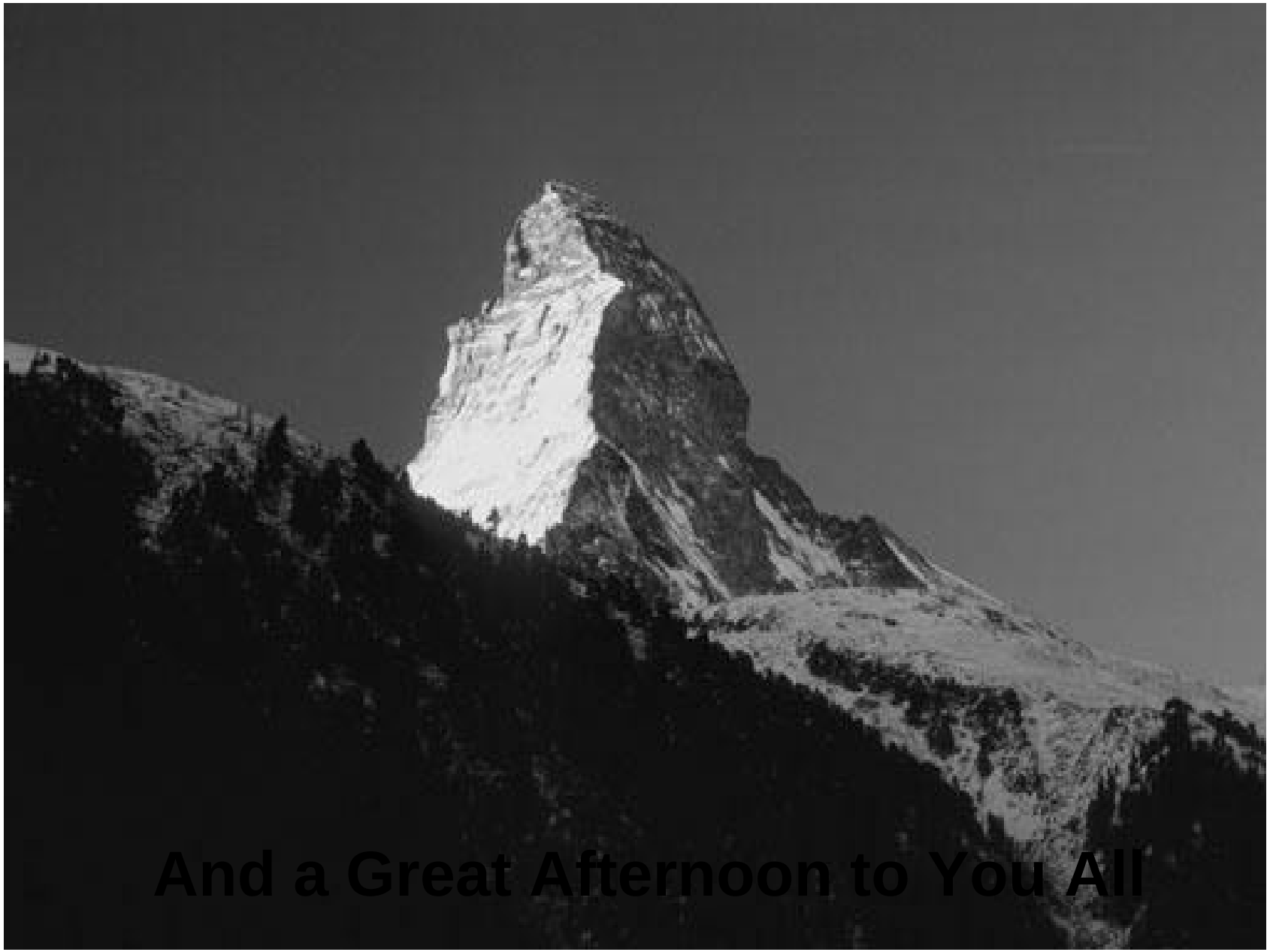

And a Great Afternoon to You All

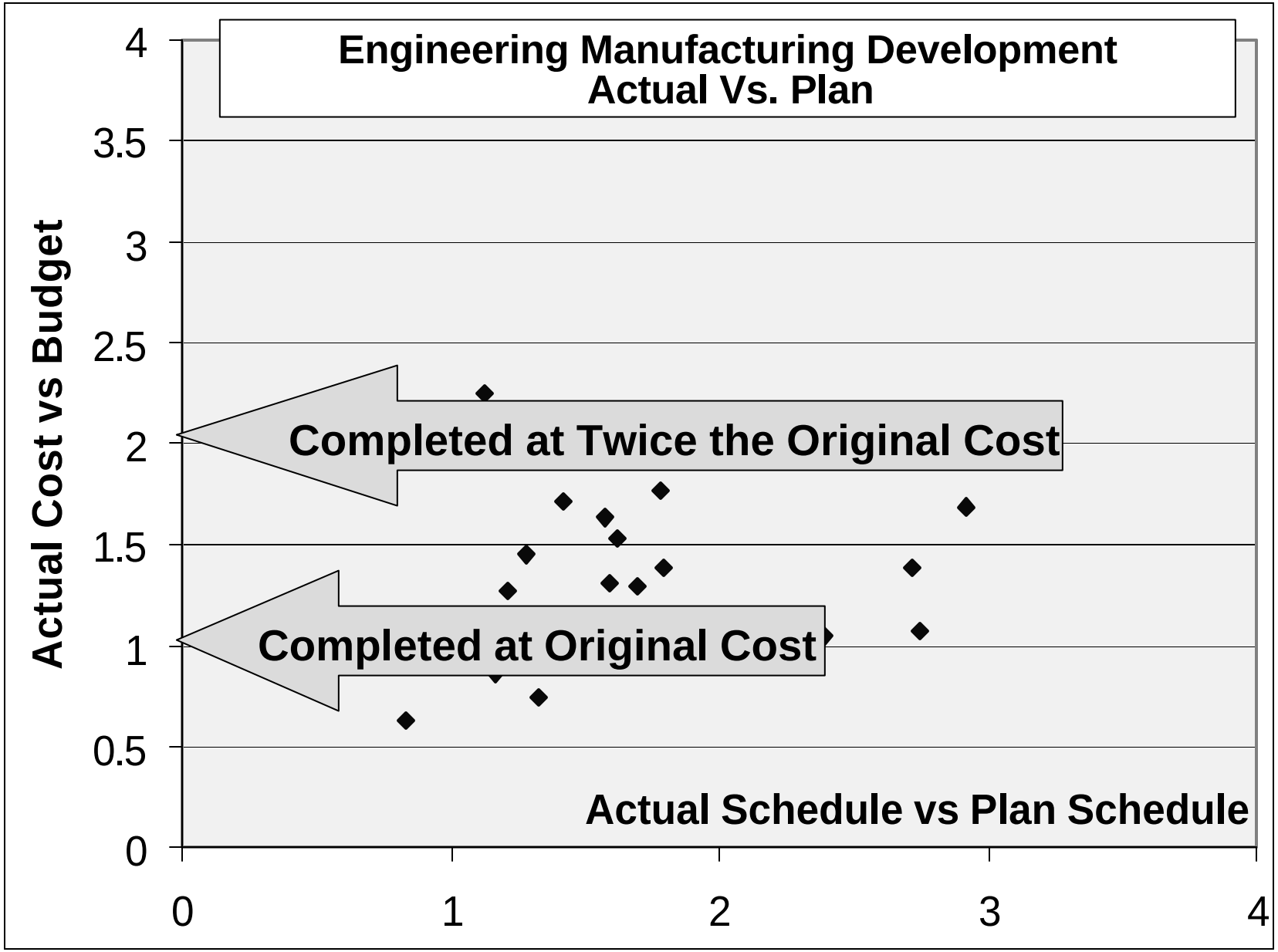
Earned Value Management as an Implementation Tool for CAIV

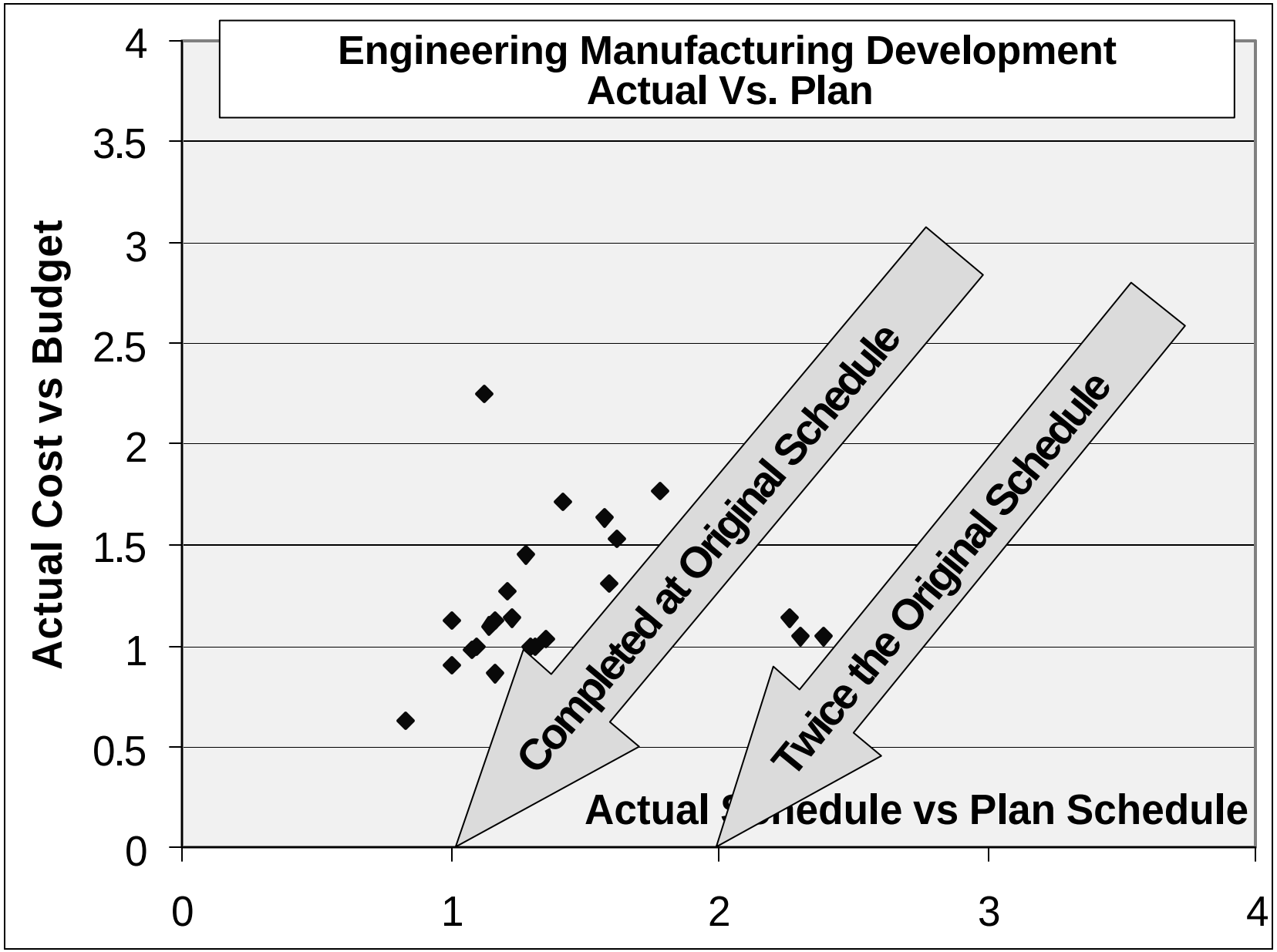
Professor Robert J. Bohls Sr.

Department Chair, Earned Value Management
robert.bohls@dau.mil
703.805.3599

Objectives

- **Program Risk**
- **Cost as an Independent Variable**
- **Generally Accepted Management Principles**
- **Management Principle's Myths**


Engineering Manufacturing Development
Actual Vs. Plan
Actual Cost vs Budget
4
3.5
3
2.5
2
1.5
1
0.5
0
Completed at Twice the Original Cost
Completed at Original Cost
Actual Schedule vs Plan Schedule
0
1
2
3
4


Engineering Manufacturing Development
Actual Vs. Plan
Actual Cost vs Budget
Actual Schedule vs Plan Schedule
Completed at Original Schedule
Twice the Original Schedule
0
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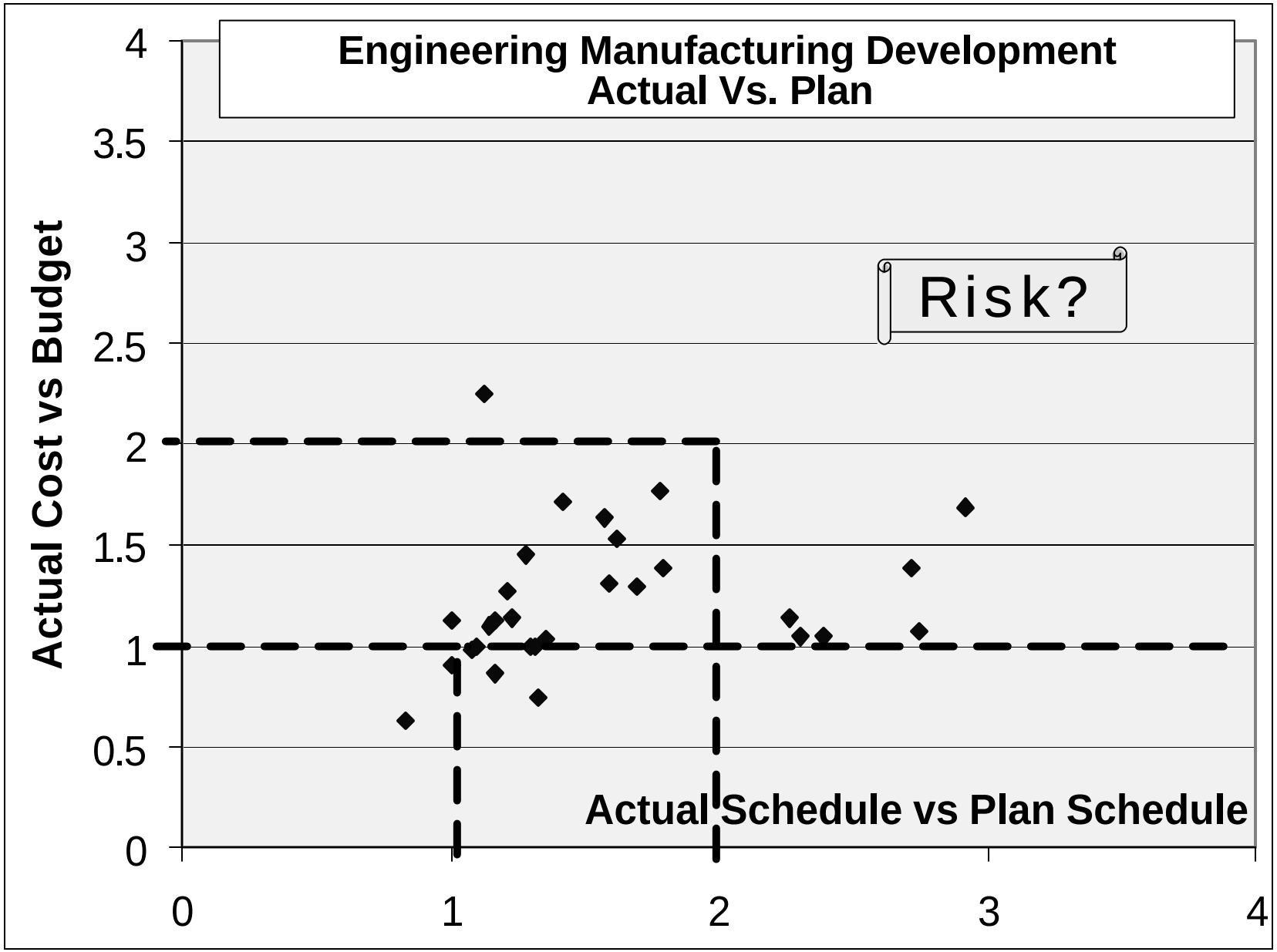
Engineering Manufacturing Development
Actual Vs. Plan
Risk?
Actual Cost vs Budget
Actual Schedule vs Plan Schedule
4
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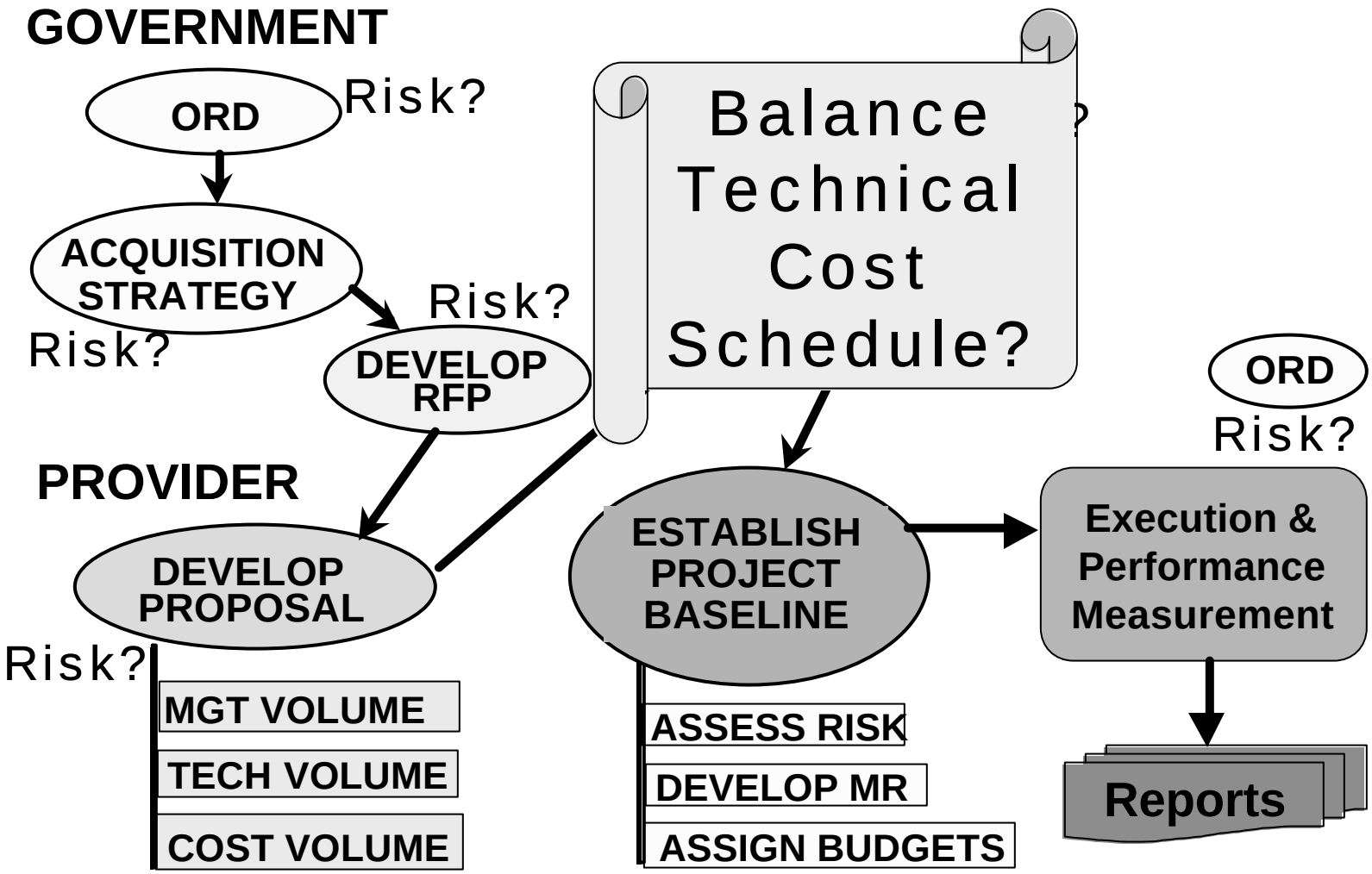
4

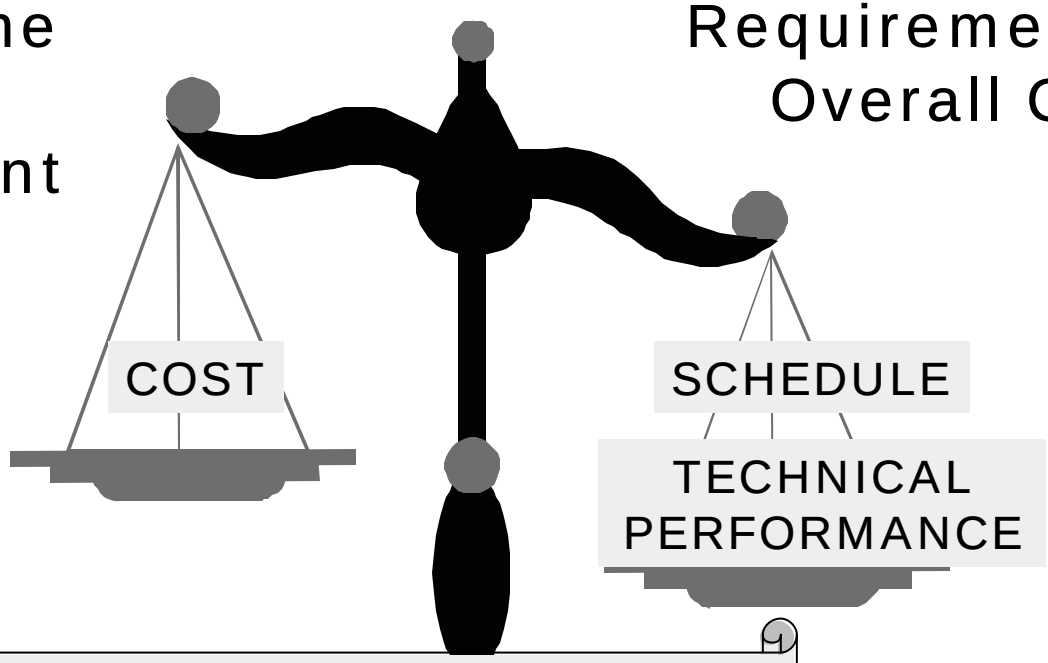
Risk
Introduced into the Program



Cost As the Independent Variable
PM Balancing Act

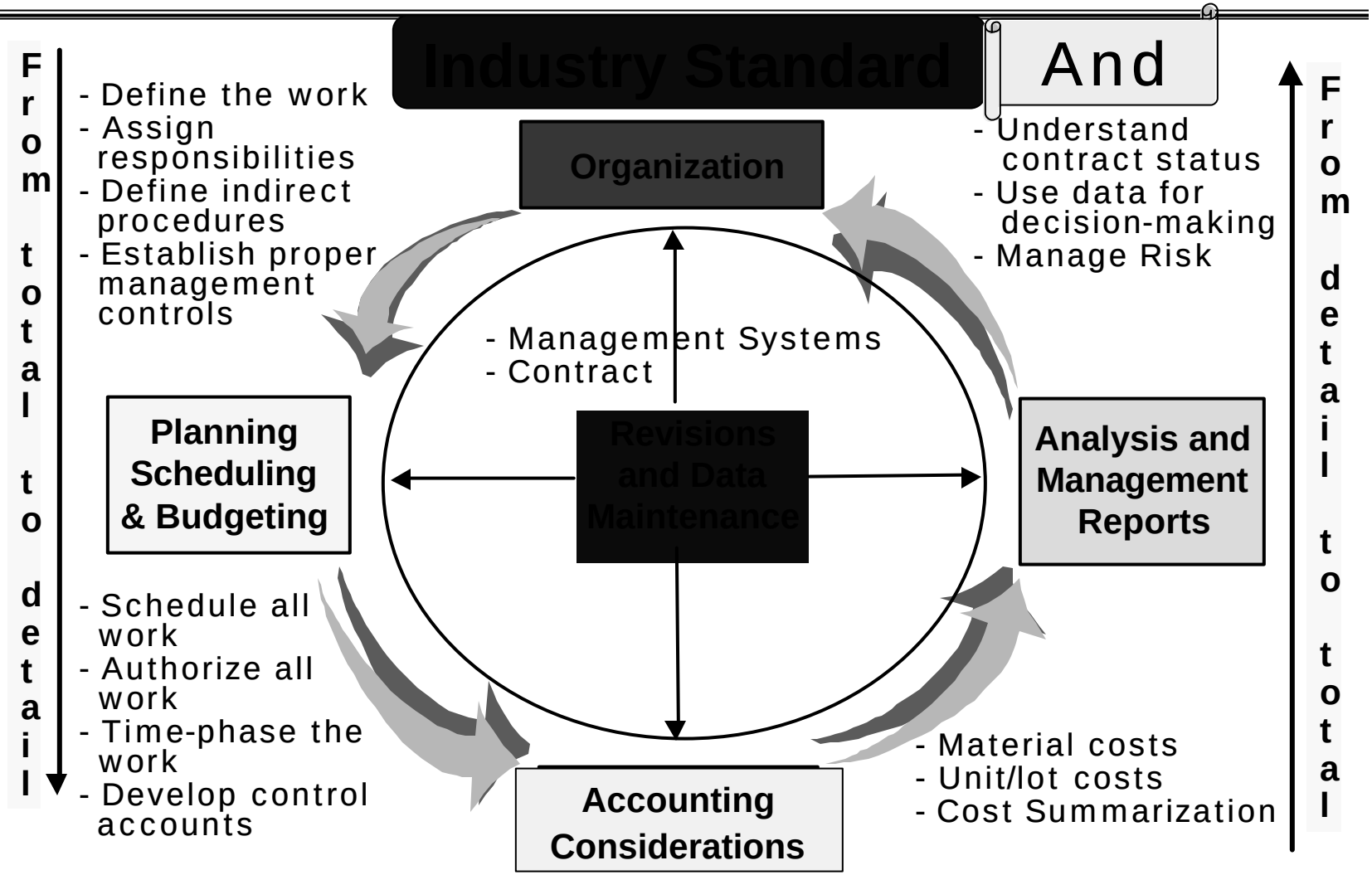
Produce the Best Product within the Cost Constraint

Must be willing to Trade Requirements for Overall Cost



Generally Accepted Management Principles?

Integrated Program Management



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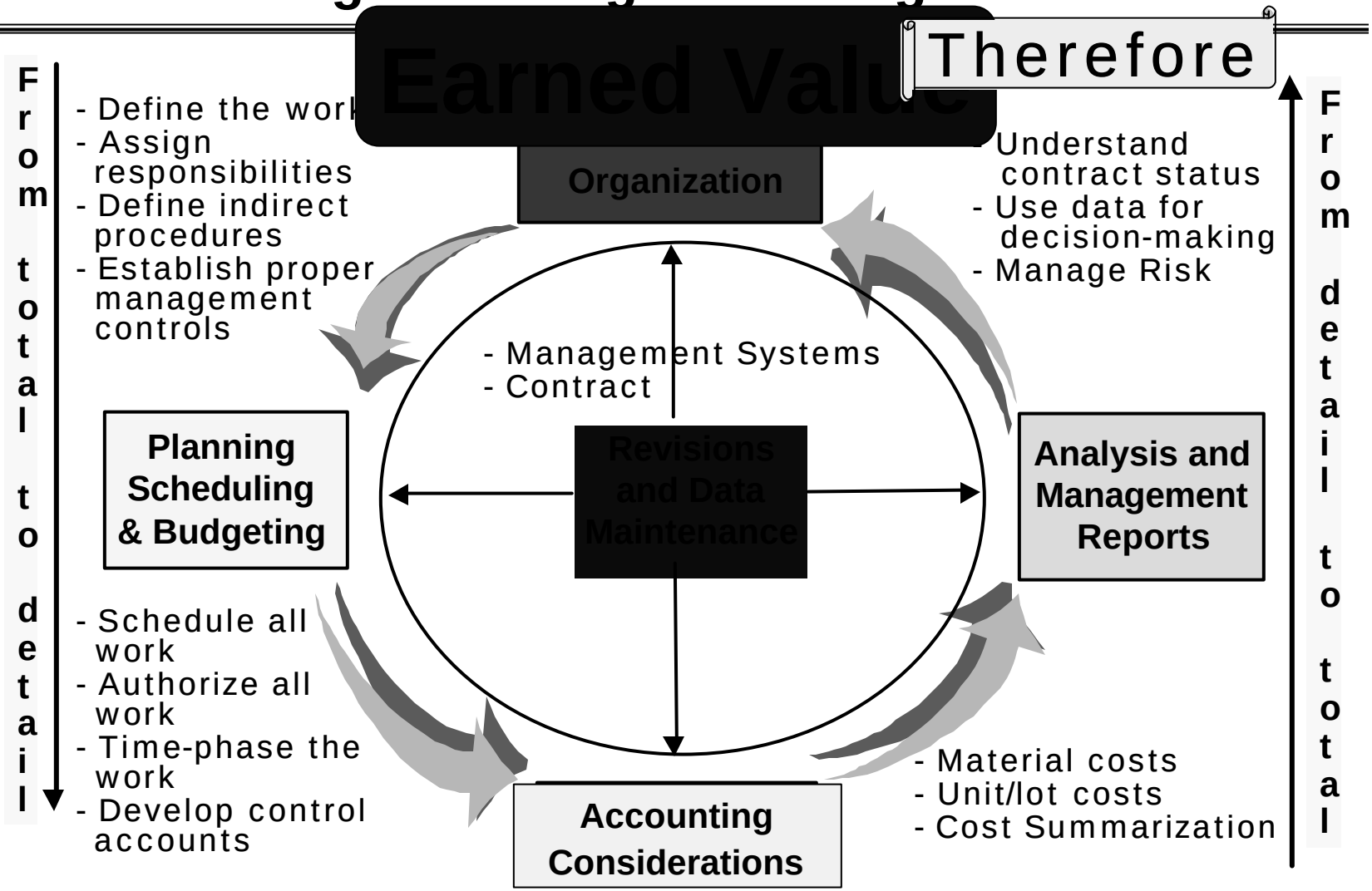

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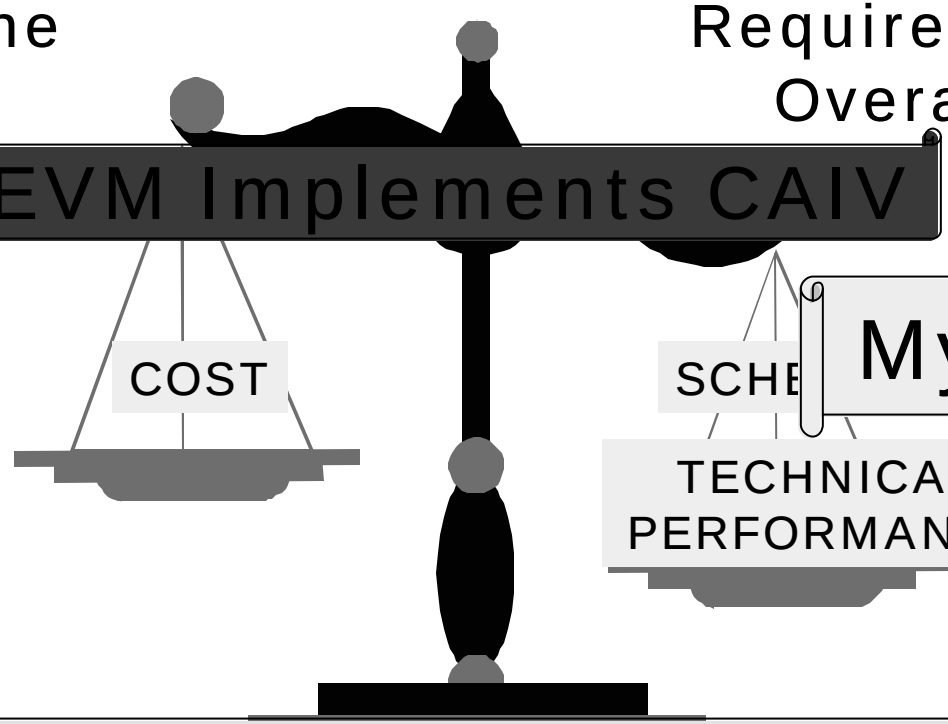

Myths?

If the CAIV Thresholds have Not been Met, the Design is Not Complete.

Myths of EVM

- Its not the way we manage
- EVMS is a government reporting requirement
- Data is too old to use
- Looks backward > not to the future
- Variances are bad
- Revising Baselines are Bad
- EVM costs too much

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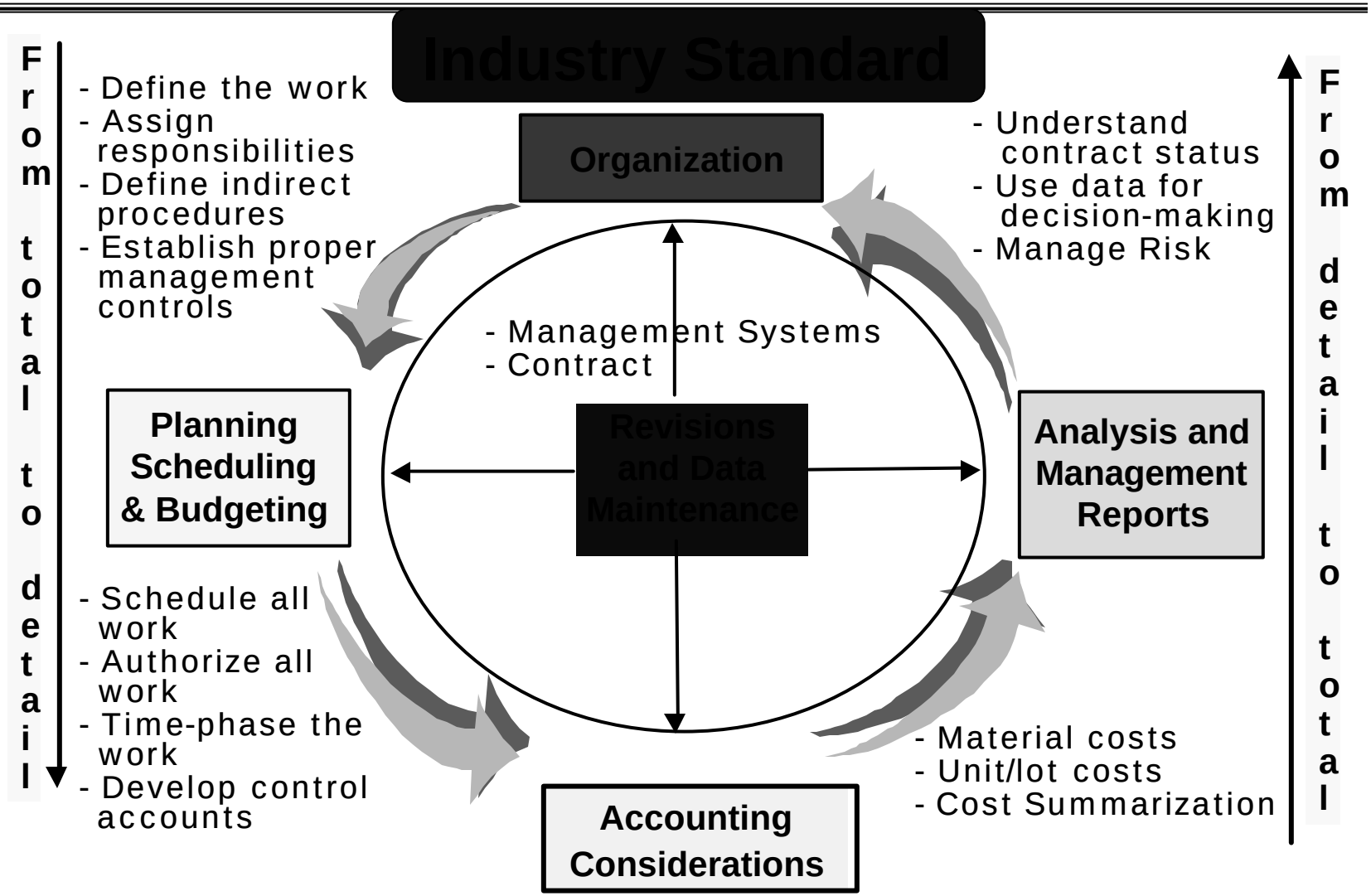

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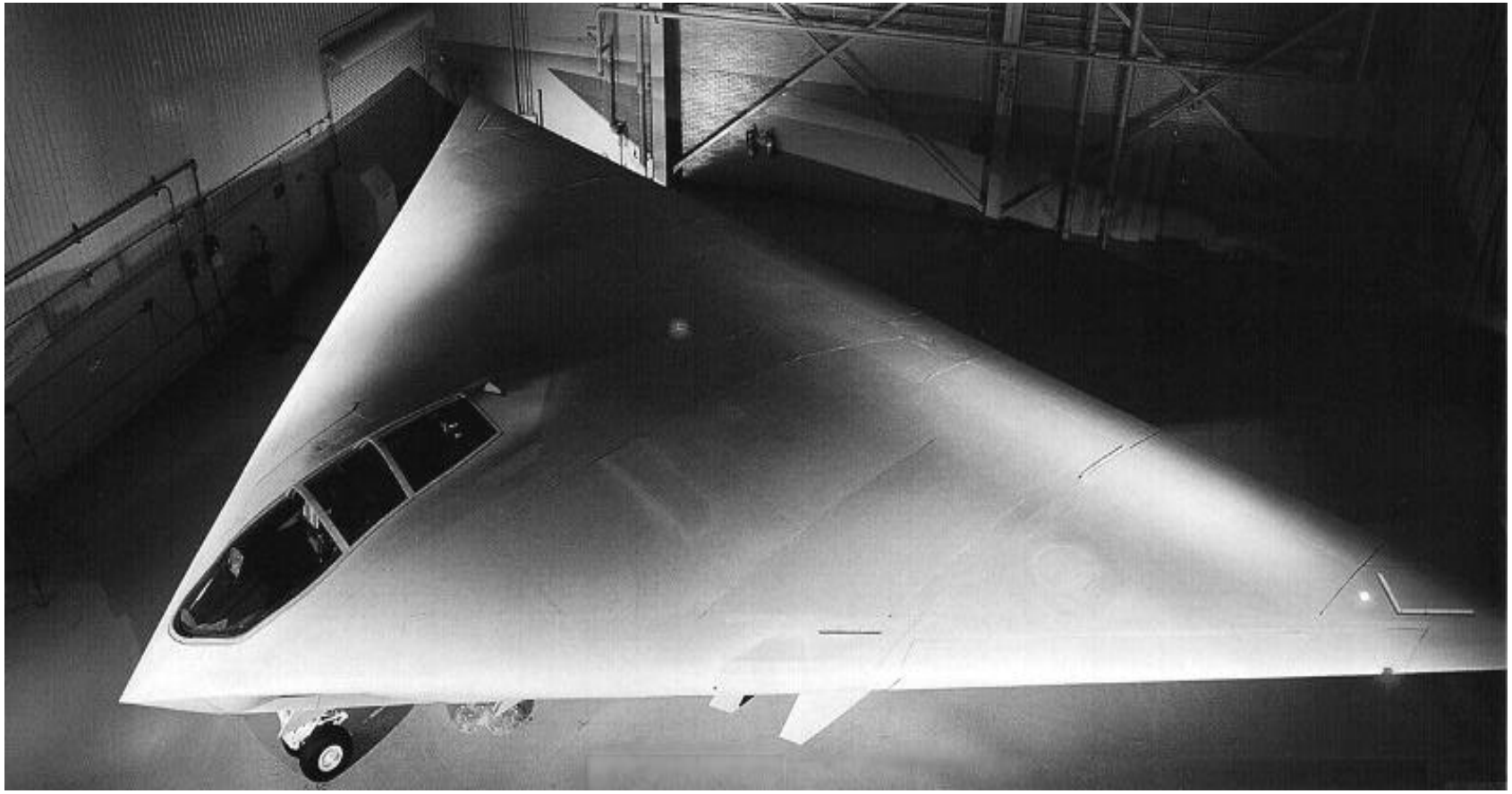
A-12
The Plane That Never Was



A-12 Lesson Learned

- **Too often, earned value insights remain the sole province of the supporting program control staff of both contractors and the government.**
  - **Earned value must be an integral part of the performing design and manufacturing organizations.**
  - **Only when program technical staffs are held accountable for earned value analysis, will they begin to understand its implications.**

The "Beach" Report
A-12 Administrative Inquiry
28 Nov 1990

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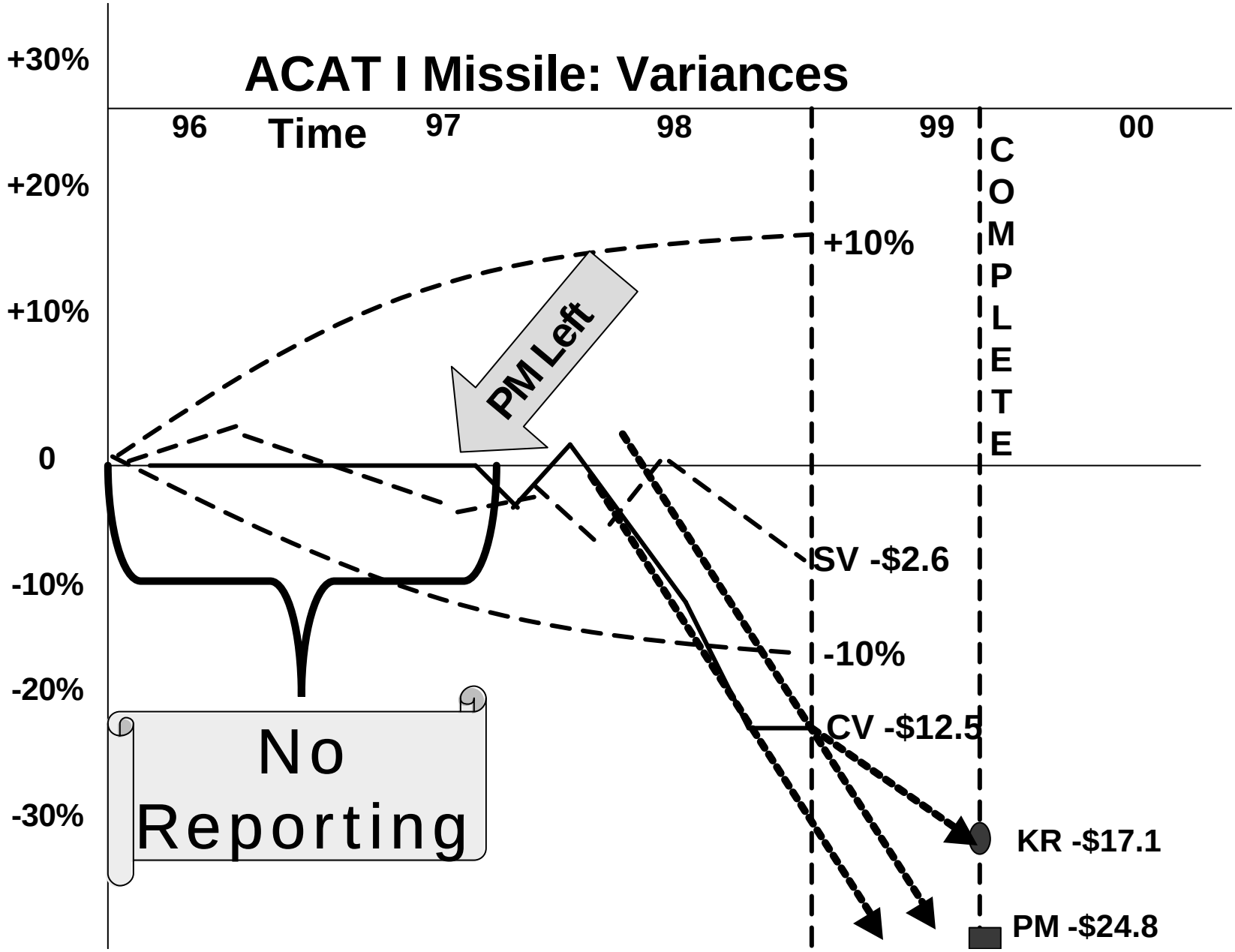
ACAT I Missile: Variances
+30%
+20%
+10%
0
-10%
-20%
-30%
96
Time
97
98
99
00
COMPLETE
+10%
PM Left
SV -$2.6
-10%
CV -$12.5
No Reporting
KR -$17.1
PM -$24.8

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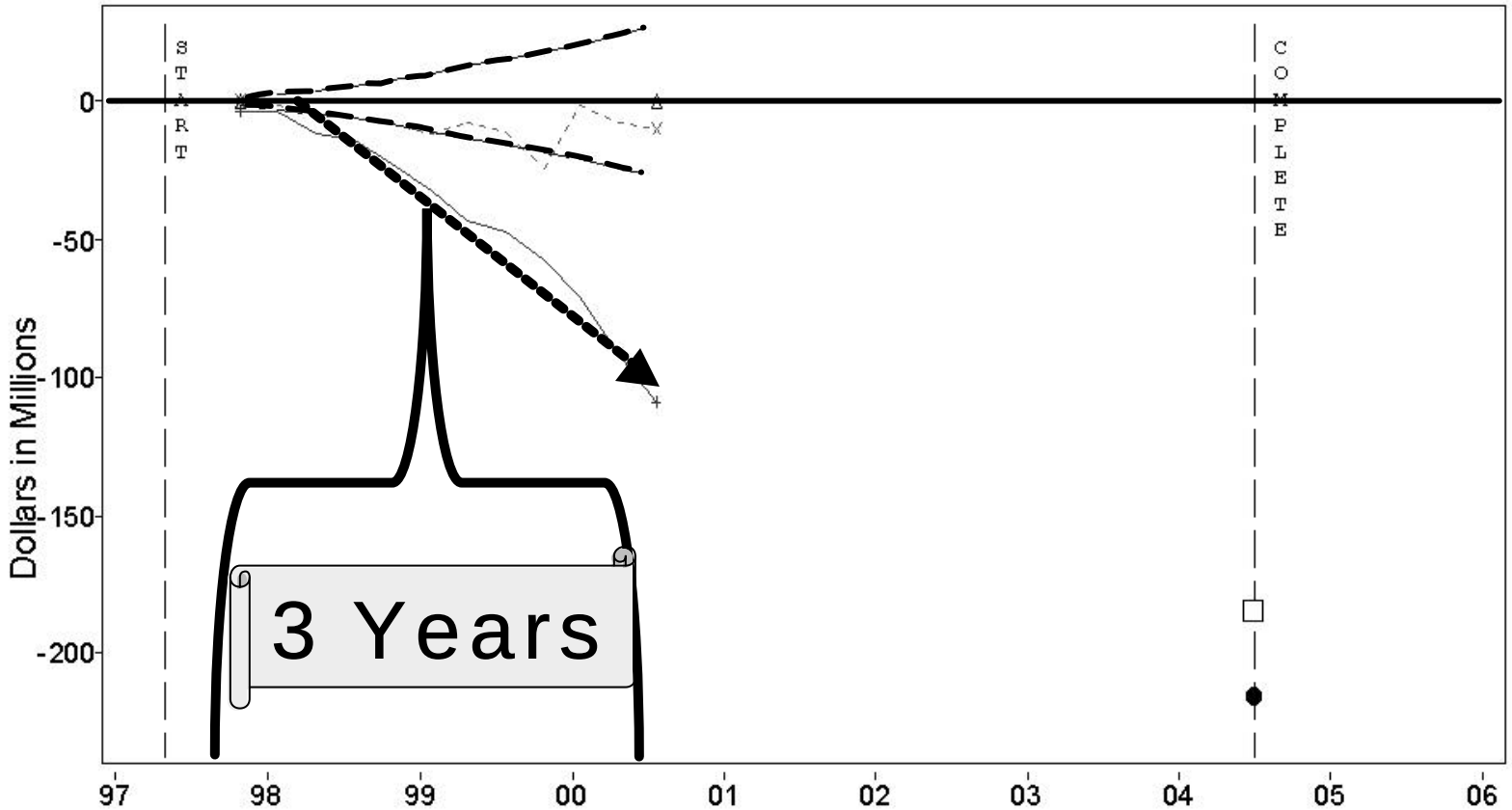
COST/SCHEDULE VARIANCE TRENDS

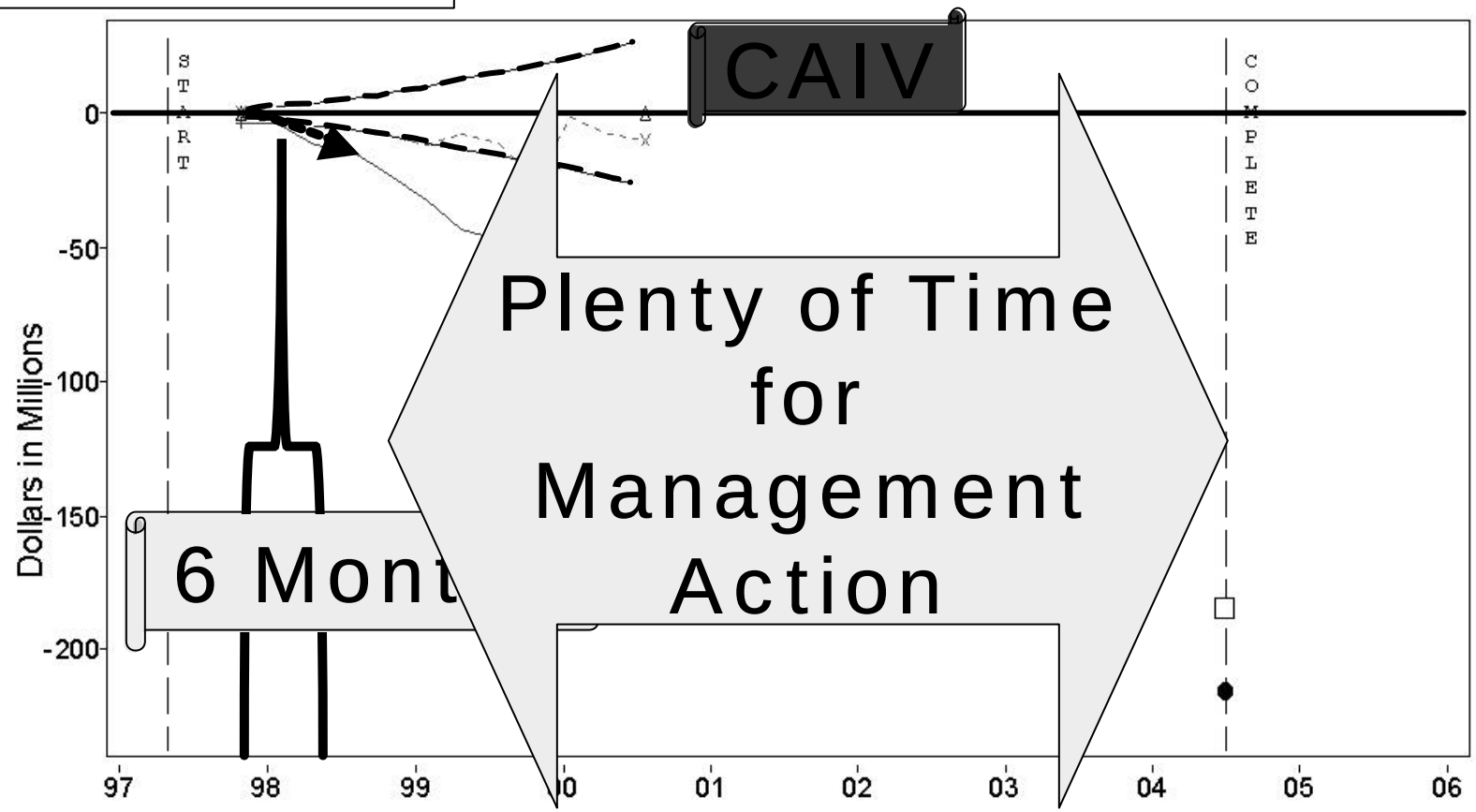
Ship: Variances



Cost Variance		-109.5			Cost Var @ Completion	
Sched Variance		-9.7	10% Thresholds		PM	-185.0
Mgmt Reserve		0.0	Start/Comp Date		CONTR	-216.0

COST/SCHEDULE VARIANCE TRENDS

Ship: Variances



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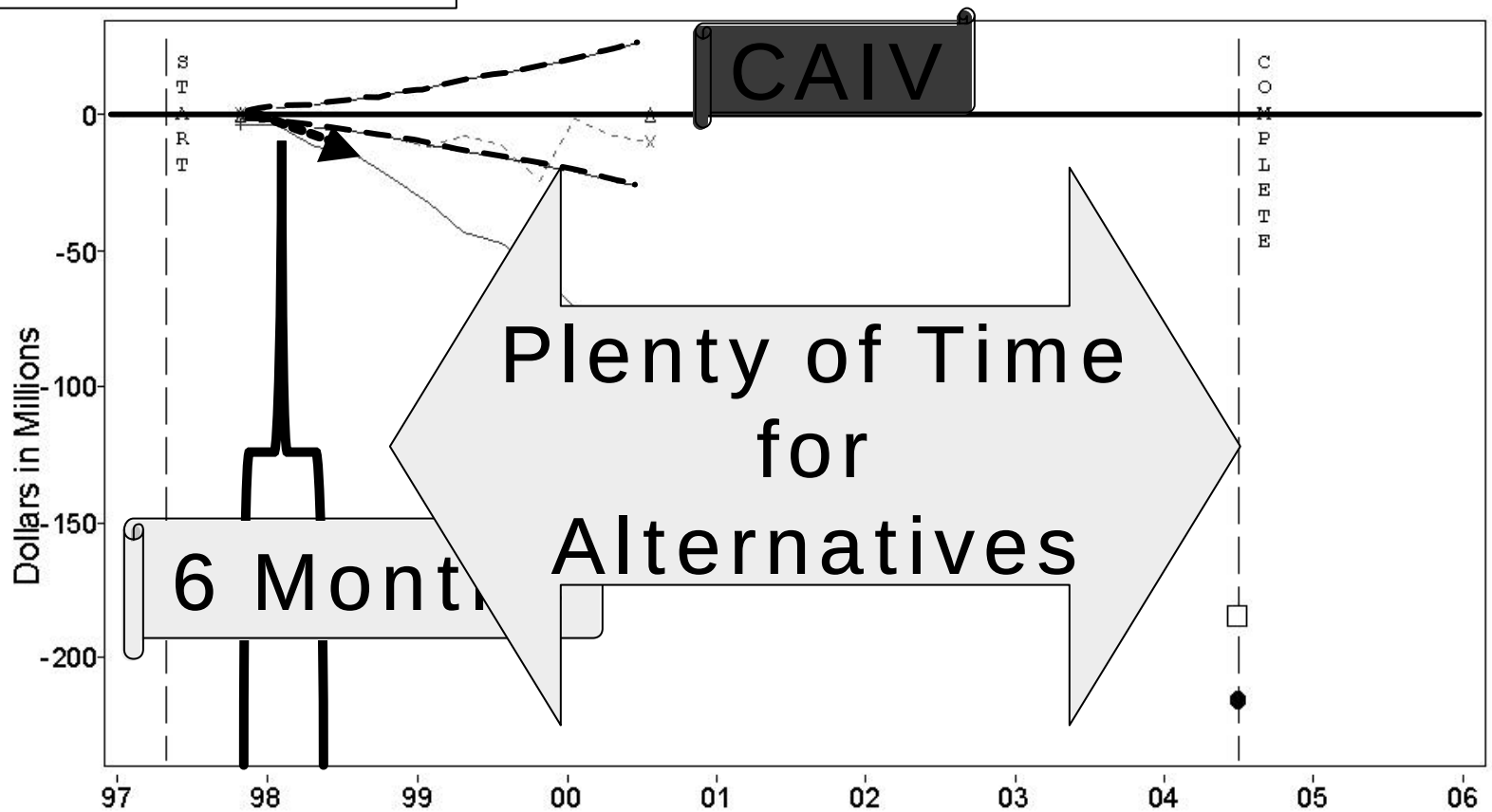

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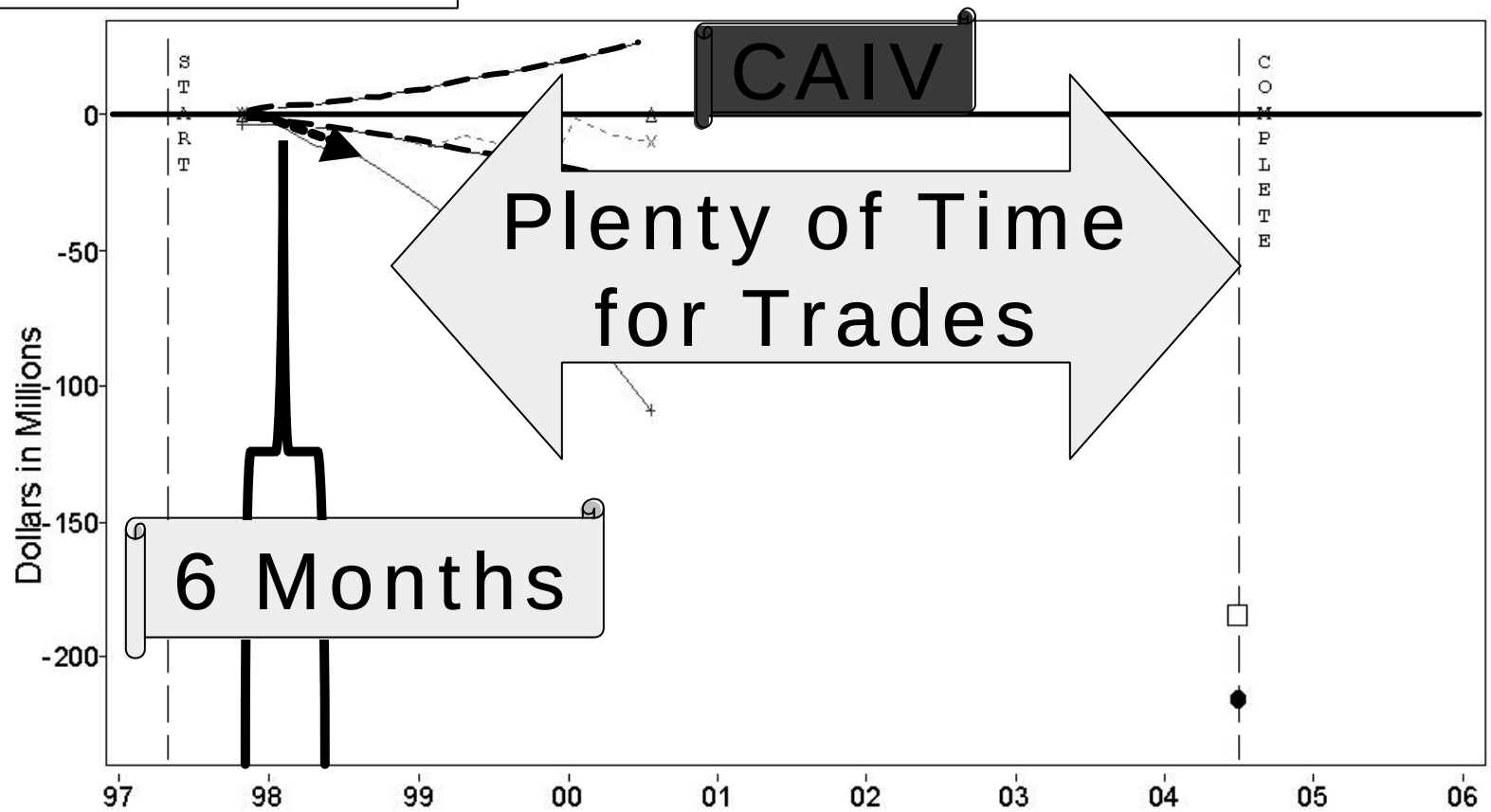

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Sched Variance		-9.7	10% Thresholds		PM	□	-185.0
Mgmt Reserve		0.0	Start/Comp Date		CONTR	●	-216.0

F/A 18 E/F Program

Trust

JSF

Mike Sears:

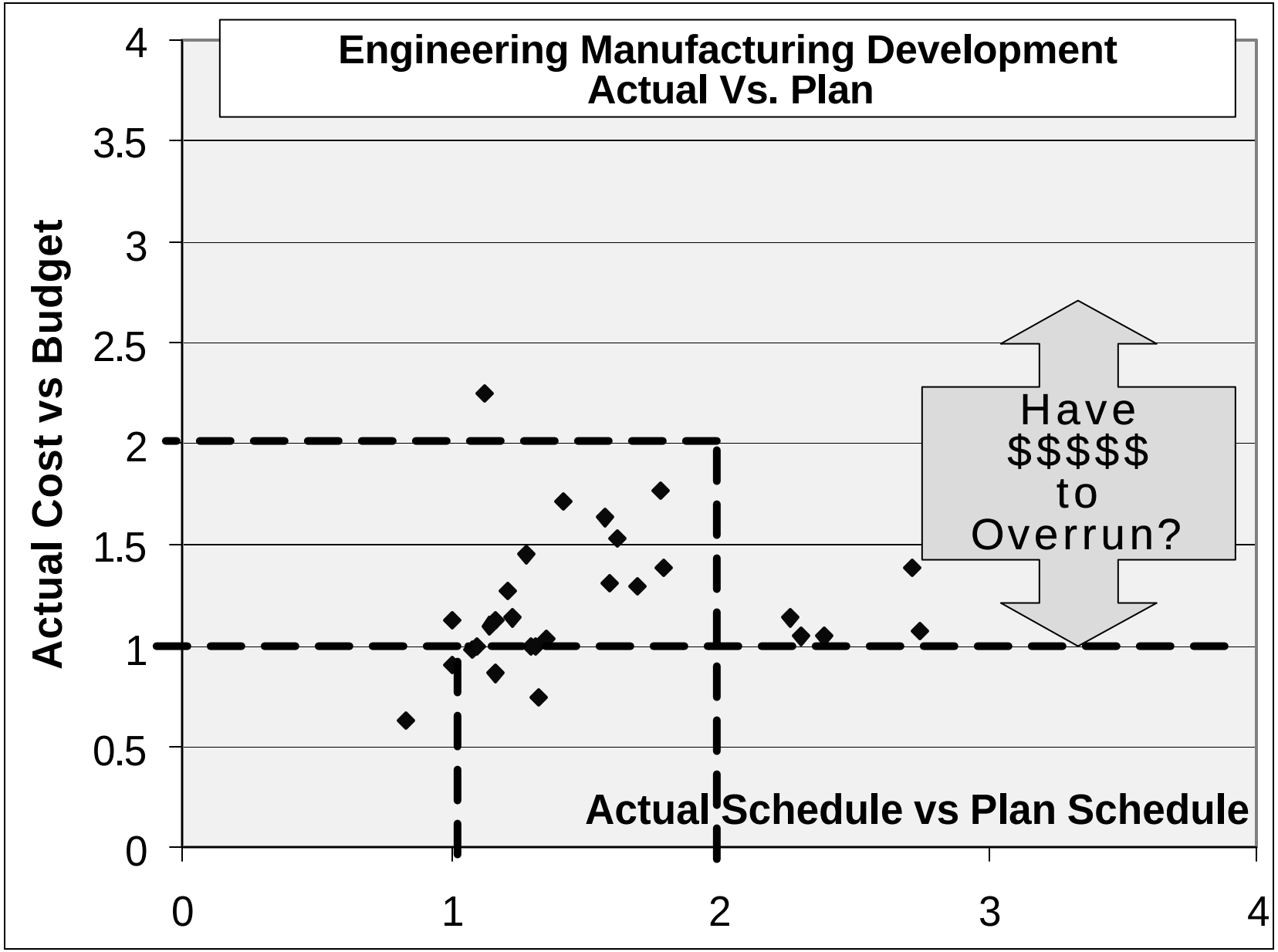
"Weekly EVM reporting so team leaders have the results of their actions quickly."

"Technical people find detail planning extremely difficult, don't like to do it. It is hard to do but it is absolutely essential to take that first step."

"We don't know all of the detail ahead of time. It is that learning process of pulling the plan together where you find lots of things that you never find if you don't attack it at the detail level."

Don't have Time?

President, McDonnell Douglas
A12 Program


Engineering Manufacturing Development
Actual Vs. Plan
Actual Cost vs Budget
4
3.5
3
2.5
2
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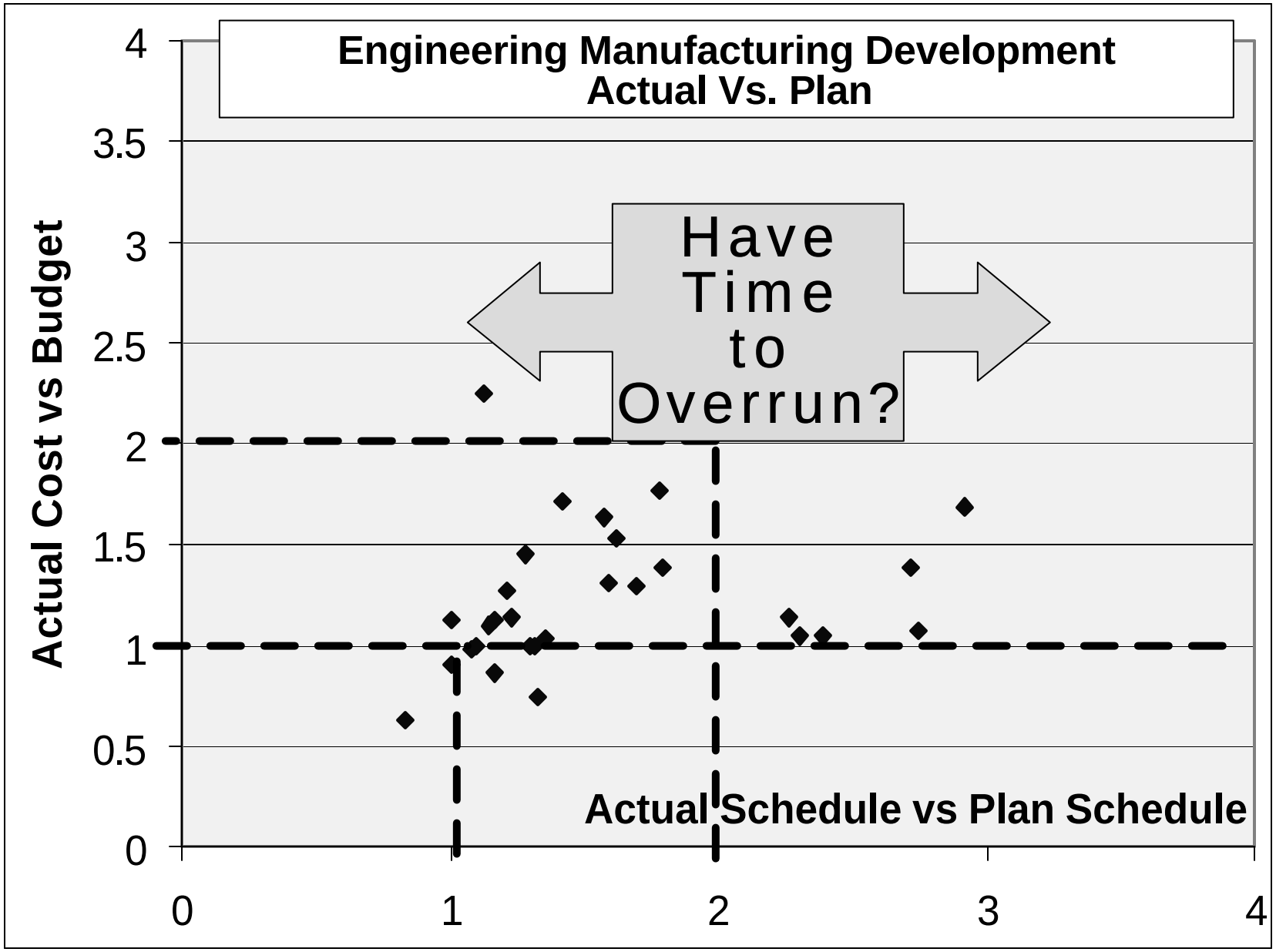
1
2
3
4
Have
$$$$$
to
Overrun?
Actual Schedule vs Plan Schedule


Engineering Manufacturing Development
Actual Vs. Plan
Have Time to Overrun?
Actual Cost vs Budget
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0.5
1
1.5
2
2.5
3
3.5
4
0
1
2
3
4

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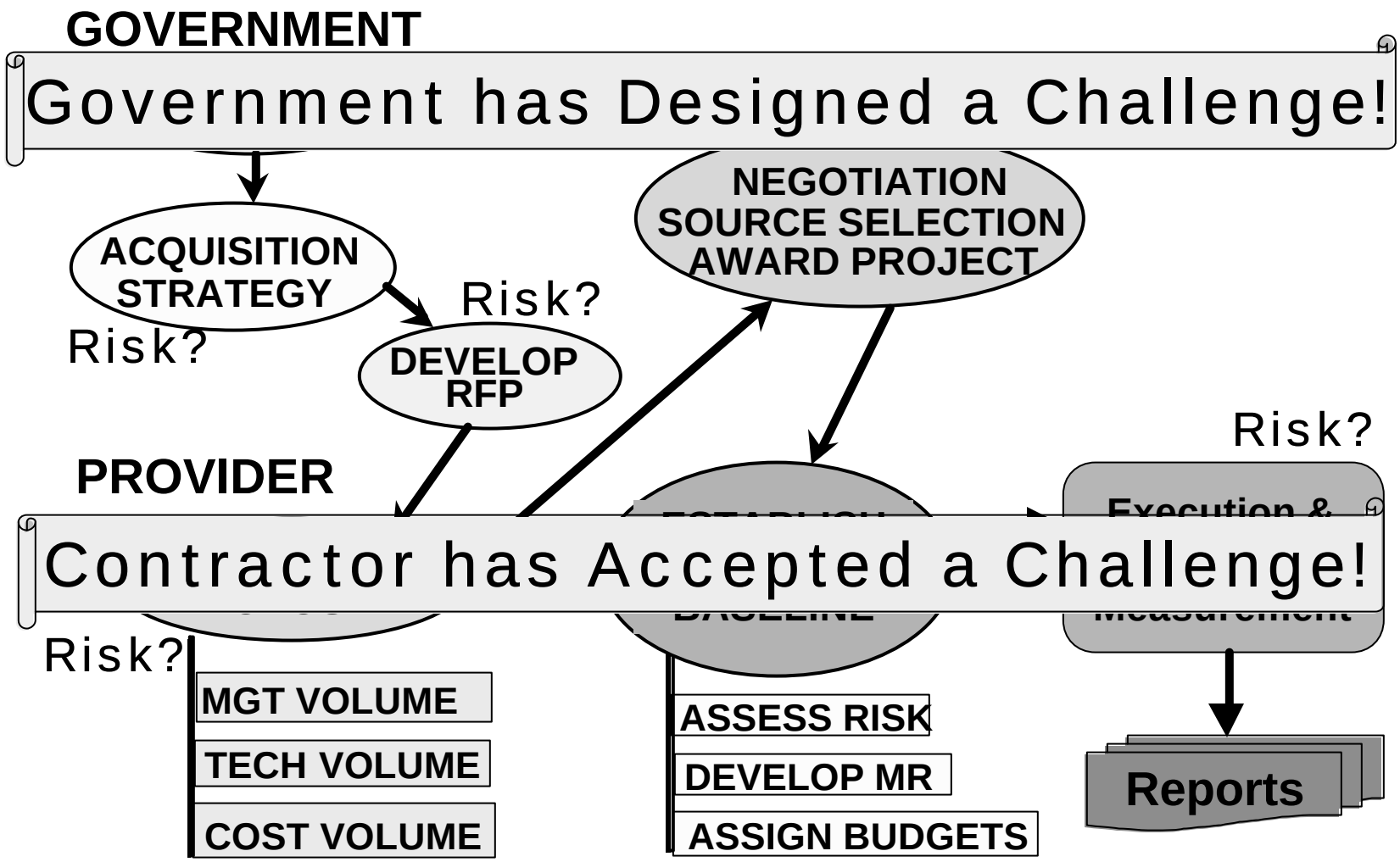
EAC - Futuristic Perspective:

- **When a contract is more than 15% complete & more than 10% overrun:**
  - ***1. The overrun at completion will be* more *than the overrun incurred to date***
  - ***2. The percent overrun at completion will be* greater *than percent overrun incurred to date***
    - **Based on OSD database of more than 500 major DOD contracts since 1977**

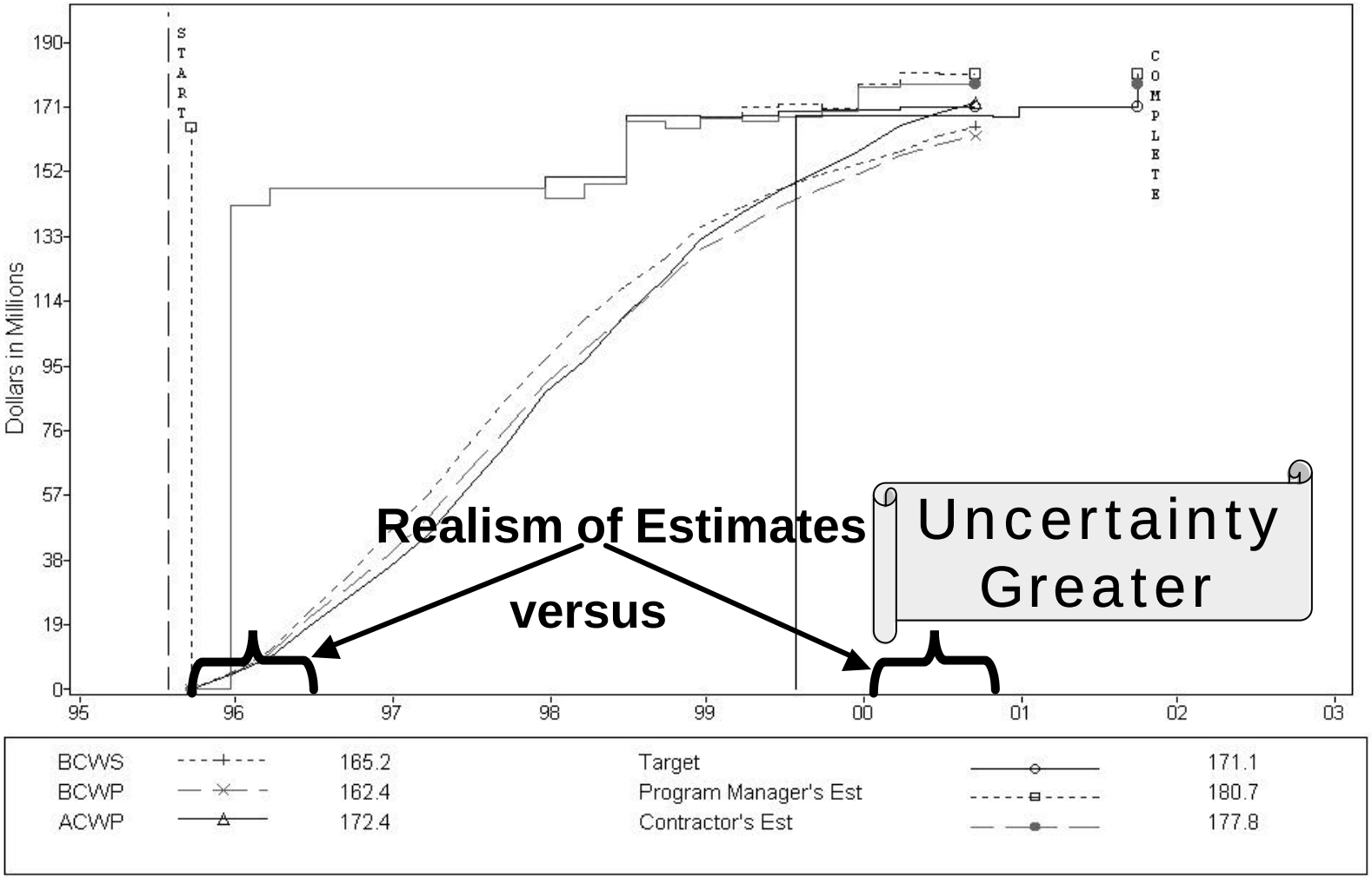
Why is this True?

Risk
Introduced into the Program



CONTRACT PERFORMANCE

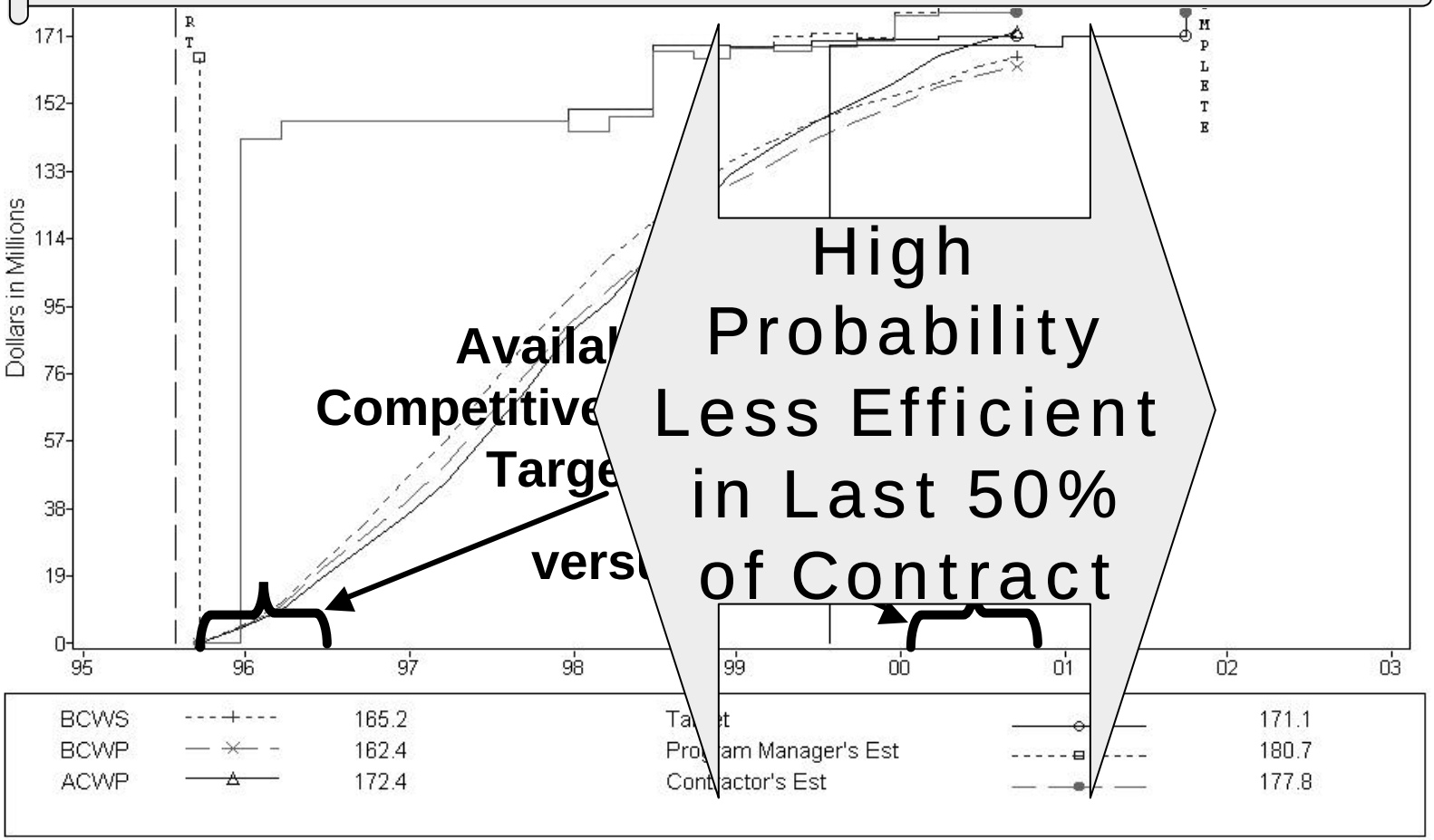
Missile: PMB



CONTRACT PERFORMANCE

Missile: PMB

Contractor has Accepted a Challenge



Availa

Competitive

Targe

vers

High Probability Less Efficient in Last 50% of Contract

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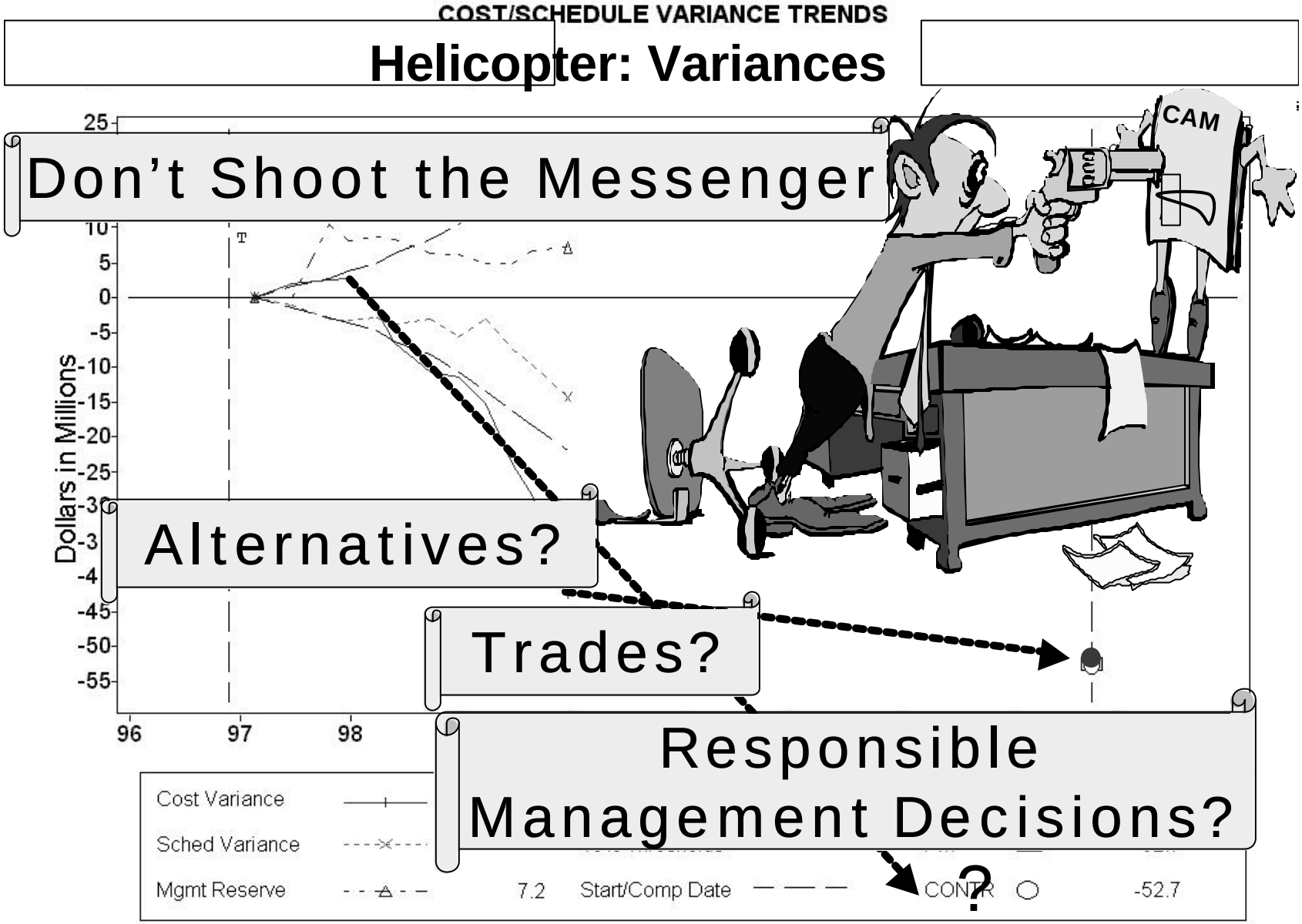
Helicopter: Variances



Don't Shoot the Messenger

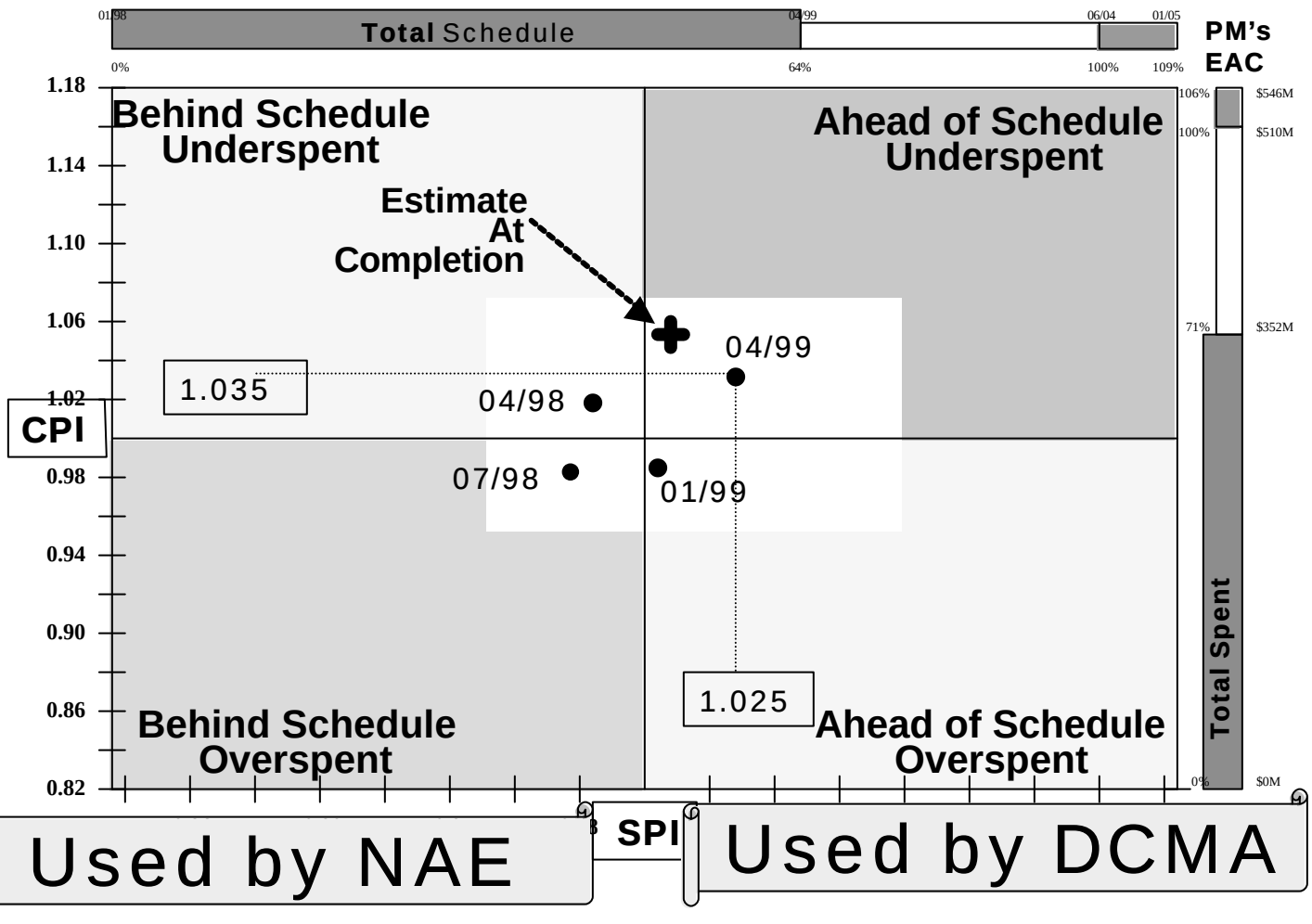
Alternatives?

Trades?

Responsible Management Decisions?

?

Performance Overview



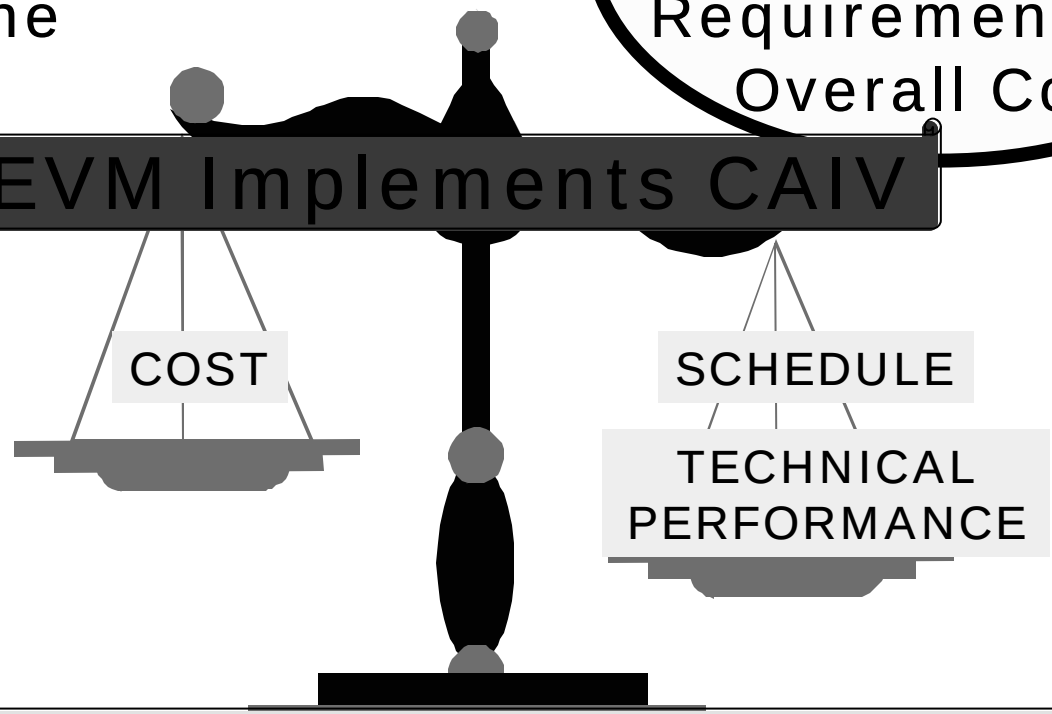
Used by NAE

Used by DCMA

Cost As the Independent Variable
PM Balancing Act

Produce the Best Product within the Cost Constr

Must be willing to Trade Requirements for Overall Cost



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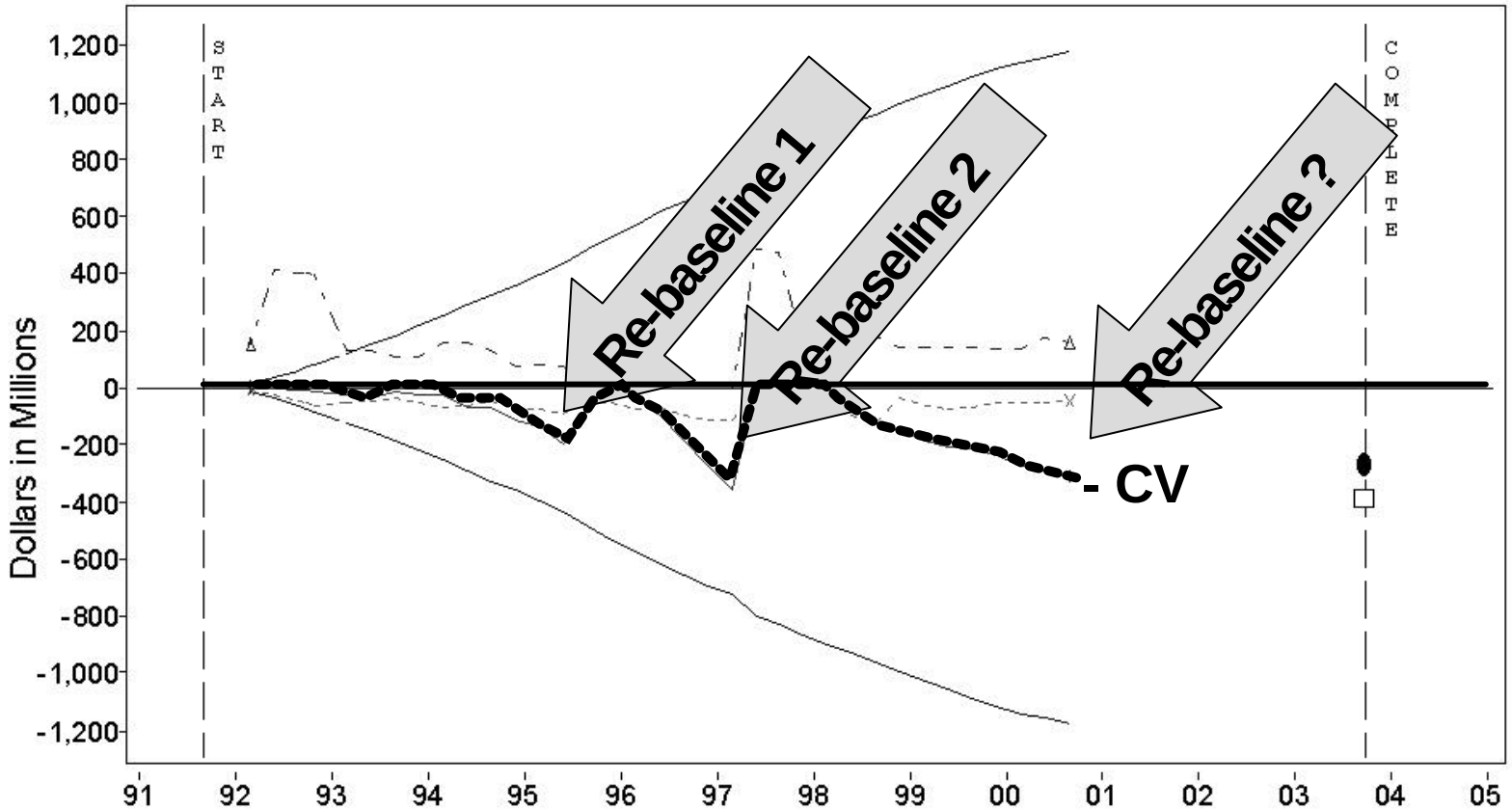
COST/SCHEDULE VARIANCE TRENDS

Aircraft: Variances



Cost Variance		-313.6			Cost Var @ Completion	
Sched Variance		-46.8	10% Thresholds		PM	-397.1
Mgmt Reserve		162.3	Start/Comp Date		CONTR	-264.7

What happens without Re-baseline?

"... management systems were closely aligned with . . . C/SCSC compliance; they could not be reset without contractual relief. Without a reset, large variances occurred between existing contractual requirements and actual plans. The system could not handle such variances, and ad hoc systems began to evolve . . . ad hoc systems could not keep pace and disconnects resulted, significantly impacting the Production Plan."

- CEO to USD(A&T) June, 1993

What happens without Rebaseline?

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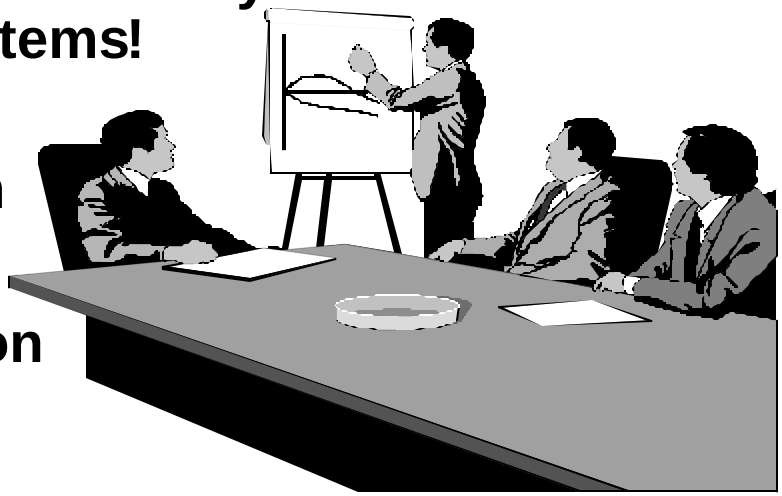
Whose Management System?

- **Contractor's Management System**
  - **Need to Manage the Contract Effort is Paramount to All other Considerations!**
  - **Contractor must have the Ability to Use its Own Management Systems!**
- **EVMS is not:**
  - **A Government System**
  - **Reporting System**
  - **Contract Administration**
  - **Accounting**
  - **Cost Analysis**
  - **A Method of Punishment**



The Re-baseline Dilemma

- **Failure to Re-baseline leads to:**
  - **Two Sets of Books**
  - **Loss of Control**

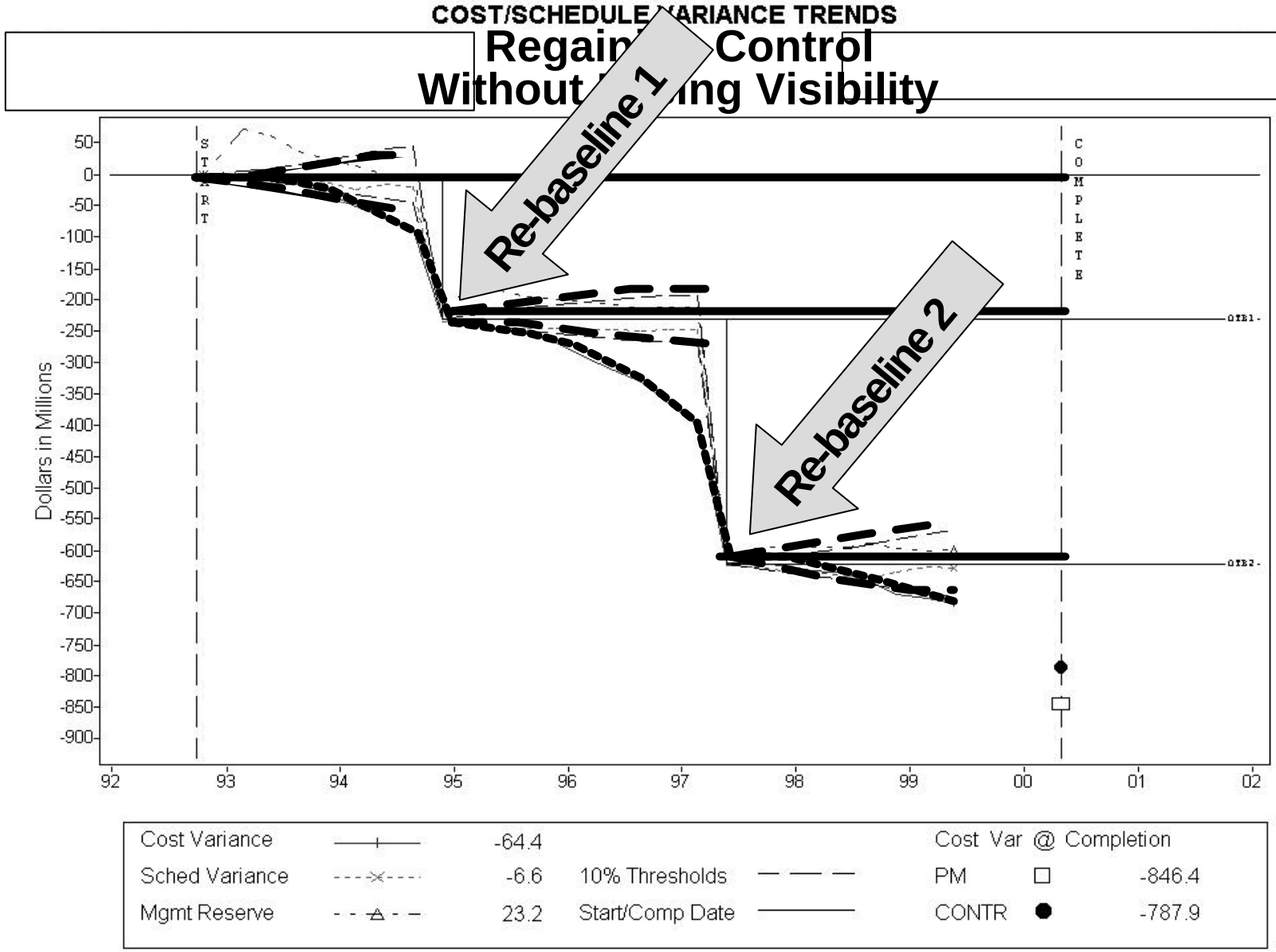
BUT

- **Re-baseline without Discipline leads to:**
  - **Rubber Baseline**
  - **Loss of Control**

And

- **Re-baseline does NOT change a Contract from “Red” to “Green”!!**

Regaining Control Without Losing Visibility



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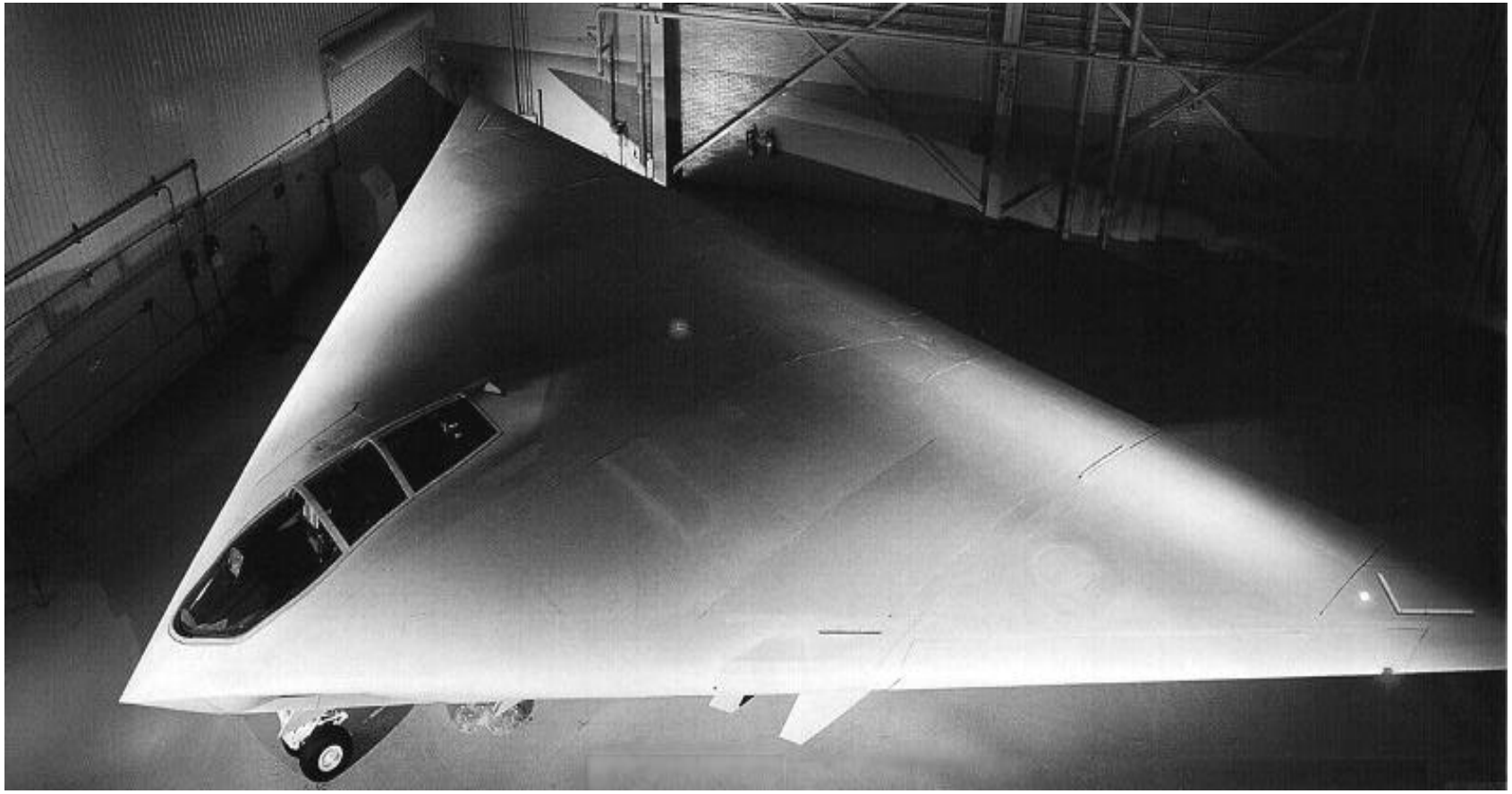
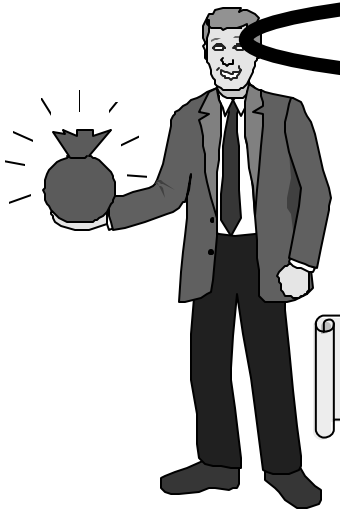


A-12: The Human Cost

Position/Person	Action
USD(A)	Resigned
COMNAVAIR	Early Retirement
PEO	Censured; Reassigned
Program Manager	Censured; Reassigned
McAir Program Manager	Reassigned
GDFW Program Manager	Reassigned

C&L/TASC Cost Drivers:
Cost Without a Requirement

- **C/SCS Cost Premium is 0.9%**
  - **Nearly 75% is in Engineering/Program Mgmt.**
    - **Written Control Account Variances**
  - **Most of Remainder is in Administrative and External Reporting Activities**



Management does cost $$

Misuse of EVMS cost more $$

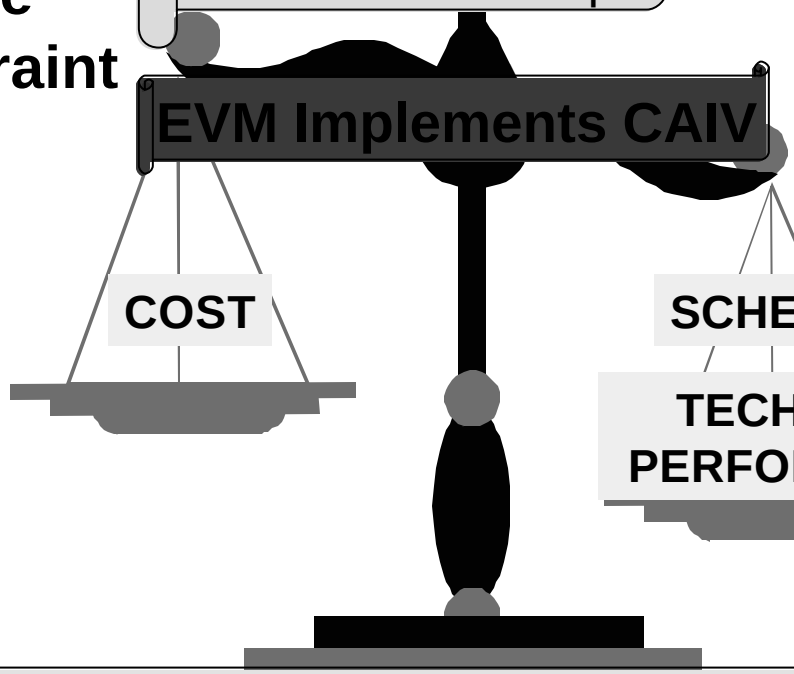
Coopers & Lybrand/TASC Study:
"The DoD Regulatory Cost Premium: A Quantitative Assessment"
December, 1994

Cost As the Independent Variable
PM Balancing Act

Produce the Best Product within the Cost Constraint

Variances are Good if not covered up.

Must be willing to Trade Requirements for Overall Cost



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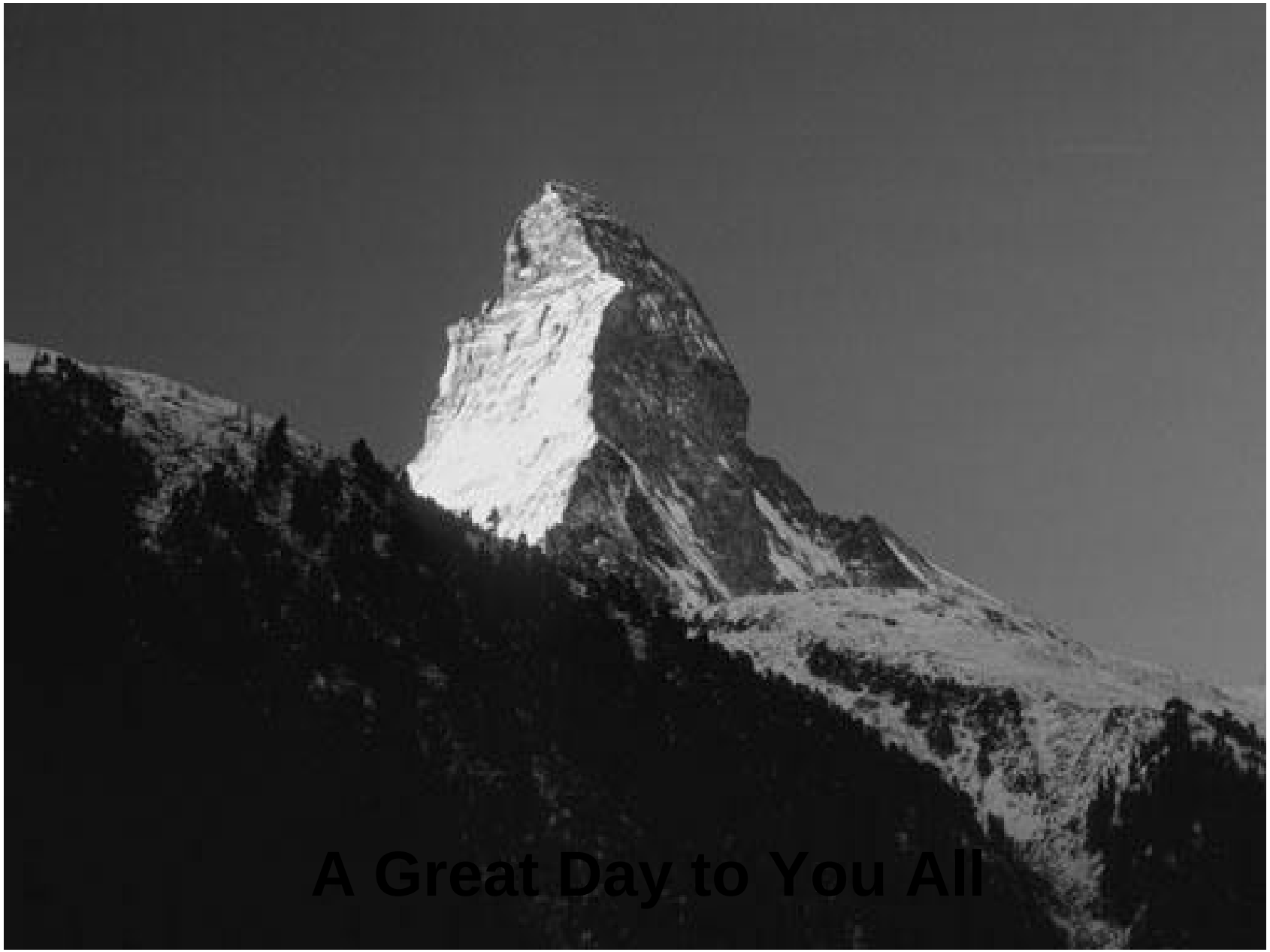
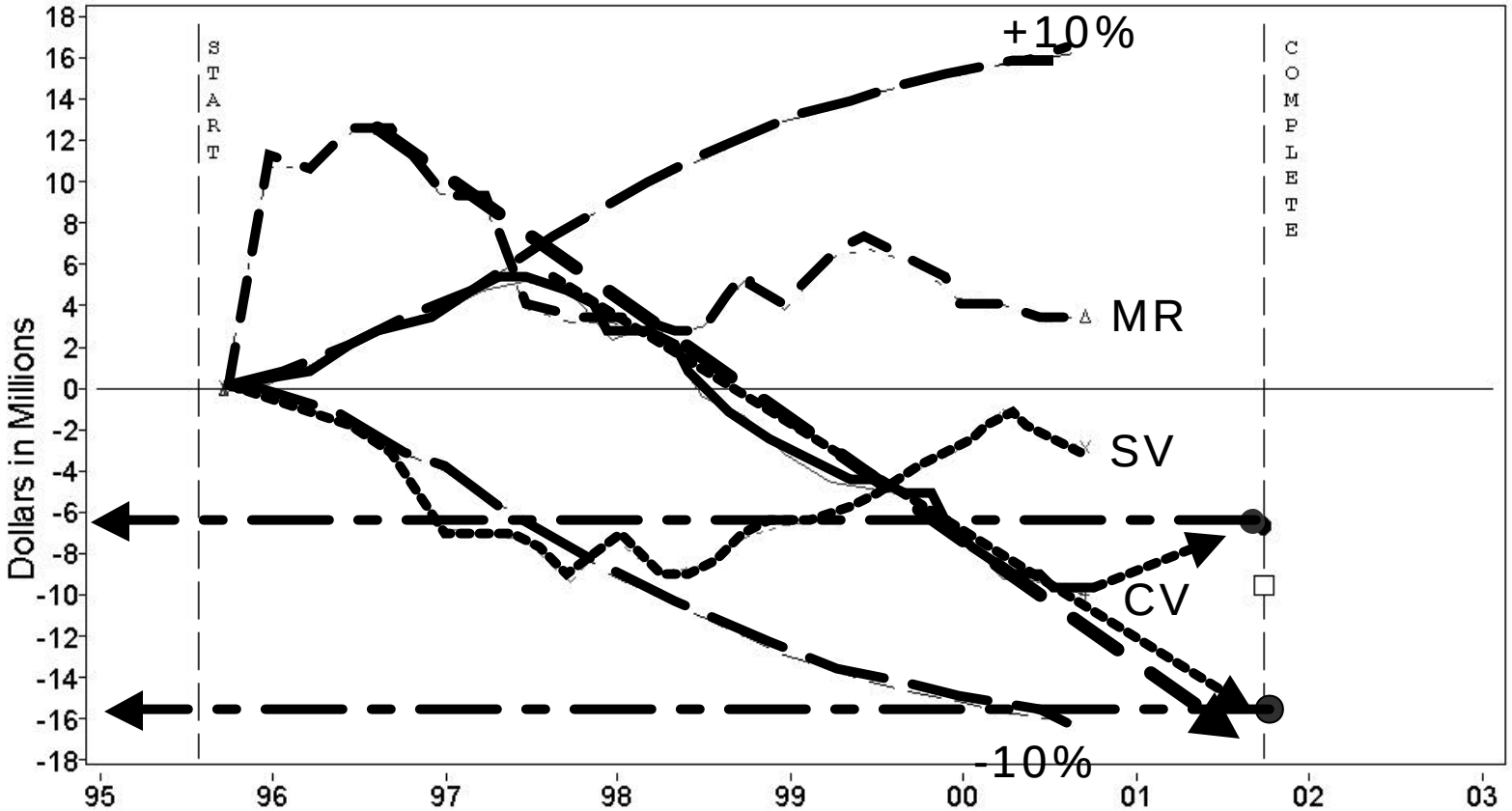
Defense Acquisition University

Education for the Acquisition Professional


A Great Day to You All

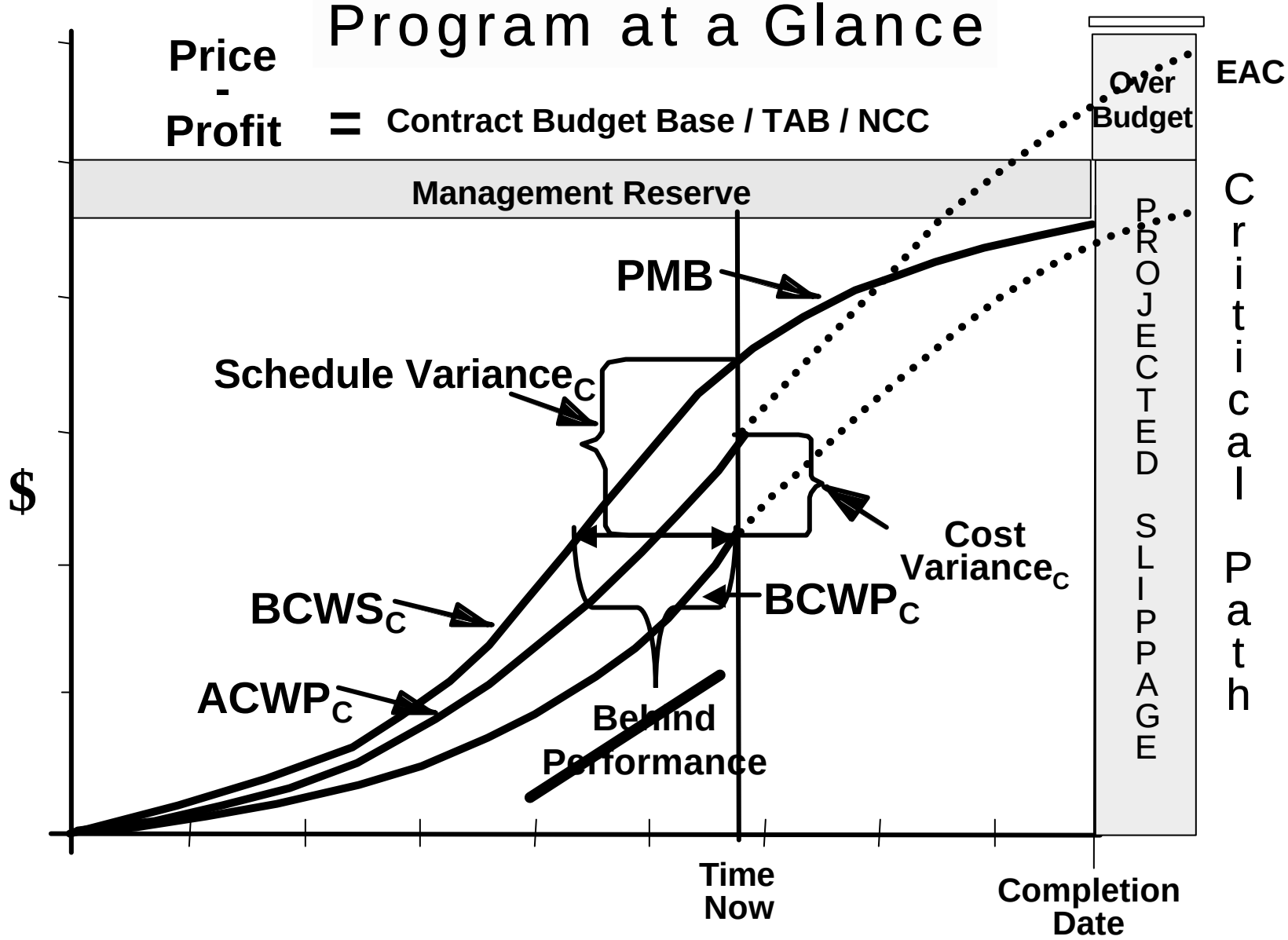
COST/SCHEDULE VARIANCE TRENDS

Missile: Variances



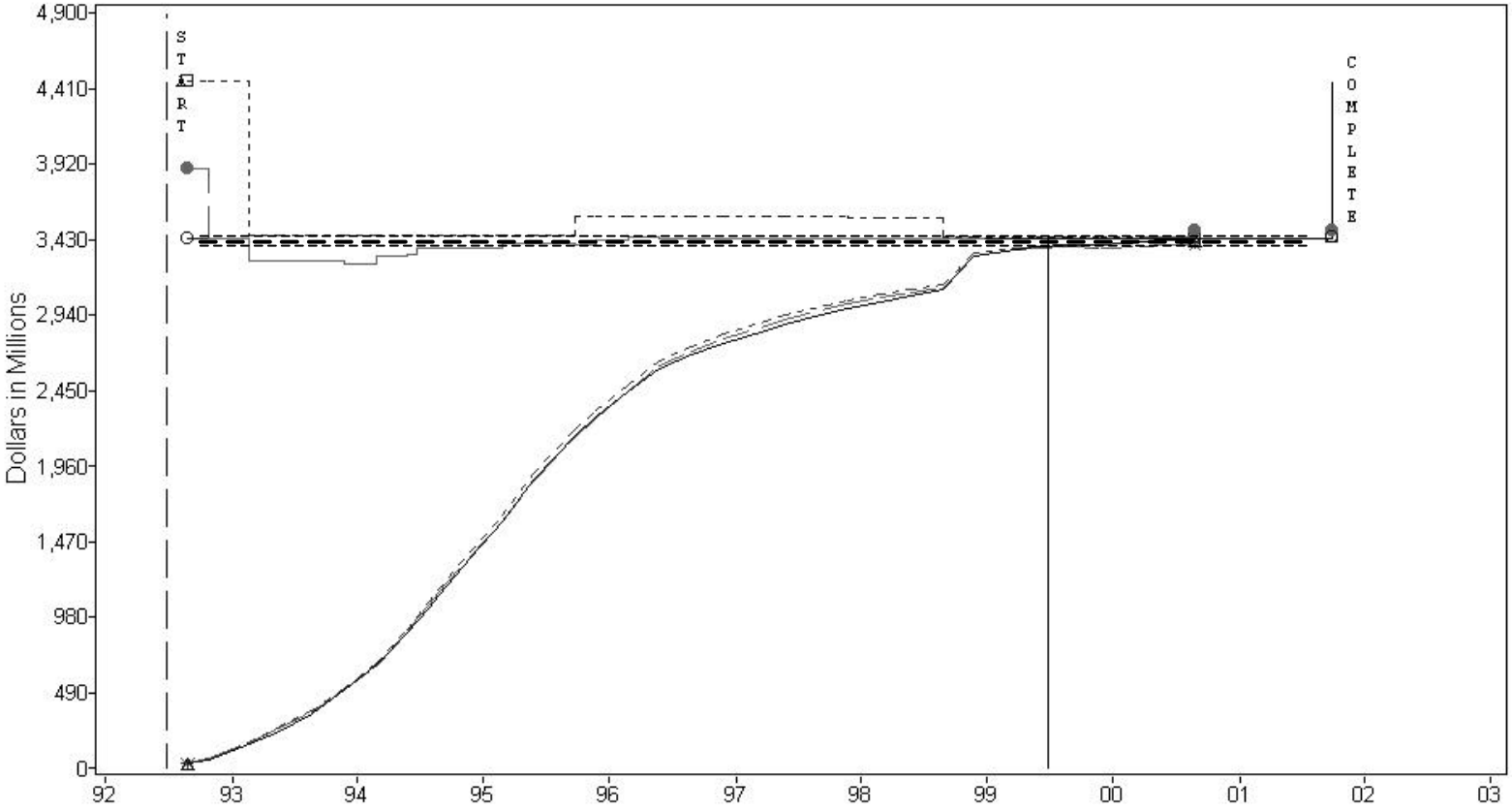
Cost Variance		-10.0			Cost Var @ Completion	
Sched Variance		-2.8	10% Thresholds		PM	-9.6
Mgmt Reserve		3.5	Start/Comp Date		CONTR	-6.7

Program at a Glance



CONTRACT PERFORMANCE

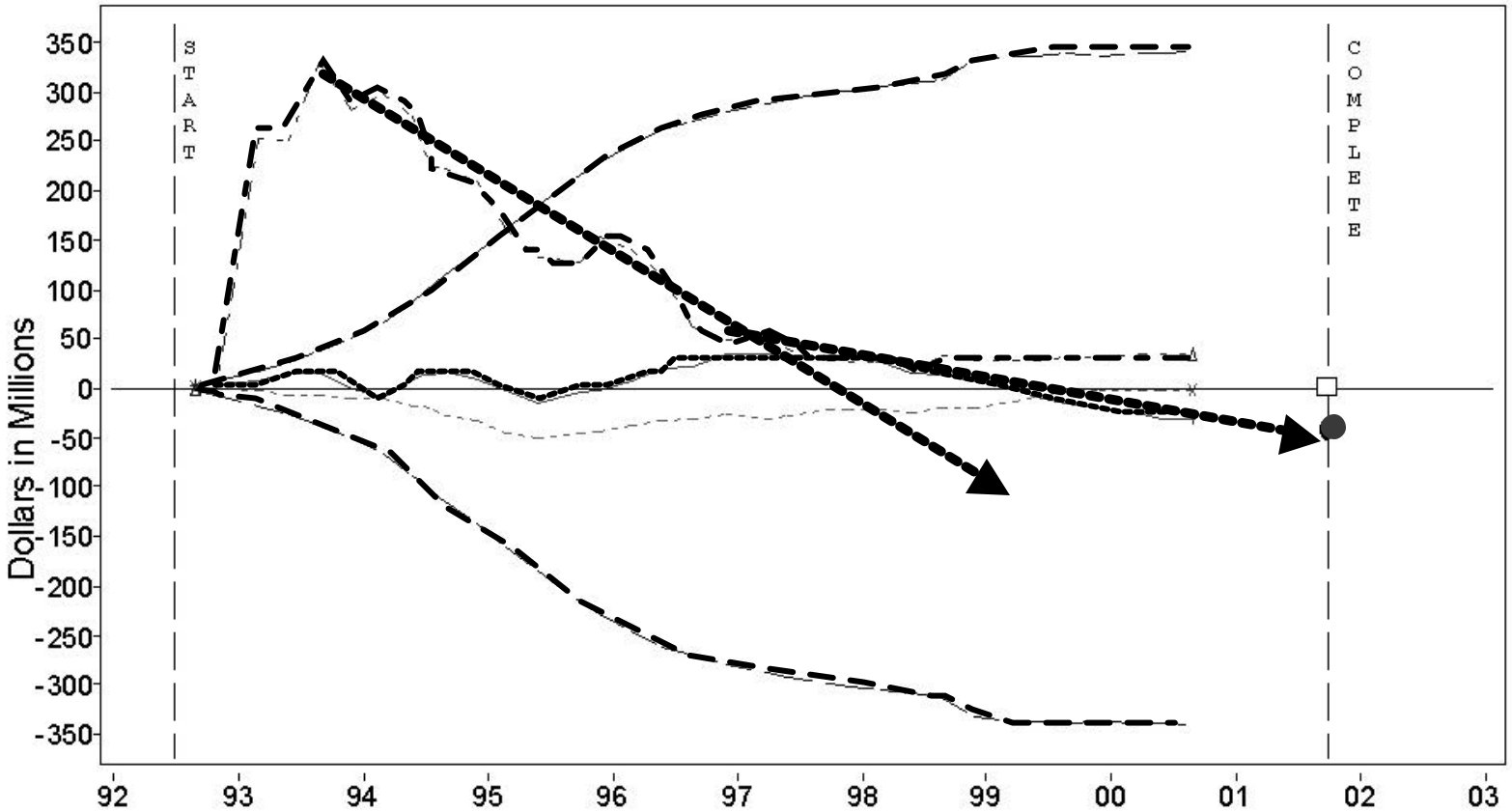
Airplane: PMB



BCWS	3,402.0	Target		3,445.4
BCWP	3,399.7	Program Manager's Est		3,445.4
ACWP	3,430.3	Contractor's Est		3,486.9

COST/SCHEDULE VARIANCE TRENDS

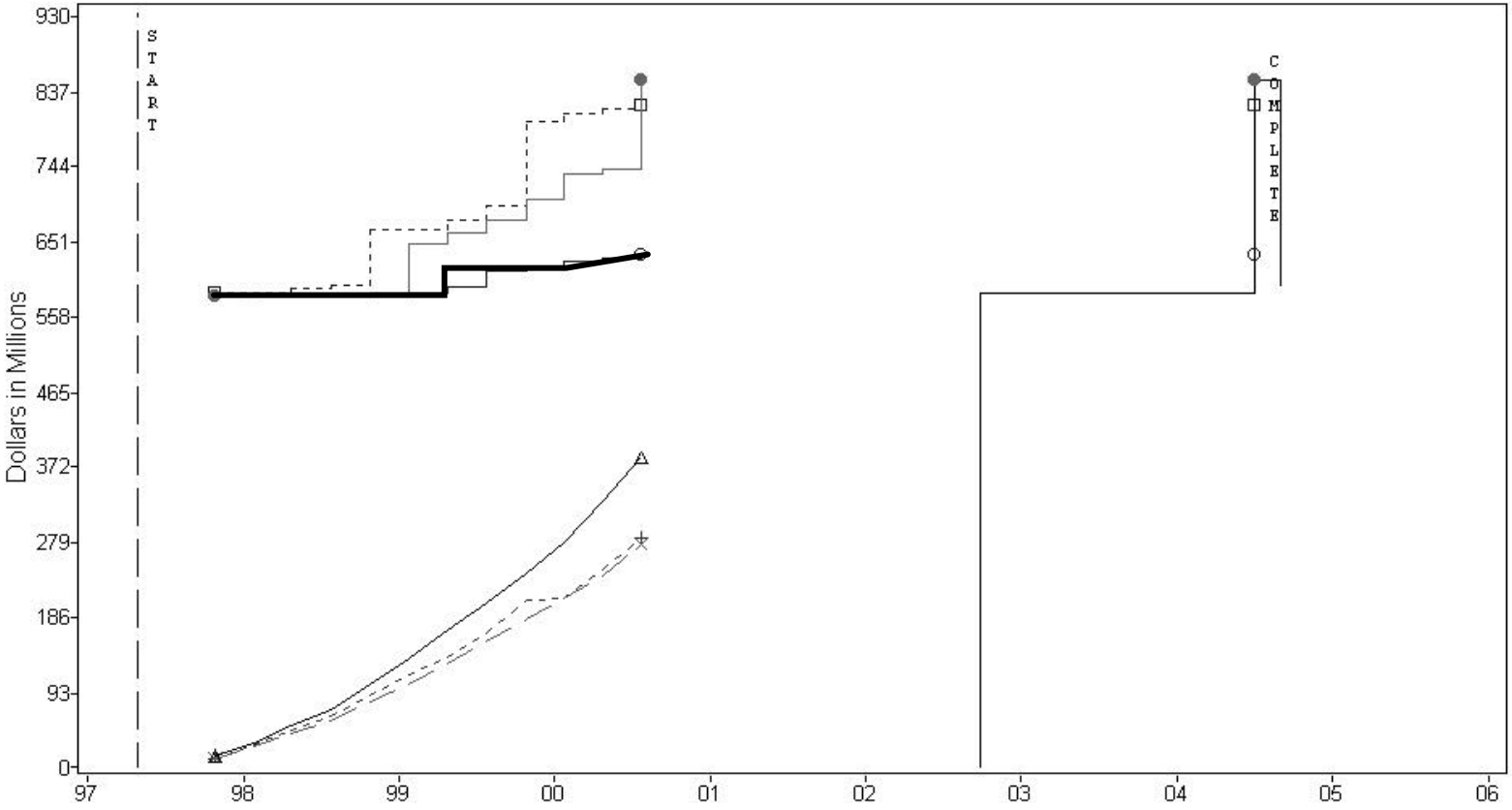
Airplane: Variance



Cost Variance		-30.6			Cost Var @ Completion	
Sched Variance		-2.3	10% Thresholds		PM	0.0
Mgmt Reserve		34.5	Start/Comp Date		CONTR	-41.5

CONTRACT PERFORMANCE

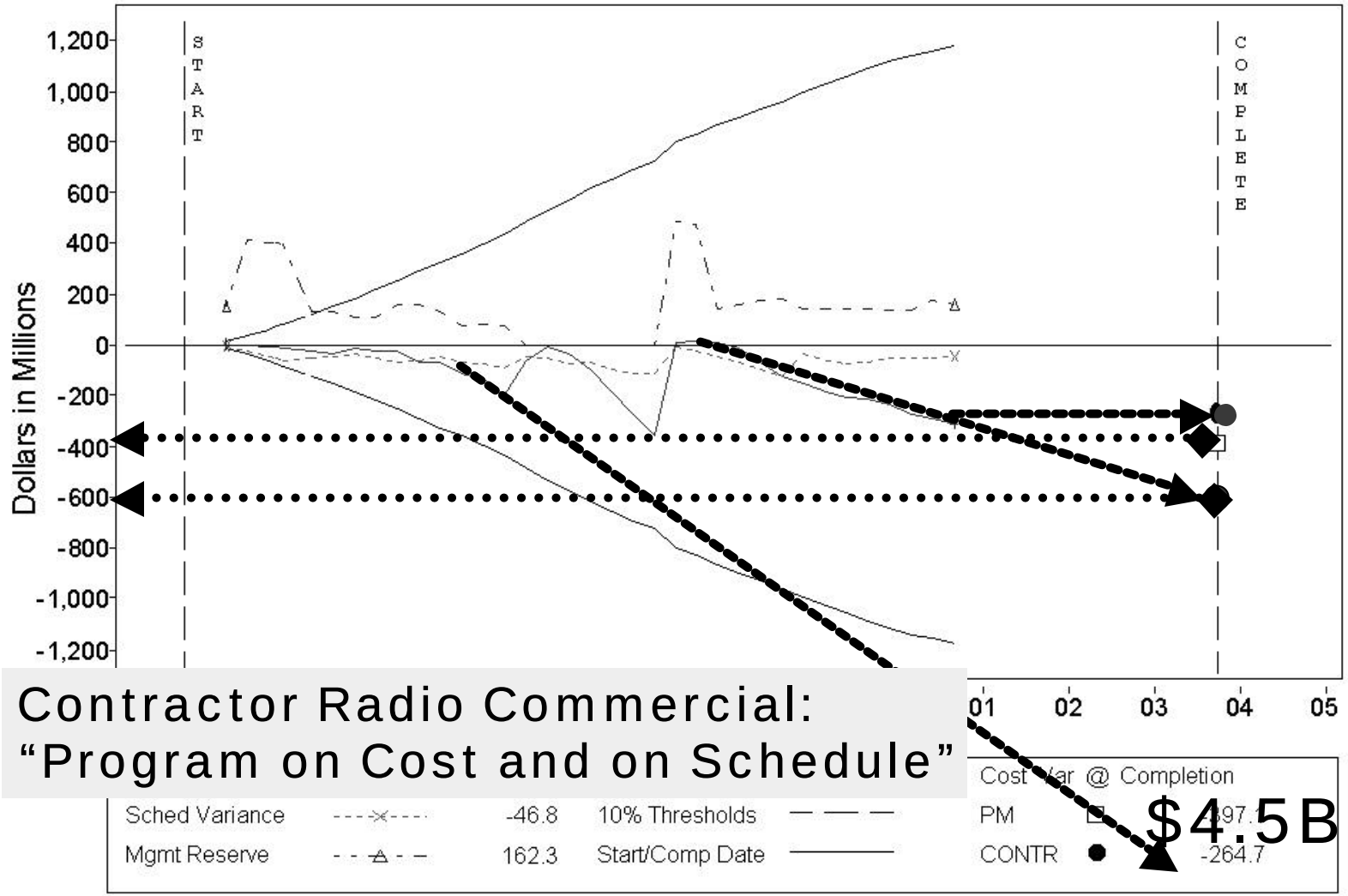
Ship: PMB



BCWS		285.1	Target		635.5
BCWP		275.4	Program Manager's Est		820.5
ACWP		384.9	Contractor's Est		851.5

COST/SCHEDULE VARIANCE TRENDS

Aircraft: Variances

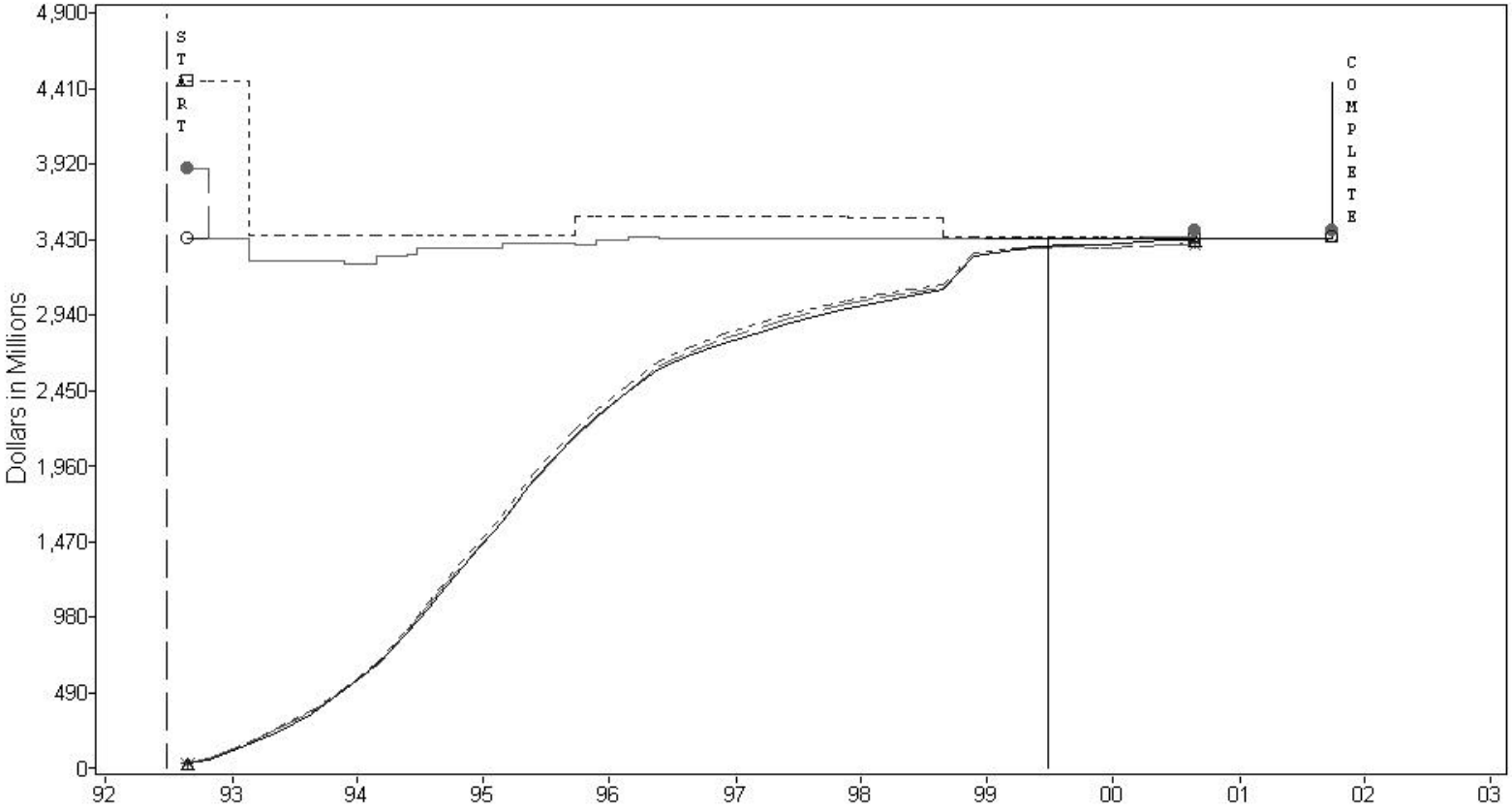


Contractor Radio Commercial:
"Program on Cost and on Schedule"

$4.5B

CONTRACT PERFORMANCE

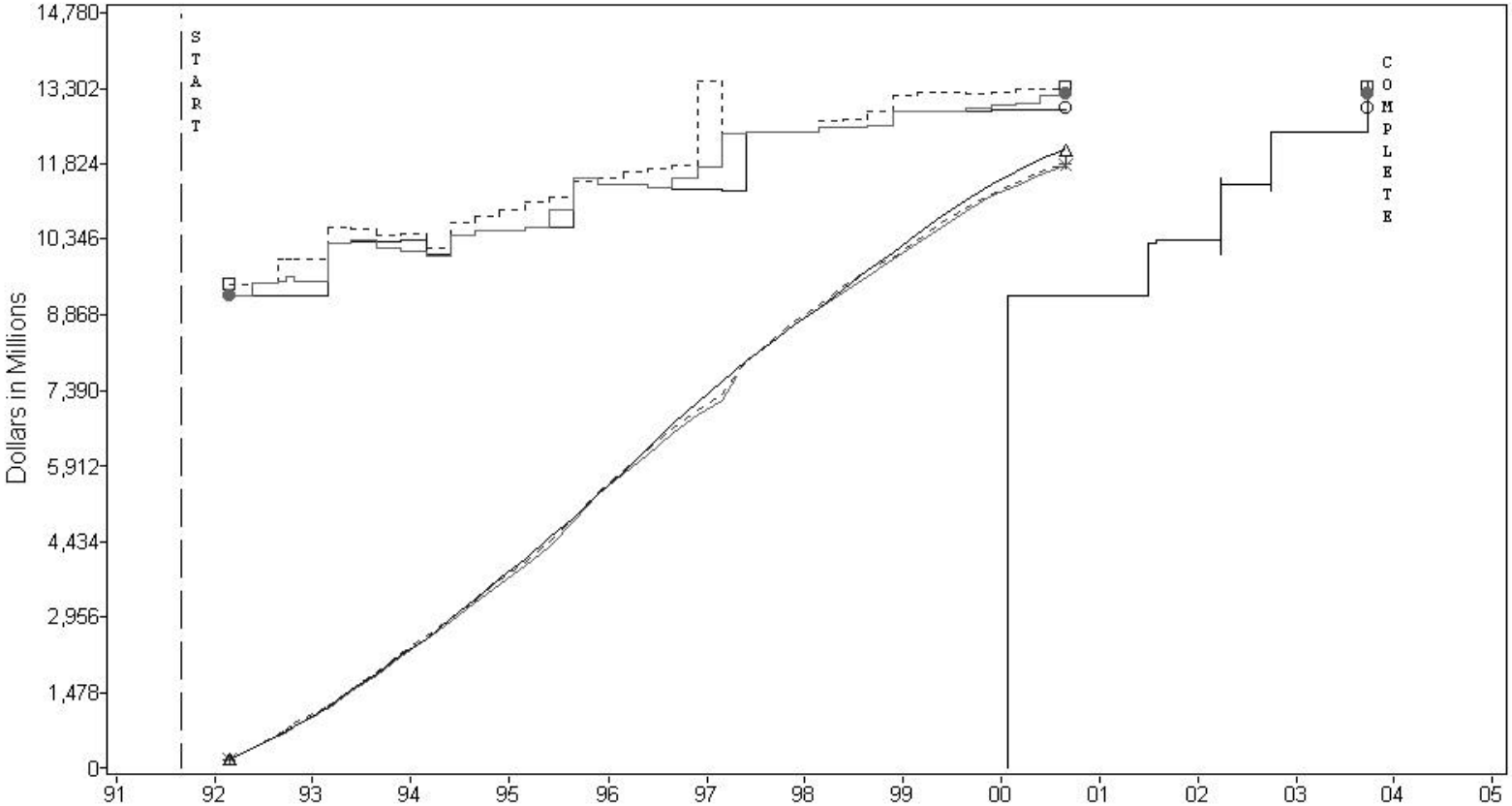
Airplane: PMB



BCWS	3,402.0	Target	3,445.4
BCWP	3,399.7	Program Manager's Est	3,445.4
ACWP	3,430.3	Contractor's Est	3,486.9

CONTRACT PERFORMANCE

Aircraft: PMB



BCWS		11,813.4	Target		12,928.9
BCWP		11,766.6	Program Manager's Est		13,326.0
ACWP		12,080.2	Contractor's Est		13,193.6

OTB Approval
A Management Decision

- **Need to Manage the contract effort is Paramount to All other Considerations!**
- **Three Conditions:**
  - **Problem is Understood**
  - **New Plan is Ready**
  - **Contractor needs OTB to effect Proper Management Control**
- **Issue goes to the Heart of EVMS Ownership and Reform**

What Does the Data Really Mean ?

"In summary, the PM underestimated the cost implications of adverse engineering and manufacturing process data...." p.12

"The PM testified that when he noted that the contract was funded to ceiling, all interest in FSD cost evaporated." p.23

"The CAIG cost analyst...memo concludes: 'The A-12 FSD contract is a fixed price incentive contract, and the Navy has budgeted to its ceiling, so the government's liability is covered'." p.25

"...it is apparent that MAR participants at the working group level did not share a clear vision of the relationship between cost and schedule risk and the contractor team's ability or willingness to perform within the FSD contract." p.28

Roadmap - Requirement to Competitive Advantage

- **Common Business Processes are at the Core of EVM**
  - **Suppliers are Realizing Savings, Efficiencies**
  - **Management Systems are a Competitive Advantage**
- **"Good Management Effect"**
  - **LM study: Relationship Between Effective Management Practices and Desired Results such as Re-win Rate, Good CPARS and Award Fee Ratings and Higher Return on Sales**

Program by program application isn't good enough