

AMSAC

ATWS Mitigating System Actuation Circuitry

The Framatome AMSAC system enables plant operators to enhance the safety of their plant and mitigate consequences of ATWS events, while meeting regulatory and technology diversity requirements.

Challenge

Regulations require that nuclear power plant operators incorporate specific systems in the design and operation of their plants to reduce the risk from anticipated transients without scram (ATWS) events. The AMSAC equipment must be diverse from the reactor trip system to perform reliably and independently, from sensor output to the final actuation device.

Solution

The Framatome AMSAC non-safety application, based on the TELEPERM XS Compact platform, provides operators a diverse option from traditional software by incorporating advanced FPGA-based technology. The traditional software-based systems provide fast and consistent response time ensuring actuation is quick and reliable. Using this application reduces the likelihood of the plant's failure to shut down the reactor following anticipated transients and mitigates other consequences of an ATWS event, helping ensure that the reactor remains safe and stable. Our solution is:

- Designed for nuclear safety applications
- Qualified Class 1 under the umbrella of IEC standards
- 100% developed and owned by Framatome
- Intuitive with a qualified library of function blocks
- Implemented with pre-qualified, simple system architecture and few module types
- Able to be put in new or existing 19-inch cabinets with densely packed 3U racks

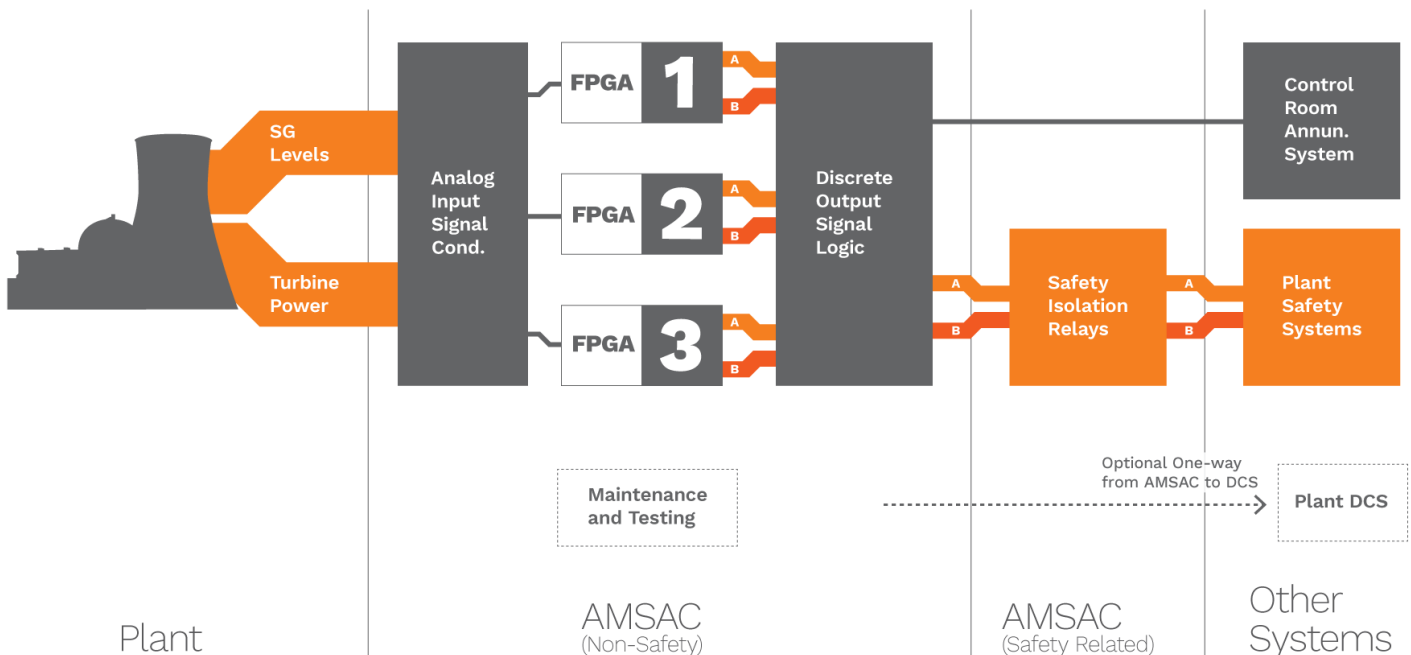


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Customer benefits

- Fully developed and owned by Framatome, ensuring long-term availability with no third-party IP concerns and full control over the product lifecycle, including whitebox licensing.
- FPGA technology offers high flexibility, making the system resistant to obsolescence.
- No re-qualification required after configuration changes.
- Delivers deterministic behavior with precise execution times.
- Intuitive GUI reduces engineering time.
- Graphical visualization enhances operator traceability.
- Automatic self-tests and diagnostic features minimize the need for manual periodic testing.
- Secure against external disruptions through predefined operational modes.
- Front-access design allows easy maintenance and flexible arrangements.
- Enhanced cybersecurity with cryptographic keys and a one-way data diode.

AMSAC System Architecture



Technical information

TXS Compact was developed in line with the IEC standards (IEC 61513, IEC 62566, IEC 60987, IEC 60880, etc.). It is made up of four types of modules which can be assembled in line with requirements:

- Binary and Analog Input/Output
- Processing
- Service/Maintenance/Diagnostics/Modbus

Communication within the rack uses a backplane, and external communications uses the front panel.

- Standard industrial format: 3U/19 inches
- Configurable processing cycle time from 4-2002 ms depending on the application

- Multiple configuration options to extend I/O capabilities:
 - Up to 17 I/O boards in single-rack configuration
 - Up to 71 I/O boards in 3-racks I/O expansion configuration (12U)
- Up to 16 processing network links per automation unit.
- Application is programmed solely using function block diagram programming (library of 85 pre-qualified function blocks).
- Engineering tools include a simulator for testing the application.

Key Figures

2,400 I&C professionals at **21** sites in **10** countries.

System response time as quick as **6** milliseconds.

Up to **71** I/O boards per automation unit.

Analog channel accuracy of **±0.35%** of 4-20 mA ranges at operational temperatures.

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Your performance
is our everyday commitment

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