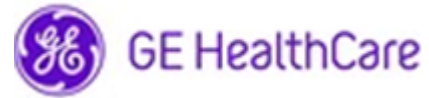




# CRITICAL INFRASTRUCTURE COMMUNICATION

Mitesh Parikh  
Product Line Leader

# GE Corporate Structure and Formation of 3 Independent Companies



- **GE HealthCare** will be the name of GE's healthcare business. Given the global prominence and established reputation of the current GE Healthcare business unit name, in addition to its trusted familiarity with billions of patients around the world, it made the most sense from both a customer and business standpoint to keep the name as-is.



- **GE Vernova** will be the name of GE's energy portfolio of renewable energy, power, and digital businesses. With "ver" conveying green and "nova" signaling a new era of reliable, affordable, and sustainable energy, this name was selected as a unifying banner under which these businesses will set out to lead the world's energy transition.

"GE Vernova, our portfolio of energy businesses"

"GE Renewable Energy, part of GE Vernova"



- **GE Aerospace** will be the name of GE's aviation business. This new name opens the aperture, expanding upon our established expertise, extensive partnerships, and commitment to customers in the aviation sector, while setting forth a confident new vision to propel a new era of possibility in aerospace.

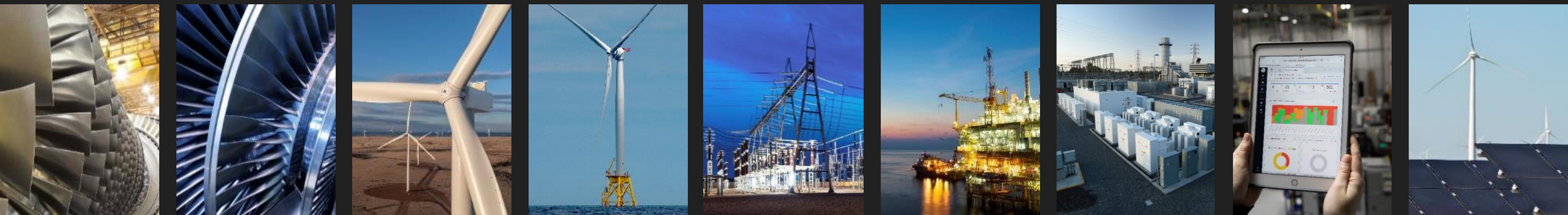


WE ARE




GE VERNOVA

Our portfolio of energy businesses



OUR CHALLENGE:

**ELECTRIFY THE WORLD  
WHILE DECARBONIZING IT**



If we act now, we can help address both the climate crisis and provide more sustainable, affordable, and reliable electricity for more people. Let's get started.

**SCOTT STRAZIK**

CEO, GE Vernova

# GE Vernova Portfolio of Businesses: **ONE-OF-A-KIND**

## POWER



### Gas Power

- Heavy Duty Gas Turbines
- Aeroderivative Gas Turbines
- Steam Turbines/Generators



### Steam Power

- US Nuclear, Global Coal
- Steam, Generators, Boilers



### Hydro

- Hydro Turbines/Generators
- Pumped Storage



### Nuclear

- Boiling Water Reactors
- Fuel
- Small Modular Reactors

## WIND



### Onshore Wind

- 2 - 3.5 MW platform
- 5 - 6 MW platform
- Services & repowering



### Offshore Wind

- Haliade-150 (6 MW)
- Haliade-X (14 MW)



### Wind Power

- ONW blades
- Haliade X blades

## ELECTRIFICATION



### Grid Solutions

- Transmission
- Transformers
- Grid Automation



### Power Conversion

- O&G Electrification
- Naval Electrification
- Microgrids



### Solar & Storage Solutions

- Inverters
- Energy storage

## DIGITAL



- Grid Software
  - Opus One Plat.
- Manufacturing
- Power and O&G

## FINANCIAL SERVICES

### Financial Services

- 3<sup>rd</sup> Party Financing Support
- Direct Financing through Equity

## ACCELERATORS

### Advanced Research

- Differentiated Technologies
- External Partnerships

### Consulting Services

- Power Market Assessments
- Investment Decision Analysis

**~80K EMPLOYEES IN 140 COUNTRIES**



## 2 focused product and technology groups:



AAA &  
Services

Advanced Automation Applications  
for REN integration, industries &  
microgrids



Substation  
Automation

Digital & conventional control  
systems, multi-functional RTUs, time  
synch, fault recorders, PMUs



Protection &  
Control

Advanced technologies for  
transmission, distribution, rail  
and industrial applications

**PAC**  
Protection,  
Automation  
& Control

**AMC**  
Asset  
Monitoring &  
Communication



Monitoring &  
Diagnostics

Wide range of asset monitoring  
devices and fleet level condition  
monitoring system



Asset Performance  
Management

Comprehensive solution for company  
wide asset performance and life cycle  
management



Critical Infrastructure  
Communication

Communication systems using switches,  
power line carrier, optical networks and  
wireless solutions

**Monitor - Protect - Control - Communicate**

# EMPOWERING GRID AUTOMATION



Where Intelligent, Resilient  
Communication Networks Drive  
Efficiency and Reliability



# Critical Infrastructure Communications

## SOLUTIONS FOR UTILITY TRANSMISSION



**Optical Networks**

**Ethernet Switches/Time Sync**

**Teleprotection**

**Power Line Carrier**

# Critical Infrastructure Communications

## SOLUTIONS FOR UTILITY DISTRIBUTION



**Wireless Routers**

**Optical Networks**

**Ethernet Switches**

**Teleprotection**

**Broadband PLC**

# Critical Infrastructure Communications (CIC)

## Portfolio of Solutions

### WIRELESS

#### Orbit Platform



Orbit MCR



Orbit OCR



Cellular Base & Core



Orbit ECR



Master Station

#### IoT Platform



TransNEXT



SD

### OPTICAL & NETWORKING

#### JPAX & JPAX-H



#### DXC & eDXC



#### Switches & GPS Sync



### TELEPROTECTION, SIGNALING

#### Power Line Carriers



#### DIP.net Teleprotection



### EMS & NMS

Offering Intelligent, Resilient Communication Networks That Drive Efficiency and Reliability

# CIC Sites



**Burnaby**

Optical-R&D

**Markham**

Optical- Manufacturing

**Rochester**

Wireless-R&D/Manufacturing

**Florianopolis**

Switches-R&D/Manufacturing

**Stafford**

Teleprotection-Manufacturing

**Massy**

PLC, Teleprotection-R&D

**Hyderabad**

NMS-Sentinel-R&D

# **BROADBAND PLC INSIDE MDS ORBIT**

# Why Broadband PLC?

Support multiple real time applications



Broadband

Cost efficient, Fast deployment with lower infrastructure costs



No heavy works (wires and trenches)  
No upfront investment (towers)

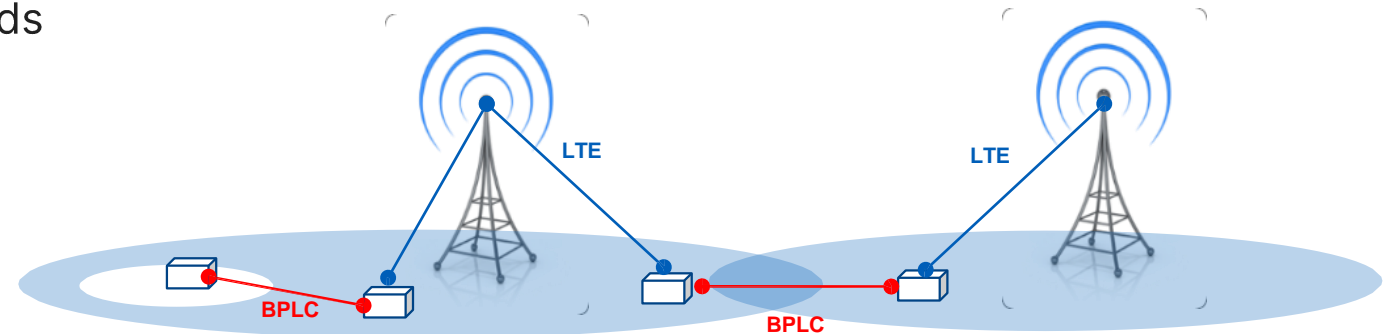
Full control on coverage, availability and QoS



Private

Where cellular is predominant or default choice, BPLC can still complement to improve network:

- Coverage by providing extensions to cellular connections
- Availability/resilience by creating back feeds



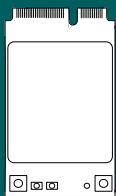
# MDS Orbit PowerNet

Medium and Low Voltage Powerline Communications

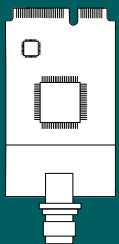


## MDS Orbit platform

Same admin, networking and cyber sec features



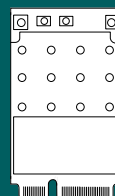
Cell



VHF/UHF  
Licensed



VHF/UHF  
Unlicensed



WiFi



Nessum  
BPL

### Flexible

- Long Haul Broadband Wireline solution
- Communicate over Medium & Low Voltage Power Lines - new BPL generation
- Re-use existing Copper pairs / pilot wires - replacement for DSL
- Large topology up to 1024 nodes and 10 hops.
- Automatic routing protocol
- Native Ethernet support & Serial conversion

### Reliable

- Self forming and self healing networks
- IEEE 1901 Compliant
- IEEE 61850.3

### Secure

- AES128 encryption
- Centrally controlled network registration
- Enterprise-class Cyber Security

**Only product with PLC, Cell, and  
proprietary Licensed Radio**

# Medium Voltage backbone

## MV Grid Automation:

- Fault detection
- RMU/recloser control

## LV monitoring:

- Load balance
- Power quality

## Substation Environment:

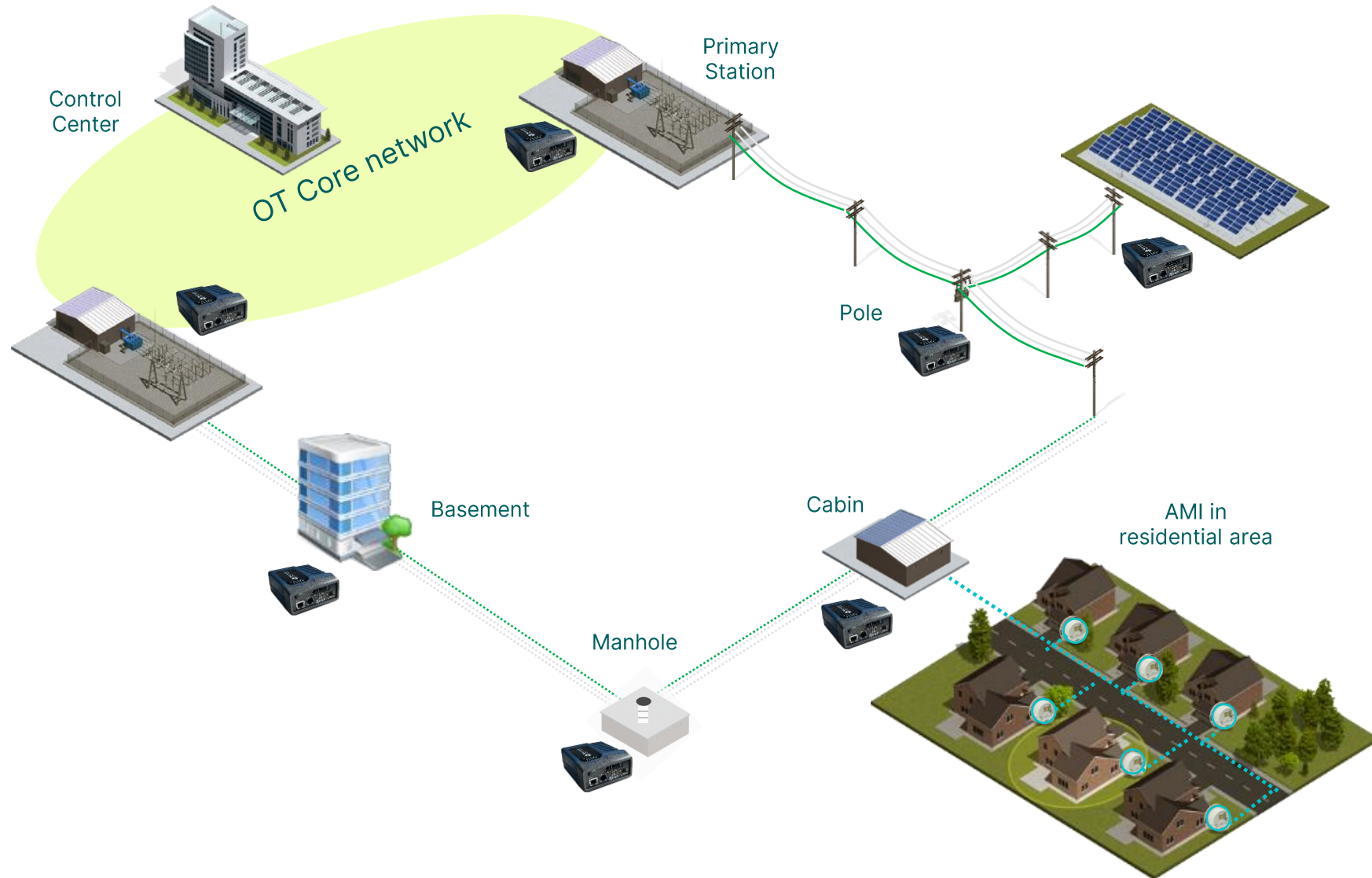
- flood/gas detection
- door alarm

## Metering:

- Backhauling of AMI gateways
- Real time industrial meter reading

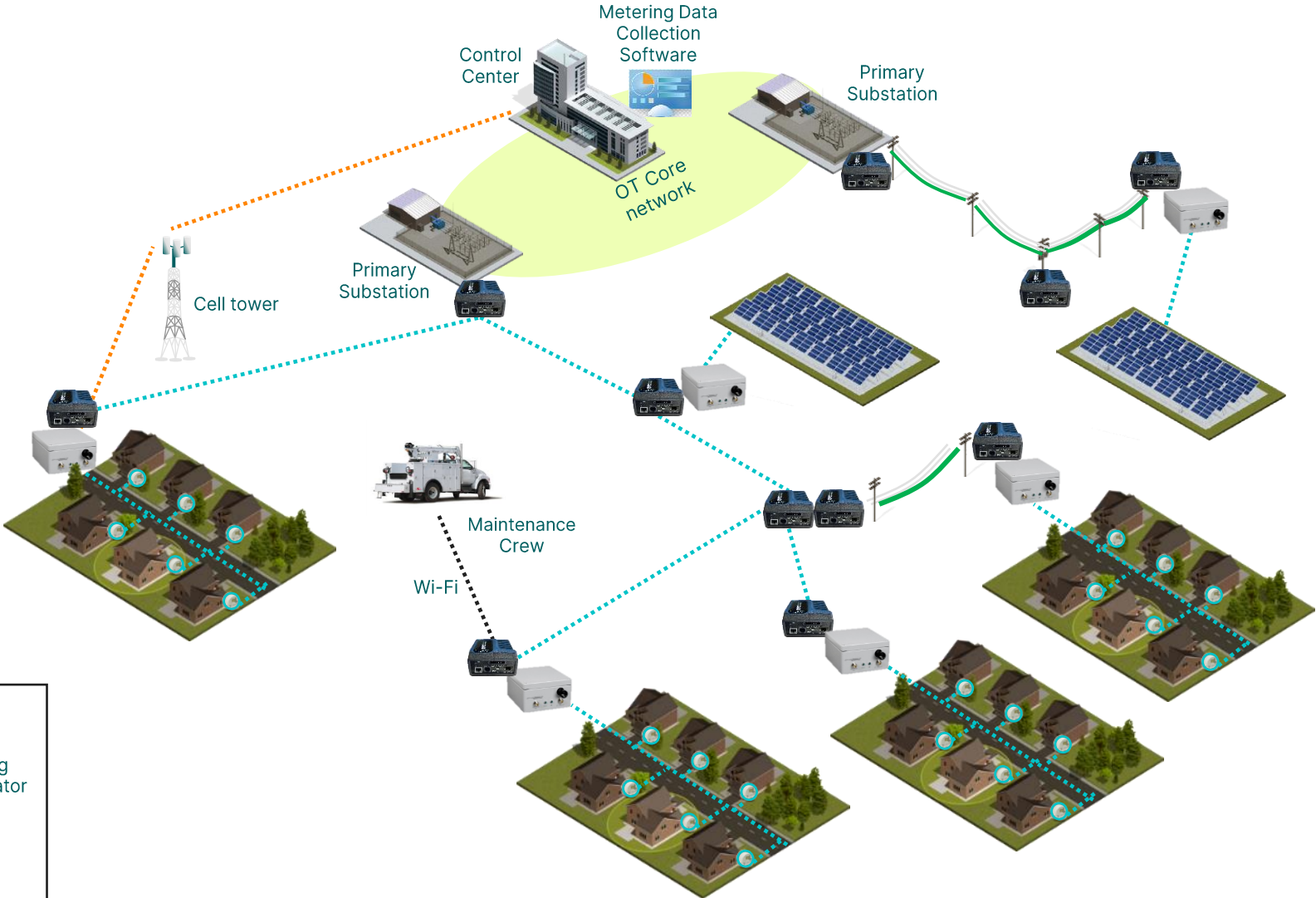
## IT services:

- OT corp network access
- VoIP





# AMI Backhaul Solutions with Orbit Routers

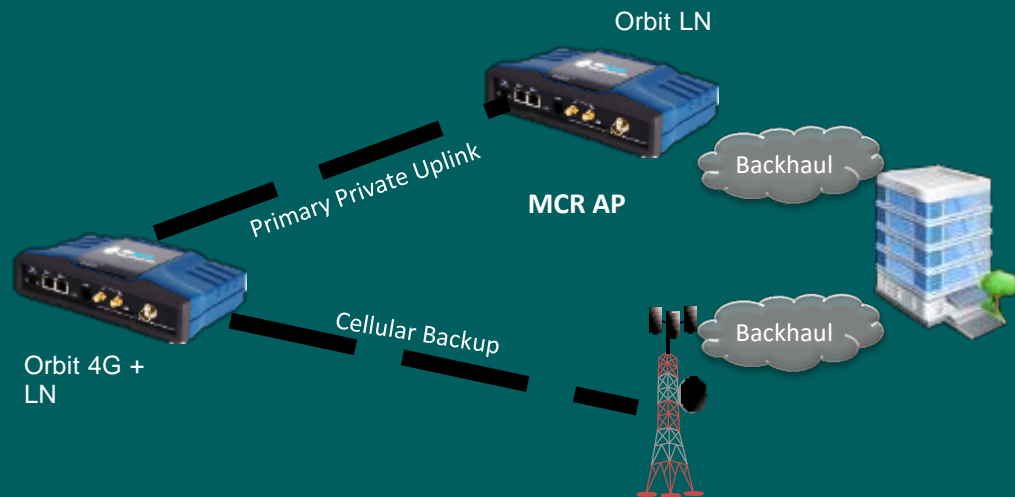


**Legend**

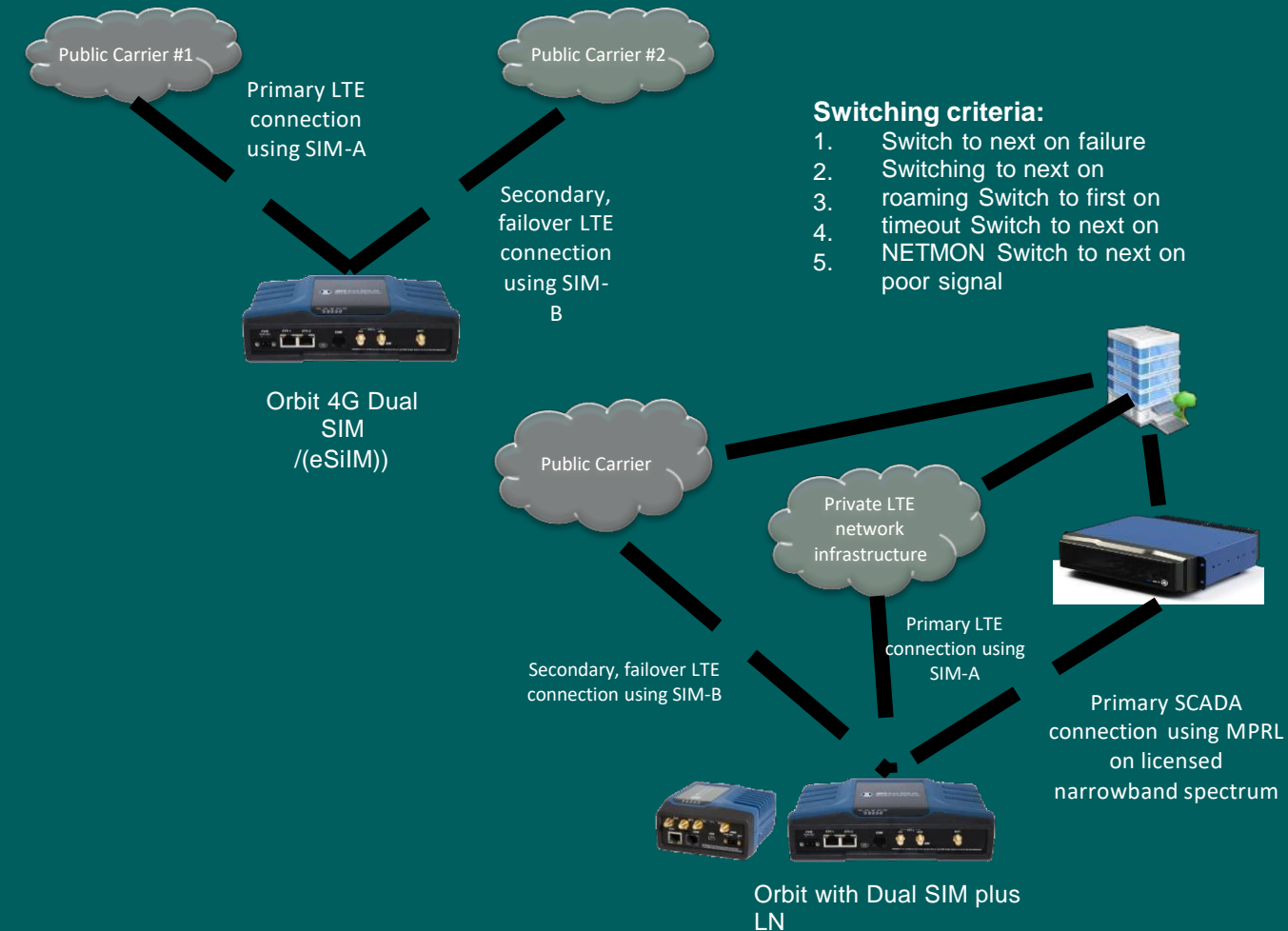
- Wireless Unlicensed (Cyan dotted line)
- LTE (Orange dotted line)
- MV Power line (Green solid line)
- Metering Concentrator (White device icon)
- Orbit Router (Blue device icon)

# Multiple Redundancy Configurations – Without BPL

Orbit with LTE and UHF/VHF connections for Private – Public or Private – Private backup options



Orbit DUAL SIM Redundancy configuration – Private LTE + Public LTE backup option

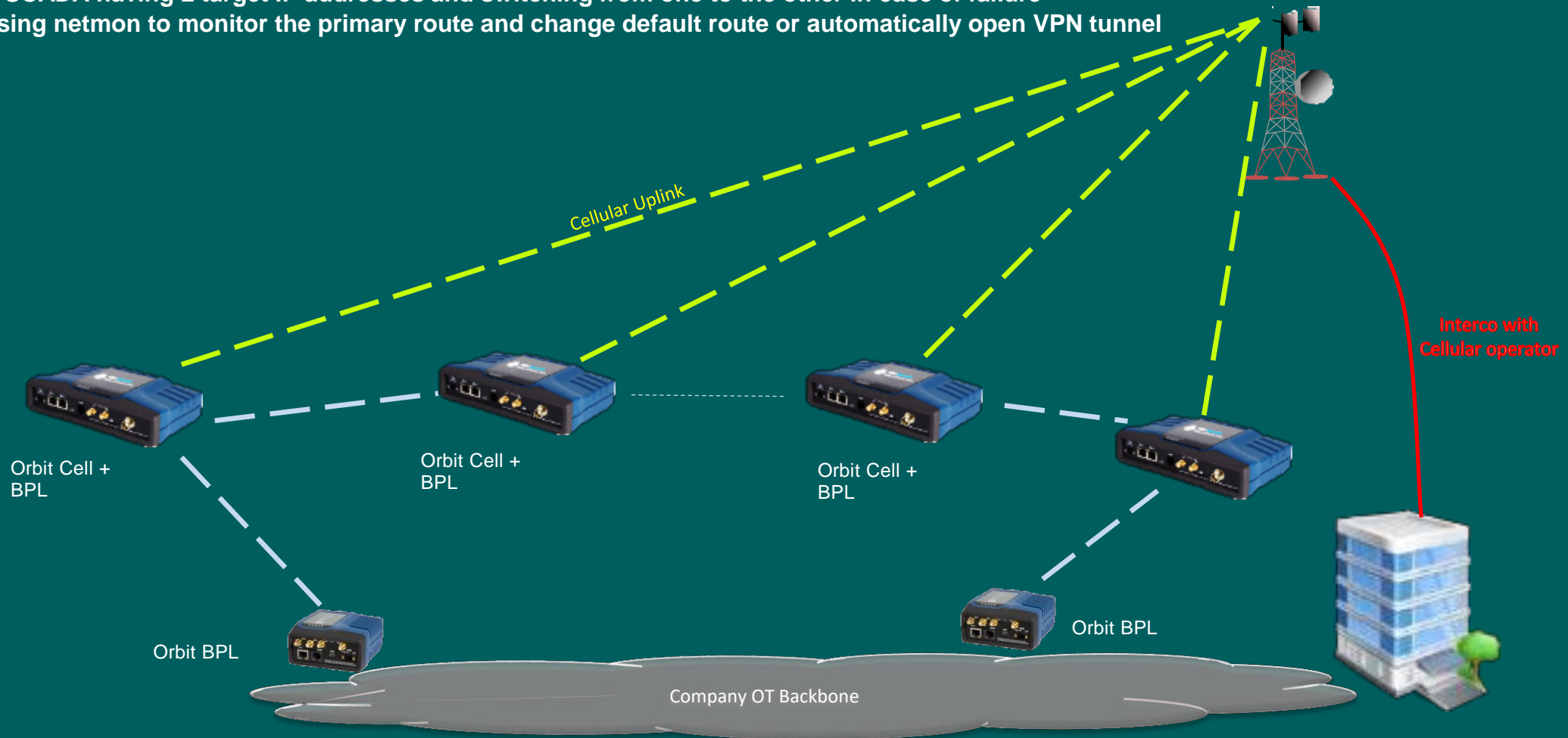


# Cell + BPL redundancy

Every Intermediate Orbit maintain simultaneously a cellular connection and a BPL connection to the control center

Failover mechanism can be handled by:

- the IEC104 SCADA having 2 target IP addresses and switching from one to the other in case of failure
- the Orbit using netmon to monitor the primary route and change default route or automatically open VPN tunnel





GE VERNOVA