



Australian Government
Department of Defence
Capability Acquisition and
Sustainment Group

Asset Management of an Ageing Aircraft

Opportunities Lost and Wins Achieved

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The views expressed in this presentation are the presenters' own and do not necessarily reflect the views or policies of the Australian Government or the Department of Defence.

Asset Characteristics



1970s design, for combat, survivability driving design

Novel features

Small part of large production runs

American support base with global liability

Multi-environments, multiple usage profiles, optimised configurations

Reliant on humans; to fly, to maintain, to supply, to manage over time

S-70A-9 is a relatively 'youthful' and 'homogenous' ageing orphan fleet

Asset Role

Force multiplier

- by transportation of combat power
- by transportation of logistics
- contributing to mass effects
- conducting concurrent operations
- on land and off water
- too a tempo
- in isolation and with constraints
- surging from differing levels of preparedness
- increasingly integrated niche capability



Asset History

Scare resource – over subscribed

Redistributed – Townsville & Oakey to Sydney

Operations – domestic, overseas, deliberate/reactive

Complexity – reliability, maintainability, supportability



Scope

Analysis Methodology

Findings

So What?

Analysis Methodology

History

Assessed as

Present

Suitable

Operating

Effective

for a series of questions pose by CASG

Checked for coverage against a mapping of

- The Institute of Asset Management Asset Management BoK, to
- ISO55000

10 Appendix A

How the 39 Subjects map to the clauses of ISO 55001:2014

Subject Group	Strategy & Planning	Asset Management Decision Making	Lifecycle Delivery										Asset Information	Organisation & People	Risk & Resilience																							
Subject Title	Asset Management Policy	Asset Management Strategic Objectives	Demand Analysis	Strategic Planning	Asset Management Planning	Capital Investment Decision Making	Operations & Maintenance Decision Making	Life-cycle Decision Making	Resource Planning	Shutdown & Decommissioning	Technical Standards & Legislation	Asset Condition & Reliability	Systems Engineering	Configuration Management	Maintenance Management	Reliability Engineering	Asset Operations	Resource Management	Shutdown & Decommissioning	Asset Decision Making & Control	Asset Information Strategy	Asset Information Architecture	Asset Information Management	Asset Information Governance	Process Management & Change Management	Asset Management Leadership	Organisational Structure	Organisational Culture	Competence Management	Risk Assessment & Resilience	Configuration Management & Resilience	Management of Change	Asset Performance Monitoring	Asset Management System Integration	Management Review & Validation	Management Improvement		
Ref																																						
4 Context of the Organisation	4.1 Understanding the organisation and its context		✓	✓																																		
	4.2 Understanding the needs and expectations of stakeholders							✓	✓																												✓	✓
	4.3 Determining the scope of the asset management system																																					
	4.4 Asset management system		✓																																			
5 Leadership	5.1 Leadership and commitment		✓																								✓		✓									
	5.2 Policy		✓																																			✓
	5.3 Organising roles, responsibilities and authorities		✓																✓								✓	✓	✓									
	5.4 Addressing risks and opportunities for the AEM system			✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓																	
6 Planning	6.1 Asset management objectives		✓				✓	✓	✓	✓																											✓	✓
	6.2 Asset system achieves asset management objectives			✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓																	
	7.1 Resources																																					
	7.2 Competence		✓																																			
7 Support	7.3 Awareness																																					
	7.4 Communication																																					✓
	7.5 Information management																																					
	7.6 Documented information																																					
8 Operation	8.1 Operational planning and control																																					
	8.2 Management of change																																					✓
	8.3 Outsourcing																											✓										
9 Performance Evaluation	9.1 Monitoring, measurement, analysis and evaluation																																					✓
	9.2 Internal audit																																					✓
	9.3 Management review																																					✓
10 Improvement	10.1 Nonconformity and corrective action																																					
	10.2 Preventive action																																					
	10.3 Continual improvement		✓	✓		✓																																✓

Asset Management Body of Knowledge

39 Subjects

ISO 55001 Requirements

CASG Key Asset Management Questions

- Is there an effective system of Asset Management in place?
- Is the Asset properly identified and characterised?
- Is there a suitable Asset Management strategy in place for the system overall and each system element?
- Has Asset Management responsibility for 'asset elements' been assigned?
- Has the Demand (requirement) for each asset element been defined and analysed?
- Do we understand the Total Cost of Ownership and cost attribution throughout the system?
- Has the supportability of each system element been properly analysed?
- Are system condition, performance, cost and life-consumption trends being tracked and analysed?
- Are ILS practices that prevent or reduce decay and cost in place?
- Are risks and issues being properly identified, acted upon and resourced?
- Are strategic Asset Management risks being properly identified and reported?
- Are opportunities for improvement being sought, proposed and implemented?

Key (asset) Management Questions

1. Effective system of (asset) management?
2. Asset properly identified and characterised?
3. (asset) management strategy in place for the system and each system element?
4. (asset) management responsibility assigned?
5. Demand (requirement) defined and analysed?
6. Understanding of Total Cost of Ownership based on sub-system cost attribution?
7. Supportability analysed?
8. System condition, performance, cost and life-consumption trends tracked and analysed?
9. Implementing ILS practices that prevent or reduce decay and cost?
10. Risks identified, acted upon and reported?
11. Strategic (asset) management risks identified and reported?
12. Opportunities sought, proposed and implemented?

10 Appendix A

How the 39 Subjects map to the clauses of ISO 55001:2014

Effective system of (asset) management?

ISO 55001:2014		Subject Mapping	Asset & Resource	Asset Management	Lifecycle Delivery	Asset Substitution	Operational Efficiency	End-to-end
1	Context of the organization	1.1	1.2	1.3	1.4	1.5	1.6	1.7
2	Leadership	2.1	2.2	2.3	2.4	2.5	2.6	2.7
3	Planning	3.1	3.2	3.3	3.4	3.5	3.6	3.7
4	Support	4.1	4.2	4.3	4.4	4.5	4.6	4.7
5	Operation	5.1	5.2	5.3	5.4	5.5	5.6	5.7
6	Performance Evaluation	6.1	6.2	6.3	6.4	6.5	6.6	6.7
7	Improvement	7.1	7.2	7.3	7.4	7.5	7.6	7.7

[illegible]

Question 3 superimposed on BoK to ISO 55000 Matrix

10 Appendix A

How the 39 Subjects map to the clauses of ISO 55001:2014

Demand (requirement)-defined and analysed?

		Subject Group	Subject Title	Asset Management Principles	Asset Management Foundations	Concepts Delivery	Asset Information	Integration Elements	Risk & Resilience
				1	2	3	4	5	6
A Context of the Organisation	A.1 Understanding the organisation and its context			●				●	
	A.2 Understanding the needs and expectations of stakeholders				●	●			
	A.3 Determining the scope of the asset management system								●
	A.4 Asset management system			●					
B Leadership	B.1 Leadership and commitment			●				●	
	B.2 Policy			●				●	
	B.3 Organisational roles, responsibilities and authorities			●				●	
C Planning	C.1 Action to address risks and opportunities for the asset system			●	●	●	●	●	
	C.2.1 Asset management objectives			●	●	●	●	●	
	C.2.2 Planning of the asset management objectives			●	●	●	●	●	●
D Support	D.1 Resources				●			●	
	D.2 Competence				●			●	
	D.3 Awareness			●				●	
	D.4 Communication							●	
	D.5 Information management					●	●	●	●
	D.6 Documented information					●		●	
E Operation	E.1 Operational planning and control					●	●	●	●
	E.2 Management of change					●	●	●	●
	E.3 Monitoring				●			●	
F Performance Evaluation	F.1 Monitoring, measurement, analysis and evaluation							●	●
	F.2 Internal audit							●	●
	F.3 Management review							●	●
G Improvement	G.1 Nonconformity and corrective action					●			●
	G.2 Incident and nonconformity					●			●
	G.3 Continual improvement			●					●

How the 39 Subjects map to the clauses of ISO 55001:2014

(asset)-management-responsibility-assigned?

[illegible]

10 Appendix A

How the 39 Subjects map to the clauses of ISO 55001:2014

Demand (requirement)-defined and analysed?

Subject	Clause	Mapping
1. Understanding the organization	4.1	✓
2. Understanding the context	4.2	✓
3. Understanding the requirements	4.3	✓
4. Understanding the organization	4.4	✓
5. Understanding the organization	4.5	✓
6. Understanding the organization	4.6	✓
7. Understanding the organization	4.7	✓
8. Understanding the organization	4.8	✓
9. Understanding the organization	4.9	✓
10. Understanding the organization	4.10	✓

[illegible]

[illegible]

[illegible]

Question 10 superimposed on BoK to ISO 55000 Matrix

10 Appendix A

How the 39 Subjects map to the clauses of ISO 55001:2014

Risks identified, acted-upon and reported?

		Subject Mapping	Strategic Planning	Asset Management Planning	Objectives Delivery	Asset Information	Registration Efforts	Risk & Control
		Subject IDs	Asset Management Policy	Asset Management Planning & Reporting	Asset Management	Asset Management	Asset Management	Asset Management
		Ref	1	2	3	4	5	6
6 Context of the Organization	6.1 Understanding the organization and its context		✓	✓				
	6.2 Understanding the needs and expectations of stakeholders			✓	✓			
	6.3 Determining the scope of the management system							
	6.4 Asset management system		✓					
7 Leadership	7.1 Leadership and commitment		✓				✓	
	7.2 Policy		✓					
	7.3 Organizational roles, responsibilities and authorities		✓				✓	
8 Planning	8.1 Addressing risks and opportunities that affect the ability to achieve the purpose of the management system		✓	✓	✓	✓	✓	✓
	8.2.1 Asset management objectives		✓	✓	✓	✓	✓	✓
	8.2.2 Planning sufficient resources and management attention			✓	✓	✓	✓	✓
9 Support	9.1 Resources				✓		✓	
	9.2 Competence					✓		
	9.3 Awareness		✓	✓			✓	
	9.4 Communication						✓	
	9.5 Information requirements				✓		✓	✓
10 Operation	10.1 Operational planning and control				✓	✓	✓	
	10.2 Management of change				✓	✓	✓	
	10.3 Monitoring			✓			✓	
11 Performance Evaluation	11.1 Monitoring, measurement, analysis and evaluation						✓	✓
	11.2 Internal audit							✓
	11.3 Management review							✓
12 Improvement	12.1 Nonconformity and corrective action				✓			
	12.2 Prevention action				✓			
	12.3 Continual improvement		✓	✓				✓

Question 11 superimposed on BoK to ISO 55000 Matrix

10 Appendix A

How the 39 Subjects map to the clauses of ISO 55001:2014

11

Strategic (asset)-
management risks-
identified and reported?

		Subject Group	Strategic & Business	Asset Management Foundations	Lifecycle Delivery	Asset Information	Organization & People	Risk & Resilience
		Subject Title	Asset Management Policy	Asset Management Strategy & Objectives	Asset Condition	Asset Management Planning	Asset Management Planning	Asset Management Planning
		ISO 55001:2014	1	2	3	4	5	6
4 Context of the Organization	4.1 Understanding the requirements that are applicable to the organization							
	4.2 Understanding the needs and expectations of stakeholders							
	4.3 Determining the scope of the asset management system							
	4.4 Asset management system							
5 Leadership	5.1 Leadership and commitment							
	5.2 Policy							
	5.3 Organizational roles, responsibilities and authorities							
6 Planning	6.1 Actions to address risks and opportunities for the OHS system							
	6.2 Asset management objectives							
	6.3 Planning of resource management objectives							
7 Support	7.1 Resources							
	7.2 Competence							
	7.3 Awareness							
	7.4 Communication							
	7.5 Information requirements							
	7.6 Documented information							
8 Performance Evaluation	8.1 Monitoring, measuring, analysis and evaluation							
	8.2 Internal audit							
	8.3 Management Review							
9 Improvement	9.1 Nonconformity and corrective action							
	9.2 Innovation and improvement							
	9.3 Continual improvement							

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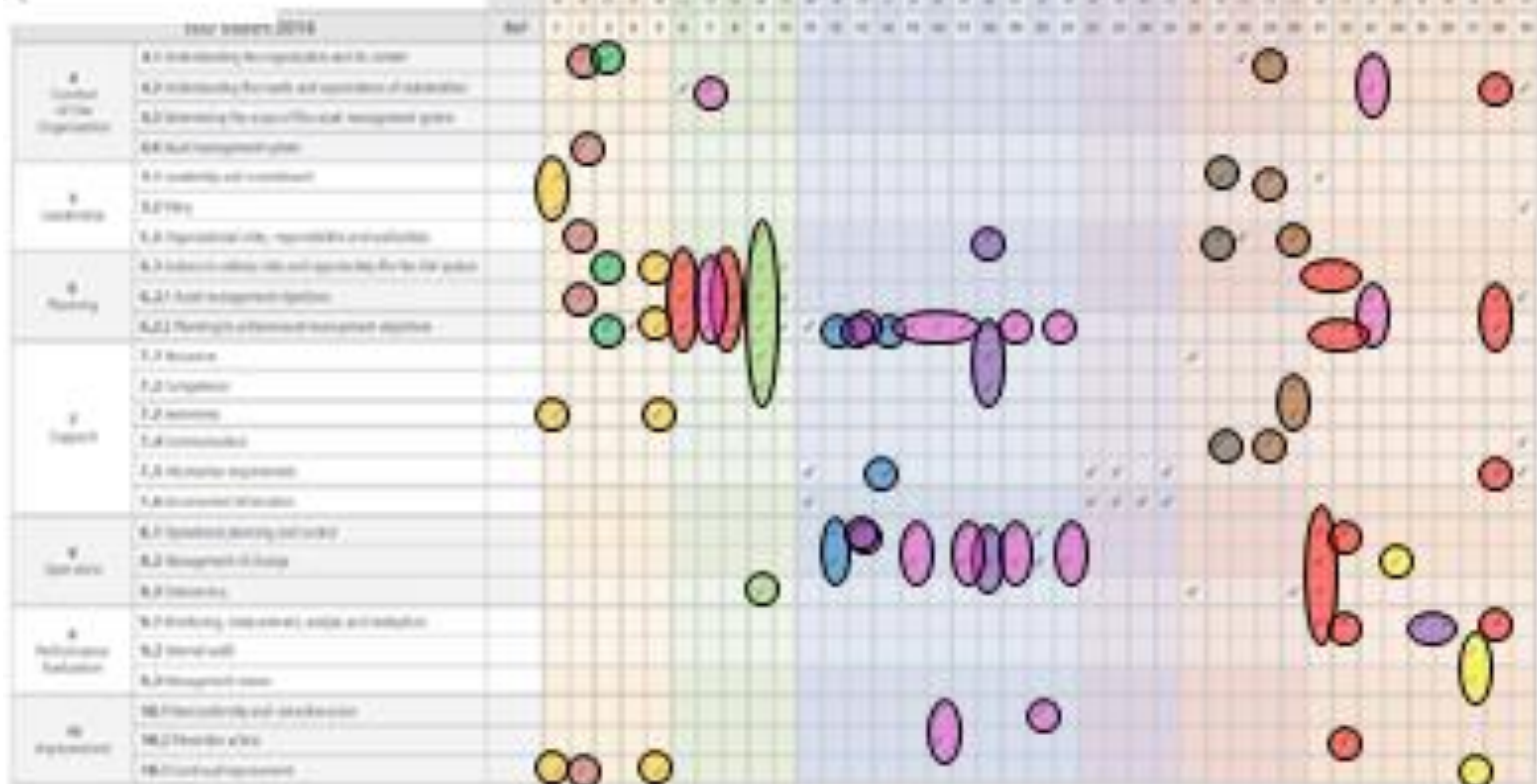
Twelve CASG Questions superimposed on BoK to ISO 55000 Matrix

10 Appendix A

How the 39 Subjects map to the clauses of ISO 55001:2014



1



10 Appendix A

How the 39 Subjects map to the clauses of ISO 55001:2014



CASG-Quick

10 Appendix A

How the 39 Subjects map to the clauses of ISO 55001:2014

CASG-Quest

ISO 55001:2014

Subject Group

Subject Name

Strategic Management

Operational Management

Uplifts the Value

Asset Performance

Integration of Assets

Risk & Resilience

6.1 Understanding the organization and its context

6.2 Understanding the needs and expectations of stakeholders

6.3 Determining the scope of the asset management system

6.4 Asset management system

6.5 Leadership and commitment

6.6 Policy

6.7 Organizational roles, responsibilities and authorities

6.8 Resources: infrastructure, skills and opportunities for the asset system

6.9 Asset management objectives

6.10 Planning for the asset management objectives

7.1 Awareness

7.2 Competence

7.3 Resources

7.4 Information

7.5 Risk management

7.6 Environmental information

7.7 Information management

8.1 Monitoring, measurement, analysis and evaluation

8.2 Management of change

Question 13:

*Is the (asset) management activity **integrated**?*

Key (asset) Management Questions + 1

1. Effective system of (asset) management?
2. Asset properly identified and characterised?
3. (asset) management strategy in place for the system and each system element?
4. (asset) management responsibility assigned?
5. Demand (requirement) defined and analysed?
6. Understanding of Total Cost of Ownership based on sub-system cost attribution?
7. Supportability analysed?
8. System condition, performance, cost and life-consumption trends tracked and analysed?
9. Implementing ILS practices that prevent or reduce decay and cost?
10. Risks identified, acted upon and reported?
11. Strategic (asset) management risks identified and reported?
12. Opportunities sought, proposed and implemented?
13. Is the (asset) management activity integrated?

Data History

Defence Annual Reports

ANAO Reviews and Audits

Project Closure Report

Fleet Management Records

Interviews

Caveat: incomplete records, eye of the beholder

Overall View what is

Asset Management Success ?

“in balance”, “low volatility”, “working to plan”

- “Achievements” trending with consistency
- Delivering outputs in an “good” range
- “Cost per unit” rationale

That reflects/approximates/empirical/proxy for *capability assurance*?

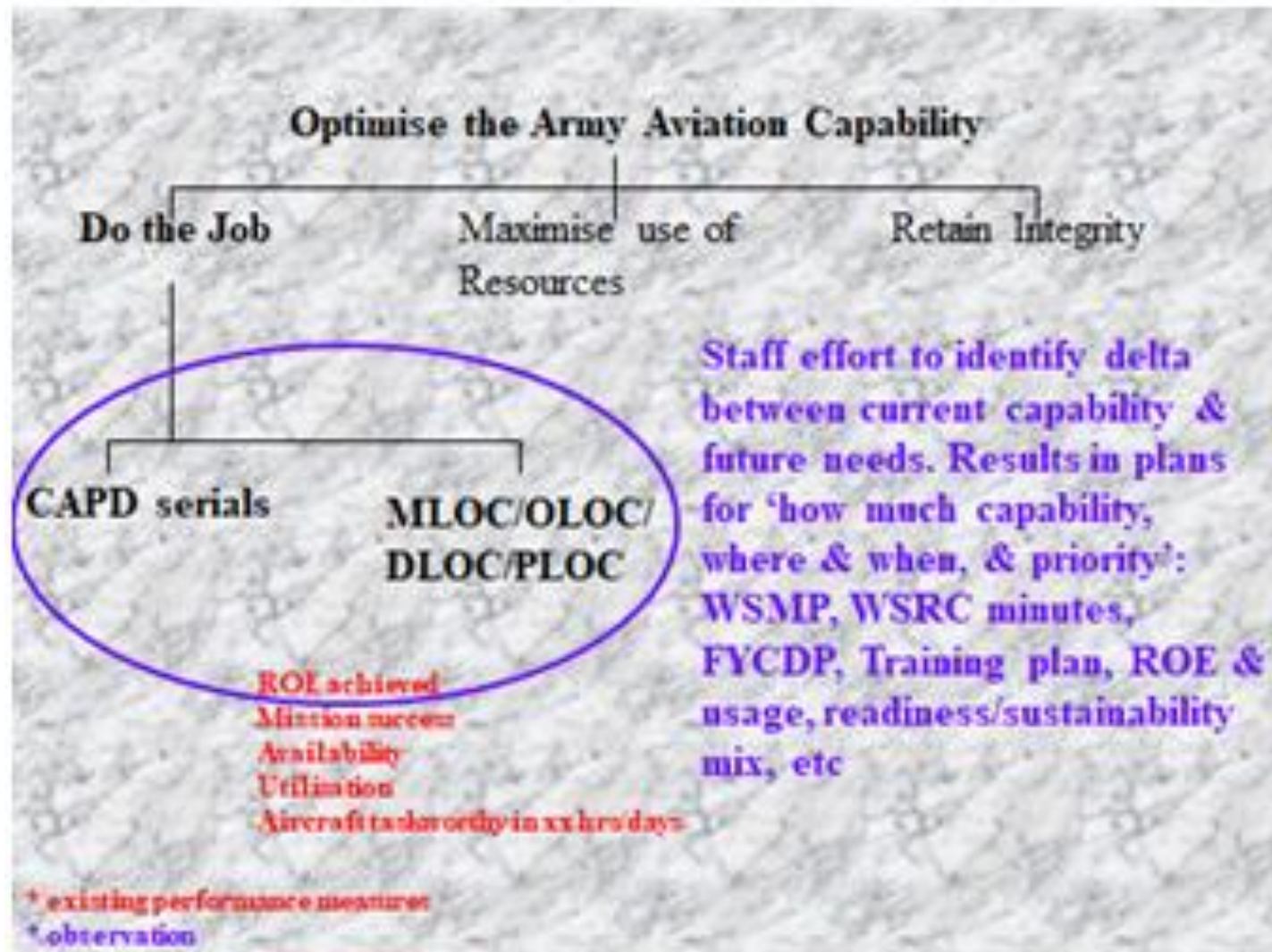


Figure 3 – ROE as a Dominant Performance Measure²

Capability Assurance

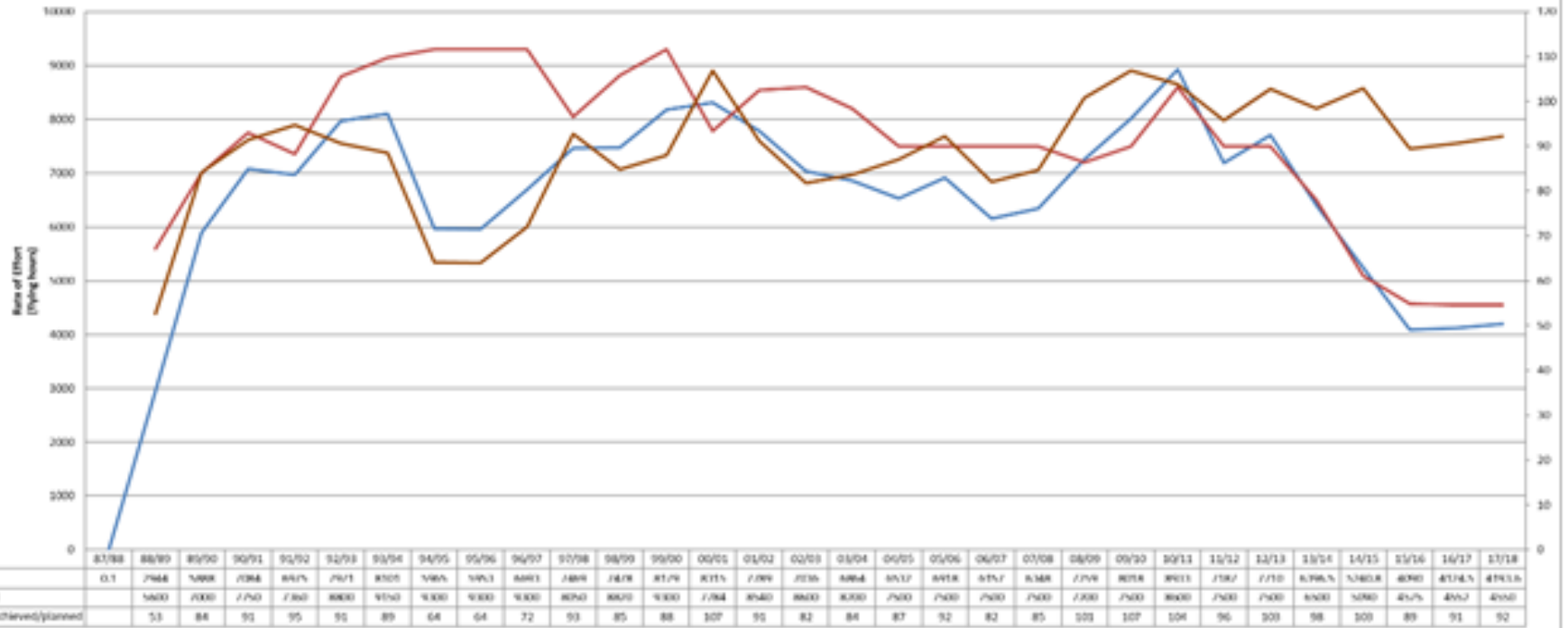
Asset Management Success ?

“in balance”, “low volatility”, “working to plan”

- “Achievements” trending with consistency
- Delivering outputs in an “good” range
- “Cost per unit” rationale

***Meaningfully achieving planned rate of effort over sequential years
matched to
Consistent resourcing for that output***

Rate of Effort Achieved vs Plan by Financial Year



Is blue on red?

Is brown consistent year-to-year?

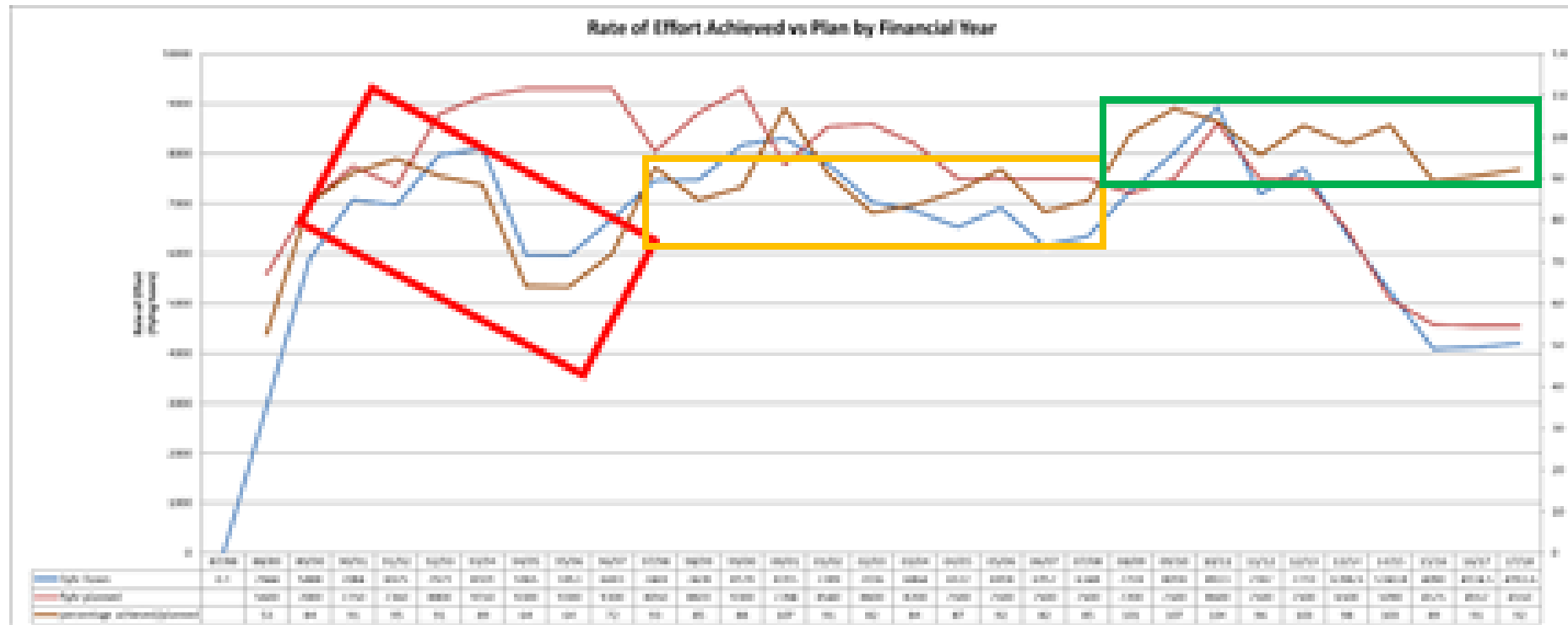
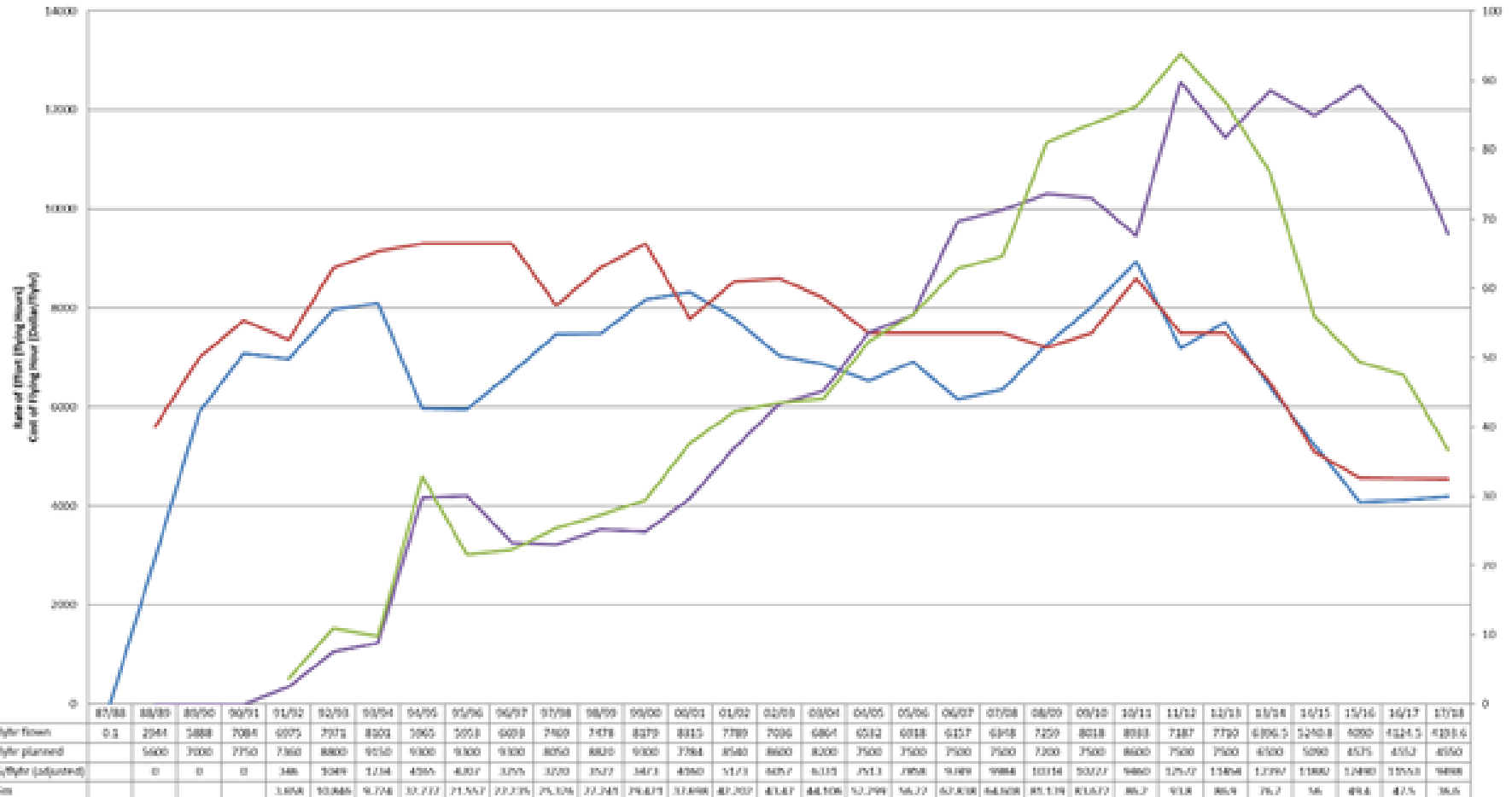


Figure 4 – ROE Achieved vs Plan³ by FY – Stability over Successive Years

Rate of Effort matched to Funding by Financial Year



Is blue on red?

Is purple consistent year-to-year?

Maximised use of Resources – by Phases

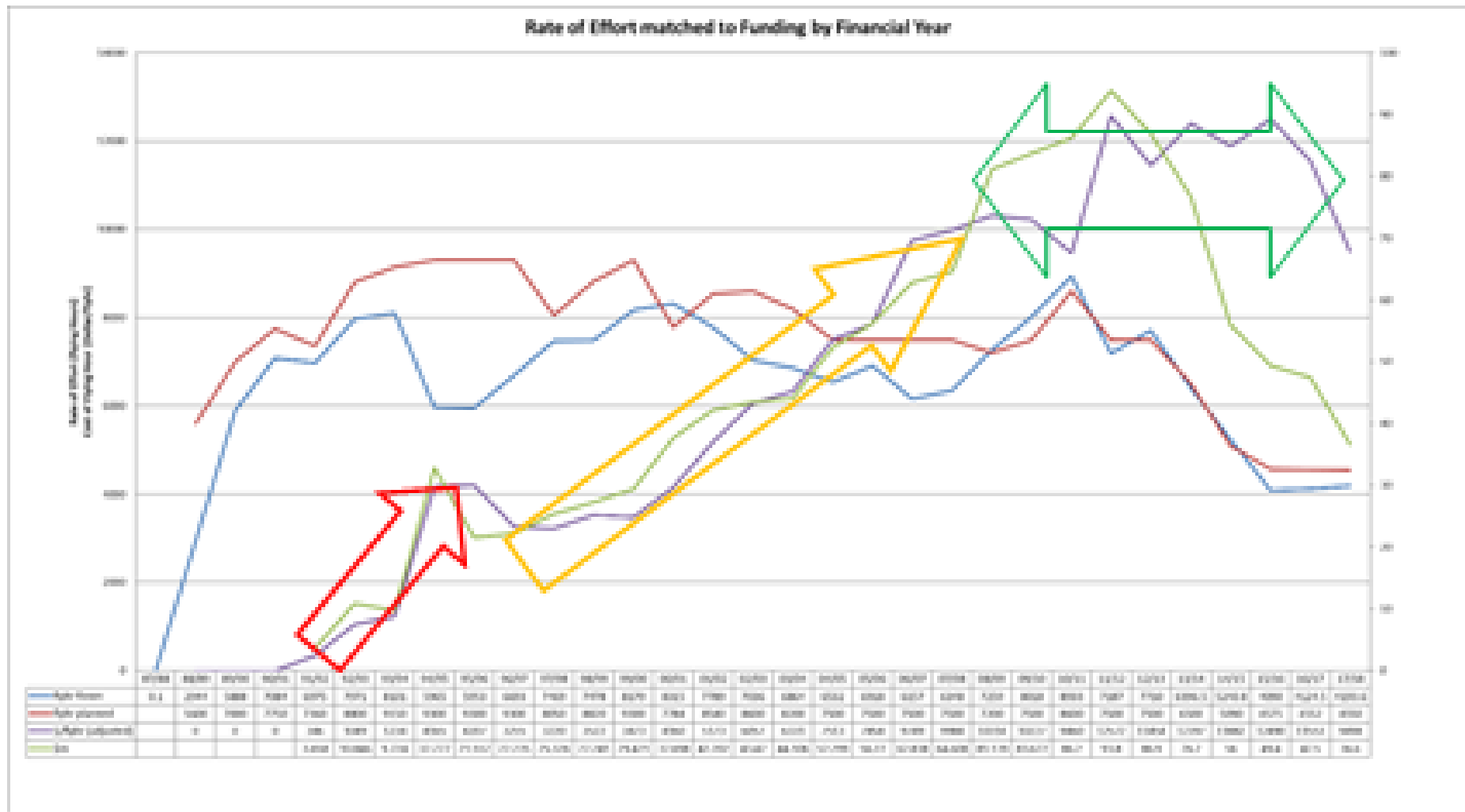


Figure 5 – ROE Achieved vs Plan by FY – Expended Funds/Flying Hour Stability

Phase 1 – Introduction to Service

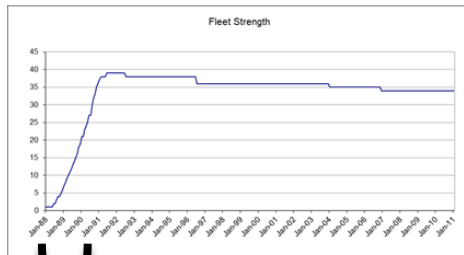


Figure 6 – Rate of Introduction to Service and subsequent Fleet Attrition

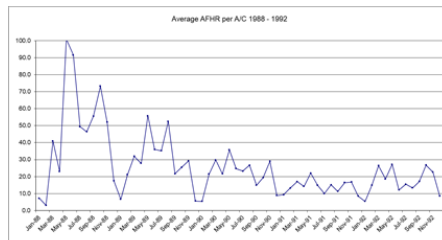
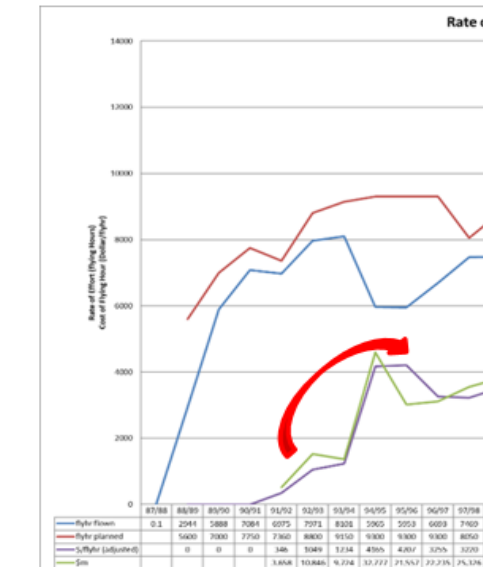


Figure 7 – Average Flying Hours per Aircraft at start of Introduction to Service



1988 to mid-1990s

- 3 years to deliver inclusive of 14 mths delivery slippage
- Tracking to towards 9300 FLYHRS ROE but stalled in 1994
- Insufficient funding base
- Insufficient spares
- Insufficient maintenance capacity
- OP GEMINI 1993
- OP LAGOON 1994

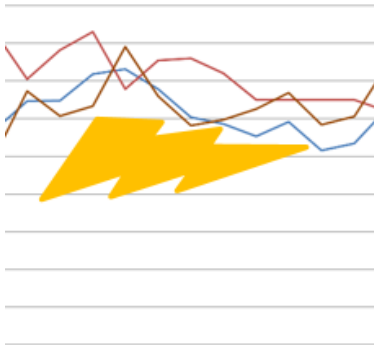
	Question	Synopsis during Introduction into Service	P	S	O	E
1	Effective system of (asset) management?	Acquisition transition resulted in inadequate in-service logistics. Navy, Army and Air Force in-service management unable to deliver capability as planned.	X			
2	Asset properly identified and characterised?	Characterisation incomplete.	X			
3	(asset) management strategy in place for system and each system element?	Assumptions for sustaining weapon system and major components – turn times, usage, cost – flawed. Fleet well sized for attrition and flight simulator	X			x ¹
4	(asset) management responsibility assigned?	Improved during period. Enactment of the WSLM construct in late 1993 established unity of command for the major system and sub-systems. Friction existed with 'commons' and ADFLM support arrangements.	X	x		
5	Demand (requirement) defined and analysed?	Limited to Acquisition estimates.	X			
6	Understanding of Total Cost of Ownership based on sub-system cost attribution?	Limited to Acquisition estimates.				
7	Supportability analysed?	Excessive 'noise' from inherent and repeated instability in-service support system rendered elements incomprehensible.	X			
8	System condition, performance, cost and life-consumption trends tracked and analysed?	Early in life-cycle; instability in all support systems. Bottom-up zero-based budgeting initiated with adoption of WSLM in 1993 drew upon very limited known cost drivers data.	X			
9	Implementing ILS practices that prevent or reduce decay and cost?	Project ILSP created late 1987, focused on interim support in 1988 and 1989. Significant interlude to first in-service ILSP created in 1994.	X			
10	Risks identified, acted-upon and reported?	Regular reporting by Operating Units and flow of US Army and OEM data. Incorrect in-service maintenance man-hours, repairable item turnaround time and inadequate funding - all 'surprises'.	X	X	x	
11	Strategic (asset) management risks identified and reported?	Acquisition assumptions not identified as risks - maintenance man-hours, repairable item turnaround and inadequate funding - all 'surprises' – and no contingency in place when they were realised.				
12	Opportunities sought, proposed and implemented?	Activity was reactive - dominated by response to emerging constraints; insufficient spares, unscheduled nuisance cracking, and funding shortfalls.				
13	Is the (asset) management activity integrated?	Acquisition to In-service – no. Between Services at in-service – no. Within Army capability elements – no. Within logistics – yes, tentatively only after implementation of WSLM.	x			

- By mid 1991 backlog of 10 aircraft for R3 (ILM activity)
- 'Operators yet to realise that capacity of logistics support arrangements is the limiting factor in setting and achieving flying rates, not authorised ROE' 1991
- Seven years to outpace logistics support basis 1994
- WSLM formed 1993
- Joint Directive 1995

Table 2 - PSOE Asset Management assessment for the Introduction to Service Phase

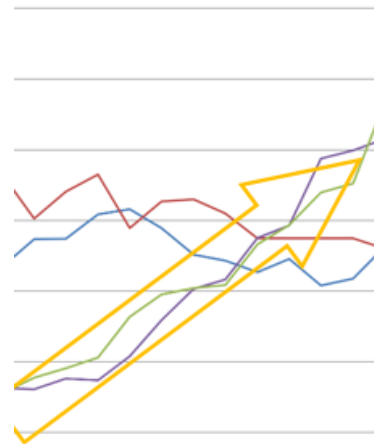
Phase 2 – Capability Recovery

of Effort Achieved vs Plan by Financial Year



07/78	08/79	09/80	00/81	01/82	02/83	03/84	04/85	05/86	06/87	07/88
1489	1474	8174	8171	7789	7110	5864	3517	8918	1572	1354
8050	8050	9100	7784	9540	8600	8200	7500	7500	7500	7500
53	85	88	337	91	82	84	87	52	82	85

Rate of Effort matched to Funding by Financial Year



07/78	08/79	09/80	00/81	01/82	02/83	03/84	04/85	05/86	06/87	07/88
7460	7478	8270	8331	7789	7096	6864	6232	6558	6157	6348
8050	8820	9300	7784	8540	8600	8200	7500	7500	7500	7500
3220	3527	3473	4380	5173	6057	6331	7513	8908	9149	9984
25.126	22.241	29.471	37.698	47.203	43.47	44.106	57.799	56.77	67.838	64.608

mid-1990s to mid-2000

Dominated by Operations

- PLES DRAI
- AUS INDO JAYA
- GOLD
- PAKISTAN ASSIST
- INTERFET 2000-2004 & East Timor 2006-2013
- Realistic management of ROE requirement
- Structural nuisance cracking
- Some year to year performance consistency, flown ROE tracking plan in band 80-100%
- Funding \$3k/FLYHR to \$10k/FLYHR over 10 years

	Question	Synopsis during Capability Recovery	P	S	O	E
1	Effective system of (asset) management?	Aviation command and control effected. Quality management system enacted. Navy-Air Force WSLM coordination matured. Minor project synchronisation improved.	X	X	x	
2	Asset properly identified and characterised?	ADFLM and commons items teams better defined 'asset' boundary. Aircraft sub-systems still 'surprising'. Integrated aircraft and support system to multiple Navy ships.	X	X		
3	(asset) management strategy in place for system and each system element?	Inventory management and MRD matured. Data gathered and purified to populate bespoke models. Performance monitored. Data driven, reliability-based, decision making.	X	X	x	x
4	(asset) management responsibility assigned?	WSLM construct bedded in. Capability management interaction maturing	X	X	x	x
5	Demand (requirement) defined and analysed?	Use of predictive models – PATTRIC, AIMS – but challenged to work with <u>repairables</u> .	X	X	X	
6	Understanding of Total Cost of Ownership based on sub-system cost attribution?	Purifying data to feed DSTO model, decision to have organic cost modelling capability. Modelling informed fleet strategic decisions.	X	x	x	x
7	Supportability analysed?	Fleet management cause and effect relationships understood, budgeted and enacted.	X	X	X	
8	System condition, performance, cost and life-consumption trends tracked and analysed?	Number of corporate and in-house performance measurement systems meeting decision-maker RFI. Data and analysis lagging by up to 2 months.	X	X	X	
9	Implementing ILS practices that prevent or reduce decay and cost?	In-service ILS periodically updated. Improved industry support-base. Insights from Ageing Aircraft Audit reduced conservatism.	X	X	X	x
10	Risks identified, acted-upon and reported?	Defect reporting management able to draw on purified failure data for better maintenance/reliability response.	X	X	x	
11	Strategic (asset) management risks identified and reported?	Monthly report internal to DMO/CASG. Twice yearly reporting to Chief of Army.	X	X	X	x
12	Opportunities sought, proposed and implemented?	Limited by discretionary resources and commercial opportunity. Regularly updated comprehensive procedures synchronised across capability.	X	X	X	
13	Is the (asset) management activity integrated?	New minor capability Acquisition to In-service – yes. Between Services – improved. Within Army capability elements – yes. Between WSLMs/SPOs – improved	X	X	X	x

- HQ Aviation Support Group 1996
- COMD Divisional Aviation 2000
- HQ 16 Bde (Avn) 2002
- 6 Avn Regt 2007
- Gaining knowledge:
 - Ageing Aircraft Audit
 - Life Cycle Costing
 - Education
 - MRD
- Twelve years to recover support basis

Table 3 - PSOE Asset Management assessment for the Capability Recovery Phase

Phase 3 – Delivering Capability

mid-2000 to present

- Flown ROE tracking plan in band 90-110%
- Funding stabilised in band \$10-12k/FLYHR over 10 years
- Consolidation in Sydney region
- Engineering workload decreasing:
 - ASORs & MDRs
 - Modification
 - MIERs

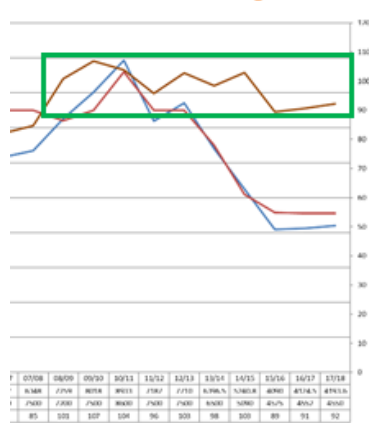


Figure 8 – Change in Technical Information Review 2007 - 2017



Figure 9 – Change in Modifications, MIERs and Special Technical Instructions 2007-2017

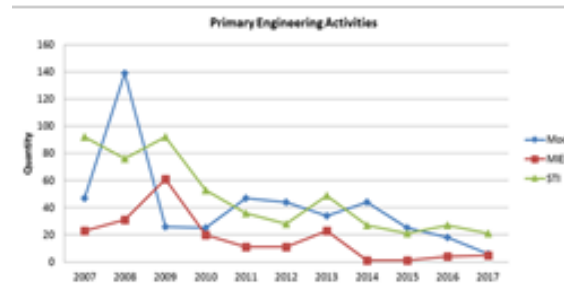


Figure 10 – Change in Supplementary Engineering Changes, Publications and Drawings activities 2007 - 2017



	Question	Synopsis during Capability Delivery	P	S	O	E
1	Effective system of (asset) management?	Aviation command and control matured; surges managed. Integrated Aviation safety review and management conducted. Capability expansion and then contraction managed. Minor capability projects effectively integrated.	X	X	X	X
2	Asset properly identified and characterised?	Whilst an ageing aircraft, relatively few 'surprises'.	X	X	X	x
3	(asset) management strategy in place for system and each system element?	Efficient policy in place but gradual loss of MRD capability risks opportunity to make bold adjustments.	x	X	X	x
4	(asset) management responsibility assigned?	WSLM construct remains robust. Effective transition of Regulatory frameworks.	X	X	X	X
5	Demand (requirement) defined and analysed?	High organic proficiency and knowledge of cost drivers, industry performance and logistics effect.	X	X	X	X
6	Understanding of Total Cost of Ownership based on sub-system cost attribution?	Effective systems developed, but loss of effective costing modelling capability during 2010-2015/16, partially restored. Knowledge retained by key individuals (not systemic).	x		x	x
7	Supportability analysed?	Fleet management cause and effect relationships understood, budgeted and enacted with accuracy.	X	X	X	X
8	System condition, performance, cost and life-consumption trends tracked and analysed?	In-house performance measurement systems meeting decision-maker RFI's.	X	X	X	x
9	Implementing ILS practices that prevent or reduce decay and cost?	In-service ILSP current and refocused for withdrawal and disposal.	X	X	X	X
10	Risks identified, acted-upon and reported?	Defect reporting improved with greater use of digital pictures and electronic forms.	X	X	x	
11	Strategic (asset) management risks identified and reported?	MSA/PMP effective. Prompt crisis resolution.	X	X	X	X
12	Opportunities sought, proposed and implemented?	Better aviation planning has allowed for both realistic contingency planning and concurrent cost minimisation.	X	X	X	X
13	Is the (asset) management activity integrated?	Aided by system simplification as all operations conducted from a single airfield. Cessation of S-70B-2 Seahawk operations negated common item management arrangements.	X	X	X	X

- Able to recover from surge
- Exploiting knowledge:
 - Strategic LOT investments
 - Synchronised VFM contracting
 - BAU replacing crisis
- But signs of weakening with loss of corporate know-how

Table 4 - PSOE Asset Management assessment for the Capability Delivery Phase

Phase 1, 3 and 3 POSE Assessments

Question	Synopsis: during Introduction into Service	P	S	O	E	Synopsis: during Capability Recovery	P	S	O	E	Synopsis: during Capability Delivery	P	S	O	E
1 Effective system of (asset) management?	Acquisition transition resulted in inadequate in-service logistics. Navy, Army and Air Force in-service management unable to deliver capability as planned.	X				Aviation command and control effected. Quality management system enacted. Navy-Air Force WSLM coordination matured. Minor project synchronisation improved.	X	X			Aviation command and control matured; surges managed. Integrated Aviation safety review and management conducted. Capability expansion and then contraction managed. Minor capability projects effectively integrated.	X	X	X	X
2 Asset properly identified and characterised?	Characterisation incomplete.	X				ADFLM and commons items teams better defined 'asset' boundary. Aircraft sub-systems still 'surprising'. Integrated aircraft and support system to multiple Navy ships.	X	X			Whilst an ageing aircraft, relatively few 'surprises'.	X	X	X	
3 (asset) management strategy in place for system and each system element?	Assumptions for sustaining weapon system and major components – turn times, usage, cost – flawed. Fleet well sized for attrition and flight simulator element?	X				Inventory management and MRD matured. Data gathered and purified to populate bespoke models. Performance monitored. Data driven, reliability-based, decision making.	X	X			Efficient policy in place but gradual loss of MRD capability risks opportunity to make bold adjustments.	X	X	X	
4 (asset) management responsibility assigned?	Improved during period. Enactment of the WSLM construct in late 1993 established unity of command for the major system and sub-systems. Friction existed with 'commons' and ADFLM support arrangements.	X				WSLM construct bedded in. Capability management interaction maturing.	X	X			WSLM construct remains robust. Effective transition of Regulatory frameworks.	X	X	X	X
5 Demand (requirement) defined and analysed?	Limited to Acquisition estimates.	X				Use of predictive models – PATRIC, AIMS – but challenged to work with repairables.	X	X	X		High organic proficiency and knowledge of cost drivers, industry performance and logistics effect.	X	X	X	X
6 Understanding of Total Cost of Ownership based on sub-system cost attribution?	Limited to Acquisition estimates.					Purifying data to feed DSTO model, decision to have organic cost modelling capability. Modelling informed fleet strategic decisions.	X				Effective systems developed, but loss of effective costing modelling capability during 2010-2015/16, partially restored. Knowledge retained by key individuals (not systemic).				
7 Supportability analysed?	Excessive 'noise' from inherent and repeated instability in-service support system rendered elements incomprehensible.	X				Fleet management cause and effect relationships understood, budgeted and enacted.	X	X	X		Fleet management cause and effect relationships understood, budgeted and enacted with accuracy.	X	X	X	X
8 System condition, performance, cost and life-consumption trends tracked and analysed?	Early in life-cycle; instability in all support systems. Bottom-up zero-based budgeting initiated with adoption of WSLM in 1993 drew upon very limited known cost drivers data.	X				Number of corporate and in-house performance measurement systems meeting decision-maker RPIs. Data and analysis lagging by up to 2 months.	X	X	X		In-house performance measurement systems meeting decision-maker RPIs.	X	X	X	
9 Implementing ILS practices that prevent or reduce decay and cost?	Project ILS created late 1987, focused on interim support in 1988 and 1989. Significant interlude to first in-service ILS created in 1994.	X				In-service ILS periodically updated. Improved industry support-base. Insights from Ageing Aircraft Audit reduced conservatism.	X	X	X		In-service ILS current and refocused for withdrawal and disposal.	X	X	X	X
10 Risks identified, acted-upon and reported?	Regular reporting by Operating Units and flow of US Army and OEM data. Incorrect in-service maintenance man-hours, repairable item turnaround time and inadequate funding – all 'surprises'.	X	X			Defect reporting management able to draw on purified failure data for better maintenance/reliability response.	X	X			Defect reporting improved with greater use of digital pictures and electronic forms.	X	X		
11 Strategic (asset) management risks identified and reported?	Acquisition assumptions not identified as risks – maintenance man-hours, repairable item turnaround and inadequate funding – all 'surprises' – and no contingency in place when they were realised.					Monthly report internal to DMO/CASG. Twice yearly reporting to Chief of Army.	X	X	X		MSA/PMF effective. Prompt crisis resolution.	X	X	X	X
12 Opportunities sought, proposed and implemented?	Activity was reactive – dominated by response to emerging constraints; insufficient spares, unscheduled nuisance cracking, and funding shortfalls.					Limited by discretionary resources and commercial opportunity. Regularly updated comprehensive procedures synchronised across capability.	X	X	X		Better aviation planning has allowed for both realistic contingency planning and concurrent cost minimisation.	X	X	X	X
13 Is the (asset) management activity integrated?	Acquisition to In-service – no. Between Services at in-service – no. Within Army capability elements – no. Within logistics – yes, tentatively only after implementation of WSLM.					New minor capability Acquisition to In-service – yes. Between Services – improved. Within Army capability elements – yes. Between WSLMs/SPOs – improved	X	X	X		Aided by system simplification as all operations conducted from a single airfield. Cessation of S-70B-2 Seahawk operations negated common item management arrangements.	X	X	X	X

What Worked – the wins

Unity of Command

Data purification, Information analysis, Knowledge retention

Growing an informed and educated vertically integrate team

Synthesis of 'system, support arrangements, people managing' by experience

In Retrospect ... if ... the losses

Timeliness: **evolve**, crawl, walk, run

- Suboptimal starting conditions, not even empirical relationships
- Incomplete model of 'asset' being managed = long learning curve
- Lack of integrated efforts; develop trust
- Lack of a philosophy, schema of 'big picture'

Responsive Resourcing

- Time effect of cash on changing support base – cycle time
- Contingency matched to risk

Flexible Planning compensated by hard work