Reaching for the sky with certified and safe solutions for the aerospace market

www.tttech.com
Advancing safe technologies, improving human lives

TTTech stands for reliability, robustness and safety. Our embedded databus and network solutions considerably improve dependable data communication and help you deploy your solutions more efficiently and profitably.

Electric aerospace, space, automotive and off-highway applications increasingly require closely integrated functions. New demands in terms of safety, availability and fault tolerance are supported by fully integrated electronics architectures.

TTTech solutions allow you to “do more with less” at faster time-to-market. TTTech provides customers with first-rate products and services for the development of integrated and modular platform embedded systems.

Worldwide cross-industry market leaders use TTTech’s deterministic network solutions in commercial production programs, for example in applications for the Audi A6, A7, A8, the Airbus A380 and A220, the Boeing 787 Dreamliner, the Bombardier Global 7500 and the Embraer E2, KC-390, Legacy 450/500.

TTTech’s aerospace products are certified according to DO-178B/C and DO-254 DAL A and provide an ideal platform for integrated architectures.

Our innovative solutions address complexity, enable modularity and scalability at lower lifecycle costs.

Cross-industry experience

Reliable networks for the aerospace, space, automotive, industrial and off-highway sector

Find out more about us:
www.tttech.com
TTTech supplies the internal communication of the Airbus A380 cabin pressure system. It has been designed to reduce operating costs over the lifecycle.

For the electric and environmental control systems on the Boeing 787 TTTech has been selected to support the development of a TTP-based data communication platform.

NASA’s Orion spacecraft deploys TTEthernet to facilitate the design of complex integrated control systems for a variety of distributed avionics applications.

TTTech has been chosen by the suppliers of the A220 fly-by-wire flight control and secondary power distribution systems to provide an integrated communication solution based on TTP.

Honeywell’s modular development platform MAC for cost-effective design of aerospace control systems (e.g. FADEC) is supported by TTTech’s products.

TTTech has been chosen by the supplier of the fly-by-wire flight control systems and the flight control computer to provide an integrated communication solution based on TTP.

Airbus Safran Launchers relies on TTTech’s radiation tolerant TTEthernet controller to handle increasing data rates of all avionics equipment onboard ESA’s flagship, Ariane 6.

Sikorsky uses TTTech’s rugged Deterministic Ethernet switches and end systems for next generation helicopters with advanced capabilities as demonstrated on the Raider S-97.

Thales’ advanced electronic interlocking system is based on TTTech’s time-triggered solution to provide new levels of safety and reliability.
ARINC 664 part 7 (AFDX®) defines a standard for deterministic data transfers in a network for safety-critical aerospace applications. It utilizes dedicated bandwidth-regulated traffic control while providing deterministic Quality of Service (QoS).

Based on standard IEEE 802.3 Ethernet, the technology includes full-duplex switched and profiled Ethernet, redundancy management and high-speed performance.

TTTech’s AFDX® COTS (commercial off-the-shelf) products play an integral part in routing bandwidth-regulated traffic through safety-critical networks with high-reliability and high-speed communication requirements.

Key characteristics

- DO-254 and DO-178B/C Level A
- DO-160G and MIL-STD-810G
- Highly efficient switch memory architecture reduces memory and power consumption
- End system: hardware-implemented redundancy management and profiled IP/UDP
- Full implementation flexibility
- AFDX® extended capabilities:
  - Up to 1 Gbit/s line rates
  - Smaller (μs range) and flexible BAG/jitter configuration options
  - Up to three channels support enabling TMR architectures

AFDX® products

Avionics Full-Duplex Switched Ethernet – ARINC 664 part 7

AFDX® product line

More AFDX® products online
www.tttech.com/products/aerospace-space

AFDX® is a registered trademark of Airbus. All other trademarks used herein are the property of their respective owners.
TTEthernet is a scalable, open real-time Ethernet platform used for safety-related applications and advanced integrated architectures. It sets new standards for flexibility, modularity and scalability in Ethernet-based systems.

This Deterministic Ethernet product line integrates standard Ethernet (IEEE 802.3), ARINC 664 part 7 and Time-Triggered Ethernet (SAE AS6802) into one solution for aeronautics applications.

The time-triggered technology of TTEthernet products enables hard real-time operation in safety-critical distributed systems with maximum flexibility and highly scalable architectures at substantially lower cost.

Key characteristics
- DO-254 and DO-178B/C Level A
- DO-160G and MIL-STD-810G
- Highly efficient switch memory architecture saves memory and power consumption
- High speed up to 1 Gbit/s
- Latency and jitter in μs range
- Up to three channels support enabling TMR architectures
- Fault tolerance synchronization
- Integrates three open standards with maximum flexibility:
  - IEEE 802.3
  - ARINC 664 part 7
  - SAE AS6802

TTEthernet products
IEEE 802.3 + ARINC 664 part 7 + SAE AS6802 (Time-Triggered Ethernet)

TTEthernet product line
More TTEthernet products online
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*These components support asynchronous deterministic Ethernet traffic similar to and 100% compliant to the Aeronautics standard ARINC 664 part 7.
TTP enables reliable distributed computing and networking for modern vehicle systems at lower lifecycle costs. This open modular control system platform technology supports efficient system reconfiguration, upgrades and growth.

SAE International has released the SAE AS6003 (TTP) standard for deterministic time-triggered communication. TTP (with 4 Mbit/s or 20 Mbit/s) offers substantially increased bandwidth compared to ARINC 429, MIL-1553 and CAN.

TTP provides distributed platform services which simplify the design of advanced integrated systems for time- and safety-critical applications. TTP communication controllers completed more than 700 million flight hours.

Key characteristics

- 700 million flight hours in DAL A applications
- TTP Classic 4 Mbit/s
- TTP high speed 20 Mbit/s
- Mature and proven in aerospace programs
- Open cross-industry standard SAE AS6003
- DO-254 and DO-178B Level A
- RS-485 physical layer up to DO-160F Level 5
- Highly efficient
- Bus and star topology
- Support for tightly coupled control loop

TTP product line

More TTP products online
www.tttech.com/products/aerospace-space

TTP Monitoring Node
TTP Development Cluster
TTP Powerlink
TTP Controller
TTP Simulate XMC/PCIe
TTP Monitoring Node
TTP Physical Layer
Software tools & embedded software
Ease-of-use and full integration

TTTech software tools for development & testing

TTTech software tools offer a powerful development and production environment for building fault-tolerant real-time systems. TTTech tools enable seamless design, configuration, data loading and verification/validation of TTP, AFDX® and TTEthernet-based networks.

Embedded software

TTTech's highly efficient embedded software components comply to DO-178B/C Level A. They can be seamlessly integrated with different software and hardware platforms and ARINC 653-based system architectures.

Configuration & verification

TTTech's easy-to-use verification tools for the aerospace market are based on our core technologies, the time-triggered Ethernet TTEthernet and the time-triggered protocol TTP. RTCA DO-178B/C verification tools verify the configurations for the airborne software.

Engineering, integration, certification & support

Our engineering involvement in large production programs ranges from standard product support, requirement capturing, trade studies, platform architecture design, development of communication components and integration to validation and certification support.

More about our software for development and testing
www.tttech.com/products/aerospace-space

TTTech software toolchain for TTE and TTP

TTEthernet distributed IMA Iron Bird
Reaching for the sky with certified and safe solutions from TTTech

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