Airborne Communication Networks for Small Unmanned Aircraft Systems

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ABSTRACT

This paper explores the role of meshed airborne communication networks in the operational performance of small unmanned aircraft systems. Small unmanned aircraft systems have the potential to create new applications and markets in civil domains, enable many disruptive technologies, and put considerable stress on air traffic control systems. We argue that of the existing networked communication architectures, only meshed ad hoc networking can meet the communication demands for the large number of small aircraft expected to be deployed in future. Experimental results using the heterogeneous unmanned aircraft system are presented to show that meshed airborne communication is feasible, that it extends the operational envelope of small unmanned aircraft at the expense of increased communication variability, and that net-centric operation of multiple cooperating aircraft is possible. Additionally, the ability of airborne networks of small unmanned aircraft to exploit controlled mobility to improve performance is discussed.