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- The ISPA Journal of Parametrics reprinted the **1993 ISPA Conference Keynote Address** by **Bill Reed, DCAA Director**. After referring (again) to the 1979 cost **modeling** article, entitled, "Parametric Cost Estimating – An Audit Perspective" (previous slide) by the then-Director of DCAA, Bill reiterated DCAA's support to parametric estimating for contractor proposals and went on to identify where parametric cost **estimates** were failing the credibility test.
- Typical contractor **parametric cost estimate** failures were judged to be:
  - Estimates not based on actuals or updated data.
  - Estimates over time varied significantly.
  - Estimators and accountants not communicating with each other.
  - Lack of written policies and procedures.
  - Estimates made by persons not responsible for performing the work.
- Note: an impetus to the founding of ISPA was the perception that parametric estimates could not be audited; here was contrary evidence that they could be.



# Beginning a Series of ISPA Journal Articles:

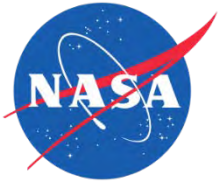
## 1. Air Force CAIG

- The Summer 2006 Journal featured our first of a series of invited articles from **Rich Hartley** representing his multiple positions as Chief, Cost Analysis Improvement Group; Deputy Assistant Secretary of the Air Force for Cost and Economics; and Chief, Air Force Cost Analysis Improvement Group Support Division, (AFCAIG), entitled “What are Quality Cost Estimates?”
- Hartley identifies the following areas to ‘watch out for’ when preparing government and contractor cost estimates:
  - Lack of transparency associated with data sources or estimating methods used - failure to establish a clear track from actuals to estimates.
  - Use of, for cost estimating or cross-check purposes, piecemeal (partial) data or data that otherwise cannot be traced to auditable program cost data.
  - Use of select data and estimating models from multiple sources - raises suspicion of “cherry-picking” to get pre-desired results.
  - Unrealistic risk-analysis results, not defining risk inputs precisely, or not tracing them to historical experience, not linking risks to potential cost impacts.
  - Excessively detailed briefings to decision makers or inclusion in such briefings of information extraneous to the decision to be made.
  - Failure to integrate schedule and time with the cost estimate.
  - Lack of, or improper, calibration.
  - Omitting cost elements (i.e., systems-of-systems level, systems engineering, and program management).



# Continuing Journal Series:

## 2. NASA



Then, in the Spring 2007 ISPA Journal, **Dr. Joe Hamaker**, then **Director of the Hq NASA Cost Analysis Division**, provided his response to the first “What are Quality Cost Estimates?” article but adding his own most important attributes of quality in cost estimating to be:

- Sufficient reserve to cover the “up morphs” [risk adders] that most projects undergo.
- Independent cost estimates performed by non-advocates.
- Top-level sanity checks.
- A management culture that desires good estimating.

# Continuing Journal Series:

## 3. Lockheed Martin

- These two quality-focused articles by government executives quickly followed, in the Fall 2008 issue of the **ICEAA** Journal of Cost Analysis and Parametrics (successor to the ISPA Journal of Parametrics) by a contractor perspective written by **Richard Janda**, Vice President of **Program Assessment and Evaluation, Lockheed Martin**.
- Richard believes the following characteristics assure a quality cost estimate:
  - Is the estimate based on objective data?
  - Is the analysis honest? [the honest broker]
  - Are the data and analysis relevant?
  - Is the basis of the cost estimate logical?
  - Is the estimate accurate?
  - Is the estimate holistic? Integrated? Complete?
  - How well is the estimate communicated?





# Continuing Journal Series:

## 4. Army CEAC

- Then, in June 2009, **Stephen Bagby**, Deputy Assistant Secretary of the Army for Cost and Economics and the **Director of the Army Cost and Economic Analysis Center (CEAC)** entered the debate on estimating quality to describe the Army process to ensure the probable costs of its programs are adequately reflected in a limited budget.
- Established Army Cost Review Board (CRB) to combine multiple cost estimates (program office, independent estimate) into single Army Cost Position (ACP)
- Increased focus when lacking adequate program and technical information, such as relying on the Initial Capability Document (ICD) when a Cost Analysis Requirements Description (CARD) is not available.
- Attempted to link capability with cost.



# Continuing Journal Series:

## 5. European Space Agency

- In 2011, the European Space Agency (ESA) published (ICEAA Journal 2011): **Herve Joumier, Chief of Cost Estimating, ESA, “Quality Cost Estimates ...”**
  - Build on published work by Hartley, Hamaker, Janda, and Bagby (published in journals)
  - European aerospace lacks mega-estimating groups (as in US) except for ESA, Airbus, and UK MOD.
  - Define estimate quality (not lowest cost and shortest schedule)
    - Forget the magic number concept
    - Dangers of the “initial poor or naïve cost estimate” paradigm
    - The value of accountability [who prepared the estimate]



# ICEAA Denver: 2015 Best Conference Paper

- **Andy Prince**, “The Psychology of Cost Estimating,” near the end of this well-researched and intuitive paper are his signs of a (possibly) overtly-biased estimate and “things to look out for;”
  - Discarding or ignoring applicable data
  - Placing too much emphasis on a single datapoint or opinion
  - Tenuous analogies or extrapolations
  - An estimate that deviates significantly from **the historical trend or reasonable analogs**
  - Any estimate that depends on changes in historical business practices [unverified new ways to do business]
  - Falling in love with a subjective assessment



# ***So, Is There Consensus on What Assures Credibility in the Cost Estimating?***

*The wisdom of the crowd* (**our peers**) suggests that consistent with enough time, qualified estimating tools and resources, and relevant information, the **estimate credibility** can be assured by five attributes:

1. A state-of-the-art, transparent, clearly defined estimating process.
2. Calibrated cost models or statistically-qualified CERs with relevant and verified data.
3. Peer reviews, sensitivity analyses, and independent crosschecks.
4. A defined baseline, sound assumptions, and suitable estimate structure.
5. Logical, reasonable, and repeatable cost and schedule predictions with risk [and schedule] assessment.