






# Overview of Today's Discussion

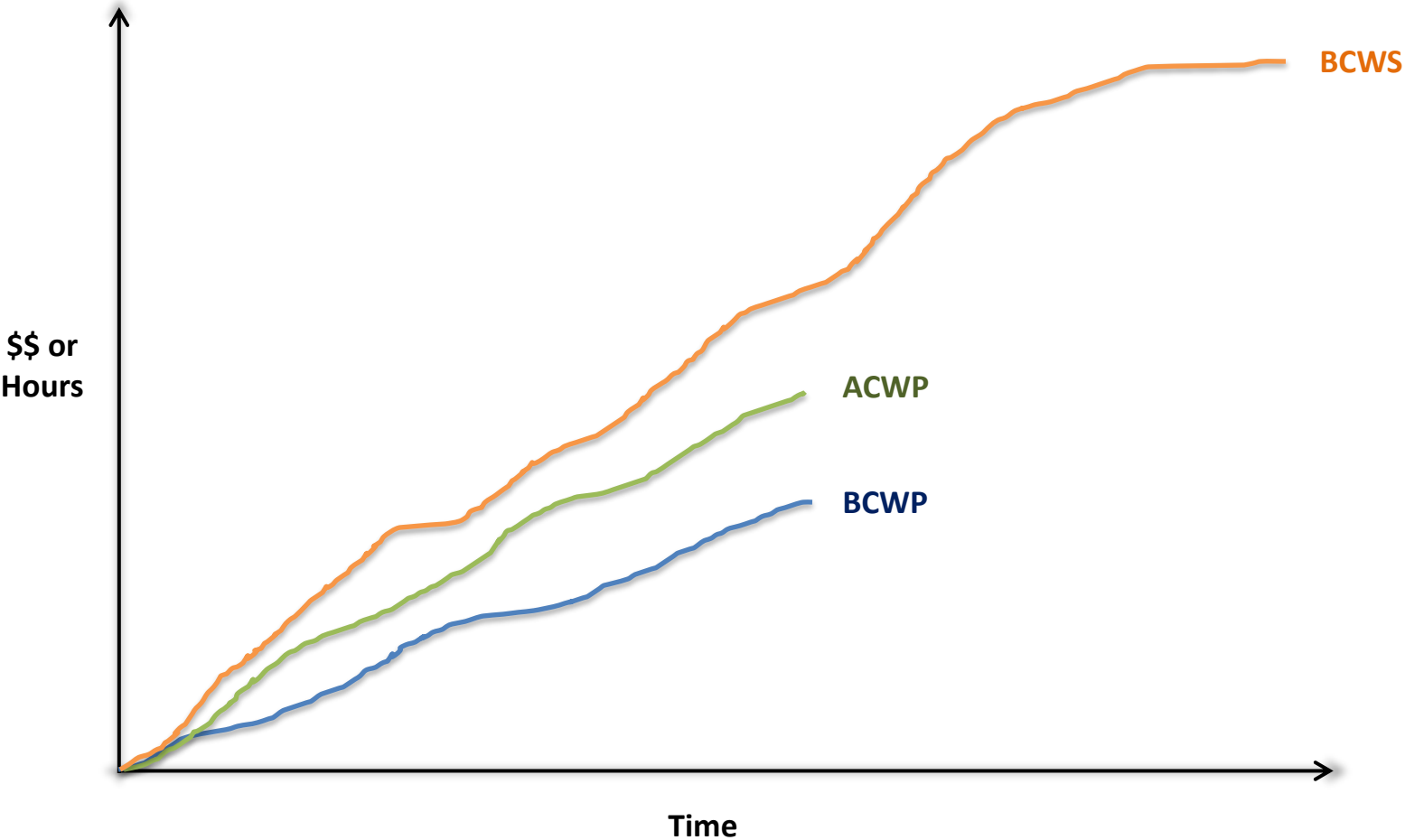


## Don't Let EVM Data Mislead You

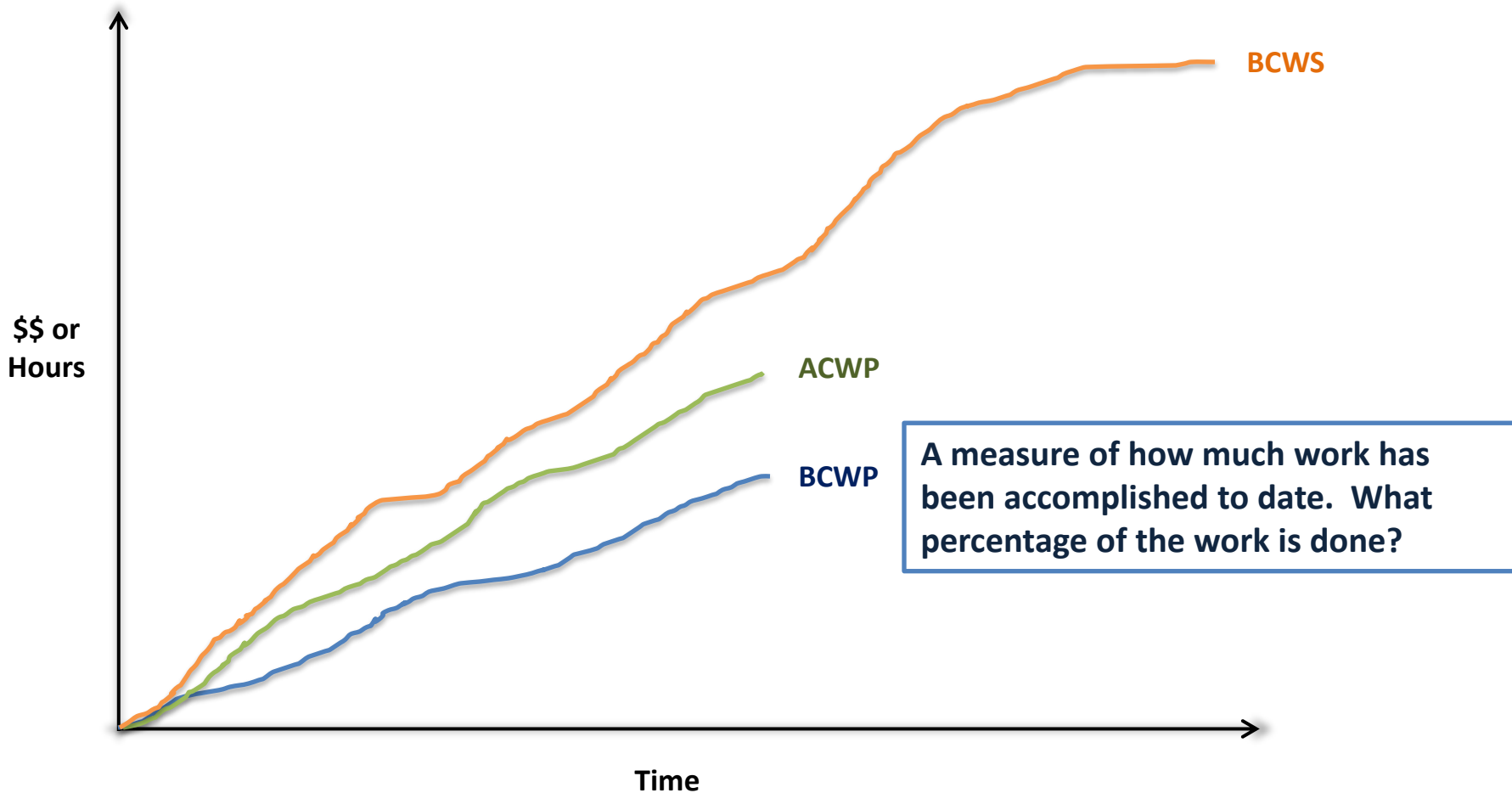
Steve Sheamer

-  Brief Overview of EVM Concepts
-  Why you can't trust BACs or EACs
-  Why EVM progress is often overstated
-  Why you need to account for schedule risk
-  How to prevent yourself from being fooled

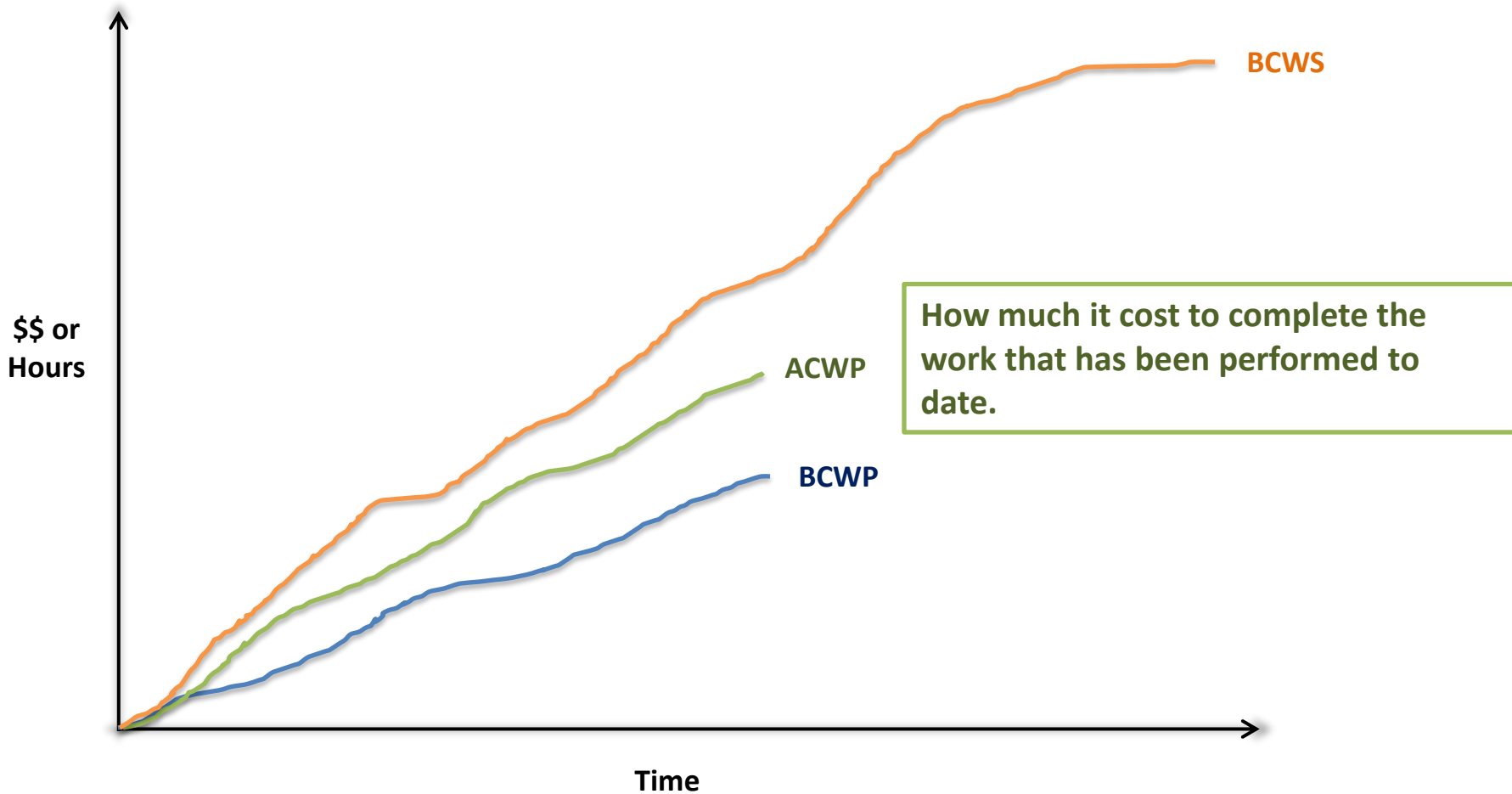
# In theory, EVM data provides everything a cost estimator needs to develop an estimate



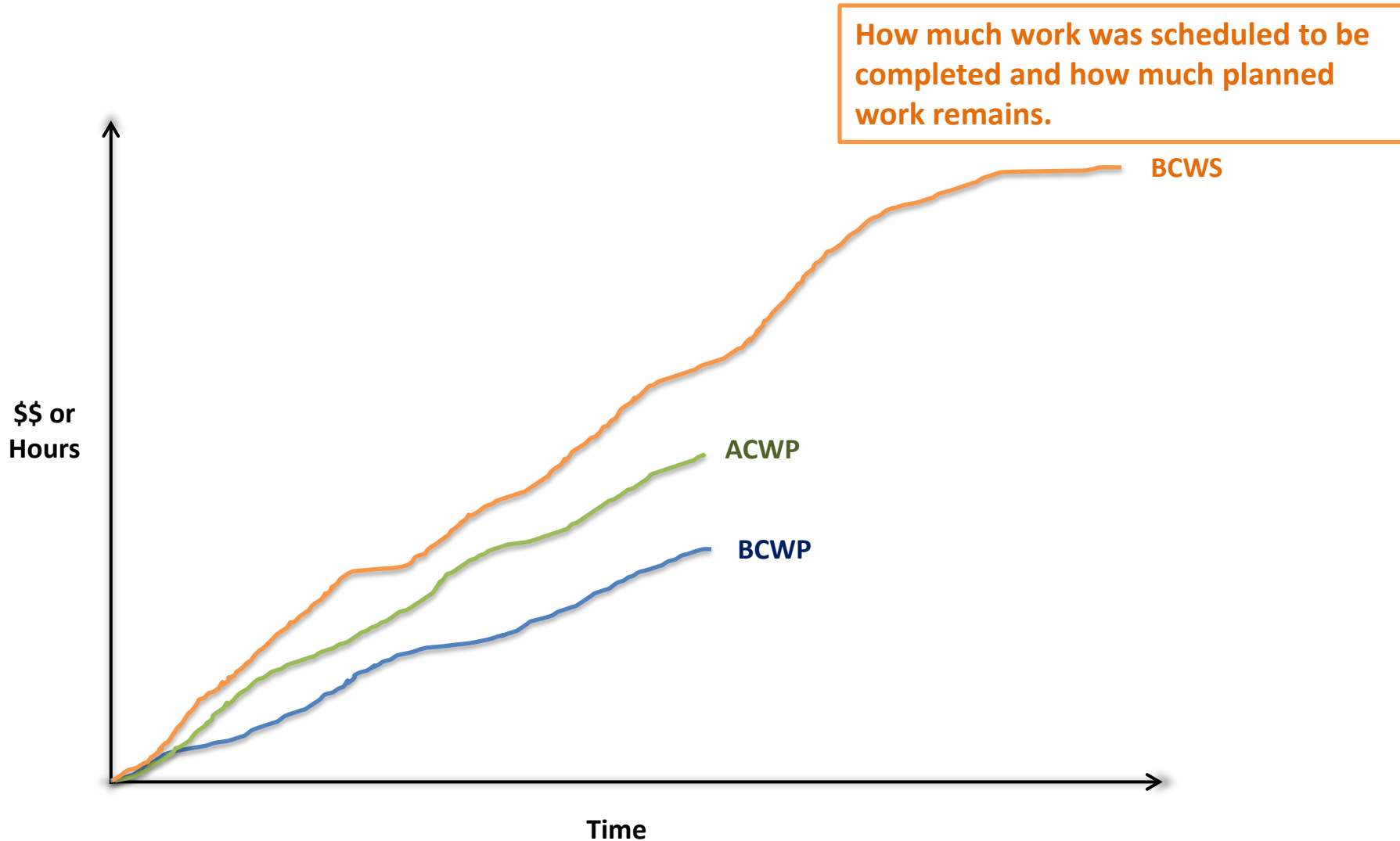
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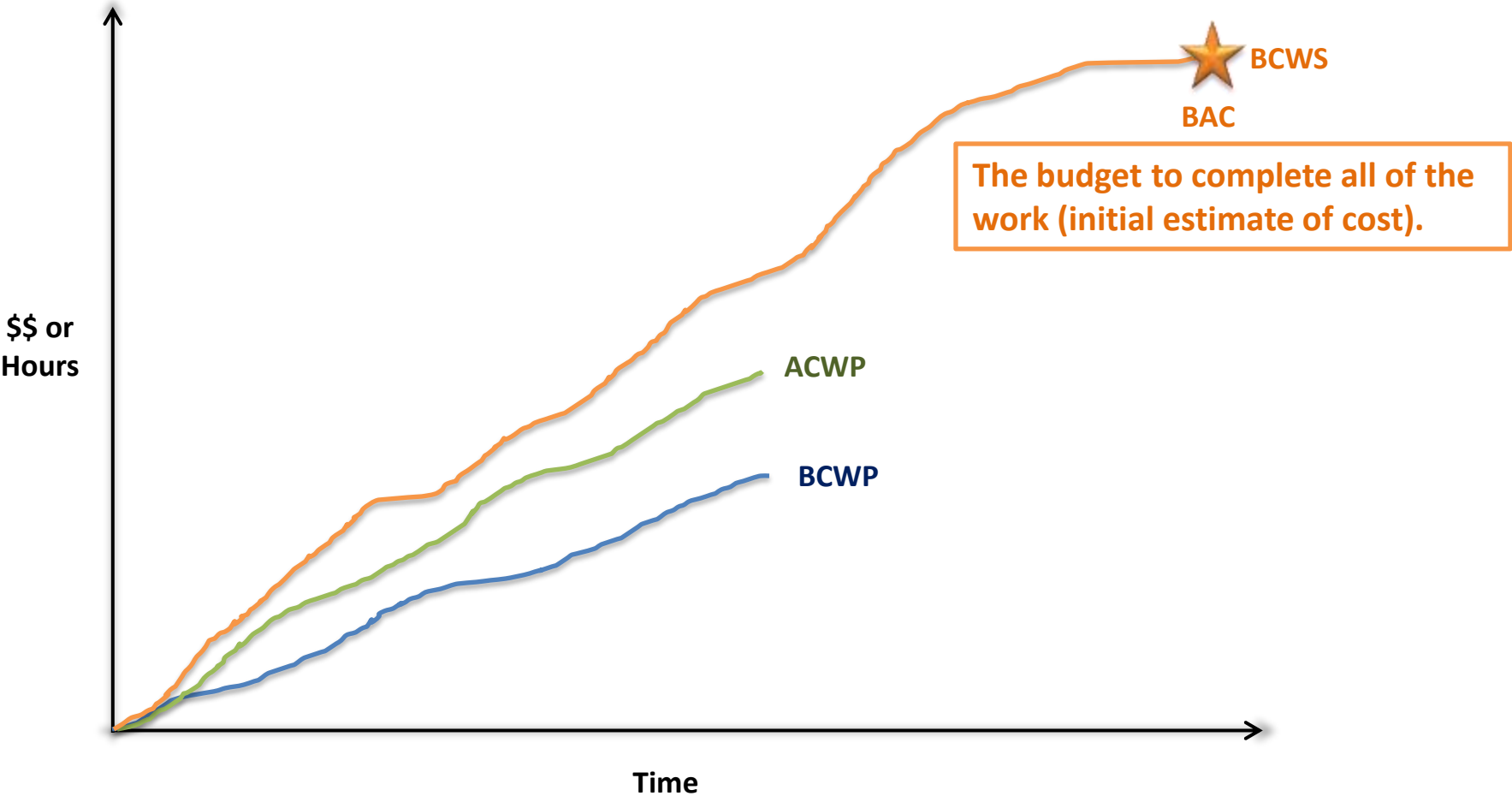
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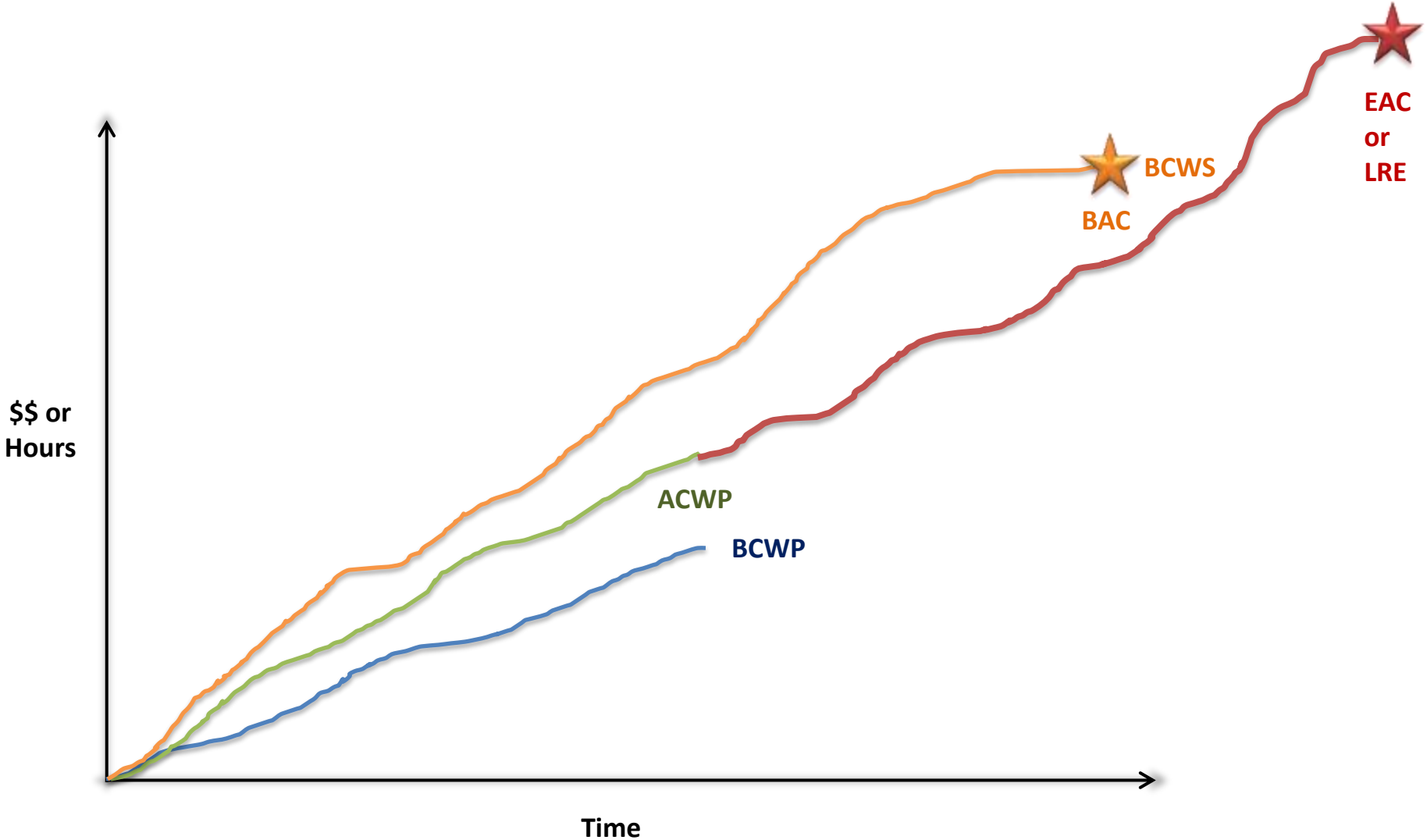
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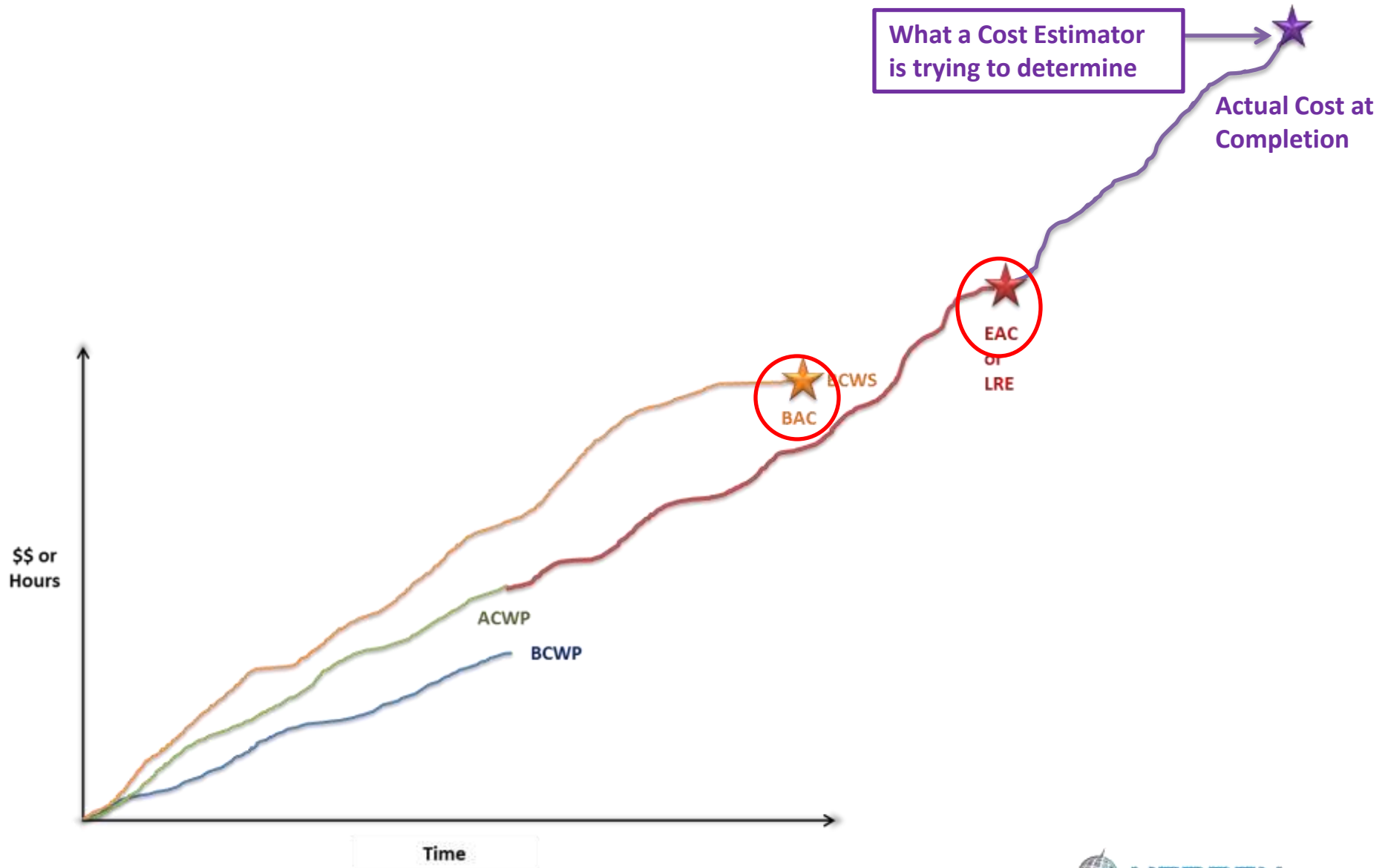
# In theory, EVM data provides everything a cost estimator needs to develop an estimate



# In addition to measures against the plan, EVM data also includes updated estimates of costs at completion

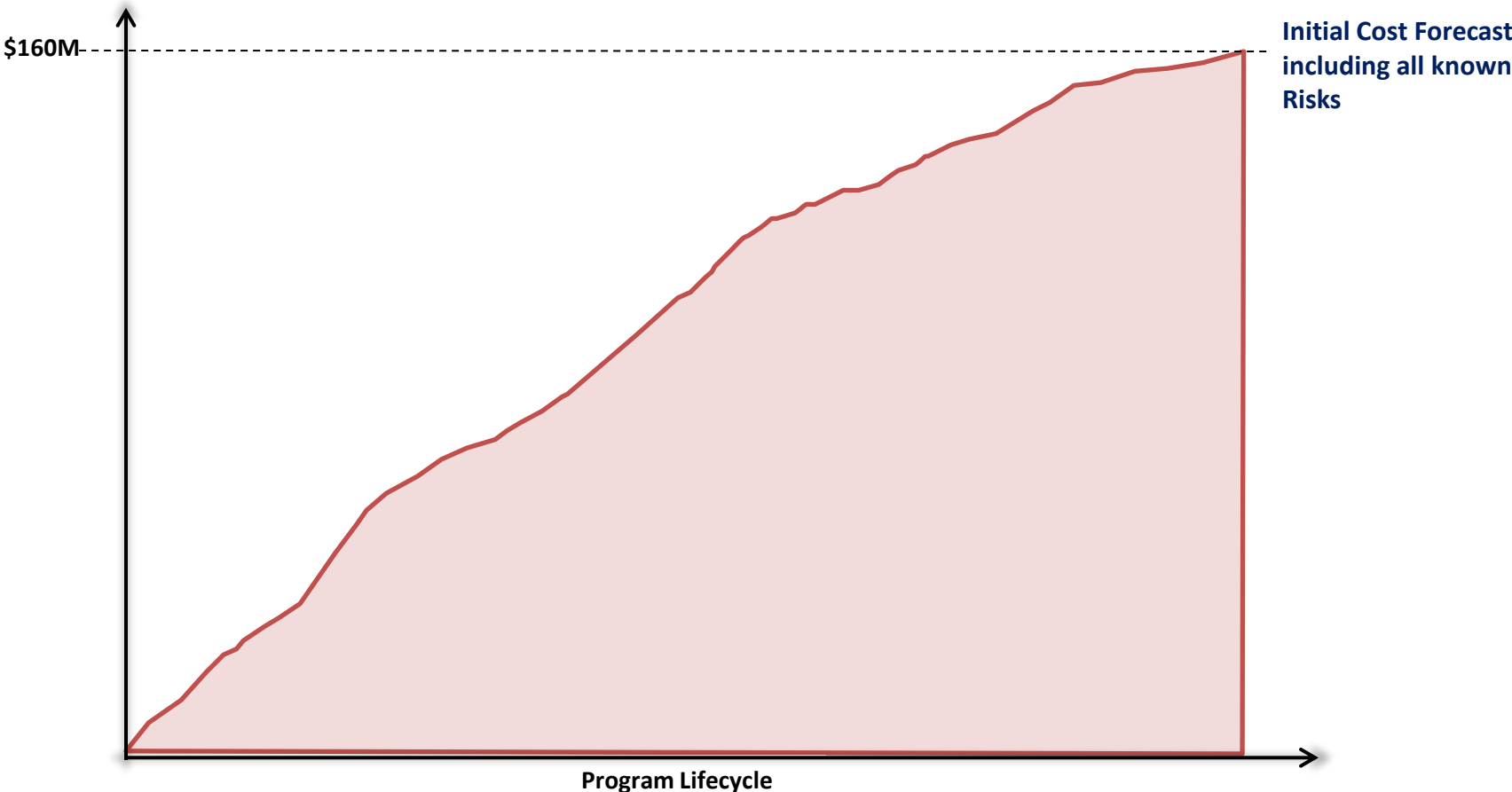


# Issue #1: Budgets at Completion and Estimates at Completion (or LREs) are often significantly underestimated

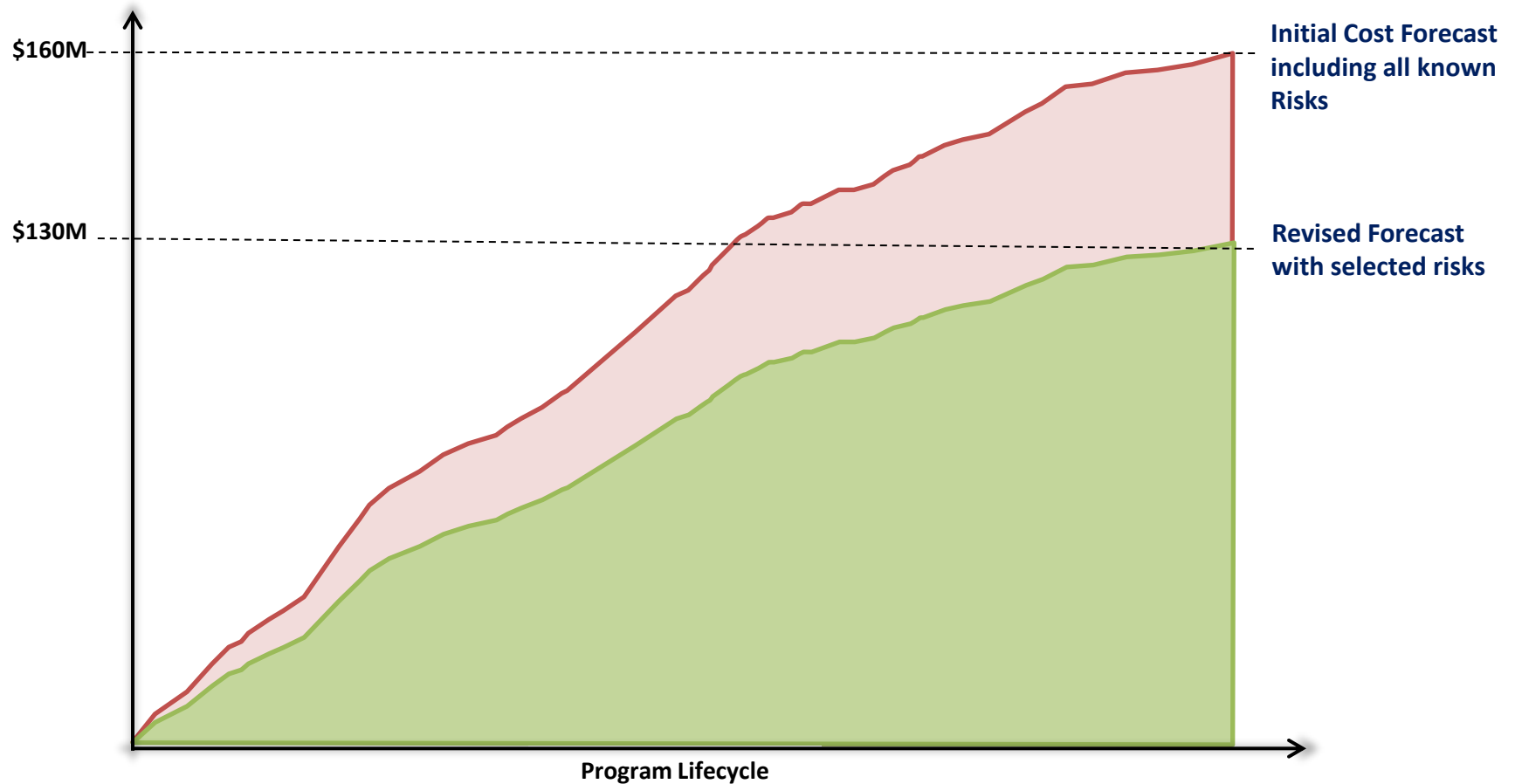




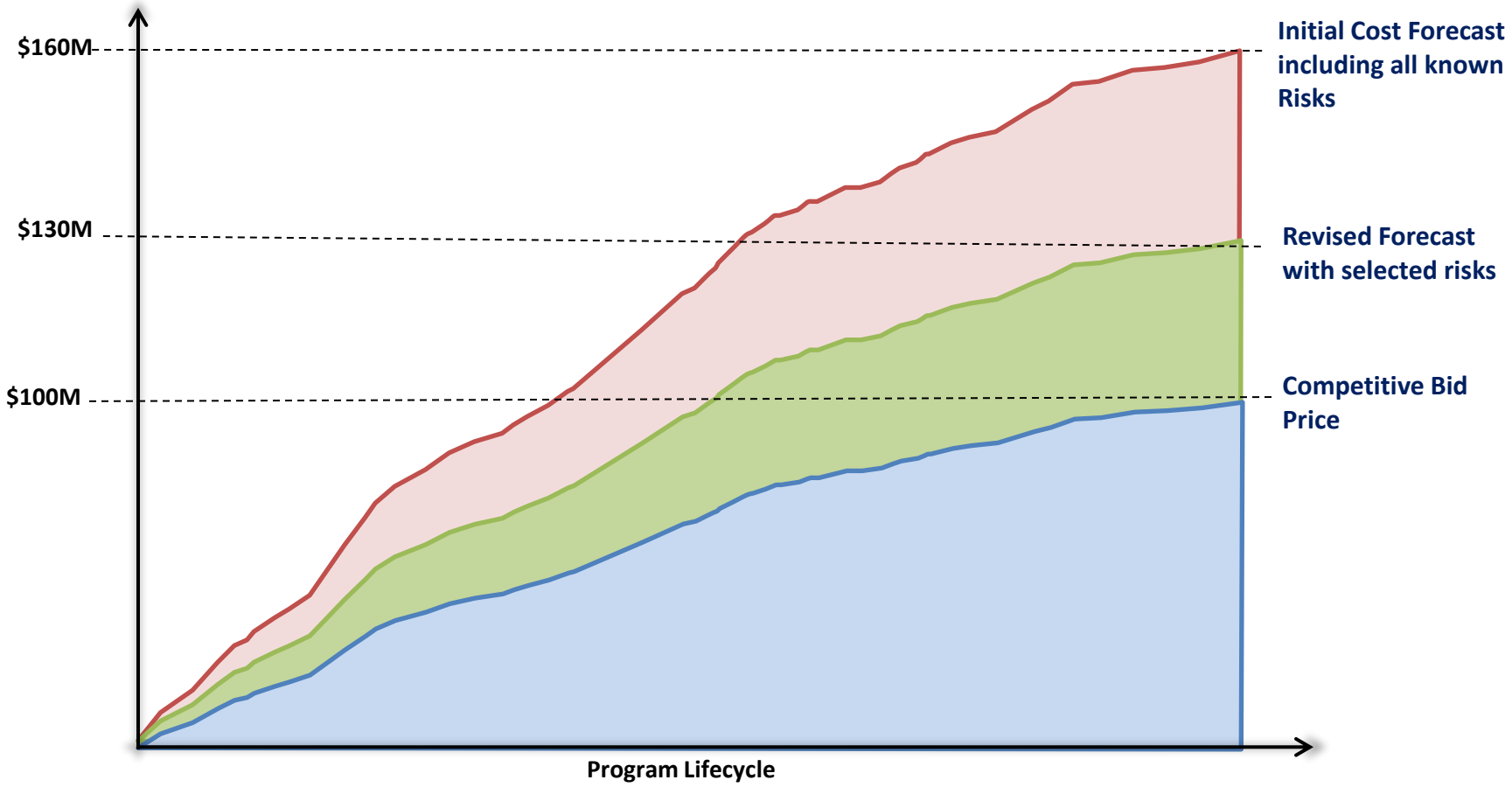
# Assume a company is submitting a bid on a competitive cost reimbursable contract that is over \$50M for a new product



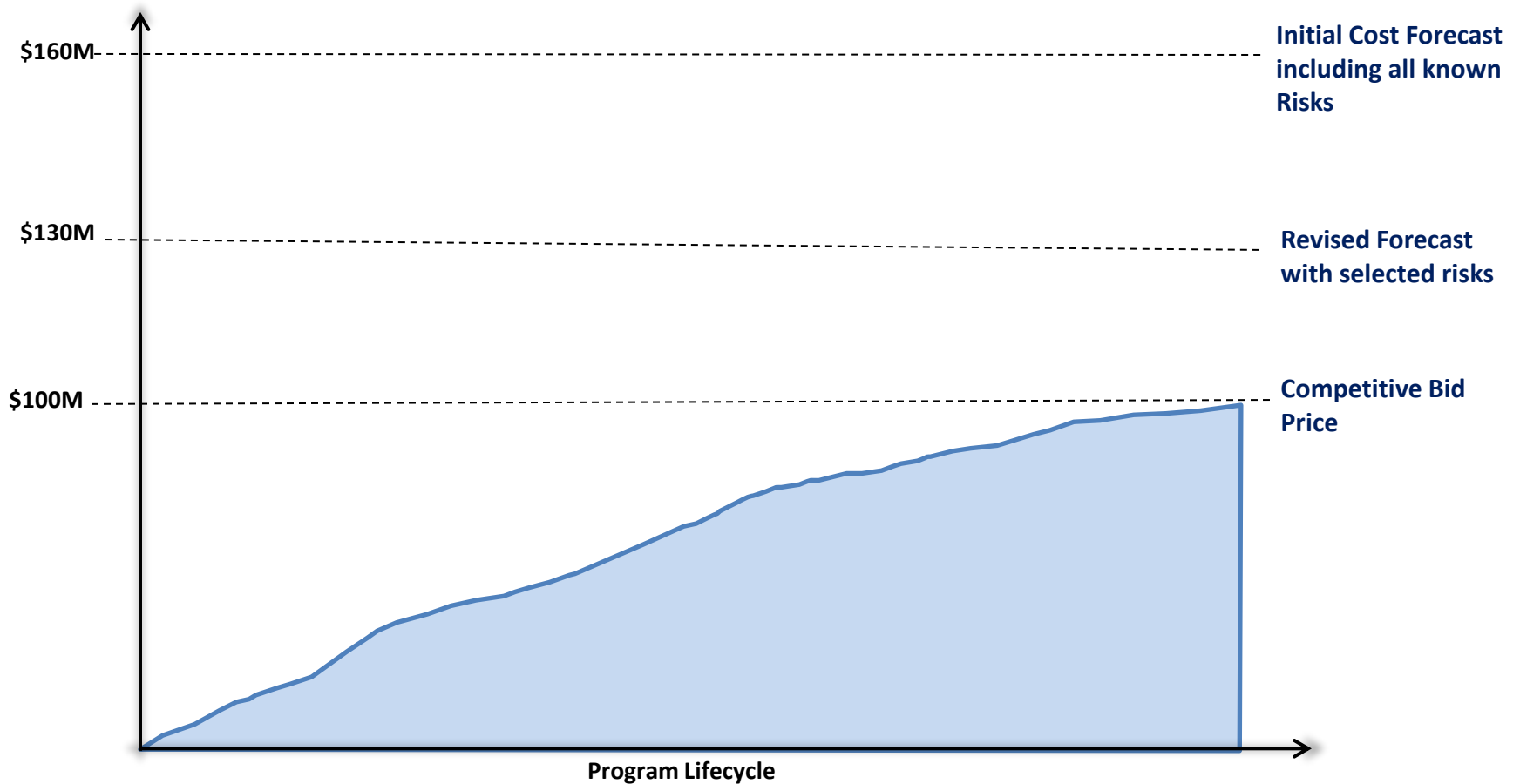
# The company decides that some risks are unlikely to occur and they are willing to accept these risks in their estimate



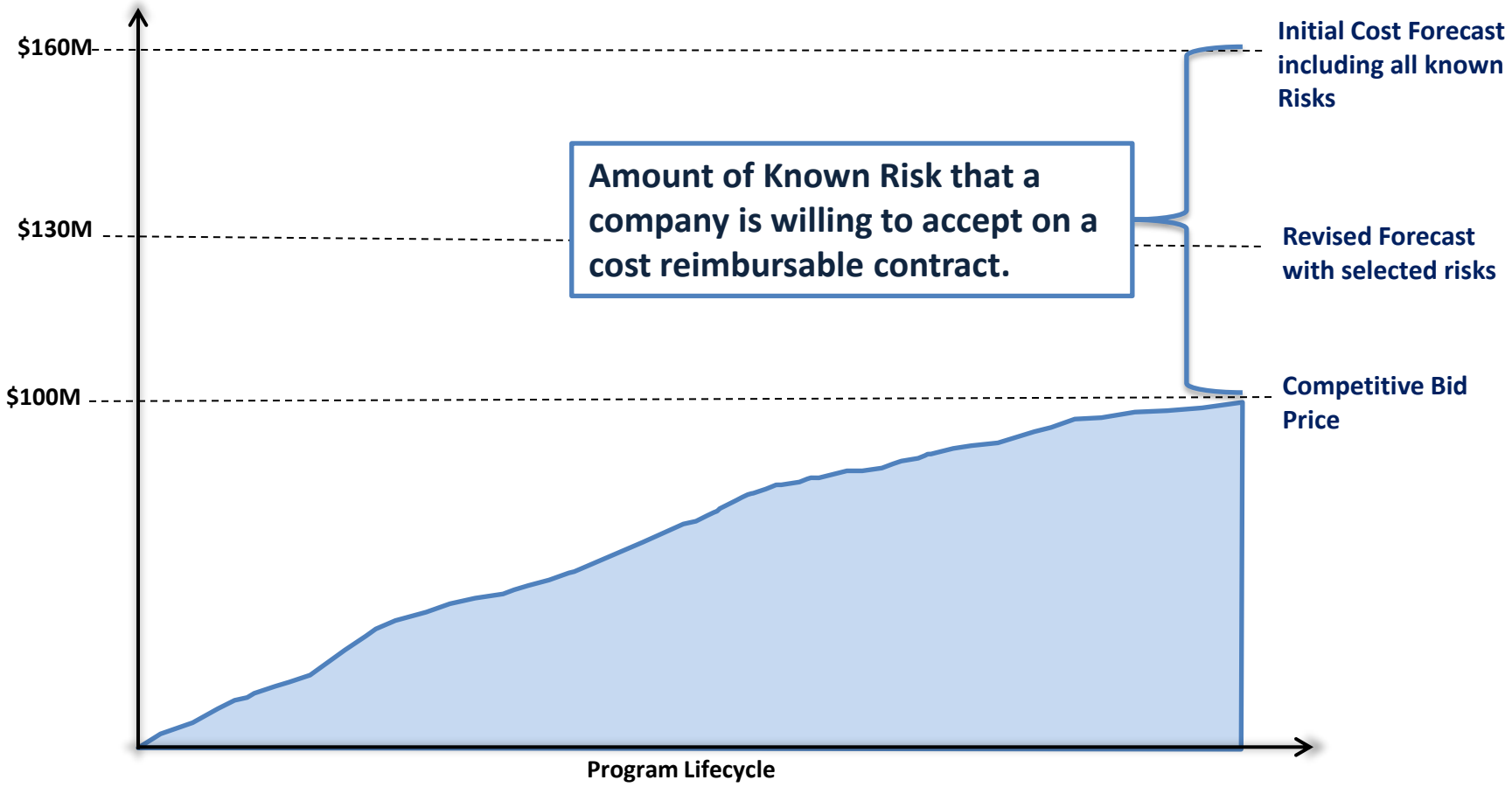
# Management determines that the price needs to be lowered in order to ensure a competitive bid



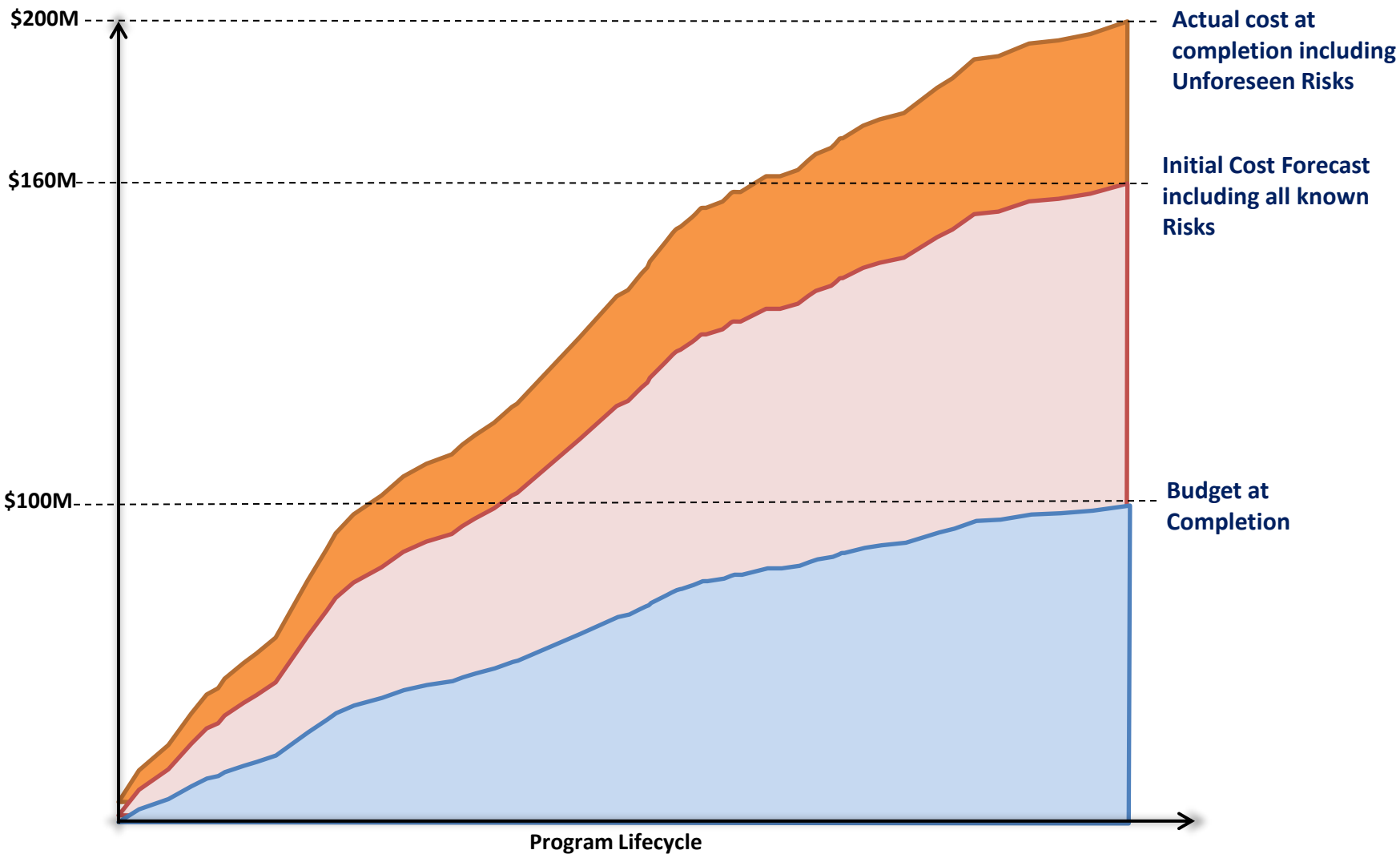
# The EVM Budget at Completion is then based on a “bid to win” price with much of the known risk stripped out



# Unfortunately, the known risk that a company has accepted is nowhere to be found in EVM reporting

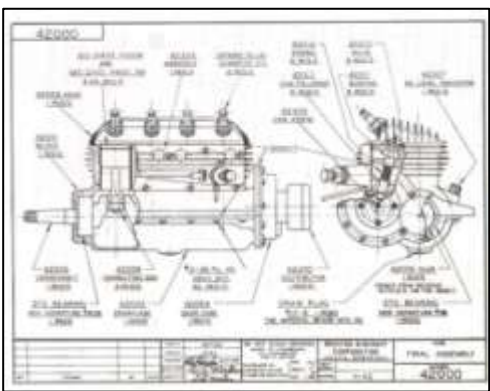


# Oftentimes a program runs into issues that were not anticipated when the budget or EACs were developed

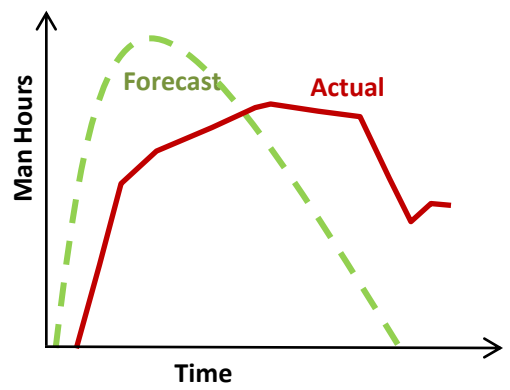


# Below are a few examples of potential unforeseen risks that may not be accounted for in BACs / EACs

Late engineering, engineering changes, and scope creep



Optimistic Estimates



Tooling, equipment, facilities, and process issues



Material Delays / Quality issues



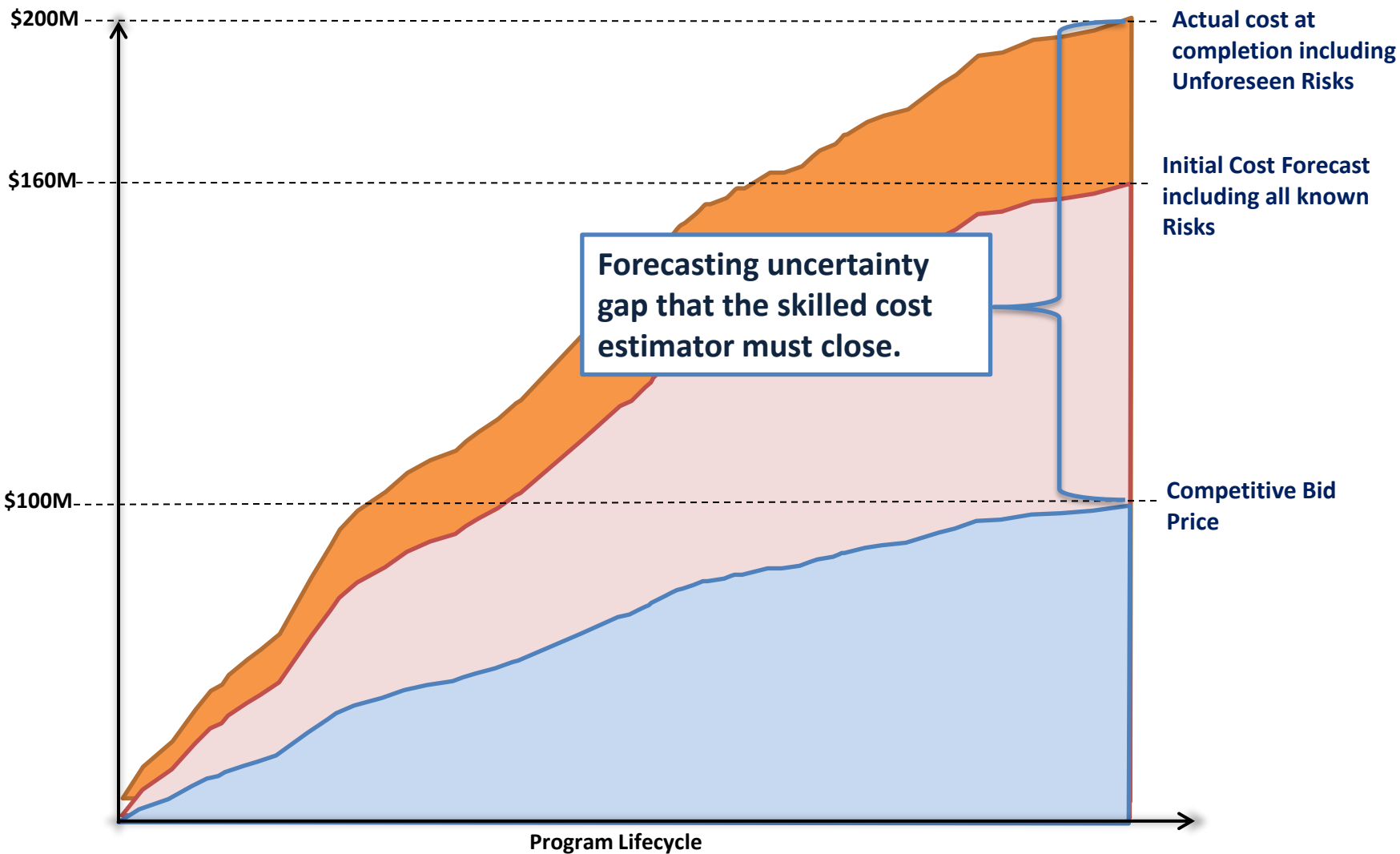
Excessive Re-work / Re-testing



Environmental Issues (e.g., weather delays, labor strikes)

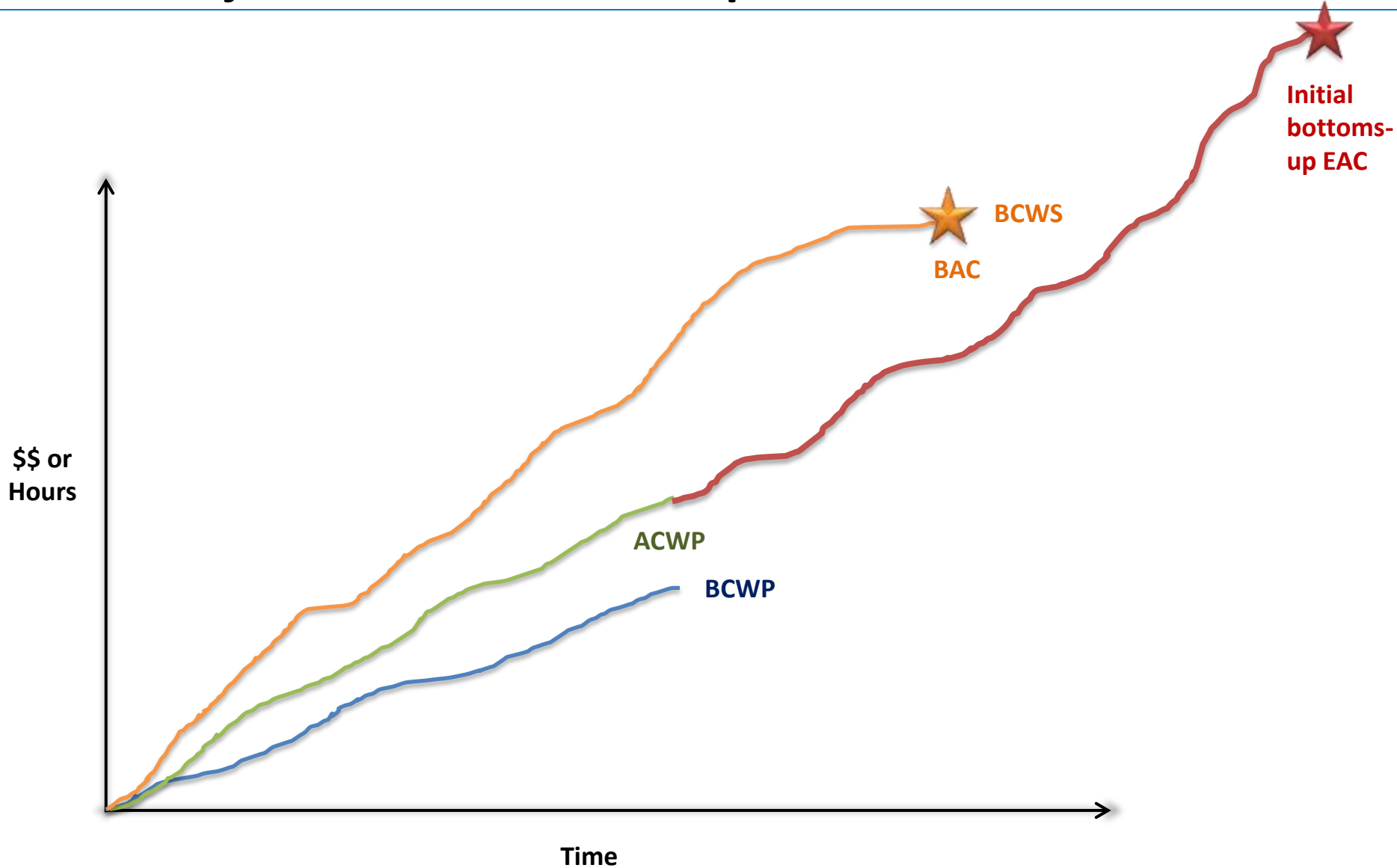


# It is up to the skilled cost estimator to determine the gap between the budget and the actual cost at completion

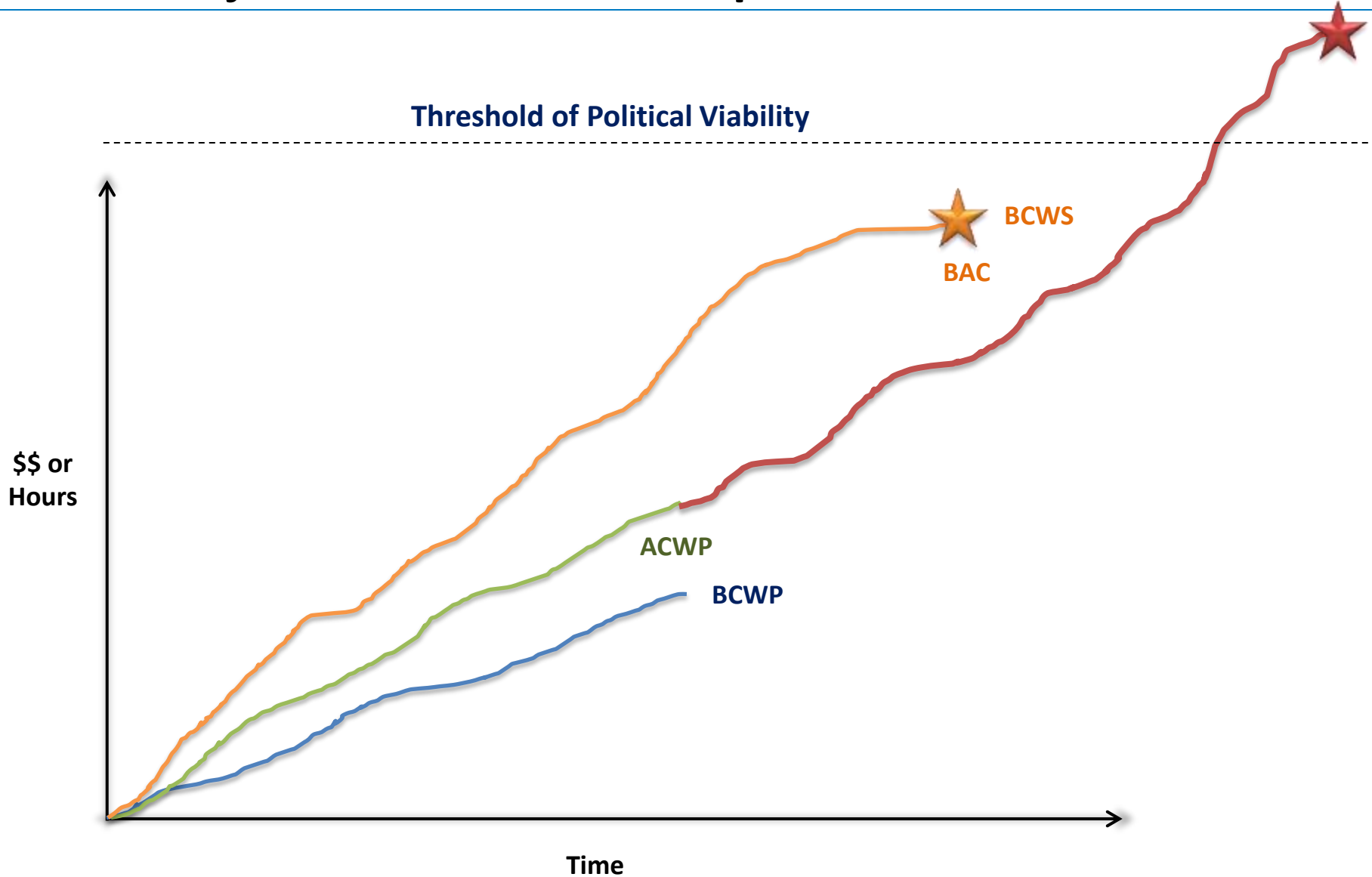




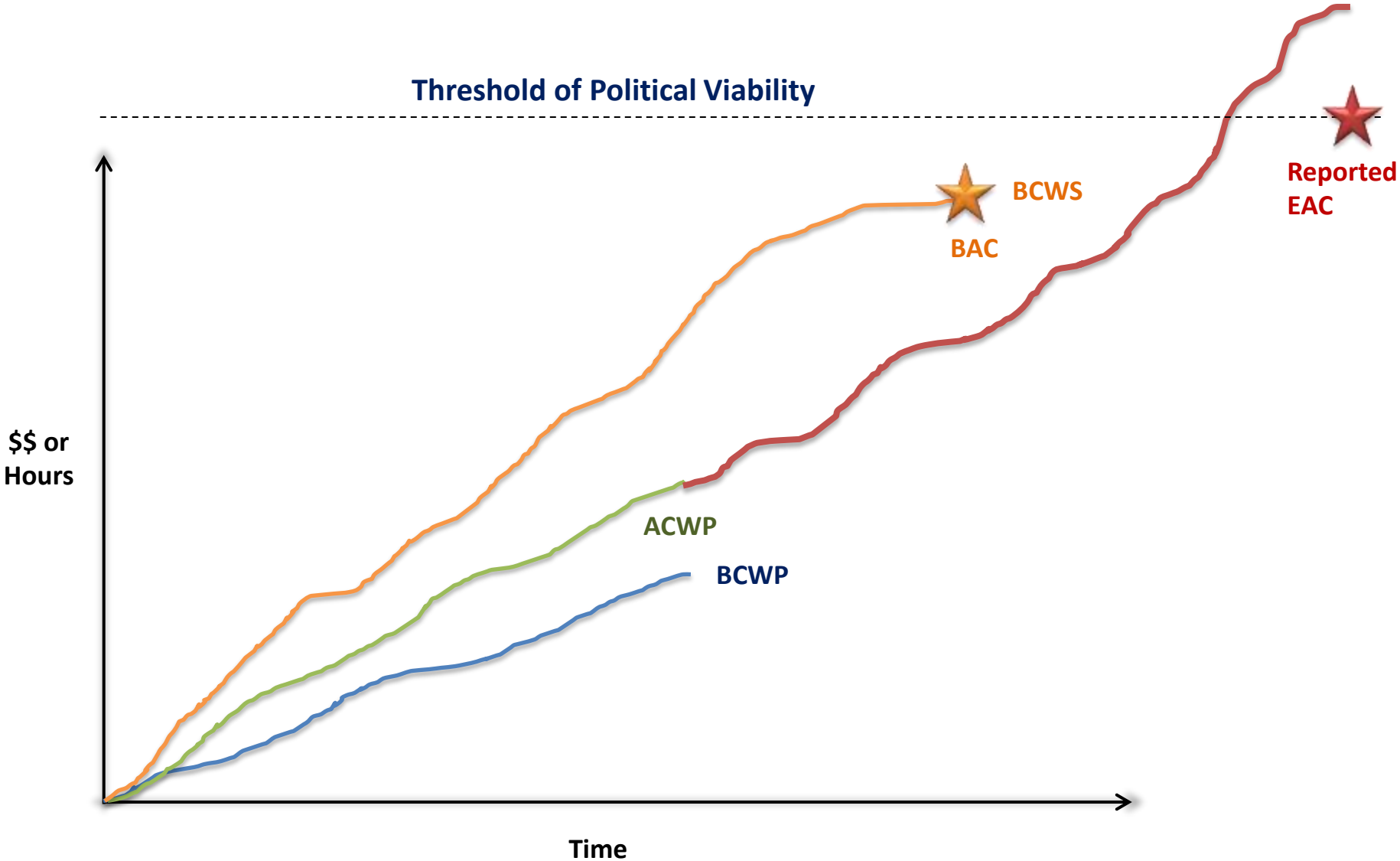
# EACs are carefully managed by program managers and often adjusted downward for political reasons



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# Remember the Threshold of Political Viability when deciding whether or not to trust a reported EAC



# Consider the role of the EVM analyst relative to the role of the cost estimator when analyzing EVM data

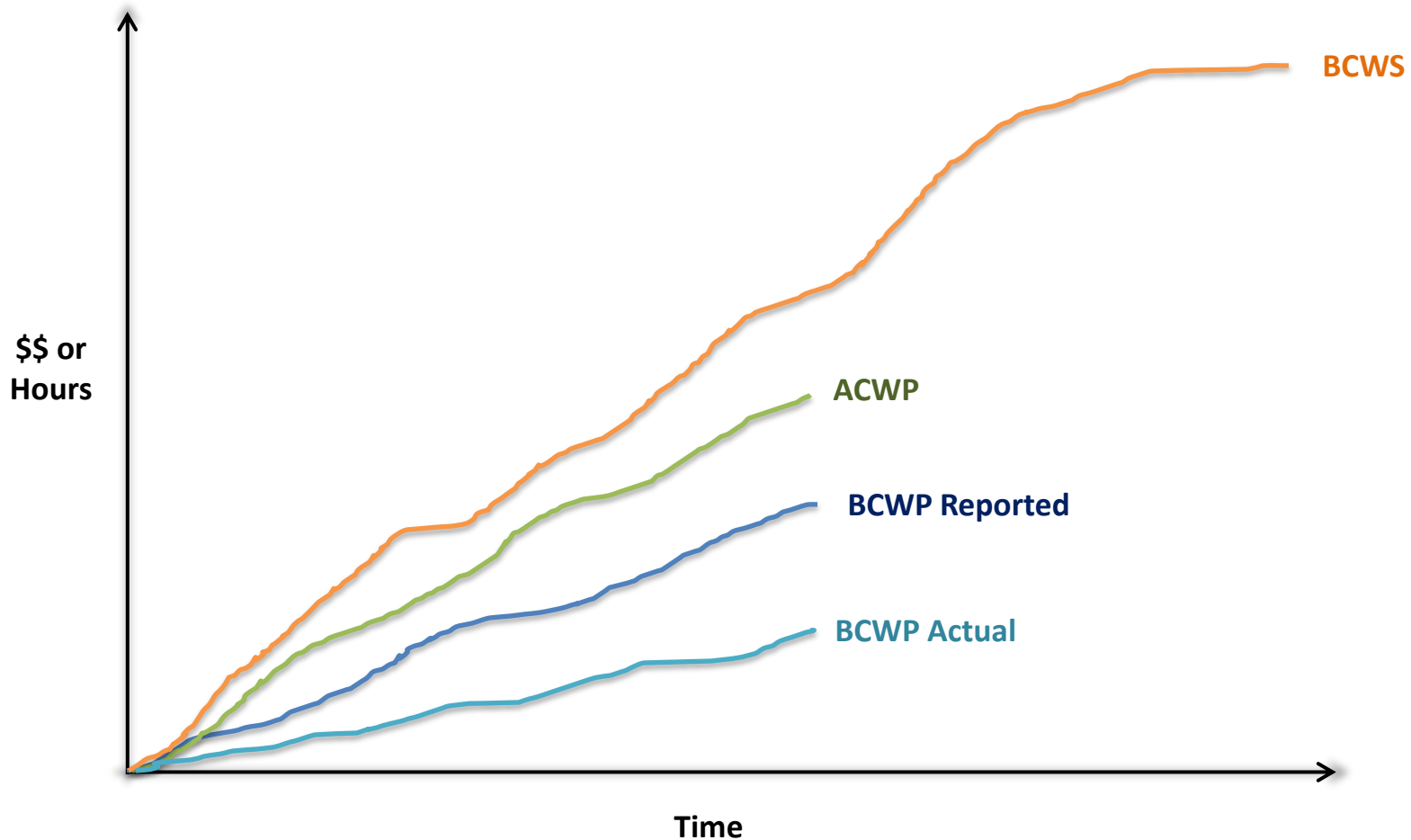


- ❖ Develop a plan to execute within budget (whether realistic or not)
- ❖ Ensure reported EACs are acceptable to management
- ❖ Strike a balance between budgeting for risk and padding estimates
- ❖ Explain variances to plan and make adjustments to the plan as needed



- ❖ Determine if the plan is **reasonable** and **executable**
- ❖ Ensure EACs are **accurate** and reflect all remaining work
- ❖ Evaluate **risk** and ensure the estimate includes an appropriate level of risk
- ❖ Use independent data to **cross-check** EACs and estimating assumptions

# Issue #2: Progress is often overstated due to unplanned work and the realization of known and unknown risks



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1,000 Hours

BAC = 1,000 Hours of Work to complete 100 engineering drawings



250 Hours

After the first 25 drawings are completed, 25% progress is used to calculate BCWP (250 hours)

# Issue #2: Progress is often overstated due to unplanned work and the realization of known and unknown risks



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After the first 25 drawings are completed, 25% progress is claimed and reported as BCWP



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As a result of design issues, 25 new drawings are required at 250 hours

# Issue #2: Progress is often overstated due to unplanned work and the realization of known and unknown risks



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As a result of design issues, 25 new drawings are required at 250 hours



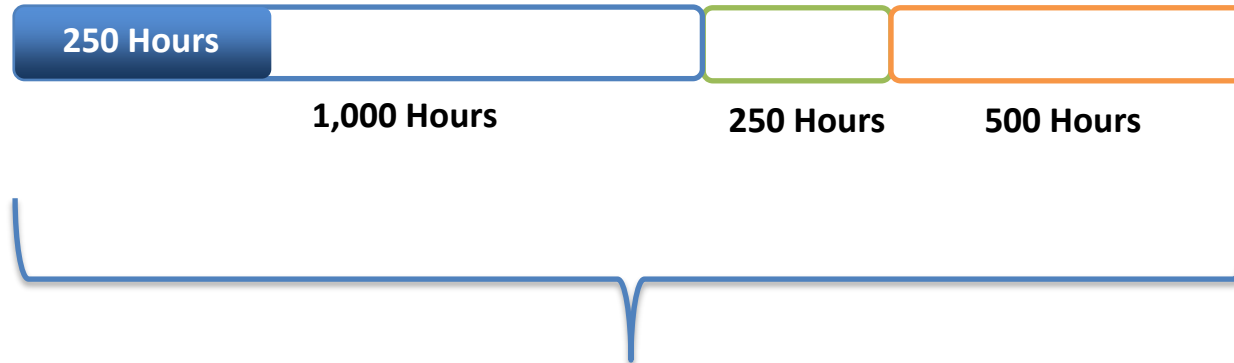
250 Hours

500 Hours

A bottoms-up weight analysis requires 50 drawings to be reworked at 10 hours each

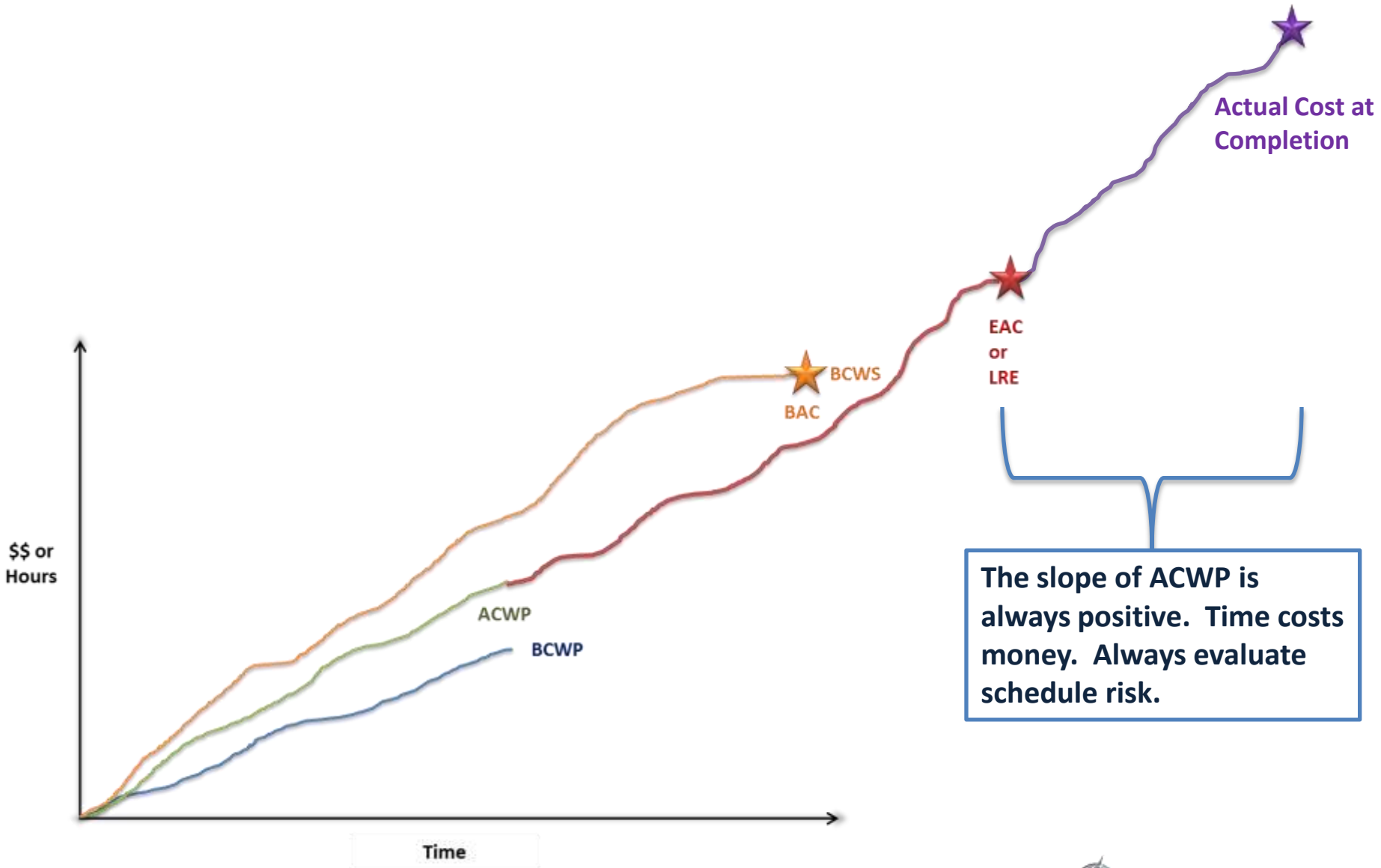


# Issue #2: Progress is often overstated due to unplanned work and the realization of known and unknown risks



After accounting for the additional in-scope work, the actual percent complete is ~14% instead of the reported 25%.

# Issue #3: Schedule risk is rarely accounted for in BACs or EACs



# The following illustrates the need to account for schedule risk using an LOE control account as an example.

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BAC =1,000 Hours of LOE Systems Engineering Support over 10 months

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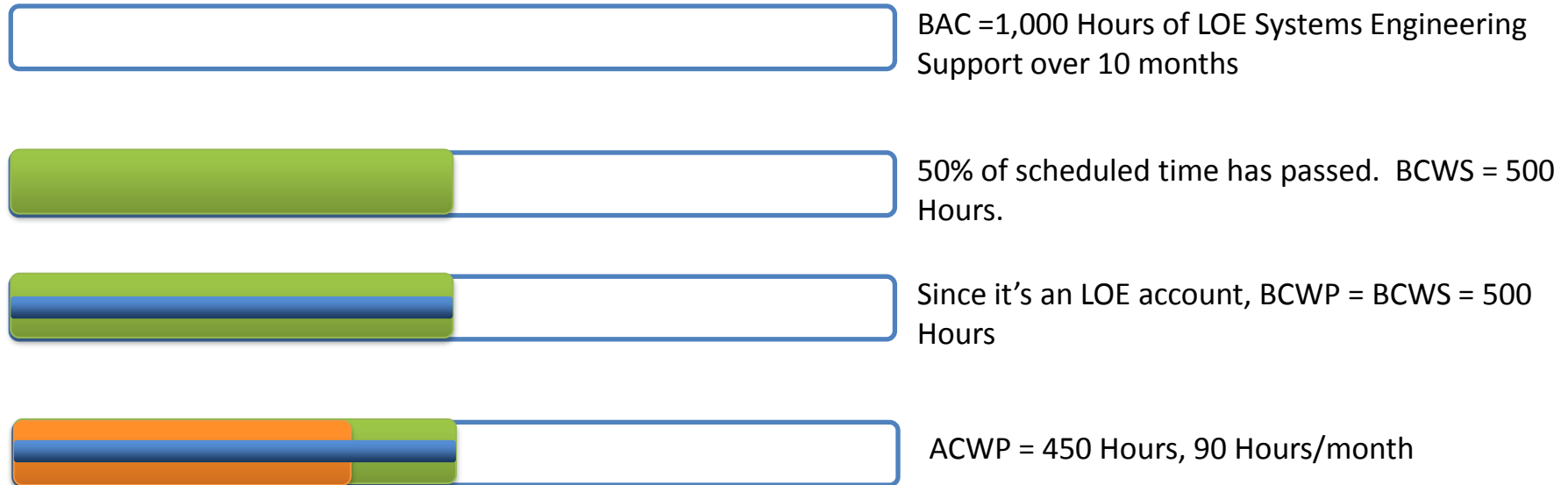


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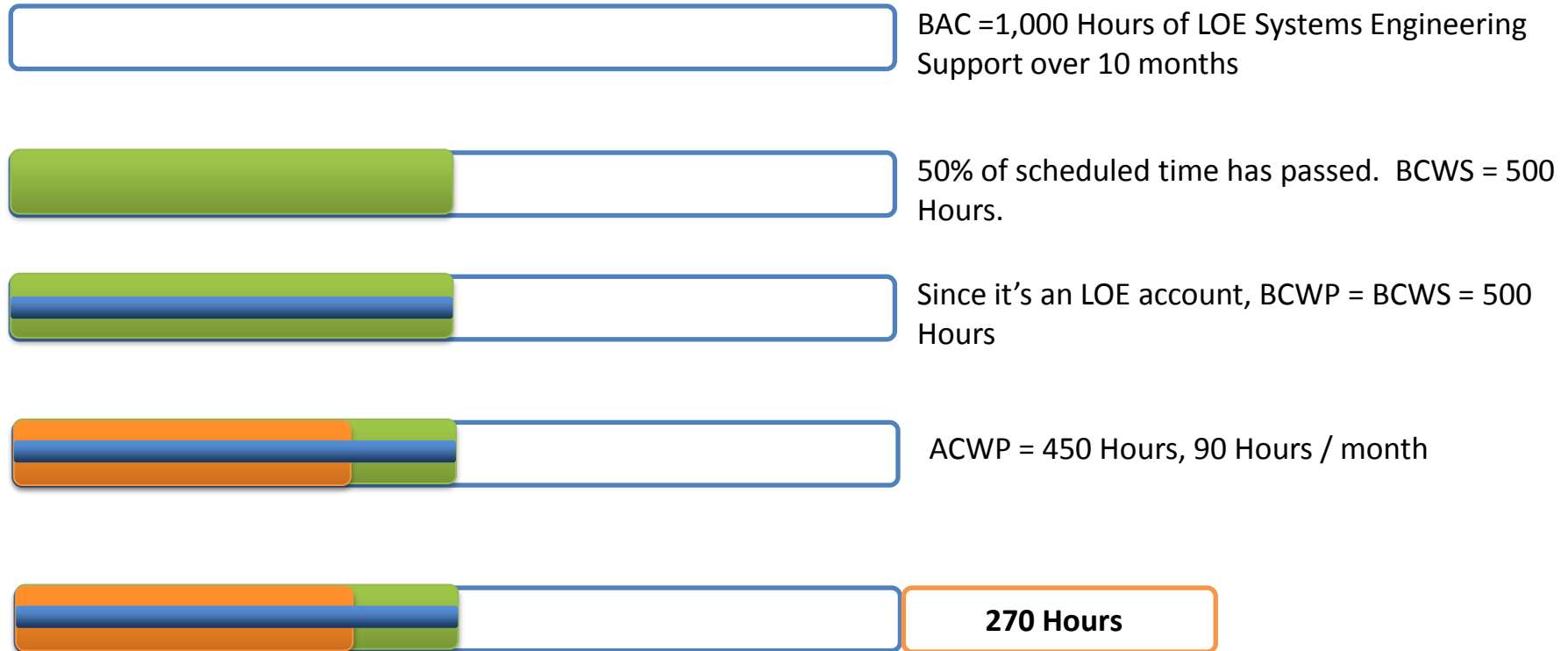
ACWP = 450 Hours, 90 Hours/month

# The following illustrates the need to account for schedule risk using an LOE control account as an example.



Using the Gold Card Formulas gives  $SPI = 1.0$ ,  $CPI = 1.1$  and EAC equal to 900 Hours.

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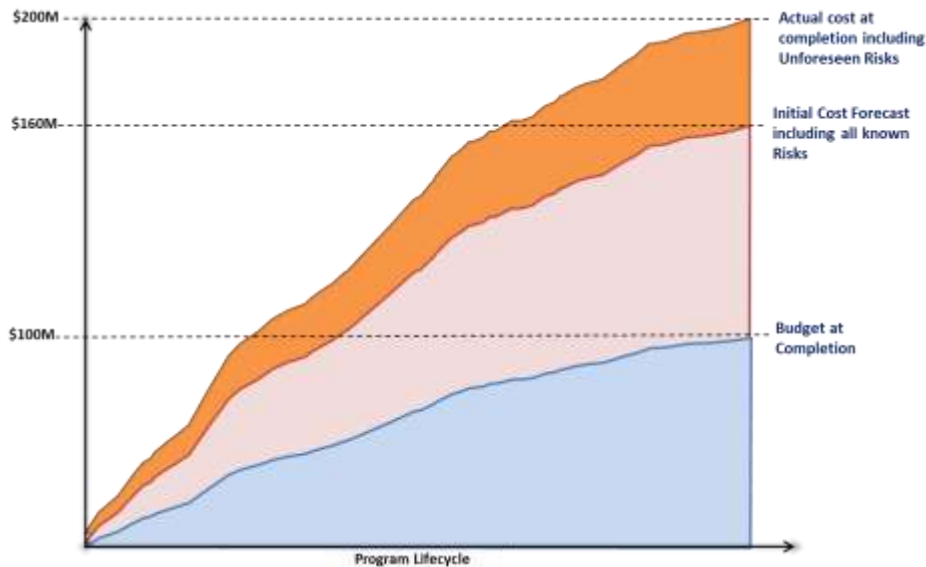


A schedule risk assessment indicates the schedule is likely to slip 3 months resulting in an additional 270 hours and a risk-adjusted EAC of 1,170 hours. This is 30% higher than the EAC derived from the gold card formula.



# Despite the issues with EVM, there are steps you can take to avoid being misled by the data

Issue #1: Budgets at Completion and Estimates at Completion (or LREs) are often significantly underestimated



Ensure that all known risks have been accounted for in EAC projections

Get the program risk log or risk register and ensure that all risks are included in your estimate

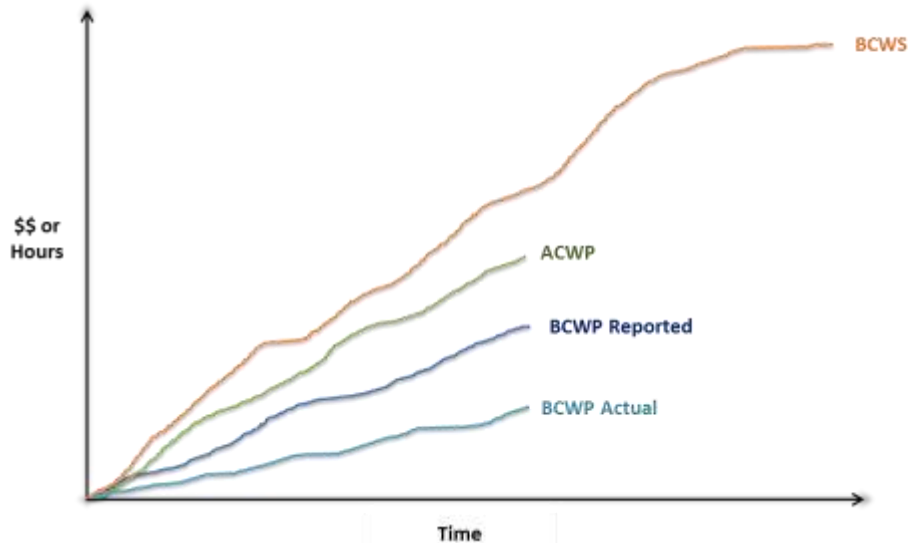
Look at what went wrong on similar programs; it may give you clues into unknown risks that you should factor into your estimate

Participate in Integrated Baseline reviews; ask probing questions to see if risks have been accounted for

At a minimum, ask about rework and retesting as nearly all programs will realize these risks

# Despite the issues with EVM, there are steps you can take to avoid being misled by the data

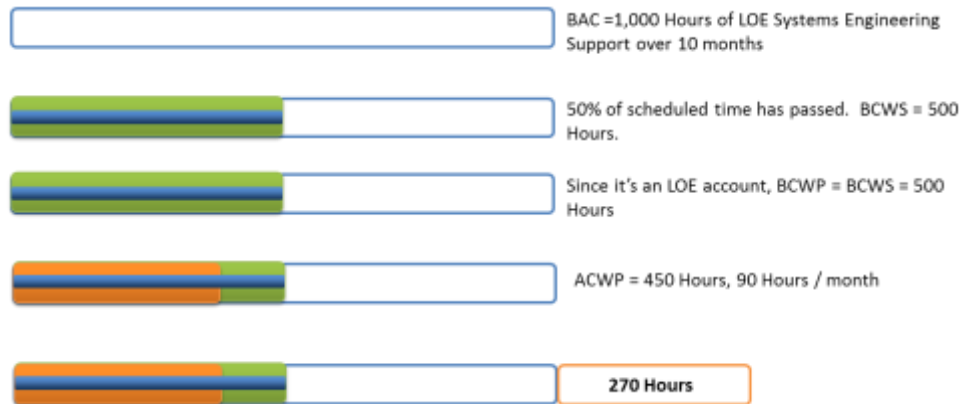
Issue #2: Progress is often overstated due to unplanned work and the realization of known and unknown risks



- ✓ Use EVM data from programs that are greater than 80% complete to make EAC projections if available
- ✓ Evaluate the progressing method for % complete and ask about risk, rework, and unplanned work
- ✓ Read the variance reports to see if issues are being deferred which may lead to work being “pushed to the right”
- ✓ Monitor risks to see if risks that are realized are appropriately incorporated into EACs

# Despite the issues with EVM, there are steps you can take to avoid being misled by the data

Issue #3: Schedule risk is rarely accounted for in BACs or EACs



Get smarter about schedule analysis; it is often the biggest cost driver and cost estimators don't study it enough



Ensure that a proper Schedule Risk Assessment is conducted; review schedule risks regularly



Build your cost model so that schedule risk can be incorporated and updated regularly; determine where schedule will drive costs



At a minimum, ensure all LOE accounts incorporate schedule risk

# Questions?

