

GE Oil & Gas
PII Pipeline Solutions

ThreatScan™

Real-time monitoring for threats
and impacts on pipelines

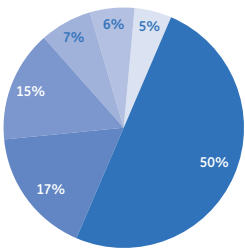


You can't fix what you can't find

Third-party damage is the leading cause of pipeline failure in the world – accounting for 35-50% of pipeline incidents in the US and Europe between 1970 and 2001 (see chart below). It is especially dangerous because it often goes unreported at the time of occurrence, allowing defects to deteriorate with devastating consequences months or years later – causing safety, environmental and public concern.

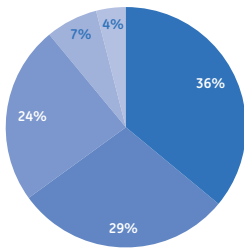
There is, on average, one delayed failure every 33 days in the US and every 34 days in Europe, resulting from previously unreported third-party damage.

Gas pipeline incident causes: Europe, 1971-2001



- External Interference (50%)
- Construction/Material (17%)
- Corrosion (15%)
- Ground Movement (7%)
- Other/Unknown (6%)
- Hot-tap by error (5%)

Oil pipeline incident causes: Europe, 1971-2001



- Third-Party damage (36%)
- Corrosion (29%)
- Mechanical Failure (24%)
- Operational (7%)
- Natural Hazard (4%)

Traditional identification techniques are challenging to implement in a cost-effective manner and frequently deliver unreliable results in terms of both detection capability and response time. ThreatScan™ from GE Oil & Gas – PII Pipeline Solutions provides significantly higher reliability and faster response times at a fraction of the cost. The system provides fully managed, acoustic monitoring for accurate location and immediate risk assessment of impact events to aboveground and underground pipelines.

Real-time monitoring

Every impact, large or small, on a pipewall creates acoustic waves that travel upstream and downstream in the pipeline product. ThreatScan measures the timing and relative magnitude of these waves to determine the impact location and severity.

Data is immediately transmitted via satellite to our state-of-the-art Monitoring Center where the situation is quickly and accurately assessed. Customers using ThreatScan's Web Access interface will receive automatic notification at the same time.

We then directly advise the customer of assessment results via internet and GSM mobile device – to ensure timely notice no matter where they happen to be at the time.

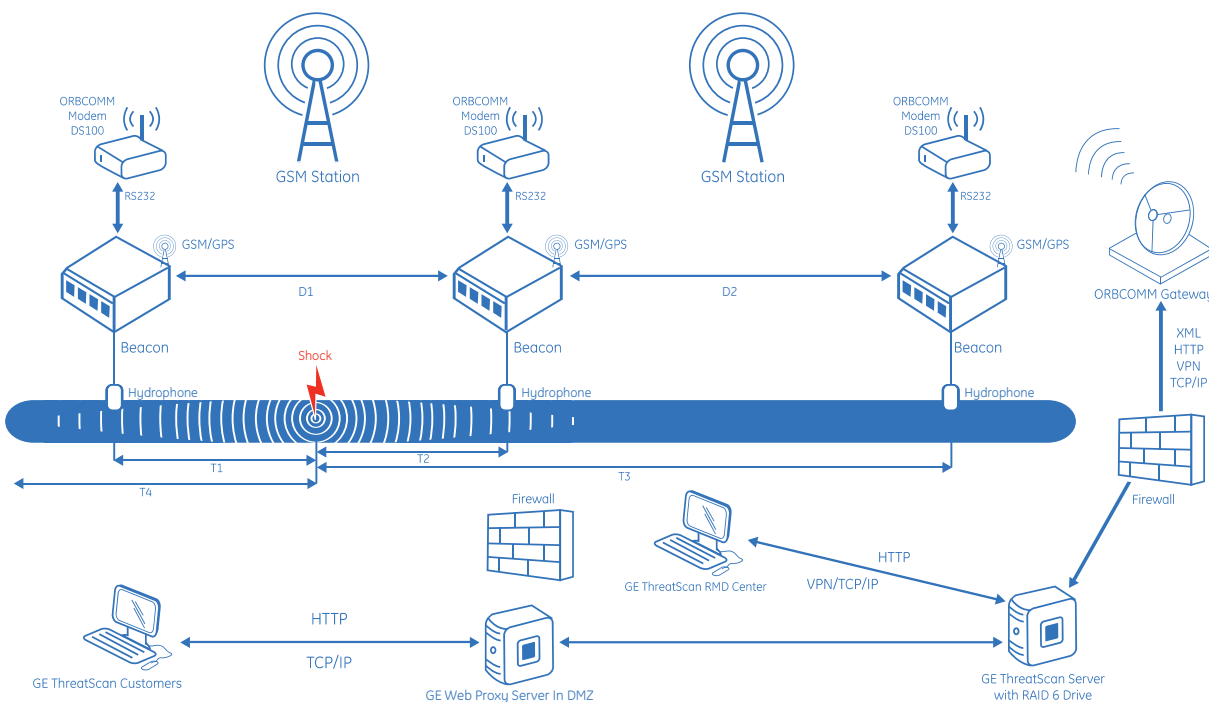
ThreatScan uses real-time acoustic signal acquisition – not model-based projections – and is supported by advanced software and skilled analysts to provide around-the-clock security.

The simple, superior solution

All equipment attaches easily to above-ground pipeline features so no excavation is required. Unlike other monitoring methods, the system is not subject to weather conditions or human error and provides non-stop coverage. Sensors are calibrated to account for product and environmental factors – noise is filtered out so that natural occurrences such as pressure and flow changes are incidental.

From installation to ongoing monitoring, ThreatScan requires little work from the pipeline operator. The service:

- Logs all acoustical events, but only threatening events trigger notification (eg. pipeline strikes)
- Lowers the false-alarm rate, saving administrative and response-team costs
- Rapidly notifies operators of potentially threatening events
- Provides comprehensive monthly reports logging all activity within the sensor range



Sensors measure timing and relative magnitude of acoustic energy. Operator is immediately notified of location if an impact occurs.

Immediate notice and risk assessment

With a series of GE's finely tuned and ATEX-certified hydrophones at multiple valve stations (attached via simple 1" NPT or flange), ThreatScan's accuracy decreases the number of false alarms and enables quick location of events that pose a real threat to pipeline safety.

	Characteristic
Pipe diameter	6-56"
Product type	Natural gas, crude, refined product, water, chemical
Power	Electric, wind or solar with battery backup
Communications	Satellite or GSM

The ThreatScan system is designed to detect harmful impacts to your pipeline. Typical performance of the system is the following:

	Specification
Sensor spacing	3.5-21 km (media dependent)
Location	1-2% of sensor spacing
Notification	3-30 minutes
Sensitivity	<1.000 Joule based on local conditions

Each application of ThreatScan is configured specifically for the pipeline it is monitoring. Client operational and environmental information are input into GE's proprietary software and the configuration is computed to maximize sensor spacing and hydrophone performance.

As an example, in a 16" gas pipeline at atmospheric pressure and approximately 11-km sensor spacing, ThreatScan can safely detect impacts sufficient to cause a 1% OD dent.

Comprehensive services

Like many of PII Pipeline Solutions' other innovations, ThreatScan can be obtained on its own or as part of a packaged solution including a wide range of inspection and integrity services. Every technology we develop is firmly grounded in the reality of your business. We are continually evolving the science of pipeline integrity, and the benefit to you is the most comprehensive suite of solutions available.

Improve safety and liability management

Commissioning without a single dig

The process is simple. Sensors are tuned specifically to your pipeline – accounting for factors such as pipe diameter, product type, pressure and soil conditions. Background noise is identified and filtered out. We survey for optimal sensor placement and perform all on-site testing to ensure the system is working to specifications. And all of this is done without a single excavation.

Continuous monitoring with fewer false alarms

GE Oil & Gas' Remote Monitoring Center provides support and expert analysis 24 hours a day, 365 days a year. With each impact, an alarm sounds in our control room and the event is automatically logged. Analysts review sensor data from the field and a decision is made.

If necessary, we initiate the notification process so mitigation procedures can begin. Your managers aren't continually taxed with having to investigate non-threatening incidents – only those that pose a real risk to your pipeline's safety. In addition to any critical reporting, monthly logs are provided for all events.

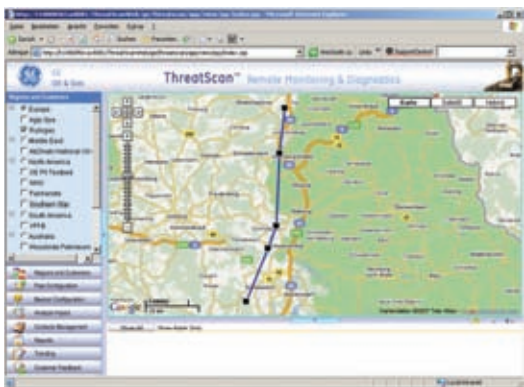
Other applications

- Early warning of excavation activity
- ILI tool tracking
- Rapid ground movements
- Sabotage warning
- Detection of illegal hot tapping (product theft)

Flexible for any budget

A variety of contract terms are available. All costs are clear and up-front, whether purchasing or renting for the long or short-term. Monthly fees include continuous monitoring, immediate notification and impact location details, as well as monthly log data.

Improve safety – put an end to unreported third-party damage



ThreatScan monitoring software gives customers secure web access from any location, Google Map integration, access to beacon settings and real-time notification.



Hydrophones are installed at various intervals along the pipeline and can be easily removed or repositioned at any time.



Solar panels can be installed to provide all necessary power, making ThreatScan a truly self-contained solution.



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