



# AFOTEC

AIR FORCE OPERATIONAL TEST AND EVALUATION CENTER





# Testing Doesn't Cost It Pays!

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# Timeless Message



- “With regard to the cost, difficulty, and time required for tests, there is mounting evidence. . .that agencies can no longer afford not to spend the money, take the time, and go to the trouble of performing sufficient tests. Such an investment may be the only way that total cost can be kept within limits of a system’s operational worth to an agency.”
  - Report of the Commission on Government Procurement, *Acquisition of Major Systems*, December 1972, p. 157



# First Formal OT&E Tasking



**“Your orders are simple, Lieutenant. You are to evaluate the airplane. Just take plenty of spare parts – and teach yourself to fly.”**

**Gen James Allen, Chief, Army Signal Corps**



# Theory of Independent OT



- In 1965 a new Pentagon office, Directorate of Operational Test and Evaluation under the Deputy Chief of Staff for Plans, established
- Memories of APGC experience still a factor
  - Eventually employed 75 personnel to monitor test programs and oversee test facilities and test ranges



**F-89 Scorpion**



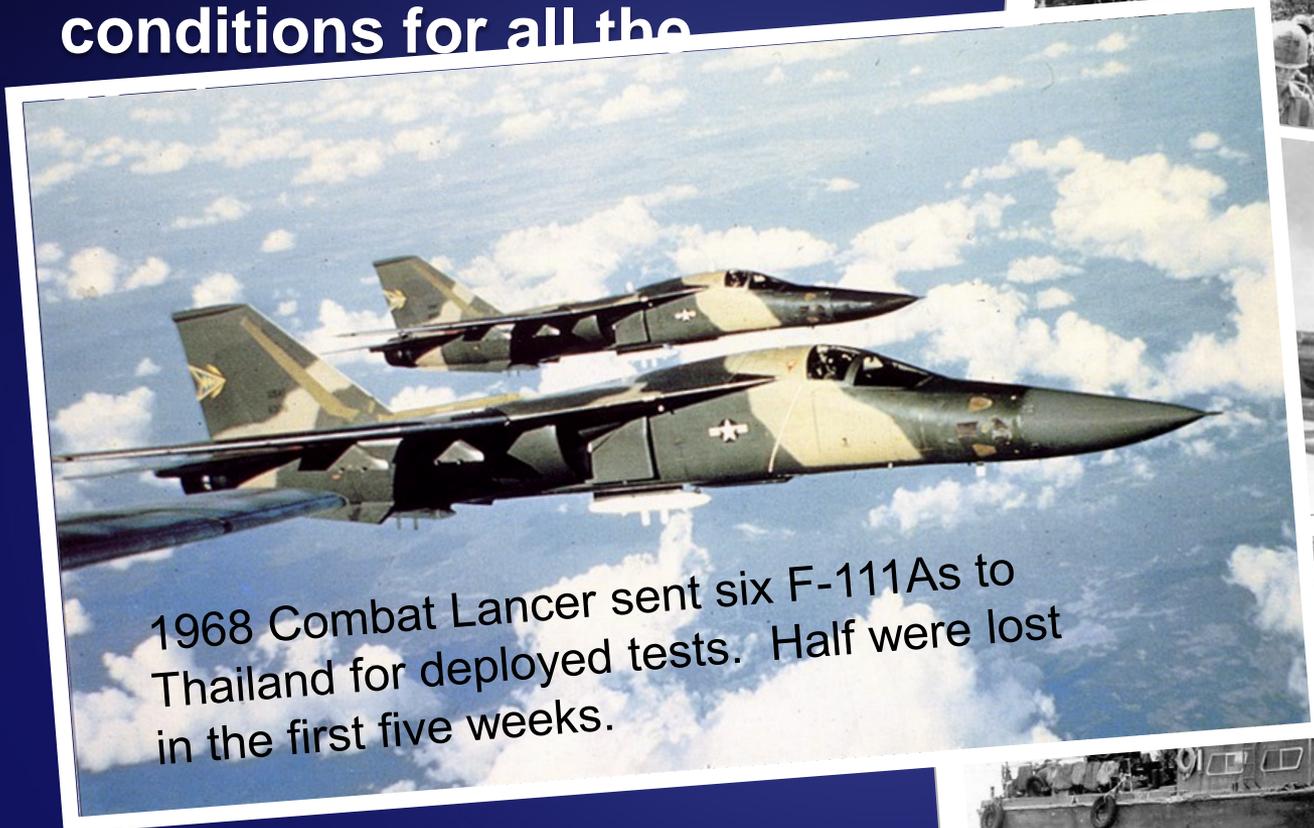
**F-102 Delta Dagger**



# Vietnam War Era



- Vietnam War presented unexpected tactics and conditions for all the



1968 Combat Lancer sent six F-111As to Thailand for deployed tests. Half were lost in the first five weeks.





# AFOTEC Activated



- But not the sole AF operational test agency
  - DoDD 5000.3, 13 January 1973, allowed “a limited number of such major field agencies”
  - Change 1, 12 April 1974, eliminated this phrase
  - AF Regulation 80-14, *Test and Evaluation*, continued to delegate OT&E to the MAJCOMs into the 1990s without meaningful objections from DoD



SecAF McLucas and CSAF Gen Brown



# Trends in AF OT&E 1974-1991



- **Inherent friction between AFOTEC and MAJCOMs**
  - AFOTEC relied on MAJCOMs for personnel and other resources
    - Infringed on Center’s independence, which Congress had intended for all services
    - GAO and others routinely criticized the AF’s OT&E organization and processes but little changed
- **“Men of good will” made this hybrid work acceptably well**
  - AFOTEC portfolio and manning grew
  - Program-funded OT&E tended to provide adequate budgets for AFOTEC-conducted OT&E
  - Arrangements for AFOTEC input to performance ratings of MAJCOM test team members



# Adm. Mike Mullen, Chairman of the Joint Chiefs of Staff



**"The budget has basically doubled in the last decade. And my own experience here is that in doubling, we've lost our ability to prioritize, to make hard decisions, to do tough analysis, to make trades."**

**Our culture needs to change back**



# Healthy Tension



**“Testing is the conscience of acquisition”**

**William Perry**

*If two people agree on everything,  
then only one of them is doing the thinking.*



# Phases of a Program



- 1. Enthusiasm**
- 2. Panic**
- 3. Search for the Guilty**
- 4. Punishment of the Innocent**
- 5. Rewards for Non-Participants**



# Early Program Optimism Is Natural



- Marketing
- “Operationally Acceptable”
- Little bit pregnant
- No deferred requirements
- “Solution Shops”

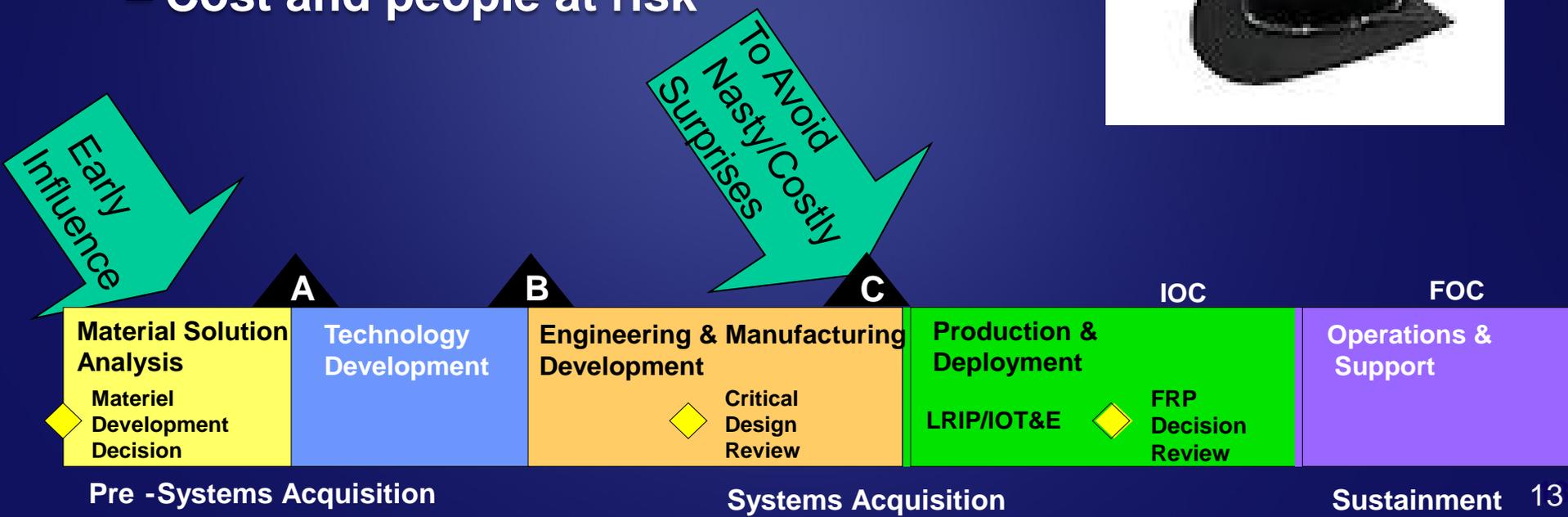
Realism has to set in...sooner or later  
*Schedule behind you is like runway behind you...*  
*Test Early and Often to minimize risk*



# Test Early...Test Often



- **Concurrency is more curse than blessing**
  - Stems from Rosy assumptions to save \$
  - Denial of problems
  - Over reliance on Modeling & Simulation / design tools
- **Risk Management**
  - Software vs hardware
  - Cost and people at risk

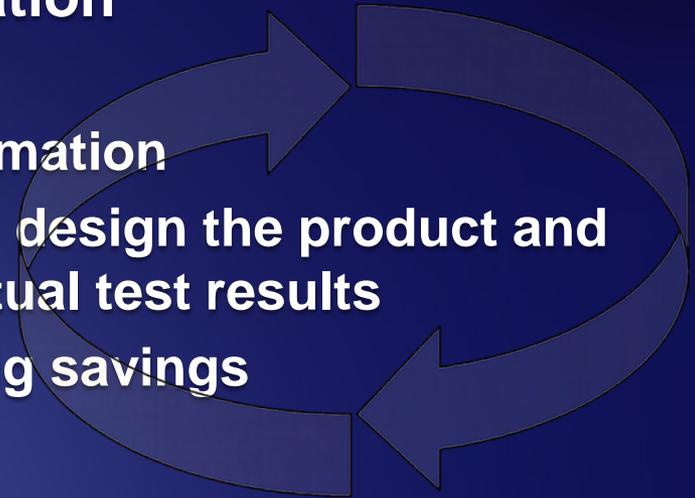




# Test: Your Partner in Successful System Development

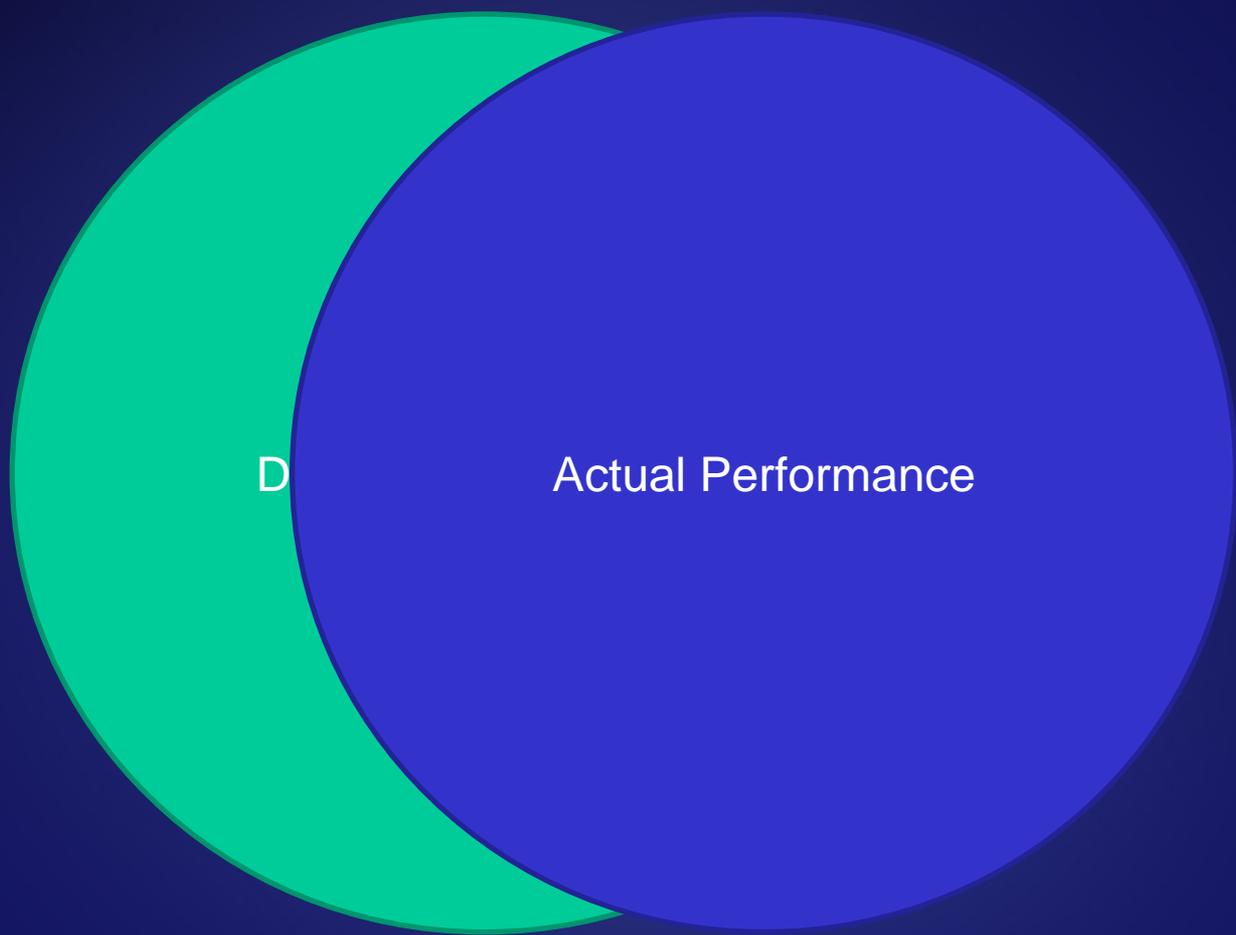


- **Over-reliance on Modeling & Simulation**
  - Garbage in – garbage out
  - Models only as good as known information
  - Circular logic when model is used to design the product and then used to test the product w/o actual test results
  - Won't find problems early – i.e. no big savings
- **Test and evaluation: integral to the development process**
  - Verifies and validates models
  - Measures actual system performance during development
  - Analytic (e.g. 5 test configurations versus 720)
  - Builds a robust, exploitable model





# Requirements vs Reality





# Test as Part of Development



- The target / weapon combination is dominant
- Weapons / systems have incredible autonomy

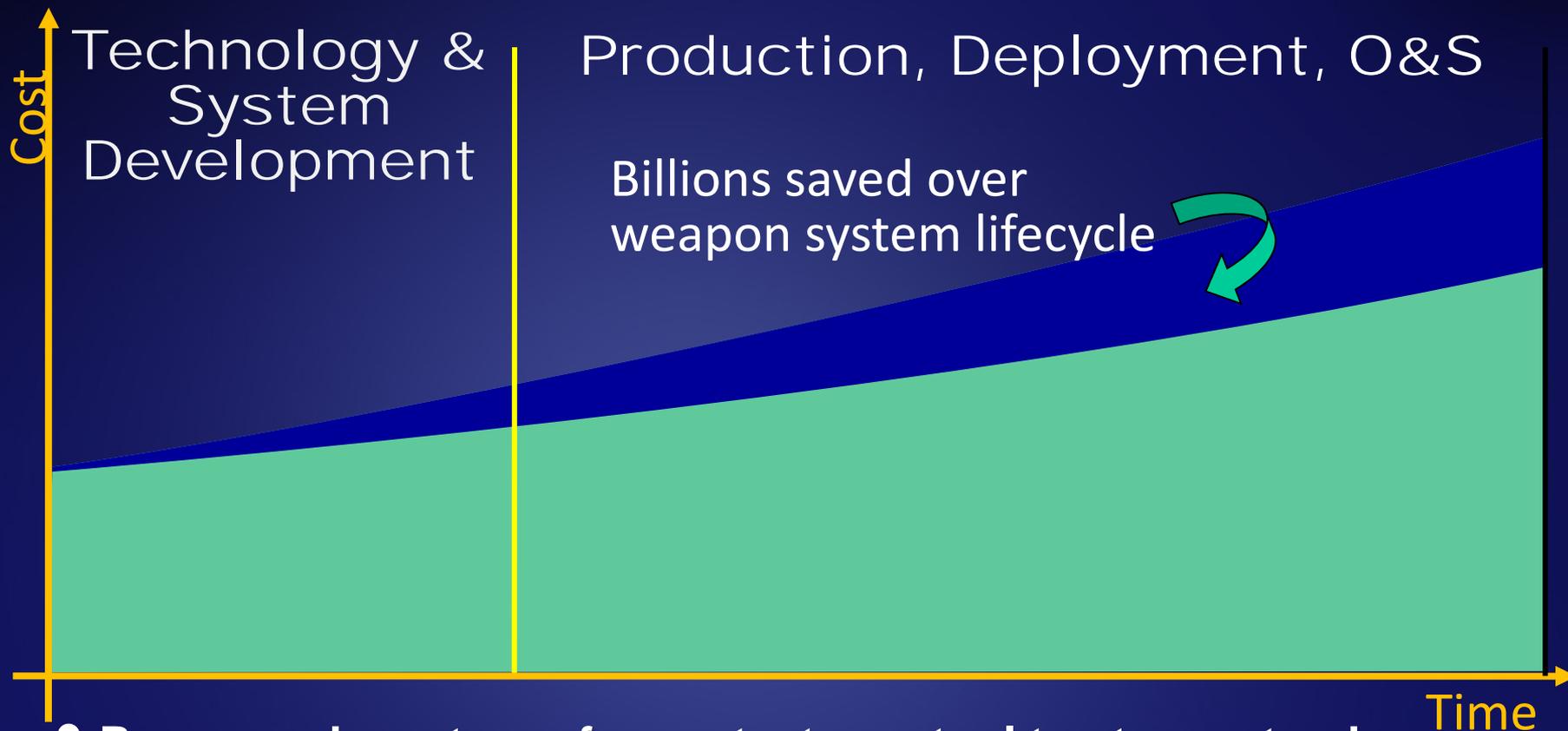
- *Test to Integrate*
- *Test to Develop*



- Decision Systems/Displays must be deemed user friendly or *hostile* – *Task Friendly Not Just Adequate*
  - *Defined task and Actionable Displays*
  - *“Unique training” closely scrutinized*
- The need for Truth – *Fair and Balanced*
  - *Tedious is tedious while agile is agile (esp. with s/w)*
  - *Easy, precise and timely is the minimum today*

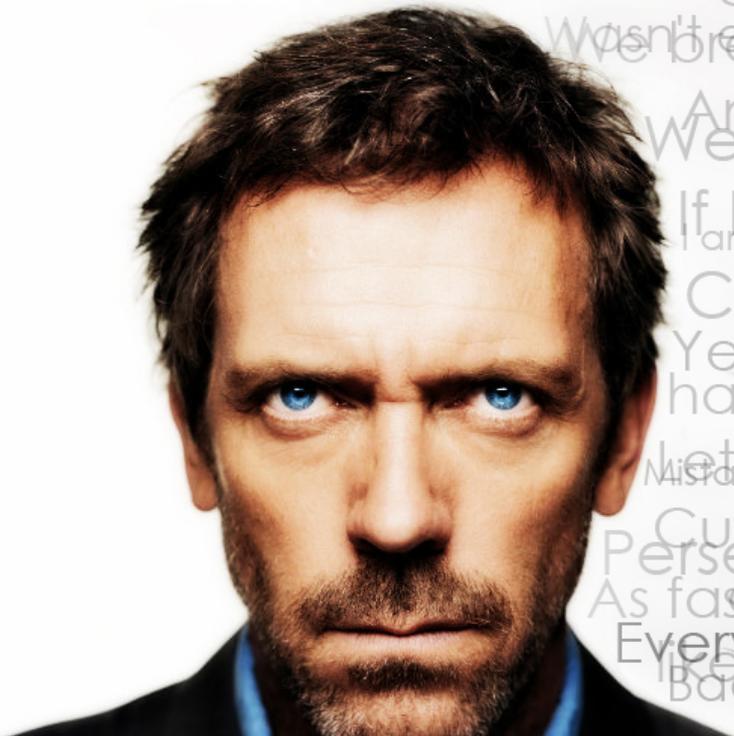


# Early Test >>> Later Test Return on Investment



- Programs have to perform – test as a tool to stay on track
  - Either cost avoidance (prevent the overrun) or pure cost savings

# Perspective:



**Everybody lies.**

a doctor who ignores you while you get  
Unfortunately grant them the greatest re  
or one who ignores you while you get  
When a baby is born, it's peice the te disigns, out the  
I suppose it would be perfect, I am both amused and annoyed  
mp, perfect, pink balloons over a preschooler's forehead  
you think I should be less stubborn than yo  
Then it's downhill, some hills steepen, then a white  
doctor who ignores you while  
Parents get off on their kid's accomplishments  
I'm sure he's a good guy. He's probably a great g  
They'll annoy you with. Probably a much better guy than I am.  
No problem. Have some Ozithromycin.  
Hell, they'll even show you a purple cow  
I'm just not sure if it's because I want to be with h  
and tell you what a kid if it's because I want her to suffer.  
If you talk to God, you negotiate. You never win.  
he doesn't smile, he does. The eyes can mislead, promise.  
If God talks to you, you're responsible for what  
The smile can lie.  
but the shoes always tell the truth  
We're bred these superbugs. They're our babies.  
Why would you feel so He figures out what's going o  
And they're all grown up and they've got  
Well here's the way in your argument  
utterly beds never doubts. I watch  
If I enjoy having life, I can't hate life. listen  
I am a complete str back pain or you  
Come out of your holes, people.  
Right, she's sake the get life, when can  
Yeah. I want to save her. I don't want to  
have flesh-eating bacteria. It's just wrong.  
Humiliation comes in all kinds of package  
Mistakes are as serious as the lies, and people lie  
Cute kids die. People finding out that your son's a perv, that's pretty h  
Perseverance does not lead to worshipping  
As fast as gas, you can't see it for sound by tr  
Everybody does stupid things, it should n't cost them everything they w  
Badmypo is not a diagnosis  
it shouldn't cost them everything they w



# Punish the Innocent



## Dilbert

OUR NUMBERS ARE WAY DOWN. WHAT SHOULD WE DO?



REORGANIZE THE DEPARTMENT SO THERE'S NO VALID HISTORY FOR COMPARISON.



THEN WE'LL FIRE A FEW PEOPLE AND GIVE OURSELVES AWARDS FOR SAVING MONEY.



[www.dilbert.com](http://www.dilbert.com) [scottadams@aol.com](mailto:scottadams@aol.com)



**“It was fine...until we got into test.”**



**Cost of OT is a relatively small portion (~1%) of the overall program budget, it is a large portion of the budget in the year it occurs. By virtue of being at the end of the development process, testing occurs when the program has few degrees of freedom left to work issues, including a checkbook with little reserve**

**Design...Build...Test**

**Versus**

**Buy...Fly...Fix**



# Testing Concerns



- Independent team assessed concern: testing drives undue requirements, excessive cost and added schedule
  - Examined 40 programs with significant delays
    - 7 experienced some delay (not primary) due to testing
    - 37 programs: problems discovered during test caused much longer program delays than test itself
- DOT&E review of 76 programs
  - cost of OT&E ~1% of total acquisition cost



**Result: Testing alone does not cause major program delays or cost increases**



# Paradigm: Quickly to the Warfighter!



- Just get it to the user (*sometimes* absolutely necessary)
- Regardless of specification shortfalls – “the contractor did their best”
- The User will determine what system can be used for
  - creating the need for user testers
- Late identification of deficiencies
  - Difficult holding the contractor accountable
- Generates new requirements
  - Fix this and that
- Increases program life cycle cost

**“Just because a thing doesn’t do what you expected, it doesn’t mean it’s worthless.” Thomas Edison**

**But can we afford it?**



# Objectivity and Accountability



- **Objectivity is #1 goal**
  - Credibility comes from Objectivity
  - Objectivity (generally) comes from Independence
  - Developing / fielding capability is the priority
  - Technological success is a precursor
- **Accountability is critical**
  - Government sets expectations
  - Contractor needs clear direction
  - Nothing is perfect and what gets fixed versus what gets lived with is a government decision
- **Resolution is a total team effort**



# Mission, Business, Politics



- Government must integrate
- We need capabilities to execute our mission
- Getting those capabilities to execute our mission is business; industry has to make a profit
- Politics trumps mission and business
  - every dime comes from Congress
- As budgets shrink drastically, we need to shift the paradigm to better “inside the box” thinking





# Summary



- The value in test is its potential to reduce bad decisions
- If bad news is avoided – bad decisions will follow
- Relationships are key to savings and success
- Government & Industry both need to insist on clear executable specs/standards
- The government has to lead/direct as the buyer / user
- Need to get Back to Basics
  - Write contracts with enforceable specs (not a bad thing)
  - Stop systems going to the field before they are ready
- Don't marginalize the Acquisition and Test Community
  - Critical role and mission to perform

***Testing doesn't cost, it pays!***