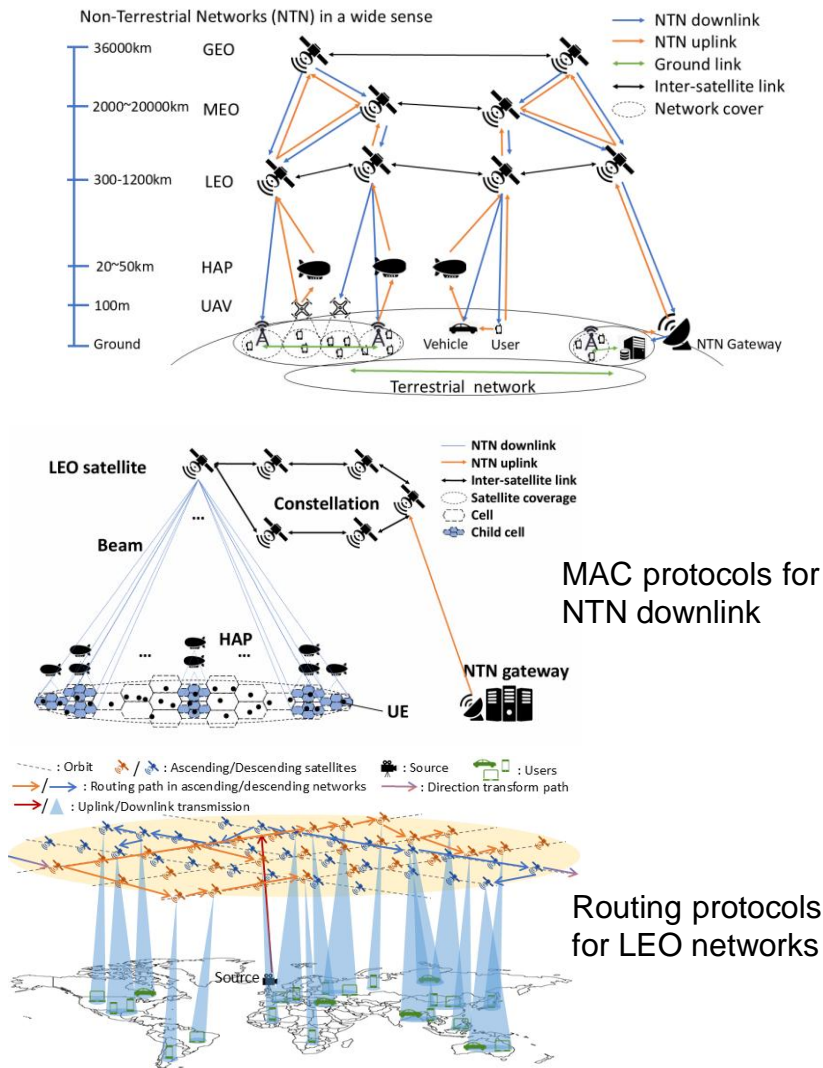




# Studies on Non-Terrestrial Networks

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## The overview of NTN



Recent years, Non-Terrestrial Networks (NTN) are gaining considerable attention as next-generation communication infrastructure leveraging aerial and spaceborne platforms. NTN adopt a multilayered architecture, including Low Earth Orbit (LEO) satellites, to complement terrestrial coverage and reduce latency in long-distance communications, offering a promising solution for achieving global, low-latency connectivity.

However, the practical deployment of NTNs presents several challenges, such as dynamically changing topology, communication delays between space and ground segments, and limited frequency and power resources.

This research focuses on the design and optimization of mid-layer protocols that address the unique characteristics and challenges of NTN. Specifically, our primary research topics include:

- MAC protocols for NTN downlink considering packet loss and retransmission mechanisms.
- Routing protocols for LEO networks considering dynamic constellation topologies and demand distributions.
- Resource-allocation optimization in NTNs leveraging deep reinforcement learning (DRL) to adapt to complex and time-varying network conditions.

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