

The Integrator

INCOSE North Star Chapter



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North Star Newsletter

INCOSE North Star Newsletter Communication

Eileen Arnold, Editor

BAE Systems: PMP and ESEP-Acq

Eileen.Arnold@INCOSE.org

Quotable Quotes:

The most important thing is to keep the most important thing the most important thing. - From the book "Foundation design", by Coduto, Donald P.

Systems Engineering at its Best!

The Nuts, Bolts and Duct Tape of Establishing a System Engineering Measurement Program

While Software Engineering has a long history of conducting a measurement program, System Engineering (SE) is still in its infancy, in relative terms, in providing comparable measurement program guidance. General Dynamics Advanced Information Systems used the following principals to establish their SE metrics program.

Initial Measures Established - Utilizing the guidance from our Integrated Process and Quality (IPQ) organization, the requirements of our common process, and the data gleaned from our research, we established and deployed our measurement program.

Measurement Analyst Team - Creation of the Measurement Analyst Team (MAT) was a fundamental contributor to our success. The MAT is a cross-departmental group with representatives from Program Management, Software, Hardware, Engineering Support Services, Configuration Management, and Systems Engineering.

Templates and Automation - We supported our initial implementation with an MS Excel™ template that was color coded and tabbed. It ensured consistency between program and supported data collection. We added additional measures, improved base measures, and established control limits. We also added macros

Chapter President's Corner

**Paul Frenz, General Dynamics-AIS
INCOSE North Star Chapter 2011 President**

Both September's and October's chapter meetings were well attended covering John Thomas' "Wanted: Systems Engineers with Moxie!" and Sarah Sheard's "Systems Engineering and Complexity". Both sessions were thought provoking and generated lots of questions and discussion. Our Fall Tutorial: "Systems Engineering and Complexity" taught by Sarah Sheard, was an enjoyable and educational success. We received positive feedback from those whom attended.

I, and other North Star members, attended "The Works" Preview Open House at their new location in Bloomington. If you are unfamiliar with The Works, it is a Hands on, mind on Museum about engineering, science and technology interesting, understandable and fun. They have moved to a large location and will be opening November 12th. I have taken my own children several times to The Works and each time they have enjoyed the learning experience. Details: <http://www.theworks.org/>

* Save the Date: Saturday December 3rd our holiday party has been finalized with a dinner at Santorini's, 13000 Technology Drive, Eden Prairie. We held the party there last year and had such a good time that we decided to return. Remember that the holiday party is open the significant others and your guests. paul.frenz@gd-ais.com

INCOSE 2011 Symposium website:
<https://www.incose.org/symp2011/>

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

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to streamline data collection as well as support charting and review. We incorporated program management feedback, ensuring that program leads have the data they need to manage execution. The template is a robust and essential component of our program.

Quality and Measurement Usage - Each month the program measurement analyst submits their program measures to their department measurement analyst. The department measurement analyst reviews the data for completeness, measurement usage, special cause variation explanations and corrective actions. The individual program measures are rolled up into department measures by the department measurement analyst to identify departmental trends and to support the analysis necessary to establish program control limits

Control Limits - Initial control (goals) were either a percentage variance from plan or expert judgment. After many months of data collection and analysis, we had sufficient data to establish organizational control limits.

Process Improvements - A fundamental principle followed was to focus on core development processes to minimize rework.

Measurement Program Goals - Our goals or guiding principles include:

1. Measure collection should be uncomplicated - preferably automated.
2. Measures are justified – we can articulate why a measure should be collected and how it should be used before requiring it.
3. We use a standard time period - everything is based on a calendar month
4. Although we permit tailoring it is discouraged
5. We stress avoiding frequent replans and focus on using measures to return to the planned baseline. We use consistent criteria and an approval process when a measurement baseline is replanned.

System Engineering Measures

Using these principles, we selected the following System Engineering measures:

1. Productivity Measure – Requirements per Hour
2. Inch-stone Schedule Performance
3. Requirements Volatility
4. Requirement Volatility Impact
5. Problem Report Status Aging
6. Effort Expended to Planned Effort
7. Peer Review Scheduled to Plan
8. Peer Review Execution and Results
9. Requirements Defect Density

Guidance for Implementing Your Own Measurement Program - Critical to Success:

- Strong measurement champion
- Strong management support
- Start small – limit your base measures to less than 7 – you can always add later
- Provide clear definitions for base measures to avoid variation
- Measure at a high enough level to identify issues for further analysis without burdening all programs with excessive data collection
- Minimize collection effort through the use of tools and automation
- Continuously educate the program measure analyst
- Follow-up information exchanges to get program measurement analyst feedback
- Be willing to change as you learn
- Take advantage of educational opportunities – including other experiences
- Use good measurement tools
- Remember the advice of W. Edward Deming: “In God we trust, all others bring data.”
- Always be alert for new ways to view the data

Pitfalls:

- Measures that have little value to the program
- Not being able to explain how to use the data
- Trying to collect too many base measures
- Poorly defined, ambiguous base measures
- Not creating a change in culture where managing with measures is the norm

Summary

The development and sustainment of a measurement program requires top down support. There must be a champion to continually sell the benefits of a measurement program to new executives, senior managers, program managers, and program measurement analysts.

The measures need to be overwhelmingly geared to assisting the program in its day-to-day execution. Our measurement program has assisted our organization in dramatically improving the execution of our development programs by quantitatively managing key processes and focusing attention on critical tasks to guide our leads through the development process.

paul.frenz@gd-ais.com

It's amazing what volunteers are able to accomplish, driven by the passion for Systems Engineering!

WELCOME, NORTH STAR NEW MEMBERS!