
HIMA
SMART SAFETY.
The Functional Safety and Cyber Security Expert
FLOWorX®
Leak detection Solution
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#safetygoesdigital

Agenda

1 Introduction

2 Can you imagine life without pipelines?

3 Why do you need leak detection system?

4 Is there a single best method for leak detection & location?

5 What should you look for in the best available technology system?

6 FLOWorX® -Comprehensive Coverage

7 Success Stories

HIMA: The leading Expert in Safety Solutions!

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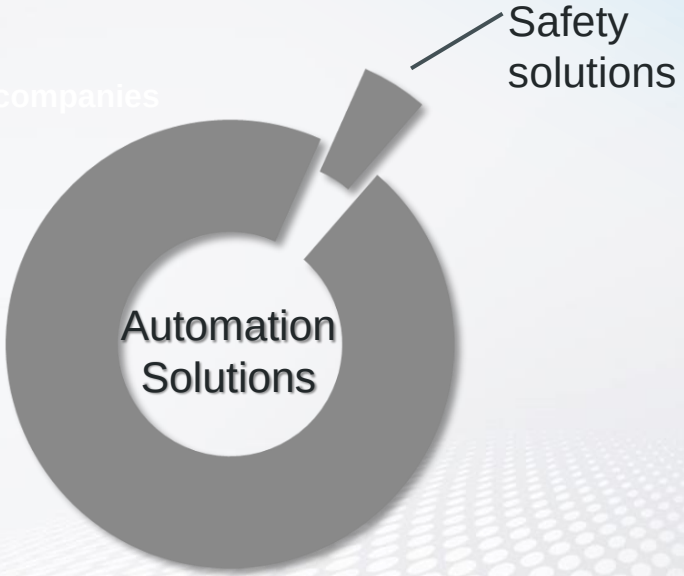
What makes HIMA unique:

Safety is our DNA

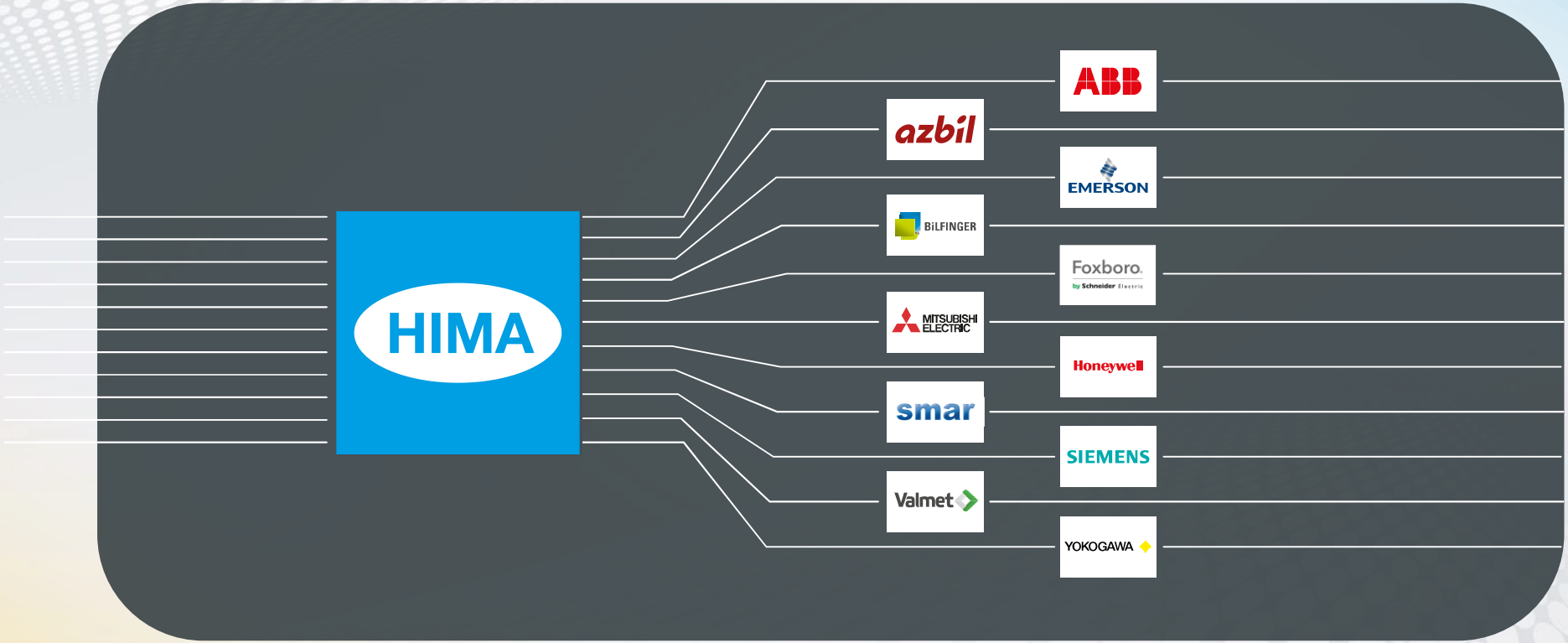
Other companies



HIMA understands Safety better than any other company

HIMA: The leading Expert in Safety Solutions

HIMA can connect to any DCS system



HIMA: The leading Expert in Safety Solutions

HIMA helps to reduce the risk in your process with an independent layer

HIMA Product Portfolio

Safety PLC

The hardware used as a basis for our Safety Solutions

HIMax®

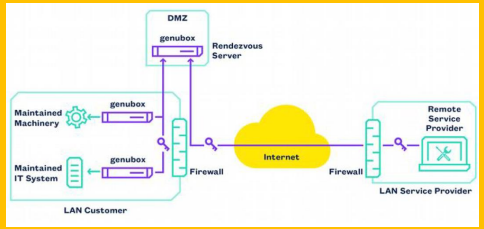
HIMatrix® F

HIQuad®

Planar4

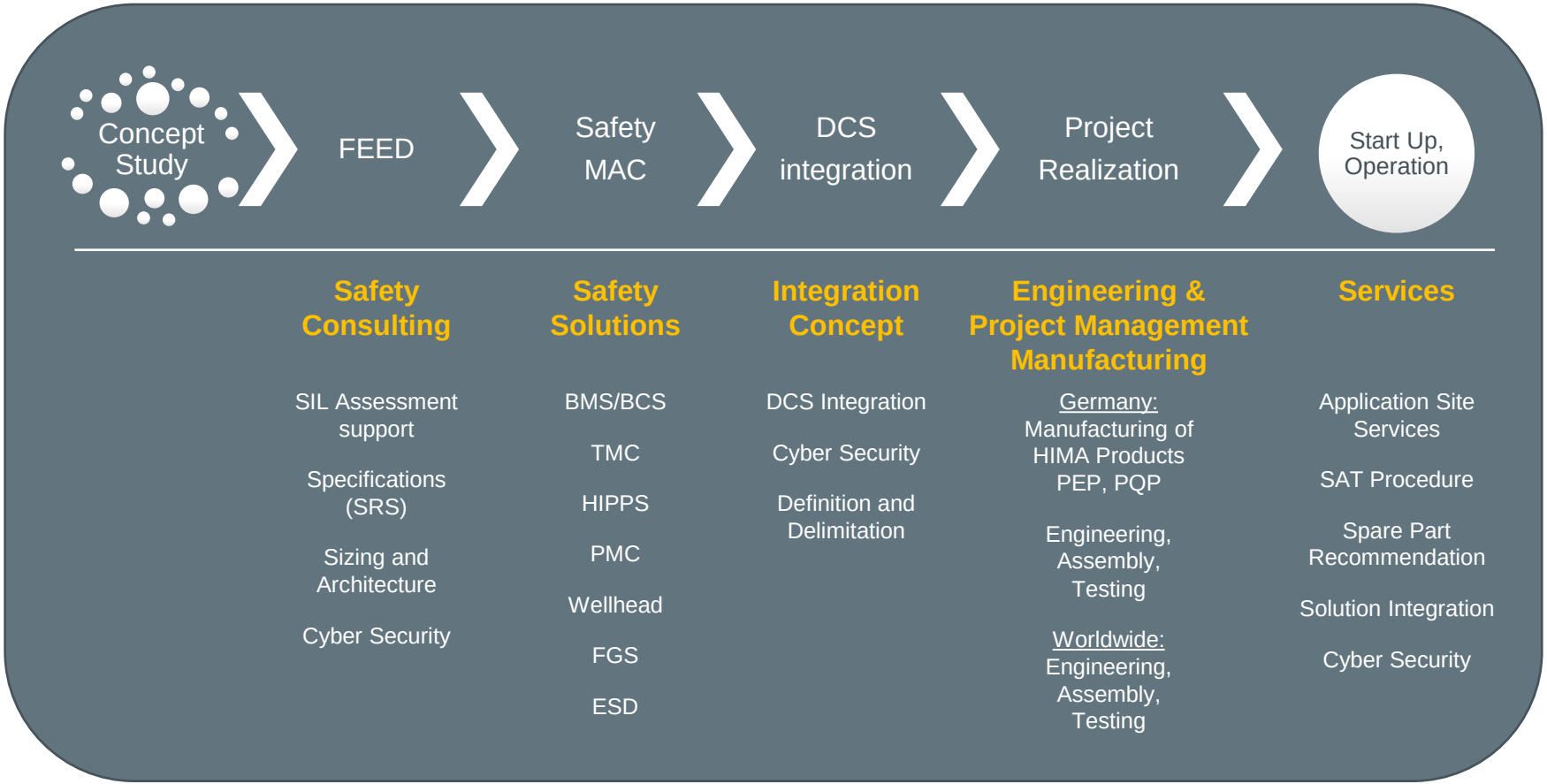
Cyber security

Cyber diode



Remote Access

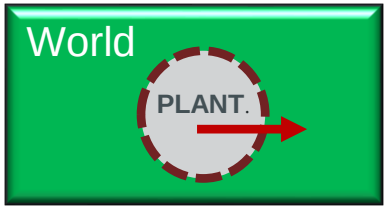
HIMA Services



What is Safety

Functional safety IEC 61511-2

*$Risk_{safety}$ = probability of a damage * potential of the damage*



Cyber security IEC 62443-3-3

*$Risk_{security}$ = threat * vulnerability * potential of the damage*

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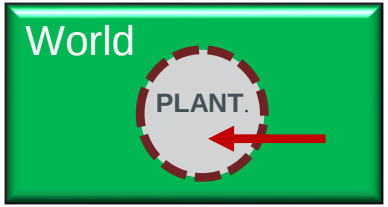
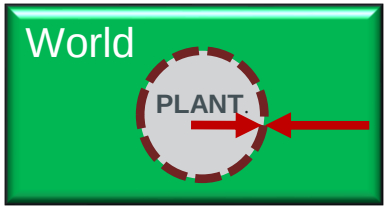




= Safety

Can you imagine life without pipelines?

Can You imagine life without pipelines?

Every day the world consumes

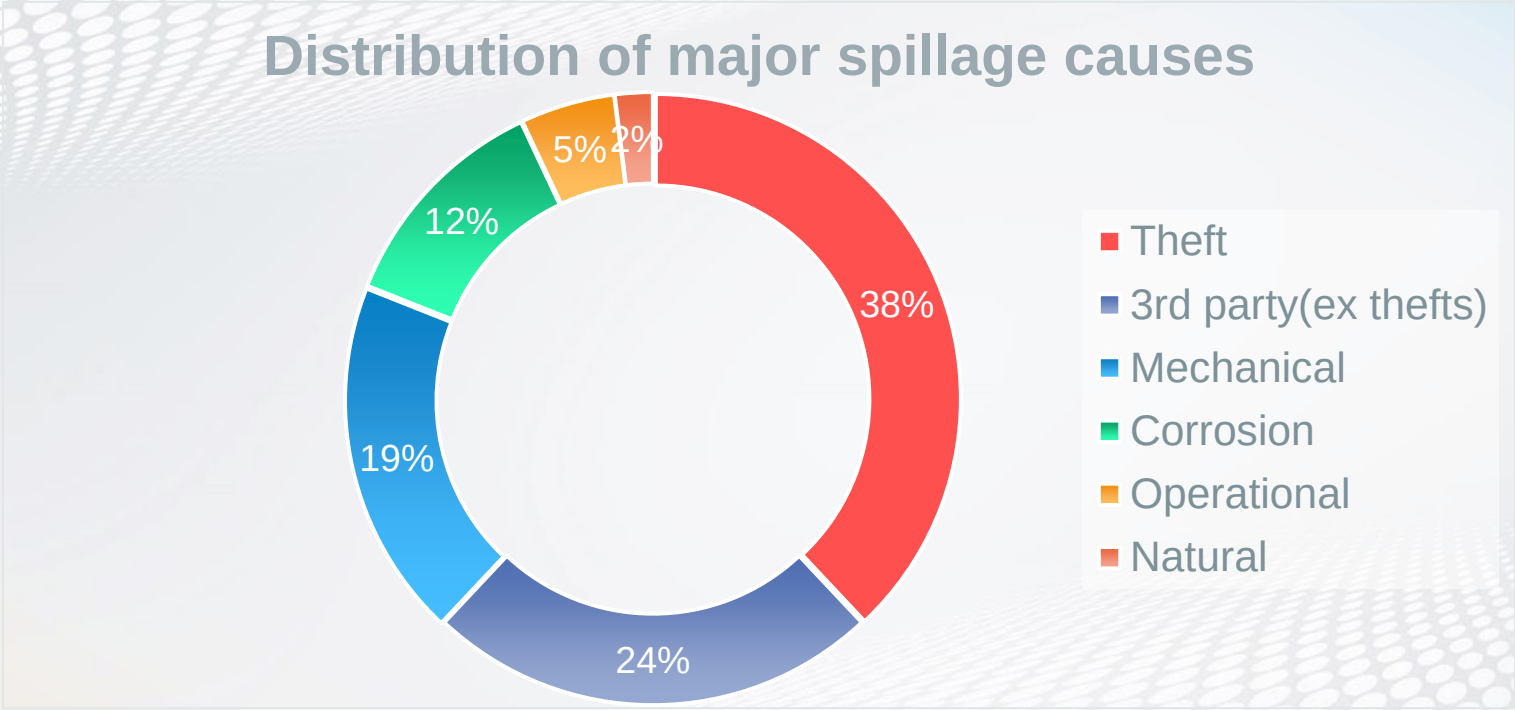
- 100 million barrels of oil
- 60 million equivalent barrels of natural gas
- 63 million barrels of water

…and demand rises…

Why do you need leak detection system?

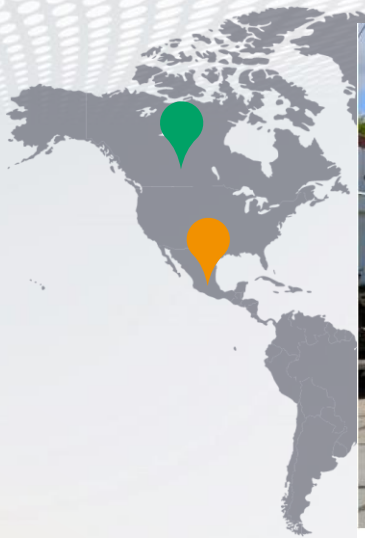
Typical problems

Statistics



Source: Concawe Report :„ Performance of European cross-country oil pipelines Statistical summary of reported spillages since 1971“

Why worry about thefts ?



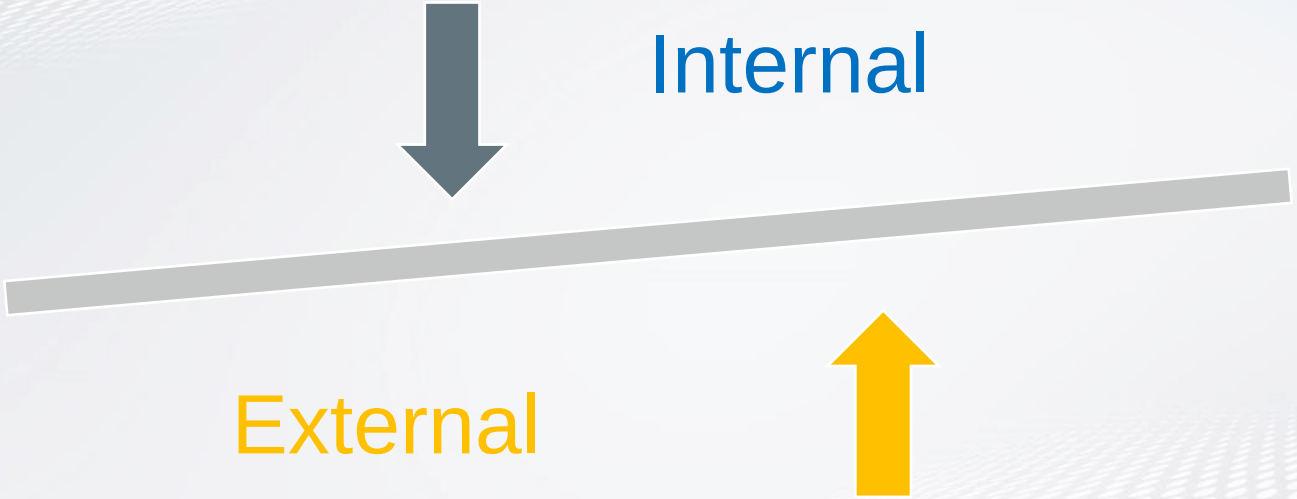
Every year, it is est
refined p

Perhaps hundreds of thousands of liters of diesel stolen

Thieves have been able to steal a large amount of diesel from fuel giant Total in a very ingenious way. They found an underground distribution pipe, made an opening in it and turned on a tap. With a hose they caught the diesel, a little further on, in a shed.

Mexico	2020: around 9,000 of fossil fuel theft were detected (the equivalent of one occurrence every hour)
USA	Annual fuel theft in the country exceeds $8 billion, including an estimated $2.1 billion a year from vehicle
Nigeria	country loses an average of 200,000 barrels of crude per day to oil thieves translating to $7.3 billion in a year
Europe	Sophisticated thefts geographically concentrated in South-Eastern Europe
Philippines	Philippines loses US$750 million annually in tax revenue due to adulterated fuel products entering its supply chain from smuggling

Is there a single best method for leak detection and location?



External Methods

Method	Pros	Cons
Acoustic Sensor	Sensitivity	Nuisance Alarm High Cost
Fiber Optic	Location Accuracy	High Cost No Leak size data Unproven stability over time Not suitable for brownfield applications
Vapor Sensor	Accurate Size and Location Data	High Cost Not Real Time Not suitable for brownfield applications

Internal Methods

Method	Pros	Cons
Statistical Analysis	Uses Existing Instrumentation	Works Only in Steady State Conditions Low Accuracy Location Data
Real Time Transient Modeling	Uses Existing Instrumentation	High Programming, Training, and Maintenance Costs Require Constant Tuning
Volume Balance	Uses Existing Instrumentation Effective in Transient Conditions	Only Estimates Leak Location
Pressure Drop	Uses Existing Instrumentation Can Detect Small Leaks	Only Effective during Shutdown
Negative Pressure Wave	Uses Existing Instrumentation Sensitive to Small Leaks Good Leak Location Reduced False Alarms	

What should you look for in the best available technology system?

Sensitivity

Accuracy

Reliability

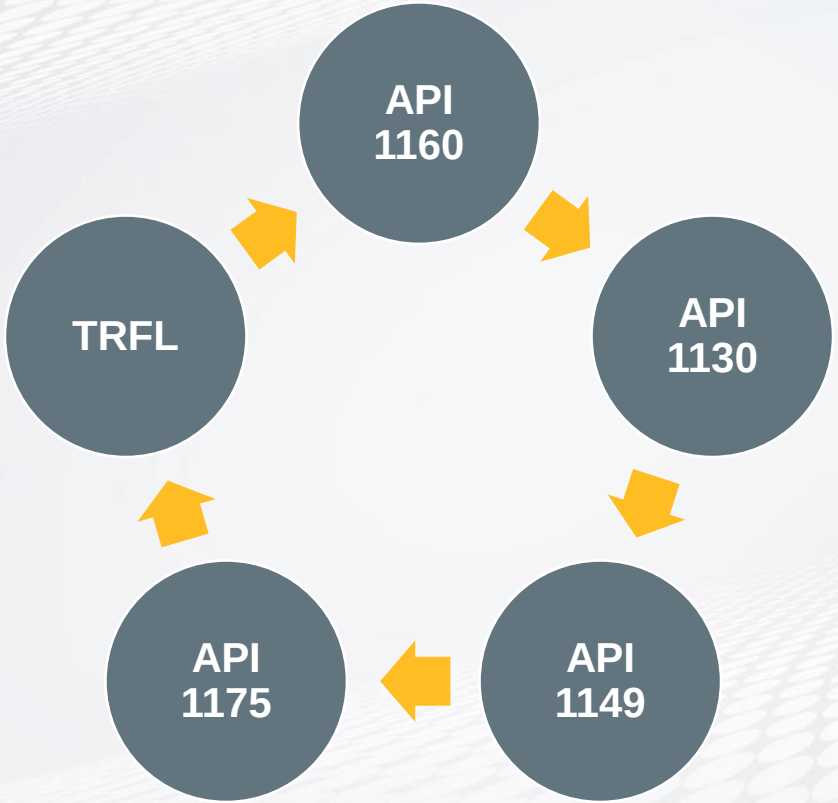
Robustness

Specific requirements from operators

- To illustrate sensitivity , our leak detection system should be able to detect one mug of beer stolen from Olympic size swimming pool full of beer

- It represents 0.000 224% of the pipeline volume

Regulations & standards

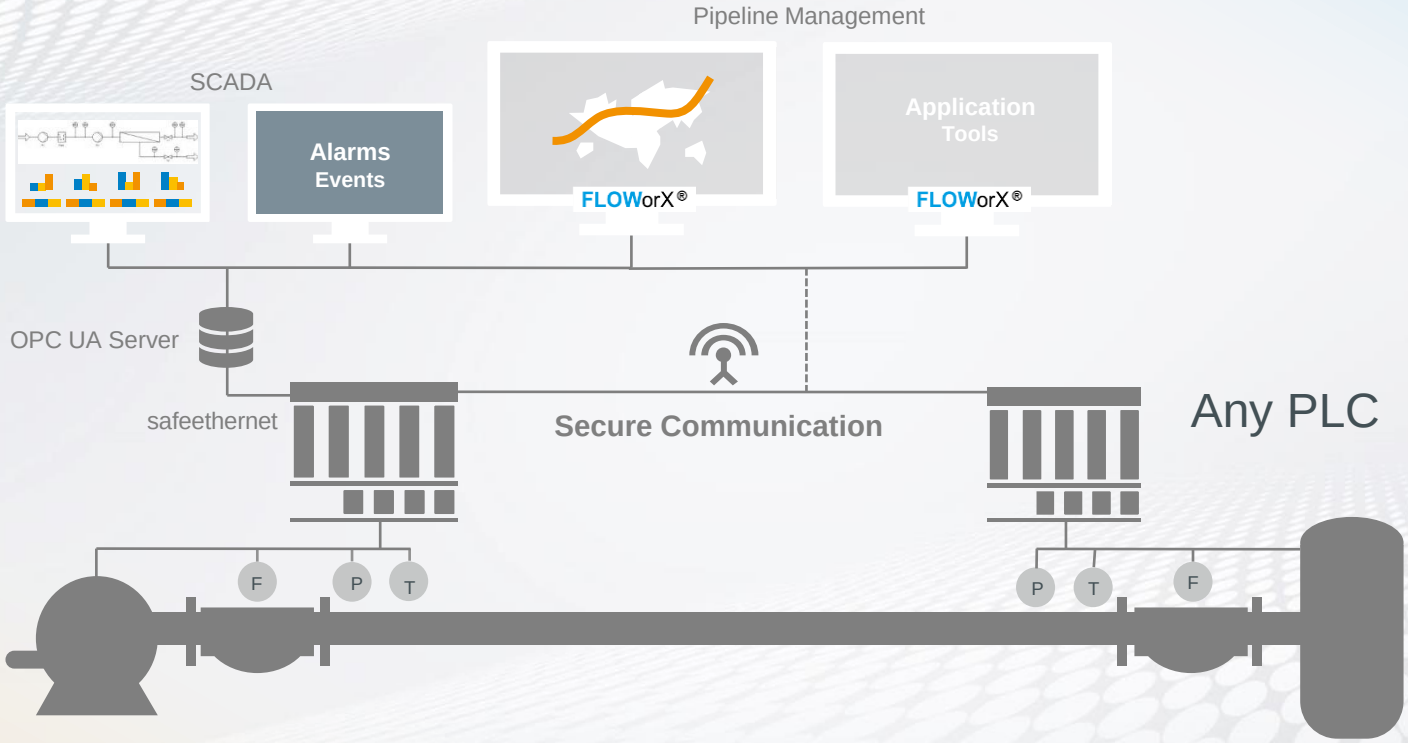


FLOWorX® -Comprehensive Coverage

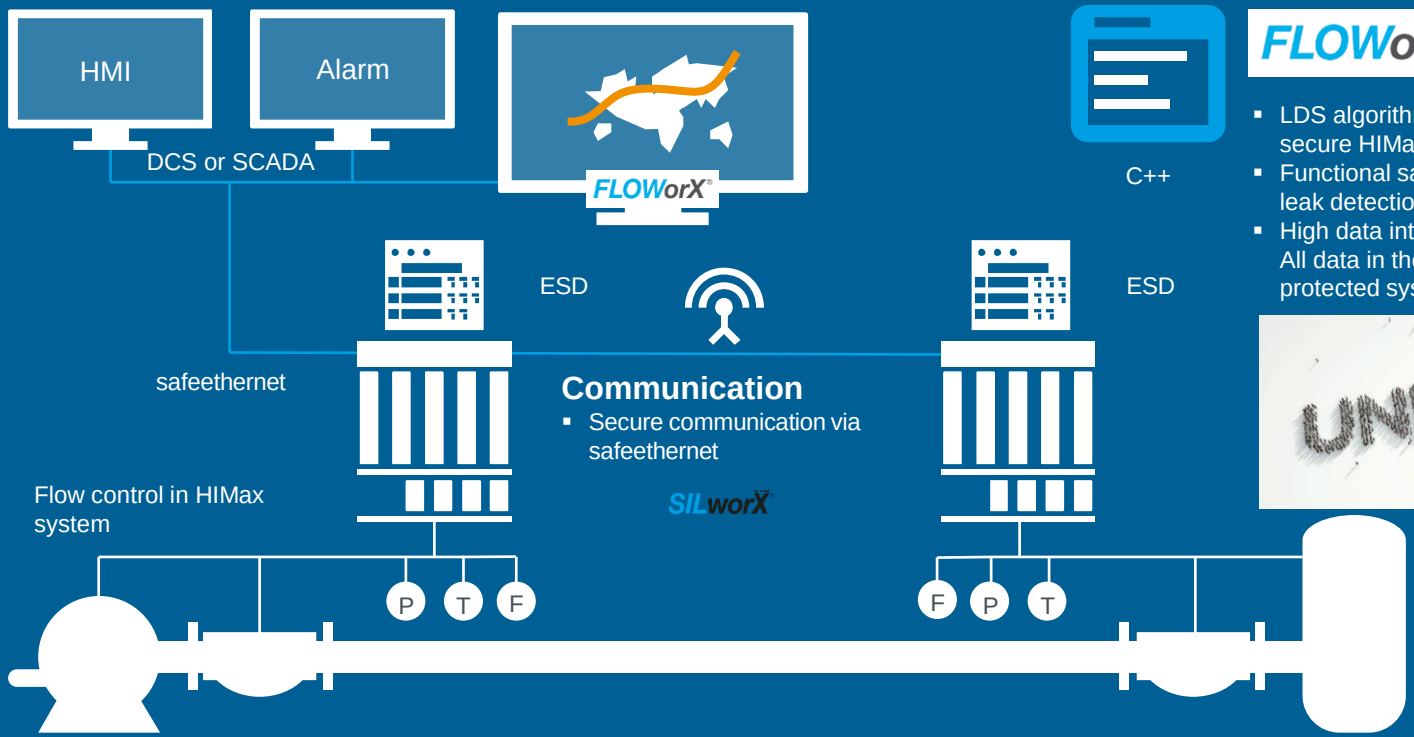
‘Mind you, I’m not responsible for the entire pipeline – just the section that flows through my office.”

FLOWorX®

All-In-One Solution for Pipeline Management

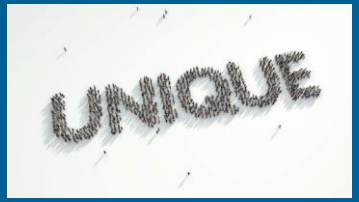


FLOWorX® HIMax based solution

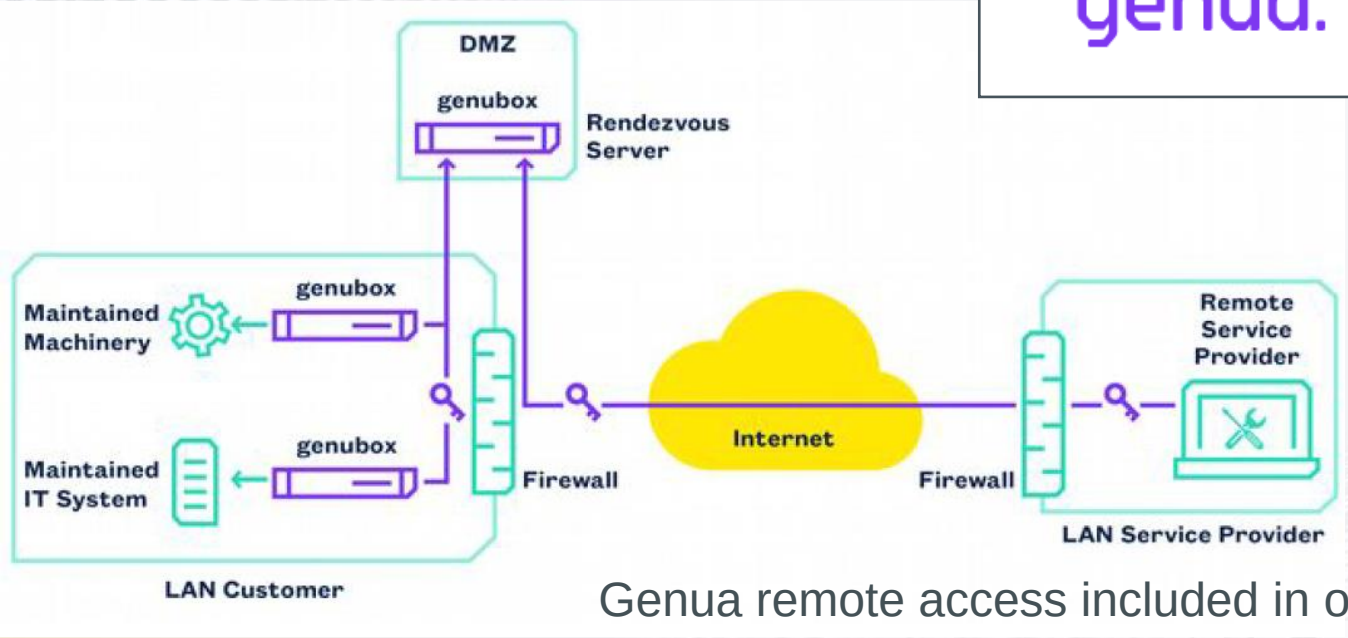


FLOWorX®

- LDS algorithms in the secure HIMax system
- Functional safety for leak detection
- High data integrity
  All data in the same protected system



FLOWorX® 24/7 Support



Genua remote access included in our solution

Which method you would choose?

VBL – Volume Balance (Absolute & Relative)

EPW – Enhanced Pressure Wave

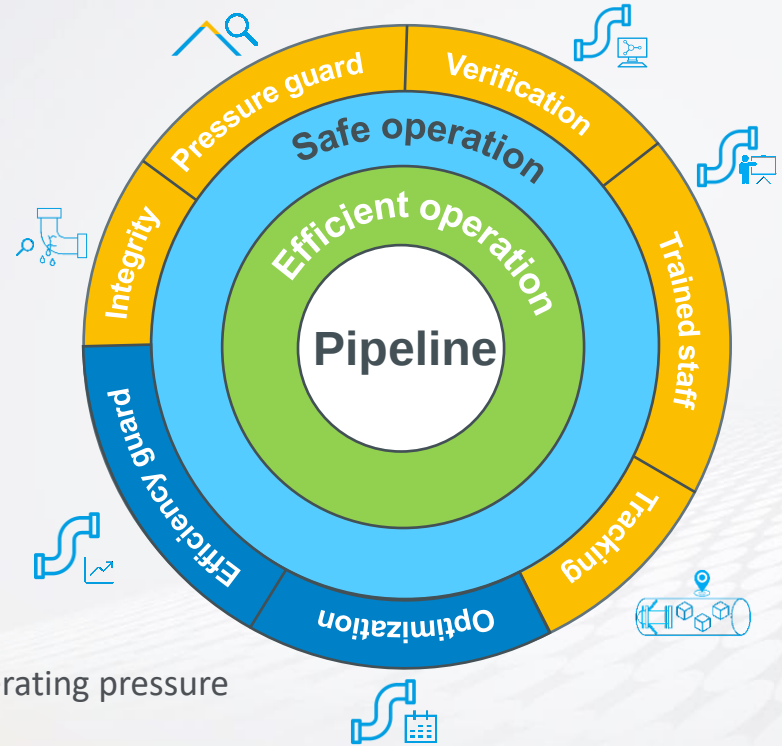
Pipeline Status		Leak Type: Burst	Leak	Seepage
	Shut Down	EPW PDM	PDM EPW	PDM
	Steady State	EPW VBL(A,R) RTTM	EPW VBL(A,R) RTTM	
	Transient	EPW VBL(A) RTTM	VBL(A) RTTM	

RTTM –Real Time Transient Model

PDM – Pressure Drop Method

FLOWorX®
All-In-One Solution for Pipeline Management

Applications
Leak Detection
MAOP & Slack Detection
Hydraulic Simulation
Pipeline training
Batch & Scraper Tracking
Demand predictor
Pipeline Efficiency



Features
Flowmeter drift tool
Split flow Routes
Dynamic Routes
Dynamic Thresholds
“Near the fence” detection

MAOP: Maximum allowable operating pressure

Why choose FLOWorX®?

All-in-One customized solution for pipelines

Unique Hybrid solution

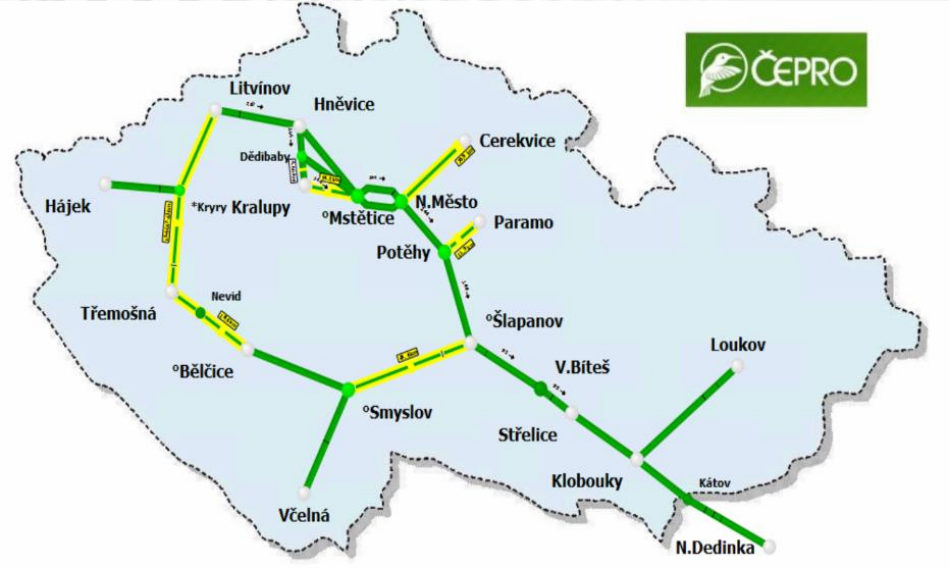
Accuracy down to 50 m

Compliant to API 1130,1149,1160 TRFL

24/7 online expert diagnostic & support

Extreme level of sensitivity from 0,3% of Flow rate

Success Stories: Cepro a.s.



Slovakia

- The “densest” **product pipeline** network in Europe
- Pipeline diameter 300mm
- Total pipeline length **1100 km,** >200 localities (pump stations, terminals, block valve stations)
- Pipeline section: 79 km length and 14 BVS with pressure measurement.
- **The typical error of a localization approx. +/- 50 meters**
- The client tests the system in regular manner (approximately 150 tests per year), without our attendance.
- **The leak sensitivity 0.2% of actual flow rate (300 m3/h).**
- **Additional functionality:** Batch and Pig tracking, MAOP and Slack detection

Success Stories: Orpic

Oman

ORPIC, MAF – Sohar pipeline project (Oman)

- Length – 270km o Diameter – 24”
- Product – crude oil
- 1 pumping stations, 1 terminal station
- 12 block valve stations
- Installation of FLOWorX leak detection software including flow and pressure profile, monitoring of MAOP and Slack line, data archiving and monitoring

Success Stories: SWWC Saudi Arabia

Saudi Arabia

- **Water pipeline** network
- Twin pipeline, line diameter 80”
- Total pipeline length **650 km,** 20 localities (pump stations, terminals)
- The leak sensitivity **2%** of actual flow rate (150.000 m3/d)
- **Additional functionality:** training simulator, demand predictor, optimization module (**pumping manager** proposes pumping regimes based on demand predictor calculations)

Success Stories: Shell

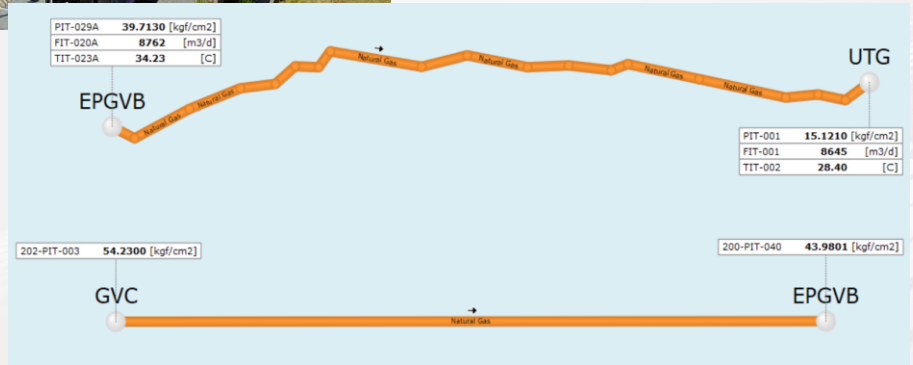
Germany

- **VinylChlorid pipeline**
- Line diameter 150 mm
- Pipeline length **9 km** between Godorf and Wesseling production sites
- Significant part of pipeline is above ground – effect of weather – vinylchlorid has much bigger Correction for the effect of Temperature on Liquid (CTL)
- **Unique Hybrid solution –** simplified LDS running in HIMax PLC

Success Stories: Eneva

- Natural Gas pipeline
- Pipeline diameter 0.5 m
- Total pipeline length 60 **km**
- Pipeline section: 40 km length, no BVS with pressure measurement.
- The leak sensitivity **2%** of actual flow rate
- The leak location error +/- 2.5 km
- **Additional functionality**: Pig tracking

Brazil



Pipeline leak detection system

HIMA SMART SAFETY.

TAL transalpine pipeline

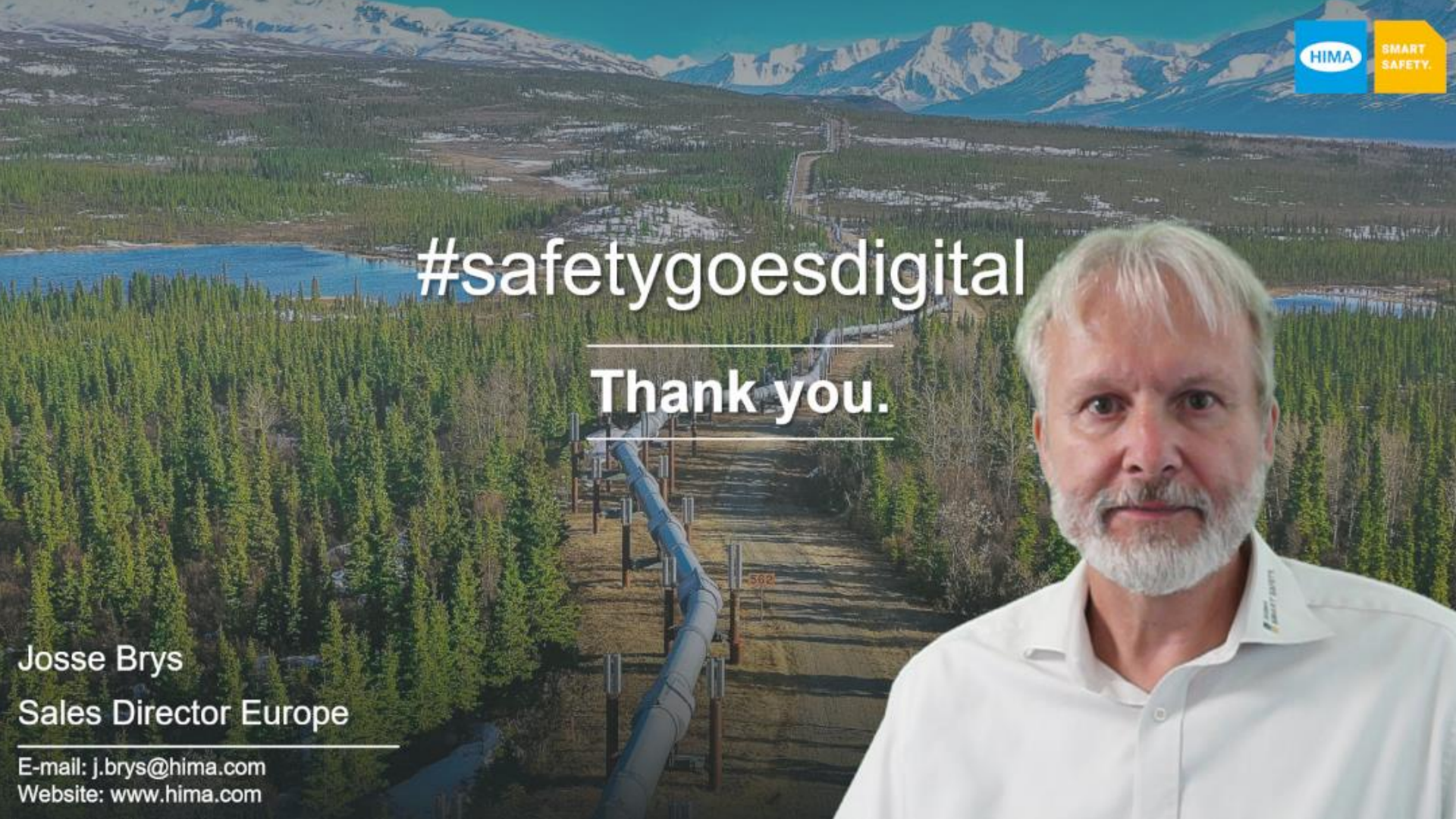
TAL Group Transalpine Pipeline

- Total length: 753 km
- From the Port of Trieste to the refineries in Central Europe
- Maximum pipeline elevation: 1,572 m
- Number of refineries supplied: 8

753 KM

38

Stop leaking money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Thank you.
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