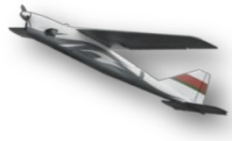
“FELIKS” SIGINT SYS Multifunctional Mobile System For Signal Intelligence

Designation

Search, detection, identification of type and nationality of radio-emitting sources (RES) installed on modern and perspective air, land, sea platforms, target positioning, as well as tracking of detected air targets taking into account transmissions of their onboard systems employing compact hardware & software SIGINT and ELINT modules installed on land and air reconnaissance means.

COMPOSITION

- Hardware SIGINT & C2 module (primary) on all-terrain wheeled chassis – 1 set;
- Support module in a trailer;
- Hardware SIGINT module (secondary) on all-terrain wheeled chassis – 2 sets;
- UAVs with SIGINT and ELINT payloads – 4 sets;
- Set of launching equipment;
- Set of communication and data links;
- Set of special software;
- SPTA set.



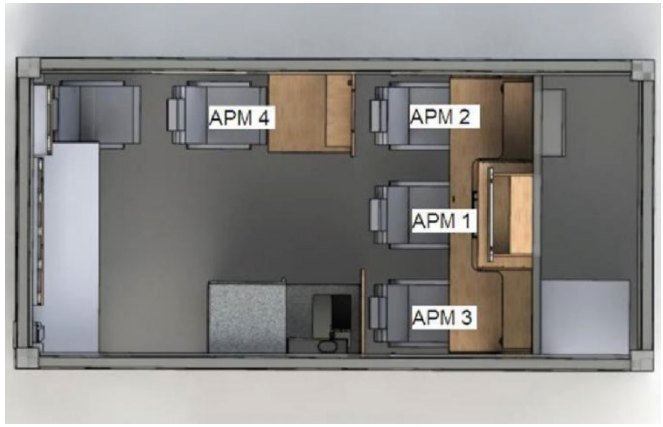
MAIN PERFORMANCE SPECS

ELINT performance by means of land platforms	
Working frequency band	1–18 GHz
Bandwidth of simultaneous analysis	400 MHz
Error of RES positioning by means of 3 modules	2–4 % of distance
COMINT performance by means of land platforms	
Working frequency band	30–3000 MHz
Bandwidth of simultaneous scanning	20 MHz
Number of simultaneously controlled frequencies	max 24
Error of RES positioning by means of 3 modules	2–4 % of distance
ELINT performance by means of UAVs	
Working frequency band	1–26 GHz
Bandwidth of simultaneous analysis	200 MHz
Error of RES positioning by means of 3 modules	max 100 m
COMINT performance by means of UAVs	
Working frequency band	30–3000 MHz
Bandwidth of simultaneous scanning	20 MHz
Error of RES positioning by means of 3 modules	max 100 m

KEY FEATURES

- Monitoring of emitting sources located at a considerable distance behind enemy lines that enables the user to monitor enemy air and land platforms simultaneously within the first and second tactical levels of enemy formation.
- Availability of ELINT UAVs enables the user to refocus the intelligence platforms promptly from one area to another and make deep maneuvers not changing the positions of land intelligence platforms.
- Monitoring of enemy SIGINT and ELINT platforms within wide frequency band from 30 MHz to 26 GHz; for this purpose, comprehensive analysis of signals is made to recognize the type and definite platform of RES to uncover the enemy intelligence.
- Monitoring of modern digital radio links (DMR etc.).
- Positioning and tracking of air targets sufficient for fire of friendly combat systems.
- High automation of functioning with minimum participation of human operators when a combat mission is performed.
- High reliability, low cost of operation, easy diagnostics system.
- Modular design that makes it easy to upgrade the system.
- Short period required to train qualified personnel to operate the system.

POSSIBLE LAYOUT OF AWS AND EQUIPMENT OF PRIMARY SIGINT & C2 HARDWARE MODULE



Top View
(Workstations Layout)

UAV Pods when Sys
in Travel Mode

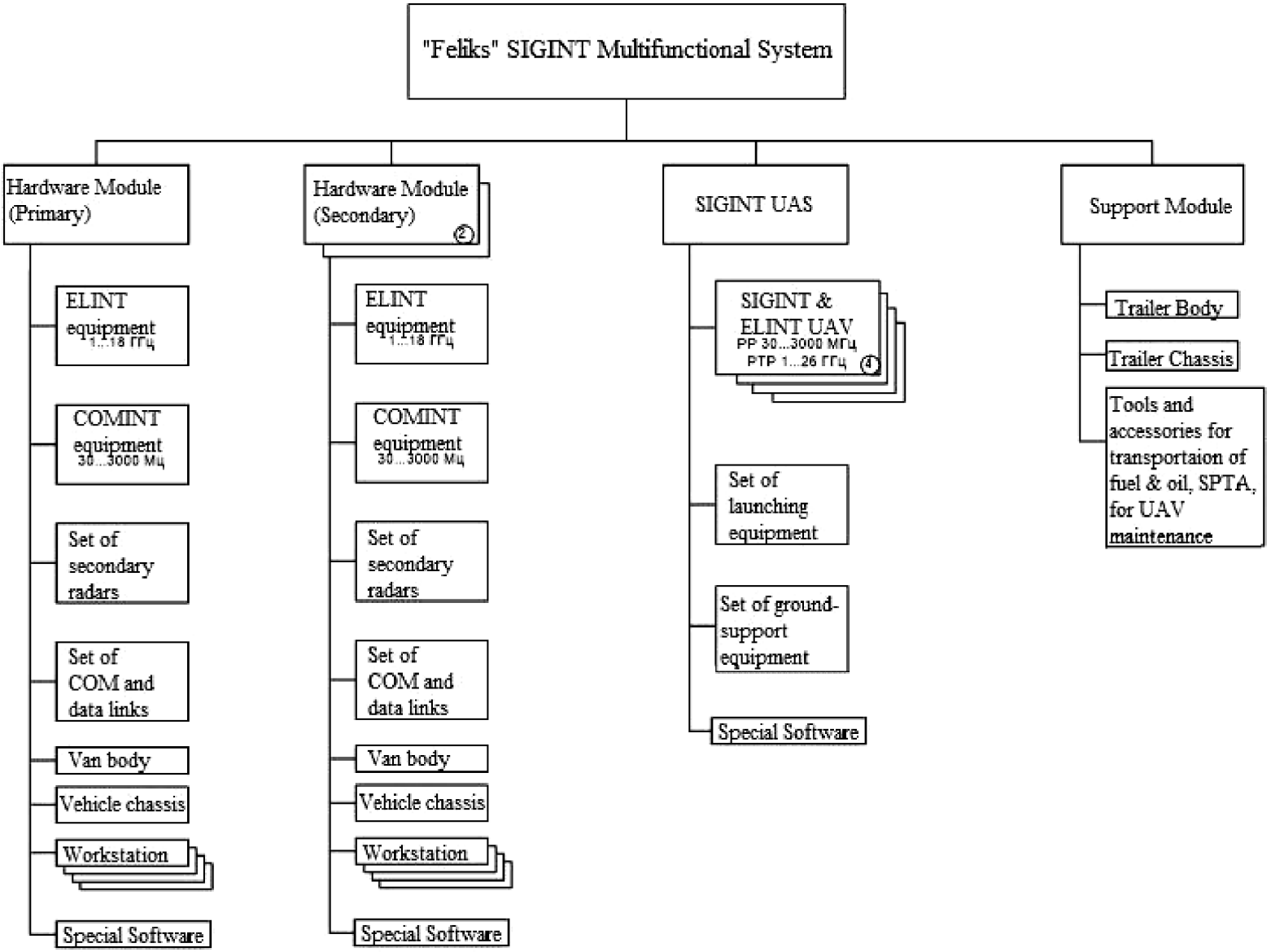
AWS-2
of COMINT
Operator

AWS-1
of UAV
Operator

AWS-3
of ELINT
Operator

AWS-4
for Data Processing and Communication

STRUCTURAL DIAGRAM



COMPOSITION OF SIGINT PAYLOAD OF SIGINT UAV

Set of hardware and software means for searching, receiving and processing of radio-emitting sources data to be installed on one UAV “Busel-10RER” includes:

- Hardware and software module for searching, receiving and processing the signals of SIGINT means within working frequency band 1 … 26 GHz “APM2-RTR” – 1 unit.
- Hardware and software module for searching, receiving and processing the radio-signals within working frequency band 30 … 3 000 MHz “APM2-RR” – 1 unit.
- Antenna to receive signals within frequency band L1 30 … 500 MHz – 1 unit.
- Antenna to receive signals within frequency band L2 500 …3 000 MHz – 1 unit.
- Navigation module “MN-2” – 1 unit.

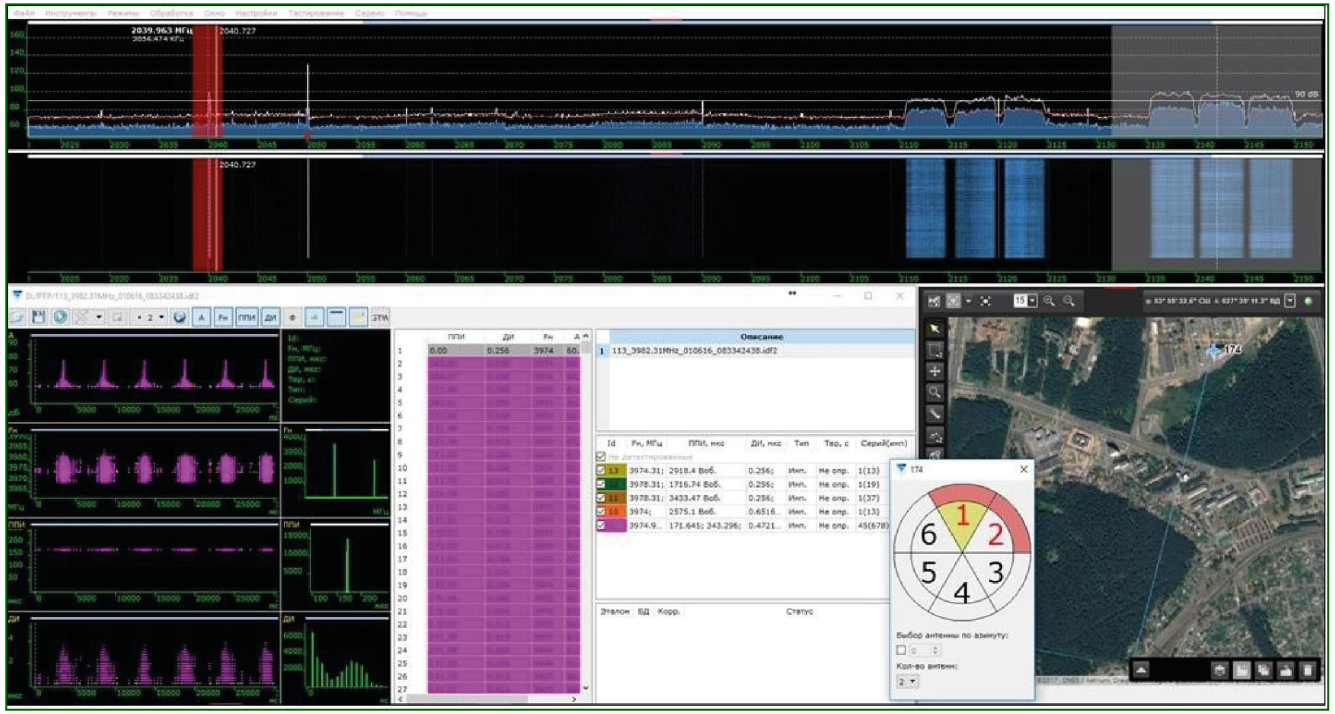
To control the payloads, we use special software intended to control hardware & software modules “A750” to be installed on all four AWS of ground control post.

Special software “A750” is unified and enables successive control over both hardware & software module “APM2-RTR” and “APM2-RR” from any AWS of ground control post.

PERFORMANCE SPECS OF SIGINT SYS (AIR COMINT AND ELINT BY UAV)

COMINT	
Working frequency band	30–3000 MHz
Surveillance range against low-power portable radio links (max 5 W)	max 170 km
Bandwidth of simultaneous analysis	20 MHz
Methods of RES positioning (by means of two and more UAVs)	multilateration and inverse synthetic-aperture
Simultaneous receiving of frequencies within survey bandwidth (DMR)	8
Error of radio links positioning (by means of two and more UAVs)	15...100 m
ELINT	
Working frequency band	1–26 GHz
Range of RES monitoring (depending on radar power)	max 450 km
Methods of RES positioning (by means of two and more UAVs)	multilateration
Bandwidth of simultaneous analysis	200 MHz
Range of measuring signal time parameters: - Pulse duration - Pulse interval	 0.05–1 000 ps 3.0–100 000 ps
Mean square error of measuring signal time parameters: - Pulse duration - Pulse interval	 0.05 ps 0.1 ps
Error of radio links positioning (by means of two and more UAVs)	15–100 m

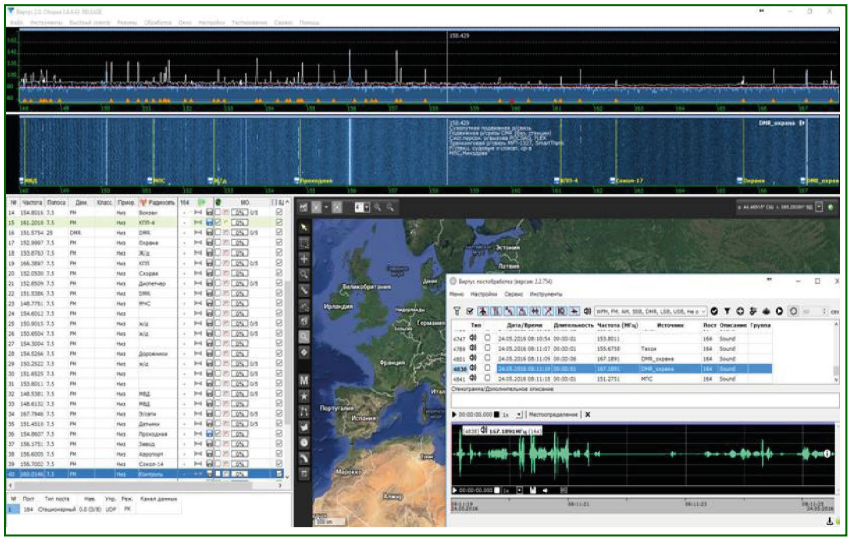
ELINT CAPABILITIES WITH SIGINT UAV



Special software of the ELINT workstation and the UAV's ELINT hardware can:

- Perform automatic and automated search and detection of signals, as well as measure their parameters; determine the type of modern and promising, ground and airborne radars, with continuous and impulse signal types and different time-frequency structure.
- Carry out logging and delayed processing of the database of ELINT sources and objects.
- Determine the location of radars with an accuracy of 15–100 m (by a group of two or more UAVs).

COMINT CAPABILITIES WITH SIGINT UAV

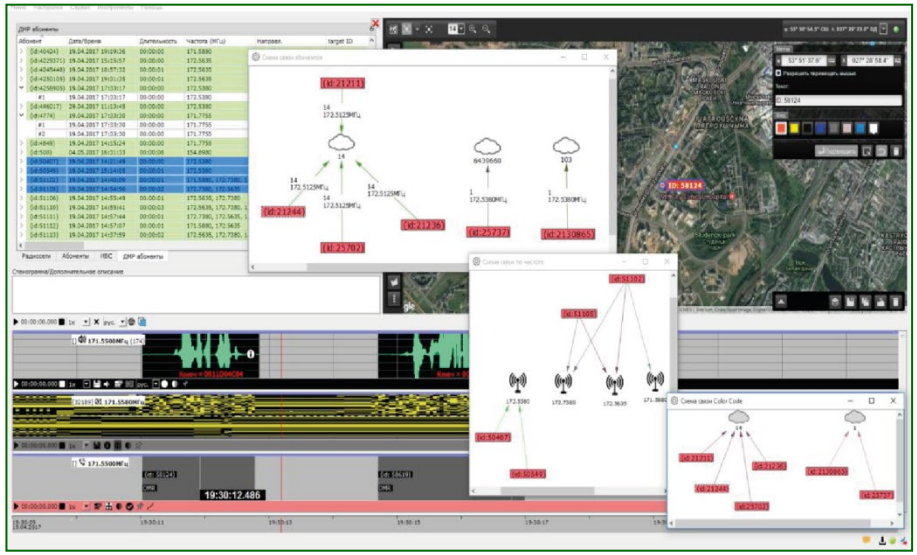


Special software of the COMINT workstation and the UAV's COMINT hardware can:

- Conduct panoramic spectral analysis throughout the entire working frequency band or separate sections at a speed of up to 2 GHz/s in a severe electromagnetic environment, with a capability to display different spectrum types (instantaneous, average and maximum accumulated).
- Adapt to the current radio electronic environment by using restricted frequencies.

- Protocol the radio electronic environment in the analyzed frequency band by logging files of the time-frequency load in the radio band, using the "amplitude–frequency–time" coordinates. This is done over a long period of time with a reference to the post's location and absolute time at the moment of logging.
- Search for signals from radio sources in the frequency bands, set by the operator.
- Receive, demodulate and eavesdrop on open radio-telephone channels of analog and digital communication systems (AM, FM, WFM, USB, LSB, DMR and APCO25).
- Perform automatic search for active radio channels and save the list of detected frequencies.
- Log the results of radio monitoring in the database, as well as view and process data in it..

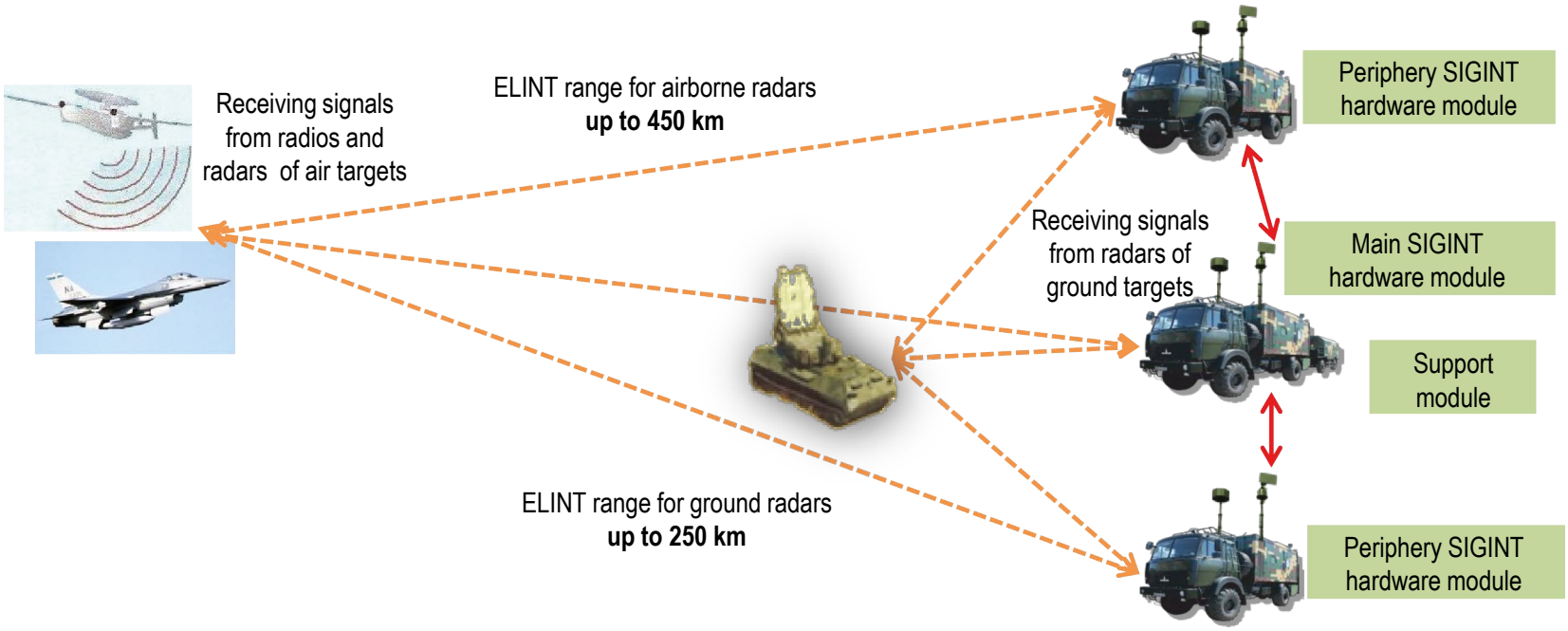
KEY CAPABILITIES OF WORKING WITH DATABASE



- Select, display and sort data, using a set of conditions (filters).
- Automatically play the records one by one.
- Display the position-finding results on the map and build tracks of mobile objects.
- Plot the sources, objects and areas on the map and save it as a user file.
- Export/import logs from the database in the form of separate files of a relevant type.

- Carry out delayed demodulation of the bitstream with a set demodulator.
- Perform delayed processing of the bitstream with set lists of DMR keys (masks).
- Make scripts of the communication sessions and link the scripts to sound sessions.
- Conduct delayed processing of communication sessions, mark individual users there, assign codenames to them, perform their delayed position-finding, link the codenames with radio networks and then automatically generate logbooks of radio networks and users.
- Automatically build diagrams of digital communication links and save them as a separate file.

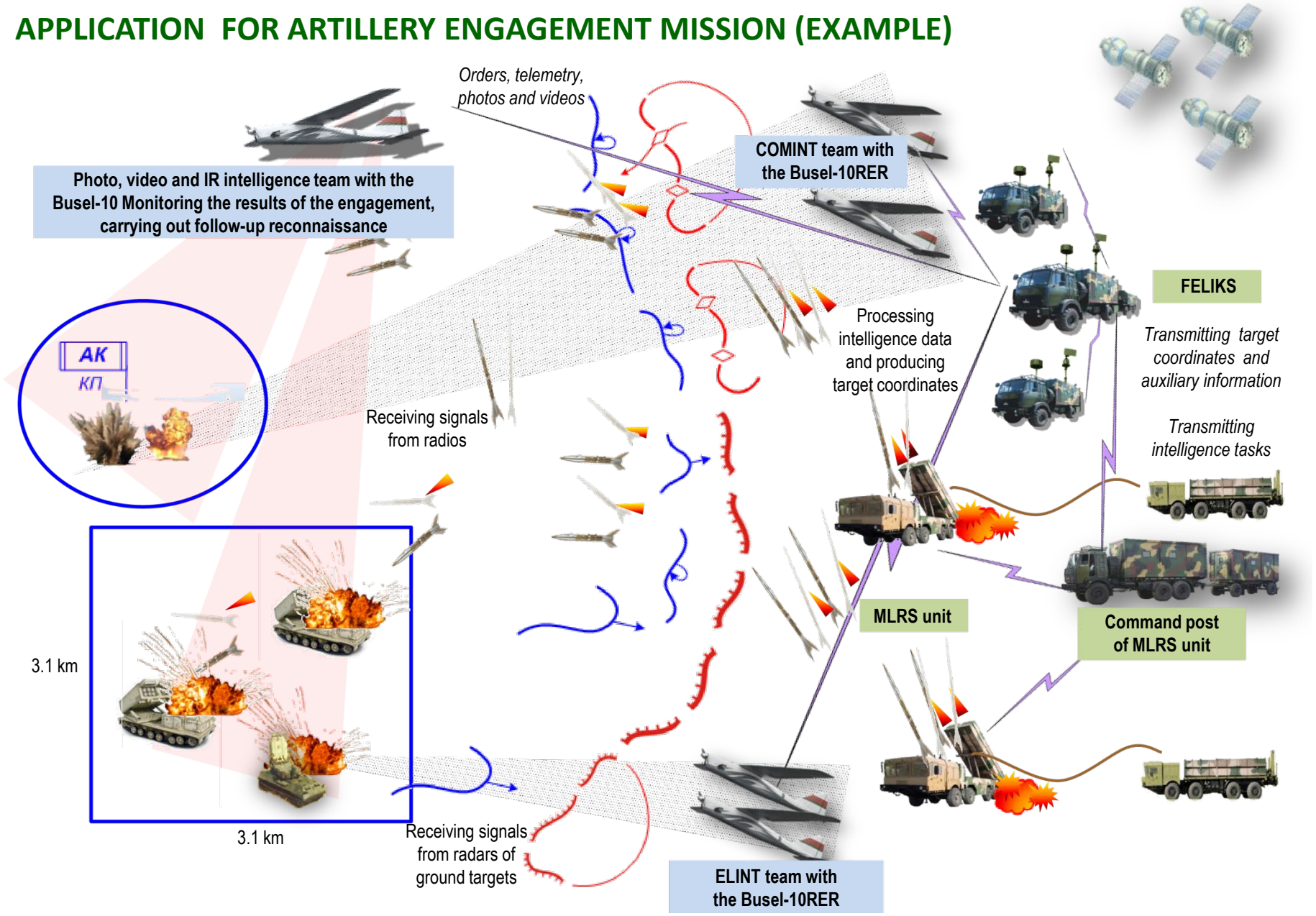
ELINT CAPABILITIES WITH GROUND ELINT POSTS



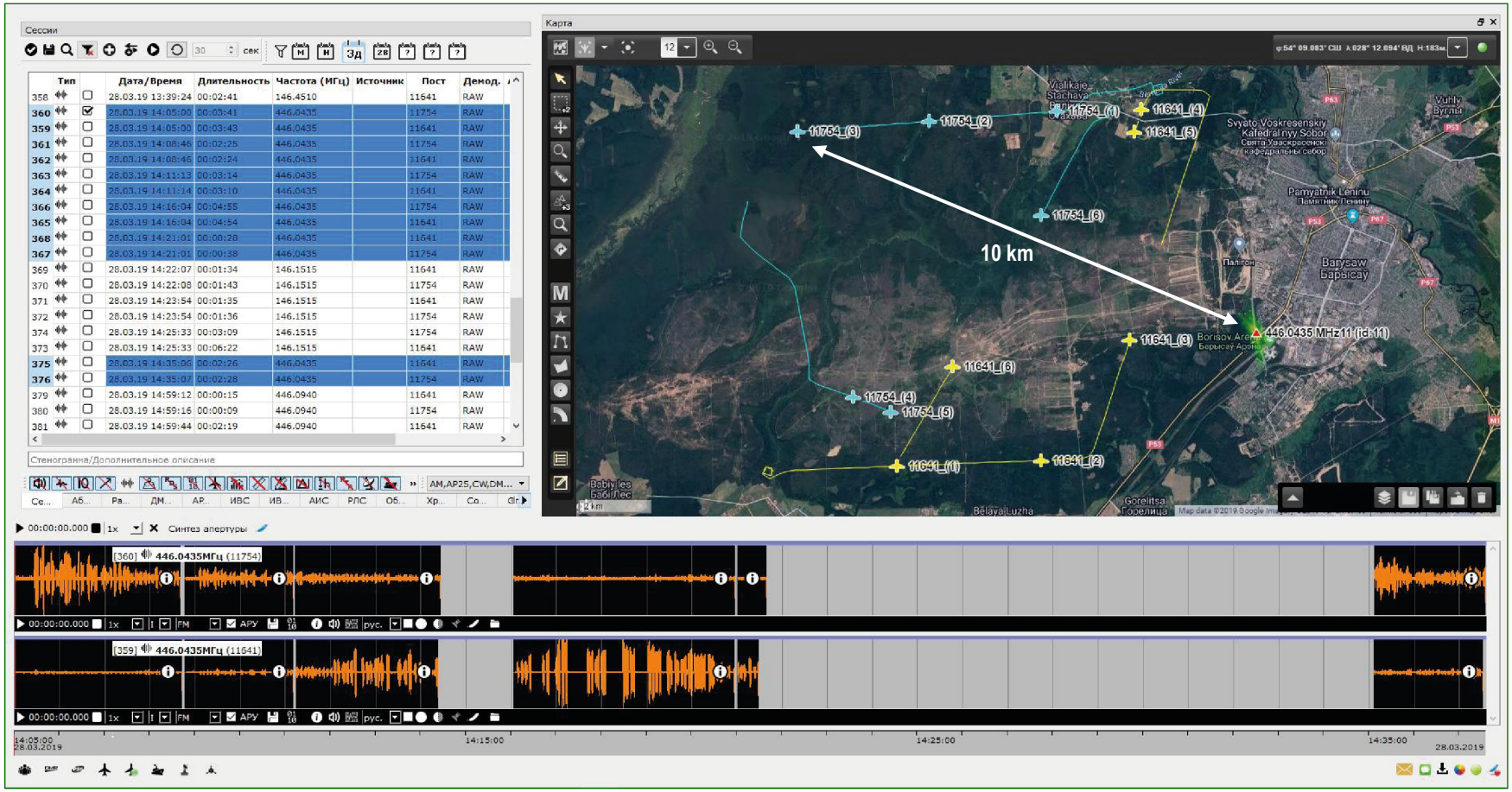
Using ELINT equipment from the SIGINT hardware modules (main and periphery ones), you can deploy three ELINT posts, two of which will be unmanned. You can then use them to search for and detect radars and determine their type, operating mode and identification. These can be radars, deployed at airfields, tactical aviation control and navigation centers, firing positions of artillery units, air defense HQs and HQs of SAM and artillery battalions, as well as onboard radars of airplanes of all types and ships (sailing in coastal waters). The bandwidth is 1–18 GHz at a range of up to 250 km (ground-based) or 450 (air- and sea-based).

The equipment finds the direction to the radio source and tracks targets in the direction. When three modules are used, the accuracy of determining the objects' positions is 2–3% of the distance.

APPLICATION FOR ARTILLERY ENGAGEMENT MISSION (EXAMPLE)



EXAMPLE OF MISSION SEARCH, RADIO CONTROL AND DETECTION OF LOCATION OF LOW POWER DMR RADIO STATIONS



LOCATION OF LOW POWER DMR RADIO STATIONS