

## 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.

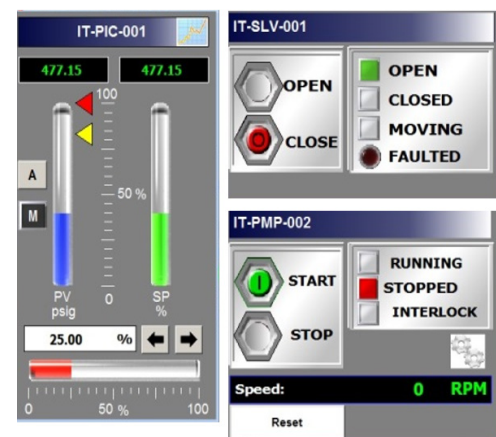
### Qualify pipeline operators

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)
- 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



Realistic user interface

- 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 shows a software interface for an operator qualification report. At the top, it displays company information: 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 showing a pass result with a score of 60. The 'Operations Score Summary' table shows 0 violations across various categories. The 'Operations Score Breakdown' table lists specific engine events with their scores and reasons.

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

Engine Time	ID	Object Name	Data Point	Value	Min Value	Max Value	Window Start	Window End	Relative To	Score	Reason
0	1	1/T-STR-PMP-001	Status	0	1	60	120	Engine Start Time	5	Not Matched	
0	2	1/T-PMP-003	Status	0	1	15	60	Engine Start Time	5	Not Matched	
0	3	1/T-PMP-004	Status	0	1	15	60	Engine Start Time	5	Not Matched	
0	4	1/T-PMP-003	Status	0	0	5	60	1/T-3-3-M-V-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.

The screenshot shows a 'Operator Scoring' window with a table of training sessions. The table has columns for Date, Model, Scenario, User, Score, and Passed. It lists various sessions from 04/19/2017 to 04/27/2017, with scores ranging from 0 to 100.

Date	Model	Scenario	User	Score	Passed
04/19/2017 10:19 AM	AGT_06	2017_01_10aConfidence	CEMO	79	Yes
04/19/2017 10:20 AM	AGT_06	2017_01_10aConfidence	CEMO	4	Yes
04/20/2017 09:44 AM	AGT_06	2017_01_10aConfidence	CEMO	7	Yes
04/19/2017 09:19 AM	AGT_06_2	2017_01_10aConfidence	CEMO	0	Yes
04/19/2017 09:19 AM	AGT_06_2	SCENARIO_02	CEMO	0	Yes
04/19/2017 09:19 AM	AGT_06	2017_01_10aConfidence	CEMO	4	Yes
04/19/2017 09:19 AM	AGT_06	2017_01_10aConfidence	CEMO	4	Yes
04/19/2017 09:19 AM	AGT_06	SCENARIO_02	John Doe	0	Yes
04/19/2017 09:19 AM	AGT_06	SCENARIO_02	John Doe	0	Yes
04/19/2017 09:19 AM	AGT_06_1	2017_01_10aConfidence	John Doe	0	Yes
04/19/2017 09:19 AM	AGT_06_1	SCENARIO_02	John Doe	0	Yes
04/19/2017 09:19 AM	AGT_06_1	SCENARIO_02	John Doe	0	Yes
04/19/2017 09:19 AM	AGT_06_1	SCENARIO_02	Operator 2	62	Yes
04/19/2017 09:19 AM	AGT_06_2	SCENARIO_02	John Doe	0	Yes
04/19/2017 09:19 AM	AGT_06_2	SCENARIO_02	Operator 2	10	Yes
04/19/2017 09:19 AM	AGT_06_2	2017_01_10aConfidence	Operator 2	0	Yes

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

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#### About Atmos International

Founded in 1995, Atmos International provides pipeline leak and theft detection, simulation technology, instrumentation and engineering services to the energy, water, aviation and associated industries. Atmos is the first choice of most pipeline companies worldwide, and is extensively used by major operators like Shell, BP, ExxonMobil, Petrobras, Enbridge and Total. With associated offices in the USA, China, Russia, Singapore, Indonesia, Colombia, Ecuador, Peru and Costa Rica, and local agents in 28 countries, our multi-cultural and multilingual team is dedicated to effective global support for the lifetime of our products all over the world.

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