

## **Realities of Cost As an Independent Variable (CAIV) - Stakeholder Perceptions**

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### **Abstract**

Cost As an Independent Variable (CAIV) has been shown to be an effective tool to identify and mitigate program risk by balancing effectiveness and affordability. To help achieve an effective and affordable system, CAIV helps to establish goals and provide cost feedback to development teams as requirements change and design details emerge. However, depending on the project phase (Concept, Technology Development, SD&D, Production and Operating & Support) and the level of stakeholder support (both customer and contractor), there is great variability in the level and scope of CAIV application and investment in cost analysis capability. A survey of both government and industry stakeholders was conducted to assess the level of CAIV application in the real world. This paper presents the results of our survey and the perceptions of the various stakeholders as to why CAIV application may have been limited.

### **Introduction**

Anecdotal evidence shows that while Cost As an Independent Variable (CAIV) is often cited as a key element of successful program development, its application is often limited in scope or not addressed. While most cost professionals are familiar with the benefits of early and robust application of CAIV principles, decision makers often are reluctant to fully support the resources needed to establish Life Cycle Cost models and provide continual LCC feedback to design teams on design decisions.

Program managers and support groups are focused on successfully completing current phase contracts and in gaining customer approval to move to the next program phase. The anecdotal evidence indicates that budgets during early development programs are limited and CAIV is seen as an expendable luxury.

See Appendix for all survey comments, survey questions and format, and statistics for each question

## **Approach**

To determine if there was a solid basis for the perception that CAIV and associated tools are not well used to help improve overall program outcomes, a survey was sent to over 125 functional managers in both industry and government to determine their perceptions on CAIV application. Survey questions asked how stakeholders would invest to determine in future phase costs (CAIV) during each “development” phase. The intent was to see how stakeholders and key decision makers viewed CAIV application as their programs move through the development process (Concept Definition, Tech Development System Design & Development (SD&D)). Additional questions regarding CAIV issues such as effectiveness, budget support, standard work and accuracy, were included.

To better focus on subsets of stakeholder perceptions - and to identify potential ways to mitigate problems - respondent demographics were captured by function and organization. For example, it was postulated that programs, finance and executive managers might view the expense to support CAIV differently as is their understanding of the processes and outcomes.

Of the 125 invitations, 70 responses were received identifying themselves as one of seven different functional groups and from either government or industry. The data was summarized in graphical format, conclusions were drawn and next steps were identified to clarify trends and focus on new areas for future study and action.

## **Survey Questions**

The survey consisted of 17 questions in five sections (see Appendix for complete set of survey questions):

The *first* section asks “How much would you spend to estimate the cost for subsequent phases?” and then asks the respondent to estimate for each development phase (Concept Definition, Technology Development, and System Design & Development) how much they would spend to estimate the cost for future phases including Production and Operating & Support.

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The *second* section asks a similar question about the “importance” of each CAIV - “Absent funding constraints, how would you rate the importance of CAIV/Life Cycle Cost analysis to achieve success in subsequent phases?”

The *third* section looks generally at the issues and perceptions that may impact CAIV effectiveness. This includes questions about general understanding of the CAIV process, effectiveness of CAIV, accuracy of CAIV tools, budget support for CAIV activity, and whether CAIV is considered “standard work”

The *fourth* section collects the respondent demographics including organization (government or industry), function (Program Management, Engineering, Sales/Marketing, Customer Support, Finance or other (later determined to be Corporate Strategy) and experience.

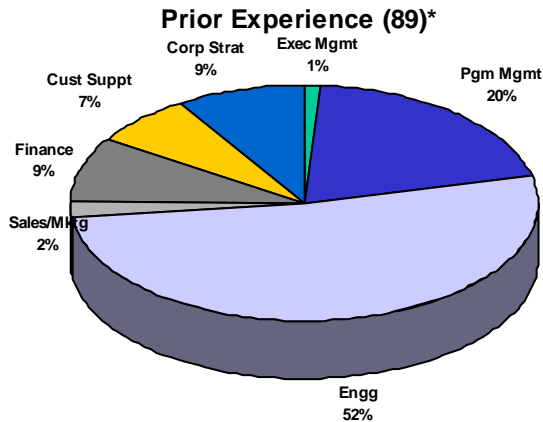
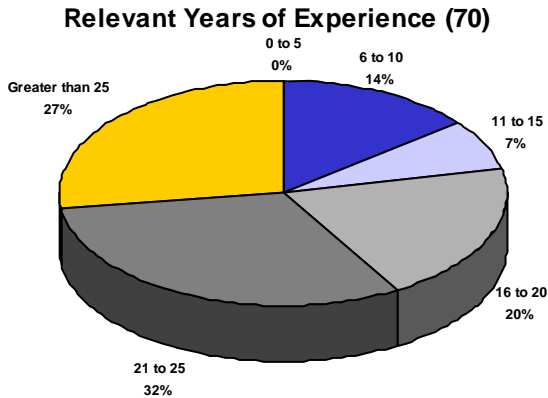
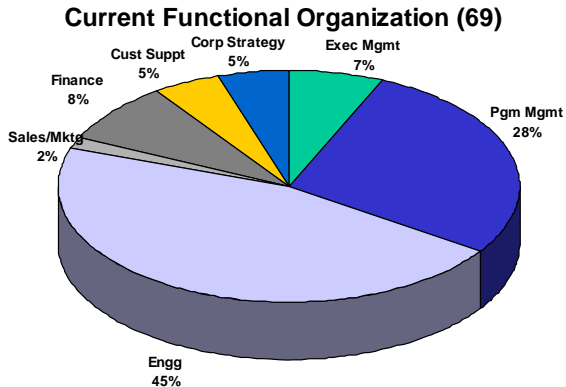
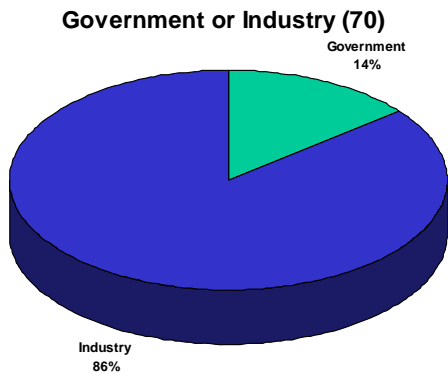
The *fifth* section provides a general area for comments on CAIV/LCC analysis

**Survey Results**

**Demographics**

Of the 70 respondents, 14% were from government and 86% from industry. The largest functional group represented was Engineering with 46%, followed by Program Management with 28%. The remaining respondents were from Executive Management, Finance, Corporate Strategy, Customer Support, and Sales/Marketing. It was also determined that more than three quarters of respondents have more than 15 years experience and most have worked in other functional areas.

The following figures illustrate the demographic content:



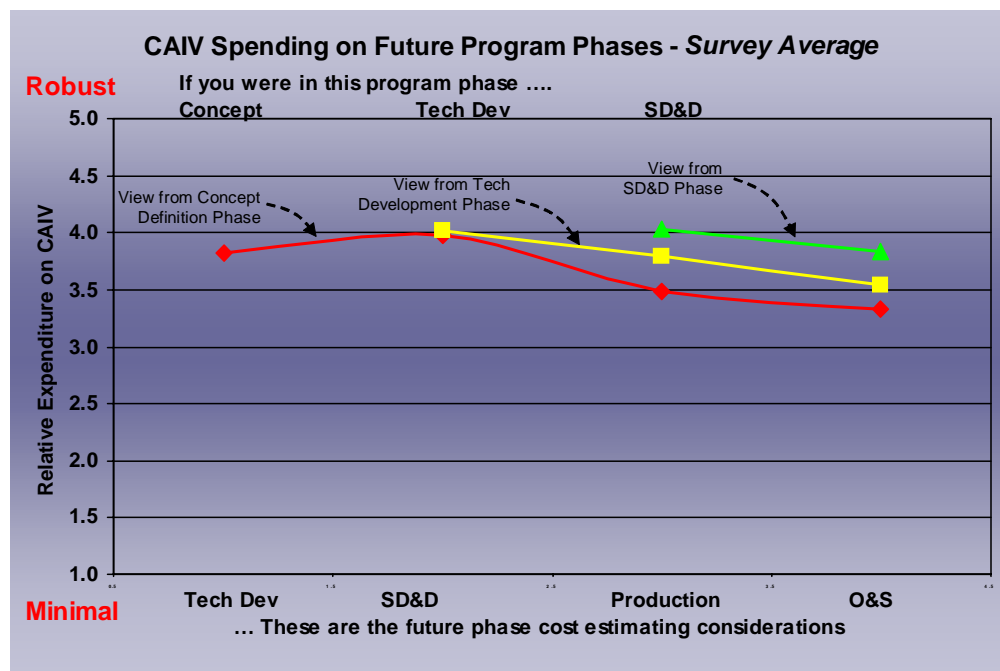
\*Respondents may select more than one Category

**CAIV Activity as a Function of Program Phase**

Per the DOD Integrated Defense Acquisition, Technology, & Logistics Life Cycle Management Framework, survey participants were asked to consider their management approach during the first three program phases that may impact implementation of the last four:

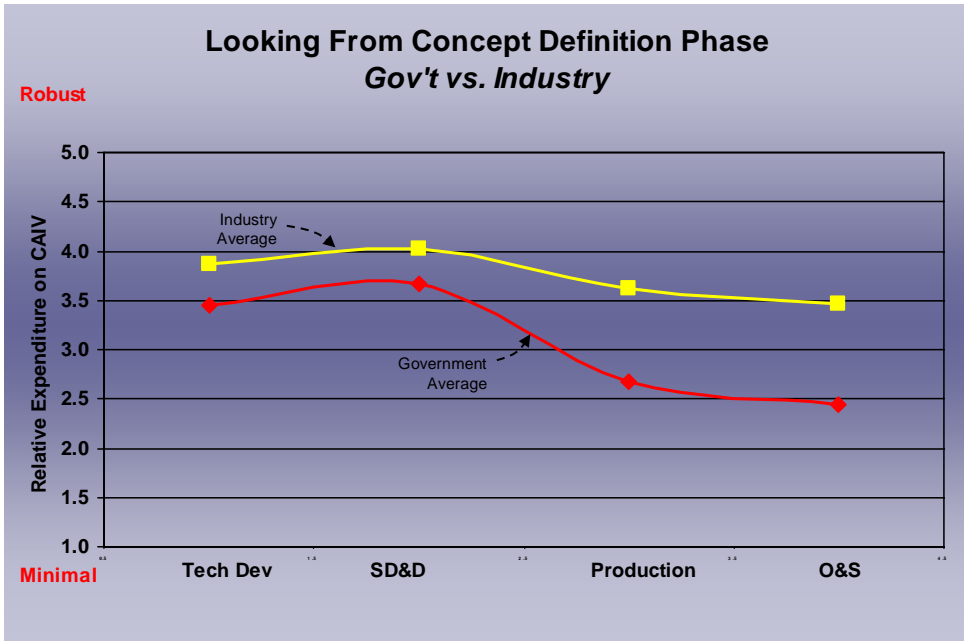
1. **Concept Refinement** - Refine initial concept, Develop Technology Development Strategy
2. **Technology Development** - Reduce technology risk and determine appropriate set of technologies
3. **System Design & Development** - Develop capability; reduce risk; ensure supportability; reduce footprint; design for producibility; ensure affordability; demonstrate system
4. **Production** - Achieve operational capability that satisfies mission needs
5. **Operating & Support** - Meet operational support requirements and sustain system in the most cost-effective manner over its total life cycle, dispose of the system

On average, respondents indicated that the “next” program phase was the most important to estimate – with less effort on the downstream Life Cycle view. The following chart shows the trend, regardless of the development phase, that the next phase cost was more important than later phases.

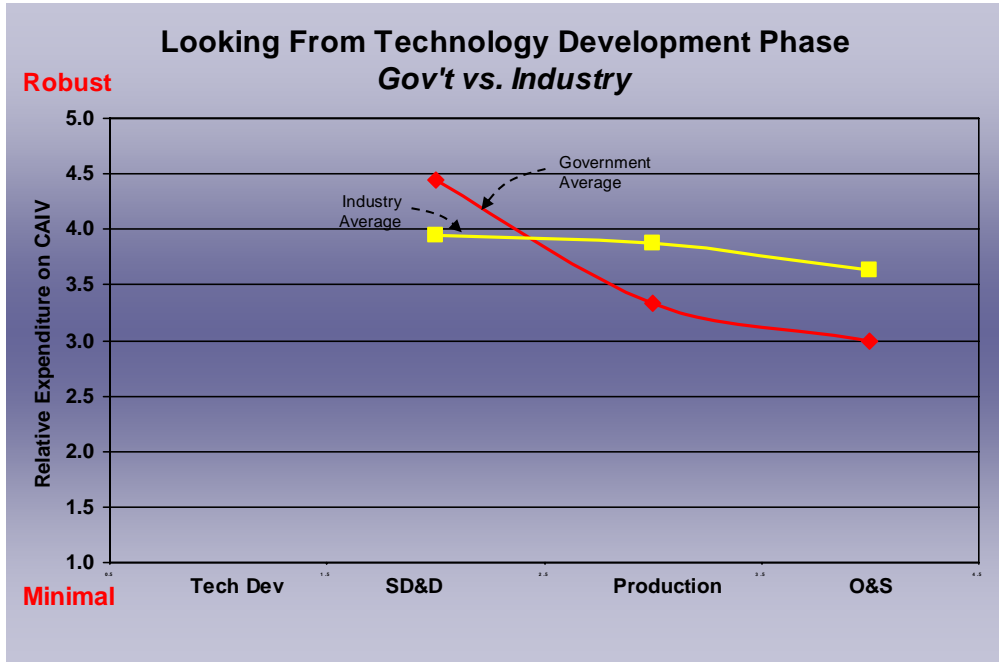


**Government vs. Industry results**

When respondents were separated by Government and Industry it appears that Industry takes the longer view as illustrated in the chart below when looking from the *Concept Definition* Phase.

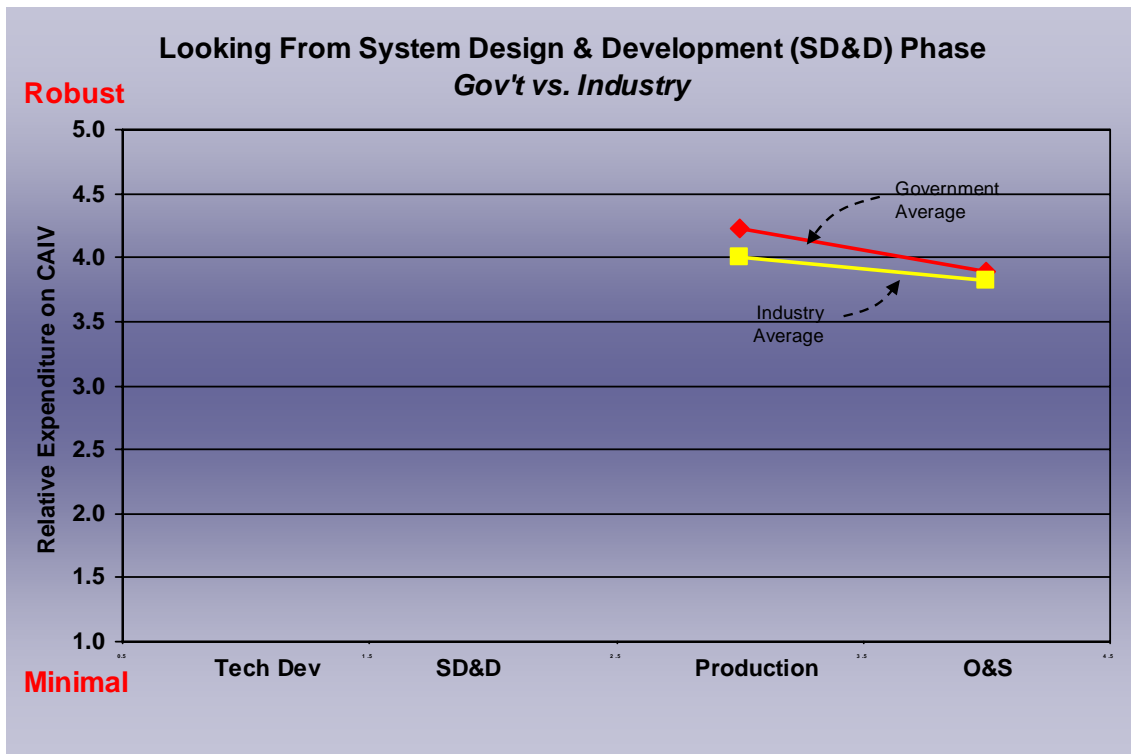


However, when asked about future phases if they were in the Technology Development phase, the government respondents view Production and O&S cost estimates as more important than Industry as illustrated below:



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Finally, when asked about future phase cost if they were in the SD&D phase, the government respondents view Production and O&S cost estimates in about the same way as Industry - illustrated below:

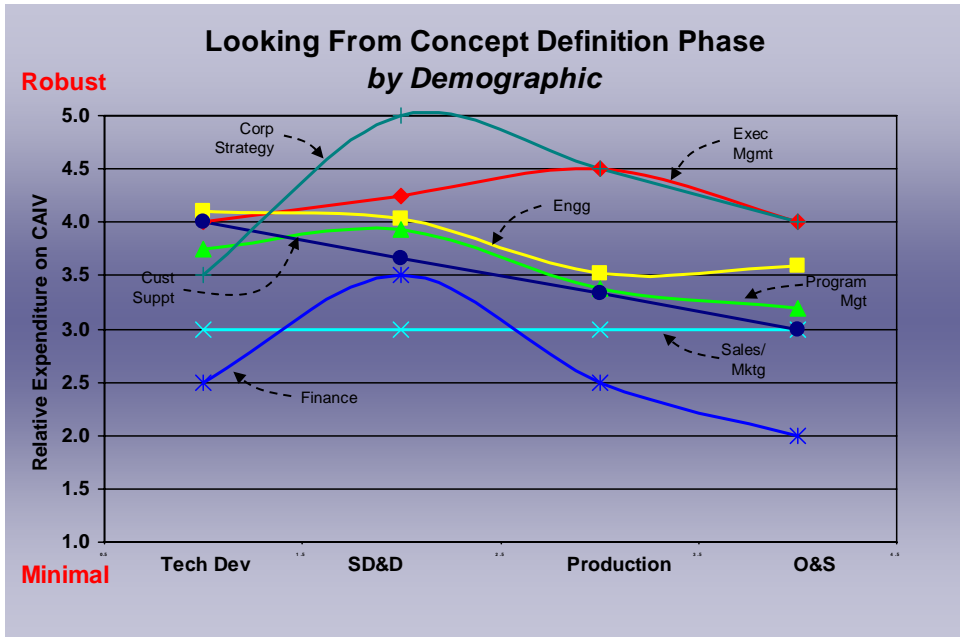


**Results by Function**

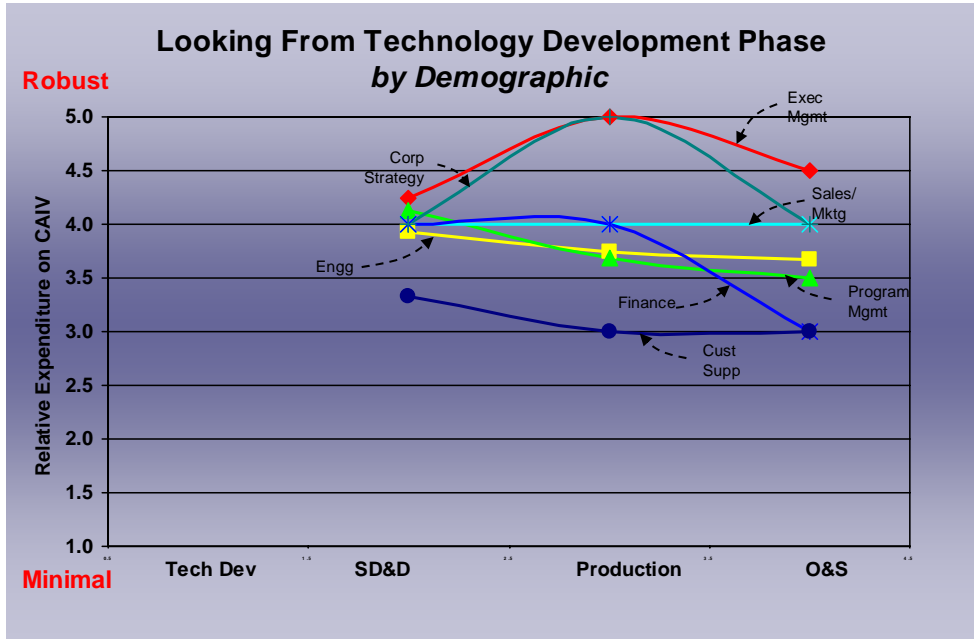
When viewed from the *Concept* Phase, Corporate Strategy and Executive Management recognize the importance of future phase estimates as compared to other functional stakeholders. This does not seem surprising in that these groups necessarily take the longer view for overall program success. Interestingly, Finance has the least positive view for support of CAIV and O&S cost when in the concept phase.

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The graph below illustrates this trend, including the overall trend across all functions to be more interested in near term phases than far term like Production and O&S when in the *Concept* phase:



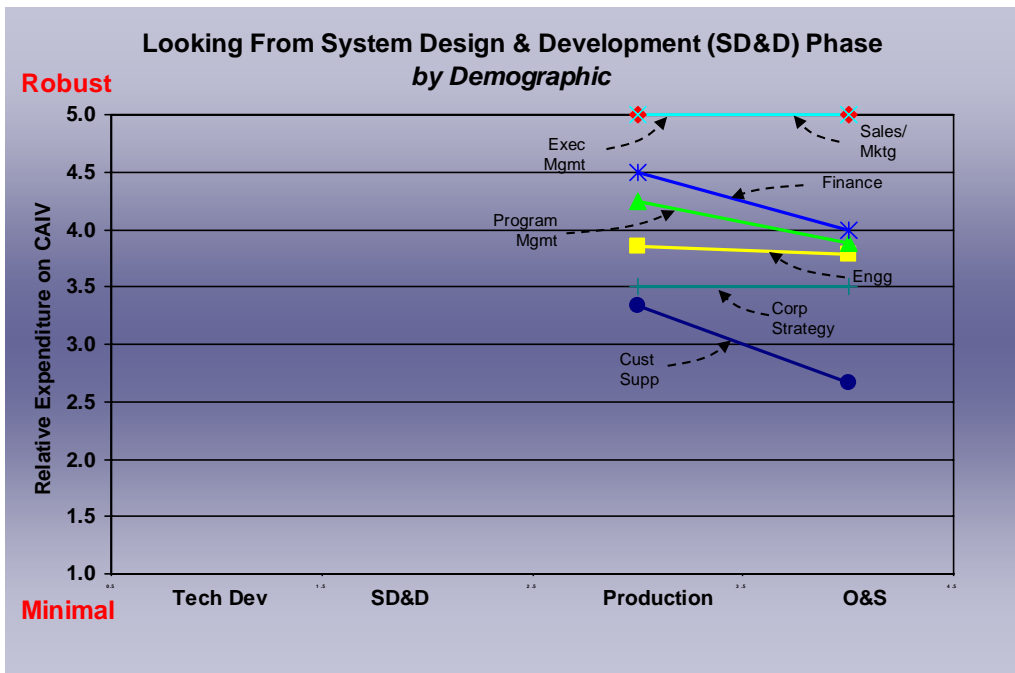
Again, when looking from the *Technology Development* phase, Corp Strategy and Executive Management recognize the importance of future phase estimates as compared to other functional stakeholders:





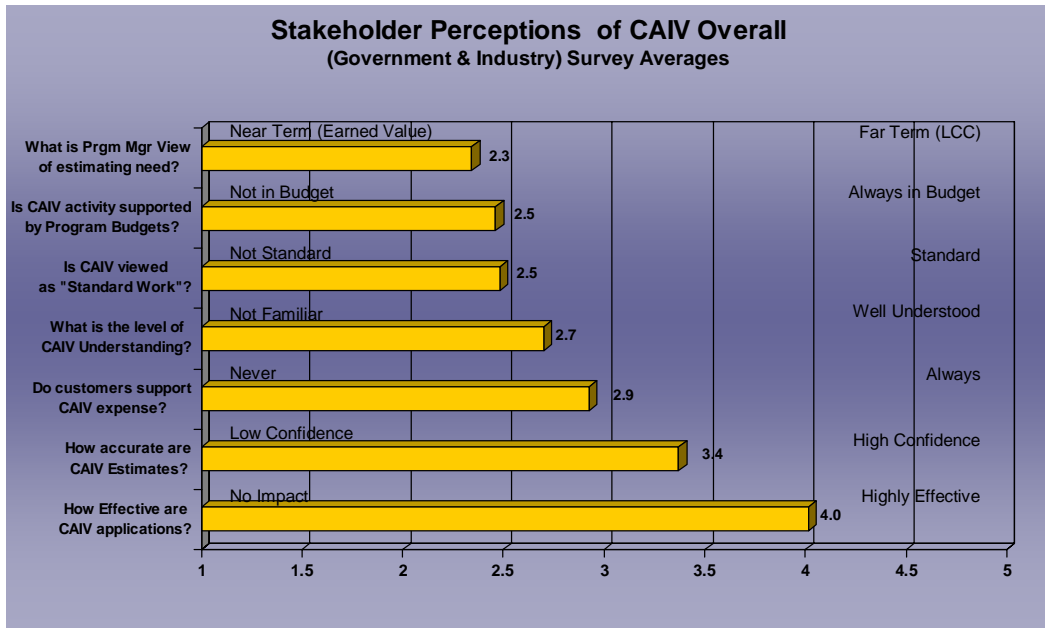
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Finally, it appears that Executive Mgmt continues to be strong proponents for cost estimating in Production and Support phases once *SD&D* begins with Finance and Program Mgmt also recognizing the near term need.



**Stakeholder Perceptions of CAIV Processes**

The average government and industry respondent believes strongly in CAIV effectiveness but recognizes that limited resources have been available. The chart below illustrates the average response to each of the seven perception questions.

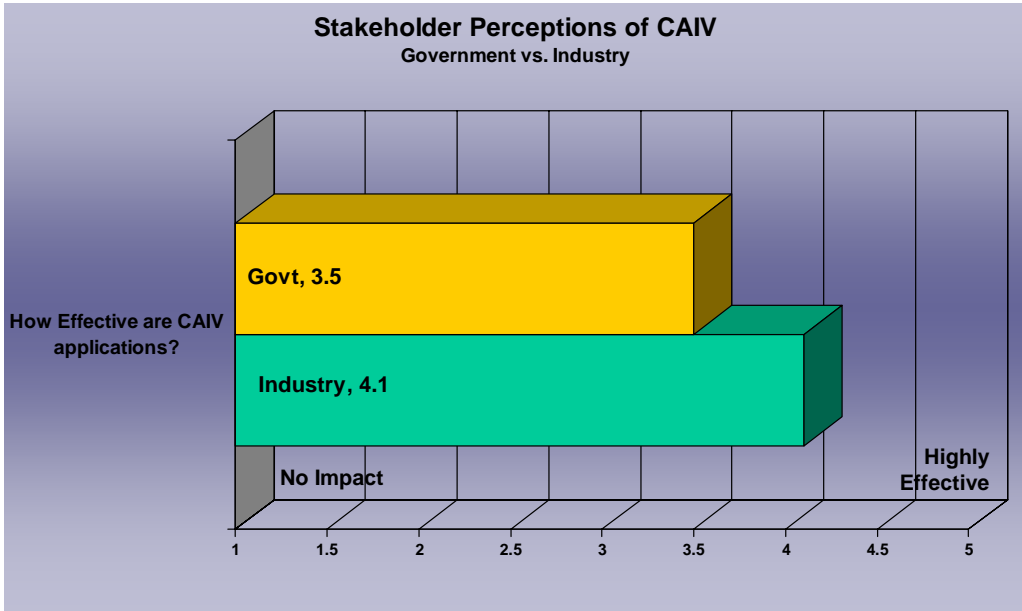


It is clear that on average, practical support for CAIV in terms of budget, management focus and overall understanding is low, while most respondents indicated that they believe CAIV can be an effective tool for ensuring program success.

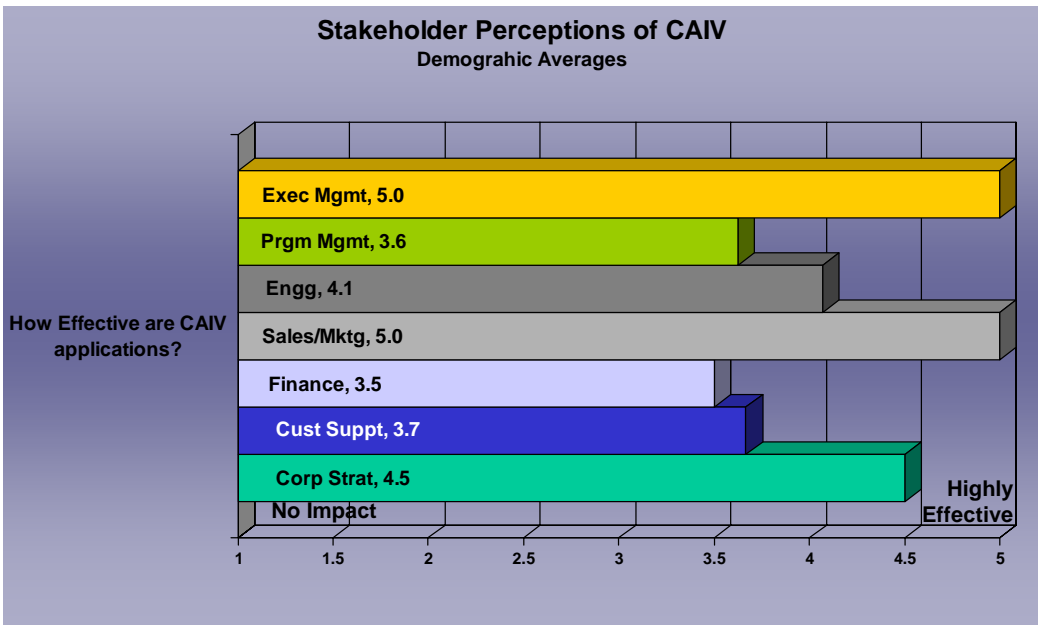
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**CAIV Effectiveness**

When government and industry respondents are separated, the trend shows that industry respondents believe that well supported CAIV applications are more effective than Government respondents (but both are positive).

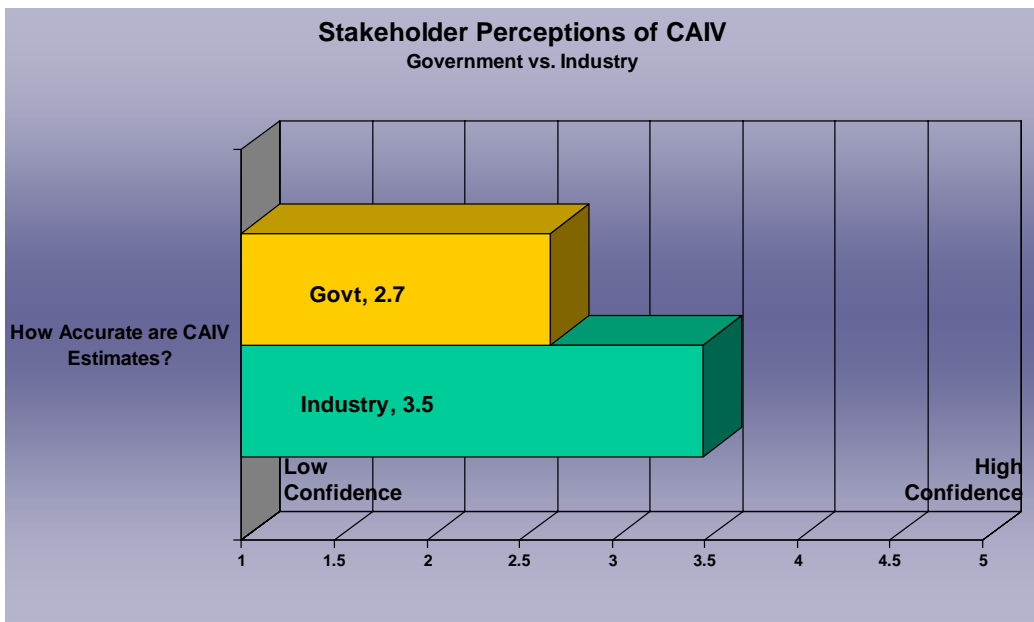


By function, while nearly all stakeholders believe that CAIV applications can be effective, Executive Mgmt, Sales and Corp Strategy show the highest support.

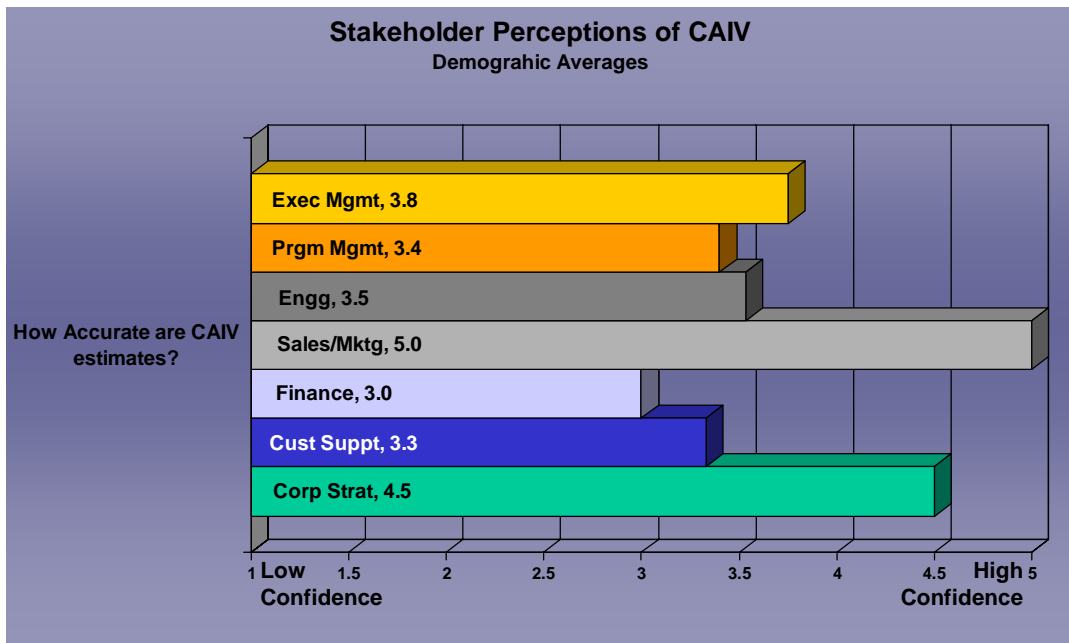


**CAIV Accuracy**

There is a large discrepancy between government and industry perceptions of the accuracy of CAIV analysis. It is may be that government concerns over parametric tools used for CAIV may be driving this result.



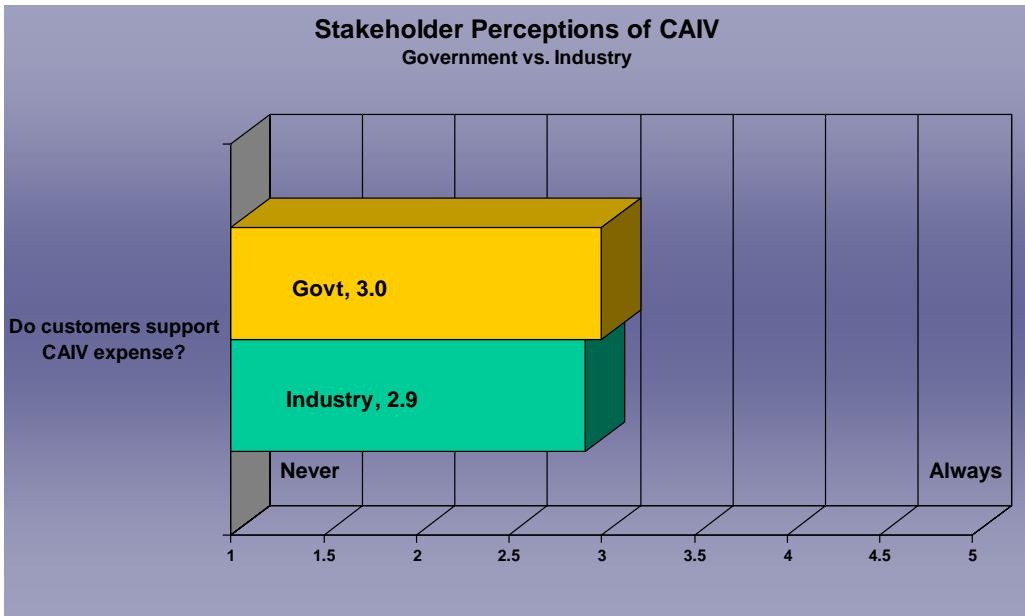
Finance has the least confidence in the accuracy of CAIV estimates while most respondents have only average confidence. This may not be surprising since Finance uses traditional pricing methods and is mostly unfamiliar with parametric tools.



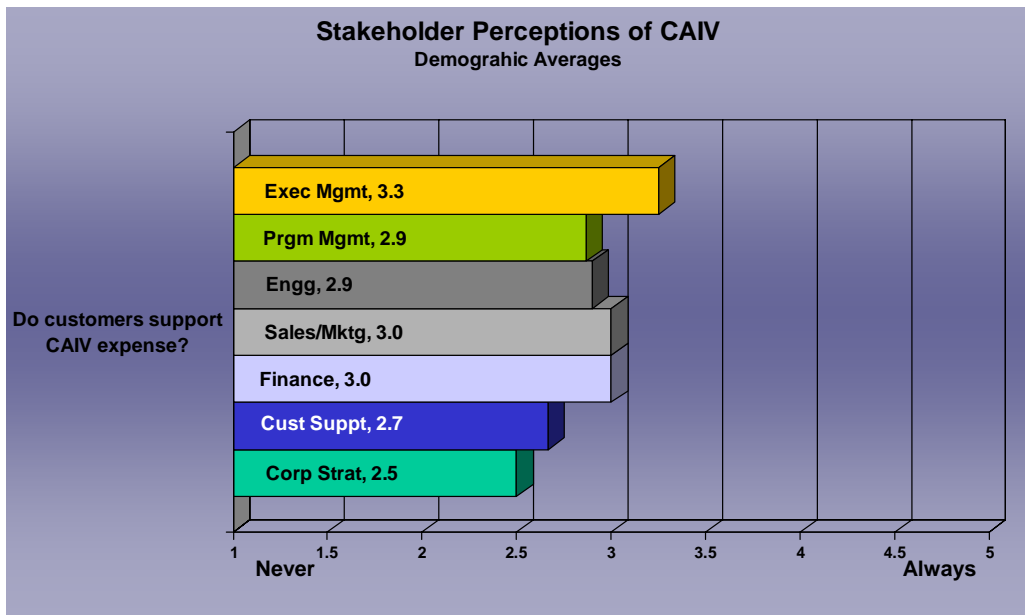
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**Customer Support for CAIV**

Government and Industry both perceive that customers only modestly provide resources for CAIV activity. The results of this question seem to correlate to other results indicating that government does not generally believe that the parametric tools used to conduct CAIV is accurate.



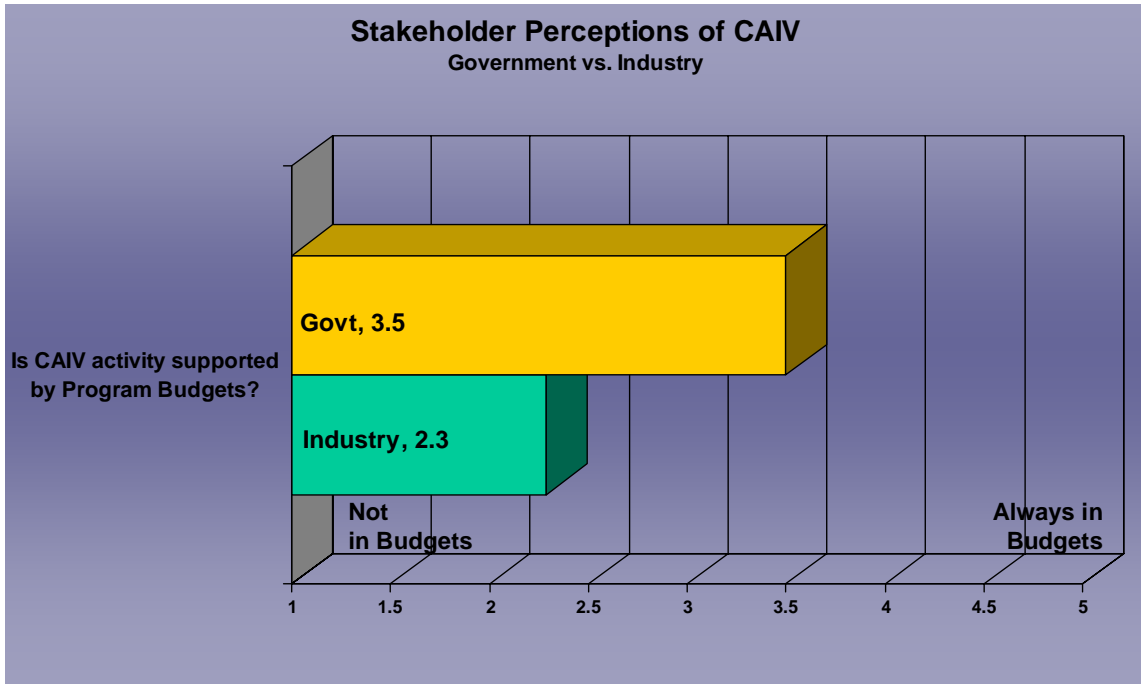
Functional perceptions vary only slightly on customer's support for CAIV



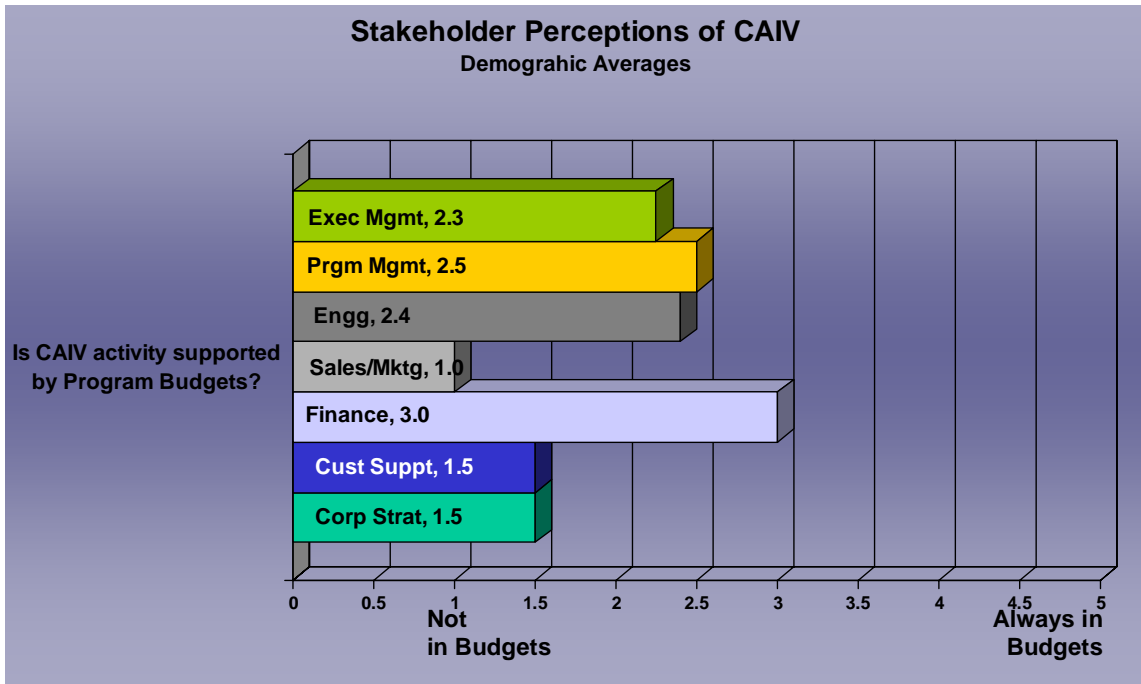
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**CAIV In Program Budgets**

Industry stakeholders report that current programs generally **do not** include CAIV resources – while Government assumes that it usually **is** included. This sharp discrepancy correlates with the answer to the prior question on Customer Support for CAIV.

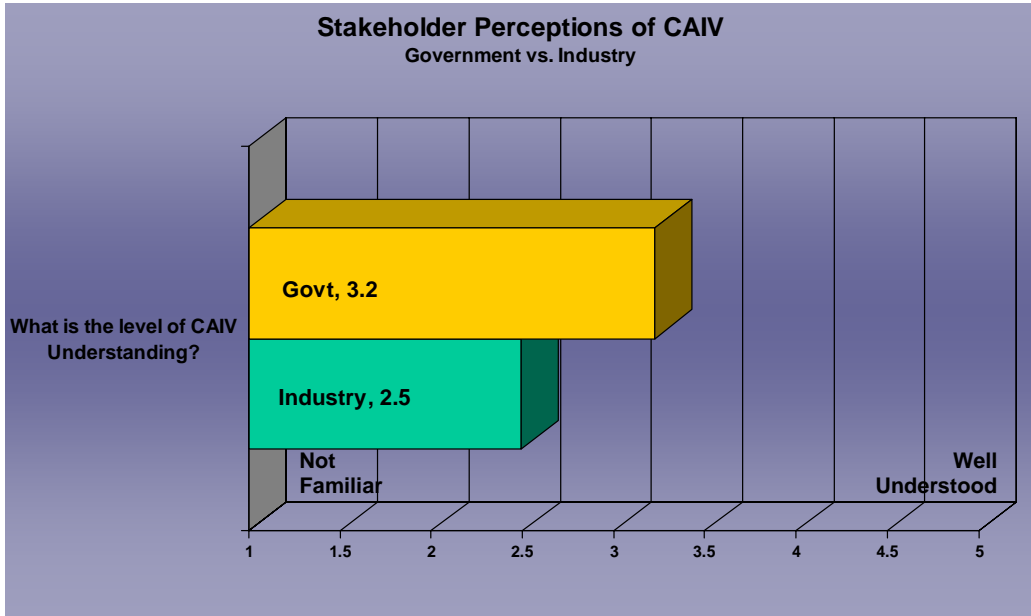


Nearly all functional groups believe that CAIV is not supported on most programs

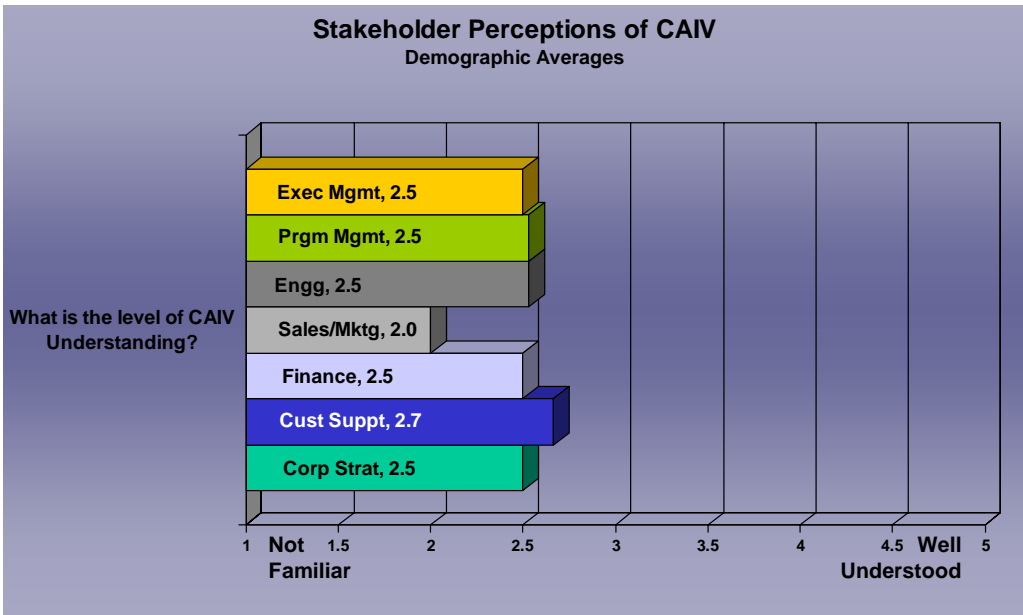


**CAIV Understanding**

Most respondents indicate that they believe stakeholders have less than average understanding of CAIV methods and objectives – however, Government perception of understanding is higher than industry.



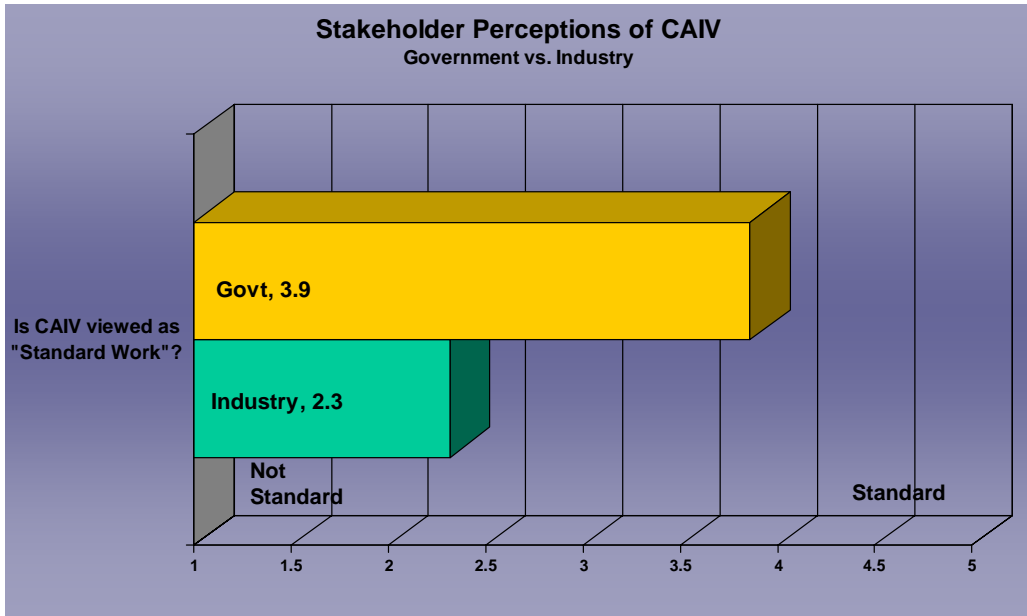
Many from industry do not fully understand CAIV applications – with several N/A responses from finance groups



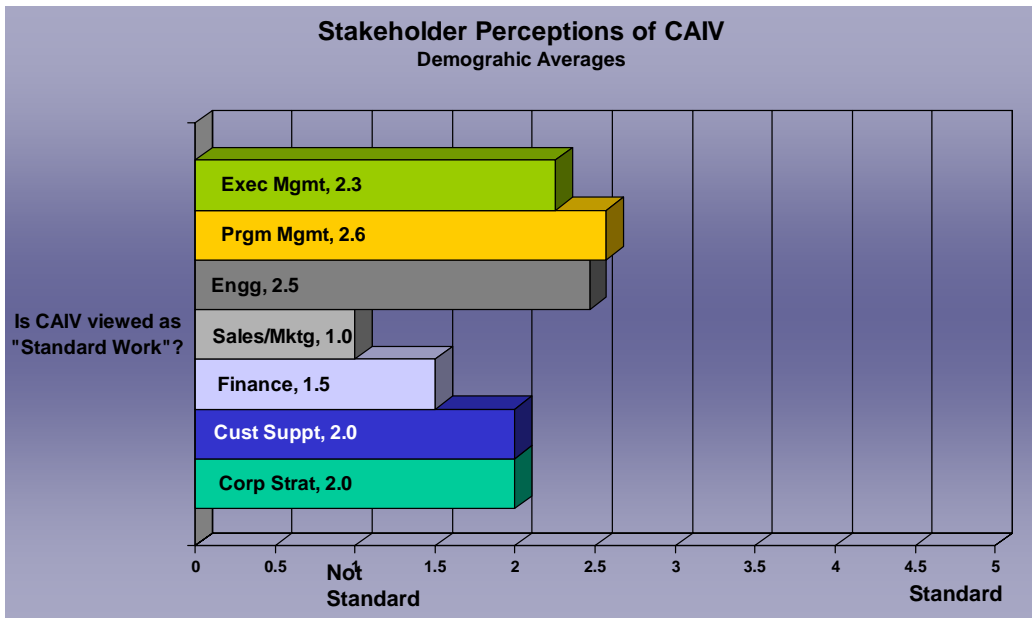
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**CAIV as Standard Work**

Government strongly views CAIV as "Standard Work" while Industry does not consider CAIV as standard for most programs. This great disparity implies that the government believes "this is what contractors should be doing anyway" and they do not need not to provide additional budget to support CAIV activity.



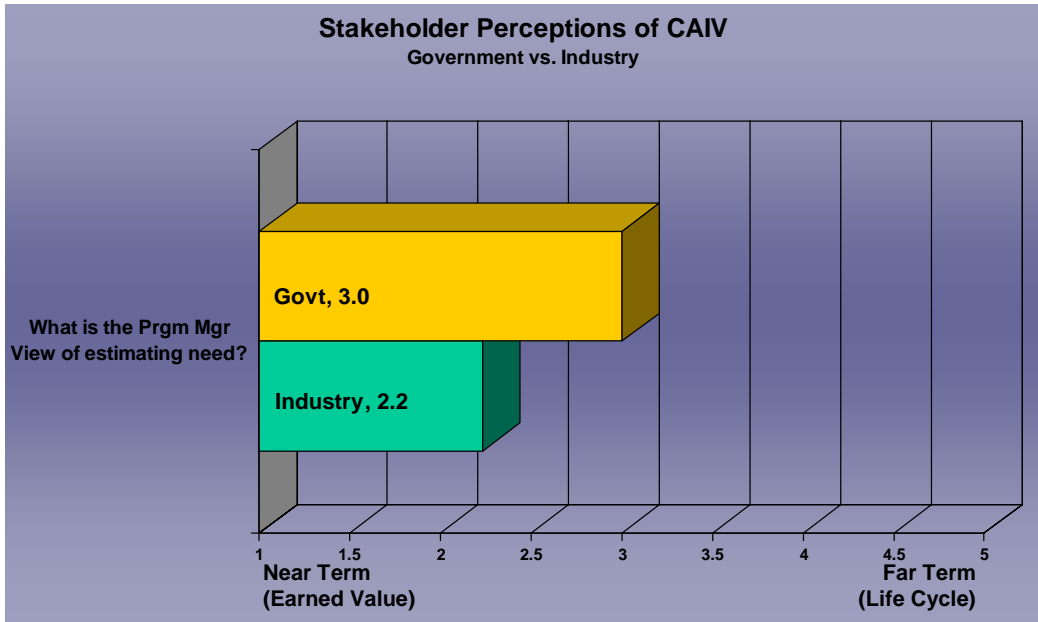
Most functions do not view of CAIV as standard work



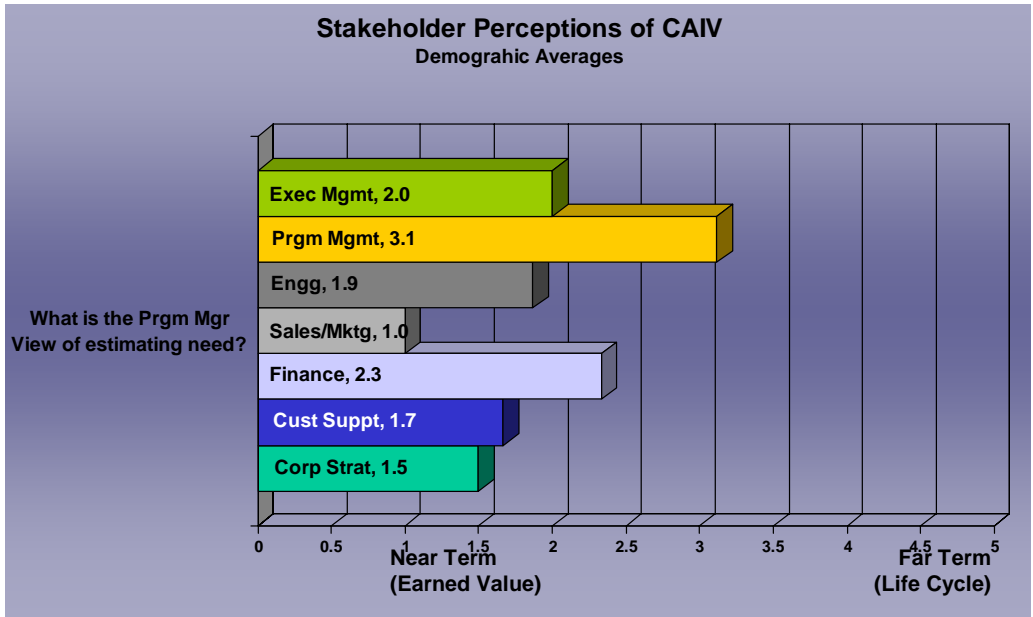


**Program Manager View of Estimating Need**

The data shows that Government managers believe they take a longer view of cost through the life cycle than industry. The average values are low for this question indicates that most managers look at near term budgets to some exclusion of the longer program view. However, some comments indicate that executive managers recognize the importance of long term estimating.



Data shows that functional Program Management respondents believe they focus on Life Cycle Costs more than others view PM attention to LCC - however all are at or below nominal (average) levels.



## Summary of Respondent Comments

### *Government Comments*

- CAIV is critical for controlling requirements and achieving best value - Without requirements control, CAIV is irrelevant.
- CAIV= An oversold under executed program. You told us one thing, it wasn't true and now we lie some more to get the money.

### *Industry Comments*

#### General

- CAIV is a fancy term for plain old cost effectiveness studies
- CAIV continues to require a "selling" job regarding its benefits for industry and customers
- CAIV it is best implemented as part of as a part of all design activities such as Weight Review Boards, Change Boards and Trade Studies
- CAIV was responsible for producing an RS-68 booster engine for half the development cost of any prior booster engine
- Managers should always be looking at both near and far term cost to ensure program success. Commercial customers do not really care about CAIV, but internally we should in their place.

#### CAIV as Standard Work

- CAIV should be a standard process supported by both the customer and contractor – it is often implemented too late to impact downstream costs. Might be best suited for larger programs.
- While I believe CAIV is an important tool, the enterprise does not budget for the use of the tool nor is it standard work in the business development or proposal areas. Most in the enterprise only believe a bottoms up.
- It is always one of the first things to be cut during estimation and subsequent negotiations with the customer while more and more we are seeing the customer focus on LCC.

#### Understanding CAIV

- This survey is the first time I've heard of the acronym. Life Cycle Cost analysis is a familiar concept, and is integrated in to product business plans.
- I don't think CAIV/LCC is well understood by the Program team and how it influences our number 1 customer, the US Govt. We should be committing more time and resources to this effort up front to reap the benefits in the program execution phases.
- A "CAIV PRIMER" to IPT Leads and PM would add value at any time during a program but especially during a Risk-Reduction phase

## Survey Summary

Several trends are clear from the survey results

1. Nearly all Government and Industry respondents believe that a well executed CAIV program has great value for overall program success
2. There is a strong Government and Industry perception that development programs tend to focus on early phase contract performance more than Life Cycle affordability
3. CAIV support varies with program phase – While the highest overall support for Production and O&S costs analysis was during the SD&D phase, addressing these future costs was considered less important than the “next” phase.
4. It was interesting to note that some respondents indicated it is almost too late to impact production and support costs once you enter the SD&D phase
5. Industry stakeholder understanding of CAIV objectives, principles and tools appears to be limited while Government perception is that CAIV is well understood
6. In strong contrast, Government respondents view CAIV as funded “Standard Work” while Industry view is that CAIV not standard and inadequately funded
7. Overall accuracy of CAIV estimates is questioned by most managers – especially government (need to understand why)
8. Executive managers value early application of CAIV to help ensure an affordable program more than other decision makers in Finance, Engineering and Sales/Marketing

## Conclusions

Based on the survey results and respondent comments the following conclusions may be derived:

1. Nearly all government and industry respondents believe that a well executed CAIV program is a highly effective key to program success
2. Government managers expect CAIV to be conducted as standard work on most programs – as opposed to the average industry manager
3. The focus of industry managers on near term contract deliverables often leads to limited CAIV activity early in program, when it is most effective
4. CAIV is not well supported by government or internal budgets
5. Preponderance for initial CAIV application during SD&D is too late for significant impact on production and support costs – the longer view is often overlooked
6. There remains overall stakeholder skepticism for the accuracy of CAIV estimates
7. Government has low confidence in CAIV estimating accuracy
8. Low investment in cost methodology and robust application may lead to increased estimate skepticism
9. Increased skepticism may in turn lead to limited CAIV budget
10. The basis for low confidence in estimating accuracy must be determined and addressed

## Next Steps

Next steps focus on both the limitations of the survey and drilling deeper into some of the comments and conclusions. Further, action needs to be taken by the cost community to better educate the decision makers on the benefits and costs of CAIV so that it is applied much earlier in the development program

1. A wider survey base is needed to obtain better information on demographic perceptions that can focus education and mitigation efforts
  - a. Survey reflects only two aircraft and space companies
  - b. Need more data from including avionics, ship, ground, other government agencies and other stakeholders in the acquisition process
2. Government and Industry must invest in developing education, tools and methods to gain stakeholder acceptance
  - a. Industry needs better data collection and support for parametric calibrations to overcome government "accuracy" concern (work with government agencies to gain understanding and acceptance
  - b. A "certification" process that validates an organization or personnel estimating capabilities (both traditional and parametric) may help overcome skepticism
  - c. Develop better focused education materials for key demographics
  - d. Government agencies need to be familiar with and accepting of parametric tools that drive CAIV analysis
3. Industry needs to consider CAIV as "Standard Work" that is supported by government customer
4. Finance, Pricing, Program Management and other teams need specific examples of CAIV benefits to them
  - a. The cost community must create a solid business case and present it to mid and upper level functional managers

## Appendix

### *All Respondent Comments*

#### *Government*

- CAIV is critical to requirements control. Requirements control tied to actual and expected future mission need is critical to cost control and identifying best value proposals. Without requirements control, CAIV is irrelevant.
- CAIV= An oversold under executed program. You told us one thing, it wasn't true and now we lie some more to get the money.
- CAIV/LCC is critical to achieving full program reqts

#### *Industry*

- This survey is the first time I've heard of the acronym. Life Cycle Cost analysis is a familiar concept, and is integrated in to product business plans.
- For my Program, CAIV/LCC was a contract deliverable and the government team provided guidelines with which to develop estimates.
- CAIV is a fancy term for plain old cost effectiveness studies. Cost is always a program design parameter to be traded against performance, schedule, and risk.
- CAIV should be a standard process supported by both the customer and contractor. Programs often look to control "downstream" costs when it is too late to impact.
- The CAIV is an important tool for the enterprise to utilize. I find that the enterprise does not budget for the use of the tool nor is it standard work in the business development or proposal areas. Most in the enterprise only believe a bottoms up.
- "Type of product may drive some of the resource assessment. Many of our products are expendable (rocket engines that are discarded after launch), and as a result, the O&S part of the LCC may be (but not always) small compared to SDD and Production.
- In this survey, I have assumed that CAIV includes cost risk analysis more robustly than in the past.
- The perception of CAIV estimating accuracy is likely to vary by phase as well.

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- CAIV may be considered ""standard work"" or standard practice more for larger programs, than smaller (<\$10M) programs."
- Managers should always be looking at both near and far term cost to ensure program success. Commercial customers do not really care about CAIV, but internally we should in their place.
- many proposals, Boeing best practice assessments, project leadership,
- Seen during proposal activities for VXX and CSAR-X
- CAIV works only with total management and customer commitment.
- I don't think CAIV/LCC is well understood by the Program team and how it influences our number 1 customer, the US Govt. We should be committing more time and resources to this effort up front to reap the benefits in the program execution phases.
- Continues to require a "selling" job regarding its benefits at Sikorsky and with customers.
- CAIV can drive high technology programs to low cost, but also low reliability. The balance between the product requirements and cost of meeting the requirements is critical to a successful program.
- It is always one of the first things to be cut during estimation and subsequent negotiations with the customer. More and More we are seeing the customer focus on LCC. It is important that we make CAIV standard work and assure it is within our IMP/IMS to extent possible and we have standard BOEs based upon contract complexity and size to assure CAIV is supported by all involved groups.
- CAIV relative to the Black Hawk and Comanche Programs experience.
- CAIV/LCC analysis was a critical element in decision-making on RS-68. I still think however that there is a general lack of understanding by PM's of what CAIV/LCC analysis is and how to use it in planning and executing programs
- I believe that CAIV is essential. I think that CAIV needs to be considered as a part of all design decision making and change management activities. As such, I believe it is best implemented as part of other program integration activities such as Weight Review Boards, Change Boards and Trade Study activities by ensuring that NRE, Recurring and downstream support costs are evaluated as a part of all design decisions, trade studies and change board activities.



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- CAIV was responsible for producing an RS-68 booster engine for half the development cost of any prior booster engine
- CAIV/LCC is extremely valuable but is little understood by our PM and IPT community. A "CAIV PRIMER" to IPT Leads and PM would add value at any time during a program but especially during a Risk-Reduction phase.

**Survey Questions and Format**

**CAIV - Stakeholder Perceptions**

Cost As an Independent Variable (CAIV) has been shown to be an effective tool to identify and mitigate program risk by balancing effectiveness and affordability. CAIV establishes goals and provides cost feedback to development teams as requirements change and design details emerge. This 5-10 minute survey is intended to measure stakeholder perceptions on CAIV support and use.

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The survey assumes the following program phases:

1. Concept Definition & Refinement
  2. Technology Development
  3. System Design & Development
  4. Production
  5. Operating & Support
- See bottom of survey if you need more detailed program phase definitions

Section 1 - How much would you spend to estimate the cost for subsequent phases?

\*

If you are not familiar with CAIV objectives or methods please select N/A

1

You are in the Concept Definition & Refinement phase. How much would you spend to estimate the cost for the following phases?

	1 None	2 Limited	3 Average	4 Above Avg	5 Robust	N/A
Technology Development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
System Design & Development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operating & Support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2

You have now progressed to the Technology Development phase. How much would you spend to estimate the cost for the following phases?

1	2	3	4	5	N/A
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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	None	Limited	Average	Above Avg	Robust	
<hr/>						
System Design & Development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operating & Support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3

You have now progressed to the System Design & Development (SD&D) phase. How much would you spend to estimate the cost for the following phases?

	1 None	2 Limited	3 Average	4 Above Avg	5 Robust	N/A
<hr/>						
Production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operating & Support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 2 - Absent funding constraints, how would you rate the importance of CAIV/Life Cycle Cost analysis to achieve success in subsequent phases?  
\* If you are not familiar with CAIV objectives or methods please select N/A

4

You are in the Concept phase. How important is CAIV analyses to phase success in the following phases?

	1 Not important	2 Minimal	3 Average	4 Significant	5 Critical	N/A
<hr/>						
Technology Development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
System Design & Development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operating & Support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5

Realities of Cost As an Independent Variable (CAIV) - Stakeholder Perceptions

You are in the Technology Development phase. How important is CAIV analyses to phase success in the following phases?

1 None	2 Minimal	3 Average	4 Significant	5 Critical	N/A
<hr/>					
System Design & Development					
<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/>
<hr/>					
Production					
<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/>
<hr/>					
Operating & Support					
<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/>

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You are in the System Design & Development (SD&D) phase. How important is CAIV analyses to phase success in the following phases?

1 None	2 Minimal	3 Average	4 Significant	5 Critical	N/A
<hr/>					
Production					
<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/>
<hr/>					
Operating & Support					
<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/>

Section 3 - Issues and perceptions that may impact CAIV effectiveness

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Do program stakeholders understand CAIV methods, tools and objectives?

Not Familiar				Well Understood	N/A
<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6

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How effective is a well executed CAIV effort in helping to achieve overall program success?

No Impact				Highly Effective	N/A
<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6

Realities of Cost As an Independent Variable (CAIV) - Stakeholder Perceptions

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What level of confidence do you have in CAIV estimating accuracy?

Low Confidence

High Confidence

N/A

1 2 3 4 5 6

10

Do current program budgets fully support CAIV initiatives and goals?

Not in Budget

Fully Supported

N/A

1 2 3 4 5 6

11

Do customers generally support CAIV expense to the program?

Never

Always

N/A

1 2 3 4 5 6

12

What time frame is Program Management's focus for cost analysis?

Near Term Earned Value

Long Term LCC

N/A

1 2 3 4 5 6

13

Is CAIV considered "Standard Work" for the Proposal/Program process?

Not Standard

Standard Work

N/A

1 2 3 4 5 6

Section 4 - Experience

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Select gov't or industry and single function that best describes your current job

- Government
- Industry
- Exec Mgmt
- Pgm Mgmt
- Engg
- Sales/Mktg
- Finance
- Cust Suppt
- Other

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What other prior experience?

- Exec Mgmt
- Pgm Mgmt
- Engg
- Sales/Mktg
- Finance
- Cust Suppt
- Other

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Realities of Cost As an Independent Variable (CAIV) - Stakeholder Perceptions

Indicate total years of relevant experience

0-5	6-10	11-15	16-20	21-25	>25
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Section 5 - Comments - Please enter a few optional comments on your experience implementing CAIV/LCC analysis on past programs

Program Phase Definitions:

\*

1. Concept Definition & Refinement - Refine initial concept, Develop Technology Development Strategy

\*

2. Technology Development - Reduce technology risk and determine appropriate set of technologies

\*

3. System Design & Development - Develop capability; reduce risk; ensure supportability; reduce footprint; design for producibility; ensure affordability; demonstrate system

\*

4. Production - Achieve operational capability that satisfies mission needs

\*

5. Operating & Support - Meet operational support requirements and sustain system in the most cost-effective manner over its total life cycle, dispose of the system

## Realities of Cost As an Independent Variable (CAIV) - Stakeholder Perceptions

**Survey Averages, Variance & Count**

	Entire Survey Average					N/A	Count
	Average	Max	Min	Var			
Question 1: You are in the Concept Definition & Refinement phase. How much would you spend to estimate the cost for the following phases?							
Question 1: Technology Development	3.815	5	2	0.997	5	70	
Question 1: System Design & Development	3.969	5	1	0.968	5	70	
Question 1: Production	3.484	5	1	1.143	5	69	
Question 1: Operating & Support	3.328	5	1	1.462	6	70	
Question 2: You have now progressed to the Technology Development phase. How much would you spend to estimate the cost for the following phases?							
Question 2: System Design & Development	4.015	5	2	0.797	5	70	
Question 2: Production	3.797	5	2	0.958	5	70	
Question 2: Operating & Support	3.547	5	1	0.950	5	70	
Question 3: You have now progressed to the System Design & Development (SD&D) phase. How much would you spend to estimate the cost for the following phases?							
Question 3: Production	4.031	5	2	0.888	6	70	
Question 3: Operating & Support	3.831	5	1	0.893	5	70	
Question 4: You are in the Concept phase. How important is CAIV analyses to phase success in the following phases?							
Question 4: Technology Development	3.754	5	2	0.907	5	70	
Question 4: System Design & Development	4.031	5	1	0.874	5	70	
Question 4: Production	3.781	5	1	0.999	6	70	
Question 4: Operating & Support	3.625	5	1	1.095	6	70	
Question 5: You are in the Technology Development phase. How important is CAIV analyses to phase success in the following phases?							
Question 5: System Design & Development	4.046	5	2	0.920	5	70	
Question 5: Production	3.846	5	1	0.851	5	70	
Question 5: Operating & Support	3.641	5	1	0.901	5	69	
Question 6: You are in the System Design & Development (SD&D) phase. How important is CAIV analyses to phase success in the following phases?							
Question 6: Production	4.090	5	2	0.810	5	70	
Question 6: Operating & Support	4.000	5	2	0.818	3	70	
Question 7: Do program stakeholders understand CAIV methods, tools?							
	2.700	5	1	0.976	2	70	
Question 8: How effective is a well executed CAIV effort in helping to estimate program costs?							
	4.015	5	1	0.890	4	69	
Question 9: What level of confidence do you have in CAIV estimating program costs?							
	3.369	5	1	1.112	4	69	
Question 10: Do current program budgets fully support CAIV initiatives?							
	2.463	6	1	1.616	2	69	
Question 11: Do customers generally support CAIV expense to the program?							
	2.925	6	1	0.706	3	70	
Question 12: What time frame is Program Management's focus for cost estimation?							
	2.343	5	1	1.620	0	70	
Question 13: Is CAIV considered 'Standard Work' for the Proposal/Program?							
	2.484	6	1	1.905	6	70	