

The Integrator

INCOSE North Star Chapter



Volume 4, Issue 4

August 2008

North Star Newsletter

INCOSE North Star Newsletter Communication

Summer is here, but not to stay. Enjoy it while you can!
Eileen Arnold, Editor, BAE Systems

Systems Engineering at its Best!

Systems Engineering: Human Systems Integration

According to INCOSE's SE Handbook V3.1, Human Systems Integration (HSI) "focuses on the human, an integral element of every system, over the system life cycle. It is an essential enabler to systems engineering practice as it promotes a 'total system' approach which includes humans, technology (hardware, software), the operational context and the necessary interfaces between and among the elements to make them all work in harmony."

Failure to include the human as an integral part of Systems Design leads to numerous examples of poor design. For example, do you own multiple cars or have you rented cars with the gas door on different sides of the car than what you were used to?



Fill Up Confusion

Although automobile design may drive the fuel tank to be on different sides of a vehicle, dependent upon the

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Chapter President's Corner

Neill Radke, Eaton Corporation and John Palmer, U of Minnesota, 2008 Co-Presidents

Every October, the North Star Chapter Leadership Team holds a planning meeting to lay out the program for the coming year. This program consists of monthly meetings, semi-annual tutorials, and other events that will draw interest and serve the needs of our members and colleagues. The team also holds monthly meetings to review implementation progress and work problems.

Each year we pick an interesting theme and build the program around it, emphasizing the basic principles of Systems Engineering and the steps in the Systems Product Life Cycle. The goal is to provide useful information that can quickly be used on projects by those attending the monthly Chapter meetings. For 2008, our theme was "Back to Basics", and to date our speakers have covered interesting topics pertaining to activities throughout the systems engineering life cycle.

With October quickly approaching, we need input from each of you describing how the chapter events would be of more benefit to you – our stakeholders. What basic themes would you like to see us pursue? What steps in the Systems Engineering process do you want to know more about or have clarified? Which aspects of the overall System Product Life Cycle are most important to you in your work and what would you like to know more about? The North Star Strategic Plan describes our goals to grow the chapter in number of paid memberships as well as increased participation in local, national, and international INCOSE activities.

Now is your opportunity to put your oar in the water and let us know what you would like to see, what you yourself would support for future Chapter meetings or other participation. Please let us know at:

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North Star Chapter Website
<http://www.incose.org/northstar>

vehicle type, taking the human into consideration may foster adding a simple aid to the design to alleviate confusion. Standardization is not the only solution.



At last, an indicator for the fuel door!

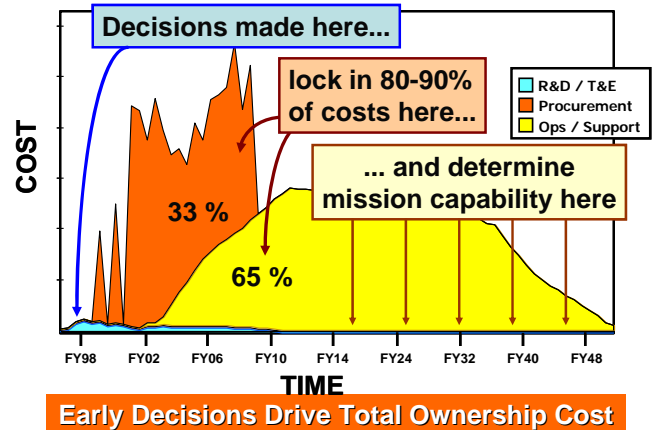
Failure to employ an HSI approach within your systems engineering process may result in a poor design, unintended consequences, unnecessary burdens on the workers, and in some cases negative impacts to the environment and public health and safety. Additionally, without this total system approach, the Enterprise which owns and operates the system may incur unnecessarily high total ownership costs.

The 1979 nuclear incident at the Three Mile Island power plant in Pennsylvania is an unforgettable example. *"The accident was caused by a combination of personnel error, design deficiencies, and component failures. The problems identified from careful analysis of the events during those days have led to permanent and sweeping changes in how NRC regulates its licensees – which, in turn, has reduced the risk to public health and safety."* Further the article states: *"it brought about sweeping changes involving emergency response planning, reactor operator training, human factors engineering, radiation protection, and many other areas of nuclear power plant operations."* (U.S. Nuclear Regulatory Commission's (NRC) "Fact Sheet on Three Mile Island Accident," <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html>).

The failure to do HSI in conjunction with comprehensive systems engineering resulted in loss of confidence in nuclear power in the United States and delayed progress in the nuclear field, driven by fear, for almost 30 years. The clean up costs, legal liability, and significant resources associated with responding to that near catastrophe trace directly to lack of attention to the human element of a highly complex system.

Three Mile Island also emphasizes that, while human performance includes raw efficiency in terms of tasks accomplished per unit time and accuracy versus number of errors made, human performance also involves additional considerations such as intrinsic motivation, the

opportunity to learn and improve, and gaining confidence that the human-machine entity can cope with rare, surprising or non-routine events. These considerations can be positively or negatively impacted depending upon how well the hardware and software support the human in meeting system goals.



Remember, informed decisions made early in the Systems Life Cycle, have a direct correlation to the Cost of ownership. HSI can help provide informed decisions.

The "human" in HSI includes all personnel who interact with the system in any capacity:

- system owners
- users/customers
- operators
- maintainers
- support personnel
- trainers, etc

HSI integrates nine human-centered domains: manpower, personnel, environment, training, safety, human factors engineering, occupational health, survivability and habitability into a single voice for the Human.

Excerpts from Dr. Fran Greene presentation.
AF Human Systems Integration Office
Office of the Vice Chief of Staff

WELCOME, NORTH STAR NEW MEMBERS!

Name	Company	Title
Jim Orrock	Stratasys	Manger, SE
John Weyrauch	Alliant Techsystems AW	VP Eng
Matthew Yoder	Medtronic, Inc.	SE