Appendix 2.2

Report of International Conference Presentation

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Affiliation:	Universiti Sains Malaysia
Project Title:	PEP-star: A Performance Enhancing Proxy for Low Earth Orbit Satellite Communications in Disaster-Resilient ASEAN Network Infrastructure
Name of International Conference: (Link to website)	International Technical Conference On Circuit/Systems, Computers and Communications (ITC-CSCC) 2026 https://itc-cscc2026.ecti-thailand.org/
Title of Research Paper:	Adaptive Handover Detection for QUIC over LEO Satellite Networks
Name of all Co-authors (if any)	1. Jianping Tian (Universiti Sains Malaysia, Malaysia 2. Yung-Wey Chong (Universiti Sains Malaysia, Malaysia) 3. Muhammad Niswar (Universitas Hasanuddin, Indonesia) 4. Sye Loong Keoh (University of Glasgow, United Kingdom (Great Britain)) 5. Achmad Basuki (Brawijaya University, Indonesia)

Comments or feedback received at the conference and your answers:

Question 1: What attributes are used to distinguish a satellite handover from actual network congestion?

Response:

The proposed AHD algorithm uses three transport-layer metrics that are observable at the end host which are RTT, available bandwidth, and packet loss. A handover is identified when there is a simultaneous increase in RTT, decrease in bandwidth, and low packet loss, which differs from typical network congestion where increased RTT is usually accompanied by persistent packet loss. By combining these metrics with an adaptive EWMA baseline, AHD is able to distinguish handover events from genuine congestion and avoid unnecessary congestion window reduction.

Question 2: Can this protocol be applied to networks other than LEO satellite networks?

Response:

Yes. Although AHD was specifically designed and evaluated for LEO satellite networks, its detection mechanism relies only on end-to-end transport-layer measurements rather than satellite-specific information. Therefore, the approach has the potential to be adapted to other dynamic network environments that experience transient path changes. However, additional evaluation and parameter tuning would be required to validate its effectiveness in these environments.

Contribution to the project:

This session presented "Adaptive Handover Detection (AHD) for QUIC over LEO Satellite Networks" a transport-layer optimization developed as part of the PEP-Star project, directly supporting project objectives which are enhancing TCP/UDP performance over LEO links and enabling handover-aware continuity of data flow.

The work targets the core problem motivating PEP-Star: LEO satellite handovers create connectivity gaps that conventional congestion control algorithms like BBR misinterpret as network congestion, causing unnecessary throughput throttling and for UDP-based sensor traffic, irretrievable packet loss during exactly the moments disaster monitoring data cannot afford to be dropped.

The contribution of this project is designed AHD, a lightweight detection mechanism that wraps around BBRv3 in the QUIC protocol stack, distinguishing genuine congestion from handover-induced disturbances using only observable end-to-end metrics (RTT, bandwidth, packet loss). The protocol requiring no proprietary satellite information or fixed handover schedules, making it deployable on commercial LEO networks such as Starlink. Implemented an EWMA-based baseline smoothing mechanism and an RTT-adaptive freeze protection phase that holds the congestion window steady and suppresses false congestion signals during handover transients.

Photos

[Required Documents]

A) Presentation Materials (e.g., PPT slides) - Attached

B) Final Program of the conference - Attached

Reporter: NURULFAIZAL BIN M SHUKERI

Date: 16/7/2026