# NDIA 14th Annual Systems Engineering Conference

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# Systems Analysis and Agile Acquisition

**October 26, 2011**

# *Overview*

- **Customs and Border Protection (CBP) mission**
- **Office of Technology Innovation and Acquisition (OTIA) mission**
- **Systems analysis**
- **Systems Engineering Tailoring**

# Customs and Border Protection Mission

We are the guardians of our Nation's borders.
We are America's frontline.

We safeguard the American homeland
at and beyond our borders.

We protect the American public against terrorists
and the instruments of terror.

We steadfastly enforce the laws of the United States
while fostering our Nation's economic security
through lawful international trade and travel.

We serve the American public with
vigilance, integrity and professionalism.

*Every day, CBP deploys more than 42,000 frontline personnel to protect nearly 7,000 miles of land border and 327 ports of entry.*

# Recent Border Protection Successes


- **361.2 million travelers inspected at ports of entry**
- **556,000 illegitimate entrants stopped along border**
- **224,000 inadmissible aliens turned away at ports of entry**
- **1.5 million prohibited animal or plant products kept out**
- **166,727 agricultural pests blocked**
- **39,000 suspected criminals arrested**
- **9,500 wanted criminals arrested**

*FY 2009 data*

# Office of Technology Innovation and Acquisition (OTIA) Mission

- **Ensure all technology efforts are properly focused on the mission and are well integrated across CBP**
- **Provide expertise and effectiveness in acquisition and management of contractor-delivered products and services**
- **OTIA Assistant Commissioner is CBP's Component Acquisition Executive**


# *OTIA Acquisition Roles*

- **Serves as CBP's Component Acquisition Executive**
- **Authority to review and approve key acquisition decisions**
- **Execute similar authority to Acquisition Decision Authority (ADA) for other acquisition programs not captured within the DHS acquisition system**
- **Represent CBP on Acquisition Review Boards (ARBs)**
- **Provide oversight that all programs progress through the Acquisition Review Process**
  - Level 1, 2 & 3
  - Other CBP acquisitions
  - IT and non IT programs

# OTIA Acquisition Focus

- **Rapid fielding of capability to Customs & Border Patrol Agents**
- **Focus on commercial and non-developmental (vice developmental) procurement items**
- **Field systems that work; quickly and affordably**
  - Capabilities-based
  - Vendor integration and support
  - Government acceptance test and operational test

# CBP Technology Interest Areas*

- Open Architecture
- Broadband/wireless
- Common operating pictures
- Radiation Portal Monitors
- Wide-area surveillance
- Automated target recognition
- Ultra-light detection
- Tunnel detection
- Predictive intelligence
- Insider threat detection
- Foliage penetration
- Target classification
- IP-addressable sensors
- High resolution cameras
- Synthetic aperture radars
- Chemical identification

*Not a comprehensive list

# Acquisition Challenge

- **Department of Homeland Security (DHS) acquisition and systems engineering guidelines are primarily defined around developmental programs**
  - Planning, Requirements Definition, Design, Development, integration & Test, Implementation, O&M
  - “Full” systems engineering, CM, developmental test, operational test, support planning
- **These guidelines require significant tailoring to support current OTIA focus on commercial sourcing**
  - Existing design, no development, vendor integration, vendor CM and support, minimal acceptance test, focused operational test
  - Tailored Systems Engineering Life Cycle (SELC)

A Technical Basis for Tailoring Is Needed

# System Perspective

- **OTIA acquires systems that are comprised of elements that may be commercially sourced or may require development**
  - Commercial/Non-Developmental Item (Coml/NDI)
  - Adapted (Class I change from Coml/NDI)
  - Development
- **Acquisition, technical and business approaches and insights differ for each system element type**
  - Coml/NDI – No development, acceptance testing, vendor CM, and high cost certainty
  - Adapted – ECP, limited DT, vendor CM, and medium cost certainty
  - Development – design, development, integration, test, full CM, and low cost certainty

One Size Does Not Fit All

# Why System Analysis?

**Historically, programs have underestimated the technical complexity of the systems to be delivered**

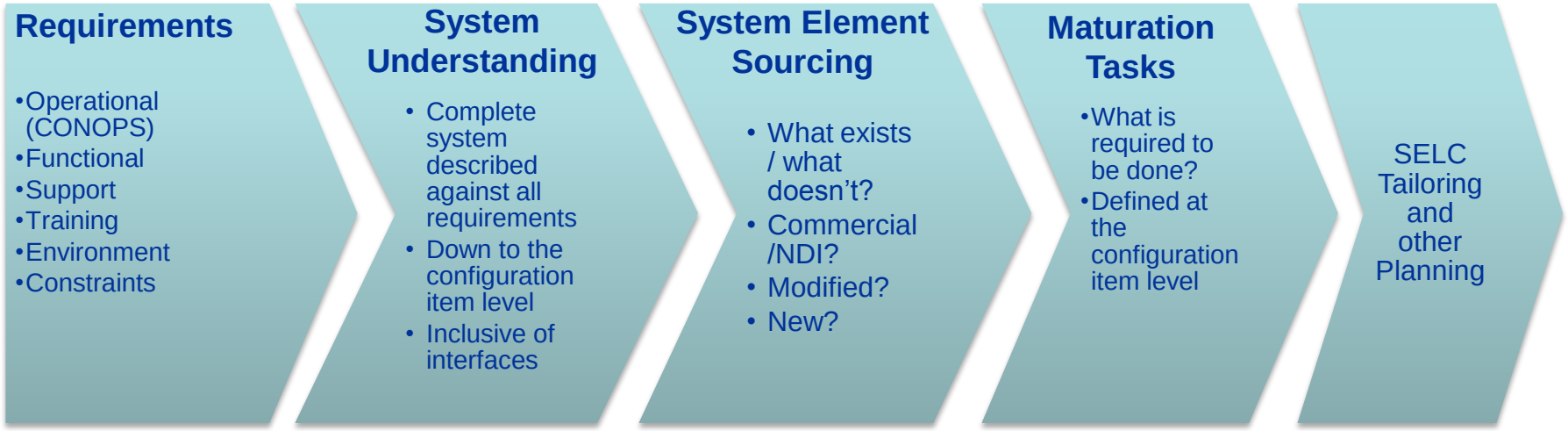
- Underestimated the software development effort involved
- Overestimated the amount of software reuse benefit
- Overlooked internal and external interfaces
- Overestimated technology maturity
- Underestimated the impacts of changes to design
- Overlooked various design considerations such as reliability, corrosion, safety, manufacturing, etc.
- Underestimated the cost implications of technical complexity
- Overestimated industry's capability to deliver

**Collectively, these factors put programs at risk for cost/schedule/performance**

**System Analysis can help programs better define the technical complexity of their systems**

# System Analysis Application

**Systems Analysis must be accomplished before SELC Tailoring can begin**




**System Analysis Informs SELC Tailoring and other Program Planning**

# Definitions

## Commercial Item*

(1) Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes

(i) Has been sold, leased, or licensed to the general public

(ii) Has been offered for sale, lease, or license to the general public

## Non Development Item*

(1) Any previously developed item of supply used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement

(2) Any item described in paragraph (1) of this definition that requires only minor modification or modifications of a type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency

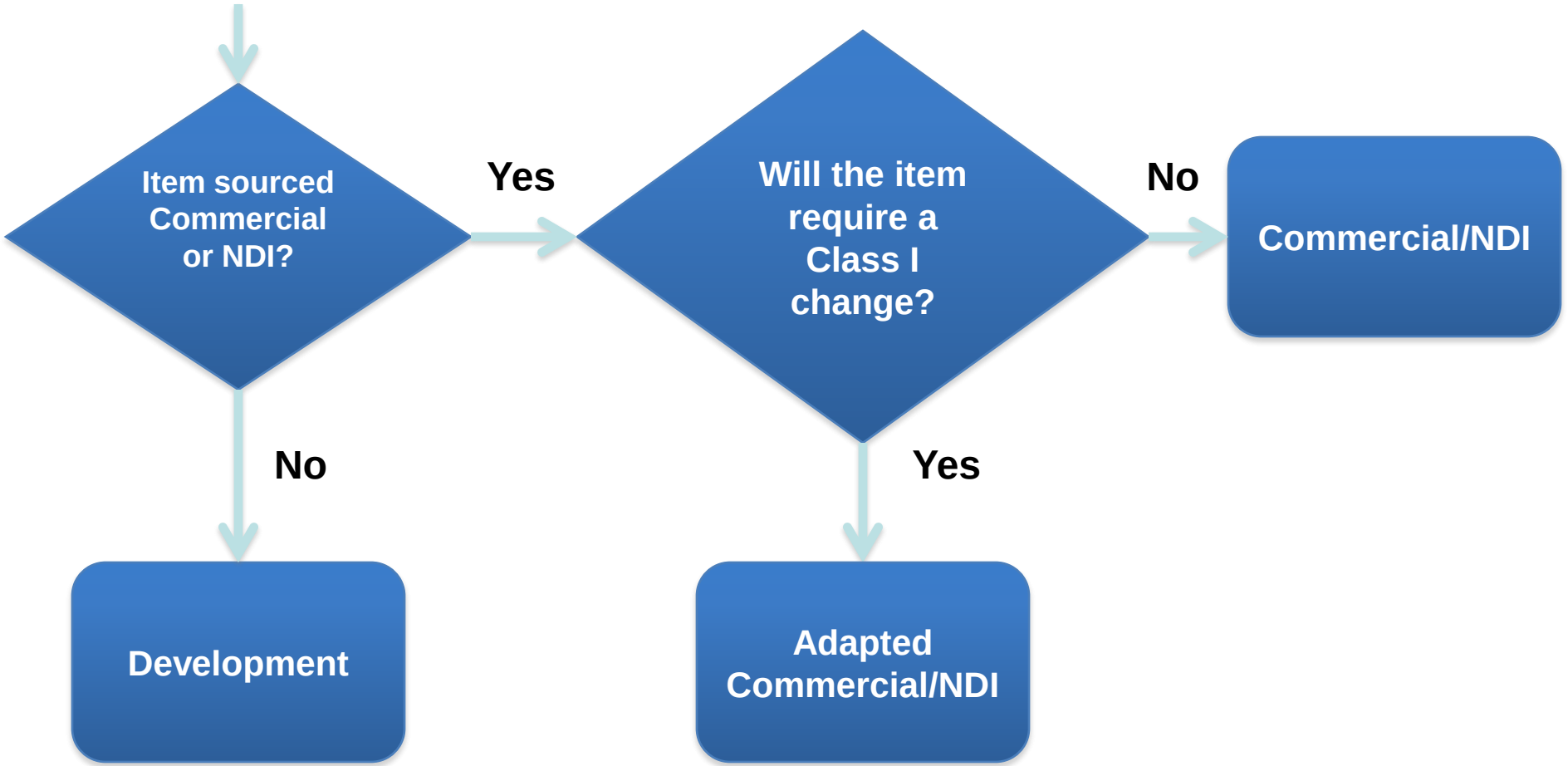
## Class I Change**

An engineering change that affects the form, fit, function, or logistics support of an item.

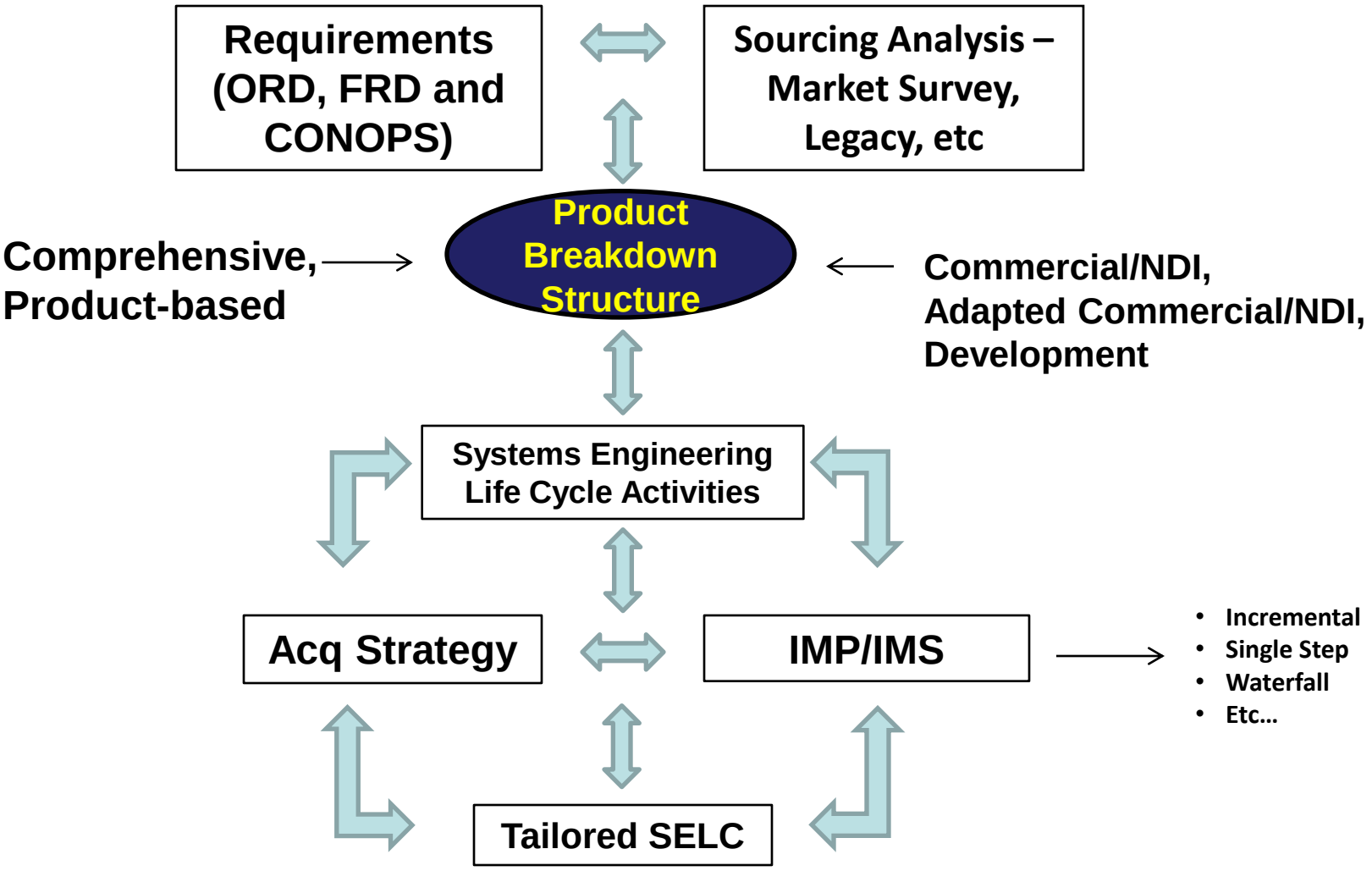
*** Taken from FAR Part 2**
**** Taken from Mil-HDBK 61A**

# Definition Application

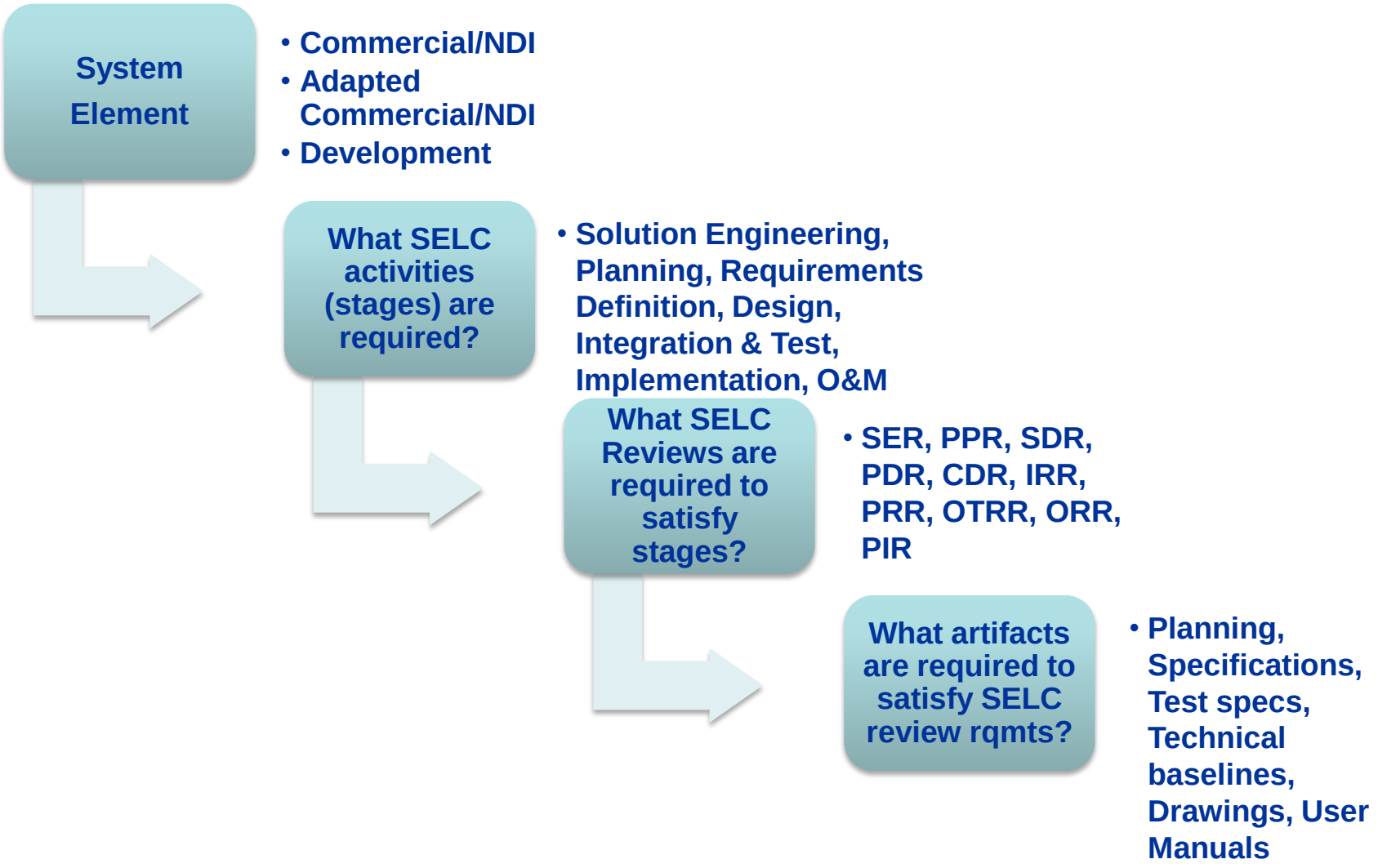
**For each system element:**



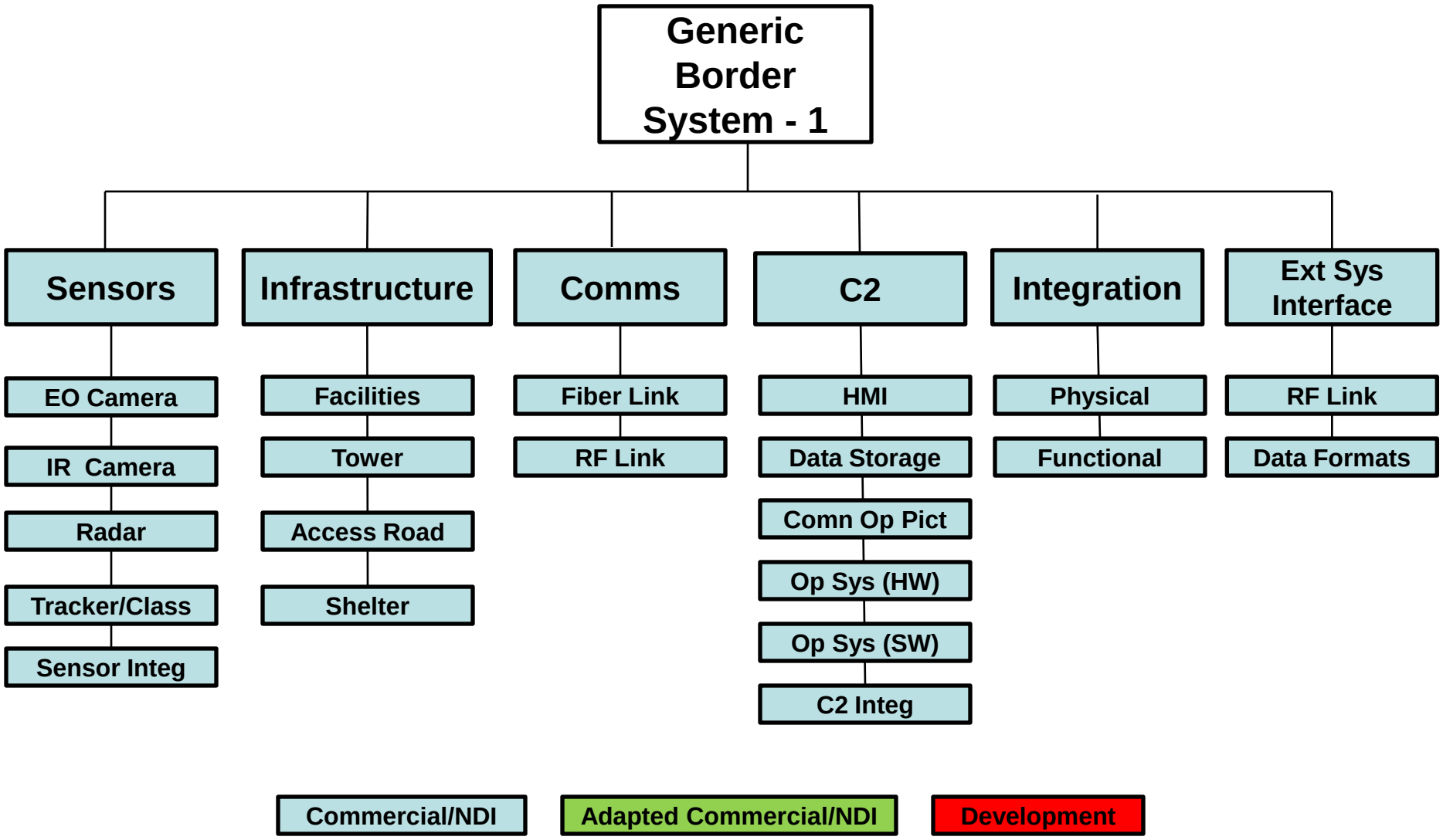
# System Analysis Approach



# PBS-Based Tailoring Logic



# Example PBS – Coml/NDI



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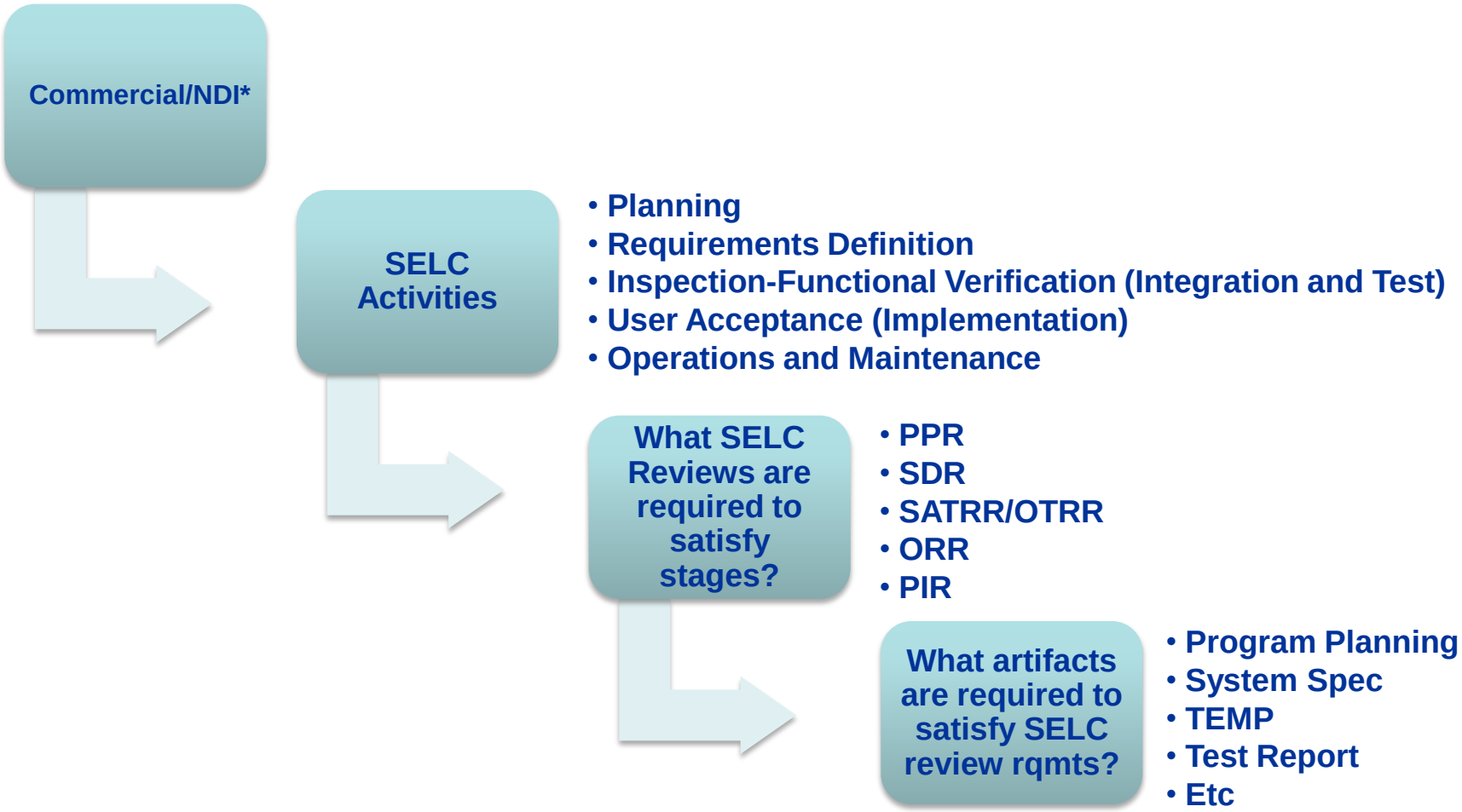


# Project Tailoring - Considerations

**Execute, Combine or Delete SELC stages**

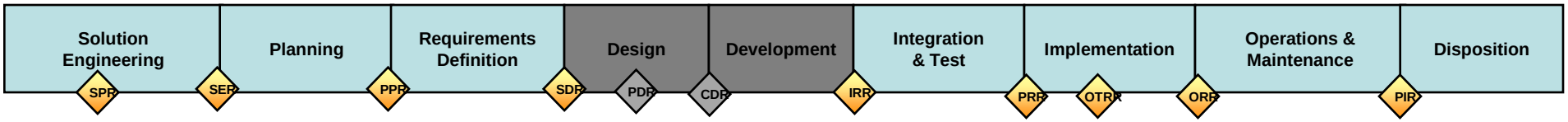
**Execute, Combine or Delete SELC reviews**

**Execute, Combine or Delete SELC artifacts**

**Substitute products of similar content**

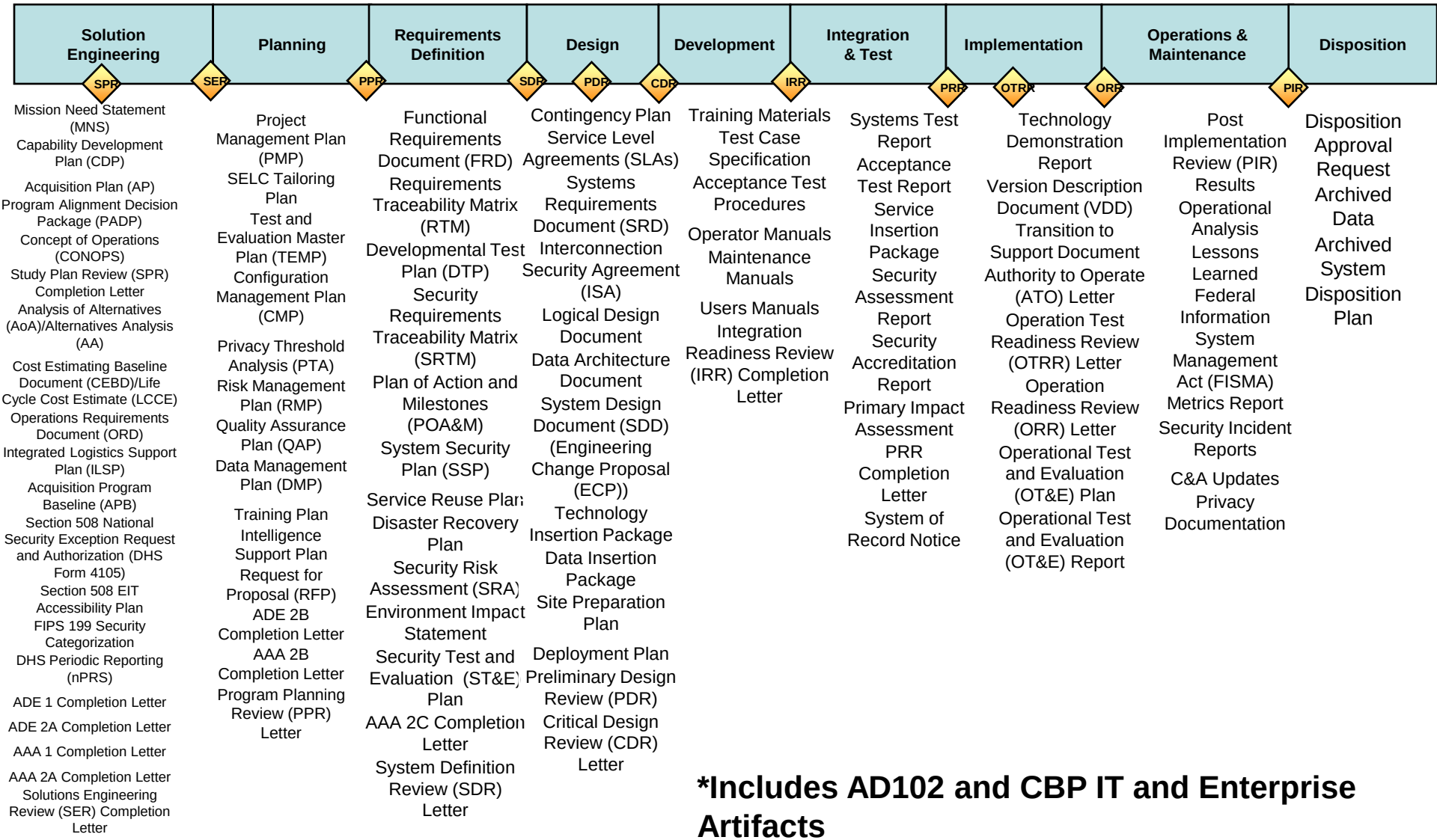
**Some Artifacts Identified in the SELC are Required by DHS Policy, Statutes, or Regulations and May Not Be Able To Be Deleted**

# SELC Review Tailoring – Coml/NDI



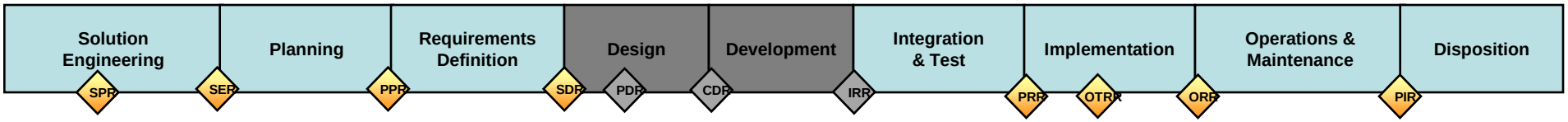

- **No design or development stages eliminates the need for the PDR, CDR and IRR**
- **Artifacts normally developed in design and development stages are presented at the Test Readiness Review (TRR) in preparation for testing**

# SELC Artifacts – All*




***Includes AD102 and CBP IT and Enterprise Artifacts**

# Coml/NDI Tailoring Example – Non IT




Mission Need Statement (MNS)
Capability Development Plan (CDP)
Acquisition Plan (AP)
Program Alignment Decision Package (PADP)
Concept of Operations (CONOPS)
Study Plan Review (SPR) Completion Letter
Analysis of Alternatives (AoA)/Alternatives Analysis (AA)
Cost Estimating Baseline Document (CEBD)/Life Cycle Cost Estimate (LCCE)
Operations Requirements Document (ORD)
Integrated Logistics Support Plan (ILSP)
Acquisition Program Baseline (APB)
Section 508 National Security Exception Request and Authorization (DHS Form 4105)
ADE 1 Completion Letter
ADE 2A Completion Letter
Solutions Engineering Review (SER) Completion Letter

Project Management Plan (PMP)
SELC Tailoring Plan
Test and Evaluation Master Plan (TEMP)
Configuration Management Plan (CMP)
Privacy Threshold Analysis (PTA)
Risk Management Plan (RMP)
Quality Assurance Plan (QAP)
Data Management Plan (DMP)
Training Plan
Intelligence Support Plan
Request for Proposal (RFP)
ADE 2B Completion Letter
Program Planning Review (PPR) Letter

Requirements Traceability Matrix (RTM)
Environment Impact Statement
Security Test and Evaluation (ST&E) Plan
System Definition Review (SDR) Letter

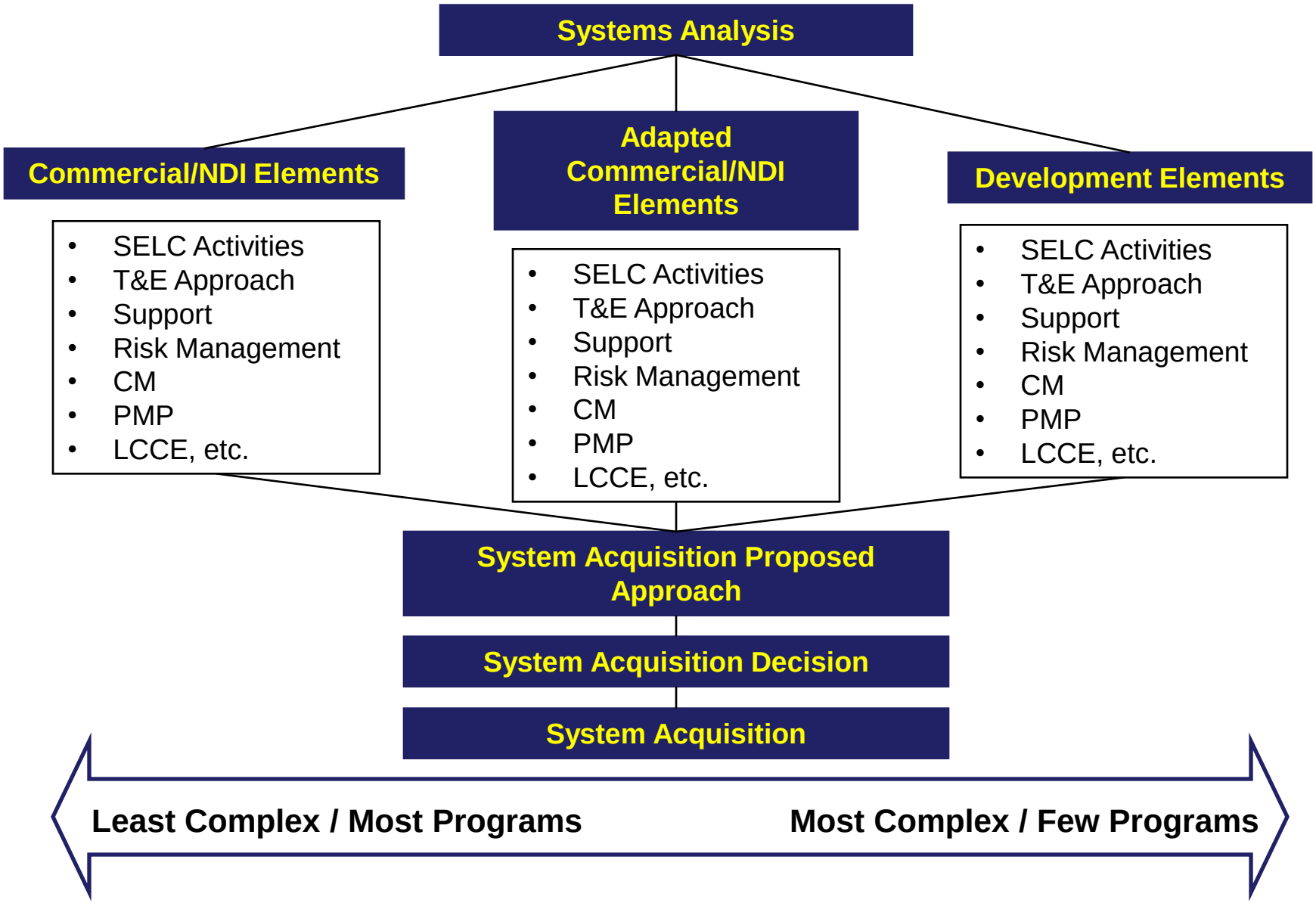
Service Level Agreements (SLAs)
Interconnection Security Agreement (ISA)
Data Insertion Package
Site Preparation Plan
Deployment Plan
Training Materials
Acceptance Test Procedures
Operator Manuals
Maintenance Manuals
Users Manuals
Acceptance Test Report
Primary Impact Assessment
PRR Completion Letter
System of Record Notice

Version Description Document (VDD)
Operation Test Readiness Review (OTRR) Letter
Operation Readiness Review (ORR) Letter
Operational Test and Evaluation (OT&E) Plan
Operational Test and Evaluation (OT&E) Report

Post Implementation Review (PIR) Results
Operational Analysis
Lessons Learned
Federal Information System Management Act (FISMA) Metrics Report
Security Incident Reports
Privacy Documentation

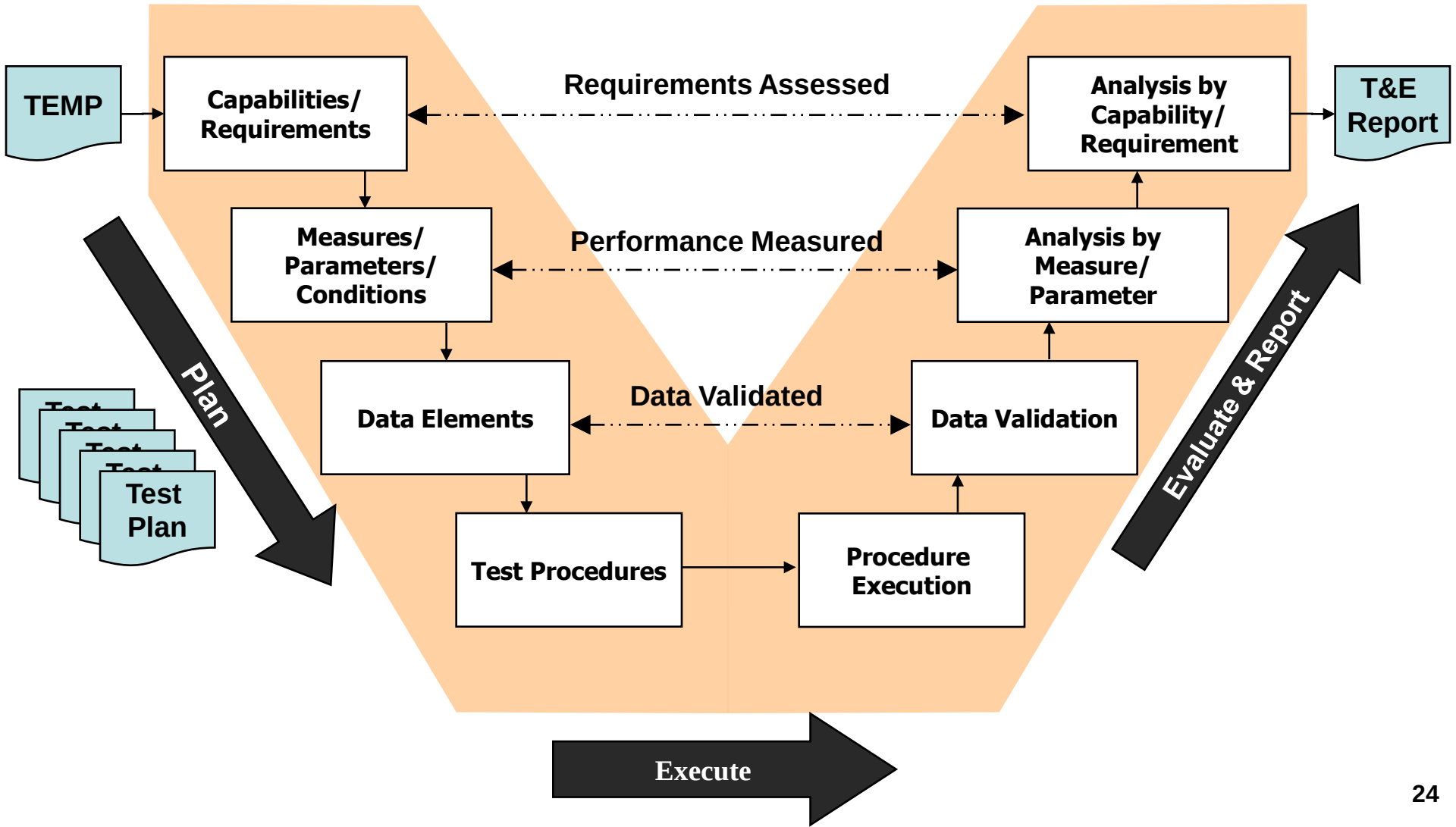
Disposition Approval Request
Archived Data
Archived System
Disposition Plan

# System Analysis Application

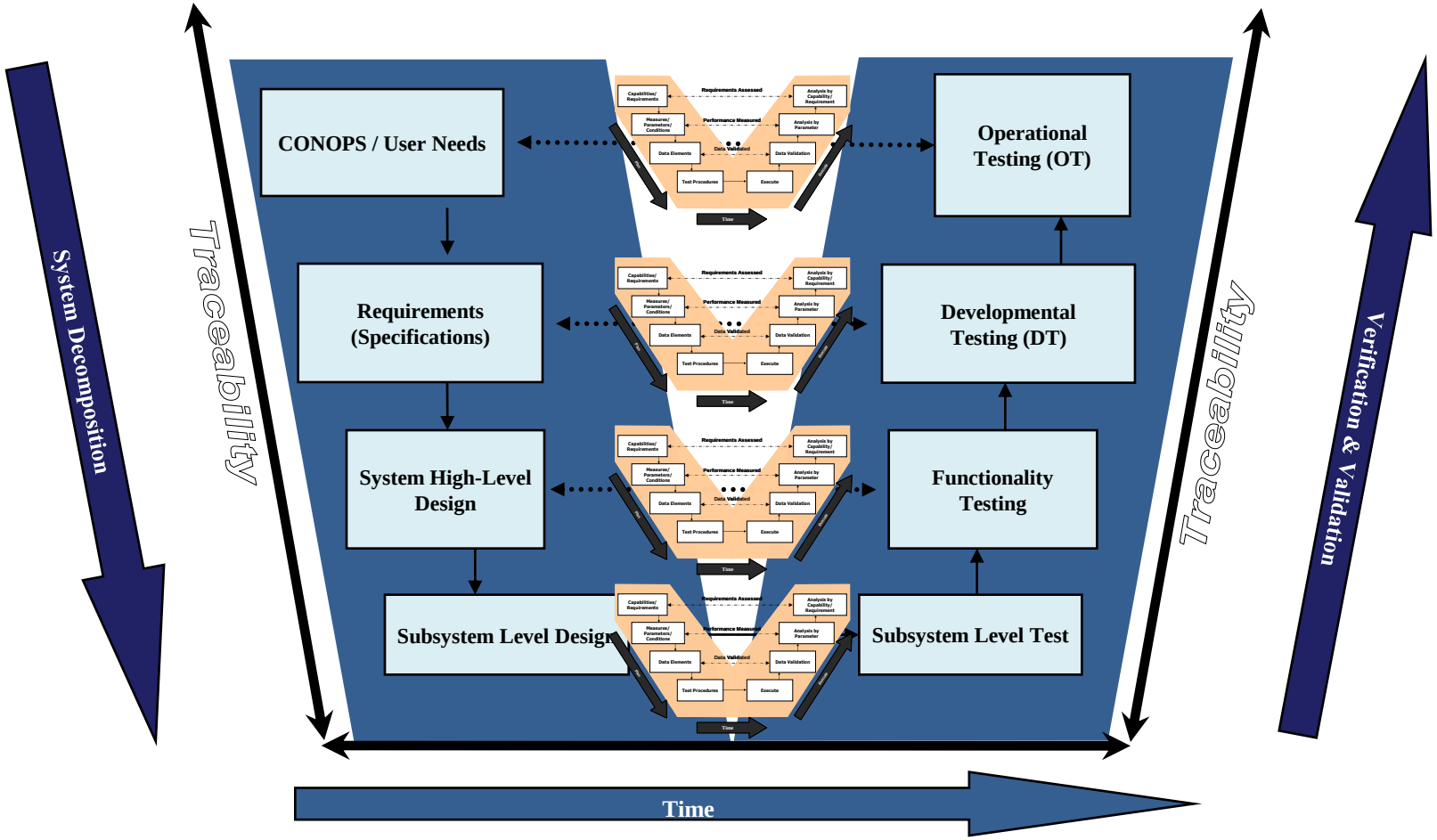


# Test Event Planning/Executing/Reporting

## The T&E 'V' Process



# Relationship Between SE 'V' and T&E 'V'




**T&E 'V' – Implemented at Every Level of SE 'V'**

# DHS Commercial Development Test & Evaluation

- **Vendor Interface**
  - Explicit T&E scope, expectations and roles outlines in RFPs
  - Close interface with vendors and vendor testing
  - Synergy in government witnessed contractor testing
  - System Qualification Tests typically based on vendor stated capability vice firm government requirements
  - Tightly coupled following contractor testing
- **User Interface**
  - SAT integrated with OT for cost, schedule and performance gains
  - Efficient handoffs with OAs to shorten cycle time to Border Patrol

**Agile T&E process**

# DHS Commercial T&E

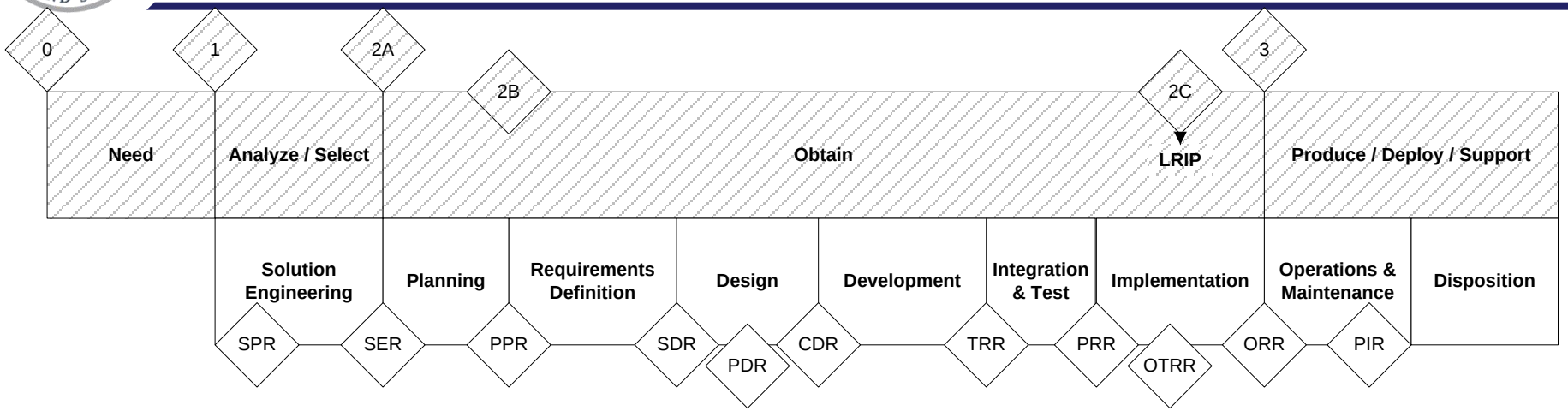
## •Types of DT&E:

- Contractor Testing
  - Testing done by the vendor during the design and development phases
- System Qualification Testing
  - Determine whether system meets the specified requirements
- System Acceptance Test:
  - Determine whether system satisfies its acceptance criteria and customer can accept the system
- Technology Demonstrations:
  - Determine whether an item of hardware or software performs a specific function (limited exhibition of the operation); obtain user feedback
- Production Tests:
  - Determine whether the vendor can produce a system to specification
    - First Article Tests, Lot Acceptance Tests, Production Qualification Tests

## Types of OT&E

- Early Operational Assessment (EOA)
  - An OA conducted prior to or in support of prototype testing
- Operational Assessment (OA)
  - An evaluation of operational effectiveness and suitability and overall mission capability made by an independent operational test activity on other than production systems
- Initial OT&E (IOT&E)
  - Conducted on production, or production representative articles to determine systems are operationally effective and suitable for intended use by representative users
- FOT&E
  - T&E that may be necessary after system deployment to refine estimates make during OT&E, to evaluate production changes and to re-evaluate the system to ensure that it continues to meet operational needs

# Testing Synergy




**DEVELOPMENTAL TEST & EVALUATION**

Contractor Testing

SQT

SAT SAT

Production Tests

Integrated T&E

**OPERATIONAL TEST & EVALUATION**

EOA

OA

IOT&E FOT&E

Tech Demos

Technical Focus (vendor)

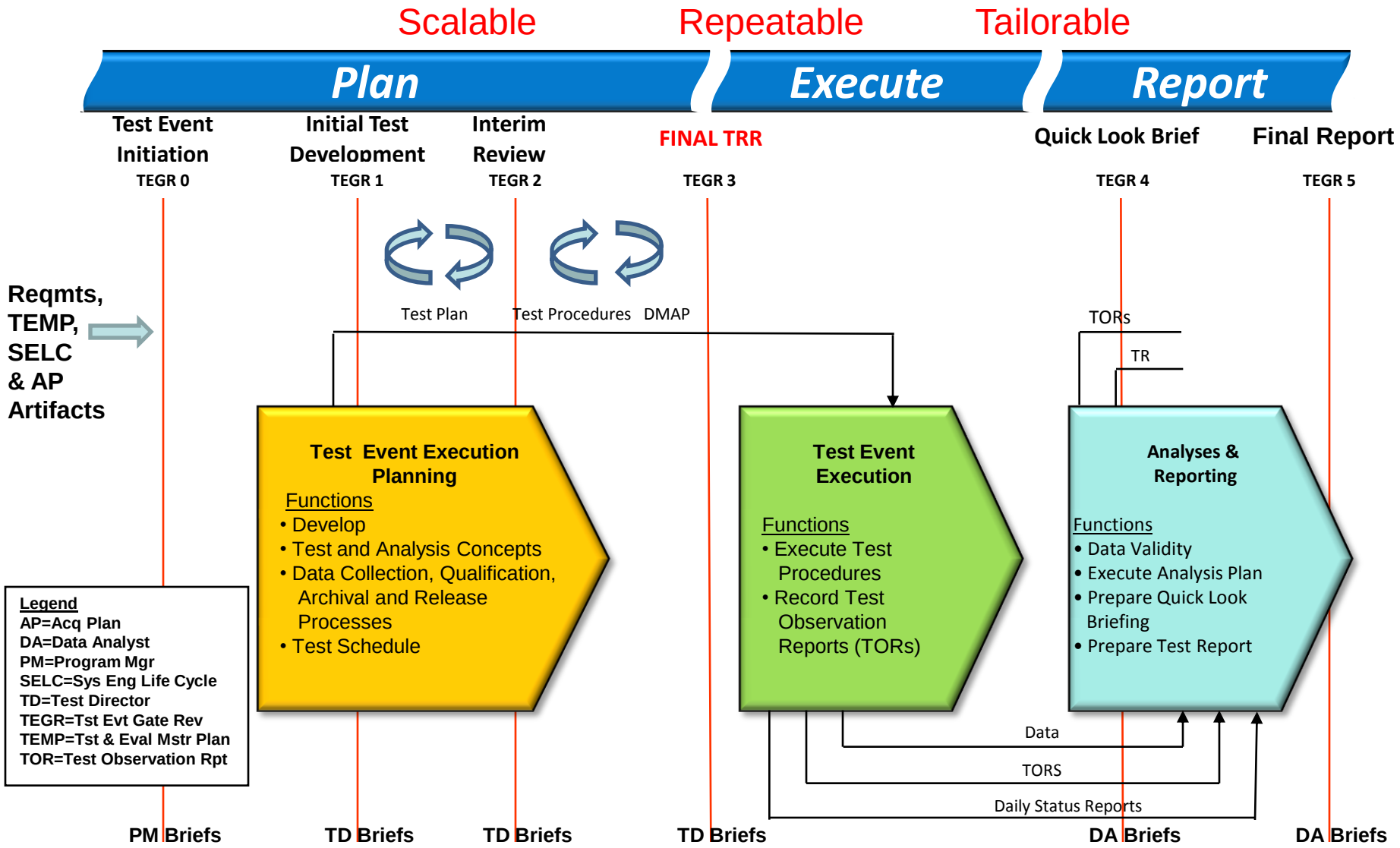
Technical Focus (gov)

Operational Focus (gov)

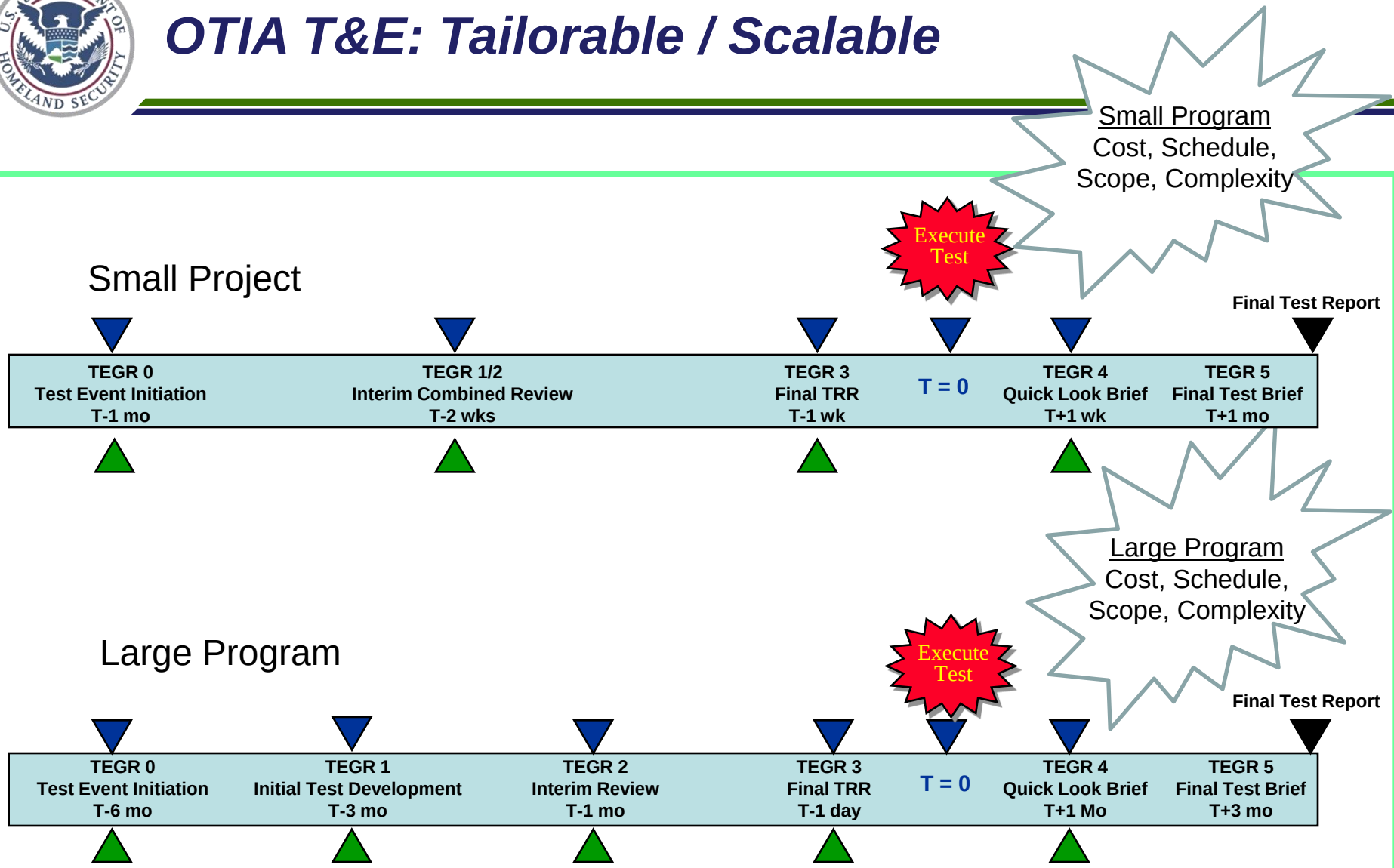
# *OTIA Review T&E Process*

- **OTIA provides end-to-end test event planning/review process for all OTIA programs**
- **Process includes lines of responsibility and periodic gate reviews with entrance and exit criteria to ensure proposed and planned tests successfully progress**
- **Process may be tailored for individual test events**
- **Supports DHS Acquisition Directive 102-01**
- **Process is repeatable, adaptable, and scalable**

# Test Event Planning/Executing/Analysis & Reporting



# OTIA T&E: Tailorable / Scalable




Time line is scalable  Gate Reviews are tailorable  Process is repeatable

# *Conclusions*

- **DHS is leveraging commercial acquisition approach to save cost and schedule while preserving performance**

- **SE  is using agile systems analysis approach to focus engineering efforts on key areas**

- **DT&E is gaining synergy with vendors and Operational testing to improve:**
  - Speed, scope, and completeness
  - Quality to program office decisions and capability to the Border Patrol

# Questions


# BACK UP


# …So Is Managing Our Massive Imports


*In FY 2009, CBP processed $1.7 trillion in commercial imports.*

# Trade Security

- **108.5 million conveyance vehicles inspected**
- **56,000 foreign examinations of cargo**
- **2,500 security validations in 90 countries**

*FY 2009 data*

# Drug Seizures

- **1.5 million pounds of drugs seized at ports of entry**
- **1.3 million pounds of marijuana and cocaine seized by Air and Marine agents**
- **Significant increases over FY 2008:**
  - Heroine seizures rose 316% along the border
  - Cocaine seizures rose 53% at ports of entry, 18% along the border
  - Marijuana seizures rose 19% at ports of entry, 58% along the border

*FY 2009 data; *measured by kilos of weight seized*