INCOSE Chesapeake Chapter
International Council on Systems Engineering

E-Newsletter

April 2015

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President's Point of View
Lights, Action, and Video

Mr. George Anderson
INCOSE CC
President george.anderson@incose.org

The Chapter events of last month proceeded as planned with our participation in two Middle/High School Science Fairs and our membership meeting held on March 18, 2015. Both Science Fairs were held on the weekend of 21-22 March. I participated in judging the 60th Baltimore Science Fair on Saturday along with Charles Struchen, CSEP, Thomas Platt, ESEP and Charles Welch, Associate Director. It was hard to choose the winners among the close competition but we ultimately awarded three cash prizes in the High School and two honorable mentions in the Middle School categories. On Sunday, Charles Struchen and I formally presented the three cash prizes ($150, $125 and $100) and two honorable mentions. The show was well supported by both academic and business entities and I was especially impressed with the large turnout of judges from engineering societies, the military services and other DoD organizations such as the Naval Research Laboratory and the National Security Agency. I cannot say enough in describing the importance of our support to these events. Among all the participating engineering societies, I believe that our members have the unique potential to provide a broader range of expertise and mentoring advice to the contestants. Prizes are certainly not the single goal of our

Figure 1. Dignitaries L to R, Mr. Robert Bufano, Dr. David Vanko, Dean Towson U. and Donald Thomas, Former Astronaut and Towson Faculty Member. (Chesapeake Chapter Banner in Background).

In Vol. 6 Issue 3

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

participation. We tried to listen to all the students present their findings and offer positive reinforcement. I hope other Chapter members will feel motivated in future years to be judges. This would allow us to accommodate additional shows that are seeking individuals with solid technical training and experience. If anyone has further interest and wishes to review the Show's program, please click on Baltimore Science Fair.)

Figure 2. Students, Parents & Teachers listen to the announcement of the winning exhibits.

Outreach Associate Director, Don Gantzer was in charge of planning and organizing this year's overall effort, and his 15 previous years experience in supporting many other Science Fairs has made him the undisputed architect of our success. Please join me in thanking him for his service. Don will be reporting to us separately on the Anne Arundel Science Fair, names of the judges and any recommendations that he has for next year's planning.

Mark Walker, ESEP, Past Chapter President and current Vice President of Systems Engineering at BCT-llc, provided an in-depth presentation of the critical points of MBSE at the monthly membership meeting on the 18th. There was enough interest to fill the JHUAPL Building 200 lecture hall with 50 attendees despite our failure to move the meal from Building 1, to the Building 200 cafeteria. For all who were confused, we apologize, and assert that we do learn from these mistakes. An after-action report will provide more detail of Mark's areas of MBSE focus.

Moving into April, we will hear from Programs Director, Glenn Townson, on what programs are in store for the year. These will include the speakers for the monthly meetings, weekend tutorials, and those training classes that rated high in last year's surveys. Because we had so many new members last year, we will survey again and I urge everyone to take a few moments to let us know about your training needs and program preferences. We will also expand the survey to include all subscribers to our newsletter. In depth DoDAF 2.02 and IBM Systems Architect training are discriminators with our DoD customers so we will pick the best of these courses for presentation this summer.

Those of you who are ESEPs will be receiving an invitation from me to a special Chapter Summit to be held on a Saturday morning in May. Chesapeake has always been forward leaning and innovative in our approach to improving the practice of systems engineering and it makes sense that our most experienced members should spend some time together considering the key issues facing us here in MD. We now have 23 ESEP members with the latest being Myra Gross of Oceanriders Inc. Congratulations Myra!

2015 Programs Director, Glenn Townson, 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 Engineering in the local area:

Booz | Allen | Hamilton

The Institute for Systems Research
A. JAMES CLARK SCHOOL OF ENGINEERING

ELIASSEN GROUP
Your Success, Our Talent

serco
Bringing service to life

Camber
Customer Focused, Employee Driven

CyberCore TECHNOLOGIES

APL
JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

I have talked about our video capability before but I need to emphasize again just how vital our movement into routine broadcasting is to our future. Our existing YouTube videos are being accessed and provide a semi-permanent on-demand source of high quality SE content. I was even able to invite the Baltimore Science fair students to check out our Chapter's offerings on YouTube and connect with their worldview.

YouTube, however, is not broadcasting. We want to improve the current streaming of our meetings over the Internet so that we offer real time camera coverage of the proceedings and two-way communication with a growing number of remote participants. The remote participants can be groups assembled as a satellite meeting or individuals logging in from computers, smartphones, or tablets. Bigger audiences can allow us to attract the more sought after speakers.

It is hard to be patient but the facts are that we need more help in Communications to provide expertise and on-site technical support before and during the meetings. I know we have the individuals in the Chapter who would gladly learn this skill but we don't yet know when they are going to show up at a membership meeting and identify themselves. Meanwhile, please take a look at the video programs already available online (at INCOSE-cc on YouTube) and give us some feedback.

George Anderson - INCOSE Chesapeake Chapter President

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Results of Judging at Anne Arundel County Public Schools Science and Engineering Fair

On Saturday, March 21st, Don Gantzer, Sherwood Olson, and Susan Plano-Faber judged at the AACPS S&E Fair, held at South River HS. Over 300 middle and high school students participated on ~250 projects. This is the 3rd year we have participated. In the 3.5 hours of judging, we were able to review ~ 15 projects. We chose to focus on Electrical & Mechanical Engineering and Computer Science [HS only] in that time period.

I believe all of us were impressed with the general enthusiasm, creativity, problem-solving and dedication to learning.

There were, as always, some challenges in the group ranking one over another; however we came to consensus on the following:

1st Prize: The Generation Gap, Josie Danckaert, $150.

2nd Prize: Bamboo Drywall, Quinn Morris, $125.

3rd Prize: Effect of Blade Angle on Energy Output, Brianna Banning, $100.

Honorable mention: Program to Determine Computing Performance, David Kravets

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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Don Gantzer and Sherwood Olson attended the award ceremony on March 25.

We were pleased to see that the students we selected also received other awards.

Some other organizations that participated were AIAA, ASCE, AAC Sierra Club, Anne Arundel Community College, Armed Forces Communications & Electronics Association, Lockheed Martin, Rockwell Collins Information Management Services, USNA, Office of Naval Research, American Geological Society, Association of Women Geoscientists, Defense Spectrum Org, Intel, NOAA, Society of Women Engineers, and the USCG.

We feel this is a very worthwhile activity for our chapter, and that INCOSE members can support this and similar STEM Outreach activities, in the future.

Please contact Don Gantzer, Outreach Lead, 410-956-1562, dongantzer@comcast.net for more details.

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15 April, 2015 (6:00pm - 8:00pm): The Engineering of High Power Amateur Rockets

Michael Mangieri (CSEP), Senior Principal Process Engineer at Business Transformation Institute, Inc

Presentation: This presentation will discuss topics specifically focused on the engineering, design, and production of High-Power amateur rockets. Topics will cover a discussion of various types of rocket designs, from the simple single-stage to clusters and multi-stage; design techniques (tools, simulation software, etc.); motors and propellants; recovery and tracking techniques, and how these concepts change when rockets go super-sonic. Much is learned when things go wrong, so examples of both successes and failures will be presented.

Click here for more details:(www.incose-cc.org)

Go to www.incose-cc.org/registration/ to register

Parsons Auditorium, Bldg 1
Johns Hopkins University Applied Physics Laboratory
11100 Johns Hopkins Road
Laurel, MD

Map and Directions

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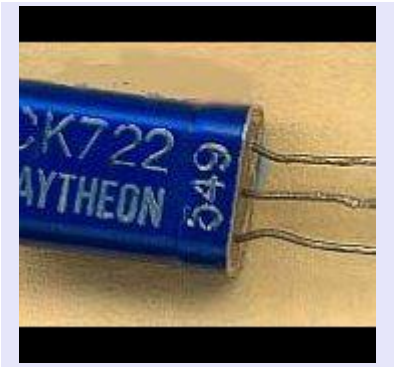
My First Transistor Radio- A Disruptive Techno-Social Experience

by George Anderson



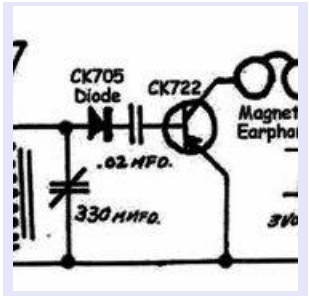
A recent trip to a high school science fair brings back memories of my own efforts to master science as a child working in my basement. There was very little in the way of adult guidance but we learned how to build things from library books and we had no real restraints on utilizing toxic chemicals, ionizing radiation, or dangerously high voltages. My friends would collect items at large and convene on Saturdays to conduct experiments. At the age of ten, I had learned to wield a soldering gun and could connect a circuit using only a schematic diagram.

My most memorable project was a single transistor radio. I used what at the time was one of the first affordable transistors available to the public- the Raytheon CK722, introduced in 1953. What made this project so memorable was the effect that it had on many of the adults that I engaged to “try it out”.

The world worked on vacuum tubes at that time and radios were bulky and power hungry devices that gave off heat and made various extracurricular noises ranging from power line hum to whistling and squealing. Television had just become affordable and those living in fringe areas often saw a picture only dimly through what looked like a snowstorm but was actually the random noise that covers a weak broadcast signal.

My circuit was simple and had no special technical merit. It consisted in today's vernacular of a diode detection stage followed by a single transistor amplifier. The audio signal was output to high impedance headphones and was powered by a single penlight battery. When installed in a small clear plastic box, it did not look like an electronic device. There were only six parts! What it did, however, was amazing. Hooking an alligator clip to a radiator or a window blind made the earphones come alive with a seeming universe of broadcast stations.

The radio performed at a comfortable volume and demanded no appreciable power consumption. My grandfather, an electrical contractor who had serviced radios of the 1920-1940 era, was dumbfounded and spent considerable time studying the circuit. To him that little transistor was a total conundrum and challenged everything he knew about vacuum tube technology. He knew, of course, about crystal sets[1], but they did not provide the performance of the six-component wonder. He did later master the transistor but he often commented to others that my radio had been a disruptive moment for him.



Other adults with less knowledge of radio receivers simply wanted one and after several more years they were able to buy sophisticated transistor radios that were available on a scale of variety and low cost that was unanticipated by the manufacturers of the now obsolescent vacuum tube radios.

My later education included both technologies, and I sometimes worked with the vacuum tubes that lingered in the stereo systems and TV sets through the 1970's. In the 1980's I met the vacuum tube again unexpectedly. I was with a team restoring a 1950's era USAF aircraft at Aberdeen Proving Ground here in MD. As we powered up the electrical system for the first time, everyone was on the interphone system to monitor all compartments of the aircraft for signs of possible short circuits. After the master switch was activated, silence reigned on the intercom for about 30 seconds after which the test leader shouted that something was wrong. I suggested that he wait. Several seconds later, the sounds of a bank of vacuum tubes warming up to their task was heard in everyone's headset. I was one of the few participants who recognized those sounds as validation, that after 20 years of neglect, the tubes and their electrical circuits were ready to serve another tour. And they did.

Today, the unit transistor is almost gone. It has faded and the integrated circuit and its new surface mount derivatives rule supreme. Someone in the oscilloscope repair business said in a brochure published last year that if your device was made after 1997, it could not be serviced economically. What he seems to be saying to me is that there is no longer a market for the skills involved in reading an electrical wiring diagram or using a soldering iron.

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[1] An authentic crystal set used an actual fragment of galena crystal as a detector. A small bronze wire called a cat's whisker was used to probe for sensitive spots on the crystal's surface that would activate its function as a radio frequency detector. The opportunity to experience the thrill and satisfaction of manually operating a crystal radio is sadly absent from most of today's school science experiments. See the real thing!)

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Let Services Serve!

by Zane Scott

We hear a lot today about services. There are service oriented architectures (SOA's), software as services (SAS) and services in the cloud. In our day of scarce resources and increasing performance demands on enterprises we are seeking the economies and leverage of scale. We know that we must provide services in the most efficient and effective ways possible. But along the road to establishing service delivery systems we have a tendency to miss a crucial aspect of the design.

The dictionary says that a service is, "an act of helpful activity." In order to be a "service" something must be helpful. In the world of systems engineering the concept of "helpful" means "meets requirements." When we design service delivery systems we are prone to exercise less than due diligence in capturing and analyzing those requirements.

Often we conclude quickly that the requirements are to provide the existing services more efficiently by offering the software tools in current use through the new delivery system. We then do an inventory and compile a listing of services to include in the new system. Sometimes we extend this by doing an independent "evaluation" of the tools and "standardizing" what will be offered to the enterprise. Instead of, for example, offering all three or four spreadsheet applications currently used across the business we select the "best of breed" to offer all spreadsheet consumers.

The problem is that we are omitting a key underlying step and that omission will cost us in terms of effectiveness and acceptance. This means that the implementation of our new system will be hamstrung by resistance to change and unmet user needs. So what is the missing step?

We must get an understanding of the requirements for services from the service consumer perspective. It is not enough to provide the existing services in a new way. We must take advantage of the opportunity to assess the consumers' processes in light of the need for tools to leverage their effectiveness and efficiency. (Since we are repeatedly using these two terms "effective" and "efficient" we should say that by effective we mean doing the right things and by efficient we mean doing things right.)

We must get a picture of the enterprise processes that are to be served by the new system that will tell us the nature of their needs for services. The first step in painting that picture is clearly defining what processes are included among the project customers. This is the classic systems boundary question. Stated like this it may seem obvious but it is left blurry or undone with an amazing frequency.

Once we know the processes we will serve we need to map them so that their service requirements emerge. When we understand their steps and performance requirements we will have a clear picture of what it takes to meet their service

needs. By aggregating these needs we can compile the requirements for our service delivery system.

We may discover along the way that the enterprise uses three different flavors of a particular application (spreadsheets, for example). Without the requirements gathering process of understanding the business process needs we might be tempted to look at the three applications, do a market survey and conclude that a fourth application is superior to any of the three. But with the detailed information about the process needs we could see potential problems that might result from such a substitution. The new app might replace two of the three quite well and be adopted seamlessly by their users.

The third existing spreadsheet might be offering its users something not possible in the other two or in the replacement (e.g.- an export file format that they need to interact with their customers). Without an understanding of the processes of this user we may well have missed this important nuance in our spreadsheet "bake-off." Despite its technical superiority the new spreadsheet won't meet their needs and will cause them to experience problems with their customers and/or go " off standard" to meet their needs. Both consequences will degrade the gains in efficiency and effectiveness that we are seeking. They need this missing functionality to perform.

But with the missing step (modeling the processes to be served) restored to the requirements gathering process we can have a service delivery system design tightly tied to the consumers' needs. At this point we can offer them services that truly serve!

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Upcoming Events and Announcements

- **April 15, 2015:** Dinner Lecture - The Engineering of Large-Scale Amateur Rockets; Michael Mangieri
- **April 24, 2015:** "Women in Systems Engineering (WISE) April Meeting"
- **May 20, 2015:** Dinner Lecture - 3D Printing; John Slotwinski
- Interested in Jobs Networking? Contact Mark Kaczmarek at mkaczmarekengr@comcast.net

Keep up with the latest news and events. Find out about our new Board of Directors. Explore our extensive library of previous lectures from our Monthly Dinner Meetings. Learn of the Benefits of Joining INCOSE. Check out Systems Engineering education in the local area. All this and more awaits you at our INCOSE Chesapeake Chapter Website.

For any comments or suggestions about this newsletter please e-mail our President, George Anderson or our Communications Director, Pat Williams. We value your feedback.

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