Leonard Tripp[1]

Leonard Tripp was born in Los Angeles, California in 1941. His family moved to the small town of Avenal in 1946. Leonard's father owned his own auto repair/auto parts business. Around the age of 10, Leonard went to work for his father in the auto shop after school and summers. Most nights he worked until 9:00 p.m. Money was scarce and the work ethic strong. In high school, Leonard excelled in science and mathematics and received the Bank of America award for this as a senior. He graduated from high school in 1959. Leonard completed a Bachelors of Science and Masters of Science degree in mathematics at Brigham Young University, finishing in 1967. Leonard was married to Celia Tripp on November 27, 1963.

In 1967, Leonard took a job with the Boeing Company in Seattle, WA. He moved with his family to Kent, Washington. Leonard enrolled in the University of Washington, starting a doctorate program in mathematics. He was attending classes, working for Boeing, serving in his church and balancing all his endeavors with a growing family. He decided that it was too much and decided to not pursue completing his doctorate. He and his wife eventually had total of 6 children and are now grandparents of 28.

Early in his career at Boeing, Leonard began writing papers for publication. In 1973, he wrote "Elastic Stability of Biaxially Loaded Longitudinally Stiffened Composite Structures," published in AIAA Journal. He also wrote, "Software Design Validation Tool," (1975) and Systematic Development of Automated Engineering Systems," (1975). These writings furthered his interest in software standards and eventually, in developing criteria and framework for software engineering standards.

The following is an excerpt written by Leonard in 1999 for the IEEE magazine, *Computer*:

> "Forty years ago I made the decision on my career preparation. Computing for the most part was a manual discipline. The number of computers expected to be needed was projected to be a small number. My career preparation choice was mathematics.
>
> In hindsight, my choice was a good one. Of the important lessons I learned was the need

---

[1] Dave Walden of the Computer Society History Committee interviewed Leonard Tripp on August 30, 2013. However Leonard's ill health prevented him from reviewing the transcript of the interview. Instead one of his children, daughter Monica Tripp Barret, provided this outline of Leonard's life and career.

for a disciplined decision process. Also a foundation of mathematics is a collection of principles. Most disciplines have a well-defined set of principles. It is the use of those principles that lead to effective solutions for well-posed problems. In addition, principles have a timeless quality about them. They transcend today's technology.

I became active in the IEEE Computer Society about twenty years ago. Since 1972, I have been involved in developing processes, methods and tools for doing what today we would call software engineering. My initial involvement with the Computer Society was in the development of framework for software engineering standards.

My involvement in software engineering standards concluded with serving two terms as chair of the IEEE Computer Society Software engineering Standards Committee. The 1999 collection of software engineering standards contains 45 standards and over 2200 pages. My involvement led to opportunities to develop my leadership skills and to network with peers around the world.

It was not my goal initially to become President of the Computer Society. Opportunities were presented and I was able to take advantage of them. Success in a volunteer driven organization is to provide opportunities for volunteers to provide service to the profession."

Since 1993, the IEEE Computer Society has been promoting software engineering as a profession and a legitimate engineering discipline notably through its involvement in the Joint IEEE Computer Society and the ACM Steering Committee for the Establishment of Software Engineer as a Profession. In March of 1998, Leonard was asked to be the chair of the Joint Committee. The Joint Committee sponsored a project to build a consensus on what constitutes the core body of knowledge for software engineering. It was a key milestone in all disciplines and has been identified as crucial for evolving software engineering toward professional status. A comprehensive test was developed to indicate professional status. The test resulted in a credential titled, "Certified Software Development Professional." It was first offered in 2001.

While fulfilling his obligations for IEEE, Leonard traveled the world (over 300,000 air miles) and met with leaders in the standards world in Tokyo, Ottawa, Montreal, Brisbane, Prague, Johannesburg, Germany, Walnut Creek, CA, Curitiba, Brazil, Vancouver BC, London, Hawaii, Florida, St. Thomas, Virgin Islands, France, and Italy to name a few.

Leonard was recognized in 2003 as an IEEE Fellow for "leadership in software engineering." Leonard retired from Boeing in 2003 after 36 years of employment with the company.

In 2004, Leonard and his wife Celia moved to Camas, Washington to live near some of their grandchildren. Unfortunately, four years later Leonard was diagnosed with multiple severe health challenges. His eyesight is affected by a meningioma, he has early-onset dementia and Parkinson's disease.

Leonard was interviewed by IEEE Computer Society History Committee member, Dave Walden on August 30, 2013. Much of Leonard's recollections of his time with Boeing and IEEE are clouded by his dementia, but he can still remember the main purpose of what was being worked on and achieved during his tenure. The following are some of his comments from the interview:

> "When you try to promote the formulation of a discipline, such as an engineering discipline, you're interested in where do we go? What needs to be taught? How do we develop the standards necessary for increasing software quality and productivity?"

He also said,

> "We brought together groups of people who were interested in developing standards for software engineering. While working with people in various parts of the world, and with different educational institutions, international engineering effort was established."

Leonard was involved in developing software standards in his position at the Boeing Company. "I was involved with engineering standards, particularly for safety critical systems." He went on to represent both Boeing and IEEE throughout the United States and the world in the arena of developing software standards.

In the later years of his career with Boeing he was awarded the Boeing Technical Fellow: Recognition in Software Engineering. When applying for this award, many of Leonard's associates contributed observations regarding his contributions to his field. Here are a few of these comments:

> "Leonard's early work involved the difficult job of evaluating and reducing to practice work in software design methodology. This work was exemplary for its time, for it reduced hard concepts to easy use. He used an innovative approach to compare and contrast various approaches to software design. His work showed strong technical grasp and insight, and has been used by many as a guide. In addition, Leonard has always been most concerned with identifying what is useful and viable in actual practice.
>
> In the 1980s, Leonard turned his attention to the broader area of software

engineering standards. He was one of the founders of the international Software Engineering Symposium and Workshop series. He is recognized as an effective leader in both IEEE and ISO as a leader in development and implementation of software engineering standards.

In addition to his technical work, Leonard has volunteered for a variety of professional society leadership positions. He has served as standards chair, working chair. He recently finished two years of service as the IEEE Computer Society vice president for standards activities. In 1995 Leonard was appointed to the Steering Committee of Joint Task Force on Software Engineering as a Profession. In 1996 I appointed Leonard vice president of technical activities. The Computer Society highly values Leonard's contribution to the IEEE Computer Society."

Mario R. Barbacci, Carnegie Mellon University

"A specific area of his pioneer work was software design representation, in particular graphic representation. Interestingly, this problem of how to "draw" software, an intangible object, is still a hot topic and Leonard's early insight is still valid and valuable. I often used his contribution in my own research at IBM's Thomas J. Watson Research Center, where in the 70's and early 80's, I was manager of software technology." **L.A. Belady, Mitsubishi Electric**

"Leonard Tripp has been a major player in the current work to establish a unified set of software engineering standards both internationally and within IEEE since 1989. He holds key positions both within SESC and within ISO/IEC, and continues as a leader in bringing greater unity to the software engineering standards. He has been instrumental in a four year effort to merge commercial and military software engineering standards. This culminated in 1997 with the joint adoption by the Electronics Industry Association and IEEE of 150/IEC 12207 as the "strategic" software life cycle processes standard. From my experience, he is instrumental, if not key, in the current overhaul of worldwide software standards." **Mike DeWalt, Federal Aviation Administration**

"Mr. Tripp is an internationally acknowledged leader in the development of software standards and processes related to safety-critical avionics systems. In particular, he has made key contributions to many of the most significant documents in this field including:

a) The BCAG software standard (06-35071) used by all BCAG suppliers in the development of on-board avionics systems.
b) The FAA/RTCA document (D0-178B) used as a primary regulatory guidance source in the development, validation and certification of on-board systems containing software.
c) International standards on Software Engineering sponsored by 150/IEC, JTC1, IEEE and others.
d) The Boeing Corporate standards for Software Engineering, including the BSWS series of standards and processes.

As all of the above standards have direct applicability to safety-critical and/or mission-critical systems, the consequences of the technical decisions documented within these

standards is of the highest order. These standards also directly impact the cost and schedule of delivering a product, and thus also have major impact on the business success of companies throughout the world."

Roger A. Seeman, Boeing Commercial Airplane Group

Awards & Achievements

- Project Sponsor for IEEE Guide to Software Engineering Body of Knowledge. The guide provides a consensus-validated characterization of the bound of the software engineering disciple and provide a topical access to the body of knowledge, 2004
- IEEE Fellow, 2003
- Boeing Technical Fellow: Recognition in Software Engineering, 2002
- IEEE Senior Member, 2000
- President, IEEE Computer Society, 1998-2000
- Head of US delegation to the ISO committee on software engineering, 1993-1998
- IEEE Computer Society Hans Karlsson Award, 1996
- BCAG Materiel Team of the Month, 1995
- IEEE Working Group Chair Award, 1993
- IEEE Meritorious Service Award, 1993
- Federal Aviation Authority Service Award, 1992
- BCAG Engineering Division Employee of Month, 1990
- IEEE Outstanding Contribution, 1987
- NASA Certification of Recognition, 1975, 1976

To conclude, an excerpt from an article written by Leonard in June, 2002 entitled "Software Certification Debate: Benefits of Certification:"

"For the past few years, the IEEE Computer Society has focused volunteer efforts on initiative to support a true profession of software engineering. Under its "Doing Software Right" program and other joint activities with the ACM, the Computer Society has moved forward with curriculum development, professional training, a body of knowledge, a code of ethics, and standards. The current (1999) IEEE software engineering standards collection contains more than 40 standards totaling 2,400 pages in four volumes. We are convinced that the CSDP certification program will contribute to significant improvement in preparing software development practitioners and will raise the benchmark for individual performance in achieving software quality and productivity. We believe the results will benefit both the profession and the public."