EA-6B Total Ownership Cost Reduction Plan for TOC/CAIV Workshop

Todd Balazs
Deputy PMA-234A

4 November 1999

Program Executive Officer
RADM J.A. Cook
PEO(T)

Resource Sponsor
CDR Casey Collins
N880C3

EA-6B Program Manager
CAPT J. Scheffler
PMA-234

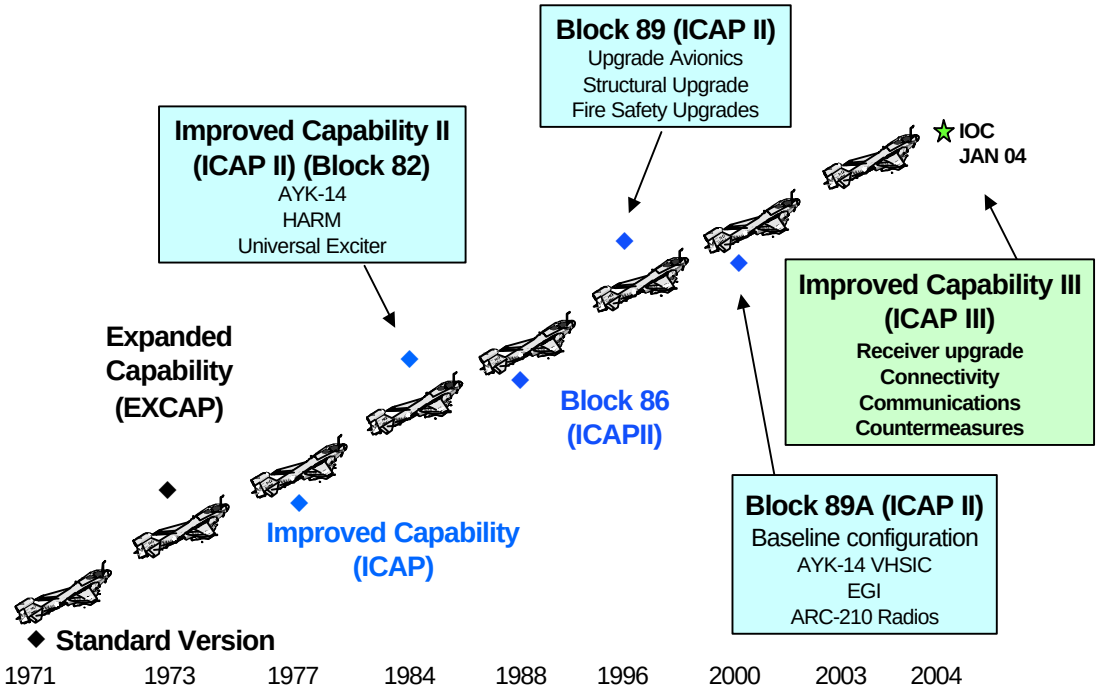
Outline

PEO(T)

- **Background**
- **Goals**
- **Strategy**
- **Baseline Cost**
- **Initiatives**
- **Summary**

Program Background

PEO(T)



EA-6B is DOD's Sole RADAR Jamming Support Aircraft

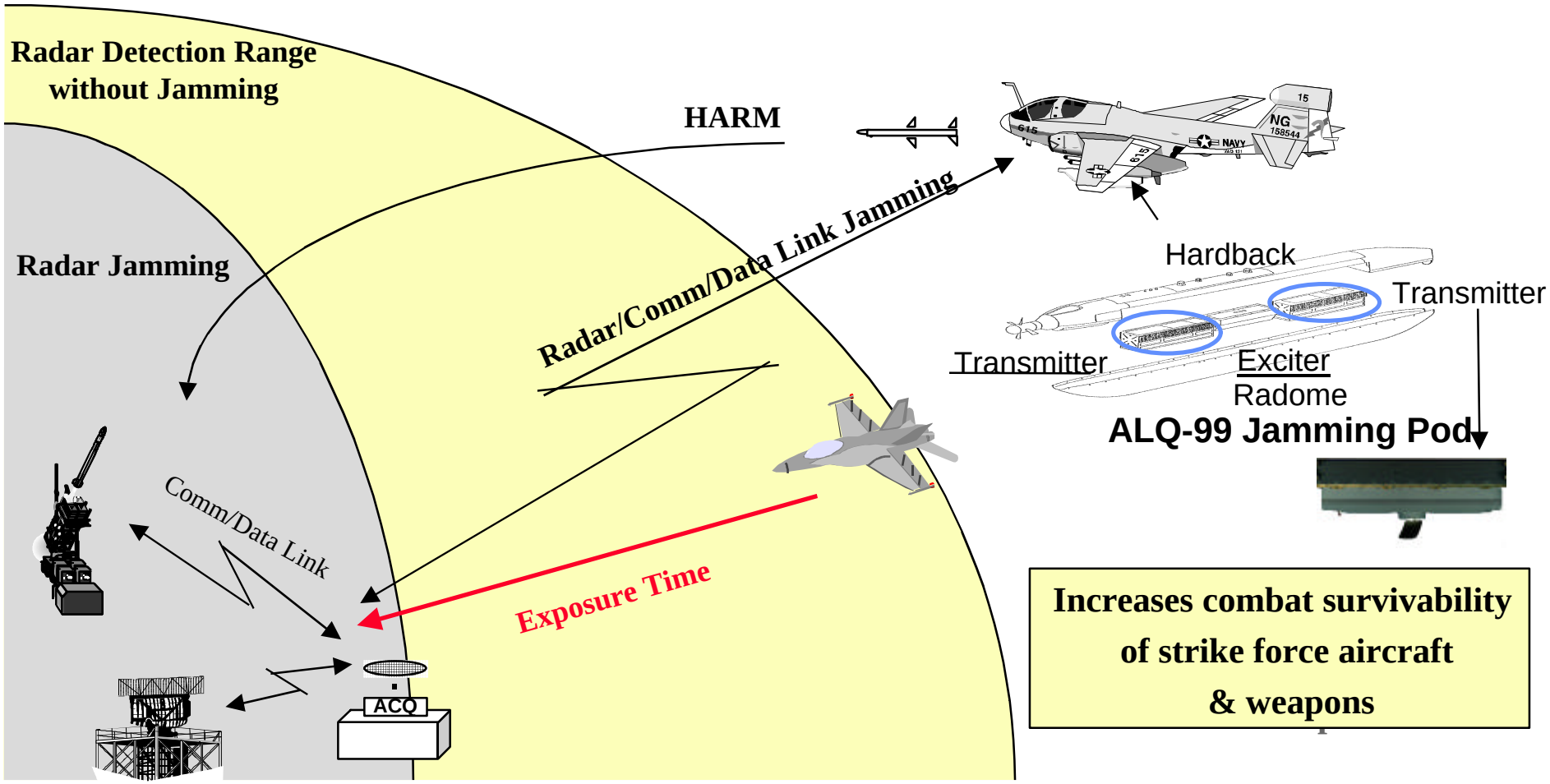
Background

- 170 A/C manufactured
- 1st A/C delivered in 1971
- Last production aircraft delivered in 1991
- 1995 PAA increased from 80 to 104 Aircraft
- 1998 complete standup of 5 new squadrons
- 1998 EF-111's retire
- 1999 will see over 100 A/C in active inventory

EA-6B Prowler Mission

PEO(T)

Deny, delay, degrade the acquisition of friendly forces by enemy air defense systems



Increases combat survivability of strike force aircraft & weapons

EA-6B Program Goals for this Pilot Program

PEO(T)

- **Reduce Total Operating and Support Cost**
- **Improve readiness**
- **Reduce the escalation rate of O&S costs**
- **Identify <u>existing hurdles to leadership</u> to improve ability to accomplish above**

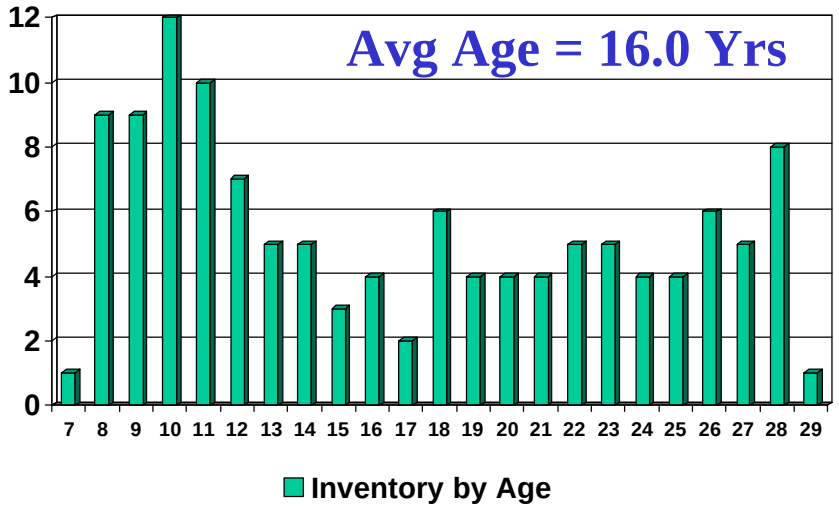
Cost Reduction Strategy

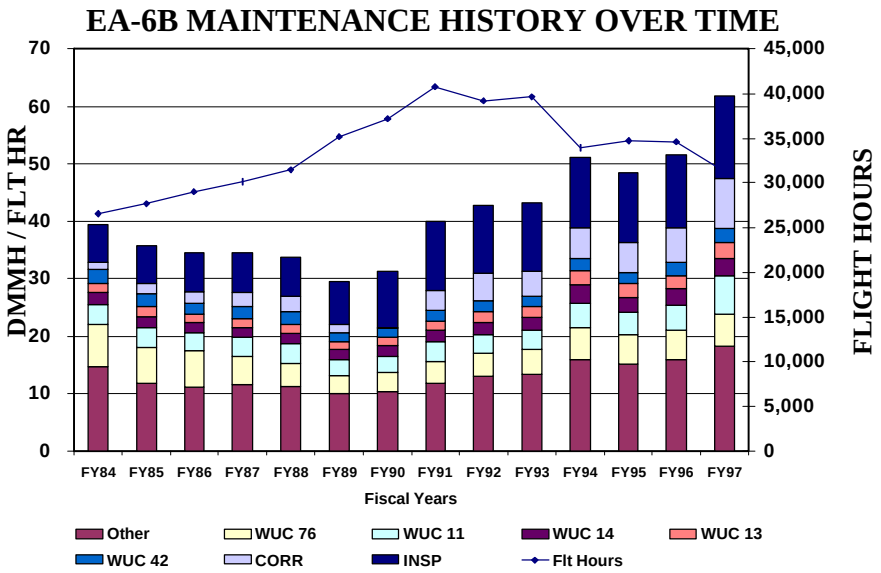
PEO(T)

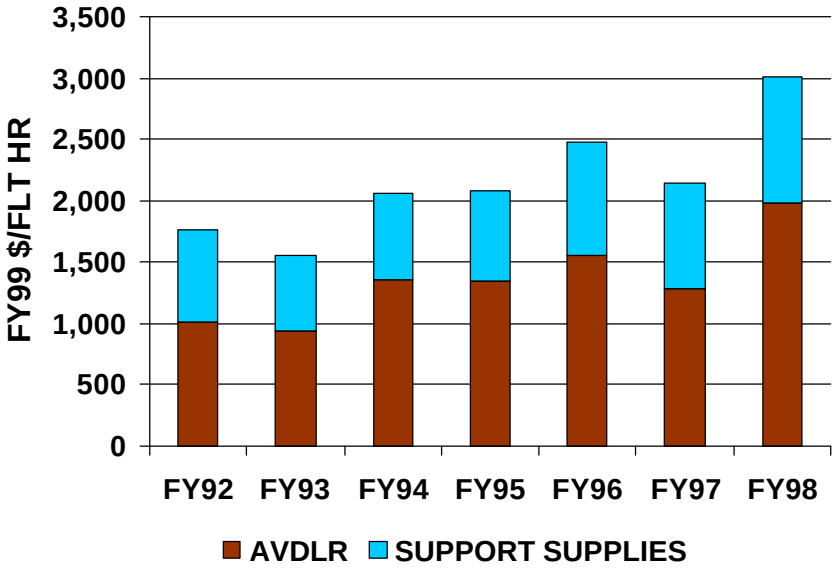
- **Develop a Total Ownership Cost baseline**
  - **Project future costs based on historical data, trends and anticipated use**
- **Seek greater level of visibility into operating and support costs**
- **Identify cost drivers**
- **Identify actions to reduce cost drivers**
- **Seek investment funding**
  - **NAVAIR Affordable Readiness Initiatives (ARIs)**
  - **Logistic Engineering Change Proposals**
  - **Department of the Navy Cost Reduction Effectiveness Improvement Council (CREIC)**
  - **Execution Funds**
  - **Commercial Operations & Support Savings Initiative (COSSI)**
  - **Modernization Programs**
  - **Pilot Program Projects**
  - **Combination of above**

EA-6B Aging Aircraft Effects

PEO(T)



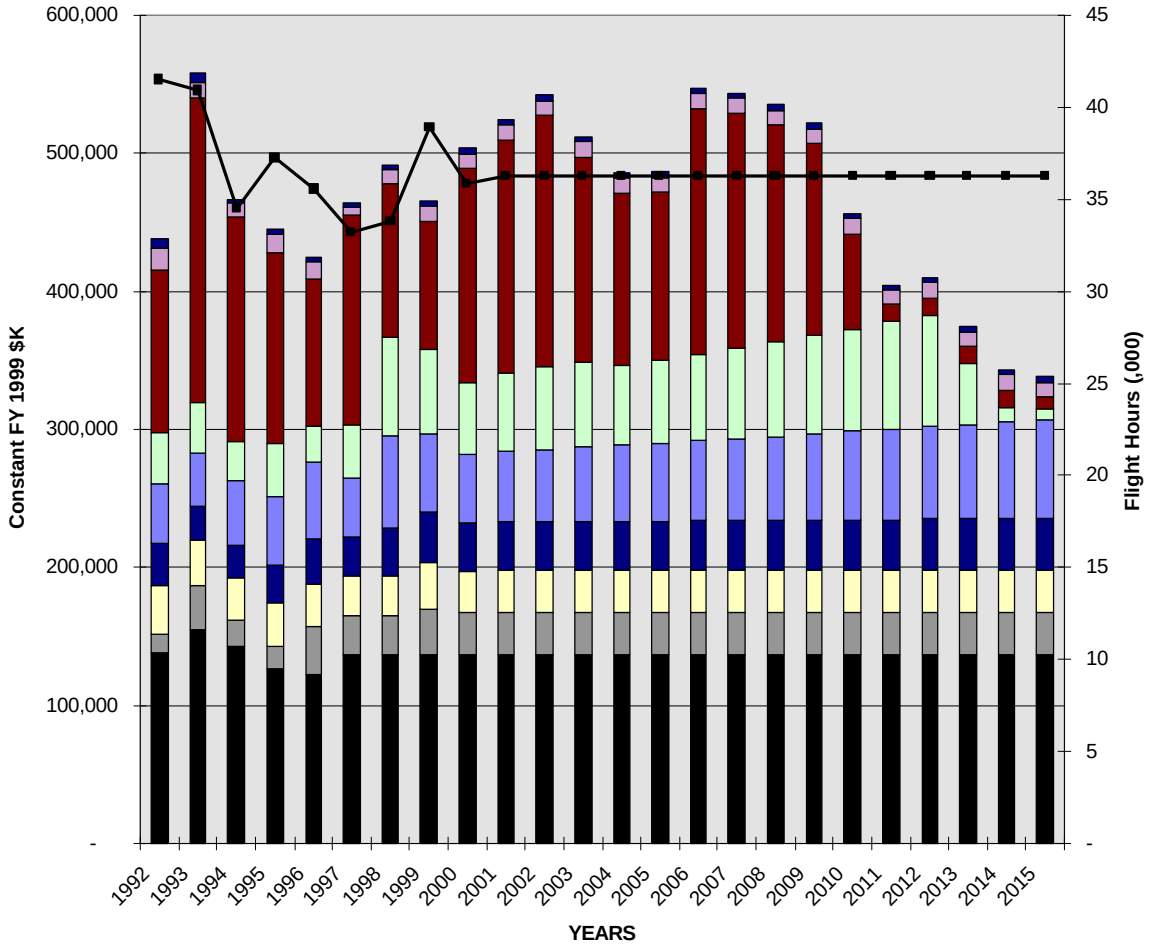




- Aircraft Aging is Driving Additional Maintenance Requirements
- Burden on Navy “O” and “I” Personnel Increasing Significantly
- AVDLR & Support Supply Demand Increasing
- Flight Hour Program Funding Profile Leads to Many Work Arounds To Support Mission Requirements
- Squadron Manning Consistently Less than Increasing Requirements Adversely Impacts Personnel Retention Rates

EA-6B Total Ownership Cost and Support Baseline *(Before Reduction Initiatives)*

PEO(T)



Assumptions

- **2015 is period end date**
- **Annual inventory of 123 A/C**
- **Annual operating hours based on OP-20, CNO Flying Hour Program**
- **Aircraft aging factors applied to out-year factors**
- **Projected surcharges applied to Aviation Depot Level Program (AVDLR)**

Cost Elements

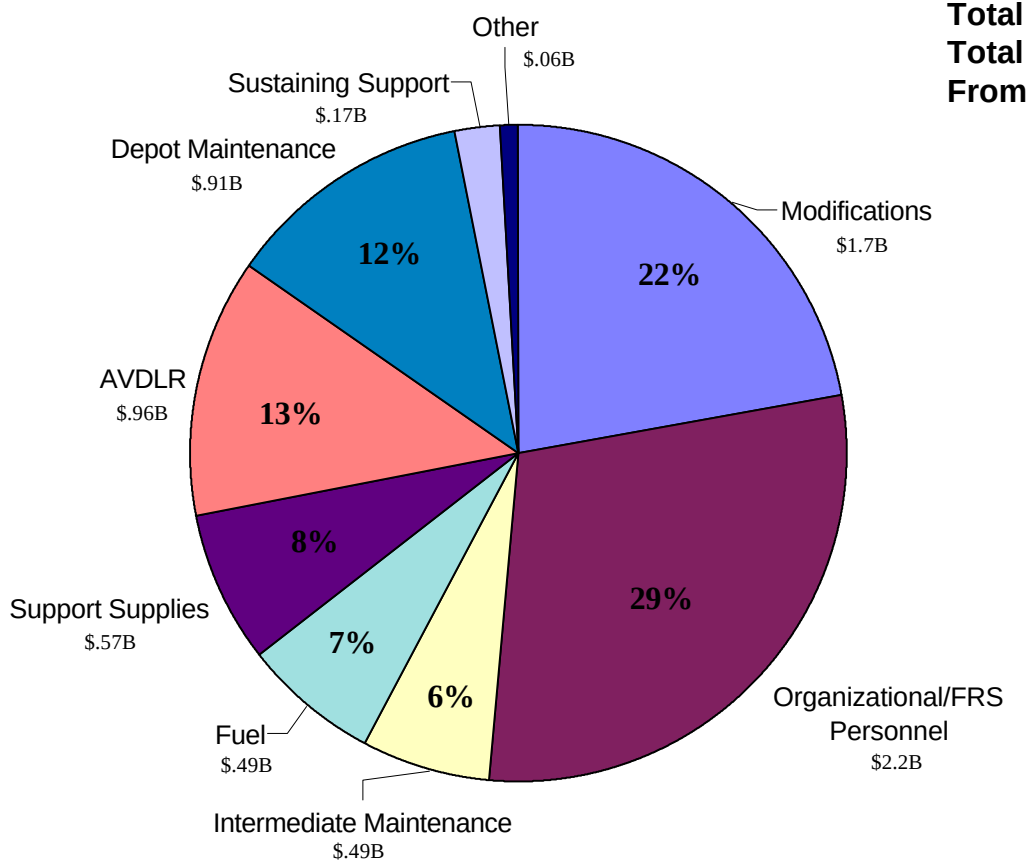
- Other
- Sustaining Support
- Modifications
- Depot Maintenance
- AVDLR
- Support Supplies
- Fuel
- Intermediate Maintenance
- Organizational/FRS Personnel
- Flight Hours (,000)

EA-6B Cost Components

PEO(T)

TOTAL OWNERSHIP AND SUPPORT COST
Constant FY 1999 $

Total = $7.5B
Total = 579.4K Flt. Hrs.
From 2000-2015

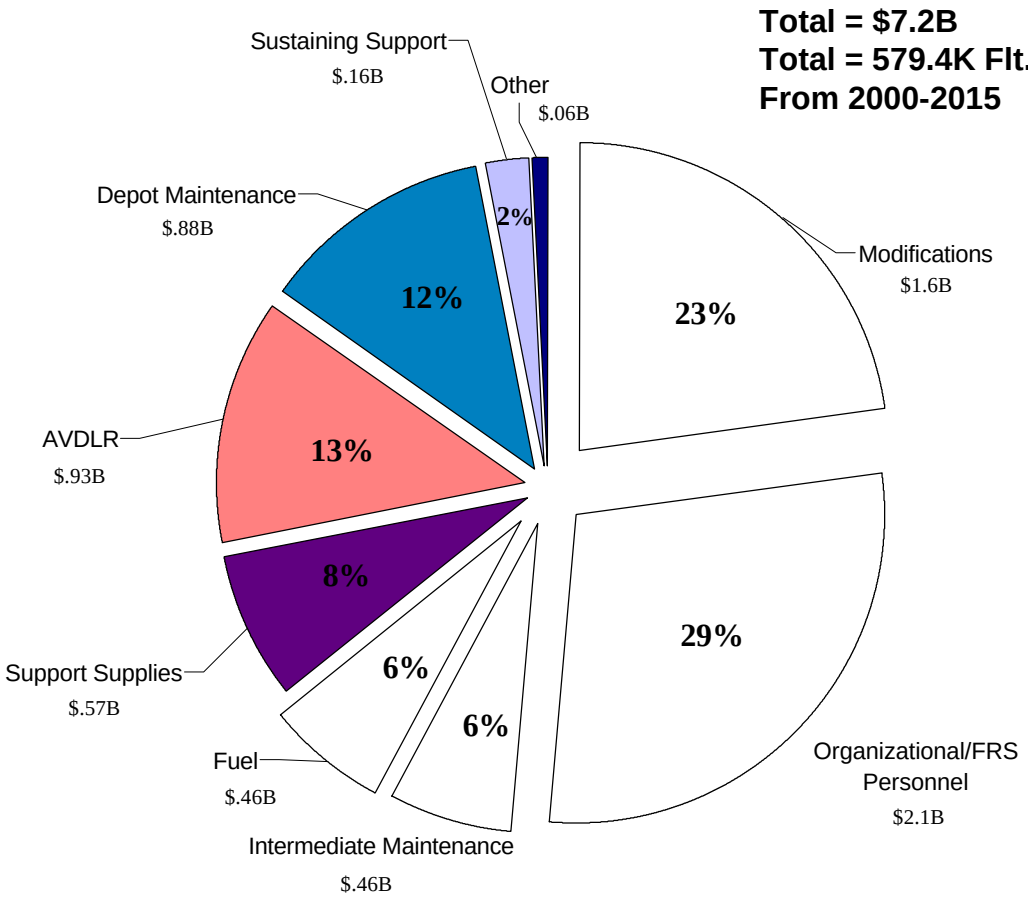


Projections based on 348.2 Flt. Hrs. per A/C per year.
Average cost of $12,992 per Flt. Hr.

EA-6B Baseline for DSAC Goals

PEO(T)

Constant FY 1997 $

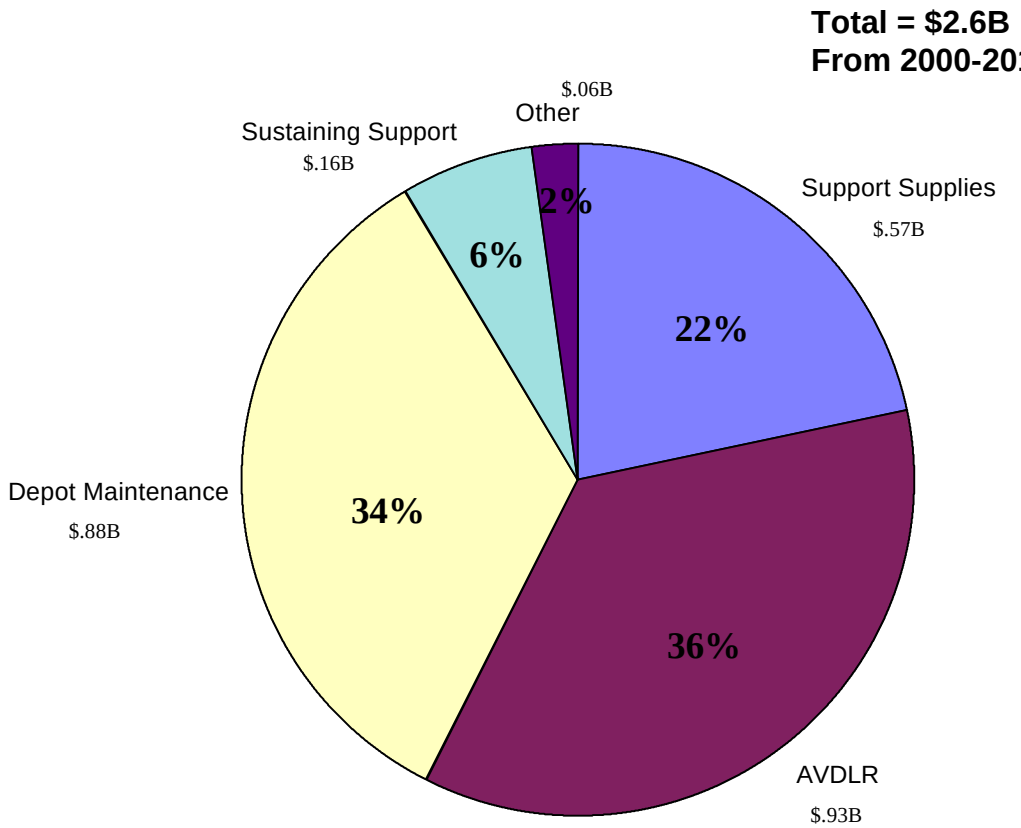


- 10 May 1999 USD (A&T) memo states "O&S reduction goal excluding fuel and manpower"
- CAIG O&S Manual 1992 "Exclude modifications undertaken to provide additional operational capability not called for in the original design or performance specification"
- DSAC Goals
  - 7% by 2000
  - 10% by 2001
  - 20% by 2005

EA-6B DSAC Logistic Support Cost Elements

PEO(T)

TOTAL DSAC LOGISTICS SUPPORT COST
Constant FY 1997 $



Projections based on 348.2 Flt. Hrs. per A/C per year.
Average cost of $12,504 per Flt. Hr.

Major Components

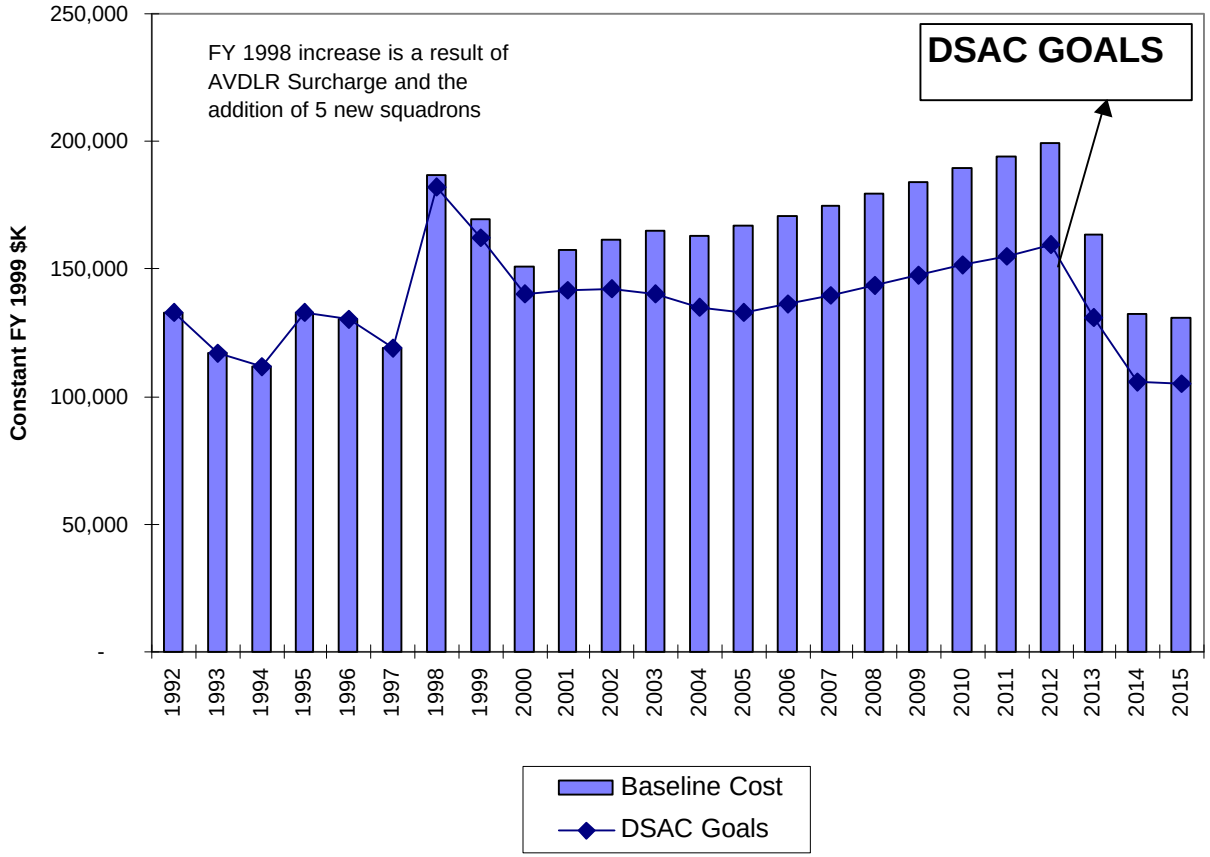
- **Aviation Depot Level Repairables (AVDLR)**
- **Depot Maintenance**
  - **A/C rework**
  - **Engine rework**
  - **Transmitter rework**
- **Support Supplies**
  - **Maintenance material**
  - **Flight clothing**
  - **Safety equipment**

Although DSAC goals exclude manpower, significant reductions in workload are being quantified in terms of hours/work years eliminated

EA-6B DSAC Operating and Support Cost Goals

PEO(T)

TOTAL DSAC LOGISTICS SUPPORT COST
Constant FY 1997 $K



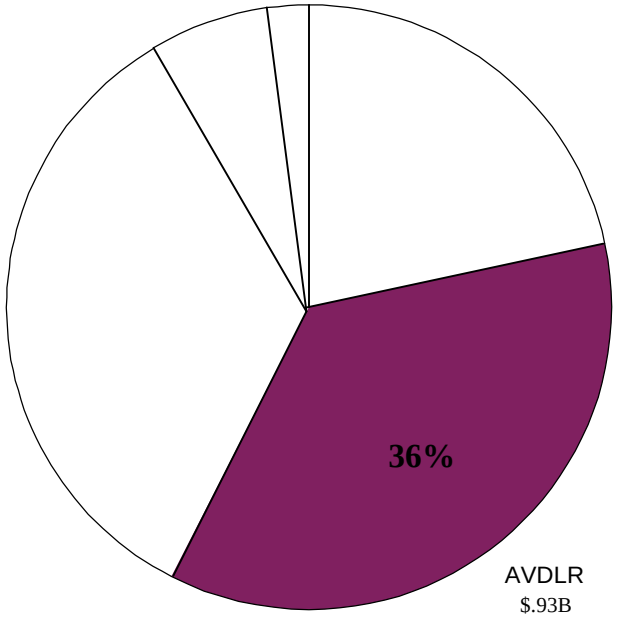
- **DSAC goals applied to cost projections based on current operating force**
  - **PAA increased from 80 to 104 A/C**
  - **DOD Sole Radar Support Jammer**

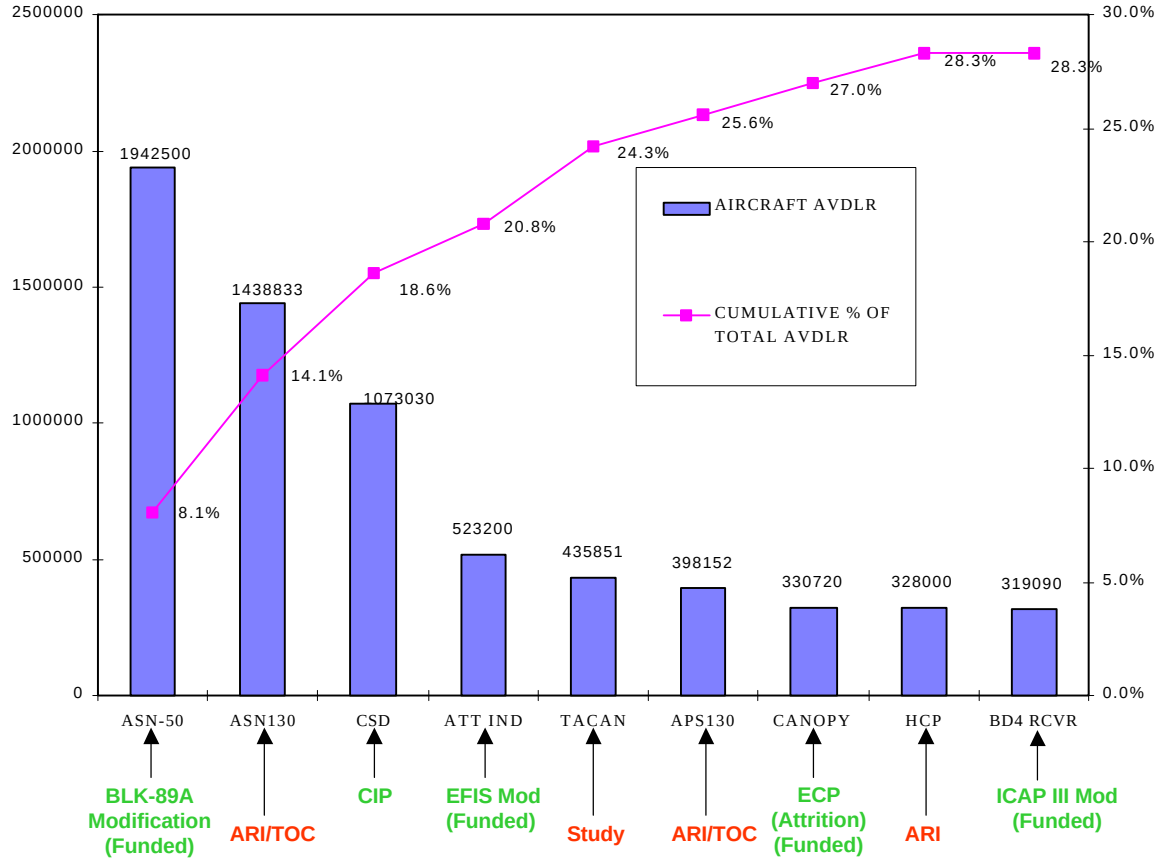
Actions

PEO(T)

EA-6B Primary AVDLR Cost Components

PEO(T)





EA-6B:
AN/ASN-130A Upgrade (#2 AVDLR cost driver)

AN/ASN-172 Embedded Global Positioning System/Inertial Navigation System (EGI) will replace the obsolete AN/ASN-130A. ASN-130 remains as the secondary navigation system in Blk-89A and ICAP III aircraft.

Goals:

1. Increase reliability
2. Decrease Maintenance man-hours
3. Decrease O & S costs through aircraft life
3. Installation concurrent with major A/C Mod

FUNDING ($M)

	00	01	02	03	04	05	Outyrs
Funded	0	0	0	0	0	0	0
Unfunded	2	.5	3	3	2	.3	0
Total	2	.5	3	3	2	.3	0

Total FYDP Cost: $10M
Funded: $0M Unfunded: $10M
Total Cost: $10M

Return on Investment

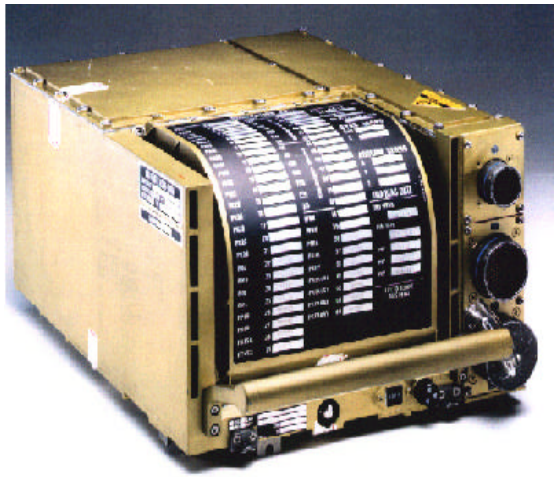
- Avoidance: $2.5/3.0/3.4M in annual maintenance costs due to replacement of AN/ASN-130
- Integrate 2-Level Maintenance Concept (O to D)
- Eliminate I-Level Maintenance workload
- Utilize Contractor's warranty; No Depot level Maintenance costs for first 5 years
- Readiness Improvement: 3.9% in PMC, 2.6% in NMC

Risk

- Technical: Low. Proven system in EA-6B. Simple integration.
- Financial: Low. Current contracts in place with contractor

Payback Period

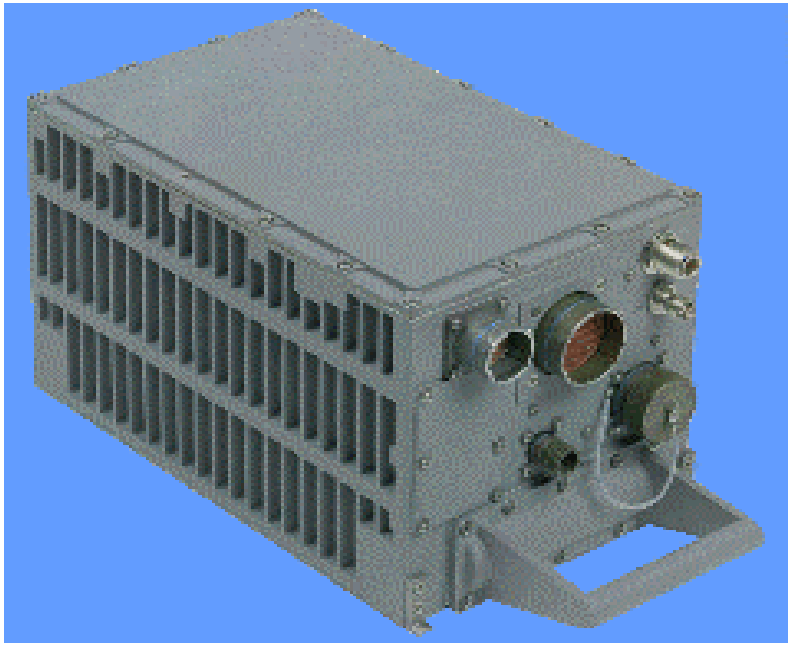
Program cost avoidance begins as soon as AN/ASN-172 is installed with full investment payback realized by FY06



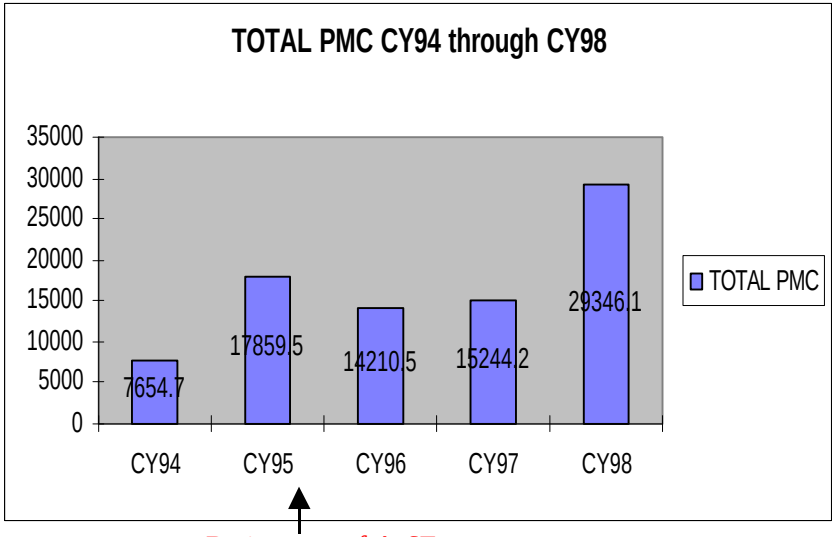
ASN-130 is #2 for overall aircraft AVDLR costs for CY-98

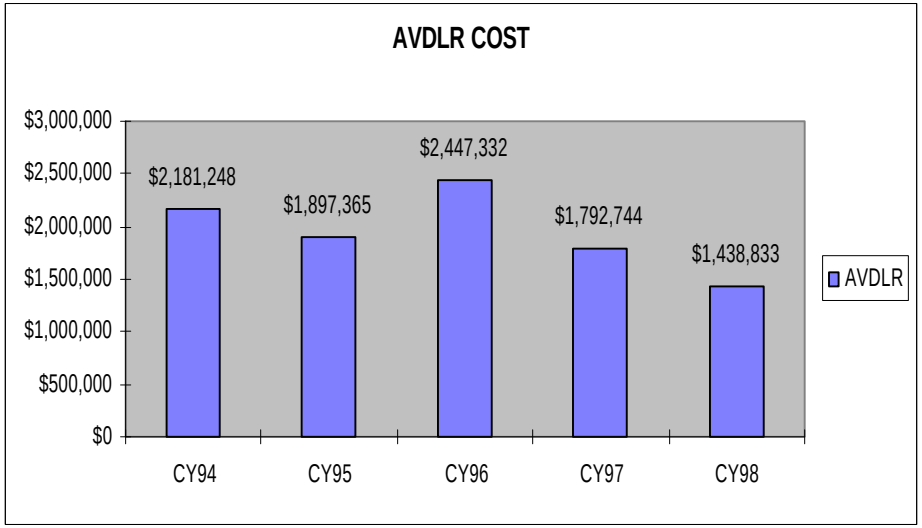
ASN-172 (EGI) Replacement

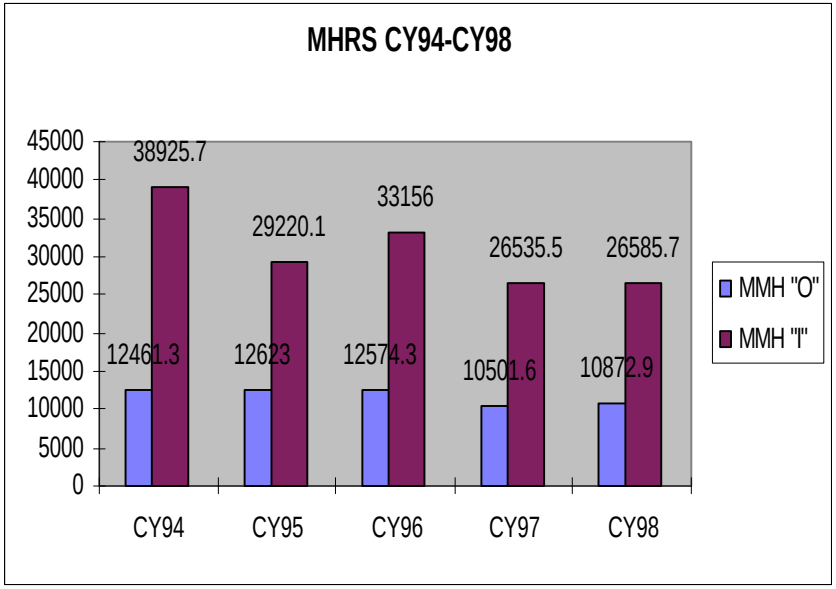
- O to D Maintenance Concept
- Contractor warranty for 1st five years
- Recovers PMA-209 sunk costs associated with EGI procurements (excess EGIs)
- Built-in test available which eliminates numerous O-level Ops check man-hours
- Simple integration to EA-6B Navigation system
- Weight Reduction (18 lbs vs 35 lbs)
- Requires only 30% of the power

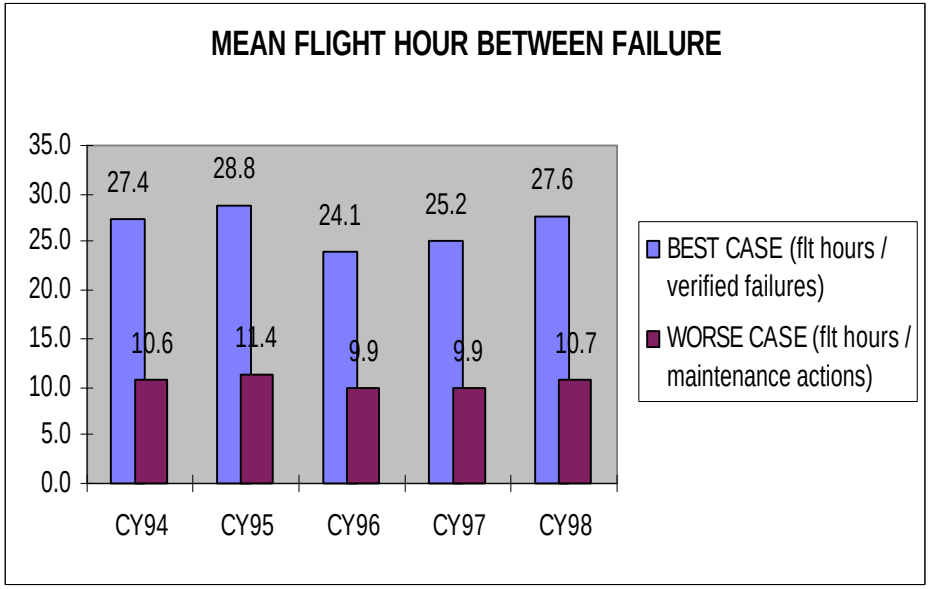


EA-6B AN/ASN-130A Metrics









EA-6B:
APS-130 Radar Upgrade (#6 AVDLR cost driver)

Available alternative will replace obsolete APS-130 Radar which has historically been an aircraft readiness degrader.

Goals:
1. Increase radar reliability 20 times
2. Procure, integrate, test and install replacement radar
3. Commence installation 2001

FUNDING ($M)

	00	01	02	03	04	05	Outyrs
Funded	0	0	0	0	0	0	0
Unfunded	3	10	9	0	0	0	0
Total	3	10	9	0	0	0	0

Total FYDP Cost: $22M
Funded: $0M Unfunded: $22M
Total Cost: $22M

Return on Investment

- Avoidance: $46/54/62M in overall program costs
- Higher reliability and reduced maintenance actions with installation of modern radar
- AVDLR avoidance of ~ $1M/year
- Decreased PMC rate by 11%
- Increased safety via enhanced Aircrew situational awareness in all weather environments

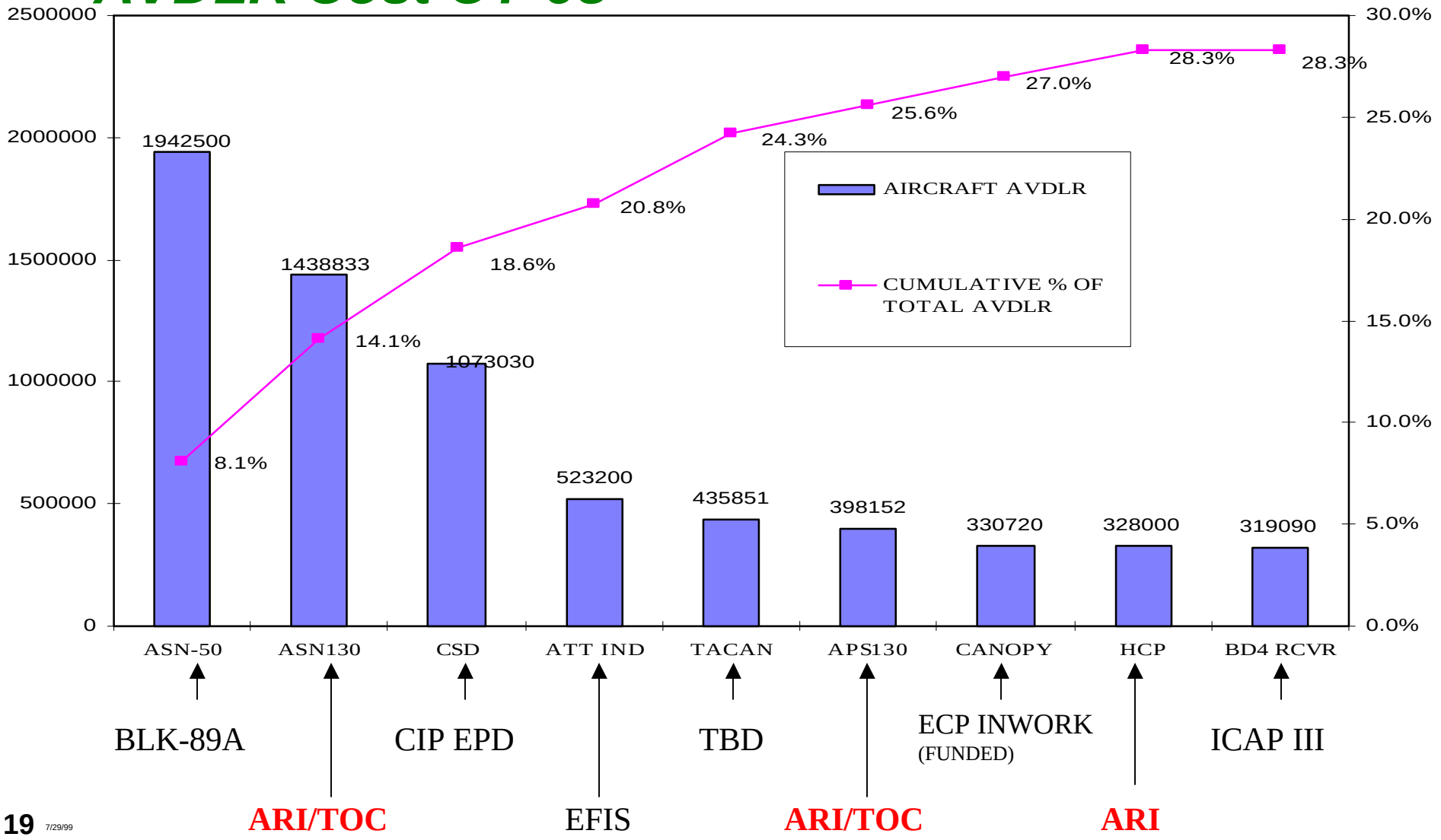
Risk

- Technical: Low. Modern technology radars available
- Financial: Low, will require establishing effort with contractor

Payback Period

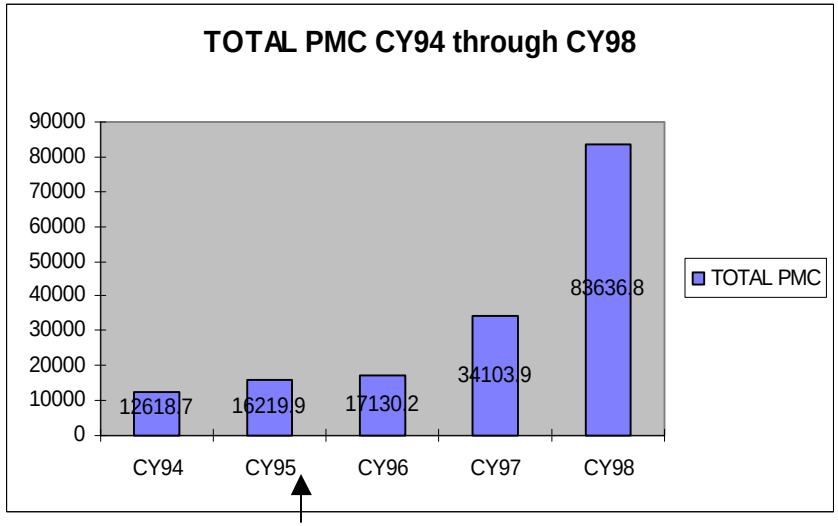
Program cost avoidance begins as soon as new radars are installed with full investment payback realized by FY02

EA-6BAircraft Total AVDLR Cost CY-98

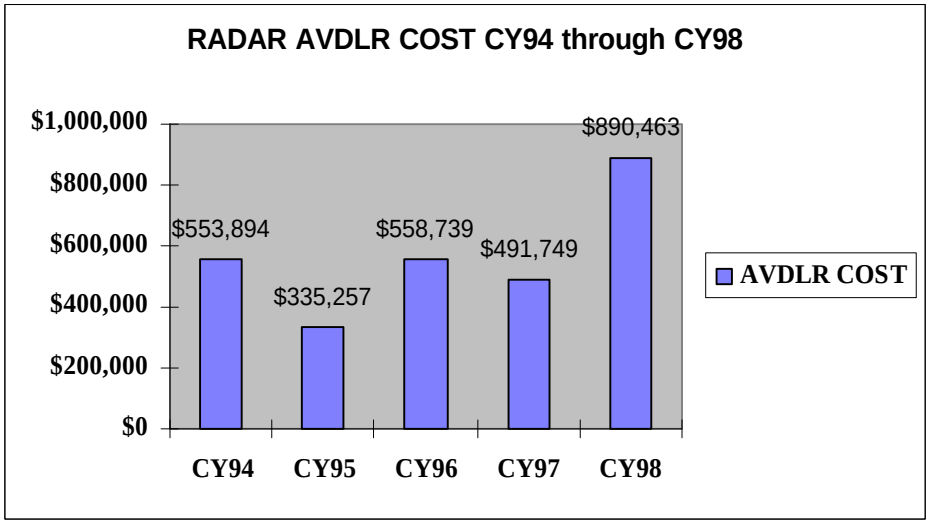


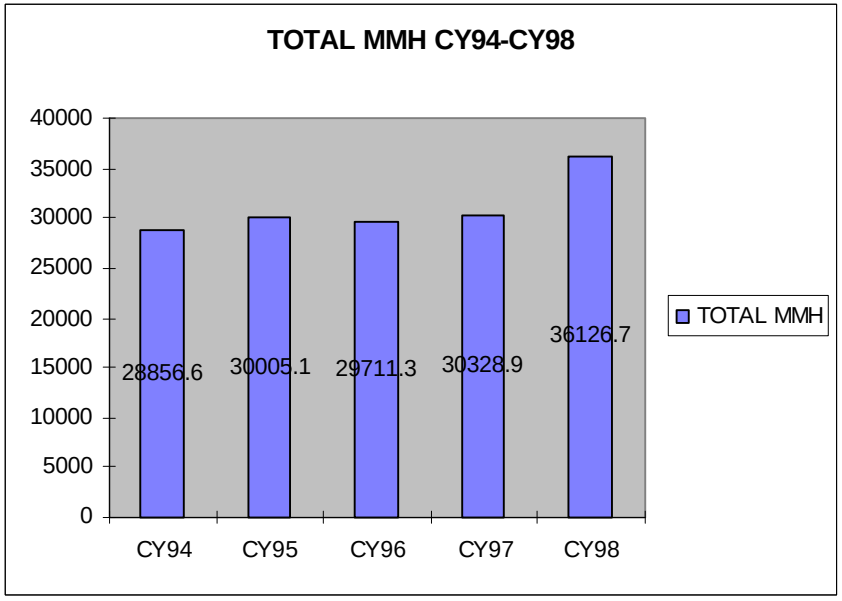
Pilot Program Forum Working Papers

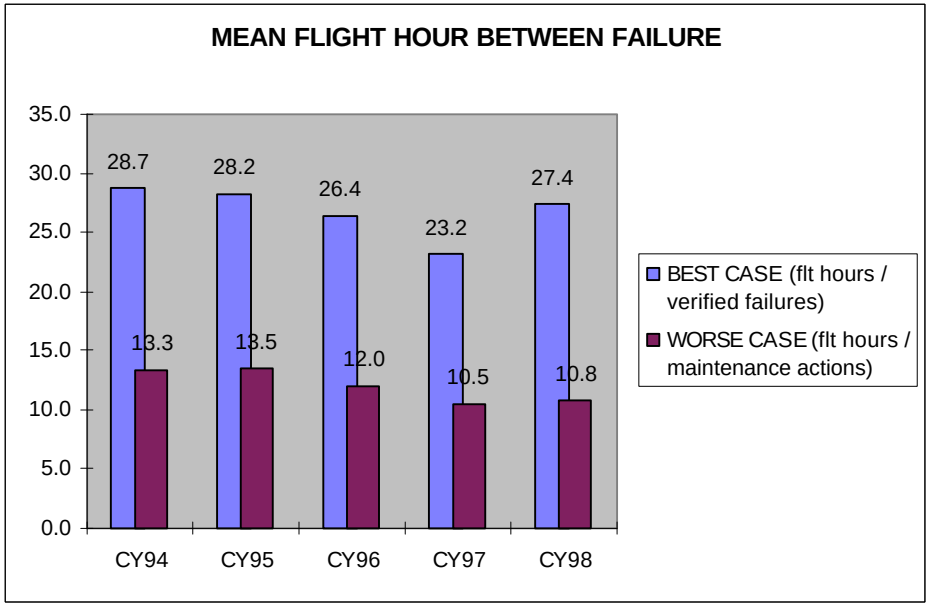
EA-6B APS-130 Radar Metrics



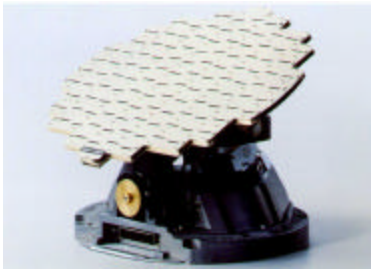
Retirement of A-6E



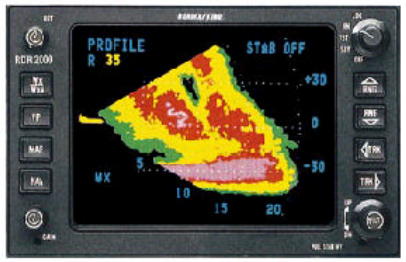




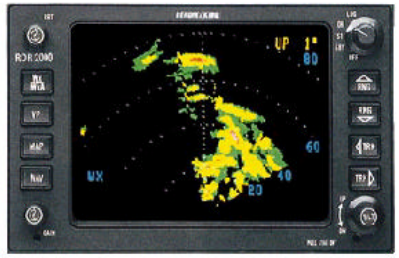
EA-6B APS-130 Radar Upgrade TOC Initiative

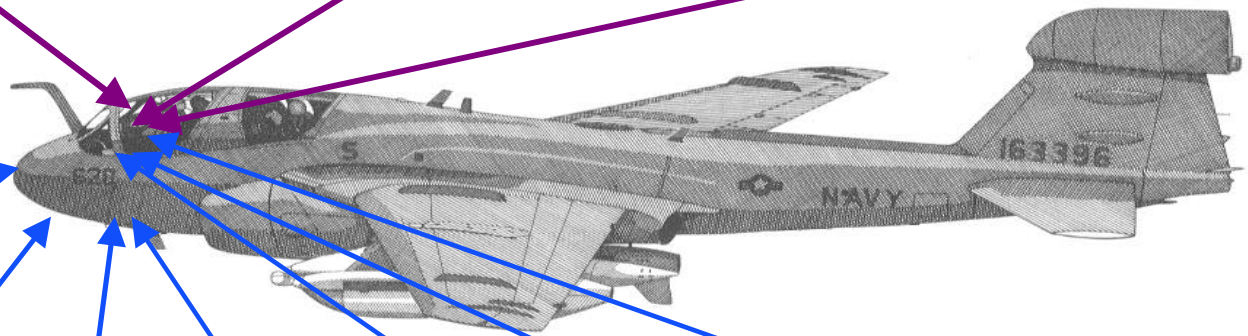


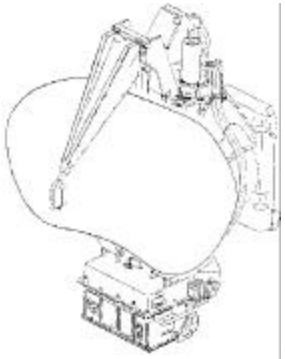
Modern, solid state, all in one Antenna/Receiver /Transmitter unit



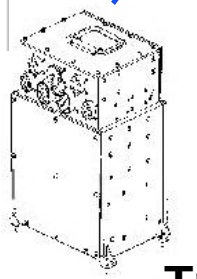
Solid State Color displays and controls



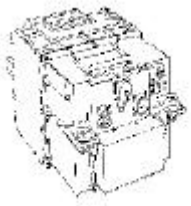




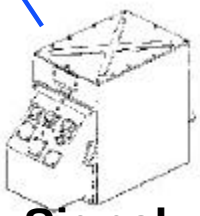
Antenna/ Receiver



Power Supply

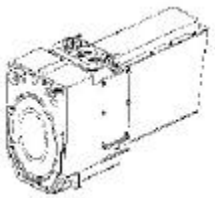


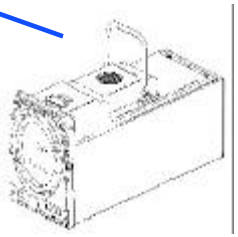
Transmitter/ Modulator



Signal Generator

Radar Control





Monochrome CRT Analog Displays

EA-6B: J52 Engine

Decrease Operating and Support Costs of J52 Engine by increasing engine and component reliability.

Goals:

1. Increase Major Engine Inspection (MEI) Interval from 1100 to 1500 hours
2. Increase J52 reliability from 482 to 800 hours
3. Reduce safety risk associated with current turbine exhaust case

Requirement to meet Goals: 6 engine modifications - turbine exhaust cases, oil tubes, inlet guide vanes, oil leaks, 6th stage stator, and 1st stage turbine vanes

FUNDING ($M)

	00	01	02	03	04	05	Outyrs
Funded	0	0	0	0	0	0	0
Unfunded	9	9	9	.3	.3	.2	0
Total	9	9	9	.3	.3	.2	0

Total FYDP Cost: $27.8
Funded: $0M Unfunded: $27.8M
Total Cost: $27.8M

Return on Investment

- Avoidance: $7/8/10M in annual maintenance costs due to installation of engine upgrades
- Decreased unscheduled engine removals and Major Engine Inspections
- Readiness improvement: Decreased aircraft down time for engines

Risk

- Technical: Low. Modification designs and val/ver are complete
- Financial: Low. Current contracts in place with Contractor

Payback Period

Program cost avoidance begins as soon as engine upgrades are installed with full investment payback realized by FY05.

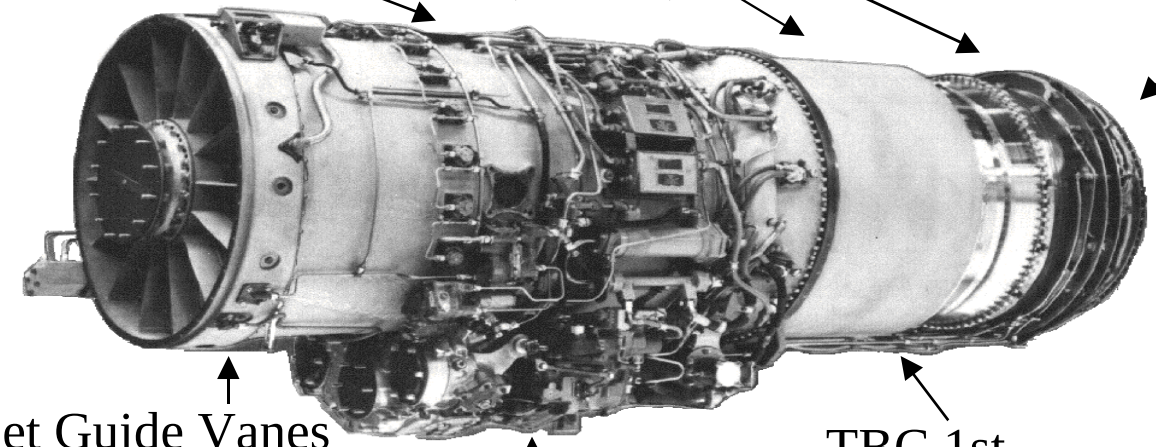
6th Stage Stator
(Attrition Change)

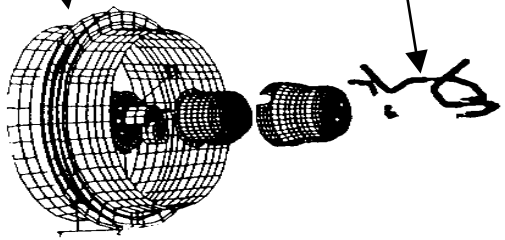
Oil Leaks
(PPC 299)

(PPC 304)

Turbine
Exhaust
Case
(PPC 306)

#6 Bearing
Oil Tubes
(PPC 304)

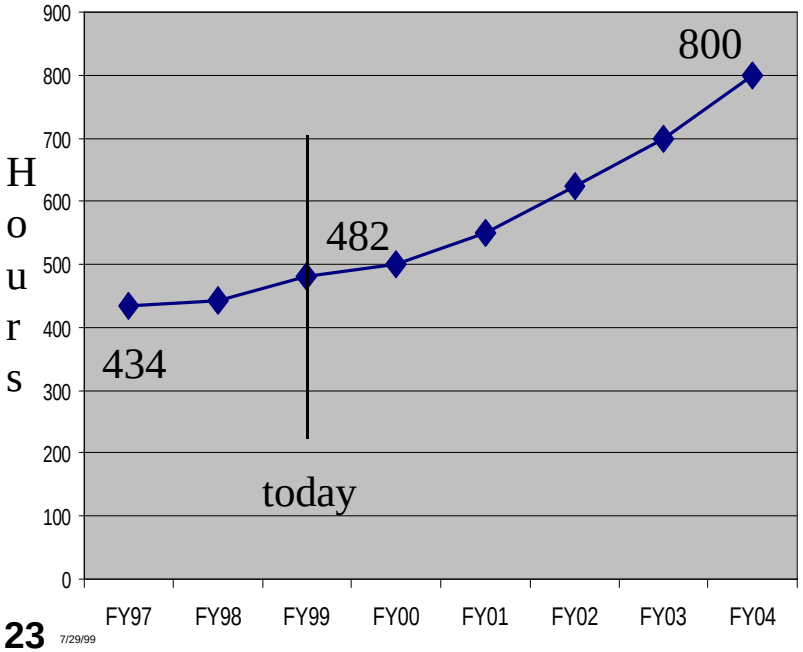




Inlet Guide Vanes
(PPC 300)

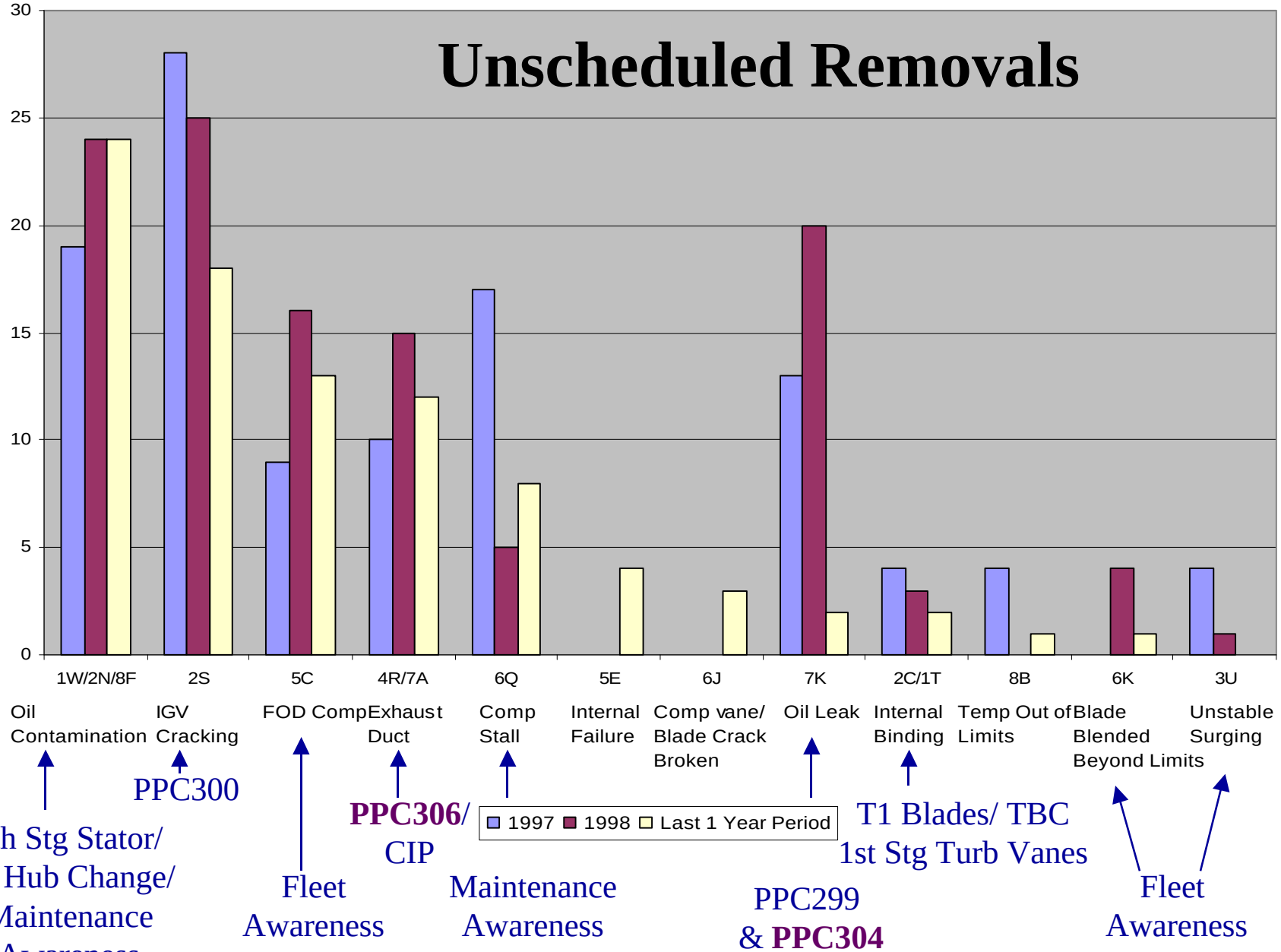
FOD, Compressor Stalls
Maintenance Awareness

TBC 1st
Stage Vanes
(Attrition Change)



Timeline to Higher Reliability:

	00	01	02	03
Build 1st Engine	X - Fleet Leader to 1500 MEI -			
Turbine Exh Case	X----------	----------	----------	----------X
Oil Tubes	X----------	----------	----------	----------X
IGVs	----------	----------X		
Oil Leak	----------	----------	----------X	
6th Stage Stator	X----------	----------	----------	----------X
1st Stage Turbine	----------	----------	----------	----------X
All engines 1500 MEI				X



Solutions identified would eliminate 67% of unscheduled removals.

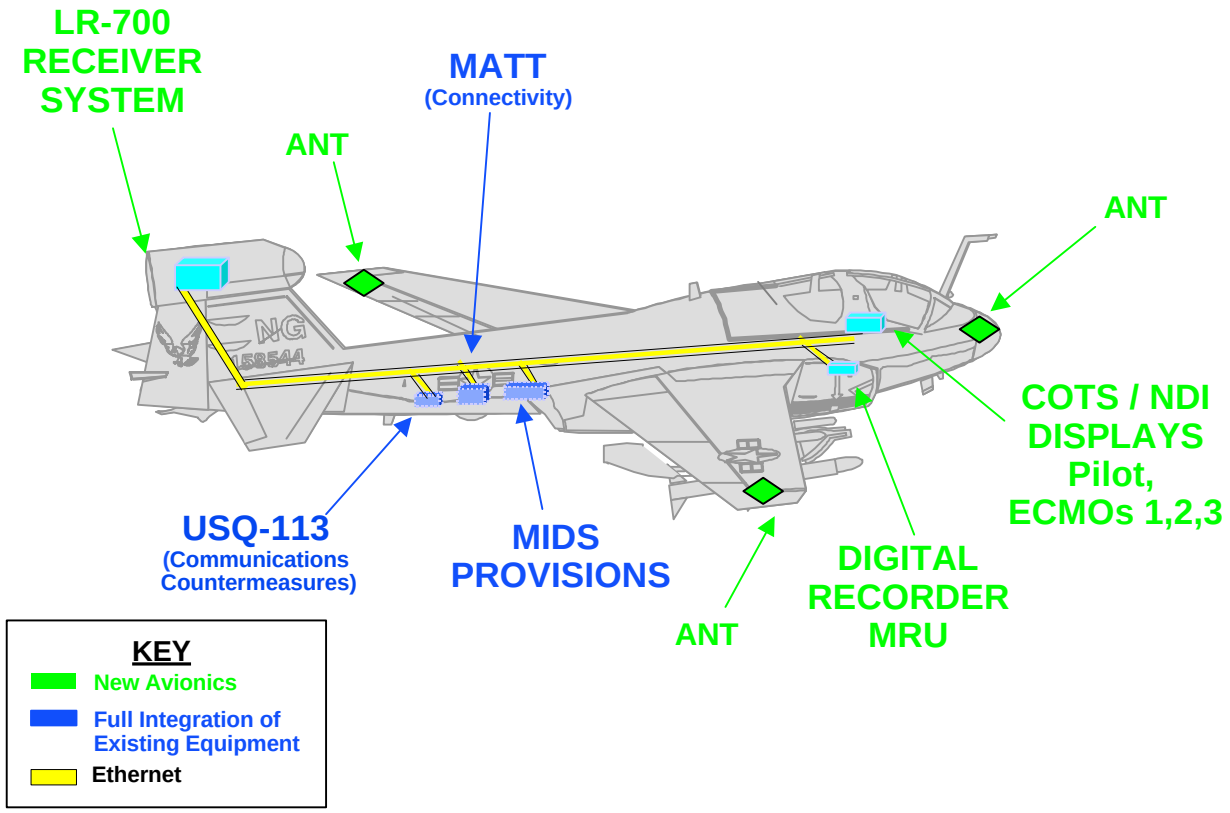
FY-00 TOC Initiatives Proposed

PEO(T)

PROPOSED INITIATIVE	ROI	INVESTMENT	AVOIDANCE	MAN-HOUR SAVINGS/YEAR
J-52 Engine Reliability Initiative	3.3	$28M	$87M	23,450
AN/APS-130 Radar	2.4	$22M	$53M	29,000
ASW-41 Air Navigation Computer	2.7	$16M	$43M	11,900
EA-6B ASN-172	3.9	$10M	$39M	40,560
Flight Control Surfaces	3.4	$23M	$78M	TBD
Low Band Transmitter Acceleration	1.9	$64M	$120M	TBD
EA-6B Airborne Air Removal Device	15.3	$1.8M	$27M	27,000

ICAP III Upgrade (ACAT II)

PEO(T)

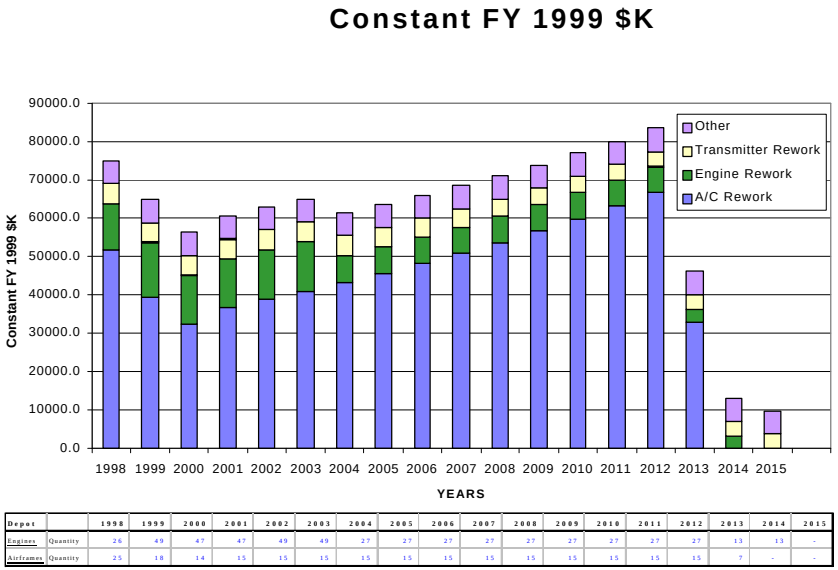


- ACAT II Program
- EMD
- IOC 2004
- Replaces 70 - 80 WRAs with 20
- Increases Reliability of ICAP III System 7 hours to 20 hours

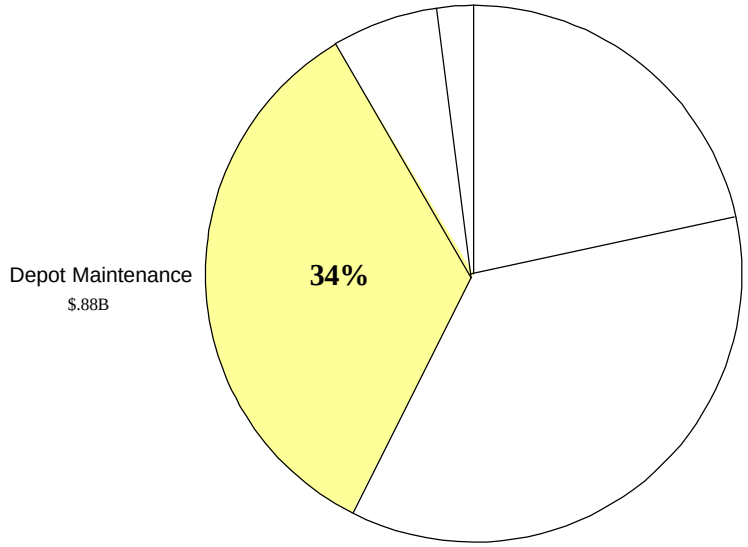
ICAP III PROVIDES SELECTIVE REACTIVE JAMMING CAPABILITY, ACCURATE EMITTER GEOLOCATION, AND FULL AZIMUTH COVERAGE TO COUNTER THREATS THROUGH 2015.

EA-6B Depot Maintenance

PEO(T)



Depot		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Engines	Quantity	26	49	47	47	49	49	27	27	27	27	27	27	27	27	27	13	13	-
Airframes	Quantity	25	18	14	15	15	15	15	15	15	15	15	15	15	15	15	7	-	-



Actions to reduce Depot Maintenance

Aircraft ≈ 15 Months → 10 Months

- SDLM Turn-Around-Times (TAT) Times reductions based on capital equipment investments/ personnel skills
- Reliability Centered Maintenance (RCM)
- Combine SDLM with A/C modifications
- Improved Supply Support
  - DLA Weapon System Manager
  - Supply Initiatives
- Stabilized quantities across FYDP
- Annual review of SDLM specification

Engine

- Reduce TAT from 320 → 111 days
- Reduced test cell reject rate from 70% to 30%
- Incorporation of power plant changes
- Improved Supply Support
- Floor space
- Potential J-52 TOC

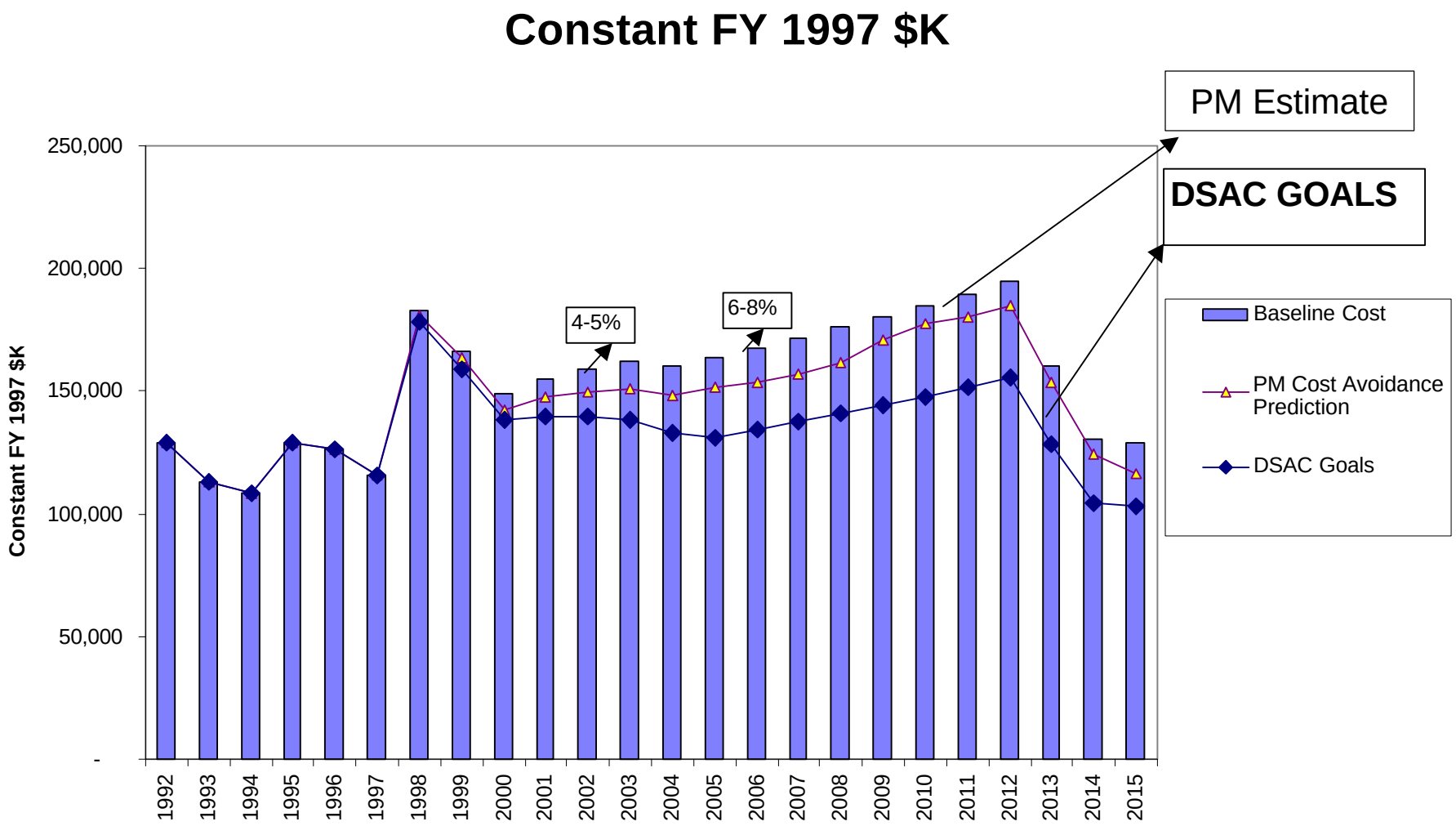
Other Areas Being Pursued

PEO(T)

Initiative	Phase	Funding Status	
Virtual Prime Vendor support with DLA		**Being Studied**	
– J-52 Engine/EA-6B/F-14			
– Decrease cycle time			
– Better forecasts of requirement			
– Improve maintenance and production planning			
Reliability Centered Maintenance/Integrated Maintenance Concept		G	
– Adjust preventive maintenance cycles to improve A/C material condition			
– Integrate maintenance activities to maximize A/C availability			
Modernization programs	Phase	Y	
– Blk-82-89As	LRIP →	G	
– Blk-89-89As	LRIP →	G	
– ICAP III	EMD →	G	
– Band 9/10 Transmitter	Production →	G	(KOSOVO Supplemental)
– Low Band Transmitter	EMD →	Y	(TOC Initiative/POM Issue)
– Universal Exciter Upgrade	Production →	G	(KOSOVO Supplemental)
Integrated Data Environment		G	
– Prototype to establish data infrastructure			
– Facilitates Team tools and data			

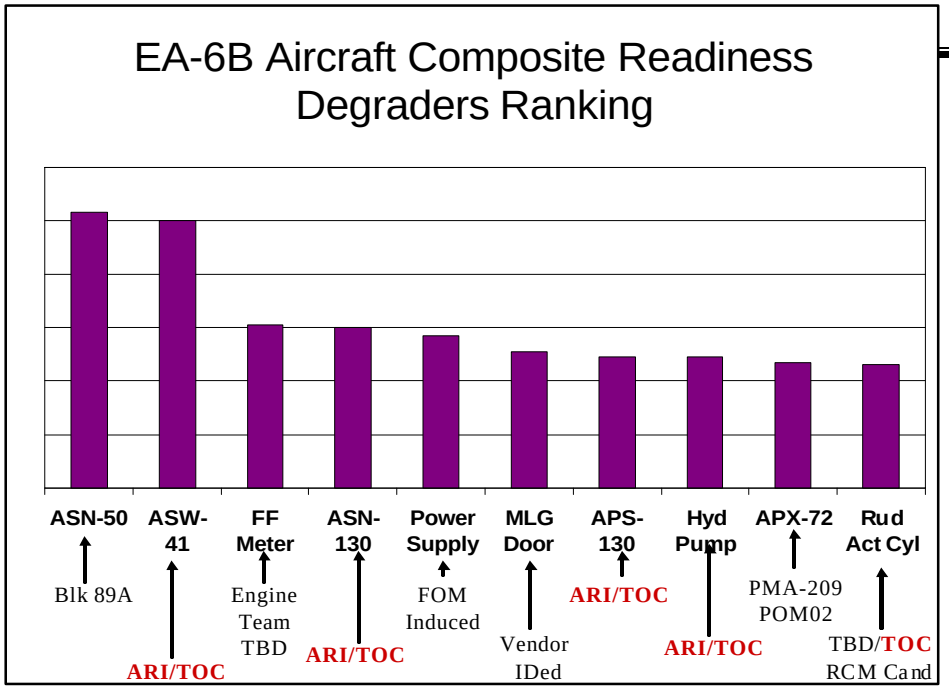
EA-6B Total DSAC Logistics Support Cost

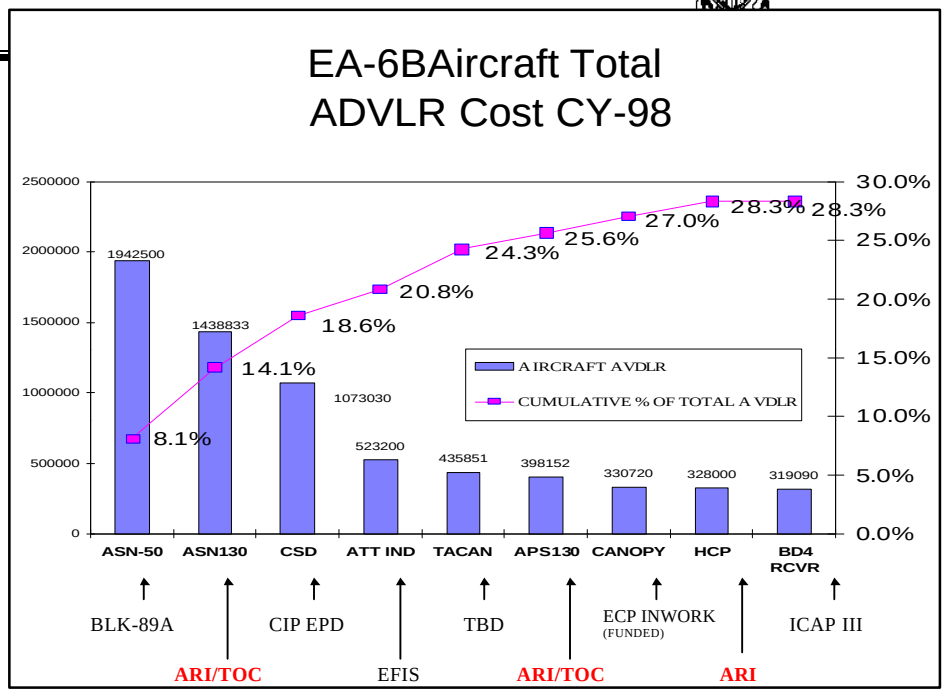
PEO(T)



EA-6B Aircraft Composite Readiness Degraders Ranking

PEO(T)



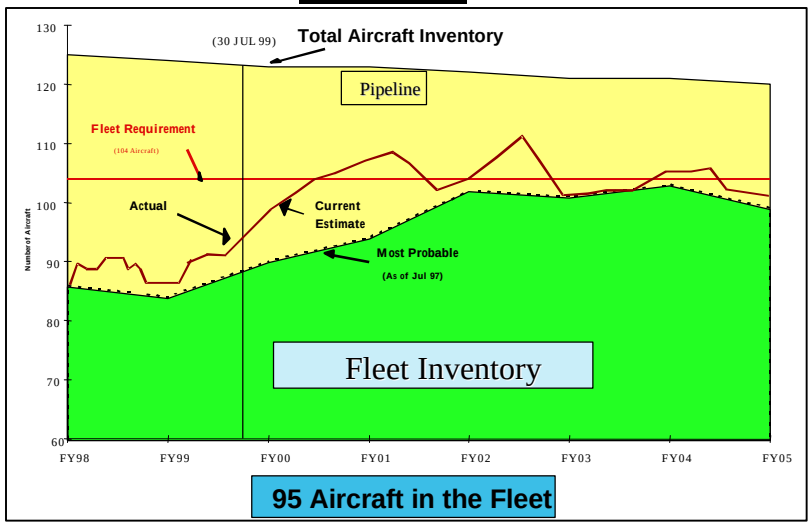


Degrader	Issue	Action
J-52 Engine	$ / Components	R&M MODS identified
MLG Doors	AFB / Sub-assemblies	New procurement
Canopies	AFB / Sub-assemblies	NADEP manufacture/ECP
Landing Gear	Consumables	New procurement/SRC
Air Nav computer	Obsolescence/Carcass	ASW-41 support/ARI/TOC
EFIS displays	Low MTBR	Reliable HVPS implemented
EFIS control panel	Low MTBR	Spares/RAMEC/Canopy/Rainseal
Slats	Tired Iron	New Procurement
Hydraulic Pumps	MTBOF	Hyd servicing ECP/ARI/TOC
Truss Assembly	Stress cracking	Fatigue test/Redesign

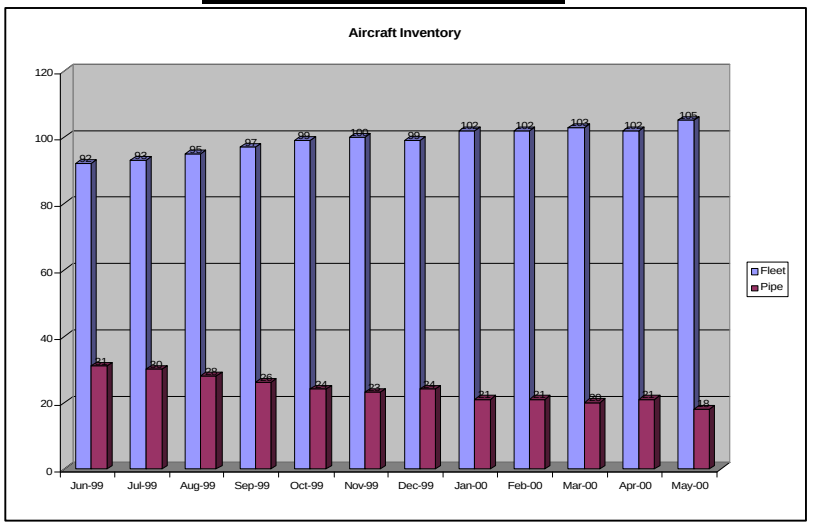
Measures

PEO(T)

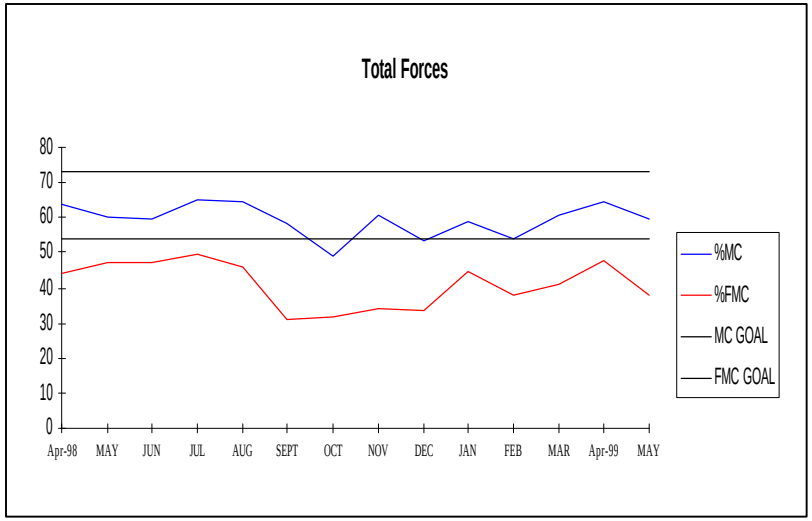
Inventory



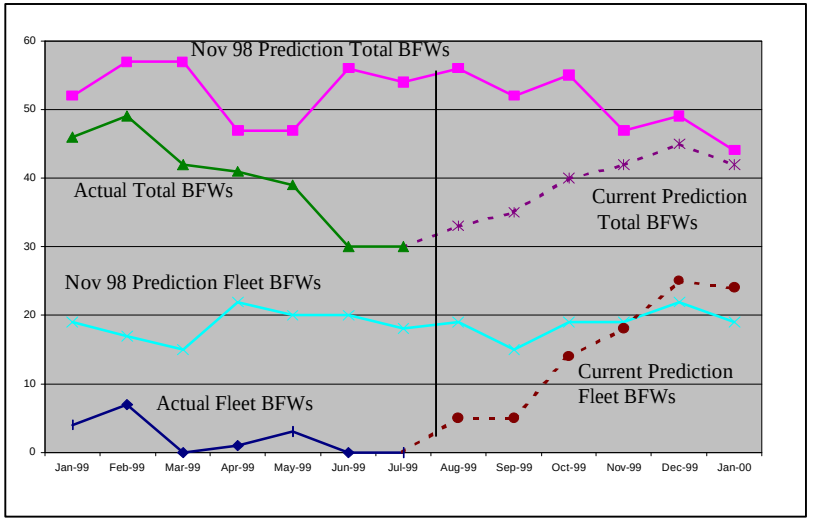
Near Term Inventory



Readiness



Bare Fire Walls



Hurdles/Challenges

PEO(T)

- **10 USC 2469 - Code prevents moving more than $3M worth of workload out of a depot. Drafting legislative proposal.**
- **Colorless Appropriation - PEO approval during execution year**
- **Ability to mix/reprogram BA-4 and BA-1 O&MN accounts**

Lessons Learned

PEO(T)

- **Cost saving/avoidance issues**
- **Trends are more significant than absolute $$$**
- **Baseline difficult to establish and maintain**
- **Interrelationships of cost elements difficult to understand**
- **Saving O&S Costs starts with initial design which includes Logistic Support System**
- **Better luck with low investment high return initiatives**
- **Quit initiatives with low payoffs early**
- **Manage resources carefully**

Summary

PEO(T)

- **EA-6B is a National Asset!**
- **Stretch goals difficult to accomplish for a legacy platform.**
- **RTOC initiatives are necessary to improve readiness and material conditions of the A/C**