



Building Culture in the Chapter

Ron Lyells, Chapter President, Honeywell

We are one quarter into 2016 and your Board of Directors is busy “making culture”!

In the last newsletter I made a claim that everything about INCOSE is cultural in nature. I also offered, that taking a cultural perspective on the INCOSE vision and what we want as a chapter would benefit us in our planning and personnel engagement. So given that the word “culture” conveys a broad set of meanings to most of us, what does having a cultural perspective look like? A few framing thoughts to help us all be able to converse about this idea.



1. **The focus of our attention?** Cultural Artifacts (specific products that are created and cultivated).
2. Culture is what humans make of the world, but not everything that human beings make shapes culture.
3. Our responses to the culture we are forming, both individually and as a collective chapter:
 - Condemning - Withdrawal
 - Consuming - Sit Down and Enjoy
 - Critiquing - Engagement, Dialogue
 - Copying - Going with the Crowd

4. Culture keeping: What needs to be cultivated, maintained, practiced.

Take some time to look at this newsletter and the last several newsletters. You will find many cultural artifacts in play. Some include notices of meetings, tutorials, social events, certifications, and even the announcement of us being awarded a 2014 Gold Circle Award. These newsletters themselves are cultural artifacts. We are making culture!

What I ask you to do is to reflect on what you see and think about these cultural artifacts in light of the framing thoughts above. Also, please spend a little time considering your own response to these cultural artifacts. This may require a little soul searching for some of you. This may lead some of you to inquire of yourself “why” you practice the discipline of system engineering, or system thinking. And also to inquire “why” you are a member of INCOSE.

I put out these challenges, because creating culture requires relationships be established and cultivated. The cultural artifacts we create require use, require cultivation. Let your Board know what you think. Talk to your fellow INCOSE members about what comes to mind. Share your culture with others who are not members or may not even be practicing system engineers. ∞

We Need Your Help to Make Our Fall Workshop Valuable to You

Chapter Board

The Enchantment Chapter has a mission to support regional Systems Engineering needs and membership professional development and engagement. Underway is planning for a Systems Engineering 2-day multi-workshop event for this fall, in Socorro at NM Tech. Workshop dates will be established in April, chosen from Friday/Saturday October 21-22, or 28-29.

These workshops will not be tutorials, but rather working sessions on topics that can benefit from some collaborative thought by people interested in learning more about what others know and think. The objective is to increase the knowledge base of participants wrestling with issues at work, that can benefit from broader exposure to what others with similar issues and interests have experienced, are thinking, and know.

We want to choose 8 workshop topics that are of value to the organizations and people in our region. We seek your input on choosing topics that will inspire you and others in your organization to attend and participate. Input is being sought from Sandia Labs, Los Alamos Lab, Honeywell, ATA, White Sands Missile Range, AFRL, UTEP, NM Tech, UNM, NMSU, and others.

Final topics chosen will also need workshop leaders – who will open their workshop with appropriate positioning and background on the topic, to focus subsequent collaborative discussion, and guide the effort toward meaningful knowledge sharing and development.

Event planning objectives are to minimize cost for participation and maximize participation value. To minimize cost, NM Tech is co-sponsoring this event with facilities and logistics assistance; and is within commute distance of at least Albuquerque, and possibly White Sands and El Paso as well. To maximize participation value, we seek your assistance in identifying high-value topics.

Some Possible Systems Engineering Topics for Consideration—But What do You Want? Tell rick.dove@parshift.com

- High performance teaming.
- T&E for unmanned and autonomous systems.
- Meaningful customer involvement.
- Sub-contractors as fully engaged team members.
- Design concepts of user-embraceable systems.
- Agile hardware-development infrastructure and ConOps.
- Agile security adaptable to adversary attack evolution.
- IPT support infrastructure for data and communication.
- High-value relationships with/among academic institutions.
- Systems engineering cultural transformation.

What Systems Engineering issues do you have that need some inspirational thought? Are any of the above suggestions, or suggestions you can offer, of sufficient interest to encourage you and/or personnel from your organization to participate?

For more information see page 7 on workshop ConOps. ∞



INCOSE Handbook Tutorial with SEP Certification Prep

May 12-13—Registration is Open Now

Mary Compton, Sandia National Labs

Are you interested in learning or reviewing SE from the INCOSE SE Handbook V4.0 and ISO/IEC/IEEE 15288:2015 perspective? Are you thinking about taking the INCOSE SE Professional (SEP) exam, and achieving INCOSE Associate SEP (ASEP), Certified SEP (CSEP), or Expert SEP (ESEP) Certification?

If the answer to either question is yes, there will be a 2-day in-depth tutorial on May 12 and 13, 2016, in Albuquerque.

White Sands Missile Range will have a 1-day version 2 days before the Albuquerque tutorial. It is not likely that this 1-day version will be open to outsiders, but in collaboration with the Chapter with back-to-back dates, the cost to each of us has been reduced.

The Albuquerque tutorial will provide a brief overview of the INCOSE SEP process and a detailed summary of each chapter of the INCOSE SE Handbook V4.0, followed by a SEP exam exercise.

This tutorial will help you understand

the SEP levels, requirements, and application process, and learn or review SE from the INCOSE SE Handbook V4.0 and ISO/IEC/IEEE 15288:2015 perspective. It is aimed at engineers of all disciplines, managers, and leaders and decision makers.

Course materials include the tutorial slides (including PowerPoint Notes), example exam questions, exam tips, help to fill-out your certification application, reference to audio & video recordings for later downloading, and a certificate of completion.

Leading this tutorial will be John Clark, a retired Chief Engineer and Corporate Systems Engineering (SE) Instructor at Northrop Grumman Corporation (NGC) with several years of experience applying SE and Software Engineering. He is an internationally recognized speaker and Subject Matter Expert in SE, an SE tutorials instructor in major SE symposia and webinars, and a founder and member of several NGC and INCOSE Working Groups (WGs).



The 2-day tutorial will be held Thursday-Friday, 12-13 May 2016, from 8:00 a.m. to 5:00 p.m. in Room 137 at the [Workforce Training Center](#), 5600 Eagle Rock Ave. Albuquerque, NM.

Registration will be 7:30 – 8:00 a.m. on 12 May. The tutorial cost: \$400 for INCOSE members, \$500 for non-members, and free for students, includes tutorial notes, lunch and snacks.

For more information or to register please visit Tutorials under the Library tab at www.incose.org/enchantment.

Direct questions to Ann Hodges at alhodge@sandia.gov or Mary Compton at mlcompt@sandia.gov.

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Not For Women Only

Heidi Hahn, Los Alamos National Lab

A periodic column that will feature news about INCOSE's Empowering Women as Leaders in Systems Engineering (EWLSE) initiatives and other tidbits relevant to women's participation in STEM.

EWLSE kicked off at the International Symposium (IS) 2015 and also held meetings at the International Workshop (IW) 2016, with participation of women and men, working at different levels and different areas of systems engineering, serving as advocates for women as leaders in systems engineering.

EWLSE has an eight-person Leadership Team, which includes two Enchantment Chapter Board of Directors members. Regina Griego leads the Highlighting INCOSE Leadership thrust area and I lead the INCOSE In-reach area, which looks at collaborations at the chapter, regional, and sector levels within INCOSE.

Regina is organizing a Leadership Workshop to be held at IS 2016 in Edinburgh – Sunday, July 17, 1:00 - 5:15. Con-

tact Regina at grieger@sandia.gov for more information.

EWLSE has also just launched a Mentor/Mentee Initiative, which will partner early career female systems engineers seeking advice for navigating the systems engineering field with a more senior systems engineer of the same gender. EWLSE is looking for both mentors and mentees; participants must be INCOSE EWLSE members. Please send your mentor or mentee request to ewlse@incose.org to get started, or look for additional information in the INCOSE 2016 Q1 Newsletter.

Both male and female INCOSE members are eligible to join EWLSE through incose.org. Here's how:

- Log in (Member Login)
- Select Profile Home
- Scroll to My Committees/Working Groups
- Select Browse/Join a Working Group
- Scroll to "Empowering Women" and select <view>
- Scroll to bottom of member list and select "Join this Committee"

It's that easy! Once you join, you can go to

the ELWSE website on INCOSE Connect under the Programs and Projects tab.

A public website that will be accessible to non-INCOSE members is coming soon.

This Newsletter's tidbit: Reshma Saujani, founder of the nonprofit, Girls Who Code, initiates young women into the tech world. She says "We're raising our girls to be perfect, and we're raising our boys to be brave."

Saujani cites a report that found that men will apply for a job if they meet only 60 percent of the qualifications, but that women will apply only if they meet 100 percent of the qualifications. 100 percent! This study is usually invoked as evidence that women need a little more confidence. But Saujani thinks that it's evidence that women have been socialized to aspire to perfection, and that they're overly cautious. She asserts that this needs to change, and that girls need to be taught to be brave, not perfect. [Watch](#) Saujani's TED talk – Reshma Saujani: teach girls bravery, not perfection. www.ted.com/talks/reshma_saujani_teach_girls_bravery_not_perfection

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Recent Meetings

Ann Hodges, Sandia National Labs

All presentations and recordings are on the [Enchantment Chapter Website](#).

January 2016—Jim Armstrong, Industry Professor at Stevens Institute of Technology, presented *Systems Integration – What are We Waiting For*. The common approach to integration is that it doesn't really begin until the assembly of the actual product. However, there are many examples of where earlier actions did or could have prevented serious problems and reduced the costs of late changes. Several examples of these incidents were explored in the talk with lessons learned.

February 2016—Jin Zhu, a Ph.D. candidate of Civil Engineering at Florida International University, presented *Towards*

a New Paradigm for Management of Complex Engineering Projects: A System-of-Systems Framework. Complex engineering projects consist of different interconnected networks of processes, activities, stakeholders, resources, and information. The traditional project management paradigm, which identifies complex engineering projects as monolithic systems, has failed to capture the interdependencies and dynamic interactions at the interfaces between different entities and networks in complex projects. Jin Zhu discussed a system-of-systems (SoS) framework towards creation of tools and techniques for integrated management of complex engineering projects. Two principles, base-level abstraction and multi-level aggregation, that were used to develop the proposed framework were discussed.

March 2016—Duke Buster, a Staff Systems Engineer at Honeywell Aerospace, presented *Observations on Using Models as Specifications*. When we want to understand someone's behavior, or a company wants to advertise their product's behavior, we watch a video. This holds true for teams developing complex systems – users, buyers, management, and engineers all understand the system better when they watch it in action. Recently, development teams have used tools like SysML and AADL to put the requirements in pictorial form, but a picture has trouble conveying behavior. A few development teams have used “moving” or executable models to present behavior. This presentation covered a few personal lessons-learned / caveats for using models, both static and executable, as specifications. ∞

Next Meetings

Ann Hodges, Sandia National Labs

April 13: Got Phenomena? Science-Based Disciplines for Emerging Systems Challenges.

Bill Schindel, President, ICTT System Sciences.

Abstract: Engineering disciplines (ME, EE, CE, ChE) sometimes argue their fields have “real physical phenomena, hard science” based laws, and first principles, claiming Systems Engineering lacks equivalent phenomenological foundation. We argue the opposite, and how replanting systems engineering in MBSE/PBSE supports emergence of new hard sciences and phenomena-based domain disciplines. Supporting this perspective is the System Phenomenon, wellspring of engineering opportunities and challenges. Governed by Hamilton's Principle, it is a traditional path for derivation of equations of motion or physical laws of so-called “fundamental” physical phenomena of mechanics, electromagnetics, chemistry, and thermodynamics. We argue that laws and phenomena of traditional disciplines are less fundamental than the System Phenomenon from which they spring. This is a practical reminder of emerging higher disciplines, with phenomena, first principles, and physical laws. Contemporary examples include ground vehicles, aircraft, marine vessels, and biochemical networks; ahead are health care, distribution networks, market systems, ecologies, and the Internet of Things (IoT).

May 11: Systems and Software Product-Line Engineering.

Paul Clements, PhD, Vice President, BigLever Software, and Charlie Krueger, PhD, CEO, BigLever Software.

Abstract: Product-line engineering (PLE) is a way to engineer a portfolio of related products in an efficient manner, taking full advantage of the products' similarities while respecting and managing their differences. By “engineer,” we mean all of the activities involved in planning, producing, delivering, deploying, sustaining, and retiring products. Born in the 1980s in the software field, but now having grown well beyond those early roots, PLE derives benefits from engineering the whole family rather than separately engineering each member. Numerous case studies show that exploiting the commonality throughout the products' total life cycles can return substantial improvements in time to market, cost, portfolio scalability, engineer productivity, and product quality; no other engineering paradigm shift has, to our knowledge, brought about results that rival these. This talk will explore how PLE is being used in industry today, and discuss how it has grown and evolved to meet the needs of such high-demand industries such as automotive, avionics, aerospace and defense, and more.

June 8: Cooks, Recipes, and Ingredients.

Andy Pickard, INCOSE Chief of Staff, Rolls-Royce Associate Fellow in System Engineering.

Abstract: To make a meal, you need ingredients and a recipe. A recipe defines sequencing, quantities, timing etc. This is analogous to a project's processes (ingredients) and life-cycle (recipe). For a project, the attributes of cost, schedule and quality are properties that emerge from the recipes and ingredients. But how important is the recipe? The study behind this presentation found instances where a project's recipe had a 16-fold cost difference using the exact same ingredients. This suggests that a good cook can make a great meal almost regardless of the ingredients. Many Project Managers inadvertently become chefs of their projects and create new recipes in their attempt to recover their project. However, few managers are aware of the outcome of the recipes they create. When things turn out unexpectedly, generally badly, they blame the ingredients and not the recipe. This presentation will show how a business can characterize a recipe to meet business goals, define it in a structured way (a reference model) and then use that definition to plan and monitor a project. The method has been used at Rolls-Royce since 2002 and has been shown to improve project success, halving the level of scrap and rework whilst holding schedule. In one case, this method brought a 45% cost reduction to a project with only a small increase to schedule.

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Student Division Builds SE Handbook Learning Game And Invites You to Play It

Eric Smith, University of Texas El Paso

UTEP Student Division members have prepared a game to learn the SE Handbook v4.0 processes in preparation for the ASEP/CSEP exam. The game is based on the Inputs, Activities, and Outputs of the context diagrams of the SE Processes from SE Handbook v4.0. Each process area has its own poster, onto which are placed the inputs necessary for the process activities to run. Upon completion of the activities, the process outputs are free to flow out and become inputs to following process areas.

A prototype of the game is now based on an analysis of the SE Handbook v3.2 performed by Student Division Advisor Eric Smith. The analysis of consistency and connectivity among the SE Handbook processes was provided to the SE Handbook Working Group prior to the writing of version 4.0. Student Division members are now updating the process network map to reflect the SE Handbook v4.0.

Gaming fundamentals, such as randomness, memory recall, and decision making, as well as strategy at both the individual and collective level, will be integrated to make the game fun and engaging. The game boards are placed in a room to allow kinesthetic learning, as the students walk around the 3D game in order to transfer work products among process areas.



Chapter Board members Rick Dove and Tom Tenorio visited on 29-February. Left to right: Louis Steinmetz (M.S. SE student), Bhriannon Tiscareno (M.S. SE student), Tom Tenorio, Rick Dove, Eric Smith (Student Division Advisor), Angel de la Rosa (M.S. SE student), Aditya Akundi (Student Division President).

Members can review it, play it, and give suggestions for improvement. To review and play the game please contact Eric Smith at esmith2@utep.edu or (915) 747-5205.

In related news, Mr. Nick Gonzalez, Systems Engineering Director at Lockheed Martin Space Systems Company, visited UTEP on 22-February, as part of a broader visit by directors and vice presidents. Mr. Gonzalez met with INCOSE Student Division members and provided advice for the creation of the SE Handbook game, utilized to promote learning of SE processes in preparation for the ASEP/CSEP exam, and for real SE challenges in the workplace.



Ms. Margarito Muro, placing input work products into the 4.8 Validation Process

Scenarios useful for Systems Engineering learning naturally arise from the game. For example, the questions arise: Is it necessary for all inputs to be present and delivered to a process area in order for the process area activities to begin, or, is it better to allow process activities to begin with incomplete inputs, in order to allow a variety of analyses to investigate system alternatives, and to capture the iterative nature of system design? How can SE Processes adapt to requirements changes, unpredicted circumstances, and unintended consequences?

Three walls in the conference room have this SE-Process Board Game posted on them—with process inputs-activity-outputs for each, one to a board, with movable sticky-notes.

The SE Handbook Game is foreseen to provide greater insight into the utility of standard ISO/IEC/IEEE 15288, Systems and software engineering - System life cycle processes, and is seen as a key bridge between Gamification and SEP Exam passage.

Enchantment Chapter members are invited to play the game and provide ideas as to game formulation. This prototype is ready-to-use by Chapter members end of March. The basic game will be available in electronic form, so that Enchantment Chapter



Left to right: Angel de la Rosa, Bhriannon Tiscareno, Jagadish Thimiri, Mr. Nick Gonzalez, Margarita Muro, Louis Steinmetz. (all M.S. SE students, except for Mr. Nick Gonzalez)

Mr. Gonzalez also provided feedback and advice for the creation of the Online program at UTEP, slated to begin in the Fall of 2016 with the offering of an online Master of Science program in Systems Engineering. ∞



Natural Systems Working Group (NSWG)

Dr. Lawrence D. Pohlmann, *Strategics Member, NSWG Working Group*

The NSWG focuses on helping the systems engineering community understand why, how, and when to ask: “*What would Nature do?*” The primary goal of the group is to influence systems engineering processes to routinely consider natural systems data and solution concepts as sources of design inspiration. Additional information is on our public site: <https://sites.google.com/site/incosenswg/> and on the INCOSE Connect site for the NSWG Working Group.

Natural Systems (NS) are simply systems that humans did not create: living systems, non-living things, and the interactions among them. We include not just the physical manifestations, such as earth, air, fire, and water, but also the forces and laws that govern Nature and the many unknowns about how and why NS do what they do and how they are made.

Why Should SEs be Interested? We SEs deal with a very wide range of domains, situations, challenges, complexities, and opportunities. It is our job to look for innovative, cost effective solutions that satisfy customer needs. If we look solely at other human-designed systems, we will be missing a great variety of design solution in Nature—solutions that are surviving in a wide variety of challenging environments, and that perform the same kinds of functions that we ask of our engineered systems: sensing, locomotion, self protection, and others. Nature’s myriad of designs already exists—for observation, study, and inspiration. Looking to Nature can help SEs in multiple ways, such as by exposing innovative solutions, by leading to new opportunities, by increasing the fit between design and user, and by facilitating integration with our environment.

NSWG Activities are currently structured to increase the INCOSE community’s awareness of this emerging, exciting, and current technical area. We:

- Sponsor monthly webinars by various leaders in the BID (bioinspired design) field—and make presentation materials and recordings for these available on our web sites
- Meet each year at the INCOSE IW—using both on-site and remote participation
- Seek to partner with other INCOSE and industry working groups on topics and issues of mutual interest
- Have weekly team meetings to discuss topics of interest, plans, and progress—with these meetings open to all who wish to participate
- Invite group members to work individually and collectively on areas of particular interest to themselves
- Create and publish products—for example, we are currently working on an article for SEBoK and a Natural Systems for Systems Engineering Primer.

To Find Out More, first review the materials on our web sites listed above. Secondly, read our *Natural Systems Special Feature Section* in the April 2016 *INSIGHT*. Thirdly, use your search engine to follow your own curiosity and interests. Start with terms such as biomimicry, bioinspired design (BID), Janine Benyus (the founder of the Biomimicry Institute), biomimicry applications, or biomimicry successes.

To Get Involved, contact us at nswg-info@incose.org. Get on our email distribution list. Attend some of our webinars; participate in our weekly meetings. Discuss with us your interests, and how you would like to work with us. We are easy to work with! You will learn something, you will have some fun, and you can make a

difference. We invite you to: *Join with us to influence SE processes to routinely consider: “What can we learn from Natural Systems?”*

In Closing: Since INCOSE’s inception 25 years ago, I have worked with and led a wide range of INCOSE working groups. Beginning in 2013, I intentionally chose to focus my current INCOSE support efforts on the NSWG. *This is neat stuff!* As Star Trek’s Mr. Spock would say: “Fascinating!” And most importantly, while we must be cautious about over-enthusiasm and over-promising, the field has extensive near- and long-range potential.

NSWG Leadership

Curt McNamara, P.E., the NSWG Chair, is an educator and practicing systems engineer and designer with 30 years experience in medical, commercial, and industrial markets. He is a Biomimicry Education Fellow. He has published in both engineering and BID areas.



George Studor, the NSWG founder and current Co-chair, is a retired NASA engineer and a consultant for the NASA Engineering and Safety Center. He provides expertise for in-space inspection and monitoring, wireless avionics and robotic spacecraft bio-inspired engineering.



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April 9–10, 2016, Los Angeles, California—Registration is now open! www.rmc16.net

This conference is a collaboration of the Los Angeles, San Francisco, San Diego, and Central and Southern Arizona INCOSE chapters.

Theme: Systems engineering professionals and students exchanging concepts and experiences in a forum to discuss key topics related to the future of systems engineering.

Presentations: Spacecraft, planes, unmanned air vehicles, trains, automobiles, Infrastructures, infrastructures medical systems, and more. **Panel discussions:** Systems Engineering Career Path (Early to Mid-Career), Integration of MBSE Tools, MBSE Lessons Learned, Systems Engineering and Program Management featuring Senior Executives..

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An interview with Paul Mann, on the MRAP Program Turnaround

*Paul Mann, Executive Director,
White Sands Missile Range
Rick Dove, Paradigm Shift International*

Rick Dove: Paul, your December talk to our Chapter, on your turnaround experience with the Mine-Resistant Ambush Protected (MRAP) program, indicated that your success hinged on a culture of unifying internal and external program personnel to a common mission. Unfortunately the time didn't allow you to elaborate on how you pulled this off.

Discordancy appears to be a not-uncommon problem with complex projects involving many tribes. Can you elaborate now on how the cultural change occurred? It might provide ideas for all of us.

Paul Mann: Rick, there were so many contributors, and once we had success (it took a full year) things began to get easier to keep all on the same page. But the following process was used 200 weeks in a row—the first 50 were turbulent and we were fragmented—but the principles took root.

Every Sunday, without fail, I would reflect on everything we had done and progress against the goal. We rapidly went from 5 people to 700 program office personnel during that first year.

As the leader and program manager, I wrote a 2 page essay every Sunday. First, I congratulated all the achievements that were noteworthy and called people out by name. I wanted people to see the results every week that we were making progress. Then, I restated every week what the priorities were, usually 5 to 7, but always framed around the principle to deliver as many survivable trucks as fast as humanly possible. As time rolled on, our priorities

were clearly communicated from production, to integration, to transportation, to fielding. We published a pipeline chart every single day on where all the vehicles were in the pipeline and we didn't feel successful until the numbers fielded grew. Everything else was effort, we were focused on outcomes.

I translated the priorities every week to the near term schedule to get people focused on the priorities with action not just words. Finally, I was transparent every week without fail on publishing real issues and challenges—we were transparent. I did not blame any one, and focused on the issues, not personalities. Ultimately, everyone was on the problem solving team, everyone knew we were candid and receptive to real solutions.

I wrapped these essays in a prologue and epilogue that enabled me to communicate to the humanity of the project. Music, humor, self deprecation, where useful, were included in every essay. This essay went to everyone including the Under Secretary of Defense—possibly 300 or more on distro—everyone came to work Monday knowing what was going on. Additionally, my staff meeting included all 20 division leaders, and we reinforced these essays with conversation and problem solving. People were not used to being so candid on issues, but over time it became our culture to discuss issues, as we valued solving them.

My key leaders throughout MRAP were very hard workers. We probably did 70/80 hour weeks for 4 years because we knew we were saving lives on massive scale. When we finally had success, and it was evident to all the naysayers, the last 3 years everyone in the entire nation

(Industry, Congress, Warfighters) were all helping us. This was not true in the first year.

Staying focused on the principles and leading by example, the dedication and commitment inspired virtually everyone to bring their A game. Because we had more than \$40 B over the nearly 5 years, even industry was inspired to work together. It was a true team of teams.

I enjoyed the benefits of some great Americans helping me; but as the Joint PM, I was in the center, and knew that team work was critical on massive scale, and reminded everyone of it all the time. If you behaved otherwise there were significant consequences until the behavior was corrected.

So I started 30 October 2006 and virtually all 2007. We were a turbulent team trying to fly together. In January 2008 Secretary Gates came to our team and thanked us in a very public way. From my vantage point we were a UNITED team throughout my tour (Dec 2010), and the JPO was celebrated as mission complete 2 years later by the Vice President of the USA.

Telling people what we are doing and why—communication!—is always the great enabler. Persistent and consistent comms from the leader in deeds and words gains credibility. Else, the vacuum forms.

But do not forget the guiding principle of all we did—we had a national imperative to save lives—as many MRAP vehicles, that met the requirement, as fast as possible—it drove everything we did.

If leaders take time to tell their teams what they need to do and why it is important—wowzers—the world opens up.

I continue to write these essays every week in my WSMR role. It works. ∞

An Eye Opener: The Evolution of Small, Smart, Cheap Weapons

Excerpt: T. X. Hammes, CATO Institute

Various technological advances are about to make hundred-drone swarms a reality, and a nightmare for today's top-of-the-line weapons.

Rapid advances [are occurring] in robotics and artificial intelligence, additive manufacturing, nanoexplosives, composite materials, energy-reflecting coatings, and

improved energy densities in gel fuels. These technologies mean that long-range, autonomous, stealthy, precision weapons will soon be cheap and ubiquitous.

Even small numbers of intelligent, mobile IEDs would be a major problem for U.S. forces — yet tech trends indicate we could face tens of thousands of such drones on the battlefield, autonomous weapons

that can attack with precision to destroy vehicles, parked aircraft, fuel, and ammunition stores.

An enemy might choose not to fight the F-35 in the air, but instead send cheap drones to hunt them at their air bases.

Real eye opener video [here](#). Paper [here](#). A call for new defensive technologies and rethinking of complex weapon systems. ∞

Fall 2-Day Socorro Workshop ConOps

Rick Dove, Paradigm Shift International

Objectives: Engaged professional development. Expanded work-relevant network. New knowledge to take home. A stimulating time-out from deadline driven work that leaves little time for thinking.

Intent: Understand the problem and solution spaces of the topic area better—barriers to solution, roots of cultural incompatibilities and push back, systemic inertia, misaligned forces, and solution value propositions, objectives, and requirements.

Day 1: Speed dating. Workshop leaders will provide an intro to their topic of about 1.5 hours each. Participants can attend four intros in the time allowed. During this 1.5 hour intro the leader will provide some background on the topic “issues” of workshop interest, limited to only a few issues for focus; outlining what is beyond best practice knowledge and generally accepted knowledge, and worthy of collaborative discussion. Leaders will also get each participant to provide a brief statement of their personal and organization’s interest and experience in the area, and their interest in the issues to be discussed. The session will conclude with objectives for the 2nd day workshop – which won’t be to solve the issues, but rather to share knowledge and experience that will cross pollinate everybody’s thinking. This will prepare all who remain interested for a more in-depth exploration on day-2, who will likely be contributing to the collaboration as a mission-driven team, and what is held collectively as general perspectives.

Day 2: Two dance dates. Participants will choose the two 3-hour workshops they will participate in, one in the morning and one in the afternoon, which don’t have to be among the four intros they attended on day-1. The objective of day-2 is to develop a team-work environment, expose each participant to the thinking, practices, and knowledge of the others, and provide new contacts that can become longer term collaborative relationships. An equal objective is to have the workshop identify a clearer understanding of the problem, concepts, and knowledge that surfaces in the workshop – which will be briefed out in general session to all event participants.

A final open discussion and participant survey will gather suggestions and comments on the effectiveness and organization of the two days.

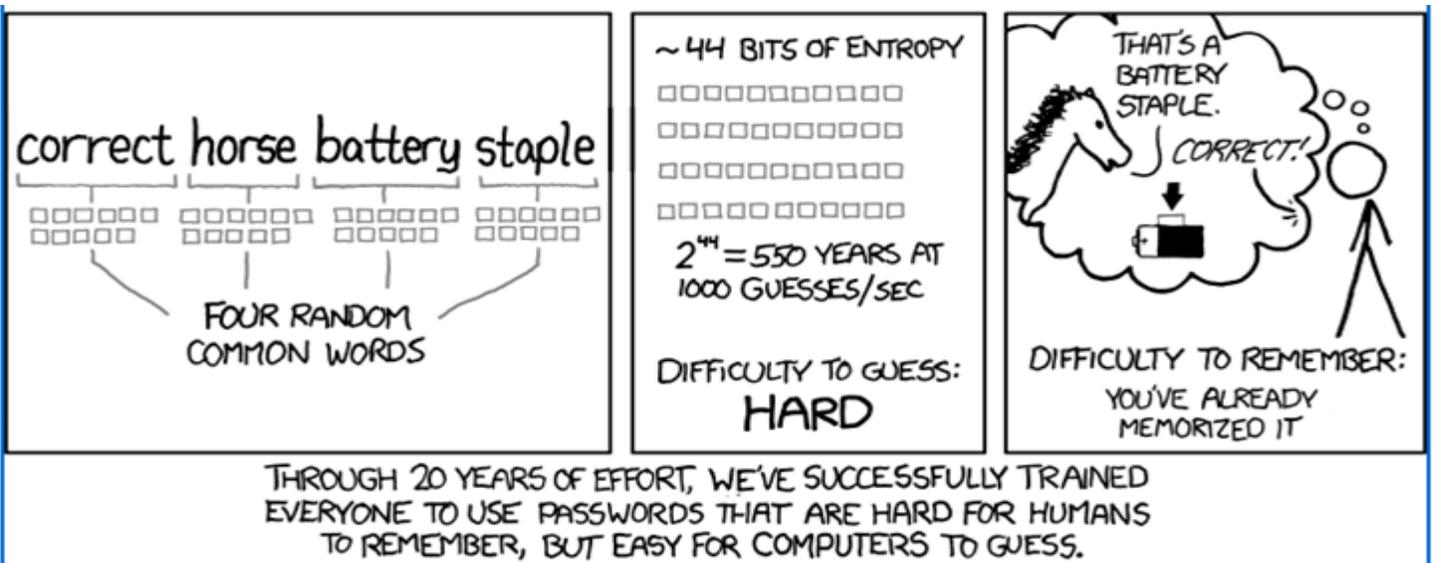
A meet-and-greet reception at end of day-1 will help people socialize with new contacts. On-your-own group dinners after the reception will be facilitated, encouraged to include new contacts and not just who brought you.

It isn’t the expectation to solve issues here, as the issues to be discussed are necessarily open and insufficiently understood; but rather the knowledge and idea base of all participants will be expanded, and exposed in a working environment with other people that may become professional colleagues with similar inquisitive interests. This event is for thinking people that recognize vexing issues worthy of attention, and not expecting quick answers, though some will likely surface for people who get ideas from others that can be immediately applied.

All of this may spawn interest for additional and perhaps longer dedicated workshops, or perhaps even Chapter working groups, but that remains to be seen. Deliberations will surely provide topics of clear interest that can then be scheduled with appropriate speakers at monthly Chapter meetings, maybe even topics for the Chapter’s twice-yearly tutorials.

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For Real: More on this at <https://xkcd.com/936/>. Random word-based password generator at <https://xkpasswd.net/s/>. Efficacy discussion at www.reddit.com/r/technology/comments/1yxgqo/_on_choosing_a_secure_password/.





Resources

From TED, [watch](#) Trial, Error and the God Complex. Economics writer Tim Harford studies complex systems — and finds a surprising link among the successful ones: they were built through trial and error.

In this sparkling talk he asks us to embrace our randomness and start making better mistakes.

www.ted.com/talks/tim_harford#t-1057568

From TED, [watch](#) How frustration can make us more creative. Tim Hartford shows how challenges and problems can derail your creative process ... or they can make you more creative than ever. In the surprising story behind the best-selling solo piano album of all time, Tim Harford may just convince you of the advantages of having to work with a little mess.

www.ted.com/talks/

tim_harford_how_messy_problems_can_inspire_creativity

From TED, [watch](#) Flow, the Secret of Happiness. Mihaly Csikszentmihalyi looks to those who find pleasure and lasting satisfaction in activities that bring about a state of “flow” — a state of heightened focus and immersion in activities such as art, play and work.

He is the architect of the notion of “flow” -- the creative moment when a person is completely involved in an activity for its own sake. www.ted.com/talks/mihaly_csikszentmihalyi_on_flow

From IEEE, [watch](#): Boston Dynamics has just posted an incredible video showcasing a massively upgraded version of the ATLAS robot that they initially developed for the DARPA Robotics Challenge. While BD calls this the “next generation” of ATLAS, it looks like such an enormous technological leap forward that it’s more like a completely different species. <http://spectrum.ieee.org/automaton/robotics/humanoids/next-generation-of-boston-dynamics-atlas-robot>

New Chapter Members

Jeni Turgeon, Sandia National Labs

Enchantment Chapter now has 133 active members and student members. We welcome the following new regular members:

Kimberly Aragon	Los Alamos National Laboratory
Ed Carroll	Sandia National Laboratories
Sue Collins	Sandia National Laboratories
Ben Schaefer	Sandia National Laboratories

We welcome the following new student member:

Patricia De La Rosa Nunez	University of Texas at El Paso
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Connect to Your Community of Practice

Chapter meetings with a focus on systems engineering are held monthly on the second Wednesday, except when social events occur, with mingling, dinner, and often a speaker chosen for enjoyment by systems engineers and guests alike.

Monthly meetings feature speakers from out-of-town as well as local subject matter experts on topics of relevance.

On occasion special facility tours are arranged, sometimes as the monthly meeting, and other times on a separate schedule.

Chapter meetings begin at 4:45 pm.

After chapter news, announcements and introductions, the presentation and discussion lasts until 6:00 pm; and are carried and recorded as a web meeting for anybody to access who can’t attend in person.

Tutorials with coverage on topics of interest are arranged approximately twice a year. Delivered by experts in the field, tutorials range from 1/2 day to day+ durations, and generally involve a tuition.

Mix with people who have the same professional interests as you do, but with a diversity of perspective beyond daily

workmates. It comes in handy when you need help or answers to questions outside your accumulated experience, need a connection at another organization, or simply want some mind stretching thought.

Meeting announcements, event notices, and web-meeting links routinely go to all INCOSE members within the Chapter’s geographic territory; as well as to names on a special *information* list open to one and all. Sign up for the *information* list with a request to the Chapter secretary listed below.

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Chapter Board

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