Observations

• Operational Testing is Lengthy

• Systems Not Ready for Initial Operational Test and Evaluation

• Call to “Integrate” and “Streamline” Testing

I plan to update existing DOT&E guidance to incorporate an integrated testing philosophy. In my independent assessments, I intend to use all credible information to provide the warfighter and the Congress a complete understanding of how the systems the Department acquires will improve the readiness and lethality of our military forces. (FY2017 Annual Report)

- Robert F Behler

Director, Operational Test and Evaluation
In-Stride Operational Assessments

- Continuous Evaluation of Critical Capabilities
- Phased Planning and Execution by PM, FORSCOM, ATEC
- Phased Reporting at Key Programmatic Decision Points
- Benefits:
  - More efficient use of all available data.
  - Enables planning for and visibility of risk reduction during development.
  - Increases probability of successful IOT.
  - Reduces the impact on the operational force.

Create understanding of the maturity of a system continuously in order to increase the system’s chance of passing and reduce the scope (schedule) of IOT.
Overarching Purpose and Steps

**Ends:** create understanding of the maturity of a system continuously throughout its developmental life cycle in order to **increase the system’s chance of passing** and to **reduce the scope (schedule) of IOT** …

**Ways:** by planning, conducting and reporting the progress of system development against one or more critical capabilities and **creating a phased DT/OT approach** …

**Means:** through use of an aggregation evaluation methodology and all available data (contractor testing, developmental testing, operational testing, M&S, etc.) and integrate Soldiers into early testing.

**Steps:**

1. Determine Critical Capabilities
2. Determine Key Evaluation Metrics
3. Develop Aggregation Methodology
4. Develop Evaluation Schedule
5. Execution and Reporting
1. Determine Critical Capabilities

You know when you are done...when you have a list of capabilities that are critical to Soldiers and are the purpose for the acquisition of this system.

Sources:
- R-/P-Forms
- Critical Operational Issues
- Capability Gaps

Thoughts: best when...
- described as operational capabilities, i.e. Soldier task outcome,
- can be linked to performance (operational or technical) that will be testing during CT, DT, etc., and
- limited in number.

Advanced Integrated Air and Missile Defense
1. Dynamic Force Tailoring
2. Joint Engagements
3. Extended Battlespace
4. Flexible Interceptor Selection
5. Reliability
6. Enhanced EA Defense
2. Determine Key Evaluation Metrics

You know when you are done...when you have a list of key metrics that will be analyzed using data from test, M&S, etc., and are linked to the critical capabilities.

Sources:
- Requirements Documents
- System Evaluation Plan
- Developmental Evaluation Framework

Thoughts: best when...
- limited in number for each critical capability, and
- data will be available throughout development.

AIAMD Example
- Extended Battlespace Critical Capability
  1. MOE: # of engagements using fused sensor data
  2. MOP: % of remote tracks presented
  3. MOP: Slant range of engagements
3. Develop Aggregation Methodology

You know when you are done... when you have normalized and developed a method to aggregate the key metrics into progress towards meeting the Critical Capability.

Sources:
- None (you have to figure it out)

Thoughts: best when...
- shows progress towards desired capability at IOT.

AIAMD Example
- Extended Battlespace Critical Capability

\[ i = \frac{\text{MOE}/P_n}{n \times 100} \]

Where each MOE/MOP is normalized. i.e. Slant Range requirement 5 to 50 km is normalized to 5 = 0% and 50 = 100%.
4. Develop Evaluation Schedule

You know when you are done…when you have an outline graph for each capability that shows expected performance growth and data sources scheduled.

Sources:
- Systems Engineering Plan
- PM, Contractor

Thoughts: best when...
- critical capabilities show continuous improvement throughout schedule.

LUT: Limited User Test
GSIL: Government System Integration Lab
WTI: Weapons Tactics Instruction
SCOE: Soldier Checkout Event
IOT: Initial Operational Test
Example: Shape of the solution…

And then a miracle happens…

That was easy…
Example: Risk Mitigation vs. Capability

- **Risk Mitigation**
  - High
  - Med
  - Low

- **Program Start**
  - Phase 1 (12-14 mos)
  - End of Phase 1
  - Phase 2 (36 mos)
  - MS C

- **Key Events**
  - RFP: Request for Proposal
  - CA: Contract Award
  - CTV: Captive Test Vehicle
  - CDR: Critical Design Review
  - PDR: Preliminary Design Review
  - DRR: Design Readiness Review
  - PPT: Production Prove out Testing
  - EDT: Engineering Design Test

- **Risk Management**
  - **Proposal Deliveries**
  - **Lab Testing**
  - **Environmental Testing**
  - **Tower Testing, CFT of RRS**
  - **HWIL**
  - **ManTech Results**
  - **Final Design Selected (Most Producible Dome)**
  - **Tower Test, CFT, DBF**
  - **EDT Flight Tests**
  - **Initial E3 Testing**
  - **Production Prove Out**
  - **CFT**
  - **Flight Tests**

- **End of Phase 1**
  - Program Start

- **Program End**
  - Prime Contractor Selects Second Source Seeker 90 Days After CA (with Dome and IFS Model)
  - Second Source Seeker Option
  - Proposal Deliveries
  - Down Select to One Contractor (two Domes)
  - Produceability Effort Initiated
  - Lab Testing
  - Environmental Testing
  - Tower Testing, CFT of RRS
  - HWIL
  - ManTech Results
  - Final Design Selected (Most Producible Dome)
  - Tower Test, CFT, DBF
  - EDT Flight Tests
  - Initial E3 Testing
  - Production Prove Out
  - CFT
  - Flight Tests

- **Eventline Not to Scale**

- **GTV**
  - CFT
  - Flight Tests

- **MS C**
  - CFT
  - Flight Tests
5. Execution and Reporting

You know when you are done...when you have an graph that shows progress towards meeting the critical capabilities and can be summarized in effectiveness, suitability and survivability.

Sources:
- All previous information
- DT data and analysis

Thoughts: best when...
- progress is related to the overall desired effectiveness, suitability and survivability.
Example: AIAMD

- ATEC will assess progress against key AIAMD capabilities and system performance after each test event and summarize results yearly.

Results are % progress towards R-Form promises and Critical Operational Issues through examining 17 related AIAMD key capabilities and attributes from CDD & gaps using quantitative assessment of related KPP, KSA, and AA measures

Effectiveness R1/COI 2: Common Mission Command
R2/COI 3: Distributed Operations
R3/COI 1: Plug and Fight

Suitability COI 4: Suitability

Survivability COI 5: Survivability

Effectiveness R1/COI 2
Suitability COI 4
Survivability COI 5

Distributed Operations
Plug and Fight
Suitability
Survivability

Dynamic Force Tailoring
Joint Engagements
Defense Design & Planning
Extended Battlespace
360 Engagement
Improved Aerial Target ID
Flexible Interceptor Selection
Span of Control
Track Accuracy & Loading
Reliability (Software Stability)
Built In Test
Enhanced Realistic Training / Improved Soldier, Leader, Team Safety (currently high risk rating)
Tech Manual Readiness
Enhanced Defense against EA Cybersecurity

KPPs
KSAs
Additional Attributes (AA)
Measures of Effectiveness
Measures of Performance
In-Stride Operational Assessments

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backup
Critical Operational Capability

Percent Capability Observed vs. Months

Baseline vs. Observed Performance

Government DT

Contractor DT

OT
Critical Operational Capability

- Baseline
- Observed Performance

Percent Capability Observed

Months

OT

Government
DT