



The Society of Cost Estimating and Analysis

# The Dayton Coster Greater Dayton Chapter

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## 2004 - 2005 DAYTON CHAPTER

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## *President's Message: Janet Marshall*



It is hard to believe that the new chapter year is here already! I am truly looking forward to serving you as President of the Dayton Chapter of SCEA! This year's dynamic SCEA Board is ready to take on the challenge of not only meeting, but exceeding the goal, of strengthening the cost community profession.

Recently, the Board met to lay out goals for this chapter year. The four goals are broad, but touch upon each area I would like to see the Dayton SCEA chapter grow in over the next year.

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## *Upcoming Chapter Events*

**Monte Carlo Night ..... October**

**SCEA CCE/A Review Sessions ..... 9 September—4 November**

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## *President's Message (continued)*

Our first goal is **Professional Development**. We want to “hit the mark” by providing information that will be useful to you, as you continue to develop and improve your cost estimating and analysis skills. The Dayton chapter will focus on hosting educational seminars, SCEA certification reviews, and some fun networking get togethers. We are dedicated to providing value-added events to help you grow personally and professionally.

The second goal is **Nurturing Our Current Membership**. We are committed to providing our members a worthwhile service. We also want to ensure our members get recognized for the great work they do for the profession through participation in SCEA Awards programs, and informal recognition during local SCEA events.

Our third goal is **Chapter Growth**. In order to make sure the Dayton SCEA chapter is vibrant and dynamic, I would like to increase SCEA membership in the local area. This year we want to reach out and capture members not only from financial management, but from other career fields. By partnering with our counterparts in Engineering and Contract Pricing, we can examine topics of mutual interest that will improve the quality of the estimates we produce. The larger the variety of topics, the broader our knowledge base becomes.

The last chapter goal is **Improving Communication**. We are reviving the newsletter and website so we can help you keep in touch with current happenings. We are also going to have a diversity of events to share ideas and lessons learned.

My hope is that through a collaborative effort between the SCEA Board and all of you, we can excel in delivering meaningful information throughout this year. I encourage all of you to take a moment and email your suggestions and comments to [Amy.Balsamo@wpafb.af.mil](mailto:Amy.Balsamo@wpafb.af.mil). Together we can make a difference!

## *Spotlight: Kerrie Schieman, Regional VP*



Let me introduce myself – I’m Kerrie Schieman, your SCEA Region IV Vice President. Many of you might not realize it, but I and your Dayton Chapter President represent you at the National level. I have been serving as the Regional Vice President for the last few years and have been a local member since 1993. I have seen a lot of changes over the years both locally and nationally. Honestly, I never knew there was a Regional Vice President until three years ago when I was asked to fill the position for Region IV. Since becoming a VP, I have had learned more about our organization and how it operates. Recently, Janet Marshall asked me to share with you the role of the VP and a few current National happenings.

First, what does a Regional Vice President do for our region? As a voting member of the National board, I vote on many different issues that can affect our Region Chapters. These are brought up at the National Meeting and can include changes to our bylaws, procedures, spending money, national conventions, and so forth. I am also a liaison for the local chapters within my region - to vocalize any issues they feel National should address. In addition, I look for areas within the region to start new memberships; currently I have been working within the St. Louis area to re-start their chapter. Finally, I work on special projects for the national board...these can range from Awards Committee to assisting on the selection of the National Meeting Site.

From a national perspective, I attend and participate in National SCEA Board meetings, which happen three times a year (Fall, Winter, and Summer). The meetings are held on a Saturday and last all day. Discussions focus on

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## *Spotlight (continued)*

operational issues, special projects, national convention, certification, and local and regional updates. For example, one project you may be aware of is the development of CostPROF. If you haven't seen CostPROF, it is a CD-ROM of cost estimating training that can help you with a variety of cost estimating techniques (including learning curve analysis, rate development, data normalization....). This effort was led by Mr. Frank Flett (Past SCEA President) and has provided our cost estimating society with a training tool and a primer for the Certification test. This past year was also ground-breaking for the society when it added an international presence, including 7 new members from Moscow Russia (they are attempting to begin a new chapter). In addition, at the June Board Meeting, the United Kingdom presented a proposition for an "international certification". Currently the UK has about 200 cost estimators working for the Ministry of Defense. My current SCEA workload includes working on the UK certification, establishment of a new chapter within Region IV, and supporting the local chapter where required.

At the June Board Meeting, I relayed my excitement for the Dayton Chapter, that we have elected some very energetic and committed board members. A professional organization's success is highly dependent on the board you elect and your participation in the society. It takes personal time and energy to re-vitalize an organization and we are experiencing this with our newly elected board of directors. Please support them by volunteering and participating in the SCEA events, you will be amazed by what this organization can do for you.

Bio: Kerrie Schieman has been an active member of SCEA since 1993 and serves as the Region IV Vice President. She currently works as a cost estimator in the Joint-Unmanned Combat Air Systems Program Office. She has been associated with the base for the last 18 years first as an Air Force Officer and now as a contractor employed by Management Consulting Research (MCR).

## AREA UPDATES

### HQ AFMC Cost Chiefs Meeting

By  
**Linda Turner**

The HQ AFMC Cost Studies & Analysis Branch hosted Cost Chiefs Meeting at Wright-Patterson AFB on 21-22 July. The purpose of the meeting was to bring Air Force Material Command and Air Force Space Command Cost Chiefs up to date on SAF/FM Transformation Activities, and to discuss current topics in Cost Estimating and Analysis within the Air Force. 15 Cost Estimating professionals joined the AFMC Cost Staff for the two-day meeting.

Mr. Jay Jordan, the Air Force Cost Analysis Agency Technical Director, gave a very informative overview of current issues in Cost Estimating. Air Force Senior Leaders desire and value objective cost estimates as inputs to their decision-making process. The appetite for these analyses, however, exceeds the Air Force Financial Management community's ability to provide every analysis desired to support the Air Force Corporate decision-making process. Given that the appetite for cost analysis currently outstrips FM's ability to satisfy the demand, SAF/FMC has established the following strategic priorities for the cost analysis community: Get Involved; Be Relevant; Collect Data; Standardize Processes; Improve Staffing; Build Credibility; Promote Accountability; Communicate; Transform. Each strategic objective has supporting goals that the AFCAA, in conjunction with field organizations, is working to complete.

SAF/FMC and the AFCAA are participating in and following with interest the progress of the many teams that have been established within the past two years, to improve the Cost Estimating Process, identify barriers, standardize processes, and improve cost skills and training. A brief overview of the many Cost Transformation Teams is provided below.

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## HQ AFMC Cost Chiefs Meeting (continued)

**1. Service Delivery Model** – SAF/FM is looking at all aspects of Financial Management, to determine if there is a better way to deliver services to the customers of financial information.

- For Cost Estimating, the current Acquisition Estimating service delivery model is to have estimators embedded in system program offices, with a pool of additional estimators assigned to the Center Cost Staff to formulate policy, offer assistance, and lead/augment teams when possible. This model does not work equally well in all locations, due to the fact that the required numbers of experienced estimators are not always available. Future service delivery model discussions were deferred since the Acquisition Decision Support Phase I team has made recommendations in this area.

- For Center Level cost analysis, the team recognized a need for cost analysis in developing and justifying budget submissions, in articulating the impacts on potential program cuts & offering Commanders viable alternatives, and in exercising the Economic Analysis Process in support of Military Construction and Capital Purchases. The current service delivery model is to have analysts capable of providing these skills assigned to the Wing level. Recommendations to improve cost services provided to an Air Base Wing center on expanding analytical education and training opportunities for the resource advisors.

**2. Acquisition Decision Support Phase I (Cost Estimating Process)** – This team looked at ways to improve cost analysis, and to provide increased decision support to Air Force Leadership. The team discussed & streamlined a recommended standard AF Cost Estimating Process for Acquisition. The team formulated two sets of recommendations; one constrained within today's current budget and manpower environment, the other unconstrained. **Constrained recommendations:** Implement re-designed estimating process across the Air Force; Update Cost Reference Volumes; Fund estimating site licenses across the Air Force; Endorse & use of legacy database of cost estimates to enhance information sharing; Institutionalize regular cost communication forums; and commission a study to review spaces & qualifications of FM resources, to determine optimal mix of cost vs. budget vs. financial services. **Unconstrained recommendations:** Establish cost policy with 'teeth' (require AF to budget to AFCAIG approved estimate); Increase numbers of government cost estimators to regain critical mass; Modify grade structure to be in line with other cost analytical organizations (increase); Support Change in FM reporting requirements – costers report to FM leaders, not program office leadership; Increase funding for cost data; alter military cost career field

**3. Acquisition Decision Support Phase II** – This team is investigating improvements to the budget process (Reprogramming, Funds Distribution). They are also discussing the best way to implement some of the Cost recommendations from the Phase I team, along with ways to increase Cost participation in the PPBE process.

**4. Re-Engineer Analytical Education & Training** – This team is performing an AF Cost Analysis skills assessment, to determine the current state of the FM workforce's analytical skills across the Air Force. The goals are to improve computer & communications skills, cost modeling skills, governance interpretation skills, and estimating skills. Once skills gaps have been briefed to Senior AF leadership, the team will recommend ways to make improvements. Available training will be assessed, and recommendations to fill the shortfalls will be made.

**5. Expand Cost Management Methods** – This team was formed to provide a framework for Air Force cost management. It is also examining options for the AF to expand cost management methods. The recommend course of action is to follow efforts of multi-service and industry organization (CAM-I) which is already investigating this work. The team is also contacting DEAMS program office for information on the cost accounting capabilities the system will have when fielded.

**6. Attrition Based Planning/Common Process IPT** – This effort was aimed at improving the credibility of AF Acquisition Planning; institutionalizing processes that are currently ad-hoc; and identifying common processes that are easier to manage/improve/institutionalize. The team's objectives were: recommend best planning practices that will support realistic expectations; develop appropriate guidance documents for each best practice; recommend approach to institutionalize best practice; identify resource and organization impacts; identify metrics to measure

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## HQ AFMC Cost Chiefs Meeting (continued)

resulting change. The team will report final recommendations 20 Oct 04.

**7. Government Most Probably Cost (Source Selection):** The team's purpose was to improve the Air Force's ability to develop an objective and accurate estimate to select the best contractor proposal in a Source Selection environment, arrest cost growth, and establish the credibility and reliability of our programs to withstand in external and external scrutiny. Team Goals: Give bidders incentives to provide more realistic proposals; improve the GMPC estimate; develop policies and processes to establish and sustain realistic budgets. **Summary of requirements:** Need incentive for realistic bid, through evaluation criteria that focus on proposal realism; Data for GMPC through better AF support to the CCDR program & additional funded data collection initiatives; Policy for GMPC content/process/objective budget inputs; Objectivity through FM led GMPC, review of budget & input into corporate board deliberations & independent technical assessments; Resources to produce credible GMPC.

**8. Contracted Logistics Support IPT** – Team's objective is to improve insight into expenditures on CLS, and to improve ability for the AF Corporate Board to make budget trade-off decisions. Currently, many large CLS requirements are presented as must-pay bills to the AF each year, limiting the size of the AF budget decision-space. Team focus is to leverage existing information to provide added insight, and to recommend ways to improve visibility into CLS efforts in the future.

**9. O&S IPT** – This team was established to improve the quality of Operations & Support estimates for acquisition and sustainment programs.

**Summary:** Multiple teams have studied the Cost Estimating process, and have come to similar conclusions. There is a great desire for 1) additional experienced cost estimators, 2) improved objectivity in the estimates (to include cost, schedule and technical risk assessments), 3) a link between the objective estimate and the budget process, 4) access to better estimating data, 5) consistent funding for/access to estimating tools, and 6) metrics to measure cost estimating performance over time.

Other topics discussed during the two-day meeting included a demonstration of the Enterprise Knowledge Management Life Cycle Cost Estimating Process tool, an update on the Air Force Knowledge Now Cost Estimating Community of Practice, and discussion of the estimating tools for which HQ AFMC/FM funds Command-Wide Site Licenses. Any estimator within AFMC currently can access the following estimating tools: PRICE, SEER, ICE and ACE-IT.

Copies of the briefings presented during the two-day meeting have been uploaded to the AFMC/FMPC page on the AFMC Web Site, <https://www.afmc-mil.wpafb.af.mil/HQ-AFMC/FM/fmp/fmpc/index.htm>. If you would like additional information, please contact Linda Turner at [Linda.Turner@wpafb.af.mil](mailto:Linda.Turner@wpafb.af.mil).

### SCEA Certified Cost Estimator/Analyst Professional Certification Program

By  
Steve Malashevitz

The professional Certified Cost Estimator/Analyst (CCE/A) program is conducted by the Society of Cost Estimating and Analysis for both members and nonmembers. It provides professional recognition to those applicants possessing the requisite education and/or job experience and successfully demonstrating their knowledge and skills through a written examination.

The examination consists of two parts. The first part, or **core**, consists of 100 questions and tests general knowledge of cost estimating and analysis. Its questions cover five areas, allocated (roughly) as follows: mathematics and statistics, 25%; contracting, 10%; cost estimating and analysis, 50%; cost accounting, 10%; and general

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## SCEA Certified Cost Estimator/Analyst Professional Certification Program (continued)

management and communications techniques, 5%. To pass, each applicant must answer 70 questions correctly. The cost estimating and analysis area covers such topics as: types of estimates, hardware and software estimating and analysis, manufacturing standards, and learning curve analysis.

Each examinee must also complete a test of **practical knowledge** of cost estimating and analysis for the 50 questions which make up the second part of the examination. Many of the questions in part two require generating appropriate prices of representative manufacturing operations, in view of data given; and solving quantitative problems, such as determining trends from data, evaluating mathematical expectation from given distribution functions, and projecting manufacturing costs with learning curves. To pass, each applicant must answer 35 questions correctly.

The exam is offered annually at the National SCEA Conference in June, by the Dayton chapter in November, and in partnership with the Air Force Institute of Technology in the Spring. Applications for the exam should be submitted to SCEA 30 days prior to the exam date.

This fall's **CCE/A Exam offering in Dayton, Ohio is planned for Wednesday, 10 November, 2004**. The testing will take place at the Defense Acquisition University facility in Kettering, Ohio. To be eligible to sit for this exam offering, you must submit your SCEA CCE/A Application to Linda Turner, AFMC/FMPC, no later than 30 September 2004.

Reviews of the bodies of knowledge that the exam encompasses are offered both locally and at the National Conference. Educational materials are also available in CD-ROM as a set of 16 interactive modules known as CostPROF which can be purchased from the Society.

The fee for the examination is \$85 for members and for military and government nonmembers; and \$135.00 for other non-members.

Air Force Civilian employees may apply for reimbursement of exam expenses (the \$85 examination fee), provided they do the following:

1. Complete the Certification Reimbursement Form and have their supervisor sign it.
2. Forward to SAF/FMPW, for approval
3. Take the exam and pass
4. Complete an SF 1164 requesting reimbursement, and forward that (with supervisor's signature) and a copy of the certificate, back to SAF/FMPW.

Additional information on reimbursement is available either at <http://www.daytonscea.org/> or by contacting Linda Turner at [Linda.Turner@wpafb.af.mil](mailto:Linda.Turner@wpafb.af.mil). Other participants should check with their organizations for any reimbursement benefits. For more information on the certification program or the examination you can refer to the Dayton SCEA website or the National SCEA website at <http://www.sceaonline.net/>.

## SCEA Certified Cost Estimator/Analyst Review Sessions Available

By  
Linda Turner

The Greater Dayton Chapter of the Society of Cost Estimators and Analysis (SCEA) is hosting a review session this fall, to prepare individuals to sit for the Certified Cost Estimator/Analyst exam.

The professional Certified Cost Estimator/Analyst (CCE/A) program is conducted by the Society of Cost Estimating and Analysis for both members and nonmembers. It provides professional recognition to those applicants possessing the requisite education and/or job experience and successfully demonstrating their knowledge and skills through a written examination.

If you would like to prepare for the exam in a group setting, then the upcoming seminars are for you. Review sessions are planned weekly, from 9 September through 4 November. During the course of these 9 sessions, members of the study seminar will take turns leading the group through the information contained in the CostPROF study guide. The Greater Dayton SCEA chapter has purchased a copy of the materials for seminar use, eliminating the need to purchase your own copy. Two of the 16 CostPROF modules will be covered each week, with the last week used as a review session.

Even though the sessions have already begun, you are welcome to join in. If you would like to participate in the review session, please contact Linda Turner, HQ AFMC/FMPC, at [Linda.Turner@wpafb.af.mil](mailto:Linda.Turner@wpafb.af.mil). Review sessions are held Thursday afternoons (with the exception of substituting 28 September for the 30<sup>th</sup>), 1530-1700, in the HQ AFMC/FMP Conference Room (Building 262, between Posts 212 and 215 B).

Registrations for the 10 November testing opportunity must be submitted to Linda Turner no later than 30 September 2004. Each certification application must be accompanied by payment (check made payable to SCEA). For the location, please select 'Other', and write Dayton, Ohio, 10 Nov 2004.

## LESSONS LEARNED/BEST PRACTICES

### X, My Search for Significance (Developing Cost Estimating Relationships)

By  
Steve Malashevitz

Hello, my name is turbine inlet temperature, but you can call me X. I'm an independent variable by trade, and this is the story of my search for significance.

#### What makes it tick?

I haven't always been an independent variable. When I first started out I was just one of the many characteristics of a jet engine. Then one day a cost and price analyst happened along apparently trying to understand why the cost varied from one jet engine to the next. He began by sitting down with one of the engineers and tried to get an understanding of how a jet engine worked. After that they discussed the different factors that effect or drive the cost of a jet engine. These factors can describe things like the size, performance, or technology of an item. I suppose that if you were interested in trends in wage rates, prices, or something else over time, you could even use

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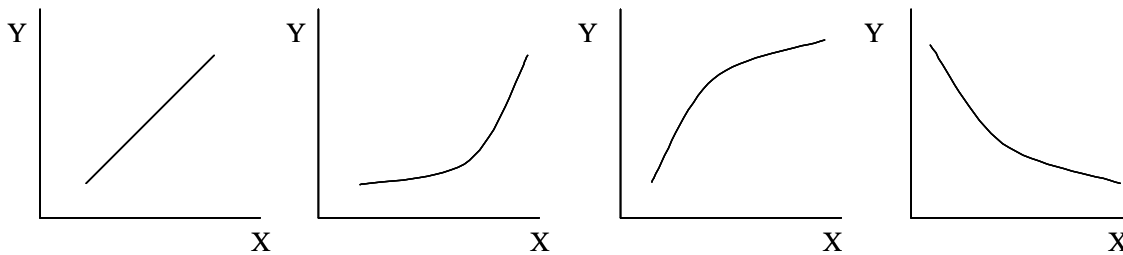
## X, My Search for Significance (Developing Cost Estimating Relationships) (continued)

time as an independent variable. The analyst made a list of the various factors like weight, thrust, by-pass ratios, and other characteristics like myself because he wanted to develop a parametric or regression model. It seems that the reason the analysts call it “parametric” estimating is that they are trying to explain why the cost varies from one engine to the next by associating the changes in cost with the changes in the engine characteristics or “parameters”. I’m told that cost is considered the “dependent” or “Y” variable, and that a dependent variable can be cost, price, hours, pounds, or anything else you want to predict.

Apparently not just anybody can become an independent variable; we had to pass several tests. The analyst didn’t want to waste time and money by investigating and collecting data on all the engine characteristics, just the major drivers. He also wanted only “significant” variables. As it turned out, because the by-pass ratios were about the same for all the engines they looked at, the by-pass ratio was not considered to be significant since it didn’t vary with the cost. He also seemed particular about knowing with some confidence what the value of the independent variable would be for any engine he needed to estimate. He said, for example, that with software estimating one of the parameters they like to use is size, measured in lines of code or function points. The only problem is that before they can use size to estimate cost, they have to figure some way of estimating the size. The more uncertainty associated with the independent variable, the more uncertainty in being able to predict the value of the dependent variable. And, it goes without saying that an independent variable is no good to you if you can’t get the data on it, so some upfront planning is necessary to come up with a reasonable data collection plan.

### What’s my line?

The next step, for those of us that made the first cut, was to determine in a general sense how we related to cost. Did we make the cost increase or decrease? What “specification” or “function” would best suit us? The analyst said that a function could be linear, curvilinear, or even nonlinear in nature like some of the examples below.



He said that starting out with the right function was important when working with small data sets because one or two data points could easily lead you to the wrong conclusion, so you had better know what you were expecting to see.

### In God We Trust (all others must bring data)

They also seemed pretty concerned about how many “analogous” data points or other engines they would be able to find cost and technical data on. The larger the sample of data you have the more the sample looks like the population that it came from and therefore the more confident you would be in any inferences or statements that you would make. Sure, you can run regression on two or three data points, but how much confidence would you have? According to the analyst, when you have a simple regression equation with one independent variable you will lose two “degrees of freedom” because you have estimated the Y-intercept and the slope of the independent variable. So

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## X, My Search for Significance (Developing Cost Estimating Relationships) (continued)

if you have two data points, you have zero degrees of freedom left, with three data points you would have one degree of freedom, and so on. Just like the sample size, the more degrees of freedom the more confident you are in your equation. With each additional independent variable in the equation you lose another degree of freedom. Some analysts suggest that in an ideal situation you should have six to ten degrees of freedom for each independent variable in the equation. Now while that may be desirable, often times we find ourselves with a limited amount of data and have to be a little more realistic. Perhaps a more reasonable rule of thumb would be to count the data points, subtract a degree of freedom for the intercept and one more for each independent variable in the equation, and try to leave yourself with three to five degrees of freedom. You can see how this would affect the number of data points you need to collect and the number of independent variables you could have in an equation. If you only have a few data points you might be better off to find the best one-variable equation rather than using several independent variables together.

Sometimes, good data is hard to come by because it may be: proprietary; collected in a different format; defined differently; not collected at all. Data can also be difficult to compare because things like costs, prices, labor hours, and technology change over time. These things can result in smaller sets of analogous data points. One piece of advice that the analyst offered was to not overly constrain the term “analogous”. For instance, you want to determine a reasonable price for a piece of fire fighting equipment on a ship. It might be analogous to equipment used at airports, fire departments, and in industrial settings. Another way that analysts can constrain themselves is to look at something like the F-117 stealth aircraft and say, “There’s nothing else like it”. Well, maybe there’s nothing like the aircraft as a whole, but there may be a number of aircraft using the same landing gear, avionics, engines, and material coatings. The same is true with services. Maybe you don’t know what a fair price is for overhauling a truck, but you can find prices for the individual tasks involved in performing an overhaul. Breaking an item or a task down into lower level components is one way of increasing the number of possible analogous data points.

Remember, any regression equation is only as good as the data that was used to create it. It’s a lot like painting a room; most of the time is spent in preparation, and if you skip the spackling they won’t care how well you rolled the paint on.

### 85.23567% of all estimates claim a false level of precision

Now, after collecting data on a number of engines, the analyst was going to test myself and some of the other independent variables statistically, using a spreadsheet like Excel or one of the many statistical packages available, to see how well we could explain why the cost varied on jet engines.

One of the tests was to determine how much of the variation in the engine cost I could explain. This was called the  $R^2$  or coefficient of determination, and it is a measure of the *strength* of the relationship between the dependent variable and myself. I was rated on a scale from 0% to 100%. Scoring 0% would have meant that I had nothing to offer, where as scoring 100% would have meant that there wasn’t anything about the change in engine cost that I couldn’t tell you. The analyst offered two cautions, one, if it sounds too good to be true it probably is; check sample sizes and both the data that was included as well as the data that was not included. Second, the  $R^2$  only represents correlation, not causation; don’t go on a fishing trip to find correlated variables, start out with variables that you believe are causal, and then see if there is correlation. Another thing I found out was that as more independent variables are added to the equation the  $R^2$  can only get better, not worse. I was just about to invite some

<sup>1</sup>Applied Linear Regression Models, Neter, Wasserman, & Kutner, 1989.

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## X, My Search for Significance (Developing Cost Estimating Relationships) (continued)

of my friends to join me in the equation so that we could really max-out the  $R^2$  when the analyst warned me about the adjusted  $R^2$ . He said that in equations with more than one independent variable he used the adjusted  $R^2$  because it accounted for the loss of the additional degrees of freedom associated with including additional independent variables. Apparently the adjusted  $R^2$  can actually decrease if an independent variable is included that explains little of the variation.

Another test that was run on me was the T test, a measure of the *significance* of the relationship between the dependent variable and myself. The analyst was concerned that factors such as sample size and sampling error could create a false impression of my worth. He assumed that I was not related to engine cost and that it would be up to me to prove otherwise. If I was not significantly related to cost I would have a slope of zero or thereabouts. The larger the slope value, relatively speaking, the more confidence the analyst would have in using me. The T statistic represents the number of standard deviations my slope is from zero, the higher the better. Most applications report a “P” value, which is the probability of my slope being zero. If the P value is .01 then there is only a 1% probability that my slope is zero. Roughly translated, the other 99% is the confidence that you can have in using me. Analysts usually have a pass/fail criterion for using an independent variable based on either an acceptable P value (the level of significance) or an acceptable level of confidence. If I fail the T test in a single independent variable model it means that you would actually prefer to use the average engine cost as your estimate rather than the equation with me. Don’t write me off too soon though because even if I don’t do well by myself I still might be helpful if paired with one or more other independent variables.

When more than one of us independent variables are used together, our individual T statistics measure the *marginal contribution* we make to the equation. If I fail the T test here you would conclude that you are better off without me in the equation. After all, I cost you a degree of freedom and I wouldn’t be giving you anything in return.

One thing you might consider if you decide to use me with another variable is whether the other variable and I are correlated, and how strong is that correlation. Some applications provide a pairwise correlation matrix that can show the correlation between all the variables in a particular model or the correlation between selected variables. This correlation is measured by the R value, which, appropriately enough, is the square root of  $R^2$ . The R value can range from a  $-1$  to  $+1$ , the plus or minus driven by whether the slope between any two variables is positive or negative. The closer the R value is to one  $|1|$  the stronger the relationship between the two variables. The analyst would actually prefer if we were not related since then it would be easier to tell us apart. Some analysts would prefer not to use two independent variables in a model if their R is greater than  $|.7|$  even if they have good T statistics. Their concern is that the slopes of the independent variables are less accurate in this case and that they may change from one sample to the next. Other analysts feel that as long as the slopes make sense and have good T statistics there is no harm in using the equation. Given all that, the real issue is that there are two characteristics of, let’s say an engine, that are strongly related like the thrust and weight. If the engines in the data set have a thrust to weight ratio of 25% to 30% then we better not use this data, *in any form*, to estimate an engine with a thrust to weight ratio of 45%.

This also brings up a good point about the range of the data which is, stay in the range whenever possible. Take me for example. If the turbine inlet temperatures for the engines in the data set range from  $2500^\circ$  to  $3500^\circ$  then you should not estimate any engine with a value outside this range unless you have the guidance of a technical expert.

Of course, one of the most important considerations is my accuracy; how well do I predict the cost of an engine. In order to answer this question the analyst will look at my standard error (SE) or what is sometimes called the standard error of the estimate (SEE). The SE or SEE is the average or typical estimating error associated with

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## X, My Search for Significance (Developing Cost Estimating Relationships) (continued)

using the equation. If the SE were \$50,000, then, *on average*, the estimated engine cost would be off by \$50,000 from the actual cost. Sometimes we might be off by a few thousand dollars and at other times by \$60,000 or \$70,000, but on average we would be off by about \$50,000. Now while a SE of \$50,000 is a lot of money, it is difficult to put the SE into perspective unless we compare it to the average cost of an engine. If the average engine cost \$1,000,000 then the SE of \$50,000 would only represent on average a 5% estimating error. This calculation where we divide the SE by the average or mean value is known as the coefficient of variation or CV and it represents the average percent estimating error.

### Putting it into Perspective

While there are certainly other important issues to explore like the influence and treatment of outliers, residuals and standardized residuals, and so on, we will leave these for another story. Whether you are building the model yourself or evaluating a model that someone else has developed, the questions are the same. What are the cost drivers? What is the nature of the relationship between the dependent and independent variables? What data points do we include or exclude? What are the statistics and how do we interpret them? Also consider the use of scatter plots because a picture is truly worth a thousand statistics. Keep in mind that when evaluating the results of a parametric model, nothing is more important than the process by which it was built.

## DO YOU NEED A RISK MANAGER?

**G. JEFFREY ROBINETTE**

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WHY HAVE A RISK MANAGER? Each process requires someone with experience and knowledge to ensure that the process is planned, implemented and carried out effectively and efficiently. This is true of Program Manager, Quality Manager, Systems Engineering, Financial Manager, and many other program disciplines. It is no different for risk management. If risk management is to be done effectively and efficiently, there must be someone to coordinate and facilitate it just like all other critical processes. The risk manager will ensure that consequences of program risks will be properly reflected in performance impacts, schedule impacts and the all important cost estimate.

As we developed the ASC risk management process it was apparent that almost none of our programs had a dedicated risk manager. Some programs said it was the responsibility of the Director of Engineering for the program. Others said it was the Contractor's responsibility or the Program Manager. While others and this is the worse situation, didn't know who was responsible. The risk manager must be familiar with the major functional risk management areas and be able to fully implement them. Those major risk management areas are:

**Risk Planning** is the process of developing and documenting organized, comprehensive, and interactive strategies and methods for performing risk management. Risk planning includes a plan to identify and track risk areas, develop risk mitigation plans, perform risk assessments to determine how risks have changed, and plan for adequate resources.

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**DO YOU NEED A RISK MANAGER? (continued)**

**Risk Assessment** is the process of identifying and analyzing risks to increase the likelihood of meeting performance, schedule, and cost objectives. It includes risk identification and risk analysis. Risk identification is the process of examining the program, processes, requirements, and critical technologies to identify and document risk areas. Risk analysis is the process of examining each identified risk, isolating the cause, and determining the impact. Risk impact is defined in terms of its probability of occurrence, its consequences, and its relationship to other risk areas or processes.

**Risk Handling** is the process that identifies, evaluates, selects and implements options in order to set risk at acceptable levels given program constraints and objectives. This includes the specifics on what should be done, when it should be accomplished, who is responsible, and the cost impact. The most appropriate strategy is selected from these handling options and documented in a risk handling plan. There are several risk handling options at the discretion of the program manager.

**Risk Monitoring** is the process that systematically tracks and evaluates the performance of risk handling actions against established metrics or indicators throughout the acquisition process and develops and executes further risk handling options as appropriate.

THE RISK MANAGER is responsible for and maintains the program risk management process for the program. The responsibilities of the Risk Manager include:

- Develop and maintain the program risk management plan.
- Keep an eye on the health of the risk management process.
- Ensure that the risk management process is integrated with other processes, such as systems engineering, financial management and the overall program management process.
- Ensure that the risk management process, especially the risk assessment results, is linked to the program's master schedule/plan.
- Ensure that the risk management process is properly implemented across the entire program, the program office, the prime contractor, the major subcontractors, suppliers and vendors.
- Maintain a liaison with the customer or user. Ensure that their risk management expectations can be and are satisfied.
- Ensure that the roles and responsibilities of individuals/groups within each organization are clearly defined.
- Ensure that all functional managers and/or involved offices or organizations are participating in all aspects of the program's risk management process.
- Establish and monitor the process and means for effective two-way communications between all team members (program office, prime contractor, subcontractors, suppliers, vendors and the customer/user).
- Ensure that risk management process is consistent across the entire corporate organization
- Keep risk awareness at a high level throughout the program.
- Schedule and conduct program corporate risk assessments.
- Select, develop, and maintain risk assessment tools and methodologies.

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## DO YOU NEED A RISK MANAGER? (continued)

- Facilitate risk discovery meetings and assist in the identification of risks.
- Assist in the determination of handling options and the selection of metrics to monitor critical risks.
- Maintain a risk management information database and associated documentation.
- Ensure that the risk management information database is current and accurate.
- Monitor the development and status of risk handling options and contingency plans.
- Coordinate the accomplishment of program process risk assessments.
- Collect and distribute summary or overview data on risk assessments and status.
- Facilitate any required dialogue and action on high impact risk items.
- Provide a program wide interface for all risk-related issues.
- Develop and provide all risk management training.
- If the other functional leads can keep up with these responsibilities you may not need a risk manager, but it is very unlikely that they can.

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IT'S YOUR CALL.

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**Jeff Robinette** is a systems engineer in the Aeronautical Systems Center Engineering Directorate. He is an active member of the International Council on Systems Engineering (INCOSE), a member of the INCOSE Risk Management Working Group, a contributor and editor for the DAU Risk Management Web page and a technical expert in risk management and risk assessments. He is a co-lead in developing and implementing risk management at ASC and has spent the last nine years as a risk management expert for ASC. He also is the developer of the Probability/Consequence Screening (P/CS) software used for risk discovery and risk assessments. He holds a Bachelors of Science Degree in Systems Engineering from Wright State University and a Masters of Science Degree in Electrical Engineering from the University of Dayton. He has also attended the Air Force Institute of Technology and George Washington University for specialized training and postgraduate study.



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# SCEA NATIONAL NEWS

## SCEA National Conference

By  
**Amy Balsamo**

The 2004 SCEA National Conference was held in Manhattan Beach, California from June 15—18. Courses offered ranged from basic to advanced topics in Cost Estimating, Earned Value Management (EVM), and Program Management. The conference was an excellent opportunity to meet SCEA members from across the country and it was especially insightful to hear topics presented from both government and industry perspectives. In addition to the training sessions, there were paper presentations that shared valuable lessons learned, vendor exhibits that displayed various tools such as parametric estimating and EVM models, a panel discussion, and a keynote speaker. I would highly encourage those who have never attended the SCEA National Conference to consider attending the upcoming 2005 conference!

The 2005 conference will be a joint conference between the International Society of Parametric Analysts (ISPA) and SCEA. The conference will be held in Denver, Colorado from June 13—17. SCEA is currently seeking papers on topics such as Cost Estimating Models, Hardware Estimating, Life Cycle Cost Analysis, and Risk Analysis to be presented at the 2005 conference. The deadline for paper submissions is December 31, 2004. For more information about the SCEA National Conference, please visit <http://www.sceaonline.net>.



## COMMITTEE UPDATES

### 2004 SCEA Annual Award Winners Announced

By  
**Bruce K. Hudson**

Each year the Greater Dayton Chapter of SCEA has an annual awards program dedicated to recognizing outstanding performers in the area of cost analysis. This year's award recipients are no exception to the rule. The Greater Dayton Chapter of SCEA announces the following 2004 Annual Award Winners.

The recipient of the award in the category of Management is Mr. Robert J. Lyons. Mr. Lyon's recognition stems from his work at Aeronautical Systems Center's C-17 system program office. During his time at the C-17 SPO, Mr. Lyons Served as System Program Director's focal point for development of all cost estimating, budgeting, funding proprietary strategies related to establishment of the business case analysis and associated program office estimate to support the C-17 long term sustainment decision. Mr. Lyons also manages and supervises a diverse workforce of Military, Civilian, and Support Contractors very effectively. Please congratulate Mr. Lyons for his superb work.

The recipient of the award in the category of Technical Achievement is Mr. Jeremy S. Mitchell. Mr. Mitchell is currently a cost analyst at Aeronautical Systems Center's Special Operations Forces Group. In the role as the lead program office cost estimator for the MC-130H Talon II Plus10 program office estimate, Mr. Mitchell demonstrated a high technical ability to perform various what-if analyses on a rapidly changing baseline. Mr. Mitchell's attention to detail and strong work ethic helped to make this high-profile weapon system program a success.

For more information on the Greater Dayton Annual Awards Program, please contact Mr. Bruce K. Hudson at (937) 255-3917.

### June Luncheon Summary

By  
**Jeremy S. Mitchell**

Our latest Greater Dayton SCEA luncheon was held on 10 June 2004 at the Twin Base Golf Course Club House. Ms. Eleanor Haupt presented the topic: "Earned Schedule Analysis, A Better Set of Performance Metrics". As usual, Ms. Haupt kept the audience entertained with a unique blend of humor and a very interesting topic. Ms. Haupt's presentation focused on the trouble with traditional schedule EVM metrics reflecting real schedule performance at the end of the program as well as the difficulty understanding schedule performance in terms of budget.

The solution: Earned Schedule Analysis. This new earned value analysis bases schedule performance on time-based, rather than cost-based, metrics. The earned schedule metrics relate work performance to actual time, not work scheduled. This is an easier concept to grasp and makes common sense. In the words of Ms. Haupt, "Why haven't we thought of this before?"

The luncheon continued with the introduction of the 2004 – 2005 SCEA Board Members by Carolyn Van Voorhis (2003 – 2004 Chapter President) and Janet Marshall (2004 – 2005 Chapter President). Following the board member introductions, Ms. Van Voorhis was recognized with a bouquet of flowers for her service to the local organization. Additional recognition went to Jeremy S. Mitchell, who was awarded with a SCEA Coin for successfully passing the SCEA Certified Cost Estimator/Analyst examination.

For more information about Earned Schedule Analysis, please contact Ms. Eleanor Haupt at (937) 656-5482. For more information about future SCEA programs, please contact Mr. Brian Lofthouse at (937) 656-5483.

## Annual Golf Outing By Ron Vorhis

The Society of Cost Estimating and Analysis (SCEA) and the American Society of Military Comptrollers (ASMC) jointly sponsored the annual golf outing for Comptroller personnel on 4 August. As usual, we had maximum attendance (116 golfers). We completed approximately 8 holes before having a brief interlude for lunch and the drawing of door prizes while Mother Nature watered the golf course. Then, with full stomachs, door prizes, and a little rest, we completed the remaining 10 holes. The outing is always a huge success because we keep the price low and still provide door prizes for every golfer. We are able to do this because of our large contractor support base. Fairborn Buick, as they do every year, sponsored the hole-in-one prizes (a 2004 Buick Rendezvous, golf vacation, car care package, and golf clubs). We had a total of 11 support contractors who provided door prizes: Modern Technologies Corporation (MTC) provided 2 \$50 gift certificates for men/women's longest drive and Management Consulting & Research (MCR) provided 2 \$50 gift certificates for the closest to the pin. The remaining contractors provided a variety of door prizes – golf balls, hats, golf towels, umbrellas, divot repair tools, ball retrievers, etc. Those contractors are Titan, Northrup Grumman Corp (TASC), ITC, Tecolote, Frontier, PESystems, PRICE Systems, Booz-Allen Hamilton, and STG. Although our support base is not required to donate door prizes or skill prizes for the outing; they do it to show recognition for the hard work performed by Comptroller personnel. If you have the chance, thank them for their support. Special thanks should go to Fairborn Buick for giving everyone the opportunity to win a new car. They also provided a card for each golfer to fill out, take to Fairborn Buick for their signature, and mail to receive a dozen Nike golf balls and the opportunity to win a Las Vegas golf vacation – I hope everyone mailed their cards.

Special recognition is given to our volunteers who arranged the prizes and worked as hole-in-one spotters on hole #8 (to win the Rendezvous). If someone would have made a hole-in-one, 2 spotters were required to validate the shot before the car could be won. Our volunteers this year were Debbie Ross, Erika Swain, Larry Hoffman, and Jeremy Mitchell.

As always, we hope everyone had a great time and would welcome any suggestions for improvement for next year. Please contact Ron Vorhis (656-5012) or Tom Weideman (255-0450) by phone or e-mail if you have any suggestions. Thanks again and we hope to see you on the course next year for the 2005 SCEA/ASMC FM Comptroller golf outing.



*The Society of Cost Estimating and Analysis*

## The Dayton Coster Greater Dayton Chapter

If you have comments, ideas, or are interested in contributing an article to “The Dayton Coster”, please direct them to Amy Balsamo at [Amy.Balsamo@wpafb.af.mil](mailto:Amy.Balsamo@wpafb.af.mil).