



Homeland Security & Critical Infrastructures

## GRS® GLOBAL RANGER SYSTEM

Leonardo Global Ranger System (GRS®) is a SCADA system to monitor and control heterogeneous remote processes or plants. It has been successfully used in several technology fields, such as energy transportation, oil & gas, energy distribution, electrical traction control and ancillary systems management. SCADA GRS® is based on a distributed architecture allowing data collection from different equipment and systems geographically distributed on a wide area.

Typical architecture is composed by Operator Consoles (GRS HMI) to monitor and control the plant; communication, application and historical servers (GRS RAS-FEBOX-HIST) to process and archive data; Remote Devices (GRS Local SCADA-FEBOX-PLC) to locally control and collect data from the field. All these components are linked together by means of heterogeneous communications infrastructures including optical fiber, copper lines, wired or wireless connections and serial buses.

GRS® is a complete suite to provide standard and/or custom solution for process control or plant automation. GRS® includes all the tools (engineering,

maintenance, training) needed for developing and deploying a complete complex SCADA system.

### GRS® BEYOND A BASIC SCADA

Beyond the basic SCADA functionalities, GRS® provides important and unique capabilities:

- Designed to control very large and complex systems (>600K tags) but enough lightweight and flexible to be collapsed on a single computer when needed or in an emergency condition.
- Development of custom independent software modules operating within the SCADA core to cover particular custom requirements (SDK available)
- Development of custom communication protocols (SDK available)
- Up to 64 clients and 128 communication servers couples
- Up to 5 screens per client plus video wall visualization
- Automatic and/or Forced Primary-Secondary switchover for Application and Communication Servers

- Hot-backup on Application and Communication Servers
- Embedded advanced System and equipment health check and run time parameters monitoring
- User authentication and authorization with single supervisory control execution granularity (protected password)
- Alarm monitoring, filtering, and ordering according to specific needs
- Intelligent alarm processing and hierarchical alarm management (event suppression, monitoring mode etc.)
- Analog optimized historical archiving
- GRS® as integration platform via embedded web browser and ability to integrate external and third party applications
- Automated computation execution and MS Excel reports generation
- Playback function availability in training environment simulating the process with real recorded data
- Complete training system powered by real-time database
- Integrated execution of electro technical computations (energization, phases, grounding condition, short circuit, fault calculation, etc.)
- Complete embedded graphical programming environment to create complex command and control procedures (load shedding, electrical network reconfiguration, integrated emergency fan control, etc.)
- Areas of Responsibility support in order to section the plant and to balance control among different operators keeping each operator focused on his own duty
- Web interface: every HMI page and alarm management are made available via web in monitor only mode or in complete controlling mode. Pages navigation and look&feel are kept in web version.

### Multi-protocol Communication Server

GRS® application servers communicate with the field by means of Communication Servers implementing standard and custom interface protocols. GRS® Communication Server is composed by multiple and independent instance of software modules each of them dedicated to data exchange with one or more remote devices (network or serial communication). Different instances with different protocols can run on the same Communication Server. Communication servers are dynamically configured by Application server using SCADA configuration data. Communication servers can act in single or in hot-backup mode. Communication servers are able to keep data exchange with remote devices even if Application servers are not available. On Communication servers,

realtime data are available also through a web interface and historical data can be stored in a local MySql data base.

### Main Communication protocols

- IEC-60870-5-101
- RP570
- IEC-60870-5-104
- MODBUS (serial or TCP)
- Ethernet/IP
- SNMP
- OPC DA - UA
- Custom protocols SDK available

### External Data Exchange

GRS® is open to exchange data with other SCADA or different subsystems. Alarms, statuses and measures collected and/or elaborated by GRS can be made available via Web Services or RDBMS technology towards external platforms. Moreover custom data exchange protocols can be implemented via available SDK.

GRS® also allows I/O forwarding to-from external systems using different communication protocols (protocol to protocol Routing).

### Data Base

Real-time data are stored on a very fast proprietary database (RT GRS DB) while historical data are stored on relational database (Oracle/MySql). Databases size, both for real-time and historical data, is limited only by disks capacity.

### Cyber Security

GRS® is developed according to a “secure by design approach”. Guidelines are provided to properly configure hardware and software to achieve high level of cyber security and resilience (ref. CEI UNI ISO IEC 27001/27002).

### GRS® at a glance

GRS® is available both on:

- Linux (Red Hat/CentOS, SUSE, Debian/Ubuntu)
- MS Windows

GRS® has been developed according to guidelines of IEEE POSIX software development.

GRS® core technologies are:

- Oracle/MySql/Sqlite3
- C, C++, Java, Python, SQL programming languages
- LAMP (Linux Apache MySQL PHP)
- WEB Services
- Html 5
- Jetty
- X Windows System X11, Xtoolkit, Motif
- Qt multi platform library.