Booz Allen Hamilton Norfolk 5G Laboratory Experiment Government Project and Experiment Description

Government Contract Information

Booz Allen is working under contract to the Naval Information Warfare Center – Atlantic (NIWC-LANT) to provide, maintain, and operate 5G New Radio equipment in a laboratory setting in order to conduct testing and experimentation to determine the utility and application of 5G technology to U.S. Navy operations on bases, piers, and aboard ships in the fleet.

- Project Name: "Naval Station Norfolk 5G Enhanced Infrastructure Applications Prototype"
- Contract Number: IWRP2 OTA DELIVERY ORDER NO.: N65236239001, Prototype Project No: 2: IWRP-22-LANT-1173-008
- Contract Period of Performance: July 12, 2023 through November 9, 2026
- NIWC Contracting Officer Representative:

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Experiment Description

The work to be conducted under this experimental authorization consists of ongoing investigations into 5G infrastructure equipment, user devices, cybersecurity, spectrum certification, and software applications in a laboratory environment using commercial and developmental 5G products from leading 5G technology manufacturers.

The equipment used for this work will consist of a combination of items owned by Booz Allen and the U.S. Government or obtained on loan from manufacturers. Booz Allen will be solely responsible for the operation of all transmitting equipment used in this experiment and for conducting all testing, although Navy and industry representatives may participate from time to time under Booz Allen's supervision. All the work performed will be done by or under the supervision of qualified engineers skilled in 5G and radio system operations. The work will be conducted in the NIWC facility in Building Z-133 on Norfolk Naval Station in Norfolk, Virginia.

The work will involve evaluating 5G device and infrastructure compatibility, New Radio link performance and RF characteristics, coverage/propagation testing, 5G user device and software application testing, and other developmental efforts to advance and operationalize the utilization and application of 5G and related mobile wireless technology specifically for U.S. Navy operations on piers, bases and aboard ships.

In the laboratory, multiple 5G Radio Access Networks (RANs) will be operated at low power under the control of a 5G core and within 3GPP and other industry standards to facilitate

testing of broadband wireless access for voice, video, and data services. Commercial user devices such as smartphones, tablets, and modems will connect to the 5G RAN to obtain services from the 5G core and attached data networks. Radio Access Network components including base station radios, antennas, and baseband signal processing equipment from multiple equipment manufacturers will be operated in various frequency bands to enable testing of compatibility and interoperability with user devices from multiple device manufacturers. Testing will include device connectivity, data throughput, cybersecurity, radiated emissions, and other technical parameters necessary to evaluate and develop the military utility of this technology for the Navy and other military departments.

All operations will be designed to avoid interference to incumbent 5G and other government and commercial wireless operations through the use of low gain or directional antennas, low power, and indoor operations contained entirely within a government-owned facility. Coordination and concurrence with other licensees and government spectrum managers has been conducted under previously issued Experimental Special Temporary Authorization to facilitate construction and commissioning of a 5G laboratory testbed and the work under this authorization will operate the testbed for experimentation and solution development. A stop buzzer function is provided for fast interference resolution, and concurrence from incumbents will be obtained where required.

Program Objectives

- Developing a prototype system to provide wireless broadband communications for official services aboard Navy ships both in port and at sea.
- Developing a prototype system to provide wireless broadband communications between ships in harbor at pierside and Navy ashore networks.

Expected Technical Contributions to The Radio Art

- Greater understanding of radio propagation at centimeter and millimeter wave frequencies in ship interior and topside environments and between ship and shore.
- Evaluation of the effectiveness of MIMO techniques in shipboard and littoral environments.
- Understanding of the electromagnetic compatibility between commercial 5G radio access networks and military radar and communications systems.
- Development of interference mitigation techniques between commercial 5G radio access networks and military radar and communications systems.
- Improved techniques for wireless communications using 5G technology for military and related applications.

Interference Control Measures

- Prior to operation, the intended bands of operation will be measured with a calibrated spectrum analyzer to verify the presence or absence of incumbent operations and during operations to ensure that experimental transmissions do not extend beyond the area of operation.

- Operations on active incumbent frequencies will be coordinated with the licensee and concurrence obtained prior to operation.
- Operation will utilize low power and low-gain or directional antennas to control coverage and minimize signal levels beyond the immediate area of the experiment.
- 5G New Radio systems, through the techniques defined in the 3GPP standards, provide automatic power reduction to the minimum required for communication such that most operations will be well below the maximum authorized power in the short-range operations anticipated under this program.
- Stop buzzer is available by contacting Chief Engineer Mike Jacobs at 443-758-5788