

**USAF Scientific Advisory Board Study**  
**Airborne Networking and Communications for Contested Environments**

*Study Abstract*

Current and future Air Force operations require robust airborne communications and data links to share situational awareness and integrate information across platforms. While 5<sup>th</sup> generation Air Force tactical aircraft have intra-flight communication capability, their ability to communicate with different aircraft types is limited even in permissive environments. In addition, legacy Air Force aircraft have communication and networking capability in benign environments, but those capabilities are at risk in contested environments. The lack of robust, interoperable communications links can also undermine command and control capabilities needed for joint operations. In order to overcome these limitations, the *Airborne Networks and Communications for Contested Environments* (ANCCE) Study examined the Air Force's current approach to networks and communications in a contested environment and developed recommendations for senior leader consideration.

The ANCCE Study examined multiple options towards addressing these shortfalls. The most urgent materiel recommendation was for the Air Force to implement a Link 16 transmit capability on the F-22, enabling a robust and operationally flexible solution that provides direct connectivity with 4<sup>th</sup>/5<sup>th</sup> generation and command and control platforms. In addition, the Study recommended implementing upgrades to UHF voice and Link 16 in order to approve operational capability in contested environments.

Overarching the materiel recommendations, the Study recommended that the Air Force empower oversight above the program level to ensure stability and practicality of a long-term data link vision, leveraging best practices from the SATCOM enterprise. Other non-materiel recommendations suggested increasing network management expertise and conducting training against representative network and communication threats. Finally, to meet far-term needs, the Air Force should develop a next-generation, self-forming, self-managing directional tactical data link operating at higher frequencies, with the ability to make mission-aware trades involving capacity, latency, jam resistance, and detectability in real time.