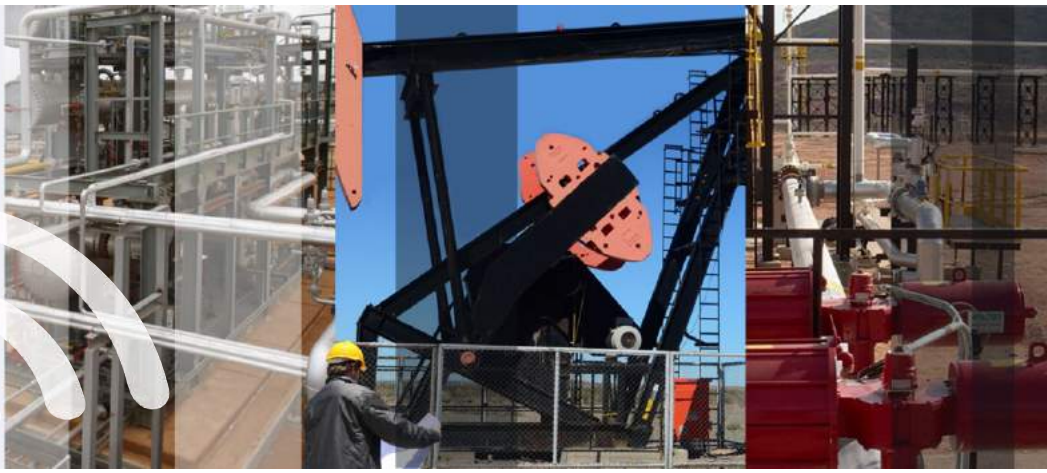
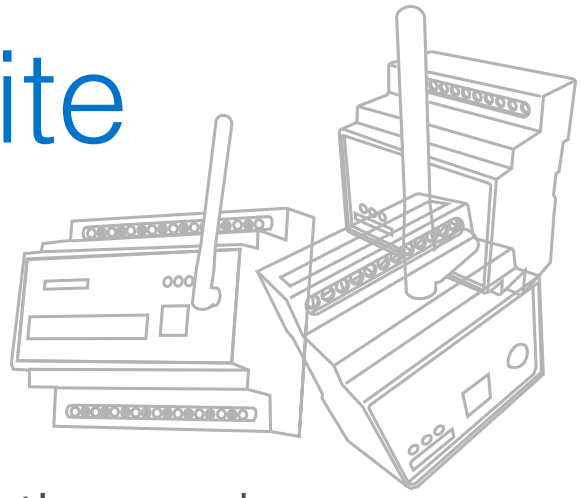
exemys



Cellular / Satellite Telemetry



Telemetry devices with **Cellular/ Satellite** communication and **programmable logic**

About Us

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E-mail: info@exemys.com

- Argentine company founded in 1998
- ISO9001:2008 quality Certification
- UL 60950 Products Certification (Electrical Safety)
- CE Products Certification (according to European guidelines)
- Approval of the National Communication Commission
- Software law certification
- Exports products worldwide
- Own designs and know-how

MANAGEMENT SYSTEM ISO 9001:2008

IRAM GESTION DE LA CALIDAD RI-9000-6174 OAA

IQNet CERTIFIED MANAGEMENT SYSTEM

UL 60950 CERTIFICATION

UL LISTED UL60950 16WU

SOFTWARE LAW CERTIFIED

ArgenTIna

EUROPEAN COMMUNITY CE CERTIFICATION

CE

APPROVED PRODUCTS

CNC COMISION NACIONAL DE COMUNICACIONES

Devices for monitoring and controlling with Cellular / Satellite communication and programmable logic

GRD

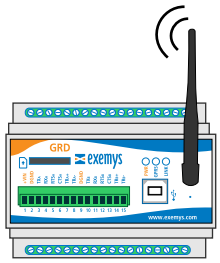
The GRD family of products helps control and supervise any kind of equipment from distance, be it a control system or process system facilitating the implementation of the remote telemetry systems. Additionally it includes the possibility to load a text script to perform internal logics.

Using the GRD series of products allows for remote monitoring and control of sensors, transducers, and intelligent devices from your own control system or through our Web Server for telemetry applications

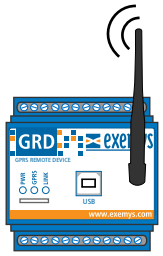
General Features

Models

Module Antenna Satellite (optional)



GRD3534-XF



GRD1300-XF
GRD3305-XF

- Cellular GSP/ GPRS Quad Band communication
- Satellite communication (optional module antenna)
- 4-20mA and 0-10V inputs
- Digital Inputs
- Pulse Counter Inputs
- Digital Outputs
- Serial Ports RS232/RS485

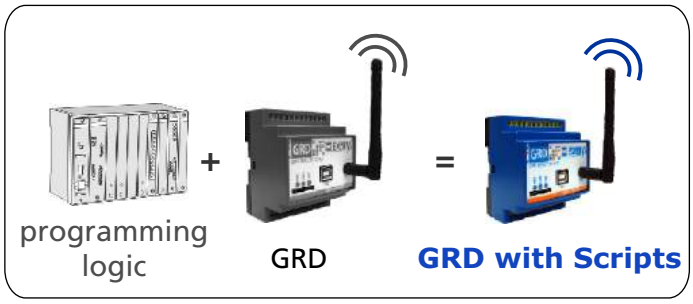
Funcionality

- Remote Serial Port (Modbus or wireless)
- Modbus Master protocol in port RS232/485 for I/O expansion
- Modbus Slave protocol for local access to I/O
- Logic programming with Scripts
- Alarms and capability to control by SMS text messages
- Record Logs
- Automatic reconnection by shear link
- Satellite module antenna (optional)
- Display of data through:

1. SCADA Software
2. Your own software
1. Exemys provided web page

Internal Programming Logic

The GRDs incorporate programming logic and calculation by loading a simple text script.



- Mathematical Operations
- Binary Logic Operations
- Date and Time Operations
- Operations with timers
- Reading of Analog Variables
- Records of Variables
- Turning on and off digital pins of I/O
- Sending and Receiving SMS text messages
- Interpretation of data from the serial port
- Sending of data through the serial port

GRD - Cellular / Satellite Telemetry

TECHNICAL SPECIFICATIONS

RF Wireless
- Protocol: GSM-GPRS/SMS
- Frequency: 850/1900 - 900/1800 MHz (Quad Band)
- SIM Card: Supports all providers
- Transmission Power at 850/900 MHz: +33 dBm
- Transmission Power at 1800/1900 MHz: +30 dBm
- Reception sensitivity at 850/900 MHz: -104 dBm
- Reception sensitivity at 1800/1900 MHz: -102 dBm
- Antenna: 0dBi SMA Connector (other antennas, optional)
- Cellular module certification: CNC, FCC, CE, RyTTE, PTCRS, ATyT

General
- Led Lights: GSM / GPRS / Link a datos
- Ahrdware box: Industrial, Riel DIN
- Dimensions: 70 x 90 x 65 mm / 150 x 90 x 65 mm (Width x Height x Depth) depending on model.
- Optional Temperature : -20°C a +65°C
- Warranty: 1 year

Power
- Power Input: +10Vdc min. a +30 Vdc max.
- Average Consumption: 90mA at 12Vdc, 80mA at 24Vdc
- Maximum Consumption: Peaks of 1A at 12Vdc, 1A at 24Vdc

Communications
- Serial Port: Up to 2 ports RS232 / RS485 (simultaneously)
- Protocols: Modbus Master, Modbus Slave, ITAS Iridium Satellite and others by scripts programming.
- USB port: 1 Port for configuration.
- Configuration: Local by USB or remote by GPRS
- Data Encryption: User`s own encryption.

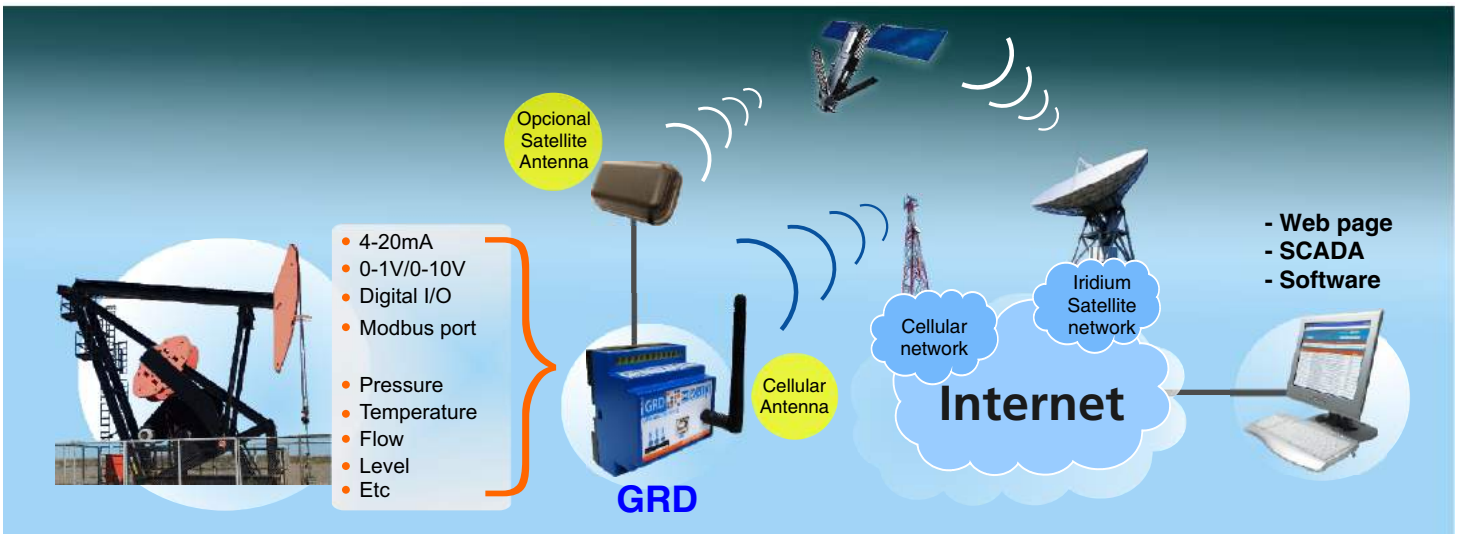
Inputs and Outputs
- Analog Inputs: Configurable in 0-1V, 0-10V, or 4-20mA
- Analog Inputs at 0-1Vdc: Accuracy 0,1mV
- Analog Inputs at 0-10Vdc: Accuracy 1mV
- Analog Inputs at 4-20mA: Accuracy 1uA. Protection in the input against voltage peaks
- Digital Inputs: Up to 16 on Transistor (depending on model) Activation: +3,5Vdc min. a +28Vdc Max.-, Impedance: 2 Kohm
- Digital Outputs: Up to 8 on Transistor Open collector (depending on model) +45Vdc input max., 50mA Current max.

Counting and Recording of Events
- Counter Inputs: Input Frequency: 50 Hz / 1 Khz (depending on model)
- Pulse of Inputs: 10 ms min. / 0.5ms min. (depending on model)
- Records log: In nonvolatile memory, with real time clock.

AVAILABLE MODELS

Model	Serial Port	Analog Inputs	Digital Inputs	Digital Outputs	I/O Modbus Expansion	Script	SMS	USB
GRD1300-XF	1 RS232/RS485 simultaneously	---	---	---	Yes	Yes	Yes	Yes
GRD3301-XF	---	2 Configurable 0-1V/0-10V/4-20mA (1 input PT100)	4 (4 for pulses of up to 50Hz)	Up to 2	No	Yes	Yes	Yes
GRD3305-XF	1 RS232/RS485 simultaneously	4 Configurable 0-1V/0-10V/4-20mA	4 (4 for pulses of up to 50Hz)	2	Yes	Yes	Yes	Yes
GRD1530-XF	2 RS232/RS485 simultaneously	---	---	---	Yes	Yes	Yes	Yes
GRD3534-XF	2 RS232/RS485 simultaneously	8 Configurabls 0-1V/0-10V/4-20mA	16 (8 for pulses of up to 1KHz)	8	Yes	Yes	Yes	Yes

GENERAL SCHEME OF OPERATION

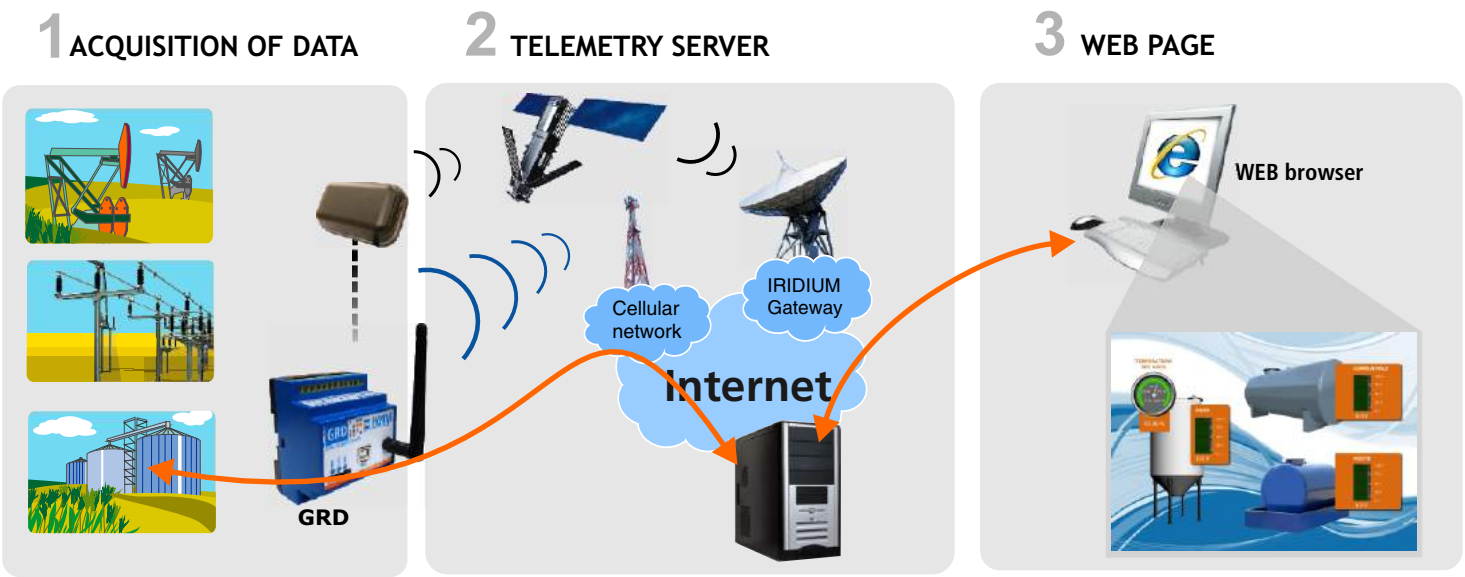


GRD - Cellular / Satellite Telemetry

DIFFERENT WAYS OF USE

1) Through a Web page

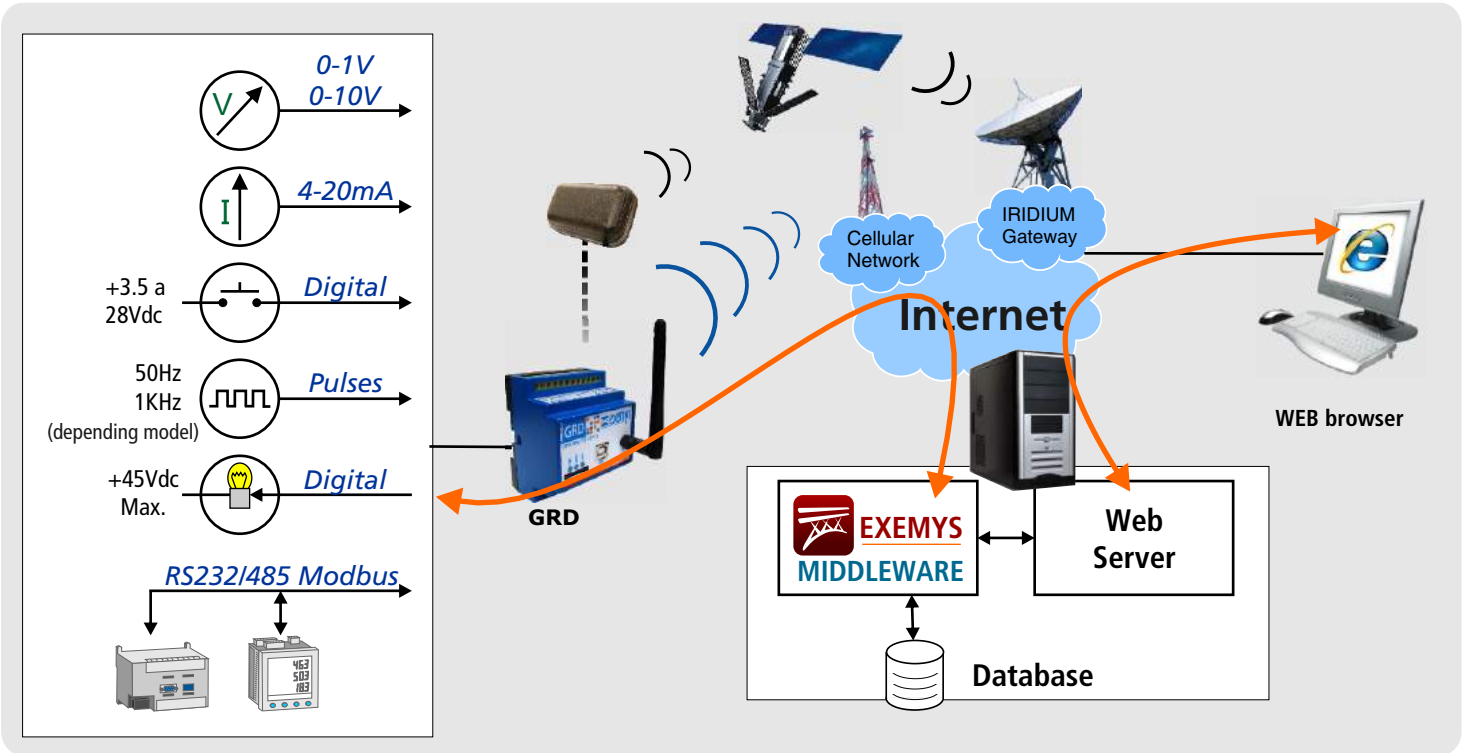
In this way of use, the client simply enters a set web page that we will sent them and there the customer puts in username and password and will be able to view all of the information on his or her remote GRD devices. The web site is hosted by the Telemetry Server developed by Exemys and is available for any user of the GRD products.



How does it work?

In the Telemetry Server are installed two simple software applications:

1) Middleware: The software in charge of communicating with all of the remote GRD devices.
2) Web Server: The software in charge of taking the data from the Middleware and publishing it on the web page, which the customer can access by entering their username and password.

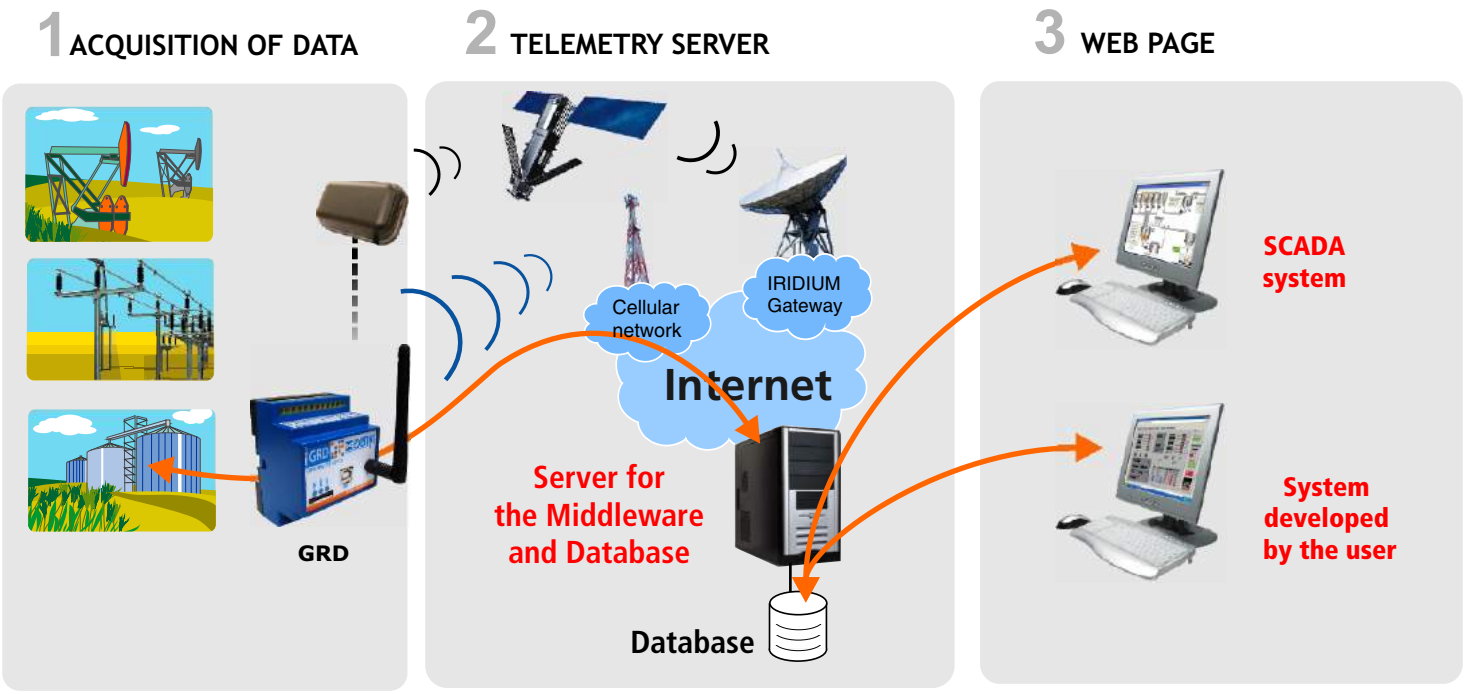


GRD - Cellular / Satellite Telemetry

2) Database

In this way of use all of the information obtained by the GRD devices is store in a MySQL type database. This kind of database can be accessed by a few different ways, for example:

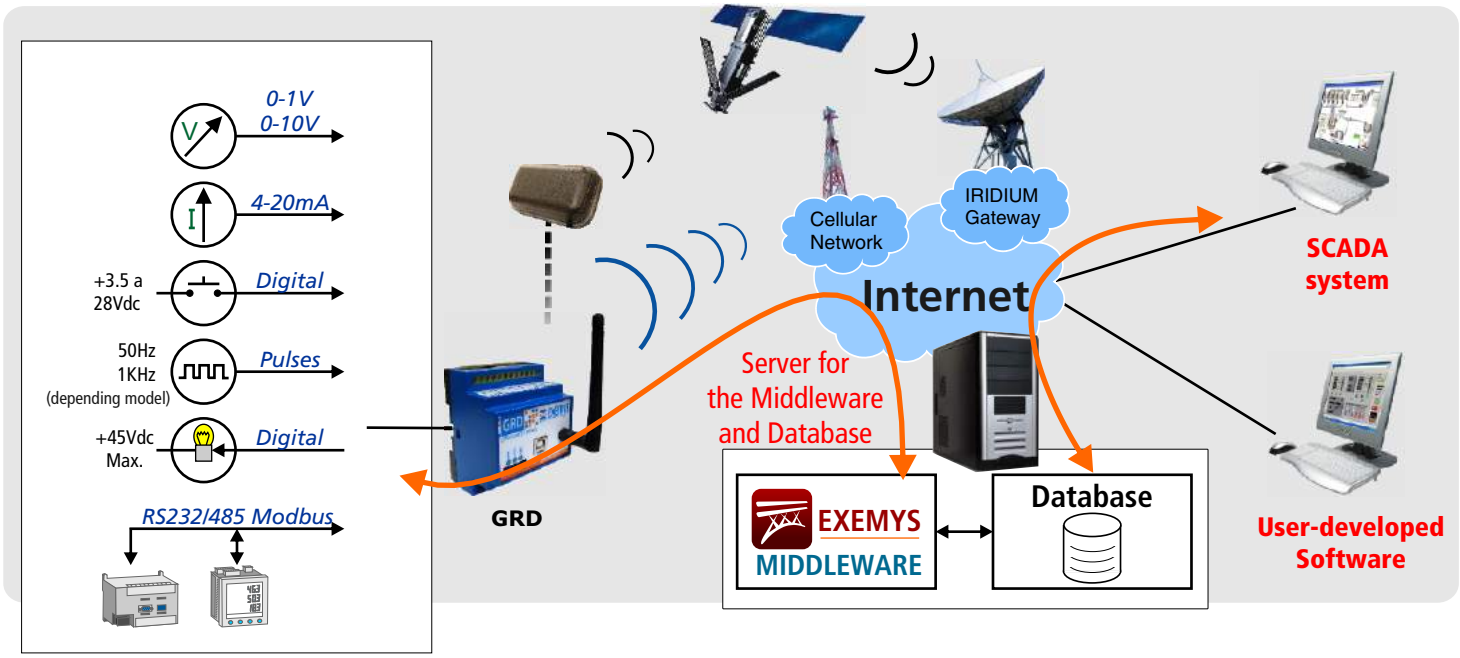
- SCADA system that takes the information in the database and displays it in its own ways.
- Software system developed by the client itself that can obtain the information from the database.



How does it work?

In the Telemetry Server are installed two simple software applications:

1) Middleware: The software in charge of communicating with all of the remote GRD devices..
2) Database: The Middleware then deposits all of the information from the GRDs in the database.
   Then the different software programs depend on the database to obtain the information from the GRDs.

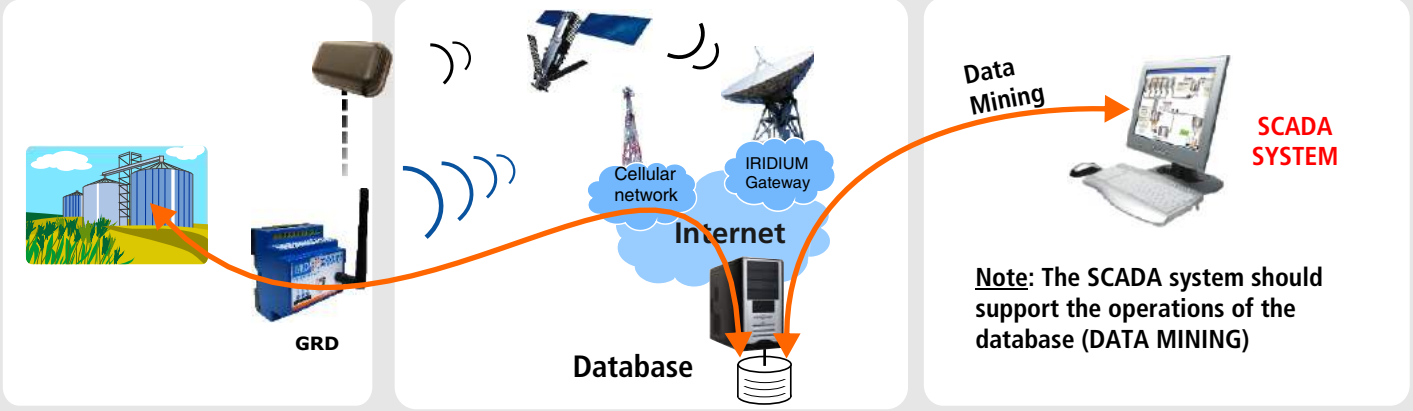


GRD - Cellular / Satellite Telemetry

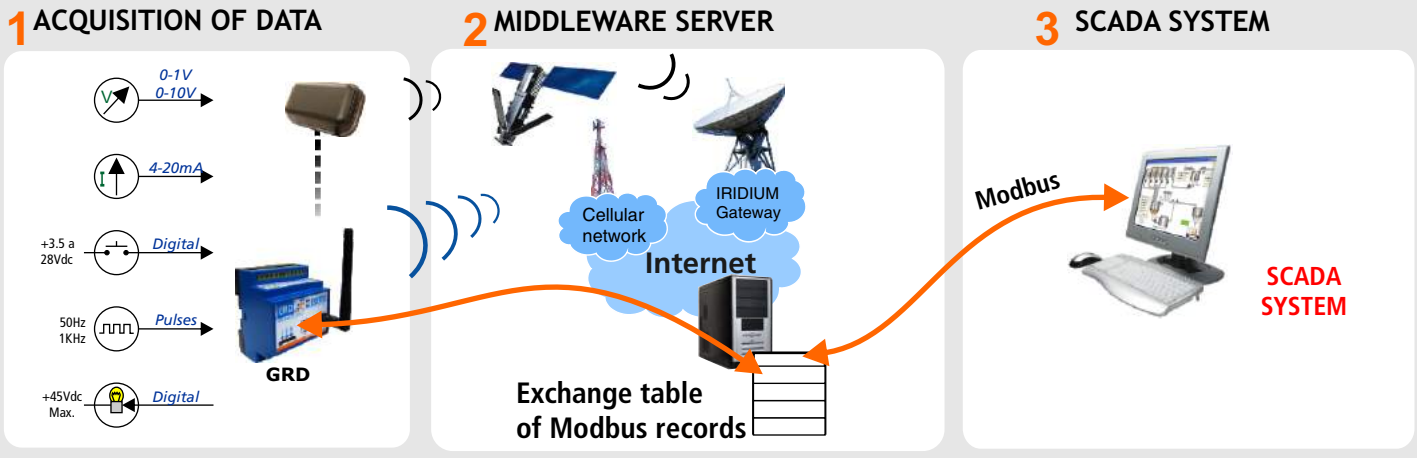
3) SCADA system

Exemys´ Cellular telemetry system has been developed to be compatible with any kind of SCADA system and under different ways of use. The SCADA System can access the information of the remote GRD devices in any of the following forms:

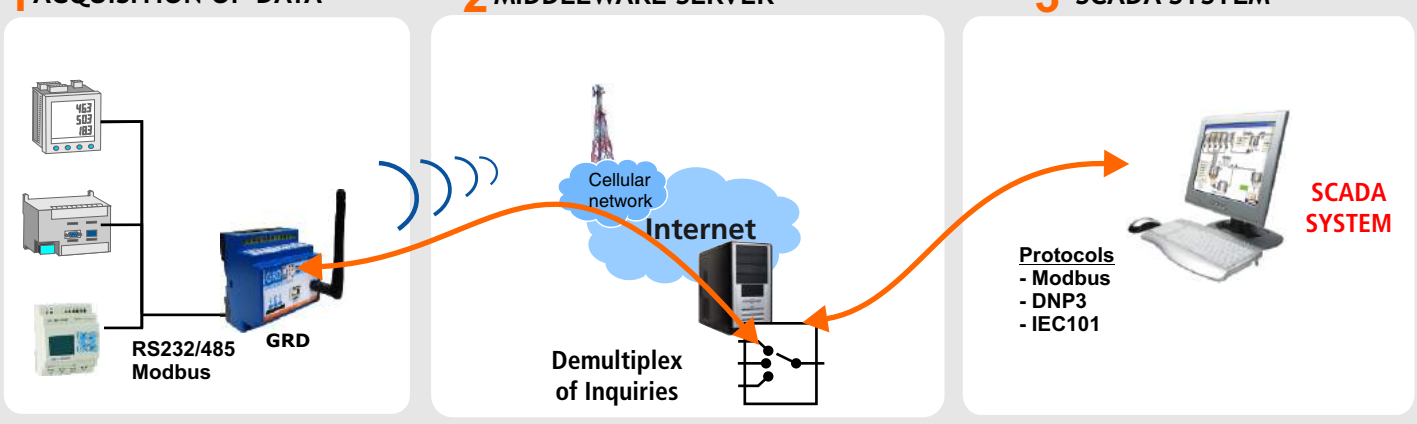
SCADA Database: Obtains the information from the database on whichever of the remote GRD devices. The SCADA systems should posses the function, Data Mining



SCADA I/O: The SCADA System consults directly, in Modbus protocol, for the records of the GRD devices; consulting about the state of the inputs and outputs.



SCADA Serial port: This form consults, in Modbus, DNP3, or IEC101 protocol, the devices connected through the serial port of the GRDs. In this way the devices´ demultiplexing feature can be used.



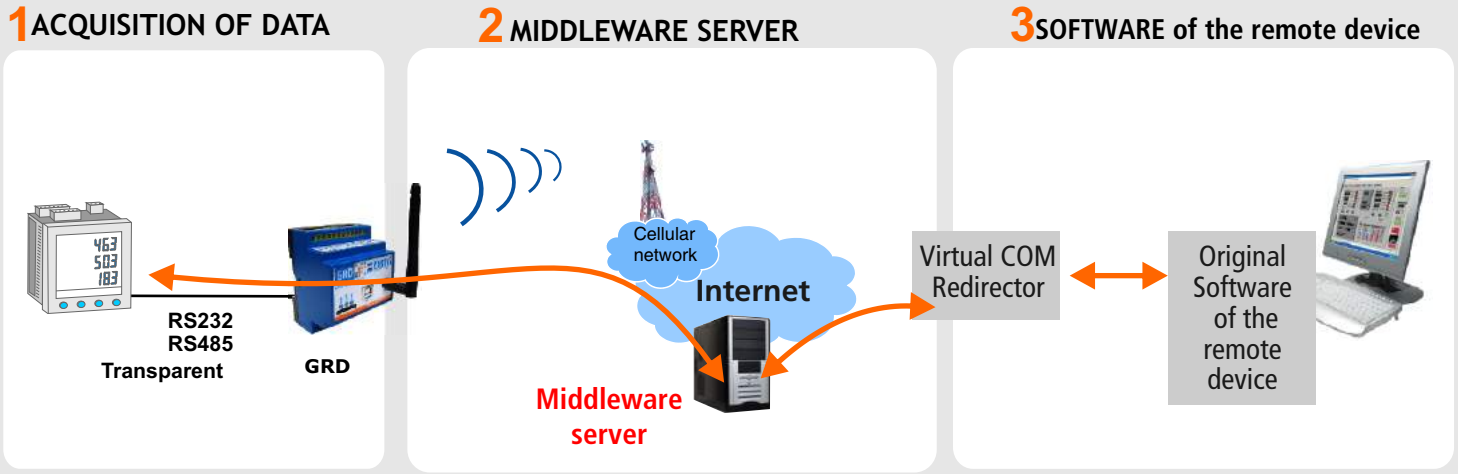
GRD - Cellular / Satellite Telemetry

4) Remote and Wireless Serial Port (not available fro satellite module)

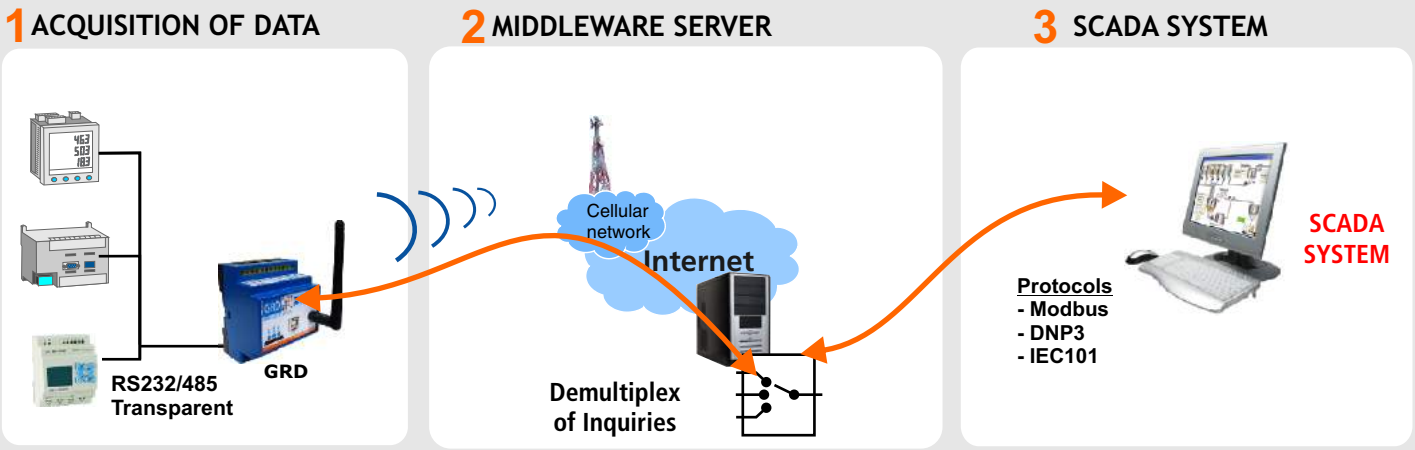
In this mode, any software application that uses a serial port to communicate with a device locally may be adapted to communicate with multiple remote devices, using a GRD as a means of communication to reach others. A wireless communication channel is established through which the data travels from the GRD to the remote device in question.

There are 2 ways of doing this:

Virtual COM mode: On the computer where the device's software is hosted, a Virtual Redirector is hosted with COM and TCP/IP ports. Thus, all the information previously circulated through a serial port is now circulated within a package of TCP / IP data thanks to the redirector. This package processes the Middleware and sends it to the corresponding GRD, which is responsible for decompressing and going back to a pattern of serial communication.



SCADA Seral port mode: Consults are made in Modbus, DNP3, or IEC101 protocols, between the devices connected through the serial ports of the GRDs. This mode uses the Demultiplexing feature.



GRD - Cellular / Satellite Telemetry

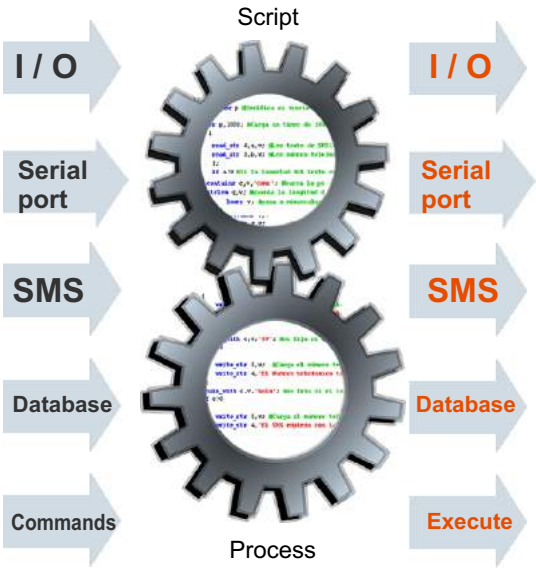
Internal Logic Programming through Scripts

What is a Script?

A Script is a file with orders that once loaded on to the GRD1300, or GRD3305, is interpreted and executed.

Operations performed by a Script:
The Script describes what operations should be executed by the device, for example:

- Mathematical Operations
- Logic and Binary Operations
- Operations with Timers
- Reader of Analog Variables
- Control of digital pins of I/O
- Sending and Receiving of SMS text messages
- Interpretation of data from the serial port



Example of a Script

Below is a simple example which turns on and off a digital outputs in a predetermined time:

```
start
{    b=0;
     timer a,10000;
};
check_timer a
{    timer a,10000;
     neg b,b;
     write_io 1,1,b;
};
end;
```

How are the Scripts loaded?

The script is programmed with a simple software, which lets you write in an orderly manner, the commands are executed within the GRD 3305.

The scripts are loaded to the GRD3305 through a USB port or remotely by Middleware.

Once the scripts are loaded, the GRD3305 is ready to execute the logics

Examples of application

Calculation of Flow:
Calculates flow by measuring the differential pressure

Alternating of 2 Pumps:
Alternates the use of 2 pumps using a timer

Detection of faults in the Dosing Machine:
Stops the dispenser through its digital outputs based on measurements of two temperatures and a digital signal.

Remote Turning On an Off:
Using an SMS text message or a button on the telemetry website server, the outputs of the GRD can be activated temporarily to control the equipment by turning it on or off

Automatic Turning On or Off:
A temporary logic can turn on or off a system

GRD - Cellular / Satellite Telemetry

Alarms and alerts by SMS

The GRD devices can operate in the form of SMS text messages

Outgoing SMS text messages

The GRD can be configured to send text messages when predetermined values on a sensor are reached. Such as:

Analog and digital Inputs

→ SMS

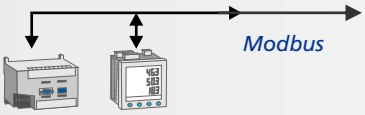
Results from mathematical and logic operations of Scripts

```
start
{   b=0;
    timer a,10000;
};
check_timer a
{   timer a,10000;
    neg b,b;
    write_io 1,1,b;
};
end;
```

Script

→ SMS

Values of Modbus records

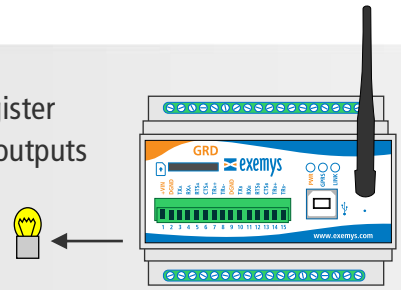


SMS

Incoming SMS text messages

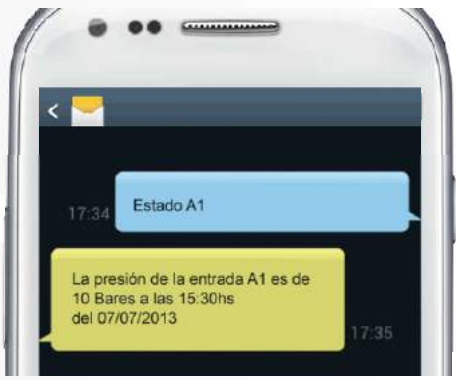
The GRD can receive text messages and report values from its Modbus records or the state of its inputs and outputs. In turn it can trigger a process or operation of a Script.

Values of
- Modbus register
- Inputs and outputs

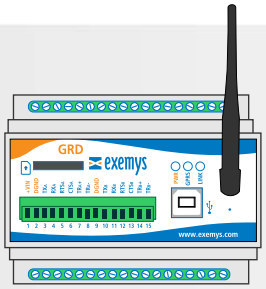


← SMS

→ SMS



Execution of SCRIPTS



← SMS

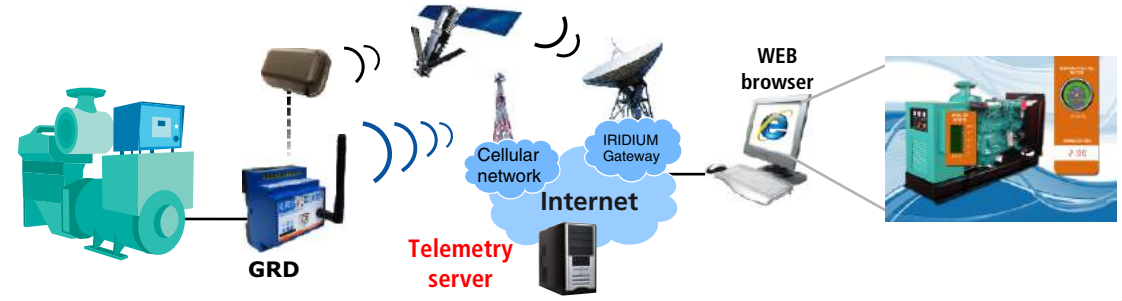
GRD - Cellular / Satellite Telemetry

Examples of Application

Power Generator

Measurements

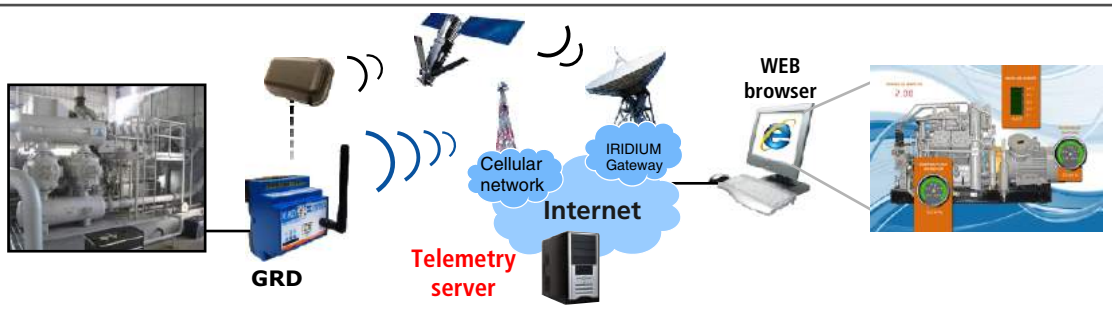
- Hours of Usage
- Combustion Level
- Motor Temperature
- Battery Voltage
- Electric Parameters-



Compressor Gas

Measurements

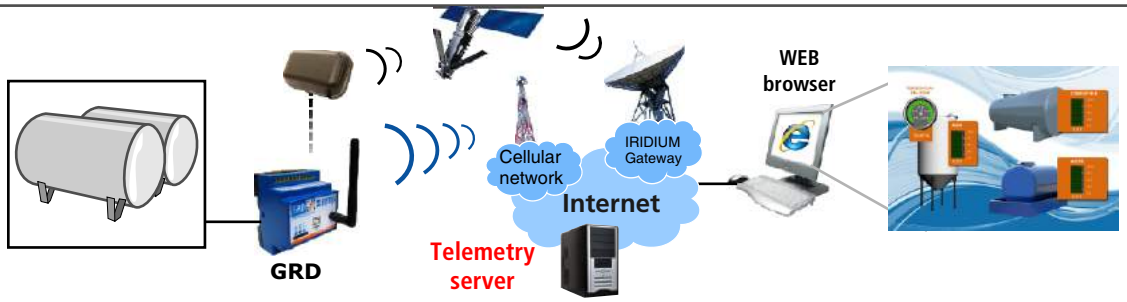
- Water Pressure
- Gas Pressure
- Oil Pressure
- Combustion Level
- Electric Parameters



Tank Levels

Measurements

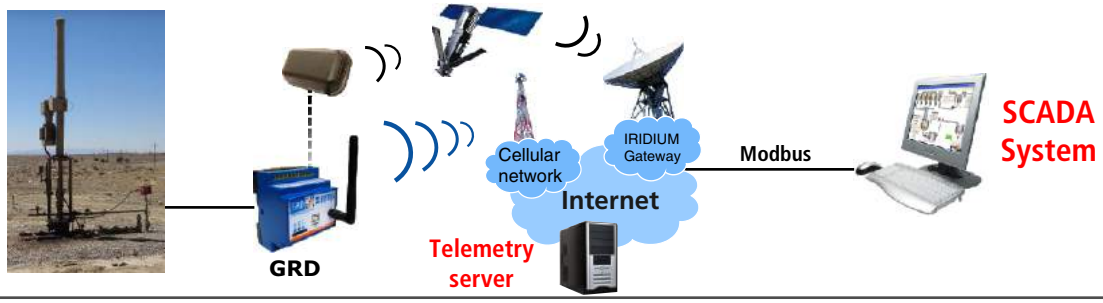
- Level of storage tanks
- Pump Activation
- Temperatures



Extraction Oil

Measurements

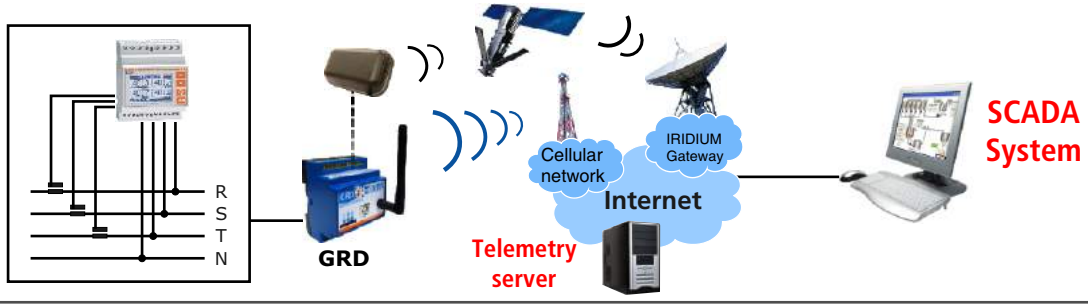
- Parameters of the Controller of the well



Power Meters

Measurements

- Measured Electrical Parameters by the Power Meter



GRD - Cellular / Satellite Telemetry

DIFERENCIAS CON UN MÓDEM GSM

What is a GSM modem?

A GSM modem is a device for point to point communication, which utilizes cellular phones as means of transporting data.

What is the difference between the GRD and a simple GSM modem?

The GRD is a part of a complete wireless Telemetry system, which is different from a GSM modem, as further detailed

GRD Devices	GSM Modem
✓ Point to Multipoint Links	✗ Point to point only
✓ All GRD devices are Online	✗ Must be "dalled" each modem at a time
✓ Has own inputs and outputs (Digital and Analog)	✗ It has not inputs or outputs
✓ Acts as Modbus Master	✗ It has not own protocol
✓ Communicates with other smart devices by Modbus protocol	✗ It has not own protocol
✓ Acts as registrar, storing data in a database	✗ It cannot act as register
✓ Uses the GPRS data channel **(payment necessary for data)**	✗ Use the CSD channel **(payment for connectiosn time)**
✓ Faced with loss of cell signal, it stores data in its memory buffer and transmits it when back online	✗ It does not offer option to send SMS text messages
✓ Delivers alarms and alerts through SMS text messages	✗ It does not offer option to send SMS text messages

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R 2014-10-30