

Atmos Trainer



Train operators without danger to pipelines or equipment

Trained operators act fast and effectively

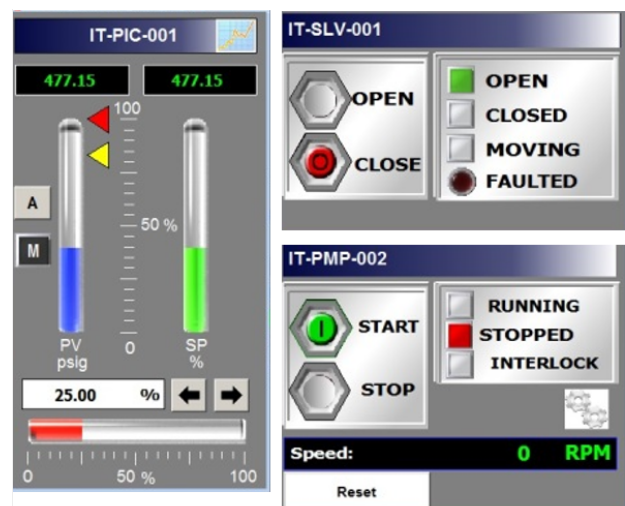
Inadequate training of control room personnel compounded the damages caused by a number of pipeline accidents, prompting regulators and industry experts to push for tougher standards to perform and document training sessions. US federal regulations require pipeline companies to demonstrate that pipeline operators are adequately trained to recognize and react to abnormal operating conditions. Government regulators around the world follow this lead. API 1168 (Pipeline Control Room Management) and API 1175 (Pipeline Leak Detection Program Management) expect a record of pipeline operator training and a plan for continuous performance improvement. It is difficult to expose operators to abnormal operating conditions, such as a leak situation, when they only train on a real pipeline system. On average, a pipeline operator is asked to control different pipelines every three years, making 'hands-on' training alone inadequate.

Qualify pipeline operators

Atmos Trainer combines the Atmos SIM hydraulic simulator with a SCADA user interface and a sophisticated operator scoring and qualification module to generate a fully integrated, high-fidelity gas or liquid pipeline training environment for the operator. Hydraulic simulators mimic the pipeline control system environment just like flight simulators mimic a flight environment, allowing a pilot to experience take-off, cruising, and landing exercises. This allows a pipeline operator to control a virtual pipeline during normal and abnormal operating conditions. The experience is as realistic as operating a real pipeline.

Main features

- A highly responsive pipeline model, incorporating:
 - Pipeline dimensions
 - Elevation profile
 - Fluid properties
 - Pipeline equipment with actual specification
 - Realistic flow regimes
- Life-like replication of normal or abnormal operating conditions
- Configurable with any SCADA/HMI
- Logic Control:
 - Proportional, Integral, and Derivative Setpoint Control (PID)
 - Ideal Setpoint Control
 - Shutdown keys and cause and effect matrix for automatic emergency shutdown
 - Interlocks for permission to operate
 - Flexible logic to simulate external systems (eg. fire systems and/or seismic activity monitors)



Realistic user interface



- Load real operational snapshots of the pipeline system from an online module
- Dynamic trainee interaction with pipeline equipment during an active training session. Elements the trainee can interact with during the training session include:
 - Block valves (open/close)
 - Control valves (open/close/partial) via manual or automatic setpoint for flow or pressure control
 - Compressors/pumps (start/stop/VFD)
 - Different size leaks at predefined positions
 - Inlet or product composition
 - Tank/storage at source and delivery
- Prepackaged training scenarios:
 - Normal operating conditions including pipeline startups, shutdowns, flow regime changes, etc
 - Abnormal operating conditions including leaks, unexpected equipment shutdowns, communication failure, etc
 - Instructors are trained to create additional training scenarios based on day-to-day operations and occurrences
- Supports “Monitored” sessions scheduled with an instructor present, and “Self” sessions where operators can practice normal and unexpected operations alone
- Interacts with other Atmos modules; leak detection, batch and pig tracking, online modeling for look-aheads and what-if cases, and optimizer

Powerful trending tool

- Plots the resulting hydraulic response to each action, showing operators and instructors the pipeline behavior and consequences via a profile, or time trend
- Displays multiple trends simultaneously. Aids the operator to understand how his actions affect the entire pipeline as transients travel through the system
- Data playback for performance review

Operator Scoring and Qualification Module

- Documents the operator training session and performance
- Maintains records of operators’ training history and performance improvements per regulatory requirements and API recommended practices 1168 and 1175

The Operator Qualification module (OQ) links to the scenario results database to score the performance of each trainee session.

The screenshot displays the 'Operator qualification report' interface. At the top, it shows the company name 'ATMOS INTERNATIONAL' and session details: Company: Atmos International, Scores for: AGT_2015MAR31-SCENARIO_06, Instructor: AtmosAdmin, Trainee: John Doe, and Time: 04/27/2016 13:48:05. Below this is a 'Results Summary' table:

Result	Pass
Pass Mark	60
Total Score	55
Total Alarm Count	23
Total Alarms Violated	3

Next is an 'Operations Score Summary' table:

Change out of tolerance	Not Within Time Window	Out of Order	Not Matched	Unexpected Operation	Total
0	0	0	40	0	40

Finally, there is an 'Operations Score Breakdown' table:

Engine Time	ID	Object Name	Data Point	Value	Min Value	Max Value	Window Start	Window End	Relative To	Score	Reason
0	1	IT-BSTR-PMP-001	Status	0	1		60	120	Engine Start Time	5	Not Matched
0	2	IT-PMP-003	Status	0	1		15	60	Engine Start Time	5	Not Matched
0	3	IT-PMP-004	Status	0	1		15	60	Engine Start Time	5	Not Matched
0	4	IT-PMP-003	Status	0	0		5	60	BV3-MLV-001 Outlet Pressure Alarm	5	Not Matched

Operator qualification report



The instructor can configure a scoring system for each operating scenario. The Operator Qualification module stores the results for each operator training session for record keeping and easy retrieval from the operator performance management window.

Date	Model	Scenario	User	Score	Passed	View	Export
05/19/2017 1:01 PM	AST_PB	2017_01_LineConference	DEMO	7/15	<input type="checkbox"/>	View	Export
05/19/2017 2:03 PM	AST_PB	2017_01_LineConference	DEMO	4	<input checked="" type="checkbox"/>	View	Export
05/23/2017 10:44 AM	AST_PB	2017_01_LineConference	DEMO	7	<input checked="" type="checkbox"/>	View	Export
07/19/2017 3:41 PM	AST_PB_2	2017_01_LineConference	DEMO	0	<input checked="" type="checkbox"/>	View	Export
07/19/2017 3:43 PM	AST_PB_2	SCENARIO_02	DEMO	0	<input checked="" type="checkbox"/>	View	Export
07/19/2017 3:44 PM	AST_PB	2017_01_LineConference	DEMO	4	<input checked="" type="checkbox"/>	View	Export
07/19/2017 3:45 PM	AST_PB	2017_01_LineConference	DEMO	4	<input checked="" type="checkbox"/>	View	Export
07/19/2017 3:47 PM	AST_PB	SCENARIO_02	John Doe	0	<input checked="" type="checkbox"/>	View	Export
07/19/2017 3:49 PM	AST_PB	2017_01_LineConference	John Doe	0	<input checked="" type="checkbox"/>	View	Export
07/19/2017 3:53 PM	AST_PB_1	SCENARIO_02	John Doe	0	<input checked="" type="checkbox"/>	View	Export
07/19/2017 3:56 PM	AST_PB_1	SCENARIO_10_Leak	John Doe	0	<input checked="" type="checkbox"/>	View	Export
07/19/2017 4:00 PM	AST_PB_1	SCENARIO_02	Operator 2	62	<input type="checkbox"/>	View	Export
08/10/2017 3:17 PM	AST_PB_2	DEMO_01	John Doe	10	<input checked="" type="checkbox"/>	View	Export
11/16/2017 9:59 AM	AST_PB_4	SCENARIO_16	Operator 2	10	<input checked="" type="checkbox"/>	View	Export
12/07/2017 3:12 PM	AST_PB_2	2017_01_LineConference	Operator 2	0	<input checked="" type="checkbox"/>	View	Export

Operator performance management window

Atmos Trainer is available in different configurations

Option 1: Generic Trainer

Inexpensive, off-the-shelf solution that provides a realistic experience of operating a complex pipeline with elevation changes, multiple injections, and multiple deliveries.

The Generic Trainer, interfaces with multiple popular SCADA products, comes pre-loaded with normal and abnormal operating scenarios, allowing students to begin training immediately. Instructors can also create additional training scenarios and interact with the trainees, introducing events such as pump failures, leaks, or communications outages.

Option 2: Hybrid Trainer

Merges different pipeline sections and equipment from several pipelines operated by a company into one pipeline, allowing the trainee to experience the operation and challenges of different pipelines without the high cost of building and maintaining individual training systems for each pipeline. This option provides a realistic training environment with access to functionalities such as PID logic control, emergency shutdown, trending, and alarm & event handling.

Option 3: High-fidelity trainer with SCADA HMI

Mimics a customer's real-time system, allowing the trainee to operate an exact replica of the real pipeline(s), using an offline version of the customer's SCADA. This option provides a training environment identical to the SCADA in the control room with access to functionalities such as PID logic control, emergency shutdown, trending, and alarm & event handling.

Alternatively, Atmos can provide ideal logic control for a simpler, still accurate response at a lower cost.

Atmos Trainer improves operating performance

- Complete and document initial training, retraining, and refresher training as per API 1175
- Emphasizes new and existing pipeline operator compliance with the company operating procedure
- Pipeline operators will react to normal and unexpected abnormal operations faster and with greater confidence
- Training includes:
 - Normal startup or shutdown
 - Flow rate or customer delivery changes
 - Leaks
 - Communication failures
 - Unexpected pump shutdowns or sudden valve closures
- "Monitored" or "Self" training sessions, train safely without risk to the real pipeline
- The scoring report highlights areas where the operator needs to improve
- Reduce risk and errors by improving the operator's performance and confidence
- Record keeping of all training sessions to track the operator's performance over time
- "GO BEYOND" regulations and standards compliance



Atmos International (Atmos) provides pipeline leak detection and simulation technology to the oil, gas, water, and associated industries. The company was founded in 1995 in the UK by the inventor of the statistical pipeline leak detection system – Atmos Pipe,

now one of a suite of leak and theft detection solutions from Atmos. These technologies are implemented on hundreds of pipelines in over 50 countries, including major oil and gas companies such as Shell, BP, ExxonMobil, and Total.

With associated offices in the USA, China, Russia, Singapore and Costa Rica, and local agents in 28 countries, the multi-cultural and multilingual team can provide effective support all over the world.

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