COMINT & C-ESM
INFORMATION FUSION





WHY COMMUNICATION INTELLIGENCE

The use of Communication Intelligence (COMINT) and Communications Electronic Support Measures (C-ESM) enables any platform or fixed installation with the capability of reconnaissance and surveillance of radio communication signals. Saab Sensor Systems Germany provides solutions for the complete field with an experience of more than 30 years.

THERE ARE TWO MAIN APPLICATIONS:

Strategic COMINT: possible results are the determination of the emitter position (geo-location), technical meta data, the analysis of the complete wideband spectrum and the analysis of the content of the radio signals. These results can be fed into an information fusion system. COMINT is mandatory to collect, analyse and prepare information for the automated C-ESM routine.

Tactical C-ESM: the system supports and contributes to situational awareness. Radio emitters can be detected, identified and tracked, geo-located and are displayed in a situational picture. C-ESM is using basic COMINT knowledge to perform its situational awareness contribution near real-time and high reliability to identify radios, platforms and weapon systems as well where the emissions come from.

THE WAY OF WORKING

COMINT and C-ESM can be used in land-based (e.g. fixed installations, trucks, shelters, cars), naval (vessels, submarines), as well as airborne applications (AEW&C, SIGINT aircraft, MPAs). One or more antennas, receivers, processing hardware, and software are required. Work places can be added for interactive operation of the system, both remote or at central stations.

All emitters in the radio theatre send out emissions. They are captured by the antenna and receivers. They are then displayed in a wideband spectrum, e.g. HF, VUHF, SHF, or the entire band. The signals can be analysed according to the direction from which they came, the geo-location of the emitter, other meta data or to its content. Wherever possible, the signals are automatically processed. Human interaction can take place at any time. Especially for the detailed analysis of unidentified signals, signal experts are recommended.

The systems can work at different locations simultaneously in order to be able to perform high quality interception of signals along e.g. a long border or coastline via remote control.

Fusion systems can be added (or used alone) to gather information from different sensors and information sources, e.g. like radio, satellites, cable and internet. Content of different types can be processed like text, speech, IP traffic, pictures and video. The typical results of information and intelligence systems are to provide high-level and specific reports, visualisations of communication networks and relations of persons and objects.

A training centre completes the offer. All situations and functionalities can be simulated and trained in a reproducible environment. Additionally, cost effectiveness is provided by reducing the reliance on platforms like aircrafts or submarines for training purposes.

COMINT AND C-ESM APPLICATIONS

The user needs can be fulfilled with more general approaches and with specially focused applications. Our systems support intercept, analysis, processing, geo-locating of analogue and digitally modulated signals. We consider LPD and LPI signals like frequency hoppers as signals of interest.

SITUATIONAL AWARENESS OF THE SURROUNDINGS

This application provides an analysis of signals in a certain area. After a first or detailed analysis of the situation, a warning function provides threat information or abnormalities. This is typically used by military forces in a mission.

AUTOMATED ANALYSIS OF THE RADIO THEATRE

The goal is to obtain a picture of the complete radio spectrum. This is especially useful for intelligence agencies. All signals in the requested wideband are detected, geo-located, classified and demodulated. Wherever possible, this is done automatically. Detailed mission planning guarantees that the important signals are detected and processed. The result is a data base containing all demodulated signals and reports for each signal.

EMITTER GEO-LOCATION IN URBAN SCENARIOS

The semi-mobile and mobile geo-location of (mobile) emitters in urban or hilly scenario supports the security at large-scale events like Olympic Games, world championships or other large public gatherings and also supports finding illegal operation of communication transmitters like VSAT terminals.

EVALUATION IN BIG DATA SCENARIOS

Information from different sources (e.g. COMINT, ELINT, HUMINT, IP, OPTINT) is stored in a unified data model and can be processed automatically and/or manually for high-level reporting. Search can be based on any type of meta data.

DETECTION OF FAKE EMISSIONS

The detection of fake emissions, (i.e. a difference in the sent signal and the real identity and position of vessels and aircrafts) can be performed by COMINT technology. Comparing the position information from direction finding with the one reported in the signal exposes the faked identities and leads to a warning function (AIS, ADS-B signals).

NAVAL AND AIR COMMUNICATION

AM, FM, and ACARS (in VHF) signals are detected, processed and recorded from the civil air, military air and naval communication. A few hundred signals can be recorded per hour.

FIGHT AGAINST TERRORISM

Fusing information from different databases and sources helps with fusion of intelligence and providing network and relationship management including visualisation.

DETECTION OF UNIDENTIFIED (UI) SIGNALS

The goal of this application is to detect signals that are new to the current radio theatre. The system displays those signals which cannot be processed using standard means. These UI signals are fed to a database and can be manually analysed (offline).


COMINT & C-ESM FEATURES

With the modular and flexible design of Saab Sensor Systems Germany systems based on our SDIA® concept (Software Defined Intelligence Architecture), the solutions can have the following features.

MONITORING

The complete surveillance of the frequency band of interest is provided. Both automated and manual processing is possible. As a result, both the wideband spectrum and the narrowband signals can be analysed and stored. Listening-In functionality is provided. The classification results can be compared to knowledge databases.

ADBF (adaptive digital beam forming) can be used for increased sensitivity, suppression of unwanted signals, and disambiguation of signals.

DIRECTION FINDING

The direction of the emitter with respect to the sensor is determined both in manual and automated processing. Wideband signals are used to get the complete coverage of the radio theatre. This technology uses the AoA approach (angle-of-arrival).

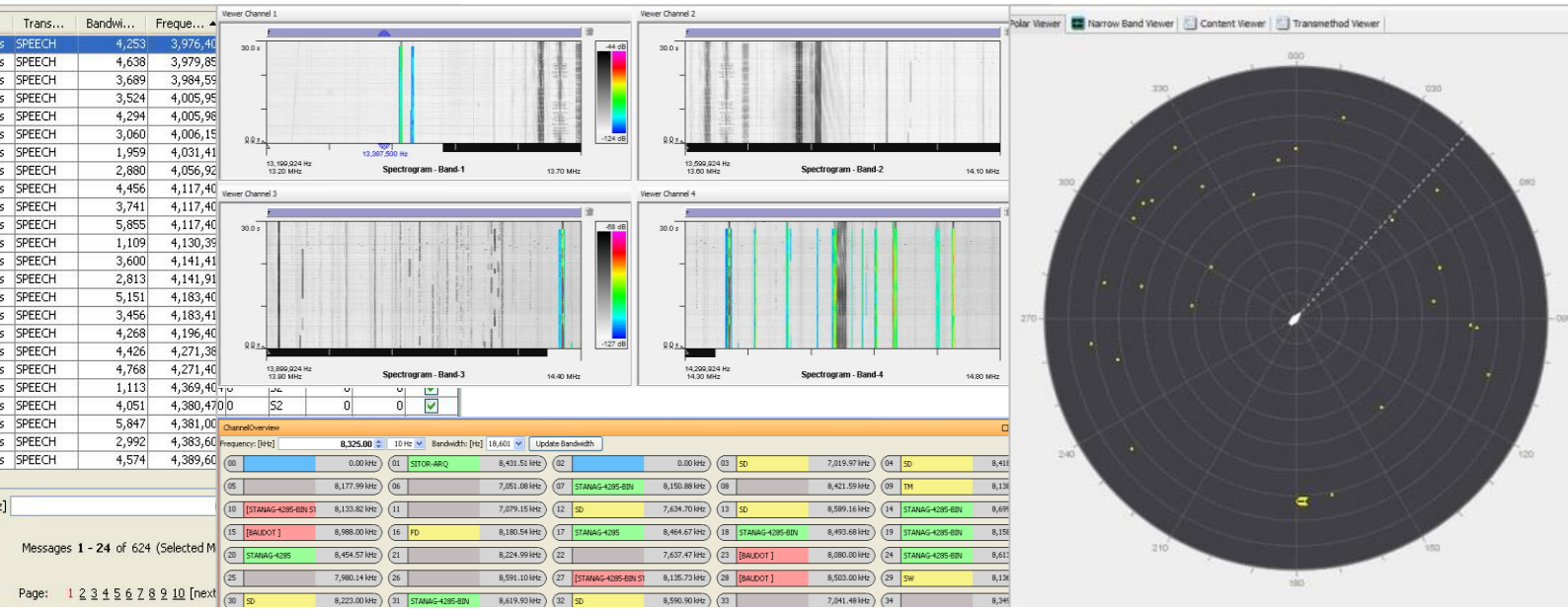
We offer SRDF (super resolution direction finding) for even better reliability through improved capability in handling co-channel interference.

GEO-LOCATION

We offer three technologies to determine the geo-position of emitters: AoA (angle-of-arrival), TDoA (time-difference-of-arrival), and a very new hybrid technology combining the best of both approaches.

SIGNAL ANALYSIS

A sophisticated tool is available for the interactive analysis of unidentified (UI) signal types. UI signals can be analysed and characterised according to their technical characteristics. With known parameters, new demodulators and decoders can be developed for future automated processing of radio signals.



MISSION PLANNING

For all missions, a mission plan can be set up. This includes the time, direction of interest, and the amount of processing resources dedicated for a mission. A sophisticated role and access right management is provided.

SENSOR NETWORK MANAGEMENT

The sensors of larger systems are synchronized and accessed remotely. Resources and status can be controlled centrally, as well as software updates and upgrades can be conducted through remote sensor access.

INFORMATION & INTELLIGENCE FUSION

Any type of data can be entered into the fusion system. Automated and interactive processing is provided. By use of a unified data model, data coming from different sensors can be fused and evaluated.

REPORTING

High-level reports are produced for decision makers using all information and intelligence from the complete system. Visualisation of e.g. relation networks is provided.

AUTOMATED SPEECH CLASSIFICATION

Large amounts of detected audio signals are classified according to prevailing language and speaker. The system is trainable.

TRAINING CENTRE

Any of the applications can be used identically in the training centre for user training on both the product operation as well as on typical operational usage scenarios.

INTELLIGENCE & INFORMATION FUSION

Fusion of information is used for manifold applications like counter-terrorism, crime prevention, and visualisation of communication networks, cyber warfare and many more. Fusion of different kinds of data, information and intelligence is a challenge for many organizations.

UNIFIED DATA MODEL

Using this model, the prerequisite of a well-working information fusion system, all incoming data is stored in a common representation to be able to compare, match, and analyse information in one common database. This approach is very useful for big data applications.

AUTOMATED PROCESSING

A workflow guarantees standardized processes and unified storing of information and intelligence. Automated processing allows for fast results and support for human operators.

UNAMBIGUOUS DEFINITION OF RESPONSIBILITY

Access to processes and data is based on access rights and responsibilities. During the configuration of workflows these rights are assigned and can be verified at all times.

REPRODUCIBILITY OF RESULTS

Using automated processing and standardized workflows, all results are reproducible and can be tracked according to time, user, and processing algorithm.

ELABORATED SEARCH & FIND

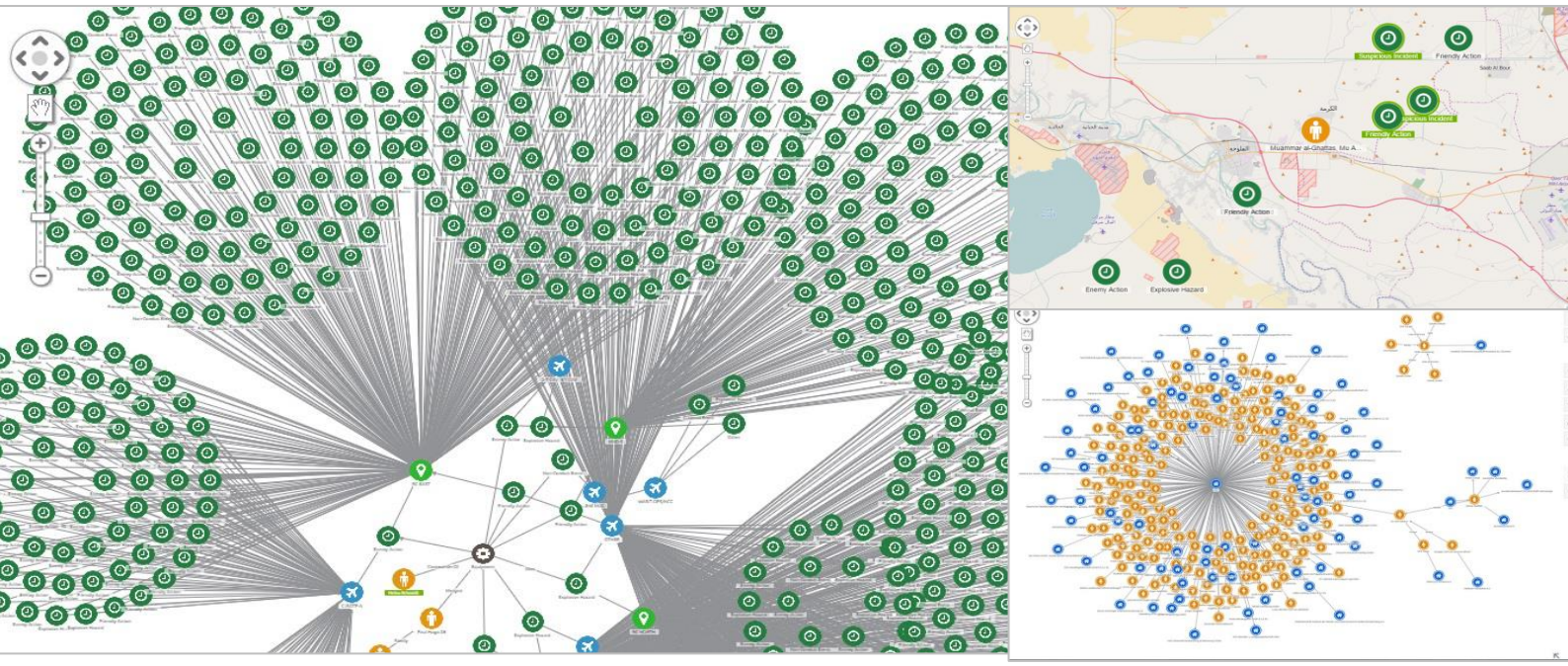
All meta data and signals are incorporated in the realisation of the search algorithm providing optimal results.

NETWORK AND RELATIONSHIP VISUALISATION

The relations between entities as well as the data itself can be visualised according to different focus, e.g. on a map or based on entities.

HIGH-LEVEL REPORTS

For strategic analysis, decision makers are provided with high-level reports according to their tasks and missions. The link to raw data is provided at any time to perform detailed analysis.



PRODUCTS

Depending on the application and requirements, we configure the system based on our modular products and solutions. All our solutions are based on our flexible software concept SDIA®. This architecture supports tailoring the system with respect to the number of workplaces, signal volume, analysis capabilities etc. The same system architecture can be realised on different hardware, ranging from a notebook installation to a large server farm based system.

ARS
STRATEGIC LARGE SCALE SOLUTION

For strategic applications, it covers automated detection of signals in the wideband spectrum, classification, decoding and demodulation as well as further post-processing to the generation of reports. This system is widely used for automation of routine tasks as well as for identification of abnormalities (new emissions).

Direction finding and geo-location is also in the scope of this product.

Distributed realisations are available for a complete coverage.

CRS
TACTICAL MOBILE SOLUTION

For tactical applications, automated or manual monitoring, direction finding, and geo-location of radio emitters are realised. One objective is the generation of situation pictures, e.g. by map visualisation or with an interface to C2 systems.

This system is aimed especially at light-weight and semi-mobile applications, e.g. vehicle / shelter based, vessels and submarines.

IFS
INFORMATION FUSION SYSTEM

A large variety of sensors can be integrated to this system. A set of data processing algorithms are offered. It can also be used within big data applications.

SIPAC
SPEECH AND DATA PROCESSING

Automated processing of data like speech, text, and images is provided with this system, putting the meta data in a unified data model.

A training environment for speech classifiers (e.g. speaker, language) is provided.

CCI
ONLINE AND OFFLINE ANALYSIS

For smaller semi-mobile and mobile applications we have a transportable solution for mainly interactive radio surveillance and signal analysis, supporting wideband and narrowband recording, analysis and processing.

OC-6040
SIGNAL ANALYSIS

This workplace solution supports the interactive analysis of radio signals, especially for new and unidentified signal types.

OUR EXPERTISE

Saab Sensor Systems Germany has an installed customer base in more than 30 countries in a wide variety of system sizes ranging from software delivery only to truck integrated systems for platoons and companies. We are proud of delivering high quality solutions and good services.

HIGH-TECHNOLOGY

Our focus is to be on the edge of technology. We consider ourselves the technology leader in many fields, also as a result of cooperations with universities and research institutes.

MARKETS

We successfully serve the international military market, especially naval and land-based applications. In intelligence services, we also have a large installed customer base in the world-wide market.

PLATFORMS

Our systems are installed on a large variety of platforms. We provide fixed installations for office environments as well as semi-mobile and mobile solutions integrated in shelters, trucks and cars. Installations for special environmental conditions are integrated for example in submarines and surface ships.

TRAINING & SERVICE

We support the operators with detailed training on the product and application.
Our support and service is esteemed by our customers.

TECHNOLOGY TRANSFER

We are open to international cooperation and have realized technology transfer projects.

Saab Sensor Systems Germany GmbH

Marienbergstr. 96 | 90411 Nuremberg | Germany
+49 911 47725 001
s3g-marketing@saabgroup.com | www.saab.com