



2025 New Mexico TechFest

Speaker Bios and Presentation Abstracts

(Rev. February 7, 2025)

Presentations

Is Tropospheric Ducting a Myth?

by Mike Hasselbeck WB2FKO (High Springs, Florida)

Presentation Abstract:

Radio wave propagation in the troposphere is rigorously analyzed using the principles of physical optics. Waveguide-like ducts are often used to explain anomalous, extreme DX paths that sometimes occur at VHF+ frequencies. Limitations imposed by the refraction of electromagnetic waves in air, however, make this picture entirely implausible. Scattering by the turbulent mixing of warm and cool air masses is proposed as an alternative, more realistic explanation.

Speaker Bio:

Mike Hasselbeck WB2FKO was first licensed as WN2FKO in 1976 in Tonawanda, NY, a suburb of Buffalo. He obtained a BS and MS from the University of Buffalo and a PhD from the University of Central Florida, all in Electrical Engineering. His career includes positions in the aerospace-defense industry, domestic and European research labs, startups, consulting, and academia. He retired from the Department of Physics and Astronomy at UNM in 2019 and relocated to High Springs, FL where he has a startup company that is developing sensor technology for the Internet of Things. His amateur radio interests are VHF weak signal communication and contesting.

A Technical Overview of the NanoVNA: Where it Came From, How it Works and What You Can Do With It

by Larry Goga AE5CZ (Albuquerque, New Mexico)

Presentation Abstract:

The nanoVNA, in one form or another, has now been available for over 5 years and it continues to be developed and to find new uses in the Amateur Radio Community. This presentation will be in three parts.

- Part 1 will present a brief history of the development of the device.
- Part 2 will provide a review of how the unit works and its similarities to other Software Defined Radio (SDR) devices.

- Part 3 will conclude with a discussion of the effects that this device is having on the teaching of Electrical Engineering at the college level as well as a preview of the various demonstrations that will be available throughout the day at the NanoVNA Demo Table.

Speaker Bio:

Larry Goga AE5CZ was first licensed in 2007. He relocated to Albuquerque from Los Angeles, CA in 1998, where he worked in the Motion Picture industry for over 25 years including time spent with Skywalker Sound and 20th Century Fox. He was recently the President of the Duke City Hamfest Planning Committee for the 2024 event. Now retired, Larry uses his time and his nanoVNA to learn the intricacies of modern RF Technology.

Amateur Radio Hotspots - Not just for DMR

by Michael Lozano KØNGA (Aurora, Colorado)

Presentation Abstract:

This presentation will review the various types and capabilities of available amateur radio hotspots and their capabilities, including supported cross-protocol support. Demonstrations will also be provided!

Speaker Bio:

A relative newcomer to Amateur Radio, Michael Lozano KØNGA has been licensed since 2008. As a member of Rocky Mountain Ham Radio, Michael mainly focuses on amateur radio DMR utilization where he maintains many of the DMR sample codeplugs. Michael can be heard as the net control of the RMHAM TRBO Tech Net on the first Saturday of every month at 7:00 PM on the Rocky Mountain talk group.

Getting Started with LoRa APRS

by Steve Barks W5RRX (Las Cruces, New Mexico)

Presentation Abstract:

This presentation aims to provide an exploration of LoRa APRS, a low-power, long-range communication protocol that leverages the LoRa modulation technique to transmit APRS data.

The talk will be divided into three key sections.

1. Introduction to LoRa APRS: The presentation will begin with an overview of LoRa APRS by covering its core principles, benefits, and applications. LoRa APRS is suitable for a myriad of applications ranging from personal tracking, messaging and remote sensor monitoring.

2. **Technical Insights and Applications:** Following the introduction, the presentation will delve into some of the technical aspects of LoRa APRS to include: the architecture, frequency bands, and modulation techniques employed in this system. Emphasis will be placed on understanding how the combination of LoRa and APRS can result in a highly efficient and reliable communication system
3. **Getting Started with LoRa APRS:** The final section is dedicated to guiding participants on how to embark on their journey with LoRa APRS. Details will be provided on selecting the right hardware, setting up the software, and configuring the system for optimal performance.

At the end of the presentation, attendees will possess a basic understanding of LoRa APRS and the necessary knowledge to implement their own LoRa APRS projects. This session is designed to be both informative and practical, catering to amateur radio enthusiasts who wish to explore the potential of this innovative technology.

Speaker Bio:

Steve Barkes W5RRX served 6 years in the US Navy and received his Bachelor of Science degree in Computer Science from the University of West Florida in Pensacola in 1982. Over the years he worked as a software programmer and database engineer for Harris Corporation, Contel, GTE, USinternetworking and New Mexico State University.

While working at NMSU, Steve received his master's degree in business administration in 1995, and a Bachelor of Science degree in Physics in 2021. He retired from NMSU in June of 2021. Steve first became licensed as KG5RRX in 2019 and went on to obtain his General and Extra class licenses over the next 3 years. He then obtained his vanity call sign, W5RRX.

Steve enjoys SSB operations, contesting (especially during the New Mexico QSO party), kit building, and supporting the MVRC Builders group when he's not on the golf course at NMSU or enjoying the dark skies of New Mexico with his many telescopes.

Through-the-Earth Texting and Digital Sensor Data Communications in a New Mexico Cave

by John Lyles K5PRO (Los Alamos, New Mexico)

Presentation Abstract:

Fort Stanton Cave in Lincoln County is the second longest cave in New Mexico, and the 9th longest in the country. Exploration since last winter increased the length by over 7 miles, to 51.7 explored miles and there is no end yet. Camps were established in multiple locations, reached after 10 hours of hiking, crawling and climbing from the single cave entrance. Cavers exploring and mapping spend up to 4 days underground while being unable to communicate with the surface support team. There is considerable interest by the cavers and the Bureau of Land Management to find a solution, to assist in case of injury, for emergencies or warnings of

potential flooding. Previous testing using PSK-31 on 30 meters with a tuned dipole on the surface and a tuned loop underground, was partially successful, but failed between 100 and 195 feet of bedrock. Over the past year US and Canadian hams tested a new direct-digital radio, modified for 2200 meter band from the QDX-M monoband 5 watt SDR transceiver from QRP Labs. It is matched to a low frequency magnetic field loop, and text is handled by a smartphone app with FSK modems such as Thor4 and Olivia 4-125. Experiments with the new hardware are underway and prototype equipment will be shown. A second topic is the operational results from our quasi-real time water sensor network using unlicensed UHF radio transceivers. Near line-of-sight 915 MHz links in the same cave use 10 milliwatts of transmitted power at 110 kbps data rate. The 26 transceivers started operating autonomously in May of last year, and have been sending data to the cloud every 30 minutes. This work is sponsored by the Fort Stanton Cave Study Project and the BLM.

Speaker Bio:

John Lyles K5PRO was first licensed in 1971 (WB4PRO). He has been a designer of high-power RF Amplifiers, transmitters and instrumentation for radio broadcast, industrial and scientific applications for 45 years. He joined Los Alamos National Laboratory in 1992 to develop kW to MW-level HF and VHF amplifier systems for LANSCE, a large proton accelerator facility. Besides experimenting with through-the-earth communications and ham radio, his other hobby is cave exploration, where he has helped find and map miles of new cave passages under New Mexico.

RMHAM Multi-State 5 GHz Microwave Network: A Realtime demonstration of its Functionality and Capabilities

by Ed James KA8JMW (Edgewood, New Mexico) and Brian Mileschosky N5ZGT (Albuquerque, New Mexico)

Presentation Abstract:

Rocky Mountain Ham Radio (RMHAM) has designed, built, and operates a fully-managed IP-based 5-GHz amateur radio microwave backbone network spanning Cheyenne, Wyoming down to Belen, New Mexico and across Colorado's western slope. This network was purposefully created to be an infrastructure that enables partnering clubs and repeater organizations to expand their capabilities (repeater linking, repeater troubleshooting and administration, any IP-based application that is Part 97 compliant, etc.). Over 15 amateur radio clubs across New Mexico, Colorado, and Wyoming presently leverage the network to enable their own repeater and IP capabilities – including DMR, D-Star, All-Star, Fusion, APRS, IP cameras, etc. – to better serve their members and amateur radio communities.

The RMHAM microwave network has been built from reliable commercial, off-the-shelf 5-GHz networking and microwave equipment configured to operate on Part 97 amateur radio spectrum. Throughput averages 100-150 Mbit/sec across the network. It does not rely on the internet to function...however it does have several internet taps for automatic fail-over, if an RF link goes down. The network is managed and monitored 24x7x365 by a dedicated network

operations team and a suite of tools/protocols (DevDB, Observium, RADIUS, Smokeping, OSPF, and automated email/text alerts).

This presentation will brief a very brief PowerPoint overview of the microwave network, and largely focus on demonstrating its functionality and capabilities, including:

- Walkthrough of RMHAM's network operations website (network map, network monitoring tools, etc.)
- Realtime network device monitoring via Observium (microwave link quality, voltages, logs, alerts)
- Demonstration of devices and systems tied to RMHAM 5 GHz microwave network:
 - Repeater site IP cameras
 - Repeater site IP power management units
 - Remote operation of HF radio through microwave network
 - Remote weather stations
 - SIP phone PBX
 - DMR C-bridge
- Other demonstrations as time permits

Speaker Bio:

Ed James KA8JMW first earned his novice license in 1978. Since then he's savored from the broad palette that amateur radio offers. Ed's activities have included the design and fabrication of various projects from DC to daylight, QRP, net operations, traffic handling, rag chewing, contesting, DXing, transmitter hunting, search and rescue, public service communications, ARES, youth promotion, satellite operations, EME, along with elmering/mentoring many new hams.

Ed has served as New Mexico Section Manager and New Mexico Assistant Section Manager. Ed currently serves as an Assistant Director of ARRL Rocky Mountain Division with a focus on emerging technologies and as the Technology Director for Rocky Mountain Ham Radio - New Mexico.

Demonstrations

Amateur Radio Hotspots

by Mike Lozano KØNGA (Aurora, Colorado)

Demonstration:

This demonstration will showcase various types and capabilities of available amateur radio hotspots and their capabilities, including supported cross-protocol support.

Speaker Bio:

A relative newcomer to Amateur Radio, Michael Lozano KØNGA has been licensed since 2008. As a member of Rocky Mountain Ham Radio, Michael mainly focuses on amateur radio DMR utilization where he maintains many of the DMR sample codeplugs. Michael can be heard as the net control of the RMHAM TRBO Tech Net on the first Saturday of every month at 7:00 PM on the Rocky Mountain talk group.

The NanoVNA and What You Can Do With One

by Albert Richard K5AJR (Bernalillo, New Mexico) and Larry Goga AE5CZ (Albuquerque, New Mexico)

Demonstration:

The following demonstrations will be presented at various times throughout the day:

1. How and why to Calibrate your nanoVNA and the effect it has on your measurements.
2. Antenna Examinations at various frequencies. (7, 14, 50 and 400 Megahertz).
3. How to determine the Character Impedance of an unknown piece of coaxial cable.
4. Time Domain Reflectometry (TDR) and how it works to examine coaxial cable.
5. Filter Circuit Analysis using a nanoVNA: Lowpass, Highpass and Bandpass.
6. A demonstration of the TinySA ULTRA Spectrum Analyzer and how it differs from a VNA.

These demonstrations will be presented throughout the day, as time allows, by Larry Goga and Albert Richard and they will be available to answer any questions that might arise.

Speaker Bio:

Larry Goga AE5CZ was first licensed in 2007. He relocated to Albuquerque from Los Angeles, CA in 1998, where he worked in the Motion Picture industry for over 25 years including time spent with Skywalker Sound and 20th Century Fox. He was recently the President of the Duke City Hamfest Planning Committee for the 2024 event. Now retired, Larry uses his time and his nanoVNA to learn the intricacies of modern RF Technology.

Albert J. Richard K5AJR, was born in Albuquerque, New Mexico. He served a 20-year lifetime career in the US Air Force as an Avionics Technician from 1969 to 1989. In 2011 he returned to his home state and retired to the city of Bernalillo, NM. Albert received his first amateur radio license in 2014 as W5YDZ. His ham radio interests include kit building, working HF and 6 meters, running his FT8 station, repairing radio equipment and teaching Ham Radio to others. Albert is currently an Instructor with the Frank Warren Instructor Group and is a certified Volunteer Examiner.

LoRa APRS

by Steve Barkes W5RRX (Las Cruces, New Mexico)

Demonstration:

This demonstration will showcase LoRa APRS, a low-power, long-range communication protocol that leverages the LoRa modulation technique to transmit APRS data.

Speaker Bio:

Steve Barkes W5RRX served 6 years in the US Navy and received his Bachelor of Science degree in Computer Science from the University of West Florida in Pensacola in 1982. Over the years he worked as a software programmer and database engineer for Harris Corporation, Contel, GTE, USinternetworking and New Mexico State University.

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Steve enjoys SSB operations, contesting (especially during the New Mexico QSO party), kit building, and supporting the MVRC Builders group when he's not on the golf course at NMSU or enjoying the dark skies of New Mexico with his many telescopes.

3D Printing / Additive Manufacturing

by Jon Fox WØAMT (Albuquerque, New Mexico)

Demonstration:

Jon will setup a small 3D printer and print some ham radio related items and some general purpose items. He will also bring several pre-printed items.

Speaker Bio:

Jon Fox WØAMT has lived in Albuquerque since moving to New Mexico in 2005. He was first licensed in 2001 in Minnesota. He upgraded to general and extra over the next couple of years. He mostly operates SSB, and the FT-8/FT-4 modes on HF. He has operated rover and portable

for the June and September VHF contests from Mount Sedgewick, South Baldy, and other locations around the state. He is a member of Rocky Mountain Ham Radio, the New Mexico VHF Society, and the Albuquerque DX association.

Jon has been an FAA licensed Airframe and Powerplant mechanic since 1981. He also has an FCC General Radiotelephone Operators license. He spent the first 24 years working for airlines, including 20 years with Northwest Airlines. In October of 2005 he accepted a position with Eclipse Aviation (EAC). He was with EAC in various mechanic / tech support positions until the company closed in the spring of 2009. In the fall of 2009, he accepted a position as a service engineer with Eclipse Aerospace (EAI). He worked at EAI until October of 2020 when started working for Resurgent Aviation Solutions. His focus is on after-market support for the 285 aircraft that were built by EAC and EAI.

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