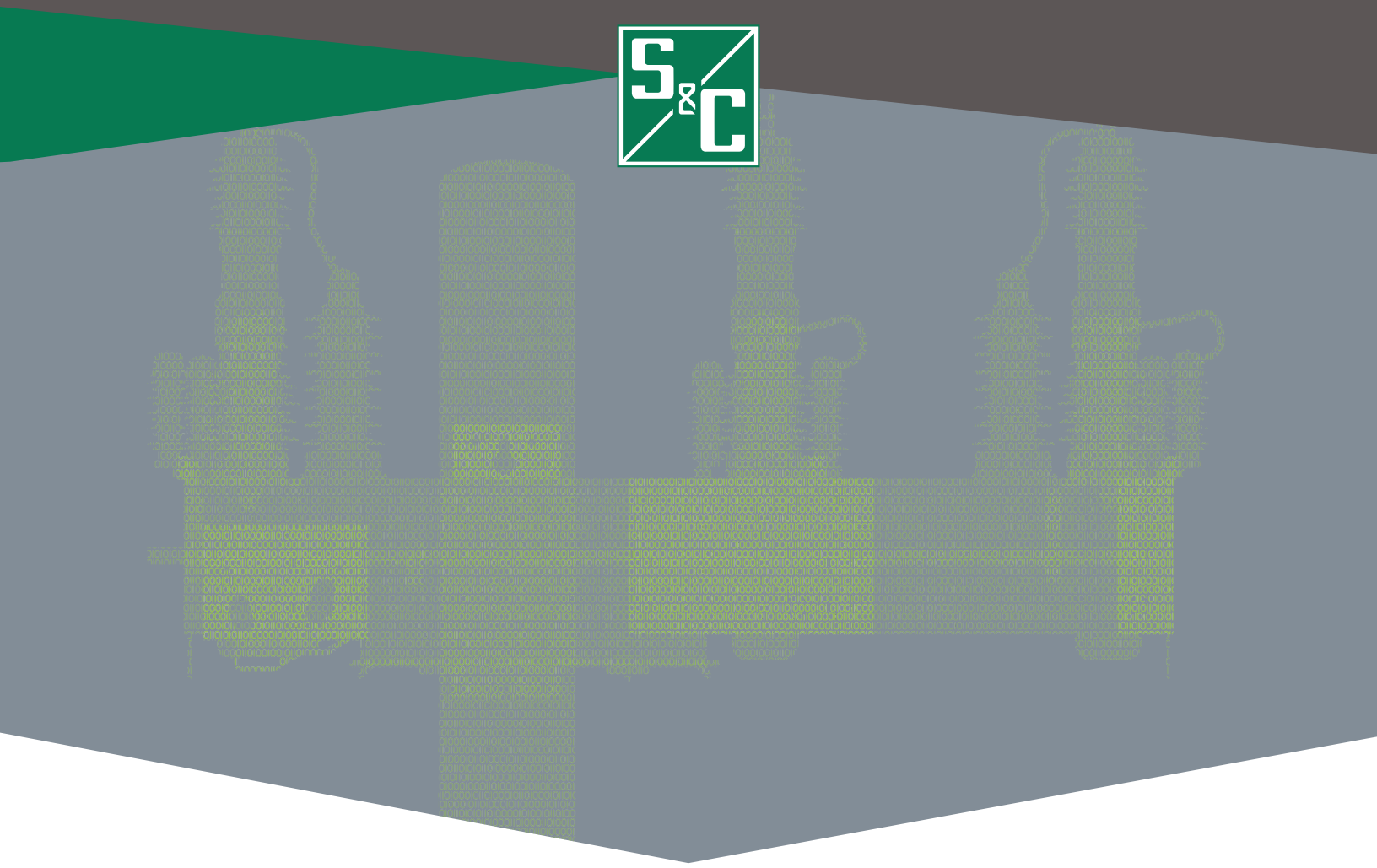
IntelliTeam® FMS

Feeder Management System



Advanced S&C Device Management

The Problem with Managing a Smart Grid

The primary benefit of automated devices is the ability to immediately isolate distribution faults and quickly reroute power, thus improving system reliability.

But with the advantage of a more reliable grid comes the challenge of managing large numbers of technically robust devices. This is caused by using manual processes and the same tools designed for smaller fleets of simpler devices. Utilities have told us they need at least one additional employee for every 250 devices managed manually. That's the equivalent of eight hours annually per device.

Beyond increasing operational costs, manual device management can also reduce the original smart grid reliability benefits. This is often caused by engineers not having the time to manage and track every device properly. For every 40 devices managed manually, utilities can expect to have one incident each year where a device didn't operate properly.

A Device-Management System Is the Solution

Advanced tools are needed to efficiently manage an entire fleet of automated devices, saving engineers and system operators time. This also allows them to work more effectively, thus further leveraging the smart-grid investment to improve reliability.

To fully realize the benefits of a self-healing smart grid, S&C offers the IntelliTeam FMS Feeder Management System. This enterprise software can significantly improve a utility's efficiency and overall reliability by managing devices and providing insightful data analytics from an entire fleet of S&C automated smart grid devices.

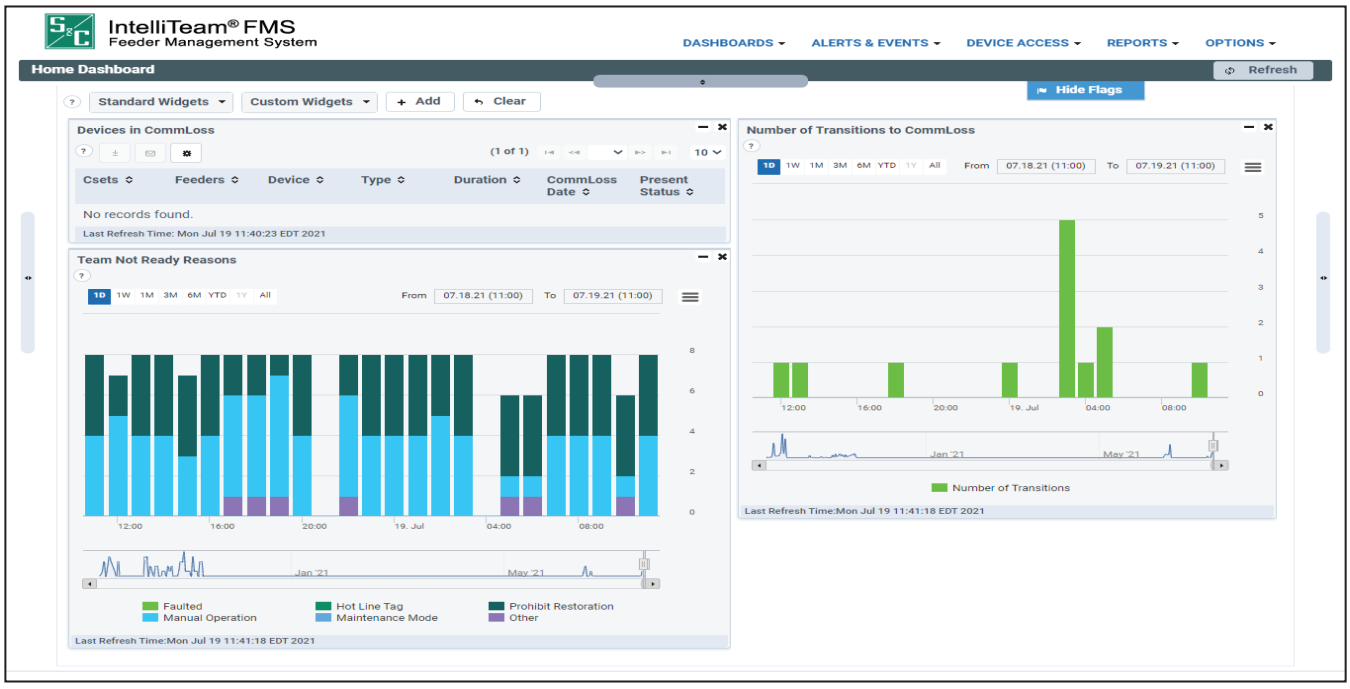
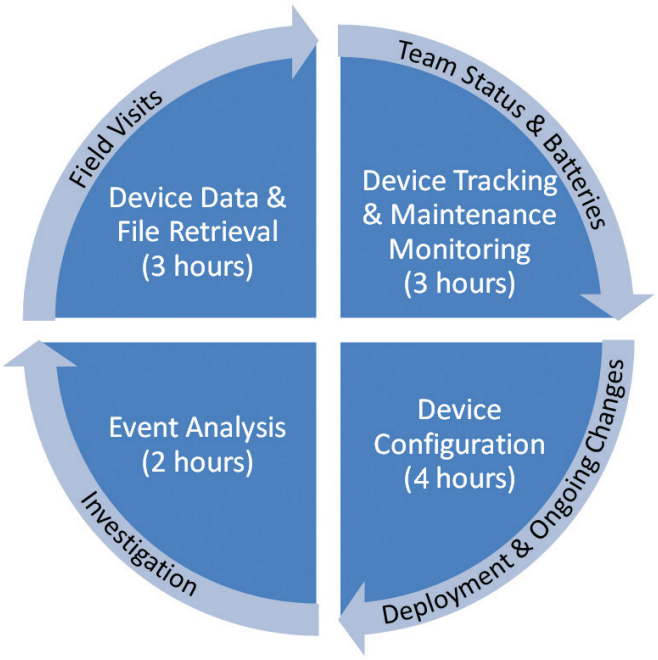


Figure 1. Dashboards.

Saving Operational Time

By leveraging IntelliTeam FMS features to automate otherwise manual tasks done on a point-by-point, device-by-device basis, 10 to 12 hours per device can be saved annually through improving and automating tasks in four operational areas:



Device Data & File Retrieval.

- **File Retrieval:** Utilities often use traditional methods and tools to access waveform and event files—either one device at a time or by rolling a truck. IntelliTeam FMS facilitates bulk retrieval, both on demand and on a scheduled basis.
- **Data Collection:** Collecting, organizing, managing and displaying relevant data is often done via SCADA and a historian, but IntelliTeam FMS does this automatically and collects points SCADA systems can't access, such as setpoints.

Device Tracking & Maintenance Monitoring

- **Dashboards and Reporting:** Utilities can spend considerable time investigating devices manually, reacting to SCADA alarms and generating reports. IntelliTeam FMS offers an automated approach with dashboards and reports that track Team Ready statuses, battery health, firmware versions, and more.
- **Device Filtering:** IntelliTeam FMS allows a user to work with almost any group of devices based on a wide array of filtering options. This saves a lot of time when working with a subset of devices.

Event Analysis

- **Sequence of Events:** Understanding what happened during an event requires investigation. IntelliTeam FMS makes this easy by collecting key data across multiple devices and displaying it chronologically.
- **Alert Management:** Addressing the numerous alerts devices generate is a time-consuming task. IntelliTeam FMS makes it easy to filter down to only those devices and alert types that are relevant and enables the creation of custom alerts with specific actions such as email notifications.

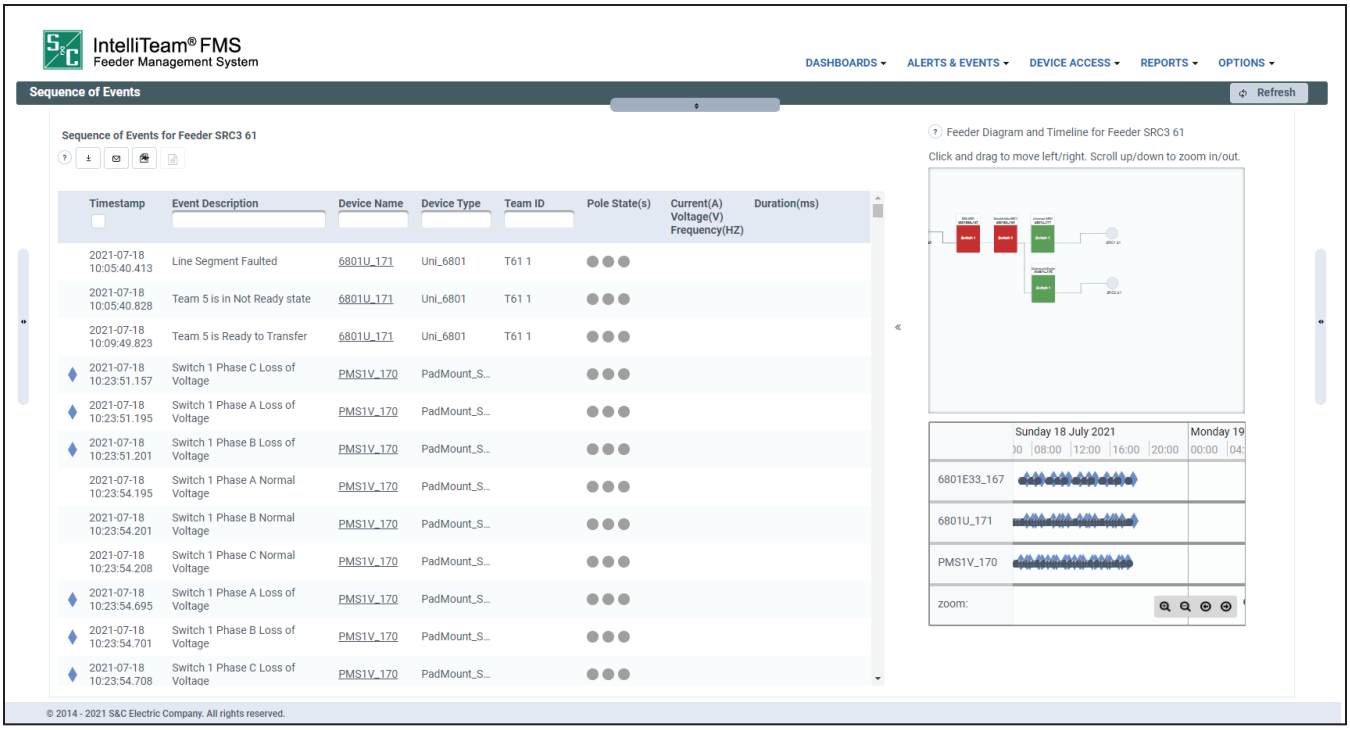


Figure 2. Sequence of Events.

Device Configuration

- **Settings Management:** Configuring new devices and changing device settings can be managed by IntelliTeam FMS across multiple devices, saving many hours when a fleet-wide change is required.

- **Firmware Upgrade:** Upgrading devices to the latest firmware can be time-consuming and often requires truck rolls when radio networks don't have the bandwidth to transmit the upgrade files quickly or reliably. IntelliTeam FMS offers robust upgrade workflows, error handling, notifications, and more, allowing for quick and easy management of the process.

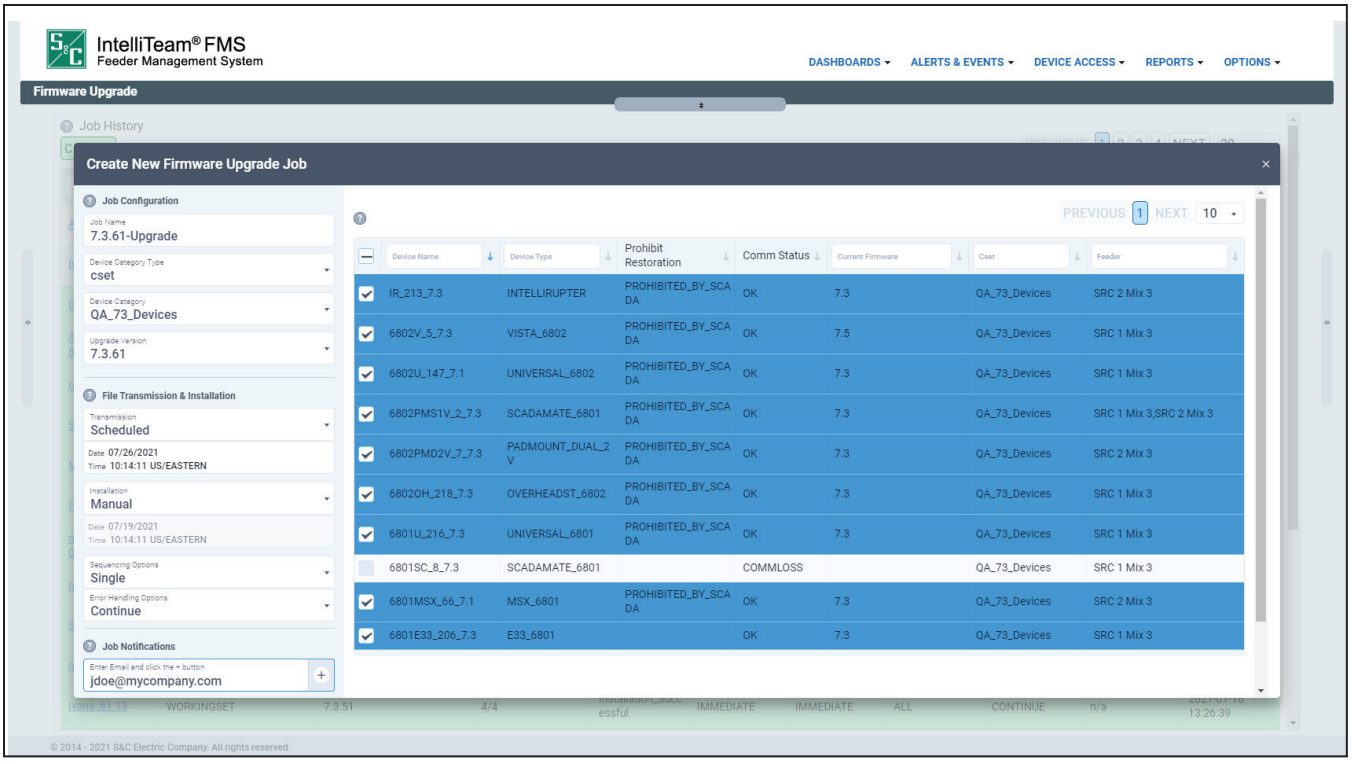


Figure 3. Firmware Upgrade.

Increasing Reliability

IntelliTeam FMS helps utilities identify issues before they result in misoperations where a device doesn't operate as intended. Misoperations can cause outages or lost opportunities to leverage grid automation. With a fleet of 400 devices, 10 such misoperations can be avoided annually in four process areas:

Team Status Monitoring

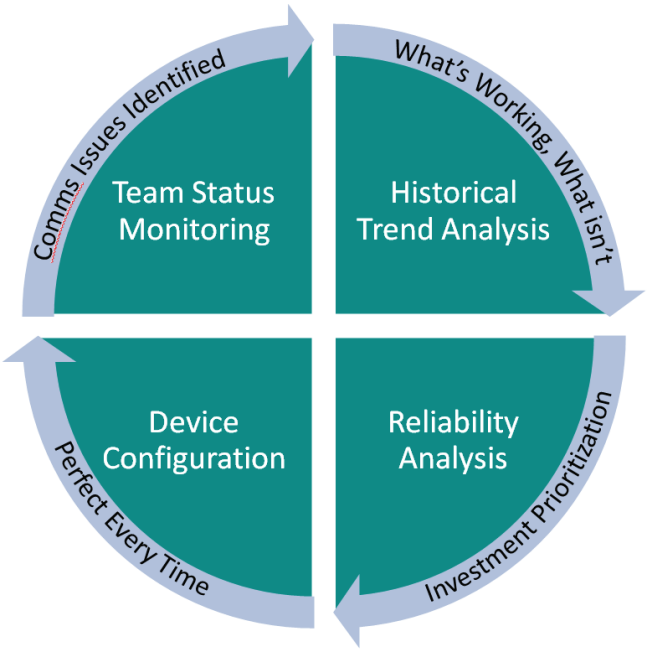
- **Dashboards:** Team-Ready statuses and reasons why teams aren't in a ready state are displayed. Communication issues are a leading cause of teams falling out of a Ready state, so IntelliTeam FMS offers a dedicated dashboard to track communication statuses.
- **Device Details:** Understanding the detailed status of individual devices and how they are affecting Team Ready status is often a critical part of monitoring the overall status of a team.

Historical Trend Analysis

- **Reporting:** Together with dashboards IntelliTeam FMS reporting provides insights into device data, ranging from maintenance needs to abnormal statuses.
- **Alert Management:** Alerts are generally used to identify specific issues quickly, but analyzing alert trends over time also can help identify systemic issues that, when resolved, increase reliability.

Device Configuration

- **Settings Templates:** Utilities can create ideal configurations for their devices and then replicate those settings to their entire fleet using saved templates. This avoids manual settings errors and the use of factory default settings.
- **Device Filtering:** Filtering in IntelliTeam FMS is primarily used to allow working with specific sets of devices, but the system also can be used to find devices with certain statuses or settings that must be addressed.
- **Change Logs:** Without change-logs, diagnosing a problem with a device becomes a matter of detective work. IntelliTeam FMS solves the mystery by logging who, when, and what was changed.



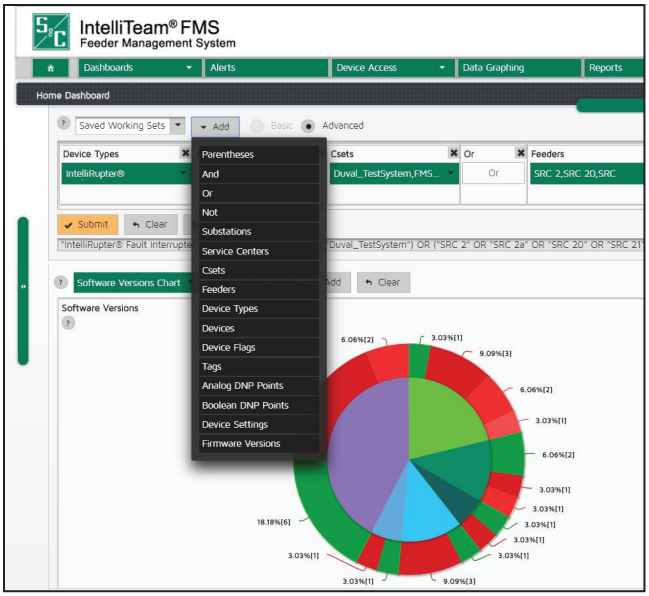


Figure 4. Device Filtering.

Reliability Analysis

- **Reliability Dashboard:** Analyzing the results from IntelliTeam restorations and the financial ROI can help in planning future smart grid investments.
- **Sequence of Events:** Understanding what IntelliTeam devices did to address a fault in an easy to read timeline of events can help management weigh the benefits of grid automation.

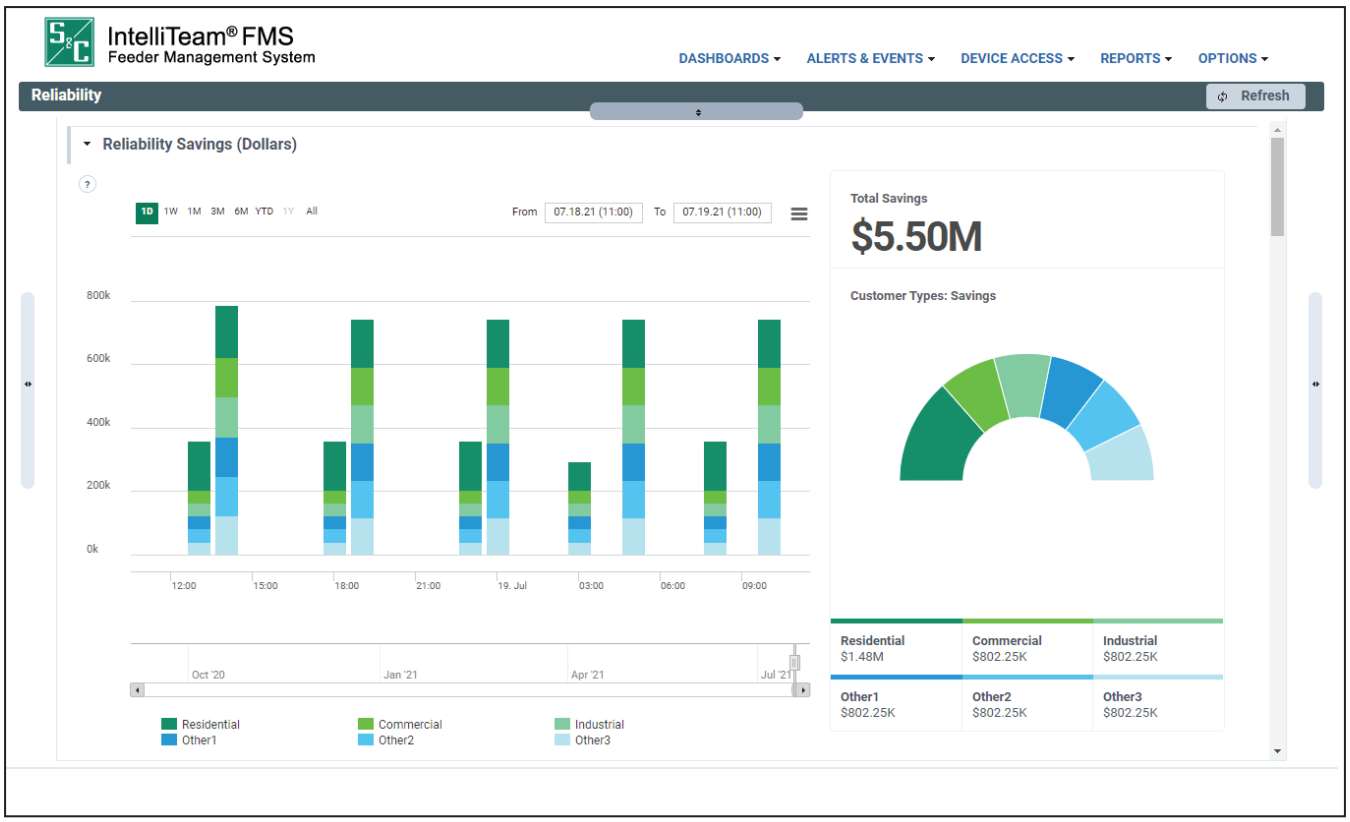


Figure 5. Reliability Dashboard.

Features and Benefits

Supported Device Types

The IntelliTeam FMS Feeder Management System provides powerful monitoring and data analytics for the following devices:

- IntelliRupter® PulseCloser® Fault Interrupters
- Automatic switch controls applied with Scada-Mate® or Scada-Mate® SD Switching Systems, Remote Supervisory Pad-Mounted Gear, or Vista® Underground Distribution Switchgear
- IntelliNode™ Interface Modules applied with substation breakers, midline reclosers, and other intelligent electronic devices
- IntelliCap® Automatic Capacitor Controls

Device Communication

IntelliTeam FMS is designed to communicate with S&C devices via fiber-optic and radio, such as S&C SpeedNet™ Radios or those from third-party vendors. Several technologies help IntelliTeam FMS adapt to the bandwidth available:

- **User-configurable data-collection intervals:** The frequency at which IntelliTeam FMS contacts a device for various types of data can be adjusted from seconds to days based on a utility's needs and the bandwidth available.
- **Staged Communications:** IntelliTeam FMS has the ability to communicate with only a single device at a time on each feeder. Communicating with random devices could cause bottlenecks at the head-end unit if multiple devices on a feeder are responding to requests concurrently.
- **Adaptive Communications:** IntelliTeam FMS communicates with a set number of devices concurrently for collecting various types of data, and it adapts to network-response time. If responses are delayed, then IntelliTeam FMS will not schedule new data-collection requests until the previous requests are completed.

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