Section-by-Section Summary of the Quantum Network Infrastructure and Workforce Development Act of 2021

Office of U.S. Senator John Thune (R-SD)

SECTION 1 lays out the bill's short title, the "Quantum Network Infrastructure and Workforce Development Act of 2021."

SECTION 2 defines key bill terms "elementary school," "high school," "local education agency," "secondary school."

SECTION 3 describes requirements for the Quantum Networking Working Group within the Subcommittee on Quantum Information Science of the National Science and Technology Council.

SECTION 4 directs the undersecretary of Commerce for Standards and Technology to conduct research on the development and standardization of quantum networking and communications technologies and applications, such as quantum cryptography, repeater technology, network traffic management, transduction, long baseline entanglement and teleportation, among others. This section also lays out directives for implementing and developing standards for the related research.

SECTION 5 establishes a program to utilize the Energy Sciences Network at the Department of Energy and conduct quantum network testing to advance development of communications technology and quantum networking. Specifically, this section is to improve research and testing on long-baseline quantum entanglement, teleportation, quantum repeater technologies, quantum transduction, the coexistence of quantum and classical information, multiplexing, forward error correction, wavelength routing algorithms, and other quantum networking infrastructure.

SECTION 6 lays out a directive for the National Science Foundation to enter into an agreement with the National Academies of Sciences, Engineering, and Medicine, for the purpose of preparing students to participate in the quantum workforce, to conduct a study on;

- the education gaps and areas in need of standardization in K-12 and higher education curricula,
- the skills and workforce needs of industry,
- the resources and materials needed to train K-12 educators.

SECTION 7 directs the National Science Foundation to prioritize the integration of quantum information science and engineering (QISE) into the STEM curriculum for each grade level from K-12, including methods to conceptualize QISE for each grade level, age-appropriate materials, and recommendations for standardizing key concepts, definitions, and curriculum.

SECTION 8 establishes the "Next Generation Quantum Leaders Pilot Program" to support the education and training of the next generation of students in the principles of quantum mechanics. This section also directs the NSF to prioritize tribal and rural schools in its consideration of pilot program applicants.