TTTech

Press release

TTTech Aerospace contributed to new ECSS Time-Triggered Ethernet engineering standard for space applications

- TTTech Aerospace collaborated on the new European Cooperation for Space Standardization (ECSS) standard ECSS-E-ST-50-16C along with the European Space Agency (ESA), the Centre National d'Études Spatiales (CNES) and other major European Space Industry representatives, especially ArianeGroup, Airbus Defence and Space, Thales Alenia Space and RUAG Space.
- This new open standard ensures interoperability and compatibility in space programs.

Vienna, Austria, February 21, 2022: **The dedicated ECSS (European Cooperation for Space Standardization) working group has released its ECSS-E-ST-50-16C standard for Time-Triggered Ethernet for space applications in September 2021. This standard will make it easier for companies to implement Time-Triggered Ethernet networks in their applications. TTTech Aerospace has collaborated with the working group and contributed heavily to this new open standard.**

This ECSS Working Group comprises Europe's largest space agencies and most important industrial companies that integrate Ethernet networks which rely on fault-tolerant synchronization and deterministic packet routing as described in the Time-Triggered Ethernet (SAE AS6802) standard. The ECSS Working Group collaborated to create a common set of design principles to be used for future European space activities and programs based on Time-Triggered Ethernet on-board communication, simplifying the deployment and reuse of real-time Ethernet networking in space.

TTTech Aerospace had participated in this ECSS working group since 2016 and helped to further standardize the Time-Triggered Ethernet protocol for the use in launchers and satellites, while paving the way for human and robotic space exploration. The ECSS-E-ST-50-16C standard enhances the Time-Triggered Ethernet protocol (SAE AS6802) with space-specific requirements and tailors network devices configuration to promote their interoperability. TTTech Aerospace had already contributed to the SAE AS6802 protocol standardization and the Time-Sensitive Networking standardization in IEEE 802 and this key know-how was used together with the deep experience of the working group to adapt the generic SAE standard to the European space industry's needs.

"We have been advocates for open, standardized technologies since day one and we are proud to actively contribute to several well-known standards[1] that now benefit the space industry. ESA is one of the most significant actors in the European space sector and their support, together with major industrial partners, of the new standard is key for its success," says Christian Fidi, Senior Vice President Business Unit Aerospace at TTTech. "ECSS-E-ST-50-16C will ensure compatibility and interoperability between different Time-Triggered Ethernet hardware components for space applications. This is especially important for large-scale projects, such as Ariane 6 or NASA's Gateway, where several suppliers are involved, and where all the equipment needs to be connected seamlessly."

"Open communication standards, such as ECSS-E-ST-50-16C, foster interface compatibility between communication devices and components and aim at facilitating equipment design and development as well as seamless integration and test activities. A stable and community driven standard specification reduces long-term costs, lowers operational risks for suppliers and secures both large-scale integrators and equipment suppliers investments in compatible avionics units for a

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[1] In the aerospace and space sectors, TTTech Aerospace contributed to SAE AS6003 for the Time-Triggered protocol TTP®, SAE AS6802, ECSS-E-ST-50-16C for Time-Triggered Ethernet / TTEthernet®, and NASA's IASIS (International Avionics System Interoperability Standards). In addition, the company worked with IEEE on TSN (time-sensitive networking) standards, which are used in industrial automation as well as automotive and aerospace applications.

long time-span," says Marco Rovatti, Avionics and Data Handling Engineer, Electronic Department at ESA-ESTEC.

Time-Triggered Ethernet is becoming a widely accepted data networking standard in the industry, also thanks to its implementation in high-profile space programs. TTEthernet®, a Time-Triggered Ethernet technology, has been baselined in the "International Avionics System Interoperability Standards (IASIS)" by NASA and its space agency partners. It will be deployed in the avionics of NASA's Gateway and serves as single avionics data network in the European flagship launch vehicle Ariane 6.

Images

Caption: Logo TTTech (© TTTech Computertechnik AG). TTTech Aerospace is part of TTTech Computertechnik AG.
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Caption: "We have been advocates for open, standardized technologies since day one and we are proud to actively contribute to several well-known standards that now benefit the space industry. ESA is one of the most significant actors in the European space sector and their support, together with major industrial partners, of the new standard is key for its success," says Christian Fidi, Senior Vice President Business Unit Aerospace at TTTech. (Image © TTTech Computertechnik AG)
Download: https://www.tttech.com/wp-content/uploads/Christian_Fidi.jpg

Caption: Orion integration on top of Moon launcher (© ESA - S. Corvaja). Time-Triggered Ethernet is also used in NASA's Orion.
Download: https://www.esa.int/ESA_Multimedia/Images/2021/10/Orion_integration_on_top_of_Moon_launcher3

About TTTech Aerospace

TTTech Aerospace provides deterministic embedded network and platform solutions for aerospace and space applications. Its products have already completed over 1 billion flight hours in Level A safety-critical applications like fly-by-wire, power systems, avionics, engine controls and environmental control systems. Proven, mature solutions help customers in the aerospace and space industries to develop integrated, modular and scalable deterministic network platforms that increase safety, fault-tolerance and availability. In addition, integrated solutions reduce size, weight, power and cost (SWaP-C), allowing for easier handling of equipment and lowering total lifecycle cost.

TTTech Aerospace is part of TTTech Computertechnik AG, a leading provider of safe networked computing platforms. TTTech is the innovator of Deterministic Ethernet and a driving force behind the IEEE TSN and the SAE AS6802 Time-Triggered Ethernet standards. TTTech Computertechnik AG operates under the umbrella of the TTTech Group, a globally oriented group of high-tech

companies, founded and headquartered in Vienna, Austria. TTTech North America Inc, headquartered in Andover, MA, USA is part of TTTech Computertechnik AG.

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