The Physics of System Safety

Abstract

This paper summarizes the observations and experiences of a retired Aerospace Engineer with over 40 years of industry experience combining both Design Engineering and System Safety backgrounds. The author holds a Mechanical Engineering degree from Michigan State University and a System Safety Certificate from the University of Southern California Viterbi School of Engineering Aviation Safety and Security Program. He is currently a system safety consultant and teaches safety certification courses at USC in Los Angeles to students from around the world.

From this engineering/safety perspective, the author presents a view of the foundational basis for the modern system safety discipline and profession from which observations on the current state of its practice in industry can be made.

The main thesis of this presentation contends that just as physics guides and bounds the practice of engineering, the foundational principles of the modern approach to system safety, established in the post-WWII expansion in aerospace applications, can also guide the practice of system safety both now and into the future.

This paper is intended to help facilitate self-examination for both individuals and organizations involved in the practice of system safety to compare their perspective with the central principles presented in this paper. It provides an expansion on a paper (System Safety A Profession in Crisis) presented at the 2025 ISSS Summit and Training in Austin, Texas, a subsequent YouTube podcast and contains content from a series of recent LinkedIn articles on associated topics. All of which have received positive reviews.

In addition to presenting the author's perspective, this paper is an attempt to provide perspective on the industry today as well as galvanize both individuals and organizations from very diverse domains to align their core system safety efforts with these foundational principles (or "physics") to face the many challenges ahead.

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