



System safety engineering is much more than just influencing the development of safe systems, products or processes. As has been shown over decades of experience in a wide variety of programs, an effective system safety program also positively improves system effectiveness and reduces programmatic risks, including the identification of cost-effective, schedule-effective and safety-effective mitigation strategies. The timely avoidance of even one significant mishap can easily “pay” for the costs of a high-quality system safety program.

In recent years, the Virtual Chapter of the International System Safety Society (ISSS) has been engaged in an ongoing discussion about what, if anything, the ISSS could — or should — be doing to better achieve the Society’s stated purpose, mission and objectives as described in its Bylaws and Strategic Plan, as outlined here:

Mission

Advance the system safety discipline by creating an international, interdependent network of system safety professionals dedicated to the continuous improvement of the art, sciences and technology needed to provide *the best total system safety solutions*. [Source: *The International System Safety Society Strategic Plan*]

Objectives and Activities of the Society

1. Advance the state-of-the-art of system safety
2. Contribute to a meaningful managerial and technological understanding of system safety
3. Disseminate newly developed knowledge to all interested groups and parties
4. Improve the public understanding of the system safety process and discipline
5. Promote system safety to all levels of management, engineering and other professional groups
6. Foster communication within the system safety profession and with other scientific, legal, public and professional groups

7. Encourage research into the development and application of new safety management, scientific or engineering techniques
8. Encourage system safety professional development and education

[Source: *About the International System Safety Society page on www.system-safety.org*]

The Virtual Chapter has identified four initiatives related to these goals and objectives. They include:

1. Create a high-level system safety standard owned and maintained by the International System Safety Society.

The goal of this activity is to create a standard that is the accepted basis for an effective system safety program. This new standard will describe system safety concepts and approaches intended to be used directly by a company or project, but also to provide guidance needed to develop industry-specific system safety standards. Two examples of industry-specific standards are MIL-STD-882 and the European Union’s Machine Directive. This new standard will not take the place of other standards; rather, it will provide the overarching performance strategy for implementing other system safety standards.

This new standard will clearly describe the key engineering and management attributes of an effective system safety program that are necessary and sufficient to allow the proper functioning of that program throughout the system lifecycle. These attributes will be described in terms that clearly describe the “what” and “why” of the elements of a good system safety program. However, the standard will not specify the “how” because that detail needs to be tailored to conform with the needs of individual projects, companies or industry sectors.

2. Assist universities with integrating system safety concepts into their engineering curriculum. This activity will create engineers and managers who are familiar with system safety practices, but is not intended to “create” system safety engineers.

A significant issue that has plagued system safety engineers over the years is attempting to work with a design and development team (engineers and managers) that is not “on board” with system safety goals and approaches. To be truly effective, all members of the team need to be working toward the same system safety objectives. This part of the initiative is focused on working with universities, assisting them in teaching engineering students basic system safety knowledge and processes. However, the more important goal is modifying engineering paradigms and management cultures in ways that not only accept the value of the system safety approach, but consider it a “natural” and expected part of all projects.

The reason for the distinction of not trying to “create” system safety engineers is that universities and their patrons are asking for “normal” engineers who know about system safety, both to integrate system safety into their projects and to work more effectively with dedicated system safety personnel on their teams. Universities want their graduating engineers to be engineers, but also to be safety smart. I think it is a bit like when universities require “engineering economics.” They don’t want their engineers to turn into economists, but they *do* want them to understand and use economic and financial considerations as a normal part of their engineering activities. We are hoping to influence *all* engineers — almost 21,000, in the case of Arizona State University (ASU) — in ways that help them use system safety as part of their normal practice.

3. Provide consistent, high-quality system safety training and education for system safety engineers and managers.

There is a need for system safety training for safety engineers and managers. Currently, there are few opportunities to obtain an education in system safety engineering beyond on-the-job training (OJT), or an occasional seminar or company-sponsored course. There is little consistency in what is taught in the available courses because there are no fully integrated or well-developed curriculums. The ISSS attempts to provide training at its annual Conferences, but that is not enough. The Society needs to develop consistent, high-quality training programs using a multitude of venues, including courses presented at conferences or other locations, online training, and possibly through the creation of a System Safety Institute. This training needs to reflect all of the

necessary and sufficient engineering/management elements specified in the system safety standard discussed in Objective Number 1.

My opinion is that the level of education needed is closer to a master’s or doctorate program than it is to a bachelor of science (BS) degree. It is my opinion that system safety engineering is not an appropriate undergraduate-level topic but one that works only at the graduate level. The reason for this is not that the material is all that difficult; rather, it is because the field of system safety engineering requires a good engineering/science background as a basis for doing the system safety job. I think it is important to obtain a solid foundation via a BS degree in an appropriate engineering and/or science discipline. System safety engineers need to know how things work (and don’t), as well as how people work (and don’t).

4. Develop a method for certifying safety engineers and managers.

There is a need for system safety engineers to be able to provide evidence of their qualifications. Perhaps the ISSS can assist with fulfilling that need by offering an ISSS certification based on education, training and experience. We could leverage this effort by requiring engineering and/or science degrees in conjunction with other recognized certifications, such as the Certified Safety Professional (CSP); verification of successful completion of a core set of system safety-specific courses provided through the ISSS, or through qualified instructors using an ISSS-approved curriculum, in addition to experience in the field.

In a nutshell, we are proposing an initiative consisting of four inter-dependent parts involving the following topics:

1. Develop a system safety standard that is used to create industry- or sector-specific standards
2. Integrate system safety into the engineering curriculum
3. Provide high-level training for system safety engineers
4. Provide ISSS-sanctioned certification to system safety engineers

The foremost, and most obvious, problem is that we cannot accomplish any of this with our current limited support team consisting entirely of unpaid volunteers. Each of these initiatives will require large efforts from highly qualified and dedicated individuals. We will need to find new ways to accomplish our work if we are going to achieve success with any of these initiatives. In addition, all of these initiatives are highly dependent on the success of the other parts — they are not independent activities.

The Virtual Chapter has requested time at the Conference this August to more fully present and describe these initiatives in the hopes of getting Society-wide support for this work. Assuming sufficient interest, we then propose to hold four sessions on each topic during the week to discuss and plan in detail. Our goal is to move this effort from Virtual Chapter investigations to ISSS-owned and managed activities.

The initiatives described herein are *much* larger than anything that a single chapter can accomplish; it is a Society-centric effort designed to achieve many of the long-standing missions, goals and objectives of our organization. This is a way that we can expand the membership of the Society, expand the implementation of the system safety process into the global economy, and provide valuable services and products to our individual and corporate members. Members of the ISSS know the huge value of the system safety process and approach in all types of projects, programs and activities — but we tend to be shy and wait for others to come and force us into helping them. While we may be asked for our assistance often, we don't have the means to do much, with our current dependency on an all-volunteer model. We will never be able to achieve our goals if we continue this way. It is time to change and attempt something different, something that has the potential for success before

the “old timers” are no longer able to support the Society — and the profession dies from a lack of interest.

Historically, this is when we stop. Since we can't accomplish these kinds of projects with our existing staff, we typically let them drop as “good ideas that are not feasible.” Perhaps it is time to try a different approach. Perhaps it is time to ask the beneficiaries of our activities for sufficient financial and technical assistance to allow us to achieve these goals. The main beneficiaries are the companies that benefit from strong system safety programs, and benefit from being able to identify and hire trained and qualified personnel. Perhaps it is time for us to obtain their support to achieve these goals.

You are invited to assist the International System Safety Society in furthering development of these ideas to the point where they can be properly supported and implemented. The activities to accomplish these goals will require funding for a staff of full-time technical positions within the ISSS to manage and support the tasks, plus significant ongoing volunteer efforts by the corporations and companies benefiting from these activities. We cannot expect to accomplish this by depending on our traditional approach of individuals donating “after hours” efforts. Achieving the goals of this initiative will require a significant industry commitment of time and money to support these difficult and ongoing activities. ●