



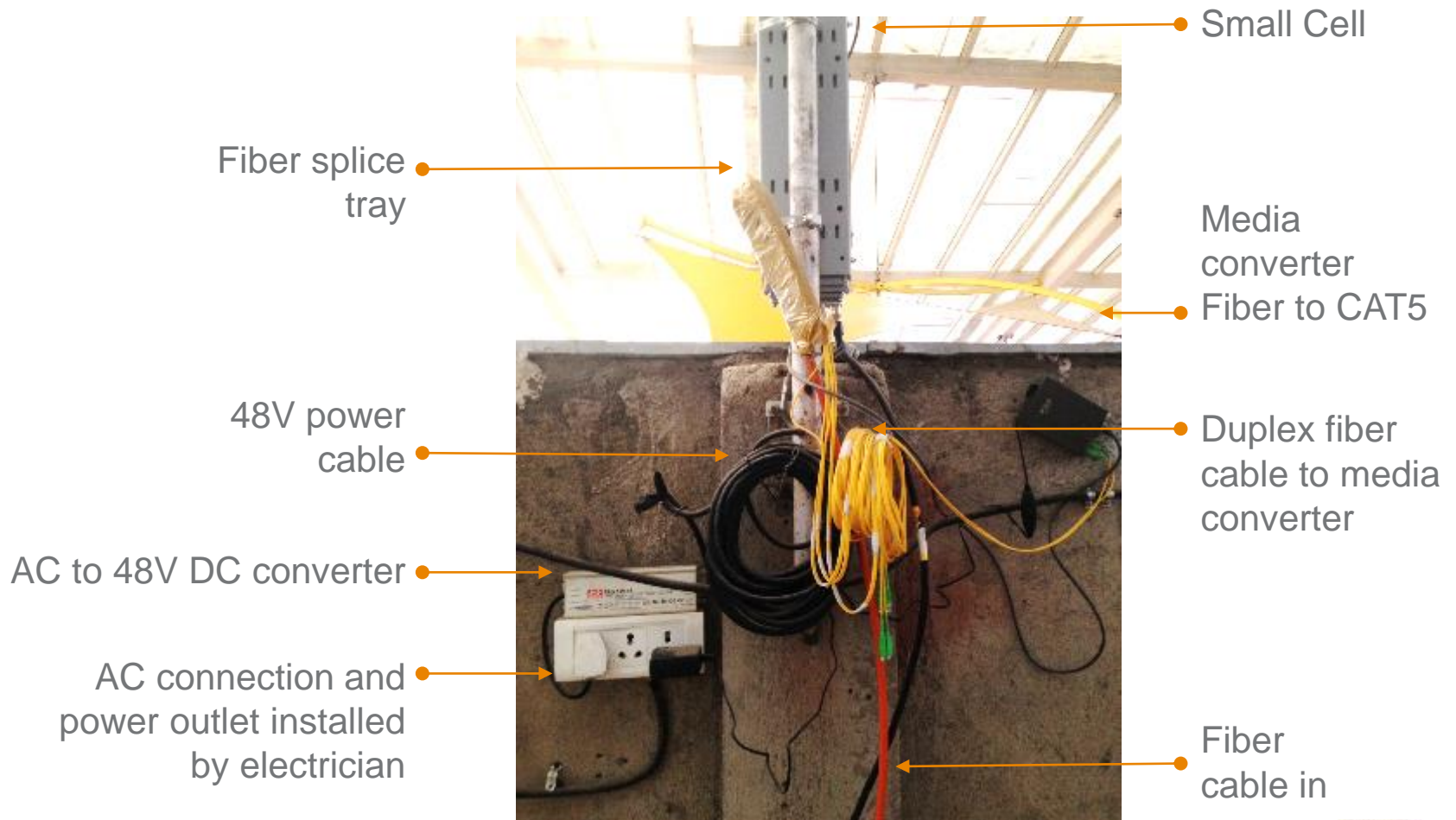
Powered Fiber Cable System

Power and Communicate with Network Access Devices Simultaneously



Fundamental Problem

POWER OVER ETHERNET (PoE, PoE+) HAS
DISTANCE, DATA RATE AND POWER LIMITATIONS



Move From Complexity to Simplicity

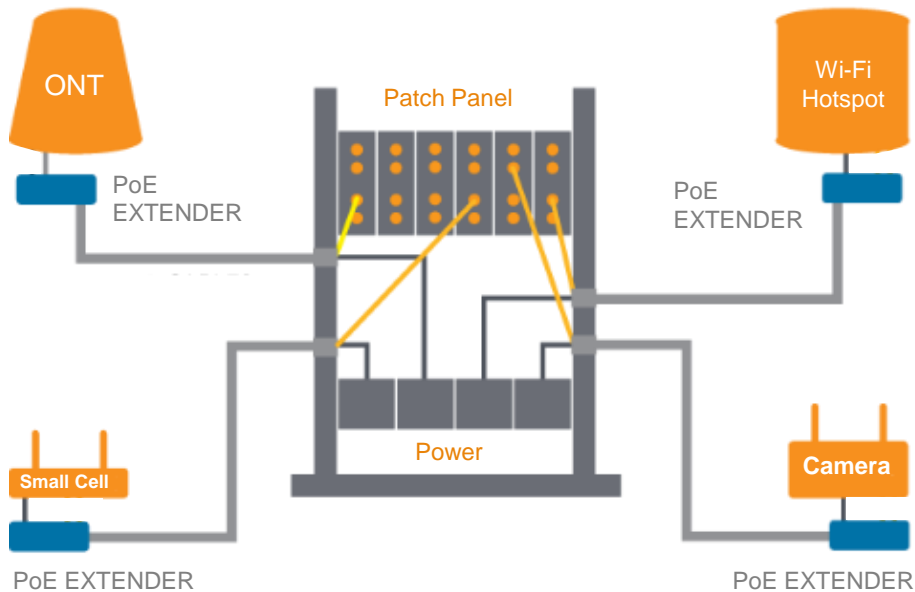
Traditionally engineered solutions are complex, expensive to implement, slow, unreliable, and require significant expertise.

A STANDARDIZED SOLUTION IS NEEDED TO ADDRESS THESE ISSUES...



TE's Powered Fiber Cable System

Complete “rack to device” solution for both powering and communicating with devices such as small cells, Wi-Fi hotspots, HD cameras, and variety of devices requiring optical communications and DC power in one system.



GOAL

A hybrid copper/fiber system that installs like a “long extension cord”

SYSTEM ELEMENTS

- Hybrid cable
- PoE Extender interface
- Cable/Fiber management
- Power supply (PSU)

Modular Hybrid Cable

UP TO 12 OPTICAL FIBERS SMF OR MMF

EXTREMELY FLEXIBLE CABLE DUE TO SPECIAL STRANDED CONDUCTORS

AVAILABLE IN 12 AWG or 16 AWG

Single “modular” hybrid copper/fiber cable design for simplified cable field access.

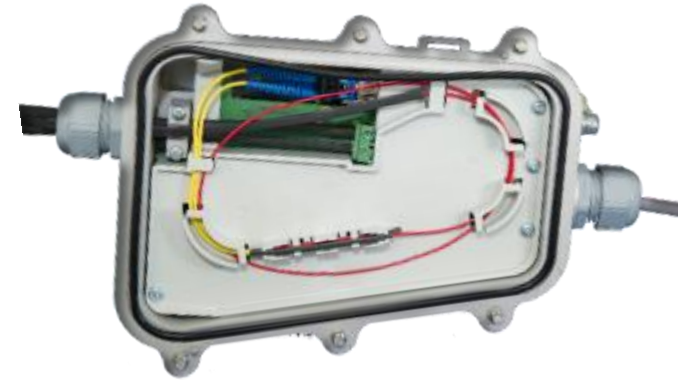
- Designed for “easy peel” access – the cable can be accessed faster than traditional hybrid cables
- No special tools needed – one ordinary wire strip tool accesses both the optical fiber and conductor elements
- Utilizes globally existing, proven and inexpensive FTTH style flat cable hardware
- Outdoor and Riser/LZSH indoor/outdoor rated versions
- Contains a ridge that allows for physical polarity identification



PoE Extender



Pole / Wall Mount Brackets



POWER MANAGEMENT

- Eliminates the need for electrical “system design” by automatically correcting for voltage drop over distance
- Optical signal and power in is converted to RJ45 PoE+ compliant jack

THREE LEVELS OF ELECTRICAL PROTECTION

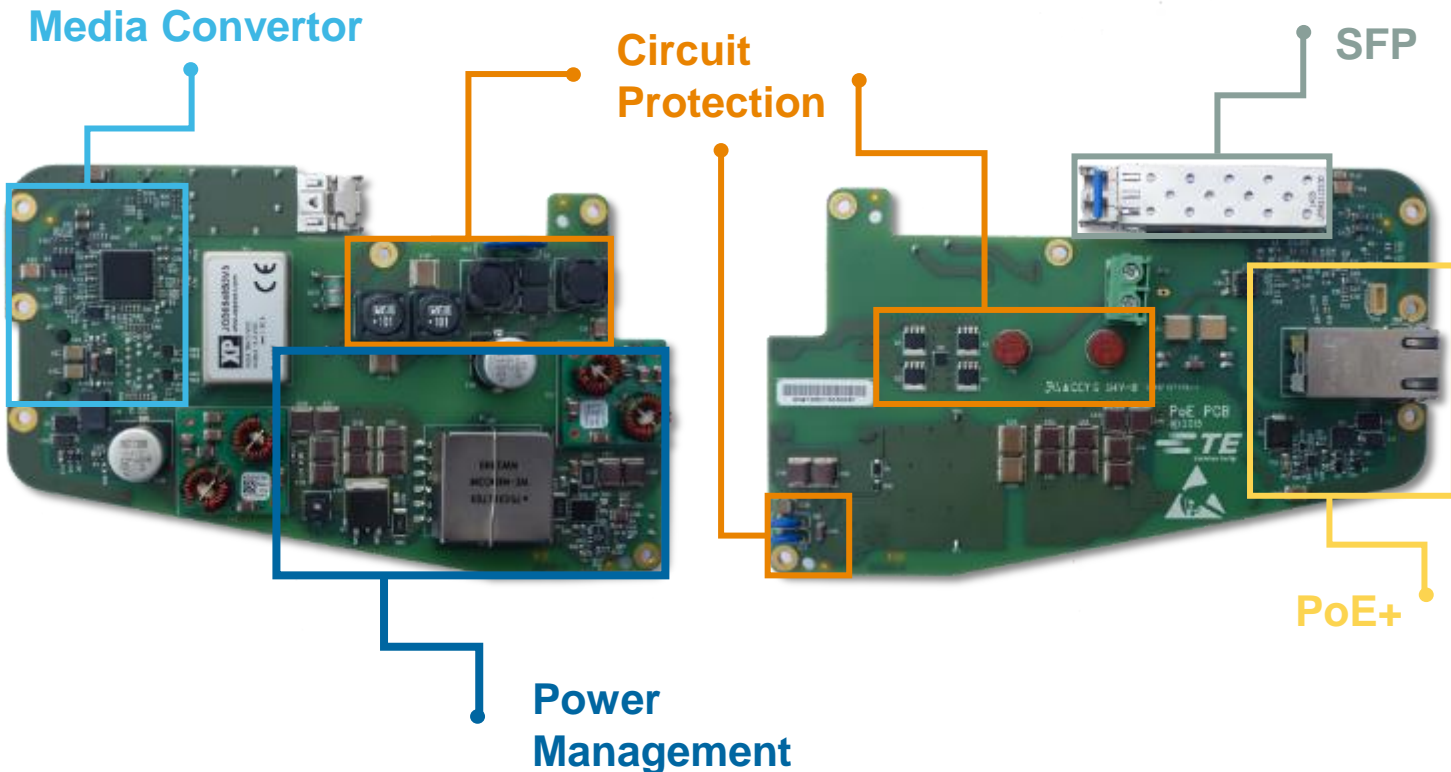
1. **Primary** - GDT component rated to 40kA surge protection
2. **Secondary** - MOV components rated to 4.5kA
3. **Tertiary** - TVS prevents the voltage from rising above 80-100V

FEATURES

- Termination for hybrid cable input
- Circuit protection electronics
- Environmentally sealed closure
- Electrical power management
- Media Conversion
- 1 PoE+ output

Solution

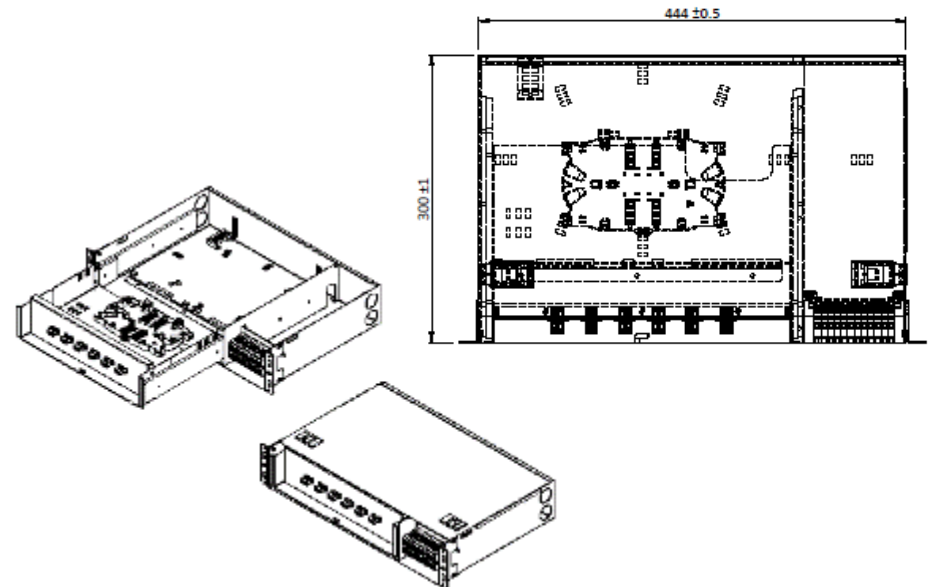
POWERED OPTICAL CABLE SYSTEM
WITH INTEGRATED POWER
MANAGEMENT AND MEDIA CONVERSION



Accessories – Combiner Panel

Allows separation and management of hybrid cable power and fiber elements at the central power supply rack location

- Fiber splice tray
- Fiber Connectors on front
- Terminal block for front access connection to PSU, circuit breakers, etc.



System Partnerships



The PoE Extender can power and communicate with any PoE+ device, however it has been designed to integrate inside the bracket which holds an Aruba Networks AP-275 Wi-Fi access point.



This allows for “hiding” the PoE Extender for demanding aesthetic situations

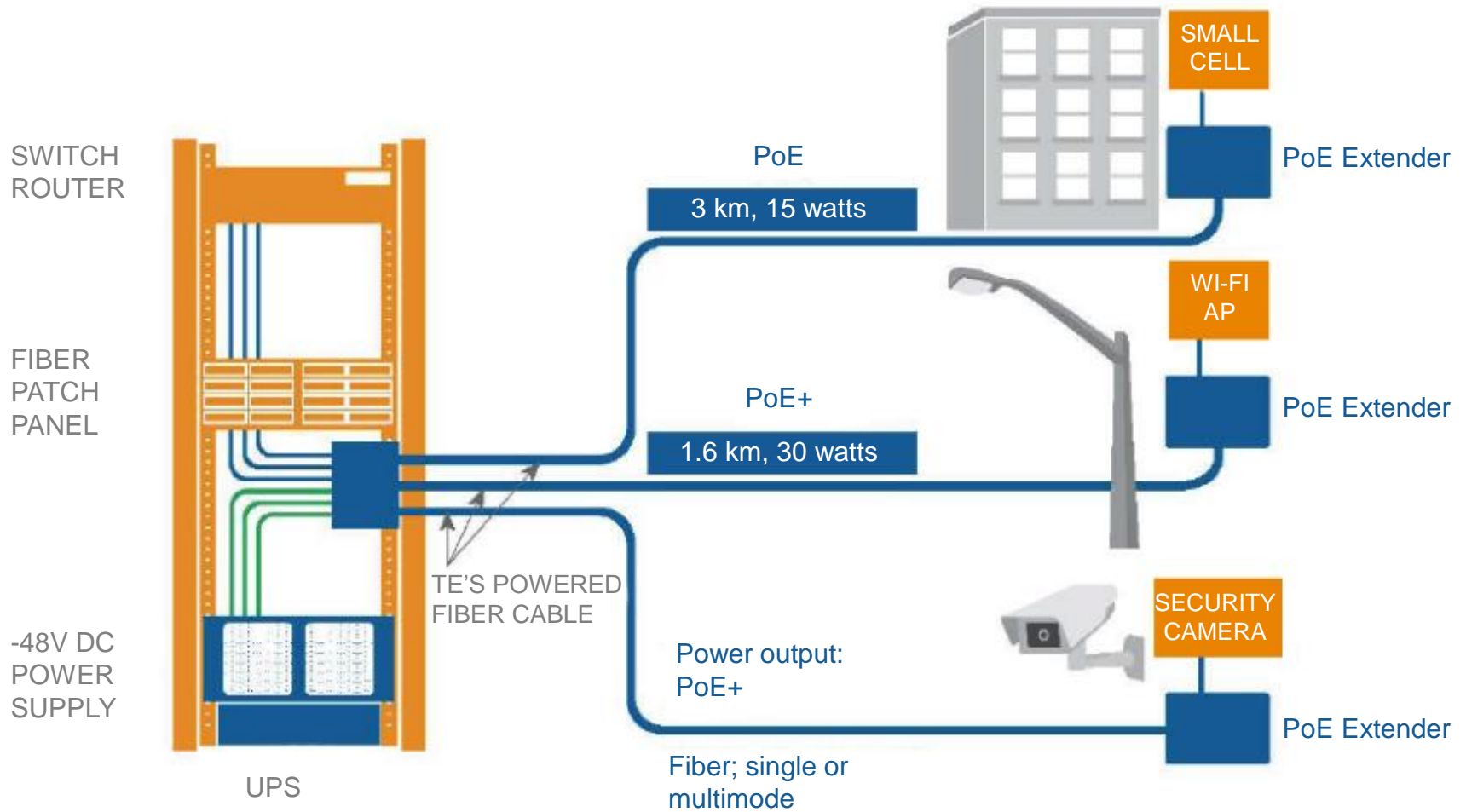


The Powered Fiber Cable System can operate from any commercially available 48VDC power supply, however when combined with the Power Express Class II shelf from GE Critical Power the maximum distance is extended to 1.6km for PoE+ (30W output), and 3km for PoE (15W output)

**System distance may be reduced with other vendor's power supply – please check with TE for specifications*

- One Power Express Class II shelf can handle up to 32 Powered Fiber Cables
- Modular in sets of 8 cables
- NEC Class II and SELV compliant

System Overview



Application

CAMPUS ENVIRONMENT

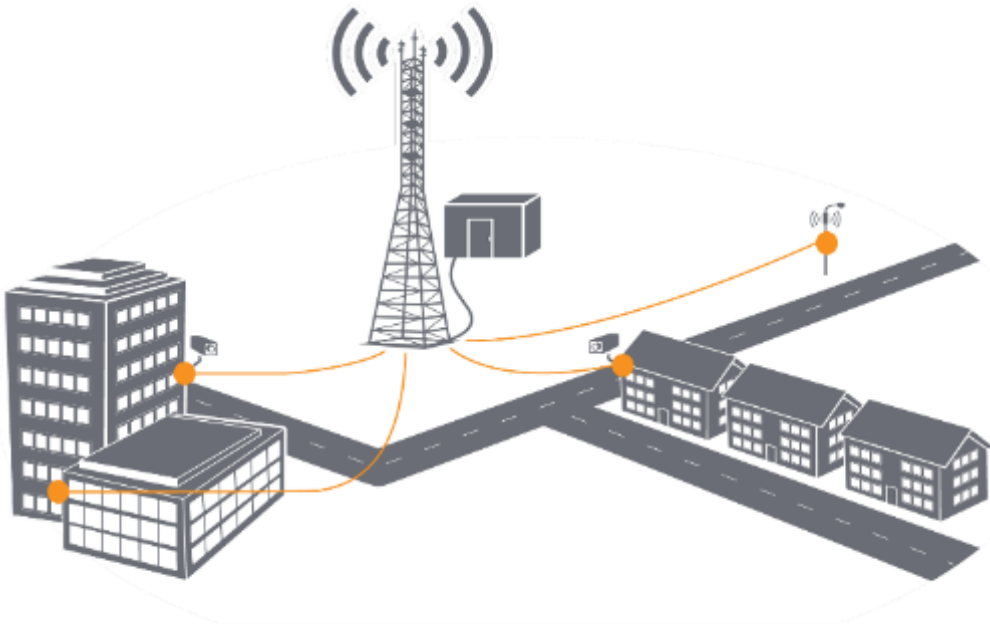
INDOOR/OUTDOOR CABLE CAN BE ROUTED INSIDE BUILDINGS AND THEN TRANSITION TO OUTSIDE AND UNDERGROUND APPLICATIONS

- Security camera(s) on lamp posts and in parking areas
- Wi-Fi hotspots for data offload
- Small cells for poor coverage areas

PSU LOCATED IN TELECOM CLOSET OR DATA CENTER, WHERE POWER AND FIBER NETWORK ARE AVAILABLE

Application

CELL SITE BASE STATION

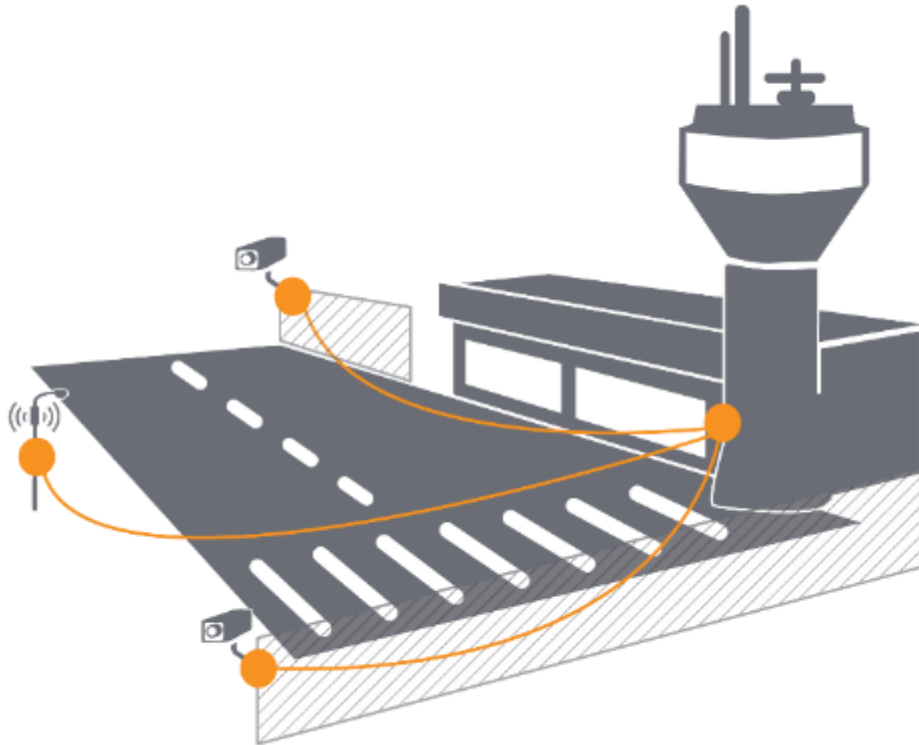


REACH TYPICAL DEVICES
SUCH AS CAMERAS,
OUTDOOR WI-FI HOTSPOTS,
SMALL CELLS

- Security camera(s) on street corners and in commercial areas
- Wi-Fi for data offload
- Small cells for poor coverage areas

PSU CO-LOCATED AT BASE STATION
WHERE POWER AND FIBER
NETWORK ARE AVAILABLE

Application



AIRPORT SURVEILLANCE CAMERAS

SYSTEM CAN ALSO SUPPORT OUTDOOR HOTSPOTS FOR AIRPORT EMPLOYEE PROPRIETARY DEVICE APPLICATION (SECURITY, DATA COLLECTION, ETC)

- PE outdoor rated cable can be direct buried, duct installed, etc.

PSU LOCATED IN TELECOM CLOSET OR DATA CENTER, WHERE POWER AND FIBER NETWORK ARE AVAILABLE

CASE STUDY

Jade Communications Inc, a leader in cabling communications systems engineering, worked with TE to design an implementation of TE's Powered Fiber Cable System for a golf course camera project.

- 36 high definition security cameras (two per hole)
- Distances up to 10,700 feet from the power source

Traditional means of running long distance AC power and separate fiber optic cables to each camera

Materials: including conduit, transformers and rectifiers at each pole, electrical protection, media conversion, etc. to connect the cameras - **\$616K**

Labor: including electrical contracting and trenching - **\$365K**

Project Cost \$981K

Utilizing TE's Powered Fiber Cable System

Total system including NEC Class II compliant power supply, Powered Fiber Cables, 36 PoE Extenders, labor and other materials including trenching, conduit, handholds, etc.

Project Cost \$839K

SAVING \$142K

14.5% over the traditional method

System Benefits

- 30x the Distance of PoE
- Reduce Landlord/Utility Negotiations
- Eliminate Local Power Sources
- Carrier Grade Electrical Protection
- Centrally Located UPS
- SELV and NEC Class II Compliant

ADDITIONALLY THE POWERED FIBER CABLE SYSTEM

- Greatly speeds up planning by eliminating DC electrical calculations for voltage/power drop over varying distances
- Handles up to 32 devices simultaneously from one power supply
- Allows placing devices exactly where they are needed to maximize coverage



POWERED FIBER CABLE SYSTEM

Simultaneously Power &
Communicate with Small Cell,
Wi-Fi Hotspots, HD Cameras &
Other Network Access Devices



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