EW LESSONS LEARNED
Russian Hybrid Warfare in Ukraine

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RUSI
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RUSSIAN AGGRESSIVE POSTURE
AGAINST UKRAINE & THE REST OF EUROPE

Russian forces deployed on Western and South-Western directions pose a real threat to overall European security.
Deployment of the Russian EW Units on the occupied territory of Ukraine
(December 2016 – Dec 2018)
RUSSIAN EW TACTICS

TACTICS

- Disturbing and turbulent jamming tactics
- Demonstration of presence in the specified areas
- EW Superiority (Domination) in the Electronic Domain

TASKS and MISSIONS

- Jamming some designated equipment;
- Suppression of some networks;
- Sending SMS to the enemy soldiers;
- Interference in specific areas.

- Full network suppression;
- Blocking all communication;
- Enforce to use GSM or SATCOM or mobile Internet;
- Determine access points for GSM and mobile Internet.
PECULIARITIES of EW EMPLOYMENT by RUS FORCES

FEATURES

- hidden influence of radio-electronic warfare means on radio communication (sudden disappearance of radio communication due to unknown reasons);

- sending SMS messages to private phones of the military with the indication of places for their gathering, in fact, places for planned fire shooting;

- blocking GSM radio communication with its further restoration, defining the points of access and shooting the areas of mass access to GSM radio communication;

- using the capabilities of radio-electronic warfare means for spotting the places of the location of counterbattery radars with further shooting on them;

use of new physical principles, the effect of application equals electromagnetic weapons which destroy electronic equipment (System Murmansk BH in some types of operation radiates the signal of blocking with the power of 400 kWt that covers the distance up to 5000 km and affects the receiving equipment in UHF lines.)
COURSE OF ACTIONS by Russian EW Units in Ukraine

the enemy defines C2 of the UKR forces and determines the most important (crucial) objects,

searches and defines the most effective positions for radio-electronic warfare means;

evaluates the effectiveness of blocking radio means of the UKR Armed Forces executing short-term radio break offs of different functional purposes and registers the reaction on the loss of radio communication in the UKR units

blocks radio communication of the UKR units in some tactical episodes.

NEGATIVE EFFECTS

disclosing of UKR units control systems on the level union – battalion – brigade,

defining the most critical purposes of radio blockings that can lead to the loss (violation) of control;

learning the scenarios of actions of UKR units in case of the loss of communication.
DURING ACTIVE COMBAT ACTIONS

To disorganize C2 of UKR units in the area of active combat;

Spotting of the operating radio systems, jamming systems, counter-battery radars and targeting fire on them;

Operational maneuver by EW units on the new directions of actions;

Breaking the control (misleading) of the UAV.

NEGATIVE EFFECTS

Loss of control over the ATO units in the directions of active combat;

Damage of the positions of jamming systems, counter-battery radars;

Impossibility to use UAV.
### RUSSIAN ARMED FORCES PRIORITIES in EW in the EASTERN UKRAINE

#### PRIORITIES

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<tr>
<th>1</th>
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<th>4</th>
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| **To suppress enemy’s UAV by deployment of Jamming stations**
R-330Zh “SHYPOVNIK – AERO” | **Jamming of VHF and UHF, GSM communication by deployment of BORISOGLEBSK -2 AND INFAUNA SPR-2M SYSTEMS** | **EW SYTEMS AND STRIKE WEAPONS INTEGRATION** | **DETECTIONS OF THE INFORMATION LEAKAGE CHANNELS AND THEIR Suppression Systems SVET-KU, “Dziudoist”** |

**R-330Zh “Шиповник”**

**СПР-2М**

**П-378БМВ**

**“Інфауна”**

**П-330БМВ**
THE STRUCTURE OF THE DETACHED EW COMPANY
1 AND 2 ARMY CORPS OF THE RUSSIAN PROXIES

EW COMPANY

C2 PLATOON
LEER - 3 * 2 pcs

VHF JAMMING /INTERFERENCE PLATOON
P-378БМВ – 2 pcs

UHF JAMMING /INTERFERENCE PLATOON
P-330БМВ – 2 pcs

JAMMING /INTERFERENCE PLATOON
P-330Ж – 2 pcs
РП-377Л – 2 pcs
P-934УМ – 2 pcs

РБ-341В “Леер-3”
P-378БМВ

Р-330БМВ

Р-330Ж
EW System “Leer – 3”

Training of Russian proxies (May 2015). On the left in the red frame Leer-3”

Jamming frequencies, MHz
935-960, 1805-1880
890-915, 1710-1785

Donetsk, Ukraine 2016

Territory of Ukraine
Electronic Interference Station P-378BMV from “Borisoglebsk-2” SYSTEM

Territory of Ukraine

Pictured 18.12.2014, in Internet since 08.05.2016
R-378BM deployed close to Stahanov, Lugansk Region

**Jamming, interference and signal intelligence frequencies, MHz**

1.5 – 29.9
Jamming, interference and signal intelligence frequencies, MHz

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Description</th>
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<tbody>
<tr>
<td>25 – 960</td>
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JAMMING STATION R-330Z “Zhitel”

01.07.2015, MAKIIVKA, DONETSK REGION
ANTENNAS OF R-330Z “Zhitel”

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<thead>
<tr>
<th>SIGNAL INTELLIGENCE frequencies, MHz</th>
<th>100 – 2000</th>
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<tbody>
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<td>JAMMING frequencies, MHz</td>
<td>1227,6; 1575,42; 1500 – 1900</td>
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</table>
22.06.2014,
OCCUPIUED TERRITORY OF DONETSK REGION
EW SYSTEM “LORANDIT”

signal intelligence frequencies, MHz  |  20 – 2000
Jamming, interference frequencies, MHz | 137 – 174, 410 – 470, 100 – 500

RP-377LA “LORANDIT”
MOBILE AUTOMATED RADIO CONTROL SYSTEM
“DZIUODIOST”

16.01.2015, 12.40 – LUGANSK, Shopping Center AURORA

TOT of Ukraine
INTERFERENCE AND JAMMING STATION R-330BMV
“BORISOGLEBSK-2”

TOT of Ukraine 25.07.2015, Bryanka, Lugansk Region
TOT of Ukraine

EW System “SHIPOVNIK-AERO”
On TOT of Ukraine Donetsk Region

22.07.2016 Donetsk city center
“SHIPOVNIK - AERO.”
RUSSIAN EW UNITS on the TOT of UKRAINE

West side of Bryanka town, Donetsk reg.
RUSSIAN UHF JAMMING SYSTEMS

- R-934UVM
- R-934BMV

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<th>100 – 2000</th>
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<td>Jamming Frequencies, MHz</td>
<td>100 – 400</td>
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<tr>
<td>Jamming Frequencies, MHz</td>
<td>100 – 150, 150 – 220, 220 – 400</td>
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STATION “MURMANSK-BN”
(CRIMEA, cape FIOLENT)
STATION “MURMANSK-BN”
(CRIMEA, cap FIOLENT)
DEVELOPMENT OF THE RUSSIAN EW SYSTEMS
WAY AHEAD

MULTIFUNCTIONAL EW COMPLEXES

"INFAUNA"

SPR-2M "RTUT-BM"

"LEER-2"

R-330Zh "Zhytel"

IED PROTECTION

ARMORED

PROTECTION FROM THE RADIO CONTROLLED FUSES

SIGINT SUPPRESSION JAMMING

INTERFERENCE

SIMULATION OF RADIO ACTIVITY

SIGINT

GPS JAMMING

GSM 1800 JAMMING

IMMARSAT, IRIDIUM JAMMING
1. Assets for blocking strategic, operational and tactical C4I. In 2017 instead of the system Borysohlibsk-2 a new system Palantin was deployed.

2. Fighting the air assets equipment. It is ensured by blocking air communication and on-board radars, including ISTAR aircrafts.

3. Assets for blocking signals of GPS and fighting UAV. In 2016 a new EW with small-size UAV Repellent-1 was developed.

4. UAV EW Assets. UAV Leer-3 is used for collecting data from personal GSM, namely IMEI and MTIMSI.
WE MUST STOP THEM
DO NOT UNDERESTIMATE RUSSIAN THREAT
General Staff of the Armed Forces of Ukraine

STRONGER TOGETHER
RF produced weaponry and equipment found in the Eastern Ukraine (never used by UAF)

**ARMOR**
- Armored vehicle BPM-97 “Vystrel”

**Air Defence**
- Artillery rocket missile complex “Pantsyr-C”

**Antitank Armament**
- Antitank rocket complex “Konkurs-M”

**Unmanned Aerial Vehicles**
- UAV “Eleron-3CB”
- UAV “Takhion”
- UAV “Orlan-10”
RUSSIAN MADE WEAPONS AND EQUIPMENT USED IN THE EASTERN UKRAINE

Mobile patrol complex “Patriot-OKAPI”
REW station “LEER-2”
REW station “Shypovnyk—aero”
REW station R-330G “Gytel”

Mini UAV “ZALA”
UAV “Dozor-100”
UAV “Takhion”

Radio “Azart-P1”
REW station R-330M1P “Diabazol”
Artillery radar system “Rys”
Small-size navigation equipment 14C822 “Grot-m”
2017 - 641 cases of the of enemy UAV usage observed

250 cases of UAV employment by enemy have been observed in 2018. 
Frequency of UAV usage in 2018: 
Daily average - 1-2 flights; in case of favorable weather conditions – 10-13 flights