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## Solution Brief



# Tokamak Diagnostics Data Acquisition Systems

Modern experimental Tokamaks must be equipped with a broad array of diagnostic instruments to provide the measurements necessary to control, evaluate, and optimize plasma performance. These requirements demand high performance, scalable and flexible data-acquisition systems, and high-speed signal processing.

# Tokamak Diagnostics Data Acquisition Systems

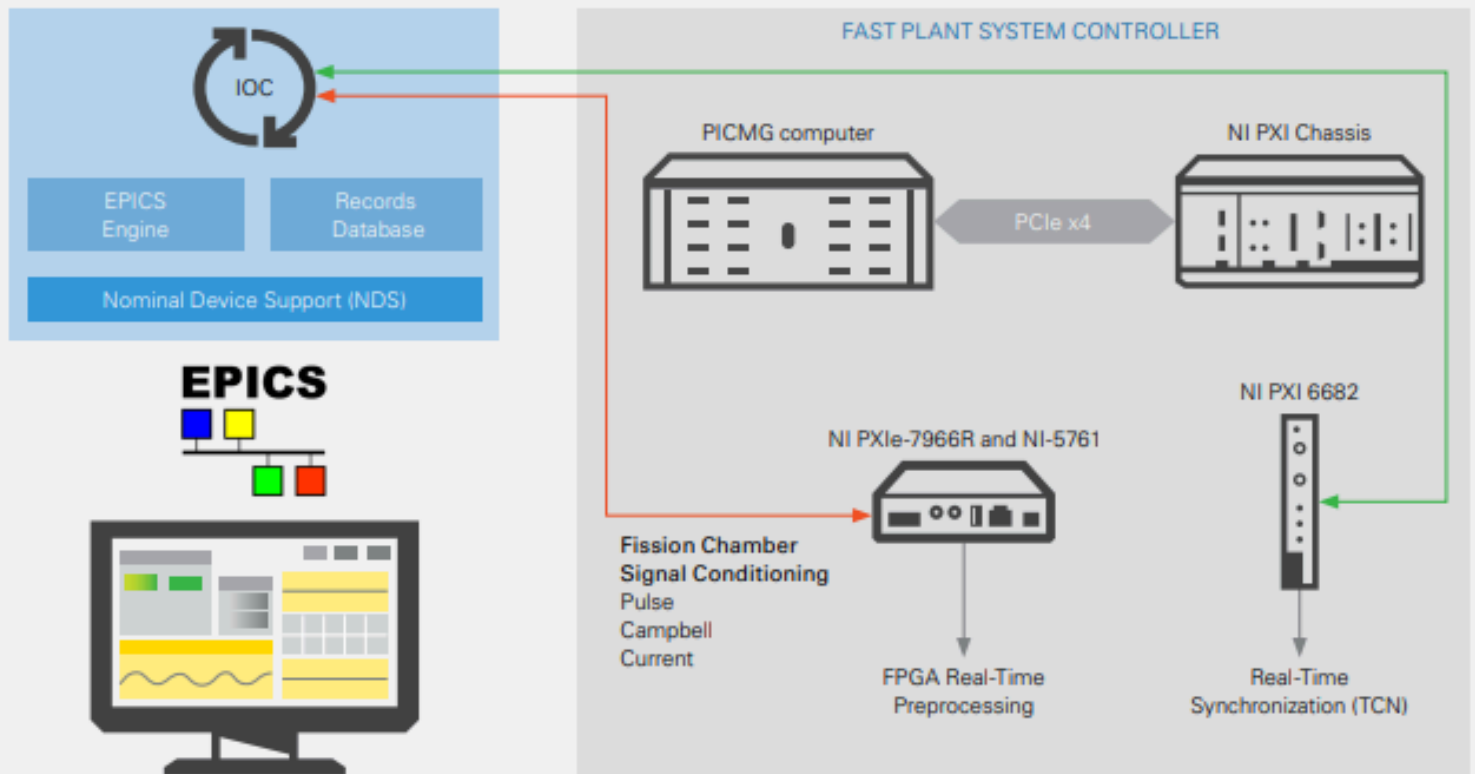
With the NI platform, you can measure a broad variety of signals, provide signal conditioning, and conduct high-performance computing to build customized diagnostic instruments. You also can reduce instrument development time and resources while improving reliability and availability by using NI's commercial off-the-shelf (COTS) solution

## Application Requirements

- Customizable high-performance measurements and high-speed signal processing
- Ability to meet demanding schedule, cost, and RASM targets
- Integration with plasma control applications such as EPICS

### ITER Neutron Diagnostics

#### ITER Fast Plant Controller Hardware and Software Components



# The NI Advantage

Build a customizable and scalable data acquisition system to enable high-performance measurement and computing requirements.

Conduct high-speed signal processing with the high-level language programming of a state-of-the-art FPGA.

Gamma and neutron radiation exposure testing performed under an ITERsupported project.

## The NI Solution

### Measurement Devices

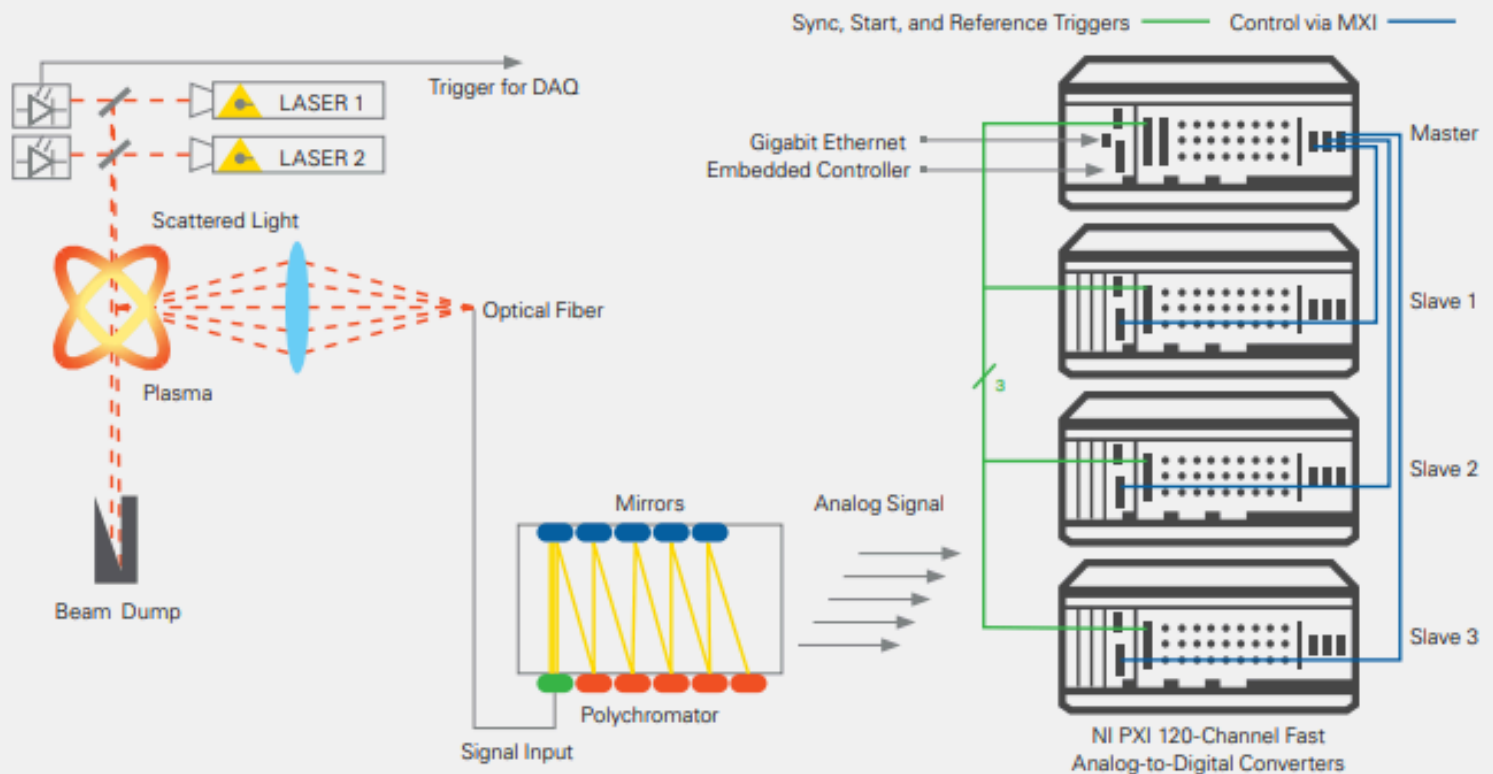
Account for broad measurement I/O needs with PXIe and FlexRio, backed by a LabVIEW-programmable FPGA and 64-bit Linux device drivers.

### Comprehensive Options

Utilize a single platform for data acquisition, fast controllers, timing and synchronization, and machine-control needs.

### Global Support

Accelerate development and deployment by accessing world-class technical support, proficiency, and training, along with repair and calibration services.

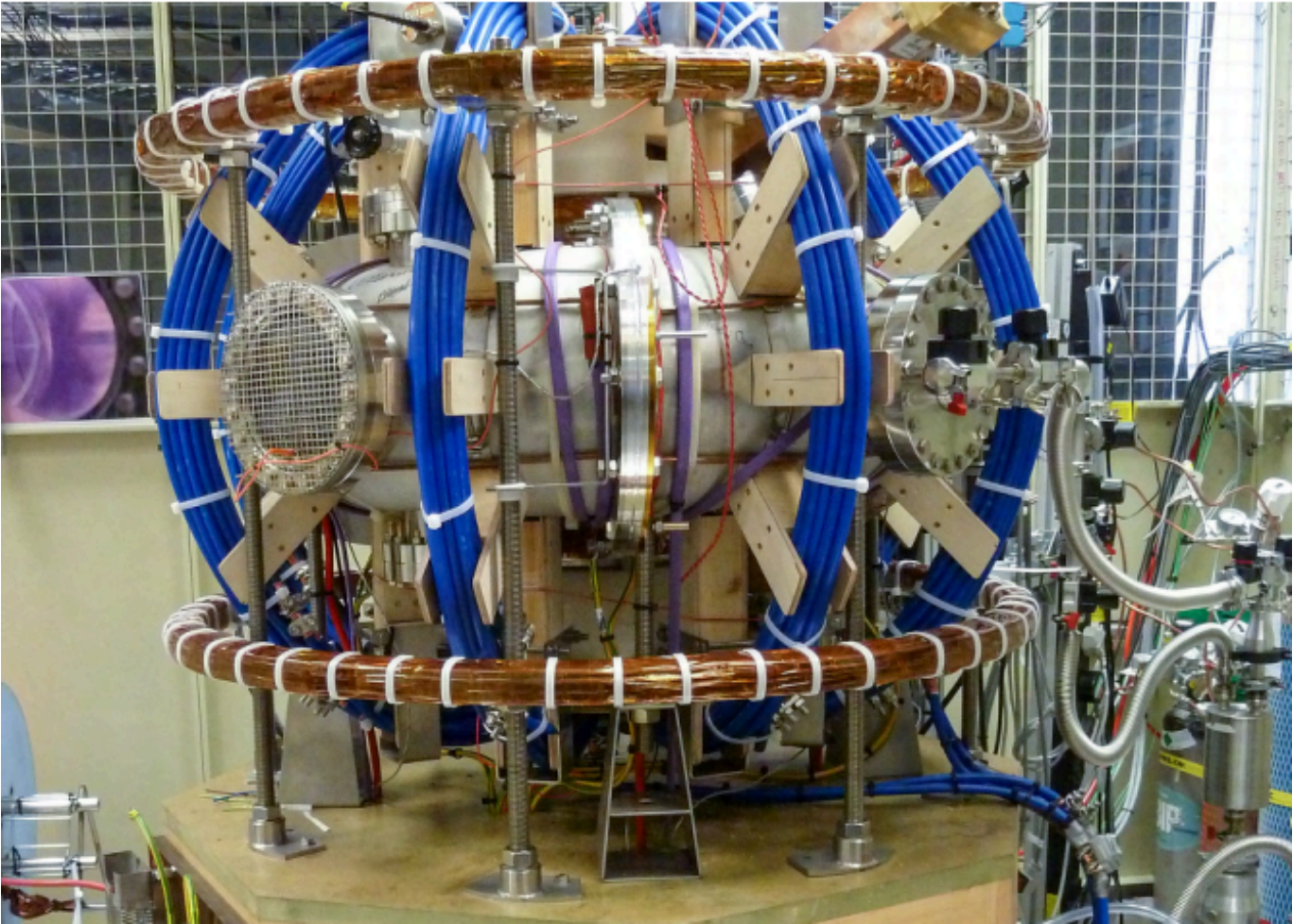


Thomson Scattering Diagnostics System, Institute of Plasma Physics, Czech Republic

"All channels from all chassis are tightly synchronized with the reference clock from the NI PXI-6653. Using NI-TC1k technology and built-in phase-locked loops, we can achieve less than 300 ps interchannel skew, even in this high-channel-count system."

**Milan Aftanas**  
Institute of Plasma Physics, Czech Republic





## System Integration on Your Terms

NI offers a variety of solution integration options customized to your application-specific requirements. You can use your own internal integration teams for full system control or leverage the expertise of our worldwide network of Alliance Partners to obtain a turnkey system.

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## NI Services and Support

- Consulting and Integration
- Turnkey Solution Delivery and Support
- Repair and Calibration
- Global Support
- Prototyping and Feasibility Analysis
- Training and Certification

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