



Networking Solutions for Integrated Substations

Use Case: TTTech Solutions for Substation Automation



www.tttech.com/energy





“ Substation automation is becoming as integrated as advanced systems in aerospace applications. TTEch’s Deterministic Ethernet networks support sustainable design of complex integrated systems at reduced effort. ”

*Dr. Mirko Jakovljevic
Business Development Manager
TTEch Computertechnik AG*

Predictable integration of complex functions is essential for the robust design of highly available and safe networked energy infrastructure

TTEch’s Deterministic Ethernet network solutions have a profound impact on system complexity and the reduction of design, integration, verification, certification and maintenance cost in integrated embedded systems.

Deterministic Ethernet enables effective integration of IEC 61850-based control and protection functions with GOOSE messages, sampled values and any other traffic (e.g. media, video or predictive maintenance) in one system without affecting critical protection functions. The testing and verification of protection functions after system modifications is viable at significantly lower cost and effort.



TTEch’s network devices, board level or rugged Ethernet switch products enable the design of integrated networks which provide full control of Quality-of-Service (QoS), latency and jitter for many parallel data streams at 100 Mbit/s and 1 Gbit/s. Due to the internal architecture the products provide a high level of network resource partitioning not supported by other Ethernet solutions. This allows the design of highly deterministic networks which can support all process bus requirements for sampled values or GOOSE messaging and enable the integration / unification of the Ethernet-based IEC 61850 station bus as well as process bus.



Separated Station and Process Functions

Unified Deterministic Ethernet Networking

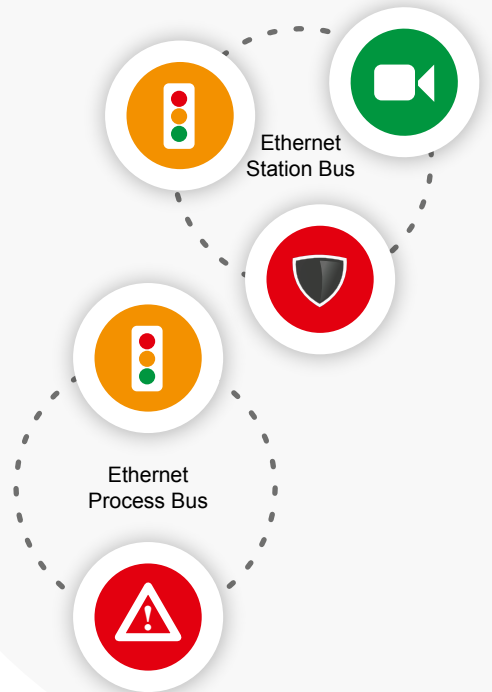
Typical substation automation is based on hierarchical station and process bus architecture, imposing significant limitation and complexity on integration of sampled value, GOOSE and other substation communication messages. In order to gain more flexibility for the functional integration of different functions, controls and protection within the systems, TTECH offers unified Deterministic Ethernet solutions, which serve as an integration platform for all substation functions within the existing or optimized network architectures:

- Station integration (e.g. SCADA, IP cameras, maintenance, other traffic)
- Station and process bus integration: Mission/time-critical functions (e.g. control functions, data multiplexers)
- Protection- or safety-critical functions (e.g. protection relays)

Our networking solutions further enable robust integration of protection and control functions using IEC 61850. Critical functions cannot be affected by network workload, rogue components or denial-of-service (DoS) cyber-attacks.

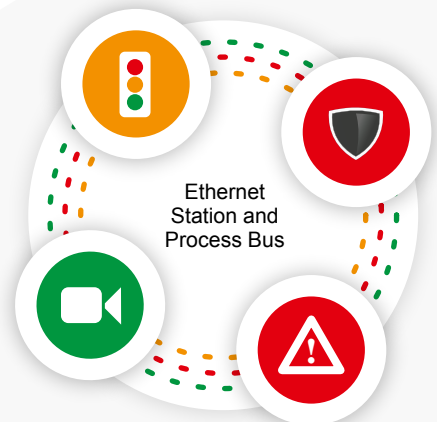
Key Benefits

- Low integration and maintenance effort
- Predictable integration of critical functions
- Enables hosting of functions with different QoS requirements
- Supports design of highly available real-time architecture
- Complexity reduction: Clean interfacing and predictable network bandwidth use
- Flexible system growth, upgrades and extensions



- Media
- Control
- Protection
- Safety

Convergence of Station and Process Functions



Improving Environmental Sustainability With Solutions for High-Availability Applications

Europe, Austria – Headquarters

Phone +43 1 585 34 34-0
industrial@tttech.com

North America, USA

Phone +1 978 933 7979
usa@tttech.com

Asia, Japan

Phone +81 52 485 5898
office@tttech.jp

Asia, China

Phone +86 21 5015 2925-0
china@tttech.com

www.tttech.com