

“The Answer is 5”: Observations on Cost & Schedule in Small Defense Programs

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June 2012
ISPA/SCEA Conference, Orlando FL

Agenda

✧ Background

✧ Data Sources & Methodology

✧ Findings:

✧ Future Efforts:

Background

- This started as an office joke: “every program takes 5 years”, “at 7 years...the program dies”
- 2010 ESC Acquisition Support Factors Study: “programs have more in common with each other than their own MS-B estimates”
- 2012 Reality: Programs consistently under-executing early, under-funded in out-years...

Hypothesis

- Programs experienced significant schedule growth
- Programs experienced moderate cost growth (RDT&E and Procurement)
- Limited trends

Data Sources

- Primary Data Source: Acquisition Program Baselines (APBs)
 - Individually dated snapshots
 - Could limit to “trusted” programs
- ACAT II/III programs
- CY2000+ only
- 26 different programs/over 50 snapshots in time
- Multi-Service, mostly “electronic” related
- Mix of function...mix of hardware/software
- Avoided incremental programs with easily passed functionality

Caveats

- We need more data
- We need more data
- We need more data
- ...more data- would be good 😊

Methodology

- Compared Cost Estimate (% change)
 - MS-B vs. IOC
 - Ensured same BY
- Compared Duration (Actual & % change)
- MS-B through IOC
- Why not MS-C?

Findings: RDT&E Cost

- RDTE cost growth averaged 30%
- Standard Deviation: 36%
- Min: -4%, Max: 102%
- If I exclude 2 outliers:
 - Average: 26%
 - STDEV: 12%

Findings: Procurement Cost

- Procurement cost growth averaged -18%
- Standard Deviation: 39%
- Min: -70%, Max: 41%
- 3 clusters:
 - -X%
 - -60% to -70%
 - 40-45%

Findings: Schedule

Schedule (MS-B to IOC)				
	Mean	STDEV	Low	High
Planned	2.7	1.0	1.7	4.2
Actual	5.8	1.3	4.2	7.2
% Growth	137%	65%	72%	239%

- Most programs were planned to take 2-3 years
- No program took under 4 years
- Most programs actually took 5-6 years
- Programs that took longer than 7 years...were cancelled

Findings: Additional Dataset

- Also examined limited historical C3I aircraft programs dataset
- 9-12 year planned MS-B to IOC
- Actual duration 5-10% less than planned
- Averaged cost growth 20% development/40% procurement
- Upon Further examination: Real, well-informed, cost/schedule/technical tradeoffs were made to field faster
- Very limited dataset requires more data

Findings: Takeaways

- Unrealistic schedules compress reasonable estimates into a front-loaded funding profile
 - Schedule growth outpaces cost growth typically by at least 3:1
 - Creates credibility issue for estimators, program returns funding early on
 - Creates big problems for program, no funding programmed for out years
- Perhaps a certain type of program at a certain ACAT level...just takes a certain amount of time to complete
- Implementing NASA's JCL to force a tighter schedule/cost link may help
 - Anything that forces a second look at schedule risk would help!

Future Efforts

- Collect more data on ACAT II/III electronics
 - No reason not to have 100+ program dataset!
- Collect more detailed schedule data
- Collect more detailed expenditure data
- Examine practicality of using JCL

Closing Remarks

- If you tell me “My ACAT II or III electronics system has just reached MS-B”; I can respond with “It will take between 5-6 years to reach IOC”
- I will be right about 75% of the time
- The program office’s schedule will be wrong almost 100% of the time



Thank you for your attention

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