MIRION Connect AMERICAS 26

Annual Users' Conference

ADVANCING RADIATION SAFETY. EMPOWERING PROGRESS.

M Resort, Henderson, NV | June 15 – June 18

MIRION TECHNOLOGIES

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Advancing Radiation Safety. Empowering Progress.

Digital Nuclear Instrumentation System

Westinghouse/Mirion Solution

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MIRION Connect 26 AMERICAS
Annual Users' Conference

Mirion Connect | Annual Users' Conference 2026

Henderson, NV

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Digital NIS Overview

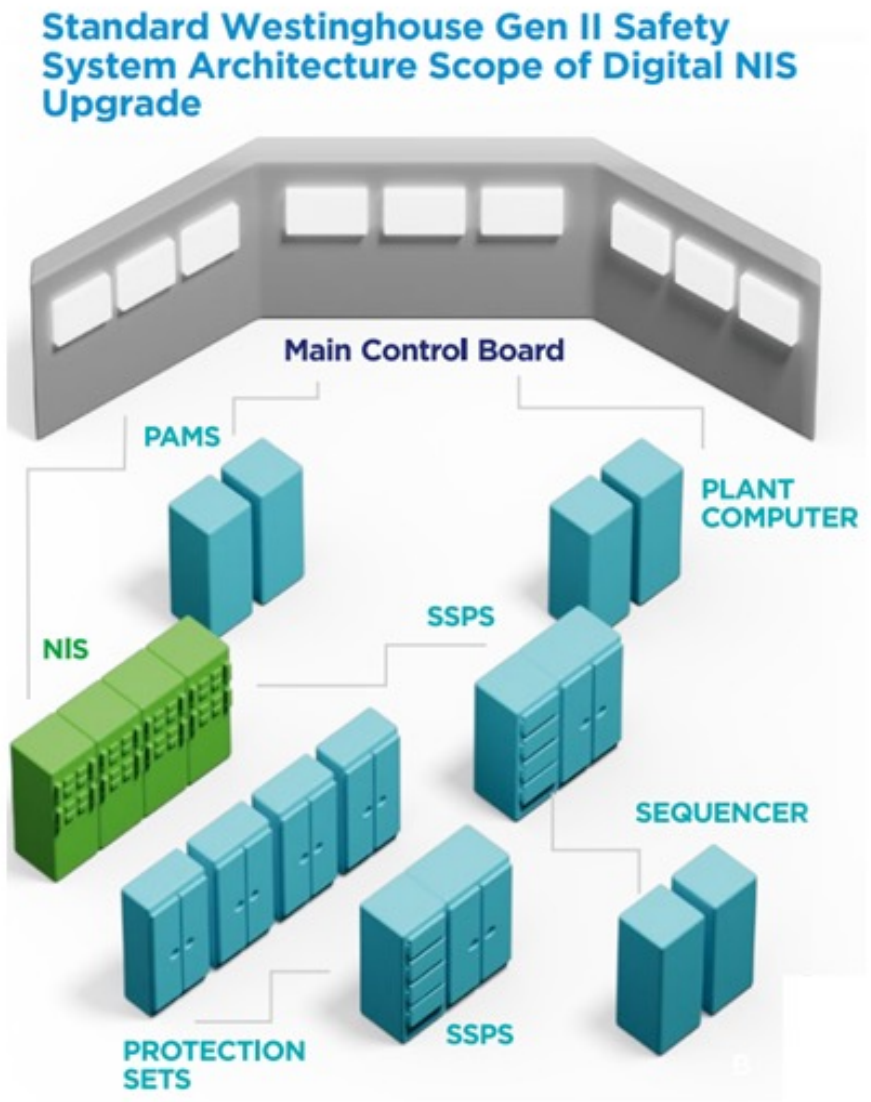
Introduction

Westinghouse and Mirion are collaboratively developing a digital replacement of the Westinghouse analog nuclear instrumentation system (NIS) drawers using ProTK™

Digital NIS Solution Overview

Replacement Overview

- *Direct digital replacement utilizing the Mirion proTK™ series platform*
- *Digital Drawer-for-Drawer replacement of legacy Westinghouse (SR/IR/PR) NIS drawers*
  - *Requires no changes to system architecture*
  - *Meets existing functional and licensing design basis*
- **Standard Licensing** *using Westinghouse Topical Report*



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Why Move to Digital?

Legacy Analog NIS System

- *Original analog NIS based on antiquated technology and nearing end of service life*
- *Hardware-based analog signal processing with limited diagnostics and frequent manual calibration requirements*
- *Increasingly costly to maintain — obsolescence management, recurring analog bistable calibration, and channel out-of-service time for calibration*
- *Equipment originally designed in the 1960s, with a declining pool of trained technicians*

Digital NIS Replacement

- *Mirion proTK™ platform — 400+ drawers deployed, 4,000+ operating years of proven service*
- *Improved accuracy and reliability with built-in redundancy, diversity, self-diagnostics, and integrated test functions*
- *Lower trip risk and operating costs — no analog bistable calibration; ion current calibration without taking the channel offline*
- *Drop-in, drawer-for-drawer replacement — minimal impact on operations, procedures, and training; supports phased modernization*

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Platform Overview

ProTK™ Platform Overview

- *Scalable, 19-inch rack-mounted multiprocessor platform for neutron flux monitoring*
- *Modular, third-party compatible architecture enabling 1:1 form-fit-function replacement*
- *Deterministic real-time performance with fixed 2.5 msec and 5 msec cycle times*
- *Developed, qualified, and certified to international nuclear safety standards for Class 1E, Category A applications*
  - *System architecture: IEC 61513 / IEEE 603*
  - *Software: IEC 60880 / IEEE 7-4.3.2, IEEE 1012*
  - *Environmental / seismic: IEC/IEEE 60780-323, IEC/IEEE 60980-344*

✓ *Simple & Clear Design*

✓ *Deterministic & Fast*

✓ *Reliable Operation*

✓ *Safety-Qualified*

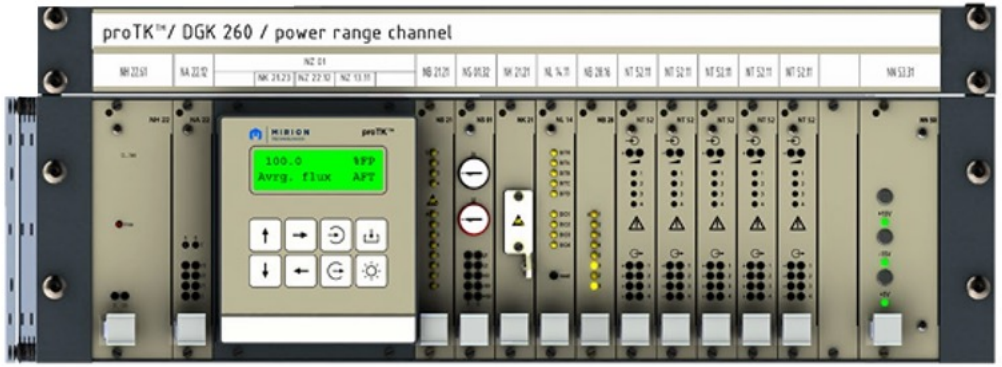
✓ *Simplified Testing*

✓ *Independent V&V and Certification*

Reduced Operational Burden

Upgrade benefits

- *Digital Technology eliminates or reduces manual tasks common with analog systems such as:*
  - *Technical Surveillances*
  - *Daily calorimetric calibrations*
  - *Gain potentiometer replacements*
- *Self-Testing features simplify surveillance testing via front-panel HMI,* **reducing outage critical path risk**
- *Digital setpoints remove the need for bistable calibrations and ion current calibrations can be performed without taking channels offline, helping* **lower plant trip risk**



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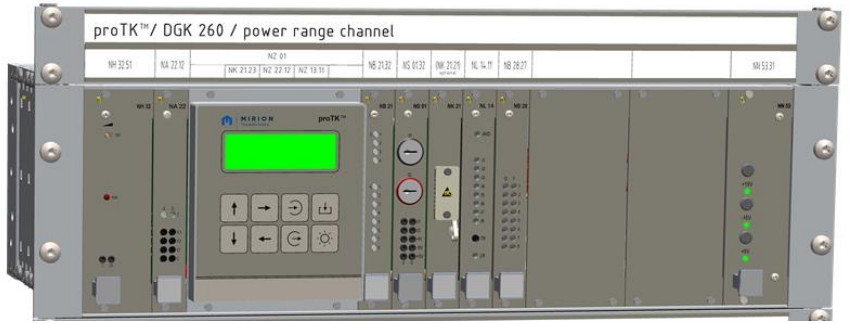
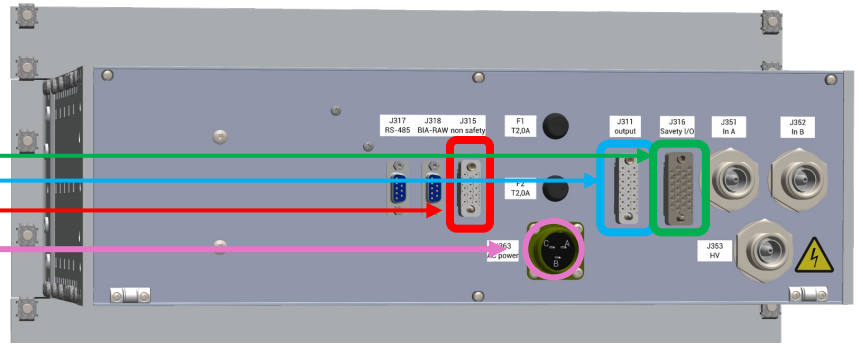
Designed for Easy Integration

Power Range “A” Analog Drawer

Power Range “A” Digital Drawer





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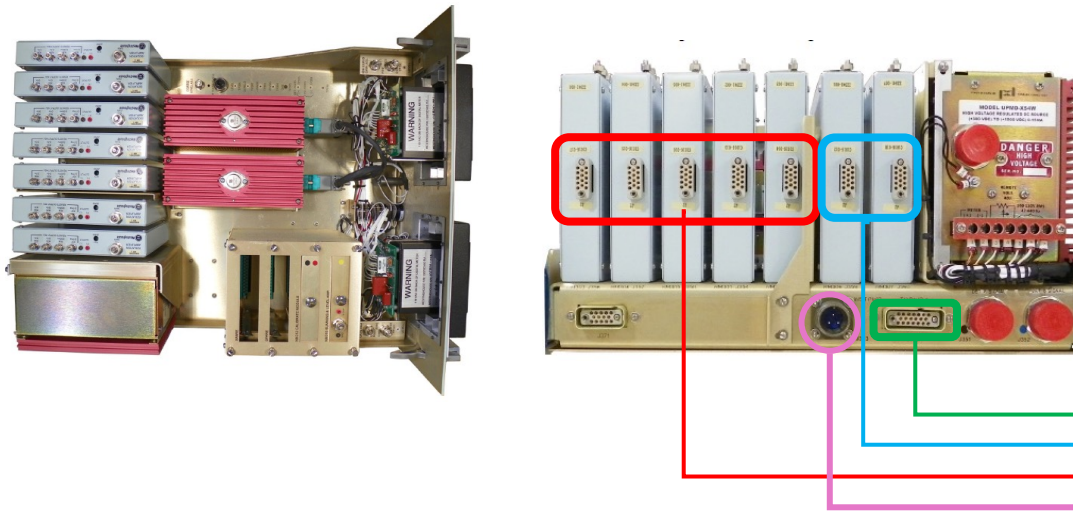
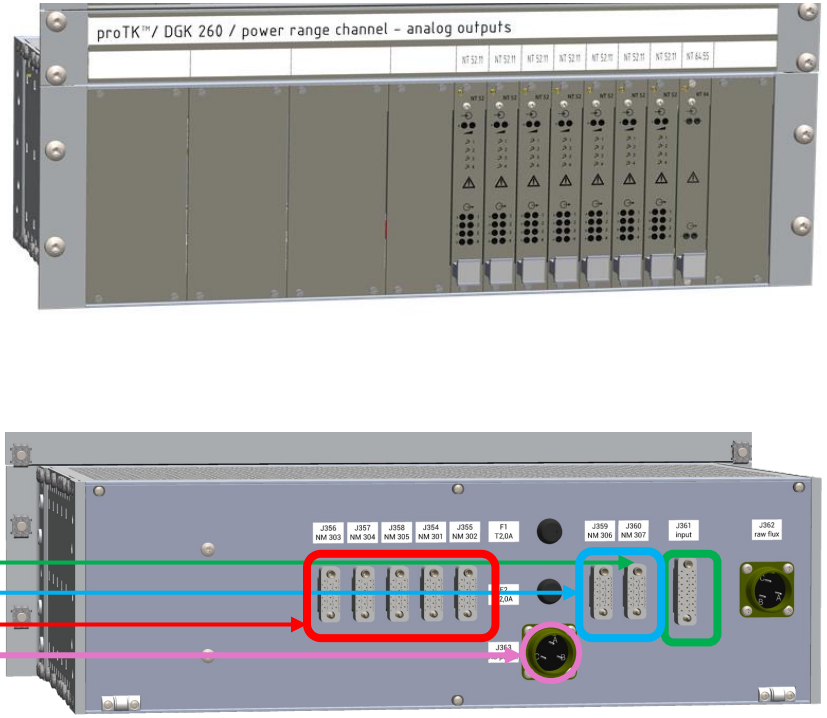
Designed for Easy Integration

Power Range “B” Analog Drawer



Power Range “B” Digital Drawer



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Digital NIS Overview

Power Range (DGK 260) Conceptual Design

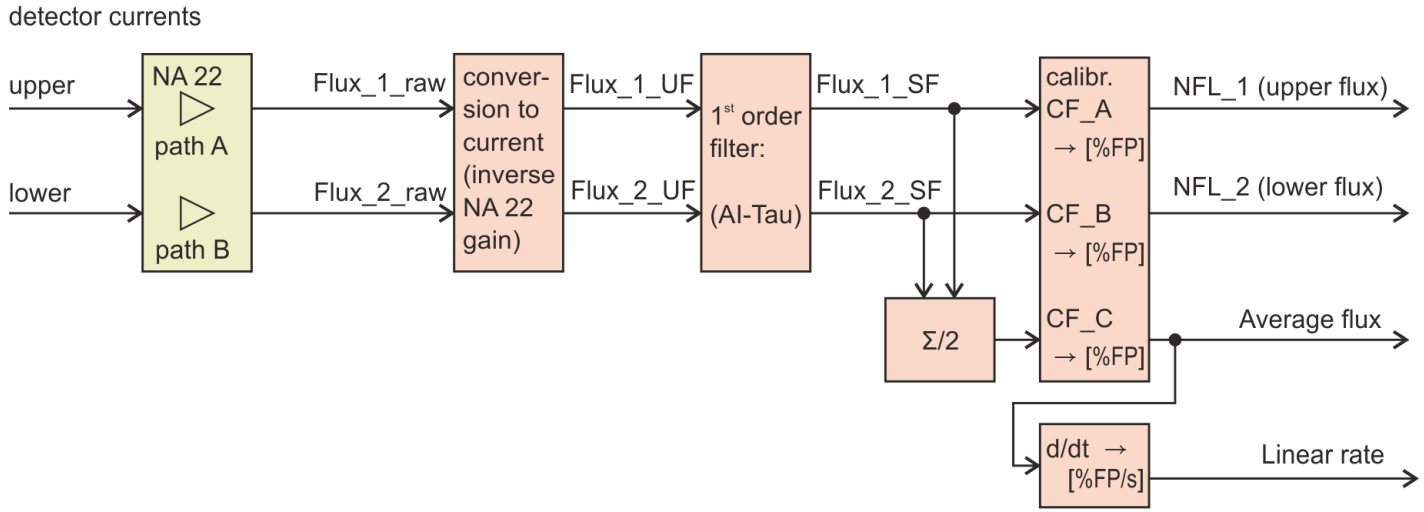
- *Channel upgrade consists of two main components:*

1. **proTK™ Power Range DNIS Unit**
   - *Core signal processing unit — fits in the existing console*
   - *“Brains” of DNIS – fits in current console*
   - *Hosts primary plant I/O interfaces*
   - *Integrates CPU, DSP, A/D and D/A conversion, and operator interface*
   - *Reuses existing plant cabling — no rework required*
   - *Built-in provisions for channel blocks, channel-on-test, and related surveillance function*
2. **Bistable Interface Assembly (BIA)**
   - *Form-fit-function replacement for legacy bistable circuits*
   - *Compact module mounted at the rear of the console*
   - *Driven by the proTK™ unit with closed-loop status feedback*
   - *Accepts existing J312 / J314 bistable connectors — no field rewiring*
   - *Optional integrated bypass test panel*

Digital NIS Overview

Digital NIS Power Range Functions

- *Built in Analog to Digital Converters*
- *Analog and Binary Outputs*
  - *Upper and Lower Flux*
  - *Diverse Flux Output*
  - *Average Flux*
  - *Linear Rate*
  - *Alarms and Trips*
- *Digital Programming*
  - *Set & Reset Setpoints*
  - *Ion Current Adjustment*
  - *Key Lock Protection*



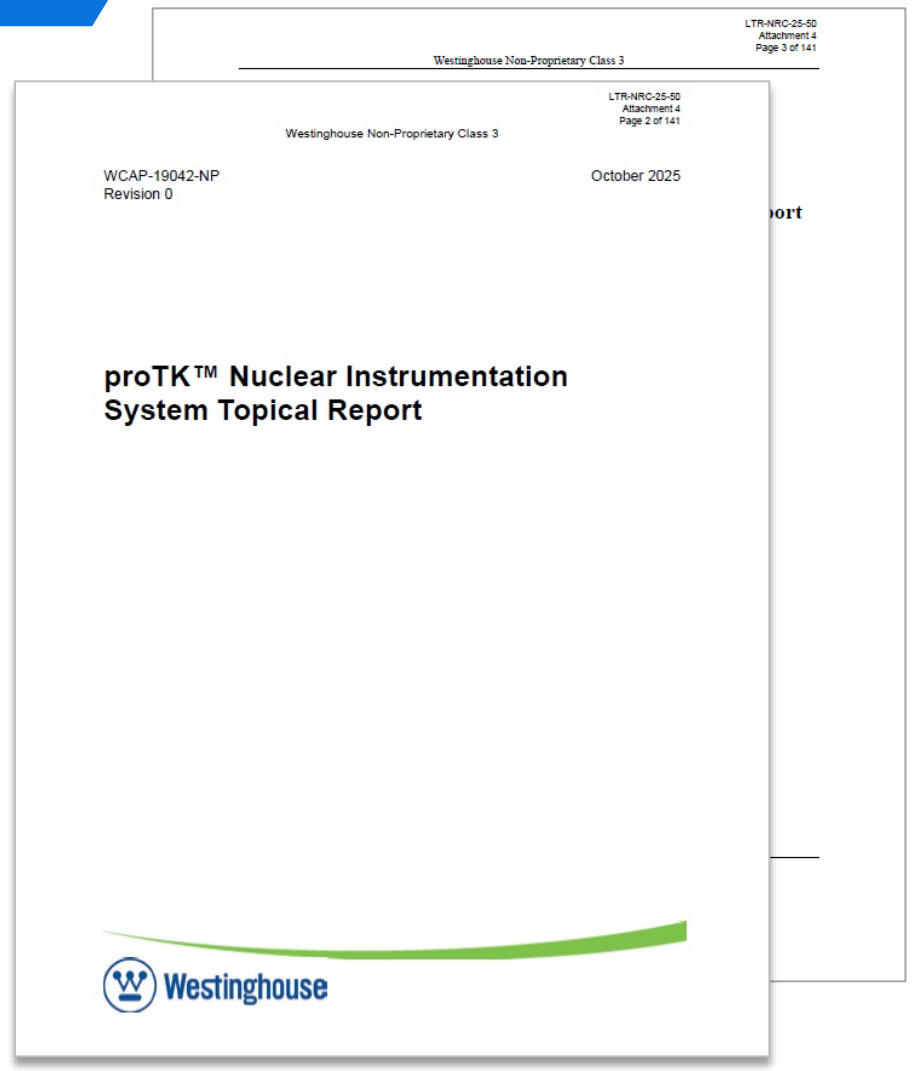
Licensing Update

Licensing Status

Topical Report

- *WCAP-19042-P and WCAP-19042-NP, Revision 0, "proTK™ Nuclear Instrumentation System Topical Report"*

- *Submitted to the NRC in October 2025*
  - *Currently in the NRC Audit Phase of the review*
  - *Safety Evaluation (SE) –A (Approved) Topical Report expected in* **mid-2027**



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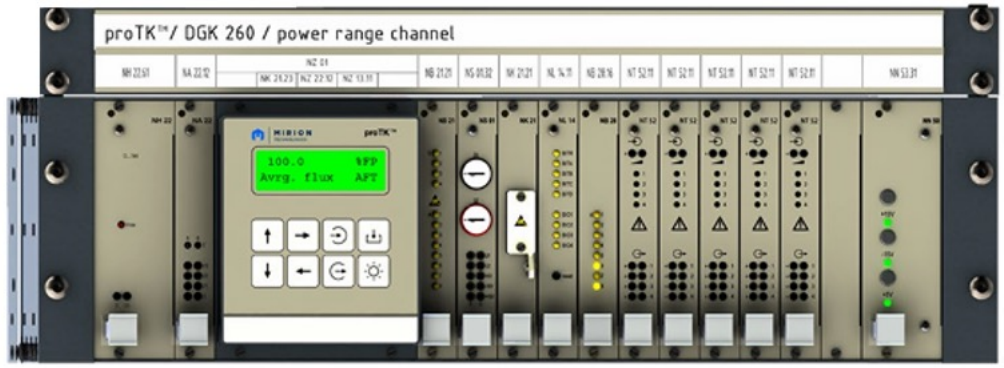
Summary

Digital NIS Summary

Digital NIS Replacement Summary

- **Direct digital replacement utilizing the Mirion proTK™ series platform**
  - *Seamless Integration*
  - *Enhanced Performance*
  - *Built-in Safety and Reliability Features*
  - *Expanded Capabilities*
  - *Reduced Operational Burden & Lower Trip Risk*
- **Standard Licensing**
  - *Approved Topical Report mid-2027*



Meets Existing Functionality

Provides Enhanced Features

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Questions?

Learn more about Westinghouse I&C products and services at:

Digital Nuclear Instrumentation System Brochure

The ex-core Nuclear Instrumentation System (NIS) drawers for Westinghouse nuclear power plants, developed in a strategic partnership between Westinghouse and Mirion Technologies, are based on high-performance proTK™ platform from Mirion Technologies.

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Thank you