

## **Panoramic detector of VHF-UHF frequency band signals «PANORAMA-F»**

VHF-UHF panoramic signal detector “Panorama-F” is purposed for efficient monitoring of operating radioelectronic devices in the open waves within 20–3000 MHz frequency band.

**Efficiency of radiomonitoring of “Panorama-F” product is achieved by implementing of two receiving radio channels**, one of which is panoramic, another – executive. This allows operator to analyze and record signals of detected radio emission sources without stop-search of new sources.

High efficiency of frequency search ( $V_{063} \geq 10$  GHz/s) is realized due implementing in panoramic detector of high efficient DSP and FPGA – FFT computers, built-in panoramic receiver “Filin-VU/P”.

Panoramic detector “Panorama-F” operates both in automatic modes of signal detection and in the mode of spectrum analyzer under computer control.

Algorithm of spectral and statistical detection of newly appeared signals against the background of present load providing record of radioenvironment change in undercontrolled frequency band is realized in the product “Panorama-F”.

Product “Panorama-F” provides efficient detection of signals of cutting edge wideband communication systems including Bluetooth, Wi-Fi etc.

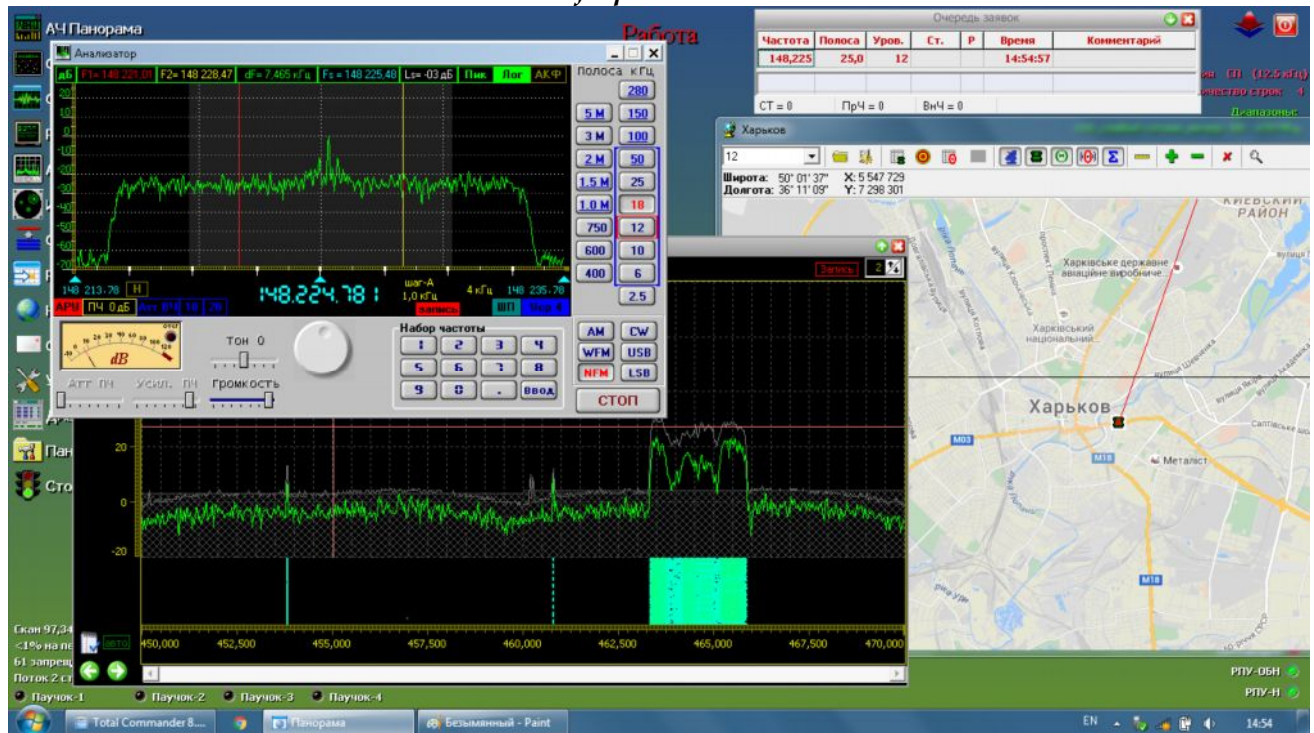
Software of product “Panorama-F” provides automatic control over executive receiver of audio control, wideband recording of IF-signals (up to  $\Delta F=3$  MHz) and analysis “Filin-VU”.

Results of detection are recorded into the database, with the opportunity to edit, sort and print.

*External view of “Panorama-F”*



## Work board of operator "Panorama-F"



## COMPOSITION

Basic composition of the product contains:

- 1) Compact panoramic receiver "Filin-VU/P";
- 2) Compact receiver of audio control "Filin-VU";
- 3) Wideband antenna (option);
- 4) Operator control board on the base of Note-Book;
- 5) Operator push-button key-board;
- 6) Special software of panoramic signal detector;
- 7) Case with power adapter from AC 220 V and DC 12 V;
- 8) Complete set of connecting cables;
- 9) Soft covers for product equipment transportation;
- 10) Operational and maintenance documentation (including Technical Data Sheet).

Additionally with product "Panorama-F" the following antenna-feeder systems can be supplied:

- 1) Wideband antenna (25-3000 MHz) AFS-NP in radioparent cargo box with telescopic mast height 3 m;
- 2) Magnet-mount active antennas for frequency bands 25-1000 MHz AN1 and 1-3 GHz AN2;
- 3) Complete set of directional antennas of log-periodic antenna type for frequency bands 130-470 MHz, 400-3000 MHz and omnidirectional active antennas for frequency bands 30-1000 MHz and 1-3 GHz with antenna switch, wideband antenna amplifier, power supply, HF-feeders (10 m) and 3 m height mast (set AFS-P).
- 4) Wideband VHF-UHF signal divider for 2 outputs for connecting external antennas.

## MAIN FUNCTIONS

- Scanning of frequency band 20–3000 MHz with automatic detection and selection of signals by preset parameters;
- Visualization of amplitude-spectrum and frequency-time panoramas of radiofrequency spectrum on the screen of operator's board;
- Data logging of group radiofrequency spectrum load to computer HDD, visual analysis of signal spectra and measurement of frequency parameters;
- Audio control of AM/FM radiosignals;
- Operational tuning of audio control receiver to the frequency of detected RES for conducted express-analysis of its signal;
- Generating of detected signal queue with subsequent their processing (listening, observation, recording) and possibility of out-of-turn processing of signals from priority frequencies list;
- Record of IF signals in the form of I/Q-samples to computer HDD with bandwidth of up to 3 MHz;
- Visual analysis of detected signals and measurement of frequency parameters;
- Automatic issuing of the command for bearing taking of detected signal into portable VHF-UHF radio direction finder "Pauchok-S" (mobile direction finder "Pauchok-M") or DF network consisting of 2 – 4 direction finders "Pauchok-S" ("Pauchok-M");
- Display on operator's board of bearing information and coordinates of detected radio signals on the map;
- Viewing, sorting and analysis of accumulated radio electronic environment data.

**Product "Panorama-F" with two active magnet-mount antennas for frequency bands 25-1000 MHz AN1 and 1-3 GHz AN2 fastened on the vehicle**



*Product "Panorama-F" in the case with active dipole and discone antenna in radioparent cargo box (AFS-NP) deployed in the field*





## TECHNICAL PARAMETERS

- 1) Frequency band:  
of panoramic signal detection **20 - 3000 MHz**  
of signal reception and recording **20 - 3000 MHz**
- 2) Sensitivity of radio section of panoramic signal detection (SNR=10 dB,  $\Delta F=12.5$  kHz):  
within frequency band 20 – 1000 MHz **0.8  $\mu$ V**  
within frequency band 1 – 3 GHz **1.0  $\mu$ V**
- 3) Scanning rate including detected frequencies processing  
(max value):
- |                           |              |             |             |           |
|---------------------------|--------------|-------------|-------------|-----------|
| Scanning rate, GHz/s      | <b>3</b>     | <b>5</b>    | <b>7</b>    | <b>10</b> |
| Frequency resolution, kHz | <b>3.125</b> | <b>6.25</b> | <b>12.5</b> | <b>25</b> |
- 4) Real time BW: **10 MHz**
- 5) Panoramic frequency resolution (at the level  $-3$  dB): **8 ... 75 kHz**
- 6) Minimal duration of detected signals **300  $\mu$ s**
- 7) Dynamic range (by signal level compression 1 dB) **100 dB**
- 8) Dynamic range by third order intermodulation **75 dB**
- 9) Attenuation of image channels **not less than 80 dB (25-1000 MHz)**  
**not less than 60 dB (1000-3000 MHz)**
- 10) Suppression of spurious channels **> 80 dB**
- 11) Spectral density of heterodyne noise (25 kHz detuning):  
at tuning frequency 300 MHz **– 97 dBc/Hz**  
at tuning frequency 1500 MHz **– 90 dBc/Hz**
- 12) Relative instability of receiver adjustment frequency  
within operating temperature range  **$\pm 1 \cdot 10^{-6}$**
- 13) detection probability of signal with 3 s duration  
within frequency band 20–3000 MHz **>0.9**
- 14) IF signals recording (I/Q- samples) within bandwidth **2.5 ...3000 kHz**
- 15) Signal demodulation **AM/NFM/WFM**
- 16) Consumed power not more **20 W (without PC)**
- 17) Operating temperature range **from 0°C to +50°C (without PC)**
- 18) Power supply: **AC~220 V/50 Hz**  
**DC 12 V**

**“Scientific-Engineering Center of Radio-Electronic Systems of Applied Radio Electronics of Academy of Sciences” Ltd.**

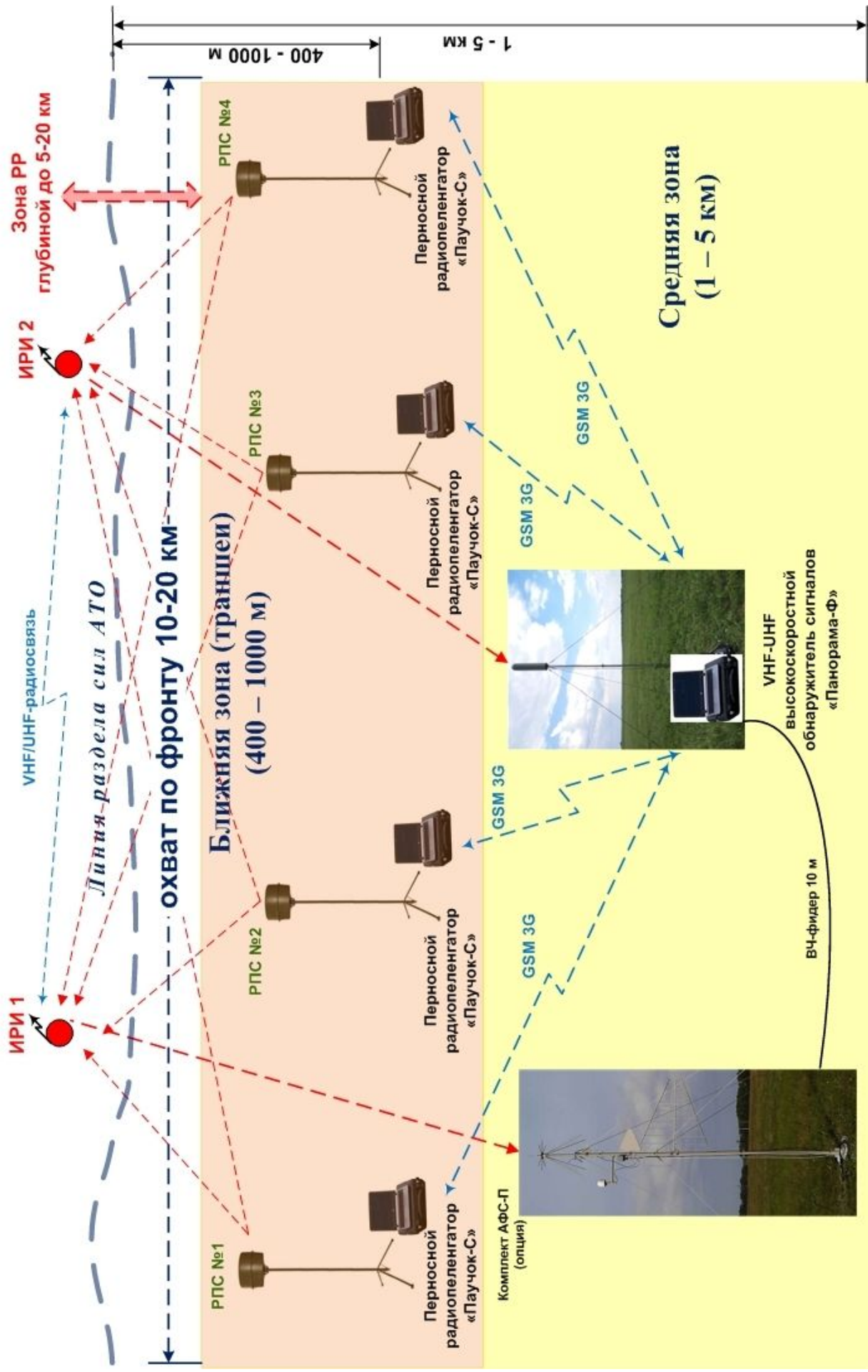
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**Структура системы радиомониторинга и местоопределения  
источников радиоизлучений VHF-UHF диапазона (25-3000 МГц)**  
(на базе изделий «Панорама-Ф» и «Паучок-С»)



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