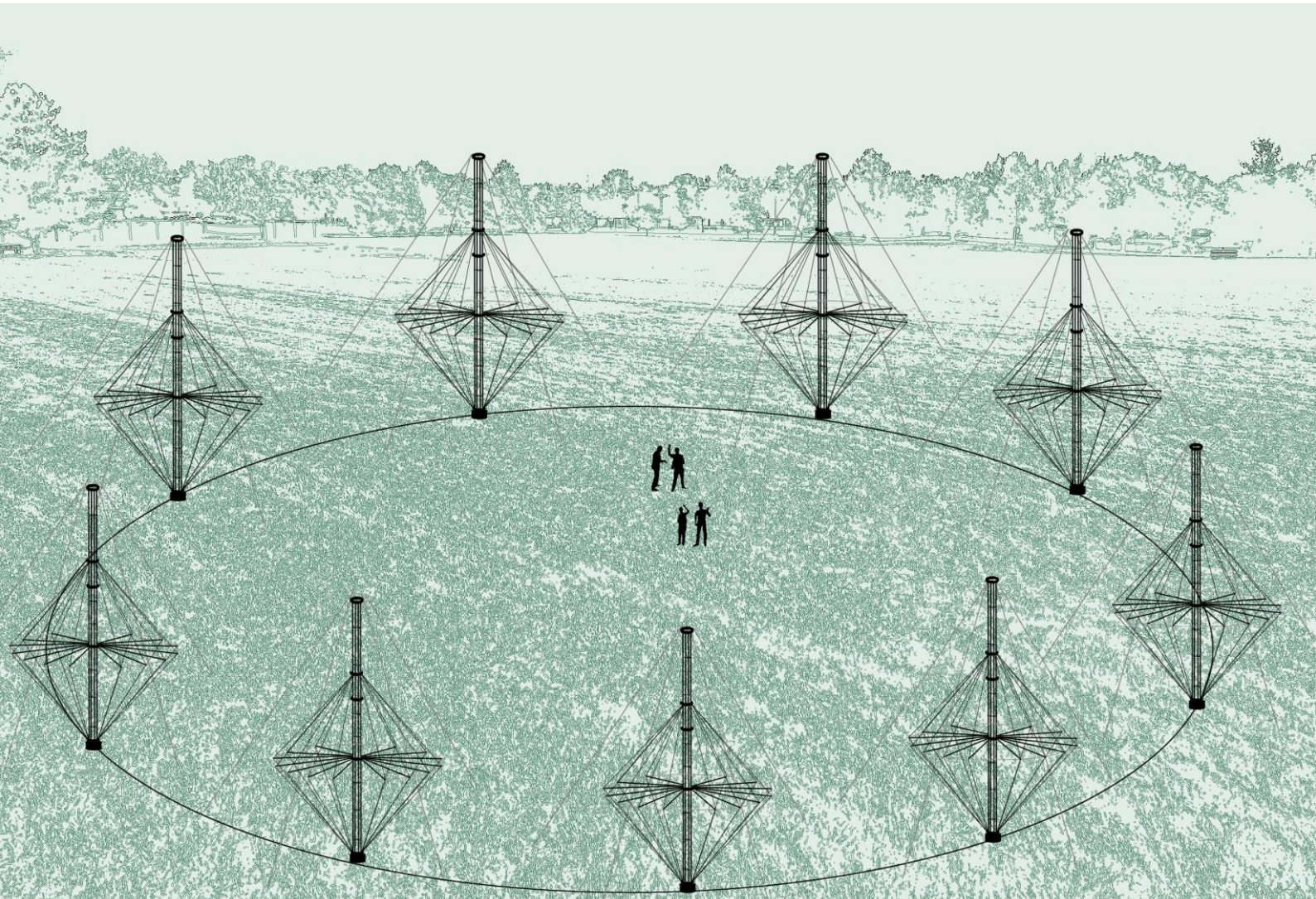# ARS-GLOBAL

WORLD-WIDE HF RADIO MONITORING SYSTEM

WHY ARS-GLOBAL

Intelligence agencies need a deep and complete understanding of all communications in the global radio communication theatre, especially for the world-wide communication in HF.

ARS-Global offers complete and automated monitoring of the spectrum, additionally with the possibility to store the complete spectrum for a dedicated time. The HF spectrum is processed in a completely automated manner. Several antennas can be connected to the system to analyse the spectrum and to calculate the directions of incoming transmissions.

The system detects, classifies, and processes narrowband and wideband signals. Operators are required for mission planning and tasking as well as for detailed signal analysis and reporting on the stored wideband spectrum according to their needs.

Highly sophisticated approaches allow for excellent detection, classification and analysis of the signal itself as well as the direction and geo-location of every emitter.

Sensors can be deployed over large regions and are connected upon request to be able to process and merge signals from every area. Adaptive digital beam forming techniques also use the DF antennas and receivers for interception and allow for significantly better signal recovery.

We have surveillance systems in operation for the coverage of up to 16 antennas with the complete wideband spectrum and up to one thousand production channels for monitoring, demodulation and decoding of signals. The system is flexible and can be extended for more antennas and production channels upon request.

APPLICATIONS

- Instantaneous surveillance of the complete HF spectrum in a world-wide scenario
- Direction finding of emitters
- Geo-location supported for distributed sensors using triangulation

BENEFITS

- Fully automated processing over the complete HF signal spectrum
- Super-resolution direction finding (SRDF) for optimized signal detection to determine the direction of several incoming signals from different directions even on the same frequency
- Co-channel interference reduced by using ADBF technology (Adaptive Digital Beam Forming) to receive several beams in the same frequency simultaneously
- Elimination of the fading effect by ADBF
- World-wide coverage of the complete HF spectrum including e.g. 24 hours history
- Mission and task planning to focus on the signals of interest
- Post-processing, analysis of unidentified (UI) signals, and demodulator/decoder development
- Scalability and ease of integration
- Maintainability at low lifecycle costs due to software based approach
- Remote control and remote maintenance
- Outstanding sensitivity, dynamic and bearing accuracy even with extremely short duration single bursts through non-commutating fully parallel DF receiver architecture techniques
- Proven software concept allowing for fast updates and upgrades, independently from hardware platform.

PRODUCT BACKGROUND

Saab Sensor Systems Germany introduced the ARS family to the market in 2003. Since then it is in use in different applications and sizes. Regular upgrades guarantee cutting edge technology.
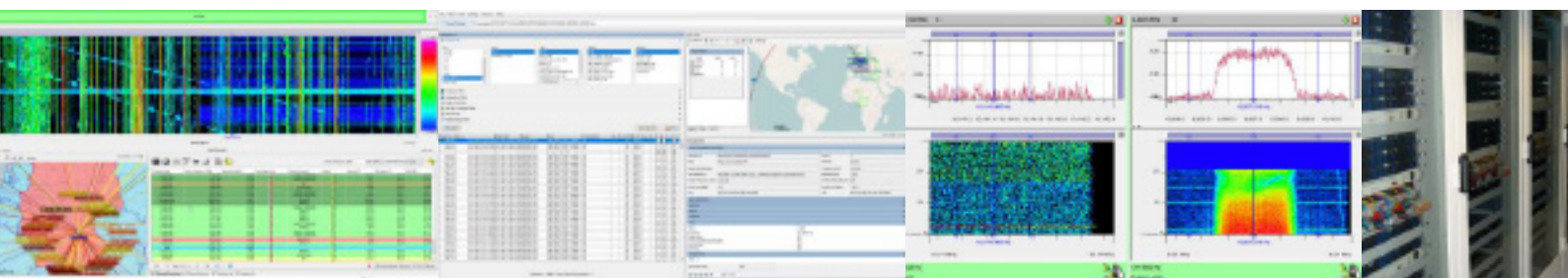
SYSTEM DETAILS

The system consists of sensor stations in different regions of interest. They can be connected to each other or to a central control station.

All sensor locations are equipped with DF sensors, with directed or omni-directional antennas. For every signal, the direction is determined. Depending on the mission planning, the incoming signals are prioritized for further processing. ADBF is used for the reduction of co-channel interferences, see graph below.

For geo-location applications, additional auxiliary DF stations can be installed in appropriate places to provide geo-location by means of triangulation.

FEATURES

The complete system is based on wideband technology for both monitoring and direction finding.

- HF frequency range
- Automated intercept of signals
- Direction finding and geo-location
- Sensor network including communication among sensors and the headquarter
- Different display functions for emitter display (polar, spectral, lists, map)
- Listen-in function to received signals
- Tracking of emitters over time including visualisation
- Combining of messages from different sensors to obtain the best restored signal
- Fusion of signal information to extract more knowledge (option)
- Fully automated signal detection, classification, demodulation and decoding of more than 200 analogue and digital transmission modes, easy integration of customer developed modes possible
- Comprehensive online and offline analysis
- Offline analysis provides knowledge to be used in libraries for continuous improvement of performance
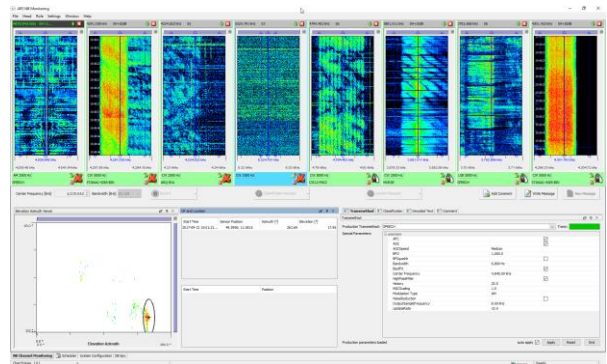
- Signal preview to get a quick picture of the analysed signals to support fast manual analysis
- High system availability by fail-over function for central stations and sensors
- Intuitive health monitoring and BITE.

TECHNICAL DATA

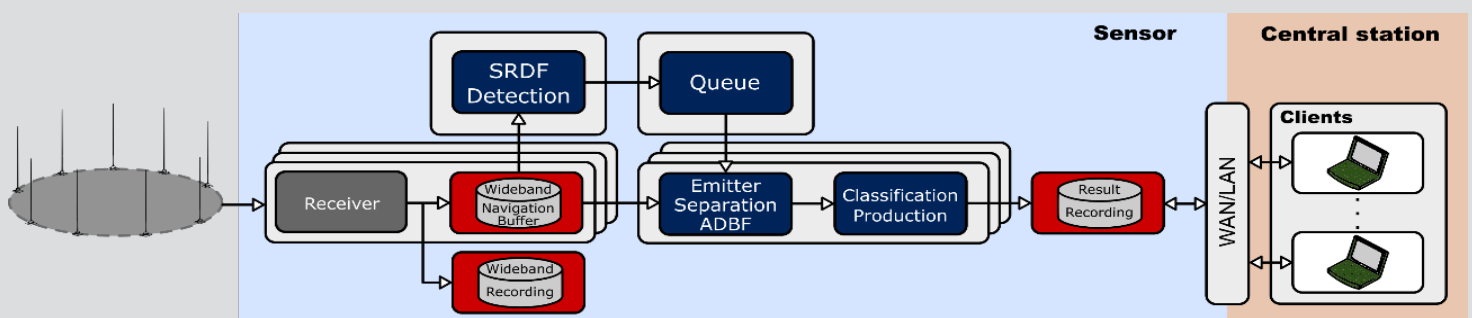Frequency range (higher ranges upon request):

- Monitoring / DF: 9 kHz to 30 MHz
- 30 MHz instantaneous bandwidth

Communication between the sensors and the central station: CFE (customer furnished equipment) or secure data tunnelling, long-haul wireless, or VSAT communication depending on distances and requirements.

EXTENSIONS

The system can be extended to provide more functionality with

- Information fusion system to evaluate more details on the received and processed signals, e. g. for statistics on appearance of special signals, signal types, and emitters
- Detailed signal analysis for the analysis of unidentified (UI) signals for understanding the signals and for establishing new demodulators and decoders to keep the system up to date.