



TXS
Compact

Built for nuclear
Built on success
Built for the future





A platform built on success

The goal is secure, reliable and safe plant operation for decades.

TXS Compact is the instrumentation and control platform that helps get you there.

Are you preparing for long-term operations by modernizing equipment and systems? Or are you designing and building the next generation of nuclear plants? Either way, you need a safety-related instrumentation and control (I&C) system that offers high performance in a compact and flexible design while meeting the latest regulatory requirements for ease in licensing.

Framatome developed the TXS Compact safety I&C platform based on field programmable gate

array (FPGA) technology. This innovative and proven solution for Safety Class 1 systems is competitive, robust, adaptable, durable and scalable. A variety of enclosures and configurations allow for a compact footprint. The simplicity of its design makes qualification easier for new build projects at existing nuclear plants. TXS Compact relies on a qualified function block library, and a qualified digital tool chain to implement any I&C function for nuclear power plants. It can also be used to build both technologically diverse and autonomous systems.

Worldwide experience & expertise

You know the expertise of Framatome — our decades of experience developing, manufacturing and maintaining I&C systems as well as our fleet-wide implementations of digital I&C modernizations.

We've completed more than 450 comprehensive system installations worldwide, including over 250 digital I&C upgrade projects. That's more recent and relevant experience in performing digital upgrades for existing plants than any other supplier.

With the commissioning of our first TELEPERM XS system in 1998, we took nuclear power plant operation to the next level.

Since then, we've developed platforms that integrate seamlessly into existing systems, optimizing performance, safety and security, while allowing for easy upgrades.

Now we've done it again with TXS Compact.

New platform — same certainty

Building on the foundation of a proven platform with over 25 years of documented success, TXS Compact is fully and natively compatible with TELEPERM XS. That means the same safety principles and the same ease of licensing.

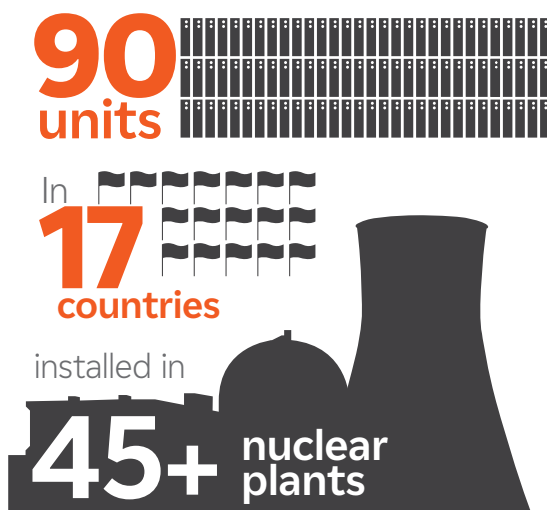
TXS Compact also received a Safety Evaluation Report (SER) from the U.S. Nuclear Regulatory Commission. This comprehensive review of the platform's design, architecture, industrial chain and safety attributes confirms that it meets rigorous regulatory requirements for safety-related systems in U.S. nuclear plants.

The solution is developed 100% in-house. That ensures engineering ownership, long-term product availability and ongoing maintenance.

The entire engineering and supply chain system, and production infrastructure for this product are industrialized and well-established for decades. They are all controlled by Framatome, improving lead time and component availability. Our continuous support of all digital installations ensures the long-term availability of spare parts and backward-compatible upgrade solutions, and enhanced future life-cycle management for the lifetime of the plant.

When you decide on TXS Compact, you are getting a comprehensive I&C solution for the long run.

TXS Compact | Built on the proven TELEPERM XS platform



Developed for nuclear and built to last ...

TXS Compact has been developed from its initial conception to consider the requirements of international standards, in particular IEC standards for nuclear I&C, and IEEE too. It's qualified and created with the expectation of a lifespan measured in decades, not years.

The hardware is robust and has been type-tested according to a qualification program which meets IEC, IEEE, KTA, and RCC-E standards, with respect to functional, climatic, EMC, and seismic requirements. Validation and testing activities are performed independently from the platform development and implementation team.

It's been specifically designed from the ground up for the nuclear industry, facilitating licensing and regulatory authorization.



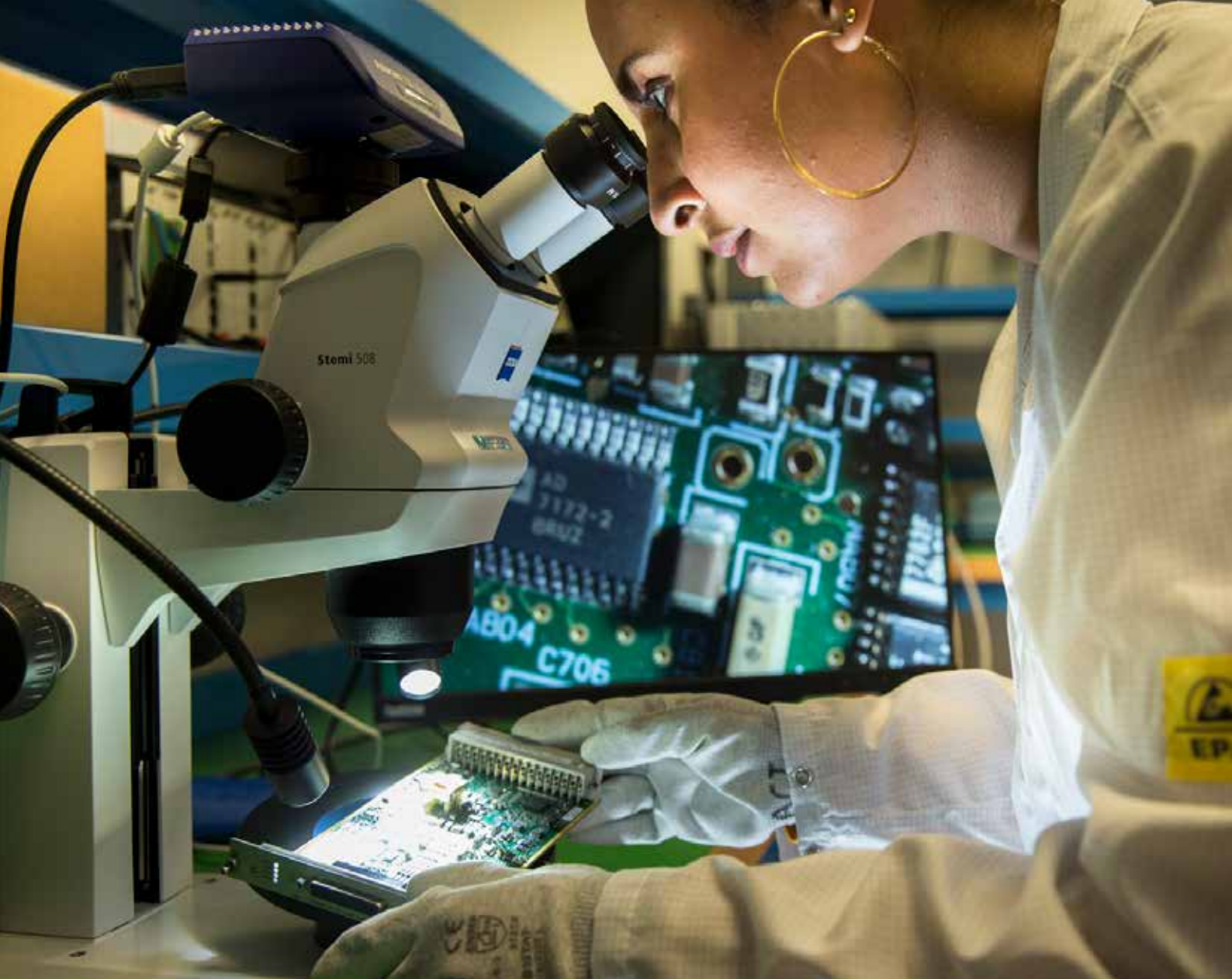
... with adaptable flexibility and licensing assurance

> The TXS Compact platform is based on FPGA technology.

This modularity, along with the system's qualification assets and documents, allows for easier qualification, whether you are constructing a framework from scratch or performing digital upgrades to your existing instrumentation and control. The TXS Compact platform received its SER from the U.S. NRC, and TÜV SÜD certification to IEC 61513.

That means it's modular, versatile and can be reconfigured as many times as you need over the lifetime of the system. Plus, the generic controller allows for configuration changes to the application alone — so you can change on the fly and modify parameters with no impact on the prequalified product.





Cost-effective on multiple levels

What gives TXS Compact its flexibility is also part of what makes it such a cost-effective platform. Self-diagnostic, permanently running self-monitoring detects potential errors in the hardware and FPGA HDL program. This significantly reduces the need for periodic testing and calibrations, making it maintenance-free, saving you money over the lifetime of the equipment. The FPGA base also makes the platform less prone to obsolescence.

TXS Compact saves money on cabling, as only one cable is needed to the rack. That is due to the outstanding signal processing performance provided by the combination of FPGA and the compact 3U form modules. The environmental qualification also means that TXS Compact racks can be situated close to the sensors, shortening the cable needed, where possible.

Our extensive experience with the licensing process means a cost-effective path to approval is clearer. It lowers project risk while increasing schedule and cost certainty for you.

Installing TXS Compact, whether for new plant construction or current plant modernization, will lower operating costs by improving reliability.

➤ All these features, along with the competitive total cost of ownership, means this platform quickly pays for itself.



For the future of nuclear

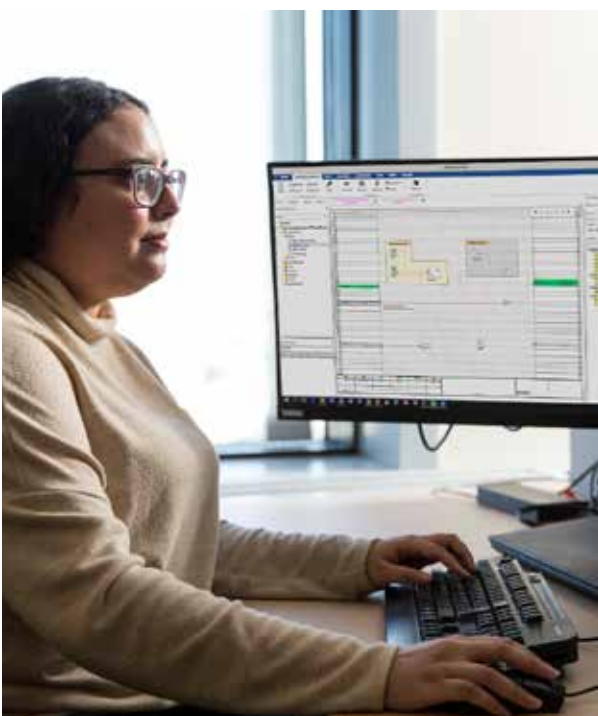
The next generation of power generation, whether small modular reactor (SMR) or advanced reactor, will require great adaptability in all I&C designs. TXS Compact supplies that adaptability.

Small form factor and industrial 3U racks, along with multiple output modules and interfaces, provide a compact footprint that can be used for a variety of enclosures, from recycled racks and full-height cabinets to small wall-mounted boxes.

That compact footprint is also flexible, thanks to remote I/O sub-racks and networking, which allows for many types of remote monitoring.

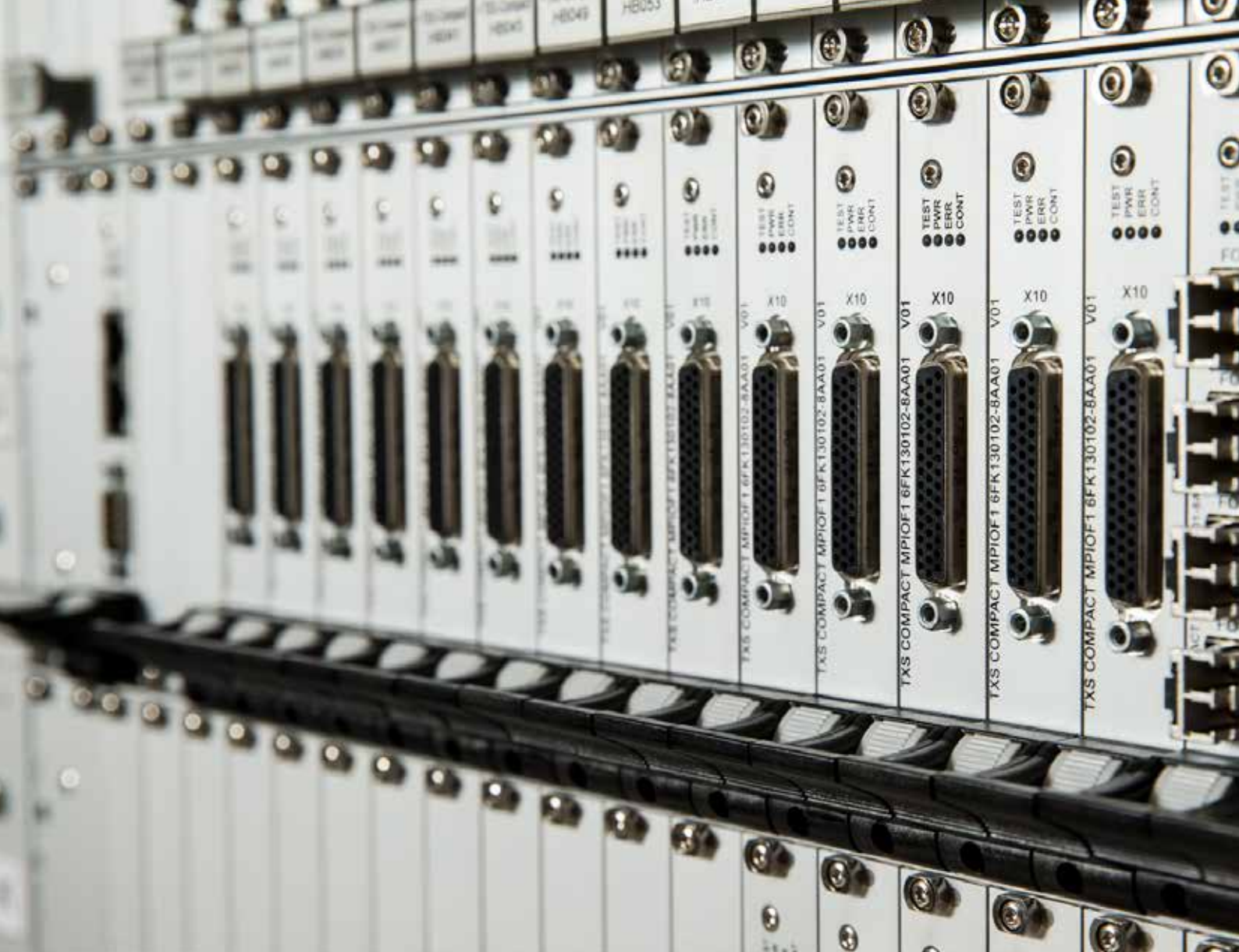
Plus, TXS Compact's design not only takes up less space, it operates using front access to racks; allowing back-to-back or back-to-wall cabinet configurations.

Security you can depend on



Because of its initial design to nuclear standards, TXS Compact provides greater safety and cybersecurity than other I&C platforms. Co-designed with cybersecurity experts to have an unprecedented level of self-reliance against external attacks, it has advanced, intuitive tools featuring standardization, modularity, integrated configuration management, multiple interfaces and a wide range of function block types.

➤ **TXS Compact is developed 100% in-house so there is no external IP and no black box. All of that, along with end-to-end authentication of changes, lowers operational risk.**



Customized systems

The flexibility and durability of TXS Compact is also available for other, less classified (e.g., non-1E, non-1E with special requirements, B/C) options for instrumentation and control.

The high performance and compact footprint of TXS Compact allows for advantageous replacement of industrial PLCs while solving the challenge

of qualification and maintenance in a nuclear requirements environment. Plus, TXS Compact's switchable data diode provides multiple isolated channels and clear network separation between safety and non-safety systems, reducing the risk of safety system interference during I&C system operation and maintenance.

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Framatome is an international leader in nuclear energy recognized for its innovative, digital and value added solutions for the global nuclear fleet. With worldwide expertise and a proven track record for reliability and performance, the company designs, services and installs components, fuel, and instrumentation and control systems for nuclear power plants. Its more than 22,000 employees work every day to help Framatome's customers supply ever cleaner, safer and more economical low-carbon energy.

Visit us at www.framatome.com, and follow us on LinkedIn.

Framatome is owned by the EDF Group (80.5%) and Mitsubishi Heavy Industries (MHI – 19.5%).



Learn more about
our I&C solutions.

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