
OPERATIONAL TEST AND EVALUATION
DIRECTOR
WEAPONS THAT
KEY TO
WORK

Improving System Reliability Through Better Systems Engineering

23 OCT 07

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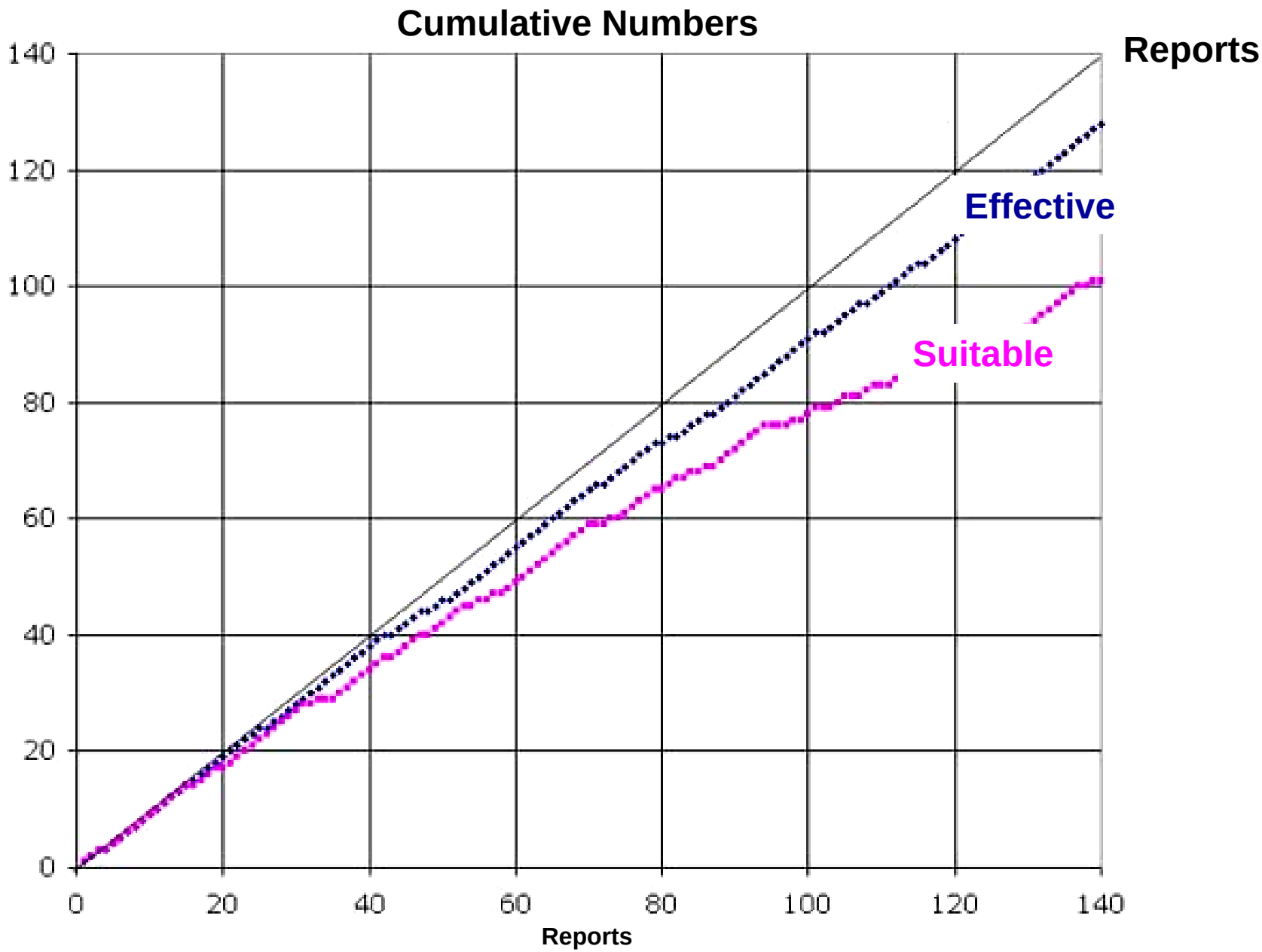
Director
Operational Test and Evaluation

IOT&E Results: Effective, Suitable



DOT&E Priorities

1. **Improve Suitability**

2. **Enhance operational realism in early tests**

3. **Provide timely performance information to the war fighters and fielding decision makers**

4. **Facilitate adequate OT resources**

5. **Ensure DOT&E personnel are well trained and prepared**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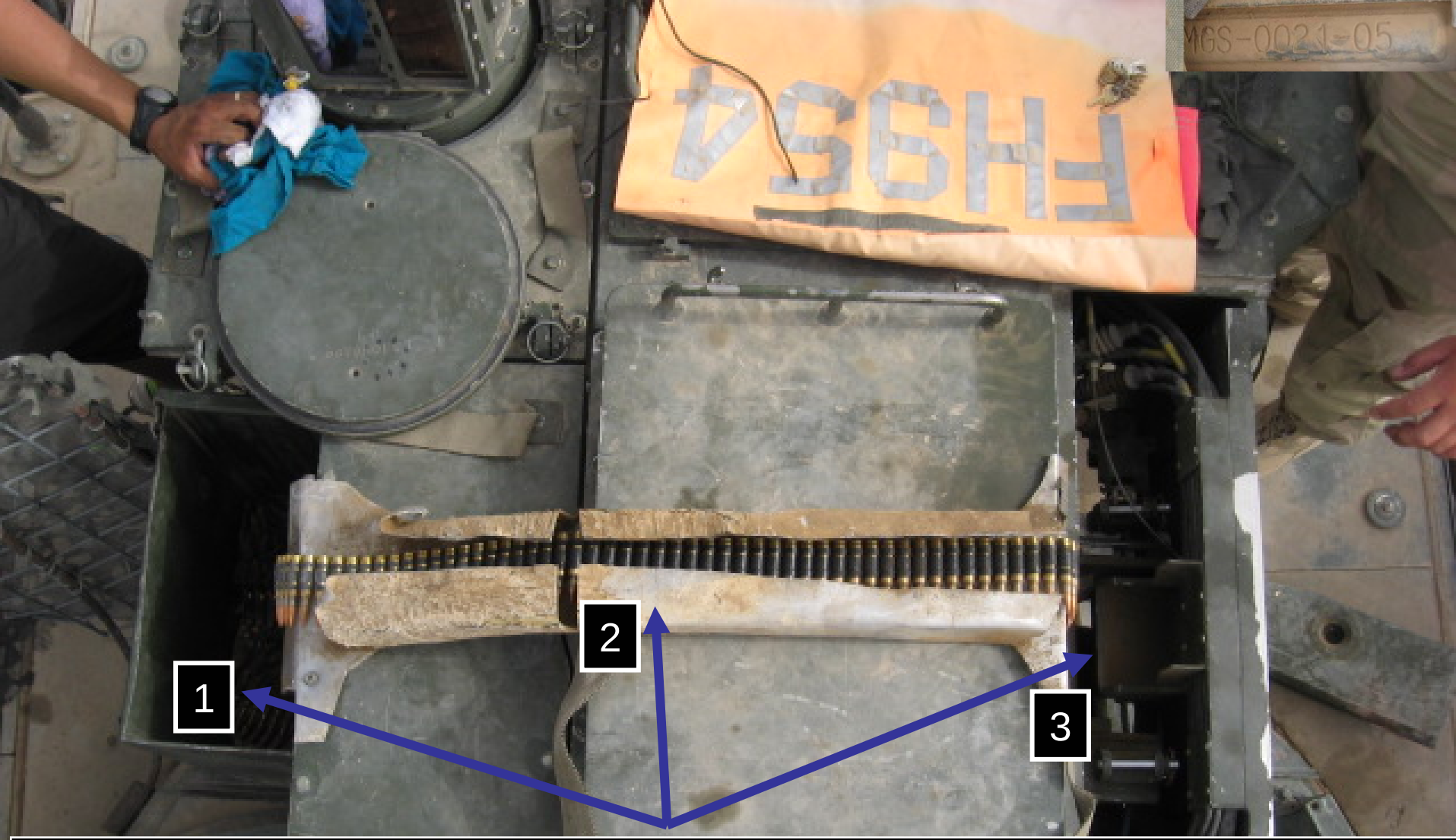
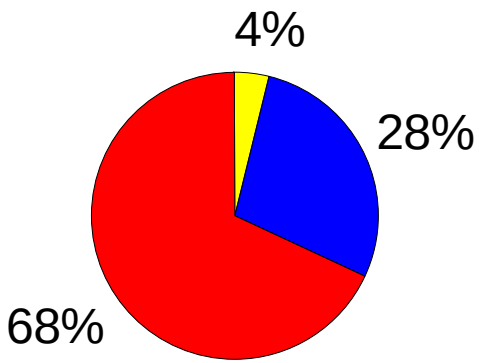


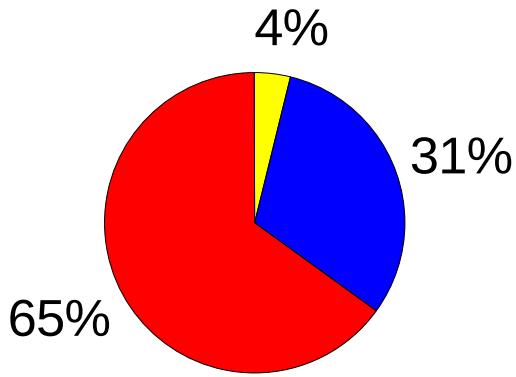
1. Used star cluster ammo can mounted to the TC's 50 Cal ammo can with tie down straps.
2. Fabricated feed chute from old road sign to top feed ammo across the top of the turret and to help prevent stoppages.
3. Door providing access to the coax held open to allow ammo to feed into the COAX.

DoD O&S Costs
Largest Fraction of Life Cycle Costs

Ground Combat Systems

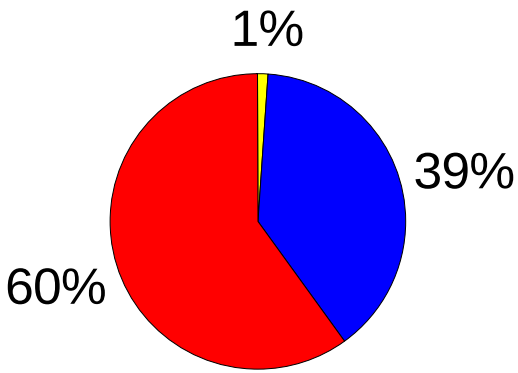


Rotary Wing Aircraft

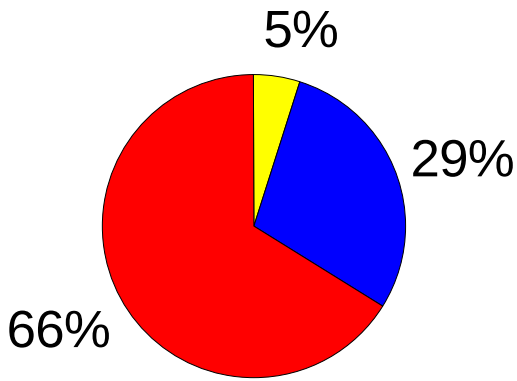


*** Source: OSD CAIG**

Surface Ships



Fighter Aircraft



RDT&E Procurement O&S

"We have a tendency to look at what it takes to get a program out the door. We don't think too much about what the life cycle [cost] is. It's 'Can I build it?' I would like us all to be mindful of what it costs to operate whatever we are building for whatever its life is going to be because I have to pay that bill every single year."

(CNO, ADM Michael G. Mullen in an interview with "Government Executive" magazine May 15, 2006)

Logistics Management Institute Study
Reliability Investment RoI 5:1 to 128:1

Reliability Investment and Support Cost Reduction

Case Study	MTBx Hours			* CASA 20-Year Support Cost (costs in FY03 M $, discounted 7%)			Economics (FY03 M $)	
	Was	Is	Percent Change	Was	Is	Percent Change	Reliability Investment	ROI
Predator	40	77	92.5%	$1,463	$576	60.6%	$39.1	22.7:1
Global Hawk	67.7	120	77.3%	$2,547	$1,958	23.1%	$121.9	5:1
FBCB2	47	364	674.5%	$13,060	$1,880	85.6%	$87.4	128:1

* CASA – Cost Analysis Strategy Assessment

- Reliability investments resulted in 20-yr support cost reductions
- Returns-on-Investment ranged from 5:1 to 128:1

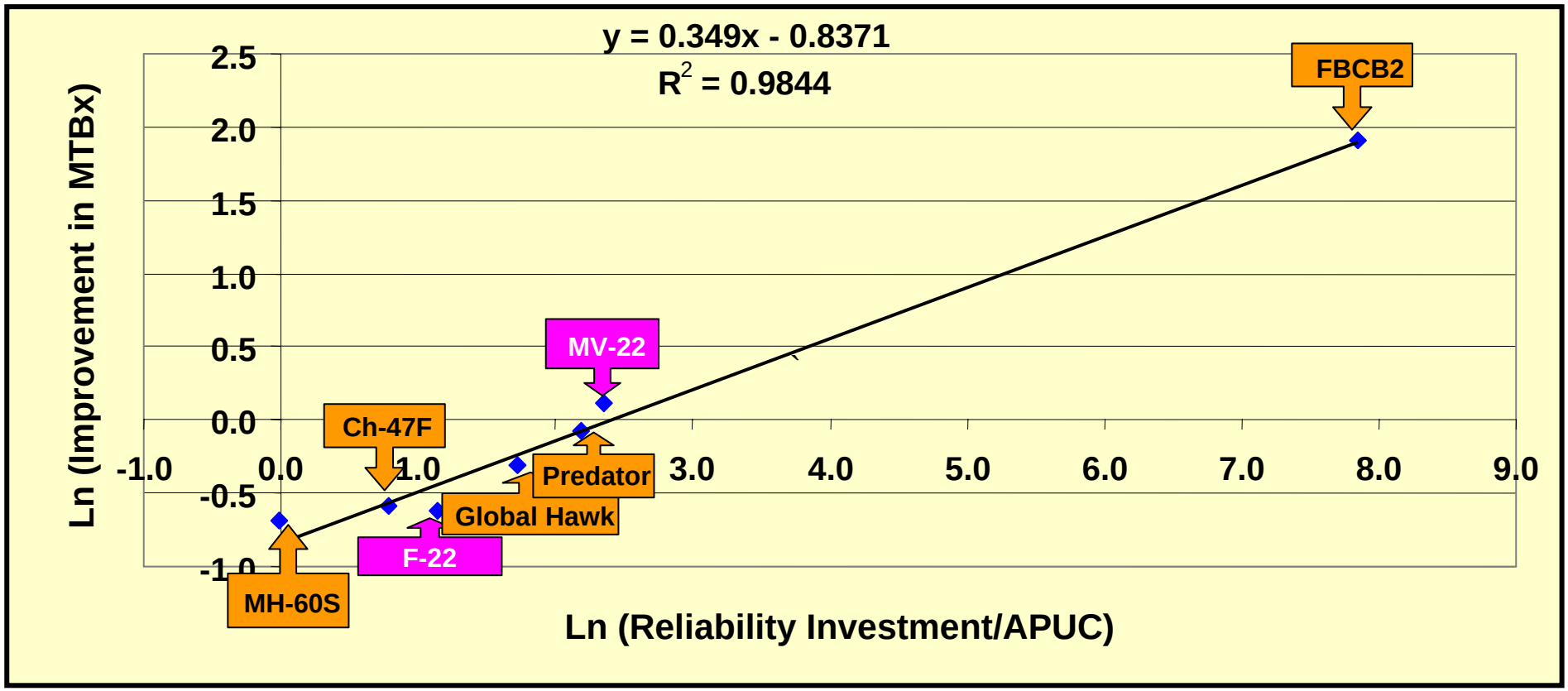
Defense Logistics Agency Metrics
Reliability Investment RoI 15.5:1

DLA Reliability Investment Summary			
Service	**Investment ($M)**	**Estimated 10 year LC Savings ($M)**	**ROI**
Army	14.1	187.0	13.3:1
Navy	9.7	207.0	21.3:1
Air Force	8.3	102.0	12.3:1
Total	32.1	496.0	15.5:1

Source: Karron Small, Aviation Engineering Directorate, Defense Supply Center Richmond, Nov 2005

Returns-on-Investment in reliability 15.5:1

Empirical Relationship
Reliability Investment & Reliability Growth



IDA Data

LMI Data

Areas That Need Engagement of SE Community

1. **Requirements**
   - Need to be fully understood so that a good reliability program can be characterized
   - Government must articulate the reliability requirements in RFPs or Request for Proposals, to provide both the incentive and understanding for industry
   - Industry must propose appropriate solutions; and then systems engineers and management must follow through with an appropriate design
2. **Reliability Objectives**
   - Need to be an integral part of the business strategy and have the commitment of senior management - and appropriate incentives must be in place
3. **Reliability tasks**
   - Must be an integral part of SE and addressed early in the design phase
4. **Operational-use-environment, Duty cycles, Related stresses**
   - Must be understood for the entire life cycle
5. **Root cause analysis of critical failure modes**
   - Must be done to eliminate or minimize their consequences
6. **Reliability of the design**
   - Should be verified by testing and analysis to ensure requirements are achieved

Actions to Improve Suitability

1. Key Performance Parameter (KPP) for Materiel Availability with two Key System Attributes (KSA) - Materiel Reliability and Ownership Costs

2. Sustainment Metrics Rationale Report

3. DoD Guide for Achieving Reliability, Availability, and Maintainability

4. Four new metrics for acquisition program oversight process

5. New industry based reliability program management standard

6. Standard data elements associated with the KPP and KSAs

7. Reliability training for select OSD staff

8. NDIA conference focusing on improving suitability

9. NDIA/DT&E committee proposing changes to improve suitability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