Continuous Leak Detection based on Smart Infrared Monitoring

EPSC Webinar – 01.07.2026

AT SENSORS

moviTHERM
advanced thermography solutions

WHO ARE WE

A PROVEN, HIGH PERFORMANCE PARTNERSHIP

AT SENSORS & moviTHERM advanced thermography solutions

> Three decades of specialization

Both companies focused on thermal-imaging monitoring.

Proprietary SMART analytics Software

In-house image analytics and camera configuration

In-house engineering capabilities

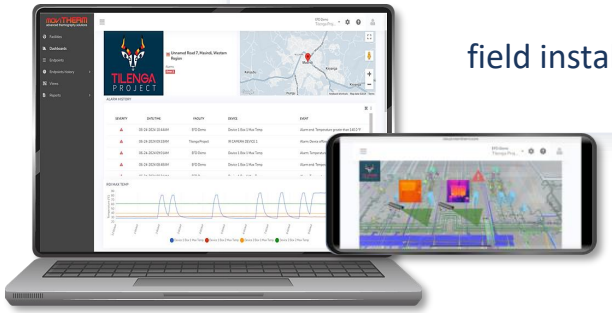
Ongoing software and hardware optimization in-house

30+

years of monitoring expertise

>300

field installations worldwide



THE PROBLEM

WHY LEAK DETECTION?

Monitoring hydrocarbon infrastructure — onshore and offshore — for unintended releases is a highly complex task.
Minor leaks often stay unnoticed for hours or days.

Early detection is critical to limiting:

- Environmental impact
- Production interruptions
- Financial losses
- Infrastructure damage
- Regulatory exposure
- Health & safety risks

BARRIERS TO RAPID LEAK DETECTION

Pipeline & Facility Monitoring

Four challenges that typically impact the speed of leak detection and response:

Limited Remote Visibility

Alarms still need on-site confirmation

Intermittent Inspection Gaps

Leaks develop between scheduled checks

Reliance on Personnel

Response limited by staff and travel time

Safety & Weather Constraints

Weather and hazards delay inspections

BARRIERS TO RAPID LEAK DETECTION

Limit of Conventional Technologies

Coverage gaps

Fibre-optic, computational and acoustic systems miss leaks at valves, pig traps, receivers and instrumentation

Excessive false alarms

Frequent nuisance alerts raise workload and can delay identification of genuine leaks

KEY TECHNICAL REQUIREMENTS

for a reliable Visual Leak Detection System

Advanced analytics

To allow a reliable and precise leak detection and classification

Fully configurable

Flexible system parameters

Environmental filtering

To enable reliable performance even under fog, rain, and thermal noise conditions

Parallel analytics

Multiple analysis functions run simultaneously to avoid false alarms

Multiple alert channels

Control room alarms, dashboard & e-mail notifications

Maintainable

Adequate maintenance concept

KEY TECHNICAL REQUIREMENTS

for a reliable Visual Leak Detection System

System Architecture

Long-wave IR (7–14 µm)

No detector cooling required, as opposed to short- and mid-wave cameras

Embedded SMART processing

Capable of combining multiple analytics in real time

High sensitivity

NETD < 30 mK

Wide sensing range

−40 °C to +550 °C with ±2 °C accuracy

Flexible optics

Multiple lenses for an optimized Field-of-View

Certified bundle

Camera & enclosure already ATEX & IECEx certified

APPLICATION AREAS

Suitable for **onshore** and **offshore assets** across upstream, midstream, and downstream operations, including:

- Well pads
- Pump stations
- Pig-trap stations
- Transmission pipelines
- Gathering systems
- Block-valve stations
- Metering stations
- Refineries
- Compressor stations
- Terminals & tank farms
- Water treatment
- Remote / unmanned sites

APPLICATION AREAS

Detectable Substances:

Petroleum products

Crude oil · fuel oil · gasoline · diesel · kerosene · bitumen · steam

Industrial fluids

Brine · diluents · water · effluents · chemicals · acids · and others

CORE COMPONENTS

of the Visual Leak Detection System:

Smart Infrared Cameras

ATEX / IECEx Enclosure

iTL Studio Software

iTL Gateway

Core component – Camera

THE IRSX SMART INFRARED CAMERA

- Combined Evaluation Functions through SCRIPT
- Up to +60 °C operating temp. range
- Multiple lenses available (from 4mm to 100 mm)
- App-concept with Desktop digital twin
- **Job-concept** for storing multiple measurement tasks
- Available also in a **9Hz** version

Camera capability

SMART SEARCH REGION

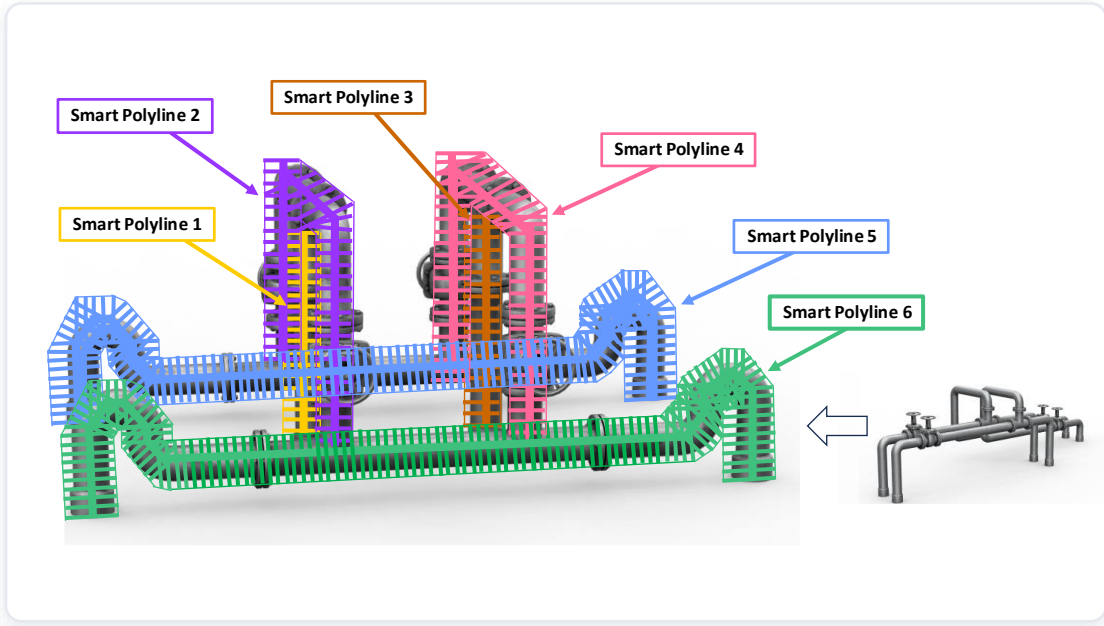
BENEFIT: Enables easy configuration of “Smart Search Regions,” where the thermal signature is continuously monitored to detect leaks (e.g., in complex pipe networks).

Polyline tooling

The parameters “increment” and “width” allow easy polyline setup

Full coverage

The search region is designed to ensure the easy 100% coverage of the pipeline



Core component – Enclosure

CAMERA HOUSING

Maximum safety

ATEX & IECEx Certified for explosive zones 1/2 & 21/22

Extended flexibility

Supports SMART IRSX-I models with a wide variety of lenses

Built for hazardous areas

Designed for customers with hazardous areas (e.g. petrochemical industry)

The camera and enclosure are already **ATEX & IECEx certified** as a bundle, meaning that no costly & time-consuming re-certification process required, and they are ready for immediate installation.

Core component – Hardware

ITL GATEWAY

CORE FUNCTIONALITY

- ✓ Centralizes data from many cameras & sensors
- ✓ Real-time monitoring & early warning
- ✓ Aggregates temperature, images & trends

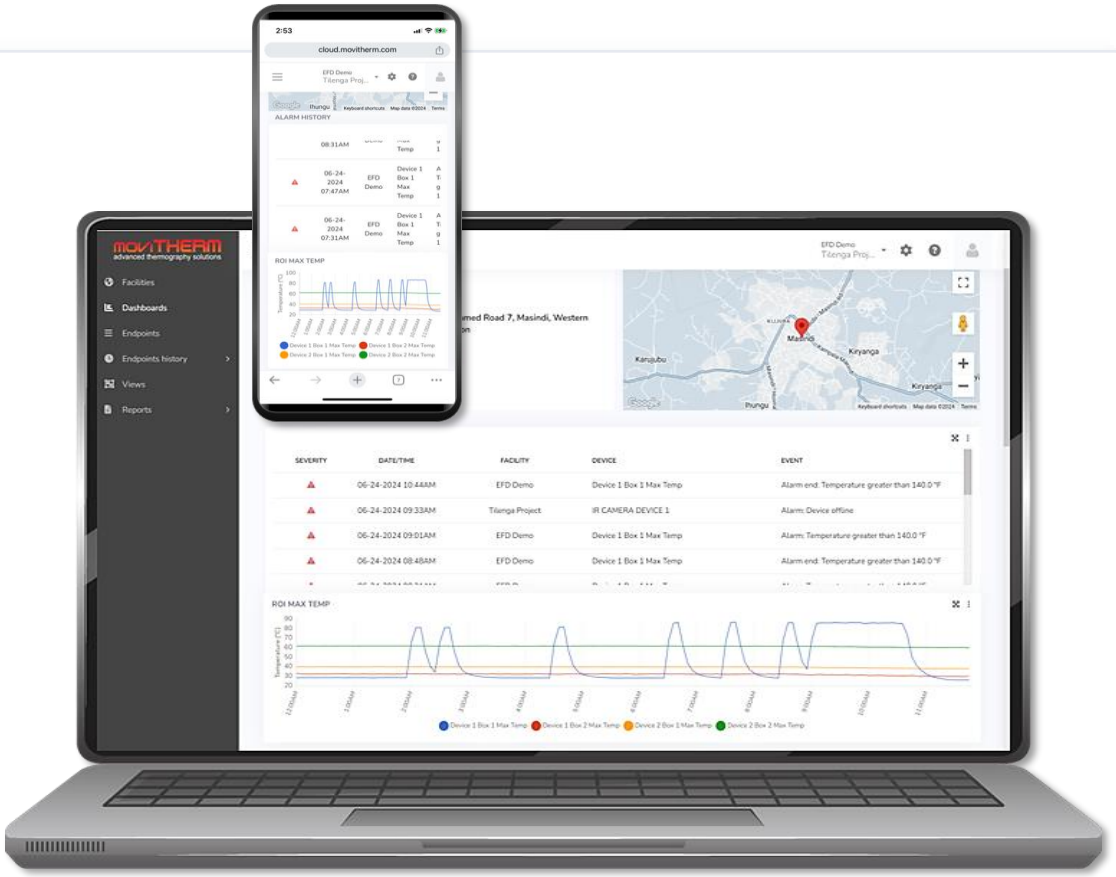
ALERT & NOTIFICATION

- ✓ Real-time alerts via e-mail, SMS & voice
- ✓ Triggers local alarms & control systems
- ✓ Event alerts with thresholds & snapshots

Core component – Software

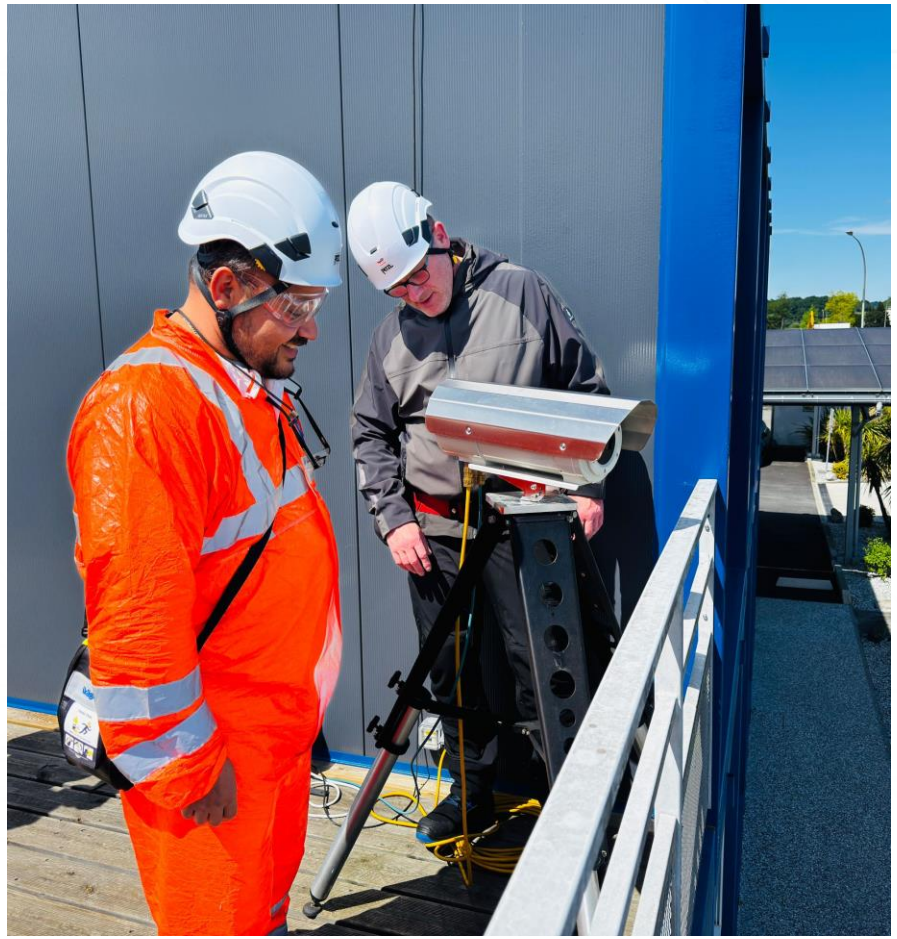
ITL STUDIO

- On-premise monitoring
- Single or multi-facility
- Map-view dashboards
- Automated reporting
- Endpoint data download
- Sensor health & thresholds
- E-mail notifications
- Text & voice alerts



USE CASE: PROJECT TILENGA

Visual Leak Detection System (VLDS) for monitoring 29 well-pads in Uganda



VLDS concept

Phase 1: 66 Smart-IRSX cameras

In IRCamSafe EX enclosures

Gateway per well-pad

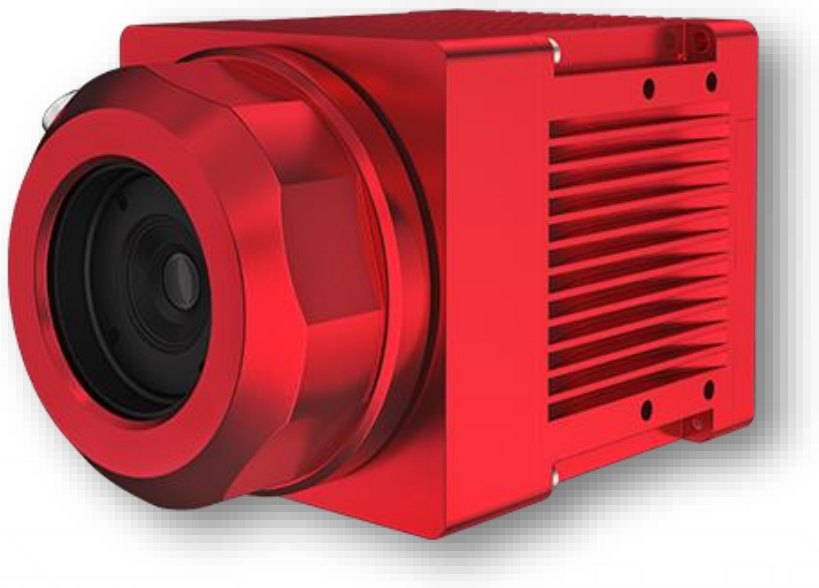
Processes data, alerts F&G via digital I/O

Decentralized visualization

Well-pad control room & CCR

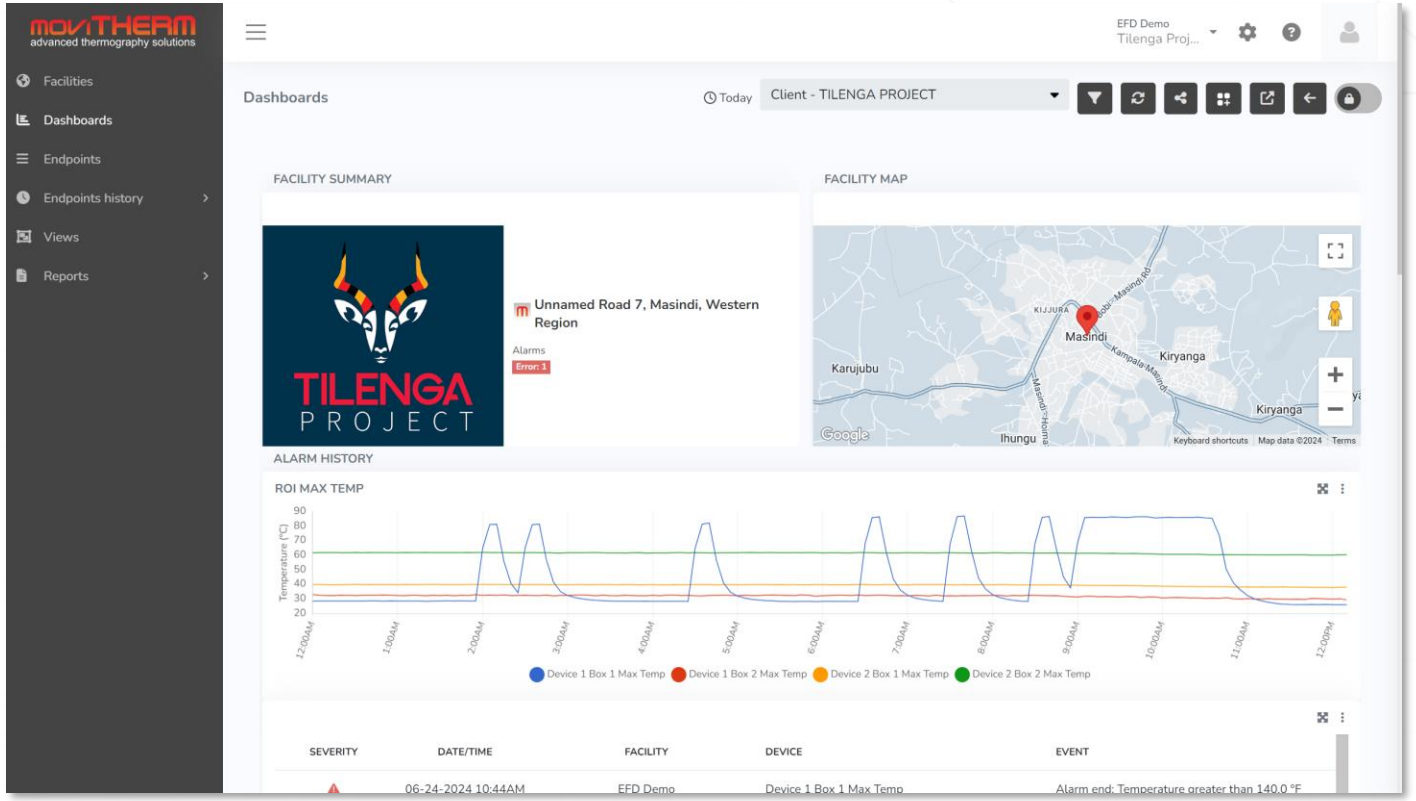
USE CASE: PROJECT TILENGA

Live presentation of the IRSX-I SmartCamera



USE CASE: PROJECT TILENGA

Live presentation of the iTL Studio Dashbaord



KEY BENEFITS AT A GLANCE

for reliable end-to-end Leak Detection

Continuous 24/7 surveillance

Autonomous thermal cameras monitor facilities around the clock, independent of ambient light conditions.

Instant detection & notification

When a leak is identified, the system automatically transmits images and video footage to the control center in real time.

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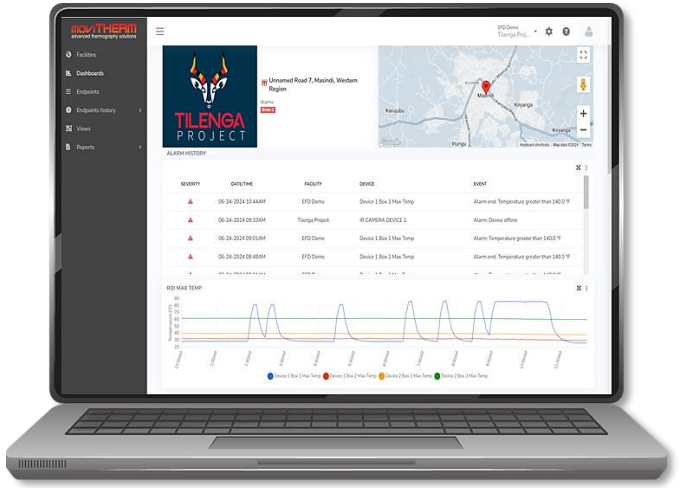
Immediate remote verification

Operators can assess alarm footage and live video feeds without dispatching personnel.



KEY BENEFITS AT A GLANCE

for reliable end-to-end Leak Detection

The camera and enclosure are already ATEX & IECEx certified as a bundle

High detection accuracy due to very high thermal sensitivity

Scalable, decentralized architecture for easy integration into existing control systems

KEY BENEFITS AT A GLANCE

for reliable end-to-end Leak Detection

Combined Evaluation Functions for Reliable Leak Detection and False Alarm Prevention

Reliable detection comes from logically combining several evaluation functions per polyline.

Script-controlled Analysis

Allows the combination of multiple analysis in real time to enhance leak detection robustness

Advanced analytics

To allow a reliable and precise leak detection and classification even with changing environmental conditions

Multiple alert channels

Map dashboards and real-time alerts (email & digital outputs) ensure full visibility at all times.

Smart Search Regions

Each Smart Polyline is evaluated independently to allow a precise analysis

KEY BENEFITS AT A GLANCE

for reliable end-to-end Leak Detection

Maintenance concept:

Recommendation: the Calibration of the IRSX-I camera should be verified at least every 12–24 months

Maintenance-free camera

MTBF of 772,000 h at 15 °C operating temperature.

On-site Calibration Verification

When combined with a calibrated IRS-Calilux Blackbody, the user can verify the camera calibration on Site

Easy Worldwide Export

9 Hz cameras can be shipped without export restrictions

Job-concept

Cameras can be exchanged quickly if needed

ANY QUESTIONS ???

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