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PROSES EMNİYETİ SEMPOZYUMU

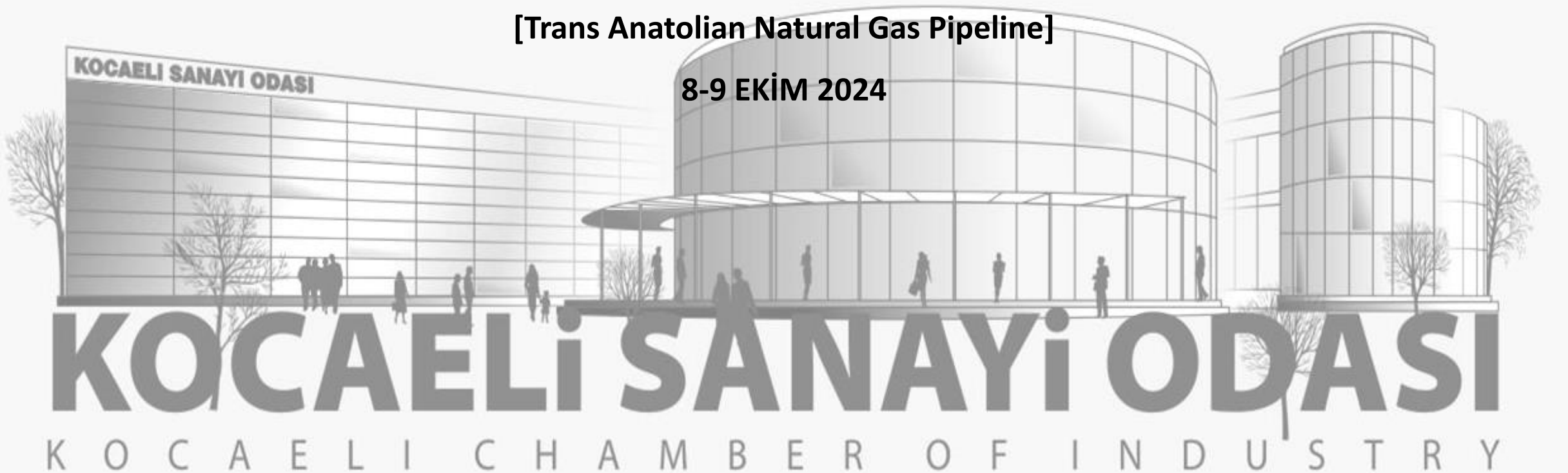
PIPELINE MONITORING SYSTEM

H.SİNAN GÜNEŞLİ / OPERATION SUPPORT MANAGER

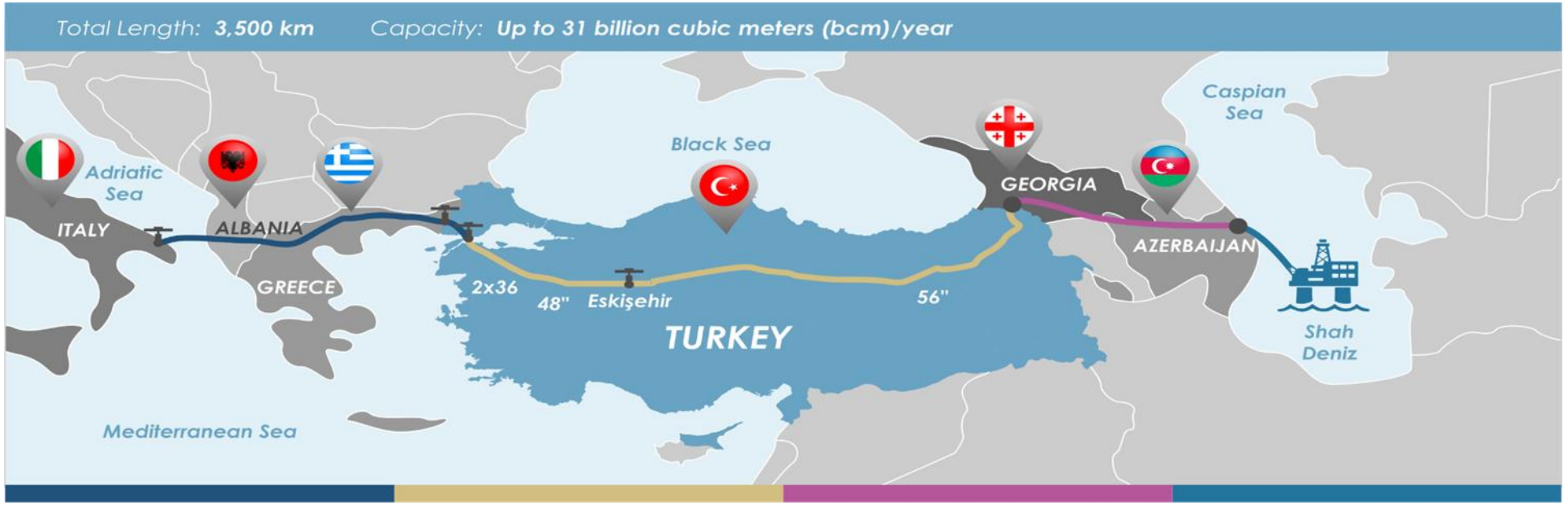
TANAP

[Trans Anatolian Natural Gas Pipeline]

8-9 EKİM 2024



TRANS ANATOLIAN NATURAL GAS PIPELİNE (TANAP)



Trans Anatolian Natural Gas Pipeline (TANAP)

Turkey 1811.7 km

Total Length:
1811.7 km (Turkey)

Shareholders

SGC	SOCAR	BOTAŞ	BP
51%	7%	30%	12%

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WHY TANAP & SOUTHERN GAS CORRIDOR?

For Turkiye:

- Enhancing supply security and diversity, social and economic benefits (spill over effects, e.g. new jobs and business opportunities for local people, contractors and vendors, social and environmental investment programs to foster regional development, tax revenues etc.)

For Azerbaijan:

- Creating stronger economic and political ties with EU, having access to new consumer markets to ensure demand security and diversity, creating revenues from gas exports to sustain economic growth and being the second biggest gas supplier to Turkey and a new gas supplier to Europe.

For Europe:

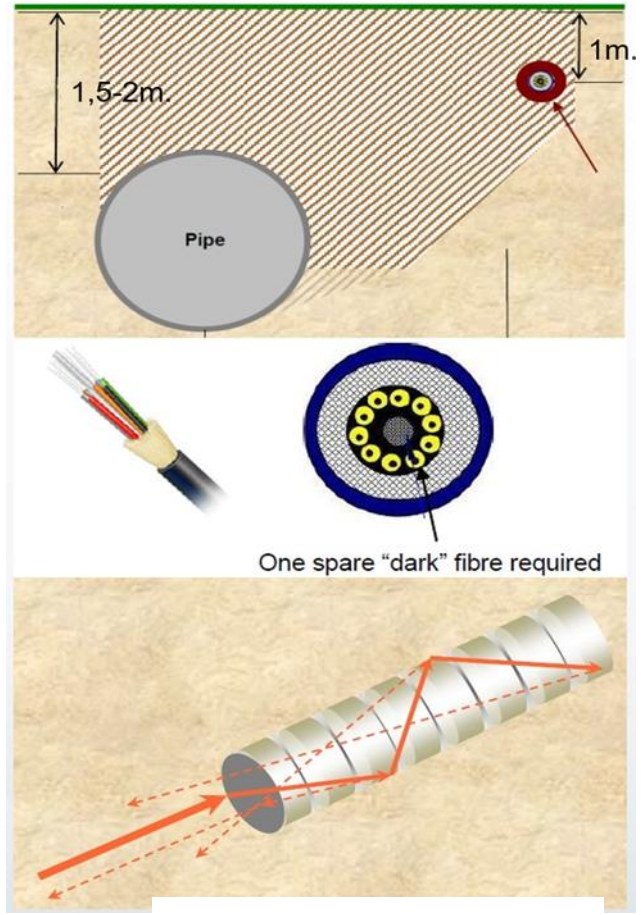
- Reducing high import dependence of the South East European Countries on a single source by diversifying not only supplies but also supply routes, development of new cross border gas interconnectors and transmission networks with neighboring countries.

PROCESS SAFETY EVETN (PSE)

- A Process Safety Event (PSE) typically involves an unexpected mechanical integrity failure in a pipeline system or processing facility, often including a fire, explosion, rupture, or hazardous chemical leak. These events can be caused by a number factors including;
  - Lack of Integrity Management Systems
  - Operational and Maintenance Failures
  - Physical Damages by 3rd Parties
  - Geotechnical Risk (i.e. earthquake, landslide, flood etc.)
  - Security Violence
- All process safety events cannot be completely eliminated, but can be kept under control and minimized by following good inspection, maintenance, and engineering practices.
- Pipeline companies employ various control measures including security technologies (Fiber optic-based security systems) to protect their infrastructure and ensure process safe and uninterrupted operations considering its personnel and communities health and safety.

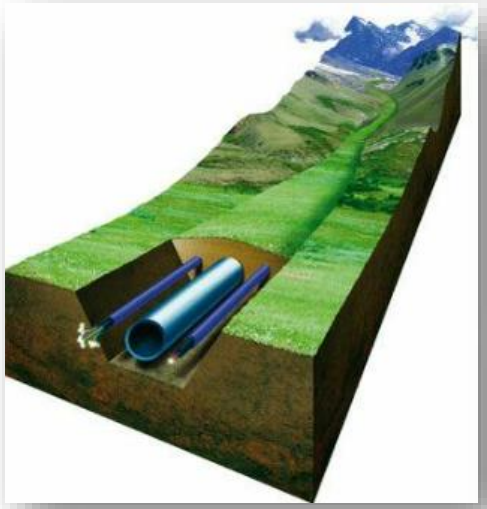
FIBER OPTIC – BASED SECURITY SYSTEMS

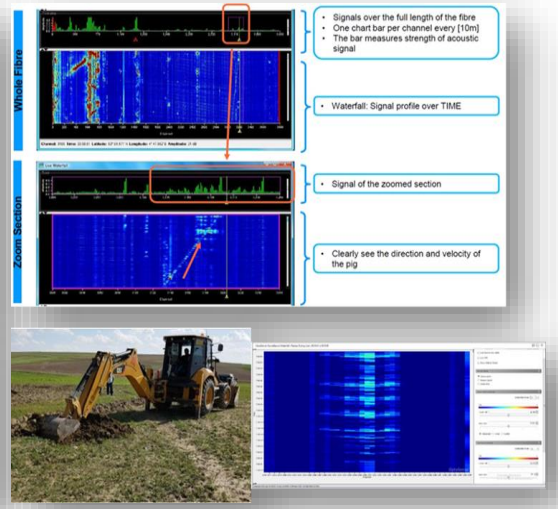
- Fiber optic-based security systems are one of the control measures to ensure process safe operations is achieved along the pipeline and its Above Ground Installations (AGIs) by application of;
  - Pipeline Monitoring System (PMS) – generally applicable to pipeline only
  - Fence Intrusion Detection Systems (FIDS) - generally applicable to AGIs
  - Buried Intrusion Detection Systems (BIDS) - generally applicable to AGIs
- Fiber optic sensing uses the physical properties of light as it travels along a fiber to detect changes in;
  - Temperature
  - Strain
  - Vibration (acoustics) and other parameters.
- Fiber optic sensing utilizes the fiber as the sensor to create thousands of continuous sensing points along the fiber.

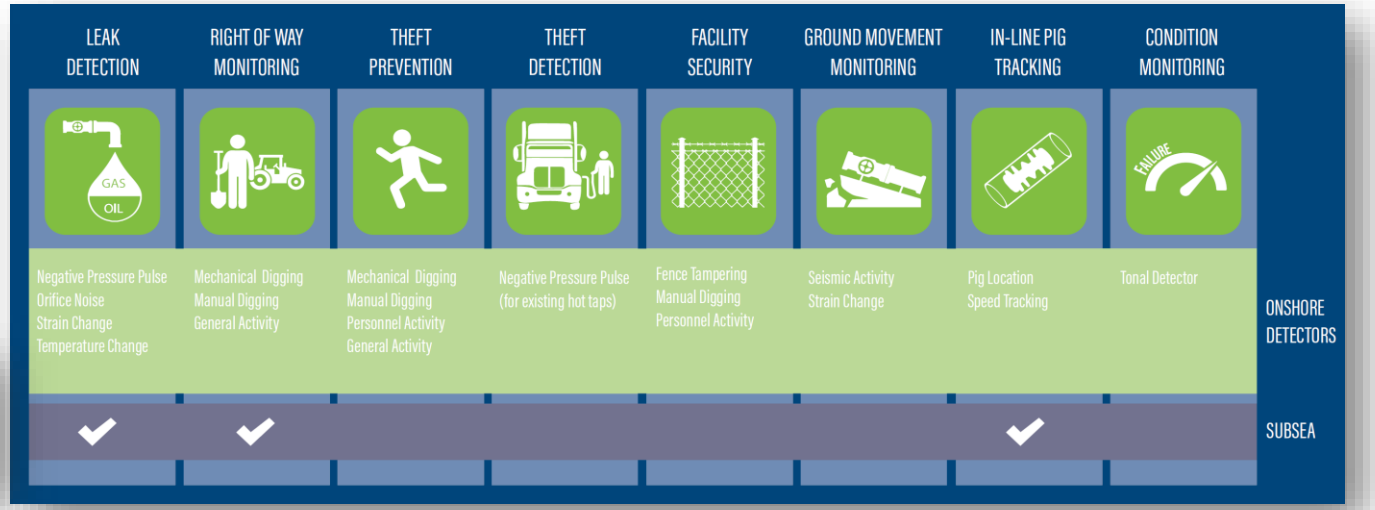


PIPELINE MONITORING SYSTEM

- The Pipeline Monitoring System extends along the pipeline to monitor external threats (such as hot-tapping, excavation, landslides, etc.) and potential leaks within the pipeline.
- Activities such as machine excavation, manual digging, blasting, hot-tapping, pigging (in-line inspection), landslides, earthquakes, anchor dragging, and the movement of humans or animals generate unique vibrations. These vibrations induce disturbances in the light traveling through the fiber optic core.
- When a threat is detected, each system generates an alarm on the operator's screen and triggers Operator for further investigation, determination and intervention as required.
- It may further require contacting with the nearest law enforcement agencies for their intervention to ensure pipeline security.







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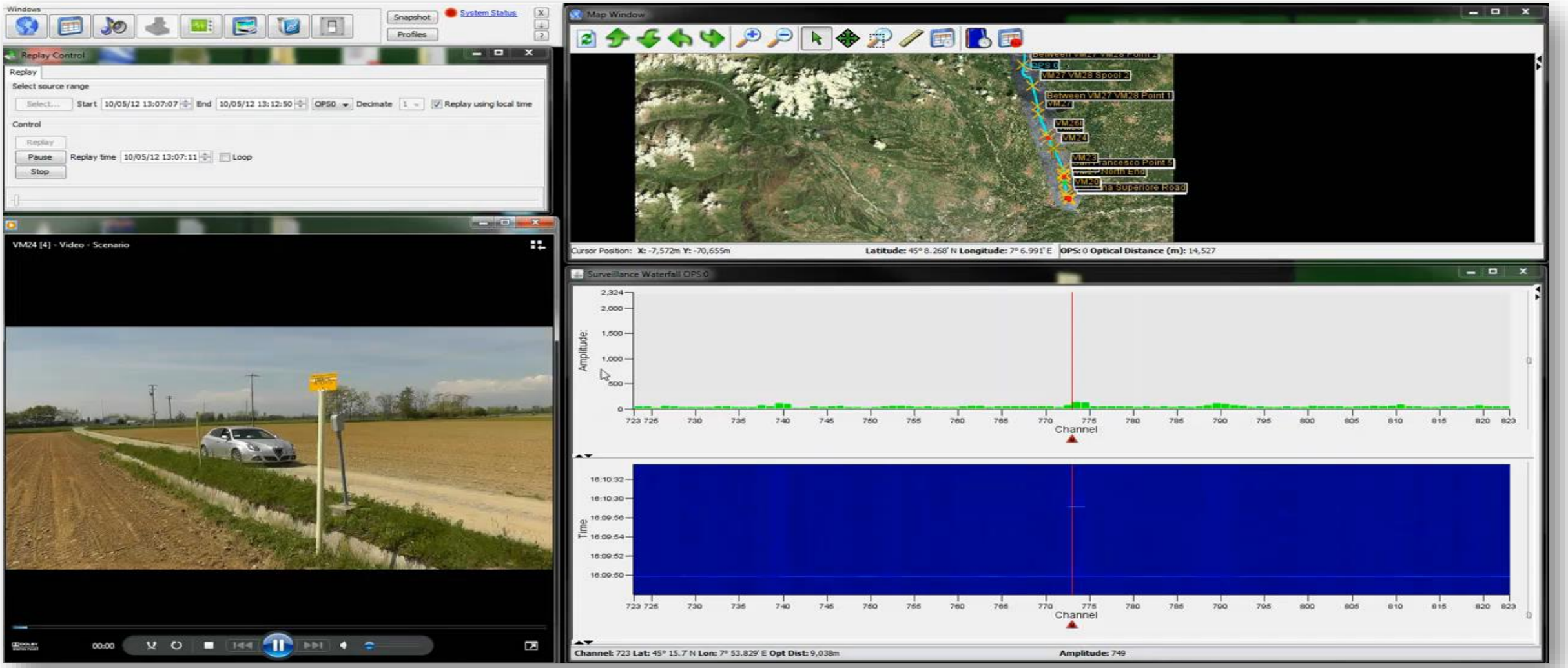
PIPELINE MONITORING SYSTEM



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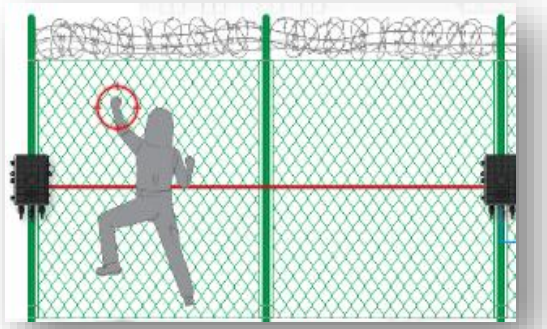
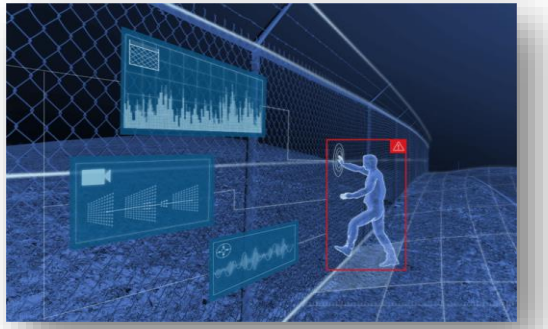
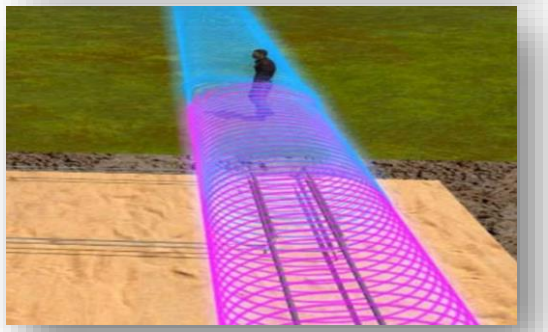
FENCE & BURIED INTRUSION DETECTION

- In addition to PMS, Pipeline Operators also involve Fence Intrusion Detection Systems (FIDS) and Buried Intrusion Detection Systems (BIDS) particularly applicable to AGIs to ensure security completeness beside CCTVs.
- Fence Intrusion Detection System is used to detect climbing, propping ladders, and other interventions or threats around manned and unmanned stations.
- Buried Intrusion Detection System employs fiber optics buried in the ground near the perimeter of the fence to detect excavation, vehicle entry, walking, and other interventions or threats in that area.







- When a threat is detected, each system generates an alarm on the operator's screen and triggers Operator for further investigation, determination and intervention as required.
- When such an intervention is detected, the system triggers an alarm and the nearest camera automatically turns towards the detected direction.
- It may further require contacting with the nearest law enforcement agencies or in-house security servic

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PROCESS SAFETY MANAGEMENT

- In conclusion, the **Pipeline Monitoring System plays a crucial role** in the rapid detection and intervention of threats such as gas leaks, 3rd party intrusions, geotechnical risks and any security violence along the pipeline, as well as around manned and unmanned stations.
- By classifying these threats, the system enables timely intervention before the threat escalates into a larger incident, therefore **enhancing the Process Safety through Risk Based approach**.

KOCAELİ SANAYİ ODASI

PROSES

EMNİYETİ SEMPOZYUMU

FUAR İÇİ 41040 İZMİT/KOCAELİ

TEL: +90 262 315 80 00

FAX: +90 262 321 90 70

WEB: www.kosano.org.tr

E-MAIL: kso@kosano.org.tr