



*UAV's detection and counteraction  
integrated solutions  
JSC "Concern "Avtomatika"*

## MULTIFUNCTIONAL COMPLEXES OF DETECTION AND SUPPRESSION OF UAV's CONTROL, DATA TRANSFER AND NAVIGATION SYSTEMS



*Radio-electronic direction finding  
"Kupol" module with isotropic  
antenna feeder system*



*Radio-electronic suppression "Luch" module  
(targeted action in frequency and direction)*



*Wearable "Pishchal" complex*



*UAV detection and counteraction mobile complex  
"Sapsan-Bekas"*



*Maintenance-free detection  
and counteraction modules (container version)*



*UAV's SUBSYSTEM OF RADIO TECHNICAL DETECTION AND DIRECTION FINDING*



## WEARABLE UAV's COUNTERACTION COMPLEX "PISCHAL-PRO"

### PURPOSE:

*The "Pishchal" wearable complex is designed to disrupt the UAV flight mission by suppressing the UAV's communication, control and navigation channels from unprepared positions of the security site*

### IMPLEMENTATION:

*Range of use is **at least 2,000 meters**  
Does not require special training and is ready for combat use in real time*



# WEARABLE UAV's COUNTERACTION COMPLEX “PISCHAL-PRO”

## SPECIFICATIONS

Frequency ranges jamming	Simultaneous impact on channels of communication, control and navigation support of unmanned aerial vehicles
Power supply, V	16
Battery capacity, Ah	10
Type of noise generated	Noise-like, aiming in direction
Duration of continuous operation (for 2 battery), not less than, hrs	1
Working temperature range, ° C	From -20 to +40
Overall dimensions (W × H × D), cm	200x240x700
Weight, not more than. kg	4,5
Suppression range, not less than, m	2000 (assuming direct radio line of sight)





# PORTABLE UAV's COUNTERACTION COMPLEX "Kupol-PRO"

## DESIGNED

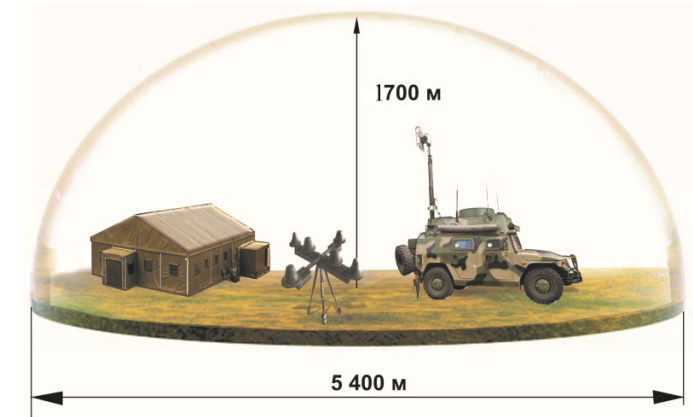
to pressure UAV's channels of navigation, control and data transition in order to целью obstructing the UAV's functioning in the object's airspace.

## EQUIPPED

with isotropic antenna feeder system, that creates over an object an insurmountable for an UAV "Dome"

## RADIO SUPPRESSION RANGE

of UAV's control and navigation channels is **at least 2.0 km** in radius (with direct visibility)



# PORTABLE UAV's COUNTERACTION COMPLEX *“TARAN-PRO Kupol”*

## SPECIFICATIONS

<b>Tactical and technical advantages</b>	Simultaneous impact on frequency channels of communication, control and navigation support of unmanned aerial vehicles
<b>Energy potential</b>	80 W
<b>The Kupol-PRO UAV combating complex includes</b>	Antenna-feeder system: 1 set Noise generator blocks: 1 set Supporting tripod
<b>Outdoor equipment of the complex ensures operation</b>	In the temperature range from -40 °C to + 50 °C When exposed to atmospheric precipitation (rain) with an intensity of 5 mm/ min; When exposed to sand and dust



## ***“LUCH” UAV RADIO SUPPRESSION SUBSYSTEM***

### ***DESIGNED***

*The “Luch” complex is a portable UAV counteraction complex. A portable complex of a sectoral direction, designed to disrupt the UAV's flight mission by suppressing it's communication, control and navigation channels on unprepared security area.*

### ***EQUIPPED***

*Counteraction range is **at least 4 km**.*



*“LUCH” UAV RADIO SUPPRESSION SUBSYSTEM*

**SPECIFICATIONS**

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<b>Tactical and technical advantages</b>	Simultaneous impact on the channels of communication, control and navigation support of unmanned aerial vehicles
	The accuracy of combining the frequency-targeted Interference Is at least 10% of the width of the high-frequency spectrum of the suppressed signals
	The reaction time when creating a frequency Interference Is not more than 100 ms Transmitting antennas provide emission noise with linear vertical polarization
	The counteraction distance Is at least 6 km
<b>The complex includes</b>	Antenna-feeder system: 1 set Noise generator blocks: 1 set Radio jamming subsystem positioning mount: 1 set AWP on the basis of the controlling laptop-type PC: 1 set
<b>Outdoor equipment of the complex ensures operation</b>	In the temperature range from -40 °C to + 50 °C; When exposed to atmospheric precipitation (rain) with an intensity of 5 mm/min; When exposed to sand and dust





## *"SAPSAN - BEKAS" MOBILE MULTIFUNCTIONAL COMPLEX OF UAV COUNTERACTION*

### **PURPOSE:**

*Protection of security objects and territories from actions performed using UAVs*

### **IMPLEMENTATION:**

***Detection range - at least 15 km.  
UAV suppression range - up to 5 km.***

### **COMPLEX COMPOSITION:**

*Multifunctional complex of technical means of UAV's detection, tracking and electronic suppression "Sapsan"*

- UAVs electronic detection and direction finding subsystem*
- Active radar and optoelectronic tracking subsystem*
- Radio suppression subsystem*
- Complex's operator automated workstation*



# "SAPSAN - BEKAS" MOBILE MULTIFUNCTIONAL COMPLEX OF UAV COUNTERACTION

## SPECIFICATIONS

### Technical characteristics of the radio detection subsystem

Working frequency range	Provides for timely detection in the range of UAV control communications
Sensitivity, dBm / Hz	-140
Dynamic range, dB	100
Maximum frequency resolution, Hz	8
Maximum scanning speed, MHz / s	10000

### Technical characteristics of the radar detection subsystem

#### Space sector:

• By azimuth	360
• In elevation	70
D resolution D, m	15
V resolution, m/s	0,165



## SPECIFICATIONS

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Target height range, km	Up to 4
Scanning speed, deg/sec	0...20
Before detection of a small air target, not less than, m:	
• Up to 0.02 m <sup>2</sup> radar cross section	≥ 3600
• Over 0.2 m <sup>2</sup> radar cross section	≥ 7100
Power consumption, W	100

### Technical characteristics of the optoelectronic surveillance subsystem

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Video camera of visible spectrum  
Recognition of air targets, at least, m:

• «Fantom» type UAV	2 200
• «Orlan» and «Merlin» types UAVs	5 500
Fields of view (optical zoom)	35,5° ~ 1,8°
Zoom lens, mm	20-420



**SPECIFICATIONS**

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Cooled thermal imager «Kvant-420»

Range of recognition of mobile and stationary aerial objects in the dark,  
no less than, km:

- |                                   |   |
|-----------------------------------|---|
| • «Fantom» type UAV               | 4 |
| • «Orlan» and «Merlin» types UAVs | 7 |

Fields of view (optical zoom)	35,5° ~ 1,8°
Digital zoom	8x

**Technical characteristics of radio electronic suppression subsystem**

Tactical and technical advantages	Simultaneous impact on the frequency channels of communication, control and navigation support of unmanned aerial vehicles
Number of working channels	3



# ***"SAPSAN - BEKAS" MOBILE MULTIFUNCTIONAL COMPLEX OF UAV COUNTERACTION***

## **SPECIFICATIONS**

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Energy potential of the emitted signal:

- |                              |     |
|------------------------------|-----|
| • Channel 1, no more than, W | 100 |
| • Channel 2, no more than, W | 200 |
| • Channel 3, no more than, W | 200 |

Suppression range, not less than, km	4
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Duration of continuous work during signal emission, hr	2
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Break after continuous operation with signal emission, hr	0.25
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Duration of work in standby mode (without emission), hr	24
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## ***"SAPSAN - BEKAS" MOBILE MULTIFUNCTIONAL COMPLEX OF UAV COUNTERACTION***

### **SPECIFICATIONS**

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Duration of work in standby mode (without emission), hr	24
Accuracy of azimuth setting, deg.	3
Operating voltage, V/Hz	220/50
Required current on the mains 220 V, no more than, A	5
Weight, no more than, kg	190 (with pedestal)
Operating temperature interval, °C	From -40 to +50
Number of operatorsa	one



## *"SAPSAN - BEKAS" MOBILE MULTIFUNCTIONAL COMPLEX OF UAV COUNTERACTION*



## *Armored base equipment variation*



# UAVs detection and counteraction transportable complex «*Rubezh-Avtomatika*»

## PURPOSE:

*The complex is intended for continuous radio surveillance, detection of UAVs signals and counteraction signals generation in the protected area.*

## COMPLEX COMPOSITION:

### Radio Surveillance station



Monoblock type



Container type

### Multichannel omnidirectional Suppression station



Control and visualization panel

## KEY FEATURES

- *Detection, direction finding and identification of UAV signals;*
- *Formation and signals emission for counteraction to satellite navigation channels as well as UAV's communication, command and control system;*
- *Display of the received information in tabular and graphical form;*
- *The possibility of manual and automatic modes of operation;*
- *Control of generated interference parameters.*



# *UAVs detection and counteraction transportable complex «**Rubezh-Avtomatika**»*

## **SPECIFICATIONS**

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Impact on the frequency channels of communication, control and navigation support of the UAV	Simultaneous
Panoramic tuning speed in the panoramic direction finding mode, with a resolution of 100 kHz	at least 10 GHz / s
The detection and identification range of UAVs in conditions of «direct line of sight»	at least 15 km
Instrumental standard deviation of direction finding with a probability of 0.85	no more than 3°
Suppression range of navigation, communication and control channels of UAVs	not less than 3 km
Supply voltage single-phase AC	~ 220 V ± 10%, 50 Hz
Product weight	no more than 300 kg





# UAVs detection and counteraction transportable complex «**Bastion-Avtomatika**»

## PURPOSE:

*The complex is intended for continuous radio surveillance, detection of UAVs signals and generation of counteraction signals for them in the protected area.*

## KEY FEATURES

- *Detection, direction finding and identification of UAV signals;*
- *Formation and signals emission for counteraction to satellite navigation channels as well as UAV's communication, command and control system;*
- *Display of the received information in tabular and graphical form;*
- *The possibility of manual and automatic modes of operation;*
- *Control of generated interference parameters.*



Radio Surveillance station



Jamming station



## **SPECIFICATIONS**

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<b>Impact on the frequency channels of communication, control and navigation support of the UAV</b>	Simultaneous
<b>Panoramic tuning speed in the panoramic direction finding mode, with a resolution of 100 kHz</b>	not less than 10 GHz / s
<b>The detection and identification range of UAVs in conditions of «direct line of sight»</b>	no more than 10 km
<b>Detection and direction finding sector</b>	360 °
<b>The range of suppression of UAVs' navigation, communication and control channels</b>	up to 2 km
<b>Supply voltage single-phase AC</b>	~ 220 V±10%, 50 Hz



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