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Advances and Future Directions in Terahertz Wireless Communications

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This presentation will explore the latest developments and future prospects in terahertz (THz) wireless communications. The discussion will begin by highlighting the unique characteristics of THz waves, such as their high frequency and short wavelength, which enable ultra-high-speed data transmission. The session will then move to an overview of recent standardization efforts, highlighting the collaborative international efforts to establish unified protocols and regulations for THz communications.

The talk will further explore the societal implementation of THz technologies, examining both previously considered use cases and innovative new applications. Special attention will be given to the envisioned future society, called Society 5.0^[1, 2], where THz communications are expected to play a central role in achieving a highly integrated cyberspace and physical space.

Part of the presentation will focus on the contributions of the Beyond 5G (6G) initiative, including the establishment of THz anechoic chambers and the achievements of various contract researchers. This section will highlight key milestones and breakthroughs funded by the B5G program.

Finally, the presentation will outline future research and development directions in THz wireless communications, identifying key challenges and potential solutions to further advance this promising field. The session will conclude with a summary of the key points discussed, highlighting the transformative potential of THz technologies in future communication systems.

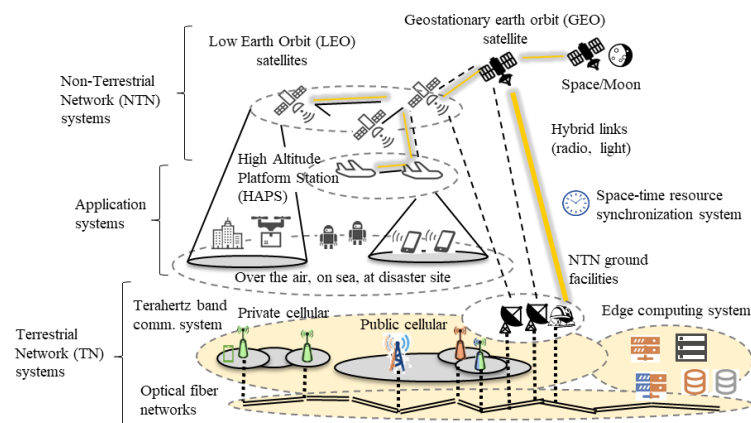


Fig.1, 6G System in Physical Space

REFERENCES

- [1] Council for Science, Technology and Innovation, Cabinet Office, Government of Japan, [Report on The 5th Science and Technology Basic Plan] (December 18, 2015)
https://www8.cao.go.jp/cstp/kihonkeikaku/5basicplan_en.pdf
- [2] NICT Beyond 5G/6G white paper (2021, 2022, 2023), <https://beyond5g.nict.go.jp/en/download/index.html>