

# ORI Projects Meetup

12 August 2025

What we did, what we're doing, any roadblocks? Need any resources?

# FCC Technological Advisory Council

## Final Meeting of the 2024-2025 Term

- Washington, DC at FCC Headquarters
- Recording at FCC website
- Dynamic Spectrum Sharing Working Group Charter Item 2:
  - 2.1 How will spectrum sharing models adapt and evolve to meet the growing demand for spectrum access among various services to support multiple purposes?
  - 2.2 How can the interplay between terrestrial and satellite services be complemented in sharing models to promote more efficient spectrum use?

# Historical Evolution of Spectrum Management

Three distinct eras of spectrum management

- Era 1 (1890-1912): Unregulated Model - A "loudest-served" system with no regulatory oversight, which collapsed following the Titanic disaster due to communication congestion.
- Era 2 (1927-1981): Command-and-Control Model - Centralized FCC authority making static allocations based on "public interest." This system struggled with emerging technologies like FM radio and cellular networks.
- Era 3 (1993-present): Market-Based/Flexible Use Model - Introduced spectrum auctions and flexible licensing, but now showing signs of regulatory overload and crisis.

# Evidence of Current Crisis

## Era 3 Regulatory Models are Failing

- 219 MHz Band Limbo: Years of regulatory deadlock between amateur radio, commercial, and federal interests with zero amateur activity despite allocated rights
- C-Band Aviation Disputes: \$81 billion auction created interference concerns with radar altimeters, requiring presidential intervention
- Inter-agency Conflicts: NTIA and FCC reaching opposite conclusions on identical technical evidence (Ligado case)
- Reallocation Resistance: Broadcasting industry claiming all "low hanging fruit" has been picked from spectrum repacking.

# Recommendations for Item 2

- Improve Spectrum Sensing: Establish independent measurement networks through citizen science projects, public-private partnerships, and dedicated monitoring systems to provide transparent occupancy data.
- Create More Regulatory Sandboxes: Use controlled environments to test new sharing models before broad deployment, building on SCS and amateur radio examples.
- Optimize Satellite Uplink Sharing: Prioritize sharing arrangements for uplink services while providing separate allocations for downlink services, recognizing the different interference characteristics.
- Develop HetNet Principles: Create coordination algorithms that leverage satellite orbital mechanics and optimize handoffs between terrestrial and non-terrestrial networks.
- The report concludes that the complexity and scale of modern spectrum management demands a paradigm shift toward automated, AI/ML-enhanced systems that can handle what human regulators cannot, while maintaining proven principles from successful sharing models like amateur radio.

# Lots of Conversations in DC

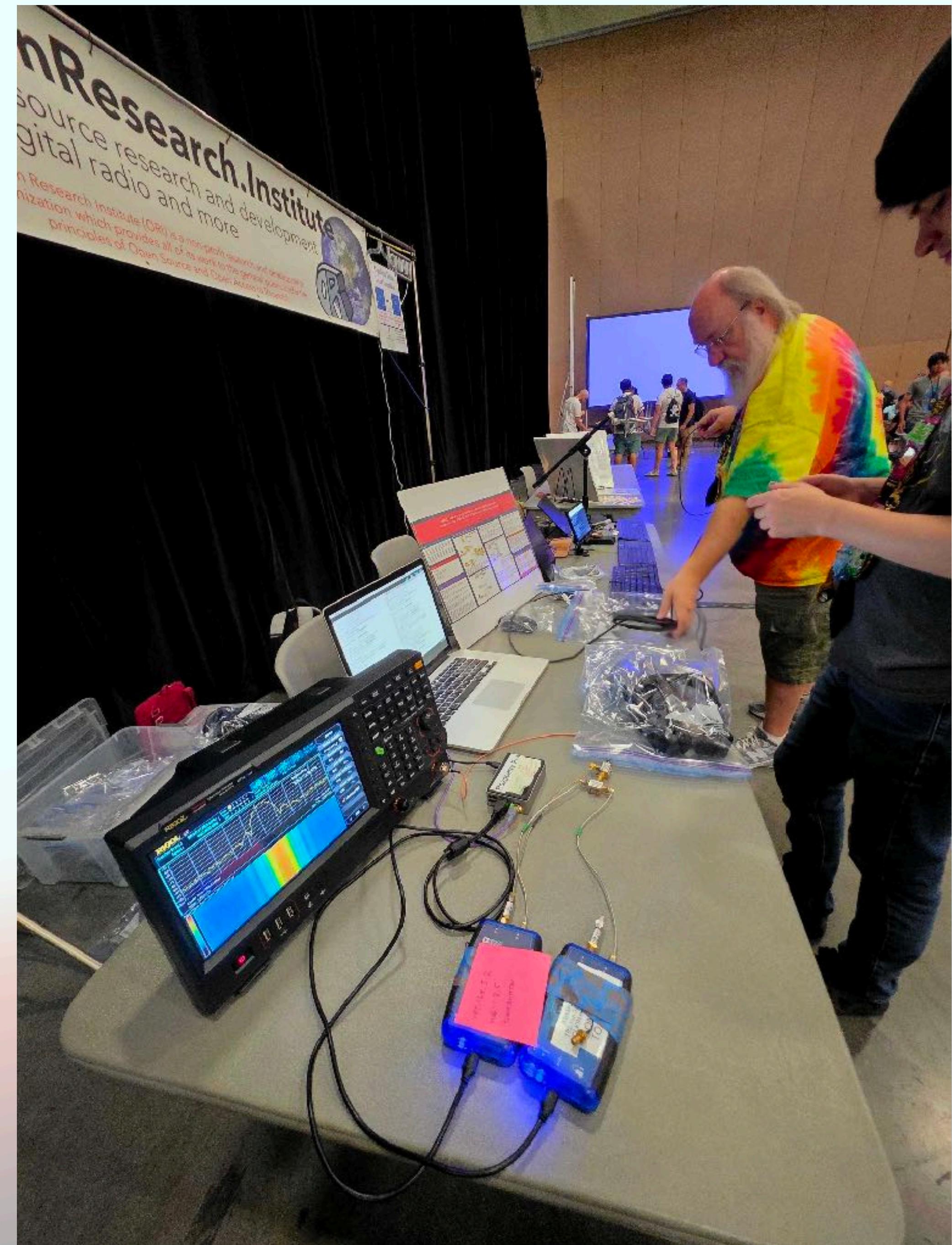
## Open Source a Powerful Force

- Open Source and OpenRAN responsible for speeding up adoption and deployment of 5G and is expected to help 6G in the same way.
- Open Source gives experiences that directly translate to personal and professional development.
- If you take it seriously and do a good job, then industry and government will too.
- Our next major AI/ML project at ORI will most likely be with WSPR

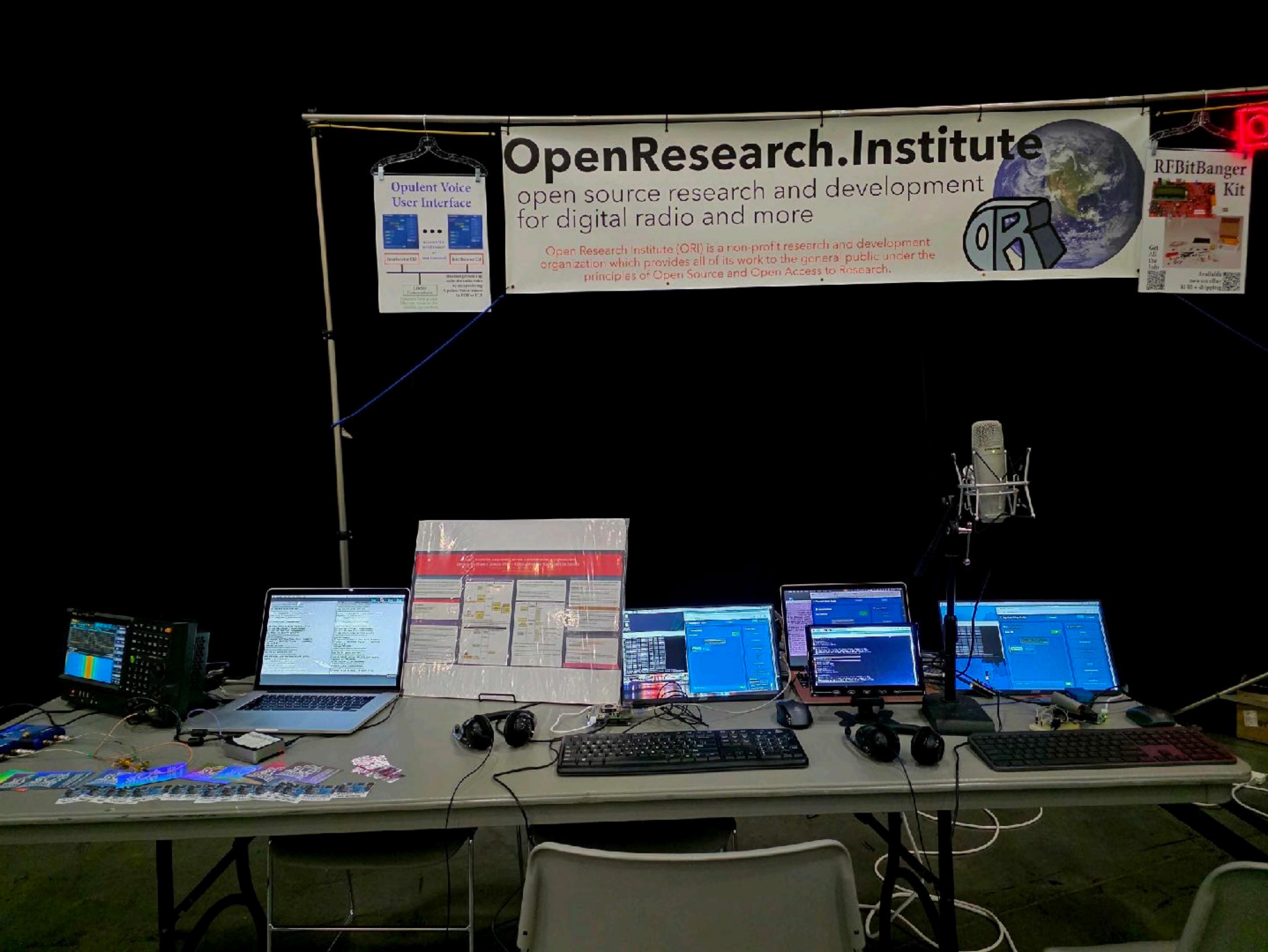
# DEFCON

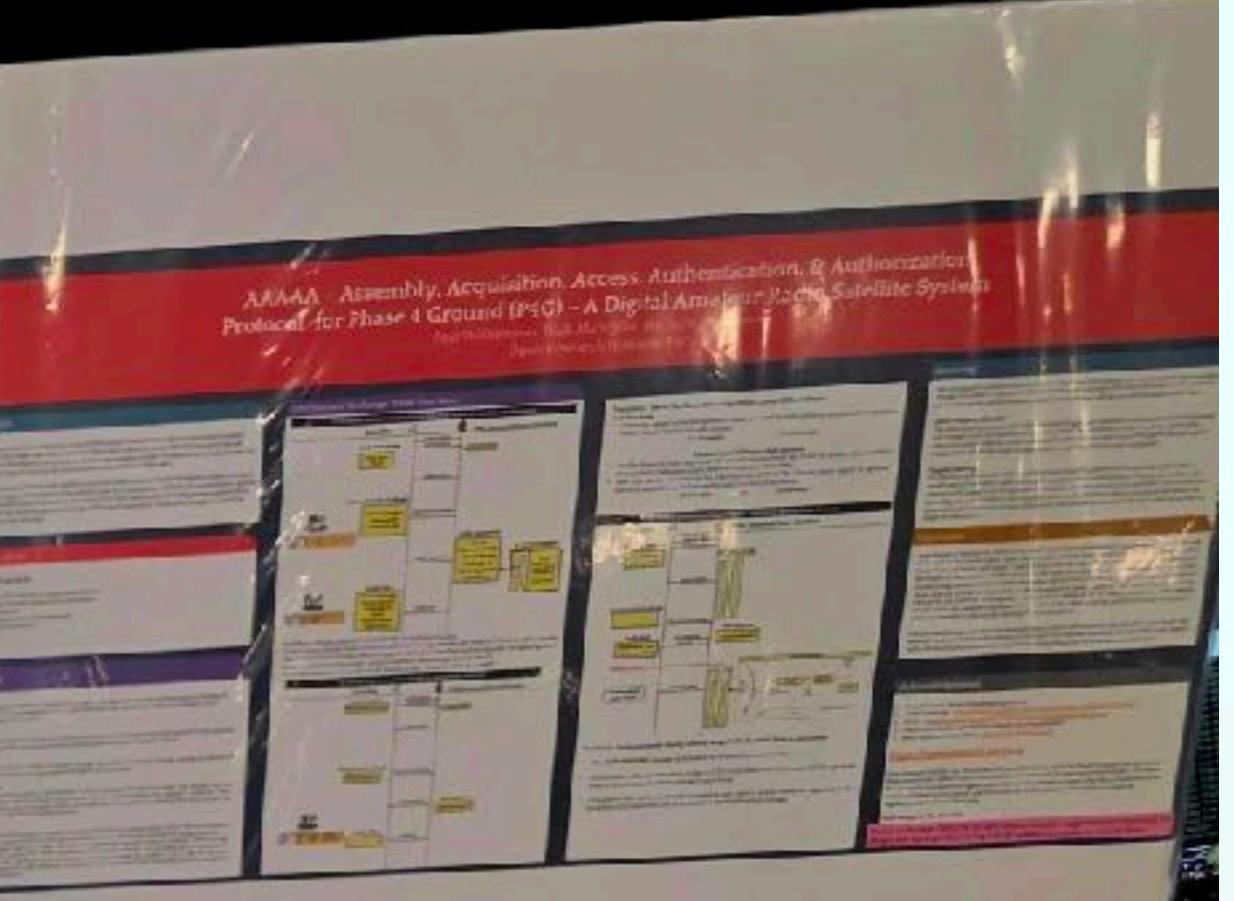
## Open Source Digital Radio Exhibit at RF Village

- In the middle of the main floor, supported by a fantastic all-volunteer village.
- Demos: Locutus (live, Pluto SDR to Spectrum Analyzer), Locus (live), Interlocutor (live, multi-station), RFBitBanger (floor model), Regulatory (poster session), Rabbit (poster session), Open Source Synthetic Aperture Radar (live)
- 20 hours over 3 days on 2 tables with a crew of 6 planned and 4 attending.
- Hotel and travel was donated with one Human Badge to be reimbursed.
- We were filmed for DEFCON TV and were interviewed by DEFCON staff.
- Atkinson Hyperlegible font will be integrated into Interlocutor based on feedback at DEFCON.











# University of Puerto Rico

## Successful RockSat-X Launch with Opulent Voice



