IMPLEMENTING A MODERN, OPEN SYSTEMS-BASED TRAFFIC SIGNAL SYSTEM

WE'RE GOING PLACES. **LET'S GO TOGETHER.**

Today's Presentation

- Introduction to RTC Southern Nevada
- Project Scope & Objectives
- Why an Open System?
- Project Approach and Outcomes

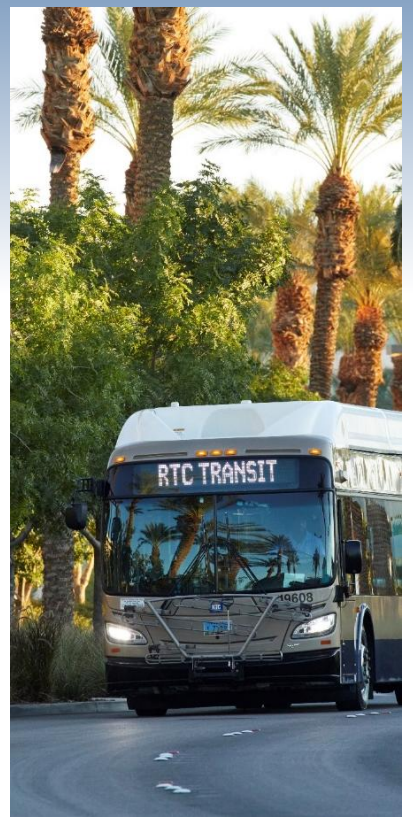
RTC Project Manager

Joe Norby, PE, PTOE

Director of FAST

Introduction to RTC Southern Nevada and FAST

RTC Southern Nevada Roles

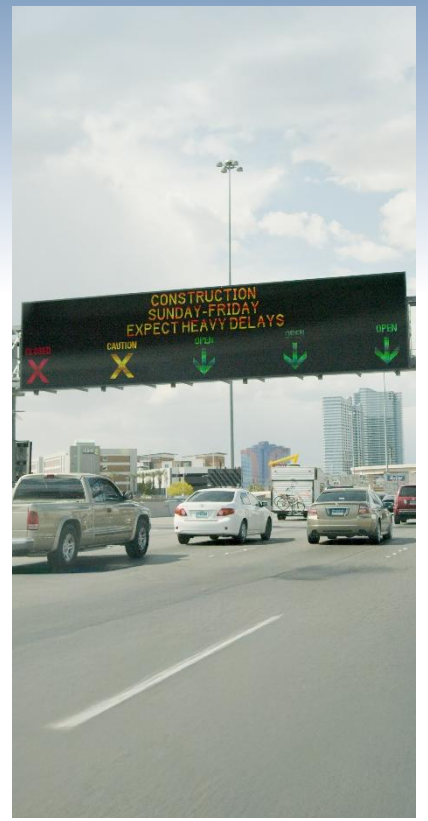


TRANSIT

BICYCLING

PLANNING

ROADWAY FUNDING



TRAFFIC MANAGEMENT

RTC Fast Manages the Region's Traffic Management Systems

1,700+
TRAFFIC SIGNALS

1,200
TRAFFIC CAMERAS

76
RAMP METERS

169
DYNAMIC MESSAGE SIGNS/ATM GANTRIES

900+
MILES OF FIBER OPTIC COMMUNICATION CABLE

11
WRONG WAY ENTRY DETECTION SYSTEMS

RTC FAST Participating Agencies

- Clark County
- City of Las Vegas
- City of Henderson
- City of North Las Vegas
- Boulder City
- City of Mesquite
- Nevada DOT

- Local agencies own and maintain traffic signal infrastructure.
- FAST owns and maintains communications network, central software and controller firmware.
- FAST manages traffic signal timing in coordination with local agencies.

THE PROJECT

RTC FAST Traffic Signal Systems Replacement Project Scope

2000 Traffic Signals (1700 today)

Full Replacement of:

- Firmware
- Controllers
- Central Software

Plus:

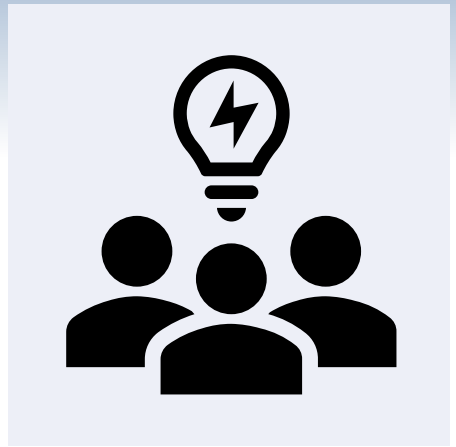
- Optional ATSPMs
- Optional Adaptive
- Optional TSP

Why Make a Change?

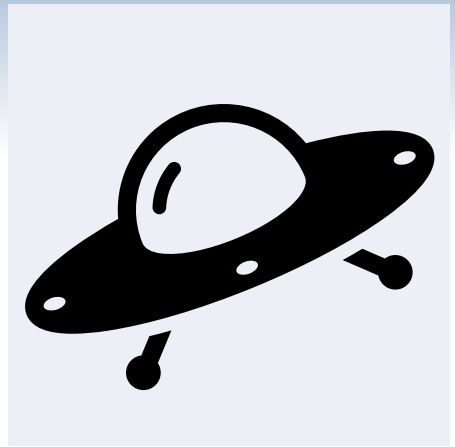
Regional Scale, Growth, and Legacy System Constraints

- **Regional Growth Pressures**
- **Legacy System Limitations**
- **Need for Modern Analytics**
- **Digital Platform Approach**

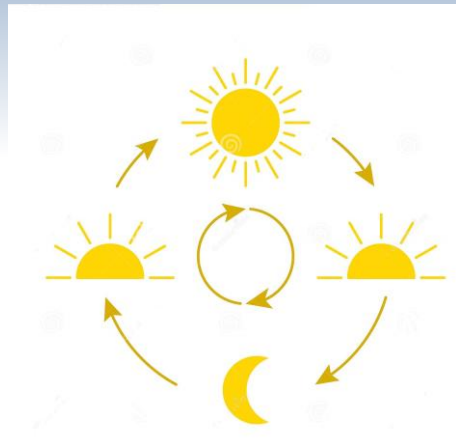
PROJECT OBJECTIVES



UNDERSTOOD BY ALL AND CREATES A SHARED COMMITMENT TO IMPLEMENT AND OPERATE, REFLECTING ALL AGENCY'S NEEDS



FUTURE READY

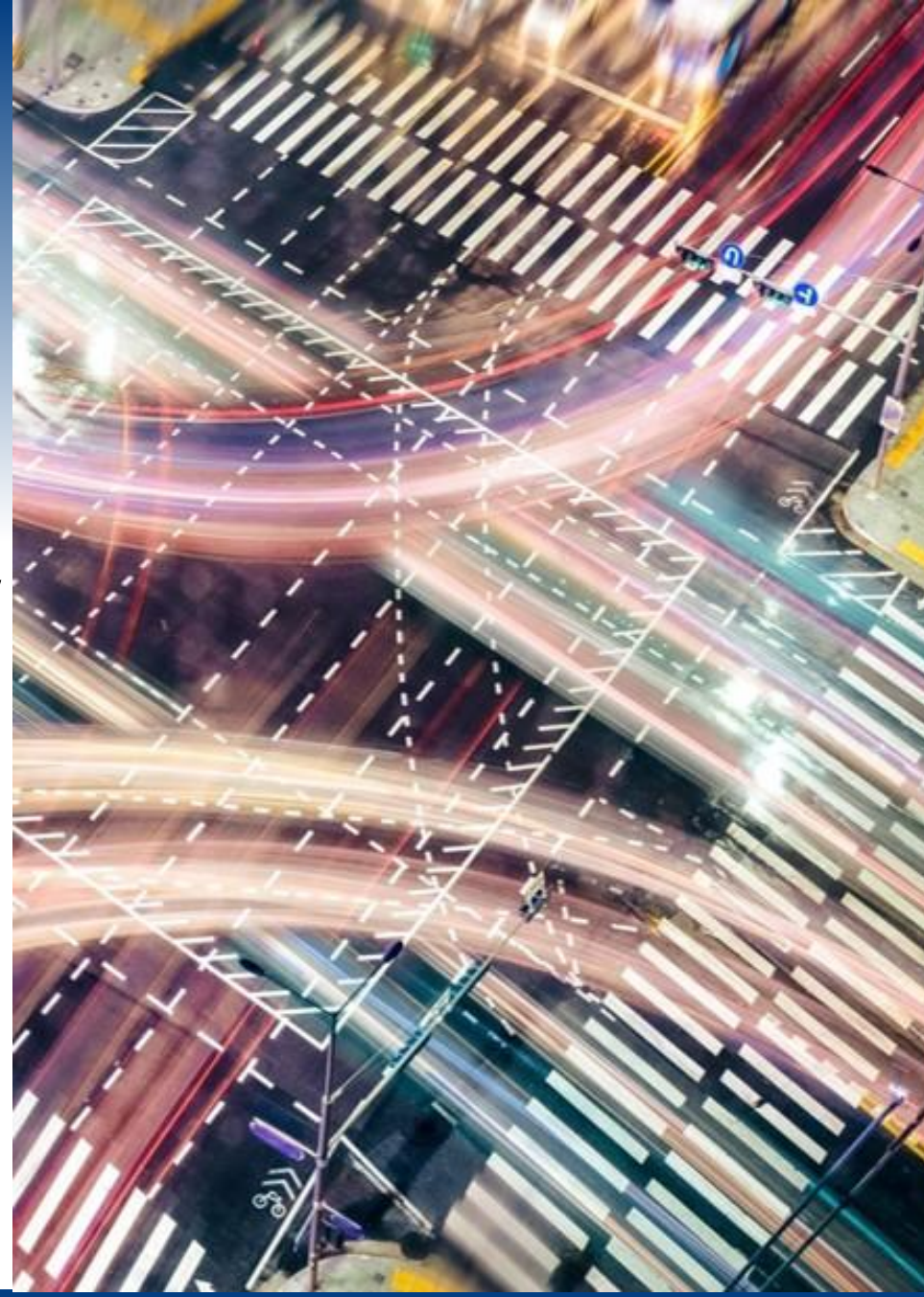


RELIABLE AND RESILIENT

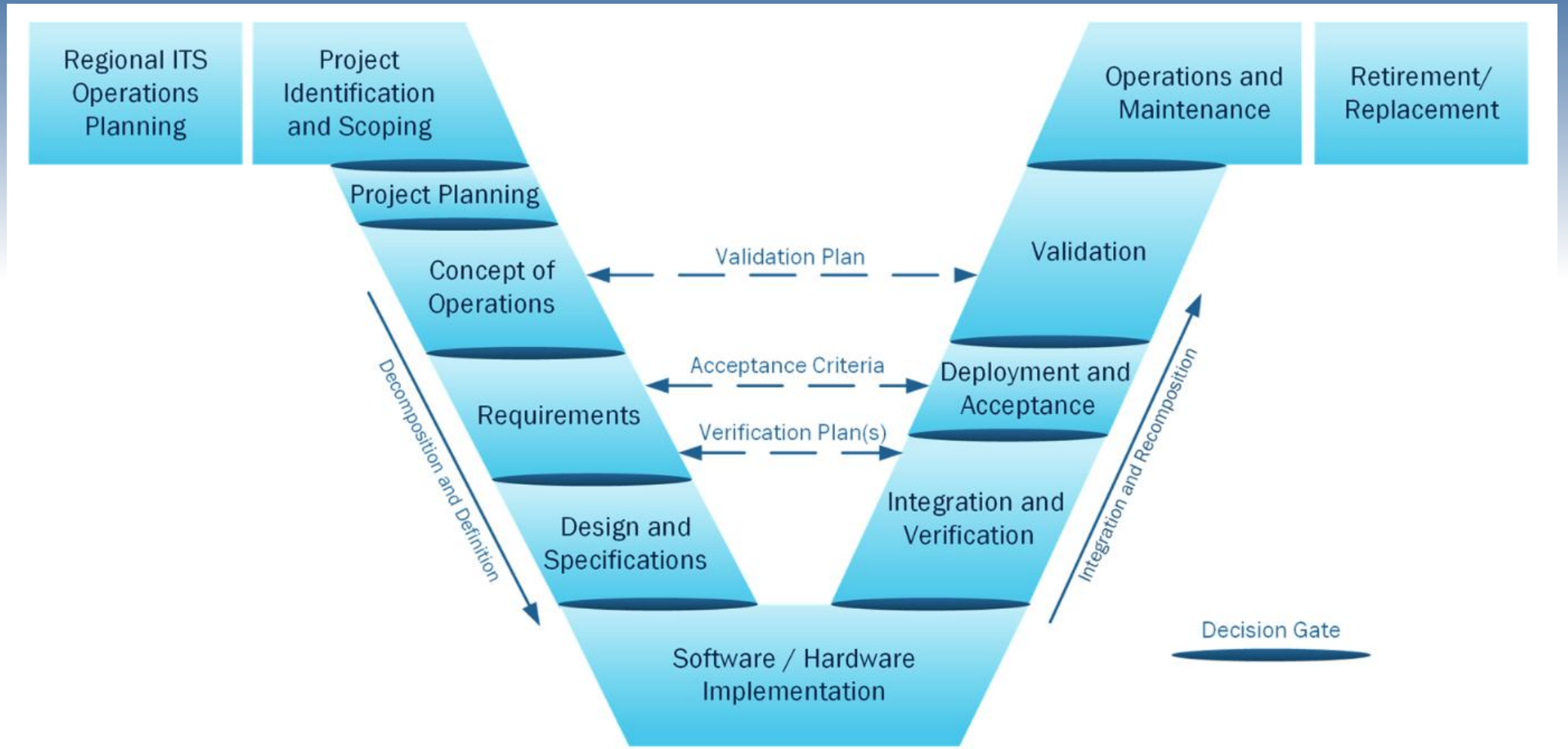
PROVIDES REAL BENEFITS TO THE TRAVELING PUBLIC

What We Did

- Contacted peer agencies for lessons learned
- Involved all levels of staff as stakeholders – crews, traffic engineers, operators, managers
- Met one-on-one with each agency, then held monthly group meetings
- Focused on needs and operational concepts
- Conducted vendor RFIs and on-site demos for both knowledge building and proof of concept for interoperability
- Followed the Systems Engineering Vee approach



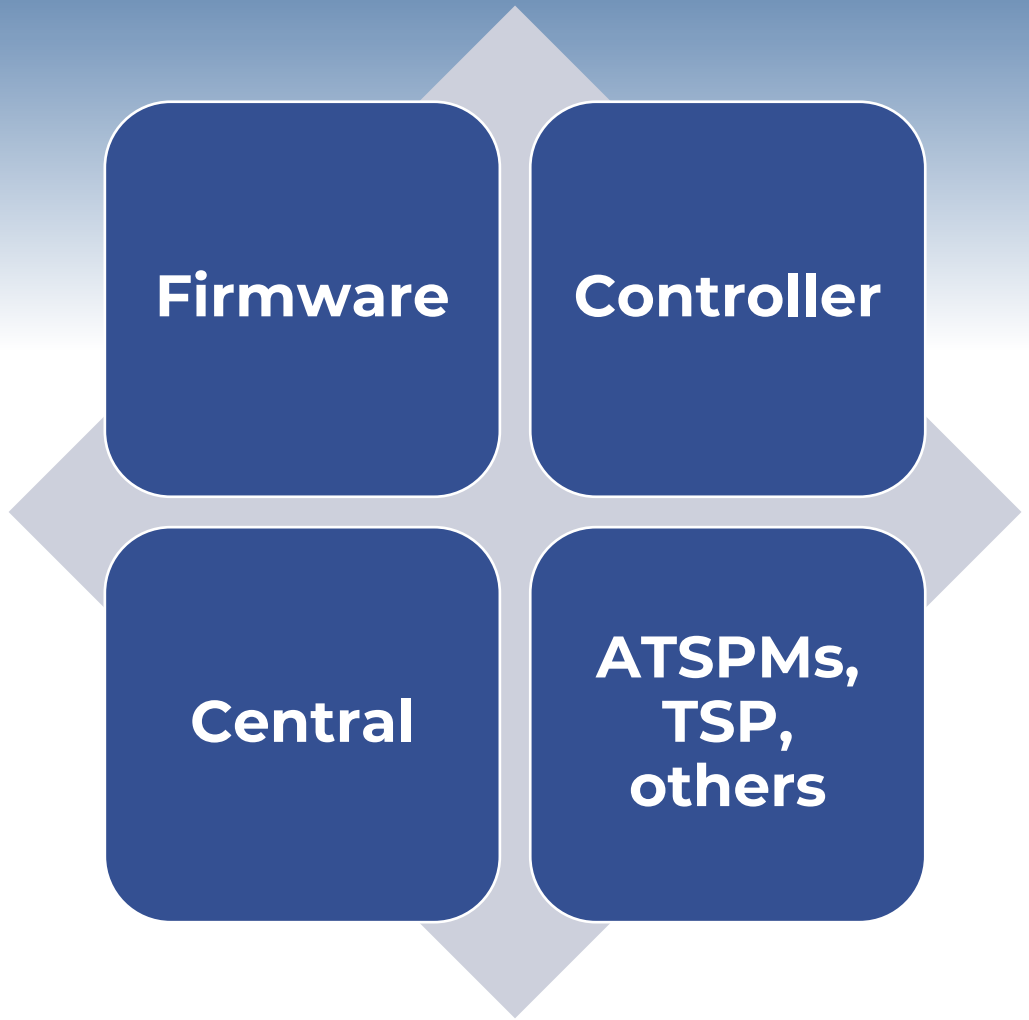
Systems Engineering Approach



WHY AN OPEN SYSTEMS APPROACH?

What is an Open Systems Approach?

Open, Secure, And Future-Ready



Any Vendor can supply one or all – you can mix and match.

Weren't Standards Supposed to Enable This?

Limitations of the Standards

First, we need to get Firmware operating on Controllers.

NEMA ATC Standards for Controllers

- The Standard requires a "Board Support Package" and other elements to allow any Firmware provider to program their Firmware to operate on the Controller.

Second, we need to enable Central to address the Firmware.

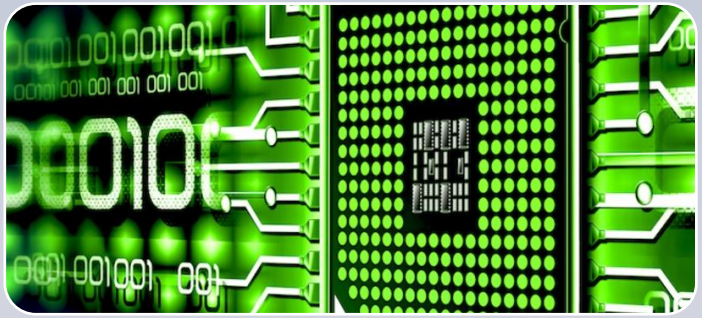
NTCIP Standards for Firmware

- Basic functions are Standard and Required
- However, the standard allows for many "optional" functions
- The MIBs/objects in the programming of the firmware must be supplied for an open systems approach so a Central System provider can program to the Firmware

Agencies Across the US are Following the Open Systems Approach to Meet Needs

- Virginia DOT
- City of Beverley Hills, CA
- City of Newport Beach, CA
- City of San Jose, CA
- City of Toronto, Canada
- City of Philadelphia
- City of Tempe, AZ
- Macomb Co, MI
- City of Mesa, AZ
- Hamilton, Ontario, Canada
- Los Angeles DOT
- City of Seattle
- RTC Southern Nevada

State of Our Industry



Firmware

6 active suppliers

1 supplier provides ONLY firmware

Hardware

5 active suppliers

Central

7 active suppliers

2 suppliers provide ONLY Central Software

Needs and Objectives Drove the Open Systems Approach

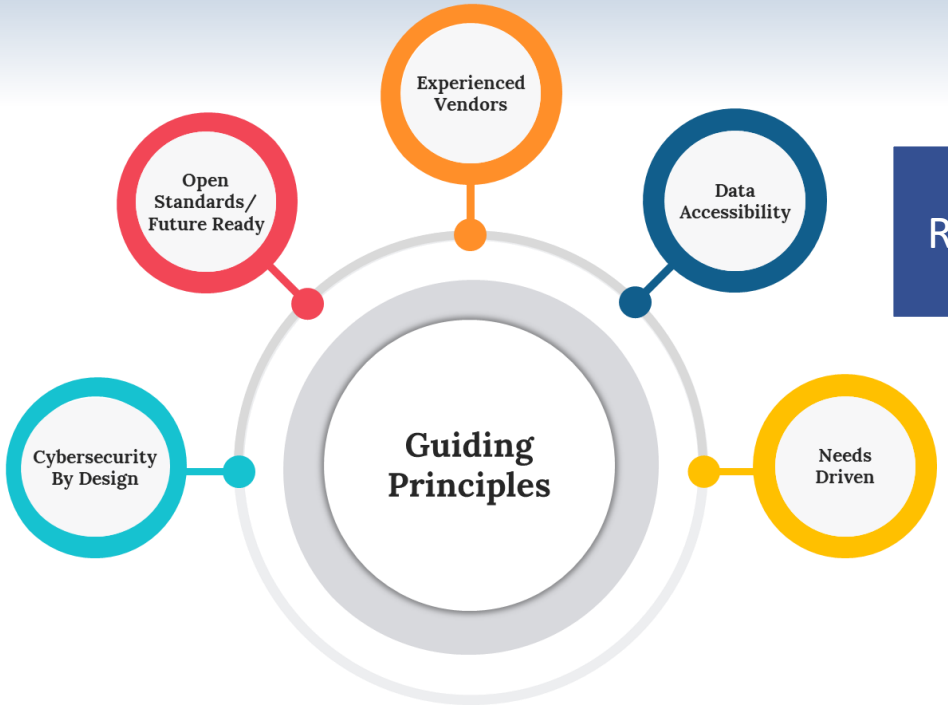
- Modern Analytics
- Integration with Emerging Technologies
- Vendor responsiveness
- Cost management

Firmware Is The Foundation for Signal Operations – Began There

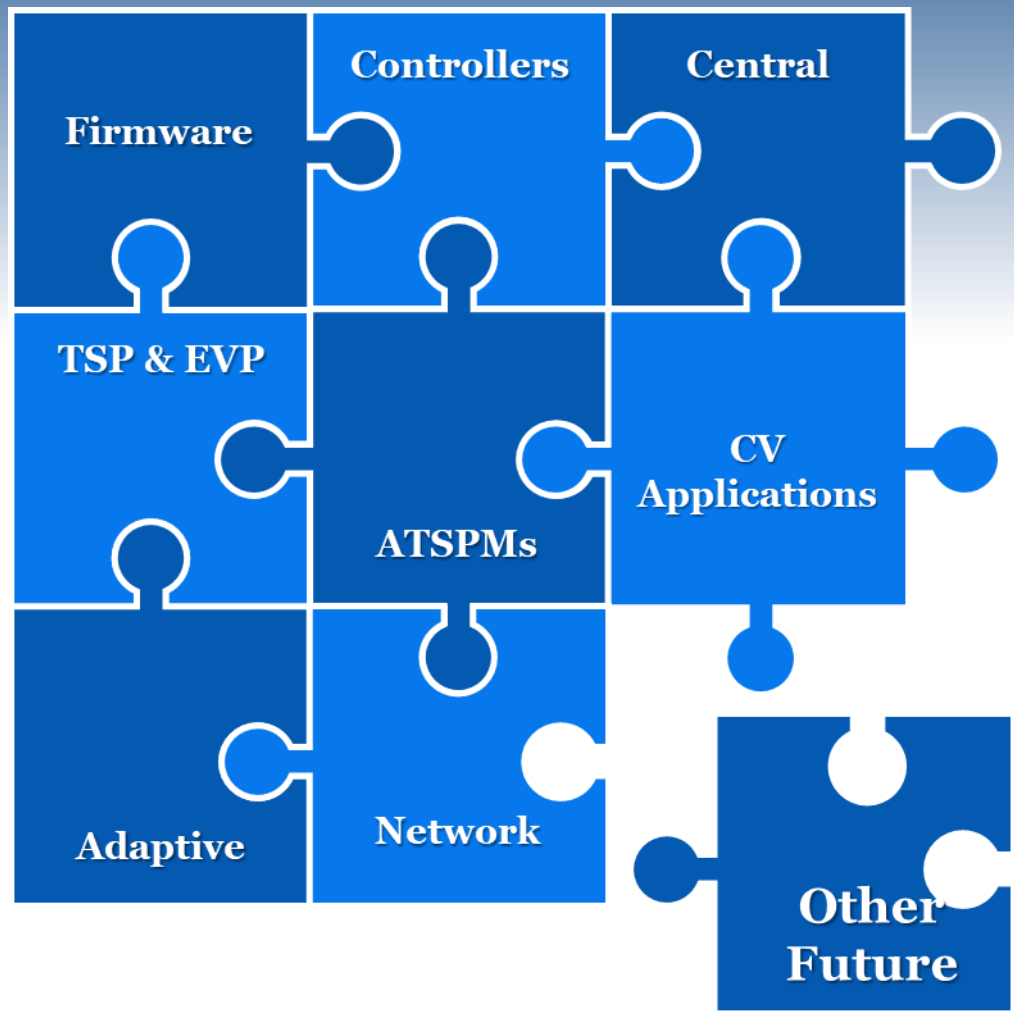
PROJECT OUTCOMES

Vision for a Digital Infrastructure Ecosystem

Guiding Principles



Procurement Requirements and Specs



Central Traffic Signal System

Traffic Signal Controller (TSC) Functional and Technical Requirements				
Ref#	Requirement	Comply (Y/NC/C/P/N)	Supplier Response	
	1.0 Essential Capabilities			
5	4	The TSC shall have an engine board that incorporates a CPU and supports circuitry that has a minimum computational capability to obtain a score of 500 using the Coremark V1.0 benchmark at 25C per ATC 5201 Standard 4.3.1. Describe your product's computational capabilities. What is the minimum computational capability for the controller being proposed?	Y	Econolite will supply our new ATC Engine Board 2 which uses a next-generation dual core 1 GHz processor, while retaining a PowerPC CPU architecture for backwards compatibility. This engine board provides a Coremark performance score of 6984, greatly exceeding the ATC 5201 requirement, providing a platform that can support advanced applications and future needs.

Section 2.0 Reporting			(1) YES, COMPLY AND INCLUDED IN BASE COST.	(2) YES, CAN COMPLY WITH ADDED COST (Existing add-on module).	(3) NO, DO NOT CURRENTLY COMPLY. CAN BE BUILT AND DEPLOYED WITHIN 24 WEEKS AT ADDED COST.	(4) NO, DO NOT CURRENTLY COMPLY. NOT ON DEVELOPMENT ROADMAP	INCLUDE A COST IF YOU MADE A DESIGNATION IN COLUMN E OR F.	ADDITIONAL INFORMATION AS NECESSARY TO SUPPORT INFORMATION IN COLUMNS E, F OR G.
RPT	1	The CTSS shall allow users to create scheduled, canned and ad hoc reports accessing data from the active signal operations database, and from the archive and logs. All data in the current and archived database and logs shall be accessible to create reports.	x					
RPT	2	The CTSS shall include the capability to create High Resolution Data Report(s) from captured and processed data using the Purdue University Outcome-based approach outlined at the following link: http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1002&context=jtrpaffdocs	x					
RPT	3	The CTSS shall allow the user to export report results into a text file (e.g. .txt and .doc formats), a spreadsheet file (e.g. .csv and .xlxs formats) and a pdf file.	x					
RPT	4	The CTSS shall allow users to delete blank pages, select only specific pages to print, when printing current and historical database reports for intersections (signal timing sheets).	x					
RPT	5	The CTSS shall allow users to create a timing sheet for FOIA requests, that represent the specific timing data programmed at Central for a specific date and time.			x		$13,847.00	TransSuite currently includes the configurable ability to record historical split data and be able to graphically play it back. To further support these FOIA requirements, TransCore can make modifications to utilize its UCM change log in the recreation of historical timing sheets.
RPT	6	The CTSS should directly interface with 3rd party reporting tools including Tableau.	x					TransSuite includes its own visualization and custom dashboard framework. This farmwork allows user to select from a library of widgets and customize the settings and data to be visualized therein by interacting with the widget controls presented to the user. If a third party tool such as Tableau or PowerBI is desired instead, a copy of the TransSuite database can be utilized for direct access by these tools.
RPT	7	The CTSS should enable creating reports that include real-time and historical Time Space Diagrams (TSD) from captured and processed data.	x					
							$26,593.00	

TESTING

Factory Acceptance Test
- Requirements
- Regression (or similar) testing

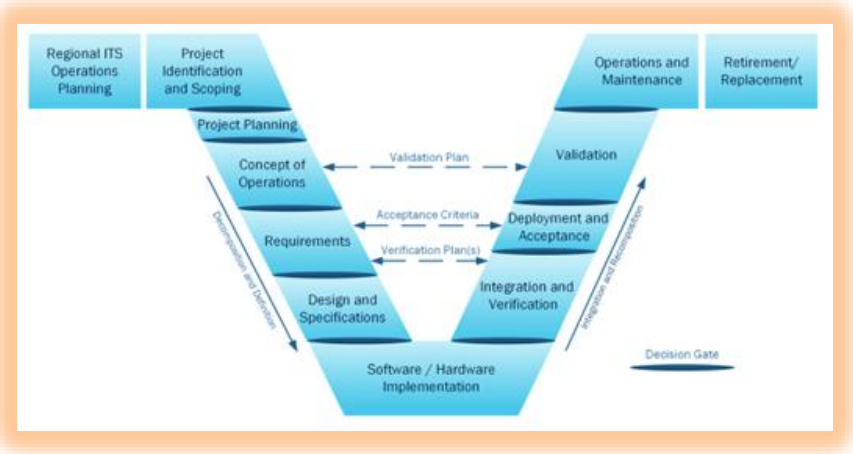
Integration Test
- Requirements
- Off network

Commissioning Test
- Requirements
- On network

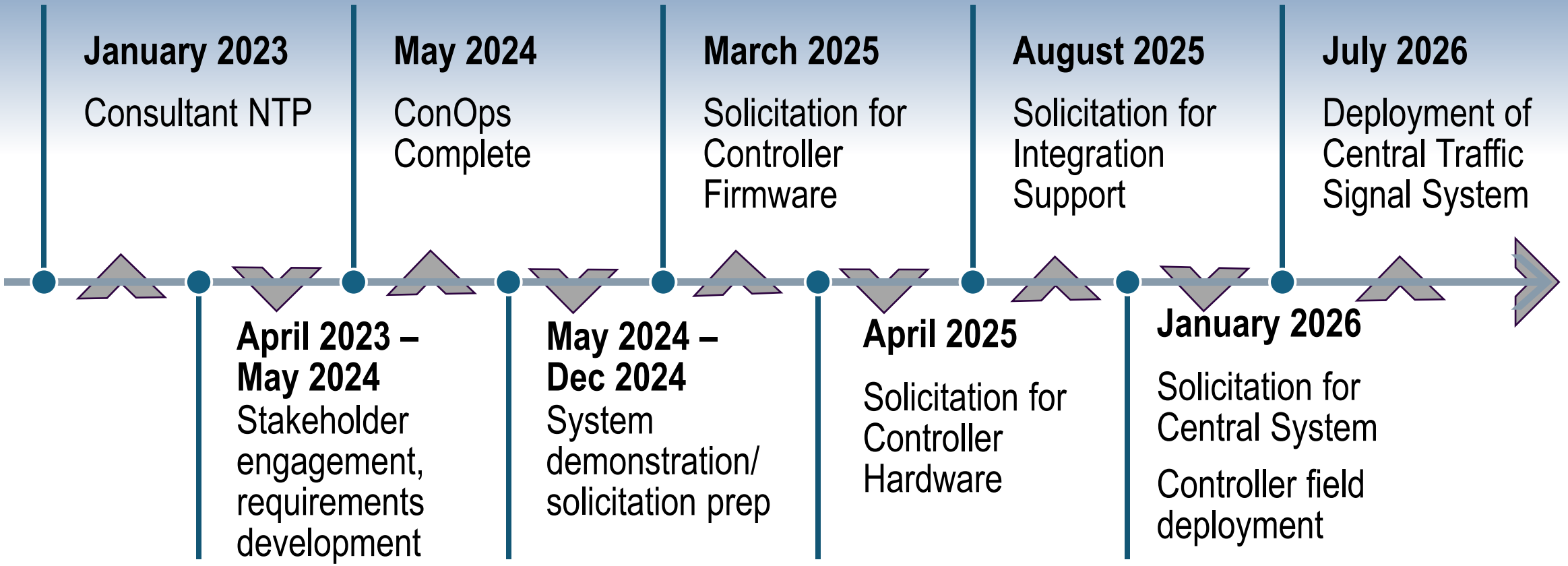
User Acceptance Test
- Use Cases

60-Day Operational Test
- In Service Operations

VERIFICATION → **VALIDATION**



Procurement and Implementation Timeline



Deployment Strategy

18-Month Phased Implementation

- Have the support of a System Manager for inspection, testing, and installation of firmware and controllers (each agency can choose if they would like installation support)

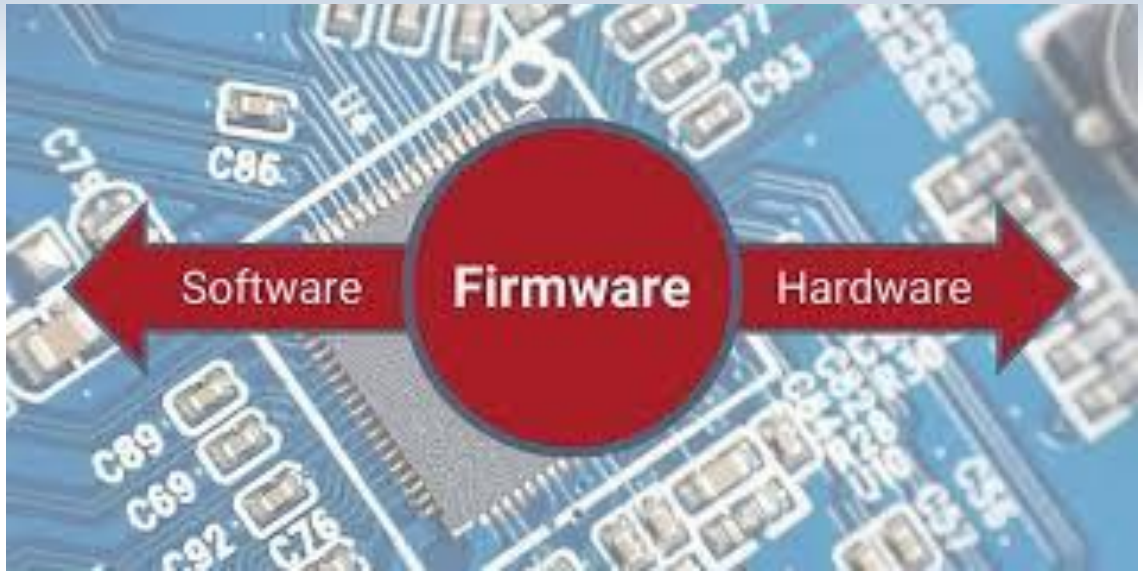
Process

- Controllers arrive and are inspected
- Firmware loaded and tested on bench
- Controllers tested at agency in cabinets
- Controllers installed in field and communications tested using firmware utility.
- CTSS rolled out in “Sand Box” and tested
- CTSS connected to field controllers
- Training & governance
- ATSPM integration
- Data warehousing

Traffic Signal Firmware Selection

- Advanced Traffic Solutions (ATS) – D4
- NTP 3/18/2025
- NTE $2,290,000
  - 10-year contract agreement
  - Included several enhancements to the firmware

Final Acceptance Testing June 22



Traffic Signal Controller Selection

- SWARCO McCain ATC FLeX and Econolite Cobalt traffic signal controllers
  - SWARCO
    - NTP 4/16/2025
    - NTE $2,440,900
  - Econolite
    - NTP 4/16/2025
    - NTE $2,262,500
- 2-year contract with each supplier

Central Traffic Signal System

- TransCore - TransSuite
- NTP 1/20/2026
- NTE $1,442,664.90
  - 5-year contract agreement

Built a Sandbox (Test Bed)

Interim acceptance testing complete May 21
(base system, no modifications)

Final testing July 14 - 16

Deployment Status

Controllers Ordered	Controllers Delivered
1350	1000
Controllers Inspected & Identified	**Firmware Loaded**
629	582
Database Loaded	**Bench Testing Complete**
340	340
Controller Delivered to Agency	**Agency Cabinet Testing Complete**
317	233
Controllers Installed by Westwood	**Controllers Installed by Agency**
107	123

Controllers Integrated onto Central System

0

Traffic Signal Controller Deployment

Flag Value

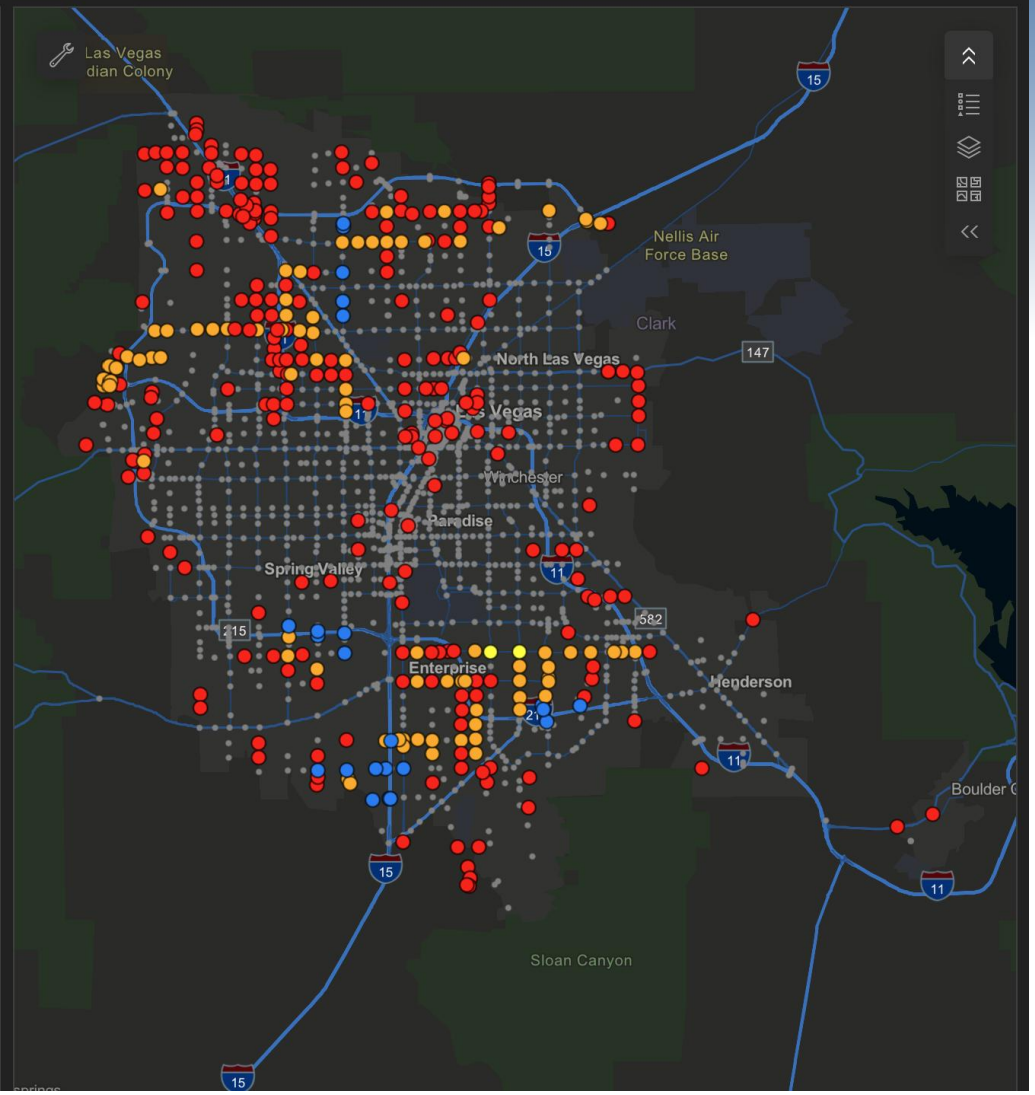
- Intersection Assigned & Database Loaded
- Bench Testing Complete
- Delivered to Agency for Cabinet Test
- Ready for Field Install
- Field Installation Complete
- Integrated onto Central System
- Other

Test Controller

- Test Controller

Controller Location

- Controller Location



Outcomes

- Better signal timing/phasing capabilities
- Faster issue detection
- Improved maintenance efficiency
- Shared regional visibility
- Better transit coordination

THANK YOU!
QUESTIONS?