

The background of the slide is a photograph of a flat, open field under a blue sky with scattered white clouds. In the foreground and middle ground, several tall, slender, green electronic warfare antennas or masts are visible, some mounted on vehicles. The horizon shows a line of trees and some distant buildings.

# In the Flat Field

*Russian Electronic Warfare during the War in Ukraine:  
April 2022 to the Present Day*

Thomas Withington  
t\_withington@hotmail.com



# Agenda

- Sources and acknowledgements
- Electronic Warfare (EW) and the Russian Army
- Russian Army EW ORBAT
- Phase 1: Russian Army EW performance
- Phase 2: UAVs and ballistic missiles
- Phase 2: Tactical communications
- Phase 2: Kinetic vulnerabilities
- Recommendations and observations
- Conclusions



# дуже тобі дякую!

- Ukrainian comrades
- UK MOD, NATO and US DOD
- Intelligence community
- Academia
- Defence industry – COMINT Consulting!!
- Fellow Crows!



# EW and the Russian Army

- “Jam a third, attrit a third and the final third shall fall”
- EW as integral to army as armour, infantry and artillery
- 15<sup>th</sup> April is EW day and a public holiday!!
- Russian Army has EW units at operational and tactical levels
- EW units deployed by SMF, air force, navy, SOF and NG



# Russian Army EW ORBAT

- Operational level: 4 x army independent EW brigades
- Tactical level: 15 x army EW companies, supported by navy and airborne EW companies
- Targets: Civ/Mil HF, V/UHF comms. incl. SATCOM  
GNSS  
Radar



# Phase 1: Russian Army EW Performance

- Communications
  - GSM largely functional
  - SINCGARS functional
  - Localised, tactical V/UHF jamming
- SATCOM
  - Sporadic disruption and jamming
  - Cyber attacks against Viasat and Starlink quickly remedied
  - Civilian satellite broadcasting largely unaffected
- GNSS
  - Small-scale GNSS disruption (Chernobyl and Donbass)
  - GNSS jamming reported in Baltic believed to be from Kaliningrad
  - Little initial effect on Ukrainian GNSS use as shown by use of UAVs
  - Little effect on M-Code GPS



BELARUS

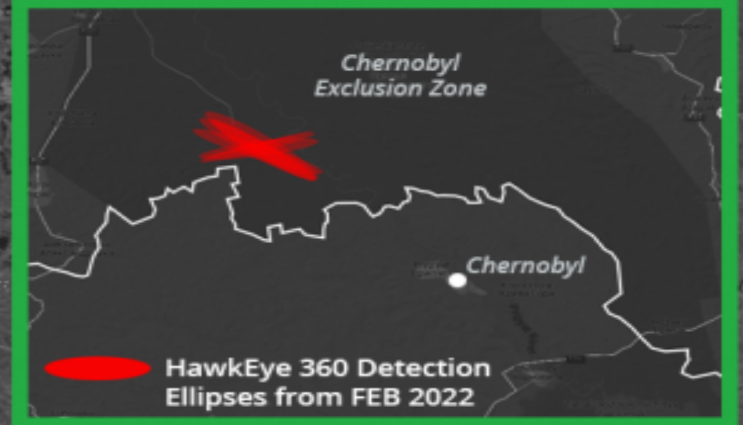
RUSSIA

UKRAINE

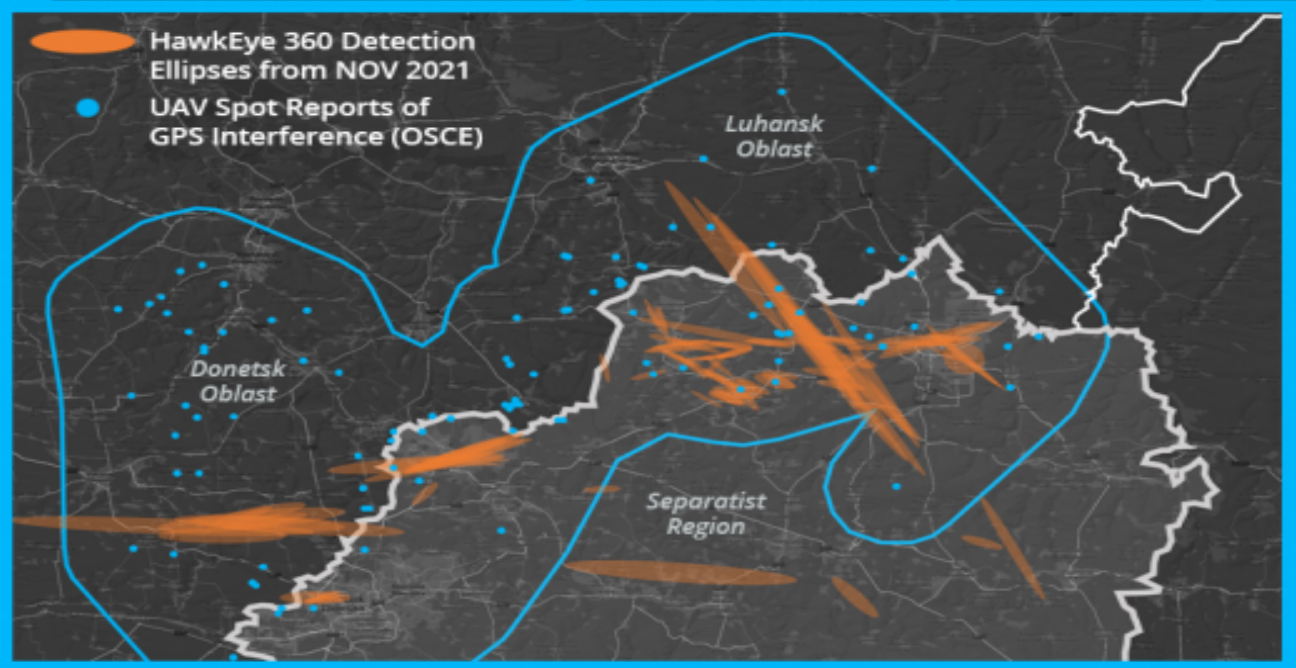
Kyiv



### A GPS Interference Along Border



### B GPS Interference Along Pro-Russian Separatist Region



HawkEye<sup>360</sup>

GPS INTERFERENCE DETECTED  
WITHIN OR NEAR UKRAINE

Unclassified Imagery and Information • Graphics Contain no "Technical Data"  
Contains Information that is Only Representative of Information  
that can be Produced from the Use or Operation of a Defense Article  
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# Phase 2: UAVs and ballistic missiles

- Decoy use by 9K720 Iskander short-range ballistic missiles
- Shahed-136/Geran-2 UAVs rely on INS, does not emit
- Unencrypted and civilian GNSS highly vulnerable to jamming
- “If you don’t have hardened GNSS you are dead.” (UK MOD official)
- Current UAV survival rate of between three and four missions
- TB2 Bayraktar survival rate less
- CUAV ‘dome’ coverage ineffective
- Directional CUAV jamming more effective



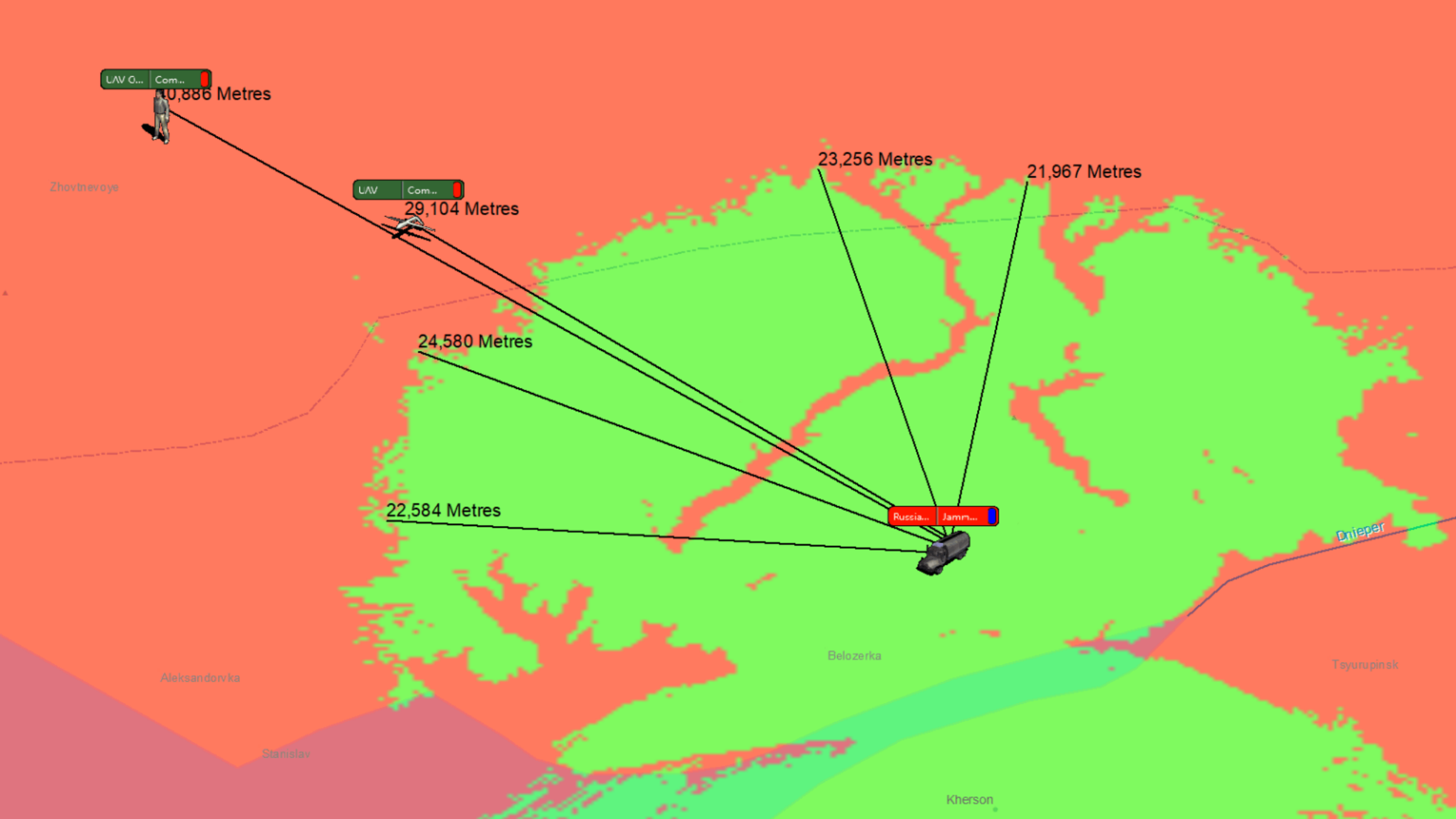




# Phase 2: Tactical communications

- Russian Army deploys ten EW systems for every 20km of front
- Effective against unsecured Ukrainian radio emissions
- Russian Army suffers significant electromagnetic fratricide
- Fratricide caused EW to reduce significantly after D+2
- Fratricide prevents EW to be used in conjunction with kinetic effects
- Russian Army EW used sequentially, reducing efficacy
- Equipment deficiencies: Repellent EW system “largely ineffective”
- Little effort against Ukrainian GSM network





LAV O... Com...

40,886 Metres

Zhovtnevoye

LAV Com...

29,104 Metres

24,580 Metres

23,256 Metres

21,967 Metres

22,584 Metres

Russia... Jamm...

Dnieper

Aleksandrovka

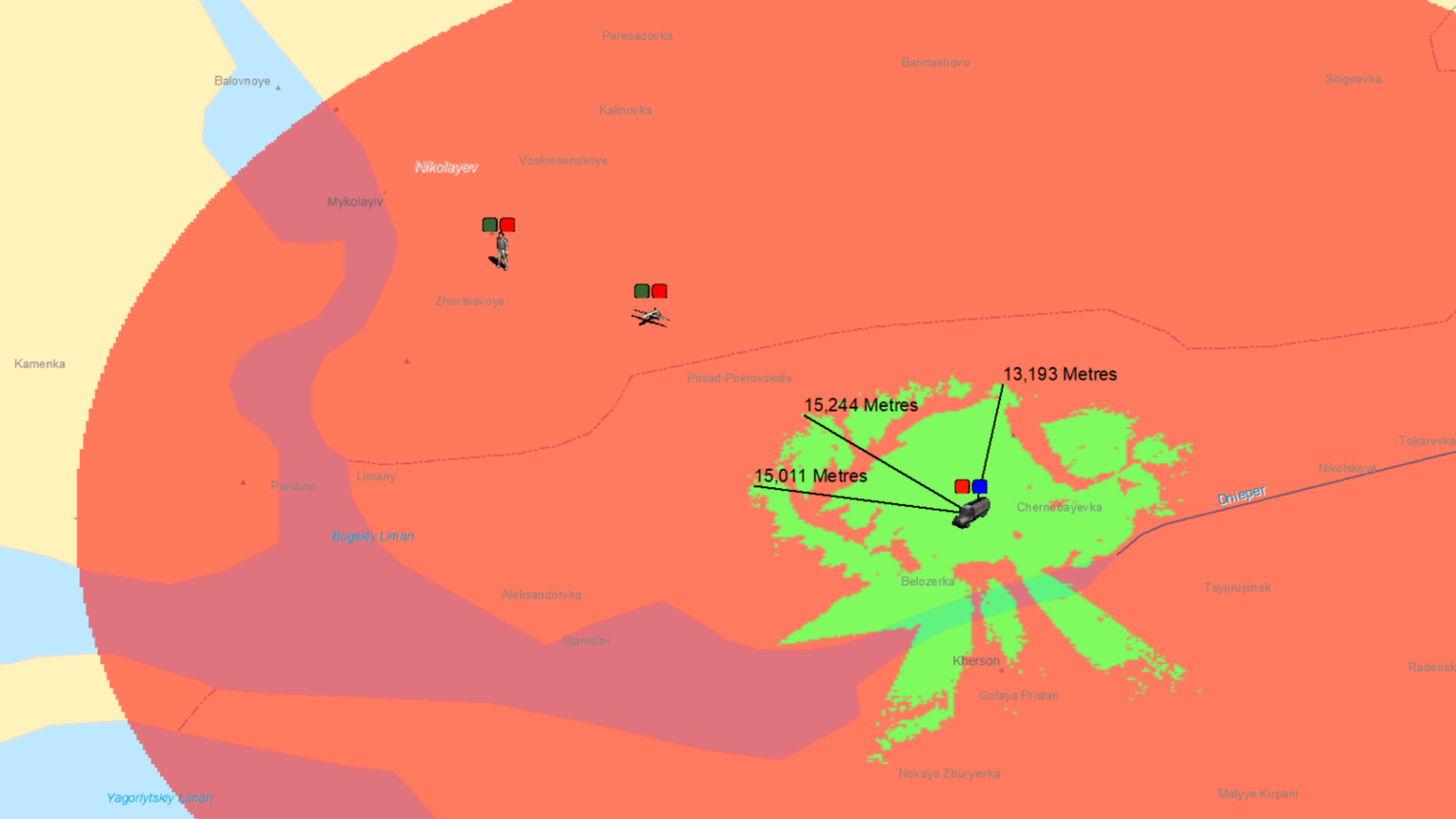
Belozerkha

Tsyurupinsk

Stanislav

Kherson

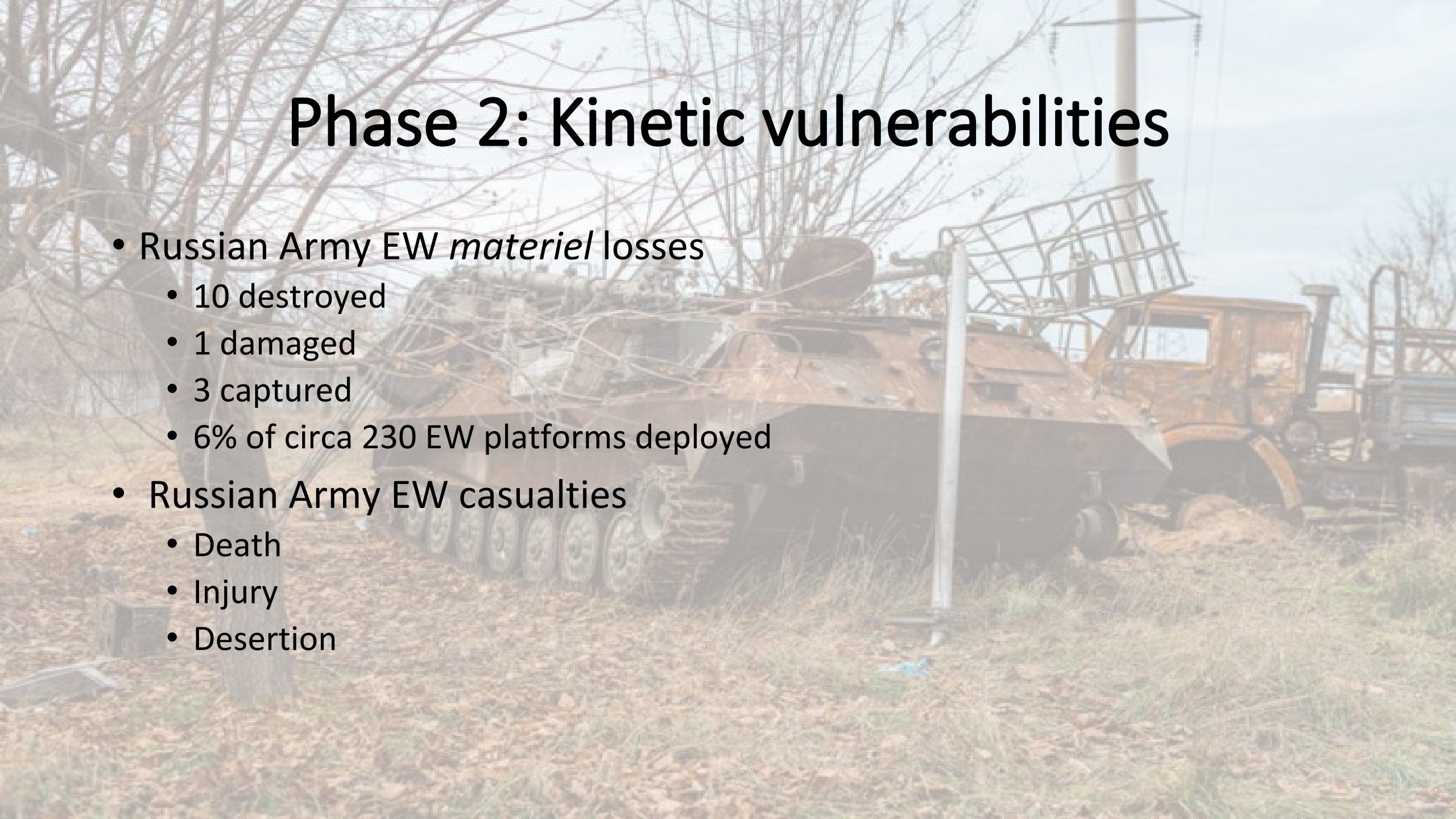






# Phase 2: Kinetic vulnerabilities

- Russian Army EW *matériel* losses
  - 10 destroyed
  - 1 damaged
  - 3 captured
  - 6% of circa 230 EW platforms deployed
- Russian Army EW casualties
  - Death
  - Injury
  - Desertion





# Recommendations and observations

- Ukraine needs hardened GNSS and communications
- Ukraine needs directional CUAV jammers
- Russian EW *materiel* and personnel is a centre of gravity
- Russian electromagnetic fratricide is a centre of gravity
- **Russian Army EW is down but not out!!!**
- **NATO and allied nations must not be complacent!!!**



# Conclusions

- *“The tankmen had their comms jammed ... a messenger runs towards them under bullets to visually indicate the direction of their fire, there is no sense in that”* (Anonymous Russian soldier)
- *“Bit by bit, the Russians are losing control of the spectrum”* (Senior UK MOD official)
- *“A lot of Russian Army equipment is dead easy to spoof”* (Senior UK MOD official)
- *“It is not enough to survive in a contested spectrum, you need to be able to fight in it”* (Ukraine CUAV expert)



A photograph of a group of people in a meeting room. Many of the people are sleeping or resting their heads on the table, illustrating a lack of attention. The text "Thank you for your attention!" is overlaid on the image.

Thank you for your  
attention!

*Any Questions?*