

**Why Expert Opinion
Still Matters**

**A History of Estimating
in the OSD**

ICEAAWorld

The magazine for the International Cost Estimating & Analysis Association





**International Cost Estimating
& Analysis Association**

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The Magazine for the International Cost Estimating & Analysis Association

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The International Cost Estimating and Analysis Association is a 501(c)(6) international non-profit organization dedicated to advancing, encouraging, promoting and enhancing the profession of cost estimating and analysis, through the use of parametrics and other data-driven techniques.

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President's Address

*Paul Marston,
ICEAA International President*

In November of 2012 - five years ago as of writing this - two professional societies merged together to form the association we call ICEAA: SCEA (the Society for Cost Estimating and Analysis) and ISPA (the International Society of Parametric Analysts). ICEAA's lineage goes even farther back than ISPA's founding in 1979; SCEA was born from two other groups, the National Estimating Society (NES) and the Institute of Cost Analysis (ICA), which were founded in 1966 and 1981 respectively. And going one more branch up the tree takes us to NES's predecessor, the Industrial Estimating Society of San Diego, formed in 1959. All of that is to say that while ICEAA has only existed in name for 5 years, the idea of a group dedicated to supporting cost estimating and cost analysis has been around for a lifetime.

Through that lifetime, however, we have been primarily focused on serving professionals in the US. Sure the word "international" has come up here and there, but each iteration of ICEAA has really been international in name only.

That started changing over the years as interest in and the importance of cost and cost estimating grew globally. ISPA formed SCAF, the Society for Cost

Analysis and Forecasting, in the United Kingdom; SCEA formed JSCEA, the Japan Society of Cost Estimating and Analysis to serve our colleagues in Japan. SCEA established a chapter in Australia in 2011, and ICEAA's chapter in Canada was formed in 2015.

These groups outside the US have not just been successful, they have been some of ICEAA's fastest growing and most active segments of our membership in recent years. For example, Canada has grown from 9 members in 2014 to 77 members as of this fall. Maybe more important than membership numbers are the sharing of knowledge, data, methodologies, and research from all our member nations. The spread of our knowledge is hugely important to the profession and directly benefits all our members and constituent organizations – industry, academia, and government.

"International" is more than a word to make things sound bigger and more important than they are. It's about bringing together thoughts and ideas that work for everyone as everyone works together. With the enthusiastic involvement of our members around the globe, I couldn't be more proud to be at the helm of what is truly becoming an international organization.



ICEAA Professional Development & Training Workshop

June 12-15, 2018 ♦ Phoenix Renaissance Downtown ♦ Phoenix, Arizona



www.iceaaonline.com/phoenix2018

Abstracts due December 4, 2017:

www.iceaaonline.com/cfp2018



Business Office Update

Megan Jones, ICEAA Executive Director

Even though I'm technically a grownup and haven't followed a school-year schedule in more years than I care to admit, September always feels like a new year to me. A new year started with less tan and fewer scrapes on my knees than in years past, but a new year nonetheless.

September was an actual new beginning for one of us: our new admin **Chelsea Torres** began her ICEAA career just after labor day. Chelsea brings not just valuable customer service and event management work experience, but with her eye for detail paired with her mind on the big picture all rolled up in a can-do attitude has made her an outstanding addition to our small team.

Chelsea's first task was to expand the ICEAA Archives, which was one that had daunted me for years. Naturally, she got 10 years of papers and presentations from ICEAA's and our predecessors' Workshops sorted, PDF'd, hosted on the website, and ready for our members to search in half the time I even hoped. Check out the newly-expanded ICEAA Archives at www.iceaaonline.com/archives

But those of you who tuned in to the 2017 All-Member Meeting on September 30 already knew that. Even more of you tuned in for our third virtual All-Member meeting than last year, but for those of you who missed it, a recording is up on the website at www.iceaaonline.com/membership

This fall can mark a new start for you too. The 2017-2019 ICEAA International Board elected in the spring is forming committees for a wide range of areas and activities. Want to get more involved with ICEAA? Send me an email and I'll connect you with the committee chairs.

Also this fall we co-hosted the 29th annual International Integrated Program Management Workshop with the College of Performance Management (CPM) and the National Defense Industrial Association (NDIA) This year's IPMW was another success, with over 300 attendees joining us for training sessions, workshops, and of course the ICEAA-sponsored Cost Estimating Track. My thanks and compliments go out to our co-hosts for their collaborative spirit and hard work in another job well done.

And really, is it fall if you're not getting your abstract ready? Summaries are due **December 4** for consideration for the 2018 Workshop in Phoenix. Sure it seems early (*seems* - there's a lot to do between abstract and workshop), but don't need your whole presentation yet, or even a formal, footnoted abstract. Summarize what you plan to present on in such a way that our Workshop Program Committee can't resist accepting it and you can work on your presentation over the next few months. Just don't let the chance get away from you! We can't wait to see what our members have to say this spring:

www.iceaaonline.com/cfp2018



Take an active role in the association: Join a Committee!

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Professional Development Committee

Workshop Committee

CEBoK Update Task Force

Software Certification Committee

Email iceaa@iceaaonline.org for more information



Letter from the Editor

Joe Wagner, ICEAA World Editor

The third and final edition of *ICEAA World* for the year is traditionally our eco-friendly edition, being sent out as a stream of electrons rather than in paper and ink format. One advantage of this process is that we avoid the inevitable return of mailed issues that are marked as undeliverable by the post office due to address changes, spelling errors, and other random mistakes of either our readership or staff. As a result, I am asking in advance of our snail mail version of the magazine next spring, to please log in to your ICEAA personal profile and be sure your mailing address, as well as email, phone, employment, and other information, are current and accurate:

www.iceaaonline.com/portal

When your data is obsolete, many things you are trying to do with ICEAA can go bad, such as registering for a workshop, renewing your membership, or registering for an exam, due to an obsolete email address or mailing address, or a change in employer.

The ICEAA training and certification process is undergoing some significant changes, and the impact on the Cost Estimating Body of Knowledge (CEBoK) and the certification exam are addressed in this issue by Vice President of Professional Development **Andy Prince** and Director of Certification **Peter Andrejev**.

In the last *Letter from the Editor*, I extolled the recent contributions of Air Force **Captain Greg Brown**, who provided unique and thought-provoking articles in each of our last two 2017 issues. They dealt with estimating based on unique sources (*Simplify an Estimating Problem: Channeling Enrico Fermi*) and measuring the impact of cost issues on the political processes, (*Measuring the Increasing Relevance of Cost Estimating*). Incredibly, Greg has made it three for three for the year by providing us with a third


subject for consideration in this issue. In a time of automated estimating products based on virtually limitless costing and technical databases, accompanied by unbelievably complex creations in parametric modeling, Greg considers *Why Expert Opinion Still Matters*.

Always looking ahead, in this issue we have an informational article associated with our 2018 ICEAA Workshop, to be held mid-June in Phoenix, Arizona. It's always a side-benefit for workshop attendees that you can take advantage of surrounding attractions wherever we meet each year. A trip to Phoenix for the 2018 Workshop absolutely demands an additional day or more spent visiting the unique environment of Sedona, AZ. Learn some more in the pages ahead. Another article on Phoenix sidelights will appear in the spring edition.

Finally, along with others in the pages that follow, I add my welcome to our newest ICEAA International Office staffer, Ms. **Chelsea Torres**. Chelsea's abilities and skills expand our service to the membership and improve our response to your professional needs, as well as helping make available online more of the cost data and estimating knowledge we have collected over past decades. As an example of Chelsea's immediate impact, thanks to her IT abilities and thoughtful labor, you are now able to do a searchable investigation of every individual paper and presentation from our past decade of workshops, on any subject and by any author, right at the ICEAA website. Check out what's in the archives at:

www.iceaaonline.com/archives

More such support will be forthcoming as Chelsea finds more opportunities.

Thanks for reading this product of your fellow ICEAA members and staff. 



Certification Corner

*Peter Andrejev, CCEA®, PMP®
ICEAA Director of Certification*

The ICEAA Canada Chapter presented a motion at the June 2017 Board of Directors meeting asking to “lead in the creation of a Canadian variant of the Cost Estimating Body of Knowledge (CEBoK) customized to address Canadian-specific requirements.” They also sought permission to “undertake the lead to create Canadian variants of the ICEAA certification examination questions.”

After the usual process of lively debate, the Board agreed that both requests were reasonable, especially given feedback from other international constituents that ICEAA training is overly populated with US defense examples and includes questions on topics that are based on US practices having little or no standing in other countries. Yet there was caution expressed that we should avoid the proliferation of country-specific certification variants that could undermine the very tenet of an internationally recognized standard. If every country has its own certification standard; then no international standard exists.


Testing on different questions for different locations could result in different degrees of difficulty. Were

we to award the same PCEA® or CCEA® designation to individuals who passed exams with different levels of difficulty, ICEAA would be doing a disservice to the employer and an injustice to the employee.

Just as medical doctors are trained and equipped to practice across international borders, I believe that we can refine the questions to a large extent in the certification examination(s) to ensure that:

Topical areas are meaningful to cost estimators around the globe, and

Proficiency is tested at levels of competency transferable across borders as practiced by multi-national companies and international governments in today’s global economy.

I look forward to working with the Canadian representatives to ensure that the integrity of an internationally recognized standard is maintained, and to eliminate US-bias in examination questions to secure the maintenance and promotion of universal best practices. 

2018 ICEAA ASSOCIATION AWARDS



TECHNICAL ACHIEVEMENT
OF THE YEAR

MANAGEMENT ACHIEVEMENT
OF THE YEAR

TEAM ACHIEVEMENT
OF THE YEAR

JUNIOR ANALYST
OF THE YEAR

EDUCATOR OF THE YEAR

ASSOCIATION SERVICE AWARD

FRANK FREIMAN LIFETIME
ACHIEVEMENT AWARD

NOMINATE YOUR FELLOW ICEAA MEMBERS BY **MARCH 18, 2018**

www.iceaaonline.com/awards



Professional Development News – CEBok Update

Andy Prince

Vice President of Professional Development

The Cost Estimating Body of Knowledge (CEBoK) is the foundation of professional development for ICEAA. It is a reference guide for the cost estimating community, it is the basis for much of our training material, and its knowledge is at the core of our certification exams. To maintain CEBoK as a relevant and valuable resource, ICEAA is taking several steps to improve both the content and delivery.


First, the content. ICEAA is undertaking a critical review of CEBoK, evaluating each module as to the quality and quantity of information provided. The results of this review will be used to develop a plan for revising CEBoK to ensure that it is giving the cost estimator the information he or she needs to do an outstanding job. Once that improvement plan is in place we will move out and make it happen, revising not only the CEBoK but the associated workshop training material as well.

Second, ICEAA has begun developing plans to make CEBoK available online. We know that we are behind the curve on doing this (CDs and thumb drives are so early 21st century); therefore, we are moving ahead to make our current content available electronically and will update later once we have the revised material. Having CEBoK online will allow us to get the knowledge to users faster, serve as an on-line resource that can be accessed from a variety of devices, and can be easily updated as new and revised material becomes available.

There is a third development that I want to tell you about that has me really excited. ICEAA has agreed to allow the Canadian Chapter to create a Canadian specific variant of CEBoK, both the training material, and the Certification Exam. This breakthrough agreement is a major step forward in

expanding ICEAA's international presence and influence.

Per our agreement, ICEAA will maintain ownership and editorial control of the Canadian CEBoK, training material, and certification exam. The Canadian Chapter will recommend changes to reflect differences in terminology and government practice, and assist in translating into the French language, which is a requirement for CEBoK to be recognized by the Canadian government. ICEAA's mission of educating, promoting, and advancing the profession of cost estimating and analysis requires that we ensure the core principles underlying our profession are not compromised, regardless of language or culture or government practice.

My hope is that the Canadian Chapter agreement will be the first of many agreements for country specific variants and training materials, leading to wider certification. Promulgating a world class standard requires world-wide recognition, and acceptance of the value ICEAA offers. By expressing good cost estimating and analysis in ways that everyone can understand and use, we will truly fulfill our charter as an international organization. 

Upcoming Events

SCAF Workshop

Vendor and Services Day
Filton, Bristol, UK · November 14, 2017
Contact: ndmorrill@dstl.gov.uk

2019 ICEAA Professional Development & Training Workshop

Tampa, Florida
May 14-17, 2019



Ask an Analyst

Edited by

Joseph W. Hamaker PhD, CPP®, CCEA®

An anonymous reader submitted the following question:

Q:

To develop cost estimates we use historical data on completed programs. We typically don't collect cost data until the program has been baselined. At NASA this is around PDR, and for Department of Defense programs it is Milestone B. There is guidance from the DoD and NASA that programs at Milestone B must be at a technology readiness level (TRL) equal to 6 or above in order to obtain authority to proceed. Thus, theoretically, all the data we have for historical programs is for relatively mature technology. However, suppose we believe that we are developing a baseline estimate for a program and we believe that one or more of the critical technologies has a TRL that is less than 6. How do we estimate the cost and how do we approach risk?

For an answer, I turned to Dr. Christian Smart, Chief Scientist of Galorath Inc. who is a noted expert in this subject. His answer is:

TRL is a concept that was developed by NASA and has since been adopted by other government organizations, including the Department of Defense.

TRL ranges from 1 to 9. For example, the low end, TRL = 1, represents the basic level at which scientific research is beginning to be applied to research and development. TRL = 3 is the proof of concept level, while TRL = 5 is component or breadboard development in a relevant environment. The critical TRL = 6 value represents a system/subsystem model or prototype demonstration in a relevant environment. The top end, TRL = 9, represents those technologies that have been successfully demonstrated through successful mission operations. For more information on TRL, see:

https://en.wikipedia.org/wiki/Technology_readiness_level.

TRL is a useful measure for cost estimating because it is widely used and commonly understood by engineers. One of the challenging aspects is that it is subjective – one engineer's TRL 5 could be another TRL 6.

Joe Hamaker of Galorath Federal has written about a rough heuristic based on his experience to increase a project cost estimate when the TRL is less than 6 by $1.3^{(6-TRL)}$. This is a "plus up factor" for the project cost. For example, if you start a project that has TRL 3 elements, it will cost you $1.3^{6-3} = 2.197$ times as much money as it would have if you had first matured the technology to TRL 6 and then had an ATP on the overall project. We recognize that except in some kind of extreme emergencies (saving the planet from an impending asteroid), projects would not knowingly go forward with low TRLs.

One can estimate the cost of maturing technologies from a risk perspective as well. Typically, the best estimate is the lower bound. Once a contract is signed any change will cause an increase in cost.

continued

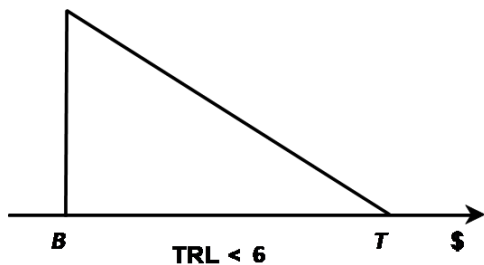


Exhibit 1: Cost Risk When $TRL < 6$.


This is embodied in the phrase “money allocated is money spent” (MAIMS). This concept is embodied in the triangular distribution displayed in Exhibit 1, where “B” represents the baseline estimate and “T” represents the “Top” value that the baseline cost could eventually grow to.

When the TRL is less than 6, the expected value of the growth above the baseline based on Hamaker’s heuristic is provided in Exhibit 2.

TRL	T
1	9.14
2	6.57
3	4.59
4	3.07
5	1.90

Exhibit 2: Values of T Relative to B for Various TRL Values.

Based on this triangular distribution and treating Hamaker’s rule of thumb as the mean of the triangular distribution, you can solve for the T value relative to the baseline costs as shown in Exhibit 2.

This experience and data applies primarily to space projects. Similar methods can be applied to other types of hardware. 

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Round and About Phoenix: A Snapshot of Sedona

Joe Wagner

In the next two issues of ICEAA World magazine, we'll spotlight a few of the many points of interest in and around Phoenix, Arizona, so that attending the June 2018 ICEAA Workshop at the Renaissance Phoenix Downtown will not be your only diversion while in that city. By starting our review now, you'll have more time for planning a great combination of work and play in mid-June of 2018. Let's get started with a quick visit to Sedona.

Only a two-hour drive up Interstate 17 north of Phoenix is a small town of just over 10,000 people that is situated among the most beautiful and impressive mountains, rock formations and desert terrain in all of America. At an altitude of 4,500 feet in the Upper Sonoran Desert, Sedona, Arizona is a truly unique masterpiece of geography and culture. A day trip to Sedona exposes you to the natural beauty of formations such as Bell Rock, Coffee Pot rock and Cathedral Rock, and the experience of driving the length of Oak Creek Canyon. This 12-mile-long canyon is 800 to 2,000 feet deep, and has been described by Rand McNally as one of America's Top 10 scenic drives.



Cathedral Rock, Sedona AZ

The massive mountains, rock formations, and beautifully colored sandstone set against the clear blue Arizona desert sky are awesome natural wonders that can be viewed simply by driving the roads around Sedona. But, for more informational and organized sightseeing, there are numerous tours available by bus, on foot, by jeep, and even hot air



Overlooking a Rock Formation Canyon

balloon. You can indulge specific interests such as photographic tours, the natural environment or other specific subjects, from stagecoach routes to Native American ruins to wine-tasting tours. Adjacent to the Sedona area is the Red Rock district of the Coconino National Forest, which encompasses many of the impressive natural rock formations as well as several wilderness areas that offer some great hiking and sightseeing opportunities. The website dreamsedona.com provides a very useful map of features, trails, and roads in and around Sedona, as well as the State of Arizona touring website at arizona-leisure.com or sedona.net for planning your sightseeing visit.

Of equal interest when you are thinking of going to Sedona is its role as a center of arts offerings, arts creation, and artistic education. There are over 2 dozen major art galleries and shops, many connected to world-class artists and exhibitors, not to mention the many side-of-the-road art purveyors and exhibitors to be found throughout the Sedona area.

For almost 80 years, sculptors, painters and artists of every medium and expression have lived and worked in Sedona. The Sedona area has grown into a major center of uniquely American art expression. As an example of its importance in the art world, in June of 1965, western artists Joe Beeler, Charlie Dye, John Hampton, Frank McCarthy, and George Phippen met at the Oak Creek tavern in Sedona and founded the Cowboy Artists of America, which still operates today as a premier nationwide organization

continued

for western artists. Virtually every kind of art medium, artistic trend, and school of expression can be found being created, exhibited, and offered for sale somewhere in the Sedona area. A

walking map of many arts venues is available at visitsedona.com, where you can look for specific artists and their studios, special exhibits, and other arts-related events. Not to be missed is the artist village of Tlaquepaque, where dozens of art retailers and individual artist workshops are collected at a single location for an easy viewing and shopping experience.


Another example of the Sedona arts vibe is the annual Sedona Summer Colony. This summer residency program offers instruction and mentoring for artists and artistic support organizations in many areas of arts engagement. The Colony's primary objective is to support the inspiration and creation of new artistic works and cultural content by providing undisturbed time, temporary living space, meals, and studio or work space for those selected to attend. Another main objective, proceeding from the collective nature of such a group residency, is to foster new connections and dialogue amongst participants and offer new opportunities for cross-disciplinary interaction and thinking.



Red Rock Formations, Sedona AZ



Tlaquepaque Arts and Crafts Village

Speaking as someone who has been there, when you are at the ICEAA Phoenix Workshop, do not miss a trip up to Sedona. It's like no place else. And if you still have some time, either before or after the Workshop, you will notice that Grand Canyon National Park is only another 4 hours' drive to the north. But that is a story for our next issue. 

2018 Professional Development & Training Workshop Important Dates

Professional Papers Deadlines:

December 4, 2017: Abstract summaries and bios due

January 22, 2018: Accepted authors notified

March 30, 2018: Papers due for Best Paper Award consideration; draft presentations due for track chair review and feedback

Training Modules Deadlines:

December 11, 2017: Requests to provide training due

January 29, 2018: Selected trainers notified

March 5, 2018: Training brief abstracts, presentations and trainer bios due

Registration & Hotel Dates

May 1, 2018: Special earlybird rates end. Register by May 1 to save \$100

May 21, 2018: ICEAA discounted room block rate ends
(may close earlier if sold out)

WHY EXPERT OPINION

Still Matters

Capt. Gregory E. Brown, USAF

Among the 2016 and 2017 ICEAA workshops, the themes of predictive analytics, machine learning, and data science were all popular presentation topics.^{1,2,3} At the same time, the U.S. Department of Defense (DoD) has instituted a requirement for cost estimators to have a more analytically-focused educational background⁴, and introduced a much improved cost data repository, CADE, which offers many built-in analytics functions. Based on these trends, it is apparent that the cost estimating community is experiencing a paradigm shift towards predictive analytics, and away from a reliance on expert opinion, which was often necessitated by prior limitations in data. With the potential for more abundant data in cost estimating, is there still any residual value in using expert opinion as an estimating technique? Or is expert opinion dead, having been replaced by analytics, statistics, and data science?

To explore this question, let's turn to the analogy of scouting in professional baseball. In 2002, *Moneyball* revolutionized the baseball industry, demonstrating that analytics could outperform the professional scout. Shortly after *Moneyball* debuted (and after Billy Beane repeatedly threatened to fire his entire scouting staff), many analytics advocates predicted the demise of the baseball scout. They observed, why would teams rely on underperforming experts when analytics can do it better, faster, and cheaper? However, now consider the following evidence. Fifteen years after *Moneyball* was first published, professional scouts are still employed by all 30 Major League Baseball teams. The Blue Jays—a team strongly focused on analytics—recently made headlines for doubling their scouting staff, in a reversal of the expected trend.⁵ The Boston Red Sox's owner announced that the team is de-emphasizing its reliance on analytics, in favor of a more balanced scouting approach.⁶ And Sports Illustrated magazine correctly predicted that the Houston Astros would win the 2017 World Series,

largely based off the innovative way in which the team is synthesizing both statistical information and scout opinion into a combined model.⁷ Taken in aggregate, these cues lead to a new conclusion: the most successful baseball teams today are those using a hybrid approach, whereby expert scouting complements and informs analytics, and vice-versa.

So what's the application to cost estimating? As we progress forward, analytics and expert opinion need not be mutually exclusive within a cost estimate. Although analytics will improve cost estimates, analytics will never completely replace the wide-ranging utility of an experienced engineer, logistician, or test manager. Rather than viewing analytics in an all-or-nothing approach, the cost estimator should instead recognize that analytics and expert opinion can work together to provide a better overall estimate. However, some readers may hesitate to recognize the limitations of analytics. For those reluctant readers, here are four fundamental, cost estimating-specific reasons why expert opinion will remain essential for supplementing analytical models.

Reason #1

Experts Provide Model Assumptions

As an omnipresent, yet rarely criticized weakness, predictive analytical models in cost estimating are almost always 'backwards-looking'. They are constructed using historical data from prior programs, with the historical data gathered at program completion. As examples, aircraft and satellite cost models commonly utilize the craft's weight at completion as a variable, while software cost models are typically driven by the source lines of code (SLOC) at completion. This methodology introduces a serious limitation though, as it is retrospective, and therefore assumes that the cost estimator can accurately predict the final weight or SLOC count for the new program to be estimated, before the program even begins.

continued

Unfortunately, experience shows that program requirements and characteristics are rarely known with high precision at the time of the initial cost estimate for a new program.⁸ As a result, the cost analyst will typically turn to an expert, such as an engineer, to provide the input variable assumptions (e.g. expected weight or SLOC) that drive the cost model's prediction. Thus, even with the introduction of bigger cost datasets and improved analytical modeling technique, we must still rely on expert opinion to subjectively estimate model assumptions—particularly in the early stages of a new program.

Reason #2 – Experts Guard Against Spurious Correlation

As access to cost and technical data improves, the cost analyst will undoubtedly begin to test a greater number of input variables when designing a new cost model. As a result, the rate of spurious, or coincidental, correlations will increase. If twenty input variables are tested using a 95 percent confidence level, one variable will be statistically significant by chance alone, on average. This is otherwise known as a false positive, and is a serious drawback to employing larger databases. In fact,

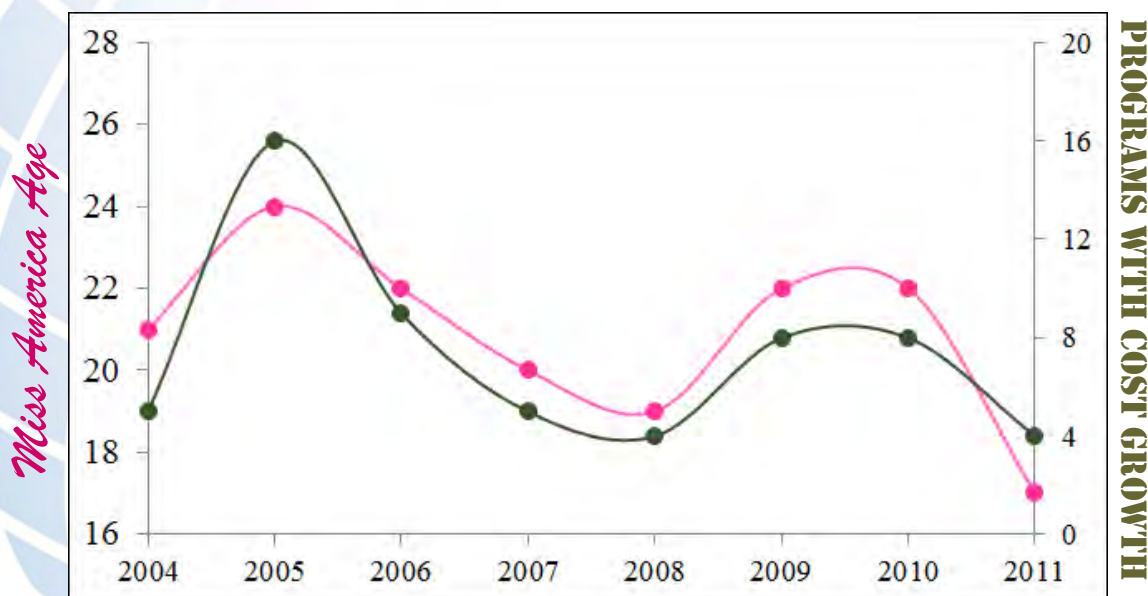
research has shown that the majority of correlations in very large databases are spurious.⁹

As a ludicrous example of spurious correlation, this author merges a real-world cost estimating database and a Wikipedia-based database—with an interesting result. For each year between 2004 and 2011, it is revealed that the age of the current Miss America titleholder¹⁰ is highly correlated with the number of DoD programs reporting Nunn-McCurdy cost breaches to Congress¹¹, as seen in Figure 1. The resulting predictive model is given as

$$\text{Number of DoD Program with Cost Growth} = -25.2 + 1.6(\text{Miss America's Age})$$

Were it not based on a nonsensical relationship, the predictive model—with a reported R^2 of 0.72 and p-value of < 0.01 —might be considered a relatively strong statistical model. While in this example correlation certainly does not imply causation, spurious correlations are not always so obvious to identify. To guard against spurious correlation, it is recommended that the cost analyst always utilize an expert to validate the theory behind a cost model's estimating relationships. Ask the expert, “does theory support that x would drive y ?” Computer-discovered correlation should never replace technical understanding.

continued



Reason #3 – Experts Offer Extra-model Knowledge

In addition to validating assumptions and theory for the model, experts may have knowledge that goes beyond the limited information captured by the cost model or database. For instance, in large acquisition programs, there often exists highly specific, highly important information which has yet to be—or cannot be—captured by a model's variables. This is referred to as extra-model knowledge.¹² Typically, extra-model knowledge is not captured by an existing model variable as it occurs relatively infrequently, or because it is 'soft' information that is known by those within a program but is difficult to quantify with 0's and 1's into a database.

Consider these examples of extra-model knowledge, adapted from a real-world acquisition case study¹³:

- An engineer receives word that a program plans to pursue a spiral development strategy for hardware; historical programs have used more traditional development strategies

- A logistician is notified that management of a modification program is to be moved to a different acquisition center, resulting in a loss of corporate knowledge
- A program manager observes that there is an extreme lack of consensus among stakeholders, and believes that a future change in technical requirements is likely

In each of these cases, the expert holds information which is not accounted for by the cost model, but could have a significant impact on the program's cost. Therefore, it may be foolhardy to blindly apply an off-the-shelf cost model output without including expert opinion to further adjust model inputs and outputs for extra-model knowledge. A similar argument holds for reason number four, new technology.

Reason #4 – Experts Estimate New Technology

Even in the era of 'big' databases, there may be times when the cost estimator doesn't have the required data or right statistical model, and must turn to the expert. Why is this? Research

continued

¹DeMarco, A. (2016, June). *How Predictive Analytics is Improving Parametric Cost Estimation*. Presentation at the 2016 ICEAA Professional Development and Training Workshop.

²Mourikas, K., King, J., & Nelson, D. (2017, June). *Machine Learning Approach to Cost Analysis*. Presentation at the 2017 ICEAA Professional Development and Training Workshop.

³Wilson, W., & Barker, L. (2016, June). *Integrating Cost Estimating and Data Science Methods in R*. Presentation at the 2016 ICEAA Professional Development and Training Workshop.

⁴Ritschel T., & Ritschel, J. (2017, June). *Anatomy of the Future Department of Defense (DoD) Cost Estimator*. Paper presented at the 2017 ICEAA Professional Development and Training Workshop.

⁵Swartz, M. (2010, September 3). Ahead in the Count: Sabermetric Teams and Sabermetric Scouting. *Baseball Prospectus Online*. Retrieved from: <http://www.baseballprospectus.com/article.php?articleid=11890%3Ffrom>

⁶Cafardo, N. (2016, Feb). John Henry says Red Sox will rely less on analytics. *The Boston Globe* (Boston, MA). Retrieved from: <https://www.bostonglobe.com/sports/2016/02/24/john-henry-says-red-sox-will-rely-less-analytics/95uy1OmoQw0jxr7SRcOWO/story.html>

⁷Reiter, B. (2014, June 30). Astro-Matic Baseball: Houston's Grand Experiment. *Sports Illustrated*. Retrieved from: <https://www.si.com/vault/2014/06/30/106479598/astromatic-baseball-houstons-grand-experiment>

⁸Jørgensen, M. (2007). Forecasting of software development work effort: Evidence on expert judgement and formal models. *International Journal of Forecasting*, 23(3), 449-462.

⁹Calude, C. S., & Longo, G. (2016). The Deluge of Spurious Correlations in Big Data. *Foundations of Science*, 1-16.

¹⁰List of Miss America titleholders. (2017, May 18). In Wikipedia, The Free Encyclopedia. Retrieved from: https://en.wikipedia.org/wiki/List_of_Miss_America_titleholders

List_of_Miss_America_titleholders

¹¹Department of Defense, Cost Assessment and Program Evaluation. (2017). *FY 2016 Annual Report on Cost Assessment Activities* (p. 31).

¹²Webby, R. G., & O'Connor, M. J. (1996). Judgmental and statistical time series forecasting: A review of the literature. *International Journal of Forecasting*, 12(1), 91-118.


¹³Lorell, M.A., Leonard, R.S. & Doll, A. (2015). *Extreme Cost Growth: Themes from Six U.S. Air Force Major Defense Acquisition Programs*. Santa Monica, CA: RAND Corporation.

¹⁴Sanders, N. R., & Ritzman, L. P. (1991). On knowing when to switch from quantitative to judgmental forecasts. *International Journal of Operations & Production Management*, 11(6), 27-37.

¹⁵Lewis, M. (2017). *The undoing project: A friendship that changed our minds*. NY: W.W. Norton & Company.

finds that models generally perform best in stable situations, when the important variables and variable coefficients are already well-established and unchanging. In contrast, the expert may outperform the model during times of instability, as the expert may utilize situational context, derived from his or her expert knowledge.^{8,14}

Within cost estimating, a prime example of instability is the introduction of a new technology. During the introduction of a new technology, the underlying data pattern may radically change, disrupting the established model's variables and their coefficients. In contrast, the expert may utilize all available context about the new technology being estimated, not just the available historical data garnered from previously completed programs. Although the historical data and models will eventually catch up with the new technology, it will not be instantaneous. In the interim, the lack of relevant data for a technology may require the cost analyst to rely on the expert to manually recalibrate an existing cost model, or in other cases, directly estimate effort and cost.

reliance on expert opinion will likely decrease. However, the need for expert opinion will not disappear completely from cost estimating, just as the expert scout has not vanished from professional baseball. In baseball, teams still require a scout to assess whether a player suffers from an emotional problem or a lagging injury not revealed by the statistics. Is the player a hard worker? Is he still developing? Is he socially a good fit for the team dynamic, or will he be disruptive?^{7,15} Similarly, in cost estimating, only an expert can validate assumptions and theory, or manually adjust for new or unusual information. You might ask the expert—does the cost estimating relationship make sense? Is the historical data applicable to the new program being estimated? What unique program attributes, if any, is the analytical model potentially overlooking? Analytics and expert opinion don't have to be a zero-sum game, whereby one must emphasize analytics at the expense of expert opinion. Instead, the two estimating methods can co-exist, and probably should for most cost estimates. Bottom line: don't fall into the false *Moneyball*-esque narrative of thinking that the expert's opinion no longer matters. 

Closing Thoughts

As the volume of available cost data continues to increase, the use of predictive analytics for estimating will become more common, and our

Captain Brown serves as a cost analyst for the Air Force Life Cycle Management Center, Wright-Patterson AFB, OH. He is a professional cost estimator/analyst, an alumnus of the Air Force Institute of Technology's Graduate Cost Analysis program, and is currently completing graduate studies in applied statistics.

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1. Topic Category
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3. Question A CER for Site Development was developed giving the relationship, y (in \$K) = $31.765x + 145.32$ (where x is the number of workstations) for a data set cost driver that had a range minimum of 2 workstations to 52 workstations, and the independent variable has tested positively for significance, the predicted cost for

4. Five multiple

- a. \$ 1,193.57
- b. \$1,193,565.00
- c. \$ 1,797.10
- d. \$1,797,100.00
- e. \$ 208,850.00

6. Solution:

$y = 31.765 * 33$
 $+ 145.32 = 1,193.57$
but must convert
from \$K; value is

5. Answer B

7. Reference
CEBoK Module 3

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Money Changes Hands... ...A Good Book Changes Minds

Book review by Col David Peeler

In the previous edition of these pages, we reviewed a selection about (ir)rational decision making more so than deep numbers analysis. Stepping even a little further away from a numbers book, the selection for this edition's review focuses on change, and how to motivate and orchestrate moves from the *status quo ante*. As cost estimators and analysts, we often find ourselves, in company with the program manager, as the person most knowledgeable about the totality of the program. Estimating and analysis makes us aware of all aspects of a programs successes and weaknesses. As a corollary, costers are also well poised to help lead change efforts, either informally or in some cases formally. This book aims to better inform regarding change and how people can be shown methods to transition.

SWITCH: HOW TO CHANGE THINGS WHEN CHANGE IS HARD

Chip & Dan Heath

Broadway Books:
New York, N.Y.; 2010



As a well-postured asset within organizations, cost estimators can help lead change from both the overarching and the tactical levels. They interact at the detailed level with numerous personnel and often have higher-level access to leaders – both formal and informal. To increase the influence one can bring to bear in situations,

leadership and change books are beneficial.

To that end, **Switch** shows everyday people ways and methods to achieve dramatic results. The authors open with an introduction discussing three surprises about change. The largest point being that change, unlike most people's perception, is welcomed and actually sought-after. The common perception that change is disliked and avoided doesn't bear scrutiny. The important things about change are the people, situation, context, and approach.

The book is segmented into three parts, each addressing ways to change behavior based on intellectual acceptance of the need for change, overcoming habits and emotional opposition to change, and cultivating the environment in which the change can occur. The brothers Heath unpack the book in three chapters in each part. The first part addresses the reason of the players, analyzing and showing the participants the need and rationale for the change. The authors describe how to leverage existing bright spots of activity, what's involved in ensuring critical moves happen, and ways to secure vision of the common destination.

The second part deals with motivating emotion and disrupting habits. The chapters herein are concerned with

emotion, scope, and growth. First, the lesson focuses on locating the emotional appeal and discerning ways to alter feelings to pursue the desired change. Next are examples and suggestions for narrowing the challenging to allow folks to eat the elephant one bite at a time. This part concludes with a chapter on growing the people, providing some psychology aimed at helping personnel identify with the change and aspire to it.

In part three, Heath and Heath discuss shaping the path to eliminate or reduce, to the maximum extent possible, organizational and cultural obstacles existing or erected in opposition to the desired change. Specifically, they deal with altering the environment to increase conduciveness to the intellectual and emotional changes, and thus increase the likelihood and pace of change. This section also deals with reducing old and building new habits before presenting methods for creating critical mass to get the herd moving behind the early adherents. The book concludes with a short chapter on maintaining the journey, presenting ideas to keep the switch going.

The lessons in **Switch** aren't applicable to mere work situations, this read has many tips and formats that will aid in personal and relationship situations across all aspects of life. Well worth the read, with enjoyable anecdotes and case studies covering a wide range of circumstances. The vignettes provide enticing examples, with concepts and meanings woven nicely throughout. There is much in the book to help cost estimators/analysts relate the need for change to others, apply it from a leadership perspective to catalyze behavior shifts, and likely contribute on the interpersonal level to drive action across the organization.



Colonel Peeler serves as Deputy Director, Financial Management and Comptroller for the Air Force Life Cycle Management Center. He is a certified cost estimator/analyst and an Air Force certified acquisition professional in both financial and program management. He is a member of both the American Society of Military Comptrollers and the International Cost Estimating and Analysis Association.

Book Review

A History of Estimating in the OSD

By Joe Wagner

Today there is an organization within the Office of the Secretary of Defense (OSD) known as Cost Assessment and Program Evaluation (CAPE). CAPE is responsible for, among other duties, providing independent analytic advice on defense programs and force structures, development and evaluation of defense program alternatives, and most important for this discussion, for determining the cost-effectiveness of defense systems.

The CAPE office was established by the Weapon Systems Acquisition Reform Act of 2009. It replaced the predecessor organization known as the Office of Program Analysis & Evaluation (PA&E) which in turn was established in December 1971. Going back one more iteration, the grandparent of the CAPE and parent of PA&E was established in 1961, and known as the OSD Office of Systems Analysis. Based on this historical organizational chain, let's take a quick look at how the practice of preparing cost estimates for an entire weapon system life cycle, based on historical cost information, was created within the DoD acquisition establishment.

“Cost estimates of weapon systems now in the operational inventory do not exist within the Air Force.”

graduate students, Mr. Walter Brink, Lt. Col. Alvin Greenhorn, and LCDR Melville Walters. In its summary, the document reports what today must seem an astounding result of the research process; after requests for cost estimating data were sent to over 40 Air Force program development, acquisition, and logistics management offices, not a

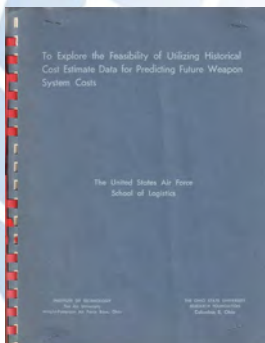
single one could provide any historical cost data for their product.

The study summary conclusion, on page 3, included the following sentence; “Cost estimates of weapon systems now in

the operational inventory do not exist within the Air Force.” Not only did cost information for current systems not exist, but planning for future acquisitions did not include reliable system-level cost estimates because no historical data was available upon which to base them. The study conclusion goes on, “The value of a reliable cost estimate in predicting the cost to the nation of developing, procuring, and operating a proposed weapons system over a period of years ... has not been recognized.”

On page 15, the report says, “Cost estimate data which were found to be available consisted principally of budget estimate figures based on information furnished by contractors for a program of specific scope, usually a limited portion of the total program and normally not definable as a phase of the total weapons system program.”

This was the situation as a new weapons management process began to take hold – the treatment of a new weapon as a set of integrated components that made up a complete system, rather than a sequential series of hardware and related activities ranging from development, through



Air Force Institute of Technology (AFIT) Research Report, December 1960

The Beginning

In December of 1960, the Air Force Institute of Technology (AFIT) School of Logistics published a 52-page research report titled: *To Explore the Feasibility of Utilizing Historical Cost Estimate Data for Predicting Future Weapon System Costs*. The report was written by three AFIT

continued

procurement, to logistical support, each treated separately regarding planning and cost.

Office of Systems Analysis

The concept of treating a weapon procurement program as an integrated system of hardware, logistics, and operating elements was gaining prominence at the Pentagon about the time of the publication of the AFIT research paper. In the early 1960's, a profound change in the defense posture of the US was taking place. Under the Kennedy administration, with Robert McNamara as Defense Secretary, there developed a new operational strategy known as "flexible response." In this major policy shift, a large number of new and different weapon systems began development in all of the military services, with the strategic goal of lessening our reliance on the nuclear weapon-based "doomsday" approach. These new platforms and employment concepts would give our leadership more defense options and approaches, so the nation could better react to the entire range of threats with something more flexible than a possible nuclear strike.

During this period of program growth, a small OSD staff office known as the Office of Systems Analysis (OSD/SA) was given the task of evaluating the costs of these programs as they came forward from the services for review and approval. These OSD estimates were not for budgeting purposes, or even to provide an independent total program estimate, but rather to give OSD decision-makers more confidence in the service estimates, and some validation of the budgets being requested by the program offices, by conducting an OSD cross-check of the program cost estimates for significant parts of a program.

The OSD/SA estimating approach was to take major pieces of the new program, particularly those pieces for which significant cost history could be generated, and create independent parametric estimates for comparison to the official program office cost requirements for that element. For example, they would estimate the cost of a new Air Force fighter's jet engine by taking the actual costs of current production engines, along with their thrust, operating temperatures and other parameters,

and then adjust the cost for the new engines based on the planned technical changes from that of the baseline. This cross-check methodology was not done for every system element under review, and estimates were often not complete in terms of a parametric for every piece of the new system acquisition. Also, it was difficult to use the parametric approach for very advanced systems with little relevant cost history, such as for space systems. However, and this was to be a key finding, where adequate parametric data did exist, the parametric answer from OSD/SA would almost inevitably turn out to be more accurate as to the ultimate actual cost than the program office estimates brought forward for budgeting.

Cost Analysis Improvement Group (CAIG)/ Program Analysis & Evaluation (PA&E)

By the end of the 1960's, when the development process for new defense systems had continued to become more complex and subject to more management oversight, there was a growing perception within DoD, in the Congress, as well as the public, that some very serious problems were arising with the acquisition process. Along with

SELECTED MAJOR ACQUISITIONS AS OF DECEMBER 31, 1970

The Current Estimate of Program Acquisition Cost for the 30 major weapon systems now being furnished to the Congress totaled \$107,600M as of December 31, 1970. This compares with a Current Estimate of \$103,453M for 30 systems on September 30, 1970--the additional system, the Air Force A-X program, accounted for \$4,147M of the quarterly increase of \$4,147M. The cost growth to date, representing the difference between the Current Estimate and the Development Estimate, adjusted for quantity changes, was \$4,147M at the end of December or \$1,333M more than the \$2,814M cost growth reported for the 29 systems in the September reports.

In terms of cause, economic change (inflation) accounted for the largest proportion of the cost growth at the end of December 1970--27 percent, followed by engineering change, 26 percent; engineering change, 20 percent; schedule change, 13 percent; program redefinition (change in scope), 7 percent; support change, 5 percent; program redefinition (change in scope), 7 percent; support change, 5 percent; unpredictable, 1 percent; and contractor cost overrun, 1 percent. The following table compares cost growth by cause between the September and December reports:

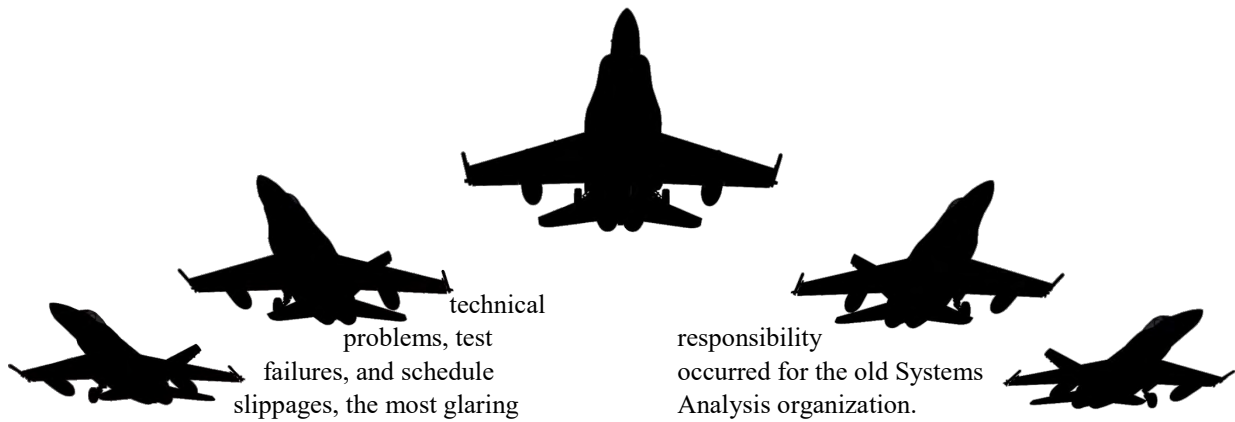
Cost Growth by Cause	December 1970		September 1970	
	Millions of Dollars	Percent	Millions of Dollars	Percent
Economic Change	\$ 2,844	27	\$ 2,705	26
Engineering Change	5,767	26	5,901	29
Schedule Change	4,400	20	3,998	19
Program Redefinition (Change in Scope)	1,475	7	-	-
Support Change	1,033	5	1,051	5
Unpredictable	173	1	161	1
Contractor Cost Overrun	293	1	165	1
Contract Performance Incentive	11	-	12	-
Contingency Provisions (C-5A)	-	-	400	2
Total	\$ 21,805	100%	\$ 20,467	100%

The following table reflects the current status, the Current Estimate of Program Acquisition Cost and the cost growth as of December 31, 1970 for the 30 weapon systems reported to Congress:

OASD(Comptroller)
Directorate for Information Operations
February 19, 1971

*Selected Acquisition Report (SAR),
December 1970*

continued



technical problems, test failures, and schedule slippages, the most glaring issue was the massive cost overruns that were appearing on virtually every one of the major programs then under development. The F-111 fighter-bomber, the C-5 transport, F-14 and F-15 fighters, SRAM nuclear missile, and HAWK air defense missile, among many others, were seeing almost daily headlines citing failures in all these areas.

In the 1971 Defense Selected Acquisition Reports (SARs) provided to Congress, the official DoD cost estimates for a total of 34 such programs, data which largely emanated from the respective program offices, had grown by an average of 200% in just a few years, and most were still many years from completion. The SRAM missile total cost estimate soared almost 500% between 1966 and the 1971 SAR.¹ These rates of growth indicated that far greater cost increases were in the offing before program completions.

For everyone involved, there came a crisis in confidence as to whether DoD could run their procurement business effectively. It was apparent that among many other areas of concern, the subject of cost validation and oversight had to be ramped up significantly. Some of the first corrective steps involved fixes with slogans like “fly before buy” and “design to cost”. More critically, a new organized review of program acquisitions was formulated by the creation of the Defense Systems Acquisition Review Council (DSARC) in 1969, to help the Secretary of Defense make major acquisition decisions in a more orderly and organized way, with better information and more objective analysis. To support the DSARC process in the area of cost, a major upgrade in capability and

responsibility occurred for the old Systems Analysis organization.

It was in December of 1971 that Deputy Secretary of Defense David Packard initiated a memo titled “Use of Parametric Estimates”, and together with SECDEF Melvin Laird, caused the creation of a critical support mechanism for the DSARC. They directed establishment of a Cost Analysis Improvement Group (CAIG), which included members from the major DOD procurement management organizations, tasked to prepare an independent parametric-based program estimate.

The original parametric approach of OSD/SA was greatly expanded to enable preparation of entire system life cycle cost estimates independent in approach from that of the program and contractor numbers. The CAIG would provide that product to the DSARC for comparison and evaluation of program office and service estimates. The OSD organization responsible for preparing the CAIG estimates was to be known as the Office of Program Analysis & Evaluation (PA&E).

While the original purpose of the CAIG was to offer alternative cost information to the DSARC for evaluating program cost estimates, it was not long before additional tasks were added to its portfolio, related to other systems acquisition processes and independent studies.

As these new tasks were added in the 1970’s and 1980’s, the CAIG methodology began to move away from the purely parametric approach of the independent costing process, and started to duplicate more traditional estimating methods such as obtaining data directly from contractors and other sources, to cost out program alternatives such as varying quantities, system upgrades verses new development, or the potential impact of schedule

1. CAIG Oral History Symposium Guide, September 10, 1997, page 6.

continued


changes. The CAIG also prepared estimates in support of source selections, to assess the soundness of contractor proposals, and for special studies directed by OSD principals. Also, the concept of dual sourcing for a given system in the 1980's resulted in estimates prepared to validate savings from multi-source investments. All of these added responsibilities resulted in typical CAIG preparation of about a dozen independent estimates per year revolving around major systems.

Office of Cost Assessment and Program Evaluation (CAPE)

The CAIG/PA&E structure for independent costing continued through many changes in DOD acquisition processes and organizational acronyms for almost 40 years. When the Weapon Systems Acquisition Reform Act of 2009 was passed to once again address defense acquisition issues, it also created a new costing organization at the OSD level – the Office of Cost Assessment and Program Evaluation (CAPE). Now reporting directly to the SECDEF, the CAPE is charged

with providing cost support for many OSD acquisition processes such as evaluating alternative weapon systems and force structures, development and evaluation of defense program alternatives, and the cost-effectiveness of defense systems. CAPE also supports OSD management reviews, including the Joint Requirements Oversight Council (JROC), the Future Years Defense Program, Quadrennial Defense Review, and the Secretary's Strategic Portfolio Reviews.

Conclusion

Over the past almost 60 years, the costing process for defense procurement has moved from a world with a lack of data, lack of analysts, and lack of costing processes to a very thorough, very structured and data-driven management of costs that tracks and measures cost issues from the contractor's floor to the senior levels of DoD decision-making. Many of you are very much involved in that process, and can look back on the decades of effort needed to reach our present capability with a justifiable pride in what the cost community has achieved. 

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If you're not certified yet, why not make it a year-end goal or a new year's resolution to become certified? Check the ICEAA website for the current exam schedule or contact ICEAA to schedule an exam in your area.

Thanks go out to the following individuals for volunteering their time to proctor the certification exam between mid-July and mid-October:

Ron Beheler, Robert Hampson, Thomas Harless, Chen Hu, Renee Jennings, Jennifer Lampe, Robert Nehring and Monique Ng.

CCEA® Achievers:

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Department of National Defence Canada

Marc-André Delparte,
Department of National Defence Canada

Matthew Gates, Technomics, Inc

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Department of National Defence Canada

The following recertified between
July 2017 and October 2017

Ghassan H. Al-Dossary	Jonathan Lister
Patrick Baranowsky	Arthur McCormick
Susan Catala	Kevin McKeel
Roger Kim Clark	Christopher Murray
Tom Dauber	Dave Peeler
Glenn Florey	Cari Pullen
Daniel Harper	James Rothman
J.D. Haynes	Rick Schwikert
Roger Hill	Eric Timinski
Eric Hong	Abbey Turnau
Richard Lee	John Yeaman

PCEA® Achievers/CCEA® Eligible:

William Mahoney,
Centre for Costing in Defence Canada

Matthew McGovern, Engility Corporation

Mark Pequeno,
Department of National Defence Canada

Washington Capital Area Chapter Report

By Meghan Kennedy, ICEAA Washington Capital Area Chapter President

New Chapter Board Elected

Following our chapter board election and with the start of the new business year, the board would like to announce some changes and welcome new members. First, **Aileen Donohue**, our Social Chair is now the Treasurer, replacing **Mike Yanavitch**. Second, the Board would like to welcome three new members to our ranks. Mr. **Michael “Jake” Mender** will be replacing Kammy Mann as Secretary. **Zach Jasnoff** will be replacing Anne-Marie Adams as Membership Chair. And **Omar Akbik** will be replacing Aileen as Social Chair.

Jake Mender is an Operations Research Analyst with the Army’s 21st Theater Sustainment Command. Previously he was an Operations Research Analyst with the Naval Center for Cost Analysis. He holds a MS in Systems Engineering from GWU, and a BS in Applied Economics from Ithaca College.

Zachary Jasnoff is Vice President, Professional Services for PRICE Systems, LLC. He has previously held roles with Lockheed-Martin, Boeing and JPMorgan Chase. He holds an MSE in Technology Management from the University of Pennsylvania. He also holds an MBA from American University and a BA from Villanova.

Omar Akbik is a Lead Analyst with Technomics, Inc. Prior to joining Technomics, Mr. Akbik worked as a consultant with Booz Allen Hamilton. He holds a bachelor’s degree in economics from the University of Wisconsin at Whitewater, a master’s degree in finance from the University of Melbourne, and is a Certified Cost Estimator/Analyst.

ICEAA Washington Capital Area Chapter 2017-2019 Board of Directors:

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Treasurer	Aileen Donohue
Secretary	Michael “Jake” Mender
Social Chair	Omar Akbik
Membership	Zach Jasnoff
Web Manager	Kevin Coonce
Past President	Dave Stem

The returning members of the board are: **Meghan Kennedy**, President; **Tim Anderson**, Vice President; **Ann Hawpe**, Program Chair; **Kevin Coonce**, Web Manager; and **Dave Stem**, Past President.

A huge thanks to our departing members for all their efforts over the last two-year term. And welcome to our new and returning board members! We’re looking forward to a great year!

Monthly Presentations

The chapter continues to offer a popular monthly lunchtime speaker series. Some of our recent presentations include:

September 2017: “Cost and Schedule Estimating Suite (CaSES) Overview”. Presented by **Nick Lanham** of NCAA/CAPE. Held at the National Geospatial-Intelligence Agency (NGA), Springfield, VA.

October 2017: “The Shortcomings of Cost Estimating Templates”. Presented by **Meagan Gadreault** and **Faye Kim** of Herren Associates. Held at Herren Associates, Inc., Washington, DC.

We also are planning some exciting events over the next few months:

December 2017: Happy Hour/Networking event

January 2018: Presentation by **Karen Richey** of GAO. To be held at MITRE, McLean, VA.

February 2018: “Technical Baseline”. To be presented by **Chris Hall** of Technomics and **Jason Dechoretz** of MCR at National Geospatial-Intelligence Agency (NGA), Springfield, VA.

Stay tuned and watch your in-box for more information on these upcoming presentations. If you’ve missed any of our past luncheon presentations, they are often available on our website <http://washingtoneaa.com>.

If you’re interested in presenting at one of our luncheons, please contact our program chair at ProgramChair@washingtoneaa.com.



Central Virginia Chapter Report

By Britt Staley, ICEAA Central VA Chapter President

The Central VA Chapter hosted a luncheon on-site at Naval Surface Warfare Center Dahlgren Division for the fourth meeting of the current term on September 7th. While attendees chowed-down on some Chapter-provided Jersey Mike's subs, we collectively celebrated the achievements of two of our outstanding members and conducted an informative "lessons-learned session."

As part of our recognition program, the ICEAA Central VA Chapter presented Dr. **Jon Brown**, Team Lead for the NSWCDD Code V11 Cost Team, with the "ICEAA Central VA Chapter FY2017 Analyst of The Year Award" for his exemplary technical contributions to the local and greater ICEAA Cost Community. Mr. **Tom Schaefer** from Tecolote Research was also recognized with the "ICEAA Central VA Chapter FY2017 Service Award" for going over and above in service of his Chapter and its initiatives.

In an effort to ensure that we as a Chapter practice continuous process improvement, we also conducted a "Lessons Learned" session with our membership during this meeting. The feedback from our membership has proved extremely beneficial as we move into FY18 and our new board takes the helm. Speaking of the new board...

I would like to introduce the ICEAA Central VA Chapter 2018-2019 Board of Directors:

President: Britt Staley (bstaley@technomics.net)


Vice President: Tommy Knoll (tknoll@tecolote.com)

Treasurer: Brian Bucceri (bbucceri@tecolote.com)

Secretary: Nicole Robertson
(nrobertson@technomics.net)

Membership: Erik Gyorgy (egyorgi@tecolote.com)

On November 16th, the ICEAA central VA Chapter (and its new leadership) will be hosting its first quarterly membership meeting of the new fiscal year. Since our last meeting, the new board has discussed our plans and objective for the coming year. We have some ambitious goals, but we are up to the challenge.

If you are in the Central VA area (Quantico, Dahlgren, Pax River), and are not affiliated with a Chapter yet – or would like to change your affiliation – please don't hesitate to reach out to any of our board members with your inquiries! The "the more the merrier" at the ICEAA Central VA Chapter! 

ICEAA Central Virginia Chapter 2018-2019 Board of Directors:

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Southern California Chapter Report

By Rich Harwin, Southern California Chapter President & Region 7 Director,
and Tom Bosmans, SoCal Chapter Vice-President

The Southern California (SoCal) Chapter of ICEAA Region 7 conducted an extremely successful Fall Workshop at the Raytheon Space and Airborne Systems Facility in El Segundo, California on September 20th. Among the terrific speakers and presentations were:

Dr. Robert Wright, Director of Engineering Operations, Raytheon SAS as our keynote speaker; *Collecting Cost and Making Change*

Dr. Rafiqul Noorani, Professor & Graduate Dir of Mech Engr, Loyola Marymount University *3D Printing – Technology, Applications and Selection*

Kurt Brunner, CCEA-P / Leidos Senior Principal Position to Win Strategist / Parametric Cost Estimator; *Improvement Curves: Beyond the Basics*

Stu Swalgen, Technical Discipline Lead, Reliability, System Safety, & Specialty Engineering; and Program Affordability and **Dr. Zhaofeng Huang**, Technical Fellow, Reliability Engineering and Probabilistic Analysis, both from Aerojet Rocketdyne; *Early Cost Risk and Confidence Determination with Minimal Project Information*

Karen Mourikas, Assoc Tech Fellow, Operations Analysis, Affordability & Systems Optimization, The Boeing Company *Machine Learning Approach to Cost Analysis*

Doug Howarth, CEO MEE Inc.; *MEE Inc. on the Towed Glider Air Launch System (TGALS) for NASA*

Gurney Thompson, Senior Cost Researcher, PRICE Systems LLC; *Deployment Cost Estimation for IT/Electronic Systems*

Raytheon also provided a tour of their Space and Airborne systems test facilities on site.

A new type of Southern California Chapter Winter meeting is being planned. It will be held **December 13, 2017** at the **Boeing Satellite** also in **El Segundo, California**. The agenda will include a networking lunch and:

John Weisinger, Director of National Satellite Programs, Boeing as our Keynote speaker,

Chinson Yew, Space & Missile Center LAAFB

Rich Harwin, President of the So Cal ICEAA chapter will lead a discussion on future chapter organization, operating model, activities and ICEAA services available



As an opportunity for ICEAA members and other participants to meet outside the lecture hall, an optional ICEAA networking lunch is being planned in the El Segundo area. The chapter will arrange the lunch and location but each attendee will be asked to pay for their own meal

The Chapter Spring 2018 Workshop promises to continue our traditional workshop! It's planned for **March 2018**. Many dynamic speakers are already enlisted and further details will be available soon. This promises to be another fantastic all day event!

As always, our workshops are no cost, last most of a day, and as an incentive to stay until the last presentation is complete, a membership drawing is held at the end of the day.

If you have questions about your membership status or would like information about membership in general, contact **Steve Sterk** at steve.a.sterk@nasa.gov or (661) 276-2377, or the ICEAA office at iceaa@iceaaonline.org or (703) 642-3090.

If you are interested in hosting a workshop or making a presentation at a workshop, please contact **Rich Harwin** at richard.a.harwin@boeing.com or **Tom Bosmans** at tom.l.bosmans@leidos.com

Our workshop focus is always to “Advance, encourage, promote and enhance the profession of cost estimating and analysis through the use of parametrics and other data-driven techniques for use by the membership as well as the general public”. The Southern California and San Diego Chapters of ICEAA will continue to offer workshops that include a notable and diverse group of extraordinary speakers, training sessions, cutting edge topics, and knowledgeable attendees that are fully entertained and engaged.



View upcoming SoCal Chapter workshop agendas or download previous workshop briefings at:
www.iceaaonline.com/chapters/socal



Society for Cost Analysis & Forecasting (SCAF): Costing News from the UK

by Dale Shermon, SCAF Chairman

Dear all, as the American hurricane season fills the UK news again, we thank our little island in northern Europe for its predictable, but mild, wet summer. As the third quarter of the year has closed, the days are getting shorter again and the British summer is starting to give way to winter.

In September, the SCAF conference was held at the Queen Elizabeth II Conference Centre and the programme of speakers was excellent. In the shadow of the Elizabeth Tower of Parliament and the now silenced Big Ben tower, we were treated to an educational day of presentations on a variety of topics; you will find a report and pictures further in this newsletter. The theme of this year's conference was "*Achieving Value for Money: Is Partnering the Solution?*" and this provided an opportunity for some stimulating discussion and networking between the formal presentations.

There was a pause in proceedings just after lunch when I conducted the SCAF Annual General Meeting. SCAF management reported that the Society has had another good year with workshops, a conference, and an awards banquet. We took the opportunity to thank last year's committee and elect another strong committee for the forthcoming year. The Society is still financially sound and we are seeking a new secretary; any volunteers are welcome! Also, we are always seeking presentations for future workshops and conferences, so get engaged with the themes and join the debate at SCAF!



*DragonFire System
MBDA with QinetiQ and Leonardo-Finmeccanica*

I was fortunate to be able to attend the Defence and Security Exhibition (DSEi) at the Excel centre in London. It was extremely impressive with over 34,000 attendees including international delegations, government officials, equipment and system manufacturers, integrators and small & medium enterprises from 84 countries. It was fascinating to see the latest technology including the DragonFire system, and the design for its turret, known as a beam director, which will be used to trial this new technology. The beam director brings together a powerful laser emitter as well as world-class electro-optics for target identification and tracking.

On a lighter note, I also saw a delegation inspecting a stand of small arms. The staff had given them the largest rifle on the stand to hold and they were taking turns having their picture taken; the .50 cal. rifle was bigger than the gentlemen holding it!



The new SCAF committee will start immediately to plan the next year of events. Our next workshop will be our "*Vendor tool and services day*" for members and non-members to attend FREE on the 14th November at the BAWA Centre, Filton, Bristol. We have invited tool and service providers in the cost forecasting and analysis capability to have an exhibition stand and present case studies of their capability. We can't guarantee that it will be as big as DSEi, but it will be an informative and educational day. Please feel free to bring colleagues to the event for free; there is such a thing as a free lunch! ☺