



T&E Metrics for Acquisition Phases & Decisions

**Developmental Test & Evaluation
OUSD(AT&L)/Systems & Software Engineering**



Purpose

DEVELOPMENTAL TEST & EVALUATION

- **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

DEVELOPMENTAL TEST & EVALUATION

- **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

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- **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)**

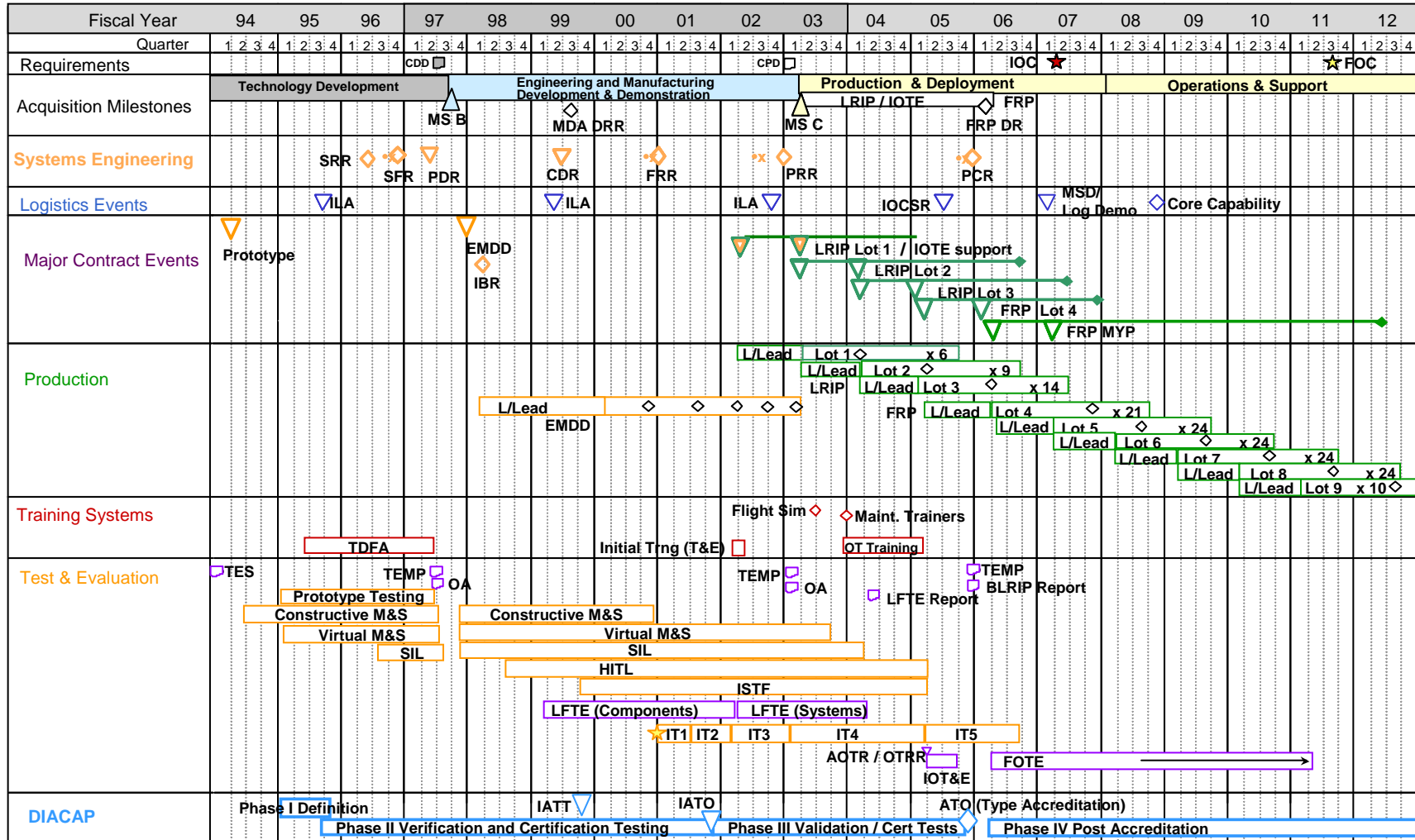


Sample Integrated Schedule

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How are you doing?

How do you know?



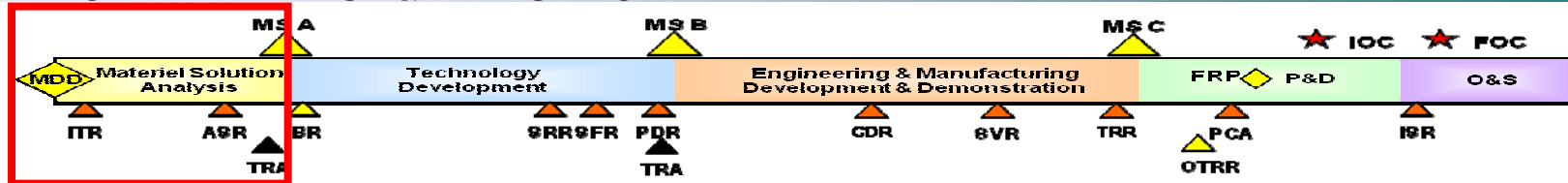
T&E - From Concept to Combat



Acquisition Life Cycle and Phases

Material Solution Analysis

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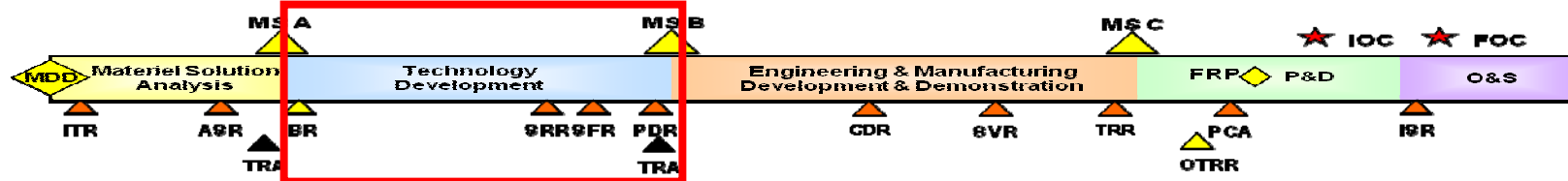
- **Focus:** Assess potential materiel solutions
- **Decision Points:** MDD, ITR, ASR, TRA, MS-A
- **T&E Activity:**
 - Review AoA for evaluatability, identify discriminators
 - M&S to evaluate alternatives, sensitivity analyses
- **T&E Products:** TES
- **Measures / Metrics:**
 - T&E Strategy defined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



Acquisition Life Cycle and Phases

Technology Development

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- **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.

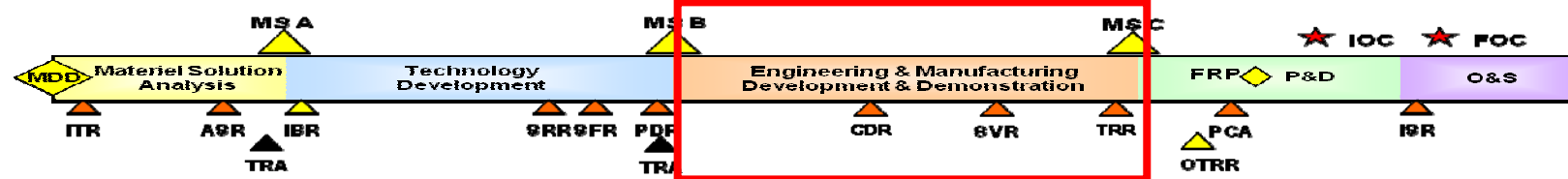
DEVELOPMENTAL TEST & EVALUATION

- **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.

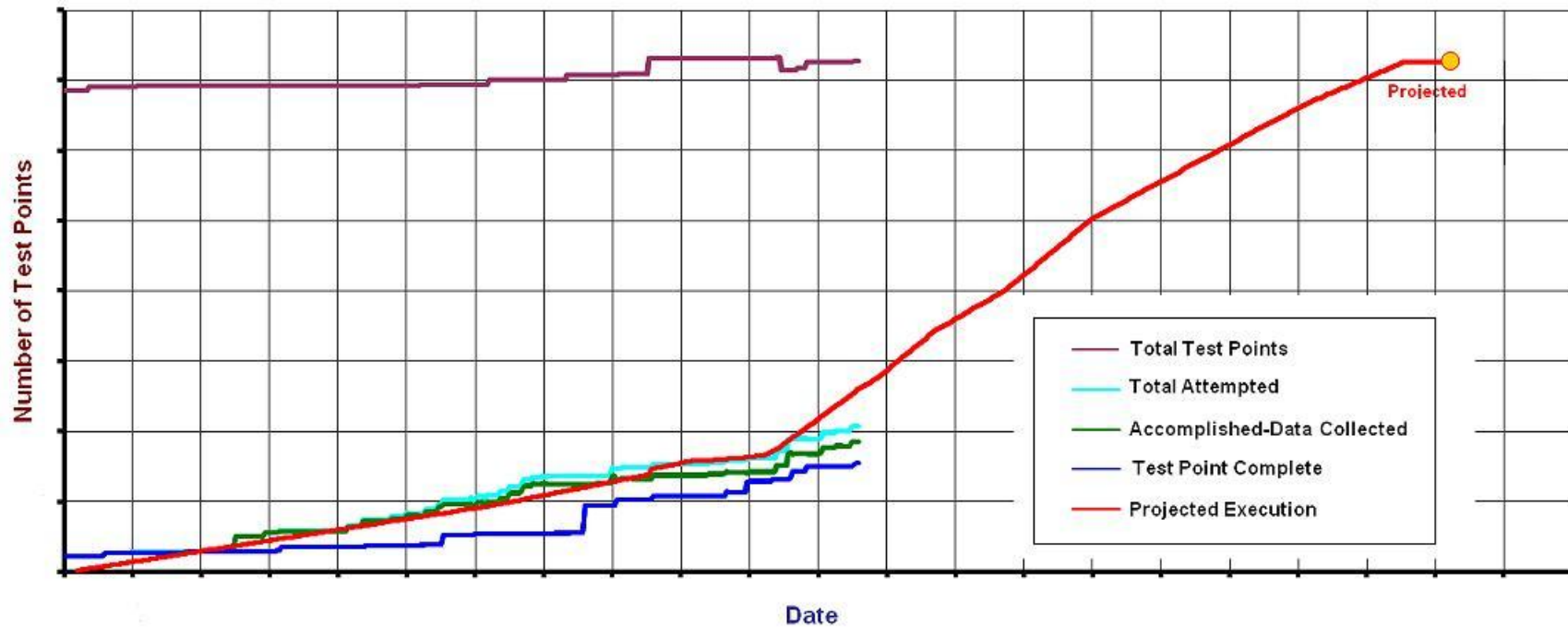
DEVELOPMENTAL TEST & EVALUATION

- **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

DEVELOPMENTAL TEST & EVALUATION

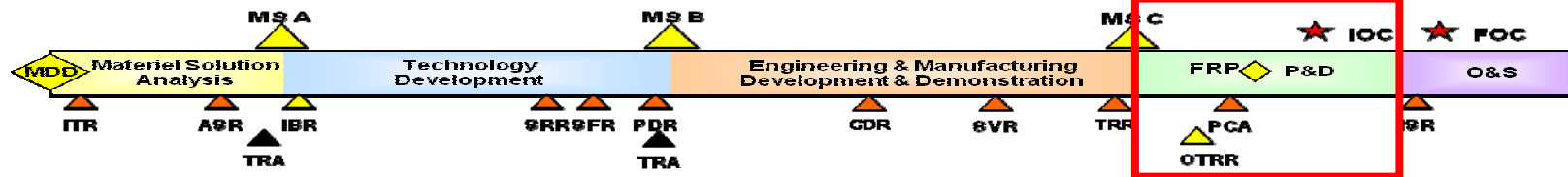




Acquisition Life Cycle and Phases

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

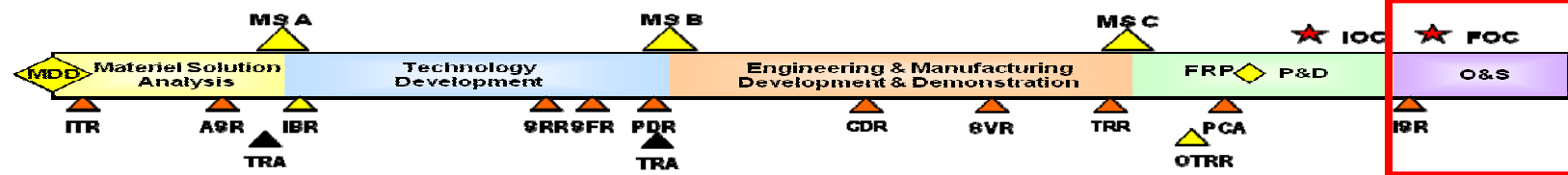
- **T&E Products:** Developmental evaluation report, AOTR, IOT&E report (BLRIP), LFT&E report, TEMP
- **Measures / Metrics:**
 - DR rate of discovery/correction (design & manufacturing)
 - Test point burn-down (OAR)
 - Test time vs schedule (OAR)
 - TOV&V (O-level, I-level, D-level)
 - System Certifications (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

DEVELOPMENTAL TEST & EVALUATION

- **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

DEVELOPMENTAL TEST & EVALUATION

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



Contact Info

DEVELOPMENTAL TEST & EVALUATION

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Visit our website:

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

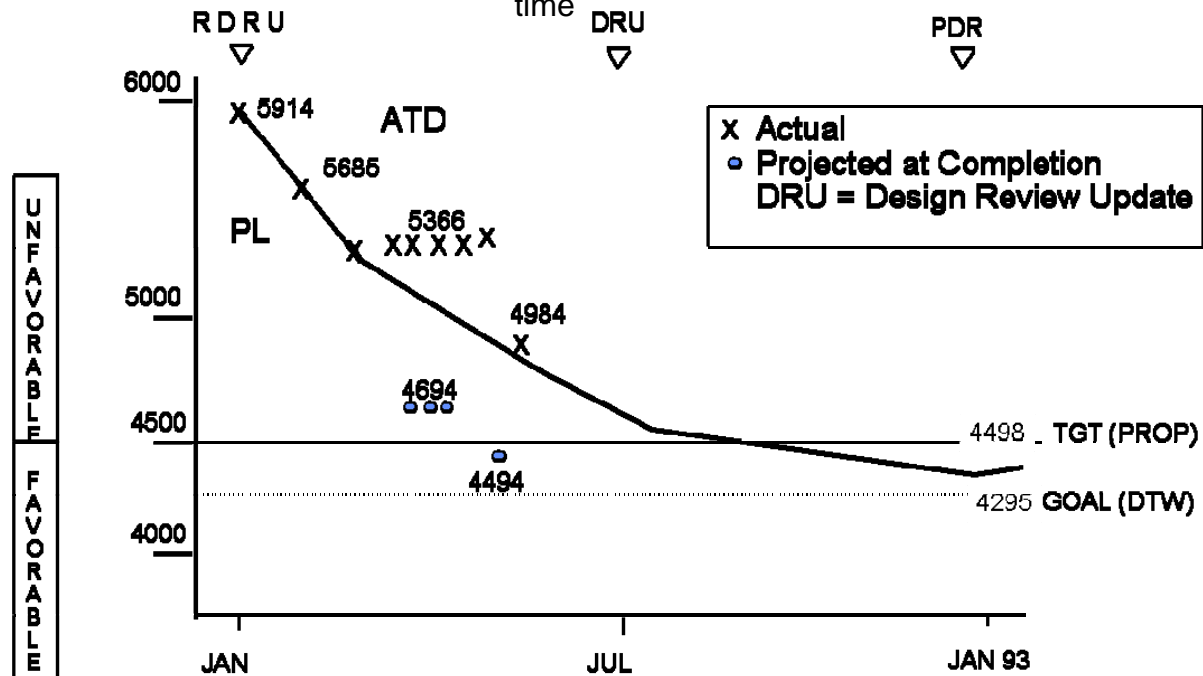
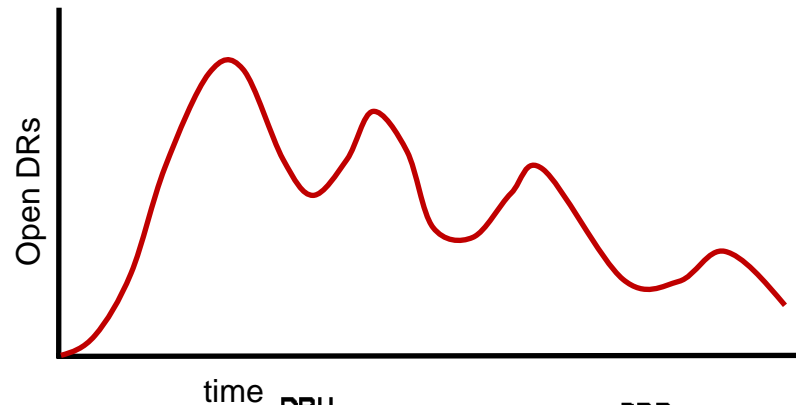
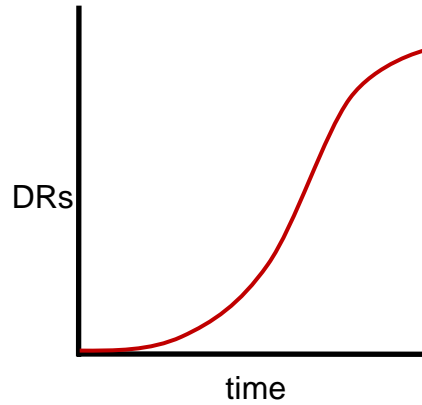
Contact us to provide feedback and share your experience

Back-up



Metric Examples

DEVELOPMENTAL TEST & EVALUATION



T&E - From Concept to Combat