

Reliability on the World Wide Web

Introduction

One of the most striking technical developments of recent years has been the explosive growth of the World Wide Web. The World Wide web is the name coined for the part of the internet designed to exploit the concept of *Hypertext* which permits documents to be cross-referenced through the use of *Hyperlinks*. From Hyperlinks in a document written in the *Hierarchical Text Markup Language* (HTML) one can access other parts of the same document, other HTML documents on the same computer or documents located on computers elsewhere in the internet. Transfer of HTML documents on the web is done using the *Hypertext Transfer Protocol* (HTTP). As of this writing there are more than 68,000,000 separate accessible sites on the web and the number is growing so fast that every known estimate is outdated.

To access sites on the web, a software package called a "browser" is used. This provides the capability of transferring from one web site to another through Hyperlinks, and displays HTML pages. Early browsers provided only text, but modern browsers will transfer graphic, including motion picture, and sound files. Two currently popular browsers are *Netscape* and *Internet Explorer*. Both can be downloaded from web sites.

Web sites are identified by a *Uniform Resource Locator* (URL) address. The browsers will access URLs entered by the user, and display the HTML documents found. They also provide links to various search engines which will, in turn, generate sets of potentially useful links from topics or keywords entered by the user.

The World Wide Web is a plentiful source of information, but has its limitations. Finding sources can be tedious, access times can be annoyingly long, and many sites present information which is out of date. Also, some useful information may not be available at all. For example, information on the international standards on dependability, or on IEC TC 56, their author, cannot be found on the web, as of this time. (In contrast, a quick search for sites containing information on ISO 9000, the international Quality Management System standard, located 141 sites.)

Following is a list of URLs of potential interest to the reliability engineering community, organized in somewhat arbitrary topical groups. All the URLs were active at the time this listing was prepared. In a short period of time, some of these sites may be removed from the web, others will likely change their URLs, and many others may be expected to come on line. This listing should therefore be updated frequently. The user can do so by searching the web himself, or by accessing frequently updated sets of reliability links provided on the web, such as <http://rome.iitri.com/RAC/WWW> (one of the RAC pages).

Information Analysis Centers:

The RAC home page from which you can access RAC Product Catalogs, past issues of the RAC Journal, START sheets and others, is <http://rome.iitri.com/RAC/>

The Defense Technical Information Center Information Analysis Center (IAC) Home Page, with links to all the DoD and service IACs (including RAC), is <http://www.dtic.dla.mil/iac/>

NTIAC (Nondestructive Testing Information Analysis Center) <http://www.dtic.dla.mil/iac/ntiac/ntiachome.html>

Shock and Vibration Information Analysis Center (SAVIAC) is at: <http://saviac.usae.bah.com>

Survivability/Vulnerability Information Analysis Center (SURVIAC) : <http://surviac.flight.wpafb.af.mil>

Data and Analysis Center for Software (DACS) is at: <http://www.dacs.com>

AMPTIAC (Advanced Materials and Processes Technology Information Analysis Center) <http://rome.iitri.com/amptiac>

<http://www.dtic.dla.mil/iac/cseriac/cseriac.html> is the URL for the Crew Systems Ergonomics IAC

Supportability Investment Decision Analysis Center (SIDAC) <http://www.sidac.wpafb.af.mil>

Government Sites:

The Defense Standardization Home Page: <http://www.acq.osd.mil/es/std/stdhome.html>
Contains status of changes made to military standards

The Rome Laboratory Reliability Sciences Status Report is at <http://erd.rl.af.mil/ER-News/Newsletter.html>

The Army Material Systems Analysis Activity (AMSAA) Physics of Failure page is at:
<http://amsaa-www.arl.mil/rad/pofpage.htm>

<http://empf.arl.psu.edu> is the URL for the Electronics Manufacturing Productivity Facility (EMPF), a Navy center of excellence.

The Logistics Division of Armstrong Laboratory is at <http://www.brooks.af.mil/HSC/AL/HR/HRG/hrg-home.htm>

Government Industry Data Exchange Program (GIDEP) home page
<http://www.gidep.corona.navy.mil>

<http://dodats.navy.mil/dodats> is the home page for the DoD Automatic Test Systems (ATS) program with links to home pages for the Consolidated Automated Support Systems (CASS).

FAA Center for Aviation System Reliability at Iowa State U
<http://www.cnde.iastate.edu/casr.html>
e.g. R&D in Techniques for inspection of A/C structures/materials/components

The Navy's Standard Hardware Acquisition and Reliability Program (SHARP) home page is <http://kraken.nwscc.sea06.navy.mil/sharp.htm>

The NASA Reliability and Maintainability Steering Committee home page is at:

<http://www.hq.nasa.gov/office/codeq/rmhome23.htm>
Site contains NASA preferred practices in reliability.

NASA Code QS products are at the home page of the NASA Safety and Risk assessment Division:
<http://www.hq.nasa.gov/office/codeq/codeqs.htm>

Some University Centers:

<http://www.cerc.wvu.edu/index.html> is the home page of the Concurrent Engineering Research Center at West Virginia University.

The Computer-Aided Life-Cycle Engineering (CALCE) Electronic Packaging Research Center (EPRC) at the University of Maryland :
<http://spezia.eng.umd.edu/>

<http://www.glue.umd.edu/enre/enreumd.htm> is the University of Maryland Reliability Engineering Home Page

<http://www.cnde.iastate.edu/cnde.html> is the Center for Nondestructive Evaluation at Iowa State University

The Institute of Reliability and Risk Analysis of George Washington University:
<http://www.seas.gwu.edu/seas/institutes/irra>

International Electronics Reliability institute at Loughborough University is at:
<http://info.lut.ac.uk/departments/el/research/ieri/index.html>

Centre for Management of Industrial Reliability and Cost Effectiveness at the University of Exeter:
<http://www.ex.ac.uk/mirce>

The Swiss Federal Institute of Technology Reliability Laboratory is at:
<http://www.zuv.ee.ethz.ch>

About the Reliability Analysis Center

The Reliability Analysis Center is a Department of Defense Information Analysis Center (IAC). RAC serves as a government and industry focal point for efforts to improve the reliability, maintainability and quality of manufactured components and systems. To this end, RAC collects, analyzes, archives in computerized databases, and publishes data concerning the quality and reliability of equipments and systems, as well as the microcircuit, discrete semiconductor, and electromechanical and mechanical components that comprise them. RAC also evaluates and publishes information on engineering techniques and methods. Information is distributed through data compilations, application guides, data products and programs on computer media, public and private training courses, and consulting services.

Located in Rome, NY, the Reliability Analysis Center is sponsored by the Defense Technical Information Center (DTIC). Since its inception in 1968, the RAC has been operated by IIT Research Institute (IITRI). Technical management of the RAC is provided by the U.S. Air Force's Rome Laboratory (formerly Rome Air Development Center).

Software Reliability Sites:

The Rome Laboratory Software Quality Technology Transfer Consortium has a home page at:

<http://rlsqttc.utica.kaman.com/sqt2c/sqt2c.html>

<http://satc.gsfc.nasa.gov/homepage.html> is the Goddard Space Flight Center Software Assurance Technology Center home page.

<http://www.cs.ncl.ac.uk/research/csr/>
Centre for Software Reliability, University of Newcastle

<http://www.qucis.queensu.ca/Software-Engineering/vendor.html>
CASE Vendor List

<http://osiris.sunderland.ac.uk/sst/casehome.html>
CASE Tool Home Page (Freeware and Shareware for IBM PC Windows)

http://www.cat.syr.edu/publications/WWW/exec_sum.94.html
CASE Center, Syracuse U.

<http://source.asset.com/stars>
DARPA STARS (Software Technology for Adaptable, Reliable Systems) Program

Software Engineering Institute Home Page is
<http://www.sei.cmu.edu>

Mechanical Reliability:

Weibull parameters for mechanical components may be found at:

<http://www.barringer1.com/wdbase.htm>

The Reliability Magazine (on machinery reliability and maintenance) is at:

<http://www.reliability-magazine.com>

Reliability of mechanical equipment (a home page of Eindhoven University of Technology) is at:

<http://www.tue.nl/wtb/woc/rme/general/genhp.htm>

Quality Sites:

<http://www.qualinet.com/isopage.htm>
Quality Related Information Sources

<http://www.xnet.com/~creacon/Q4Q/> is the homepage for The Quality Wave, another hub for quality discipline information.

<http://www.asqc.org/lynx.html>
ASQC (American Society for Quality Control) Home Page

<http://www.asqc.org/progserv/iso.html>
Answers to Most Frequently Asked Questions on ISO 9000

<http://www.exit109.com/~leebee/bibliog.htm>
An ISO 9000 Bibliography

<http://www.quality.nist.gov>
is the National Institute of Standards (NIST) quality programs home page.

ISO 9000 Action Plan is at:
<http://www.exit109.com/~leebee/actplan.htm>

Professional Societies:

<http://www.enre.umd.edu/ies.htm> for the Institute of Environmental Sciences

<http://www.enre.umd.edu/iie.htm> for the Institute of Industrial Engineers

<http://www.enre.umd.edu/sole.htm> for the Society of Logistics Engineers

<http://www.enre.umd.edu/sss.htm> for the Systems Safety Society

<http://www.enre.umd.edu/sre.htm> for the Society of Reliability Engineers

<http://www.enre.umd.edu/sae.htm> for the Society of Automotive Engineers Reliability Division

<http://www.enre.umd.edu/asqc.htm> for the American Society for Quality Control Reliability Division

http://www.enre.umd.edu/i3e/rs_home.htm for the Institute of Electrical and Electronic Engineers Reliability Society

<http://www.astm.org> is the American Society for Testing and materials. Site includes a searchable database of ASTM standards.

<http://www.smrp.org> for the Society for Maintenance and Reliability professionals.

ISO 14000 sites:

The Pennsylvania Dept. of Environmental protection has a site on "What is ISO 14000?" at:
<http://www.dep.state.pa.us/dep/deputate/pollprev/iso14000/iso14000.htm>

The ISO 14000 InfoCenter is at: <http://www.iso14000.com>

Other Sites of Interest:

<http://www.dtic.dla.mil/dps-philadelphia> is the Department of Defense Single Stock Point for Specifications and Standards (DoDSSP) at the Defense Printing Service Detachment Office in Philadelphia. Features a searchable database and order forms for identifying and obtaining mil specifications and standards.

<http://rome.iitri.com/RAC/DATA/RMST/>
Software Tools Listing

The IEEE Reliability Society Newsletter is accessible directly at
http://www.enre.umd.edu/i3e/rsnl_hom.htm

<http://vhdl.org/vi/waves/> gets to the Waveform and Vector Exchange Specification (WAVES) homepage.

TopoMetrix Corp. provides technical information regarding scanning probe microscopy and sample images at:
<http://www.topometrix.com>

For the Harris Semiconductor reliability engineering home page, use <http://rel.semi.harris.com/docs/rel/>

A consolidated calendar of events contributed by the DoD Information
<http://www.usace.army.mil/crstiac/cal-query.html>

http://www.sandia.gov/agil/home_page.html is home for Agile and Advanced Manufacturing on the World Wide Web. Includes news and tools compiled by Sandia Labs.

<http://rome.iitri.com/RAC/WWW> (One of the RAC pages) and <http://www.enre.umd.edu/rmws.htm> (One of the University of Maryland pages) provide a number of links to other reliability sites.

<http://www.enre.umd.edu/reinfo.htm> bills itself as the National Information Center for Reliability Engineering and is supported by the University of Maryland Center for Reliability Engineering and the IEEE Reliability Society.

The North American Electric Reliability Council (to promote reliability of the electricity supply) is at:
<http://www.nerc.com>

Other START Sheets Available:

94-1, ISO 9000

95-1, Plastic Encapsulated Microcircuits

95-2, Parts Management Plan

96-1, Creating Robust Designs

96-2, Impacts on Reliability of Recent Changes in DoD Acquisition Reform Policies

To order a "free" copy of one or all of the above topics contact the Reliability Analysis Center (RAC), PO Box 4700, Rome NY 13342-4700. Telephone: (800) 526-4802. Fax: (315) 337-9932. E-mail: rac@rome.iitri.com. The above topics are also available on-line at <http://www.rome.iitri.com/RAC/DATA/START> in their entirety.

Future Issues:

RAC's Selected Topics in Assurance Related Technologies (START) are intended to get you started in knowledge of a particular subject of immediate interest in reliability, maintainability and quality. Some of our upcoming topics being considered are:

- Commercial Off-the-Shelf Equipment
- Reliability Predictions
- Dormancy
- Mechanical Reliability
- Software Reliability

Please let us know if there are subjects you would like covered in future issues of START.

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About the Author:

Anthony Coppola is a Scientific Advisor to the Reliability Analysis Center operated by IIT Research Institute. He is the editor of the RAC Journal, an instructor in Reliability Engineering training courses, and the author of the "TQM Toolkit." Before joining IITRI, he spent 36 years developing reliability and maintainability engineering techniques at the Air Force Rome Laboratory, formerly known as the Rome Air Development Center. His last assignment at Rome Laboratories was as the Commander's Special Assistant for Total Quality Management.

Mr. Coppola holds a Bachelor's degree in Physics and a Master's in Engineering Administration, both from Syracuse University. He also completed the Industrial College of the Armed Forces correspondence program in National Security Management, and the Air War College Seminar Program. He has been a guest instructor for the Air Force Institute of Technology, the Air Force Academy, and George Washington University. He is a Fellow of the IEEE and a recipient of the IEEE Centennial medal. He also hold Air Force Medals for Outstanding Civilian Career Performance and Meritorious Civilian Service. He was the General Chairman of the 1990 Annual Reliability and Maintainability Symposium.