Utility Technology Forum
February 11 – 14, 2019
Silver Legacy, Reno, NV

Agenda

Monday, February 11th

5:00 – 7:00PM **Welcome Reception – Rum Bullion's Patio – Lobby Level**

Tuesday, February 12th

7:00AM **Registration & Breakfast**

8:00 – 8:15AM **Welcome Remarks**

8:15 - 9:15AM **IEEE 802.16s – A Standard Built for Mission Critical Communications**

This session will provide an introduction and technical presentation of the newly released IEEE 802.12s standard. IEEE 802.16s i. The idea for the standard was first introduced at the UTC annual meeting in Atlanta in 2015 and after over two years of joint work and collaboration on the standard, it was ratified and published by IEEE in October 2017. It is a technology which provides a standard wireless technology solution for utilities and other critical infrastructure entities in any frequency band in channel sizes between 100 kHz up to 1.25 MHz.

Speaker: **Kathy Nelson, Director of Technical Product Marketing and Industry Relations – Ondas Networks**

9:15 – 9:30AM **Networking Break**

9:30 – 10:30AM **Can SCADA and other critical data traffic safely use unlicensed or regulated unlicensed spectrum?**

Much has been made of the need for licensed broadband spectrum to support utility OT network needs, but licensed spectrum is scarce, and the FCC has long declined to make a specific allocation for utility use stating that utilities should either participate in the secondary spectrum market or utility unlicensed or lightly licensed bands. Some vendors have come forward to sell wideband spectrum with very limited potential data rates that may not scale in the long term, and other vendors have partnered with carriers to provide leased spectrum with their equipment offerings. However, are these expensive offerings really all there is that can support critical data traffic, or can a utility successfully use unlicensed or regulated bands for their critical data requirements? Several utilities are doing just this and are having great success with it, enjoying data rates that can't be matched by any licensed offering at cost points that are far below the existing licensed spectrum options.

Join RAD while they discuss the results from deployments of a secure, future proof 750 mb/s private broadband wireless system replacing their WiMAX network, the success of that implementation to date, and how other utilities can successfully deploy their own high speed private wireless network that provides security and guaranteed availability without incurring the overhead costs of licensed spectrum.

Speakers:	**Mark Madden, Director of Business Development, Critical Infrastructure, North America – RAD** **Doug McGinnis, Principal Consultant – Red Rose Tele.com**
10:30AM – 11:30AM	**State of the Union Utility Presentations**
11:30AM – 12:45PM	**Networking Lunch – Silver Baron Ballroom on lobby level**
12:45 – 2:45PM	**R56 Standards and Guidelines for Communication Sites**

This presentation covers the highlights of the R56 Standard that provides guidelines for constructing any RF communications site. The standard covers site development, building design and installation, grounding, power sources, surge protection and many other critical design factors. Special emphasis will be on safety, equipment survivability and Common Grounding (Earthing), including the various buss bars and how they should be installed, interconnected and what connects to them. There will also be a discussion on why the original Halo Grounding is no longer appropriate.

Speaker:	**Shane Morris, Senior System Support Manager – Motorola Solutions**
2:45 – 3:00PM	**Networking Break**
3:00 – 4:00PM	**Why Current Differential Relaying is the most demanding critical application and the secrets of doing it right over a packet network**

Teleprotection poses a significant challenge due to stringent latency requirements and the less know very tight asymmetrical delay requirements for Current Differential Relaying as utilities modernize telecommunications infrastructure and migrate to packet-based networks.

This session focuses on the specific challenges of engineering packet-based systems to support teleprotection, and details the problems posed by tight latency, delay asymmetry as well as the specific implications for network design. The presenter will share techniques and engineering rules to guarantee on-time delivery of teleprotection traffic as compared to a TDM transport network as well as key insights to keep asymmetrical delay under the required specifications from various Relay vendors.

Nearly two decades ago, utilities migrated from Analog Frequency Division Multiplexing (FDM) to Digital Time Division Multiplexing (TDM). Those technologies were designed for telephony and they were inherently deterministic and therefore well suited for time

sensitive critical communication for the power system. The next migration is towards Packet Networks, while it is capable to move a massive amount of data at the speed of light, it is based on statistical multiplexing and therefore inherently nondeterministic. Once again, utilities face a migration challenge for their time-sensitive most critical applications. While there is no silver bullet, we will go over the required techniques and the engineering rules to guarantee on-time delivery and the far more difficult issue of delay asymmetry for teleprotection traffic over a packet network.

We will also provide an insight into a more distant future where teleprotection traffic as Current Differential Relaying is done via Ethernet 61850 supported with 1588 PTP precision timing.

The audience will be surprised to see that while some of the constraints will be relaxed for the relay application, they are still required to support precision timing distribution over the network.

Speaker: **Bernard Brault, Power Utility Sales Director – OTN Systems**

4:00 – 7:00PM **Exhibit Hall Grand Opening Reception**

Wednesday, February 13th

7:00AM **Registration & Breakfast**

8:00 – 10:00AM **UTC Training: Designing Wireless Networks for Field Area Networks (FAN)**

Designing and maintaining Field Area Networks is a significant challenge for utilities. Application latency parameters, ever-increasing data payloads, limitations of spectrum, foliated terrain, antenna placement, and multi-pathing create the need for a prescription, programmatic approach for all phases of network design, installation, and maintenance. Within this training, a comprehensive review of the above challenges and their impact on radio network design methodology will be presented enabling the utility to more effectively build a radio network which will deliver the required performance for utility applications.

Speaker: **Keith Woodall, Communications Architect – S&C Electric Company**

10:00 – 10:15AM **Networking Break**

10:15 – 11:15AM **Individual Regional Meetings**

11:15AM – 12:00PM **Combined Regional Meeting**

12:00 – 2:00PM **Networking lunch & Exclusive Exhibit Time**

2:00 – 3:00PM	**UTC Leadership Address**
Speaker:	**Roger Bryant, UTC Chairman of the Board/Southern Company**
3:00 – 4:00PM	**Federal Advocacy Update**
Speaker:	**Klaus Bender, VP of Engineering, Training & Standards - UTC**
4:00 – 5:00PM	**Utility Case Study: NERC CIP Low Impact Substation and Generation Facilities for Cyber Security**

Presentation would cover a case study on the engineering design, installation, and procedures developed for the NERC Low Impact requirements and the lessons learned in the design, installation, and procedure developed for the NERC Low Impact requirements and the lessons learned in the design, installation, and procedure phases.

Speaker:	**Matt Schnell, ITT Telecommunications Manager – Nebraska Public Power District , UTC Past Chairman**
5:30 – 7:00PM	**Gaming Happy Hour – Silver Baron Ballroom on Lobby Level**

Thursday, February 14th

7:00AM	**Registration & Breakfast**
8:00 – 9:00AM	**Setting realistic throughput requirements in narrowband RF channels**

As there are several equipment manufacturers who now build wireless equipment for use in the licensed VHF, 220, UHF, 700 and 900 MHz bands with capability to support very narrow (12.5 KHz) up to wide (100 KHz) channels the utility telecommunications engineer needs to understand what is reasonably achievable for services and protocols.

We will review the traditional services such a substation SCADA and distribution-automation while also including expanded requirements such as AMI-backhaul, VOIP, Ethernet-based protocols like IEC61850 and challenging requirements such as protective-relaying or corporate LAN extension.

In our presentation we will demonstrate the use of a spreadsheet-based tool for calculating loading and discuss the challenges of estimating capacity, growth factors and network utilization. We will provide a basic outline of QOS (quality of service), in band and out of band management and the demands of network management (SNMP, logfiles, firmware updates and device administration).

Speaker:	**Tisha Hayes, Senior Engineer – 4RF**
9:00 – 10:00AM	**Substation Communications IP Migration Roadmap and Case Studies**

When it comes to technology, power utilities in general have never been on the bleeding edge of technologies, especially when it comes to operational technology (OT). Power utilities, being a mission-critical infrastructure, require a high level of reliability and dependability with the hardware and software that is used to operate and protect the power grid. Therefore, they rely on mature technologies and do not constantly change technologies if the current mature technology performs the monitoring and/or the control of the physical devices with some degree of reliability. Because of the critical nature of power utilities operational infrastructure, when it comes to opera ting and protecting the power grid, they are typically 15-20 years behind current technologies. Therefore, as the current technology that is being used is phasing out or becoming obsolete, power utilities always find themselves "between a rock and a hard place", looking for a path forward to migrate from the old infrastructure to the new infrastructure with minimal operational impact, and assured comparable security and high reliability for their existing mission-critical applications.

As substation communications networks migrate away from the traditional Time Division Multiplexing (TDM) technology to packet-based technology, many engineers and technicians do not have a good understanding of what is involved when it comes to substation communications IP Migration. Understanding the IP Migration Roadmap is essential to a successful transition and making sure that all your substation services continue to operate safely, reliably and securely, both during, and after the migration.

This presentation provides an overview of the IP migration roadmap for substation communications. It addresses the need to understand the challenges, the advantages and the benefits of migrating to a packet-based infrastructure. It also addresses the two most-important concerns when it comes to IP Migration: Reliability and Security. It explores several solutions that are either comparable or exceed the industry standard of reliability for mission-critical infrastructure. Finally, the presentation offers one or two successful case studies of substation communications IP Migration.

Speaker	**Manny Duvelson, Communications Product Marketing Director – RFL/Hubbell Power Systems**
10:00 – 10:15AM	**Networking Break**
10:15 – 11:15AM	**Migration of Teleprotection to IP/MPLS**

This informative session will discuss the use of Hybrid Microwave Radios and MPLS Routers to achieve a seamless migration of synchronous relays and teleprotection circuits to IP. This presentation will discuss strategies to de-risk the migration of critical traffic to IP/MPLS, allowing utilities to use their existing, proven, relay technologies while leveraging the efficiency of packet networking without an "all or nothing" leap of faith.

The session will detail the implementation of an integrated IP/MPLS network across the entire utility infrastructure of fiber and microwave connected sites for lowest cost, optimum manageability, and seamless migration of critical traffic.

Speaker: **Said Jilani, Solutions Architect – Aviat Networks**

11:15AM – 12:15PM **How advancements in radio technology are changing the way utilities think about Field Area Networks**

Several new advancements in wireless communications are having a major impact on the approach utilities are taking for the Field Area Network (FAN) when modernizing their grid. Key topics of this presentation include:

- The latest technology advancements that are changing the way utilities think about Field Area Networks to support SCADA, DA, DER, Teleprotection…and more.
- How the 2014 UTC/EPRI application model has changed over the past 5 years – and it's impact on FAN technology selection.
- A case study and discussion on why licensed narrowband technology has become the platform of choice by utilities for the Field Area Network

Speakers: **Paul Reid, General Manager North America – MiMOMax**
Tony Lindsey, Manager of IT -
Navopache Electric Cooperative, Inc.

12:15 – 12:45PM **Roundtable Discussion, Prize Drawings & Wrap Up**