# LEO/MEO Network Transport Layer Protocols Optimization Requirements and Problem Statements

IETF 123 HotRFC

China Mobile

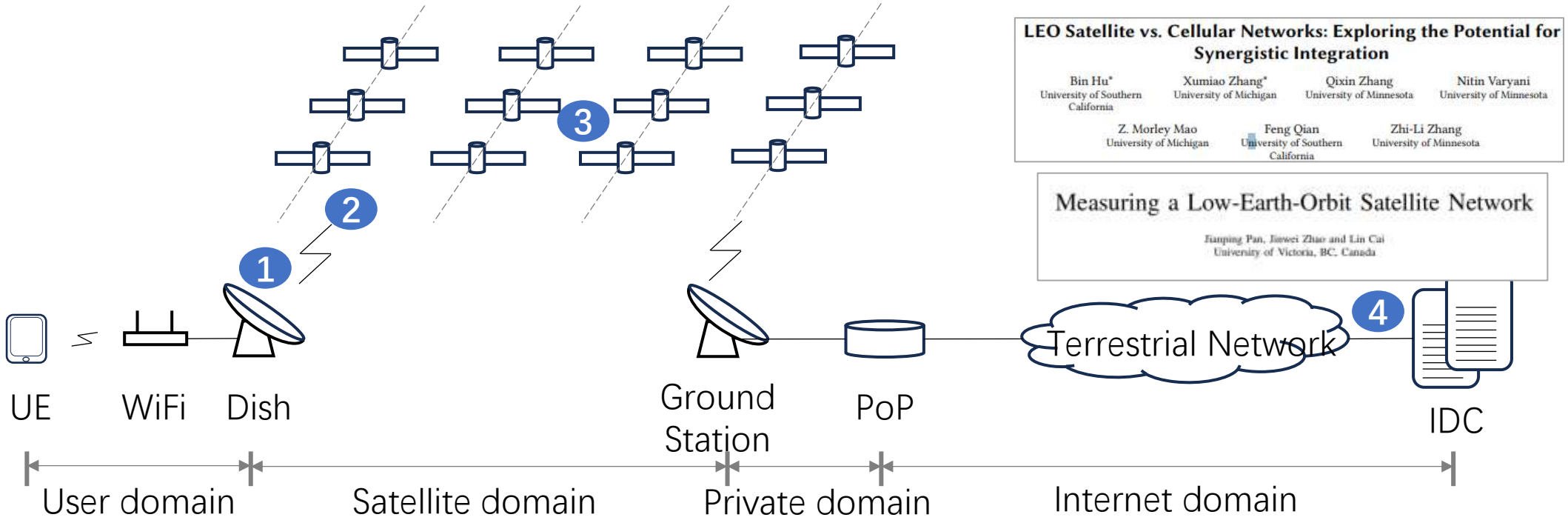
# LEO/MEO is more and more widely used

- **Internet access**
  - Provide global broadband connectivity for aircraft in flight
  - Emergency communication
  - Sparsely populated areas

- **3GPP/NTN**
  - 3GPP incorporated Non-Terrestrial Network (NTN) technical standards into its Release 17 specifications.

- **Industry application scenarios**
  - **ISO/CD TR 17783:2024** Intelligent Transport Systems - Mobility Integration - Role Model for the Use of Low Earth Orbit (LEO) Satellites
  - **GEELY** Vehicle satellite communication, IOT

# LEO/MEO transport protocol is facing challenges




LEO Satellite vs. Cellular Networks: Exploring the Potential for Synergistic Integration

Bin Hu* University of Southern California; Xumiao Zhang* University of Michigan; Qixin Zhang University of Minnesota; Nitin Varyani University of Minnesota; Z. Morley Mao University of Michigan; Feng Qian University of Southern California; Zhi-Li Zhang University of Minnesota

Measuring a Low-Earth-Orbit Satellite Network

Jianping Pan, Jiewei Zhao and Lin Cai
University of Victoria, BC, Canada

1 Satellite/beam switchover (10-20s) → Loss

2 Weather/obstacle → Bandwidth variance

2 Motion of the satellite → RTT

TCP will take the loss events and RTT surge as signal of congestion

# Transport protocol optimization is possible

- Feasible to optimize:
  - Comparing UDP and TCP, UDP throughput is almost twice that of TCP. That means there will be large room for protocol improvement

- Works on transport protocol optimization:
  - Congestion Control, e.g. BBR
  - Multi-session/link TCP
  - Transport layer FEC
  - Selective ACK
  - Switchover prediction, e.g. SatGuard
  - TCP pacing

We hope to reach a consensus on problem definition within the IETF and further conduct research on solutions.

**Welcome to join us**

Transport Layer Protocols Optimization for Satellite Networks (T4SAT) Side Meeting

9:45-11:00 AM , Monday, July 21, EI Escorial Room