

The Radiation Safety Information Computational Center (RSICC) – Forty Years of Nuclear Knowledge Management

Bernadette L. Kirk, Hamilton T. Hunter

Nuclear Science and Technology Division

Oak Ridge National Laboratory

E-mail address of main author: kirkbl@ornl.gov

Established in 1962, RSICC has seen 40 years of research and growth in the areas of radiation transport, radiation shielding, and radiation safety. During this period, the use of computers was initiated and RSICC has been innovative in the knowledge management of the products (software and data) developed within the user community.

The legacy of the international research community in the fields of radiation transport and safety is priceless. What price can be assigned to a line of computer code or data packages, especially when it has been shared and continues to be shared by many? The importance of nuclear knowledge management cannot be underestimated. Information analysis centers (IAC), like RSICC, are a key component to the research infrastructure.

RSICC technology base includes about 1400 computer codes and about 300 data packages, representing the legacy of many scientists, both living and dead. Over the years, more than 5000 scientists have used the center at one time or another. Today, the number of registered users is close to 5000. Through software and data dissemination, RSICC has served as the focal point for this network of researchers, and promoted the exchange and enhancement of technology. RSICC disseminates about 1300 copies of software/data collection each year.

Historical Background and Mission

The Radiation Shielding Information Center (RSIC) was founded in 1962 at Oak Ridge National Laboratory as an information analysis center in the specialized area of radiation transport and safety. In the words of Edward L. Brady, Chairman of the Committee on Scientific and Technical Information (COSATI) Panel 6: "An information analysis center is a formally structured organizational unit specifically (but not necessarily exclusively) established for the purpose of acquiring, selecting, storing, retrieving, evaluating, analyzing, and synthesizing a body of information in a clearly defined specialized field or pertaining to a specified mission with the intent of compiling, digesting, repackaging, or otherwise organizing and presenting pertinent information in a form most authoritative, timely, and useful to a society of peers and management".¹

In 1994, RSIC was changed to Radiation Safety Information Computational Center (RSICC), a change that was dictated by wider application of RSICC's software collection and rapidly moving internet technology. RSICC's mission is to provide in-depth coverage of the radiation transport field to meet the needs of the international shielding community. RSICC collects, organizes, evaluates and disseminates technical

information involving shielding and protection from the radiation associated with fission and fusion reactors, outer space, accelerators, weapons, medical facilities, and nuclear waste management. The Center provides in-depth coverage of radiation transport topics:

- Radiation production and sources
- Criticality safety
- Radiation protection and shielding
- Radiation detectors and measurements
- Shielding materials properties
- Radiation waste management
- Shields and shipping cask design
- Radiation safety and assessment
- Atmospheric dispersion and environmental dose
- The physics of the interaction of radiation with matter

In support of a number of government-sponsored programs, RSICC

- Collects, maintains, analyzes, and distributes technical computing software in the areas of shielding and transport
- Provides technical assistance to the user
- Publishes and distributes a monthly Newsletter to announce corrections, updates, or new packages as well as to notify the shielding community of items of interest
- Conducts seminar-workshops on computing methods and codes systems of particular interest to the user community
- Participates in the "Agreement Between the U.S. Department of Energy and the Organization for Economic Cooperation and Development Nuclear Energy Agency For Cooperation in the Field of Nuclear Data and Computer Programs" through international software exchange
- Works closely with the DOE Energy Science and Technology Software Center to avoid overlap and duplication of effort in software development and distribution
- Maintains computerized databases of abstracted shielding information selected for inclusion by technical analysts
- Exchanges visits and guests assignments with shielding installations throughout the world to collect and share shielding technology for mutual benefit
- Maintains a web server to keep users informed of changing software technology

Nuclear Knowledge Management of Software and Cross Sections

RSICC maintains very close relations with the end user community and by doing so, keeps abreast of software and data technology that need to be included in its collection. In addition to processing requests for software, RSICC staff members provide technical consultations with requesters to resolve discrepancies, assist in installation, and answer technical inquires on radiation transport matters.

Software added to the RSICC collection undergoes a quality assurance process:

1. The software is tested for completeness - source code, sample input, sample output, abstract and documentation
2. The software is tested on one or more computers - making sure that the software compiles, links and runs correctly.
3. Once tested, the software is packaged and is announced in the RSICC Newsletter and the RSICC web page as available for distribution.

Since its inception, RSICC has obtained a wealth of experience in archiving data and maintaining numerous distributed databases in order to preserve the research legacy. RSICC computer codes have seen dramatic changes in computer hardware, operating systems and storage media.

The web server acts as the interface and source of information to RSICC's user community. Various web-based technologies are implemented. Electronic notebooks are integrated into the web server. Through these notebooks, users are able to document important questions and experiences with specific RSICC-distributed software.

RSICC serves as a computational center, where a registered user can login and use RSICC's computers to run specific software in its collection. This can be done through "telnet" or through the Internet via a web browser.

RSICC also sponsors several training workshops a year. These workshops concentrate on a specific computer code. In the last two years, RSICC sponsored about twenty workshops on DORT/TORT (or package DOORS), MCNP, SCALE, MCNPVISED and others. Users learn how to use and apply these codes after attending the workshops and enhance their knowledge of the codes.

Conclusion

Knowledge management of software and data should continue to be a national priority. Government agencies like the Department of Energy recognize this, and through sponsorship of centers like RSICC, these agencies will uphold and "preserve" nuclear know-how. The burden does not only lie with government, but the technical community as well. As Dr. Alvin Weinberg stated: " The information transfer network is held together by an array of switching devices that connect the user with the information ... he needs. As the amount of information grows, more ingenuity will be needed to find effective switching mechanisms.....The technical community must courageously explore new modes for information processing and retrieval.".²

References

1. "The Information Analysis Center: Seven Background Papers", Reprinted by Panel #6, COSATI 69-6, October 1969.
2. "Science, Government and Information, A report of the President's Advisory Committee, Panel on Science Information, A. Weinberg, Chairman, January 10, 1963.