AI in Instrument and Control Projects Training Course: Pilot, Acceptance and Handover

31 May – 4 June 2027
Rome

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Programme Summary

AI in instrument and control projects is the subject of this one-week training course for instrumentation, control and project engineering managers, ending in a delivery file for one AI-enabled instrumentation use case. Plants add soft sensors, anomaly detection and predictive maintenance to instrument scopes, yet pilots often stall at acceptance or handover because data, ownership and safety boundaries were never settled. The programme moves from use case selection through data readiness, pilot design, acceptance testing and handover, using prepared plant data. Mars Training Centre UK delivers this programme on AI in instrument and control projects to mixed-organisation cohorts.

The Business Case

Process plants and utilities hold transmitter, valve and analyser data that rarely reaches a decision. Managers who can scope, test and hand over AI features inside an instrument project avoid pilots that the people who inherit them cannot operate or trust.

- Unplanned Downtime: Falls when condition monitoring on instruments is accepted against agreed detection and false-alarm limits.
- Project Rework: Decreases when data readiness and acceptance criteria are fixed before the pilot starts.
- Maintenance Effort: Is directed to the instruments that need attention when model outputs are owned and reviewed.

Principles and Evidence Base

- IEC 61511: The functional safety standard for the process sector, applied in Session 2 to keep safety functions independent of AI.
- ISA-95: The model for integrating enterprise and control systems, applied in Session 3 to place data flows between historians and analytics.
- IEC 62443: The series on industrial automation and control system security, applied in Session 4 to review connectivity and access for the pilot.
- ISO/IEC 42001: The management system standard for AI, applied in Session 5 to define ownership and monitoring at handover.

Intended Participants

- Instrumentation and control engineering managers who decide where analytics belongs in an instrument scope.
- Project managers who plan, sequence and accept automation work packages.
- Reliability and maintenance leaders who will operate condition monitoring after handover.
- Operations and technology managers who sponsor pilots and accept their results.

Typical settings include oil and gas facilities, power and water utilities and chemicals plants.

Learning Outcomes

1. Participants will be able to prioritise instrumentation use cases for AI by value, data availability and risk.
2. Participants will be able to diagnose data quality gaps in historian and transmitter records.
3. Participants will be able to construct a pilot plan with success measures, boundaries and a rollback route.
4. Participants will be able to evaluate vendor proposals and acceptance evidence for models running on instrument data.
5. Participants will be able to justify a safety and security boundary for AI features connected to control systems.
6. Participants will be able to design a handover with named owners, monitoring and retraining triggers.

Programme Structure

Day 1: Selecting AI Use Cases in Instrument Projects

Where can AI add value inside an instrument and control scope?

- Instrument Use Case Long List
- Soft Sensor and Anomaly Detection Patterns
- Value and Feasibility Scoring Matrix
- Predictive Maintenance Candidate Review
- Pilot Scope Statement

Day 2: Safety Boundaries and Risk

What must AI never decide in a control and safety design?

- IEC 61511 Safety Function Separation
- Advisory and Automatic Action Classes
- ISA-18.2 Alarm Load Review
- Model Failure Mode Table
- Boundary Decision Record

Day 3: Data Readiness and Architecture

Is the instrument data good enough, and where does it flow?

- Historian Tag Quality Audit
- Calibration Drift and Sensor Fault Screen
- ISA-95 Data Flow Map
- Labelling and Baseline Plan
- Data Readiness Scorecard

Day 4: Pilot Design, Vendors and Acceptance

How is a pilot specified, bought and accepted?

- Pilot Specification Template
- Vendor Proposal Evaluation Grid
- Factory and Site Acceptance Test Plan
- Model Validation Evidence Checklist
- IEC 62443 Connectivity Review

Day 5: Handover and Delivery File

Can the pilot be operated, monitored and trusted after handover?

- Applying the Session 1 Pilot Scope Statement
- Testing the Session 2 Boundary Decision Record
- Checking the Session 3 Data Readiness Scorecard
- ISO/IEC 42001 Ownership and Monitoring Plan
- Completing the Delivery File

Methodology

The programme is a data workshop built on prepared records from a process plant and a utility network. Participants screen data, set boundaries, specify a pilot and defend an acceptance plan to peers acting as a project board.

- Suggested activity: Scoring a long list of instrument use cases on value and feasibility.
- Suggested activity: Auditing a prepared historian extract for drift, gaps and frozen values.
- Suggested activity: Reviewing a vendor proposal against an acceptance checklist.

Capstone Output

Each participant completes a delivery file for one AI-enabled instrumentation use case. It holds the scope statement, boundary record, data readiness scorecard, acceptance plan and handover plan with named owners. At work it goes to the project board, supports vendor discussions and sets the routine for later pilots.

Frequently Asked Questions

Is AI in instrument and control projects training suitable for managers who are not data scientists?

Yes. AI in instrument and control projects is taught through prepared plant data and templates. You need responsibility for instrumentation, control or project delivery, but no programming or statistics background.

Which standards does AI in instrument and control projects rest on in this training?

AI in instrument and control projects rests on IEC 61511, ISA-18.2, ISA-95, IEC 62443 and ISO/IEC 42001, each applied to a boundary, data, security or ownership decision.

How is the delivery file from AI in instrument and control projects training used at work?

You take the delivery file to your project board, use its acceptance plan with vendors, and keep its handover plan as the routine for later pilots.

How does AI in instrument and control projects differ from a programme on industrial cybersecurity?

AI in instrument and control projects concentrates on selecting, accepting and handing over AI features, while industrial cybersecurity concentrates on defending control networks.