ARC-IT v8 Workshop

USES OF ARC-IT AND ITS TOOLS

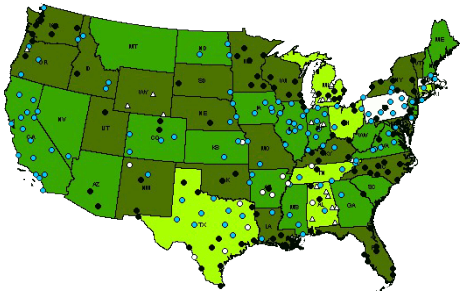
Remember Why ARC-IT was created

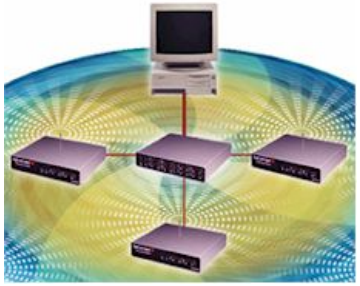
- To increase integration between systems, particularly those of different stakeholders
- To improve interoperability between systems
  - By a common framework for documenting, describing, and depicting transportation elements
- To make deployment simpler,
- To increase re-usability of systems and designs,
- To produce more reliable, manageable and functional ITS

Uses of the Architecture

- Basis for Regional ITS Architectures
- Support Project Systems Engineering
- Framework for ITS Standards

Regional ITS Architectures





ITS Standards

IEEE 1512

NTCIP

ITE TMDD

SAE J2735

Regional ITS Architecture

- A framework for ensuring institutional agreement and technical integration for the implementation of ITS projects in a particular region*

*Definition from 23 CFR Rule 940

Regional ITS Architecture Benefits

- Orderly and efficient deployments over time
- Better communications
  - Between people
  - Between systems
- Reduce design costs and development time
- Lower risk
- Help comply with ITS Architecture & Standards Rule/Policy

Regional ITS Architecture Components

- ARC-IT is a **Framework** and a **Template** to develop Regional ITS Architectures
- RAD-IT provides tool for development

ITS Architecture

1. Region description
2. Stakeholder identification
3. **ITS elements**
4. **ITS services**
5. Operational concept
6. **Functional requirements**
7. **Interfaces / Information flows**
8. **Standards identification**
9. Project sequencing
10. Agreements
11. Maintenance plan

Inventory of ITS Elements

ITS Architecture

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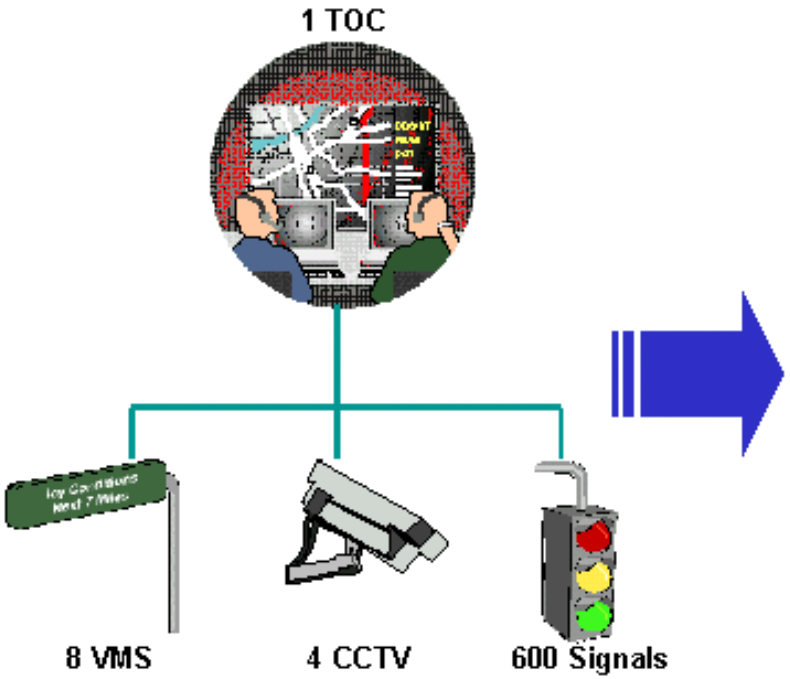
- List of ITS elements and the elements that interface with them
- An element is:
  An ITS system or piece of a system

An architecture is built around an inventory of existing and future ITS systems

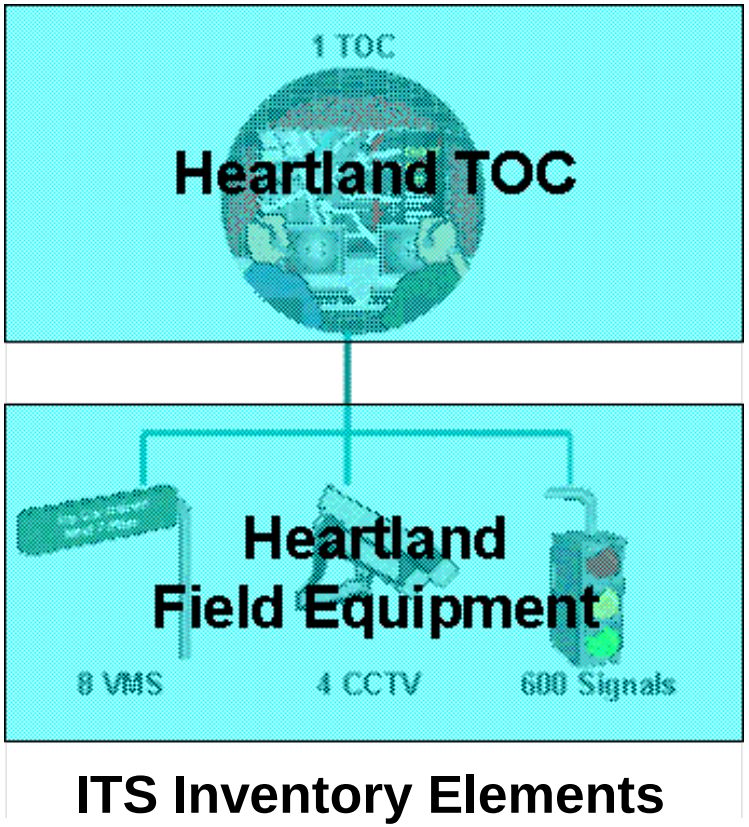
- *Know what you have today*
- *Plan for future systems*

Inventory of ITS Elements (cont.)

- Group types of elements
- Not a detailed listing of each device



ITS Systems



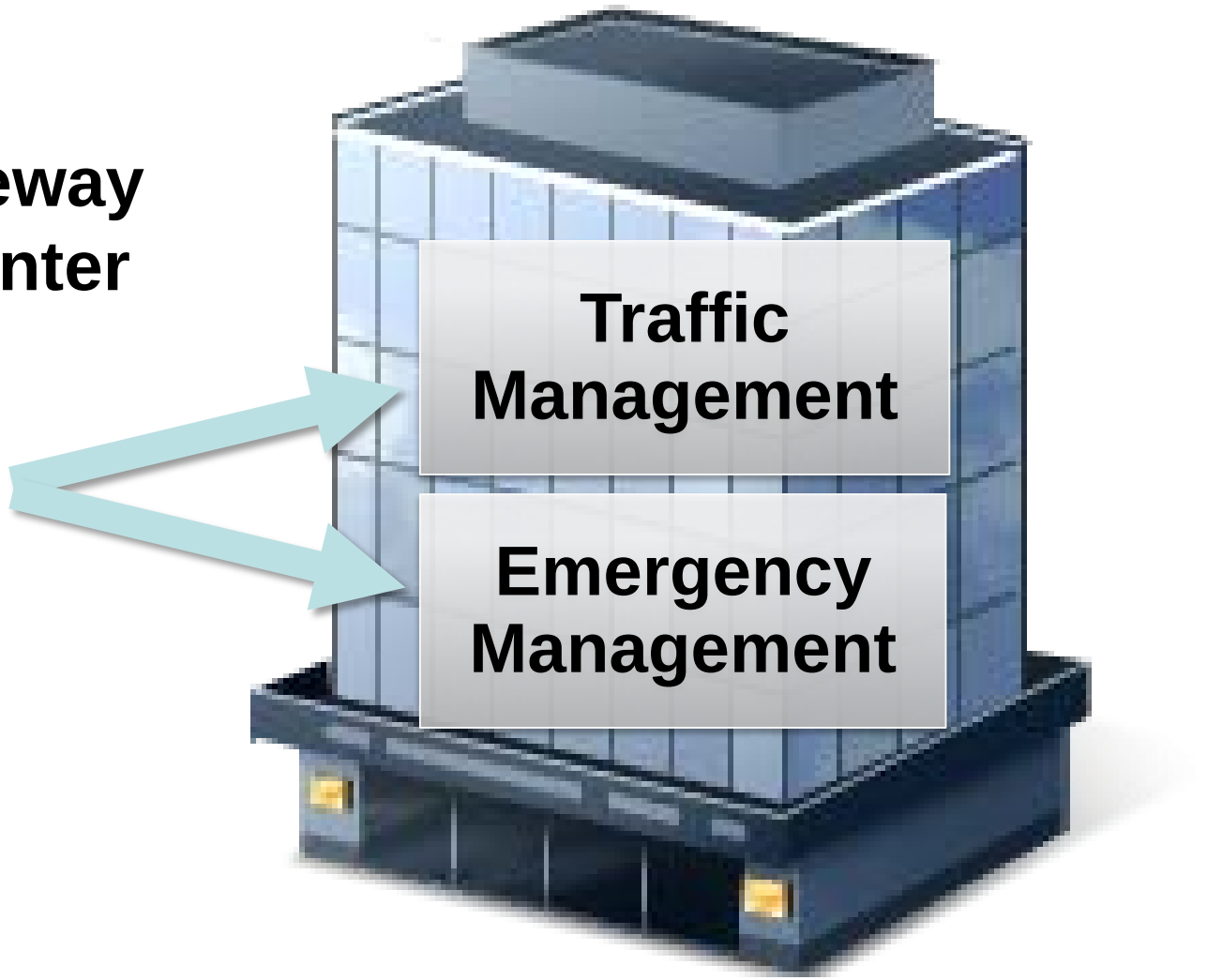
ITS Inventory Elements

Mapping Elements to Physical Objects

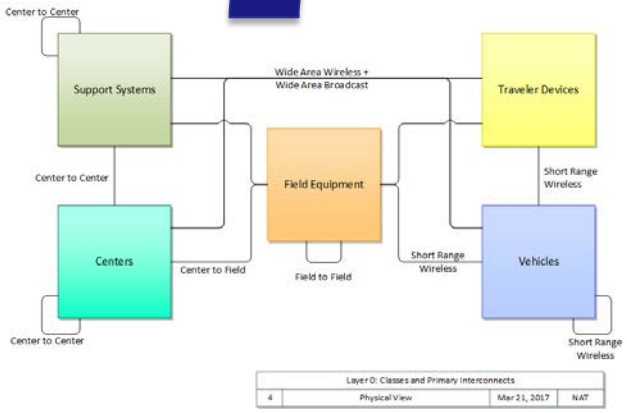
Element:

State DOT Freeway Operations Center

Physical Objects



Importance of Mapping to Physical Objects



- **Interfaces**
- **Requirements**
- **Standards**

ITS Services

ITS Architecture

1. Region description
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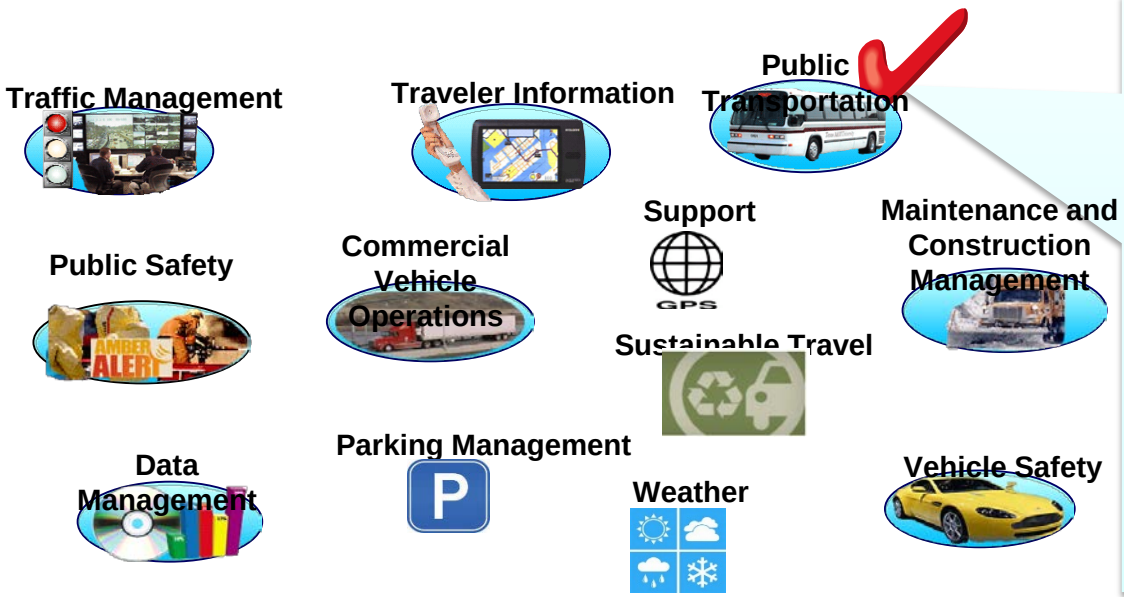
- ITS capabilities you use to meet operational goals and objectives
- Examples:
  - Traffic Signal Pre-emption
  - Electronic Toll Collection
  - Commercial Vehicle Weigh-In-Motion

Service Packages and a Regional ITS Architecture

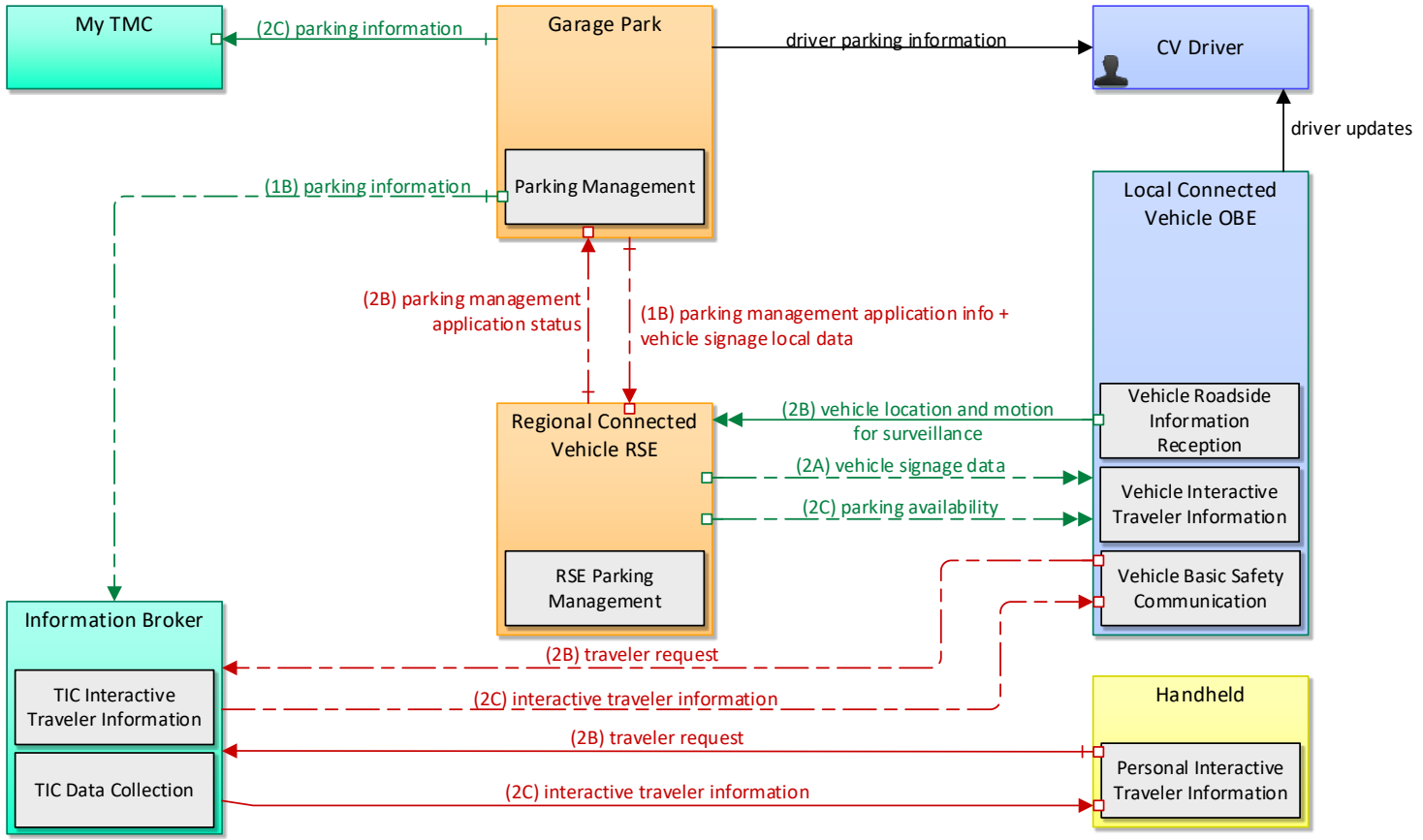
- Service Packages provide a menu of ITS services
  - Select Service Packages of interest
  - Map to your inventory and tailor



Transit Vehicle Tracking	✔
Transit Fixed-Route Operations	✔
Dynamic Transit Operations	✔
Transit Fare Collection Management	
Transit Security	✔

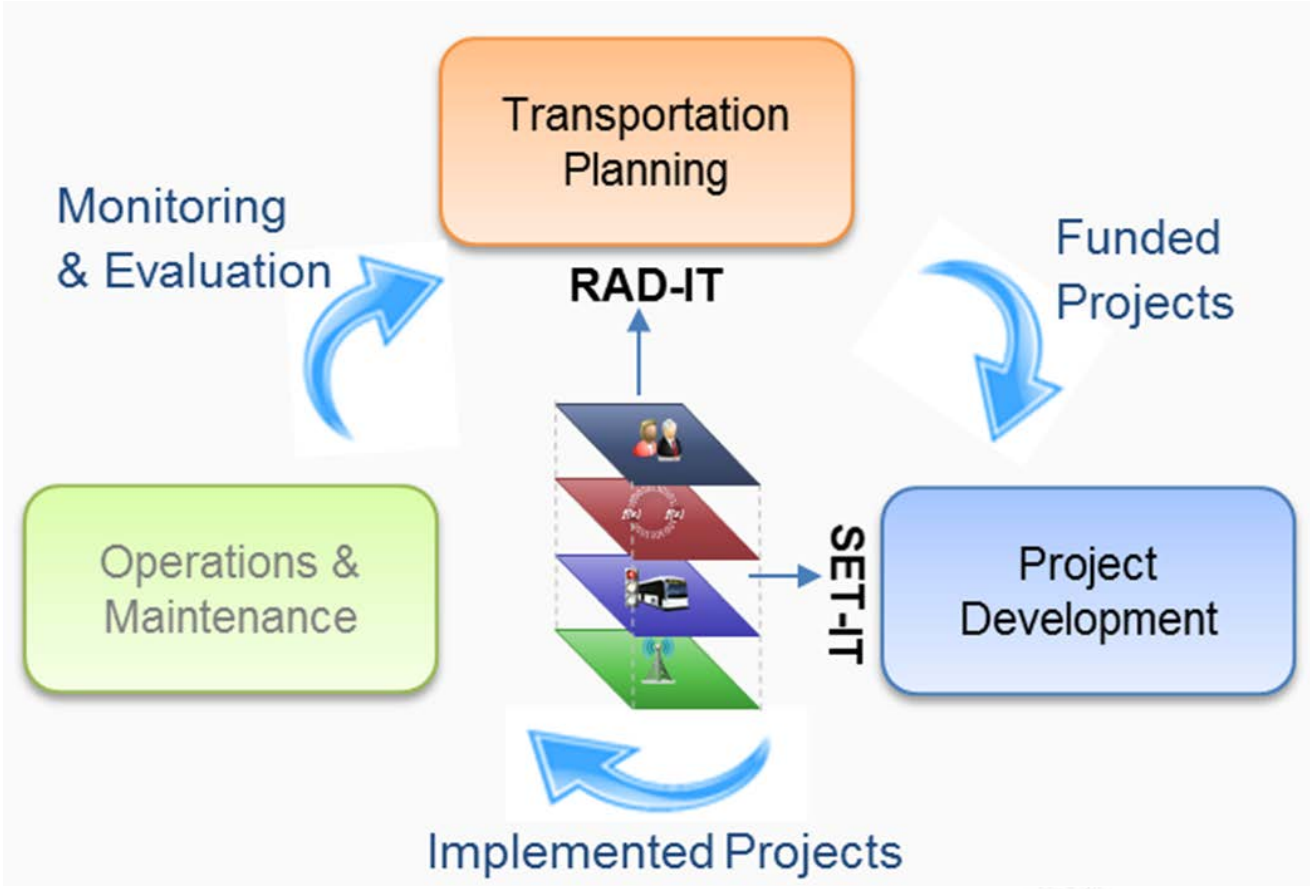
Service Package Customization

- ARC-IT Service Package definition is a template to be revised as needed to describe the service in the region.

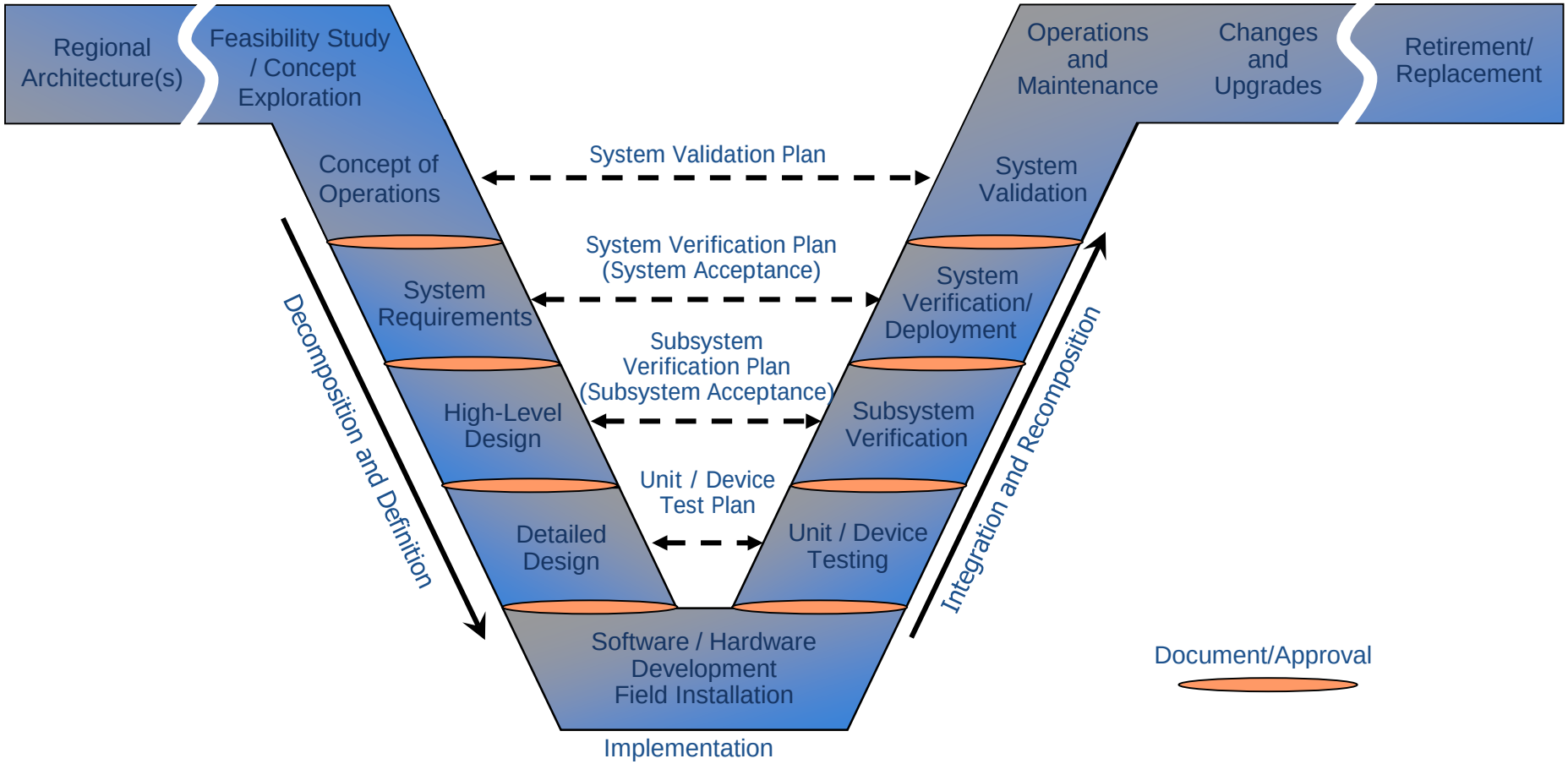


Using the Architecture

- ARC-IT Tool Set Supports Application & Usage of Architecture



ITS Systems Engineering Project Lifecycle



Systems Engineering Analysis Requirements

- Rule/Policy requires all Highway Trust Fund-funded projects to be based on a systems engineering analysis
  - Identifies seven requirements “at a minimum”
  - Scale commensurate with project scope

1
2
3
4

23 CFR 940.11

1. Portion of Regional ITS Architecture
2. Participating agencies roles and responsibilities
3. Requirements definitions
4. Alternatives analysis
5. Procurement options
6. ITS standards and testing procedures
7. Operations and management procedures and resources

Project Systems Engineering

- SET-IT supports development of:
  - Detailed Project ITS Architecture
  - Systems Engineering Documentation
    - Concept of Operations
    - Systems Requirements
    - High Level Design

Benefits of SET-IT Use

- Across multiple deployments provides the same terminology and the same means of talking about similar deployments
- Improves the “Ilities”
  - Enhance interoperability
  - Improve repeatability,
  - Simplify deployability and
  - Establish a foundation for extensibility
- Particularly key for CV/AV deployments

Using ARC-IT: Framework for ITS Standards

- Interfaces defined in ARC-IT identify what to standardize
  - Many ITS standards documents contain a section mapping their outputs to the interfaces of ARC-IT
- Use of Architecture as a framework for standardization continued with CVRIA and connected vehicle standards
- ARC-IT pulls all of these standardization efforts into one common framework

- ARC-IT is compatible with current international standards harmonization efforts