



# 402d Maintenance Wing



## *Depot Maintenance Cost Growth*

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402 Maintenance Wing  
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# Overview



*402d Maintenance Wing*

- GWOT and Aging Aircraft Impacts
- Historical cost/rate data
- Cost containment FY05-FY08
  - Labor Cost Drivers
  - Cost Reduction Initiatives
  - CCPM
- Containing Cost During and Beyond GWOT
- High Velocity Maintenance
- Multi-skilled workforce
- Summary



# Demand on MAF FY02 – FY08 (est.)



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## C-130 Overfly

- 65,972 Hours
- 119% of Planned

Avg Age  
24.8 Years

Avg Age  
28.9 Years

Avg Age  
6.3 Years



## C-5B Overfly

- 77,539 Hours
- 138% of Planned



## C-17 Overfly

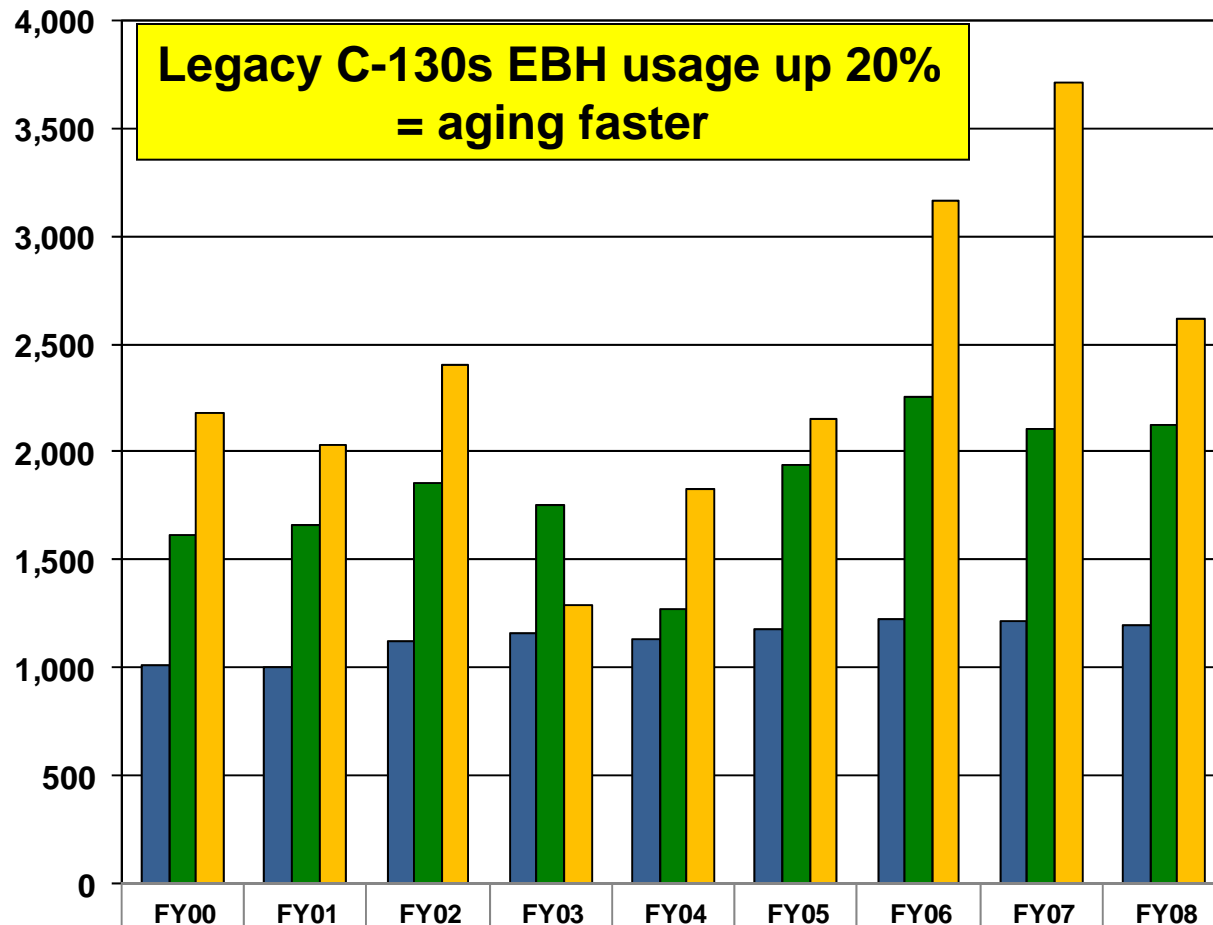
- 8,859 Hours
- 101% of Planned



# C-130 Equivalent Baseline Hours (EBH) Example



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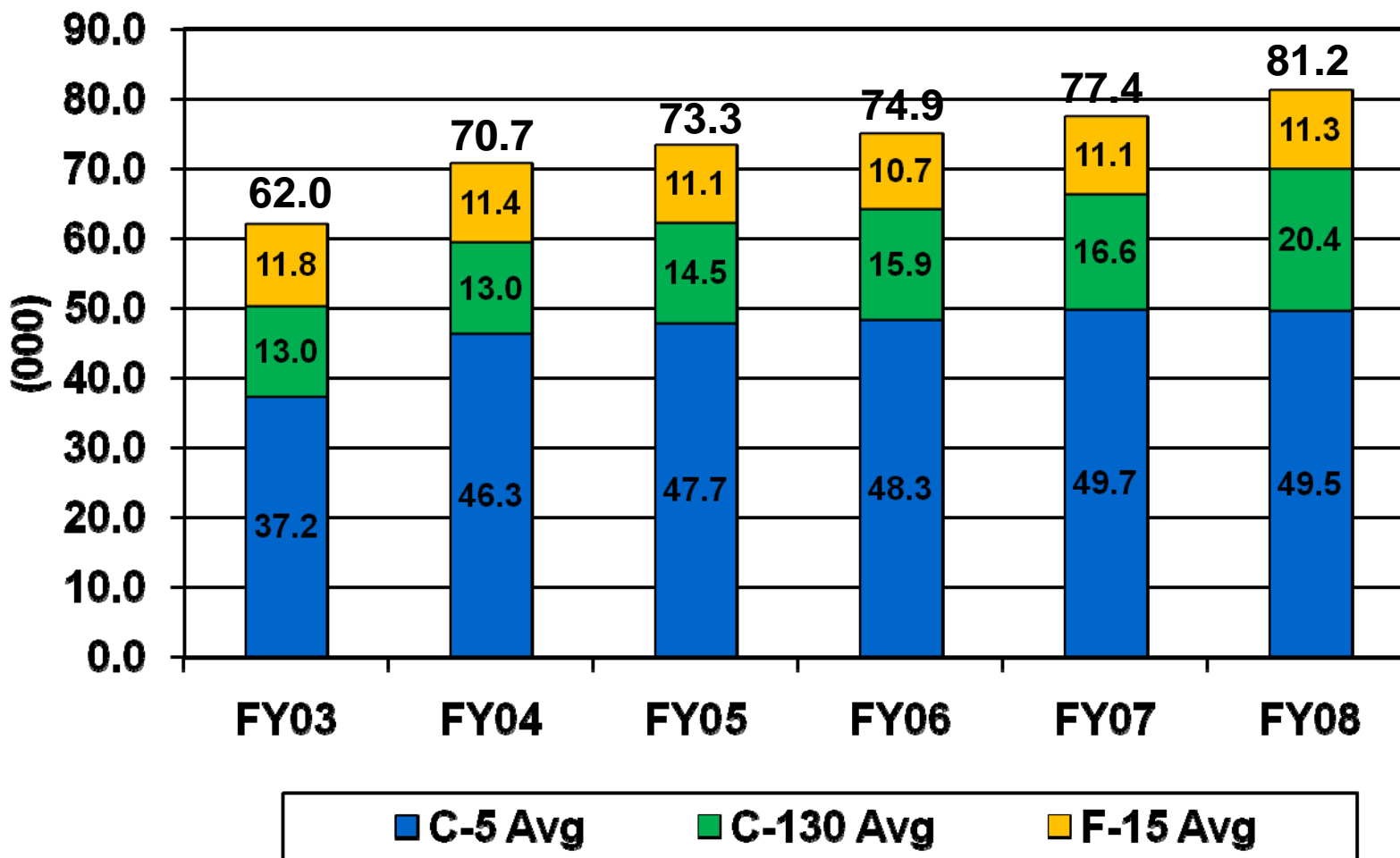
■ Fleet Average EBH per Aircraft	1012	999	1120	1161	1135	1178	1226	1212	1197
■ C-130H Average EBH per Aircraft	1618	1662	1859	1750	1274	1942	2254	2107	2123
■ AC-130U Average EBH per Aircraft	2185	2030	2403	1291	1827	2149	3163	3714	2619



# Aircraft MRRB Brochure Hours History



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# Aging Aircraft Issues



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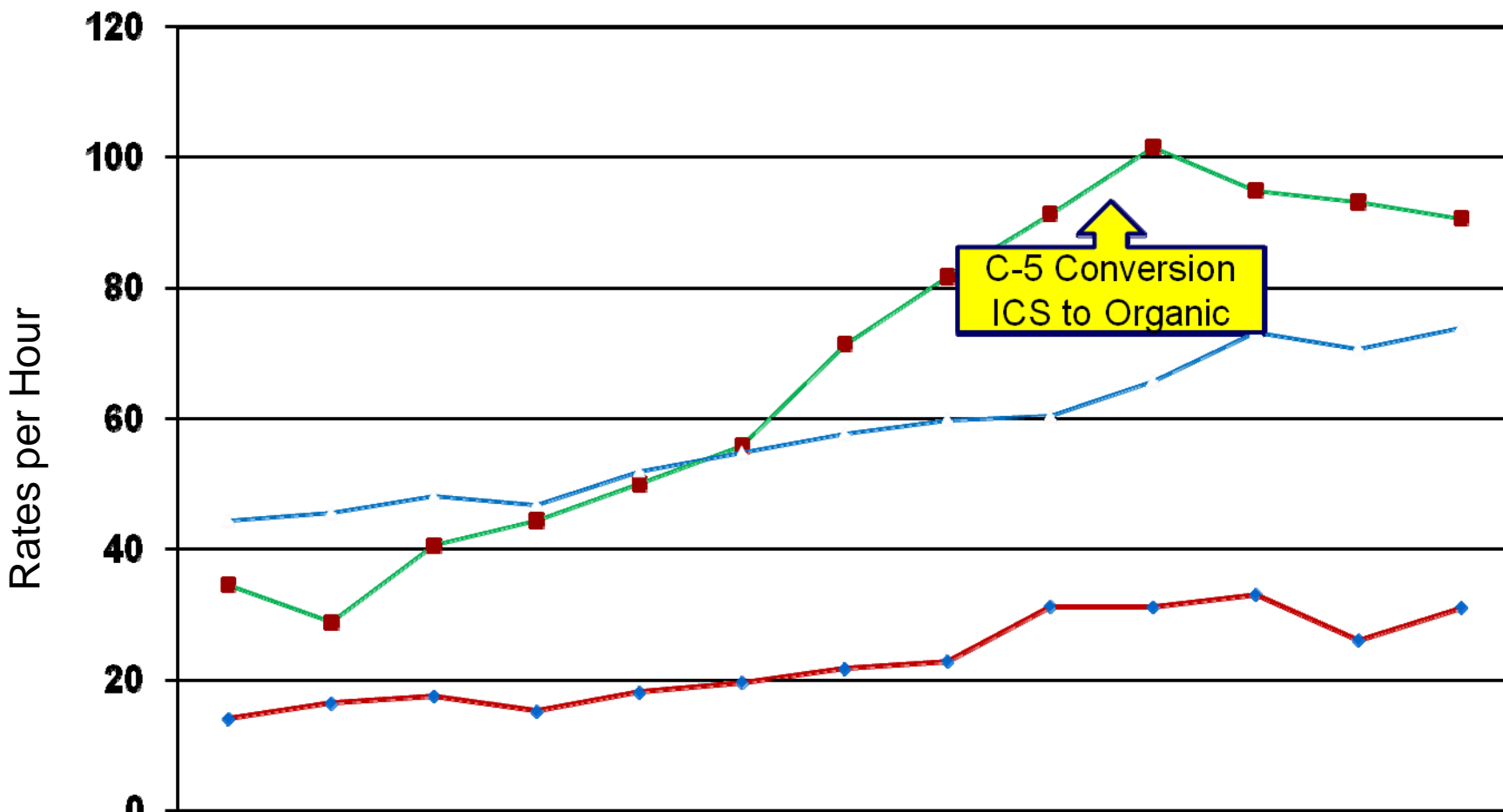
- C-5
  - Crown Skins
  - Contour Box Beam Fitting (CBBF)
  - Horizontal Stabilizer Tie Box
- F-15
  - Structural Integrity
  - Wiring degradation
- C-130
  - C-130 Center Wing (CW)
  - Rainbow Fittings
  - Obsolescence
- C-17
  - Fuselage Skin Panel Cracks
  - Corrosion on Fuselage Skin at Under Wing Fillet Attach Point



# 402 MXW Actual Rates per DPSH



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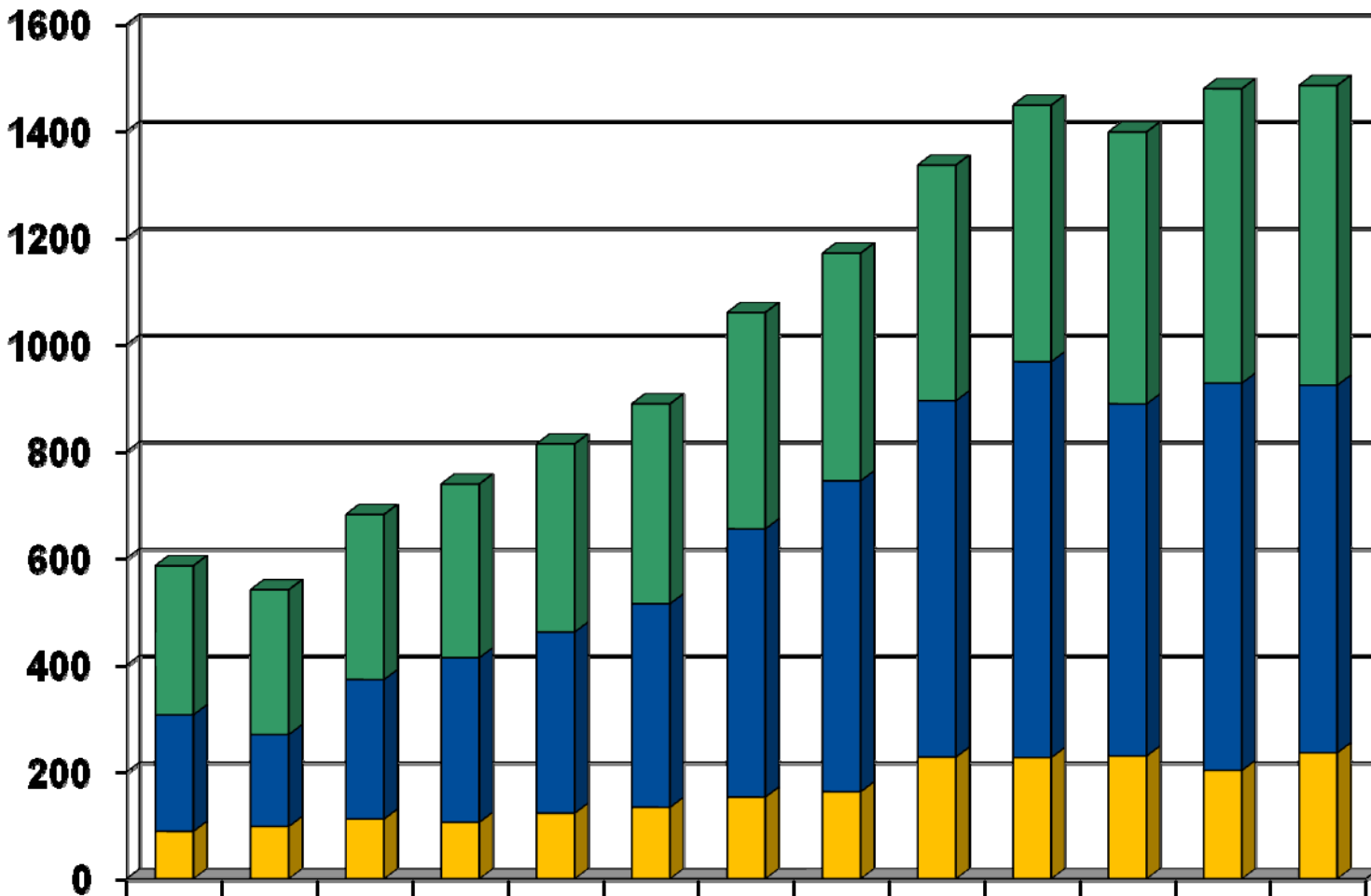
	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
Bus Ops	14.09	16.45	17.54	15.22	18.11	19.63	21.74	22.86	31.24	31.14	33.06	26.11	31.09
Mat'l	34.59	28.88	40.61	44.4	50.03	55.83	71.43	81.72	91.41	101.57	94.93	93.17	90.68
Labor	44.36	45.56	48.05	46.77	51.85	54.81	57.66	59.85	60.37	65.84	73.32	70.76	73.98



# 402 MXW Actual \$



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	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
<b>Labor</b>	279	271	309	325	352	374	405	426	441	480	509	551	561
<b>Mat'l</b>	218	172	261	308	339	381	502	582	667	741	659	725	688
<b>Bus Ops</b>	89	98	112	106	123	134	153	163	228	227	230	203	236

Sustain the Fight...Quality Depot Maintenance On Time, On Cost





# How did we contain cost growth 05 to 08?



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- Multiple AFSSO21 and Lean initiatives
- Critical Chain Project Management (CCPM)



# Labor Cost Drivers



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<u>FY04-FY08 increase</u>	<u>Cost</u>	<u>Rate</u>
COLA & Benefits	\$89.0	\$12.13
Fitness Leave	8.8	1.20
Wingman day/Cmdr's Calls	4.5	0.61
UUT SW Development	0.0	2.51
Intensified FOD & Safety	2.7	0.36
<hr/>		
TOTAL Increase Should Be	\$105.0	\$16.81
Actual Growth	91.0	12.41
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Savings	\$14.0	\$4.40

**AFSO21/Lean has Mitigated our Potential Cost Growth**



# AFSO21 Cost Reduction Initiatives



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## ➤ C-5

- FY05- Reduced flow days from 339 to 171
  - Reduction of 168 flowdays
  - Cost avoidance \$8.9M
  - Cost savings \$1.5M



## ➤ F-15

- FY04-FY06 Reduced WIP; 44 to 28
- Reduced FCF by 78%
  - Cost savings \$1.3M



# AFSO21 Cost Reduction Initiatives



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- F-15 Wing Shop: 2007 Shingo Bronze Medallion Award
  - Flowday reduction with cost avoidance of \$6.3M & 36% overtime reduction

- C-130 sloping longeron
  - Utilized robot technology
    - Improved drilling process
    - 75% manhour savings





# Cost Reduction Initiatives



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- N-1 Model Cell: Ben Epps Aerospace Innovation Achievement Trophy Winner
  - Reduced all MICAPS; reduced WIP from 22 to 14 items



- C-5 O-Level Brake Equipment (COLBE) Test Set
  - Efficiency improvement of 75% and cost savings of \$1400 per aircraft





# AFSO21 Cost Reduction Initiatives



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- Improved ground equipment support
  - \$89K annual cost avoidance
- Improved Tool Mgt
  - Cost savings \$235K



- 402 MXW Right-Sizing Initiatives
  - Reducing overhead positions
    - Reduced more than 3.5% in FY08
    - Planned reduction of 12 -15% more in FY09

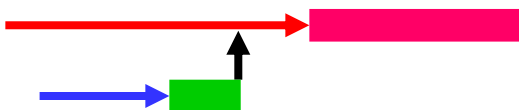




# Critical Chain Project Management Summary

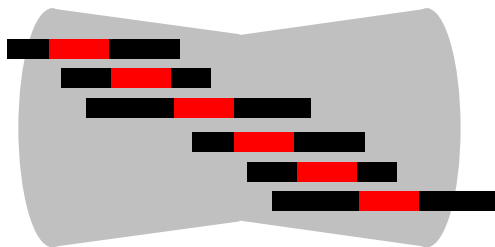
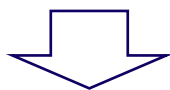


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**CRITICAL  
CHAIN  
BUFFERING**

- Remove “hidden” safeties from individual tasks.
- Protect overall project instead.



**PIPELINING**

- DO NOT release projects ASAP. Release work based on constraint.
- Reduce work-in-progress so all work can finish faster.



List of  
Tasks

Priority 1

Priority 2

Priority 3

**BUFFER  
MANAGEMENT**

- All departments follow the same set of priorities.
- All managers manage projects & resources based on buffer status.



# CCPM Results



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## ➤ Improvements in:

- Rigging - 57% reduction
- C-5 Paint Barn - 25% reduction
- Functional Test Ops - 41% reduction
- Floor Board Replacement - 47% reduction
  - Quality Assurance defects reduced 80%



## ➤ Since WR-ALC implementation, others have followed

- Tinker deployed CCPM to its B-1, E-3, B-52 and C/KC-135 lines
- Delta airlines benchmarked C-5/deployed it to their operations
- French Air Force is adopting CCPM following their study of C-5





# How will costs be contained during and beyond GWOT?



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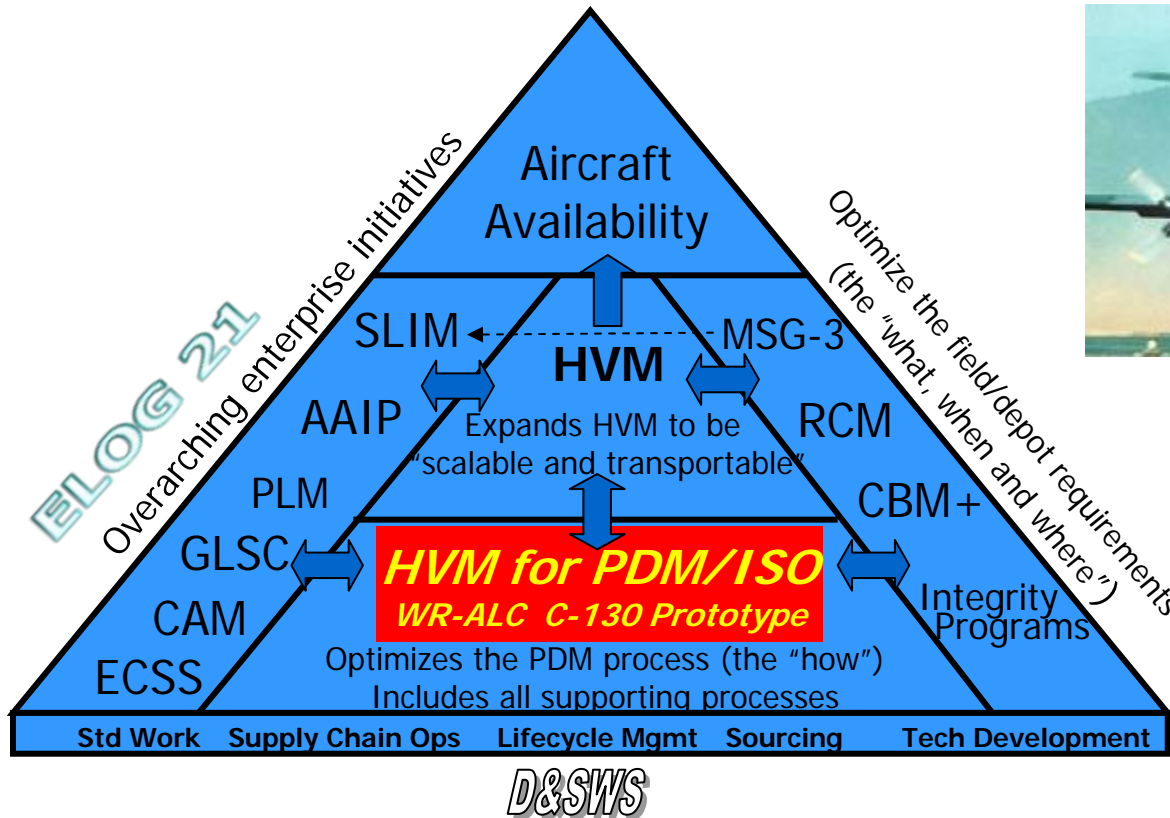
- Continued focus on AFSO21
  - Overhead material cost reduction
  - Energy usage – reduce 30% by 2015
  - Expansion of Pollution Preventatives & Ergonomics
  
- Focus on HVM development/implementation
  - Condition based maintenance & MSG 3
  - Standard work packages
  - Kitting & Parts at point of use
  
- Multi-skilled workforce



# Long Term - HVM

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**Increase Aircraft Availability using AFSO21 tools to establish a synchronized, integrated, end-to-end process such that maintenance does not impact mission requirements.**



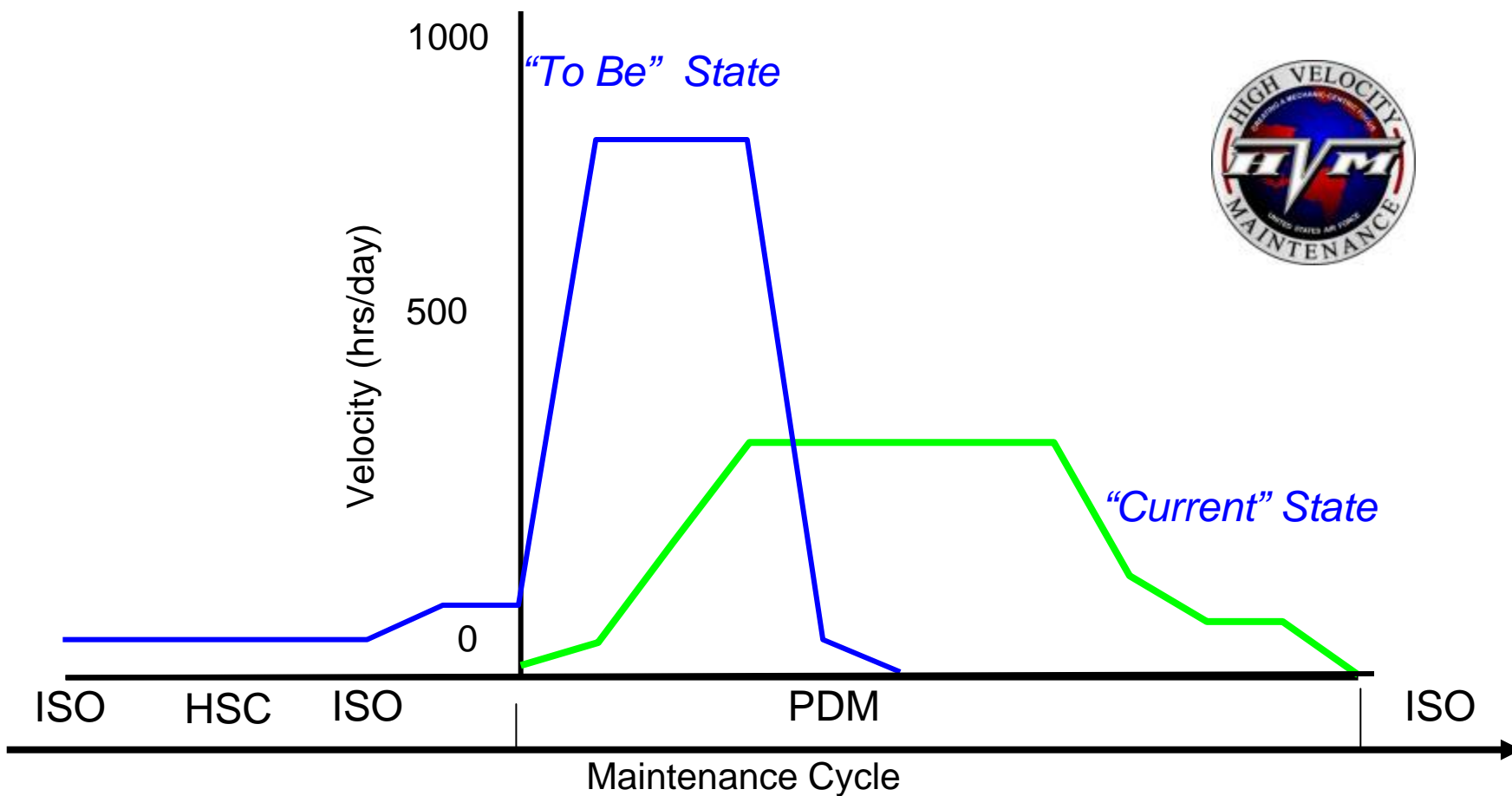
## Standard Work and Kitting in Work Now



# High Velocity Maintenance



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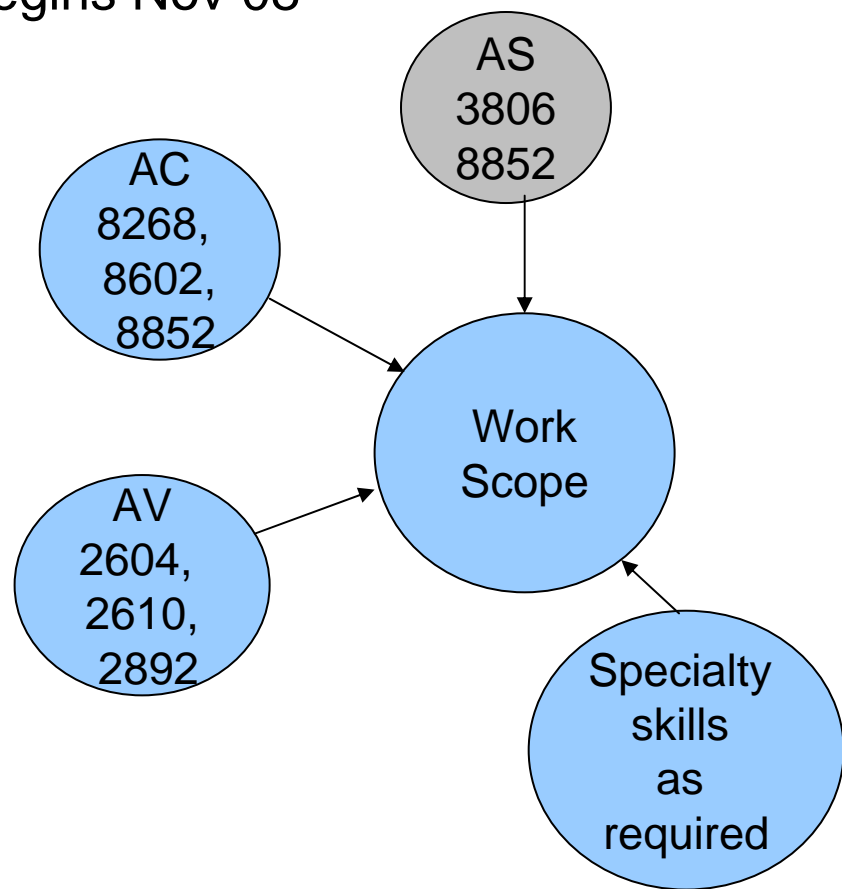
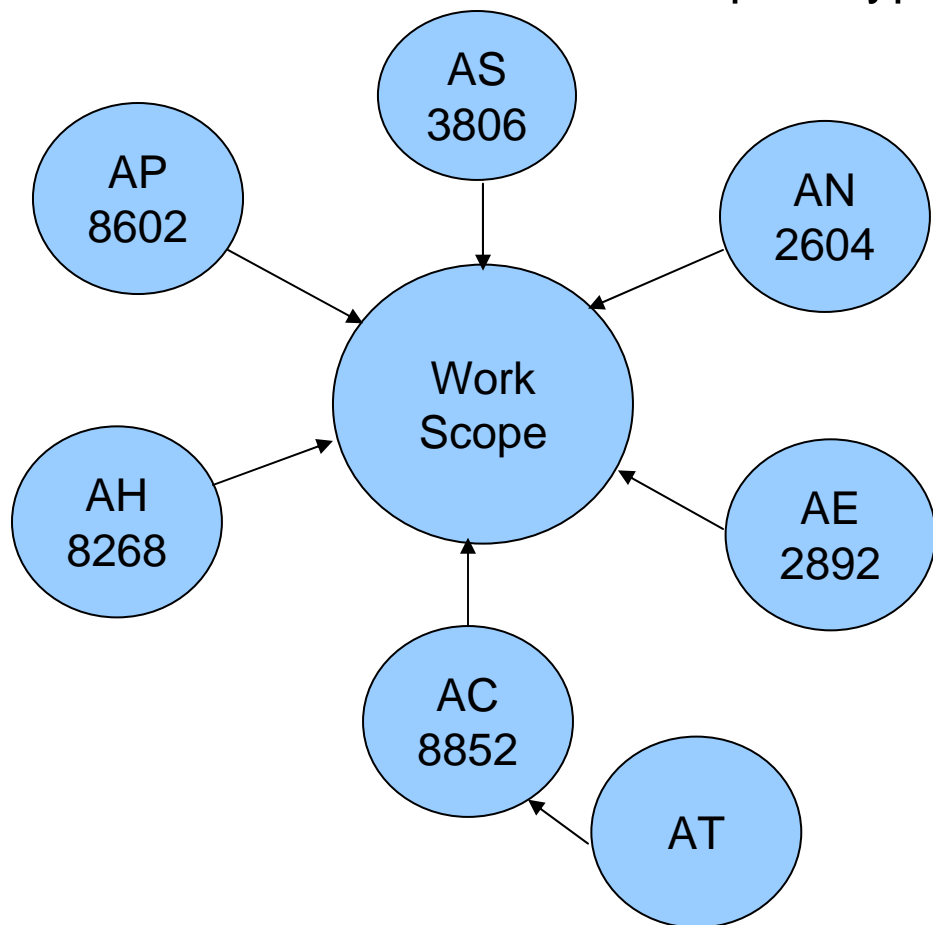
# 402 MXW Multi-Skilled / A&P Licensed Workforce

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- First Prototype AC ahead of schedule
- 25% reduction in manpower
- Zero safety/quality write-ups
- Second prototype begins Nov 08

Current C-17

Future C-17  
7 skills to 3





# Summary



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- Current environment has created many challenges
- Multiple initiatives have been implemented to control costs
- High Velocity Maintenance and multiskilling have high potential to fundamentally change the way we do business



## Discussion/Questions