A photograph of an industrial facility, likely a refinery or chemical plant. In the foreground, there are several parallel, light blue pipes running across a grassy area. Behind them, a network of red pipes is visible. The background features a large, complex industrial structure with various pipes, tanks, and a tall, grey smokestack. To the right, another tall smokestack with red and white stripes is visible. The sky is clear and blue.

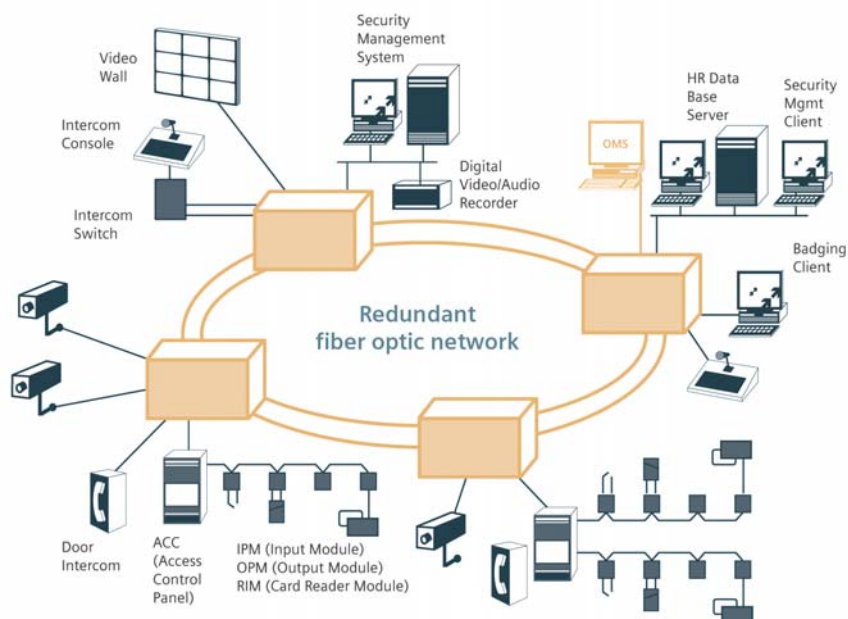
Integrated security solutions for pipelines



Security for pipelines

Siemens is able to provide an integrated solution to protect buried pipelines of any length. Due to the worldwide presence of Siemens, this solution can be deployed anywhere in the world, with the modularity of the concept allowing easy adjustment of the solution enabling it to be flexible, depending upon the customers needs and local requirements.

Systems handled by the solution



■ Protecting pipelines

Some of the main risks for the oil and gas pipelines are: construction activities near to the pipeline assets, third party activities, tampering, weather-related damage, malicious intent, sabotage, etc. Any of these actions on the pipeline can produce serious damage for people, the environment, processes, installations and the continuity of business.

“A solution offers a great deal more than only the sum of its parts”

Under this premise Siemens has developed the “security solution for pipelines”. This is our answer for the protection of buried pipelines of any length and consists of the following systems.

■ Security Systems

based upon Intrusion, Access and Video applications, which are installed in all pumping, compression and valve stations. The video images can also be used to monitor the pipeline if required to enable visual verification.

■ Sensing fiber system

is used for the detection of third party activities, natural disasters and malicious activity. The system works in real time. It consists of a single sensing cable buried near the pipeline and a sensing control unit. The system can use the existing fiber optic communication cable as the sensor. This dramatically reduces both the time to install and the overall installation cost. A laser beam is transmitted along the fiber optic cable, the returned signal is automatically monitored and analyzed by the sensing control unit. Operating as a single system, up to 40 Km can be monitoring with an event localization accuracy up to 150 m.

Multiple sensing fiber systems are networked using the transmission system to monitor long haul pipelines (thousands of Km).

■ Transmission system

is hardware based on the latest fiber optics technology from Siemens. It includes redundancy for power and optic transmission and it can also use Ethernet/IP. The same as the sensing fiber system, this system can also use the existing fiber optic communication cable. It allows full integration into one network: the sensing fiber system; the security systems; plus the following technologies that are usually encountered in pipeline environments:

- Scada
- Microwave radio, Trunked radio, TETRA
- Routers & switches, PDH, SDH, SONET, IP
- Fixed and wireless LAN and telephony
- Public address and alarm

■ Control Room

The security solution for the pipelines is commanded from the commodity of one control room and/or several local control rooms. It allows:

- Integration of the solution into one graphical user interface.
- The management of the alarm controlling and alarm dispatching from any station and zone of the pipeline.
- Real-time viewing of the pipeline (on a video wall) or wide video surveillance.
- The storage of the video streams.

■ Benefits of the solution:

- One solution handling all security issues related with the pipeline and all stations.
- Due to the openness of the transmission system, the existing infrastructure of the pipeline can be used. This can result in a substantial cost reduction. Also, all pumping stations and block valves can be put on the same optical network.
- Real-time monitoring of the pipeline including all stations.
- On-line detection of: construction activities near of the pipeline assets, third party activity, illegal tapping, weather related damage, malicious intent, sabotage, intrusion in the stations etc.

Command control center



- Interaction of the solution with the Scada system, which takes the corresponding actions to protect people, minimize damages related with the environment, processes and installations.
- Minimizes the down-time of the pipeline assuring the continuity of the business.
- The solution can be used for other pipelines such as water and refined products pipelines.

■ References

Some of our references world-wide are:

■ America

Alyeska Pipeline

■ Africa

Sonatrach

- Gazoduct Maghreb Europe Pipeline - Algerian Section
- Six Pipes
- FO Arzew - Hassi R'Mel Pipeline
- GK1/GK2 Pipeline
- GR1/GR2 Pipeline
- Ourhoud

■ Middle East

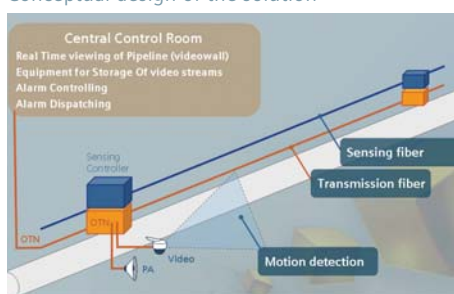
Aramco

- Khuff Gas Frame contract
- Qatif : Gas Field development
- Abqaiq-Shaybah Oil Pipeline
- Shedgum phase 1 + 2
- Hawiyah-Haradh pipeline
- AY Gas Plant East-West Pipeline
- Uhtmaniyah

Hardware for the transmission system



Conceptual design of the solution



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The information in this document contains general descriptions of technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.

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