

# Discovering Unanticipated Software Output Modes

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## Abstract

Software risk management is particularly important when the target environment of the software is a safety-critical system. Adequate development standards and methods for building software functionally that is “close to correct” exist. But unfortunately, we often fail to imagine particular classes of system hazards that the software’s behavior could induce, because quite simply, we cannot foresee everything that could go wrong from the outset of a new project. And therefore we will fail to build in the needed software protection mechanisms against these hazards.

This paper presents a software risk management technology that partially addresses this problem. Our technology is based on software fault injection’s unique ability to warn about software-induced hazards that were inadvertently overlooked during the creation of the software requirements and system-level hazard analysis. Software-induced hazards occur as a result of software behaviors that are unknown.

## About the Speaker

*Jeffrey Voas is a Co-founder and Chief Scientist of Cigital. Cigital has been listed in the Inc 500 in both 1999 and 2000. Voas has coauthored two Wiley books: (1) Software Assessment: Reliability, Safety, Testability (1995), and (2) Software Fault Injection: Inoculating Programs Against Errors (1998). Voas is working on a third book, “Software certificates and warranties: ensuring quality, reliability, and interoperability.” Voas was the General Chair for COMPASS’97, the Program Chair for ISSRE’99, the Program Co-Chair for ICSM 2000, and will be the Program Chair for ECBS 2001. Voas is a Senior Member of the IEEE, received a Ph.D. in computer science from the College of William & Mary in 1990, was named the 1999 Young Engineer of the Year by the District of Columbia Council of Engineering and Architectural Societies. Voas was co-receptient of the IEEE’s Reliability Engineer of the Year award in 2000, and received a Third Millennium Medal from the IEEE in 2000. In 2000, Voas also received a Meritorious Service award from the IEEE Computer Society. Voas is also on the editorial boards of 4 scientific magazines/journals and is a Vice-President of the IEEE Reliability Society.*