Construction, repair and maintenance of pipeline systems
oil and gas pipelines, water pipelines

SCIENTIFIC AND PRODUCTION GROUP COMPANIES
NEFTEGAZSTROYIZOLYATSIA

NEW CONSTRUCTION

Pipeline construction "turnkey"

Welding and assembly work

Insulation works

Installation of technological equipment

PIPELINE CONSTRUCTION "TURNKEY"

Construction of the pipeline DN 700mm

PIPELINE CONSTRUCTION "TURNKEY"

Construction crossing under the river, DN 700, 650m
Horizontal Directional Drilling method

WELDING AND ASSEMBLY WORK

Welding pipeline
Electric Arc welding method

Welding gas pipeline
Automatic welding flux cored wire
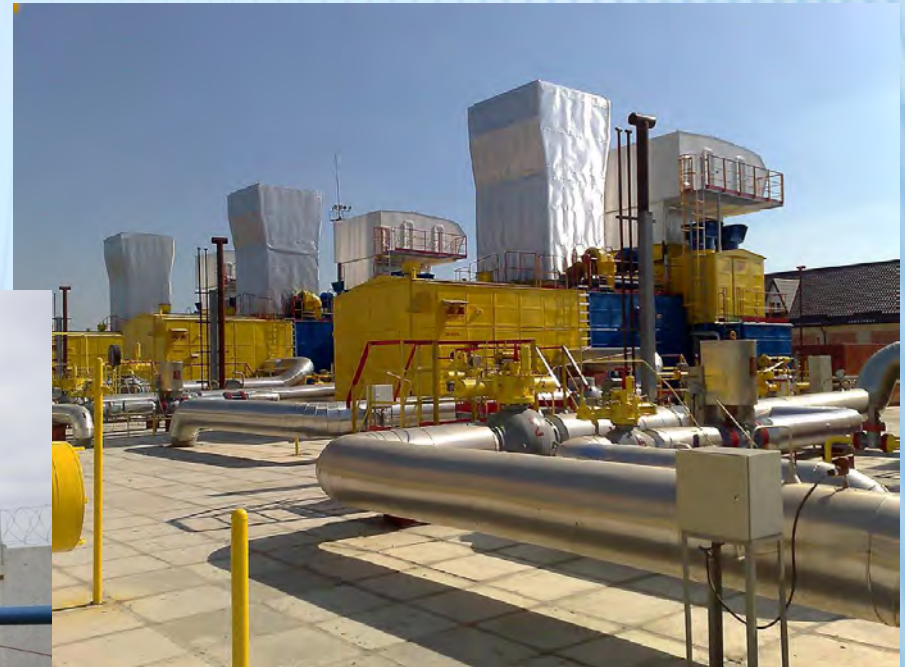
Pipe insulation in the factory and semi-stationary conditions

INSTALLATION OF TECHNOLOGICAL EQUIPMENT

Installation and commissioning of technologycal equipment
Compressor stations, pressure stations

NEFTEGAZSTROYIZOLYATCIYA

ACTIVITIES

New construction

Complex renovation

Designing Surveys

Security measures Communication

COMPLEX RENOVATION

Diagnostics

Carrier recovery of the pipeline

Restore corrosion protection

DIAGNOSTICS

Outside inspection of pipelines

- Insulation monitoring
- Control of circular welded joints
- Condition monitoring of metal pipe

Intratube diagnostics intelligent PIGs

- Cleaning the internal cavity of the pipeline
- Calibration pipeline
- Survey pipeline intellectual PIGs
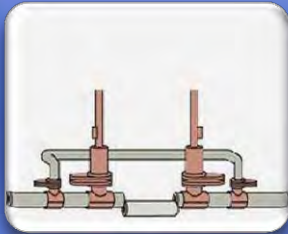
COMPLEX RENOVATION

Diagnostics

Carrier recovery of the pipeline

Restore corrosion protection

CARRIER RECOVERY ABILITY PIPELINES

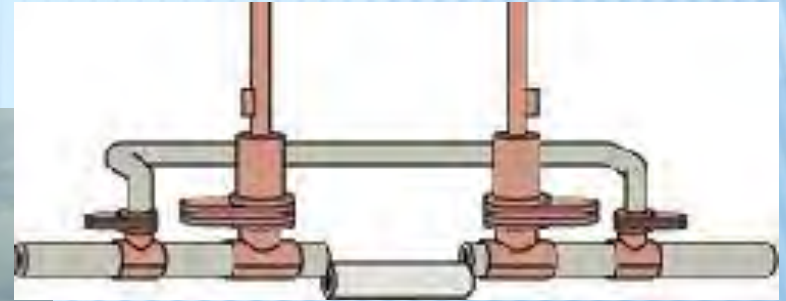Replacement of the pipeline, with bypass activities

Cold composite banding

Welded coupling

REPLACEMENT OF THE PIPELINE USING THE BYPASS EVENTS

Replacing the damaged pipeline

COLD COMPOSITE BANDING

Bearing capacity of composite gain bandage

WELDED COUPLING

Gain the carrying capacity of welded coupling

COMPLEX RENOVATION

Diagnostics

Carrier recovery of the pipeline

Restore corrosion protection

RESTORE CORROSION PROTECTION

 Linear reinsulation

 Isolation of local areas

 Isolation fittings

 Outdoor Paint

 Reinforced composite insulation

LINEAR REINSULATION

Applying polyurethane insulation coating
Complex repair of pipelines

ISOLATION OF LOCAL AREAS

Applying polyurethane insulation coating
manual method

ISOLATION FITTINGS

Abrasive blasting, insulation crane units, tees, fittings, valves, etc.

OUTDOOR PAINT

Insulation works at compressor stations,
Pressure, booster stations

REINFORCED COMPOSITE INSULATION

Pipe insulation composite insulation materials

NEFTEGAZSTROYIZOLYATCIYA

ACTIVITIES

New construction

Complex renovation

Designing Surveys

Security measures Communication

DESIGN, DEVELOPMENT NEW EQUIPMENT

Full complex of design work

Documentation «As Built»

Design, manufacture and supply of new equipment

DESIGN, MANUFACTURE AND SUPPLY OF NEW EQUIPMENT

Semi-base cleaning and pipe insulation

«BAYSIT» anticorrosive two-component polyurethane material
Designed to protect the main gas pipelines, oil pipelines

COMPLEX REPAIR OF PIPELINES

Equipment to remove old coatings
surface preparation and application of new insulation coating

Replacing insulation coating in places of local damage
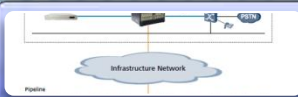
PROTECTION MEASURES, COMMUNICATION

- Digital Communications Solution for Pipelines
- Infrastructure Networks
- Backbone Transmission Network Solution
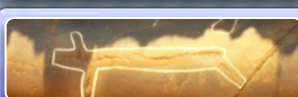- Unified Communications
- Integrated Security System
- Fiber Optic Pipeline Monitoring System
- Perimeter Intrusion Detection Systems
- Aerial Visual Pipeline Inspection
- Visual Pipeline Inspection

DIGITAL COMMUNICATIONS SOLUTION FOR PIPELINES

Communications solution for Pipelines consists of three layers: infrastructure networks, united communications, and integrated security. This multi-layered approach addresses the challenges of distance, operation and maintenance, costly manual oversight, and harsh environments.

Multi-layered network solution provides oil companies with guaranteed reliable communications across large distances. This solution also integrates varied and sometimes non-interactive office systems into a single communications platform that incorporates an intelligent security surveillance system.

INFRASTRUCTURE NETWORKS

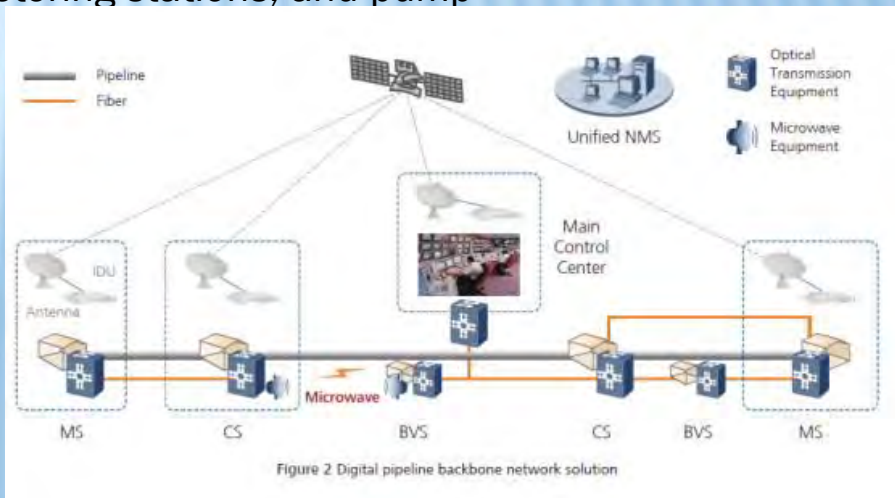Critical pipeline infrastructure stays connected no matter the distance and topography with the infrastructure solution. Control centers, metering stations (MS), compressor stations (oil pump stations) (CS), and valve stations (BVS) are linked by an optical transmission network. For stations in remote areas or in locations where it is difficult to route optical cables a microwave transmission system can be constructed.

In the event that optical transmissions are interrupted, important services like supervisory control and data acquisition (SCADA) and hotline services are switched over to the Very Small Aperture Terminal (VSAT) system. By automatically backing up the entire network the VSAT system maintains a link between key sites such as the control center, metering stations, and pump stations to ensure continuous operation.

Figure 2 Digital pipeline backbone network solution

BACKBONE TRANSMISSION NETWORK SOLUTION

Customer Benefits

- Strong security guarantee for services and production
- Simplified operation and management and reduced cost

Success Story

The China National Petroleum Corp (CNPC) Optical Pipeline Transmission Project

- Built a next-generation network (NGN) for reduced cost and simplified expansion.
- Deployed optical transmission and IP networks for improved service support and carrier-class fault protection.

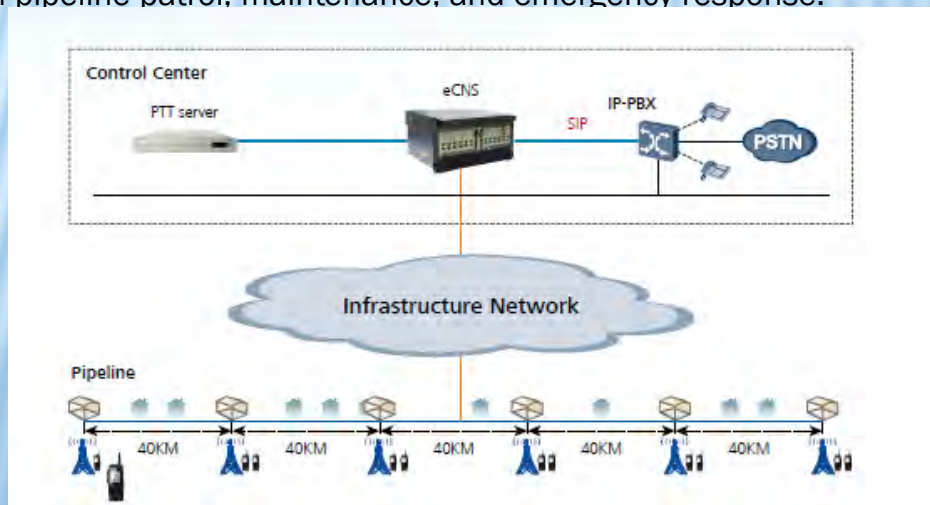# BACKBONE TRANSMISSION NETWORK SOLUTION

UNIFIED COMMUNICATIONS

Eliminate outdated and costly stand-alone office systems with the unified communications solution. Combining all communications; including voice, video, and data into one central source eliminates redundancies and saves money.

The Huawei solution connects Private Branch eXchange (PBX) voice systems to the Public Switched Telephone Network (PSTN) to ensure connectivity with the fixed network or carrier network. The PBX voice system is also connected to the LTE-based enterprise Core Network System (eCNS) via the Session Initiation Protocol (SIP). This infrastructure layout permits multiple services to be carried on one line, thus enabling streamlined communication between videoconferencing, telephone, trunking, and scheduling services.

Pipeline security and maintenance is managed via base-station equipment, using a digital cluster system, deployed at 40 Km intervals alongside pipelines to provide full coverage. The waterproof, dustproof, and blast-resistant cluster devices also facilitate wireless cluster scheduling and collaboration on pipeline patrol, maintenance, and emergency response.

INTEGRATED SECURITY SYSTEM

The integrated security system combines the ability to monitor physical security and detect leaks in pipelines and at stations. The comprehensive security system consists of an Intelligent Video Surveillance (IVS) system, SCADA system, Intrusion Detection System (IDS) and access control system linked to security and monitoring systems. The IVS includes alarm links with the SCADA and IDS and works with the GIS to maintain a surveillance umbrella over sites.

The surveillance images, collected by devices like IP cameras located alongside pipelines, are saved on a local disk array or sent to a disk array at the control center. Using application and management systems, the images can be browsed, replayed, and managed for emergency response and problem tracking.

FIBER OPTIC PIPELINE MONITORING SYSTEM

The USSI PipeSafe™ is an inherently safe, all fiber optic monitoring system for high-value oil or gas pipelines. The highly sensitive, yet unobtrusive fiber optic microphonic sensing cable placed on or near the pipeline automatically detects and localizes leaks as well as tampering (digging, cutting, operation of a drill motor, etc.). The sensor cable is the most sensitive microphonic cable on the market. Every inch of the sensor cable is acoustically sensitive ensuring that there are no gaps in coverage. The PipeSafe™ system is the only fiber optic system available that provides a clean, high fidelity reproduction of all detected events. This enables PipeSafe™ to employ sophisticated automatic signal processing techniques for event classification and the rejection of false alarms.

FIBER OPTIC PIPELINE MONITORING SYSTEM

The system consists of a rugged, low cost all-optical sensor cable and a Central Processor Unit (CPU). The CPU can monitor up to 128 individual zones, (multiple CPUs can be linked/networked to handle pipelines greater than 50 km) and individual zones can be up to 500 meters in length. The detection zones are installed into the fiber optic cable at the factory, based upon the zone lengths specified by the customer. The PipeSafe™ system is all-optical, the sensing cable contains no electronics. The rugged, outdoor-rated fiber optic sensor cable serves as both the sensor as well as the signal path back to the control center. The sensing cable can be mounted directly to a pipeline using standard metal band clamps or buried underground adjacent to the pipeline. It requires no electrical grounding, and is unaffected by EMI/RFI, lightning storms, hot/cold temperatures, or flooding.

Indoor Equipment

Fiber Optic Lead Cable

Fiber Optic Junction Box

Fiber Optic Sensor Cable

Fiber Optic Sensor Cable

25 km   25 km

Fiber Optic Sensor Cable has >350 Lb. Breaking Strength

FIBER OPTIC PIPELINE MONITORING SYSTEM

The system includes the following key features:

1. The same fiber optic cable serves as both the sensor and the path for data flow.
2. Sensor cable, lead cable, and optical junction boxes are all optical, requiring no periodic maintenance or calibration.
3. No electronics in the field. All electronics are in a 19-inch rack in the monitoring station.
4. Any adjustments for individual zones can be made via pull-down menus at the CPU/operator console in the monitoring station.
5. System is completely unaffected by electromagnetic or radio frequency interference.
6. Uses sophisticated narrow band acoustic signal processing techniques to detect tampering while screening out noise.
7. The system can detect *"Multiple Simultaneous Events"*.
8. System automatically adjusts alarm setpoints based upon environmental conditions such as wind, rain, hail, etc.
9. Can adjust gain/alarm setpoints for individual zones located near noisy equipment from the operator console.
10. Automatically archives data from each zone for review at a later time.
11. Operator can select and listen to any desired zone via headphones or speakers.
12. System continuously self-monitors vital functions and alerts operator of problems.

FIBER OPTIC PIPELINE MONITORING SYSTEM

System Specifications

Parameter	Units	Value	Comments
Zone Length	meters	Up to 500	Selectable by Customer
Maximum Number of Zones per Central Processor Unit	#	128	
System Noise Floor	dB:µPa	75	
Total Harmonic Distortion	%	<1.0	
Maximum Data Rate	Hz	16000	
Data Interface Type		RS232/422/USB	
Input Voltage (CPU)	VAC	120	240 available
Input Power (CPU)	watts	45	
Operating Temperature Cables (Outdoor)	°C	-40 to +70	
Operating Temperature Central Processor Unit (Indoor)	°C	0 to +50	
Humidity (Outdoor Equipment)	%	0-100	Fully submersible to 10 feet
Humidity (Indoor Equipment)	% RH	10 – 95	Non-Condensing
Optical Connector Type		FC/APC	
Cable Break Strength	Lbs.	>350	

PERIMETER INTRUSION DETECTION SYSTEMS

PIDS is a fast emerging application often deployed to prevent intrusion of unauthorised personnel into secure areas such as airports, maximum-security detention centers, nuclear facilities and more.

The overall plan objective is to deter, delay, detect, assess, and track, potential or actual breaches of the perimeter in a proactive manner, enhance the efficiency of security personnel in responding to security breaches, and provide a high level of protection for persons and property within the secured areas of an environment.

PIDS Architecture

PIDS is a complex combination of multiple systems that provides advanced warning and threat assessment within a secure perimeter. Through a correlation of multiple alarms and detected threat contacts, the Command and Control Center (CCC) operator can quickly identify "targets of interest" and dispatch the appropriate response to neutralise the threat.

PIDS architectures include four basic elements:

Sensors

Video Detection Equipment

Threat assessment and Alarm Correlation/Management Systems
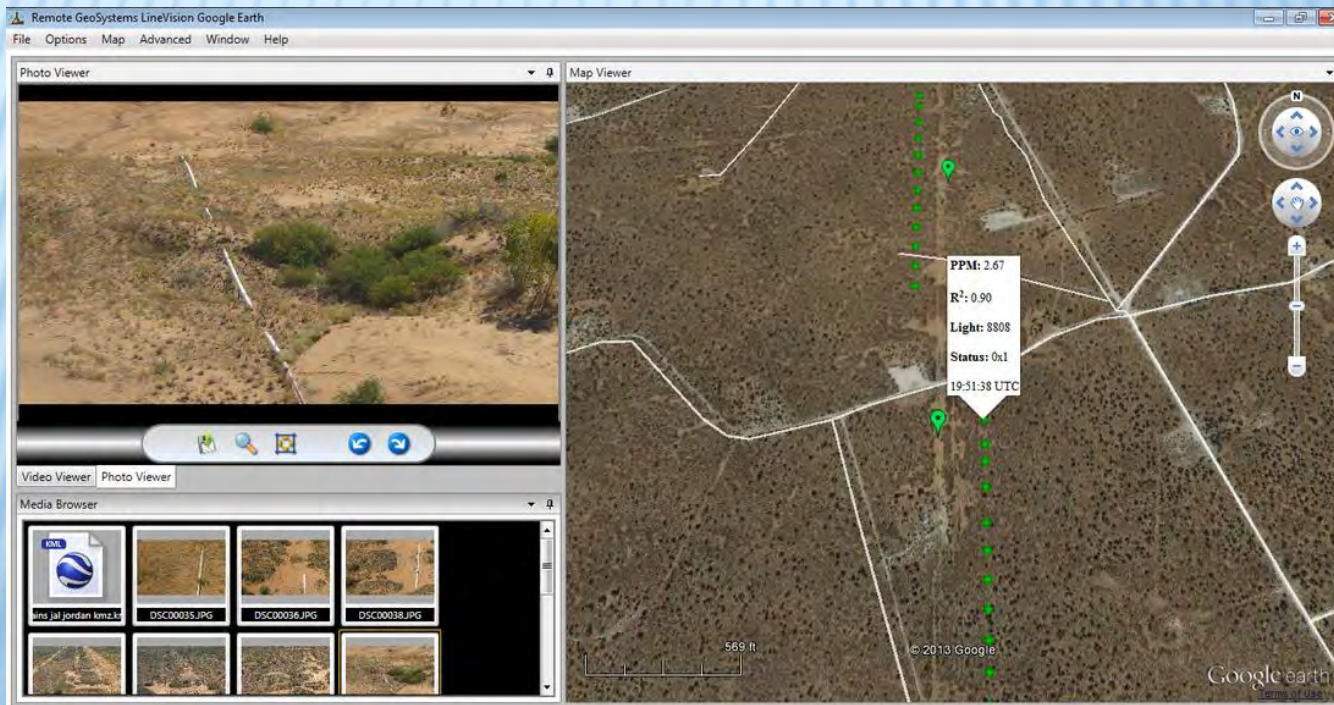
Data Communications Systems

SensorTec Security is happy to discuss your perimeter intrusion detection needs and provide a solution that is flexible and reliable with effective communications that delivers valuable data back to the command and control center to allow prompt and effective response to unauthorised intrusion to secure areas of the location.

AERIAL VISUAL PIPELINE INSPECTION

Combining full motion video (FMV) and photos with GPS data has recently emerged as a effective way to perform these important monitoring tasks with very little additional investment. When this geospatial video data is combined with Remote Geo mapping software, pipeline operators and contractors now have a permanent and visual record of WHAT the issues are and WHERE to go to take preemptive action.

AERIAL VISUAL PIPELINE INSPECTION

Highlights

•Critical findings reported immediately
•Daily patrol reports with findings & digital photos (if application) delivered via email or accessed online through CIRS.
•Provision of full reports adhering to provincial standards with digital photos

Advantages

•Pipeline leak detection
•Exposed pipe locating
•Erosion
•Vegetation issues
•Third party activity
•Encroachment activity
•Missing signs & markers

Typical Uses

Pipeline Integrity Monitoring
Pipeline right-of-way inspection
Pipeline corridor vegetation management
Management of pipeline inventory

AERIAL VISUAL PIPELINE INSPECTION

Different types of drones

VISUAL PIPELINE INSPECTION

The visual portion of the inspection consists of observing visible features and cracks that indicate potential distress. This inspection requires experienced staff to know which cracks are normal and which are indicative of a problem. It also requires a thorough understanding of the width and length of cracks that are normally produced during the production of pipe as opposed to those that might indicate lack of prestressing, or distress, in the pipe.

The visual inspection will also include an examination of the joints as well as the width of joints or the amount of pull the pipeline was subjected to in order to maintain line and grade. All anomalies will be noted with the distance and location from known features. In many instances closure pieces, adapters, shorts, and other specials are inserted in pipelines to make station on outlets and other tie-in features.

Benefits
Urgent anomalies reported immediately
Find and locate:
      Cracks (latitudinal, longitudinal)
      Welding defects
      Corrosion
      Delamination
      Loss of mortar coating
      Unknown pipeline features such as lost valves
    Inspection of valves

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