T&E Metrics for Acquisition Phases & Decisions

Developmental Test & Evaluation

OUSD(AT&L)/Systems & Software Engineering

Purpose

- **Define T&E metrics for decision points and phases across the acquisition life cycle**
  - **Define appropriate T&E execution and reporting measures**
  - **Standardize metrics to assess progress in T&E planning and execution**
  - **Convey value-added role of T&E**

Precepts

- **The purpose of T&E is to develop and deliver knowledge**
  - **Knowledge = actionable information**
- **T&E developed knowledge informs decisions to reduce risk in requiring, acquiring, and employing systems / capabilities**
- **T&E knowledge is used to:**
  - **Assess system capabilities / limitations**
  - **Assess program progress**
  - **Assess technical progress**
  - **Improve the product and processes**

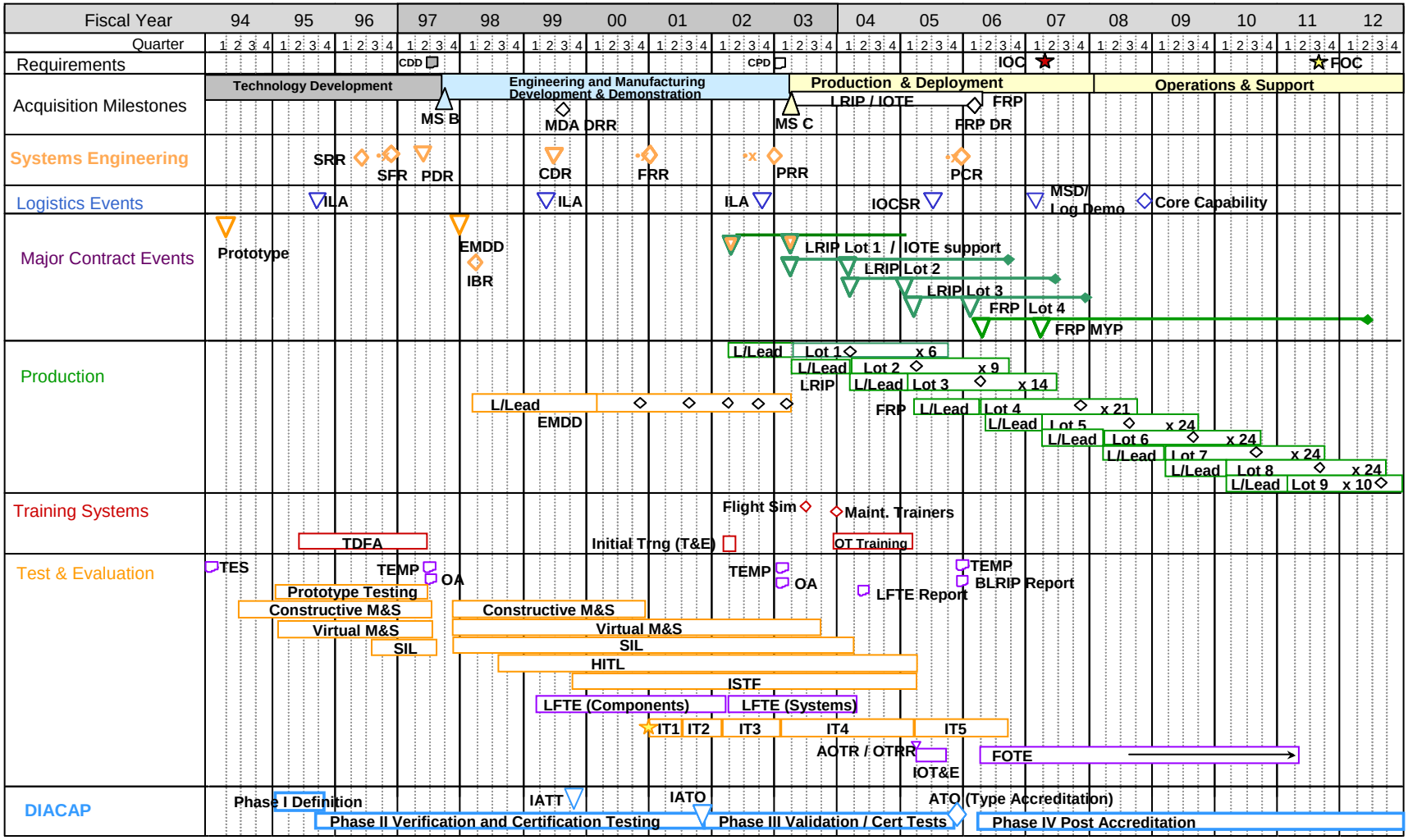
Attributes Measured

- The metrics required are related to:
  - Resources ($, people, ranges, test assets)
  - Errors / Problems (#, discovery / correction rates, criticality)
  - Process characteristics (uniqueness, complexity)
  - Project Characteristics (size, complexity, schedule)
  - Project Dynamics (Reqt chg, Sched chg, Resource chg)

Sample Integrated Schedule

DEVELOPMENTAL TEST & EVALUATION

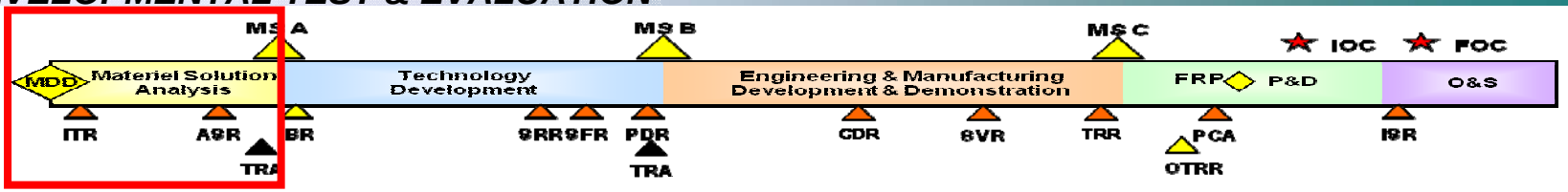
How are you doing? How do you know?



Acquisition Life Cycle and Phases

Material Solution Analysis

DEVELOPMENTAL TEST & EVALUATION

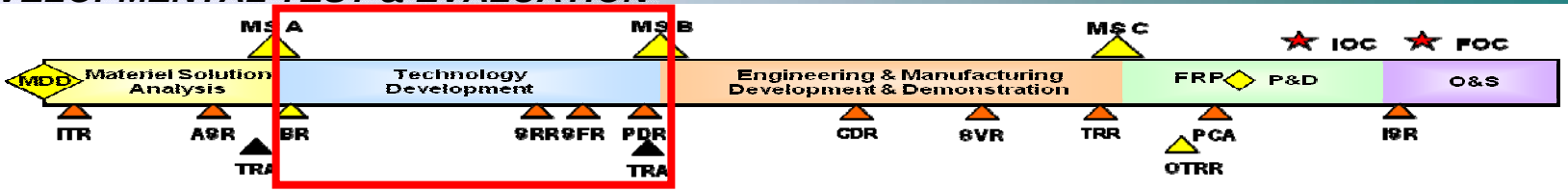


- **Focus:** Assess potential materiel solutions
- **Decision Points:** MDD, ITR, ASR, TRA, MS-A
- **T&E Activity**:
  - Review AoA for evaluatability, identify discriminators
  - M&S to evaluate alternatives, sensitivity analyses
- **T&E Products**: TES
- **Measures / Metrics**:
  - T&E Strategy defined
  - CARD input

Acquisition Life Cycle and Phases

Technology Development

DEVELOPMENTAL TEST & EVALUATION



- **Focus:** Reduce technology risk, determine technologies for system integration
- **Decision Points:** IBR, SFR, SRR, TRA, PDR, MS-B, EMDD RFP
- **T&E Activity**:
  - Risk identification & investigation
  - Technology maturation, integration, & demonstration in relevant environment

Acquisition Life Cycle and Phases

Technology Development cont.

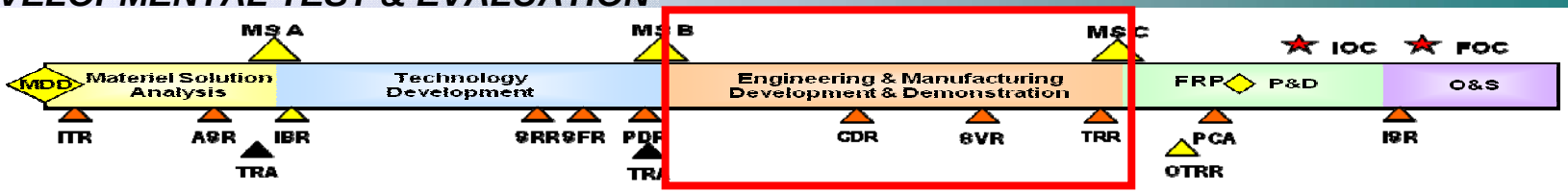
DEVELOPMENTAL TEST & EVALUATION

- **T&E Products**: Technology evaluation, TEMP, CARD update
- **Measures / Metrics**:
  - T&E WIPT charter status
  - TEMP status (KPP/KSAs incorporated, design risks, resources)
  - M&S, SIL capabilities relative to desired level
  - Test point burn-down (M&S, SIL)
  - Test time vs schedule (M&S, SIL)
  - TRLs achieved
  - Risk mitigation (Initial & current risk level)

Acquisition Life Cycle and Phases

Engineering & Manufacturing Dev & Demo

DEVELOPMENTAL TEST & EVALUATION



- **Focus:** Develop a system or increment of capability, reduce manufacturing risk, & ensure supportability. Also demonstrate system integration, interoperability, safety, & utility
- **Decision Points:** IBR, CDR, SVR, TRR, FCA, MS-C
- **T&E Activity**:
  - Risk reduction – System, manufacturing
  - Assess design maturity
  - Determine system capability & limitations
  - Demonstrate spec performance
  - Estimate reliability
  - Assess information assurance
  - Ensure supportability

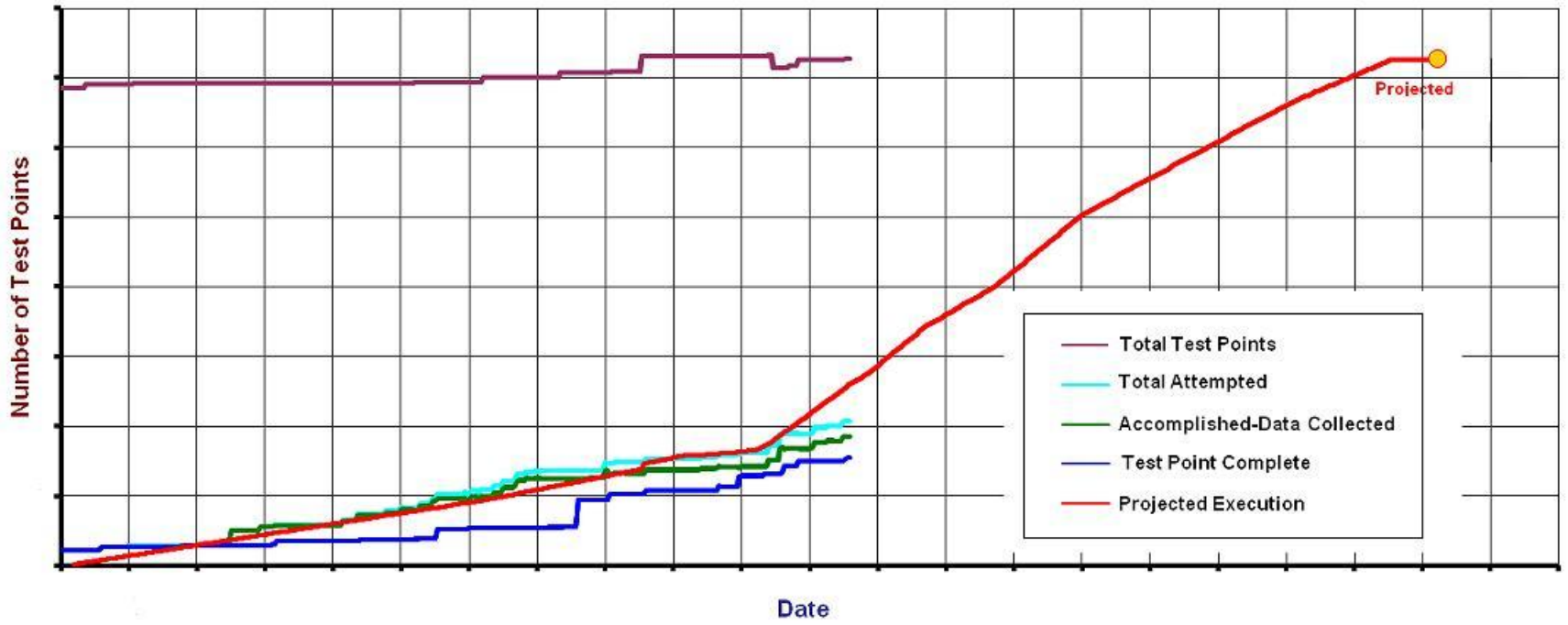
Acquisition Life Cycle and Phases

Engineering & Manufacturing Dev & Demo *cont.*

DEVELOPMENTAL TEST & EVALUATION

- **T&E Products**: Developmental evaluation reports, OA, TEMP
- **Measures / Metrics**:
  - DR quantity vs time (M&S, SIL, HITL, OAR, manufacturing)
  - DR rate of discovery/correction (design & manufacturing)
  - Test point burn-down (M&S, SIL, HITL, OAR)
  - Test time vs schedule (M&S, SIL, HITL, OAR)
  - Configuration status (M&S, SIL, HITL, OAR)
  - CTP results vs thresholds
  - CTP results vs time
  - System capabilities (mission context) characterized
  - System Certifications (Interoperability, IA, Safety)
  - TRLs

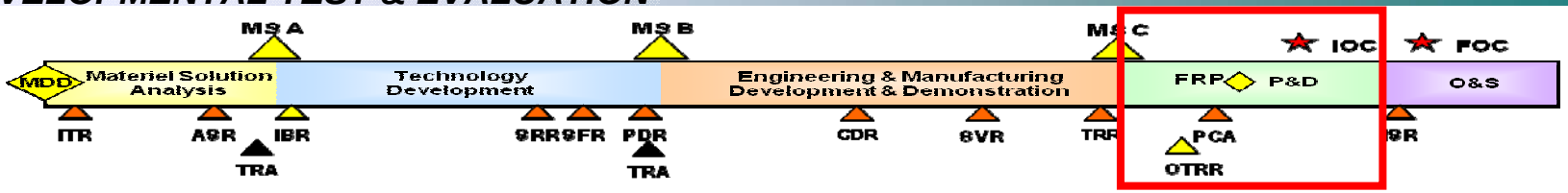
Metric Examples



Acquisition Life Cycle and Phases

Production & Deployment

DEVELOPMENTAL TEST & EVALUATION



- **Focus:** Achieve an operational capability
- **Decision Points:** PCA, OTRR, PRR, FRP, IOC
- **T&E Activity**:
  - Operational effectiveness & suitability
  - Vulnerability / Lethality
  - Production acceptance & Manufacturing process control
  - Deficiency correction
  - Reliability

Acquisition Life Cycle and Phases

Production & Deployment cont.

DEVELOPMENTAL TEST & EVALUATION

- **T&E Products**: Developmental evaluation report, AOTR, IOT&E report (BLRIP), LFT&E report, TEMP
- **Measures / Metrics**:
  - DR rate of discovery/correction (design & manufacturing)
  - Test point burn-down (OAR)
  - Test time vs schedule (OAR)
  - TOV&V (O-level, I-level, D-level)
  - System Certifications (Interoperability, IA, Safety)
  - MRLs
  - Configuration status (M&S, OAR, Trainers)
  - Operational Effectiveness & Operational Suitability
  - Survivability, Vulnerability, & Lethality
  - System capabilities (mission context) characterized

Acquisition Life Cycle and Phases

Operations & Support

DEVELOPMENTAL TEST & EVALUATION

- **Focus:** Sustain the system
- **Decision Points:** ISR, FOC
- **T&E Activity**:
  - Assess availability, reliability, maintainability
  - Identification of new capabilities, improved supportability
- **T&E Products**: Deficiency Reports, TTP updates
- **Measures / Metrics**:
  - DR discovery & resolution
  - Operating time (periodic & cumulative)

Summary

- **Product of T&E is knowledge for decisions across the life cycle**
- **Value of T&E – informed decisions (acquisition & operational)**
- **No single set of metrics applicable to all decisions or phases**
- **Metrics assess how well T&E is:**
  - Planning
  - Executing
  - Evaluating
  - Reporting

Next Steps

- **Engage with T&E and program management communities**
- **Continue to develop & evolve metrics**
- **Request your inputs to make the metrics meaningful & useful**

Contact Info

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Visit our website:

http://www.acq.osd.mil/sse/dte

Contact us to provide feedback and share your experience

Back-up

Metric Examples