DRAFT IEEE SA blog post

Time-Sensitive Networking for Aerospace Onboard Ethernet Communications

The IEEE Std 802.1DP™ / SAE AS6675 standard enables high-bandwidth communication networks for aerospace and defense platforms by leveraging Time-Sensitive Networking (TSN) over standard Ethernet.

Standard IEEE 802.3 Ethernet has been proven to be an efficient and cost-effective technology over multiple decades due to the economies of scale and the knowledge base of networking community across industries. Ever since its foundation, Ethernet has been constantly evolving to address the rising needs of the industry. As part of the evolution, IEEE 802.1 Time-Sensitive Networking (TSN) has been introduced to address time and/or mission critical applications, thus, extending the useability of Ethernet networks to aerospace, automotive, industrial automation, and professional Audio/Video deployments. In addition to the base standards specifying the technology, TSN profile specifications have been introduced to ease interoperability, deployment, and use of TSN in a particular application area. The IEEE Std 802.1DP™ / SAE AS6675 standard is such a profile specification targeting the aerospace and defense industry.

Modern aircraft depend on real-time onboard communications to perform critical vehicle and mission functions. The aerospace industry recognizes a need for an open standards-based, high-performance solution to interconnect an increasing number of digital components including sensors, actuators, controllers, processors, displays, and data concentrators. IEEE 802.1 TSN provides a standard Ethernet-based deterministic solution to not only enable higher Quality of Service (QoS), but also lower the size, weight, and power consumption with a converged zonal network architecture. TSN meets the modularity and open systems requirements that are essential to the evolution of the data distribution digital backbone in modern aerospace platforms.

To address the use of TSN for aerospace applications, the IEEE Standards Association (IEEE SA) and SAE International established a joint project that has developed the IEEE 802.1DP™ / SAE AS6675 "Time-Sensitive Networking for Aerospace Onboard Ethernet Communications" profile specification. This joint project brought aerospace industry and networking experts together to define a profile of TSN to meet the unique requirements for aerospace applications and enable interoperability across implementations. By selecting TSN features, defaults, and a common configuration scheme, the recently published IEEE 802.1DP™ / SAE AS6675 standard will benefit the developers of TSN products, OEMs integrating TSN in aerospace and defense platforms, and ultimately the users of such platforms.

IEEE Std 802.1DP™ / SAE AS6675 provides a Time-Sensitive Networking (TSN) profile specification for designers and implementers of aerospace IEEE Std 802.3 Ethernet networks to support a wide range of aerospace applications. As IEEE 802.1 standards are broad and intended for use in a variety of environments, this standard selects the features from IEEE 802.1 standards that are directly applicable to aerospace onboard networks, specifies how to use these features as part of a set of well-defined interoperable profiles, and provides guidance on configuration, management, and monitoring. In so doing, this standard facilitates communications within aerospace platforms to meet the reliability, bandwidth, latency, and synchronization needs of aerospace applications. It also provides necessary and valuable information to airframers, system

integrators, and suppliers to help with the design of aerospace systems with standard IEEE 802.3 Ethernet onboard networks.

"The approval of the IEEE Std 802.1DP™ / SAE AS6675 Time-Sensitive Networking (TSN) aerospace standard is a major step forward for the future of aircraft systems," said Jim Hvizd, Computing & Networking Leader for GE Aerospace. "This new standard gives the aerospace industry a clear, shared way to use high-bandwidth TSN Ethernet networking on airplanes, replacing custom, one-off network designs with a common, open approach. GE Aerospace is proud to have contributed to this standard, and we look forward to working with our customers to bring it into their next-generation platforms."

IEEE Std 802.1DP™ / SAE AS6675 is a great achievement made possible with broad participation from the aerospace and networking industry. This work is essential to the adoption of standard Ethernet bridged networks in onboard and in-vehicle networks for aerospace and defense use cases.

IEEE Std 802.1DP™ / SAE AS6675 is available at the [IEEE Standards Store](#) and at [IEEE Xplore](#).