

DEFENSE DEATH SPIRAL

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September 1998

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"If we don't begin to break out soon from this *death spiral* it will be *impossible* to do so later."

"The required actions, I admit, are both unpopular and extremely difficult but I believe we have *no choice*."

Jacques Gansler

Under Secretary of Defense (Acquisition)

(Source: Defense Daily 3 Sept 1998)

WASHINGTON (AP, 29 Sept) -- The nation's top general said today that without more pay, benefits and new equipment, America's *under-supplied and overworked military* will go into "*a nosedive*" and suffer irreparable damage.

"Our forces are showing increasing signs of serious wear," Gen. Henry H. Shelton, chairman of the Joint Chiefs of Staff told the Senate Armed Services Committee. "Our *current readiness is fraying* and the *long-term health of the total force is in jeopardy*."

Defense Death Spiral

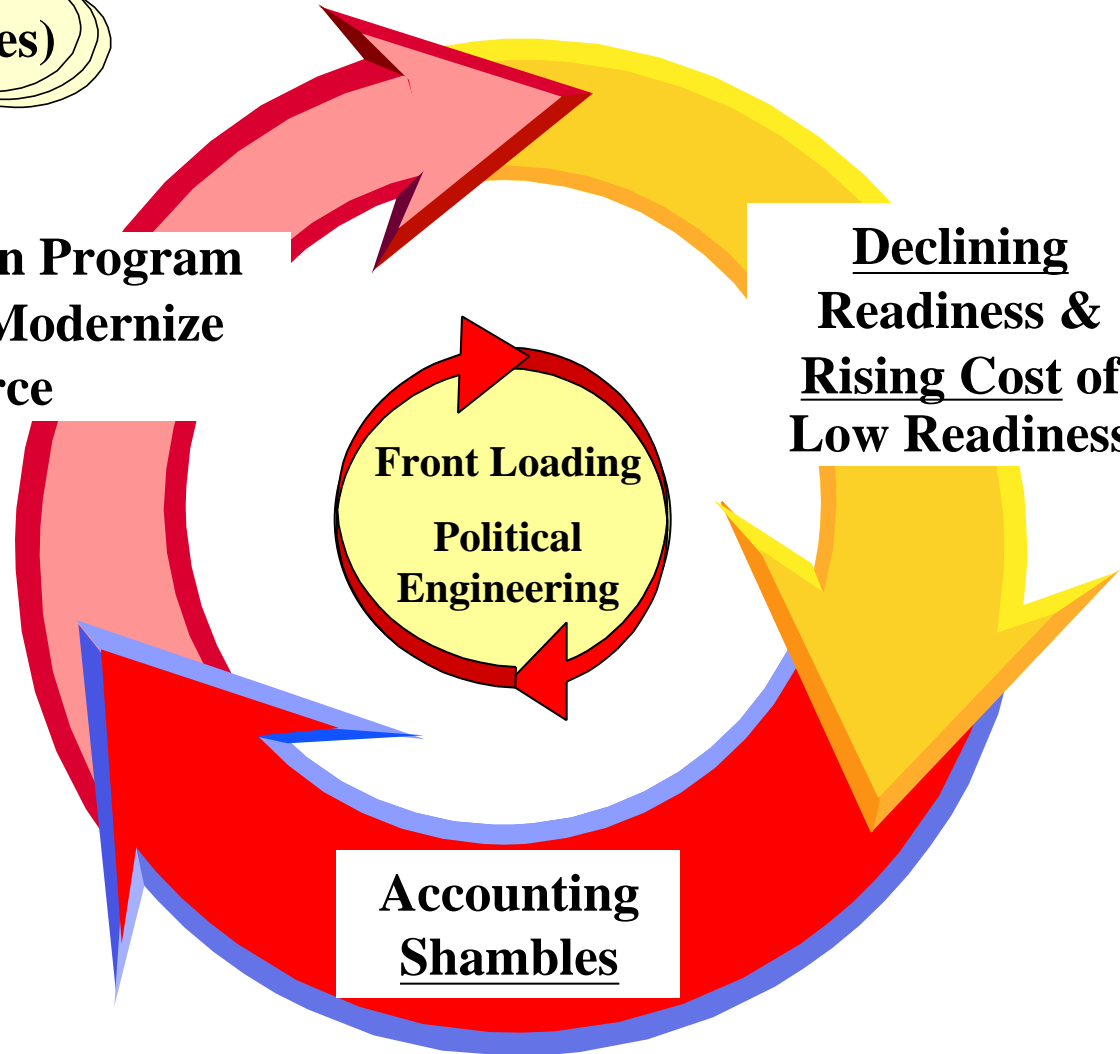
Ready for What?
(Strategy - Threat - Forces)

**A Modernization Program
that Can Not Modernize
the Force**

**Declining
Readiness &
Rising Cost of
Low Readiness**

**Front Loading
Political
Engineering**

**Accounting
Shambles**



Ready for What?

- **Background: The Evolving Nature of War**
- **Strategic Changes Accompanying End of Cold War**
- **Implications for Future U.S. Forces & Capabilities**
- **Adapting to Change @ End of Cold War**
 - ✓ **Evolution of Threats & Military Strategy**
- **Pattern of Programmatic Adaptations**
 - ✓ **Budgets & Plans**
 - ✓ **Readiness & Rising Cost of Operations.**
 - ✓ **Modernization Agenda**

Background: Evolution of War

(Re: "The Changing Face of War," Marine Corps Gazette, Oct 89)

● 1st Generation: Driven by Ideas

- ✓ Linear Tactics of Column and Line -- Regularity Driven by Culture & Technology
- ✓ Operational Art - Intuitive -- Napoleon's use of Time & Space to Set Up ***Decisive Battle*** on His Terms

● 2nd Generation: - Attrition Warfare, Driven by Technology

- ✓ ***Materialschlacht*** or Industrial War of Attrition - Civil War to WWI and Most of Allies in 2nd WWII (some exceptions like Patton)
- ✓ Linear Tactics - Regularity Driven by Technology (Indir. Arty, Mach. Guns, Barbed Wire Gave Advantage to Defense)
- ✓ Operational Art - Procure Success from Top Down: Move Around Defense to ***Destroy Adversary*** in a Battle of Encirclement.
- ✓ Space-Time Decisions Synchronized 1st by Molke, Based on Mobilization & RR (e.g., Schlieffen Plan)

● 3rd Generation: Maneuver Warfare, Driven by Ideas

- ✓ Infiltration Tactics (1918) - Blitzkrieg (Guderian) - USMC & OODA Loop (Boyd, 1980s)
- ✓ Nonlinear Tactics - Evolve Penetrations based on Ideas of Surfaces & Gaps, Recon Pull, Multiple Thrusts, Mission Tactics & Decentralized, all harmonized, by Ideas of Commanders Intent & Schwerpunkt, etc.
- ✓ Operational Art - Dismember & ***Collapse Adversary*** by Penetrating Mind-Time-Space Frame of Reference (ie., Penetrate His Observation-Oriented-Decision-Action Loops, 1st Recognized by Boyd)

● 4th Generation: Irregular Warfare by State & Non-State Actors, Driven by Ideas (?)

- ✓ Revolutionary (Lawrence - Mao - Giap) - Ethnic/Tribal/Religious - Gang - Terrorist - etc.
- ✓ Tactical Penetration Techniques Still Developing, But are Clearly Spreading w/ Unknown Implications.
- ✓ Operational Art - ***Collapse Adversary*** by Bypassing Army & Attacking Population, Culture, & Institution.

How Does this Relate to the Future?

Are there Any Evolutionary Pathways that Might Carry Forward into the Future?

(Re: “The Changing Face of War,” Marine Corps Gazette, Oct 89)

Trends that Seem to Have Accompanied Generational Shifts

(Particularly from 2nd - 3rd - 4th)

- **Greater Dispersion on Battlefield to Neutralize Increasing Lethality of Wpns.**
 - ✓ Smaller, More Agile Groups of Combatants.
 - ✓ Greater Decentralization Via Mission Tactics in Accordance With Commander’s Intent.
- **Decreased Dependence on Centralized Logistics to Reduce Vulnerability.**
 - ✓ Increased Premium on Fast Moving, Agile Forces that Can Live of the Land.
- **Shift to Multiple Penetrations to Dismember & Collapse Adversary.**
 - ✓ More Emphasis on Fire & Movement in **Maneuver** Context.
 - ✓ Less Emphasis on Fire & Movement to Destroy (**Attrition**).
 - ✓ Penetration Targets Include Population, Culture, and Institutions.
 - ✓ Conventional Military & Unorthodox Non-Military Operations.
- **Decreasing Distinctions & Greater Irregularity of Operations.**
 - ✓ More Irregular Battle Fields with Less Definable “Fronts.”
 - ✓ Greater Intermingling of Friend, Foe, &, Neutral.
 - ✓ Decreasing Distinction Between Civilian & Military.
 - ✓ Blurring of Difference Between War & Peace.

End of Cold War: Strategic Changes

- **U.S. Forces in WWI, WWII, & Cold War Were Shaped Primarily to Counter Power Imbalances in Europe and to Lesser Extent in East Asia.**
- **Collapse of Soviet Empire Restored Balance of Power Among European Countries & Obviated Strategic Need for Massive Fwd Deployment of Heavy Air/Land Forces.**
- **End of Cold War Neutralized Organizing Dynamics of Bi-Polar Rivalry & Unleashed a Welter of Nationalist, Ethnic, Religious, Tribal, and Criminal Conflicts, All Taking Place in a Multi-Polar, Multi-Cultural, Political Environment of --**
 - ✓ Over-population, Urbanization, Environmental Degradation, Poverty, Scarcity, Near Instantaneous Global Communications, the Conflict Between Western Materialism and Non-western Religious Values, etc.
- **Techniques of 4th Generation Warfare Spreading Rapidly as “State” & “Non-State” Actors Learn to Exploit Weaknesses of Hi-Tech, Fire-Power Intensive, Conventional Forces.**
 - ✓ Lesson of Gulf War -- If You Fight the West, Don't Mass Conventional Forces in Open or in Static Defensive Positions, Where It is Easy to Separate Friend From Foe.
 - ✓ Increasing Preference for Irregular/Urban Combat (Hue, Beirut, Mogadishu, Grozny), with Intermingling of Friendly, Hostile, and Neutral Parties.
 - Rise of Different Forms of Warfare -- Arabs Achieved More with Intifada and Rocks, Backed Up by Hamas, Hizbollah & CNN, than in 4 Wars with Israel.
 - U.S. Driven out of Somalia, in Part, Because Aideed Won the Infowar.
 - Heavy Russian Forces Defeated by Tribal Irregulars in Chechnya & Afghanistan.
 - Rise of State/Non-State Sponsored Terrorism to Achieve “Policy” Aims
 - Loose Nucs & Chem/Bio Wpns Magnify the Leverage of Irregular/Terrorist Forces.

Implications For Future Capabilities

How Is Pentagon Adapting to the End of Cold War?

- **Short Term? (Readiness)**
- **Long Term? (Modernization)**

What Near-Term Threat Should We Prepare For?

(FY 1993-1996 & FY 1998-2003 Plan)

Response: Focus on 2nd Generation Conventional War

**Be READY to Fight 2 Major Theater Wars (MTWs) Nearly Simultaneously
While Carrying Out a Variety of Small Scale Contingencies (SSCs).**

Short-Range Threat Scenarios and SSCs:

- **MTW-West: Iraq or Iran (Cultural Rivals & Historical Enemies)**
- **MTW-East: North Korea (Failed State & Can't Even Feed Itself)**
- **Syria (Mouse-trapped by Turkey and Israel, Shaky Relations w/Iraq)**
- **Libya, Sudan & Cuba (Inconsequential as Conventional Military Threats)**
- **SSCs: Show of Force, Interventions, Limited Strikes, Noncombatant Evacuations, Sanctions (No-Fly/Maritime), Counter-Terrorism, Peacekeeping, Humanitarian Assistant, Military Support to Civilian Authorities.**

Implications:

- **Readiness: These Scenarios Define Current Requirements.**
- **Modernization: Capabilities More than Adequate -- Replace as Equipment Wears Out**

Readiness Critique

The Strategy - Forces - Budgets Mismatch

- **Forces Are Too Small to Execute 2-MTW Strategy**

- ✓ Had Much Larger Force During War with Iraq, but Still Required 75% of Active Tacair, 42% of MBTs, 46% of Carriers, 37% of Army Personnel, and 46% of Marines.
- ✓ Took 5 Months to Get Ready and Required Extensive Cannibalization.
- ✓ Burden of Forward-Deployed Units in SSCs Is Now Higher than in Cold War.

- **Emerging Readiness Problems (Acknowledged in 29 Sept SASC Hearing)**

- ✓ **Personnel**: Declining Retention - Growing Skill Deficiencies (e.g., Pilots, 2nd Term Enlisted).
- ✓ **Units**: Understrength Combat Units & Undermanned Ships.
- ✓ **Material Condition**: Spares Shortfalls, Rising Cannibalization Rates, Growing Depot & RPM Backlogs, Increased Workloads.
- ✓ **Combat Training**: Cutbacks, Reduced Realism, Declining Ammo Allowances.
- ✓ **Declining Morale**: Frequent Deployments, Increasing Workloads, Quality of Life.
- ✓ **Leadership Problems** (Not Mentioned @ Hearing) & The Wedge of Mistrust.

What Threat Should Guide Modernization For Long Term?

(FY 1993-1996 & FY 1998-2003 PYDP & FY 1999-2015 DPP)

Response:

Evolution of Long-Range Threat Scenarios (2010 +)

- **Reconstituted Russian Superpower or China (1993 to McCain Proposal for QDR in April 1996).**
- **Generic Emerging Superpower after 2010 (used circa 1994-6).**
- **Emerging “Peer” Competitor (used most of 1996).**
- **Emerging “Near Peer” Competitor (emerged in Late 1996).**
- **Asymmetric Niche Competitor => Need to Dominate the “Full Spectrum” of Asymmetric Niche Competitors (emerged in Mar 1997).**

Critique:

Mutations in Long Range Threat Predictions Have NOT Changed the Contents of the Long-Term Modernization Program

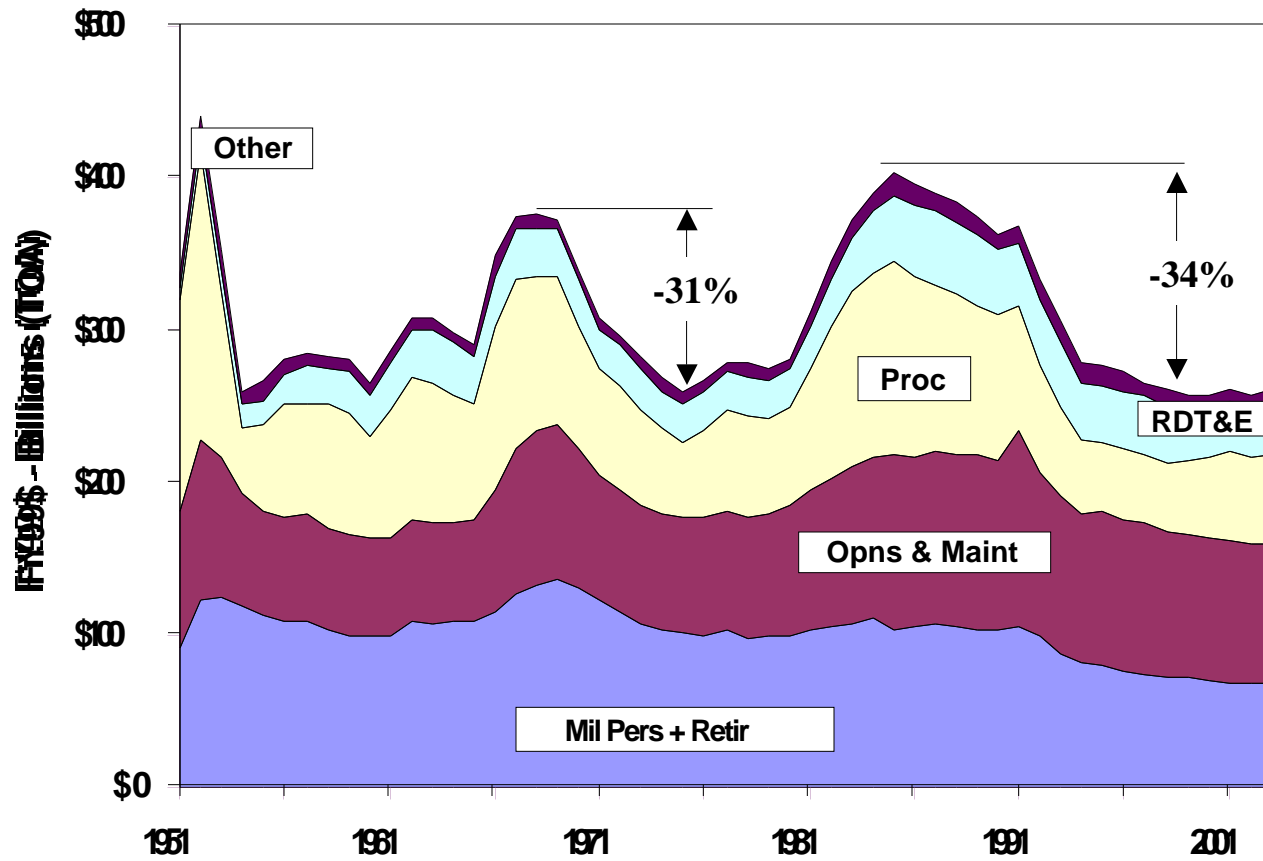
Modernization Critique

- **Aging: New Weapons Too Expensive to Modernize Forces on a Timely Basis.**
- **Plan: Envisions 2nd Generation War of Attrition in Distant Future.**
 - ✓ **JV-2010/RMA: More Complexity, Based on Old Mechanistic Ideas.**
 - Target-Based Automated **SEE-DECIDE-STRIKE** Cycle is New Version of Igloo White (1960s), Quick Strike Surveillance-Recce (1970s), Assault Breaker (late 1970s).
 - Increased Emphasis on Precision Wpns. Which Require Sharp Distinctions & Precise Knowledge.
- **New Weapons & Force Structure: Tech. & Ideas Are Legacies of Cold War Thinking**
 - ✓ **Army: Smaller Version of Heavy Force Designed to Fight on North German Plain**
 - ◆ Comanche, Crusader, Digitization, and New Generation of “Fire & Forget PGMs.
 - ◆ Increased Emphasis on Active Force Rather than Shift to Reserves.
 - ✓ **Air Force: Smaller Version of Force Configured for Bombing of “Strategic” Infrastructure & Interdicting Tank-Heavy Ground Forces.**
 - ◆ Continued Emphasis on Cold War Technologies (Stealthy F-22 & JSF, Adv. PGMs, Force Multipliers).
 - ◆ Less CAS & Dir. Supt of Army, But Increased Use of Space.
 - ◆ Marginal Increases in Reserves.
 - ✓ **Navy: Smaller Version of Force Configured for Global War at Sea & Strategic Bombardment.**
 - ◆ Surface Combatants Configured for Air Defense (Aegis) and Cruise Missile Attack (TLAM).
 - ◆ Air (F/A-18E/F & JSF) Configured for Deep Bombing..
 - ◆ No Surface Fire Support / Sea-Based CAS to Support Marines in 3rd Generation Littoral Operations.
 - ◆ Attack Submarines Configured for Open Ocean Warfare (NSSN) & Cruise Missile Attack (TLAM).
 - ✓ **Marine Corps: Only Service to Adopt 3rd Generation Warfare as Doctrine (1980s).**
 - ◆ Struggling to Evolve Doctrinal Response to End of Cold War - OMFTS & Urban Warfare.
 - ◆ But Modernizing with High-Cost Weapons that are Legacies of Cold War (JSF / V-22 / AAV).

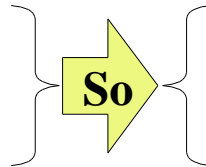
Pattern of Programmatic Adaptation

- **Budgets Adjustments and Plans**
- **Modernization Agenda**
- **Readiness & Rising Cost of Operations**

Changes in the Defense Budget (Constant Dollars)

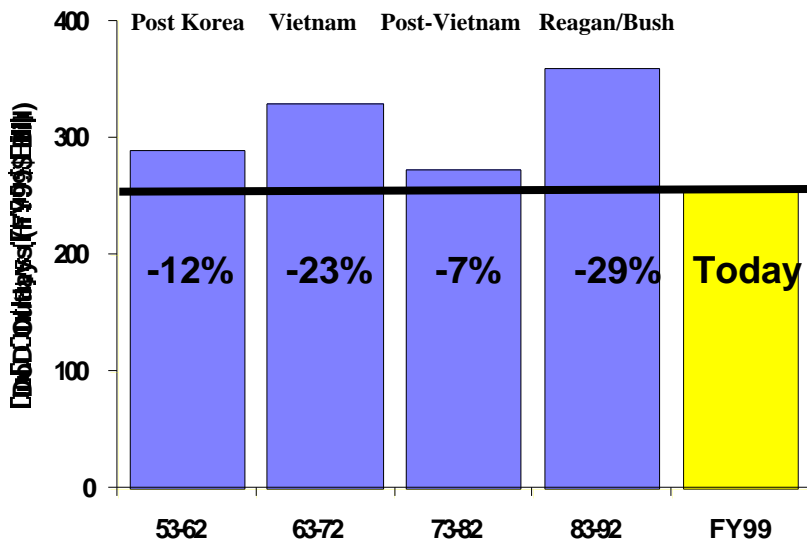


**Cutbacks Have Been Modest,
When Viewed Over the Long-Term.**

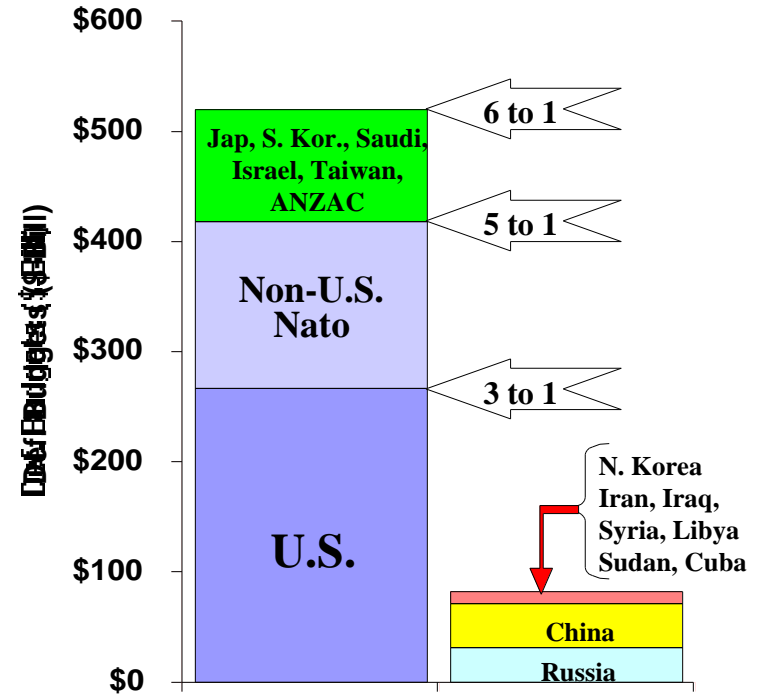


**US & Allies Now Spend Far More
Than All Potential Adversaries
Combined.**

**Average Annual Defense Expenditures
(Constant Dollars)**

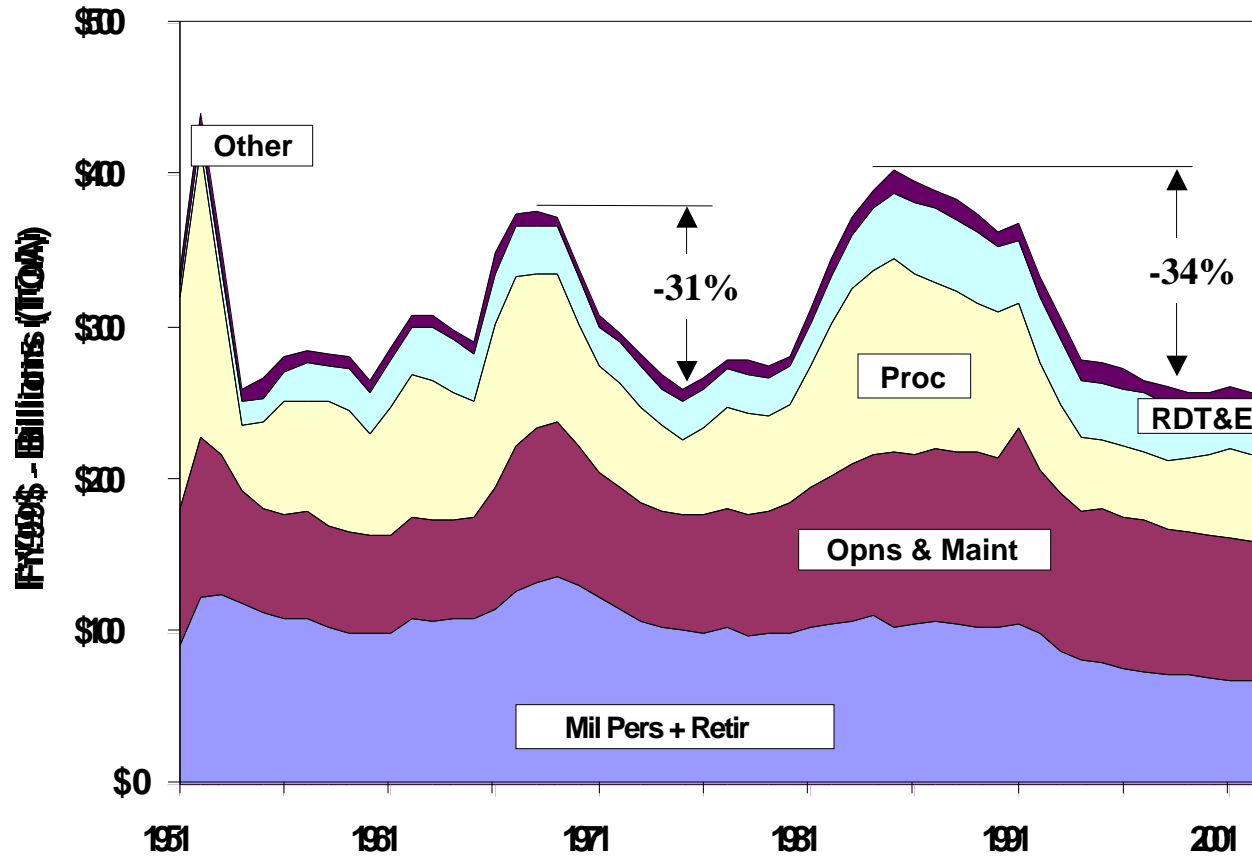


Current Spending Relative to Cold War Averages



Comparative Expenditures in 1997

Defense Budget (Constant Dollars)

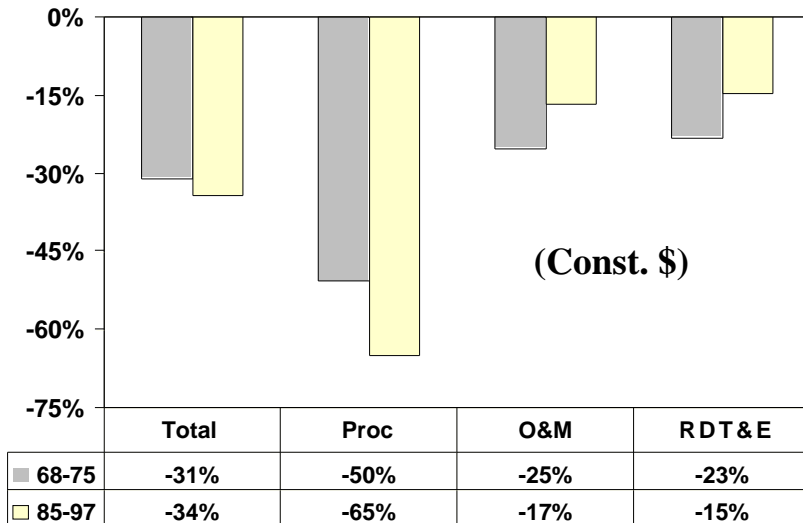


How Did the Different Accounts Change?

End of Cold War Versus End of Vietnam - Patterns of Change

ACTUALS:

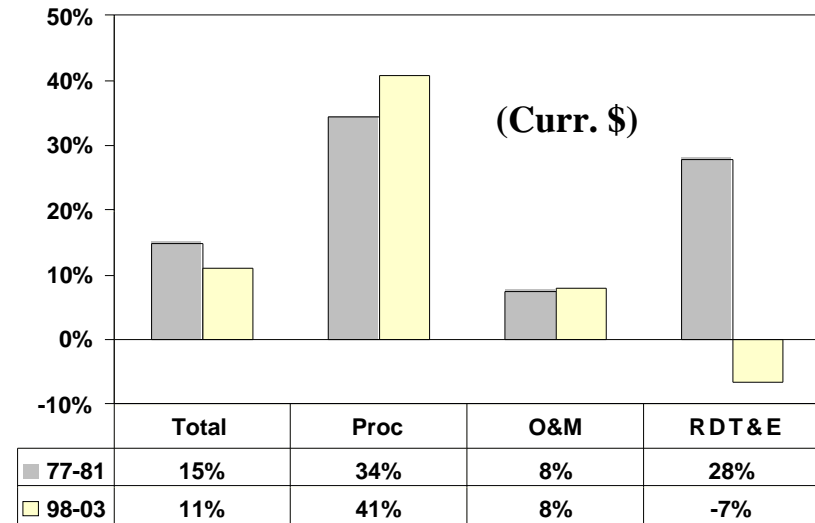
Vietnam versus Cold War (Peak to Trough)



- **Similar Patterns of *Actual* Reductions**
 - ✓ Procurement Cut Faster than Total Bud.
 - ✓ O&M and R&D Cut Slower than Total Bud
- **Asymmetry Magnified After Cold War**
 - ✓ Vietnam: Proc. Cut = 2x O&M Cut
 - ✓ Cold War: Proc. Cut = 3.8x O&M Cut

RECOVERY HOPES & DREAMS:

FY 77-81 (Oct 75) versus FY 98-03(Feb 98)



- **Similar Pattern of *Planned* Increases**
 - ✓ Procurement to Increase Faster than Total Bud.
 - ✓ O&M to Increase Slower than Total Bud.
- **Asymmetry Magnified After Cold War**
 - ✓ Vietnam: Proc. Increase = 4.2x O&M Increase
 - ✓ Cold War: Proc Increase = 5.1x O&M Increase
- **RDT&E "*Pays Bill*" for Magnification**

Asymmetries Help to Discern the Pathway to the Train Wreck

Vietnam

● Before Post-War Draw Down

- ✓ Modernized Force W/Higher-Cost Wpns.
 - ◆ E.g., F-4, A7, F-111 Replaced F-100 & F-105
 - ◆ But Left Force With Higher O&M\$/FH

● Pattern of Post-War Cutbacks

- ✓ Shrunk Forces to Cut O&M by 25%.
 - ◆ But Rising Cost of Opns Limited Size of Cutback.
 - ◆ So, We Cut Readiness (Delib. Policy by Nixon Adm)
- ✓ Slashed Procurement by 50%
 - ◆ End of a Modernization Cycle Made Cuts Easier
 - ◆ Pacified Arms Industry w/FMS (Iran)

● Mushrooming Proc. Bow Wave (FY77-81)

- ✓ Began R&D of Next Generation Weapons
 - ◆ Services & Contractors Promised Higher Unit Procurement Costs Would Be **Offset** by Lower Operating Costs. (F-15 versus F-4)
 - ◆ Made Long Term Cost of Bow Wave Look Affordable by Using Learning Curves to Predict Sharp Declines in Future Unit Costs of New Weapons (e. g., F-15 & F-16)
- ✓ Assumed Future Proc Would Grow by **34%**, IF We Hold O&M Growth to Only 8%

Cold War

● Before Post-War Draw Down

- ✓ Modernized Force W/Higher-Cost Wpns.
 - ◆ E.g., F-15, F-16, A-10 Replaced F-4 & A-7.
 - ◆ But Left Force With Higher O&M\$/FH.

● Pattern of Post-War Cutbacks

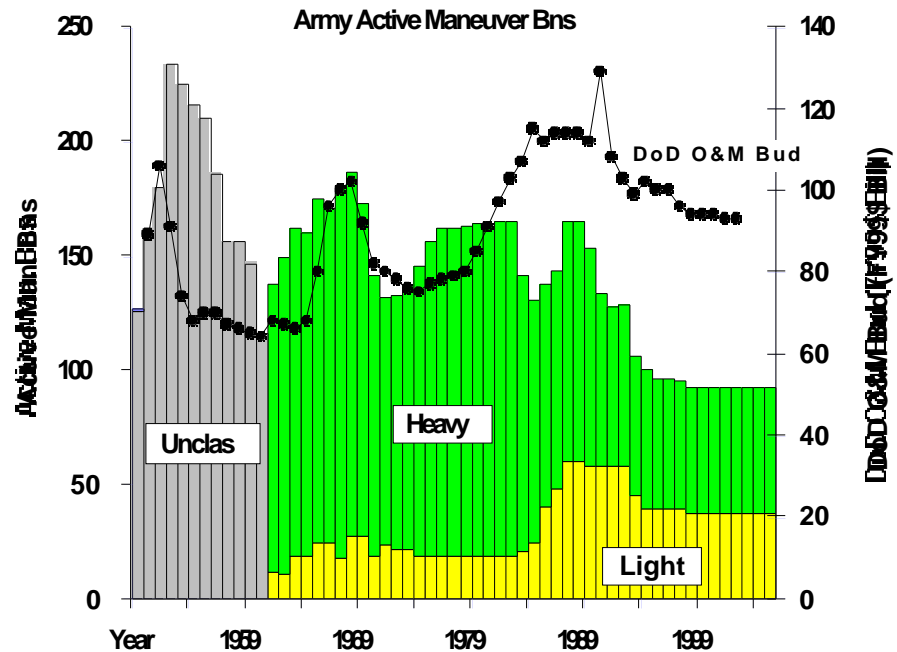
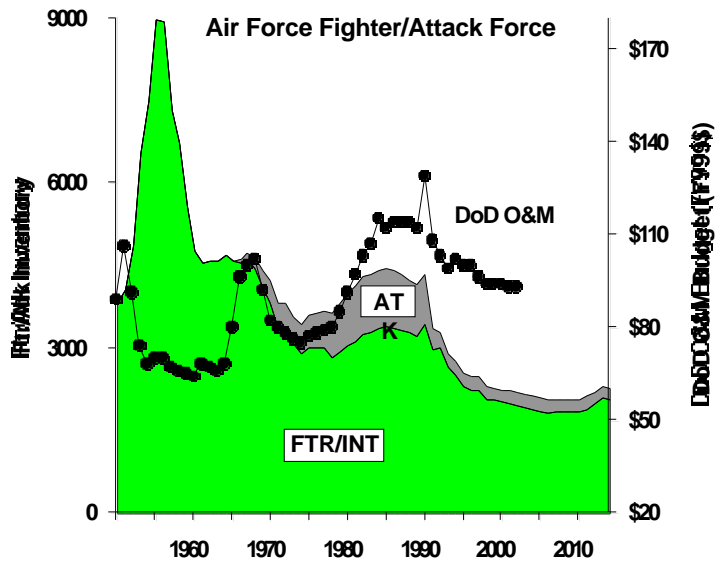
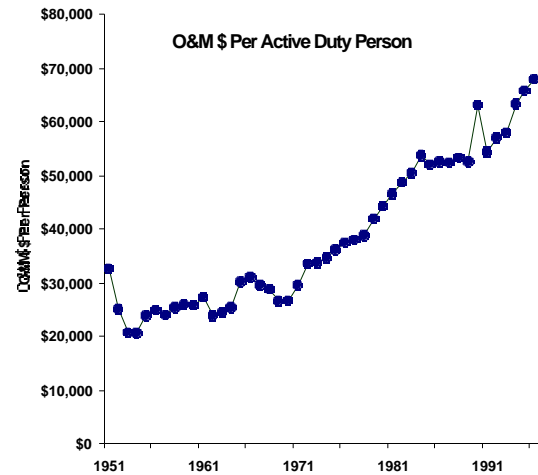
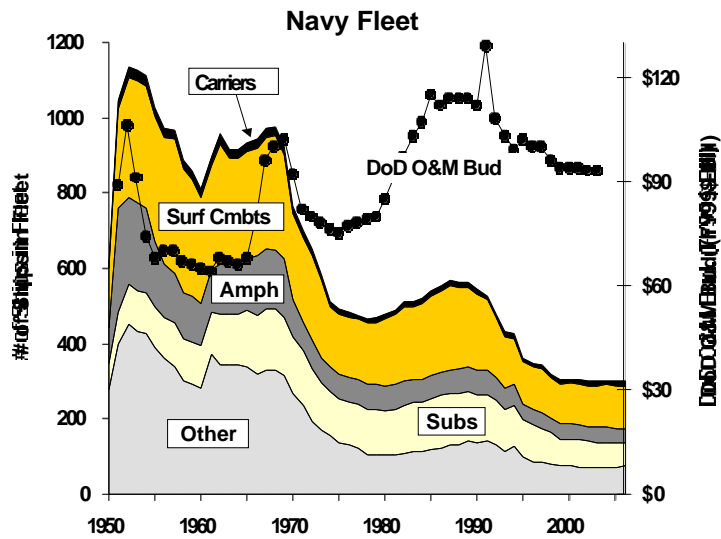
- ✓ Shrunk Forces to Cut O&M by 17% .
 - ◆ But Rising Cost of Opns Limited Size of Cutback.
 - ◆ So, Had to Cut Readiness, Despite Policy to Protect It.
- ✓ Slashed Procurement by 65%
 - ◆ End of a Modernization Cycle Made Cuts Easier
 - ◆ Pacified Arms Industry w/FMS (Saudi Arabia)

● Mushrooming Proc. Bow Wave (FY98-03)

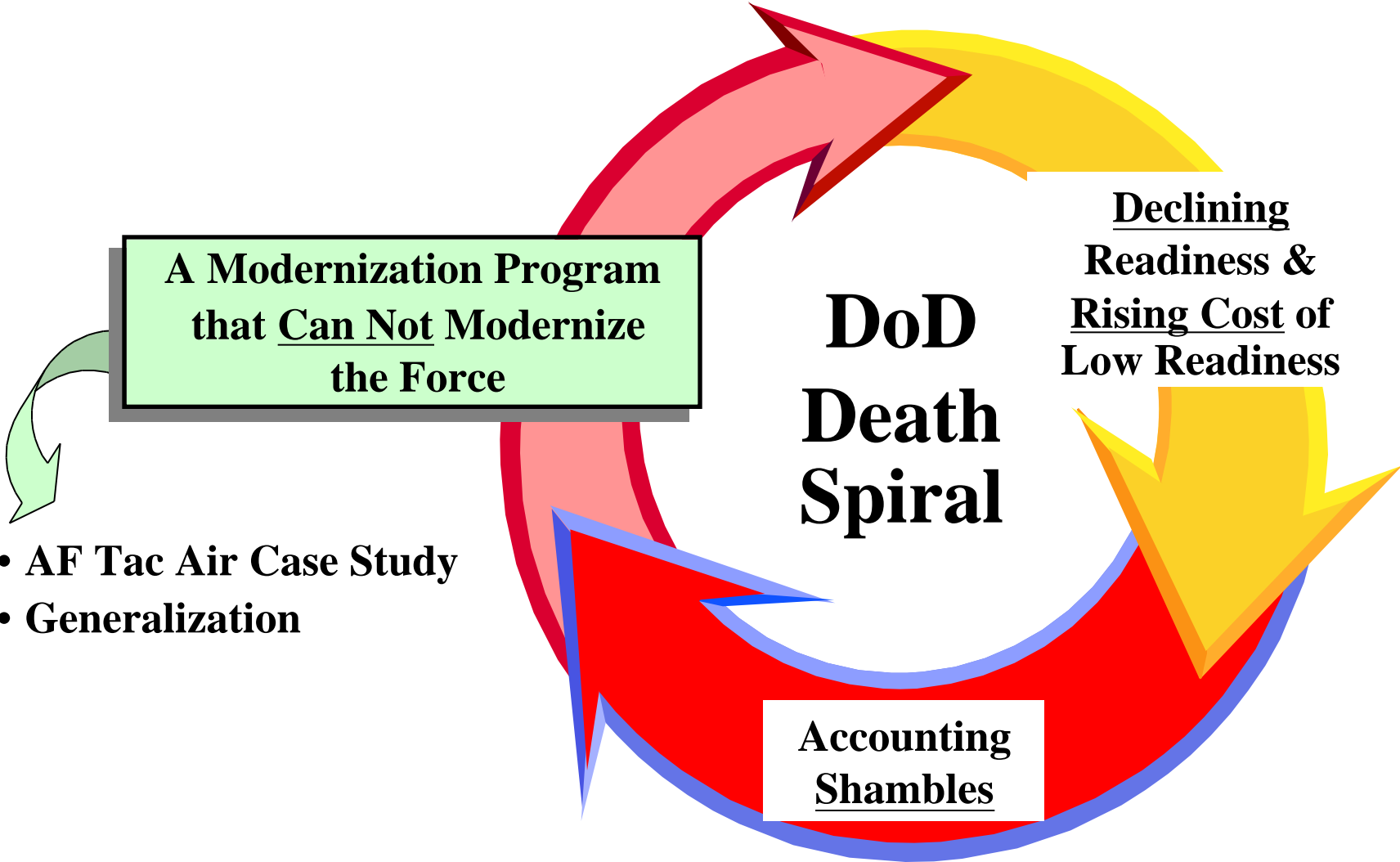
- ✓ Began R&D of Next Generation Weapons
 - ◆ Services & Contractors Promised Higher Unit Procurement Costs Would Be **Offset** by Lower Operating Costs. (F-22 versus F-15)
 - ◆ Made Long Term Cost of Bow Wave Look Affordable by Using Learning Curves to Predict Sharp Declines in Future Unit Costs of New Weapons (e. g., F-15 & F-16)
- ✓ Assumed Future Proc Would Grow by **41%**, IF We Can Hold O&M Growth to Only 8%

**Rising Cost of Low Readiness
Collides With Mushrooming Modernization Budget.**

Which is Why DoD Has Readiness Problems, Even Though Total O&M Spending Has Remained High on a Per Unit Basis

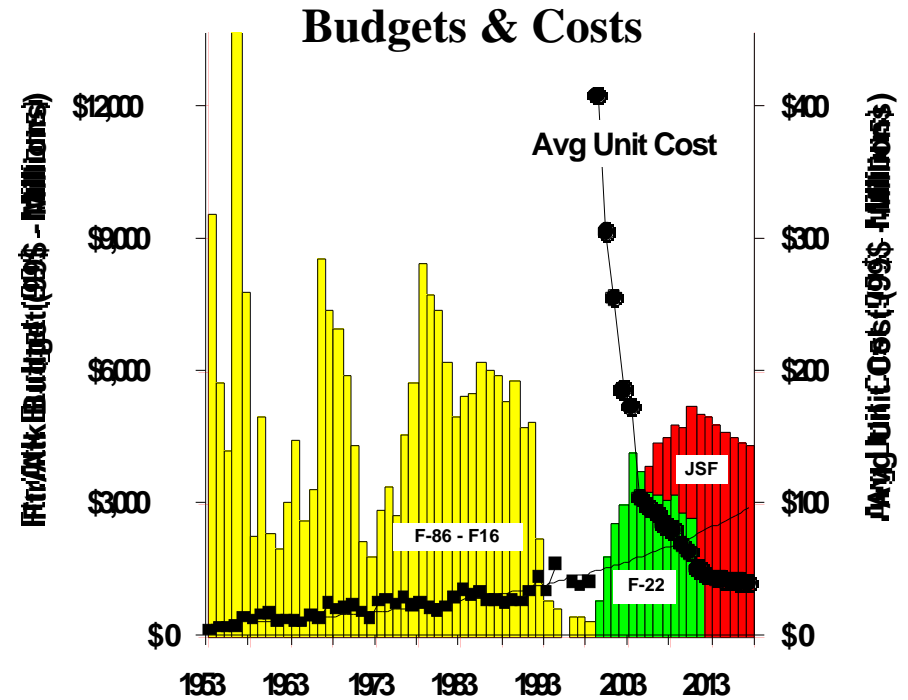
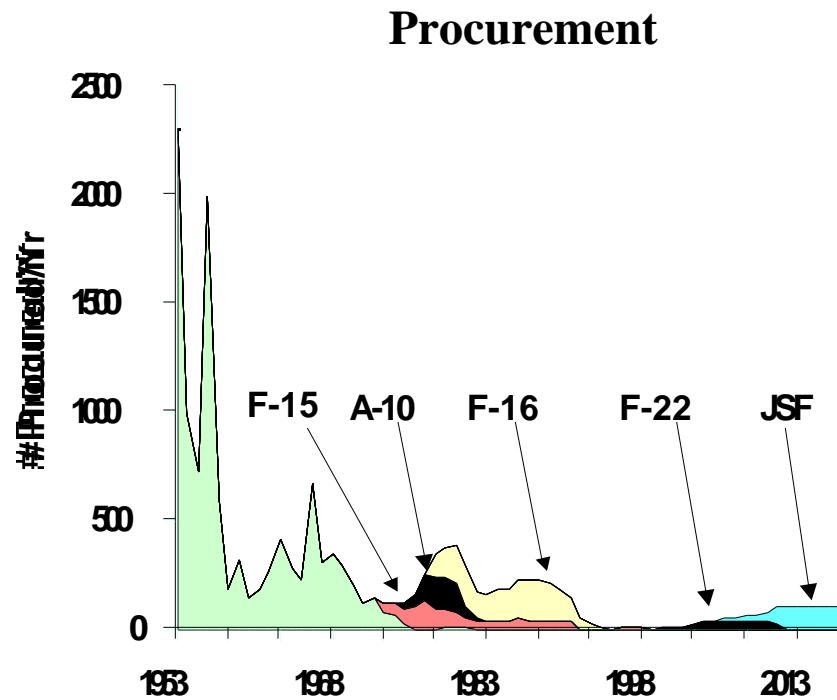


Modernization



Air Force Tac Air Modernization (1953-2017)

FY 1999-2003 FYDP & FY 2004-2017 Plan



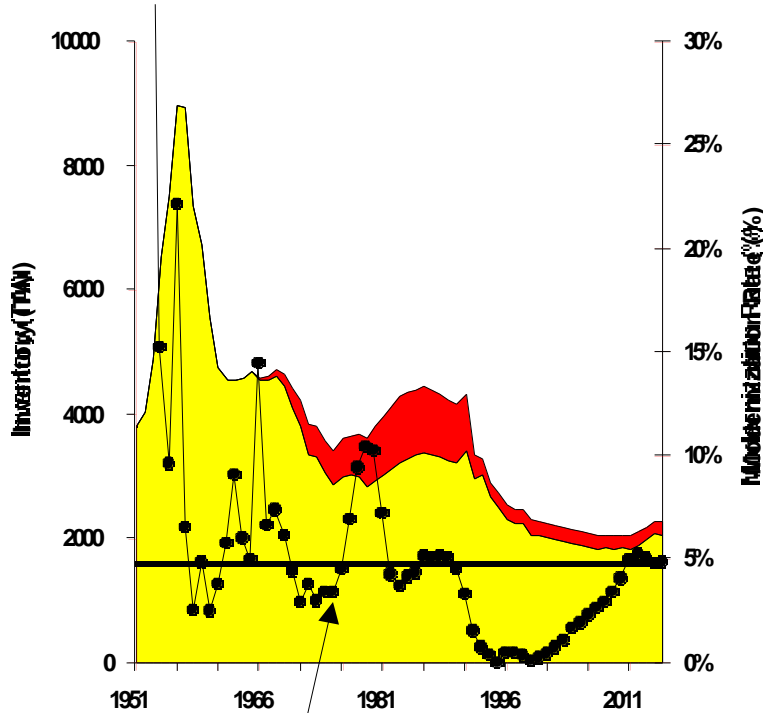
Key Points:

- Costs Grow *Faster* than Budgets.
- Budget Bow Wave *Not Matched* by Commensurate Production Increase.
- Plan Assumes *Future Costs Will Plummet By 96%* - From \$407 to \$39 Million

Air Force Tac Air Modernization (1953-2017)

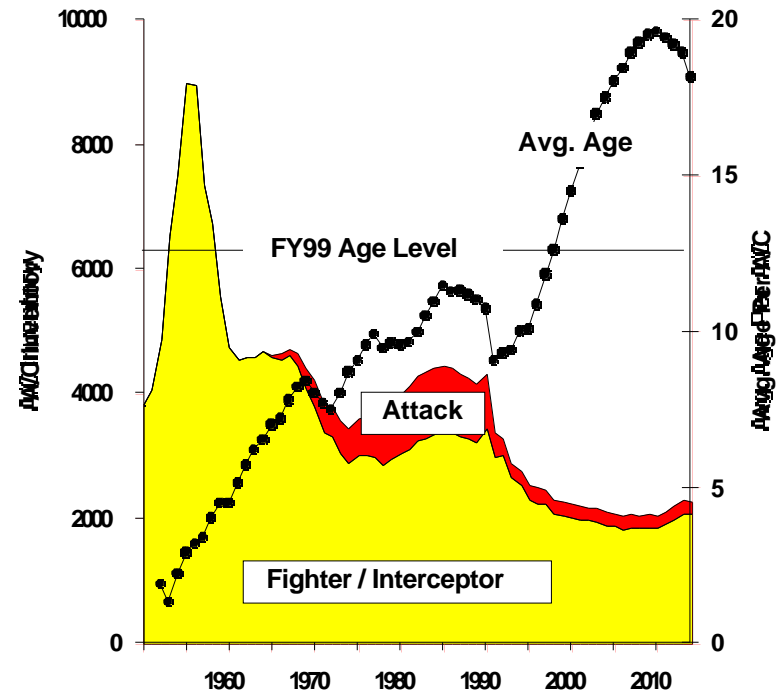
FY 1999-2003 FYDP & FY 2004-2017 Plan

Inventory & Modernization



Modernization Rate (%) = Proc. Qty / Inventory

Inventory & Average Age



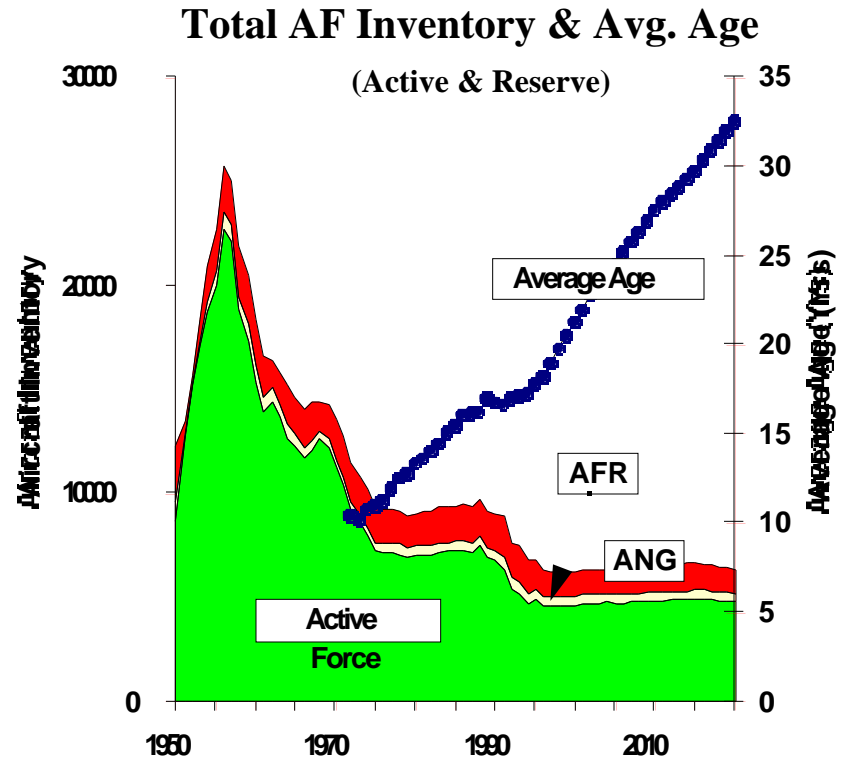
When Costs Grow Faster than Budgets - Then,


- Shrinking Forces Get Modernized at *Slower Rates*
- Smaller Inventories *Get Older* on Average
- Despite Large Future Budgets, the Growth of Average Age Will Explode.


**A Perfectly Executed Modernization Program
WILL NOT Modernize the Force!**


Generalization
An Aging Air Force:

- **Smaller**
- **Older**
- *No Light @ End of Tunnel*



 **Current Distribution**

 **Better**




 **Older (Worse)**

Age Distribution	1999	2003	2015
Tac Air - % > 19 Yrs	17%	38%	58%
Airlift - % > 21 Yrs	60%	55%	64%
Tanker - % > 45 Yrs	0%	10%	80%
Bomber - % > 16 Yrs	45%	90%	100%

**A Perfectly Executed Modernization Program
WILL NOT Modernize the Force!**

Aging Forces

- **Smaller**
- **Older**
- **No Light @ End of Tunnel**
 - ✓ Except Army Med Truck
 - ✓ Except Navy Tac Air (2015)
 - ✓ Except USMC Helo/Armor in Far Outyears (2015)

-  **Current Distribution**
-  **Better**
-  **Older (Worse)**

Army			
Age Distribution	1999	2003	2015
Helicopters - % > 22 Yrs	40%	50%	80%
Tanks/IFVs - % > 13 Yrs	1%	25%	62%
155mm SP - % > 13 Yrs	0%	0%	52%
Med Trucks - % > 13 Yrs	65%	58%	30%

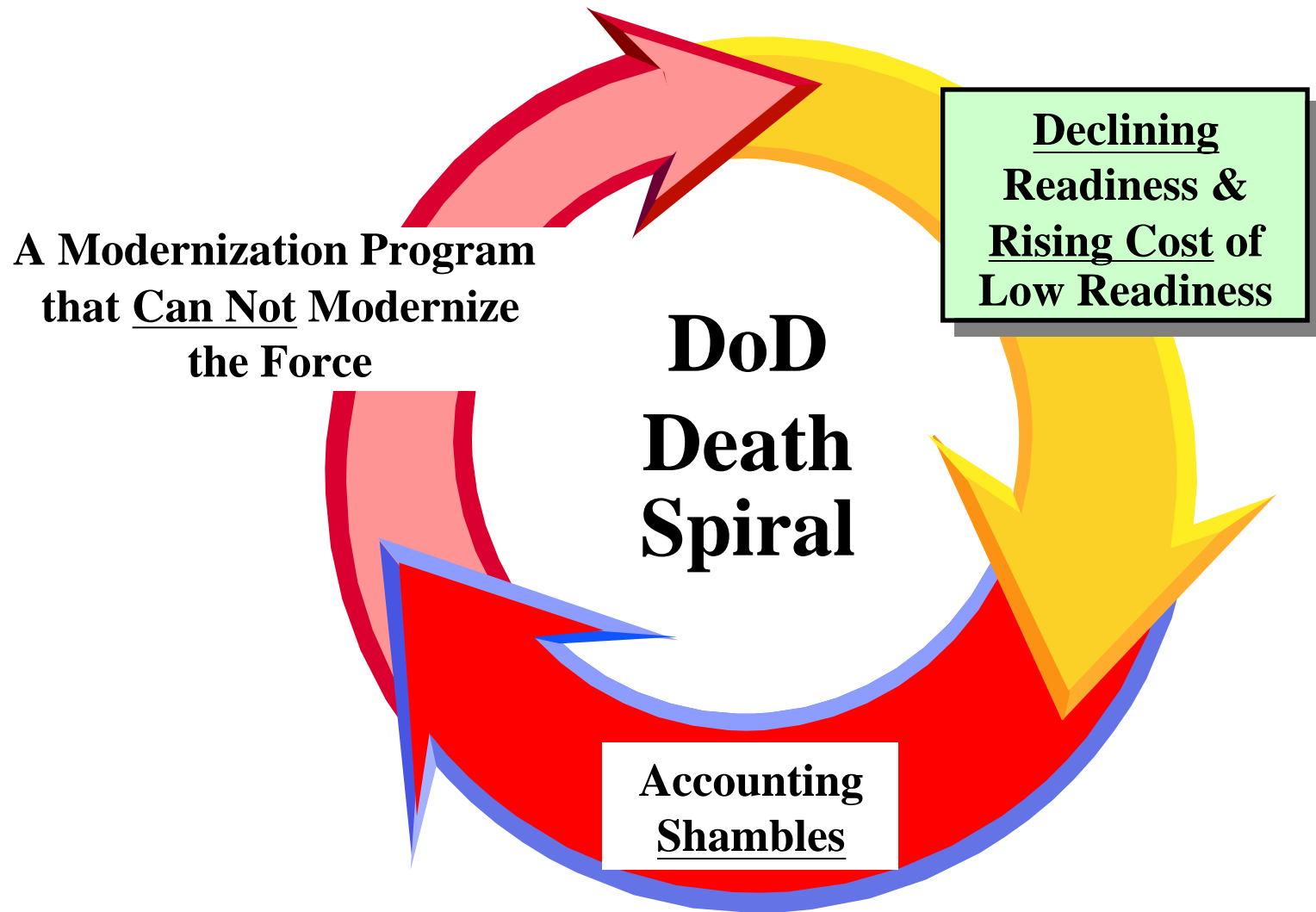
Navy / Marine			
Age Distribution	1999	2003	2015
Surface Cmbts - % > 19 Yrs	20%	39%	52%
SSNs - % > 17 Yrs	25%	38%	67%
Amphibs - % > 19 Yrs	52%	48%	58%
Navy/MC Tac Air - % > 13 Yrs	35%	58%	25%
USMC Helo - % > 15 Yrs	67%	72%	20%
USMC Armor - % > 17 Yrs	73%	100%	60%

**What Does the Global Aging Phenomenon
Mean for the Future?**

Aging Equipment Drives Up Operating Costs

Let's Examine Operating Costs ... and the ...
Rising Cost of Low Readiness

Readiness

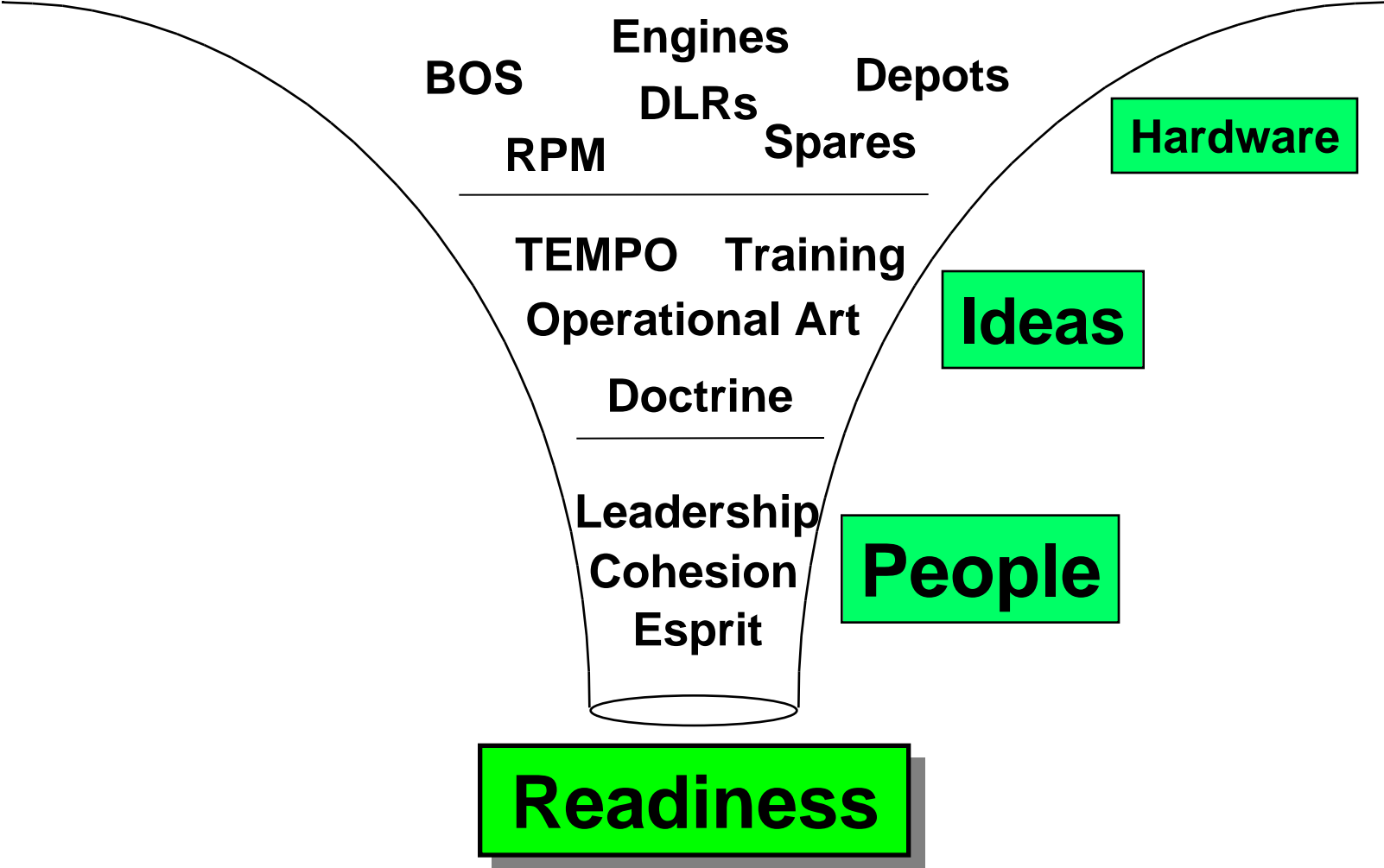


Ingredients of Operational Excellence: People - Ideas - Hardware

Modernization

Force Structure

Funding



Email from the Troops

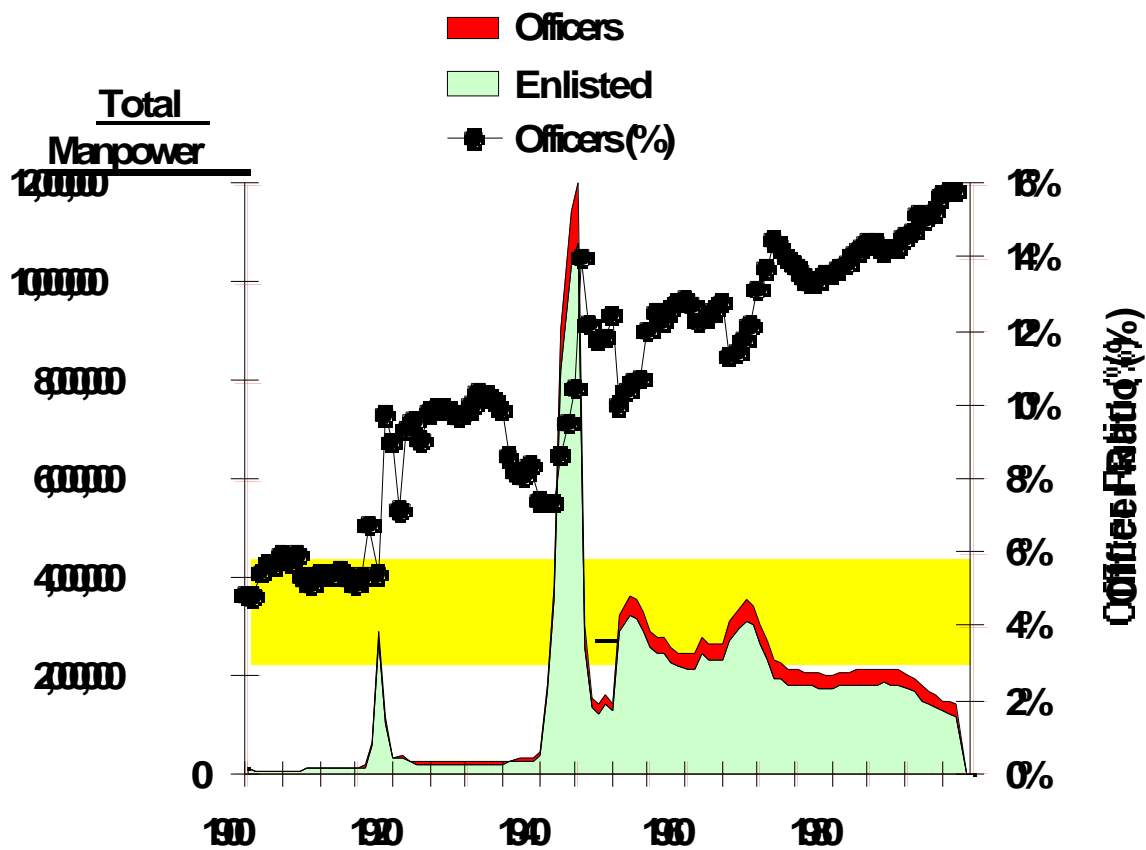
Hardware

- **Aging Systems => Increased Workload**
 - ✓ Fatigue/Corrosion/Parts Obsolescence => More Work Arounds, Longer Hours, Longer Repair Times
- **Parts Shortages**
 - ✓ Rising Rates of Cannibalization => Increased Workload & Longer Hours
 - ✓ High Value Items (Engines/Electronics)
- **Technical Orders Need Help**
- **Rising Depot Backlogs & Deteriorating Facilities**
- **Training Cutbacks**

Ideas & People

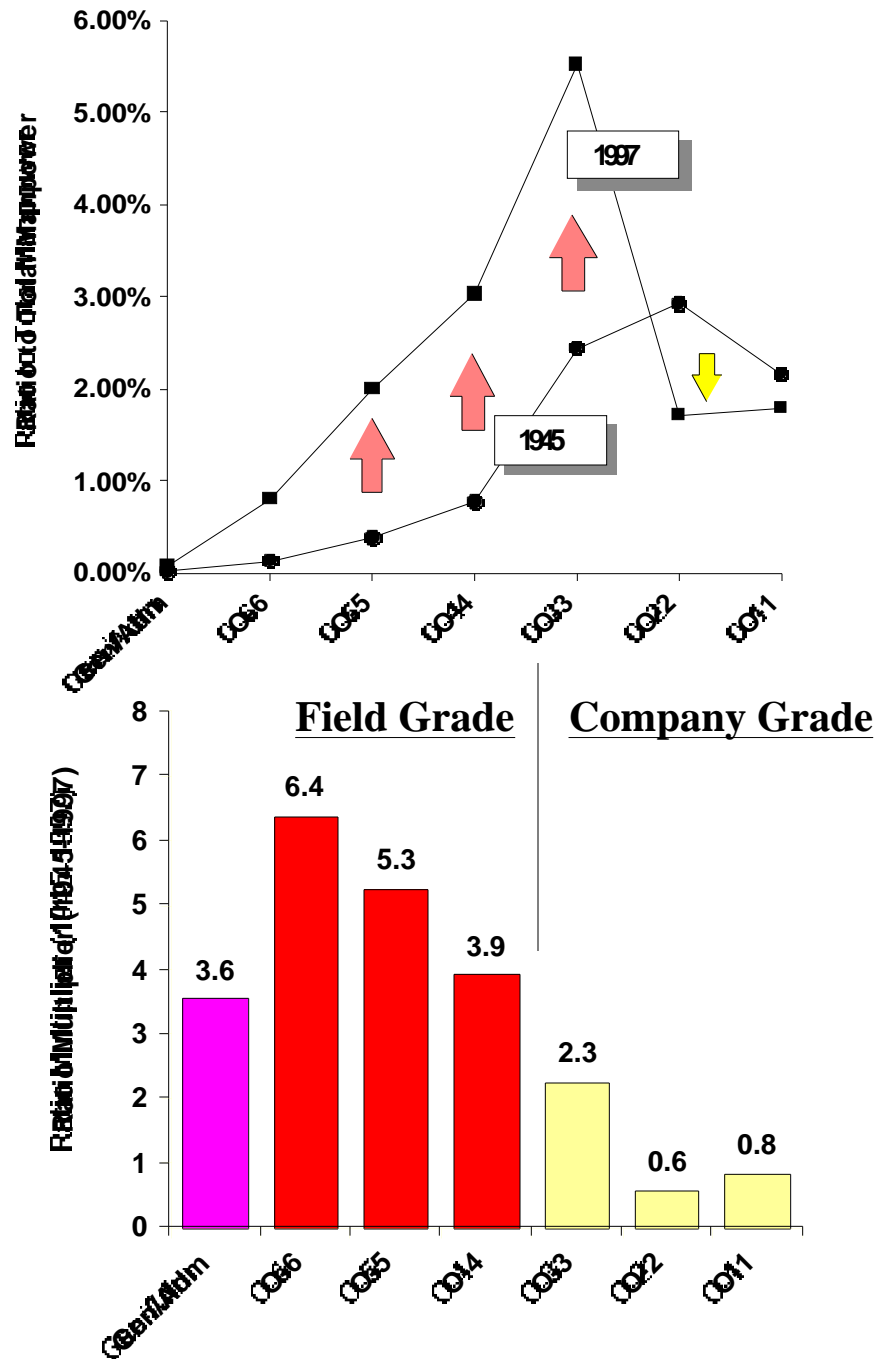
- ✓ Budget Cuts Decrease Realistic Training Opportunities
 - ✓ Peacetime Presence => Method & Routine In Place of Training Variety & Realism
 - ✓ Rising Operating Costs Decrease Training Per Dollar Spent
- **Difficult to Maintain/Retain Trained People**
 - ✓ Declining Retention Rates => Decreasing Experience Levels
 - ✓ Understrength Units & Shortfalls in Critical Skills
 - ✓ Growing Gap in Post-Command Army/AF Colonels & Navy Captains
- **Heavy Overseas Optempo Putting Stress on People & Families**
- **Spreading Breakdown of Trust Between Senior Officers & Junior Officers/Enlisted Ranks**

The Growing Officer Surplus



Historical Percentages (Ground Forces Only):
Roman - German - Israeli
 (100AD) (WWI&II) (1967)

Consequences



- **Officer Surplus**

- ✓ Combat Forces Reduced by 40%-50% Since Mid-80s
- ✓ Decreased Opportunity for Command
- ✓ Short Command Tours Decreasing Command Experience

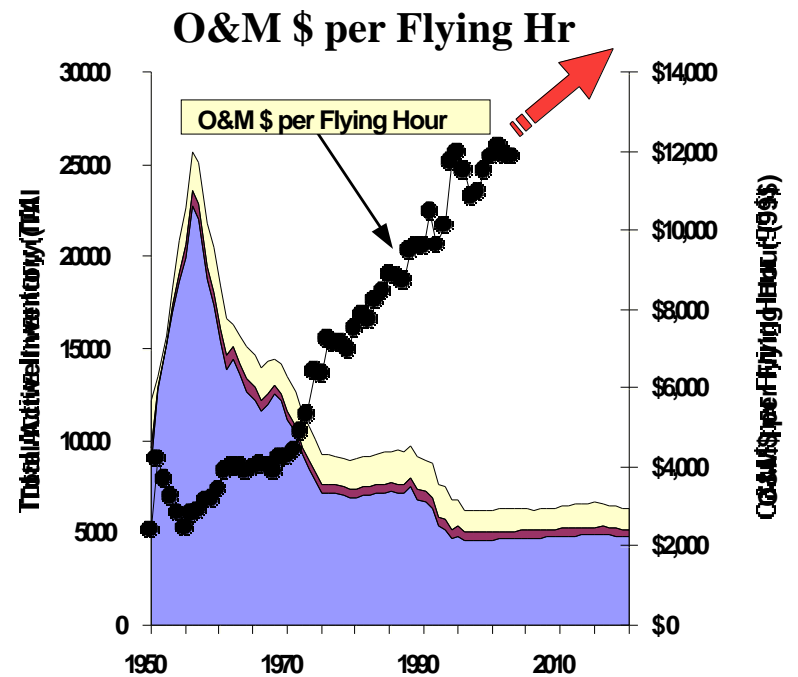
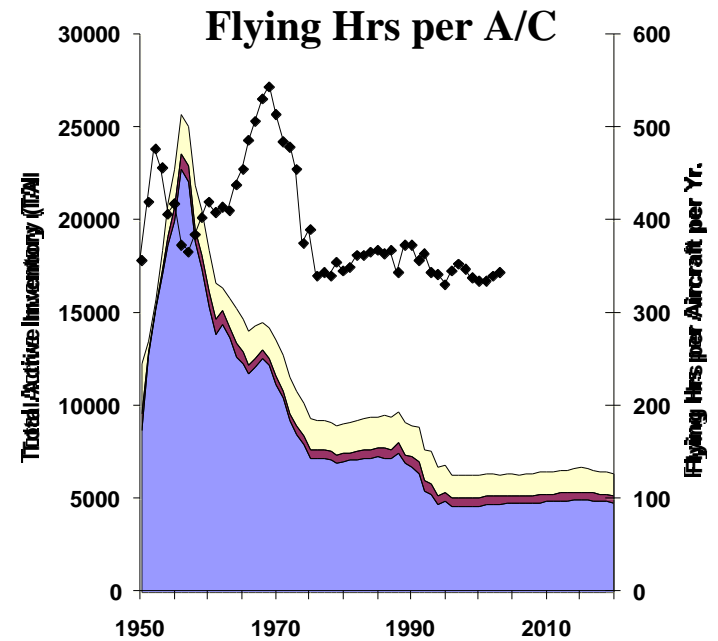
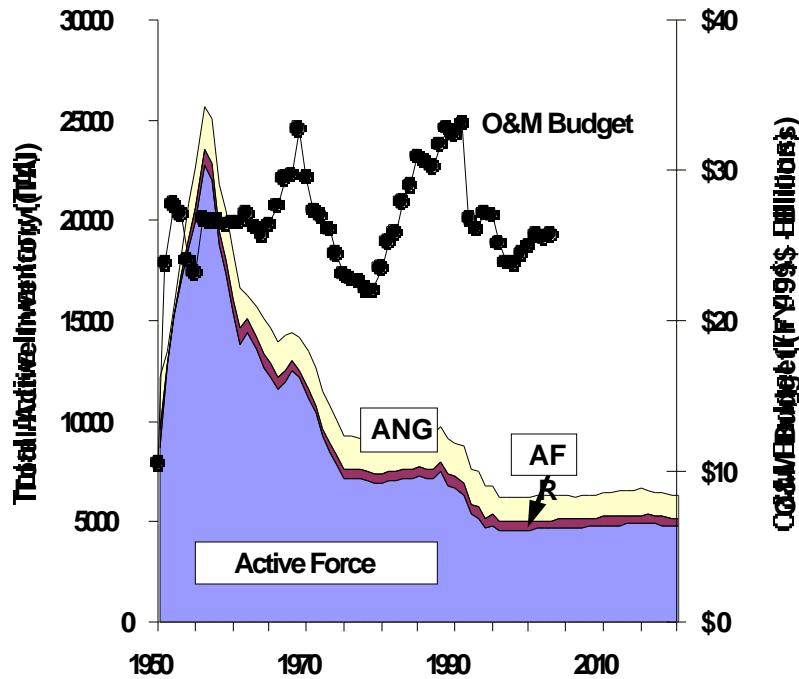
- **Excessive Bureaucratization**

- ✓ Total Personnel Reduced by About 33% Since Mid-80s
- ✓ But Hq Staffs Reduced by About 15%
- ✓ Field-Grade Glut Moves Decisions Up Chain of Command
- ✓ Increasing Centralization

- **“Up or Out” Promotion System**

- ✓ Risk Avoiding (“Zero Defects”) Mentality
- ✓ Careerism and Ticket Punching
- ✓ Little Time for Mentoring & Development of Subordinates

Rising Cost of Low Readiness Air Force Operations vs. Spending (1950 -2003)



Observations

- Forces Shrank *Faster* than the O&M Budget
- O&M \$ per FH *Increased Sharply*
- While Activity Levels Remained Relatively *Constant*.

Implication:

Operating Costs Are Growing *Faster* than Budget
(Like Procurement Costs)

Suspicion:

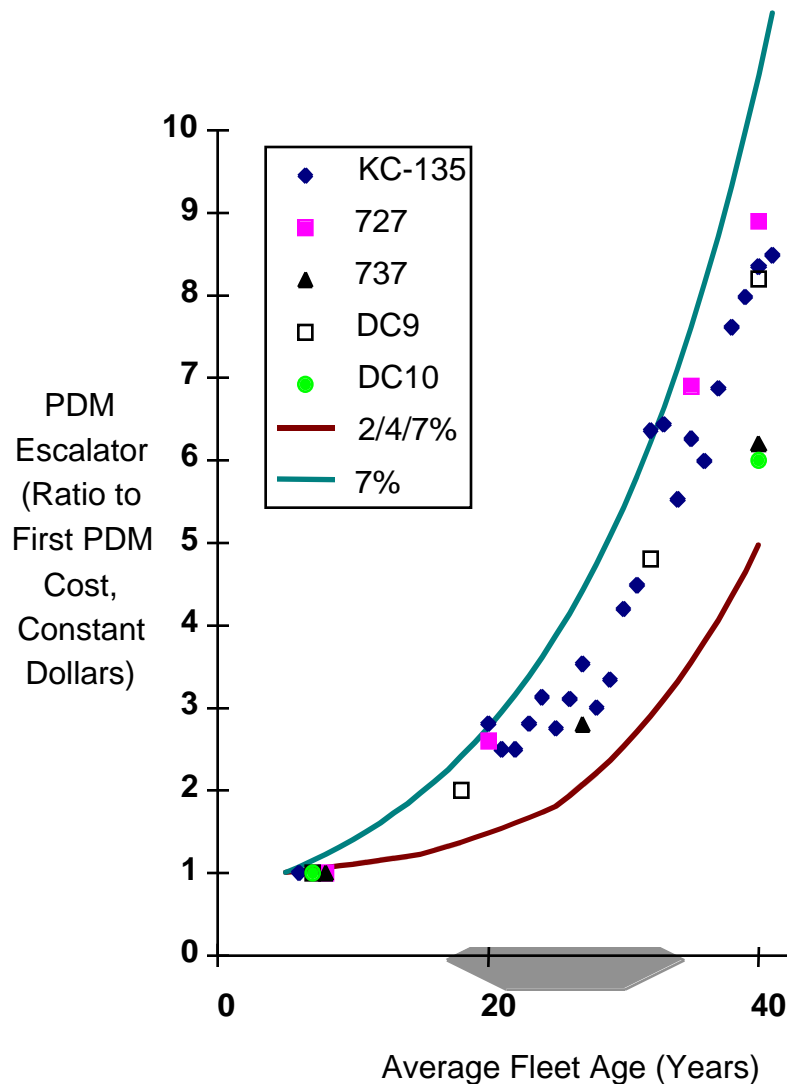
There is More to the Skyrocketing Ratio of O&M\$ per Flying Hr. than Just Aging Hardware.

Mutually
Reinforcing Effects

- **Effect of Aging Equipment**
 - ✓ Cost Growth
- **Effect of Increasing Complexity of Weapons**
 - ✓ Cost Growth
 - ✓ Growing Infrastructure Dependence
 - ✓ Shift of Maintenance Away from Operating Activity
- **Growing Infrastructure Inefficiencies**
 - ✓ Increasing Capital Intensity of Support Base
 - ✓ Forces Shrink Faster than Bases

Direct Effect of Aging:

Effect of Aging on Depot Maintenance (PDM) on Large Jet Transports



Cost Drivers:

- Stress degradation
 - ✓ Fatigue, thermal cycles
- Corrosion & material degradation
 - ✓ Airframes, subsystems, avionics & propulsion
- Parts Obsolescence
 - ✓ “Bit & Pieces,” major components, avionics systems
- Capability Mods to Upgrade Older A/C

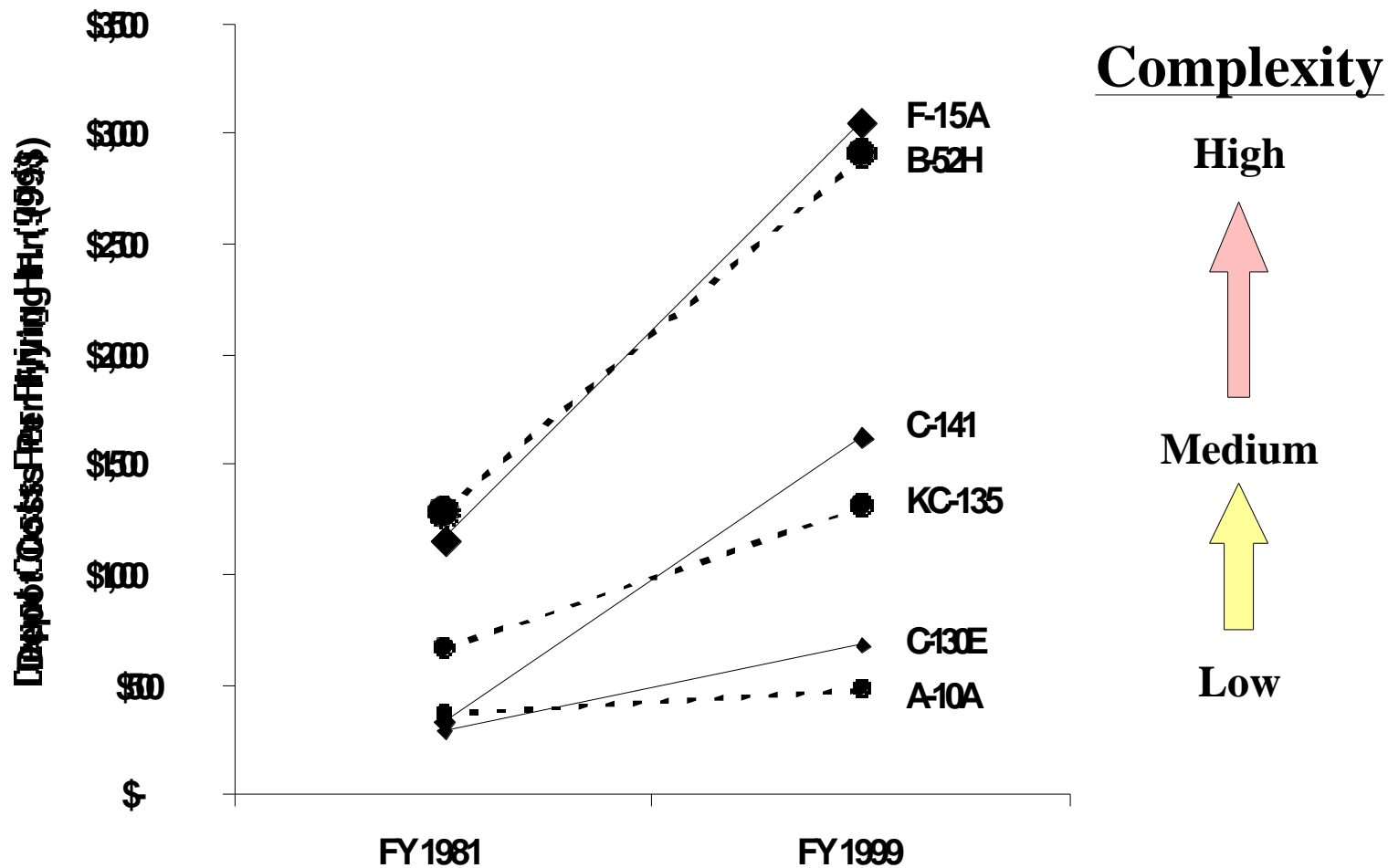
Readiness Degraders:

- More frequent failures
 - ✓ Longer repair times
 - ✓ Increased Cann Rates
 - ✓ Higher workloads
 - ✓ = Lower Mission Capable Rates
- Shrinking Forces
 - ✓ Retirements w/o replacement to cut support costs

Bottom Line:

Less Training & Fewer Wpns for Combat

But Increasing Complexity Also Interacts with Increased Age to Drive Up Costs

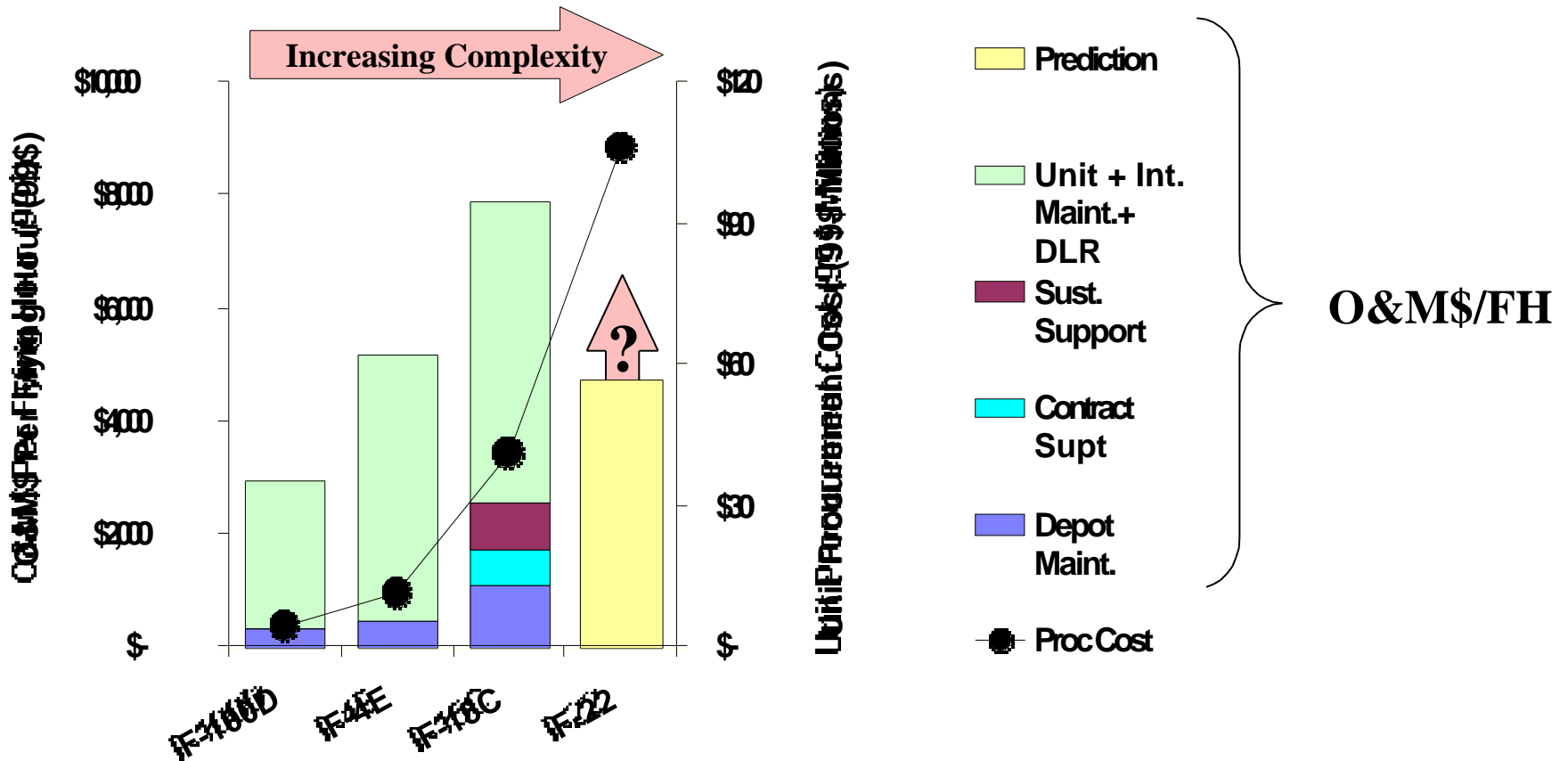


**Increasing Complexity *Magnifies* Effect of Age Growth on Operating Costs
E.g., Depot Costs Per Flying Hour**

**Moreover, Increasing Complexity *Increases Operating Costs,*
Notwithstanding Promises of Lower Operating Costs.**

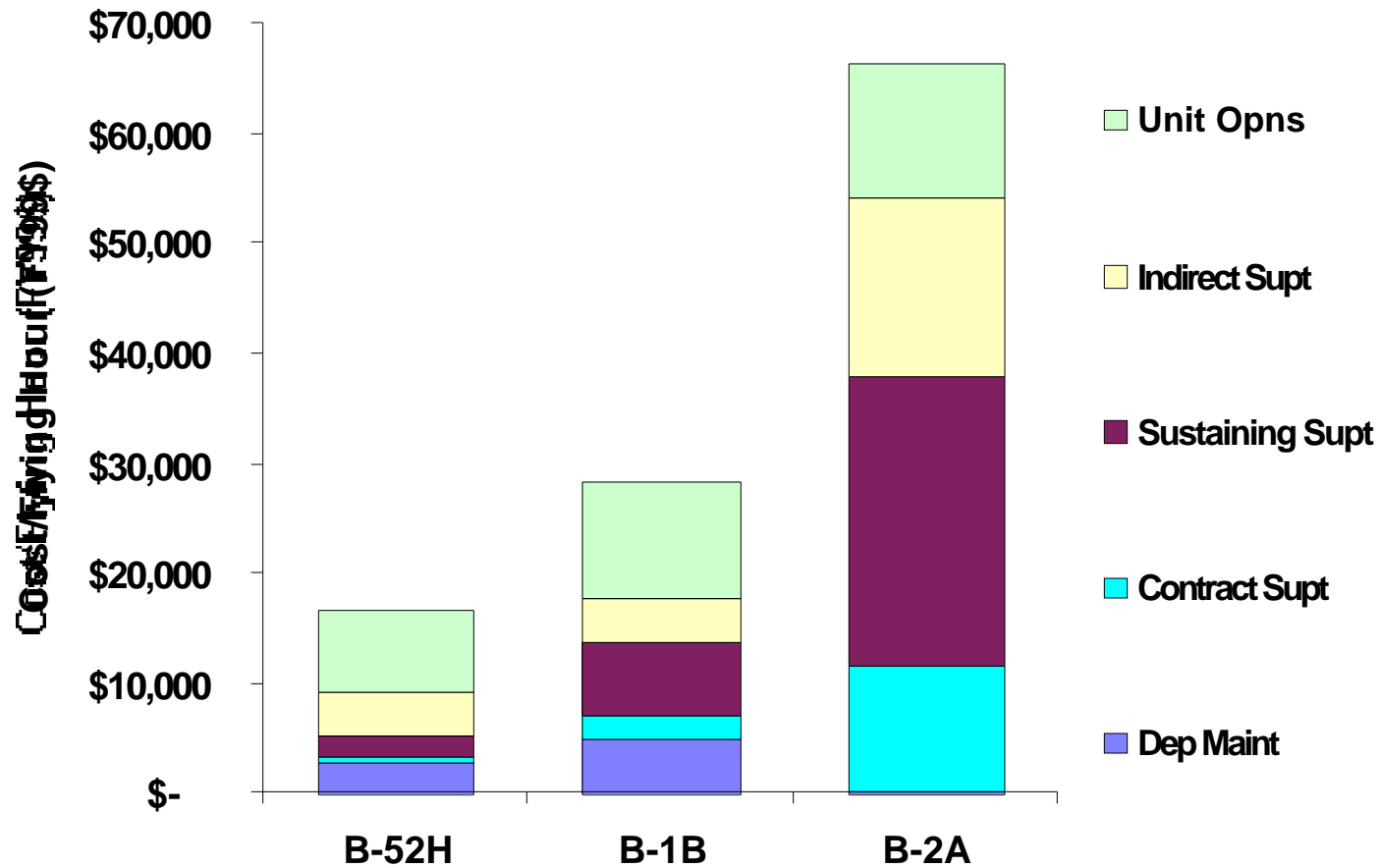
**In 1974, AF & McAir Said F-15 Would Be Easier and Cheaper to Operate & Maintain than F-4
Even though it Cost More than Twice as Much to Buy as the F-4**

The Same Promise is Now Being Made for F-22 Versus the F-15



Rising Cost of Low Readiness: AF Bombers

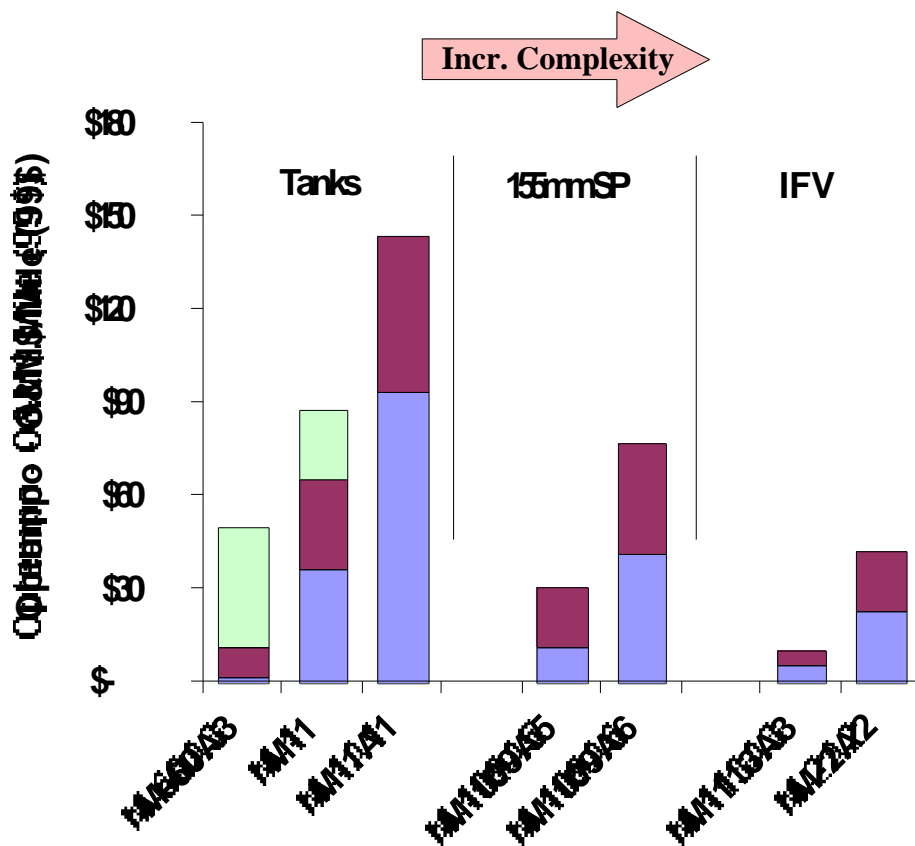
O&M Costs Per Flying Hour



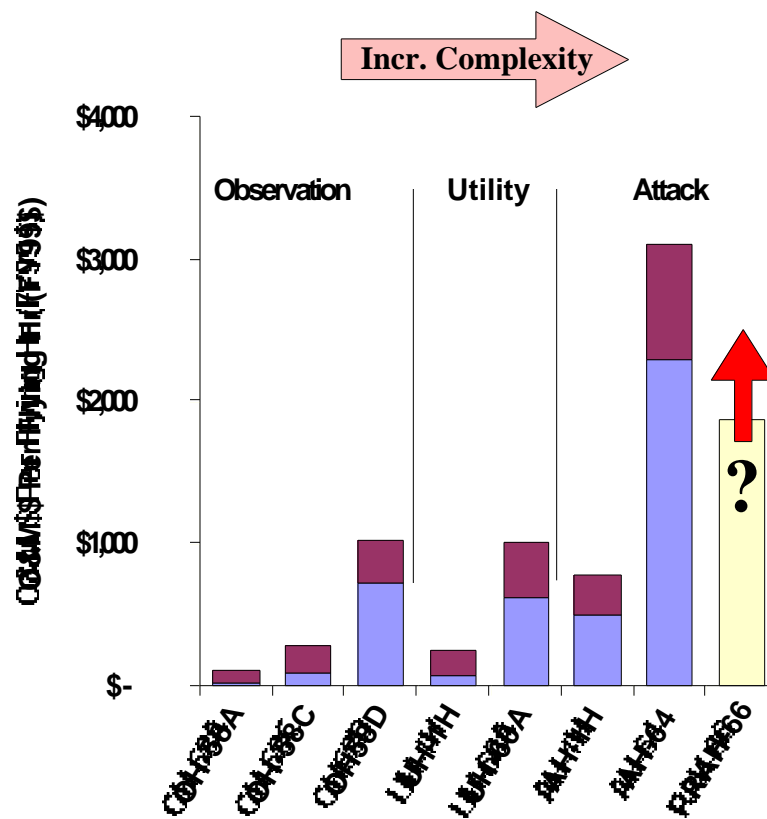
Increasing Complexity

Rising Cost of Low Readiness: Army

Tracked Combat Vehicles (O&M\$/Mile)



Helicopters (O&M\$/FH)

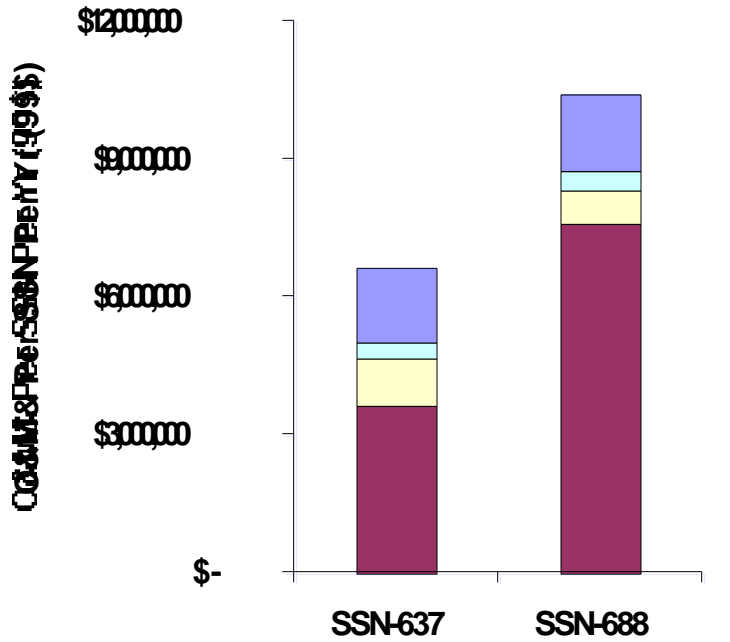


- Adj. For Transfer To ANG
- Unit/Int Level Maint.
- Depot Maint. + DLR

- Each New Generation of Weapons Costs More to Operate.
- Complex Technology Shifts Maint. Burden to Distant Depots, which Implies Increasing Dependence of Supply Sys. & Geographically Distributed Infrastructure.

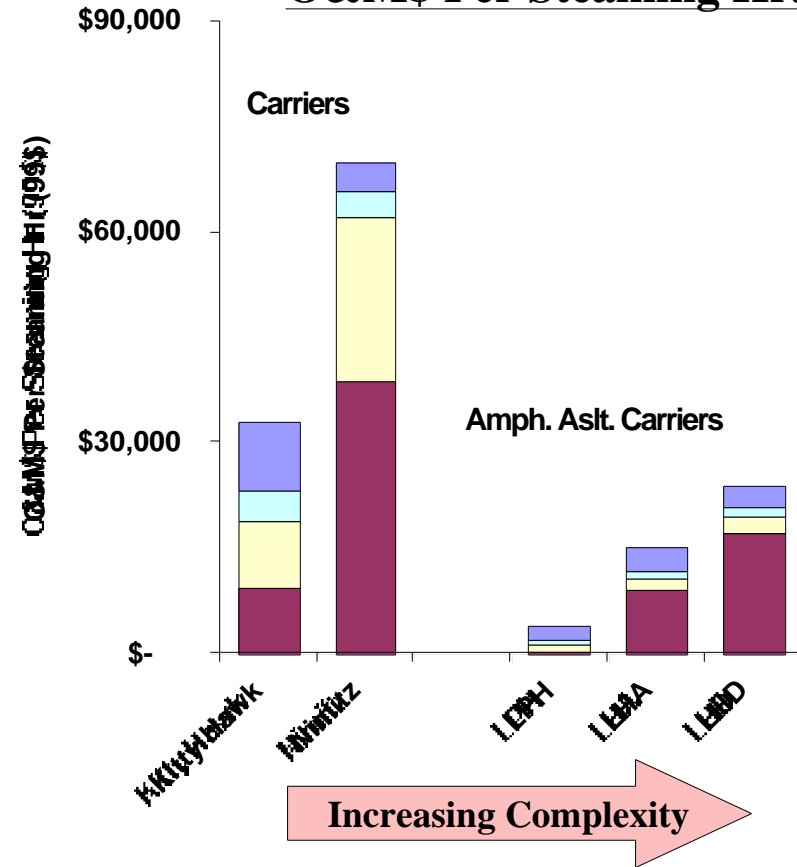
Rising Cost of Low Readiness: Navy Ships

O&M\$ Per SSN Per Yr.



Increasing Complexity →

O&M\$ Per Steaming Hr.

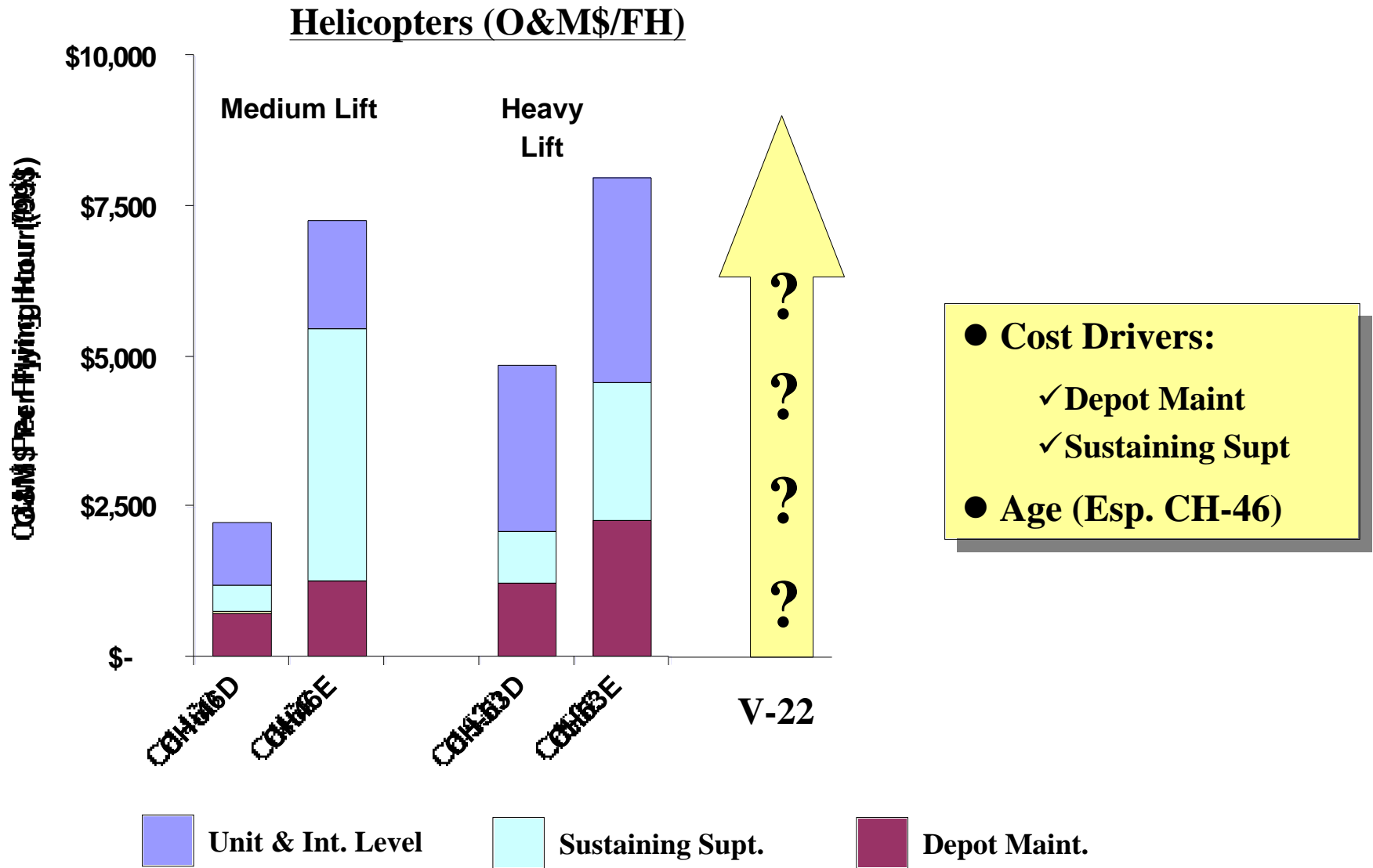


Increasing Complexity →

- Unit & Int. Level
- Contract Supt
- Indirect Supt.
- Depot Maint.

Cost Drivers:
Depot Maint. & Contract Supt.

Rising Cost of Low Readiness: Marine Helos

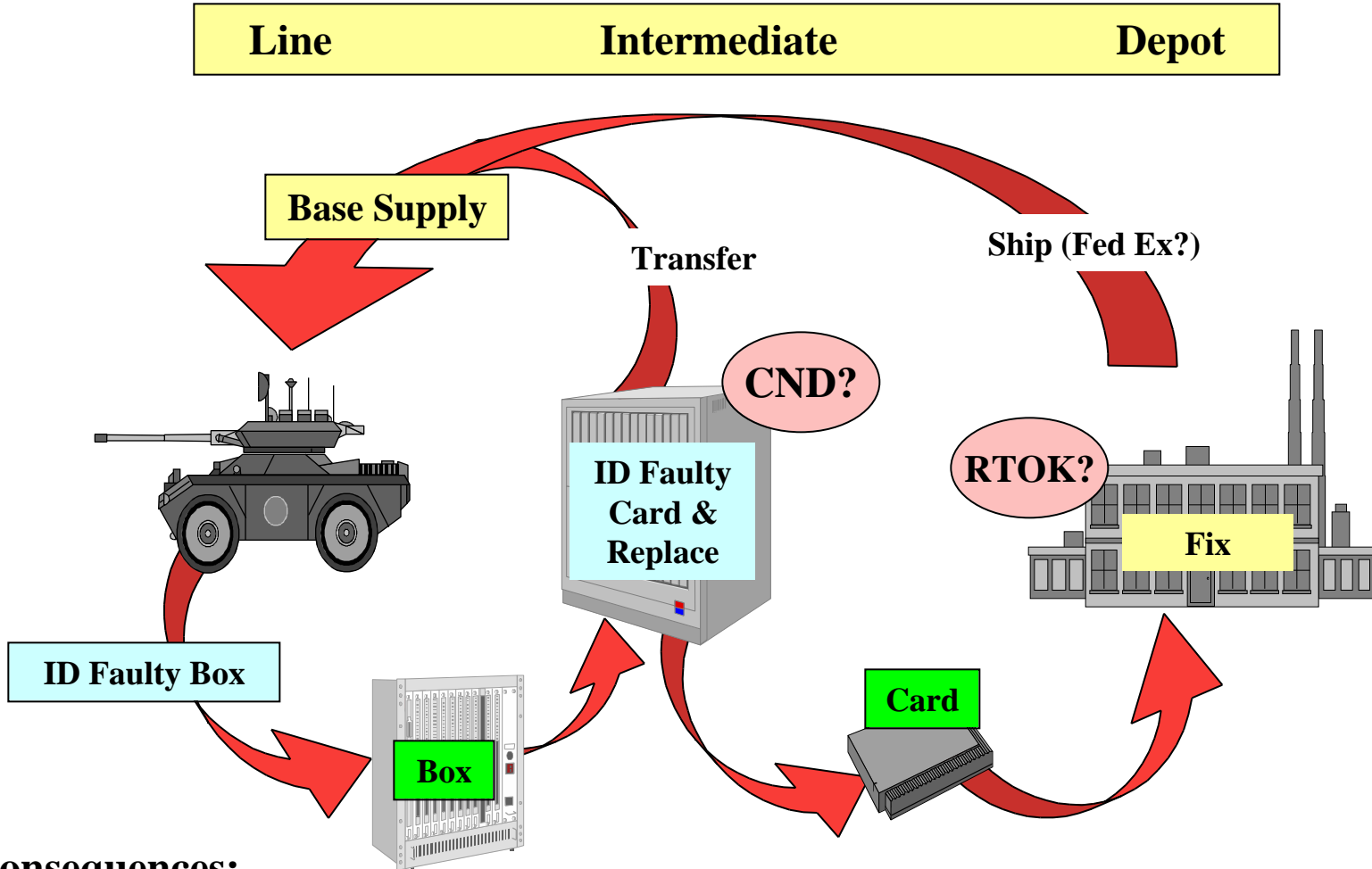


Age and Complexity

- Increasing Age Drives up Operating Costs
 - ✓ Age Growth is a Consequence of Growth in Unit Procurement Costs
 - ◆ Procurement Costs Increase Faster than Budgets
 - ◆ Production Rates Decrease Sharply
 - ◆ Decreasing Replacement Rates Cause Force Structure to Shrink and Age.
- Increasing Complexity Drives Up Operating Costs
 - ✓ Promises of Lower Life Cycle Costs Have Not Materialized.
 - ◆ Operating Costs Also Appear to Be Growing Faster than the Budget
 - ✓ Sources of Complexity-Induced Cost Growth
 - ◆ Growth of Unit Level Costs Has Been Relatively Modest.
 - ◆ Cost Drivers Relate to Maint. & Supt Activities that have been Displaced in Time & Space From the Point of Operational Activity:
 - Depot Level Repairables (Direct) & Depot Maintenance (Indirect)
 - Contract Support
 - Sustaining Support
 - ✓ Increasing Complexity Magnifies Rate of Age-Induced Cost Growth

**Displacement in Time & Space Raises Question:
How is Age-Complexity Conundrum Impact Support Infrastructure?**

Displacement of Maintenance in Time & Space



Consequences:

- Repairs Shifted to **Distant Depots**
- CND/RTOK Drives Up **Spares Inventory Cost**
- Increased Dependence on High **Skilled Labor & Contractor Support**
- Increased Dependence on **Computer Test Sets** (Which Must Also be Supported)
- Proliferating Variety/Quantity of High Value Items => **Increased Supply Mgt Cost (Overhead)**

Observation

**Since the Dawn of War as an Organized Activity,
the Goal of Forward Repair Has Been
the Cardinal Simplifying Principle
of Combat Logistics.**

**Yet, We Have Been Using Technology to Transfer More and More
Repairs to Distant Depots Deep in the Rear,**

... which ...

Increases Vulnerability & Drives Up Fixed Overhead Costs.

Indirect Consequence of Complexity-Induced Cost Growth

These Remove & Replace Maintenance Architectures Create Economies of Scale Favor Concentration of Weapons in Large Facilities

... But ...

**While Shrinking Forces Decreases Demand for Infrastructure,
But Political Pressures Make It Difficult to Close Bases.**

Result:

Chronic Excess Base & Excess Depot Capacities Drive Up Per Unit Operating Costs Even Further

Examples From Recent Draw Down:

- **Between 1989-2003, Navy Fleet Will Be Reduced by 46%, But Berthing Spaces Will Be Cut By Only 18%**
- **Between 1988 & 1996, Army Eliminated 3.7 Division in US, But Closed only 1 Divisional Base**
- **Between 1990 & 1996, AF Cut A/C Inventory by 43%, But Reduced Base Capacity by Less than 25% (See Next Slide for Example)**

(Base Load Factors FY90 vs 96)

Airbases	Load Factors				Airbases	Load Factors			
	Ramp Space X1000	FY90	FY96 POM	Chg		Ramp Space X1000	FY90	FY96 POM	Chg
Duke Field	1950	0%	21%	21%	Tinker	6740	39%	34%	-5%
Whiteman	5550	2%	11%	9%	Keesler	1610	40%	53%	13%
Patrick	2170	6%	0%	-6%	L u k e	3430	41%	35%	-6%
McClellan	7828	7%	0%	-7%	Little Rock	8695	45%	37%	-8%
Homestead	9999	8%	1%	-7%	Dyess	8465	53%	39%	-14%
MacDill	8406	8%	Closed		McChord	4634	63%	65%	2%
Bergstrom	3589	12%	3%	-9%	Altus	5760	66%	63%	-3%
Maxwell	3000	13%	13%	0%	Norton	5806	68%	Closed	
Mather	6965	15%	Closed		Eaker	3566	68%	Closed	
Elmendorf	6274	16%	25%	9%	GrandForks	3548	69%	68%	-1%
Eielson	5302	16%	12%	-4%	McGie	6921	69%	92%	23%
Morley	2759	18%	34%	16%	Kelly	4325	70%	64%	-6%
Anderson	7357	19%	Closed		Barksdale	8725	73%	36%	-37%
Selfridge	5513	20%	17%	-3%	Sey. Johnson	3379	74%	45%	-29%
Pease	9508	20%	Closed (ANG)		Fairchild	4977	75%	89%	14%
Shaw	4052	20%	17%	-3%	Charleston	5502	77%	122%	45%
Nellis	4785	21%	26%	5%	McConnell	3425	77%	109%	32%
Robbins	3397	21%	15%	-6%	Grissom	3982	78%	Closed	
Langley	5957	22%	11%	-11%	Castle	5924	80%	Closed	
Pope	10119	22%	17%	-5%	Beale	2858	81%	49%	-32%
Plattsburg	9528	24%	Closed		Doer	8139	83%	76%	-7%
George	4666	24%	Closed		Wurtsmith	3500	84%	Closed	
Minot	4850	24%	36%	12%	Griffiss	3493	84%	1%	-83%
England	3959	25%	Closed		Hubert	2600	95%	120%	25%
Holloman	5625	26%	16%	-10%	Wright-Pat.	5517	103%	28%	-75%
Tyndall	3001	26%	30%	4%	Minot	2800	115%	49%	-66%
March	9720	29%	26%	-3%	Travis	7967	117%	128%	11%
Scott	1851	32%	26%	-6%	Loring	2359	129%	Closed	
Offut	5862	34%	38%	4%	Hayden	2555	129%	1%	-128%
Malstrom	3181	36%	46%	10%	Westover	1715	158%	157%	-1%
Eglin	5709	37%	34%	-3%	Carswell	2337	171%	Closed (ANG)	
Cannon	3324	38%	27%	-11%	Davis-Mon.	1066	188%	170%	-18%

	FY90	FY96	Change
Total Ramp Space (X1000)	322076	244213	-77863
# of Bases closed			13
Average Load Factor	46%	41%	-5%

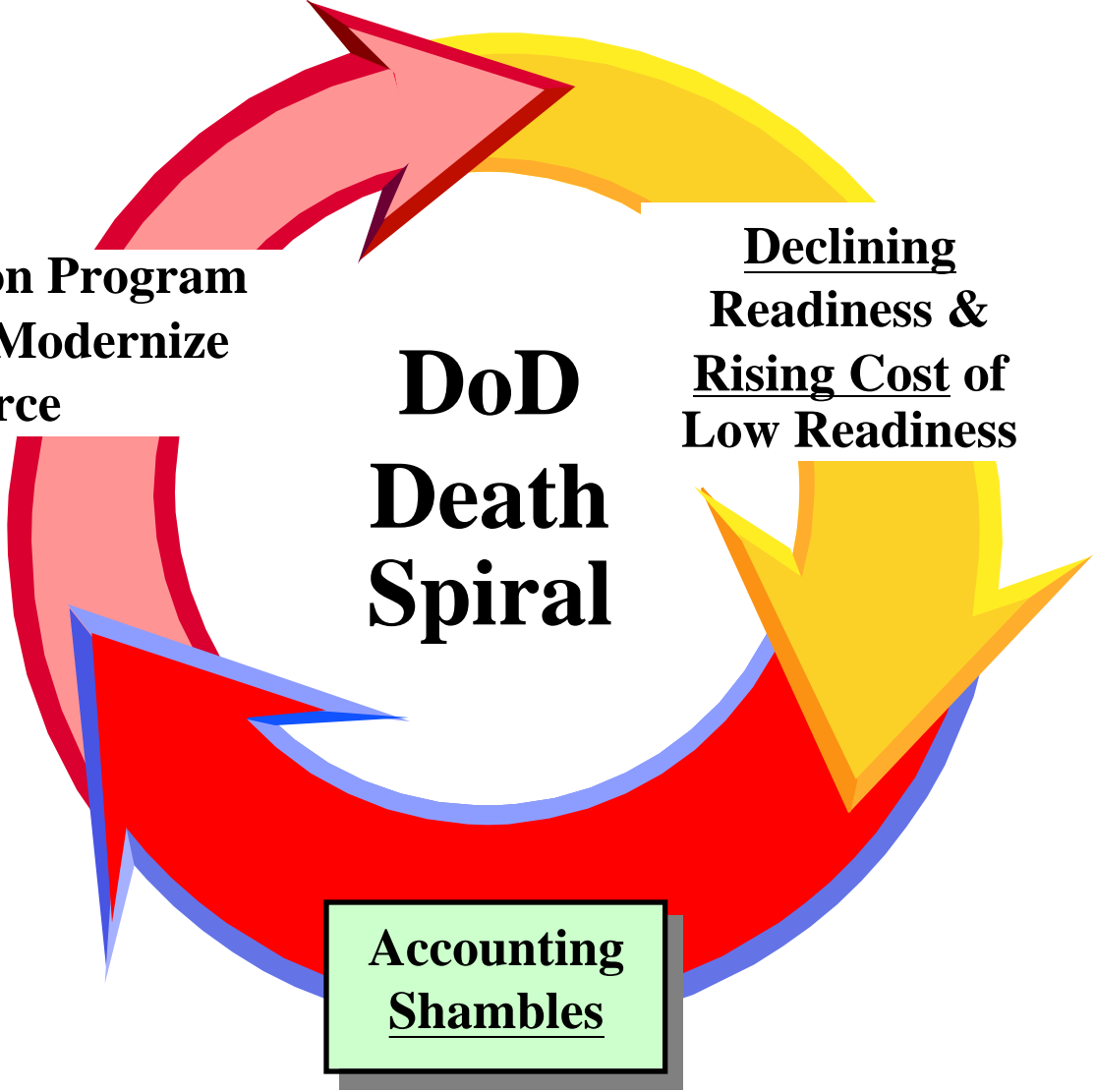
Accounting Shambles

A Modernization Program
that Can Not Modernize
the Force

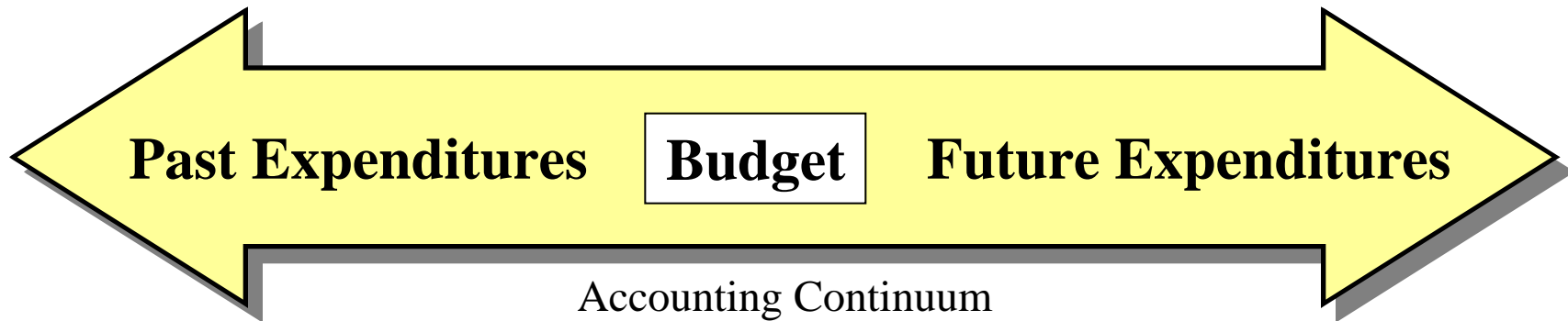
DoD
Death
Spiral

Declining
Readiness &
Rising Cost of
Low Readiness

Accounting
Shambles



DoD's Budget Shambles



Unauditable Books
Disclaimers of Opinion

Plans/Reality
Mismatch

Accounting Shambles

● Cannot Audit or Track Actual Expenditures

✓ Disclaimers of Opinion Issued By DoD/IG Because Acctg Deficiencies Prevented Audit

- ◆ 26 July 96 - Waived Audit of \$70-80 Billion DBOF
- ◆ 19 Nov 96 - Waived Audit of AF & Army General Fund Financial Statements for FY95
- ◆ 10 Ap 97 - Issued 3 Audits Outline Discrepancies in Army, N/MC, & AF Financial Statements for FY 96.
- ◆ 16 Ap 97 - Issued Disclaimers of Opinion on 15 of 16 DoD Accounts
 - E.g., DFAS Indianapolis Center made *\$350 billion of unsupported adjustments* to make the FY 1997 Army General Fund general ledger accounts (\$70 bill) match the corresponding status of appropriations data.

✓ IG's Reason DOD's lacks a double entry accounting system & failure to track expenses on the transaction level leads to billions of dollars in accounting errors, the IG reports.

✓ GAO Reports on Problem Disbursements

- ◆ 11 Jun 96 - Acctg Sys Could Not Link \$20-\$30 Billion to Items Money Purchased.
- ◆ 30 Ap 97 - Problem Disbursements Increased to \$43 Bill, DoD/Comptroller Objected Saying \$18 Bill Could Not Be Accounted For.

● Plans/Reality Mismatch

✓ Outyear Estimates Biased to Understate Future Consequences of Current Decisions. (*Anatomy of Decline* --- Calculations Validated by GAO)

Implications of Corrupt Accounting System

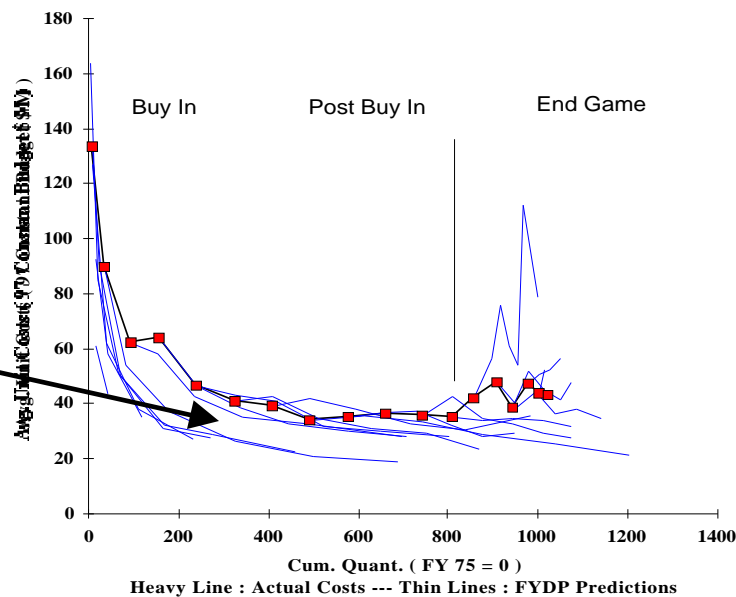
- **Impossible to Understand or Fix Readiness & Modernization Problems.**
- **Makes a *Mockery* of Democratic Governance & the Accountability Clause of the Constitution**

A Brief Introduction to the Plans/Reality Mismatch & Nature of Cost Overruns Front Loading the F-18A

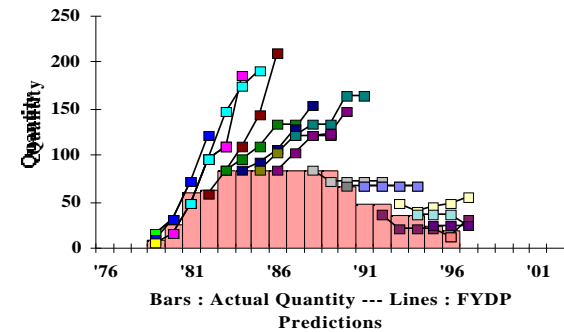
F/A-18ABCD HORNET (N)

(FYDP Predictions versus Reality)

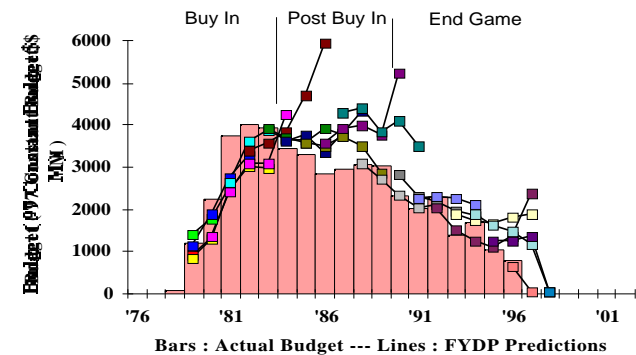
Average Unit Costs



**60-70%
Cost Overrun
@ the Margin**



Annual Budget



Point: Most of Cost Growth Occurred During Buy-In When Pentagon and Congress Spent More Money than Planned

Front Loading the F-18E

In 1991, the Navy Sold the to OSD & Congress as a Low-Risk Modification to F-18C,
But the Navy's Own Estimates of Future Production Costs Assume the F-18E was a New Airplane.

F-18E vs. F-18C

Physical Differences:

New Wing Design (Different Aerodynamics)

Radar (Different Airframe)

New Engine

Different Structure (2% by Wt)

Different Subsystems (6% by Wt)

Physical Similarities

Airframe (90% Common)

Similar Load Paths in Much Structure

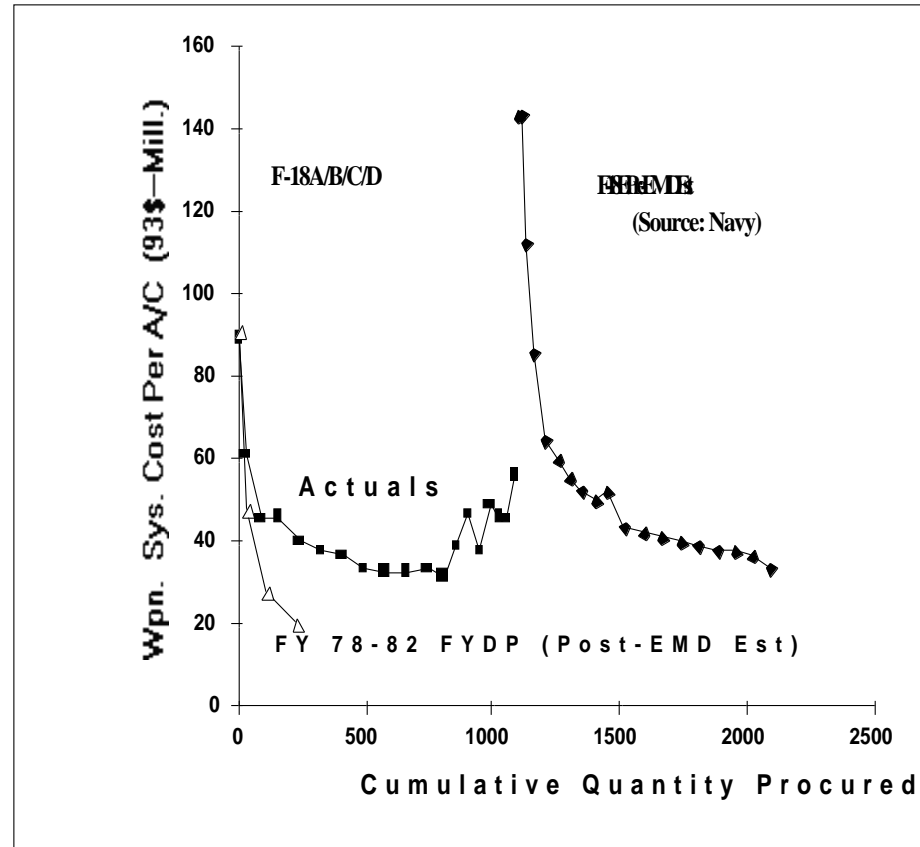
Economic Differences

Pre-EMD Est More Uncertain than FYDP Est

Max Prod Rate = 40% of FYDP Production

Mid-Low Rate Production

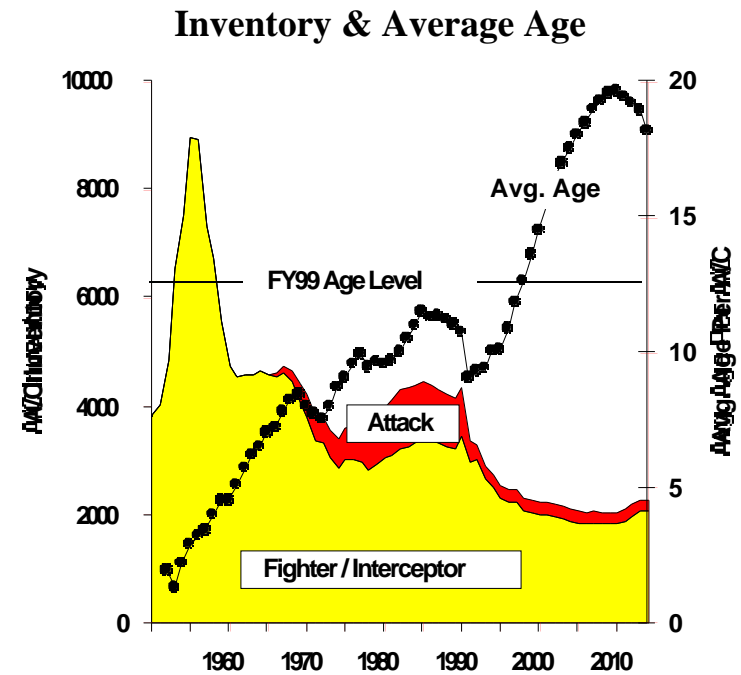
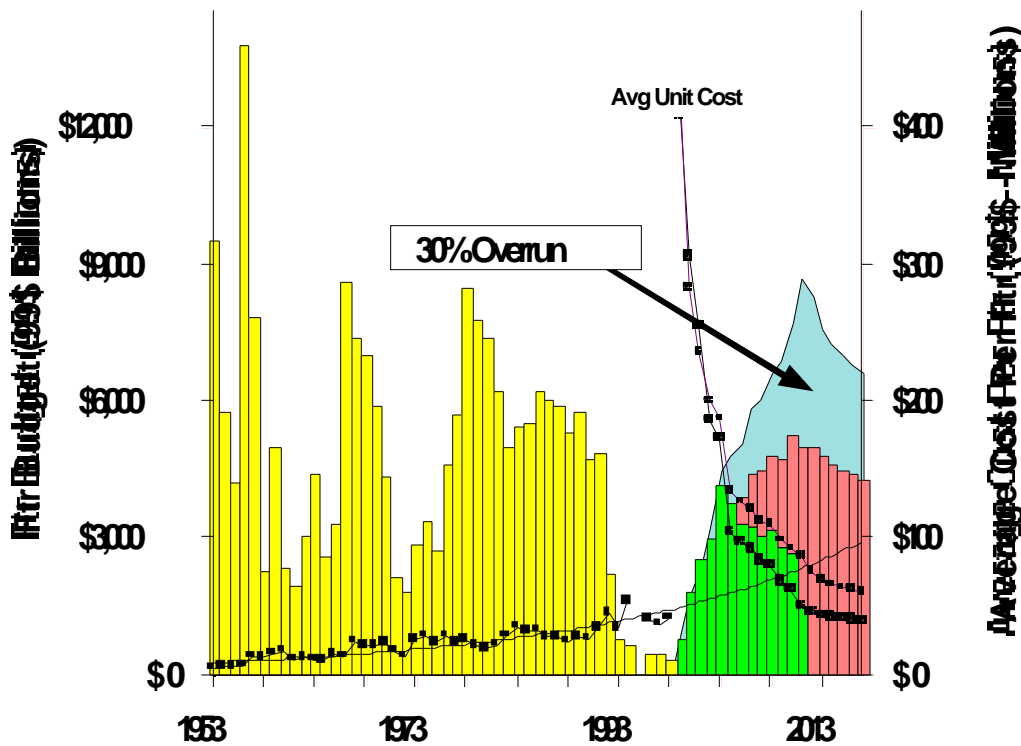
More Uncertain Fiscal Outlook



GAME:

Mask, Distort, & Downplay Differences to Bypass the Prototype Phase, Obtain a Premature Commitment to Concurrent EMD Program, and Set the Stage for the Political Engineering Operation.

What Would Happen if F-22 / JSF Had an Overrun Equal to About Half that of the F-18A?



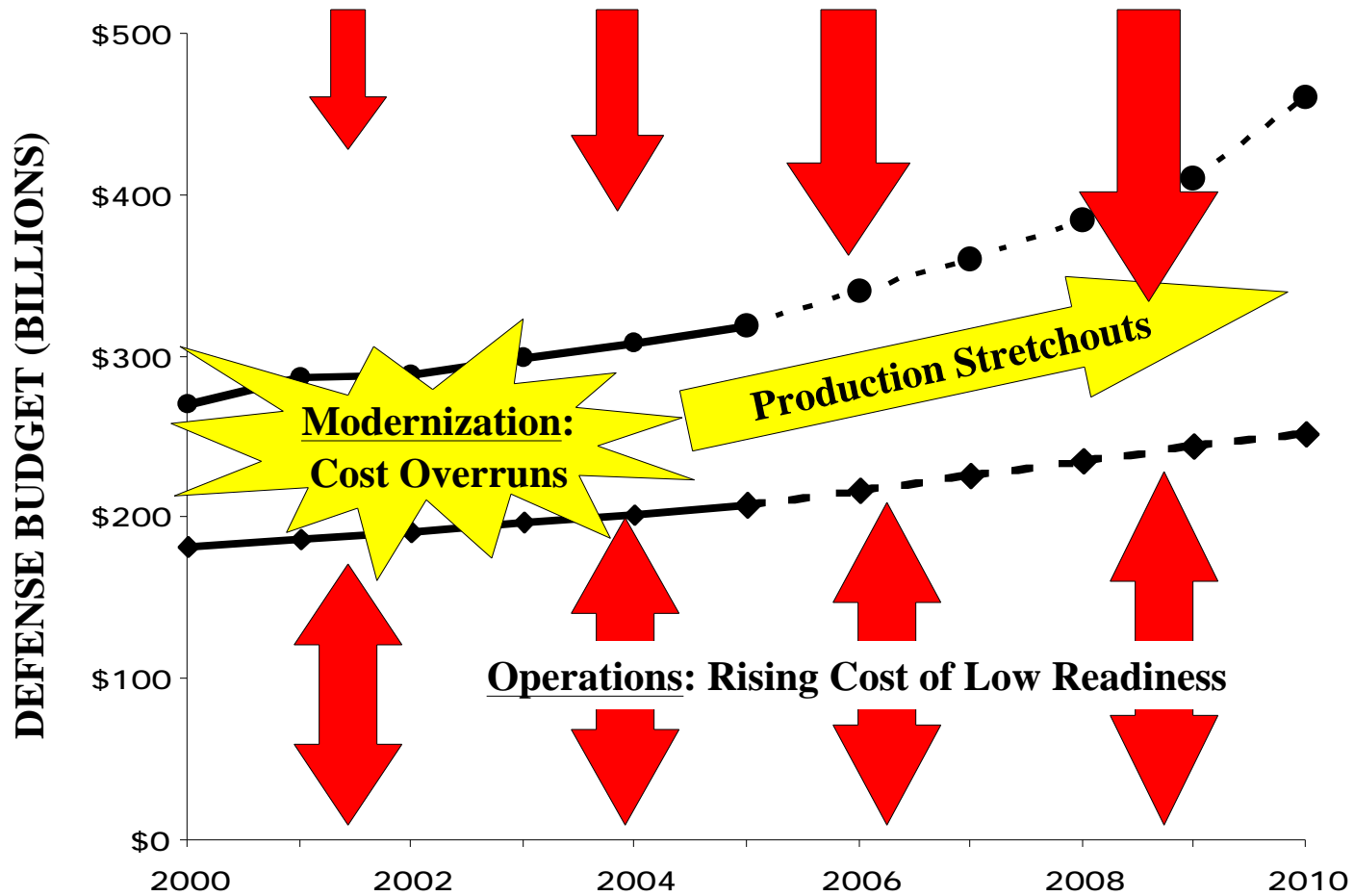
Answer:

- We Would Spend More than Spent in Most Expensive Decade of Cold War...
- To Modernize a Force Half the Size ...
- And the Average Age of the Inventory Would Rocket Upwards to 20 Years

What Does this Kind of Age Growth Imply for the Future of our Military?

END GAME: MACRO-ECONOMICS OF THE FUTURE MELTDOWN

Growing Budget Pressure (Soc Sec + Medicare + Infrastructure)



Possible Evolutionary Pathways Into the Future

- ***Additional Force Cutbacks*** -- if the cost of operating the oldest airplanes becomes prohibitive.
 - ✓ **Cost Overruns or Budget Cutbacks** - Could replacement rates further & magnify the rate of age growth, thereby increasing the pressure to cut back force size.
- ***More Readiness Reductions:***
 - ✓ **Reduce Training Rates** to contain age-driven growth of operating costs & effects of assigning a smaller number of older aircraft to combat units and bases.
 - ✓ **Declining Retention** - skilled maintenance personnel leave because of higher workloads and morale-busting workarounds that are needed to support aging, depot-intensive, hi-tech equipment.
 - ✓ **Increasing Morale Problems & Decreased Training Opportunities** - if smaller forces make it necessary to increase the proportion of deployed units in support of foreign policy commitments.
 - ✓ **Planners or Politicians Might Rob Readiness** - bail out the collapsing modernization program.
- ***Change the Strategy to Conform to Consequences of Cost Growth in Procurement:***
 - ✓ **Cave In to the Pork-Barreling Pressures of the Defense Industry** - adjust the National Strategy to match the shrinking forces made inevitable by **out-of-control costs** in the procurement program.
- ***Rationalize Status Quo With Half-Baked Theories of Technological Revolutions:***
 - ✓ **Declare that Further Force Reductions are Not Only necessary, but *Desirable*** - because technological **Breakthroughs** make it possible to replace manned weapons with a variety of un-manned, higher-cost, remote-controlled, surveillance and reconnaissance sensors, computerized command and control systems, and precision-guided weapons - all wired together into an all-seeing, all-knowing war machine.

Raises Question:

How Do Can We Break Out of this Death Spiral and Evolve a Viable Plan for Coping with a Real World of and Uncertain Resource Constraints?

Recommendations

The Central Question is How to Change the *Complex Adaptive Behavior* of an Assemblage of Quasi-Independent Living Systems.

Implication:

There is NO Silver Bullet Solution to the Death Spiral

Aim of Reform

Evolve the Information Needed to Produce Coherent Goal-Seeking Behavior
Among the the Microscopic and Macroscopic Levels of Organizatio Zn.

RESTORING COHERENCE AND INTEGRITY TO DECISION MAKING

A Notional List of Recommendations (Based on this Brief and the *Anatomy of Decline*)

R1- Policy Stand Down for a Reality Check (Department of Defense).

R2 - Declassify the Future Years Defense Plan (Department of Defense).

R3 - Swear In All Witnesses at All Congressional Hearings (Congress).

R4 - National Threat Assessment - Joint Resolution Passed by Congress Every Two Years, Sponsored by Foreign Relations/Affairs Committees (Congress).

R5 - Replace the PPBS With a Strategic Planning Process Designed to Evolve Priorities by Examining the Tradeoffs Among the Macroscopic and Microscopic Possibilities, Constraints, and Uncertainties that Decision Makers Must Contend With (Department of Defense).

R6 - Shift to Sequential Prototyping Practices In Accordance With Classical Engineering Principles (Department of Defense).

R7 - Shift to Standard Commercial Industrial Engineering Cost Estimating and Work Measurement Practices (Department of Defense).

R8 - Tie Operational Testing to the Sequential Prototyping Strategy (Department of Defense).

R9 - Establish Independent Defense Evaluation Board (Department of Defense - Congress Interface).

Aim:

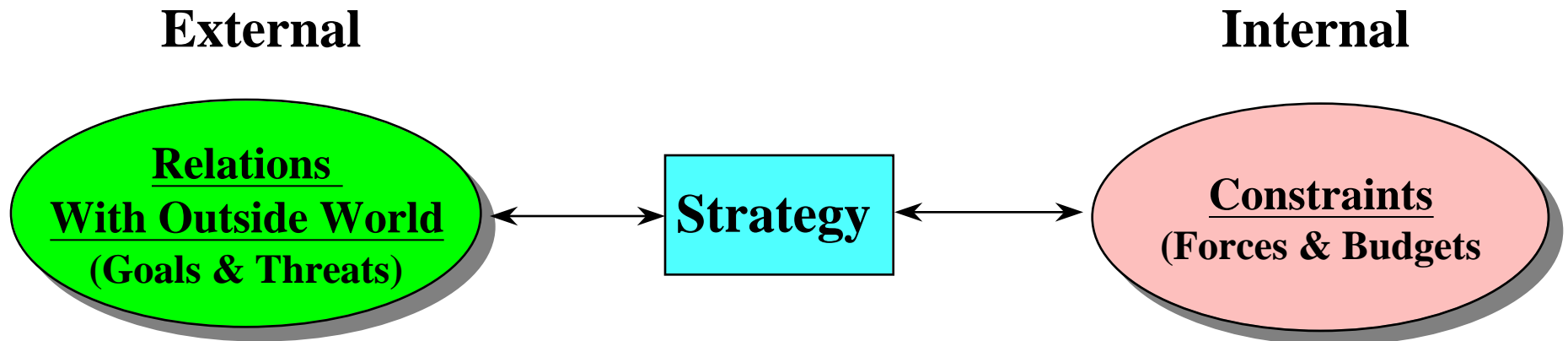
Improve DoD's Fitness to Cope with an Ever-Changing Environment while

Restoring Accountability to Congress and the American People by --

- **Improving Integrity of Information & Checks & Balances @ Micro & Macroscopic Level of Decision Making.**
- **Reducing Technical, Economic, and Programmatic Risks Before Making Commitments.**
- **Evolving Coherent Priorities Among Incommensurable Program Competing for Scarce Resources**

Recommendation:

Policy Stand Down for a Reality Check



Aim:

A Strategic Planning Activity
that Evolves Realistic Priorities by
Harmonizing External Relations with Internal Capacities

Strategic Planning

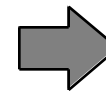
An Idealized View

Activity

Goal

Decision-Making & Force Planning Should:

- **Reflect and be Responsive to the Short-Term, Microscopic Needs of Individual Programs**
- **Combine the Individual Programs Into a Coherent Macroscopic Framework that is Responsive to Long-Term Policy Intentions of the National Leadership.**
 - ♦ Desired Tradeoffs between Readiness, Force Size/Composition and Modernization Rates
- **Account for the Long-Term Consequences of Current Decisions in Terms of the Unfolding Possibilities, Constraints, and Uncertainties of the Real World**



**Internal Consistency
with
Consistent Matchup
With Real World
(External Consistency)**

AIM:

**Continuously Improve Current Decisions and Preserve Future Freedom of Action
by Making Visible the Possibilities, Constraints, and Uncertainties
Decision Makers Must Contend With in the Real World.**

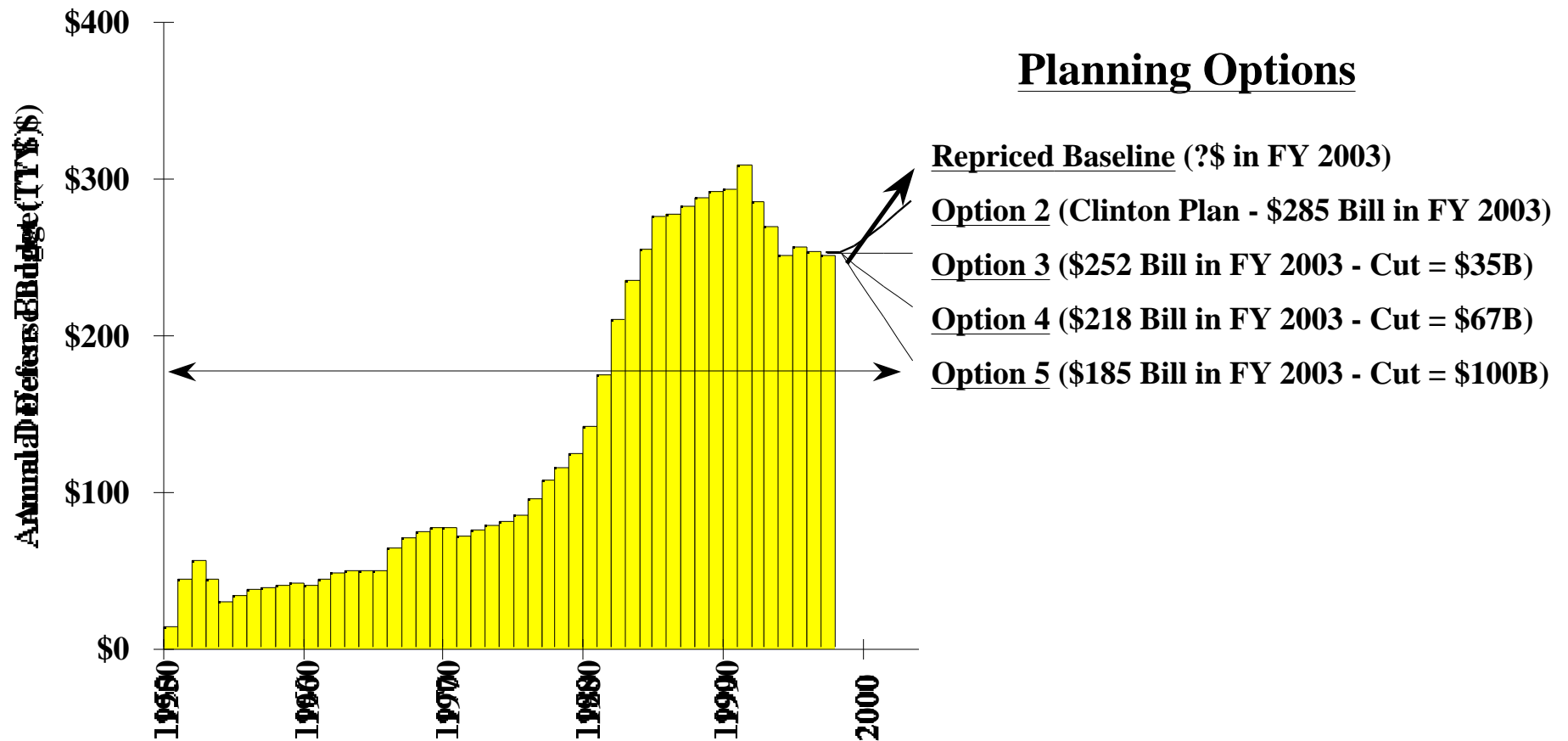
How Can We Convert this Ideal into Reality?

Stand Down for a Reality Check (I)

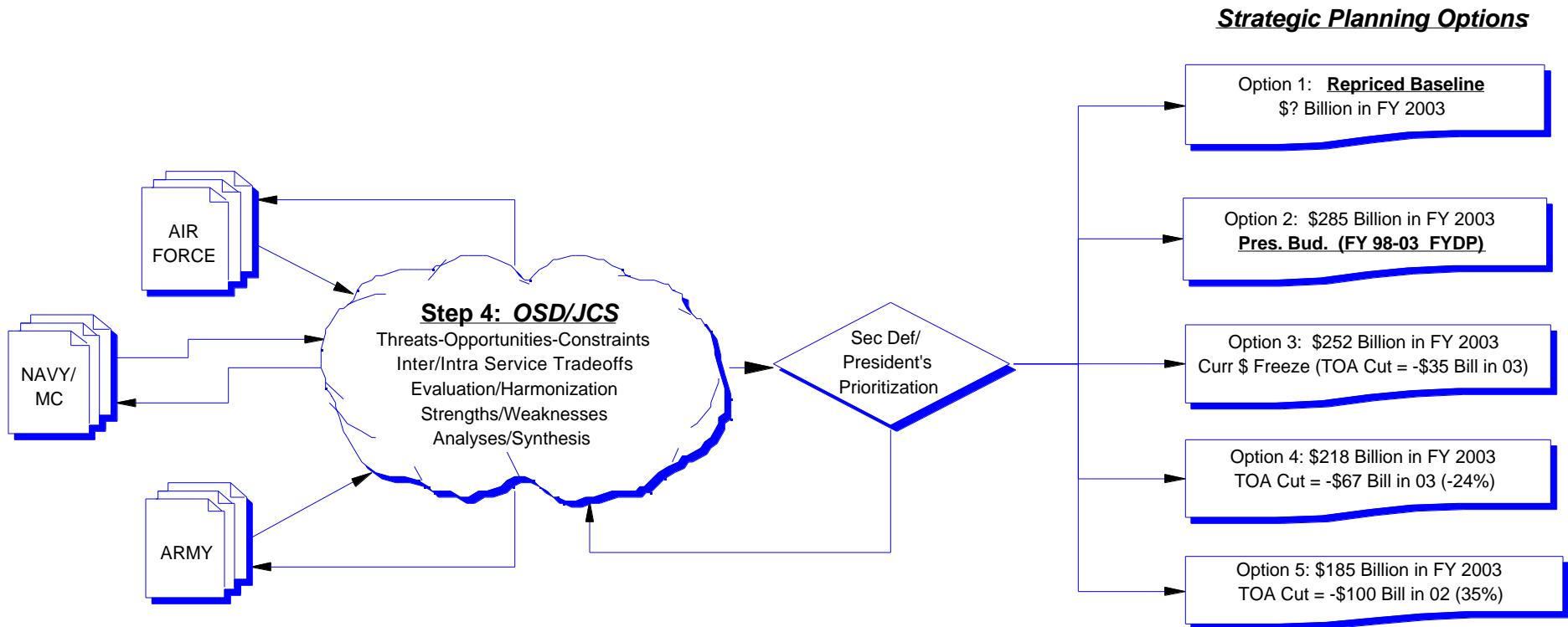
- **Step 1: Put DoD on Autopilot for At Least 1 Year**
 - ✓ Theme: Maximize Decision-Making Flexibility in Near Term.
 - ◆ No New Long-Term Commitments - Maintain Level of Effort in Existing Programs.
 - ◆ Proceed With All Planned Terminations, Cutbacks, and Base Closings.
- **Step 2: Direct Military Services to Clean Up Books and Open them to Debate.**
 - ✓ Remove Special Access Clearances from All Programs Except Intell. Programs.
 - ✓ Establish Readiness Baseline via Physical Audit of Stockpiles, Personnel, Training Tempos, and Materiel Readiness Indicators.
 - ✓ Re-price Procurement & O&M Budgets with More Realistic Outyear Costs, Assuming Realistic Training Tempos, Exercises, Spares Fill Rates, Ammo Allowances, etc.
- **Step 3: Each Service to Construct “Best” *Force Package* for 5 Outyear Budget Scenarios**
 - ✓ Each Services Provides JCS/OSD With Its Assessment of the Strengths and Weaknesses of Each *Force Package*. JCS/OSD Synthesis of Service Inputs.

Stand Down for a Reality Check (II)

Planning Options in an Historical Context



Stand Down for a Reality Check (III)



Aim

Generate More Reliable Information in the Short Term

**I.D. Options, Explore Lower Cost Alternatives, and Evolve Appropriate Priorities
To Break Cost Spiral & Produce a More Relevant Adaptation to the
Uncertainties of the Emerging World.**

Preventing the Collapse of Air Force Tactical Fighter Aviation

Illustrative Planning Options

**Caveat: Calculations are two years old and a little out of date.
Today's requirements are higher than depicted in this section**

GOALS:

Maintain 20 TFWs

Stabilize Average Age of Aircraft @ 10 Years by 2002

Two Problems

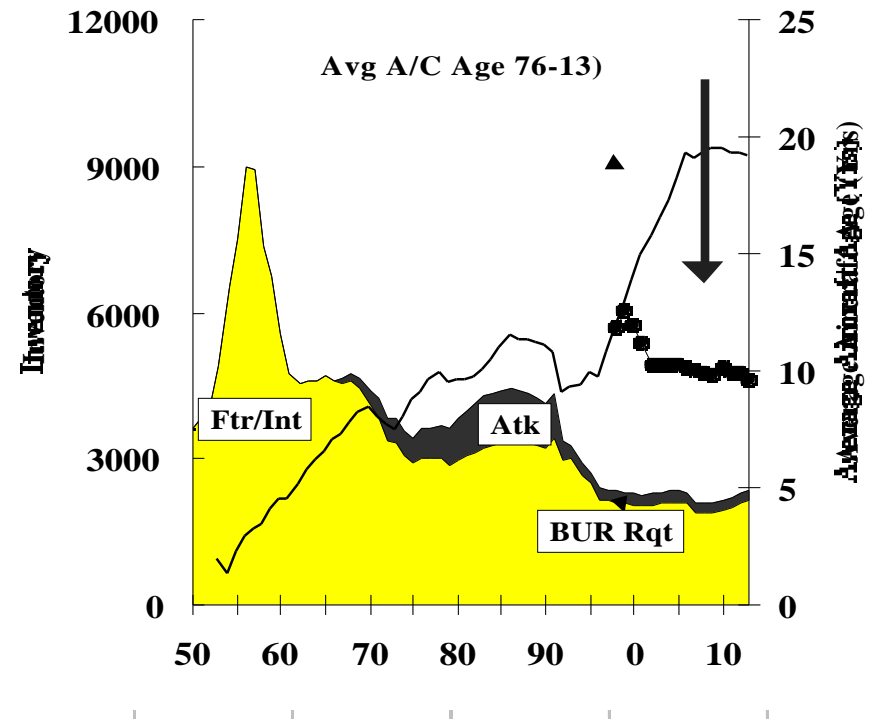
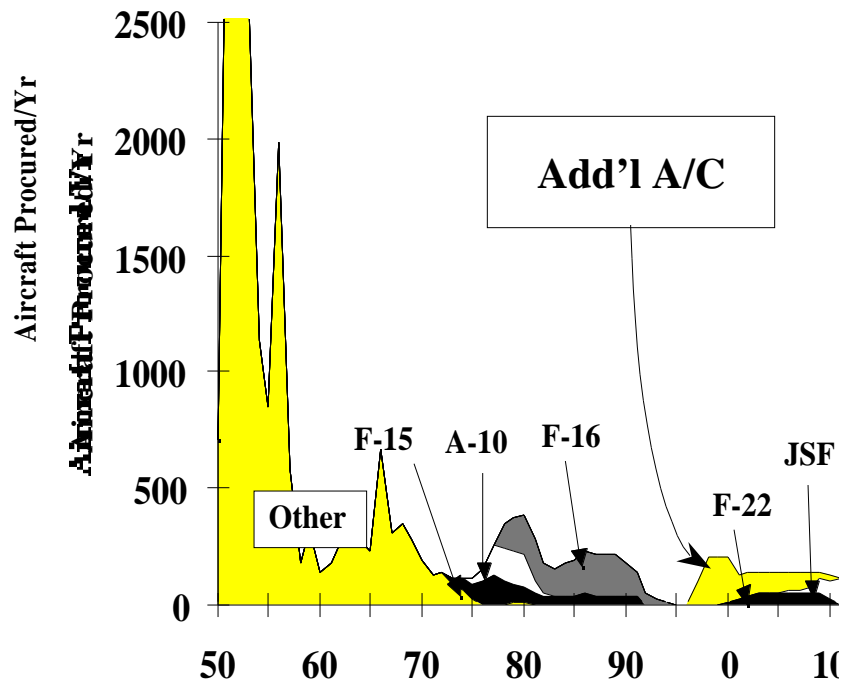
Short Term: The Procurement Hole.

Long Term: Low Sustaining Rate (Cost Growth > Budget Growth)

Implications

	<u>1997-2002</u>	<u>2003-2013</u>	<u>Total</u>
Current Program	80	902	982
<u>Additional Aircraft Required</u>	<u>900</u>	<u>590</u>	<u>1490</u>
Total Requirement	980	1492	2474

Preventing the Collapse of AF Tac Air



Illustrative Acquisition Strategies

Goal: Stabilize Avg Age or 20 TFWs @ 10 Yrs 2002-13

- Option 1 (\$125 Bill.) : Stabilize Age by Adding New F-16s to Current F-22/JSF Procurement Plan (F-16s @ \$26M/Cy)
- Option 2 (\$65 Bill): Terminate F-22/JSF & Stabilize by Buying New F-16s (\$26M/Cy)
- Option 3 (\$44 Bill.): Terminate F-22/JSF & Stabilize by Buying a Mix of --
 - Re-manufactured F-16s & A-10s (F-16s@ \$11M/Cy & A-10s @ \$5M/Cy)
 - New F-16s (\$26M/Cy)
 - CAS-Xs (Fast-Paced Prototype Program, Cost Target = A-10A Cost Profile = \$14M/Cy)
 - Ftr-Xs (Fast-Paced Prototype Program, Cost Target = F-16A Cost Profile = \$23M/Cy)

**Some People Assert Excessive Budget Reductions
Caused the
Deteriorating Readiness Posture**

**Given the Problems Described Here,
How Useful for Policy Makers is this Hypothesis?**

“The dogmas of the quiet past are inadequate for the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so we must think anew, and act anew. We must disenthrall ourselves, and then we shall save our country.”

Abraham Lincoln

Change the last word to “MILITARY”

... and ...

**We have an accurate description of the
Challenge facing the Pentagon Leadership**