



# xG Testbed

The **COMMONWEALTH CYBER INITIATIVE** (CCI) has the first end-to-end **OPEN ACCESS RADIO NETWORK** (O-RAN)-compliant, Software Defined Radio (SDR)-based testbed in the United States, creating a foundation for openness, innovation, and flexibility in radio access networks.

The **CCI xG TESTBED** is the largest and most advanced of its kind in the United States. The testbed also is an **O-RAN OPEN TESTING AND INTEGRATION CENTRE** (OTIC), one of 17 approved by the O-RAN Alliance worldwide.

Our role as an O-RAN testing and integration center aligns with our mission to spur innovation, integrate security, and lower barriers to entry into the wireless market. Our investment in shared infrastructure gives industry partners and researchers across our network of more than 40 Virginia universities and colleges access to this crucial resource that will boost workforce development and build secure, fast networks.

The xG Testbed, built on **SOFTWARE-DEFINED RADIO** and open-source software, incorporates massive computing and storage capabilities for the integration of artificial intelligence (AI) solutions.

It offers unparalleled opportunities for researchers, as well as industry and government partners, to test secure 5G and NextG network technologies, develop new intellectual property, and provide hands-on training for cyber and wireless network professionals.

## **ABOUT CCI**

CCI is a consortium of **40+ VIRGINIA UNIVERSITIES AND COLLEGES**, encompassing more than 375 researchers focused at the intersection of cybersecurity, autonomous systems, and intelligence. CCI's mission of research, innovation, and workforce development makes Virginia a globally recognized leader in cybersecurity.

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CCI is a member of the NextG Alliance, an industry-led group that's mapping a North American vision for NextG. We are also member of O-RAN Alliance and the National Spectrum Consortium. CCI research is informing the standardization process, with the testbed playing an essential role.

The CCI xG Testbed is based at the Virginia Tech Research Center in Arlington, Va. Additional components are deployed at other CCI sites throughout the commonwealth, including an outdoor campus-scale testbed under construction on Virginia Tech's Blacksburg, which features three commercial Citizens Broadband Radio Service (CBRS) base stations and three programable, open-source and SDR-based CBRS base stations for experimentation.



The xG Testbed is one of the first such SDR networks to support native AI and machine-learning capabilities. These small, powerful networks shift traditional radio duties from bulky hardware to software.

## CORE PRINCIPLES OF THE CCI xG TESTBED:

- **Openness:** Open standards, open interfaces, and open-source software allow experimentation with new technologies at the pre-commercial stage.
- **Accessibility:** CCI researchers, collaborators, and students in CCI institutions can perform experiments in the testbed from any location.
- **Programmability:** Hardware and software solutions enable programmability, from end devices to the network core to applications and services.
- **Interoperability:** The testbed is compatible with other hardware and software solutions, including commercial products, and other testbeds.
- **Modularity:** We adopt containerized, cloud-native implementations with open APIs.



Learn more about the CCI xG Testbed at [CCIxGTestbed.org](https://CCIxGTestbed.org).