The mushroom growth of man-made structures e. g. wind energy plants or production platforms in national and international waterbodies will unavoidable affect the safety and facility in maritime traffic.

For this reason the International Association of administration for sea marking / navigation marking (IALA) published in their “Recommendation O-139 – On the marking of man-made offshore structures” a series of directions.

These recommendations of IALA serve as the basis for national authorities and water and shipping authorities to develop guidelines for the marking of offshore structures.

According to country, offshore structure or project the prescribed components can vary, so that there is no economically justifiable standard solution.
AVB GmbH and Zöllner Signal GmbH, as provider of offshore solutions offer your individual, project-specific package solution from one source, including authority requirements for hardware and software components as well as customized modules.

If requested we accompany and support your project during the whole project life cycle, beginning in the early stages of the planning. Together we develop individual solutions tailored to your specific needs. Take advantage of our experience and know-how in the field of offshore signalling, safety and communication.
User Benefits

Full service, everything from one source

The Offshore SCADA System (OSS) developed by AVB GmbH and Zöllner Signal GmbH is a project-specific overall solution which includes the delivery of hardware and software components as well as services like planning, engineering and product management. We assume the interface management to project partners and act as your consulting partner for authority appointments. For the complete duration we accompany your project from the planning up to commissioning.

Many years of experience with offshore signalling, safety and communication

AVB GmbH and Zöllner Signal GmbH look back on a long tradition of 80 years in the field of offshore signalling, safety and communication. Please benefit from our extensive know-how in the development of customized solutions and our worldwide contacts to national and international authorities, admission offices and manufacturers.

Resource-optimized installation & maintenance

By the individual and customer-oriented planning, conception, implementation and our modular system of OSS the commissioning and for the wind farm operator maintenance is possible with minor personnel placement. The complete system will be delivered preconfigured and then simply needs the setting-up and cabling. All components are easily accessible for maintenance workings.

Excellent references

Wind farm „THORNTON BANK“
• Offshore SCADA fog warning system

Wind farm „ALPHA VENTUS“
• Offshore SCADA system for helicopter approach

Wind farm „ORMONDE“
• Current summation box on the Offshore Transformer Station
User Benefits

Easy integration into concepts of turbine contractors and project partners

Based on the variety of interfaces and the exalted adaptability the Offshore SCADA System (OSS) is easy to integrate in concepts of turbine contractors and project partners. Without influencing those concepts the OSS can be integrated in the existing network structures or alternatively operated by a closed network.

Support

During the complete project our team supports you in administrative problems as well as in technical problems.
By the user-friendly remote configurability of our OSS cost-intensive offshore services can be minimised.

Planning reliability

Because we accompany your offshore project from the beginning of the planning stage you will experience in the later project phase "no bad surprises". Due to our many years of experience we gain a maximum planning reliability so there is no need to work out relevant information during the project stage.

Time and cost saving

By our unit construction system and engineering service our Offshore SCADA System can be adapted directly to your special needs. Benefit from our long lasting experience in the field of offshore safety to reduce your costs and expenditure of time.
Product Information

For your offshore project the Offshore SCADA System (OSS) offers a project-specific overall solution regarding the auditory and visual navigation for shipping traffic safety as well as the integration of customized hardware.

The complex OSS consists of **hardware and software** components which can be assembled to your project-specific overall solution. These components are particularly:

- Components requiring official approval (referring to the directives, e. g. german BSH, IALA etc):
  - *Navigation lights*
  - *Fog horns*
  - *Visibility sensors*
  - *Closed circuit television vision (CCTV) components inclusive server system*
  - *AIS components*
  - *Illumination signs (identification for offshore structures)*

- Optional / customized components
  - *Measurement equipment (energy, meteorological)*
  - *Further hardware*
  - *Independent customer network*
  - *Wireless LAN technology to connect wireless components*

The varied hardware components that are combined to complete the official and customized requirements can be controlled and monitored via our flexible Offshore SCADA visualisation software.

By use of a high-capacity and extendable controller the OSS offers different possibilities:

- Automatic activation depending on environmental conditions by a dynamic “Master Slave” detection (e. g. via visibility distance or radar)
- Manual activation of the hardware for separate WTG’s or the complete wind farm
- Monitoring of the various hardware components and – if necessary – alarm due to errors
- Synchronisation – network based or via GPS
- Operating data organisation and transmission (e. g. via FTP-protocol)
Product Information

The backup of all functionalities in case of power failure is guaranteed by an intelligent UPS system to cover the project-specific requirements.

The integration of OSS into the operation management concept can be carried out in a variety of ways via modern “Cisco” network engineering:

- Integration into the WTG SCADA via web server technology
- Integration into the WTG SCADA via digital and analogue inputs and via protocol (e.g. TCP / IP)
- Integration via WTG SCADA autonomous access software (web-based)

Furthermore OSS is extendable about innovative communication connections that form, especially in cases of communication failure, an important alternative to the cabling:

- GSM connections
- UMTS connections
- Inmar-satellite connections
- V-SAT connections
- Directional radio connections

Engineering Services
Additional to the flexible constructed OSS we offer other product-supporting services:

- Preparation of concepts for navigation and marking during the stage of approval and occurrence as your concept partner at authorities
- Customer oriented components- and system development during the phase of planning
- Interface management to project partners during the stage of project implementation (e.g. WTG manufacturers, installation contractors, foundation contractors, electrical contractors)
- Service, maintenance, system enhancements and retrofits during the phase of service
System Overview

IALA Recommendation O-139
Sample marking of a windfarm

Offshore wind power plant

Internal park communication system via TCP/IP protocol inside a physical network (FOC)

Ø Local access in the control room
Ø Internet remote access via standard browser software (e.g. IE)

Offshore SCADA Visualization

Standard communication access:
- Wideband DSL

Emergency communication system:
- V-SAT
- Inmarsat SAT
- UMTS (G3)

World Wide Web

Offshore platform

Wind farm router
System Overview

Offshore SCADA Box in each WTG

- 2 of IP-cams (standard)
- FA 248LED 5m lantern with GPS (standard) or optional without GPS
- Visibility sensor (optional)
- 3 up to 4 fog horns (optional)

Customer box with all optional components:
- FOC-switch
- Patch panel
- AVB-RTU
- Zöllner fog horn driver
- AVB UPS/charger

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Wind farm FO network

FOC double

FOC double
Integration

Customer Box

The Customer Box combines the different sub systems (e.g. navigation lights, fog horns, measurement equipment) in one central cabinet in each turbine or jacket. The main features are:

- Power supply for all sub systems during normal operation and in case of power failure based on intelligent UPS system.

- Provides the communication interface to the WTG SCADA system and integrates the customer box into the whole Offshore SCADA wind farm network.

- Allocates the physical interface for controlling and monitoring of all sub system components via the Offshore SCADA visualisation software.

Basic Version

- Mounted in 19 inch rack with ambient temperature control
- AVB RTU is a microcontroller controlled electronic device
- Network-switch provides CU/FO interfaces
- Power supply 230V AC to 24V DC UPS buffered (capacity on demand)

Extension

- Zöllner fog horn driver unit
- AIS unit
- Patch panel
- Customer PC
- Further project specific systems
Visibility

Navigation marine lantern
- Rugged LED sea-lantern, suited for offshore platforms
- Highly efficient fresnel-type acrylic drum lens system
- According to IALA recommendation, U.S. Coast Guard Specification and certified by german BSH
- Range 5nm, 30 to 150 cd
- GPS synchronised
- Low power consumption, UPS buffered

Illumination signs
- Especially developed HQ LED panel
- Activ backlight technology
- Inverse view
- Character height 650 mm
- According to IALA recommendation
- Certification by WSV(FVT) proceeded
- Efficacy 10cd/m², adjustable
- Low power consumption, UPS buffered
- Mounted in seawater resistant aluminium housing, security glass front panel, IP68

Offshore visibility sensor
- Performance in all weather conditions, ice-resistant „look down“ geometrie
- According to WMO recommendation
- Range 10m to 16km
- Low power consumption, UPS buffered
- Mounted in seawater proofed aluminium frame for mechanical protection, IP66
ZÖLLNER OZS 660 Offshore ZETFON

- Especially designed for the application on offshore structures
- According to IALA recommendation and certified by german BSH
- Range 2 nm, morse letter „U“
- Low power consumption, UPS buffered
- Mounted in seawater proofed aluminium box for weather and mechanical protection, IP66
Security / Monitoring

Closed Customer TV
- HQ CCD color IP camera
- DVD quality, analog and Ethernet output
- Nightsense for low light situations
- Ultra compact size

- Outdoor Camera Housing, IP66
- Internal heater and blower, sunshield
- Several wall brackets available

- Video Management System Software
  - Control of the entire system
  - Network Video Recorder
  - Client configuration
  - Client monitoring

- High performance Management Server
  - Intel Xeon processor, 1333 MHZ FSB
  - Protected by HP Services

- Digital Video Storage Array
  - Complete RAID 5 protection
  - High speed recording
  - High performance playback
  - Uninterruptable reliability
  - Massive capacities (SATA II hard drives)
Communication

V SAT / INMARSAT
- AVB/KVH/SeaTel
- Fixed and up to 3 axis marine stabilized antenna system
- Compatible with KU-Band satellites
- For voice and data application

GSM / UMTS
- Ericsson
- High speed 3G/UMTS gateway
- For voice and internet application

Further Components

AIS components
- Rugged AIS Transponder, IP66
- Suited for offshore solution
- According to IALA recommendations
- Low power consumption, UPS buffered

Green metering (smart metering)
- Near realtime interval data collection and storage
- Correct energy-measurement without conduction loss
- Green metering is an energy tracking and management system to provide measurement and analysis on offshore WTGs

Meteorological and hydrological measuring
- E.g. wind speed sensor
- Measurement by cup anemometer
- Range 0.3 -75 m/s

Security components
- Emergency call button for castaways
- Burglary detection, reported by:
  - Alarm contacts
  - Motion sensor
  - Camera motion detect
**Project Lifecycle and Sample Project**

**Project approval**
- Preparation of navigation light concepts
- Concept partner to support the concept presentation at authorities

**Project planning**
- Development of customer-oriented and project-specific components and systems
- Integration of OSS into customized system management concepts

**Project implementation**
- Interface management to project partners (manufacturers, grounding suppliers, MEG)
- Manufacturing of the project-specific customer box and the developed components

**Operating stage**
- Service
- Maintenance
- System enhancement
- Retrofits

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**AVB-ZÖLLNER Cooperation**

**System Development**
- Offshore SCADA fog warning system
  - Concept design
  - Conversion of the customer requirement (IALA based) to a technical specification
  - Consulting service
  - Manufacturing
  - Project interface management
  - Delivery
  - Commissioning

**After Sales**
- Technician training
- System maintenance - worldwide
- System extensions
- Retrofits