NICT

National Institute of Information and Communications Technology



September 10, 2019 NICT, Japan



Role of NICT



The sole national research institute in the field of ICT in Japan

- Promoting its own research and development
- Cooperating with and supporting industry and academia

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Industry/Academia/Government
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Budget (FY2019): \sim 32.36 Billion Yen + \alpha (\sim$288 Million + \alpha)
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Personnel: 1150
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(Including board of directors, auditors, permanent employees and fixed term employees)

Main Tasks for the 4th Mid-Term* Plan



ational Institute of formation and

Communications Technology

Multi-Core Fiber Transmission Technology





STABLE: Simultaneous Transmission Access Boosting Low Letters

Overview

STABLE is a multiple access scheme for massive machine type communications (mMTC) supporting low latency.

- <u>Massive connections</u>: 5 devices are accommodated in one timefrequency block without space and code division in data signals.
- <u>Low latency</u>: less than 1ms in radio signals. Total latency including processing delay at TX and RX is less than 4ms.





Target area of STABLE in the 5G NR requirements

NICT's activities in 5G NR Standardization: Submitted 12 papers. 1 paper is referred as a possible radio access in 3GPP TR 38.812 v16.0.0 "Non-Orthogonal Multiple Access (NOMA) for NR" published in Dec. 2018.

Experiment

- Demonstrated that 90% of transmitted data from 5 devices is successfully received in a field trial. The result satisfies requirement on BLER for mMTC NOMA (3GPP TR 38.812 v16.0.0).
- Observed latency including processing delay in both TX and RX is 3.9ms.

Smart E-Road Mirror : See invisible objects

Radio

equipment

Cameras

Object

identifier



Overview

- Possible traffic accidents in intersections without traffic light and behind buildings and parking cars
- V2V comm. with sensors on board are not perfect to identify various objects
- "Smart E-Road Mirror" with 5G is a solution for safe driving

System functions

- Smart E-Road Mirror takes images on roads and sends to edge server
- Edge server grasps road situation (persons, cars, etc.) by image recognition
- Dynamic map distributes the info to car



ICT R&D for Realizing Truly Smart Society



NICT is stepping forward to pioneer new stage of ICT to realize truly smart society.

Brain-inspired ICT

- ✓ Brain inspired machine leaning
- ✓ Encoding & decoding between brain information and real information

Quantum technologies

- Quantum cryptography for wide area networks
- ✓ Applying quantum computing for cyber security analysis, 5G traffic analysis, etc.

Cyber security

- ✓ Cyber security analysis and protection for beyond-5G
- Post-Quantum-Computing Cryptography

And more ...

We believe innovative ICTs will make our future society better and safer.



http://www.nict.go.jp/en/

