



## Fault Detection and Location Solution

Cooper Power Systems OutageAdvisor uses cellular communications to minimize investment or augment the existing communications infrastructure. The OutageAdvisor solution provides utilities the ability to achieve greater reliability and reduce operation and maintenance expenses. This simple yet sophisticated solution is designed to quickly and accurately indicate permanent faults, find their location, shorten response time and improve reliability indices.

## Cellular Communications

### Sensors

The OutageAdvisor sensors utilize reliable cellular communications and field-proven sensor technology. The sensors are based on Cooper Power Systems' S.T.A.R. faulted circuit indicators that have been actively used for more than 10 years throughout the United States.

The sensors provide utilities a reliable means to locate and isolate faults and communicate a permanent fault event. This information greatly reduces the costly and time consuming fault-chasing methods that stress system components exposed to fault currents.

When the OutageAdvisor sensor detects a high rate of change of current (DI/DT) followed by a loss of current it triggers the event. After allowing sufficient time for reclosers and other line protection devices to operate, the OutageAdvisor sensor determines if current is present. If no current is found the sensor transmits the permanent fault. If current is detected, the sensor transmits a momentary outage event message.

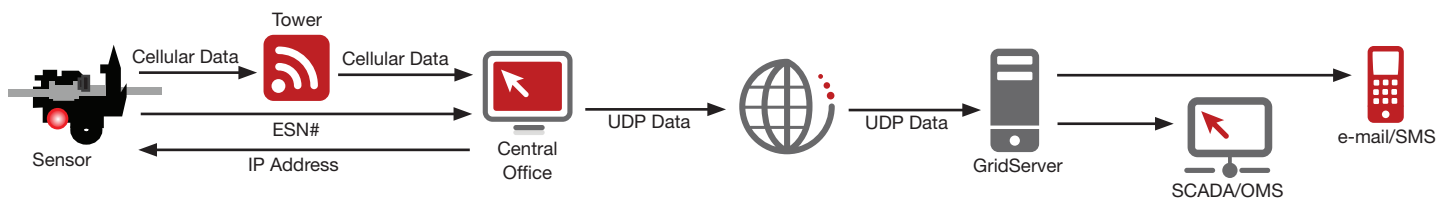
The algorithm and sensor technology are designed to prevent false positives including operations due to inrush currents and capacitive discharge current.

### Communications

The OutageAdvisor cellular solution combines field-proven equipment with an existing communications infrastructure ensuring the utility enjoys a high comfort level for service and reliability.

OutageAdvisor using cellular communications requires no customer owned infrastructure because the cellular networks are already in place. This means there is no investment in building new towers and antennas or relying on secondary-powered repeaters. This cellular technology can be used anywhere cell phones work.

Cooper Power Systems conducts comprehensive communications surveys prior to deployment to ensure the cellular network provides the required coverage. Cellular coverage depends on the carrier and allows for multiple carrier options.



The OutageAdvisor data navigation from the sensor to the end-user.

## OutageAdvisor and Cellular Communications

Quickly install the devices that use a reliable cellular network to accurately communicate system status.

### GridServer Interfaces

The GridServer and GridServer Web interfaces provide data collection from the GridServer family of field sensors with two interface options for utilities to view and manipulate OutageAdvisor data. Either interface has the capability to act as a standalone solution to view the status of deployed sensors.

Both interface options provide the following functionality:

- System Administration
- Notification
- Data Display
- Message Reception

### GridServer

The GridServer converts data from sensors into multiple protocols. It includes interfaces that work in concert with SCADA, Outage Management Systems (OMS) and other control center systems using various protocols that include DNP 3.0 and ICCC. Grid Server functions include:

- Data Routing
- Protocol Conversion

### GridServer Web

GridServer Web manages communication links to the sensors and presents the collected data via secure custom designed Web pages.

This simple yet sophisticated Web solution is designed to extend the reach of distribution SCADA and allow for increased system automation. GridServer Web can be deployed as a low cost standalone solution for smaller utilities or to test new sensor application capabilities.

### Benefits

#### Reliability

With its field proven equipment and software, the OutageAdvisor solution shortens patrol times. Crews will know the precise location of the outage and have the information they need to drive directly to the site and address the issue. This increased efficiency improves response times and increases reliability, thereby improving SAIDI and SAIFI metrics.

#### Easy Installation

OutageAdvisor is easy to install and seamlessly integrates with the enterprise system. Sensor installation requires only a single clamp stick. For most installs, cable preparation is unnecessary (UD applications may require the concentric neutral to be pulled back) and no special tools are required. This efficiency translates to savings of time and money.

#### Accuracy

The field proven sensors prevent false indications due to inrush currents and capacitive discharge current.

#### Vegetation Management

The OutageAdvisor allows utilities to quickly and accurately detect the locations of momentary faults. This information helps determine areas where vegetation management needs to occur.

#### Recloser Maintenance

Operations and maintenance dollars can be minimized if an accurate count of recloser operations is available. This is especially important for hydraulic recloser equipment.

Cooper Power Systems OutageAdvisor cellular communications to minimize infrastructure investment. It uses field proven fault indicator technology to ensure the utility can provide the highest levels of customer reliability and service.