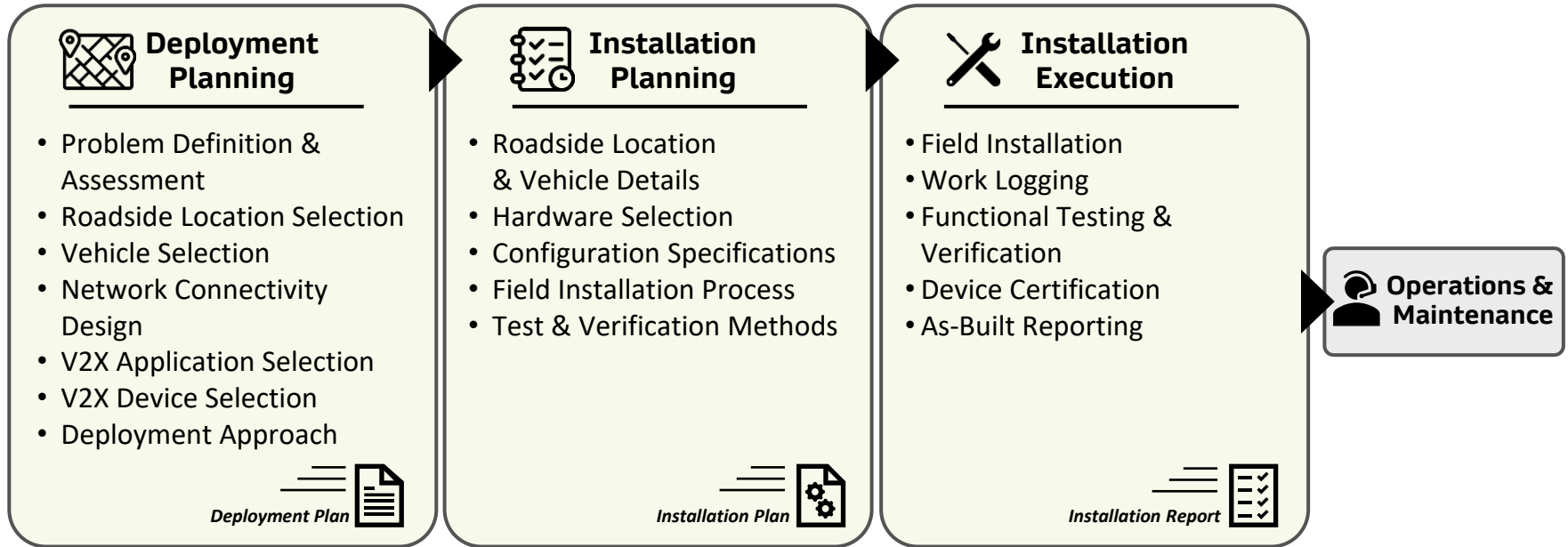


*Deploying Connected Vehicle Technology*

# Edge Deployment Process



The 3-phased process establishes a standardized method for consistently delivering high-quality V2X deployments to the field at scale.

# Deployment Planning



## Deployment Planning

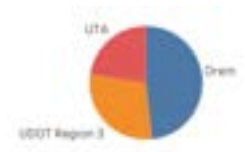
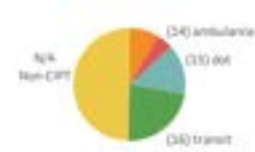
### Purpose

*Determine the why, what, and where.*

Identify what problems need to be solved and where edge solutions should be deployed to address these needs

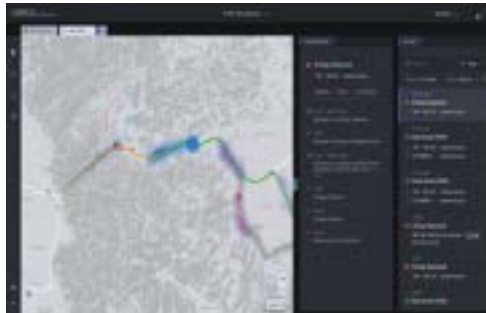
### Outcomes

- System Objectives
- Vehicles List
- Site Map



## Basic Safety

- Data Visualization
- Crash & Incident Detection
- Weather Inference



## Traveler Information

- Weather Warnings
- Curve Speed Warnings
- Work Zone Safety



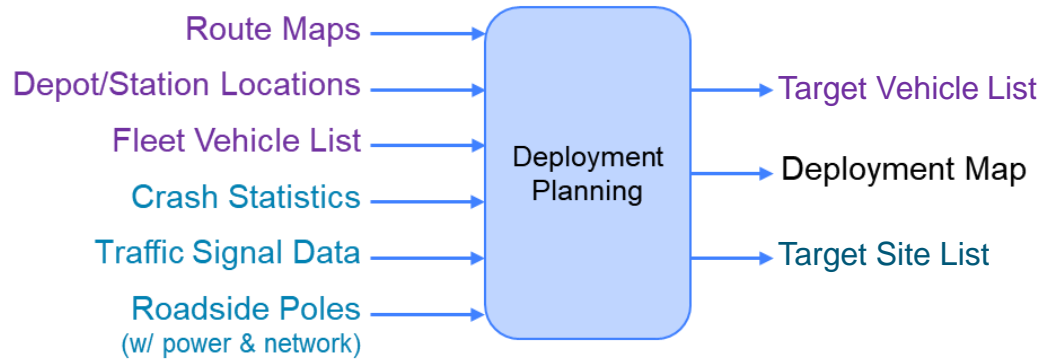
## CIPT

Connected Intersection Preferential Treatment

- Transit Signal Priority
- Freight Signal Priority
- Emergency Vehicle Preemption
- Snowplow Signal Preemption



# Deployment Research



# Installation Planning

## Purpose

*Determine the how.*

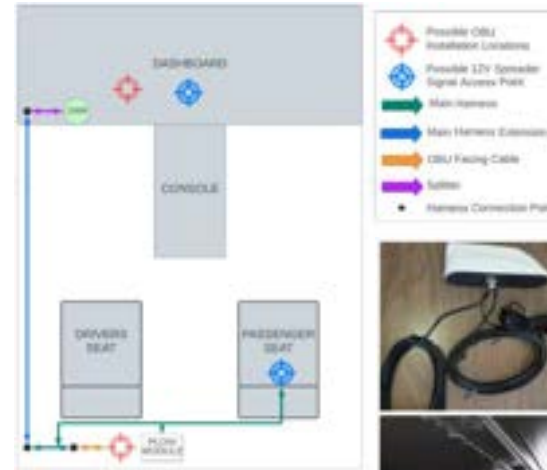
For both vehicles and the roadside, establish a detailed plan for device configuration and system integration. Define expectations for the installation and test procedures.

## Outcomes

- Vehicle Integration Schematics
- Roadside Integration Schematics
- Device Configuration Details
- Bill of Materials



## Installation Planning

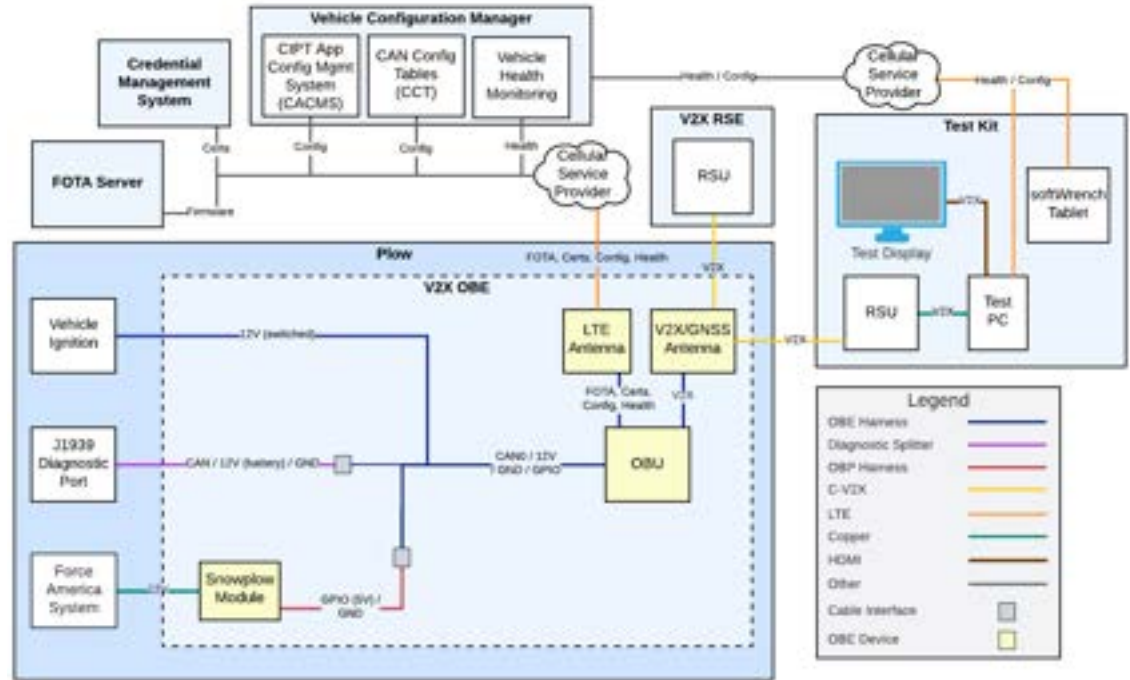


# Vehicle Planning

## Key Activities

- Vehicle Integration
  - Power
  - CAN interface
  - CIPT trigger input
- Equipment Installation
  - OBU & antenna placement
  - Cable routing
- Device Config
  - Channels
  - Security
  - Vehicle Permissions/Roles
- Installation & Verification Procedures

## Snowplow CV Architecture



# Vehicle Equipment



**Onboard Unit (OBU)**  
mounted behind driver seat



**V2X/GNSS antenna**  
installed on cab roof



**LTE antenna**  
mounted on dash



**Cable  
Harnesses**

## CIPT Interface Devices



## Human Machine Interface (HMI)



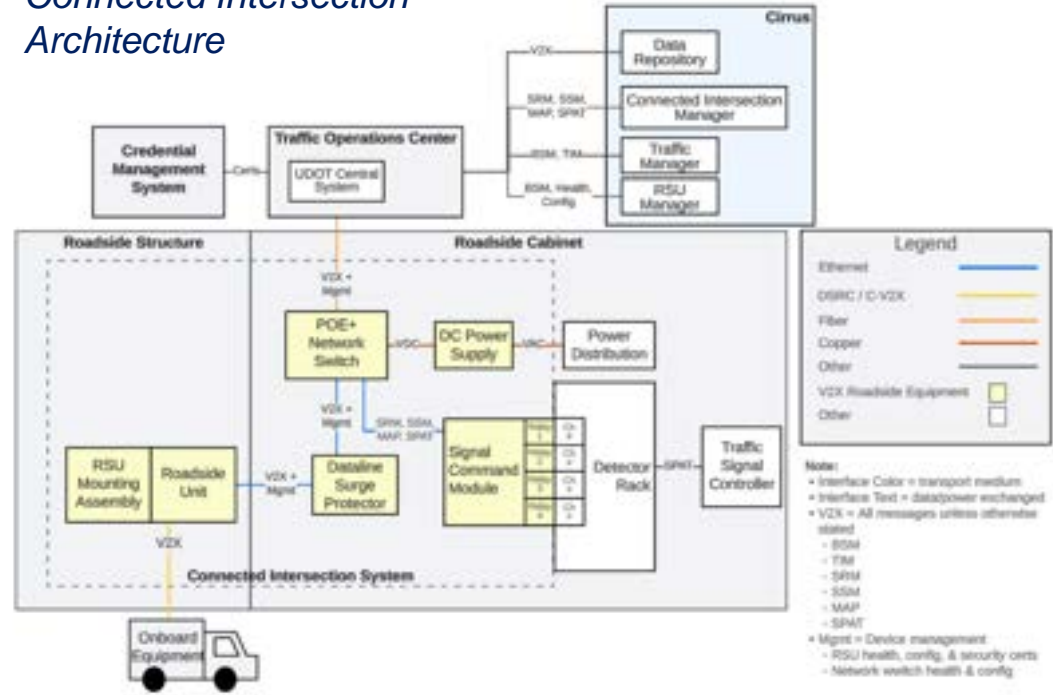


# Roadside Planning

## Key Activities

- Infrastructure Integration
  - Power & Network
  - Physical space
- Equipment Installation
  - Mounting
  - Bonding & Grounding
- Device Config
  - Channels
  - Message Forwarding
  - Security
  - Permitted Priority/Preemption Roles
  - Signal Controller Programming
- Installation & Verification Procedures

## Connected Intersection Architecture

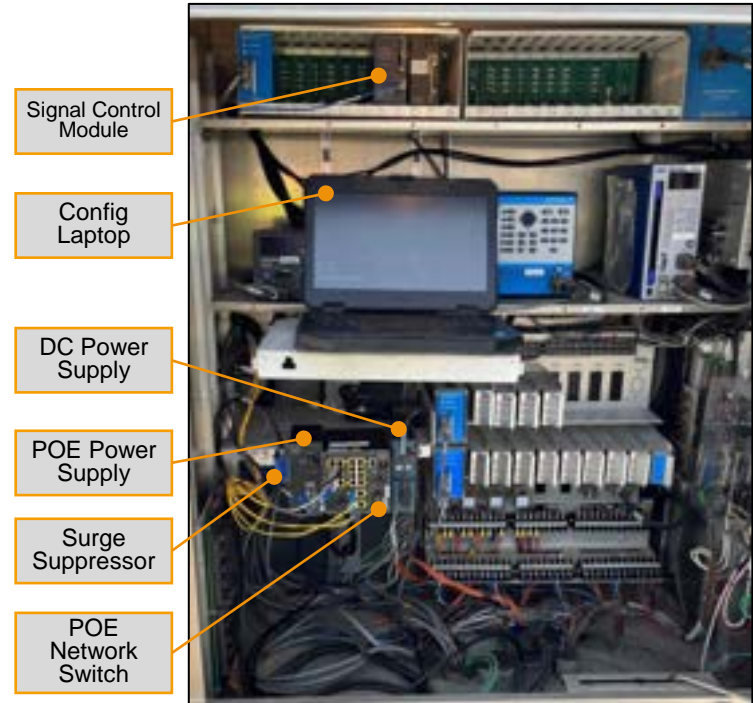


# Roadside Equipment

## Pole-Mounted Roadside Unit (RSU)



## Roadside Cabinet Equipment



## Installation Execution

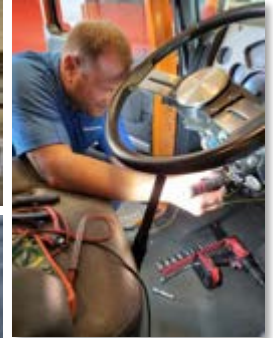
 **Installation Execution**

### Purpose

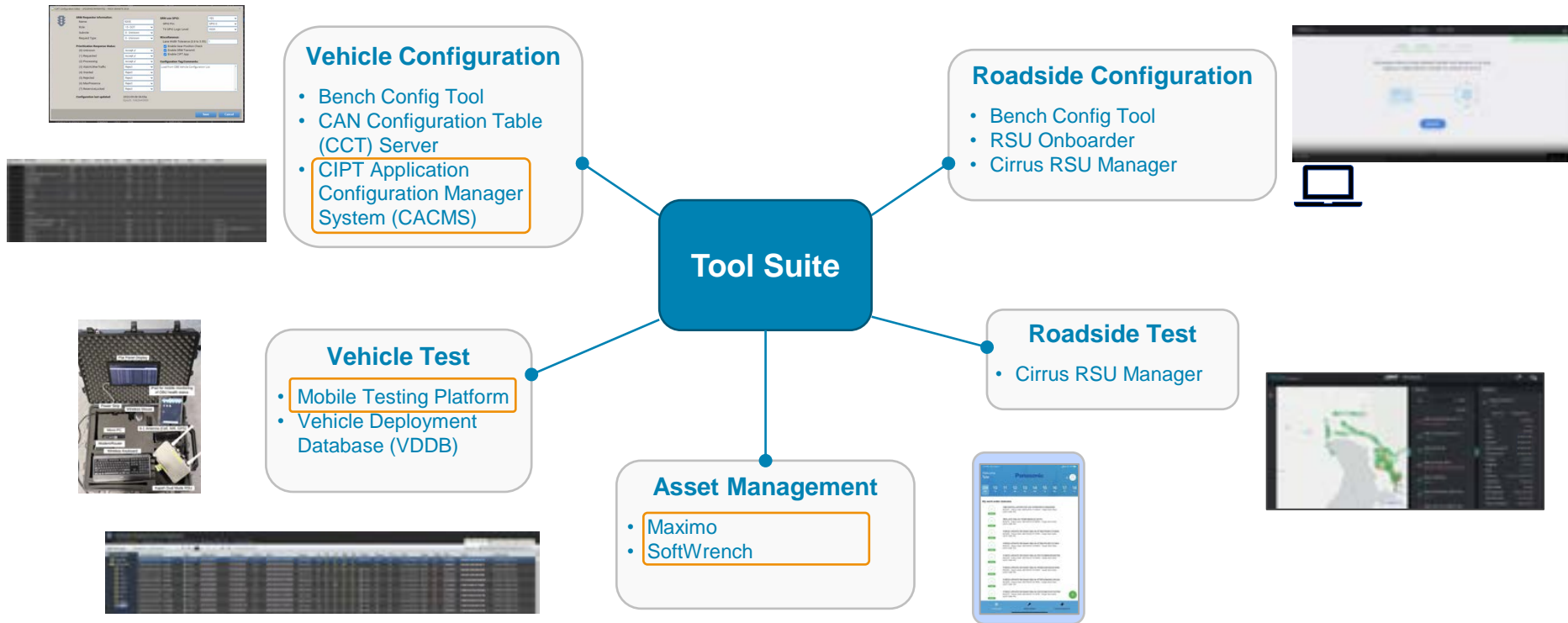
Deliver edge systems to the field according to the installation plan. Test and verify all sites and vehicles to confirm functional operations.

### Outcomes

- Field installation complete
- System verification passed
- As-built report delivered



# Installation Tools



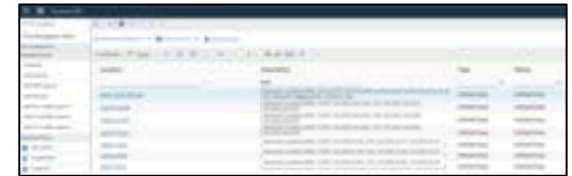
# Computerized Maintenance Management System (CMMS)

*Centralized platform for managing assets and activities throughout deployment and sustainment.*

- Work order management
- Asset management
- Inventory tracking

## Benefits

- ✓ Accurate record keeping
- ✓ Customizable
- ✓ Automation for scale
- ✓ Reporting functions



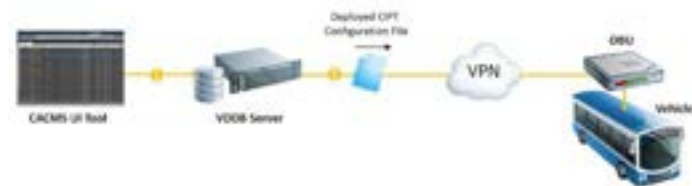
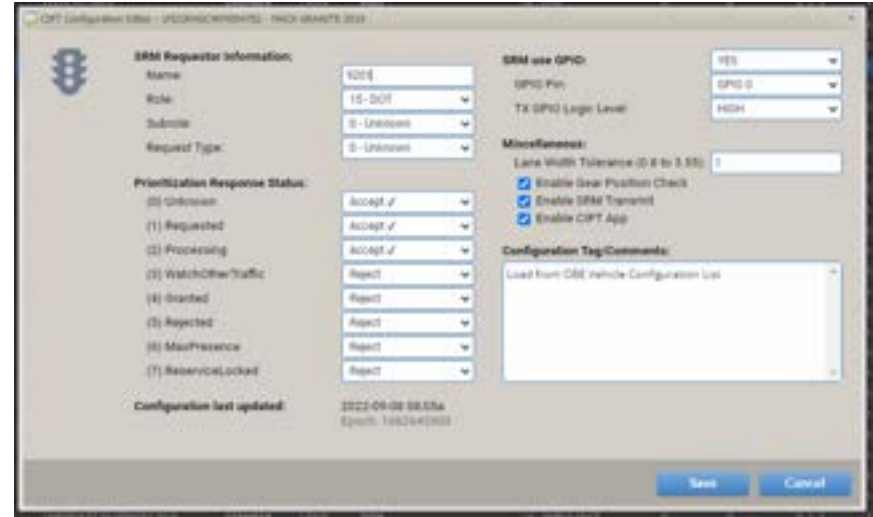
Maximo

# CIPT Configuration Manager

*Cloud-based tool for creating, managing, and deploying CIPT configurations to targeted vehicles such as emergency vehicles, snowplows, and transit buses.*

## Benefits

- ✔ VIN-based profiles
- ✔ Remote configuration
- ✔ Bulk loads
- ✔ Tailorable permissions
- ✔ CIPT application on/off

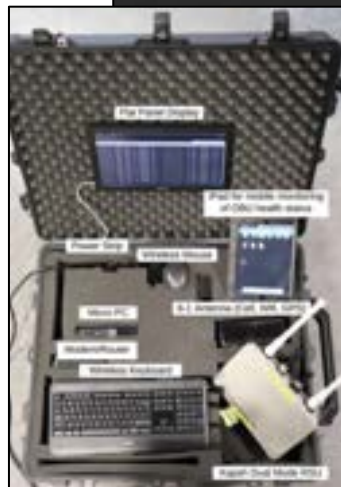
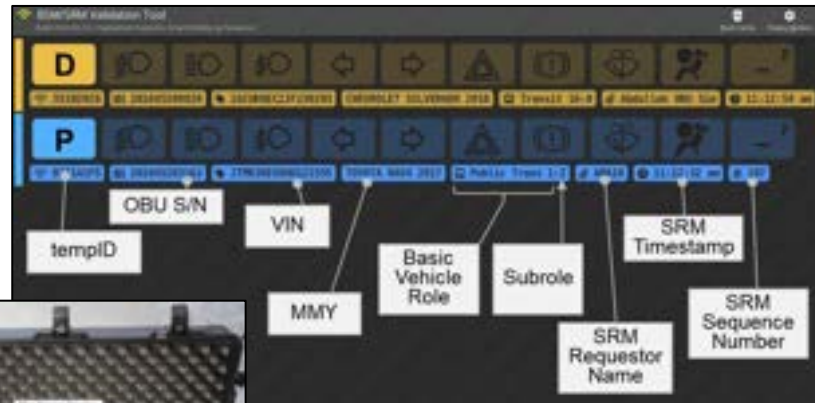


## V2X Mobile Testing Platform

*Portable test tool providing end-to-end functional verification of the onboard equipment on-site at the time of installation.*

### Benefits

- ✓ Real-time verification
- ✓ Built-in RSU
- ✓ Troubleshooting tools
- ✓ CAN data checks



# Operations & Maintenance

## System Monitoring



Tools & reports providing real-time health status and operational insights.

- **RSU & OBU Health Reporting**
- **Uptime Statistics**
- **Fault Reporting**
- **Performance & Trend Metrics**

## System Management



Central hardware and asset management across existing and new deployments.

- **Real-time Remote Monitoring**
- **Service Desk Support**
- **Cirrus Software Support**

## Maintenance Services



Corrective maintenance including in-field services to replace defective devices and restore full operations.

- **Inventory Management**
- **Field Services Subcontract Management**
- **Service Scheduling**
- **Firmware/Software Updates**



Have questions or want to learn more? Please contact us.



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