



Driving the Future

KOLEKTOR

50 let / years



Kolektor Igin d.o.o.

Siemens VAR Partner Day 2019



Company: Kolektor Igin d.o.o.

member of KOLEKTOR HOLDING

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1000 Ljubljana, Slovenia

IBAN: SI56 0292 3026 0581 328

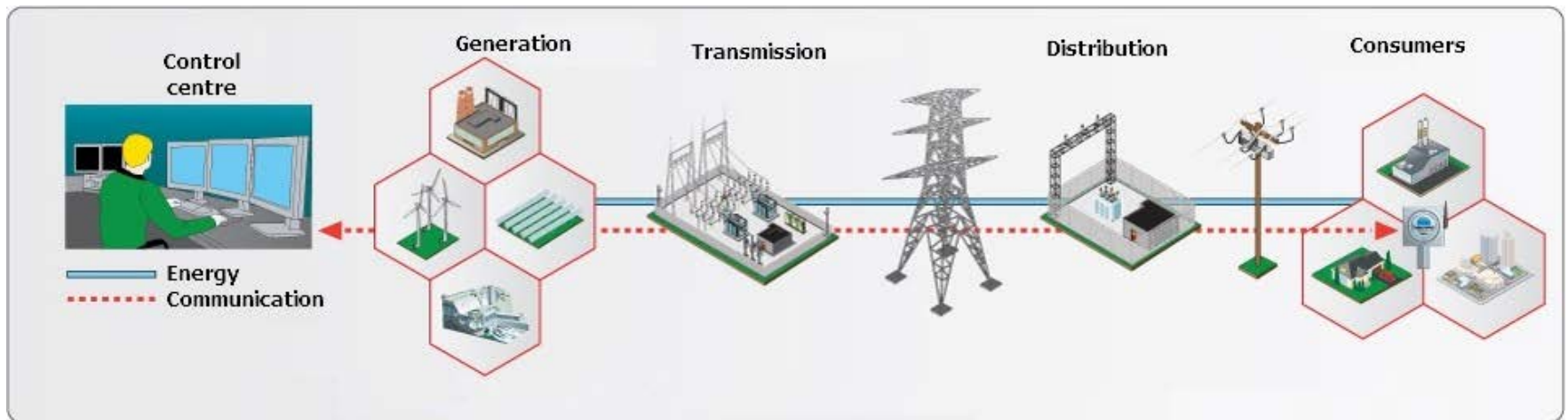
BIC: LJBAS12X

Number of employees: 53

Company Director: Robert Seme, Jože Ponikvar

Kolektor Igin d.o.o.

- Engineering and integrator company of systems in Energy sector
- Own production and assembly team
- Specialized provider of HV and MV protection, control and measurement systems
- Provider for turnkey projects of whole secondary systems
- Development of special products and services
- Production, Assembly, Mounting



Our Customers

- **Power generating utilities**
 - Hydroelectric Power Generation Systems
 - Thermal Power Generation Systems
 - Nuclear Power Generation Systems
- **Transmission utilities**
- **Distribution utilities**
- **Industry**



Engineering and integration

In our projects we are integrating the Equipment and Services of

Other KOLEKTOR companies

- KOLEKTOR ETRA
- KOLEKTOR TURBOINSTITUT

Slovenian companies

World-wide, well known companies

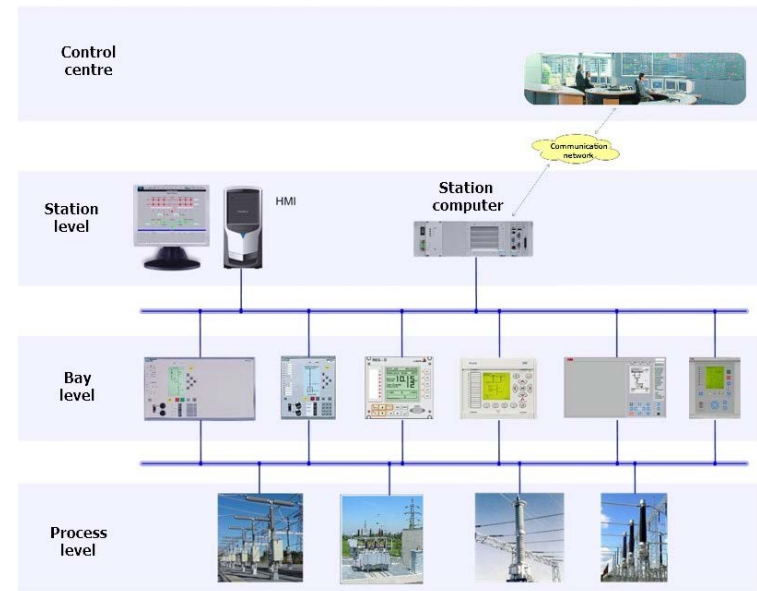
- SIEMENS
- ABB
- GE
- SEL
- SCHNEIDER
- REINHAUSEN
- A-EBERLE
- ...



Specialized provider of high-voltage and middle voltage protection, control and measurement systems.

- Design functional specifications:

- Design for construction,
- Assembling,
- Software design,
- Parametrization,
- Factory Acceptance Test,
- Commissioning,
- Site Acceptance Test,
- As-built design,
- User training of protection,
- Control and measuring systems

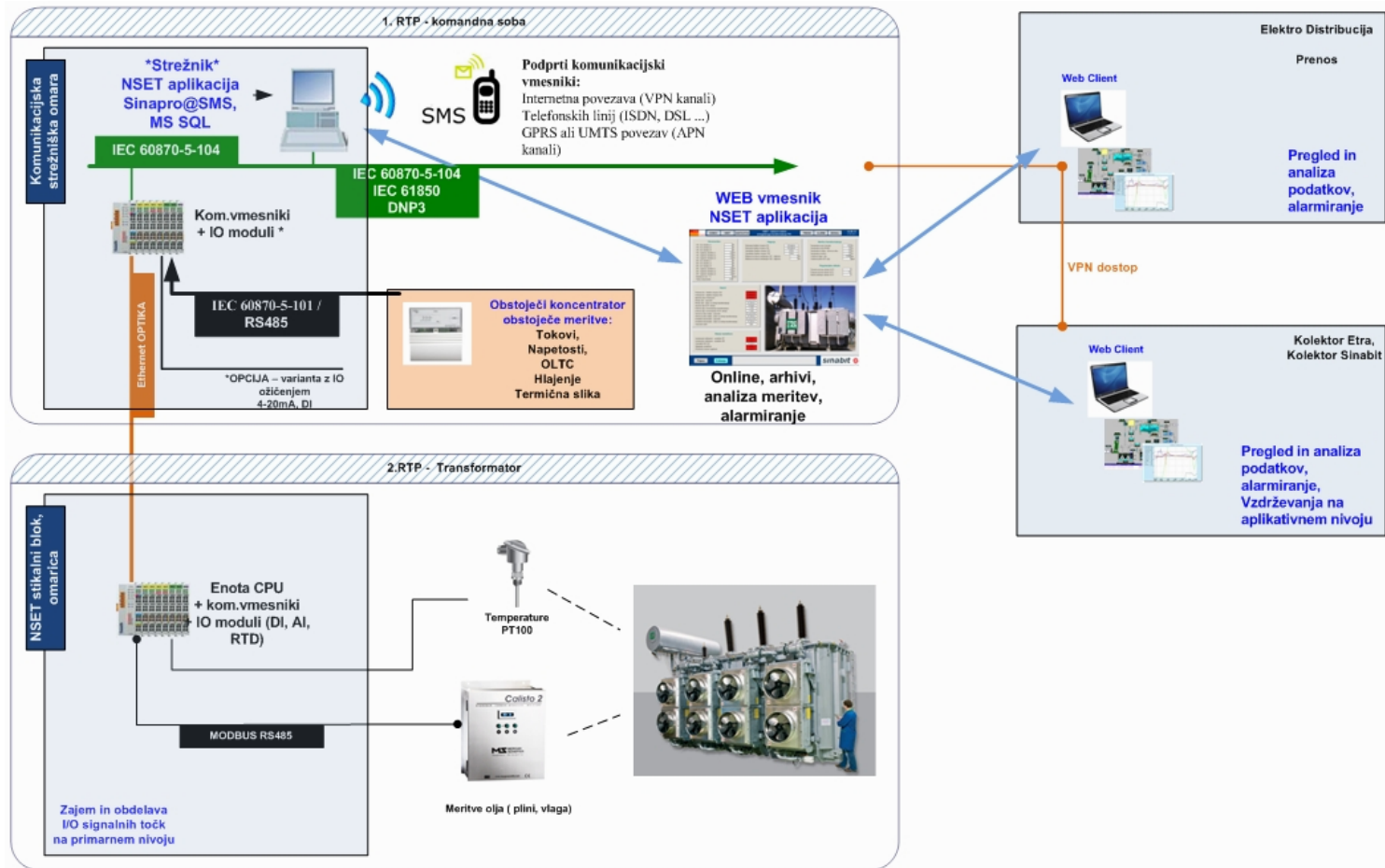


- Consulting in the area of protection and control in power systems;
- Planning and realization of regular annual periodic testing of secondary systems;
- Analyses of power quality measurements in the HV and MV network.



Development of special products and services

Transformer Monitoring System





Main contracts and projects under construction:

Projects	Country	Activities
Transmission substation 400/220/110 kV Divača	Slovenia	Delivery, FAT, SAT, Commissioning
Transmission substation 400/220/110 kV Cirkovce	Slovenia	Delivery, FAT, SAT, Commissioning
Distribution substation 110/20 kV Kamnik	Slovenia	Civil Works, Delivery, Design, Configuring FAT, SAT, Commissioning
Distribution substation 110/20 kV Ivančna Gorica	Slovenia	Delivery, Design, Configuring FAT, SAT, Commissioning
Distribution substation 110/20 kV Dobruška Vas	Slovenia	<u>TURNKEY Project</u> - Civil Works, Delivery, Design, FAT, SAT, Commissioning
Distribution substation 110/20 kV PCL	Slovenia	Delivery, Design, FAT, SAT, Commissioning
Distribution substation 35/20 kV Kobarid	Slovenia	<u>TURNKEY Project</u> - Civil Works, Delivery, Design, FAT, SAT, Commissioning
Nuclear Power Plant Krško – T3	Slovenia	<u>TURNKEY Project</u> - Civil Works, Delivery, Design, FAT, SAT, Commissioning
Thermal Power Plant Brestanica	Slovenia	Delivery, Design, FAT, SAT, Commissioning
Hydro Power Plant Vrhovo	Slovenia	Delivery, Design, FAT, SAT, Commissioning
Cement company Ahlia – substation 20 kV	Libya	Delivery, Design, FAT, SAT, Commissioning
Thermal Power Plant Ugljevik	BIH	Design, FAT, SAT, Commissioning
Hydro Power Plant Jingishan	Taiwan	Design, FAT, SAT, Commissioning



Recent reference projects

Projects	Country	Activities
Transmission substation 110 kV Pekre	Slovenia	Delivery, FAT, SAT, Commissioning
Transmission substation 110 kV Plave	Slovenia	Delivery, FAT, SAT, Commissioning
Transmission substation 110 kV Hudo	Slovenia	Delivery, FAT, SAT, Commissioning
Distribution substation 110/20 kV Slovenska Bistrica	Slovenia	Delivery, Design, Configuring FAT, SAT, Commissioning
Distribution substation 110/20 kV Ločna	Slovenia	<u>TURNKEY Project</u> - Delivery, Design, FAT, SAT, Commissioning
Distribution substation 20 kV Brnik	Slovenia	Design, FAT, SAT, Commissioning
Cement Company SALONIT 110 kV	Slovenia	Delivery, Design, FAT, SAT, Commissioning
Thermal Power Plant Šoštanj (TEŠ) 220 kV	Slovenia	Delivery, Design, FAT, SAT, Commissioning
Thermal Power Plant Brestanica 110 kV	Slovenia	Delivery, Design, FAT, SAT, Commissioning
Hydroelectric Power Plant Brežice 110 kV	Slovenia	Delivery, Design
GAS Thermal Power Plant Tripoli	Libija	Delivery, Design, Commissioning, SAT
Hydroelectric Power Plant Zenfa	Zambija	Delivery, Design, Commissioning, SAT
Hydroelectric Power Plant Hulkilidora	Sri Lanka	Delivery, Design, Commissioning, SAT
Hydroelectric Power Plants Ljuta system of eight Small Power Plants and Switchyard 110/20 kV	BIH	Delivery, Design, Commissioning, SAT,
Hydroelectric Power Plants DUB and DO	BIH	Delivery, Design, Commissioning, SAT,

Projects executed or still under construction using SIEMENS SIPROTEC 5 equipment

- Substation Trata
- Substation Železniki
- Substation Bled
- **Substation Brnik**
- Substation Radovljica
- **Substation Slovenska Bistrica**
- Substation Pekre
- Substation Hudo
- Substation Hrastnik
- Substation PCL
- Substation Kočevska Reka
- Substation Ločna
- Substation Kamnik
- Substation Ivančna Gorica
- Substation Dobruška vas
- Nuclear Power Plant
- ...



RP Brnik 20 kV - SIEMENS Protection and control system

- Investor: Elektro Gorenjska d.d.
- Year: 2018
- Location: Airport Jože Pučnik, Brnik
- Description:

Investor conducted a study for the development of a 20 kV network which served the Brnik Airport area.

In the first phase, the study envisaged construction of Substation 110/20 kV Brnik - new 20 kV switchyard, which is being upgraded in phase 2 with the construction of a new 110 kV switchyard, transformation 110/20 kV and 110 kV connections.





RP Brnik 20 kV - SIEMENS Protection and control system

SIEMENS Equipment used in this project:

- Gas-insulated Switchgear Type NXPLUS C,
- Protection SIPROTEC 5 - 7SJ85
- SICAM PAS
 - PQS V8.0 (RT&C)
 - IEC 61850 (CLIENT)
 - IEC 60870-5-104 (SLAVE)
 - AUTOMATION
- SICAM SCC 9.01
 - SCC 9.01 R&C 8196
 - SCD-Import for direct communication with IEC61850
 - Topological Coloring
- RUGGEDCOM switches (RSG2300, RSG2100 RS950G)



RP Brnik 20 kV - SIEMENS Protection and control system

- Our scope of work:
 - Configuration of protection devices (protection and control)
 - Configuration of SICAM PAS (communication with control center using IEC 104)
 - Configuration of SCC (local SCADA application using IIEC 61850)
 - Configuration of communication devices (LAN, VLAN, SNTP, HSR, PRP, ...)
 - Design of complete protection and control system
 - Testing, FAT, SAT, Commissioning
- Special functions/requirements in this project:
 - Direct communication of SICAM PAS and SICAM SCC with SIPROTEC 5 Protection devices using IEC 61850 protocol,
 - Specially developed switching authority for SICAM SCC
- Using SIEMENS equipment:

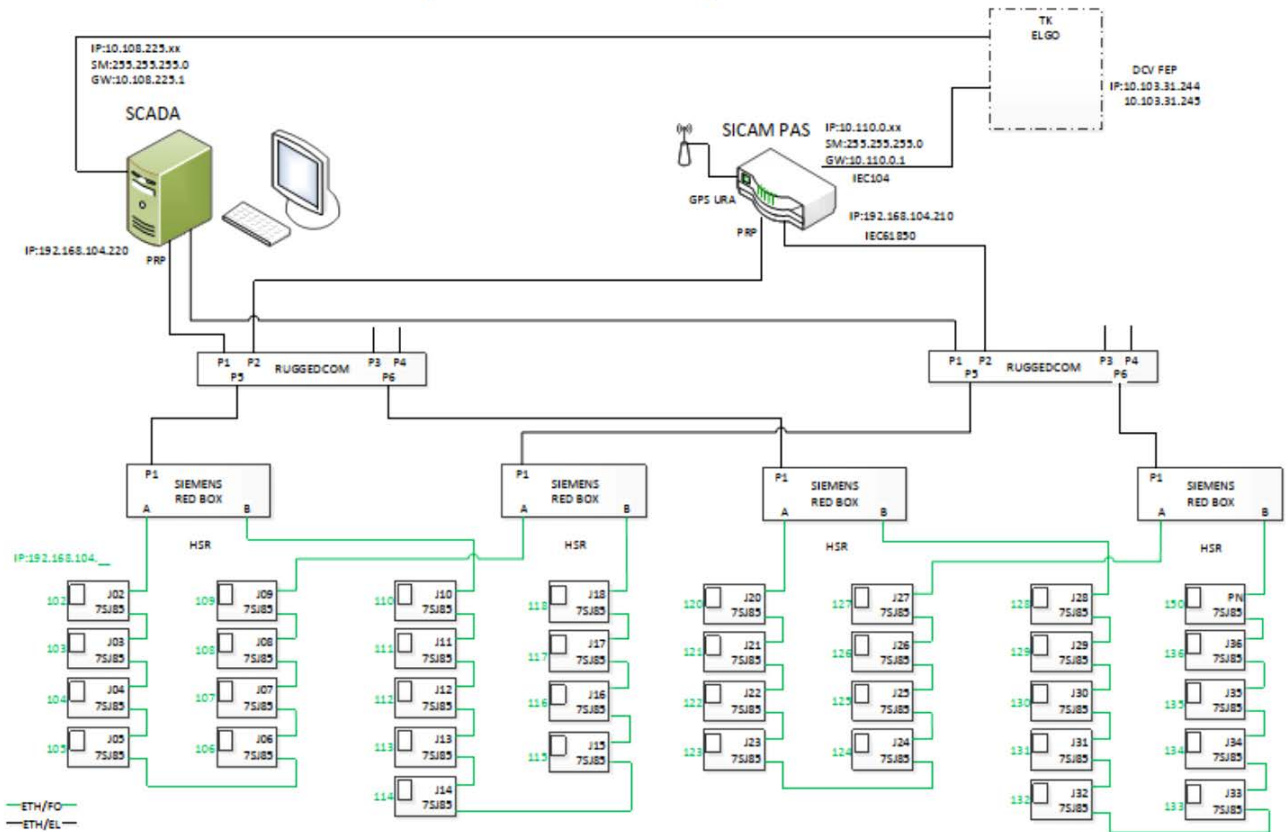
With SIPROTEC 5 devices that support communication with several IEC 61850 Clients and user friendly software SICAM PAS and SCC this kind of communication topology does not represent as big problem as it would be with other equipment
- Options for upgrade:

Stand alone software for automatic downloads of IEDs Disturbance records (seperated from SICAM PAS)

RP Brnik 20 kV - SIEMENS Protection and control system

- Communication topology of protection and control system:

RTP Brnik – Komunikacijska shema vodenja

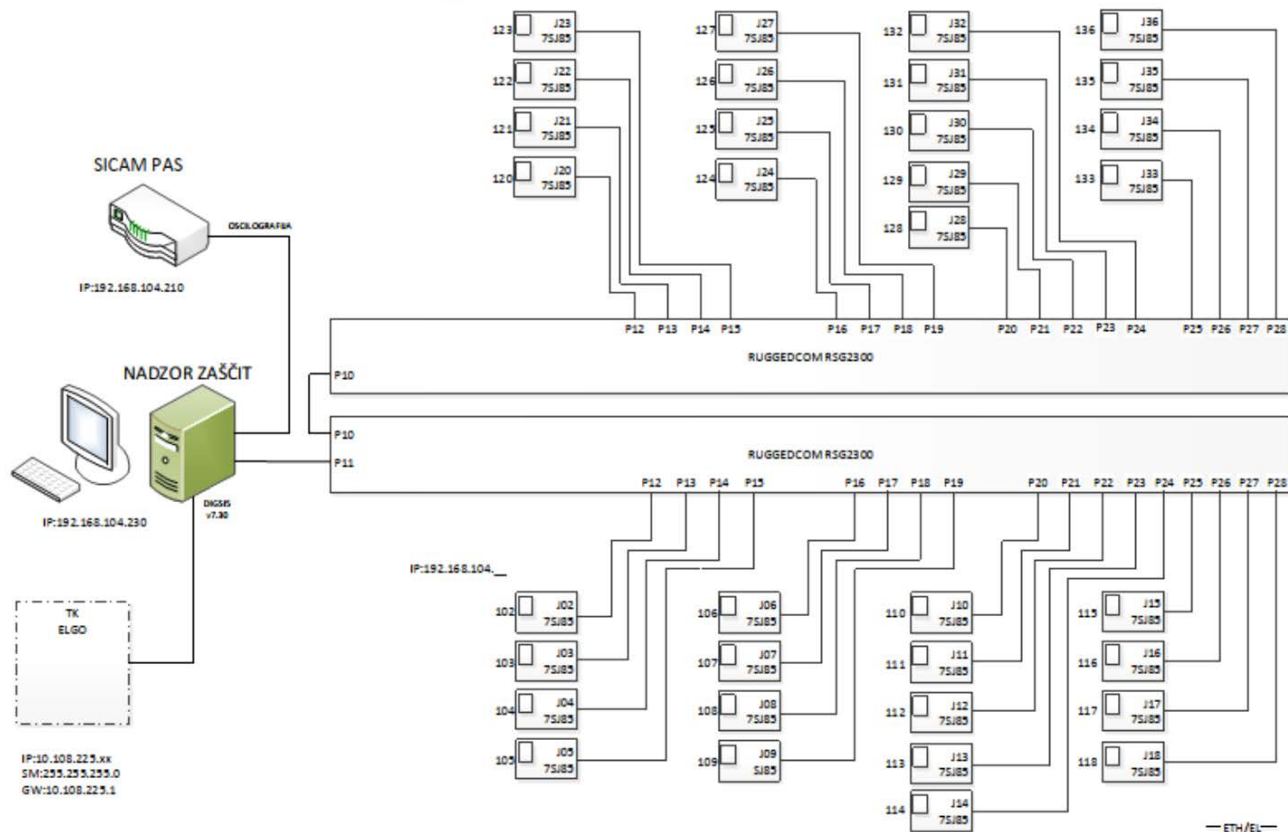




RP Brnik 20 kV - SIEMENS Protection and control system

- Communication topology of supervision of protection devices:

RTP Brnik – Komunikacijska shema nadzora zaščit



Substation Slovenska Bistrica 110/20 kV - SIEMENS Protection and control system

- Investor: ELES d.o.o. and Elektro Maribor d.o.o.
- Year: 2018
- Location: Slovenska Bistrica
- Description:

As part of reconstruction of the existing Substation (with new 110 kV GIS), scope was also the delivery of all secondary equipment (control, protection and measurement system) for the new GIS 110 kV switchyard.

Challenge:

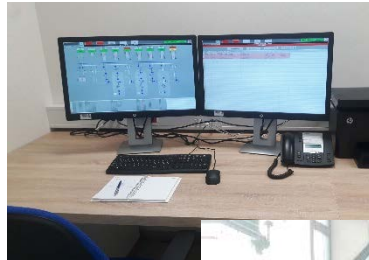
The new control, protection and measurement system of 110 kV GIS switchyard had to be merged with the existing system of 20 kV switchyard and operate as one.



Substation Slovenska Bistrica 110/20 kV - SIEMENS Protection and control system

SIEMENS Equipment used in this project:

- Gas-insulated Switchgear Type 8DN8,
- Protection and control
 - SIPROTEC 5 (7SJ85, 6MD85, 7UT85, 7SA87)
 - SIPROTEC 4 (7SS522, 7SS523)
 - SWT3000
 - 7SR4501
- SICAM PAS (6MD9124)
 - PQS V8.0 (RT&C)
 - IEC 61850 (CLIENT)
 - IEC 60870-5-104 (SLAVE)
 - AUTOMATION
- SICAM SCC
- RUGGEDCOM switches (RSG2488, RSG2100, RS416, RS910, RX1500)





Substation Slovenska Bistrica 110/20 kV - SIEMENS Protection and control system

Our scope of work:

- Configuration of protection devices (protection and control)
- Configuration of redundant SICAM PAS (communication with two remote control centers using IEC 104)
- Configuration of SICAM SCC (local SCADA application using IEC 61850)
- Configuration of communication devices (LAN, VLAN, SNTP, PRP,...)
- Design of complete protection and control system
- Interaction of new SIEMENS system and existing system (from other manufacturer)
- Testing, FAT, SAT, Commissioning

Special functions/requirements in this project:

- The coexistence of new Siemens control and protection system with old existing system using IEC 61850 and IEC 104 protocols.
- Redundant communication with two remote control systems containing signals from old (20 kV switchyard) and new (110 kV switchyard) protection devices

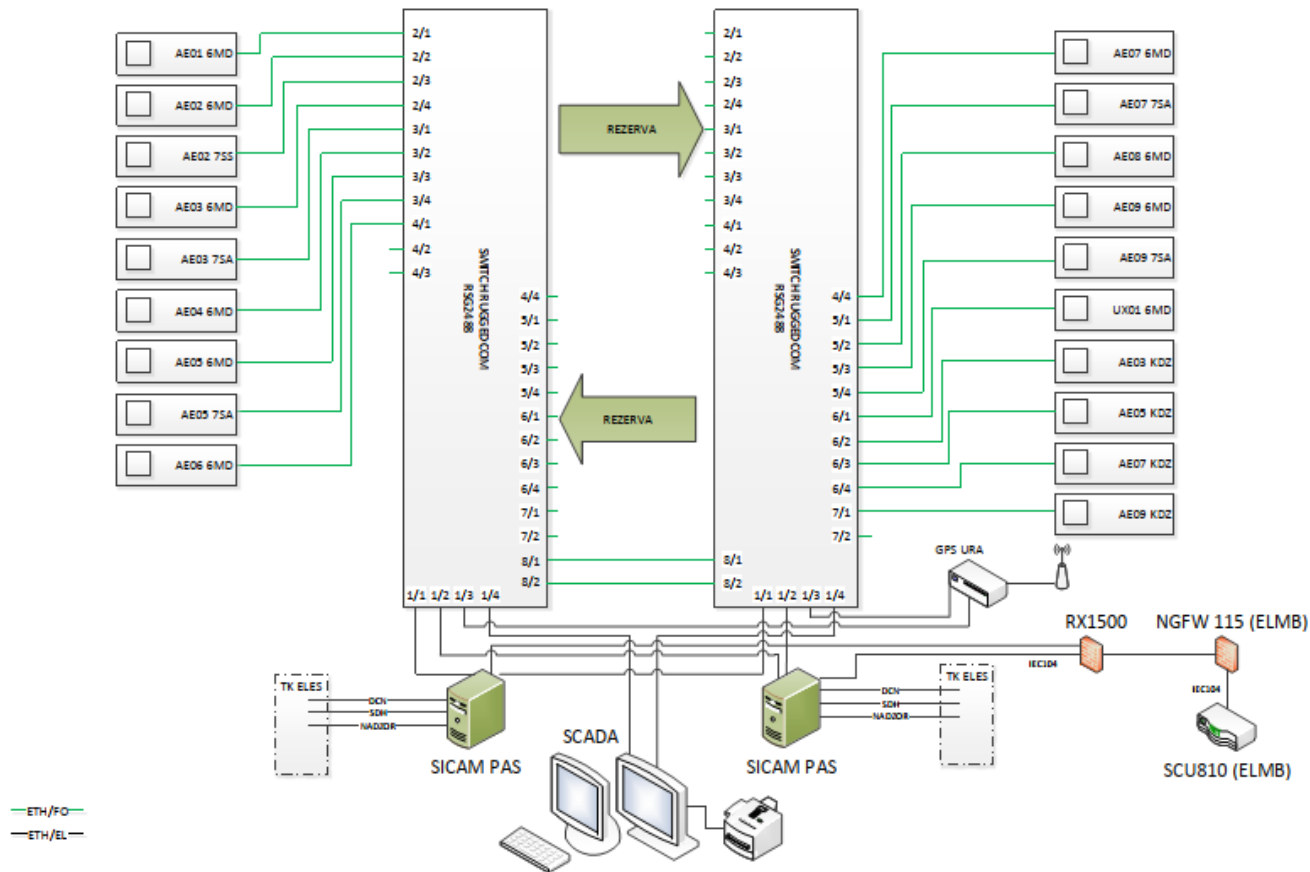
Using SIEMENS equipment:

SIPROTEC 5 devices that allow goose communication with other manufacturers devices and universal SICAM PAS software enabled interlocked commands, both from two local SCADA applications and two remote control centers

Substation Slovenska Bistrica 110/20 kV - SIEMENS Protection and control system

- Communication topology of protection and control system for each investor:

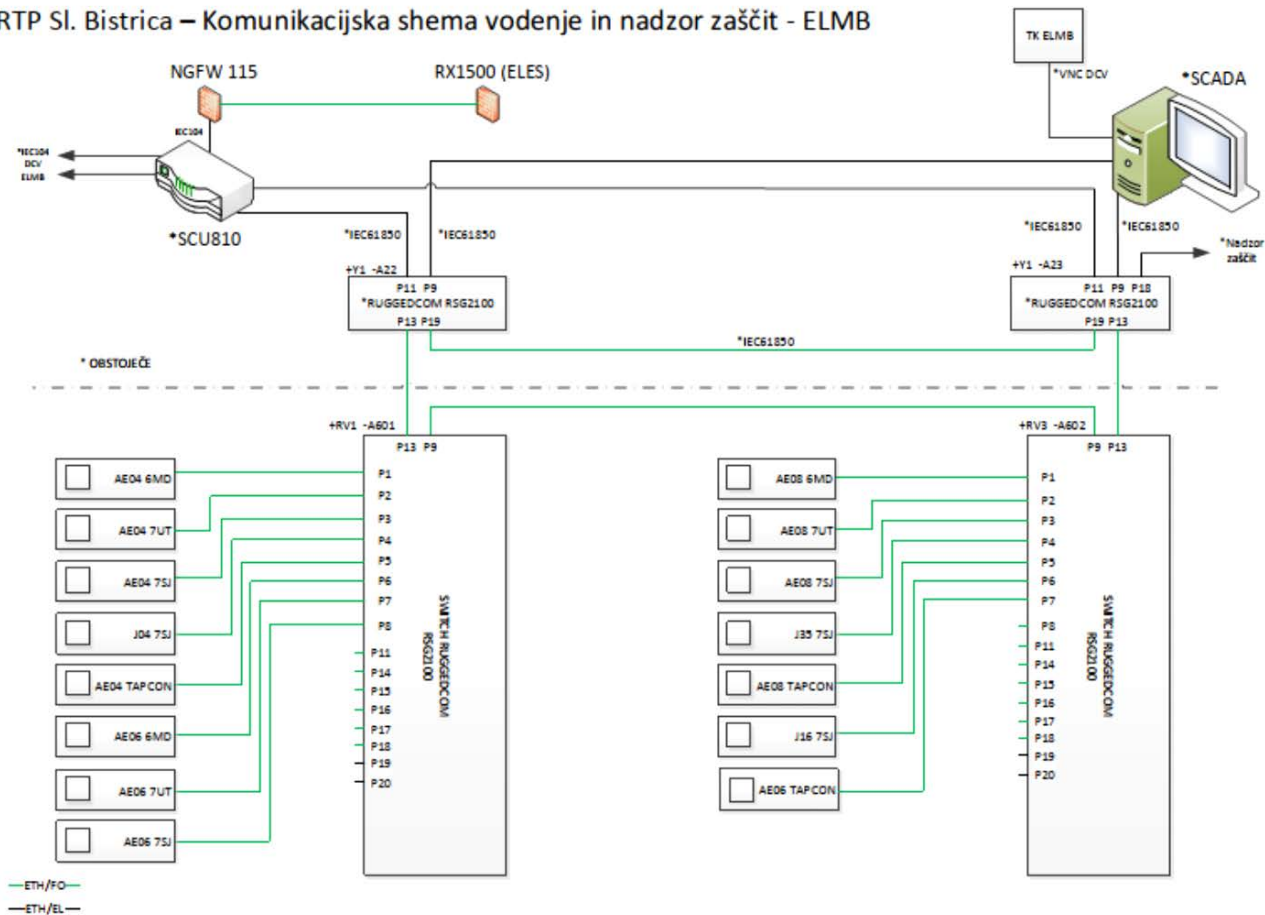
RTP Slovenska Bistrica – Komunikacijska shema vodenja - ELES



Substation Slovenska Bistrica 110/20 kV - SIEMENS Protection and control system

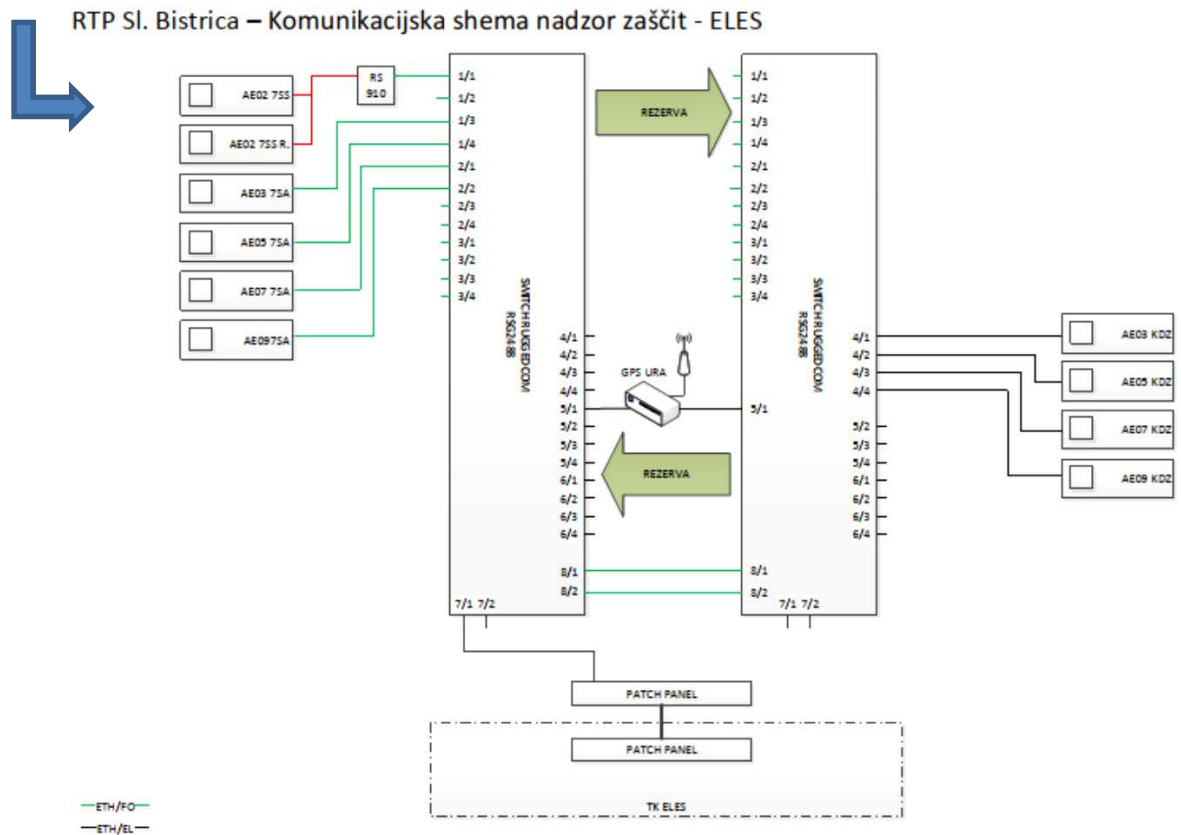
- Communication topology of protection and control system for each investor:

RTP SI. Bistrica – Komunikacijska shema vodenje in nadzor zaščit - ELMB



Substation Slovenska Bistrica 110/20 kV - SIEMENS Protection and control system

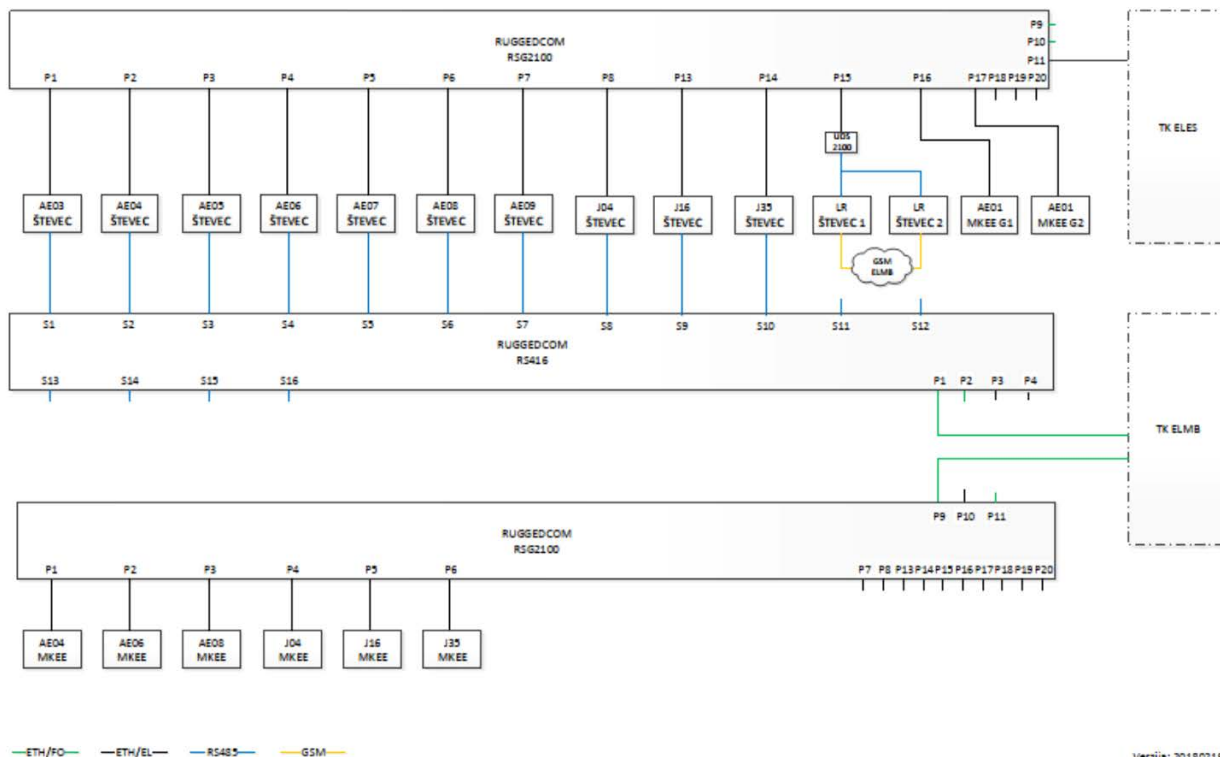
- Communication topology of supervision of protection devices:
- Communication topology of measurements:



Substation Slovenska Bistrica 110/20 kV - SIEMENS Protection and control system

- Communication topology of supervision of protection devices:
- Communication topology of measurements:

RTP Sl. Bistrica – Komunikacijska shema meritev



Verzija: 20180219



Driving the Future

KOLEKTOR

50 let / years



Thank you for your attention

Tomaž Kolarič and Sanel Huskić