEEE Service Center
P.O. Box 1331
Piscataway, NJ 08855-1331

Telephone: (201) 981-0060

International Reliability – Availability – Maintainability Conference for the Electric Power Industry (Inter-RAM)

This conference deals specifically with the unique reliability, availability and maintainability concerns of the electric power industry. The conference is held in various locations throughout the U. S. in May or June.

Contact:

Mr. Roy R. Fray
Technical Program Chairman
SAIC, Suite 1250
160 Spear St.
San Francisco, CA 94105

Telephone: (415) 855-2441

Government Microcircuit Applications Conference (GOMAC)

This government-sponsored conference has been the setting for announcement of a number of major government microcircuit initiatives. Exchange of design, engineering, reliability, and standardization information relative to microcircuit applications is the principal objective of the annual GOMAC conference.

All sessions are ITAR-controlled; one session is classified. The conference alternates between the east and west coasts and is held in October or November.

Contact:

Randolph A. Reitmeyer, General Chairman
USALABCOM
Electronics Technology & Devices Laboratory
Attn: SLCET-1
Ft. Monmouth, NJ 07703-5000

Telephone: (201) 544-3465

AFSC/AFLC Reliability/Maintainability Workshop

Air Force Systems Command and Air Force Logistics Command sponsor a joint R&M workshop in March or April each year at Wright-Patterson AFB, OH. The focal point of the conference rotates between AFSC and AFLC. Attendance is generally limited to Air Force personnel.

Contact:

AFSC/PLE
Andrews AFB, DC 20334-5000

Telephone: (301) 981-6429; Autovon 858-6429

or

AFLC-MM
Wright-Patterson AFB, OH 45432

Telephone: (513) 257-2733; Autovon 787-2733

EOS/ESD Symposium – EOS/ESD Association

This symposium promotes the exchange of technical information on the theory and practice of the avoidance of electrical overstress, with specific emphasis on electrical discharge phenomena. It is held annually at various locations throughout the U. S. in late September or early October.

Contact:

EOS/ESD Association, Inc.
Norstar Building
200 Liberty Plaza
Rome, NY 13440

Telephone: (315) 339-6937

Periodic Technical Journals

Transactions on Reliability – IEEE

The purpose of this professional journal is to advance theory and practice of the reliability discipline. Transactions on Reliability is published 5 times a year and is distributed free to members of the IEEE Reliability Society and the ASQC Electronics Division.

Contact the IEEE Reliability Society at:

IEEE Service Center
P.O. Box 1331
Piscataway, NJ 08855-1331

Telephone: (201) 981-0060

or contact the ASQC Electronics Division at:

American Society for Quality Control
310 West Wisconsin Ave.
Milwaukee, WI 53203

Telephone: (800) 272-1946; in Wisconsin (414) 272-8575

Transactions on Reliability - Reliability Review – ASQC

This quarterly review publishes papers on the management, engineering, and philosophic aspects of reliability, maintainability, quality, safety, and effectiveness of products, processes, and services. It also touches on related subjects such as product liability and risk management. The journal is distributed free to members of the ASQC Reliability Division.

Contact the ASQC Reliability Division at:

American Society for Quality Control
310 West Wisconsin Ave.
Milwaukee, WI 53203

Telephone: (800) 272-1946; in Wisconsin (414) 272-8575

The Journal of Environmental Sciences – IES

This is the official bimonthly publication of the IES. The journal includes technical reports covering environmental texting and evaluation of methods for testing at the piece part and assemply levels.

A subscription is included with membership. Nonmembers may also subscribe.

Contact:

Institute of Environmental Sciences
940 East Northwest Highway
Mount Prospect, IL 60056

Telephone: (708) 255-1561

Microelectronics and Reliability

This is a bimonthly international journal and world abstracting service publication.

In North America contact:

Pergamon Press
Maxwell House, Fairview Park
Elmsford, NY 10523

From elsewhere contact:

Pergamon Press plc
Headington Hill Hall
Oxford OX3 0BW, U.K.

Reliability Engineering

This is a quarterly international journal covering the application of reliability and probabilistic techniques in design. It deals with the choice of research programs and in inspection and maintainability of plant items or systems.

In North America contact:

Elsevier Science Publishers
Journal Information Center
52 Vanderbilt Ave.
New York, NY 10017

Telephone: (212) 916-1250

Elsewhere contact:

Elsevier Applied Science Publishers
Crown House, Linking Road, Barking
Essex IG11 8JU, England

Quality and Reliability Engineering International

This quarterly technical journal is designed to bridge the gap between existing theoretical methods and scientific research and current industrial practices. It concentrates on "high-technology" products, including both hardware and software.

Contact:

John Wiley & Sons Limited
Baffins Lane, Chichester
Sussex, PO19 1UD, England

Newsletters

RAC Newsletter

The RAC Newsletter brings reliability, maintainability, and quality information and techniques, announcements, and product information to a broad audience. A typical issue contains an in-depth feature article or case study, news about upcoming industry events, product announcements, a Technical Brief insert focusing on practical techniques, information about current RAC activities, and other items of interest.

The RAC Newsletter is published and distributed quarterly. It is mailed to a qualified list of more than 15,000 persons in military, other government, and commercial organizations. A subscription to the Newsletter is available free of charge to anyone working in reliability, maintainability, or quality.

Contact:

Reliability Analysis Center
P. O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900

Reliability and Maintainability Technology Transition Fact Sheet

This is a publication of the Systems Reliability and Engineering Branch of the Reliability and Compatibility Division of the DoD's Rome Air Development Center (RADC). It is published semi-annually and is available without charge as a service to reliability professionals.

Contact:

RADC/RBE
Griffiss AFB, NY 13441-5700

JPL/NASA Electronic Parts Reliability Newsletter

This monthly newsletter provides electronic parts reliability information for JPL/NASA use.

Contact:

Jet Propulsion Laboratory
4800 Oak Grove Dr.
Pasadena, CA 91109
Attention: Didi Rowe, M/S 303/200

Telephone: (818) 354-0319

Magazines and Other Periodic Publications

Evaluation Engineering Magazine

This is a helpful monthly magazine available free to qualified managers, supervisors and engineers in the electronics and related industries. Typical articles address electronic testing, quality control and quality assurance, design and development, research, manufacturing and production, receiving inspection, product assurance, field service, reliability, components, standards, and professional staffing issues.

Contact:

Evaluation Engineering
2504 North Tamiami Trail
Nokomis, FL 34275

Telephone: (813) 966-9521

Quality Progress Magazine

This periodical, published by the ASQC and sent to all members, deals with ideas, methods, and tools for quality management.

Contact:

American Society for Quality Control
310 West Wisconsin Ave.
Milwaukee, WI 53203

Telephone: (800) 272-1946; in Wisconsin (414) 272-8575

Test Magazine

Test addresses a number of issues of interest to the reliability and quality community, including reliability demonstration and qualification testing, environmental test profiles, environmental stress screening, test equipment, testing services, etc.

Contact:

Test
3756 Grand Ave., Suite 205
Oakland, CA 94610

Failure Rate Publications

MIL-HDBK-217 - Reliability Prediction of Electronic Equipment

MIL-HDBK-217 is a widely-used, authoritative document covering methods for prediction of failure rates for all types of electronic equipment, both military and commercial. This document is frequently referenced in military procurement specifications when standard reliability prediction methods must be applied to the item being produced.

Ordering information: MIL-HDBK-217.

Contact:

Naval Publications and Forms Center
5801 Tabor Ave.
Philadelphia, PA 19120-5099

Telephone orders: (215) 697-3321; TELEX 834295; Autovon 442-3321

RAC Microcircuit Device Reliability Databooks

The RAC Microcircuit Device Reliability Databooks are an interrelated series containing field failure rate and trend information for microcircuits. MDR-21 investigates trends in reliability for various microcircuit types. MDR-21A is a two-volume companion to MDR-21 which provides the detailed field data from which MDR-21's trends analyses were derived. FMDR-21A makes available the data contained in MDR-21A in IBM-compatible diskette format, with built-in data retrieval tools.

Ordering information: MDR-21: U. S. $95. MDR-21A: U. S. $125; diskette version FMDR-21A: U. S. $175.

Contact:

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

Electrostatic Discharge Susceptibility Data (VZAP-2) and ESD Control in the Manufacturing Environment

VZAP-2, the Electrostatic Discharge Susceptibility Databook from the Reliability Analysis Center, contains electrostatic discharge susceptibility test and classification data for over 1600 microcircuits and 900 discrete devices. This data was compiled from manufacturers, test laboratories, and end users and is widely used throughout the industry to aid in part selection and determine appropriate ESD control procedures. The data is also available on IBM-compatible diskette with built-in data retrieval tools.

Another RAC publication, SOAR-6, "ESD Control in the Manufacturing Environment," recommends ESD control measures based on the data in VZAP-2.

Ordering information: VZAP-2: U. S. $125; diskette version U. S. $185; SOAR-6: U. S. $56.

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

IEEE Standard 500 - "Reliability Data"

This document was specifically written to address the unique needs of the nuclear power generation industry. However, the failure rates information frequently has much broader application. For some classes of equipment this document contains the best available failure rate information.

Ordering information: IEEE Standard 500.

Contact:

IEEE Service Center
P.O. Box 1331
Piscataway, NJ 08855-1331

Telephone: (201) 981-0060

Non-Electronic Part Reliability Data (NPRD-3) and Non-Operating Reliability Data (NONOP-1)

These two documents address failure rates for unique types of parts (NPRD-3) and unique environments (NONOP-1) not covered by MIL-HDBK-217.

NPRD-3 provides failure rate and failure mode information for electrical, mechanical, electro-mechanical, hydraulic, and rotating devices and is a compilation of field experience in both miltary and industrial applications. This data is also available in IBM-compatible diskette form with built-in data retrieval tools.

NONOP-1 contains extensive nonoperating field and test data on an assortment of electronic and non-electronic parts. This data supports more accurate prediction of devices and systems in storage than previous methods applying correction factors to operating failure rates.

Ordering information: NPRD-3, U. S. $80; diskette version FNPRD-3: U S. $125. NONOP-1, U. S. $150.

Contact:

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

Impact of Nonoperating Periods on Equipment Reliability (RADC-TR-85-91)

This document contains models to predict the quantitative effects of non-operating periods on electronic equipment reliability. This document is the classic reference for prediction of reliability in a non-operating environment. The models can be used to predict non-operating component failure rates for any anticipated environment except a satellite environment.

Ordering information: AD-A158843.

Contact:

National Technical Information Service
U. S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161-2171

Telephone: general information (703) 487-4600; to order (703) 487-4650

Bellcore Reliability Prediction Procedure

The Bellcore reliability prediction method is an alternate to that espoused in MIL-HDBK-217. It is a unique approach applicable to a very limited specific environment: continuously operating equipment in a ground benign environment with a fair degree of temperature and humidity control. The Bellcore prediction procedure can give more accurate results than MIL-HDBK-217 for telephony and large main-frame computer installations but is not applicable to most other types of equipment.

Ordering information: TR-TSY-000332

Contact:

Bell Communications Research Inc.
Licensing, Room 2b-222
290 W. Mt. Pleasant Ave.
Livingston, NJ 07039

Telephone: (800) 521-CORE ext 2673

Reliability Prediction Models for Mechanical Equipment

This prediction procedure, while similar in methodology to MIL-HDBK-217, is not based upon the same theoretical premise. It represents a unique and controversial approach to the prediction of failure rates for mechanical equipment. In certain situations it may provide the best available reliability estimate for some types of mechanical parts.

Contact:

Belvoir Research Development and Engineering Center,
(STRBE-TQR)
Fort Belvoir, VA 22060-5606

or

Eagle Technology Inc.
2300 S. Ninth St.
Arlington, VA 22204

Reliability and Maintainability Handbooks

A Primer for Reliability, Maintainability & Safety Standards (PRIM-1)

This RAC publication gives concise descriptions of thirty-seven military standards, specifications, and handbooks dealing with reliability, maintainability and safety. It provides a comprehensive overview of the most important military documents in the field. PRIM-1 contains a brief description of the content and purpose of each document, explains its significance to a program and/or program phase, lists any applicable data item descriptions (DID's), and briefly explains how to use the document. Where necessary PRIM-1 tells how to tailor a standard or specification's requirements. Documents unique to a specific branch of the military are so identified.

Ordering information: PRIM-1, U. S. $95, Non-U. S. $115

Contact:

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

MIL-HDBK-338 - Electronic Reliability Design Handbook

This Handbook describes a comprehensive methodology covering all aspects of electronic system reliability design. Acquisition and deployment considerations for DoD equipment/systems, as they relate to equipment design, are addressed. The document contains up-to-date, practical guidelines for use by design engineers, reliability engineers, and managers. The handbook also includes a comprehensive list of reference material.

The handbook emphasizes the practical aspects of R/M design and management techniques and gives the reader insight into how the techniques are applied. Users are guided through design, production, and deployment of reliable and maintainable military electronic systems at minimum life cycle cost. The intent of the handbook is to

provide sufficient theoretical and practical information to solve frequently encountered reliability problems .

Ordering information: MIL-HDBK-338

Contact:

Naval Publications and Forms Center
5801 Tabor Ave.
Philadelphia, PA 19120-5099

Telephone: General assistance (215) 697-2179
Ordering documents: (215) 697-3321; TELEX 834295; Autovon 442-3321

RADC Reliability Engineer's Toolkit

This RADC publication is intended for use by practicing reliability and maintainability engineers. Not a complete tutorial or technical treatment of the R&M discipline, the Toolkit is rather a compendium of useful R&M reference information to be used in everyday practice. Emphasis is placed on the role of the reliability engineer in the various R&M activities of an electronic systems development program.

Ordering information: Toolkit U. S. $10, Non-U. S. $20.

Contact:

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

Microelectronic Failure Analysis Techniques (MFAT-1) and GaAs Microcircuit Characterization and Failure Analysis Techniques (MFAT-2)

Destructive failure analysis of defective electronic parts in the laboratory often provides the key to solution of a difficult reliability problem. These RAC publications are detailed procedural guides for the establishment and operation of a cost-effective failure analysis laboratory. They can serve as tools for the beginning failure analyst and as a convenient reference for experienced analysts and other professionals in the semiconductor industry, such as quality and reliability project engineers. The two volumes describe the most effective failure analysis techniques being used by industry leaders.

MFAT-1 addresses testing of silicon technology devices. MFAT-2 is similar in structure and content, but deals with the unique considerations of gallium arsenide (GaAs) technology.

A partial listing of the some of the specific techniques described includes: fault isolation, radiography, package ambient gas analysis, infrared thermal mapping, liquid crystal analysis, surface topography measurement, optical analysis, metallurgical analysis, scanning acoustical microscopy, and microbeam analysis.

Ordering information: MFAT-1: U. S. $125. MFAT-2 U. S. $100. Both U. S. $200.

Contact:

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

Analysis Techniques for Mechanical Reliability (NPS-1)

This RAC publication presents modern analysis techniques for the reliability assessment of nonelectronic equipment. It includes an extensive discussion of quantitative techniques used for determining the reliability of mechanical parts and systems. This allows meaningful trade-off studies to be implemented to assess the effect on performance, cost, size, safety, and weight of various designs.

Ordering information: NPS-1 U. S. $56, Non-U. S. $66.

Contact:

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

Guide to Government Reliability, Maintainability and Quality Assurance Organizations - RADC-TR-83-49

Many agencies within the United States government perform various functions related to reliability, maintainability, and quality assurance. This RADC document, published in 1983, is a guide to ninety specific Air Force, Army, Navy, NASA, and FAA organizations which provide significant ongoing reliability, maintainability and quality assurance functions.

Ordering information: AD-A130465

Contact:

National Technical Information Service
U. S. Department of Commerce

5285 Port Royal Road
Springfield, VA 22161-2171

Telephone:
General information (703) 487-4600
To place an order: (703) 487-4650

Reliability, Availability, and Maintainability (RAM) Dictionary

This volume is a compilation of definitions of terms used in the reliability, availability, and maintainability field. It distinguishes between various usages of terms used by reliability engineers working in various product environments. Many terms are not found in standard dictionaries.

Edited by: Tracy Omdahl, Copyright 1988

Contact:

ASQC Quality Press
310 W. Wisconsin Ave.
Milwaukee, WI 53203

Telephone: (800) 952-6587

Reliability Textbooks

There are many good reliability textbooks available. A small sampling is listed below to illustrate the diversity of their content and their approach to the subject material.

Practical Statistical Analysis for the Reliability Engineer (SOAR-2)

This RAC publication is an elementary text on statistical methods applicable to reliability studies and data analysis. It is aimed at the non-specialist and explains a variety of statistical methods, both parametric and non-parametric. Practicing reliability engineers are also aided in selecting and using appropriate analytical methods. SOAR-2 is written in understandable language with a minimum of esoteric mathematics. Graphs, tables, and clear, explanatory prose strip away much of the mystique surrounding statistical analysis.

Author: Kieron A. Dey, Copyright 1983

Contact:

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

Reliability Engineering for Electronic Design

This is the textbook used in the RAC-sponsored "Design Reliability Training Course." It takes a pragmatic approach to the subject, filling a void between the rigorous theoretical treatment found in most textbooks and the detailed procedural perspective of industry and military specifications.

Author: Norman B. Fuqua, Copyright 1987

Contact:

Marcel Dekker Inc.
270 Madison Ave.
New York, NY 10016

Telephone: (800) 228-1160

Methods for Statistical Analysis of Reliability and Life Test Data

This text provides the graduate level student and/or the professional reliability engineer with a comprehensive source of available statistical methods commonly applied in reliability work.

Authors: Nancy R. Mann, Ray E. Schafer, Nozer D. Singpurwalla,

Copyright 1974

Contact:

John Wiley & Sons, Inc.
605 Third Avenue
New York, NY 10158-0012

Telephone: (212) 850-6000

ASQC Quality Press Publications

A number of additional reliability textbooks which are currently available may be found in the ASQC Quality Press Publications Catalog.

Contact:

ASQC Quality Press
310 W. Wisconsin Ave.
Milwaukee, WI 53203

Telephone: (800) 952-6587

Chapter Three - Reliability Databases

Air Force Databases

G063: Maintenance and Operational Data Access System (MODAS)

MODAS is the primary maintenance data collection system within the U. S. Air Force. It contains collected maintenance activity data on Airborne and Ground-based systems at the organizational, intermediate, and (to a lesser extent) depot level of maintenance. It is one of the most comprehensive databases available in the Air Force and covers all aircraft currently in the inventory. Part level data is generally not available from MODAS.

MODAS receives information from the following data sources:

DO56A	Edit and Error Analysis Subsystem of Product Performance Systems
DO56B	On-Equipment Analysis System of Product Performance Systems
DO56C	Off-Equipment Analysis System of Product Performance Systems
DO56E	Maintenance Data to Contractors (MDC)
DO56T	Reliability and Maintainability Analysis
GO26	Material Improvement Program
GO33B	Aerospace Vehicle Inventory, Status and Utilization Reporting
GO33H	Trainer Equipment Inventory, Status, and Utilization Reporting

Accessibility: MODAS is available to all organizations that have a valid contract with DoD.

Contact:

Stevia Ritchie
HQ-AFLC/MMDA
Wright-Patterson AFB, OH 45433-5001

Telephone: (513) 257-6906/6021/5236; Autovon 787-6906

Reliability and Maintainability Information System (REMIS)

As planned, REMIS will serve as the central common source of all unclassified maintenance, operational, configuration and selected supply information for USAF weapon systems. It will eventually replace MODAS, GO33, and many other antiquated, interim, or unique data systems.

Access: REMIS will provide on-line data access to any qualified data users using a PC-compatible terminal via dial-up modem. It is being brought on-line in various stages.

Contact:

REMIS Program Office
Air Force Logistics Command
Wright-Patterson AFB, OH 45433

Telephone: (513) 429-6410; Autovon 787-6410

Technical Interim CAMMS and REMIS Reporting System (TICARRS)

TICARRS is a reporting system specific to the F-15E and F-16A/B/C/D aircraft. It was previously known as Central Data System (CDS).

This system gathers data from the MDC and CAMMS system. It reports on aircraft inventory, utilization, and maintenance for F-15E and F-16 aircraft. It provides the same type of information as MODAS and MILAP, but its information is more up-to-date and more reliable. TICARRS is currently being phased out in favor of REMIS.

Accessibility: TICARRS is available to all organizations that have a valid contract with DoD.

Contact:

Ray Pruett
Dynamics Research Corporation
60 Frontage Road
Andover, MS 01810

Telephone: (617) 475-9090

Maintenance and Information Logically Analyzed and Produced (MILAP)

This data system is devoted to Tactical Air Command (TAC) weapon systems. For these systems it contains the same type of information that is available from MODAS or TICARRS.

Contact:

HQ TAC/LGQPP
Langley AFB, VA 23665

Telephone: (804) 764-3924; Autovon 574-3924

Aircraft Modification Performance Tracking System (AMPTS)

AMPTS compiles and synthesizes pertinent maintenance (per AFR 66-1) and utilization (per AFR 65-110) data needed to evaluate aircraft component functional reliability. AMPTS is comprised of the following subsystems:

GO67 Compares performance statistics of modified and unmodified aircraft over the period of the modification's life.

GO98 Provides aircraft maintenance and utilization data.

DO47, DO57, and GO81

Provide Technical Compliance Technical Order (TCTO) release data, aircraft serial number range, and modification fleet size.

Accessibility: AMPTS is available to all organizations that have a valid contract with DoD.

Contact:

Air Force Logistics Command
AFLC/MME
Wright-Patterson AFB, OH 45433

Telephone: (513) 257-7886; Autovon 787-7886

B456: Systems Effectiveness Data System (SEDS)

This is an R&M data acquisition, storage, retrieval, and analysis system used by the Air Force Systems Command during the development, test, and evaluation of new systems at Edwards AFB, CA.

For database access approval contact:

SEDS Manager
MSO/ENP/SEDS
Eglin AFB, FL 32542

Telephone: Autovon 872-8652

To access SEDS following approval contact:

AFFTC/TEEES
Edwards AFB, CA 93523

Telephone: (805) 277-3066; Autovon 527-3066

GO21: Deficiency Report Tracking System (DRTS)

This system provides uniform procedures for assuring that the quality deficiency data generated by using activities are effective and that appropriate management levels are apprised of quality problems.

Contact:

Dept. of the Air Force
Headquarters Air Force Logistics Command
AFLC/MMQB
Wright-Patterson AFB, OH 45433-5000

Telephone: (513) 255-6175; Autovon 785-6175

G033: Aerospace Vehicle and Equipment Inventory, Status, and Utilization Reporting (AVISURS)

This data system provides inventory, status, and utilization reporting for aircraft, selected missiles, and trainers used by the Air Force, Air National Guard, Air Force Reserve, and government plant representatives assigned to commercial facilities to represent the U. S. Air Force.

Contact:

HQ/AFL/LOC
Wright-Patterson AFB, OH 45433

Telephone: (513) 257-5180; Autovon 787-5180

Visibility and Management of Operating and Support Costs Program (VAMOSC)

This program provides the capability to gather, portray, and retain for historical reference the operating and support cost resources (labor, material, services, and overhead) directly and indirectly associated with the Logistics Support of aircraft and ground communications-electronics systems. It is comprised of three reporting systems: Weapons System Support Cost (WSSC) System for airborne equipment, Ground Communications-Electronic (C-E) system, and Component Support Cost System (CSCS) which includes direct and indirect maintenance and overhead costs for aircraft components.

Access: These three databases and their reports are unclassified and no privacy restrictions exist.

Contact:

HQ, Air Force Logistics Command (HQ/AFLC)
Wright-Patterson AFB, OH 45433

Telephone: (513) 257-4963; Autovon 787-4963

DO41: Recoverable Consumption Item Requirements Tracking System

This system is devoted mainly to non-avionic parts.

Contact:

Air Force Logistics Command
AFLC/MMRS
Wright-Patterson AFB, OH 45433

Telephone: (513) 257-3460; Autovon 787-3460

Navy Databases

3M: Maintenance, Material, Management System (Ships)

3M is a mass-data collection system which tracks maintenance information at the organizational and intermediate levels on all types of equipments and assemblies used on Navy ships and submarines . The 3M system is comprised of two subsystems, one dealing with Planned Maintenance (PMS) and the other dealing with corrective maintenance and configuration data (MDS).

Contact:

Naval Sea Logistics Center
Code 861 (NAMSO)
Mechanicsburg, PA 17055

Telephone: (717) 790-2014/7225; Autovon 430-2014/7225

3M: Maintenance, Material, Management System (Avionics)

This is a mass data collection system that tracks maintenance information on all naval avionics systems for all aircraft in the U. S. Navy. 3M is very similar in operation to the U. S. Air Force MODAS system and offers many more reliability, maintainability, and logistics reports than MODAS.

Access: At this writing 3M is undergoing a major update, and access privileges for all accounts are being reevaluated. As new accounts are added, contractors will be considered last. Obtaining permission is possible, though approval may take an extended period of time.

Contact:

Naval Air Systems Command
Code 411 43G
Washington, DC 20361

Telephone: (202) 692-5661 or (717) 790-2031; Autovon 430-2031

Naval Aviation Logistics Data Analysis System (NALDA)

NALDA is an interactive, integrated database containing logistics data and analysis capability for fleet aircraft readiness. It is designed to enhance Integrated Logistics Support and the "Reliability Centered Maintenance" concept. NALDA can be accessed by remote dial-up terminals and has on-line query capability.

Access: There are restrictions on the use of NALDA. DoD contractors must meet security requirements and have approval from their government sponsor to gain access to NALDA. Access will be permitted only for those specific purposes requested by the contractor on NALDA Access Form supported by the contract SOW. Requesters must also have completed formal NALDA training, be scheduled to attend an upcoming NALDA course, or demonstrate proficiency in the use of NALDA.

Contact:

Naval Aviation Maintenance Office
(NOMO 314A)
Patuxent River, MD 20670-5446

Telephone: (301) 863-4454; Autovon 356-4454

Army Databases

Feedback Analysis Network (FAN)

The Feedback Analysis Network provides information to AMCCOM to support decision-making regarding U. S. Army mission-critical systems. The FAN is used to collect, store, retrieve, report, and analyze deficiency data. Data is collected through a diverse set of official data collection systems covering various weapon and ammunition systems.

The following data sources, of which some are automated and some are not, contribute to the FAN database:

Accident Investigation Reports	(AIR)
Ammunition Condition Reports	(ACR)
DATACOM	
Deficiency Reporting System	(DRS)

Equipment Improvement Report	(EIR)
Quality Deficiency Reports	(QDR)
Malfunction Investigation Forms	(MIF)
Sample Data Collection	(SDC)
Test Incident Report	(TIR)

Contact:

Mr. Angelo Castellano
Bldg 62
Picatinny Arsenal, NJ 07806

Telephone: (201) 724-5817; Autovon 880-5817

Troop Support Sample Data Collection (TSSDC) – Troop Support Command (TROSCOM)

Troop Support Sample Data Collection (TSSDC) is a data collection system which tracks a sample of equipments at a sample of locations, for a sample time period. It does not collect comprehensive maintenance information on a continuous basis.

Contact:

Headquarters, U. S. Army Troop Support Command
Sample Data Collection: AMSTR-QS
4300 Goodfellow Blvd.
ST. Louis, MO 63120-1798

Telephone: (314) 263-9468/9469; Autovon 693-9468/9469

Work Order Logistics File (WOLF)

WOLF is a mass data collection system containing system and piece part replacement data for Army fielded systems.

Access: WOLF is not available to contractors unless they have a DoD contract and are approved by HQ-AMC.

For database access approval contact:

Commander
Headquarters US Army Material Command
Attn: AMCSM-MMS
5001 Eisenhower Ave.
Alexandria, VA 22333-0001

To access WOLF following approval contact:

Commander
USAMC Material Readiness Support Activity
Attn: AMXMD-MS
Lexington, KY 40511-5101

Reliability, Availability, Maintainability and Logistics Data Base for Army Aircraft (RAM/LOG)

Contact:

The Army Aviation System Command
Directorate for Product Assurance
Methodology Branch (AMSAV-QSM)
4300 Goodfellow Blvd.
St. Louis, MO 63120

Telephone: (314) 263-1775; Autovon 693-1775

USAMC Material Readiness Support Activity Deficiency Reporting System

Contact:

MRSA/AMXMD-ER
Lexington, KY 40511

Telephone: (606) 293-3479; Autovon 745-3479

Marine Corps Databases

MIMMS Marine Corps Integrated Maintenance Management System

MIMMS is a mass data collection system which tracks maintenance information at all levels for all types of equipments and assemblies used in Marine Corps vehicles and aircraft.

Contact:

Dept. of the Navy
Headquarters, U. S. Marine Corps, LMM-3
Washington, DC 20380

Telephone: (202) 695-0044/0405

Other Government Databases

Government-Industry Data Exchange Program (GIDEP)

GIDEP (see entry under "Governmental Organizations" above) provides a central, on-line facility for storage of engineering, reliability, and failure experience data. This resource comprises four major databases, each with a number of interrelated data tables:

- Engineering Data Interchange
- Failure Experience Data Interchange
- Reliability-Maintainability Data Interchange
- Metrology Data Interchange

Three particularly useful resources offered by GIDEP are its "Alert", "Urgent Data Request" and "Diminishing Manufacturing Sources" storage and search facilities. The "Alert" system provides identification and notification of actual or potential problems on parts, components, material, manufacturing processes, test equipment, or safety conditions. The "Urgent Data Request" system permits any participant with a technical problem to rapidly access the scientific and engineering expertise of participant organizations. The "Diminishing Manufacturing Sources" system provides advance notice from device manufacturers about devices which will soon cease production and which will no longer be available for spares and inventory support.

Access: There are no direct financial obligations associated with participation in GIDEP. GIDEP participation requirements are outlined in MIL-STD-1556. Commercial access is limited in some cases to protect proprietary interests. On-Line computer query capability is available.

Contact:

GIDEP Operations Center
Corona, CA 91720

Telephone: (714) 736-4677; Autovon 933-4677

Directory of DoD R&D Data Bases

This DTIC publication, published in September, 1984 is a listing of DoD's R&D data bases. Each entry contains a description, dates of coverage, points of contact, and host hardware/software configuration. Agency, database, and subject indices are provided. The subject coverage includes meteorology, weapon systems, hazardous materials, medicine, oceanography, antennas, survivability, reliability, and chemistry.

Ordering information: AD-B085 600, DTIC/TR-84/4

Contact:

Defense Technical Information Center
Cameron Station
Alexandria, VA 22304-6145

Telephone: (202) 276-6434; Autovon 284-6434

RAC Reliability Databases

The Reliability Analysis Center (see entry under "Governmental Organizations" above) conducts an aggressive ongoing data collection effort. Data sources from both government and private industry include organizations involved in research, development, production, quality assurance, reliability and deployment of electronic systems and components. This effort includes a major thrust to collect data from unpublished sources, particularly equipment and systems development and procurement programs and field operating installations. The RAC maintains comprehensive and current data resources in the following areas:

- Microelectronic devices, including all technologies (such as bipolar, MOS and hybrids) and configurations (such as digital, linear, interface, LSI, memory, and microprocessor).
- Discrete semiconductors, including selected state-of-the-art technologies such as microwave devices, opto-electronic devices, LEDs, solid state relays, transistors, and diodes.
- Selected electromechanical and mechanical components such as bearings, actuators, brakes, compressors, valves, switches, relays, connectors, generators, motors and blowers, pumps, heat exchangers, etc., that are particularly vulnerable to reliability problems.
- Systems and equipments in which these components are used.

Access: RAC data resources are available through the purchase of specific RAC publications or their PC-readable diskette equivalents. State-of-the-Art reports, Critical Reviews and Technology Assessments are published to keep the readers abreast of current issues and technologies which impact reliability performance. RAC can also produce tailored data summaries and analyses to meet customer requirements.

Contact:

Reliability Analysis Center
P.O. Box 4700
Rome, NY 13440-8200

Telephone: (315) 337-0900; Autovon 587-4151

Ground Test Radiation Data Bank (RADATA) – JPL/NASA

This database is sponsored by the NASA Office of Safety, Reliability, Maintainability and Quality Assurance and is carried out by the JPL Electronic Parts Reliability Section. It consists of total-dose and Single Event Effects (SEE) ground-based test data.

Access: This database is available for government and industry use. It can be accessed via dial-up modem at no cost to the user. Data can also be requested and received by mail.

Contact:

Telephone access: (818) 393-4360 or (818) 393-4156

Technical access data:

9600 Baud or less	No Parity
8 bit format	1 stop bit

After the Connect prompt, press Return/Enter twice, then type RADATA and press Return/Enter twice again.

Chapter Four - Electronic Bulletin Boards

DoD Bulletin Boards

Standard Military Drawing Program (SMDP) Remote Bulletin Board System (RBBS) – DESC

This service provides the latest information on all standard military drawings under the control of Defense Electronics Supply Center (DESC).

Access: The bulletin board is available via dial-up modem 24 hours a day.

Contact:

Defense Electronics Supply Center (DESC)
Dayton, OH 45444-5279

Telephone Access: SMDP-RBBS (513) 296-6046 (24 Hrs.)

Comments or questions: (513) 296-6022; Autovon 986-6022

Navy Computer Communications Network (CCN)

CCN offers access to information on current DoD and Navy publications, Navy points of contact for design and manufacturing matters, points of contact for detailed technical assistance, government and contractor technical information reports and technical interchange between participating members.

Access: Membership in CCN is open to all defense contractors.

Contact:

Telephone Access: (202) 746-2245

Technical Data:

2400 Baud or less	No Parity
8 data bits per character	1 stop bit

User is allowed 30 minutes per session. Automatic log-off occurs if idle for over 3 minutes.

Chapter Five - RAC Products and Services

RAC PRODUCT FEE SCHEDULE

		Price Per Copy	
	COMPONENT RELIABILITY DATABOOKS	**U.S.**	**Non-U.S.**
DSR-4	Discrete Semiconductor Device Reliability - 1988	100.00	120.00
NPRD-3	Nonelectronic Parts Reliability Data 1985 - (Printed Copy)	80.00	90.00
VZAP-90	Electrostatic Discharge Susceptibility Data - revised 1990	150.00	160.00
MDR-21	Trend Analysis Databook - 1985	95.00	105.00
MDR-21A	Field Experience Databook - 1985	125.00	135.00
MDR-22	Microcircuit Screening Analysis - 1987	125.00	135.00
MDR-22A	Microcircuit Screening Data - 1987	75.00	90.00
NONOP-1	Nonoperating Reliability Data - 1987	150.00	160.00
TOOLKIT	RADC Reliability Engineer's ToolKit	10.00	20.00
	EQUIPMENT DATABOOKS		
EERD-2	Electronic Equipment Reliability Data - 1988	80.00	95.00
EEMD-1	Electronic Equipment Maintainability Data - 1990	60.00	70.00
	HANDBOOKS		
RDH-376	Reliability Design Handbook	36.00	46.00
MFAT-1*	Microelectronics Failure Analysis Techniques - A Procedural Guide	135.00	175.00
MFAT-2*	GaAs Characterization and Failure Analysis Techniques - A Procedural Guide	100.00	130.00
NPS-1	Analysis Techniques for Mechanical Reliability	56.00	66.00
PRIM-1	A Primer for DoD Reliability, Maintainability and Safety Standards	95.00	115.00
FTA	Fault Tree Analysis Application Guide	75.00	85.00
RDSC-1	Reliability Sourcebook	25.00	35.00
* The combined set of MFAT-1 and MFAT-2		200.00	300.00
	PRODUCTS FOR PERSONAL COMPUTERS		
RAC-NRPS	Nonoperating Reliability Prediction Software (Price includes NONOP-1 listed above)	1400.00	1450.00
VPRED	VHSIC Reliability Prediction Software	150.00	160.00
FNPRD-3	Diskette of NPRD-3 Data (IBM PC Compatible)	125.00	135.00
FMDR-21A	Diskette of MDR-21A Data (IBM PC Compatible)	175.00	185.00
	STATE-OF-THE-ART REPORTS		
SOAR-2	Practical Statistical Analysis for the Reliability Engineer	36.00	46.00
SOAR-3	IC Quality Grades: I mpact on System Reliability and Life Cycle Cost	46.00	56.00
SOAR-4	Confidence Bounds for System Reliability	46.00	56.00
SOAR-5	Surface Mount Technology: A Reliability Review	56.00	66.00
SOAR-6	ESD Control in the Manufacturing Environment	56.00	66.00
SOAR-7	A Guide for Implementing Total Quality Management	65.00	75.00
	TECHNICAL RELIABILITY STUDIES		
TRS-2	Search and Retrieval Index to IRPS Proceedings - 1968 to 1978	24.00	34.00
TRS-2A	Search and Retrieval Index to IRPS Proceedings - 1979 to 1984	24.00	34.00
TRS-3A	EOS/ESD Technology Abstracts - 1982	36.00	46.00
TRS-4	Search and Retrieval Index to EOS/ESD Proceedings - 1979 to 1984	36.00	46.00
TRS-5	Search and Retrieval Index to ISTFA Proceedings - 1978 to 1985	36.00	46.00
MIL-HDBK-338	MIL-HDBK-338: Subject Index	25.00	35.00

LITERATURE SEARCHES

Literature Searches are conducted at a flat fee of $50. For best results, please call or write for assistance in formulating your search question. An extra charge, based on engineering time and costs, will be made for evaluating, extracting or summarizing information from the cited references.

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