

Traffic-aware Gateway Placement for High-capacity Flying Networks

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The ability to operate virtually anywhere and carry payload makes Unmanned Aerial Vehicles (UAVs) perfect platforms to carry communications nodes, including Wi-Fi Access Points (APs) and cellular Base Stations (BSs). This is paving the way to the deployment of flying networks that enable communications to ground users on demand. Still, flying networks impose significant challenges in order to meet the Quality of Experience expectations. State of the art works addressed these challenges, but have been focused on routing and the placement of the UAVs as APs and BSs serving the ground users, overlooking the backhaul network design. The main contribution of this paper is a centralized traffic-aware Gateway UAV Placement (GWP) algorithm for flying networks with controlled topology. GWP takes advantage of the knowledge of the offered traffic and the future topologies of the flying network to enable backhaul communications paths with high enough capacity. The performance achieved using the GWP algorithm is evaluated using ns-3 simulations. The obtained results demonstrate significant gains regarding aggregate throughput and delay.