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Module 1:
iRIS Product Introduction

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Fun Fact…

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The “iris” controls the amount of light let into the eye. The iRIS logo is used a metaphor to symbolize how a program can become more enlightened or informed by using iRIS!

iRIS in the SE Lifecycle

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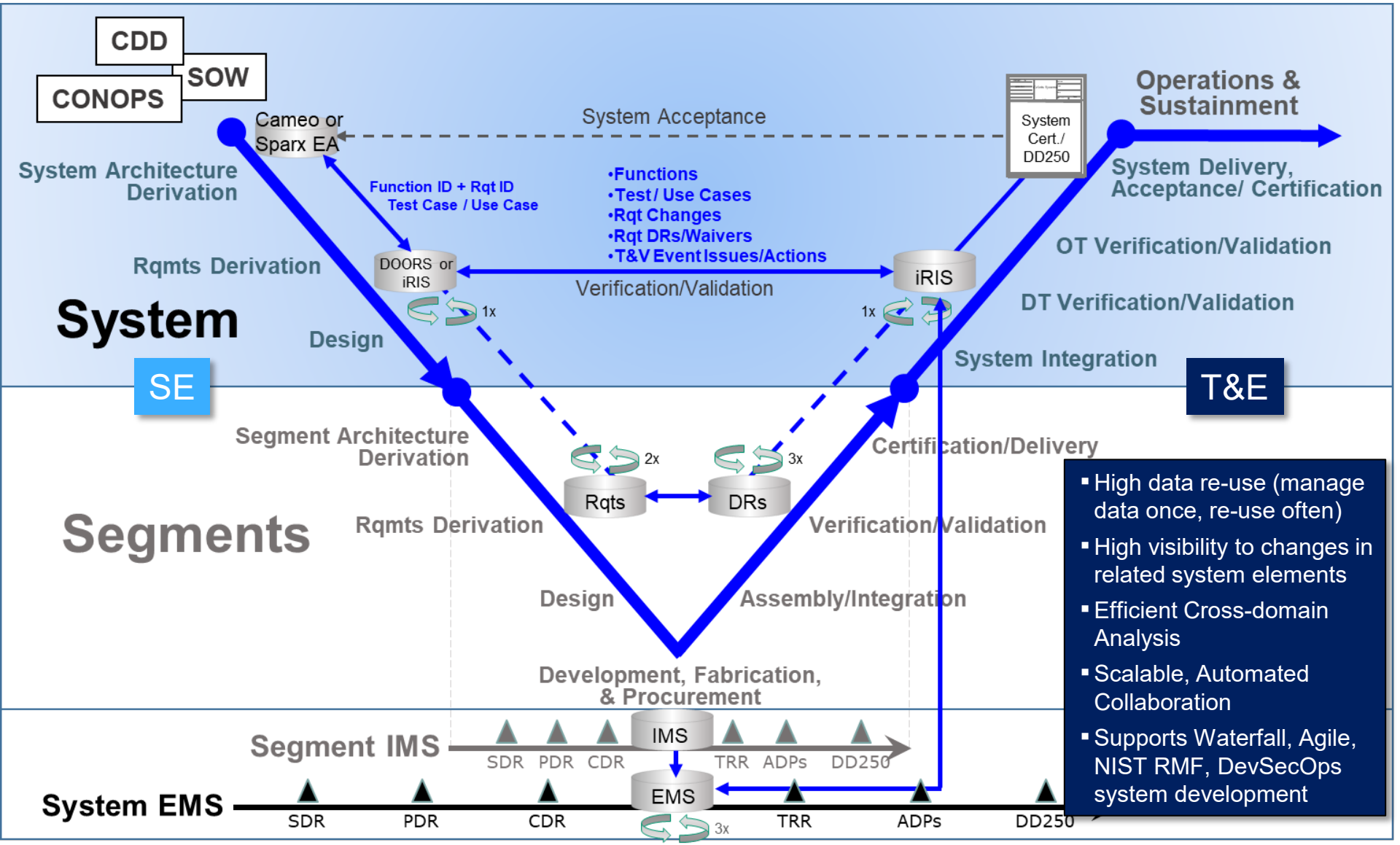

- High data re-use (manage data once, re-use often)
- High visibility to changes in related system elements
- Efficient Cross-domain Analysis
- Scalable, Automated Collaboration
- Supports Waterfall, Agile, NIST RMF, DevSecOps system development

iRIS Touchpoints in a Generic Systems Engineering Workflow

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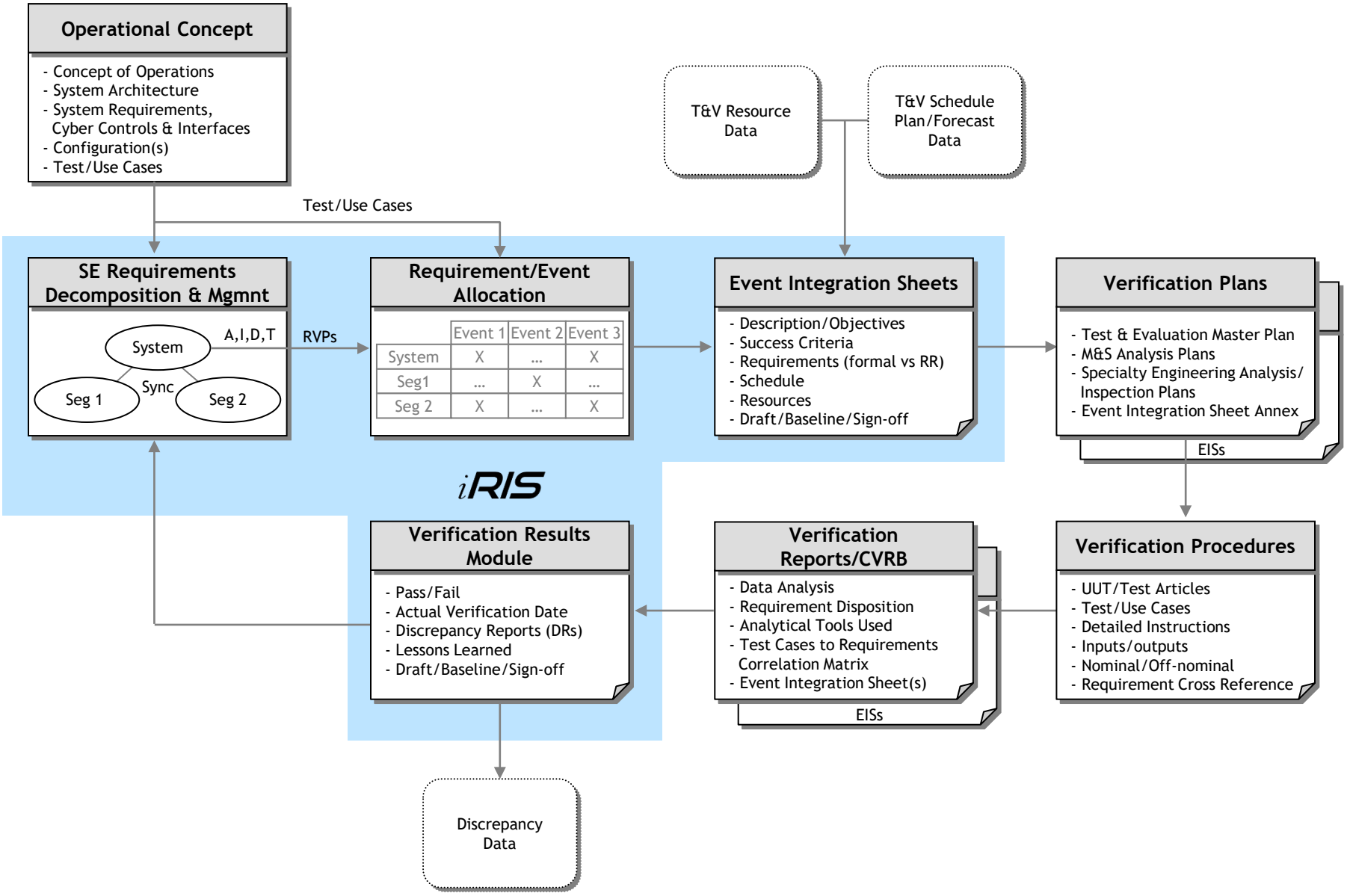

EBP Brings Stakeholders & Critical Information Together

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REQUIREMENTS					VERIFICATION EVENTS											
	VCRM				Analysis			Inspection			Demonstration			Test		
Par	A	I	D	T	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
System Specification																
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Subsystem Specifications																
3.2.1	X					A	A									
3.2.2			X									D	D			
3.2.3		X						I	I							
3.2.4				X											T	T

TVEM Correlates Requirements into Logical Events

Each Event

- Architecture Info
- Requirements
- RFCs/Contract Actions
- Evaluation Criteria
- Personnel Forecasting
- Deliverables/ Receivables

- Schedules
- Risks
- Issues/ Discrepancies
- Hazards
- MS&A Data
- Procedures
- Event Configuration

- **An EIS is developed for each event to support event planning and coordination**
- **The TVEM includes the risk reduction, verification, validation and potentially other DT&E events and activities**
- **Individual Requirement Verification Plans (RVPs) help define how system-level requirements will be verified within events**

The EIS Ensures Stakeholders Interests are Captured in Preparation for the DT&E Activity

An Accurate EIS is Critical to EBP

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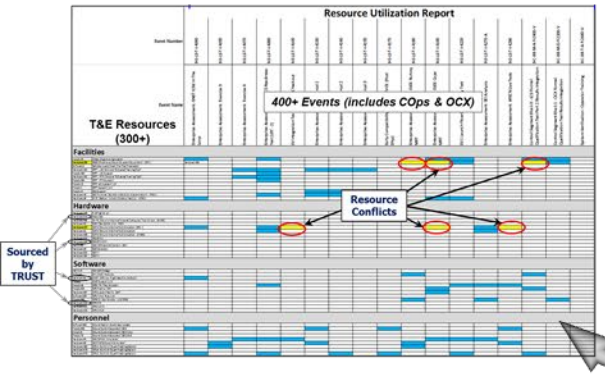
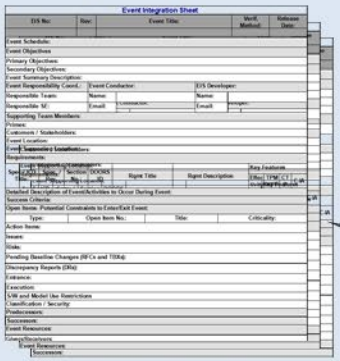
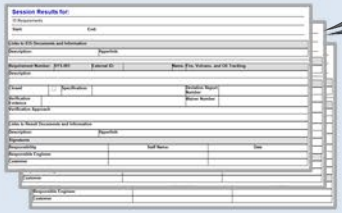
Resource Utilization



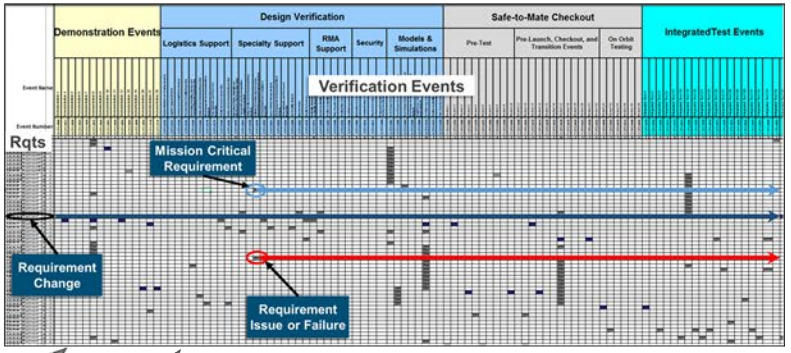
Event Plan



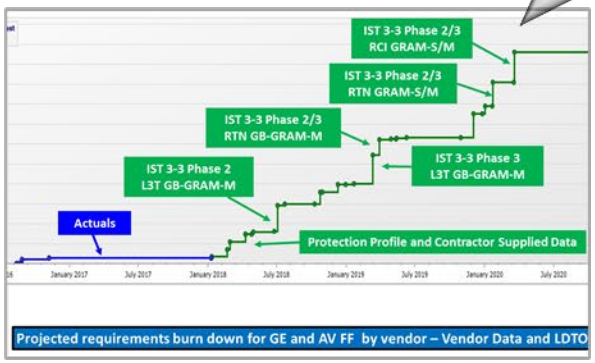
Event Results



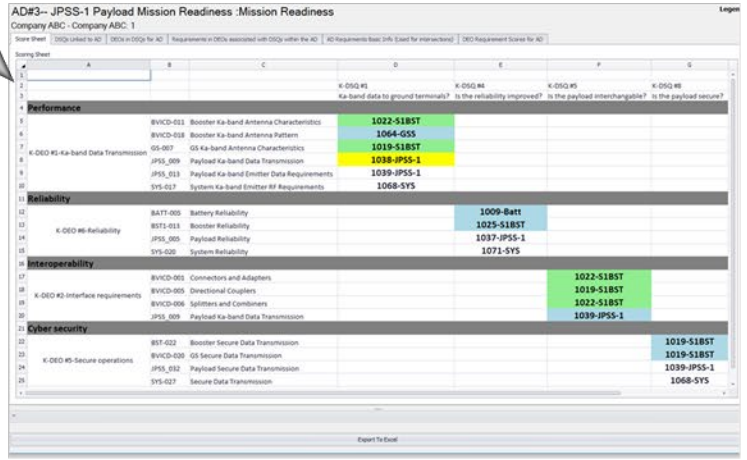
TVEM



Requirement Verification Burnup



DEF Scorecards



EBP Modularity Supports Expansion Across an Entire Enterprise

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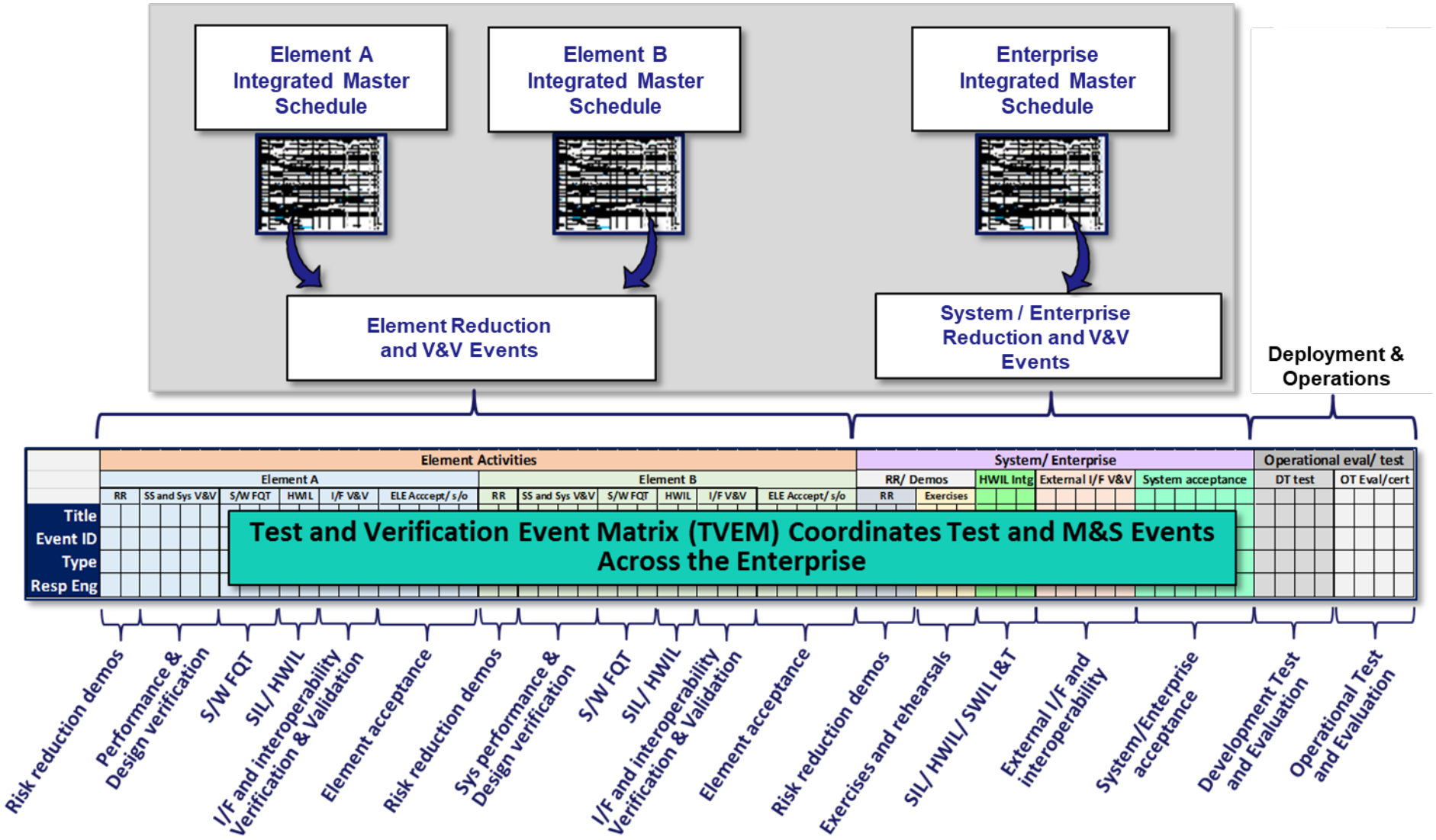

Comprehensive Subsystem-to-element-to-enterprise Level Management

iRIS Embedded Processes Driven by Governing DoD Policy, Guidance & Instructions

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DoD Systems Engineering Primers & Handbooks

- Process Monitoring & Control
- Metrics & Measurement (TPMs)
- Risk Management
- Interface Management
- Change Mgmnt/Data Mgmnt
- Validation & Verification
- Test & Evaluation

Capabilities-based Test & Evaluation

- Team Collaboration
- Event-Driven Schedules/Exit Criteria
- Combined DT/OT Test Events
- T&E resource planning
- Common T&E Database
- DT&E/OT&E Metrics & Reports
- OT&E System Readiness

System Readiness for Dedicated OT&E

- Early OT&E/ITT Involvement
- Certification Template Exit Criteria
- Contractor Testing
- Risk Identification and Tracking
- Certification Template Review/Approval
- Certification Metrics and Reporting
- Final OT&E Readiness Certification

Program Requirements

Regulatory Requirements

Range Requirements

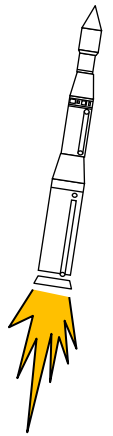
iRIS®

Enlighten your project!™

Comprehensive Verification Program

Compliance Artifacts

Real-time Metrics



Mission Success

Real-Time Situational Awareness

Traditional Data Distribution Methods

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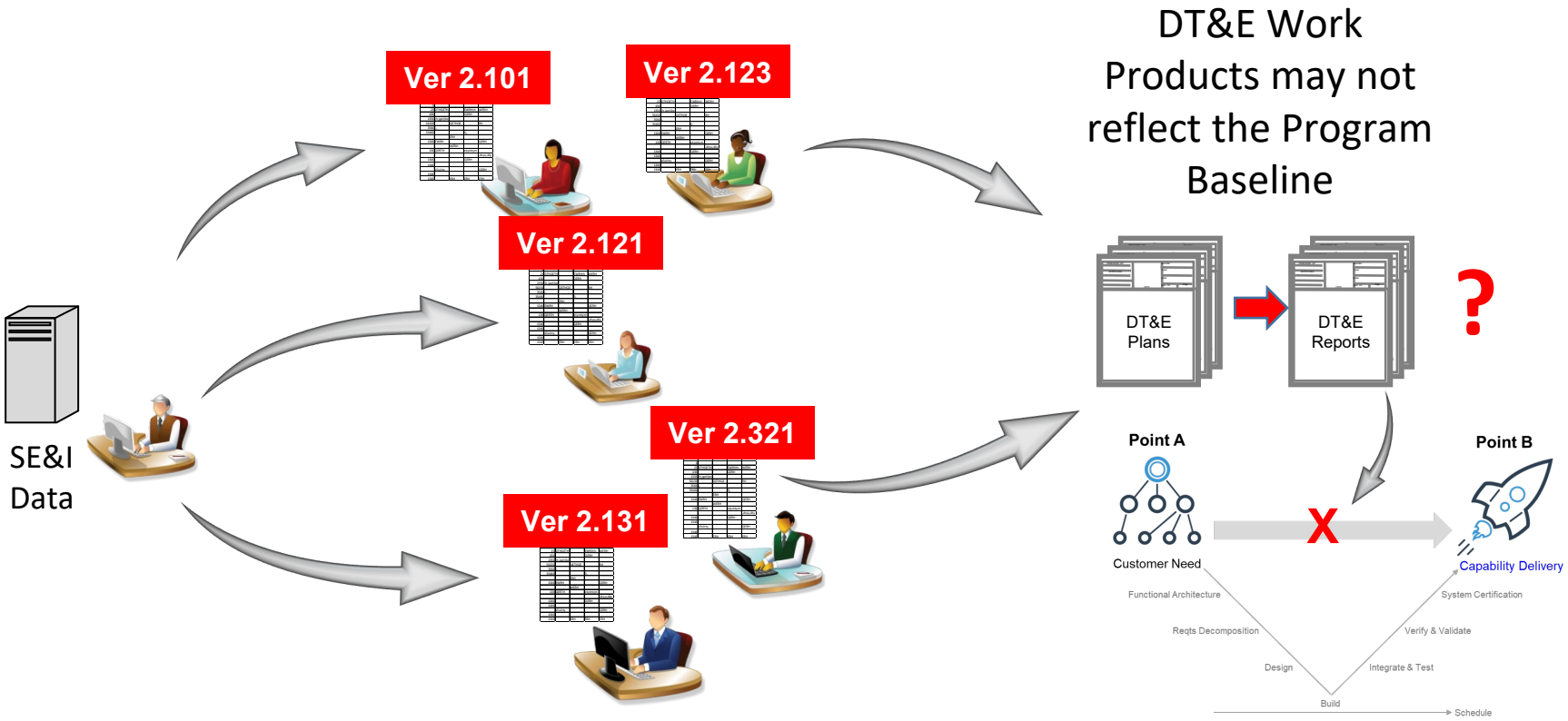

Critical SE&I data distributed as disconnected work products to DT&E personnel - not fully integrated with DT&E Planning & Execution:

- Leads to multiple divergent databases with weak configuration control
- Products not reflective of program baseline require significant rework
- Test program event facilities and software are developed to incorrect configuration

iRIS Data Distribution Approach

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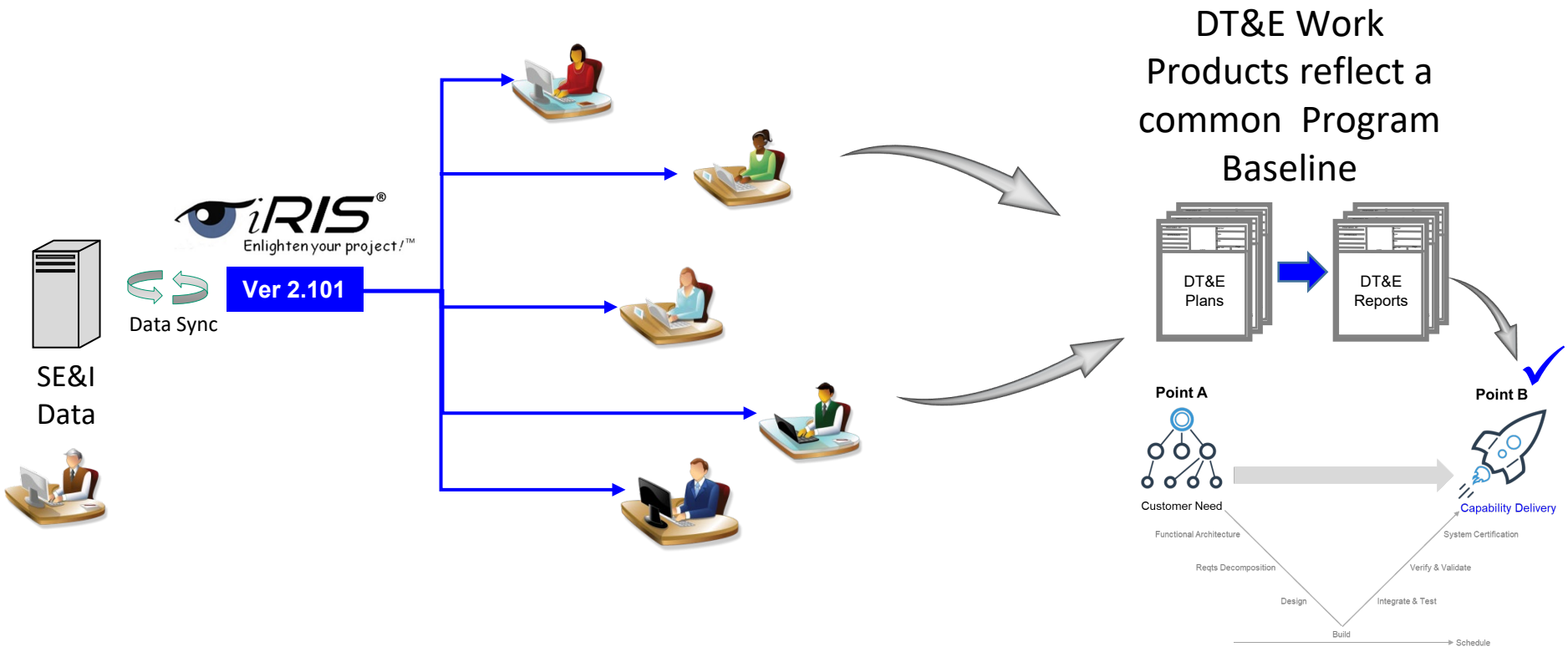

SE&I data is disseminated/distributed to the team via a fully integrated digital engineering environment:

- Team members access current baseline data real-time
- Multiple divergent baselines are eliminated
- Products are reflective of program baseline to eliminate rework
- Test program event facilities and software are developed to the correct configuration

Introduction to Event Based Planning

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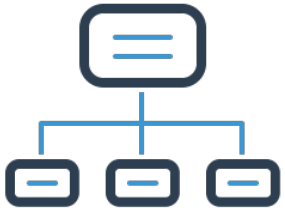
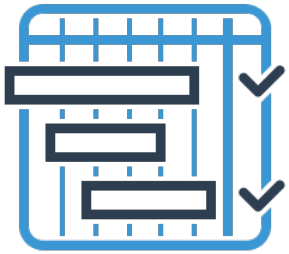
Event-based Planning

System CONOPS
& Functional Needs



Requirements
Definition & Flowdown



DT&E Planning and
Execution

Capability Delivery

DT&E Metrics

"The purpose of developmental testing is simple: to provide data to program leadership so that good decisions can be made as early as possible."

Excerpt from ITEA Journal 2013; 34: 6–10

The Challenge

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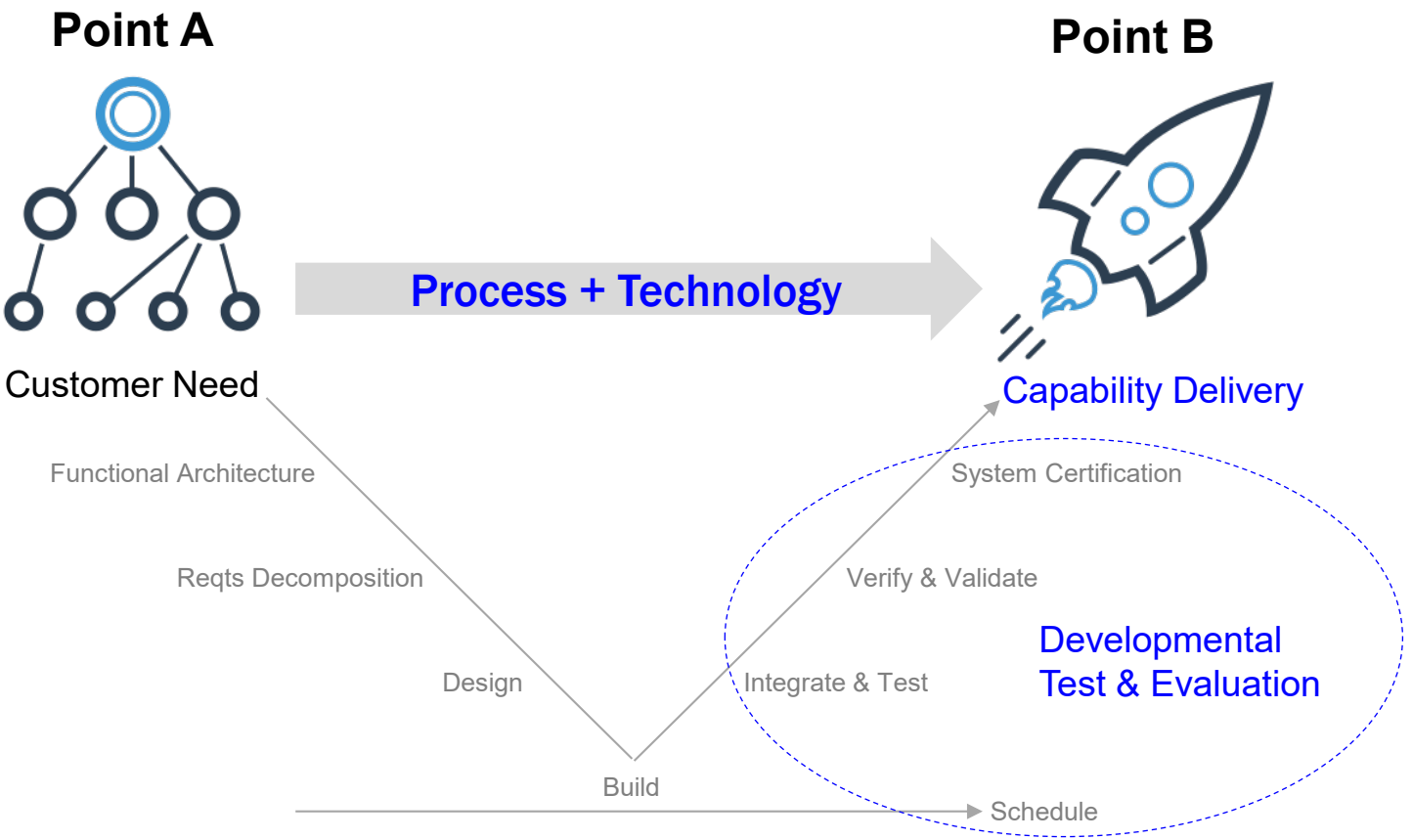
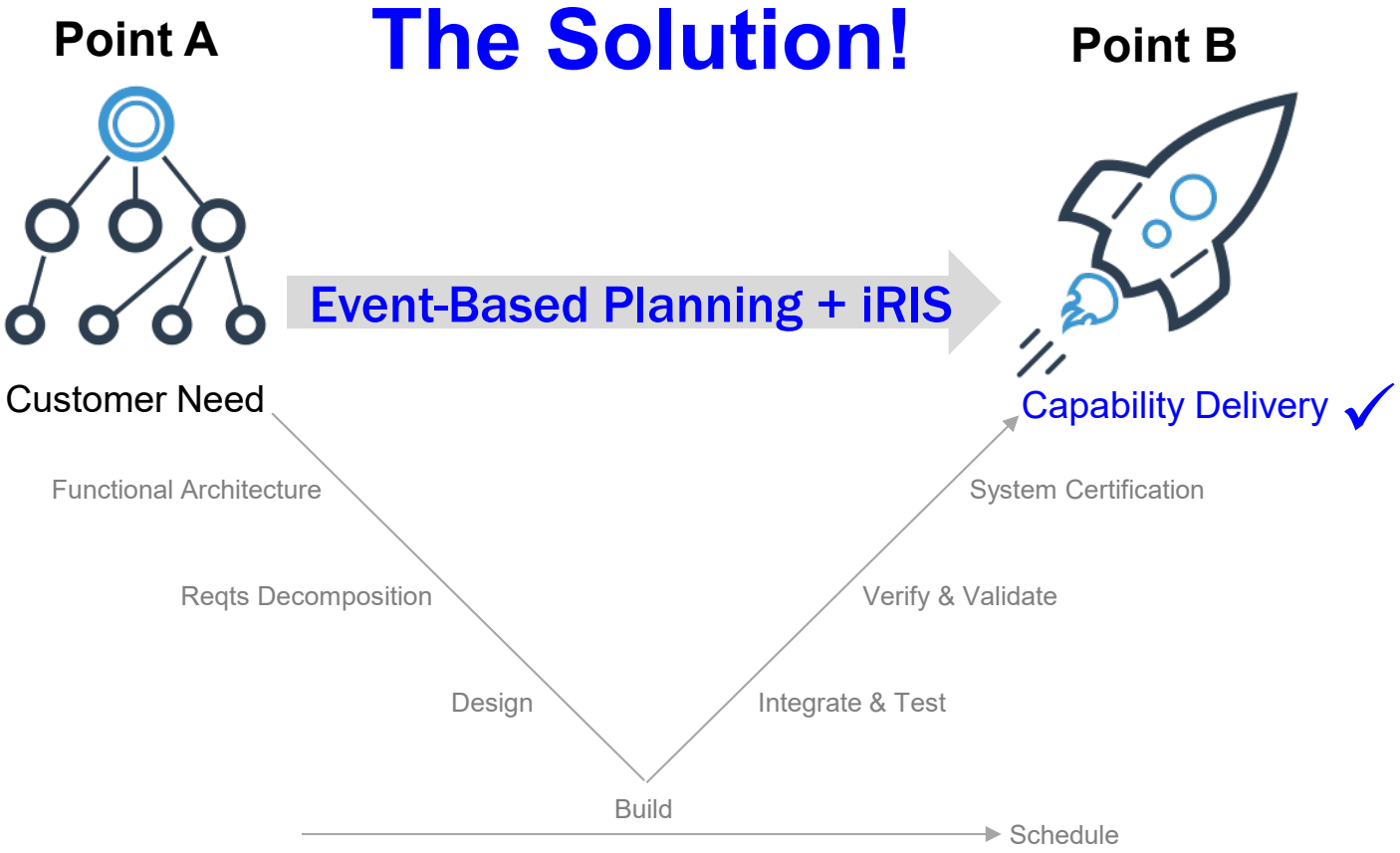
Programs Need a Disciplined, Agile, Repeatable Approach Built on Strong Systems Engineering, Integration & Test (SEIT) Fundamentals to efficiently provide accurate T&E data so that good decisions can be made as early as possible



The Solution!



Common Concerns During the Verification Planning Phase of a Program…

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- How do I verify my test/use cases?
- When do I need to be done?
- How do I know my resources will be available?
- If this change is approved, what events do I need to repeat?
- Am I over/under-testing?
- Who is available to support me?
- How do I know I'm verifying the correct baseline?
- How do I know if my requirements have changed?
- What are my event dependencies?

Event-based Planning Process Overview

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- **Event-based Planning (EBP) is a simple and consistent solution to significant problems that have plagued industry such as:**
  - **Stovepiping**
  - **Lack of communication**
  - **Conflicting schedules**
  - **Unnecessary duplication**
  - **Numerous changes to the baseline affecting future test events**
  - **Inadvertent Divergence of Baselines**
- **"Building block" approach that enables the entire stakeholder community to work from a common, integrated baseline**
- **Optimizes the overall T&E effort**
- **Proper implementation ensures compliance with ALL applicable specifications, standards, and contracts**

EBP ensures DT&E will provide ***accurate & timely*** data to program leadership so good decisions can be made as early as possible

Primary EBP Elements

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- **EBP is a Requirements-driven Process that Serves as an Integrating Function for DT&E**
  - **EBP simplifies the flow of accurate data to DT&E**
  - **Cuts across the institutional stovepipes**
- **EBP is comprised of three primary elements:**
  1. **Events: A logical grouping of requirements that will be assessed to gauge the progress toward the end product. Events can be unit tests, configuration item tests, functional qualification tests, system tests, sprints (Agile), operational tests**
  2. **Event Integration Sheet (EIS): A report from iRIS that correlates the information used to describe events**
  3. **Test & Verification Event Matrix (TVEM): is a matrix report from iRIS that identifies all project Events, the event dates, and the requirements in the event. The TVEM spans all project developers and all years of the project. This is a key system integration tool and the core of EBP**

EBP Foundation

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- **EBP is Built on the Premise that All Requirements Must Eventually be Sold Off (Verified) by Verification "Event(s)"**
  - **Inspections, Analyses, Demonstrations, Tests or a Combination Thereof**

Verification Events

Requirements

REQUIREMENTS					VERIFICATION EVENTS											
	VCRM				Analysis			Inspection			Demonstration			Test		
Par	A	I	D	T	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
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3.2.1	X				A	A										
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3.2.4				X										T		T
Interface Control Documents																
3.2.1	X				A		A									
3.2.2			X								D		D			
3.2.3		X						I	I							
3.2.4				X										T	T	T
Subsystem Specifications																
3.2.1	X					A	A									
3.2.2			X									D	D			
3.2.3		X						I	I							
3.2.4				X											T	T

2-Dimensional "Event Matrix"

What is an Event?

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- An Event is Any T&E activity performed for the purposes of either reducing risk or formally verifying a requirement

  - Requirements grouped into logical buckets (ie, mass properties, power-up, cyber pen test etc.)
  - Events can be unit tests, configuration item tests, functional qualification tests, system tests, sprints (Agile), operational tests
  - Each event is assigned a unique identifier and start and end dates which can be modified if necessary

What is an Event? (cont'd)

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- Risk Reduction (RR) events may be informal activities that may or may not need formal Configuration Management (CM) or Quality Assurance (QA) involved
  - RR events help us gain confidence that the system in development is on track
- Formal events typically require strict CM and QA and are those events that we'd audit to formally sell-off (verify) a requirement
- iRIS uses bold-blue font to identify requirements that are formally verified within an event

An Event is Intended to…

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- **Drive** Verification Planning
  - Not intended to replace verification plans or procedures although it is helpful to include EISs as annexes to these products for traceability
  - Intended to increase traceability throughout all phases of test & verification
- Be a Verification **SUMMARY**
  - Should be kept at a high level
  - Should not take more than an hour to create initial draft of an EIS
  - Should foster communication between stakeholders (Systems Engineering, Specialty Engineering, T&V, Project Controls and Customer personnel)
- Help Control the DT&E Program Baseline
  - Once a draft EIS is baselined, it can be locked and put under automated configuration control to retain a history of all approved changes
  - Needed to Ensure T&V Integrity for the FCA/PCA Process

What is an Event? (cont'd)

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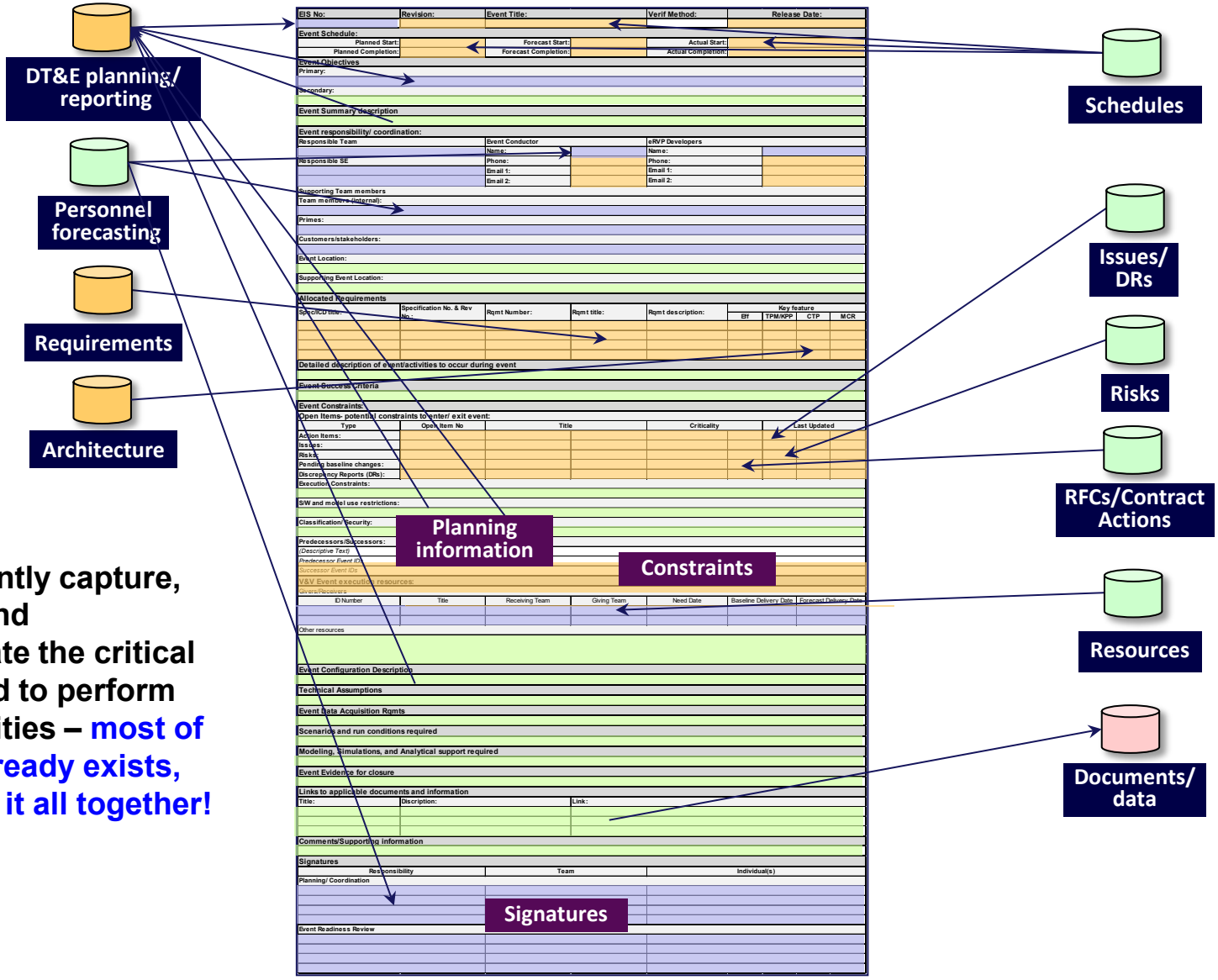

EISs efficiently capture, organize, and communicate the critical data needed to perform DT&E activities – most of this data already exists, the EIS ties it all together!

TVEM DT&E Events Within Mission Context

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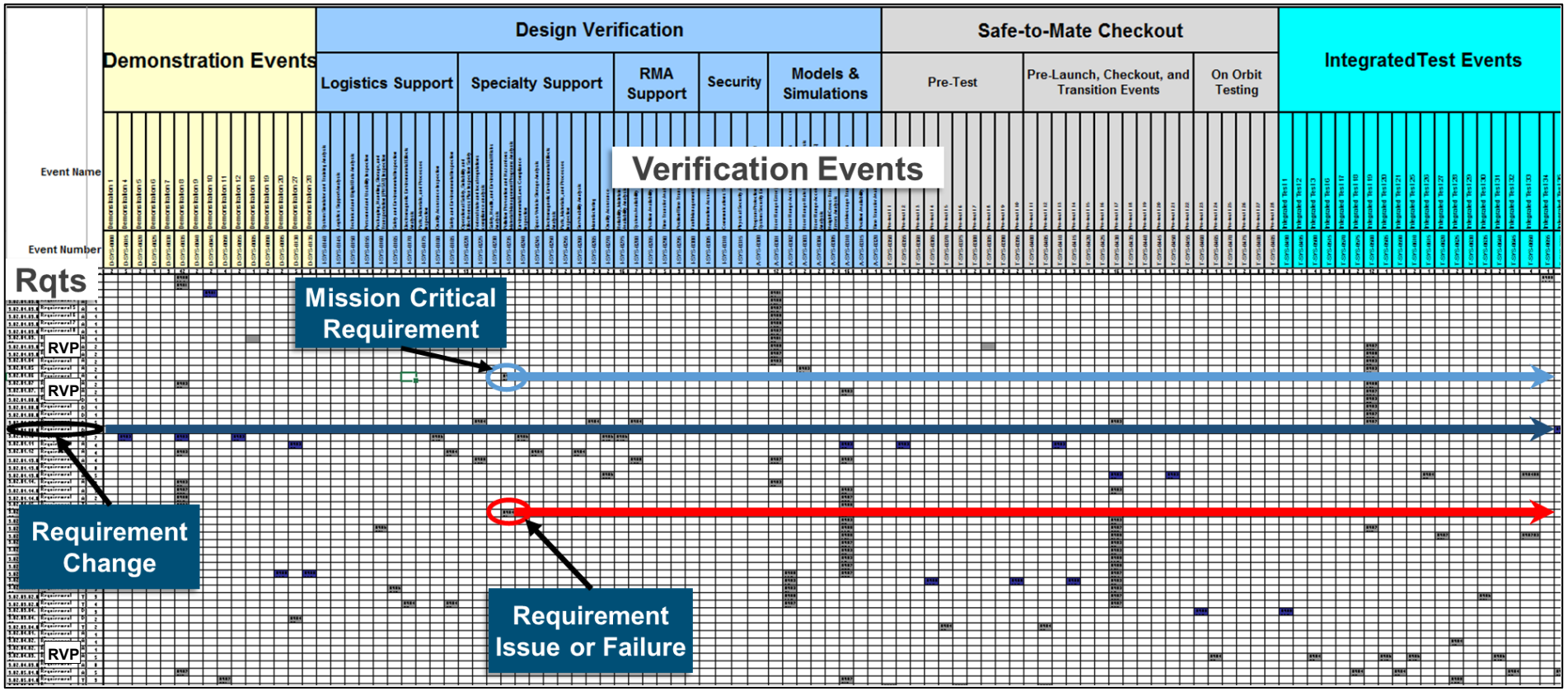

- Requirement changes can be quickly assessed to see if a change impacts the DT&E community
- Issues or anomalies that occur during DT&E can be quickly assessed and changes made under baseline control
  - Is there a problem with the prior DT&E that was missed?
  - Move DT&E or requirements to another event
  - Are there any asset utilization constraints to moving the DT&E activity?
  - Are there any schedule constraints to moving a DT&E activity

EBP Benefits

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- A challenge to successful programs is the stove pipe & geographically dispersed nature of the organizations
- There is a lot of data and information required to develop, field, & sustain a system-
- Event Based Planning
  - Brings the required information together into a common framework
  - Ensures comprehensive insight into ALL requirements
  - Engages the stakeholders at the right time and right places
  - Improves decision making
  - Right information at the right time independent of the dynamics
  - Helps keep the program aligned to the program execution realities
  - Is based on what most programs already have in place
  - Primarily requires a leadership mandate
  - Can be implemented at program start-up or while underway
  - Automation significantly reduces data transaction costs

EBP Drives DT&E Efficiencies

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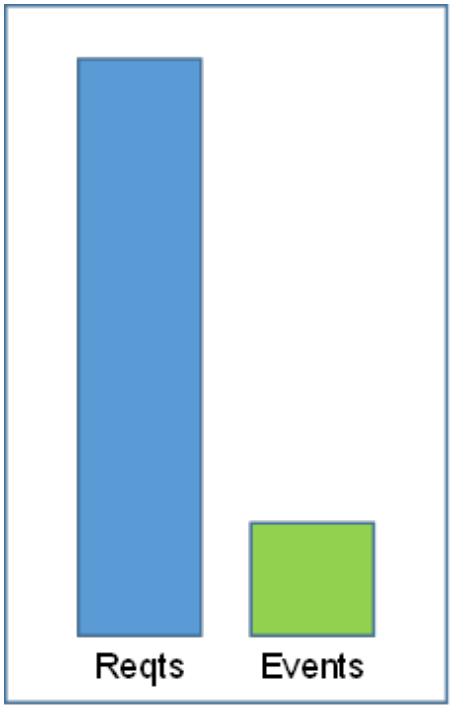
- Once all requirements have been allocated to events, the program can then manage to a significantly fewer number of events versus thousands of requirements
- The process is to “manage by event, sell-off by specifications”
- EBP is recommended for all levels of requirements verification



EBP Enables Programs to Significantly Reduce DT&E Management Overhead and Maximize Comprehensiveness

EBP is a “Team Sport”!

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- Breaks down organizational barriers
- Distributes the requirement verification workload
- Improves overall team communication
- Ensures comprehensive insight into ALL program requirements
- Accelerates the Transfer of Knowledge!