

Historical Note No. 3: The Early Dissemination of System Safety Concepts and Techniques

Members of the International System Safety Society (ISSS) are familiar with the excellent articles, papers and updates published in this *Journal*, and with the annual ISSS Conferences/Symposia held each summer at various locations in the U.S. and Canada. These serve as the primary means of peer exchange of current visions and advancements specifically related to the field of system safety. They provide a treasure of research, concepts and practical experience relating to system safety, all of which are available on CD for purchase from the ISSS headquarters. In addition, the Internet provides innumerable opportunities to gain in-depth information on almost any system safety-related subject of interest. However, it wasn't always this easy.

Back in the 1950s and 1960s, at the inception of the formal implementation of the system safety concept, the Internet did not exist. Professional journals, textbooks and industry standards specifically oriented to system safety were still more just a vision than an available resource. At this time, designated system safety personnel from the military and aerospace contractors were forced to scramble for insights on this new field of endeavor, and options to find these insights were few. Many of us who were assigned system safety-related tasks and/or management responsibilities at this time owe a debt of gratitude to the handful of system safety pathfinders who pioneered the dissemination of information and guidance on how the system safety concept could be effectively implemented.

Although various individual papers had been previously presented at aviation/flight safety-related conferences using the term "system safety" in relation to aircraft design, it seems that the primary impetus of the broader dissemination of this subject should be credited to a synergetic relationship that evolved in the early 1960s between the aerospace safety-related activities of the U.S. Air Force, USC and the Boeing Company.

This initial impetus involved visionary individuals who shared a common passion: eliminating accident-causing design defects before they were uncovered by accident investigations. The frequently occurring catastrophic missile mishaps during the 1950s and 1960s brought high-level attention to this problem, thus giving some much-needed "grease" to the prevailing institutional resistance to a new concept questioning the assumption that reliability equaled safety, and that safety

was a design — not strictly an operational-phase concern. The epicenters for this initial practice and dissemination of the system safety concept were the Los Angeles, California and Seattle, Washington areas.

The effort to prepare a requirement for implementing a system safety effort for ballistic missile programs was initiated in September 1960. This effort was refined through interaction between the USAF System Safety Office at Norton Air Force Base (Lt. Col. George Ruff) and the USC School of Aerospace Safety

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(C.O. Miller). Concurrently, the Boeing Aerospace Division's system safety engineering activity (Niel Clason) was implementing its own management-supported, system safety plans (SSP) during the conceptual/initial design phases of the Dyna-Soar and Minuteman programs. The favorable Boeing/USAF program management attitudes for this effort provided additional impetus to the release of BSD Exhibit 62-41 on April 1, 1962. Twenty-nine days later, on April 30, 1962, the USAF Directorate of Missile Safety initiated a project to prepare a Military Specification (MIL-S-38130) to expand system safety program requirements to all USAF system development programs.

In addition to ongoing personal interfacing by key individuals on system safety, an outreach to the aerospace contractor community was deemed vital by the Air Force. For years, the USAF Directorate of Aerospace Safety had sponsored annual USAF/Industry Safety Conferences to discuss ongoing aviation and ground safety issues. It was decided to expand the scope of these conferences to include the new field of system

safety. It was at the 50th Air Force/Industry Conference, held at the Mission Inn in Riverside, California on June 20, 1962, that Lt. Col. George Ruff presented to industry managers an address defining the current and upcoming contractual requirements the Air Force planned to implement. This was a notice to all contractors to prepare to respond to these requirements.

I believe this 1962 USAF/Industry Safety Conference can be considered the initial forum at which the dissemination of formal system safety program information was a primary function. Subsequent annual USAF/Industry conferences provided a much-needed opportunity for the designated industry system safety engineers/managers to interact face to face with each other and their USAF counterparts. This interaction served as a stimulus for the forming of our Society in December 1963.

Other noteworthy system safety information dissemination milestones include:

- January 1964: The initial Society newsletter was prepared and distributed by Roger Lockwood
- July 1964: The initial RAMS Conference/Proceedings incorporating a separate System Safety Session was chaired by C. O. Miller

- June 1965: The initial release of *Hazard Prevention*, edited by George Peters, was the forerunner of the *Journal of System Safety*
- June 1965: The initial multi-day System Safety Symposium, held at the Olympic Hotel in Seattle, Washington. Sponsored by the College of Engineering of the University of Washington and the Boeing Company
- 1971: Publication of *Introduction to System Safety Engineering* by William P. Rogers (John Wiley & Sons) — the initial published book on system safety engineering
- May 1971: The initial NASA System Safety Symposium was held at the Goddard Space Flight Center, Maryland. Initiated and chaired by Jerome Lederer
- July 1972: The initial System Safety Society Conference was held at the Brown Hotel in Denver, Colorado

Subsequent Historical Notes will expand on these milestones. ●