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JIAC PORTABLE SYSTEM FOR OIL LOSSES DETECTION

PROCESS

The monitoring and losses localization of big pipelines is a crucial aspect to guarantee reliability and robustness of a big network.
Jiac -just in *a* case- mobile stations have real time measurements synchronized by GPS in order to process data from geographically distributed points and identify eventual leakages on any desired distance.

JIAC
PORTABLE SYSTEM FOR OIL LOSSES DETECTION

THE SYSTEM

Jiac, the portable station developed by Loccioni Group, **is a compact acquisition system for data logging and continuous monitoring of big structures and pipelines**. By using multiple Jiac stations it is possible to have **synchronous measurements on very distant sites**: thanks to the GPS synchronization, acquisition is carried out as if the stations were physically connected to each other.

The Jiac station offers several connectivity solutions: the system is accessible via **Ethernet, Wi-Fi or GSM/GPRS/HSPA connection** and it is possible **to display acquired signals, verify the historical data and perform advanced operations such as calibration or data transfer**.

Each mobile station can acquire data locally or remotely thanks to a **Wireless Sensor Network** which includes general purpose acquisition nodes in difficult locations to reach. Furthermore every external measurement system (such as flow, velocity and level) can be dynamically connected to the elaboration unit during its functioning for extending the measurement types.

High performances data acquisition

> Real-time data acquisition and FPGA filtering and pre-processing
> Customizable AI channels (±10V, 4-20mA) and sample rates
> Deterministic data acquisition synchronization through GPS shared clock
> Up to 4GB of data storage, daily data backup on SD card

Each station is placed in **waterproof enclosure** (IP67) able to resist to any type of weather conditions, and includes an elaboration unit, communication systems, **cables and sensors slots** and their mounting tools if required.

Suitable for harsh environment and hazardous classified areas

> Hermetically sealed case
> Military sensors connectors
> Intrinsically safe barriers for each sensor

The Jiac system can work in totally safe conditions even when the case is closed: watertight military connectors ensure a reliable and long-term connection with external sensors, GPS antenna and data connection antenna with the elaboration unit inside the enclosure.

Easy transport

> Lightweight polycarbonate enclosure
> Trolley feature
> Fits hand luggage sizes

These features make Jiac suitable to long-lasting monitoring applications on wide areas, in hostile, harsh and hardly reachable environments.

A **user-friendly interface** optimized for touch screen devices, has been developed. It can be installed on tablets, rugged or laptop PC and allows users:

> to monitor data acquisition, both locally and remotely, which are being acquired from all the nodes (local and wireless)
> to verify the presence of GPS signal
> to recalibrate transducers
> to download data saved from the station

It is also possible to view the log file in order to identify the presence of possible malfunctioning and restore the regular behaviour of the system.

1. Compact mobile system

2. Wireless nodes

3. Easy transport

MAIN CHARACTERISTICS

MEASURING

Measured parameters based on GPS synchronization	Temperature, Pressure, Flow, Velocity, Level
Measurement Range	Temperature: from -20° to +80°C
	Pressure: from 0 to 30 bar
	Flow, Velocity, Level: depends on calibration
Reliability	Protection IP67
	Military connectors

BASIC CONFIGURATION

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System components	Control unit
	> Elaboration unit
	> Data backup module
	> Zener barriers
	Communication system
	> GPS system + antenna
	> Router Wi-Fi + antenna
	> GSM/GPRS/HSPA router + antenna
	> Wireless Sensor Network gateway
	> Wireless Sensor Network nodes (4-20 mA)
	Temperature, pressure sensors
	External unit (flow, velocity and level)
Connectivity	Ethernet, Wi-Fi, GSM/GPRS/HSPA
Protocols	FTP, TCP/IP
	Modbus on Wireless communication

CASE STUDY

ENI Saipem is a large, international turnkey contractor in the oil & gas industry. Saipem has a strong bias towards **oil and gas related activities in remote areas and deepwater** and in the provision of engineering, procurement, project management and construction services.

To continuously monitor the possible presence of oil losses on the long pipelines located in Nigeria, **four Jiac systems have been realized for ENI Saipem**.

All the Jiac stations have been equipped with:
> 2 pressure sensors (FS: 0,30 bar)
> 1 temperature sensor (FS: -20,80°C)
> 2 wireless nodes providing pressure measurements (FS: 0,30 bar)

Placing the stations in strategic and geographically distant sites, ENI Saipem has the **opportunity of triangulating acquired data** (by GPS synchronization) **for accurately localizing possible loss points along the pipelines**.
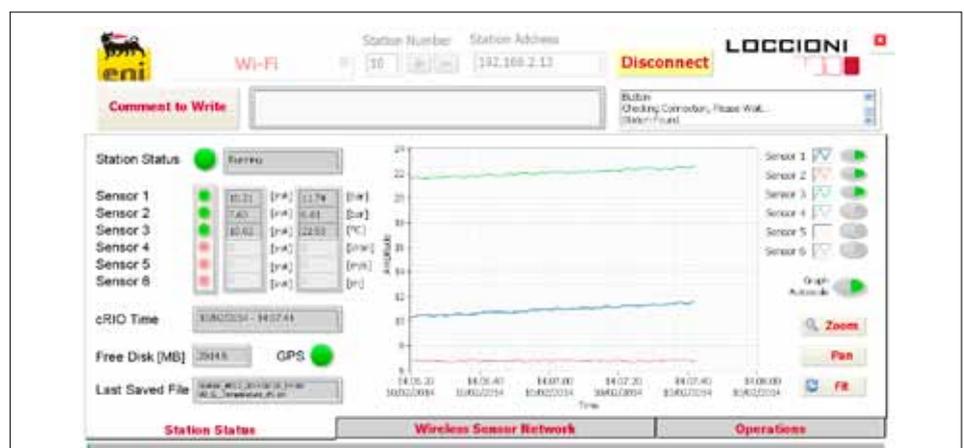
2. Data monitoring software

We transform data into value