

(Details regarding the collaborative social Initiative (Joint Research))

Context :

The University of Tokyo's Nakao Laboratory has developed software-integrated small base stations that offer customizable wireless telecommunication speeds through software adjustments. Their cost-effective design, utilizing generic hardware components, positions them as ideal tools for promoting the adoption of local 5G technology.

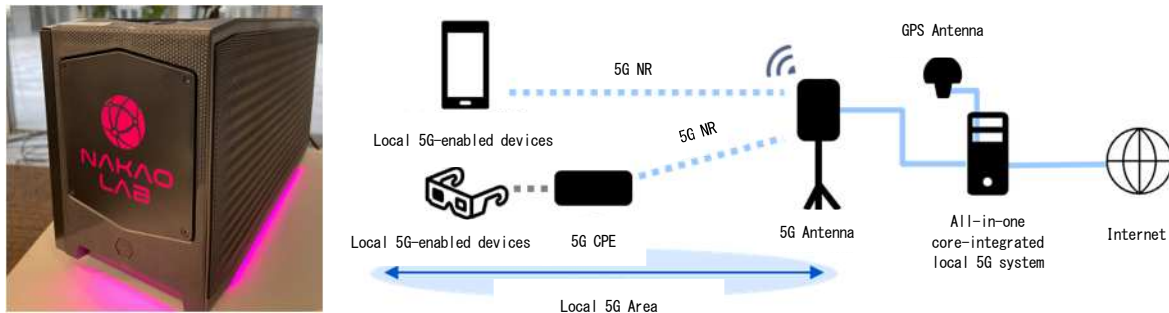


Figure 1 software-integrated small base stations (left) , and its utilization scheme (right)

On the other hand, Metropolitan Expressway has announced its “mid-term management plan for 2024-2026” (Note 3), which they have identified “6 core themes” under the “⑤Technology Development and DX Promotion” to maintain operations during disasters and ensure seamless road traffic management under normal circumstances.

In this situation, local 5G is considered highly useful as one of the next-generation telecommunication infrastructures, as we have decided to collaborate with the University of Tokyo to explore its utilization.

Anticipated Issues :

- Enhancing further reliability as a telecommunication infrastructure during disasters
- Expanding use cases for normal circumstances
- Reducing network deployment costs

Contents :

- Research on deployment and operation of software-integrated small base stations
- Research on utilizing local 5G in telecommunication dead zones
- Research on redundancy measures for local 5G connections during disasters

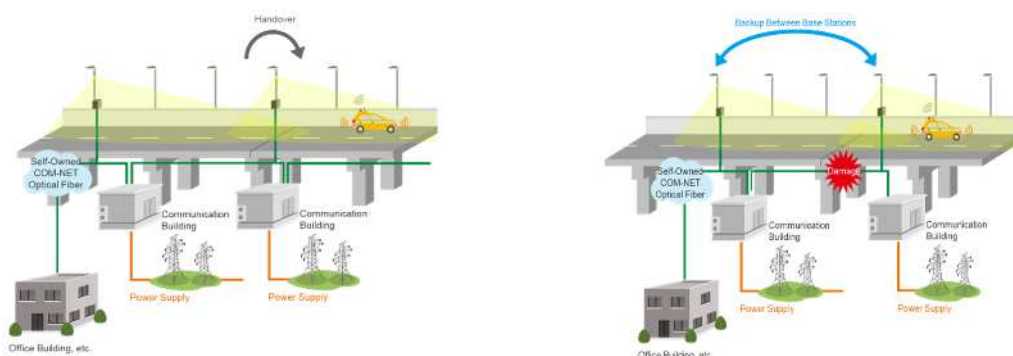


Figure 2 The research scheme utilizing local 5G

〈Achievements by University of Tokyo's Nakao Laboratory〉

The Nakao Laboratory at the University of Tokyo is dedicated to pioneering the development of “Next-Generation Cyber Infrastructure”, essential for supporting “humanitarian lifelines” for future societies. Next-Generation Cyber Infrastructure incorporates computing concepts into information and telecommunication networks. To achieve this vision, we are engaged in daily research and development focusing on “Beyond 5G information infrastructure technologies and applications,” “network visualization and software-defined networking,” and “social implementation through collaboration between academia, industry, and government”.

〈Achievements by Metropolitan Expressway〉

At Metropolitan Expressway, our research has centered on local 5G technologies, which were formalized in 2019 and are anticipated to proliferate further. Our focus has been on developing autonomous wireless systems capable of high-speed, high-capacity data transmission. Through pilot experiments conducted on specific segments of Metropolitan Expressway, we have achieved notable milestones, including the establishment of local 5G telecommunication zones along linear area and the implementation of strategies to mitigate radio interference from neighboring operators. These efforts are aimed at advancing next-generation telecommunication infrastructure to ensure robustness during disasters and optimize operational efficiency, thereby broadening the application of local 5G technology.

〈Comments〉

- Professor Akihiro Nakao, Representative of the collaborative social initiative, (University of Tokyo Nakao Laboratory, Professor)

Basic human social interactions are underpinned by telecommunication, and the critical role played by information and telecommunication infrastructure is beyond dispute. As we look toward a future where cyberspace and the physical world seamlessly converge, we hold high expectations for local 5G as a vital component of the ‘Next-Generation Cyber Infrastructure.’ Through collaborative research with the Metropolitan Expressway, which has real-world applications, we aspire to take a significant stride toward the practical implementation of local 5G.

- Toru Terayama, Representative Metropolitan Expressway (Metropolitan Expressway Co., Ltd. President and CEO)

At the Metropolitan Expressway, we have successfully addressed technical challenges related to establishing a local 5G telecommunications zone through pilot experiments. Our goal is to enhance emergency road infrastructure during major disasters by leveraging on-site video transmission. Through collaborative research with the University of Tokyo, we are working towards advancing the next-generation Metropolitan Expressway by implementing efficient and high-capacity data transmission.

〈Notes〉

(Note 1) Ministry of Internal Affairs and Telecommunications 「Expansion of Local 5G Guidelines」 December 21, 2023 https://www.soumu.go.jp/main_content/000802944.pdf

(Note 2) Research Department of collaborative social initiative (University of Tokyo)
https://www.u-tokyo.ac.jp/ja/research/orgs-projects/d04_07.html

(Note 3) Metropolitan Expressway Group Mid-Term Management Plan 2024-2026
<https://www.shutoko.co.jp/company/mmenterprise/>

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