Cumulative IOT&E Results Through FY 2008

- Total: 28% of Systems Not Suitable
  - 2007: 4 of 8 (50%) Not Suitable
  - 2008: 2 of 6 (33%) Not Suitable
• “. . . the single most important step necessary to correct high suitability failure rates is to ensure programs are formulated to execute a viable systems engineering strategy from the beginning, including a robust reliability, availability, and maintainability (RAM) program, as an integral part of design and development. No amount of testing will compensate for deficiencies in RAM program formulation.”
1. T&E should concentrate on measuring improvements to mission capability and operational support based on user needs;

2. T&E programs should experiment . . . learn and understand the strengths and weaknesses of a system and its components, and the effect on operational capabilities and limitations;

3. DT and OT activities should be integrated;

4. T&E should begin early, be more operationally realistic, and continue through the entire system life-cycle;

5. Evaluation should be conducted in the mission context expected at time of fielding to the user . . . in terms of operational significance;

6. Evaluations should include a comparison against current mission capabilities;

7. Evaluations should take into account all available data and information;

8. T&E should exploit the benefits of appropriate M&S.
• The DUSD(A&T) shall conduct an independent Assessment of Operational Test Readiness (AOTR) for all ACAT ID programs and special interest programs designated by the USD(AT&L)

• The CAE shall consider the results of the AOTR prior to making a determination of materiel system readiness for IOT&E.
New Acquisition/T&E Policies
Young Memo on Competitive Prototyping (19 Sep 2007)

• All acquisition strategies requiring USD (AT&L) approval must be formulated to include competitive, technically mature prototyping through MS B.
New Acquisition/T&E Policies
Young-McQueary T&E Policy Letter - (22 Dec 2007)

• DT and OT test activities shall be integrated and seamless

• Evaluations shall include a comparison with current mission capabilities

• T&E should assess improvements to mission capability and operational support based on user needs

• To more effectively integrate DT and OT, evaluations shall take into account all available and relevant data and information, including contractor data

• Operational evaluators will continue to fulfill their statutory roles in providing assessments of operational effectiveness, operational suitability, and survivability to the Milestone Decision Authority

• To realize the benefits of modeling and simulation, T&E will be conducted in a continuum of live, virtual, and constructive environments.
• Ensure programs are formulated to execute a viable systems engineering strategy, including a RAM growth program.

• Ensure government organizations reconstitute a cadre of experienced T&E and RAM personnel.

• Implement mandated integrated DT and OT, including the sharing and access to all appropriate contractor and government data and the use of operationally representative environments in early testing.
• “Integrated testing is the collaborative planning and collaborative execution of test phases and events to provide shared data in support of independent analysis, and evaluation.”
The Service Secretaries are directed to establish Service policy to do the following:

- Effective collaboration between the requirements and acquisition communities
- Development contracts and acquisition plans must evaluate RAM during system design.
- Evaluate the maturation of RAM through each phase of the acquisition life cycle.
“Having performance is important, but not as important in most cases, as having reliability.”

- Hon. Donald Winters, Secretary of the Navy (Sept 3, 2008)
Initiatives to Improve Reliability, Maintainability, and Availability

- DOT&E on JCIDS Functional Control Boards
- GEIA Standard 009, RFP and Contract Language, Investment Model
- Reliability Growth in design phase
- RAM growth monitoring for incentives, Young/Bolton memos
- RAM program Evaluation and Standards, testing KPP
- RAM field data collection, feedback

Number of Failures in the Field

Ownership Cost
Phase I: Empirical Research
Reliability Improvement vs. Investment

\[ y = 0.343x - 0.81 \]

\[ R^2 = 0.994 \]

ln (Reliability Investment/APUC) vs. ln (Improvement in MTBx)

- MH-60S
- CH-47F
- MQ-1 AV
- RQ-4A AV
- FBCB
Phase IIA (Basic Model)

\[ R^2 = 0.81 \]

Investment = \( \frac{\text{Reliability Improvement Ratio}}{0.3659} \times \text{APUC} \)

\[ \text{Improvement Ratio} \]

\[ \text{Investment/APUC} \]
Phase III: Notional Example

Effect of Reliability Investment on System Cost (UAV)

![Graph showing the effect of reliability investment on system cost over 20 years. The x-axis represents investment in reliability improvement ($M$), and the y-axis represents 20-year cost ($M$). The graph indicates a decreasing trend as investment increases.]