

Turning Avoidable Guidelines Into Sensible Requirements – *Credible Space Cost Estimating Policy*

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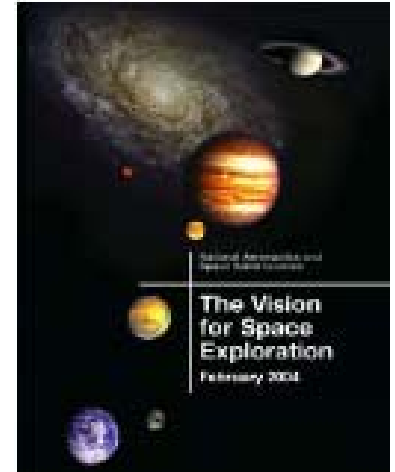


Introduction

- ▶ NASA has experienced a renaissance in cost estimating
 - Growth involved three components;
 - growing the number of trained cost estimators,
 - educating cost estimating customers and
 - providing guidance on the discipline of cost estimating at NASA

- ▶ The Vision for Space Exploration
 - Cost was not only a concern, now it was the focus of attention for all future programs

- ▶ Five years later, how have the cost estimating challenges been met?
 - Most visible tool increasing estimating credibility at NASA is the Cost Estimating Handbook (CEH)
 - 2002 NASA provided consistent guidelines
 - 2004 NASA CEH solidified initiatives into Agency required policy
 - Methods and tools for “avoidable guidelines” initially found and rarely heeded at NASA transformed into sensible cost estimating requirements



Avoidable Guidelines - *Critical Questions*

- ▶ Is estimating for a space system different than estimating for aircraft? Estimating manned missions different than unmanned missions?
- ▶ Is every NASA Center and their cost estimating needs different?
- ▶ How can we best communicate the cost estimating process to new NASA cost estimators and senior NASA cost estimators alike?
- ▶ Can we speak the same language to provide guidance from trained estimators to aerospace engineers?
- ▶ Are we working towards affordable future systems and avoiding cost growth?
- ▶ How do we provide guidance that all NASA Centers will follow rather than avoid?

Unlike past efforts, this guideline was created by the cost community, for use by the cost community, resulting in a constructive requirement that an estimator can incorporate into their daily work



Avoidable Guidelines – *Space vs. Air*

- ▶ There are differences between spacecraft and aircraft estimating
 - Basics of the core cost estimating process were no different
- ▶ Initial CEH focused purely on presenting a common vision for the core cost estimating process
- ▶ Tips where appropriate
 - Estimating manned and unmanned missions
 - as well as aeronautics



Avoidable Guidelines – *Is Every Center Different?*

- ▶ Each NASA Center has a unique focus; Still striking commonalities at the beginning and end of an estimate
- ▶ Same basic cost estimating techniques and presenting results to for same budget
- ▶ Challenge was to standardize the CE process through the presentation of the results
- ▶ Standardization of the process allows flexibility within unique product needs, while ensuring credibility by following the same tested cost estimating process accounting for estimating methodologies, risk, and documentation
- ▶ NASA cost estimating process was developed using direct input from all Centers



Avoidable Guidelines – *The Communication Challenge*

- ▶ How would these be communicated to the NASA estimators?
 - Some with years of experience at other agencies but new to NASA
 - Others new to the profession
- ▶ Interviews with the full spectrum of NASA cost estimators
- ▶ Tone of CEH was a balance:
 - High level and quick reference information for experienced estimator reference
 - Summarized step by step guidance for the new estimator
- ▶ Step by step guidance common communication method
 - Detailed enough to show the NASA approach
 - Not in depth enough to become a text book reference
 - Links to other sources were given to direct the new estimator to other resources without reinventing the wheel for NASA



Avoidable Guidelines – *Estimators to Engineers*

- ▶ Challenge of speaking to everyone from trained cost estimators to engineers, resource managers to project managers was addressed through prioritization
- ▶ Interviews mainly conducted with members of the NASA Cost Estimating Community
 - Some engineers that often addressed cost
 - Some Project Managers to determine their needs as cost estimating customers
- ▶ Primary audience of the CEH was the cost estimator
- ▶ Secondary audience was the others at NASA who interface with cost estimating and need to understand the process

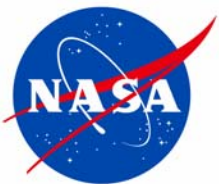


Avoidable Guidelines – *Affordable Future Systems*

- ▶ Affordable projects and avoiding cost growth could not be answered solely through the creation of new guidelines

- ▶ CEH focused on increasing the credibility of NASA cost estimates, resulting in:
 - increased confidence and realism in NASA cost estimates
 - Increasing the credibility of NASA cost estimating

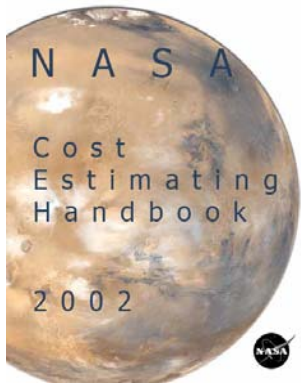
demonstrating the NASA CEC was doing their part towards delivering affordable future systems for the Agency



Avoidable Guidelines – *The Unspoken Question*

- ▶ How do you ask estimators that have spent years avoiding guidelines from Headquarters to now rally around and support new guidelines for the NASA cost community?
 - For years cost estimating at NASA was underappreciated and as a result estimators had to work around the ever changing directives
 - Pressure to deliver cost estimates that met the available budget
 - Delivering a credible cost estimate was not always welcome
 - Estimate was often conducted with an understaffed and under resourced team
- ▶ These issues undermined the credibility of the cost estimates creating an environment for estimators to work around the system, avoid any new requirements and cautiously present their work
- ▶ Creating unified cost estimating guidance for NASA not only required answering some of the most basic questions – it required a complete culture shift
 - Estimators needed resources, support and sensible guidelines
 - This was a larger challenge than expected





2002 NASA CEH Approach

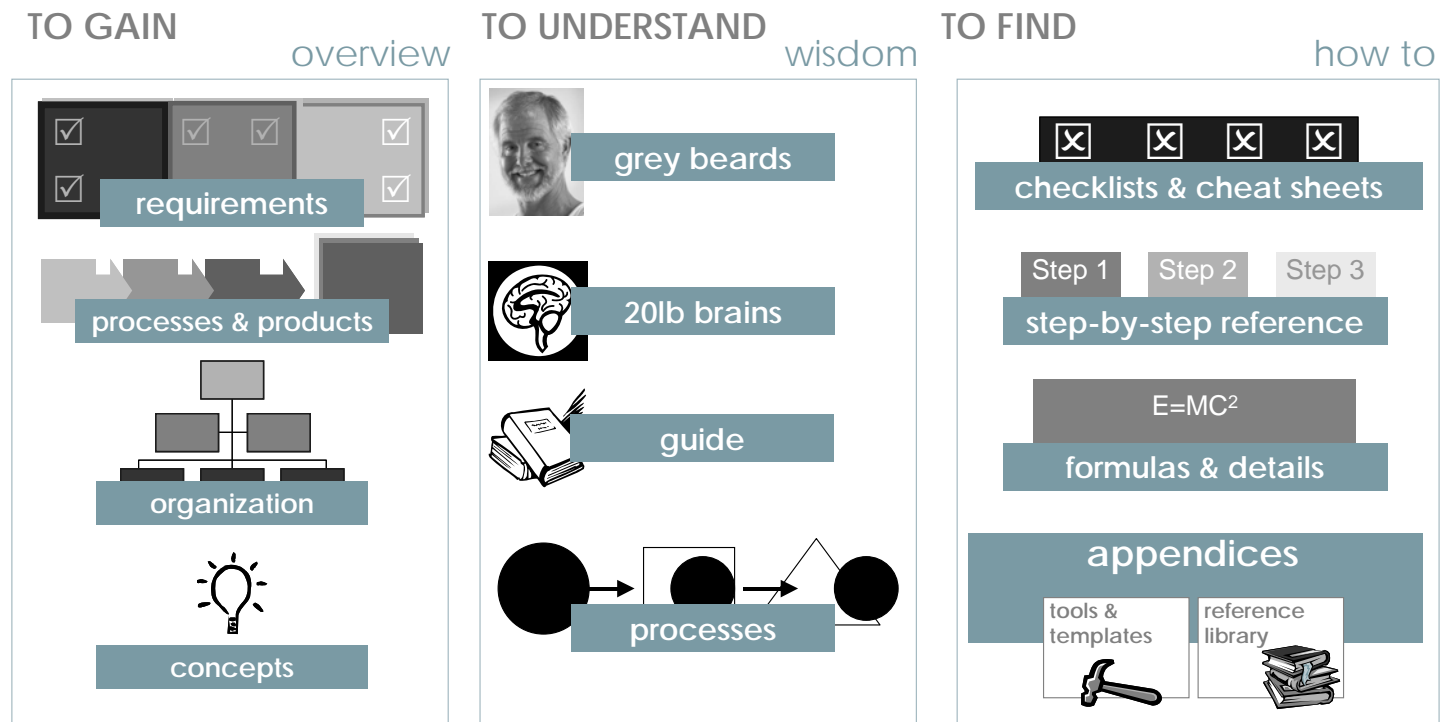
- ▶ Goal of the 2002 NASA CEH was to create a resource providing structure for cost estimates and consistency in the processes for all of the NASA centers
- ▶ Creating this structure and consistency, yielded guidelines all could agree upon
- ▶ Data was gathered by:
 - Documenting existing procedures
 - Collecting industry best practices
 - Interviewing the existing cost estimating community at NASA
- ▶ The theme that drove the 2002 NASA CEH:
 - Communication
 - Consistency
 - Credibility





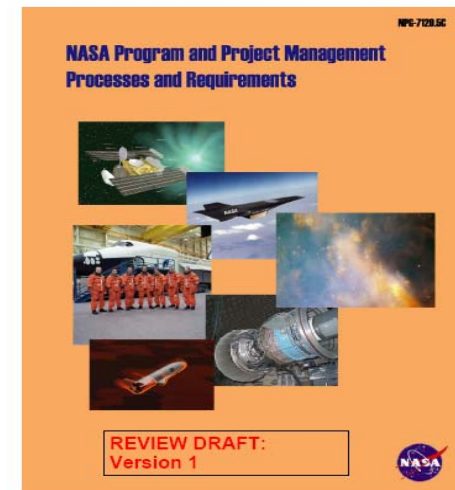
2004 NASA CEH Approach

- ▶ 2002 NASA CEH was a success because it was a collaborative effort involving the expertise and needs of the NASA cost community
- ▶ 2004 NASA CEH continued inclusive approach



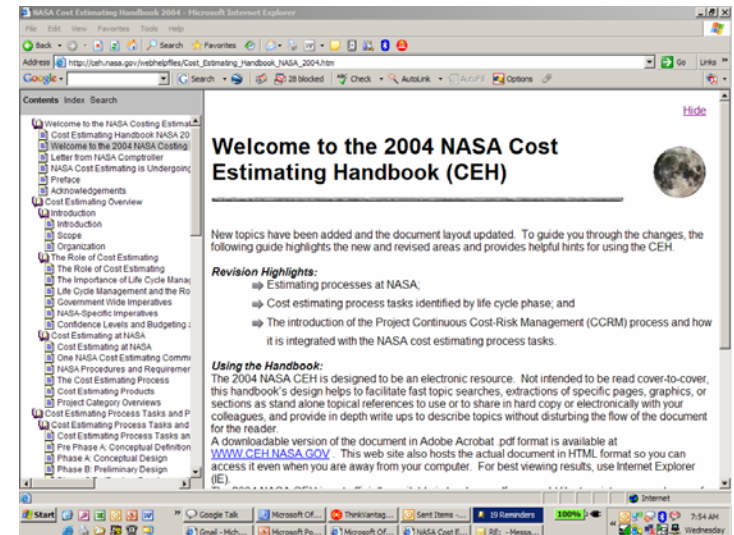
2004 NASA CEH Approach – *Guidelines to Requirements*

- ▶ 2004 CEH expanded the reach by turning guidelines into requirements in line with NASA Procedural Requirements (NPRs) such as NPR 7120.5C
 - High level cost requirements
 - Cost risk requirements
 - Cost reporting requirements
 - Milestone reviews and Independent Estimates



Sensible Requirements

- ▶ Truth and accuracy combined with a defensible and well-documented estimate will always earn the respect of a decision-maker
 - Strengthening guidelines and expressing them in the form of requirements that are not to be avoided but are followed by cost estimators and others at NASA results in structure and support from the highest levels
 - Estimator spends less energy “avoiding” useless guidelines and more energy on producing credible cost estimates
 - This is possible because the new requirements were developed by cost estimators before they became requirements
 - Results in success for the cost community and the Agency by having useful requirements, supporting the cost community and yielding credible cost estimates for the Agency
- ▶ Communicating these requirements in an easily accessible and economical manner is also critical: www.ceh.nasa.gov.



Biography – *Jill A-C Hardash*

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Jill A-C Hardash has more than 15 years of experience providing economic and business analysis services for space systems and other large programs to the Department of Defense, NASA and the space industry worldwide. Her expertise is in project management, cost and economic policy and financial management of large public sector programs. She has extensive experience in cost estimating and analysis, Cost Analysis Requirements Description (CARD) development, CADRe requirements development, acquisition management, business and financial management, Scheduling and Earned Value Management (EVM) support and the Planning Programming, Budgeting and Execution System (PPBES) process. Other professional accomplishments include being selected as a Regional Finalist for the White House Fellows Program, earning her Certified Government Financial Manager (CGFM) certification and being hand selected for high visibility studies such as the Air Force Space Systems Development Growth Analysis and the Space Research and Development Industrial Base Assessment conducted by Booz Allen Hamilton. She is the primary author of the 2002 and 2004 NASA Cost Estimating Handbook, the 2005 Naval Sea Systems Command (NAVSEA) Cost Estimating Handbook and the Australian Department of Defence Cost Estimating Method. She is also the recipient of numerous awards, most notably the Booz Allen Hamilton Values In Practice (VIP) award. She earned a BA in Business Management with a minor in Economics from Loyola Marymount University and an MBA from Pepperdine University.

