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# Chesapeake Chapter INCOSE

International Council on Systems Engineering

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Vol. 2 Issue 2

## February 2011 E-Newsletter

### Dinner Meeting - Wednesday 16 February 2011

## Status of Model Based Systems Engineering

Loren Mark Walker, CSEP --- Booz Allen Hamilton/IT

**Presentation:** According to the International Council on Systems Engineering (INCOSE), model-based systems engineering (MBSE) is “the formalized application of modeling to support system requirements, design, analysis, verification, and validation activities beginning in the conceptual design phase and continuing throughout development and later life cycle phases.” MBSE represents a model-focused approach to designing systems versus the traditional document and hardcopy approach. This INCOSE CC MBSE presentation will be based on the latest information from the INCOSE International Workshop. Two days of MBSE presentations will be provided at the IW. Mark’s presentation will provide an overview of MBSE, identify key perspectives and status information and charts, etc. from the IW presentations. This briefign will present the status of the INCOSE MBSE Initiative and the Challenge Teams progress/achievements to date. Join us to learn more about trends in MBSE methodology.



**Speaker:** Loren Mark Walker (CSEP) has 43 Years of Education and Experience He has a diversified technical systems engineering experience in DoD IT & communication system architecture/design, engineering, implementation, integration, testing and deployment. His activities in INCOSE include: Working Groups such as Model Based SE and SE Standards Tech Committee (co-Liaison for ISO Enterprise Architecture Standards) and many others. He’s published articles & symposium presentations. He’s been active in the Chesapeake Chapter as a Leader & Contributor.

**Location:** [Applied Physics Laboratory, Johns Hopkins University](#); 11100 Johns Hopkins Rd Laurel MD 20723 (Main Entrance - Lobby 1)

**Meal:** : Chicken breast with mushroom marsala sauce; Wild rice; Steamed Broccoli, served with garden salad, dressing, rolls and butter, dessert, including a small Fruit Plate, coffee, iced tea

[>>Download the Meeting Flyer Here<<](#)

### Reservations:

- **By website:** Credit card via PayPal, go to our [>>Registration Page<<](#) for details on the presentation, more about the panelists, cost details, cancellations, and directions

**Presentation ONLY: FREE (no reservations necessary)**

The purpose of the Chesapeake Chapter is to foster the definition, understanding, and practice of world class systems engineering in industry,



### February 2011

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This is the monthly newsletter for INCOSE Chesapeake, a local chapter of INCOSE International. We are a not-for-profit organization dedicated to providing a forum for professionals practicing the art and science of Systems Engineering in the Northern & Central Maryland & Southern Pennsylvania area.



The Chesapeake Chapter is always looking for volunteers to speak at our upcoming meetings! Please contact our Programs Director, [Mr. Donald York](#), if you would like the opportunity to speak or can recommend someone.

The Chesapeake Chapter of INCOSE is proud to recognize the following organizations for sponsoring our endeavors to expanding the understanding and appreciation of Systems


academia, and government. In light of that goal, every month at our dinner meeting we have a drawing for the latest in Systems Engineering literature. So come on out for a chance to win.

### This month's door prize is:

## A Practical Guide to SysML

by Sanford Friedenthal

### Mark your Calenders - What's coming up for the Chesapeake Chapter

Date			
Wednesday- 16 Mar 2011	<b>A Night Out with INCOSE CSEPs</b>	Paul Martin and various speakers	
	Dinner: Corned Beef and Cabbage		
Wednesday- 20 Apr 2011	<b>Designing an Effective Software Assurance Process</b>	Rudy Spraycar	
	Dinner: Sesame-ginger stir fried chicken with Jasmine rice		

### The President's Corner

## The International Workshop and SE Handbook V3.2

# IW 2011

The big news is the International Workshop in Phoenix AZ, a free-form gathering of systems engineering experts. There are no paper, panel or tutorial presentations. In highly interactive working sessions, INCOSE

members advance the state of the art by working on technical products like the Systems Engineering Handbook. Attendees spend 4 days with fellow systems engineers who are there to make a difference. Systems Engineers at all levels and from all backgrounds are encouraged to engage in working sessions and to contribute their knowledge and experience to take the discipline forward.

The Systems Engineering Handbook is often said to be the cornerstone of Systems Engineering. It certainly is *the* working tool for new engineers, for people entering systems engineering from other fields, or for practicing systems engineers needing a reference. It is the basis for the ASEP, CSEP, and ESEP systems engineering certifications. Softcopy is available from The SE Handbook V3.2. Hard copy will be mailed from the INCOSE office on request. This article is extracted from SE Handbook V3.2.

The SE handbook is based on the ISO/IEC 15288:2008 standard. That standard identifies four process groups to support Systems Engineering. Each of these Process groups is the subject of a chapter.

- **Technical Processes** (Chapter 4) include stakeholder requirements definition, requirements analysis, architectural design, implementation, integration, verification, transition, validation, operation, maintenance, and disposal.
- **Project Processes** (Chapter 5) include project planning, project assessment and control, decision management, risk management, configuration management, information management, and measurement.
- **Agreement Processes** (Chapter 6) address acquisition and supply.

### Engineering in the local area:



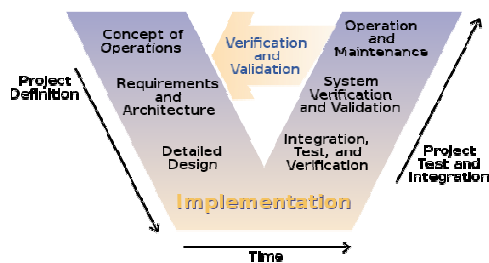
### Up Coming INCOSE Conferences

**January 29 - February 01, 2011**  
[International Workshop 2011 \(IW 2011\)](#)  
 INCOSE's International Workshop is *the* event of the year for systems engineers to contribute to the state of the art. Unlike INCOSE's annual International Symposium and other conferences, there are no paper, panel or tutorial presentations. Instead, attendees spend 4 days working alongside fellow systems engineers. Systems Engineers at all levels and from all backgrounds are encouraged to engage in working sessions, and contribute their knowledge and experience to take the discipline forward.

**March 08 - 09, 2011**  
[Sixth International Conference on Systems Engineering](#)  
 The sixth International Conference on Systems Engineering in Israel is a premier forum for the elicitation and exchange of ideas on issues and problems regarding Systems Engineering. The conference is organized by INCOSE\_IL / ILTAM and is supported by the Technion's Gordon Center for Systems Engineering.

**April 14 - 16, 2011**  
[CSER2011 - Ninth Annual Conference on Systems Engineering Research](#)  
 It has now been more than six decades since systems engineering methodologies and practices began to emerge to address the complex and challenging systems we now face on a

- **Organizational Project-Enabling Processes** (Chapter 7) include life-cycle model management, infrastructure management, project portfolio management, human resource management, and quality management.



Also in the Handbook is the VEE model, a life cycle view of the systems engineering process. The VEE captures the flow of the system design from CONOP through design into operations (and eventually disposal). This particular version (my favorite) is from [WIKIPEDIA](#). What this diagram captures

for me personally is the four-fold flow of systems engineering.

- The first flow is project definition, the construction of increasingly detailed models of the system.
- The second flow is implementation.
- The third flow is project test and integration, the deployment of that implementation into an enterprise.
- The fourth flow as the verification and validation during deployment. Did we deploy as intended in the CONOP, requirements, and design?

*John Lewis, CC President,  
john.lewis@incose.org*

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## Feature Article

### When System Engineering Goes Rogue

by George Anderson



**ISO 15288** represents to many systems engineers a pinnacle of achievement in defining not only a life cycle framework for man-made systems but [also the practice of SE in general](#). If the processes in this standard are used as defined, organized and purposed, one would expect to see a drastic improvement in the performance, suitability and increased customer utilization of modern systems. While measures of performance themselves can be subject to variation, several areas of

concern might serve to illustrate where we could improve this standard to the continuing benefit of mankind.

A good example of missteps, or at least some designer fibrillation, can be seen in the ubiquitous clock as it has evolved in the modern aircraft instrument panel. Most of us have marveled at the complexity of instruments in modern aircraft and can appreciate the need for standardization, readability, reliability and information content as key requirements. How can the clock be improved in these areas?

It turns out that it's a tough job.

The mechanical clock has been improved over many development cycles. The aircraft instrument panel clock benefits from this history and a current model is shown in the adjacent figure. This clock design is the military A-13 series and features a round dial, stopwatch function and two control inputs. The clock is driven by a mechanical mechanism powered by a spring and



regular basis. Much has been accomplished in that time and the value of systems engineering is not only unquestioned, but standards such as ISO/IEC 15288 and ANSI/EIA 632 are now widely recognised to be appropriate guidance to acquirers and suppliers for the creation of products and services. Interestingly, however, both 15288 and 632 neither define nor make any use of the term 'systems engineering'. Further, both standards have arguably as much in common with project management as they do with systems engineering. It is therefore opportune, at the start of the new decade, to examine the future of systems engineering as a discipline. The theme of SETE2011 is therefore 'Systems Engineering in the Next Decade'.

**May 02 - 04, 2011**

[SETE2011 The Systems Engineering Test and Evaluation Conference](#)

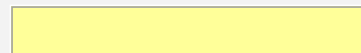
CSER 2011 is an international event being jointly sponsored by the University of Southern California and The International Council on Systems Engineering (INCOSE)'s LA Chapter. CSER 2011 provides practitioners and researchers in academia, industry, and government a common platform to present, discuss, and influence systems engineering research and will provide access to forward-looking systems engineering research - invited speakers plus refereed papers, as well as perspectives from senior industry representatives.

**June 20 - 23, 2011**

[21st Annual International Symposium](#)

The INCOSE International Symposium is the premier international forum for Systems Engineering. Participants network, share ideas, knowledge and practices, and learn more about the most recent innovations, trends, experiences and issues in Systems Engineering. Paper authors, panelists and tutorial presenters are encouraged to address ways in which Systems Engineering principles and perspectives are performed today and how Systems Engineering may influence our future. Topics of value include technology insertion, process improvements, and organizational governance of the systems we make, manage, operate and maintain over their life cycle, to the benefit of mankind.

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accuracy is provided by a precision oscillating balance wheel. At least three generations of pilots have been accustomed to using this instrument for timekeeping and as an integral part of conducting instrument approaches. This last item suggests the necessary role that the clock plays in safely completing a flight. Clearly, no compromises can be made with readability under adverse conditions and the mechanism must be unaffected by other systems malfunctions.

Digital electronics with its flexibility, low cost and availability has been used to produce replacement clocks. The figure below shows a typical example. One does not need to be a pilot to have some misgivings about this display. Where, for instance, does the pilot make time comparisons, note rate information or view spatial references? A part of the pilot's world is referenced to the visualized clock face as a surrogate for a spatial reference system based on azimuth and distance from a central point:

- "Traffic at your two o'clock position moving from right to left"
- "The generator is mounted on the case flange located at the 4:30 o'clock position as you face the front of the engine"
- "Check your six for bogies"



Fortunately, digital electronics can drive clock hands just as well as mechanical oscillators and so we have newer displays that are returning to the original designs and even include the same mechanical knobs vs. the vague little buttons. Abandoned, thankfully, is the temptation to put a voltmeter on the same face. I think the industry has dodged a serious error here, and the public seems to agree. Digital instrument displays in general are not popular in racing cars, while wristwatches with dials derived from older military designs are a commercial success. Unfortunately, the FAA has lagged

behind in this area by approving the use of digital clock displays in the cockpit without establishing or referencing meaningful design standards. <FAA Advisory Circular 20-94A, 4/13/2007>

Technology can be a double-edged sword. It provides new capabilities but can, if not managed properly, take away others. Is new always better? Does the requirements process properly identify all solution sets? Do developers have any experience and historical context in the area or industry that they are now working? These and other questions must always be answered as part of the development process.

What about another area involving standard practices related to systems safety? ISO 15288 as currently written leaves this as an exercise for the engineer to address during decomposition of the engineering tasks. Some help and perspective can be found in the various treatments of [Murphy's Law](#). The Murphy's Law series is probably one of the most influential sources of safety insights in use today. An original statement of the law is:

- If an aircraft part can be installed incorrectly, someone will install it that way.

This is just the beginning of the concept and many corollaries have been added to what can be an extremely valuable safety compendium.

While Murphy's Law began in the aerospace industry, other areas of systems engineering, especially information systems design, are notably deficient in addressing similar issues. Some of the corollaries paraphrased from a 1970's era safety magazine for USAF fighter pilots, should illustrate the point well:

- Man who has choice, has troubles - Confucius

# UMBC

**Training Centers**  
offers

**a CSEP Prep Course**

**Dates: 4 Saturday Mornings,**

**April 2th -- 30th**

**Location: UMBC Training Centers**

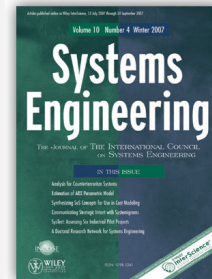
**@ 1450 S. Rolling Road,**

**Baltimore, MD 21227**

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## Discover Systems Engineering



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### Check out these articles:

- *Risk-based multiobjective resource allocation in hierarchical systems with multiple decisionmakers. Part I: Theory and methodology (pages 1-16)*
- *& Part II. A case study (pages 17-28) Zhenyu Yan and Yacov Y. Haimes*
- *Lean Enablers for Systems Engineering (pages 29-55) Bohdan W. Oppenheim, Earll M. Murman and Deborah A. Secor*

As a member of INCOSE you have online Access to the current and past issues of The Journal of Systems Engineering via the Wiley InterScience site. Search the archives and download papers of interest. Registration on the Wiley site is required. Instructions for accessing the SE Journal can be found in [INCOSE Connect](#)

With Connect you can also download the Dec 2010 Issue of INSIGHT *Systems Development in Extreme Environments from Deep Sea to Deep Space*

- Interchangeable parts won't.
- Availability of a part is inversely proportional to the need for the part.
- After a device has been fully assembled, extra parts will be found on the bench.
- Any safety factor set as a result of practical experience will always be exceeded.
- The most logical way to accomplish a task will be the wrong way.
- The necessity for a major design change increases as the job nears completion.
- A fail-safe circuit will destroy others.
- Hermetic seals will leak.
- A failure will not appear until the part has passed final inspection
- If a wrong publication can be used, someone will use it.

Safety and associated good design, is a vague thing until experts start sorting through the accident wreckage or listen to the last minutes of a cockpit voice recorder on a doomed aircraft. Some design flaws like the ones surrounding the clock are harder to find than those associated with the hardware failures commonly treated in Murphy's Law. Regardless, ISO 15288 should be expanded to include better task guidelines at the requirements stage of the product life cycle and thereby prevent future examples of those lessons already learned.

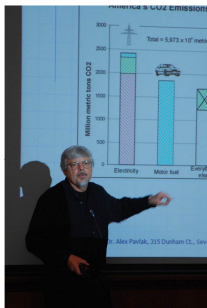


*Murphy's Law Repeated: Fine Air DC-8 Crash at Miami International Airport, August 7, 1997*

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### Did You Miss Last Month?

## Strategic Thinking of Clean Energy Systems



On Wednesday, January 19, 2011, our agenda was full as we presented several awards (left overs from our Holiday Party), a quick preview of our web-site, the installation of the Board of Directors for this year, then a great lecture by Dr. Pavlak on "How to Develop Clean Energy Systems". Bottom line, it doesn't matter if Global Warming is real or not, we need a national strategic solution for developing clean energy systems. It was well recieved and very thought provoking talk. You can read Dr. Pavlak's *American Scientist* article "[Strategy vs Evolution](#)" published on-line or:

Download his presentation slides  here.

Read our whole report on our website [>>>HERE<<](#)

By the way the meal was great too. So make a point to join us next month.



Click on image above and Log-In today.

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### Newest Chapter Members

- Peter Ildefonso III *Northrop Grumman*
- Kevin Dull *Northrop Grumman*
- John Nelson *MITRE*
- Kurt Christensen *Applied Signal Technologies/Pyxis Engineering*
- Jane Orsulak *Raytheon*
- Andy Martinez *GTEC, Inc.*
- Kevin Roberts *G2 Inc.*
- Jessica Welsh *Northrop Grumman*
- Will Harrison *Deloitte Consulting*
- Jule Davenport *Defense/TASC, Inc.*
- Jessica Tyler *Booz Allen Hamilton*

We welcome our latest new members. We look forward to seeing you at our meetings and tutorials.

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**This Newsletter is to serve our members and is open to all for contributions. Do you have an interesting idea for an article? A review of a new book related to engineering? [Let us know.](#) We'd love to hear about. It may wind up in a future issue of our Newsletter.**

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Keep up with the latest news and events. Find out about our new Board of Directors. Explore our extensive library of past Monthly Dinner Meetings. Learn of the Benefits of Joining INCOSE. Check out Systems Engineering education in the local area at our [INCOSE Chesapeake Chapter Website](#).

For any comments or suggestions about this newsletter please e-mail our [President, John Lewis](#) or our [Communication: value your feedback](#).

- Board of Director Officers, 2011**
- President: Mr. John Lewis
  - Past President: Mr. George Anderson
  - President Elect: Gundars Oswald
  - Treasurer: Mr. Glenn Gillaspay
  - Secretary: Mr. Bob Berkovits

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**Please use the Forward email link below so we can invite your friends to join  
Thanks in advance.**

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