IEEE Systems Council Chapter presents IEEE Distinguished Lecture Series:

Dr. Mohammed Elamassie

Virtual

Date: Tuesday, May 21, 2024

Time: 11AM-12PM

https://csulb.zoom.us/j/84211197166

Meeting ID: 842 1119 7166

Towards airborne Connectivity: Multi-Layered Networks for Optical Backhaul

Abstract: Global coverage to address the significant portion of the global population that remains unconnected or under-connected is expected to be achieved through the deployment of non-terrestrial networks (NTNs), which encompass a range of technologies such as High-Altitude Platform Stations (HAPSs), Satellites (GEO, MEO, LEO), and Unmanned Aerial Vehicles (UAVs). In the realm of cutting-edge wireless technologies such as 6G and beyond, the goal is to seamlessly integrate NTN nodes into terrestrial networks. Currently, there are isolated deployment examples, such as LEO mega-constellations. This presentation focuses on the design of a multi-layer airborne backhaul network, utilizing HAPSs and rotary-wing UAVs to establish free space optical (FSO) backhaul connections with ground-based stations. HAPS fleets operate in circular tracks at stratospheric altitudes. Conversely, rotary-wing UAVs operate at medium and lower altitudes, complementing HAPSs. The airborne backhaul architecture requires careful design to ensure uninterrupted connectivity with ground-based stations, eliminating coverage gaps. The presentation outlines a systematic approach for designing FSO-based airborne backhaul systems, detailing the process of determining the appropriate number of airborne layers, HAPS tracks, HAPS units per track, the number of UAVs at lower altitudes, the operating altitude for middle-layer UAVs, and the number of laser sources per airborne node based on a given coverage area.

About speaker: Dr. Mohammed Elamassie earned his Ph.D. in electrical and electronics engineering from Ozyegin University, Istanbul, Turkey, in 2020. He currently serves as an Assistant Professor at Ozyegin University. Dr. Elamassie is a distinguished leader in the field of optical wireless communication technologies, holding positions as the Executive Co-Director at the Center of Excellence in Optical Wireless Communication Technologies (OKATEM) and Executive Co-Director for the Communication Theory and Technologies (CT&T) research group at Ozyegin University.

For more information, please contact: Prof. Henry Yeh at henry.yeh@csulb.edu

*This is a joint invitation between CSULB IEEE Student Branch and IEEE Systems Council Chapter.