



## News Release

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### Verizon and NEC just made fiber sensing a whole lot easier

*New technology can assist local municipalities in better serving their residents, visitors and businesses.*

**RICHARDSON, TX** - In a recent proof-of-concept field trial, Verizon and NEC were able to use network infrastructure with existing fiber optic cables already laid in the ground as distributed optical sensors to collect information on city traffic patterns, road conditions, road capacity, and vehicle classification information.

The trial used new optical sensor technology developed by NEC with software underpinned by artificial intelligence (AI) for intelligent traffic monitoring including the measurement of vehicle density, direction, speed, acceleration, deceleration, and more. Historically, companies have had to lay purpose-built fiber very shallow in the ground with fiber grating at pre-determined intervals to gather and synthesize this type of information. Now, with optical sensor technology developed by NEC, Verizon is able to use non-purpose built fiber already in the ground to generate similar data. This new technology could lead to or improve other solutions that support public functions such as helping first responders detect and respond to gun shots and enhancing municipalities' ability to more quickly and efficiently identify earlier deterioration of bridges, tunnels and other infrastructure.

"This test marks an important milestone for technology that could provide a huge leap forward for those building smart cities and those tasked to manage them," said Adam Koepp, Senior Vice President of Technology Planning and Development with Verizon. "Instead of ripping up tarmac to place road and traffic-sensing technology, cities will be able to simply piggyback Verizon's existing fiber optic network."

Verizon is uniquely positioned to be able to scale this solution nationwide. With hundreds of thousands of miles of fiber already in place and plans to deploy 1,400 miles of additional fiber per month, the breadth of geography where Verizon can mine for data to assist municipalities' efforts is substantial.

#### Technical details about the trial

This was all accomplished through a fiber sensing system that coexisted with existing Wavelength Division Multiplexing (WDM) communication channels on the same fiber with minimal impact to data communication capacity, making it suitable for deployment even in traffic congested networks. This marks the first time that a 36.8 Tb/s data transmission system and distributed optical fiber sensing have been successfully demonstrated together through an operational

telecom network. Results from this trial were reported jointly at OFC 2019 by Verizon and NEC (download PDF at <https://www.osapublishing.org/abstract.cfm?uri=OFC-2019-Th4C.7>).

This is the first time and longest distance that such sensing data has been collected through an operational telecom network. AI tools such as Convolutional Neural Networks (CNN) and Software Vector Machines were used in order to take advantage of Distributed Intelligent Traffic Informatics (DITI). Utilizing just a single integrated interrogator, the distributed multi-parameter sensor system evaluated various properties of back-scattering light, which can be used to derive the static strain, dynamic strain, acoustics, vibrations and temperatures for each fiber segment. This allows users to identify detected signatures and to translate those back-scattering signals into actionable information over a wide range of area previously unattainable by conventional sensors. With this unique technology provided by NEC, Verizon is able to use existing telecom networks, which were not built for sensing purposes, to generate valuable new data and to automatically analyze various environments.

“NEC has a strong history of leadership in the area of optical fiber technology. The results obtained from this joint research program with Verizon are a great advancement for smart city business opportunities, especially for safer city solutions such as the conservation of roads and the utilization of traffic information. We are confident that these cutting-edge solutions will provide meaningful new value for optical fiber networks,” said Atsuo Kawamura, Executive Vice President of NEC.

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#### **About Verizon**

Verizon Communications Inc. (NYSE, Nasdaq: VZ), headquartered in New York City, generated revenues of \$130.9 billion in 2018. The company operates the network more people rely on and the nation’s premier all-fiber network, and delivers integrated solutions to businesses worldwide. With brands like Yahoo, TechCrunch and HuffPost, the company’s media group helps consumers stay informed and entertained, communicate and transact, while creating new ways for advertisers and partners to connect. Verizon’s corporate responsibility prioritizes the environmental, social and governance issues most relevant to its business and impact to society.

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#### **About NEC Corporation**

NEC Corporation is a leader in the integration of IT and network technologies that benefit businesses and people around the world. The NEC Group globally provides "Solutions for Society" that promote the safety, security, efficiency and equality of society. Under the company's corporate message of "Orchestrating a brighter world," NEC aims to help solve a wide range of challenging issues and to create new social value for the changing world of tomorrow. For more information, visit NEC at <https://www.nec.com>.