Overview
- Customer: Cerrejón
- Sector: Industrial company – mining
- Project name: Scada System Cerrejon
- Country: Colombia
- Voltage level: 69/13.2/7.2 kV

Initial situation
Cerrejón is a coal mine located in the Guajira in the north of Colombia. It is the largest mining operation in Colombia and among the largest open-pit coal mines in the world.
Due to the fast growing demand and a high economic growth, Cerrejón was looking for a modern power management system to control and supervise the complete energy supplier of the mining. The system should consist of SCADA system in the control center and RTUs equipped into mobile substations which are communicating over radio link. These RTUs should be able to operate in a very aggressive environment (mining).

Solution (Scope of supply)
The scope of the project is SICAM 1703 RTUs and Spectrum PowerCC SCADA, including design, delivery and commissioning of the entire control system in several mobile substations. The solution was based on the following standards:
- SICAM TM 1703 ACP RTUs with I/O module to control and supervise more than 50 different mobile substations
- IEC 60870-5-104 communication protocol between the RTUs and the SCADA
- SCADA Spectrum PowerCC
- Communication equipments
- Power Meter SIMEAS P50 for the acquisition of measured values
- connected via Modbus protocol
- Modbus and DNP 3.0 protocol for integrating 3rd party devices (Existent PLCs)
- OPC for integrating existing measured values devices.

One of the challenges for this project was the communication between the mobile substations and the control center room, once the mobile substations can move to another place. The solution was to use mobility antennas. In this way the communication to the Spectrum PowerCC could be achieved over a radio link using the standard telecontrol protocol IEC 60870-5-104 and therefore the mobile substation is able to change the place and keep communication with the control room.

The control room has been equipped with a Spectrum PowerCC with a communication front end to the SICAM TM 1703 ACP over IEC 60870-5-104 and two HMIs, which allows communication in real time. The functionalities RTS, CFE, PSOS and HIS have been used for this project. In the Spectrum PowerCC an OPC interface has been configured for collecting information from some existing devices.

Spectrum PowerCC with SICAM TM 1703 over radio link – Reference

Cerrejón, Colombia

Answers for energy.

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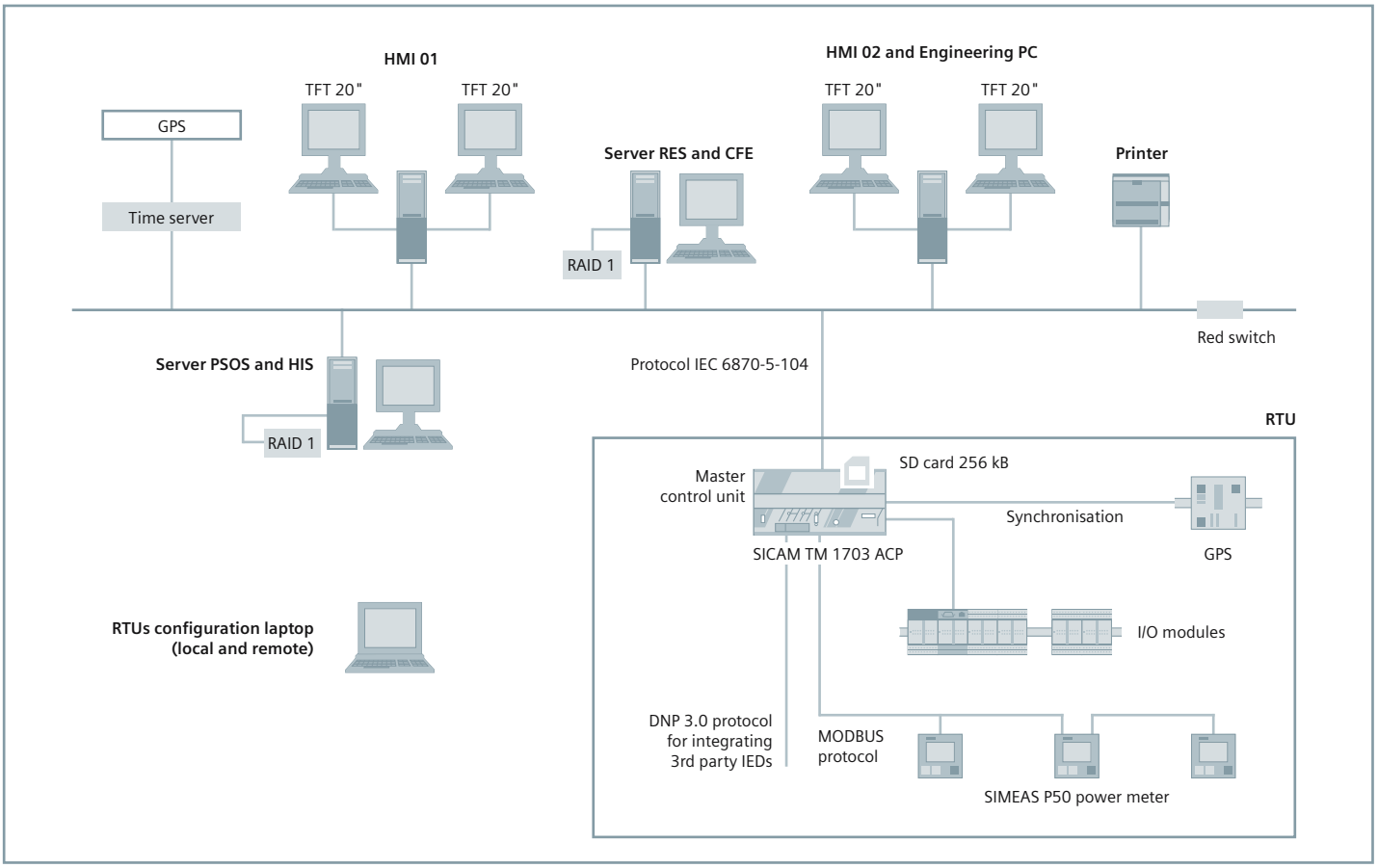

In each mobile substation a SICAM TM 1703 ACP RTU with I/O modules has been installed with supervising and control functionality. Besides the I/O acquisition, the SICAM TM 1703 ACP has also the task to acquire data from the Power Meter SIMEAS P50 devices over Modbus and to transfer these information to the control center.

A NTP time server has been installed in the control center. In this way the time synchronization can be kept all over the system.

Customer's benefits

With this solution the customer profits from a modern and reliable system, allowing him further extensions.

The solution with the mobility antenna brings the customer flexibility allowing him to move the mobile substations according to his needs and keep the control and supervising from a central control room. With this solution the customer is able to manage the complete energy network using features to increase the efficiency and utilization of the assets and future investments.

In addition to the benefits mentioned above the customer still profits of the following

- Alarm report in the control center allowing the operator to warn the maintenance team about risks of possible failures
- Open of circuit breaker when some interlocking violations happen
- Less energy outages
- Possibility of predictive maintenance
- Advice to the maintenance team about the possible causes of a circuit outage
- Fault analysis allowing him to take the correct corrective and predictive actions.

Future

The customer was very satisfied with the solution and with the local support offered by Siemens Energy Automation. Thanks to this good work and to the solution performance, the customer plans to increase the production capacity of the mining and to reduce the maintenance costs using the SCADA infrastructure.

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