

Proposed Systems Engineering Processes for the Integrated Live, Virtual, and Constructive (LVC) Test Environment (ILTE)

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NOTICE

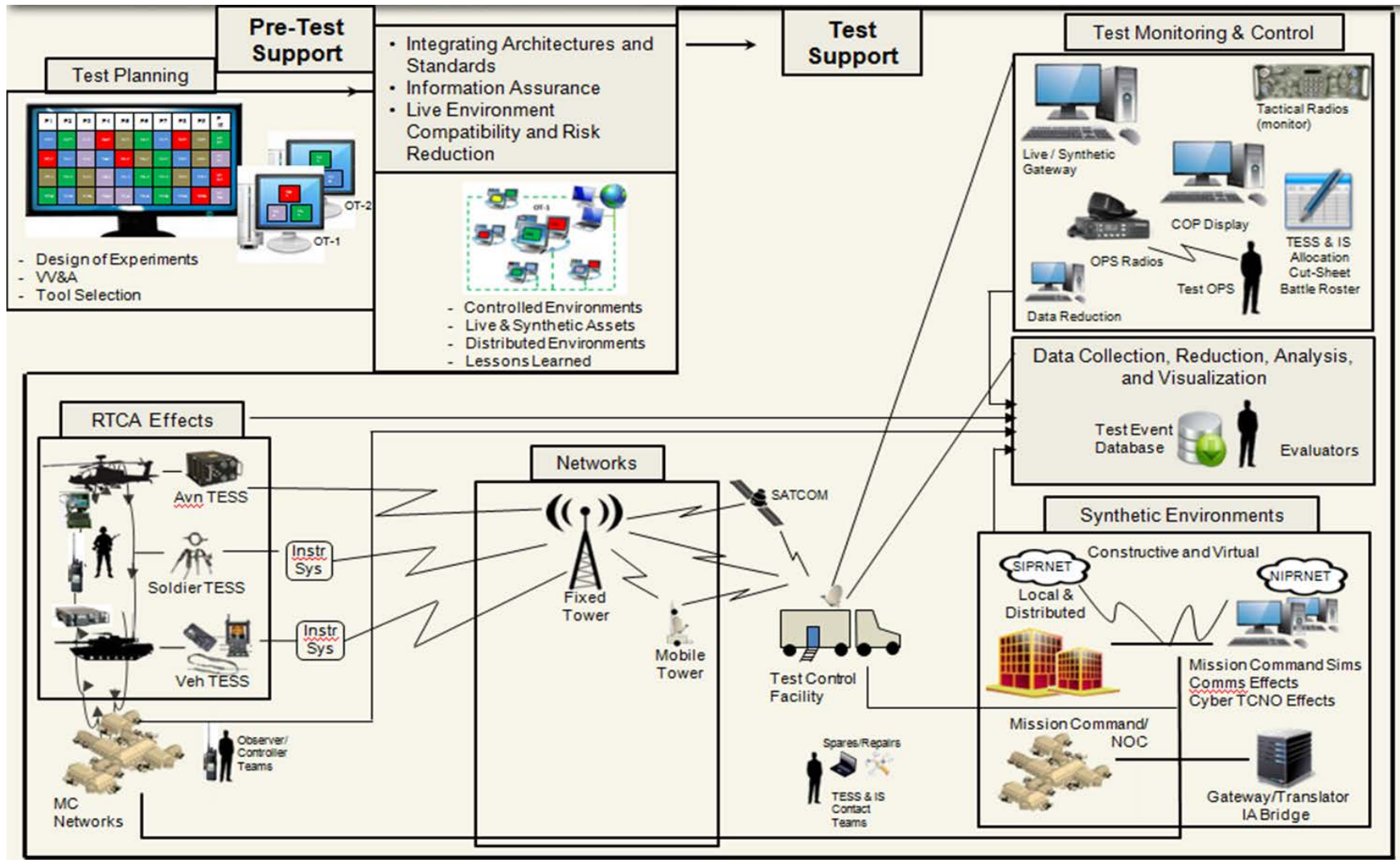
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ILTE Requirement Background

- **Integrated Live, Virtual, and Constructive (LVC) Test Environment (ILTE) is a new acquisition program that Program Executive Office Simulation, Training, and Instrumentation (PEO STRI) is initiating in FY15**
- **US Army Operational Test Command (OTC) is the ILTE Capability Developer and PEO STRI is the ILTE Materiel Developer.**
- **ILTE Requirements are documented in the ILTE Test Capability Requirements Document (TCRD)**
- **OTC requires ILTE capabilities to create a realistic test environment for Army Systems undergoing Operational Test**
- **This briefing describes an eleven step process that MITRE proposed to PEO STRI to initialize Build 0 of the ILTE System of Systems**

ILTE OV-1



ILTE Build 0 Initialization Process

	Process Step	Description
1	Define ILTE Scope and Purpose	Describe actions to define initial, overarching ILTE scope and purpose.
2	Identify ILTE Initial Components	Identify and trace ILTE components to be included in initial offering.
3	Define ILTE Current Capabilities	Decompose ILTE systems defined in [2] into functional capabilities.
4	Analyze ILTE Capability Objectives	1 st round of iterative process to examine and measure current ILTE capabilities against TCRD requirements and determine what potential capabilities can be reached in near term cycles.
5	Define Initial ILTE Implementation Plan	Create development, integration, functional test, certification, and deployment plan for 1 st round ILTE components.
6	Capture Existing ILTE Architectural Components	Conduct actions and activities to establish configuration control and management of ILTE components. Plan and manage deployments.
7	Establish ILTE Development and Integration Facilities	Conduct actions and activities to establish facilities and resources necessary for effective, on-going ILTE integration, test, and deployment preparation.
8	Establish ILTE Planning Cycle	Compare current with future requirements. Prioritize and schedule future increments.
9	Define/Establish Working Groups	Working groups needed and their expected role on ongoing ILTE efforts.
10	Requirements Analysis, Management, and Tracking	Process for on-going requirements analysis, management, and tracking.
11	First-Use (V 1.0) Integration Plan & Schedule	Specific plan for V 1.0 first test event.

ILTE Phase 0 Initialization

Step 1. Define ILTE Scope and Purpose



Test Capabilities Requirements Document (TCRD)

Integrated

Live-Virtual-Constructive

Test Environment

(ILTE)

V 1.0

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- TCRD specifies capabilities required:
 - Real-Time Casualty Assessment Effects
 - Integrating Architectures & Standards
 - Synthetic Environments
 - Test Planning
 - Test Monitoring & Control
 - Information Assurance
 - Networks
 - Data Collection, Reduction, Analysis, and Visualization.
 - Live Environment Compatibility and Risk Reduction

ILTE Phase 0 Initialization

Step 2. Baseline Initial Systems

Name	Acronym	Description
Intelligence Modeling and Simulation for Evaluation	IMASE	Simulation: IMASE is an entity-based, stochastic (random), event stepped computer simulation. It supports ISR and IEW system development, training, and testing using a threat-based, multispectral environment.
Extensible C4ISR Instrumentation Suite Fire Support Application	EXCIS FSA	Simulation: ExCIS FSA was developed to simulate fire support command and control systems.
Common Data Link	CDL	An OTC application that serves as the central command and interface for multiple components, including cross-service instrumentation systems, that together provide a Joint Real-Time Casualty Assessment (JRTCA) capability. CDL processes geospatial data, weapon engagements, and casualty assessments.
Multiple Integrated Laser Engagement System	MILES	MILES is used by US military and other armed forces for training. It uses lasers and blank cartridges to simulate actual battle.
The ATEC Player Event Tracking System	TAPETS	MILES add on used to provide position / location information and communications
Joint Tool Suite	JTS	Collection of tools developed by EPG, used for data collection, reduction, storage, analysis, visualization, simulation and stimulation of select Army systems. Formerly known as (RICS)2
Advanced Distributed Modular Acquisition System	ADMAS	Communications, video, and network data collection device suitable for soldier systems, general C4ISR applications, UxV, Wheeled/Tracked Vehicles, Air platforms, etc.
One Semi-Automated Forces	OneSAF	OneSAF is a composable, next generation, entity-level Computer Generated Forces (CGF) simulation for brigade and below, combat and non-combat operations.

ILTE Phase 0 Initialization

Step 3. Define ILTE Current Capabilities

- Functional Decomposition of **existing systems** to standard function list
- Relative Degree of coverage of function indicated by matching of inputs/outputs to function
- Tool (AWAREness) allows multiple mapping of systems to functions

The screenshot displays the AWAREness Suite - OTC (production) interface. The 'Functions' pane on the left lists various simulation tasks, such as '2.02 Send Call for Fire Message to AFATDS' and '3.1 Simulate Integrate Fires'. The 'Solutions' pane on the right shows a hierarchical tree of system categories, including '1_C4ISR and Sustainment Systems', '1_Communications Systems', and 'People and Process Solutions'. A specific solution, 'ExCIS v3.2', is highlighted with a callout bubble. The top of the window features a navigation bar with tabs for 'My IQ', 'Requirements IQ', 'Blueprint IQ', 'Quality IQ', 'Solutions Options IQ', and 'System Delivery IQ'.

Section II. ILTE Phase 0 Initialization

Step 4. Analyze ILTE Capability Objectives

AWAREness Suite™ - OTC (production)

03.06.a.02 Simulate Communications Processes

The screenshot displays the AWAREness Suite interface. On the left, a 'Scenarios' tree is shown with the following structure:

- 03.04.a Lethal Engagements
 - 03.04.a.01 Adjudicate combat results
 - 03.04.a.02 Stimulate Chem, Bio, Radio/nuclear, Mine sensors
 - 03.04.a.03 Simulation of collateral & occupant damage assessments
 - 03.04.a.04 Simulate, monitor status of, and collect data from AP
- 03.04.b Non-Lethal Engagements
- 03.04.c Electronic and Cyber Warfare
- 03.05 Integrating Architectures & Standards
- 03.06 Synthetic Environment
 - 03.06.a Constructive Simulations
 - 03.06.a.01 Simulation Accuracy - Complexity and Lethality
 - 03.06.a.02 Simulate Communications Processes**
 - 03.06.a.03 Simulate Doctrine, Tactics, Techniques, and Procedures
 - 03.06.a.04 Simulate Multiple Sides or Factions; PMESII Factors; a
 - 03.06.a.05 Synchronize Live and Synthetic Player Unit and Envir
 - 03.06.a.06 Use Accredited Combat Models
 - 03.06.a.07 Interoperate Internal to Sim Federation
 - 03.06.a.08 Simulate Operations in Urban or Complex Terrain (Syn
 - 03.06.a.09 Simulate Human Factors
 - 03.06.b Network and Mission Command Simulations
 - 03.06.c Intel/Sensor Reporting Simulation/Stimulation
 - 03.06.d Fire Support Simulation
 - 03.06.e Virtual Simulations
- 03.07 Test Planning
- 03.08 Test Monitoring and control
- 03.09 Information Assurance
- 03.10 Networks
- 03.11 Data Collection, Reduction, and Analysis
- 03.12 Live Environment Compatibility and Risk Reduction

- 04 Logistics and Infrastructure Requirements
- 05 Standardization, Interoperability, and Commonality
- 06 Schedule Considerations

On the right, the 'Functions' pane lists various simulation tasks, including:

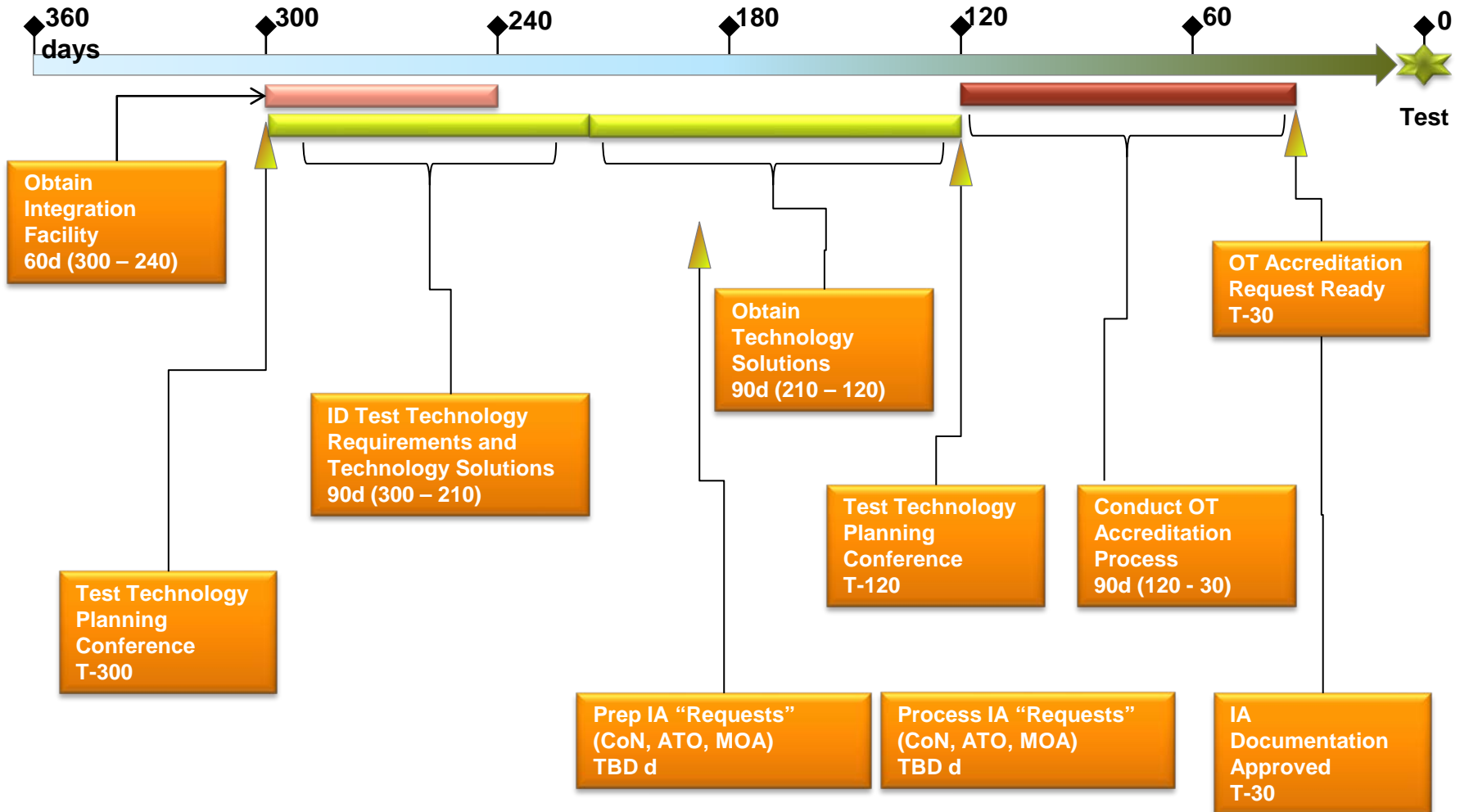
- 5.9.1.2 Conduct Cyber Network Operations
- 5.9.1.3 Provide Cyber Support
- Interoperate Sim --> WNW at Layer 3a (MANET)
- Interoperate Simulation - SINGARS Radio
- Interoperate Simulation - WNW Network
- Interoperate Simulation --> WNW at Layer 3b (IP) (Black side)
- Interoperate Simulation --> WNW at Layer 3b (IP) (Red side)
- Provide Battle Command Network Simulation and Stimulation
- Provide Network Loading
- Reconfigure Simulated EPLRS Network
- Reconfigure Simulated HCLOS Network
- Reconfigure Simulated HNW Network
- Reconfigure Simulated MUOS Network
- Reconfigure Simulated NCW Network
- Reconfigure Simulated SINGARS Network
- Reconfigure Simulated SRW Network
- Reconfigure Simulated WNW Network
- Simulate Information Distribution via EPLRS
- Simulate Information Distribution via HNW
- Simulate Information Distribution via Link 16 (TADIL-J)
- Simulate Information Distribution via MUOS
- Simulate Information Distribution via NCW
- Simulate Information Distribution via SINGARS
- Simulate Information Distribution via SRW
- Simulate Information Distribution via WNW
- Simulate Link-16 Communications Effects
- Simulate MUOS Communications Effects
- Simulate NCW Communications Effects
- Simulate SINGARS Communications Effects
- Simulate SRW Communications Effects
- Simulate WNW Communications Effects
- Simulate WNW Communications Effects in Real Time

- Functional Decomposition of required capabilities to standard function list
- Allows on-going progress monitoring of SoS development against objective capabilities
- Tool (AWAREness) allows multiple mapping of requirements to functions

ILTE Phase 0 Initialization

Step 5. Initial ILTE Implementation Plan

Notional ILTE Test Technology Preparation Process



ILTE Phase 0 Initialization

Step 6. Capture Existing ILTE Architectural Components

- **Includes the following activities**
 - Capture Proposed ILTE Component Systems
 - Capture ILTE Interoperability and Support Mechanisms
 - Capture ILTE Interchange Data
 - Capture Known/Test Data Exchange Patterns
 - Capture ILTE Common / Shared Services
 - Establish ILTE CM Process and CCB

ILTE Phase 0 Initialization

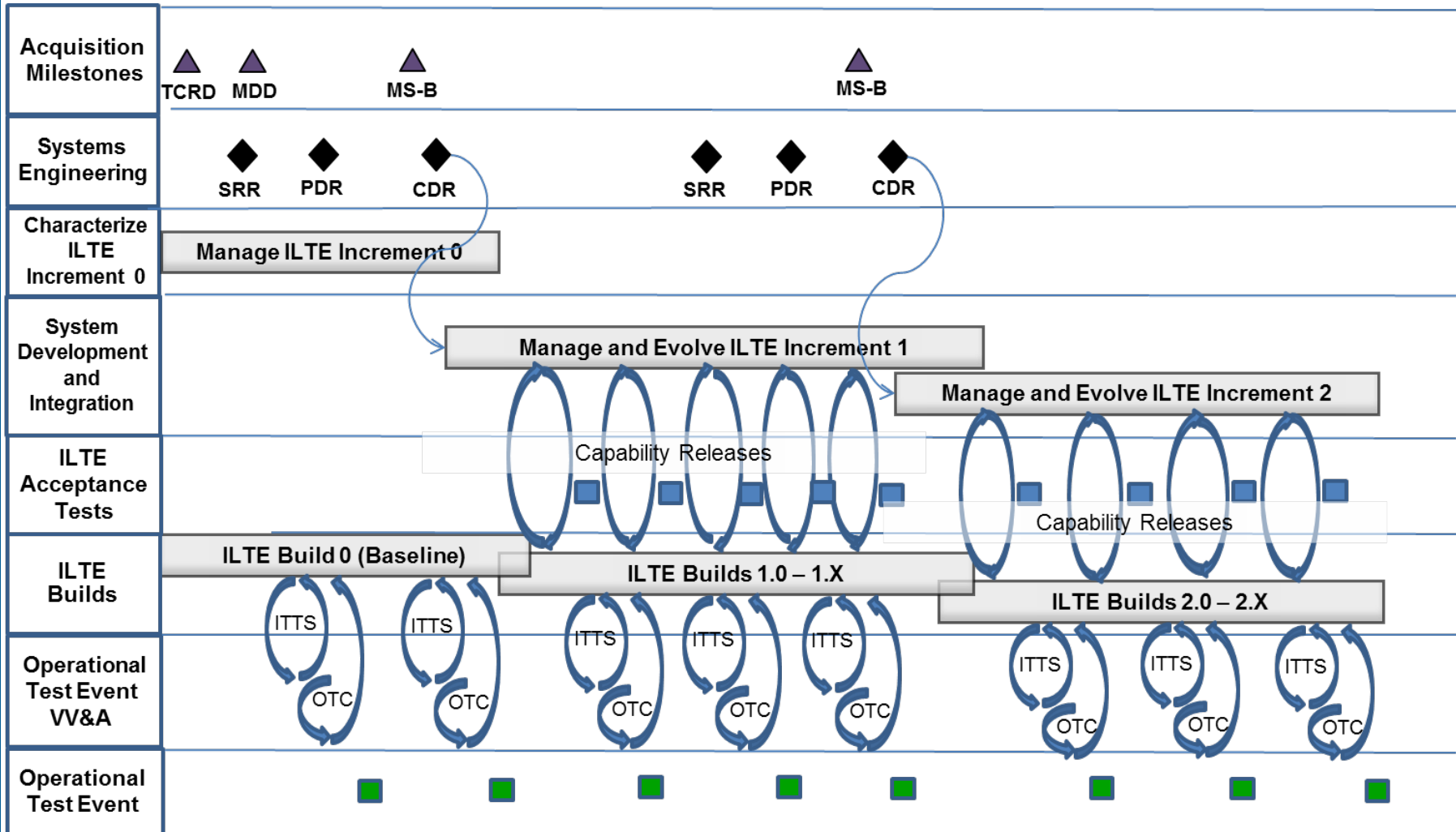
Step 7. Establish ILTE Development and Integration Facilities

▪ **Baseline Network Path**

- Checklist of the contents (the subsystems)
- What documents we want on each subsystem
- Connectivity diagrams
 - Includes Mission Command connectivity
 - Distributed protocols
- Other user identification
- Power, Operating System, 32/64 bit function, CON status
- Hardware demands for each
- Owners for each
- Contracts available to leverage for each

ILTE Phase 0 Initialization

Step 8. Establish ILTE Planning Cycle



ILTE Phase 0 Initialization

Step 9. Define and Establish Working Groups

«Pool»:SoSET «Lane»:Non-Govt SE	<p>The ILTE SoS Engineering Team (SoSET) provides independent systems engineering and architecture management on the behalf of all of the other ILTE SoS stakeholders. The SoSET is managed by PM ITTS and may be composed of both Government and non-Government Systems Engineering staff.</p>
«Pool»:ILTE CCB	<p>The ILTE Configuration Control Board (CCB) will be composed of Government sponsor representatives of User community (OTC) and Material Developer (PM-ITTS). It is the ILTE decision making body responsible for:</p> <ul style="list-style-type: none"> • Decisions on what components will be accepted for inclusion into ILTE SoS • Decision approval for modifications to existing ILTE SoS
«Pool»:Testers	<p>The ILTE Integration and Test (I&T) Team (Testers) are those responsible for conducting and supporting the periodic ILTE I&T events. This team may be composed of ILTE SE team members, PM-ITTS contractors, or test site support staff.</p>
«Pool»:Fielders	<p>The ILTE Deployment Management Team (Deployers) are those responsible for conducting and supporting the periodic ILTE fielding events. These events include receipt of ILTE components from baseline storage, performing V&V certification for operational test, and deployment to multiple sites where ILTE components will be used to conduct operational tests. This team may be composed of ILTE SE team members, OTC contractors, or test site support staff.</p>
«Pool»:Users	<p>The ILTE User Community (Users) represents the OTC Test Officers who will rely upon the capabilities of the ILTE SoS to support their Operational Tests.</p>
«Pool»:Developers	<p>ILTE Software/Hardware (Developers) includes the Government and non-Government organizations involved with ILTE development. This group will be managed by PM-ITTS, who will be responsible for interfacing directly with other Government organizations which may represent their contractor developers.</p>

ILTE Phase 0 Initialization

Step 10. Requirements Analysis, Management, and Tracking

The screenshot displays the AWAREness Suite - OTC (production) interface. It is divided into three main sections: **Functions**, **Solutions**, and **Test Events**.
- The **Functions** panel on the left shows a hierarchical tree of simulation functions, such as 'LTE 0. Simulate Combat or Tactical Vehicle as Target - Live' and 'LTE 1. Simulate Attack by Lethal Means'.
- The **Solutions** panel in the center lists various system components and capabilities, including 'Event Control', 'File Transfer Service', and 'Network Monitoring'.
- The **Test Events** panel on the right lists 'Test Event 1', 'Test Event 2', 'Test Event 3', and 'Test Event n'.
Annotations include a box around the 'Functions' panel, a box around the 'Solutions' panel, and a circle around 'Test Event 3'. A legend at the bottom identifies status icons: Noncompliant (red), Partly compliant (yellow), Installed (orange), and Selected (checkbox).

■ Noncompliant ■ Partly compliant ■ Installed □ Selected

ILTE Phase 0 Initialization

Step 11. First Use (V 1.0) Integration Plan and Schedule

- **Candidate tests down selected from OTC FY-15 test schedule**
 - 5 potential selections made based on initial components
 - 1 target operational test made for Q2 FY16

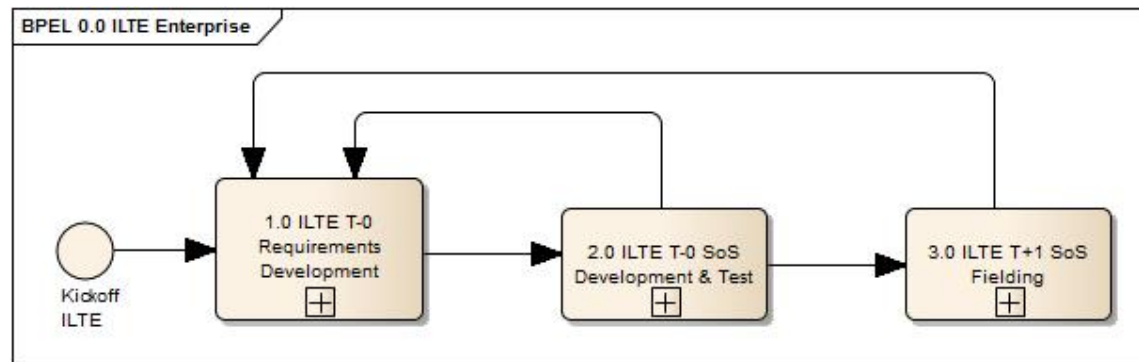
- **Issues to be considered**
 - Building relationship with OTC Test Officers
 - Fluidity of System(s) delivery
 - Fluidity of Operational Test schedule

- **ILTE Work to be done**
 - Establish / Improve interoperability of existing components
 - Establish / Improve performance metrics for on-going measurement

ILTE Lifecycle Management

Repeated SoSE Actions to Evolve ILTE SoS

- Document, refine, and prioritize future ILTE SoS needs
- Identify, evaluate, and select design option(s) for addressing ILTE SoS needs
- Develop and manage the ILTE SoS architecture
- Synchronize and develop ILTE SoS updates (system)
- Integrate and test ILTE SoS updates
- Conduct ILTE Deployment Acceptance tests
- Package and Roll-out ILTE SoS update



End of Presentation

- Questions?



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