Electronic Warfare: COMINT + COMMS/ESM
Intelligence Generation & Fusion Systems

MEDAV

MEDAV GmbH
Graefenberger Strasse 32-34
D-91080 Uttenreuth

Homburger Platz 3
D-98693 Ilmenau

Phone   +49 (0) 9131 - 583 - 0
Fax   +49 (0) 9131 - 583 - 11
Internet www.medav.de
Email   info@medav.de

Status 2009

- Established in 1982

- Employees: 75 approx.

- Turnover: 14 Mio Euro approx.

- Export share: 60 % approx.

- Head quarter: Uttenreuth/Nuremberg
  Facility: Ilmenau (Germany)

Markets addressed

- COMINT, COMMS/ESM

- Intelligence Fusion

- Radio measurement technology

- Speech technology

- Industrial & Automotive Solutions

www.medav.de

HOME **BENEF** **EW** **FORCES** **INTEL** **EXT**

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```
                    EW / IW
            Electronic / Information Warfare

         SIGINT                      ESM
    Signal Intelligence      Electronic Support Measure

  COMINT        ELINT      COMMS /       RADAR
             Electronic     ESM           ESM
Communication Intelligence Communications  Radar
Intelligence              Electronic    Electronic
                          Support       Support
                          Measures      Measures

  MEDAV                    MEDAV
```

Modern Electronic Warfare Systems may address:

- SIGINT: Intelligence gathering and reconnaissance
- ESM: Platform protection and surveillance

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Systems

Solutions
(Workplace Products)

ComCat
Buildings Blocks
(Hardware / Software)
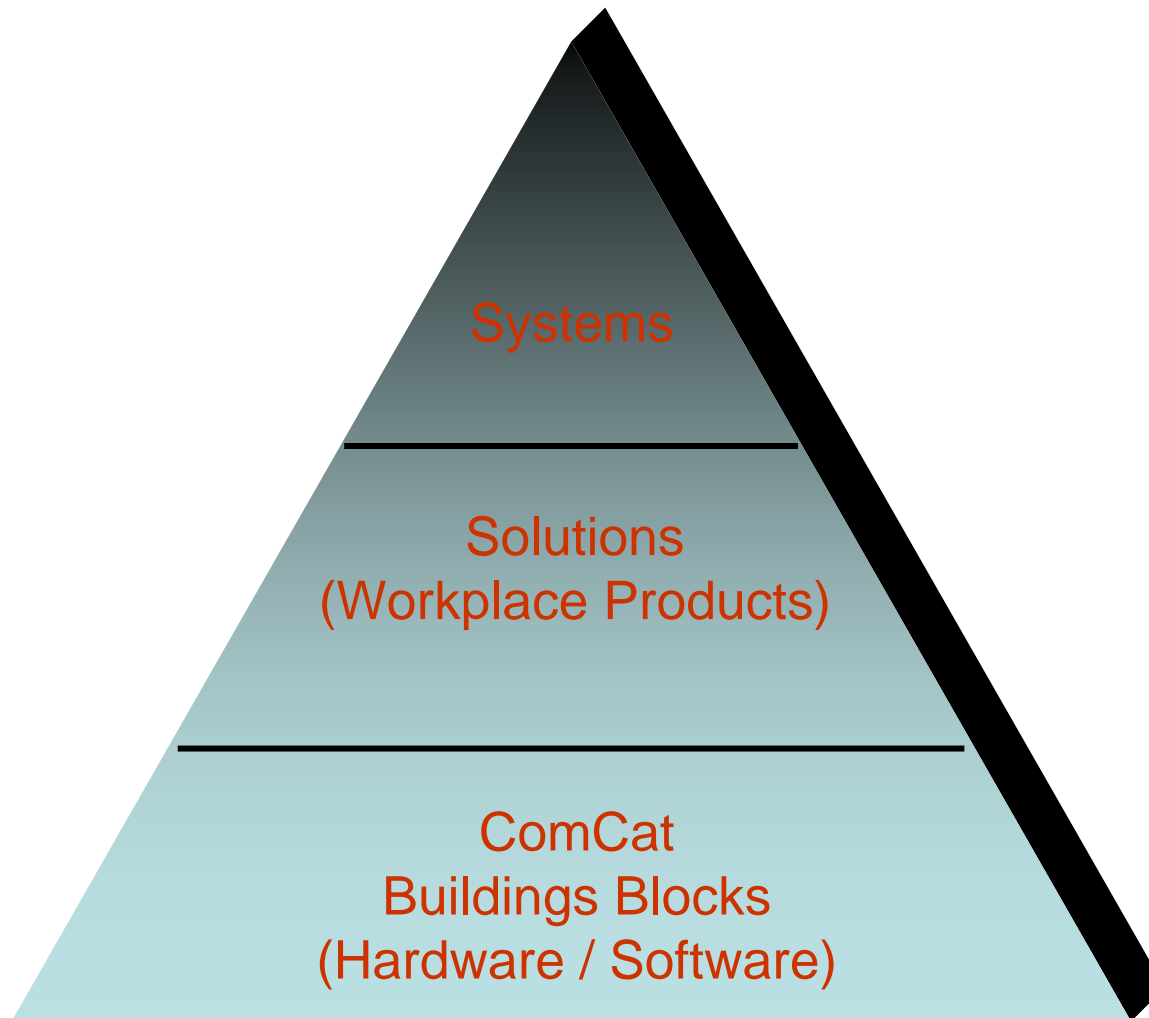
ARS-8000, TRS-8000

CRS-8000, CRS-8011

ATR-8000

PMS-8000

IFS-8000

MIRA

ASTRID-NG

MoRiS

SIPAC

CCI-Online, CCI-Online-df,
CCI-Online-Robot

CCI-Offline

ReProS

Virtual Devices

OC-6040

MELANIE

ComCat-Tuner, LAN-Receiver

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Benefits of

MEDAV's EW system technology and some examples
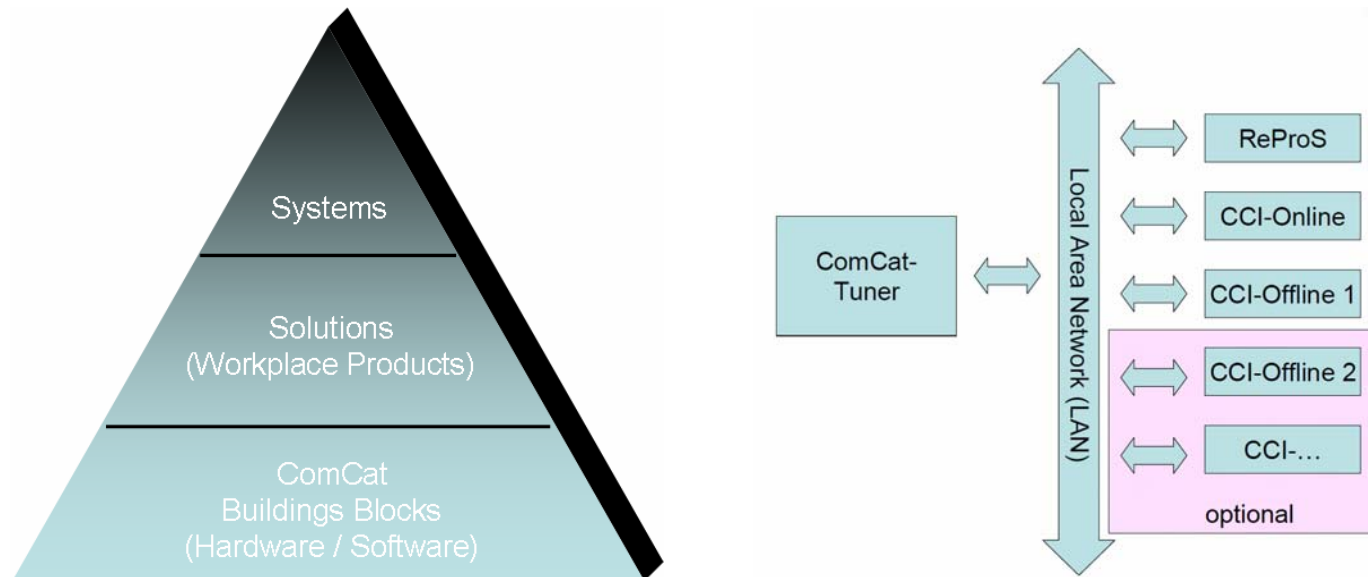
- ***Software oriented architecture*** (SOA) (similar to SDR software defined receiver)

  - Solutions & customised systems by the use of approved modules ("pyramid")
  - Flexibility through configuration files, no hardware towers
  - Virtual Devices (building blocks) include many configuration / scaling capabilities
  - Flexibility and supplier independency through commercial off-the-shelf (COTS) IT hardware/software and networking equipment (Windows, Linux)
  - Client-Server concepts, easy to extend to increase processing power

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- **_Wideband approach_** for intercept and direction finding

    - Wide band signals (e.g. frequency hoppers, OFDM)
    - Multi emitter, multi targets
    - Less hardware towers (narrow band receivers) through wideband receiver

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Benefits of MEDAV systems

- Designs for land vehicles, aircrafts, surface vessels, submarines, shelters

- Application programmable interfaces (API) for customer's programs

- Intensive training courses

- Tailored maintenance service (training, installation DVD, repair parts on stock, remote access, hot line, individual agreements)

Quality is that customers return, not the products!

Overview on

**Electronic Warfare -
COMINT and COMMS/ESM**

**products, solutions and
systems**

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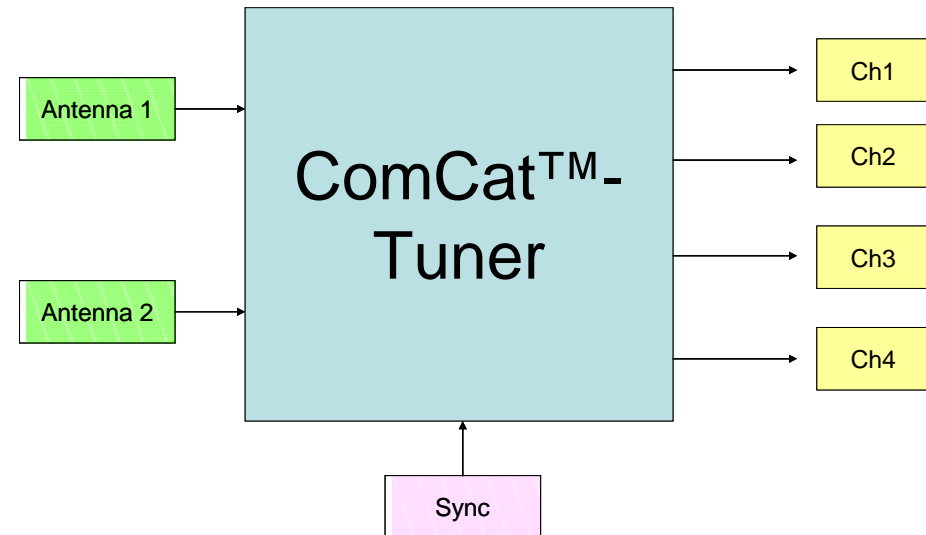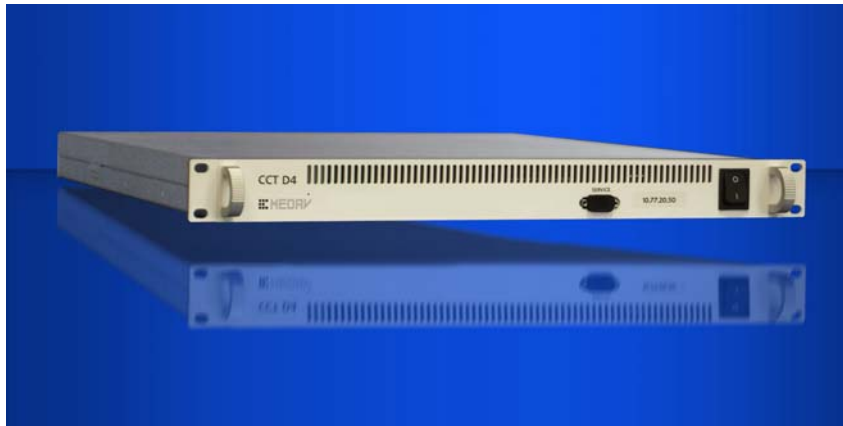
- HF/VHF/UHF; intercept 24 MHz max.

- Separate inputs for HF (antenna 1) and VUHF (antenna 2)

- 4 output channels Ch1 to Ch4, independent parameter settings (DDC), independent TCP/IP addresses (multicast possible)

- Selectable and in parallel output for each channel: CBB, CFFT, averaged PSD

- Synchronisation input, e.g. for direction finding systems

- Operation modes: fixed frequency, scan, mixed

- Standard and ruggedized versions available

Upgrades under development:

- **12 GHz frequ.range**

- **120 MHz bandwidth**

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HOME	BENEF	EW	FORCES	INTEL	EXT
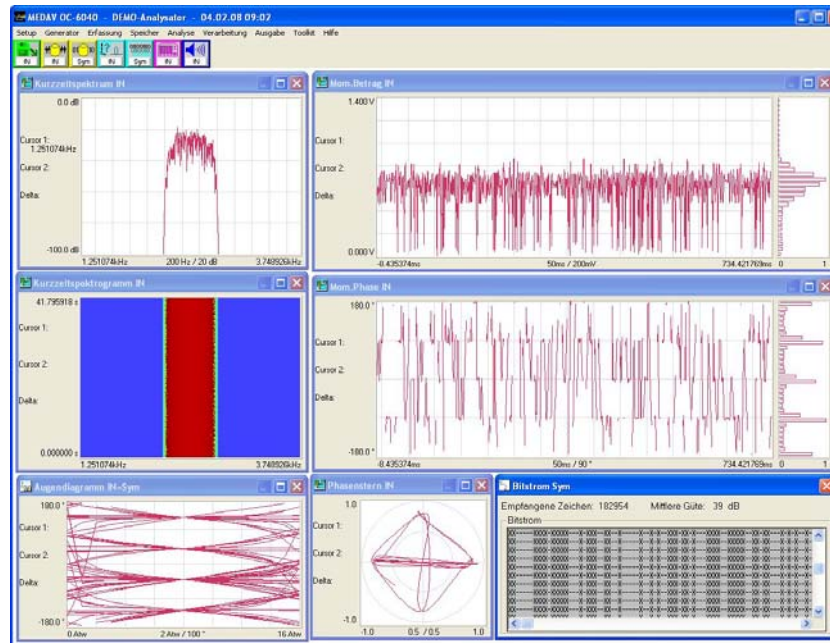
Technical analysis of unknown (non-encrypted) signals

- Online/offline analysis, interactive/automated analysis, demodulation & decoding, signal generator, …

- More than 200 methods for demodulation & decoding, e.g. OFDM, Pactor, Codan, Clover

- Free configurable, universal analyser for modulation types and transmission schemes

- Signal generator, HF channel simulator, ...

MIRA – HF/VUHF Wideband Analyser
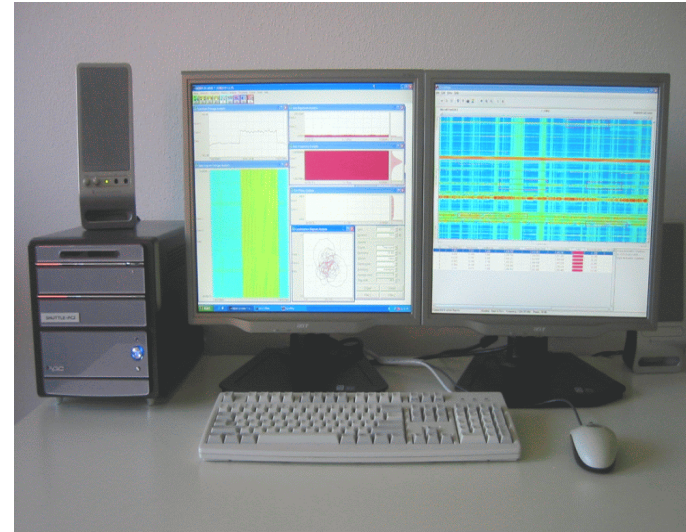
Work place for HF/VUHF analysis. Reconnaissance. Recording. Analysis.

- Up to 24 MHz surveillance bandwidth

- Up to 8 MHz recording capability

- Comprehensive online/offline analysis supported; OC-6040 incorporated

- Radio emitter detection by interactive analysis

- Content analysis of (non-encrypted) transmissions

ASTRID-NG – HF Wideband DF System
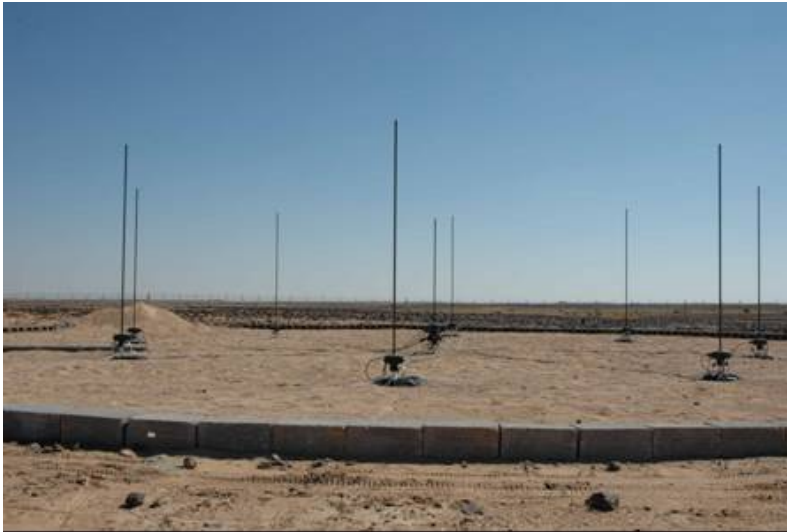
Work place for HF direction finding. Reconnaissance. Recording. Analysis.

- Up to 2 MHz real-time intercept bandwidth

- Up to 2 MHz recording bandwidth

- Comprehensive online/offline analysis supported; OC-6040 incorporated

- Radio emitter detection by interactive analysis

- Direction finding of emitters

- Content analysis of (non-encrypted) transmissions

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MoRiS – Automated Wideband Production

Automated HF/VUHF analysis. Reconnaissance. Recording. Production. Analysis.

- Up to 2 MHz surveillance / signal bandwidth
- Exploring a signal scenario from a safe distance through: deployable monitoring station(-s) & mobile basis station(-s) & data link (WLAN, DSL, GSM ...)
- Mission oriented & remote control

- Automated scan, detection, demodulation, decoding, production

- Production of 5 to 50 (typ.) transmission channels

- Suitable for office & vehicle-integrated; indoor / outdoor operation

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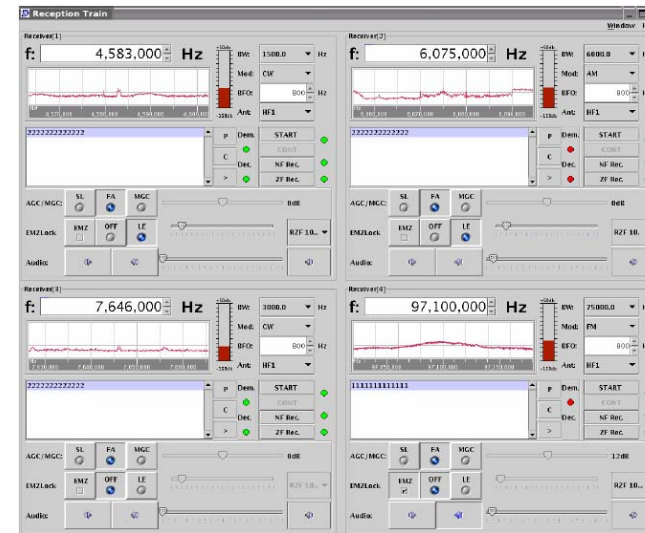
Telecommunication Reconnaissance System (TRS) for HF/VUHF
(analogue & digital demodulation & decoding)

- Interception of a limited number of emitters, demodulation, decoding

- Interface to DF systems

- Production of multiple transmission channels; 1 .. 4 channels per operator (typ.)

- Work flow oriented; roles for operators; messages & reports management

- Online & offline analysis of wide band & narrow band signals

- Suitable for office & vehicle-integrated operation

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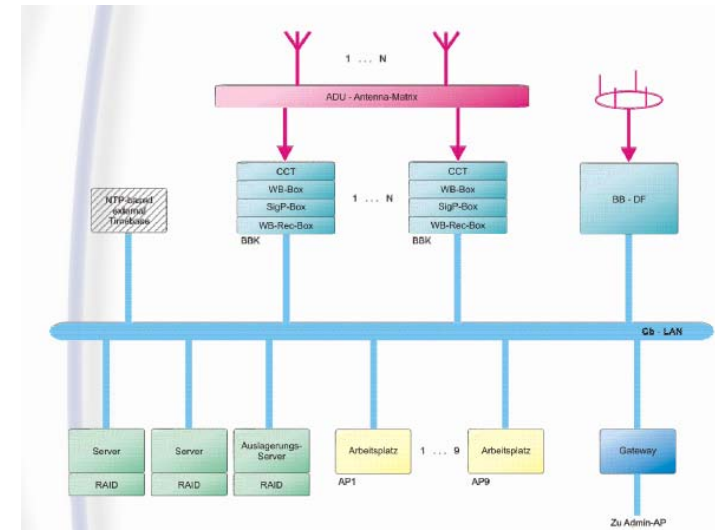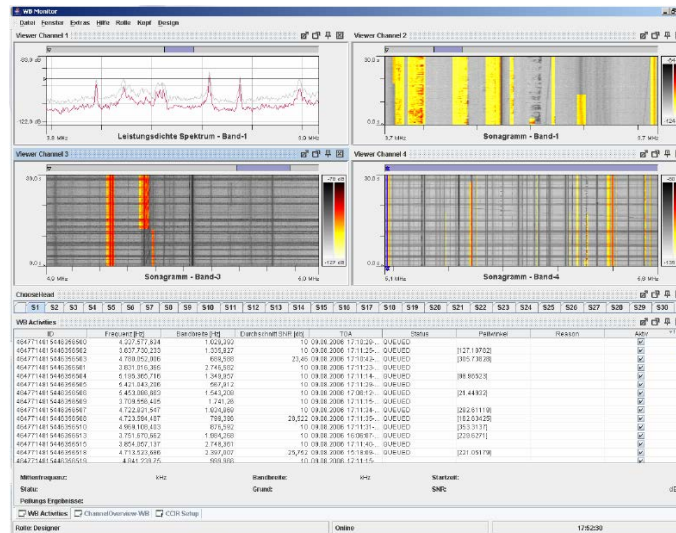
Automatic Reconnaissance System (ARS) for H/VUHF (analogue & digital dem & dec)

- Automated scan, detection, demodulation, decoding, production

- Interface to DF systems

- Production of 20 to 1000 (typ.) transmission channels;
  100 .. 150 channels per operator (typ.)

- Work flow oriented; roles for operators; automated reporting

- Online & offline analysis of wide band & narrow band signals

- Suitable for office & mobile platforms

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Dedicated platform solutions

for

**Electronic Warfare -
COMINT and COMMS/ESM**

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Photo: HDW

- Automated radio emitter detection & tracking (tactical ESM) for platform protection

- Automated & interactive radio emitter recording, detection, analysis (strategic COMINT)

- COMMS-ESM & COMINT solution. Wideband approach.
    - HF/VUHF direction finding; Watson Watt (HF), Interferometer (HF; VUHF)
    - Automated scan, production, demodulation, decoding
    - Work-flow oriented; roles for operators; multiple function console operated
    - Very compact system design, inclusive antennas

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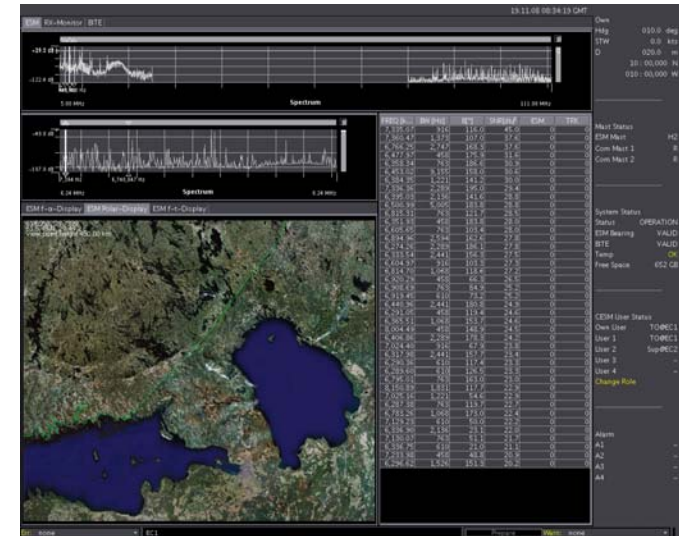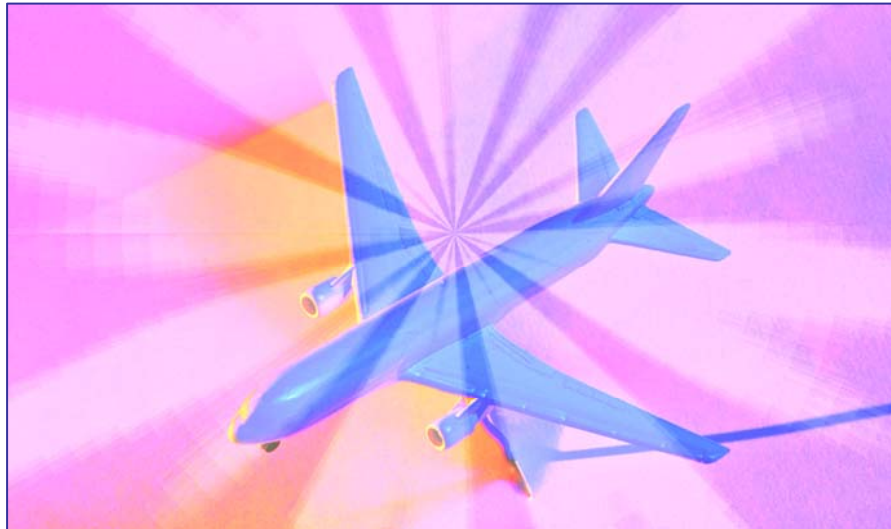
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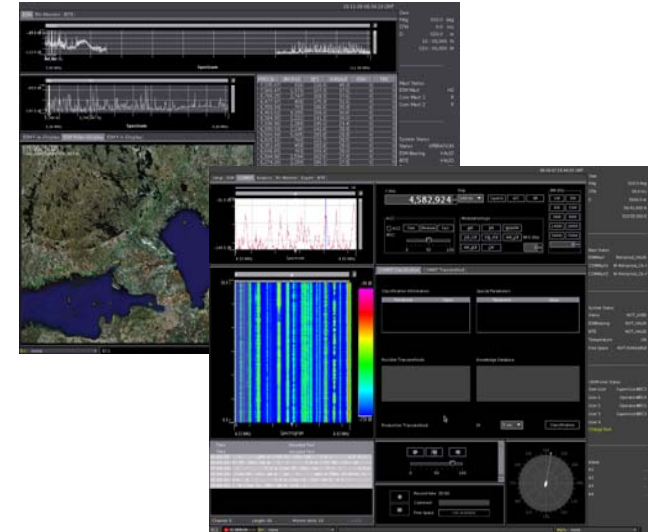| HOME | BENEF | EW | FORCES | INTEL | EXT |

Our offer:

- Automated & interactive radio emitter recording, detection, analysis (COMINT)

Status:

- Involvement in dedicated project inquiries

- Antenna placement studies conducted

- Hardware qualification required for tuners only

- Resource sharing with ELINT system (receivers, analysis, ...), communication ...

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Our offer:

- Automated radio emitter detection & tracking (tactical ESM) for platform protection

- Automated & interactive radio emitter recording, detection, analysis (COMINT)

Status:

- Involvement in dedicated project inquiries

- Supports military operations, also for squads

- Stationary, networks of distributed systems and mobile solutions available

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Overview on

intelligence related

**products, solutions and
systems**

MELANIE – Speech Analysis Modules
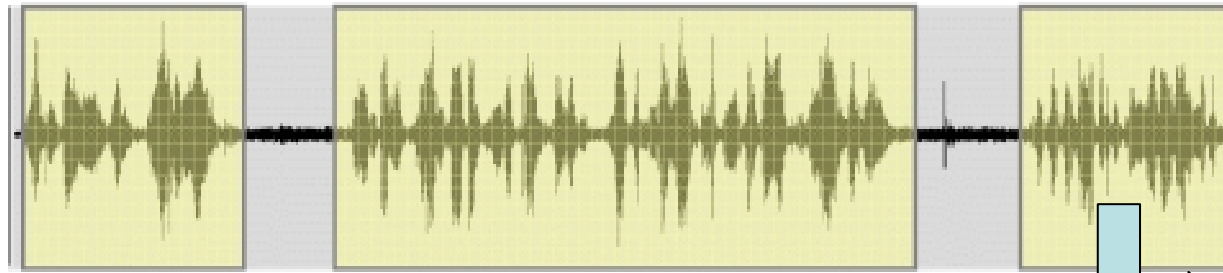
Content + Meta data
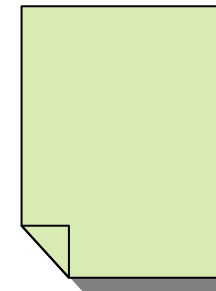
Rec Dec 1, 2007
WAV file
Speech
Male
English
"Afghanistan"

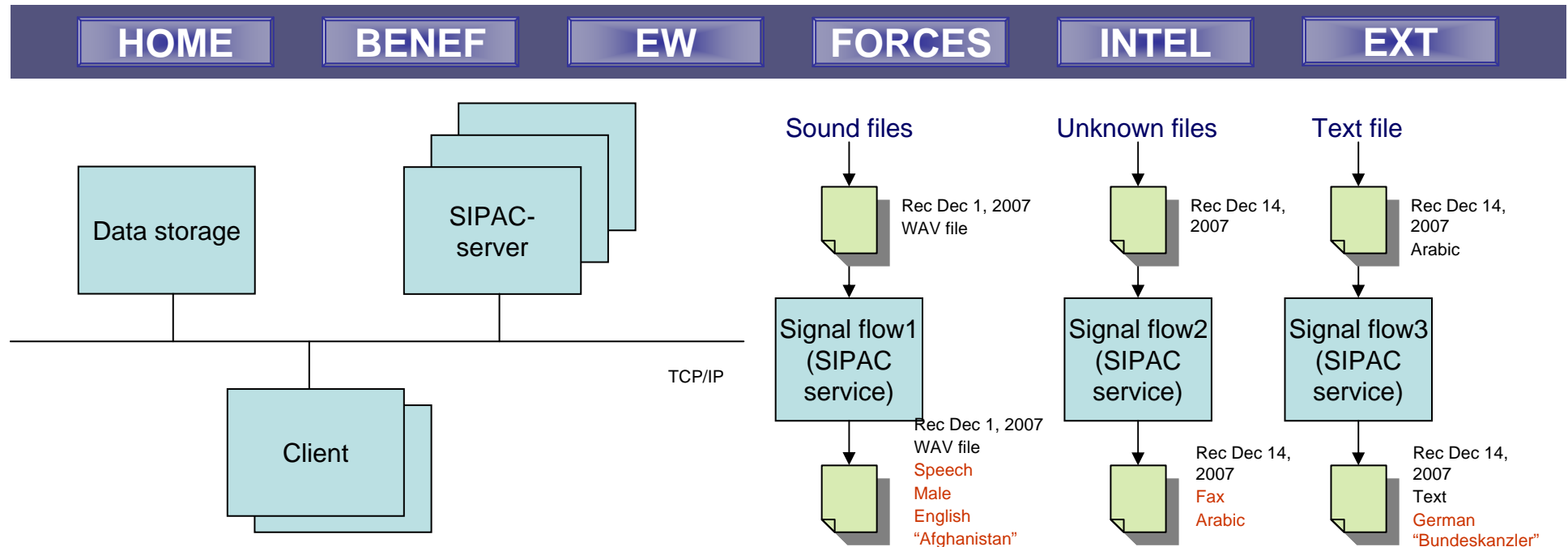**Speech & language processing system** by the use of **trainable** systems

- Content processing of speech signals by
    - Speech detection
    - Gender identification
    - Language recognition
    - Speaker identification
    - Topic spotting
    - Word spotting

    → Meta data generation

- Training environment

- JAVA-API interface

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SIPAC – Framework for Mass Data Proc.

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Data storage

SIPAC-server

Client

TCP/IP

Sound files
Rec Dec 1, 2007 WAV file

Signal flow1 (SIPAC service)

Rec Dec 1, 2007 WAV file
Speech
Male
English
"Afghanistan"

Unknown files
Rec Dec 14, 2007

Signal flow2 (SIPAC service)

Rec Dec 14, 2007
Fax
Arabic

Text file
Rec Dec 14, 2007 Arabic

Signal flow3 (SIPAC service)

Rec Dec 14, 2007
Text
German
"Bundeskanzler"

Framework for mass data processing and classification for content analysis purpose (content and meta data), operator-oriented or production

- Data storage for training data, trained models, signals, data, ...

- Clients for training (e.g. speech (MELANIE), text, pictures, videos), retrieval et al.

- SIPAC server for data processing with user definable configurable signal flows including branches (if – then – else)

- Comfortable HMI

- Open interface for customer's programs

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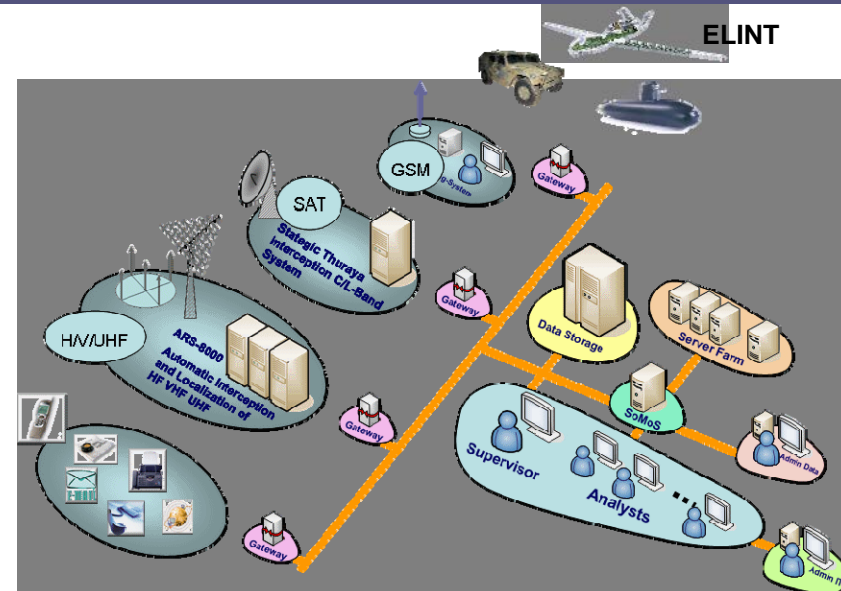
- Collection (selection) of data from different sensors ("sensor tasking")
- Data model consists of raw data and meta data (attributes)
- Automated added value through speech / text classification
- Automated mass data processing (speech, text, pictures, videos; translation)
- Work flow oriented; roles for operators
- Geographical & relationship representation
- Reporting tool (high level report)
- Open for third party products & customer's programs

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MEDAV

MEDAV - your expert partner for:

- COMINT
- COMMS/ESM
- Intelligence fusion

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91080 Uttenreuth, Germany

www.medav.de

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