SAE AS6675 Use Case Summary

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Use Case Approach

- Reviewed IEEE/IEC 60802, IEEE 802.1DG use case documents
- Characterize onboard aerospace networks across 10 use cases
  - Reflect typical range of uses in aircraft, mission, and cabin networks
  - Cover both military and civilian domains
  - Capture both current and projected future needs
- Capture aerospace needs across 13 different criteria
  - Reflect scale, behaviour, and complexity of each use case
  - Differentiate needs of each use case
  - Inform technical capabilities of AS6675
- Written in textual and tabular forms, with supporting diagrams

Use Case Summary

Use Case

1. Small Business Aircraft
2. Large Passenger Aircraft
3. Small and Combat Military Mission Network
4. Large Military Aircraft Mission Network
5. Small, Combat, and Large Military Flight Network (VMS)
6. Unmanned Military Aircraft Network
7. Rotary Wing Mission Network
8. Rotary Wing Flight Network
9. Satellite Network
10. Fibre Channel over TSN backbone (AS6509)
11. Large passenger aircraft cabin

Capture Characteristics

- Number of Nodes
- Physical Topology
- Number of Switched hops
- Number of Streams Per Switch
- Network Redundancy
- Redundancy Mode
- Data Rate
- Media Type
- Worst Case Link Utilization
- Dissimilarity, Integrity, Maintenance, Monitoring, Security [DIMMS]
- Certification Requirements
- Supported Traffic Types

Use Case Conclusions

- Each use case is unique in its blend of aircraft safety, mission performance, and cabin use needs
- Physical topologies are relatively simple given the space weight and power limitations of the platform, e.g. tens of switches, hundreds of end-stations/nodes
- Isolation (Policing) of thousands of streams is needed to meet certification requirements
- Existing data rates range from 10kbps to 10Gbps, with higher projected future rates
- Redundancy needs vary widely, from none to multiple hot active systems
- Trend towards converged Ethernet networks over copper and fiber
- Certification and Interoperability with legacy ethernet will be paramount
- Non-Ethernet buses would be converged on to TSN through gateways
- All identified needs seem to fall within TSN capabilities/standards

Thank You!