



# Midwest Gateway Newsletter

## International Council on Systems Engineering

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### *President's Corner*

*Brian Beyer*

*President MGC INCOSE*

Midwest Gateway INCOSE Chapter Members,

Congratulations to the MGC chapter of INCOSE for being a Silver Circle Award recipient for 3 years in a row now (2006, 2007, 2008). That is quite an accomplishment for a chapter of our size. It took a lot of hard work and dedication of our membership to successfully execute last year's diverse plan and meet the high expectations set out by the previous MGC Board. It is going to be challenging to keep up this level of effort and make improvements to the 2009 MGC execution plan without active participation from a significant portion of our membership.

Thus far, we have engaged our 2009 MGC Board of Directors (BOD) and our committee leadership on meeting the needs and interests of our current members. As a result, we have had some excellent discussions this year on a variety of topics including modeling and simulation, affordability analysis, and the new DoD 5000.02 framework to name a few. If you haven't joined us for a MGC lunch chapter meeting lately,

*(see Presidents Corner ... on page 2)*

### *Systems Principles and the Economy*

*by Bob Scheurer*

Have you ever thought of the current economic crisis from a systems viewpoint? Most economists agree that many aspects of the current pull-back in the economy are the worst in over the past 25 years and possibly since the Great Depression. How did we get here and how will we get out of it? Are systems principles at work?

From a systems (holistic) perspective, the massive economic slowdown is rooted in overly optimistic expectations of value, whether it be home values, business performance, stock valuations, or otherwise. The continuous positive feedback in the economic system reached an unsustainable set of gains until it essentially began a collapse into oscillation. This is a classic



application of control system theory, albeit with an "after the fact" analysis (my portfolio and probably many of yours can attest to that!).

As a result, we now have a huge amount of uncertainty as to what the real value is of anything (ref: price of gold) – thus precipitating an enormous number of collateral

*(see Systems Principles... on page 2)*

### *Achieving Better Requirements from Early Prototyping*

*by Bill Bezdek*

The INCOSE Midwest Gateway Chapter presentation in May was on "Achieving Better Requirements from Early Prototyping" by William J. Bezdek. The audience was 20+ people and lunch was served. One of the questions / comments was on the use of "Prototyping" in the title. Is the "Prototyping" a paper analysis, desktop simulation, or operators in real time simulators including flight test platforms? All of these models have a place in getting better requirements, but in this case, the use of live platforms, real time virtual simulators and

constructive entities were used to provide improved systems engineering requirements and allows the customer to be involved during the entire development and test process. The presentation was based on a previously published American Institute and Aeronautics and Astronautics paper (AIAA-2008-7090) that included Joel

*(see Achieving Better Reqmnts... on page 3)*

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### Presidents Corner ...

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you are really missing out. Check our website often for more upcoming MGC programs and outreach events in 2009.

In the first newsletter of 2009, I introduced our team of committee leaders for this year. Over the course of this spring, they have put together execution plans that are now in place. It takes a little volunteer effort on the part of our general members to now take these plans and turn them into reality. If you've been an active member of our chapter, I thank you and appreciate your service. If not, it's never too late. We invite you to help us shape the future of Systems Engineering together. Please feel free to contact Bob Scheurer or myself and let us know where you'd like to get involved to make an impact.

### SE Certification Tutorial Webinar

John Clark

The following is taken verbatim from the flier sent out by John Clark. Access the rest of the flier and tutorial schedule at <http://www.incose.org/mdwest/newsletters/JohnClarkTutorial.doc>

Interested in receiving your **INCOSE** Systems Engineering (SE) certification? Northrop Grumman Corporation (NGC) is hosting a tutorial webinar to help you prepare for the SE certification exam. The tutorial is taught by John O. Clark, Chief Engineer at the NGC Information Systems Sector and Director of Education & Training for the INCOSE Hampton Roads Area Chapter. The tutorial covers the Certified Systems Engineering Professional (**CSEP**) process and the SE Handbook version 3.1 (the basis for the CSEP exam). It also provides tips on filling out your application. A certificate of completion is provided.

### EAST MEETS WEST

#### The Human Dimension to Systems Engineering

The International Council on Systems Engineering (INCOSE) Singapore Chapter together with five other Region VI Chapters of Australia, Beijing, Japan, Korea and Taiwan will host the 19th Annual INCOSE International Symposium (INCOSE 2009). The symposium will be held at the same location and time with the 3rd Asia-Pacific Conference on Systems

Engineering (APCOSE 2009) from 20 to 23 July 2009 at the Suntec International Convention and Exhibition Centre.



More info... <http://www.incose.org/symp2009/>

### Systems Principles ...

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effects. Until valuation confidence is restored, meaning that the value of something purchased today will remain relatively stable in the near-term, the economic instability will likely continue. Government attempts to re-stabilize the economy (read stimulus packages) are obvious attempts to change the system dynamics and "shock the economic system" back onto a positive trajectory. Time will tell.

In the meantime, each of us can apply our systems engineering

principles and perform good risk management, along with trade-off analysis for whatever options come before us in the future. Having a plan is important, as is the ability to continue sound execution of our lives. Continuously measuring our progress, financial and otherwise, is important. But so is making the necessary course corrections along the way, depending on our specific environment and lifecycle phase. By applying good systems principles to our own situations, we can each make the best of the situation and arrive at the best possible outcome as a result.

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**Achieving Better Reqmnts...**  
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Maleport and Dr. Robert Olshan as co-authors. To provide continuity from early analysis of requirements, there is a trend toward using a cost effective mixture of simulators at different levels of fidelity and the use of Live, Virtual, and Constructive (LVC) entities operating in a common real/synthetic environment to expand and test to see if the requirements provide the desired results. Many times there are problems because of misunderstandings, incomplete requirements or there are unknown relationships between the requirements that are not captured. This is shown as the green "Customer" boxes on the figure below.

As an example, a series of Network Centric Operations (NCO) experiments were conducted by providing operators knowledge (information, data) from geographically separated groups, faster and in a more meaningful ways than previously possible to facilitate rapid prototyping, operator decision making and coordinated action. Improved information processing and transfer between

sensors, analysts, decision makers and effectors made this possible along with improved bandwidth of the network and the use of a "truth data" network using Distributed Interactive Simulation (DIS). The use of an Internet Protocol (IP) network at the tactical edge was rapid prototyped after initial testing using a basic Link 16 network taking advantage of new applications on existing networks. Fielded systems, such as the F-15, F/A-18, tilt rotors vehicles, helicopters and Unmanned Air Vehicles (UAV)s were used in several experiments together and separately, using different types of tactical communications from Joint Tactical Information Distribution System (JTIDS) / Multifunctional Information Distribution System (MIDS) to a combination of Extensible Markup Language (XML) over IP. Advanced wireless communication systems, such as software programmable radios, satellite communications and network waveforms were utilized to provide the IP network from the battlefield all the way back to Continental United States (CONUS). Even though some of the platforms do not have IP

communications systems installed, much of the network data can be routed through actual hardware so onboard the flight test platforms, in the high fidelity simulations in the laboratories, and operators can observe the effects of improved situational awareness and operations as if the systems were fielded to be able to test the effects of the network. Scenarios were developed and tested as part of several large live, virtual, constructive simulations involving flight test aircraft, many simulators from different locations with different levels of fidelity and additional constructive entities over a four year period. The paper describes the development of the live, virtual, and constructive simulations, the results obtained, and future planned usage using real time simulators to provide a rapid prototyping capability to support the development and testing of future concepts.

For the rest of the story, please download Bill's paper at [http://www.incose.org/mdwest/Presentations/AIAA08\\_LVC-13-fEB-09.pdf](http://www.incose.org/mdwest/Presentations/AIAA08_LVC-13-fEB-09.pdf)  
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