



# ***Effective Schedule and Cost Management As a Product Development Lead***

*Instructor: Cynthia Simmons, Code 550*

PI/Science  
Team



PDL



SE



Influences:

- Vendors
- Line management
- External partners

Funding



PM



The PDL is ultimately responsible for successful execution of their product: on time, within cost, meeting all specifications with acceptable risks.



**Risk**

# A Bridge Not Too Far?

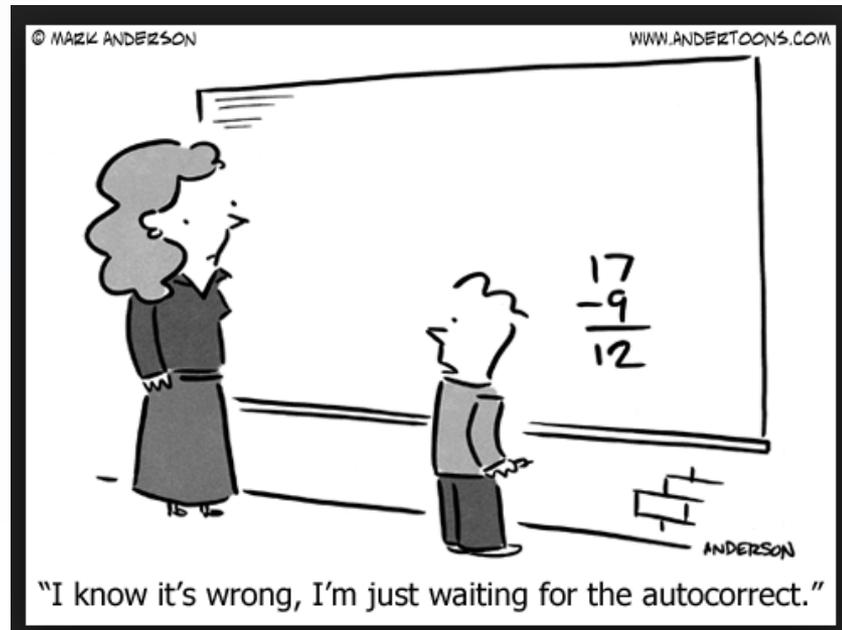
*We have learned how to do the job when everything goes right,*

*but...*



# Managing to Your Commitment

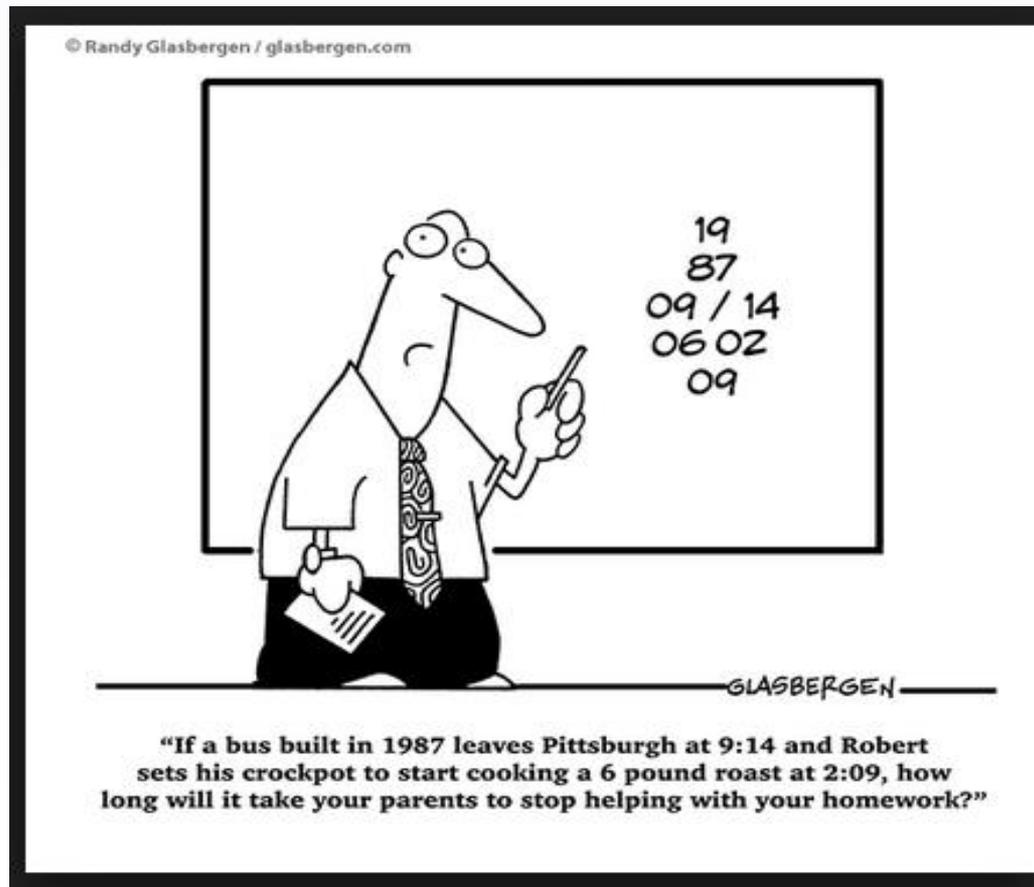
*How do we ensure that everything will go as planned?  
What do we do when something goes wrong?*



# ***SOME BASICS...*** ***EFFECTIVE SCHEDULE AND COST MANAGEMENT***



# Do I Know What Problem I Am Solving...?



# The Customer's Swing



Source: TMT-37 Dave Scheve, "The Customer's Swing"

# We Can Do It!



How the customer explained it



How the Project Leader understood it



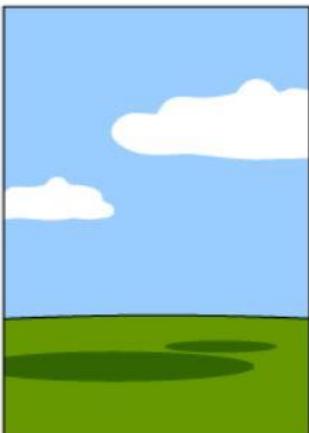
How the Analyst designed it



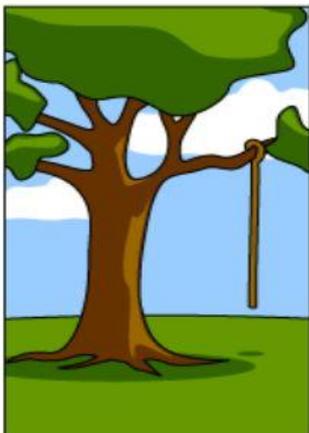
How the Programmer wrote it



How the Business Consultant described it



How the project was documented



What operations installed

Source: TMT-37 Dave Scheve, "The Customer's Swing"

# Isn't It Just a Matter of Semantics?



How the customer explained it



How the Project Leader understood it



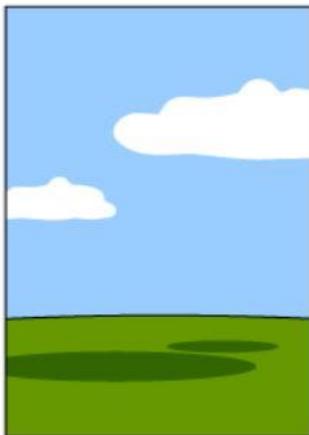
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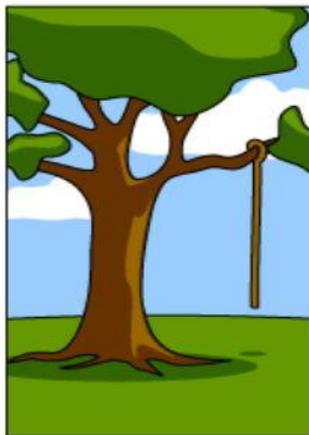
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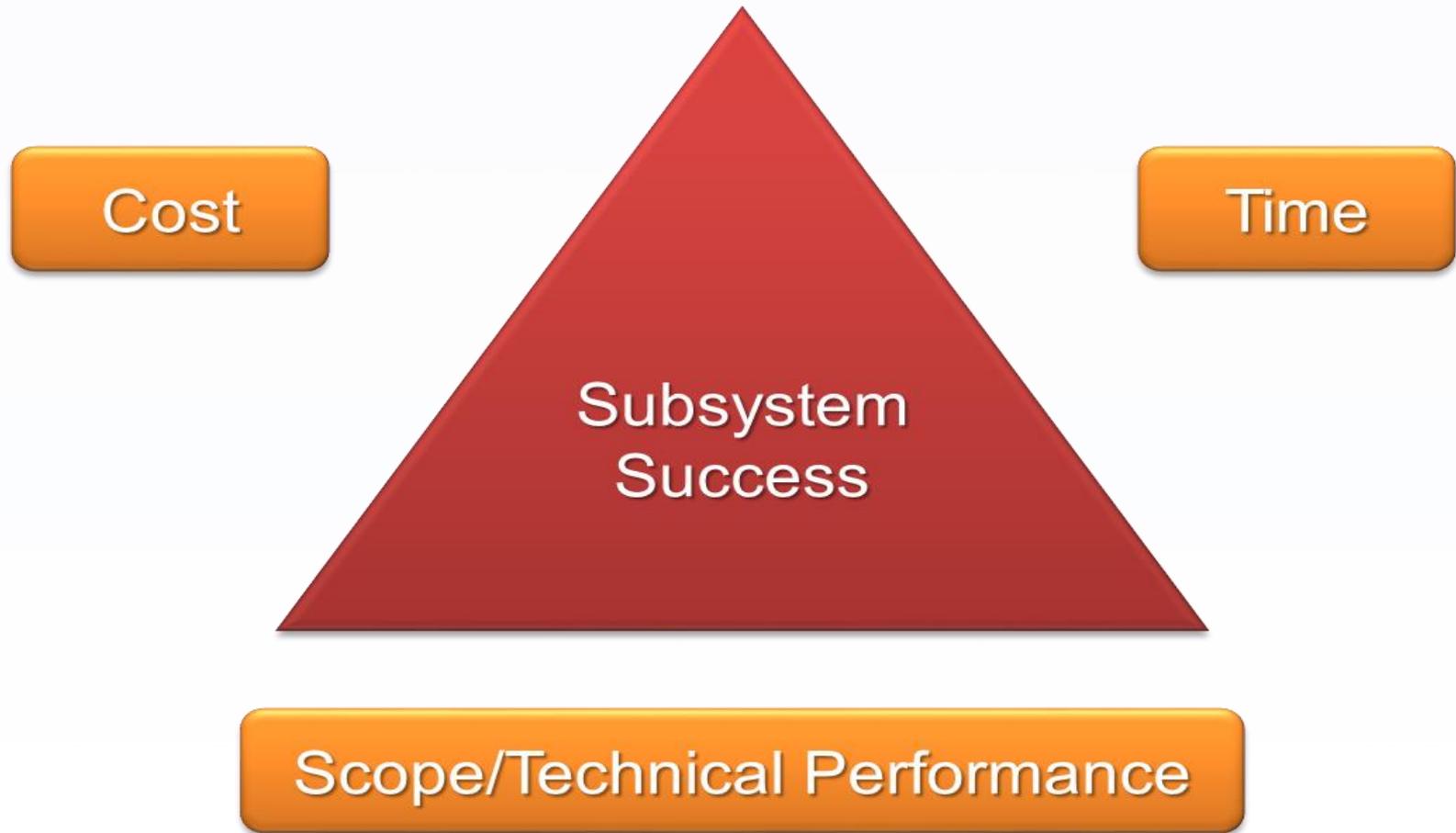
What the customer really needed

Source: TMT-37 Dave Scheve, "The Customer's Swing"

# Do I Know Who Knows What?



# Which Is Most Important?



# What Are The Risks?

Does the plan make sense?

Do I need to wait for somebody to do something?

What could reasonably go wrong?

Is the plan a feasible path forward?

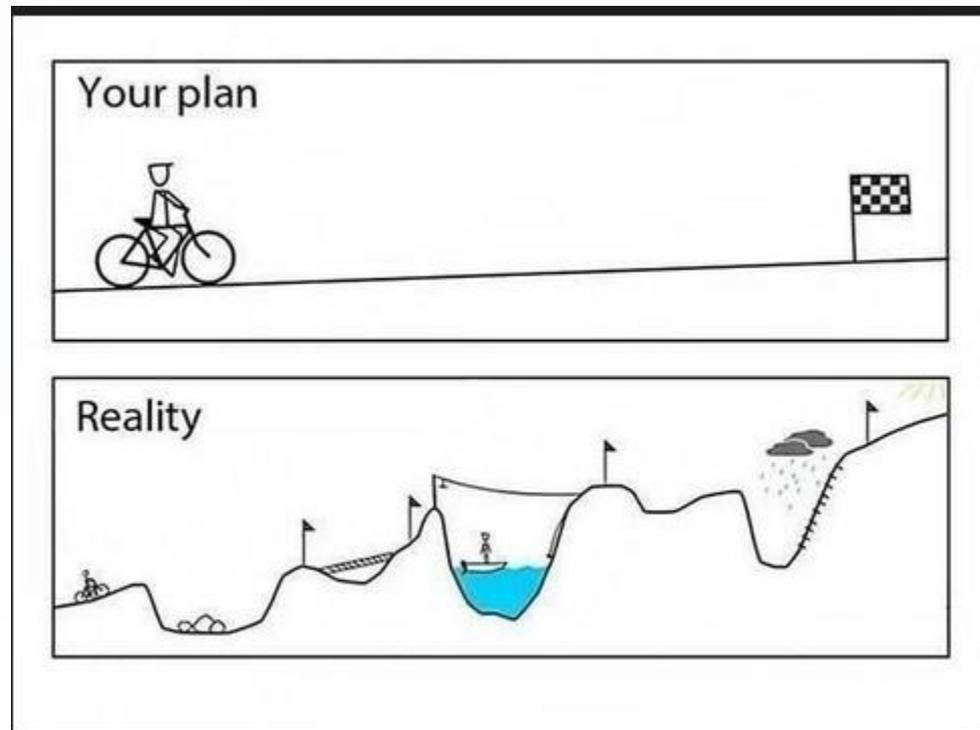




# FIRST THINGS FIRST

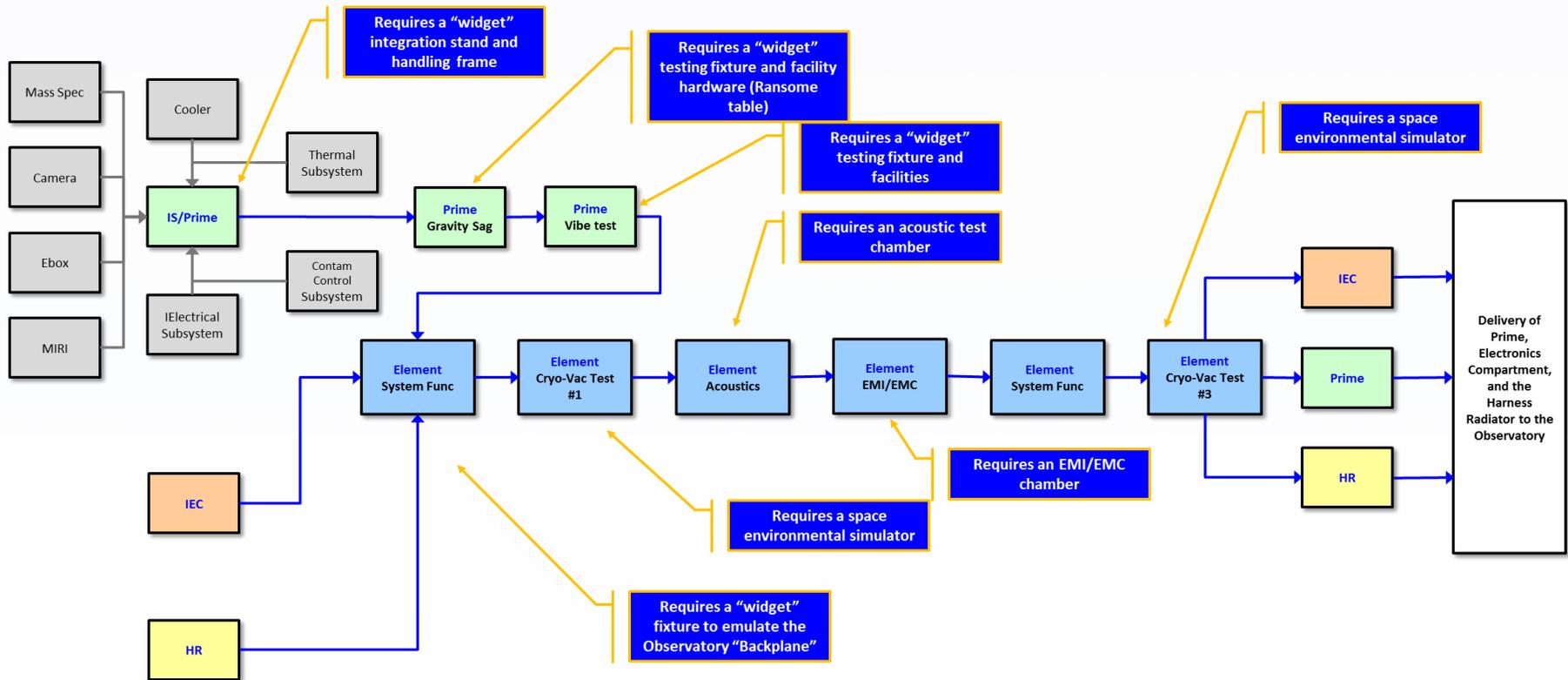
# Develop a Credible Plan

Credible = Executable



# Make an Executable Schedule

## Map out what needs to be done

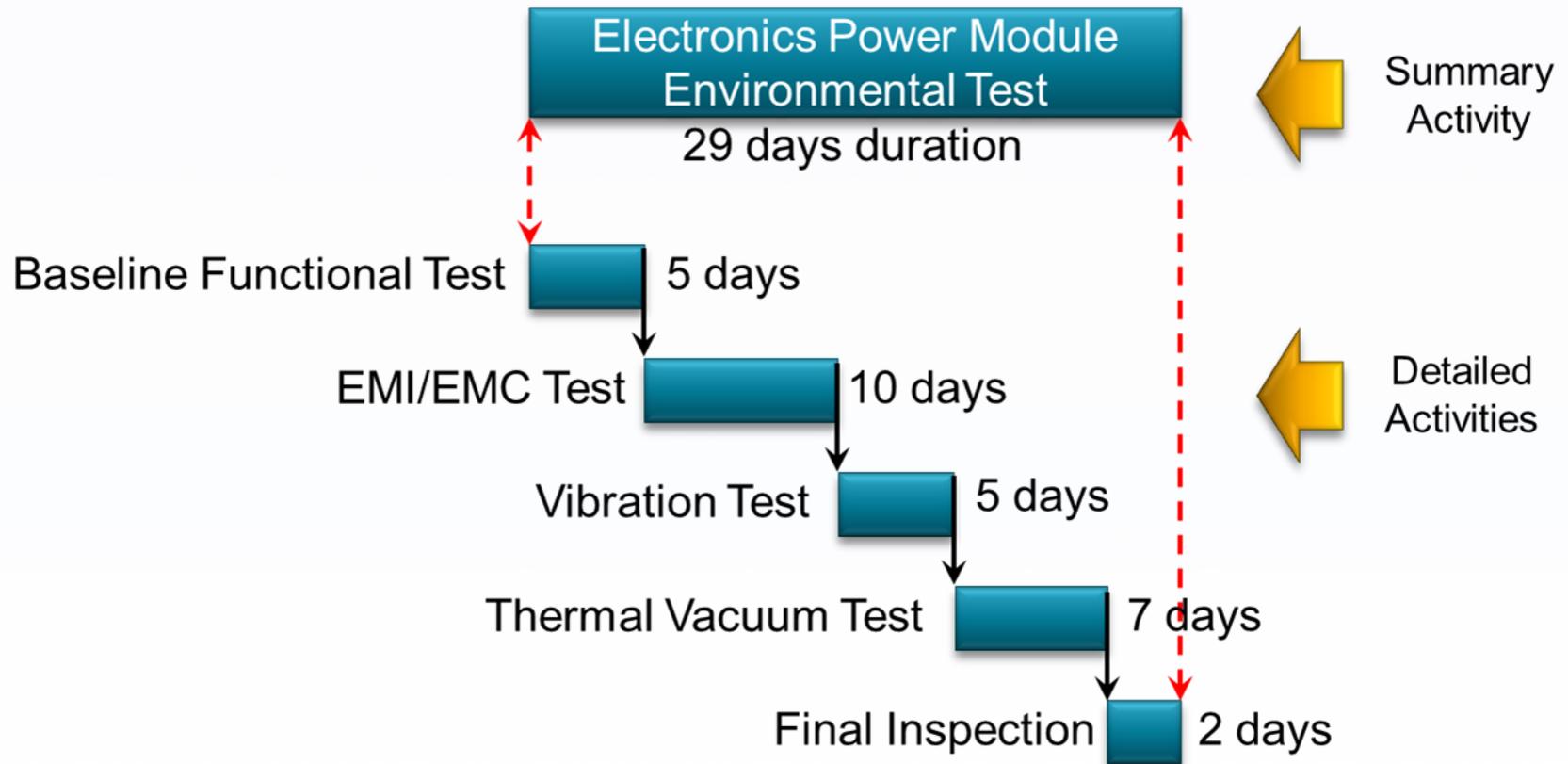


# Make a List.... Check It Twice

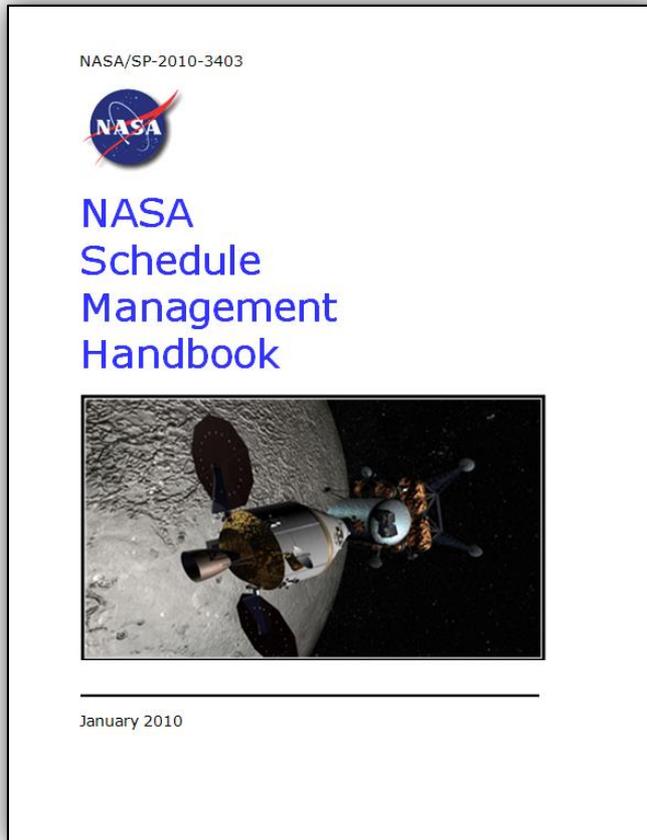
- Itemize activities and associated tasks
  - Capture critical information and risks for each task

	A	B	C	D	E	F	G	H	I	J
1										
2		<b>SAMPLE</b>								
3			<b><i>PDL Tool to assist with creating an executable schedule and budget plan</i></b>							
4										
5										
6										
7		<b>Event</b>	<b>Tasks needed to get done</b>	<b>Staffing skill set required</b>	<b>Key interim milestone</b>	<b>Duration</b>	<b>Facilities needed</b>			
8		Flight TVAC test								
9			design mounting plate	mid-level mech designer						
10			fabricate mounting plate	Building 5 fabrication shop	X					
11			fabricate harnesses	mid-level EE technician	X					
12			procure fasteners							
13			schedule TVAC chamber with 549				Chamber 235			
14			generate mounting plate drawings							
15			install mounting plate							
16			acquire test power supplies							
17			create Labview data displays							
18			obtain data acquisition system							
19			create 24/7 shift staffing plan							
20			create list of required materials & supplies							
21			develop test harness specifications							

# Schedule Enough Time



# Resource: Schedule Management



## Chapters

1. Introduction
2. Schedule Management Overview
3. Schedule Management Tool Considerations
4. Pre-Schedule Development Activity
5. Integrated Master Schedule Development
6. Status Updates and Schedule Maintenance
7. Schedule Assessment and Analysis
8. Schedule Control
9. Schedule Reporting
10. Schedule Data & Lessons Learned Archival

Download the NASA Schedule Management Handbook at:  
<http://evm.nasa.gov/handbooks.html>

# *Develop a Realistic Spending Plan*

If you have to do it...it will cost \$\$

Take time to itemize the spending plan –  
ensure it includes an estimated cost for  
each and every activity and task



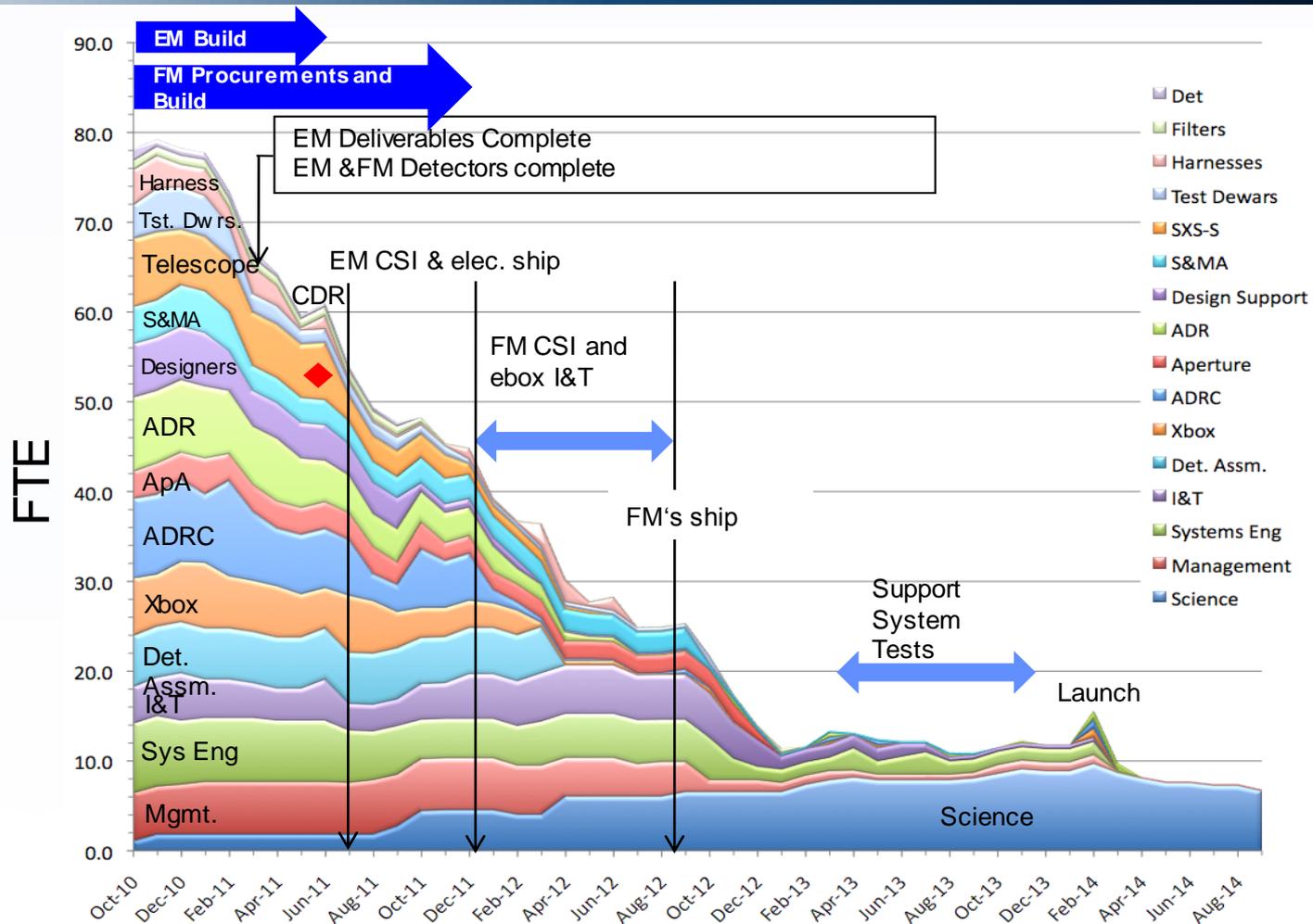


# ***STAYING WITHIN YOUR COMMITMENT***

# Staying On Plan

1. Evaluate plan against the Commitment  
*Is it real...or is it Memorex?*

# Examine the Profile – Does It Make Sense?

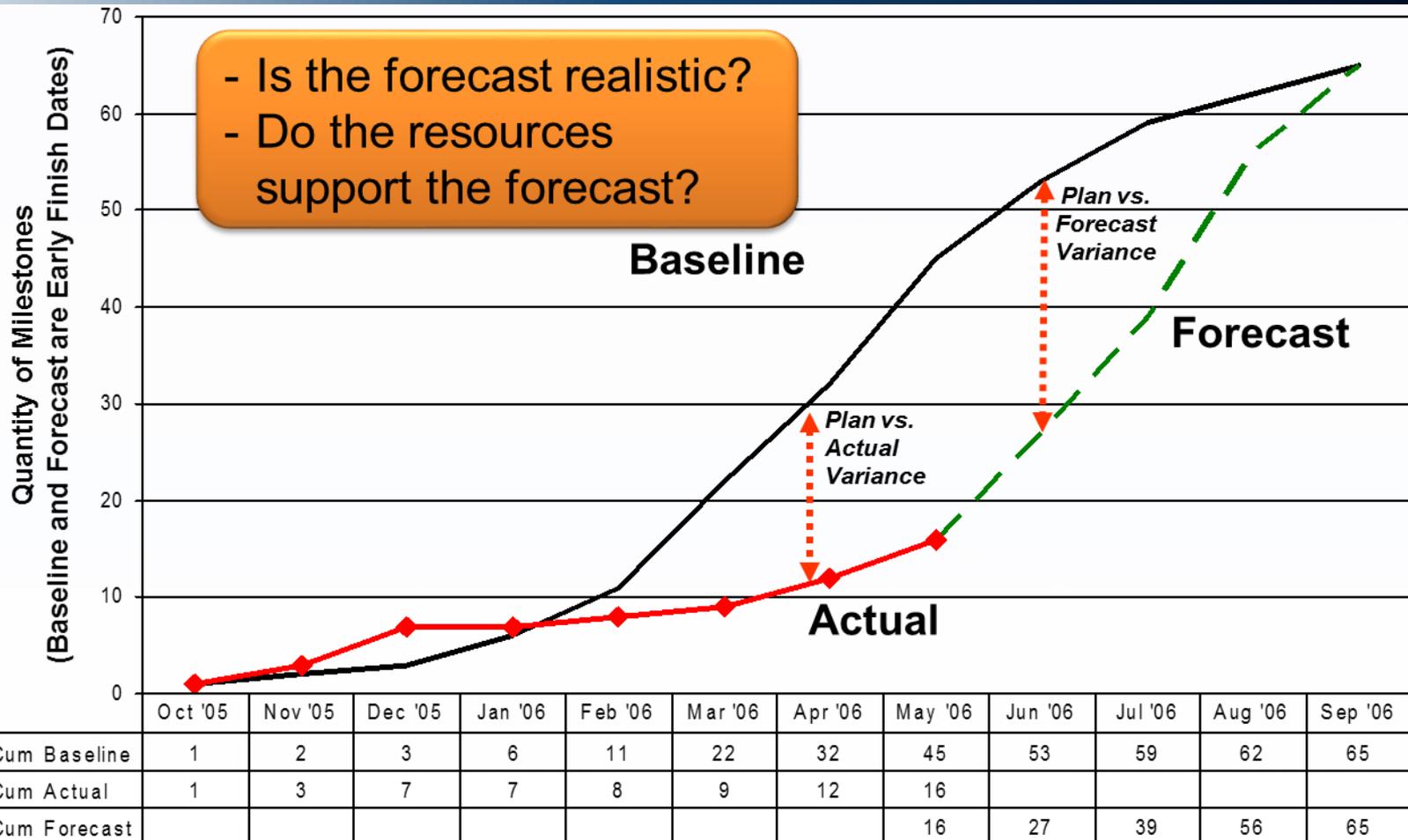


# Know Where You Are Headed...

## 2. Metrics, tracking, controls, forecasting



# Can You Really Do It?



# Know the Risks...

## 3. Mitigate, mitigate, mitigate...!

*Before it rains...*





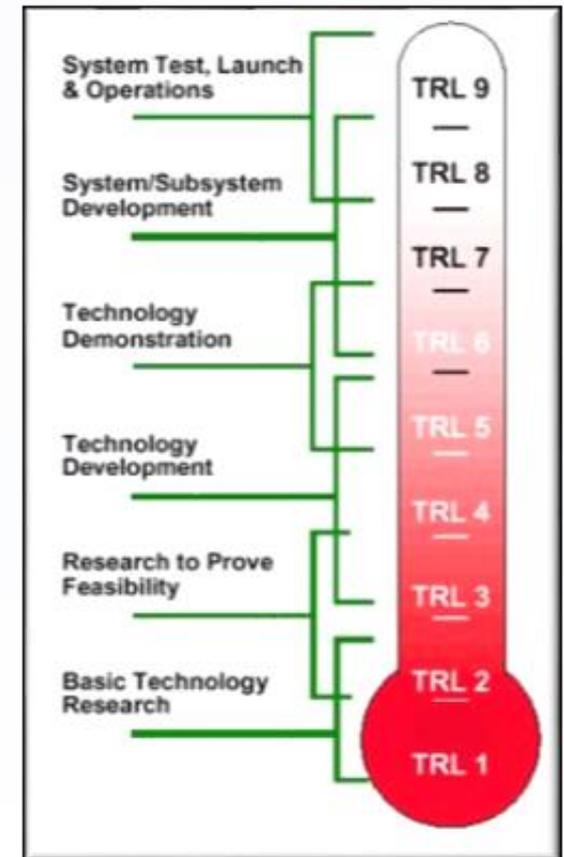
"I always try to live within my means but I have to borrow money to do so."

# OUT OF THE BOX?

## CONTRIBUTORS TO OVERRUNS

# Lower Than Expected Technology Maturity

- Ensure the development/demonstration plan is well thought-out
- Fully cost the development/demonstration plan, independently verify appropriateness, secure adequate funding, provide some contingency
- Properly bound what needs to be demonstrated: hardware, interfaces, environmental exposure
- Develop clear performance requirements to demonstrate technology readiness (maturity)
- Identify key milestones and track progress



# Requirements / Scope Creep

- Ensure requirements and scope are well understood, well-defined and documented
- Understand science/mission objectives with respect to subsystem hardware performance
- Follow formal control process for requirements and scope changes
- Realistically assess design complexity and technology maturity
- Work to meet requirements; not to exceed expectations
  - ‘Better is the enemy of good enough’



# Better Than What You Wanted!



How the customer explained it



How the Project Leader understood it



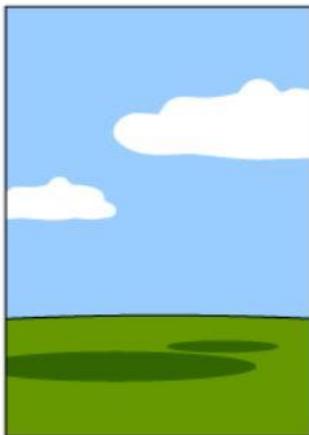
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How the customer was billed

Source: TMT-37 Dave Scheve, "The Customer's Swing"

# Paralysis...



# 25 Hours In a Day...

- Develop executable build/test flow
  - Use past experience to determine realism of activity durations and de-scope options
- Plan the most cost-effective path forward applying resources efficiently
  - Ensure there is adequate funding to complete required activities according to plan
- Eliminate activities rather than reduce activity durations
  - Use risk-based decision making
- Know key receivables required to meet critical milestones



© Randy Glasbergen / glasbergen.com  
“It’s not easy fitting 60 minutes of exercise into my busy schedule. Today I took 360 ten-second walks.”

# Holding On a Little Too Long...

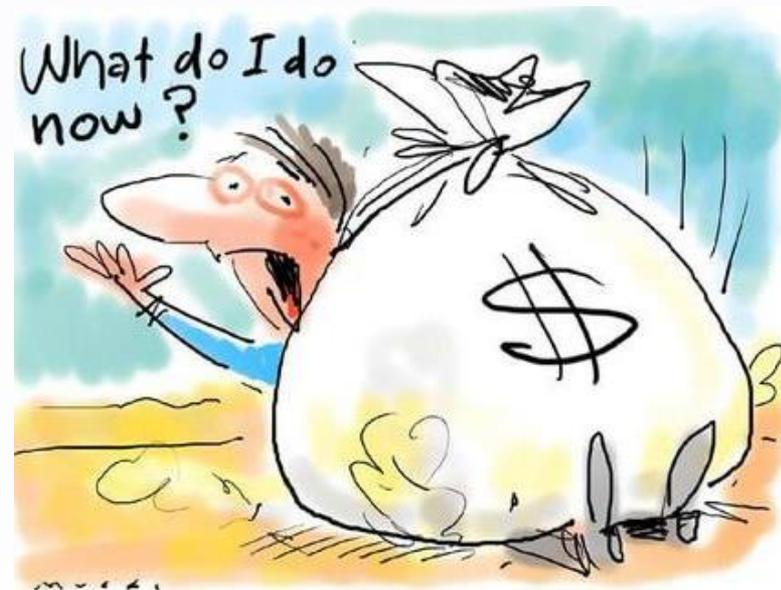
Know when it's time to cut

De-scope early and before it's a life or death situation



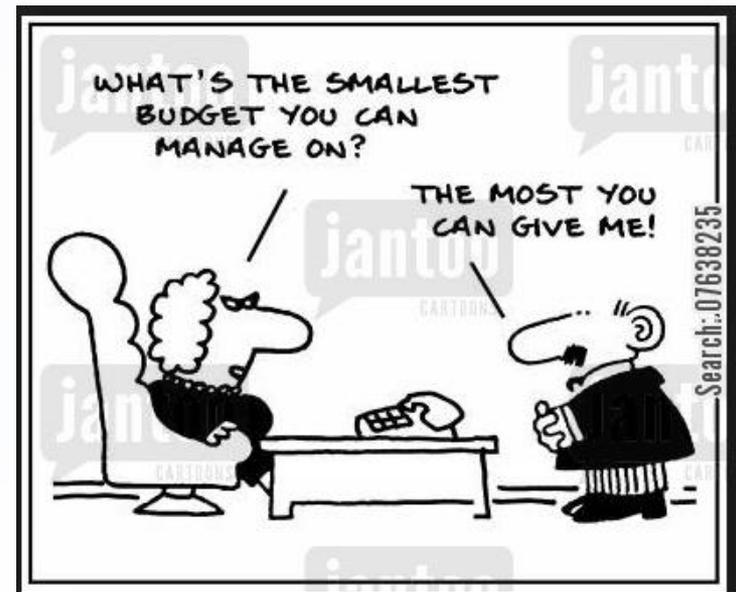
# It Costs How Much...?

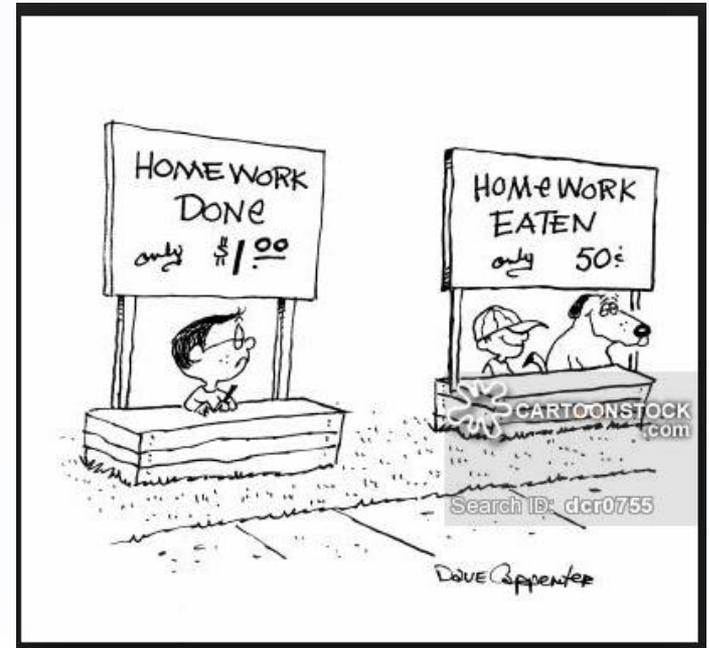
- Use most current fully-loaded labor rates for contractor engineering support
  - Use actual labor rate tables
- Include fees (lab, calibration, software licenses, etc.), taxes and miscellaneous costs (consumables, computer equipment, lab supplies, etc.) in spending plan
- Use current vendor ROMs and bids
- Assume inflation for costs in 'out years'
- Ensure spending plan includes cost estimates for every activity planned in the schedule



# Give Me More for Less...

- Carefully evaluate impact to baseline plan (technical, schedule and cost)
- If no de-scope options available, eliminate activities (e.g., delete a lower level test)
  - Use risk-based decision making
- Formally document, document, document everywhere
  - Risk and risk impact (technical, schedule and cost)
  - Use project change control process
- Ensure to gain formal concurrence from all Stakeholders on new plan before proceeding





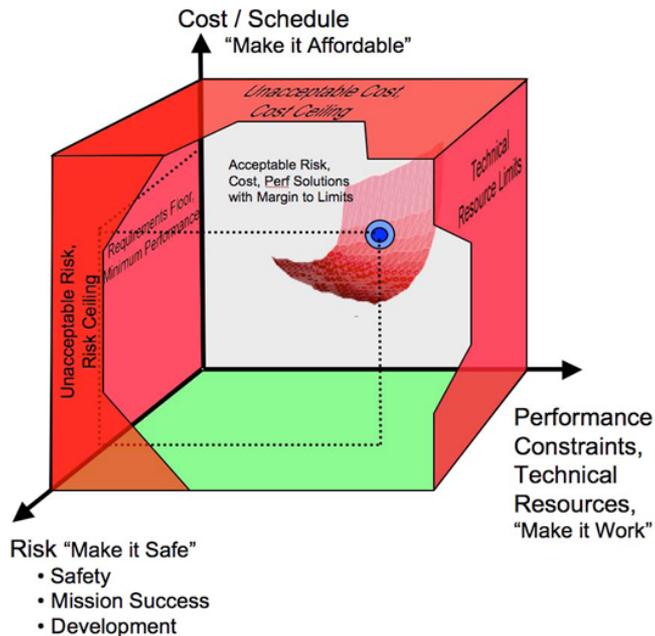
# **GOOD, BETTER, BEST HELPFUL TIPS**

# Communicate Problems...Early!



*“So what you’re saying is that we’ve been defunct and out of business for over two years and you’ve just been waiting for the right time to tell me?”*

# Anything Can Be Engineered, But...



## **"Make it work"**

*Does my product meet customers needs and objectives?*

- Ensure the design meets required performance
- Ensure the constraints and technical resources are acceptable

## **"Make it safe"**

*How will my product fail and how can it be improved?*

- Ensure the design has appropriate level of margin, predictable and sufficiently reliable to meet mission success

## **"Make it affordable"**

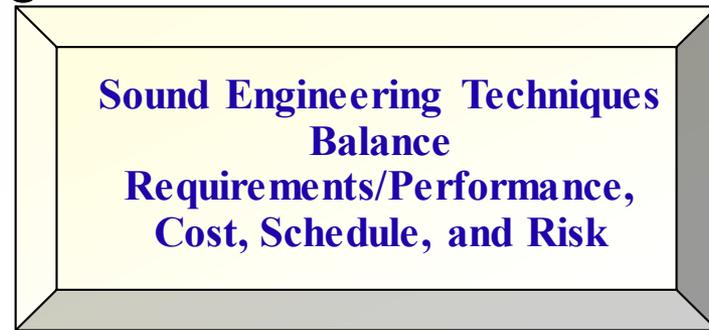
*How will my product impact costs?*

- Ensure to understand the schedule and cost impact for all design decisions

**Any decision resulting in the design solution being out of the box is potential risk**

# Guiding Principles

- Is it good enough?
- Are the right people doing the right thing?
- Work not done today means higher cost tomorrow  
*Never catch up in I&T phase*
- Delays are not automatic withdrawals from the contingency/reserve bank account
- “Can do” means we can implement the right engineering solution within schedule and cost



# Got To Be Real...!

*Conservatism and optimism must be balanced with programmatic expediency, but only realism is your friend*

