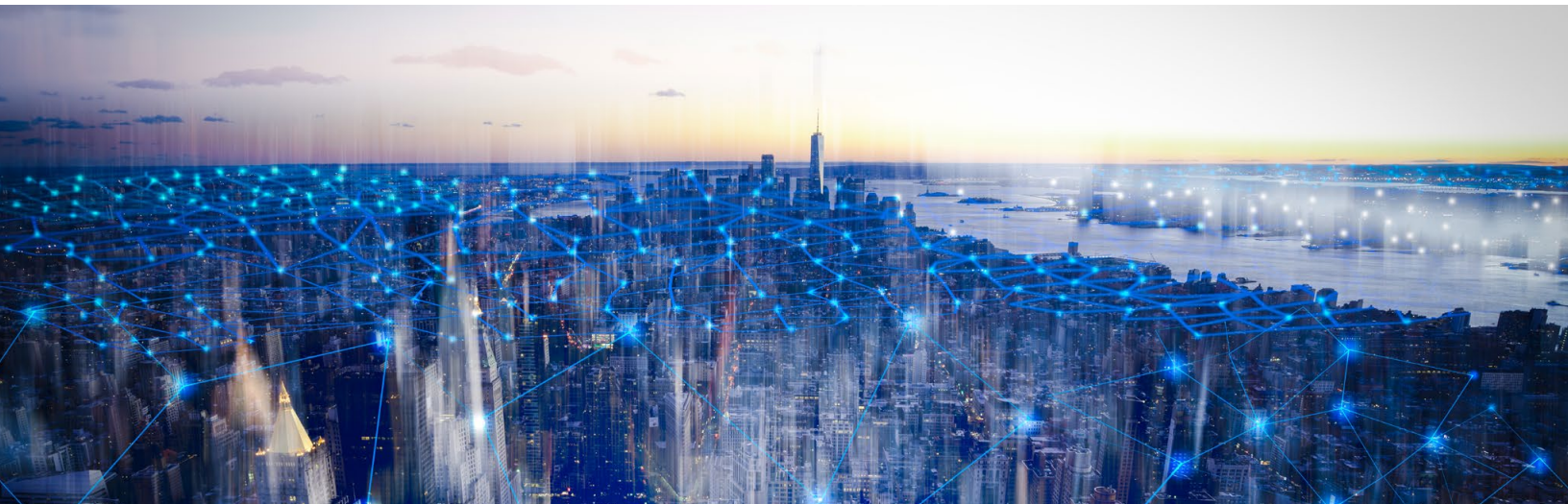


# Noblis 5G / Network Modeling and Experimentation Services

Using modeling and experimentation for information and communications technology solutioning, assessment, and optimization



## The Challenge

New transformative technologies and novel architectures (including 5G/6G wireless networks) are extremely complex. The benefits of 5G are made possible by virtualization, open standards, and automation technologies such as network functions virtualization (NFV) and Software Defined Networks (SDN) to implement the 5G architecture, in addition to the advanced antenna systems, new spectrum as well as spectrum sharing, the new 5G core architecture, and the 5G open Radio Access Network. This technology transformation includes the shift from static, deterministic traffic management to a more agile application aware, automated network, incorporating AI/ML.

**U.S. government agencies need the following to manage and leverage these complex networks:**

- Hands-on, impartial assistance to navigate the complexities of 5G and virtualization technologies and enable the new vertical use cases (e.g., augmented reality/virtual reality, mission critical applications, vehicular communications) during normal and disaster conditions.
- Research, modeling, and experimentation to develop intelligent design and deployment strategies for key 5G architectural features such as network slicing and multi-access edge computing (MEC) that will provide these use cases with the required performance and security.

## Noblis 5G Modeling and Testing Services

The Noblis Innovation and Collaboration Center (NICC), located at our Reston, Virginia headquarters, is where we explore complex problems to create practical, forward-thinking, sustainable solutions. It consists of laboratory spaces and collaborative work areas where our employees and clients can prototype, analyze, model, simulate and showcase results and new ideas.

Our telecom experts have developed hands-on testing capabilities leveraging technologies including 5G, MEC, SDN/NFV and Internet of Things (IoT) to test new architectures and concepts. This testbed allows us to study potential challenges and assess innovative solutions, ensuring the agency adoption of these technologies will be successful and non-disruptive. In addition, Noblis has developed custom modeling and simulation capabilities that allow for rapid evaluation of emerging technologies and increased scalability for scenarios with high traffic loads and massive numbers of devices.

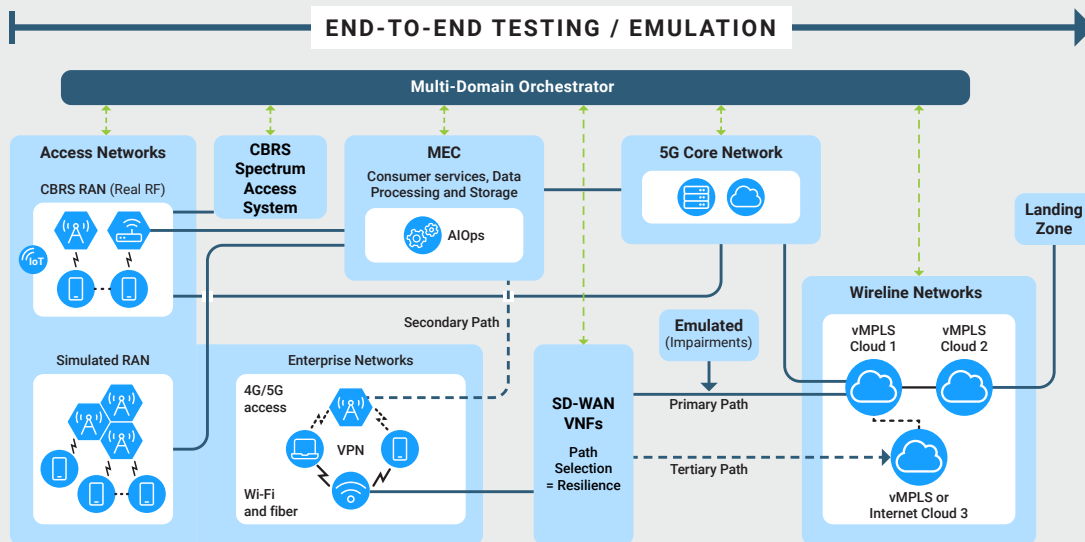
### Research, Testing, and Experimentation

- Private 5G / Citizens Broadband Radio Service (CBRS) network experimentation and evaluation, with deployed COTS, open-source, and Noblis- developed components
- Real-time positioning and spatial mapping that leverages and fuses 5G and sensor data
- MEC experimentation and evaluation, including commercial (AWS Wavelength) and open-source MEC platforms, and associated low latency application experimentation and development, including connected vehicles
- Integration of network slicing, IoT and MEC SDN/NFV/SD-WAN testing and emulation to explore areas of concern for agencies and implementation solutions

### Modeling and Simulation

- Modeling and predicting network performance under various stress conditions
- Discrete-event simulation and analytic modeling, including Noblis' custom Wireless Access Event Simulator (WAES) that models a heterogeneous network (HetNet) of large and small cells with sub-6 and mmWave spectrum
- Network design to meet quality of service (QoS) and resilience requirements
- Radio frequency (RF) propagation modeling
- Wireless and Wired Networks

## Next-Generation Network Test Lab



Network performance, architectural alternatives, and resilience across multiple network interfaces.

Integration with latest Noblis Sponsored Research capabilities will provide CBRS with real RF, Simulated RF, and MEC.