alfanar SMART GRID SOLUTIONS

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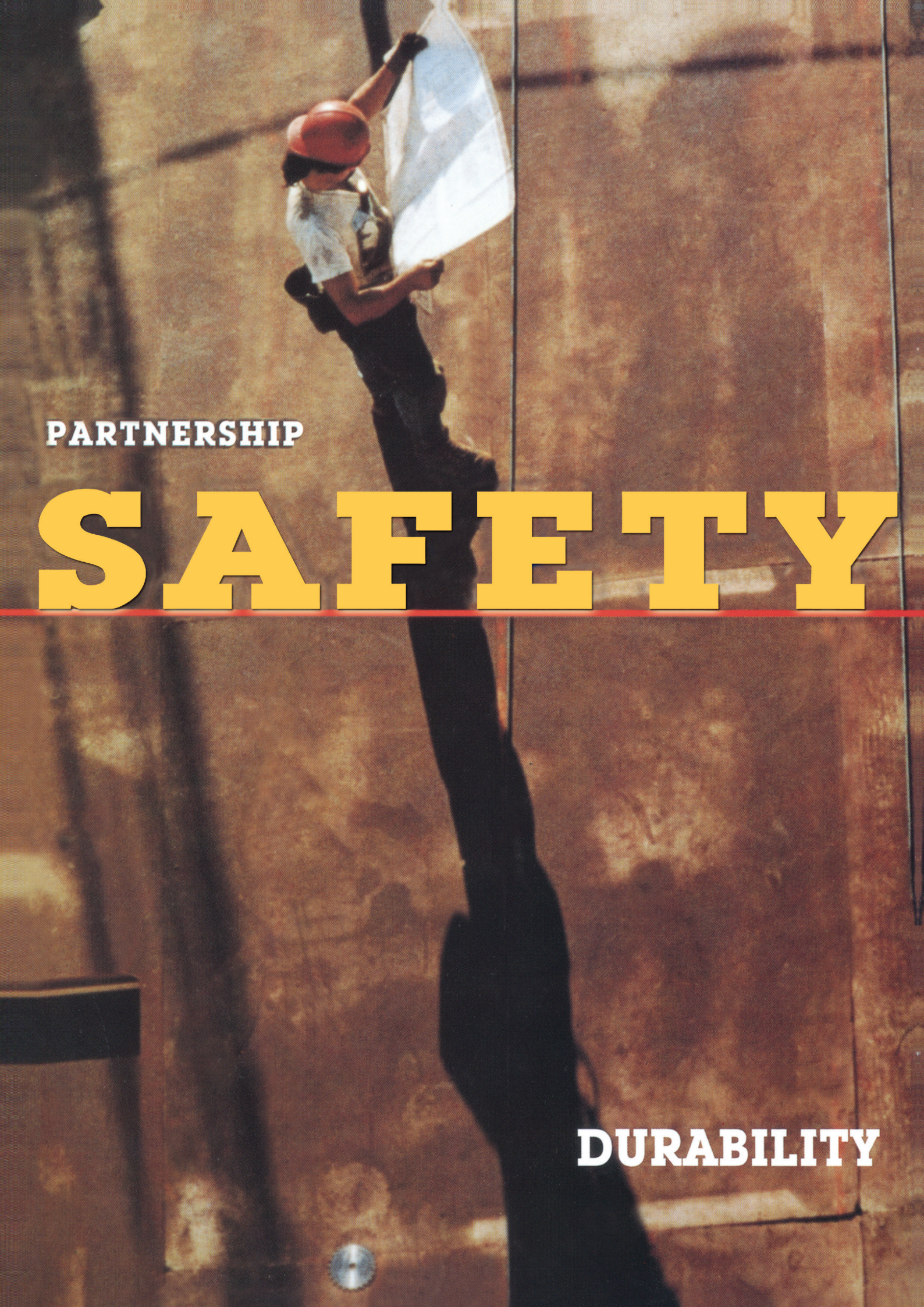
PARTNERSHIP
SAFETY
DURABILITY

Contents

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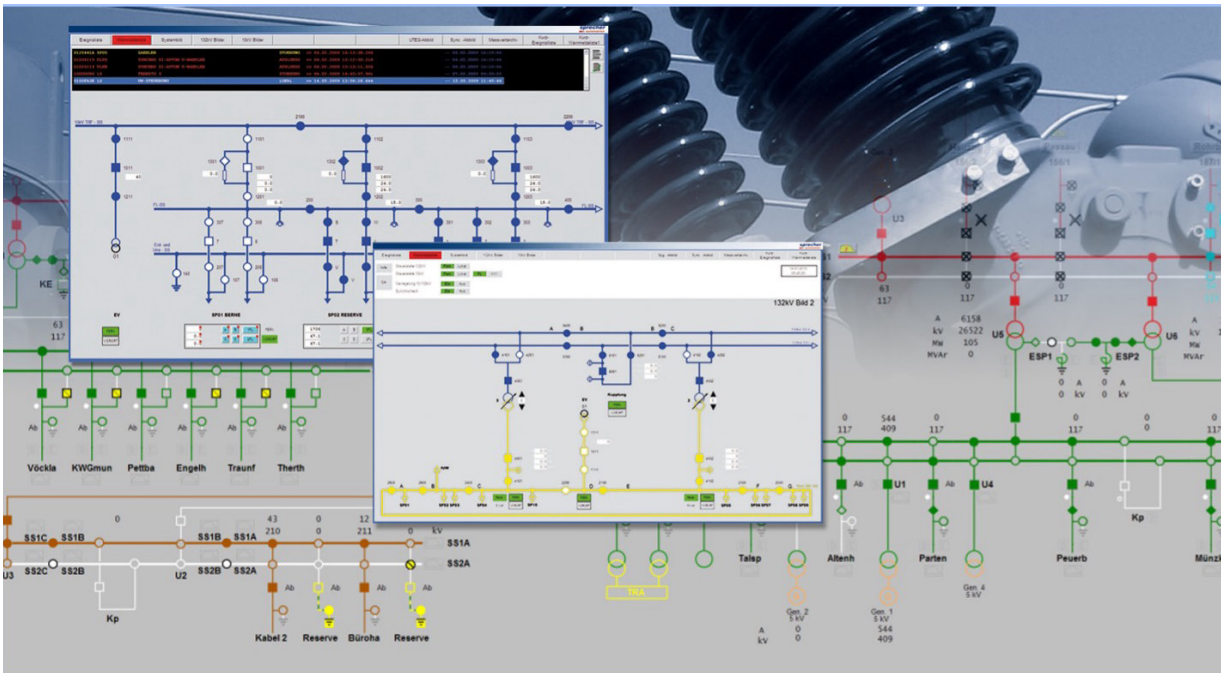
Substation Automation System Solutions

A – Introduction

alfanar provides complete Substation Automation Systems with system integrators from Sprecher-Automation. Sprecher Automation GmbH offers automation solutions for energy, industry and infrastructure processes. Our customers are power utilities, industries, transportation companies, municipal utilities and public institutions.



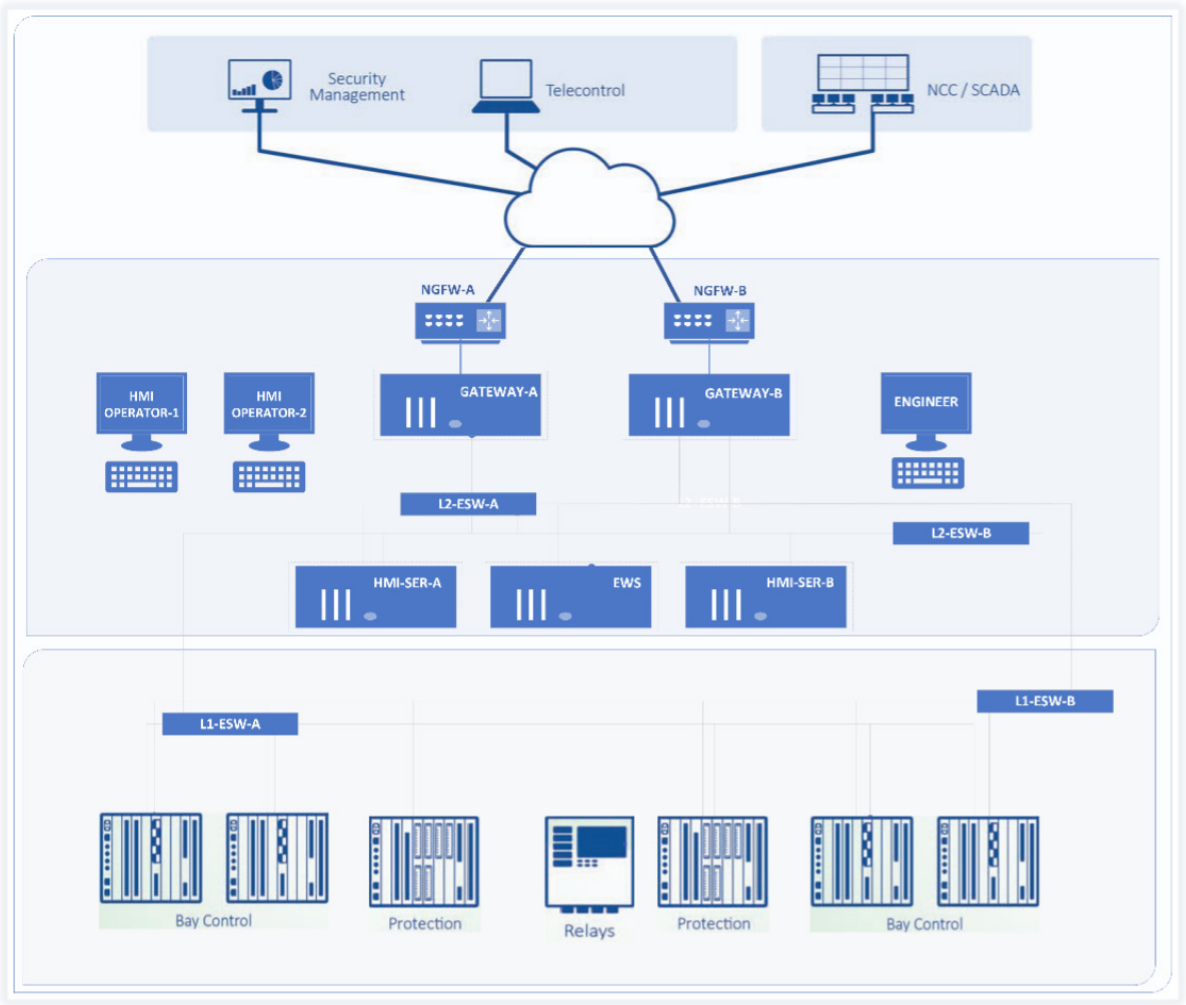
Company owned developments and cooperations with technology partners lead to a unique product portfolio consisting of traditional electrical technologies and high-tech electronics.

B – SPRECON-V460 Process Visualization

The SPRECON - V460 Energy Edition is a reliable open platform with special features for the energy industry. Valuable configuration time is saved by optimized processes in SPRECON - V460 Configuration Editor and fully integrated into the SPRECON E – parameterization.

For large and small energy companies, industry companies with their own power supply,
the SPRECON - V460 Energy Edition offers outstanding automation control, performance, stability and scalability. The SPRECON-V460 Energy Edition is tailored to the needs of energy generation, transmission, and distribution, and is available in different licensable variable expansions for server and client.

- V460 meets all demands of modern control center systems concerning monitoring, evaluation of the processes, generation, scalability, and redundancy
- Besides the standard protocol IEC60870-5-104&101 and IEC61850 with hundreds of built in proprietary protocols
- New concept to facilitate V460 in all process visualization levels
  - Local HMI
  - HMI workstations at station control level, machine control level or local power plant system
  - Hot standby, multi hierarchical Scada system for various grid and network stations and complete control centers



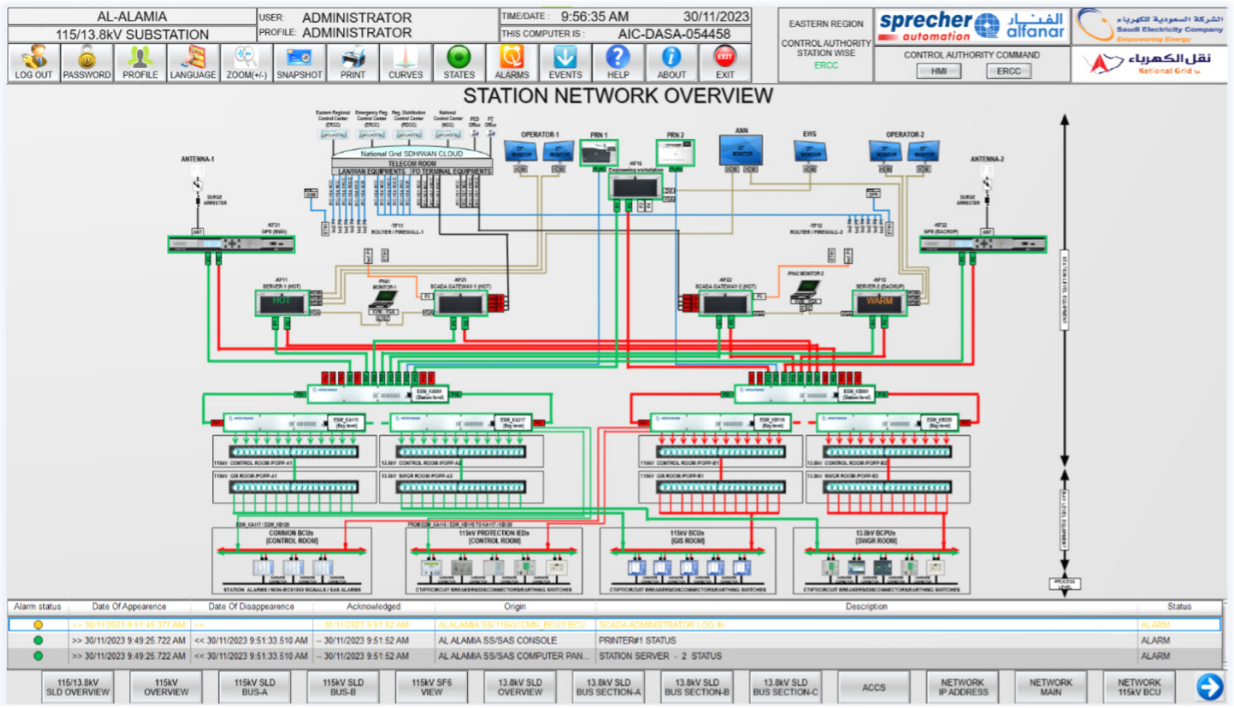
Substation Automation System Solutions

C – SPRECON-E-C (Bay control unit for any voltage level)

- Based on a uniform and modular system architechture in terms of hardware, data structures, communcations logical function
- High scalability ranges. The devices can be applied to RTU, BCU, Protection Device based on requirements.
- High performance and manufacturer independent CPU acts as the core of the process oriented hardware with multi cards suitable for any processing input and output
- Support attachable control panel and alarm panel

D – Engineering Software and Workflow

- SPRECON-E Engineering center is a workflow oriented software platform for SAS equipment covering configuration parameterization and maintenance.
- The platform is designed to comply with project management and international standards like IEC61850 and includes PRP functionality for a seamless switchover in networks.



- **GPS (time synchronizing clock with SNTP, NTP and PRP functionality for seamless switchover in case of LAN problems)**

E – Ethernet Switch

- Complies with IEC61850, PRP communication, HSR, RSTP
- Uses IEC61850 communication switches with different topology (ring, star, mesh)
- Fully redundant, with extremely high availability

F – Industry Workstation

- High availability for client and server appliactions
- Redundancy power supply, SSD storage HD, and FO ports with PRP

G – Protection IEDs

- All vendors comply with international standards, more than three hundred legacy protocols supported

Telecommunication Solutions

A. Introduction

The energy market is one of the most crucial industry sectors enabling our everyday lives. It requires constant development and innovation to make it more accessible and efficient.
Alfanar is primarily engaged in manufacturing a wide range of Low, Medium and High Voltage electrical construction products, EPC solutions for conventional and renewable power plants, allied engineering services and design engineering.
We have built up an international presence throughout much of the Middle East, Asia, Africa, and Europe.

B. Energy Monitoring

Fundamentally, energy infrastructure consists of production and transmission. All steps of production and is transmission must be closely monitored and controlled to make sure the infrastructure is producing enough power that is distributed efficiently throughout the energy network.

All of this would not be possible if all components of the grid were not connected and controlled centrally and professionally by qualified engineers and advanced automation systems.

Power issues are the most fundamental item that network operators need to monitor and manage at remote sites. The ability to remotely monitor and reboot equipment contributes to both network resilience and network efficiency.

Effective monitoring of various power-related sub-systems can give a complete picture of power-related issues at a site. This allows for better troubleshooting and reduced downtime of the network due to power-related faults.

C. Necessity of Smart Grid

The smart grid represents an unprecedented opportunity to move the energy industry into a new era of reliability, availability, and efficiency that will contribute to our economic and environmental health.

The benefits associated with the smart grid include:

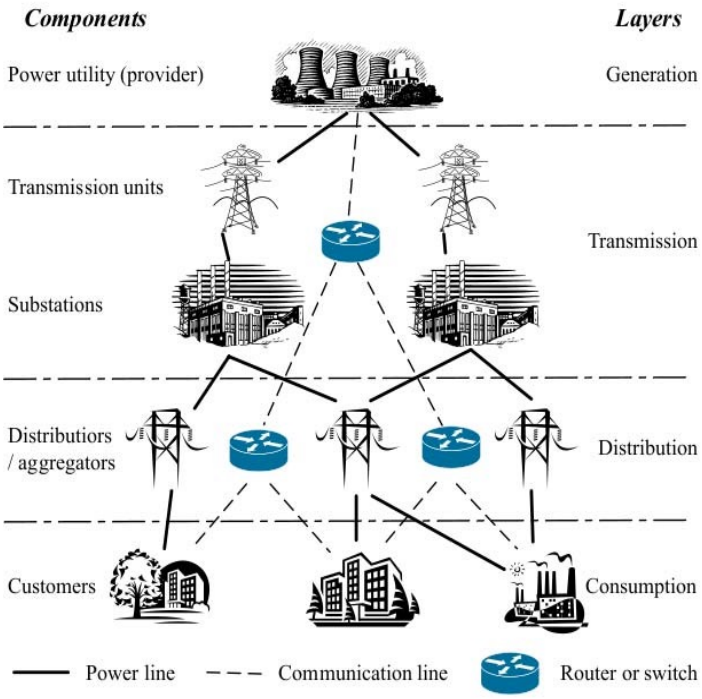
- More efficient transmission of electricity
- Quicker restoration of electricity after power disturbances
- Reduced operations and management costs for utilities, and ultimately lower power costs for consumers
- Reduced peak demand, which will also help lower electricity rates.
- Increased integration of large-scale renewable energy systems
- Better integration of customer-owner power generation systems, including renewable energy systems
- Improved security

The electricity networks are currently managed via centralized control centers, where the various equipment systems across the network are operated manually by control engineers or automatically by control systems using a mix of communication technologies.

D. Information and Communication Technology (ICT)

A smart grid implies that a vast amount of information will need to be managed. One of the key enablers of the smart grid is the integration of information and communication technology (ICT) into the grids to monitor and control power generation, distribution, and demand. ICT is rapidly developing, with new innovations impacting on every aspect of daily life, from Power to health care to computers to transport.

The telecommunications network provides monitoring and remote operation in real-time, which allows electricity networks to be operated within voltage and frequency limits in accordance with applicable Regulations, Network Codes and Standards, which are all intended to protect connected customers.



E. Telecommunication Division

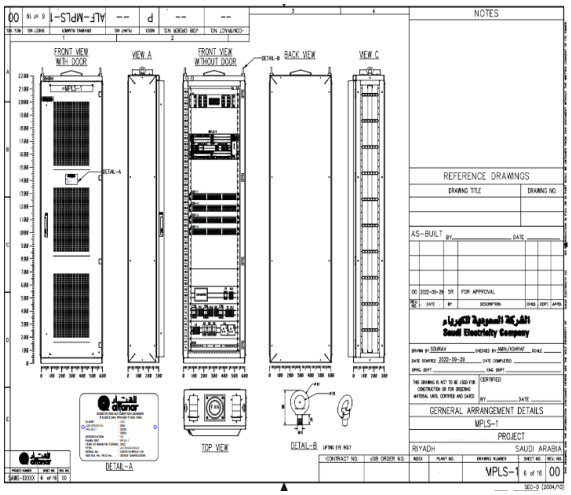
Telecommunication Services

alfanar responds proactively to digitalization and the decentralized structures in energy supply with end-to-end telecommunication networks for the digital grid. We provide telecommunication solutions for transmission and distribution networks as well as for industry specific applications.

The benefits we offer are strong experience in both telecommunications and energy technology, tested, standardized, and customer- specific solutions along with being a technology leader.
We are prepared to support and provide telecommunications services to customers in the digital transformation they must tackle, contributing with innovative services and solutions and the systematic application of simplification, virtualization and automation techniques and methodologies.

Our full scope of services and capabilities includes but is not limited to:

- Network design and engineering
- Performance coordination
- Project management and provisioning
- Cubicle integration and design
- Validation platforms
- Site engineering and installation
- Commissioning, testing and maintenance
- Technical and project training
- Network consulting, equipment expertise and diagnostics.



F. Telecommunication Solutions

alfanar provides a range of compact and modular telecommunication devices with the proper interfaces and facilities to transmit and receive different types of signals and data and can be integrated with the existing telecommunications networks. Solutions in general include:

The telecommunications network provides monitoring and remote operation in real-time, which allows electricity networks to be operated within voltage and frequency limits in accordance with applicable Regulations, Network Codes and Standards, which are all intended to protect connected customers.

- Static Multiprotocol Label Switching (MPLS-TP)
- Synchronous Digital Hierarchy (SDH)
- Plesiochronous Digital Hierarchy (PDH)
- Dense Wavelength Division Multiplexing (DWDM)
- Optical Transport Network (OTN)
- Ethernet LAN/WAN services (Routers & Switches)
- Tele protection (PSE)
- Media converters Optic/electric IEE-C37.94.
- RFTS Remote Fiber testing system
- IP Telephony IPBAX

MPLS-TP is virtually the packet-based alternative to SDH/SONET technology. alfanar introduces different models of MPLS-TP devices which enable energy companies to communicate with a wide range of requirements and features on a single communications infrastructure and can achieve a high quality of service and availability comparable to that of SDH networks.

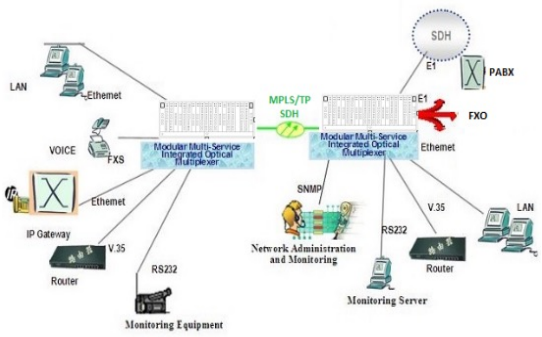
We offer PDH (DVM/DXC/MDFOTE) solutions which gives a variety of existing communications means while taking you simultaneously towards next generation technologies. Our solutions enable parallel SDH and MPLS-TP services with superior flexibility. The products can cover A wide range of interfaces like:

- Data interfaces E1, V.24, V.11, X.21, G703/64k, C: 37.94
- Voice interfaces, E&M, FXS, FXO

We offer remote fiber testing solution (RFTS)
FG-750 Fiber Guardian Scalable test solution for fiber network monitoring and management.

DWDM Next-generation high-capacity, intelligent, and converged optical and packet Optical Transmission Network (OTN) platform for 100G and beyond.

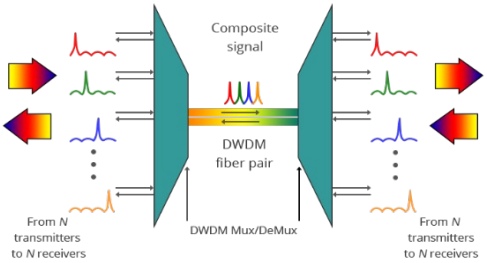
Tele-Protection PSE is a protection system in charge of monitoring the condition of the grid, isolating faults and preventing damage to critical parts of the power grid.



IP Telephony is a technology that allows for voice communications over an IP network, rather than traditional analog phone lines.

DC-DC Converter: 48VDC System BATTERY CHARGERS-(Communication Battery Chargers 48 VDC) VALVE REGULATED LEAD ACID (VRLA) STATIONARY BATTERY BANK

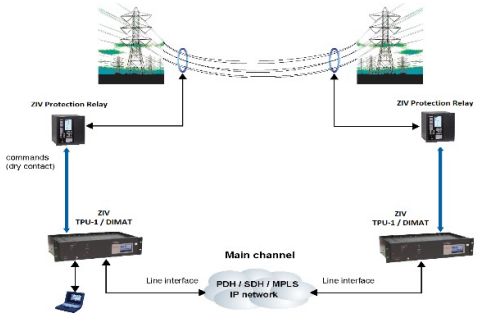
A range of optical boosters and pre-amplifiers also proposed to enable satisfactory communication between substations without using intermediate repeaters and regenerators.
Usually, we propose the DWDM technology which is suitable for long-haul transmission over a very long distance and can transmit a large amount of data.



We introduce a solution and services for tele protection system (PSE) which is a highly required solution worldwide for identifying and isolating faults extremely quickly in the high-voltage grid.

Combined with distance protection relays, it allows operators to reduce downtime to an absolute minimum.

The high voltage grid network protection disconnects the faulty part of the system as quickly as possible in a selective way.



G. Telecommunication Team and Facility

alfanar has an experienced staff of trained competent engineers and technicians who have extensive experience with our main customers and with different types of communication devices from different vendors in high, low, and medium voltage stations.

alfanar is also keen on developing its crews by introducing them to the technology and modern devices that are in service and arrange technical courses that enable them to obtain the required understanding of the various characteristics and designs.

alfanar has a special telecommunications services laboratory that is equipped with devices from various suppliers and advanced technical instruments and testing devices used for training applications to solve problems with technical solutions.

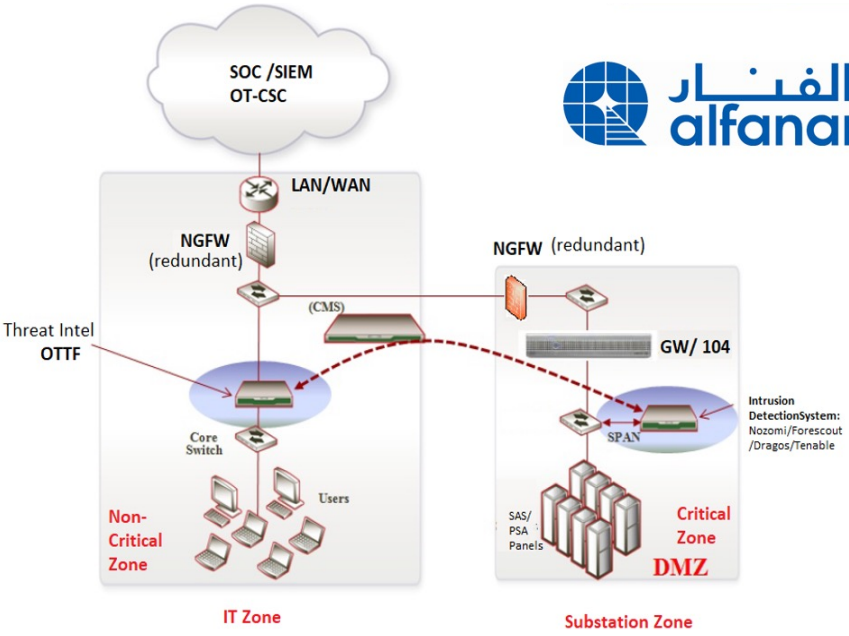
OT Cyber Security Solution

Main Topics

1. Introduction
2. Intrusion Prevention System for OT
3. Intrusion Detection System for OT
4. SIEM/ SOC for OT
5. Industries
6. Solutions & Services
7. Partners
8. Approvals

A. Introduction

- Decades of experience in executing electrical substations for National Grid SA, SAUDI ARAMCO., MARAFIQ, etc.
- Generation and transmission networks, electrical distribution networks usually involve large number of Devices/IED's which use extensive Communication Structures and Protocols.
- With the growing number of automation and communication components in a substation there is great potential for unauthorized users to compromise a field device electronically or physically, and gain access to the direct control and protection of the electrical grid network operations and exploit the communication infrastructure to expand cyber access through the system.
- There is a need for robust, reliable, resilient, efficient cyber security solutions to prevent unauthorized access.



- Your trusted partner in development of cyber security infrastructures for operational technology- NAS, OT SOC, OT SIEM & OT Data Centres & OT Operational Security.

- Company owned developments and cooperation's/ NDA with technology partners lead to a unique product portfolio consisting of traditional security technologies as well as purpose built hardware for security infrastructure.

- We understand the need for critical efficiency, time savings, and cost effectiveness for our customers, which is why we developed a simple, scalable, and uncomplicated solution.

AIC for OT (OPERATION TECHNOLOGY)

- Secure SCADA, engineering access and real-time automation, protection communications.
- Commercialization of a control system hardened Substation Automation System (SAS) with the ability to prevent, identify physical and logical intrusions, and incident response.
- Demonstrate the cyber solution in real world control system installations and prepare best practice guides for testing, deployment, and long-term management of the cyber security technology solution.
- Ability to bridge physical and cyber worlds (OT and other external Connections-IT).
- Ability to use powerful cyber technology that complies with National Grid SA Standards, NERC CIP, and other international standards.
- Enhanced distributed networks monitoring capabilities and real time logging of cyber and physical events.
- Preventing a physically compromised site from expanding access to upstream sites.
- Enabling security architectures that strictly adhere to standards and enable security and compliance.
- Cyber-Security-hardened network with the use of defense in-depth industrial control.
- Systems (ICS) cyber-security standards, protocols, and industry practices are specific.
- OT Cyber security needs to address safety concerns.

B. Intrusion Prevention System for OT

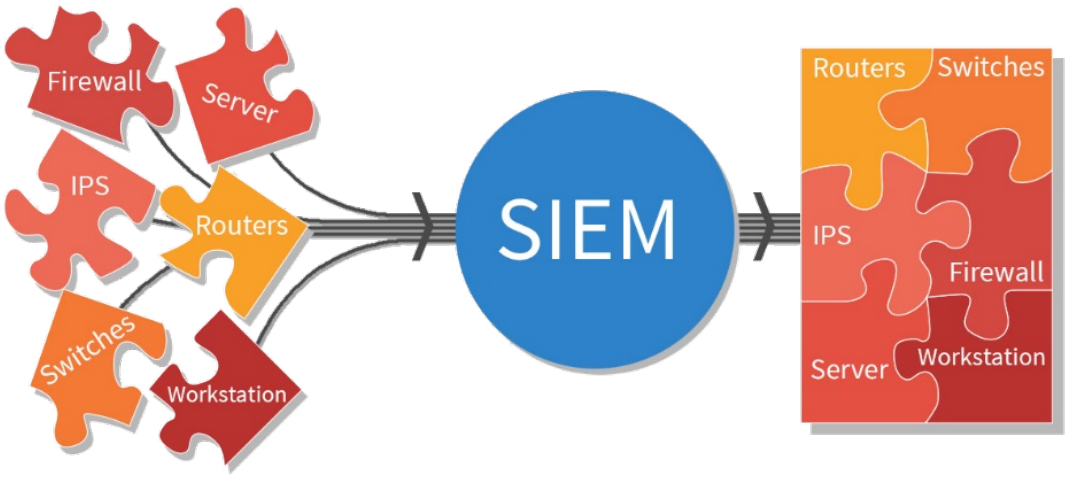
- An intrusion prevention system (IPS) is a critical component of network security to protect against new and existing vulnerabilities on devices and servers. To stop sophisticated threats and provide a superior user experience, IPS technologies must inspect all traffic, including encrypted traffic, with a minimal performance impact.
- NGFW-Next generation Firewall: FortiGuard IPS or Palo Alto
- Network-based virtual patching for business applications that are hard to patch or can’t be patched.
- NGFW while preserving operations and compliance practices.
- Protect against known and zero-day threats.
- Fortinet’s FortiGate offers a comprehensive Security-Driven Networking platform that delivers top-rated NGFW security to the enterprise.
- AI/ML-driven threat intelligence for protection against known and zero-day threats.
- Deep packet inspections
- Coordinated detection and enforcement across the entire attack surface.
- To meet all demands of modern control centre systems concerning security, monitoring, evaluation of the processes, generation, scalability, redundancy.
- Allow only the standard protocol IEC60870-5-104&101 and IEC61850 protocols.

C. Intrusion Detection System for OT

- Complete device visibility across the entire substation is key to secure ICS/OT
- From OT visibility to action, zero trust, prevent multiple ransomware attacks.
- OT security skills gap is a major challenge for industrial, utilities, and organizations (ex.., incident response, threat monitoring, risk assessment, risk mitigation).
- Darkside are taking advantage of the explosive growth in the number of connected devices in OT.
- Sound security governance, policies, practices, and operationalization.
- ICS/OT security frameworks or run incident response/security operations.
- ICS/OT security people should preferably have an OT background to understand OT criticality and the OT landscape diversity.
- Penetration testing and red team exercises from a 3rd party firm is highly recommended.
- Integrated with SOC (security operations centre) with 24/7 coverage.

D. SIEM/ SOC for OT

- SIEM Solution
- Application Whitelisting centralized management.
- Endpoint Protection centralized management
- Firewall centralized management
- AD Access centralized management
- ICS Threats Detection centralized management
- Network Management System centralized management
- Central Microsoft Active Directory



We cover the following sectors for power plants/substations - for all catagories of OT cyber security solutions:

- Oil & Gas
- Water & Utilities
- OT Security /Industry 4.0
- Digital Transformation Solutions
- Renewable and Special Integration Projects

E. Industries & Sectors

- Power Plant /Substations- All categories
- Oil & Gas
- Water & Utilities
- OT Security for Industry
- Digital Transformation Solutions
- Renewable and Integration Projects

F. Solutions & Services

- OT security / Industry 4.0
- Defence In-Depth Approach
- Access Control & Secure Management
- Network Security by Segmentation –Physical & Logical
- Overall Security Posture & Situational Awareness
- ICS / OT Cyber Security Risk Assessment
- Development of ICS / OT Cyber Security Strategy
- Vulnerability Assessment
- ICS / OT Cyber Security Incident Response Planning and Management
- Compliance Services with Regulatory Requirements for Critical Infrastructure
- Shorter downtime & Enhanced Systems Insights
- Adding more secure features without changing the existing system
- Control Centre/ Centralized Management- SOC/SOAR /SIEM/ MSSP
- Secure Remote Maintenance
- Highly specific and professional trainings
- Service level agreements and security information service

G. Technology and Strategic Partnerships – With Industry Leading Suppliers & Success Partners

- Palo Alto- NGFW Solution & Panorama and SOC Integrations
- Fortinet- NGFW solutions & Security Fabric
- Nozomi- Industry Leading Intrusion Detection Solution
- Forescout- Intrusion, DPI & Signature Based detection.
- Omicron – Intrusion & Deep Substation Integration & Monitoring Solution
- Tenable- Intrusion & Vulnerability management for IT & OT
- Microsoft- LDAP, 2FA & Defender
- Trellix /TX One- AWL & EPP Solution.

H. Approvals

- **Saudi Electric Company (SEC)** Approved System Integrator for OT Cyber Security
- **National Centre Authority (NCA)** Approved
- **ARAMCO** Approval in Process

Notes

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