FRONT_BOT

Frontline Reporting & OSINT Node Tracker Bot

Version 0.89

Military conflict	Russian invasion of Ukraine
Opposing parties	Russia – Ukraine
Conflict start date	24. February 2022
Conflict day	1341
Conflict week	192
Reporting period	2025-10-19 → 2025-10-26
GitHub system info	Linux-6.11.0-1018-azure-x86_64-with-glibc2.39 | CPU: x86_64 | RAM: 8.33 GB
Reporting FRONT_BOT version	0.89
Report writing duration	4 minutes 1 seconds
Project developer	Zsolt Lazar
Developer's website	https://bio.site/zsoltlazar
Project website	https://frontbot.my.canva.site/front-bot

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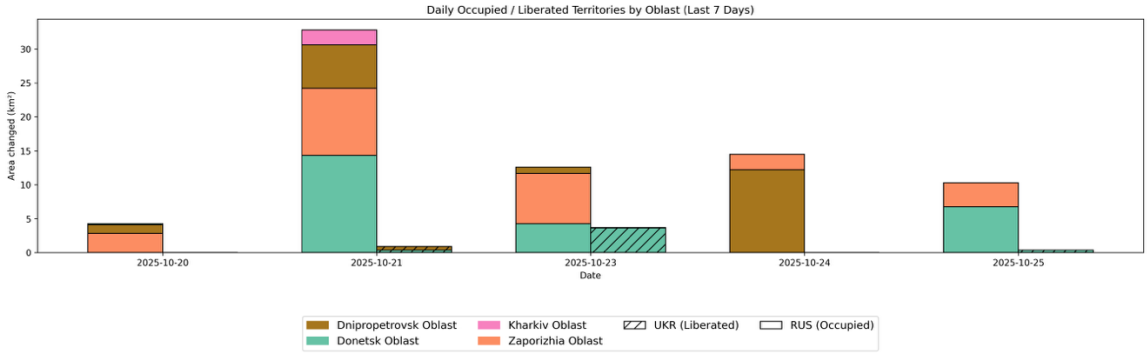
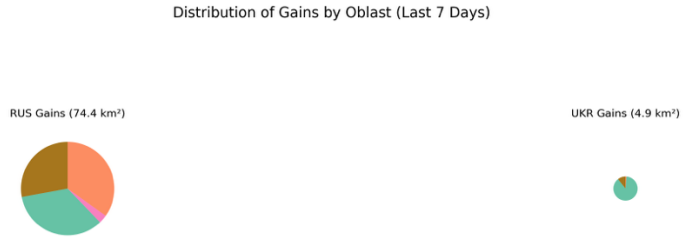
WEEKLY TERRITORIAL CHANGES

Module 7: Weekly Territorial Change Report (DeepStateMap)

According to DeepStateMap data, between 2025-10-20 and 2025-10-25, Russian and Ukrainian forces continued to contest territory along multiple fronts. Over this 7-day period, Russian gains amounted to 74.4 km², while Ukrainian gains reached 4.9 km². The largest Russian advances were observed in Zaporizhia Oblast (26.0 km²), Donetsk Oblast (25.5 km²), Dnipropetrovsk Oblast (20.8 km²). Meanwhile, Ukrainian forces achieved their most notable gains in Donetsk Oblast (4.4 km²), Dnipropetrovsk Oblast (0.5 km²), Zaporizhia Oblast (0.1 km²). Overall, the most active oblasts during the week were Donetsk Oblast, Zaporizhia Oblast, Dnipropetrovsk Oblast. The peak day for Russian advances was 2025-10-21, while the peak day for Ukrainian advances was 2025-10-23.





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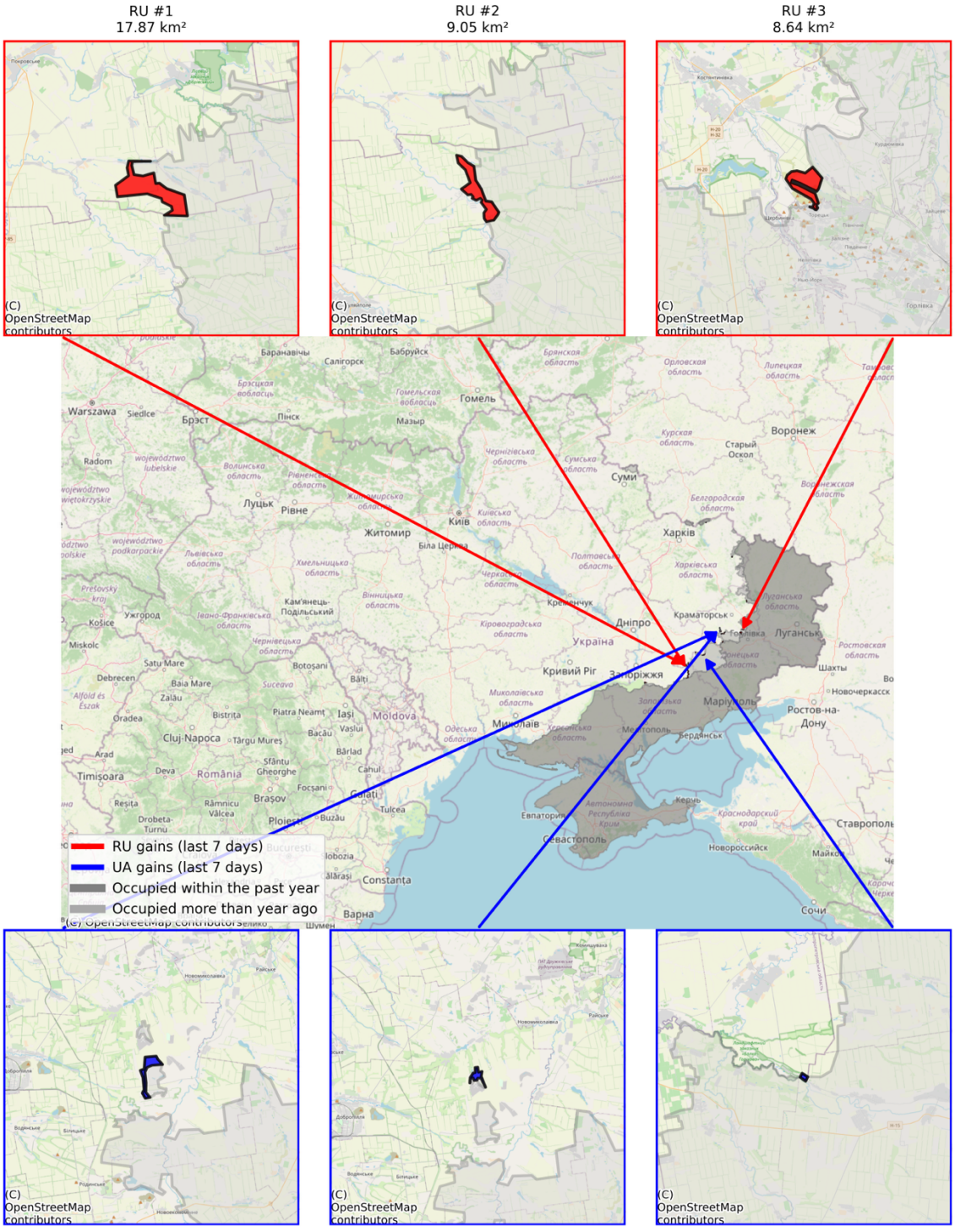
Module 8: Weekly Territorial Map (DeepStateMap)

Last 7 Days | RU Gains 81.58 km² | UA Gains 4.77 km²
Top 3 territorial changes shown on side maps



FRONT_BOT is a research prototype for automated military conflict reporting.
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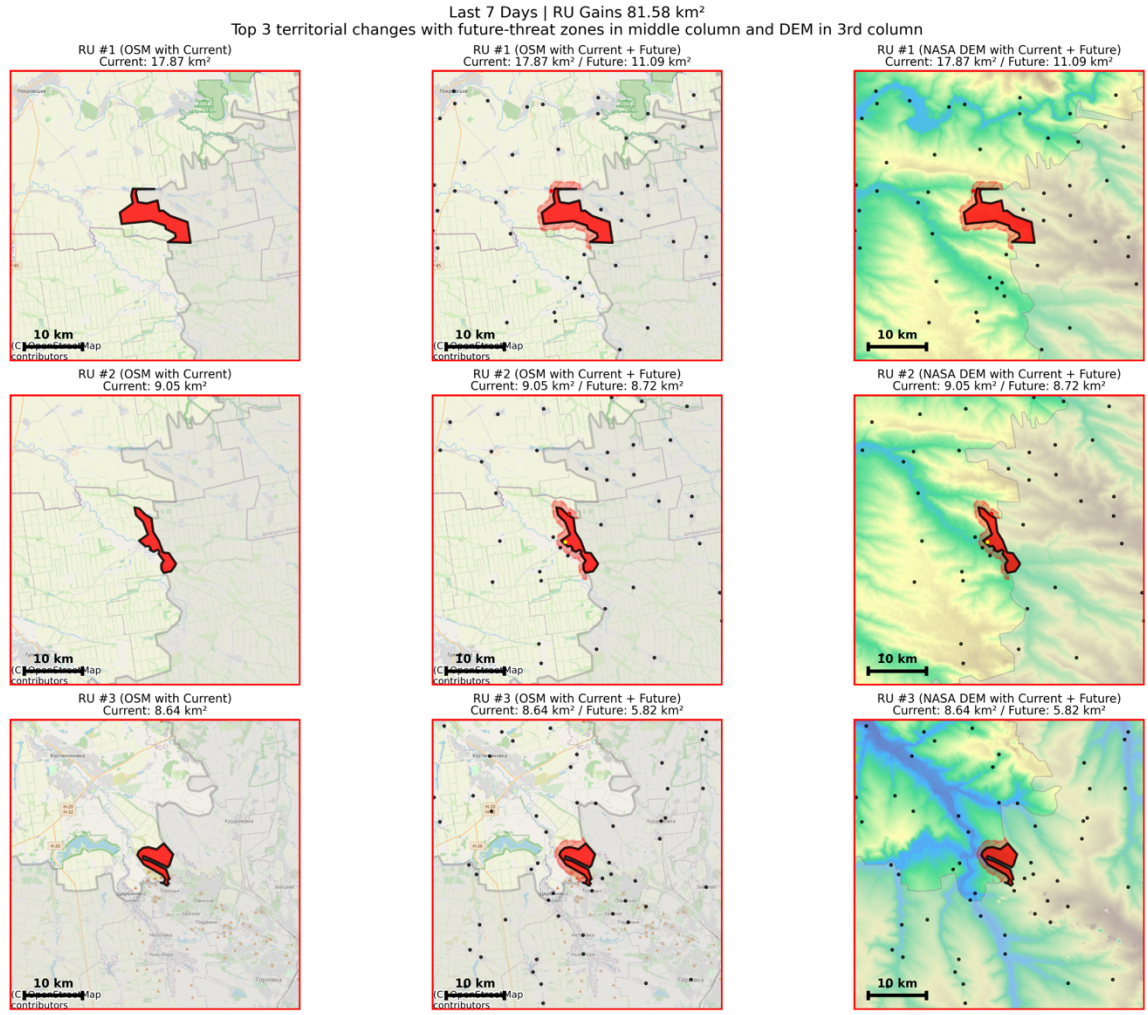
Module 9: Top 3 Territorial Maps & Narratives (DeepStateMap)



🇷🇺 RU Narrative:

According to DeepStateMap data between 2025-10-18 and 2025-10-25, the following territorial developments were observed for RU forces.

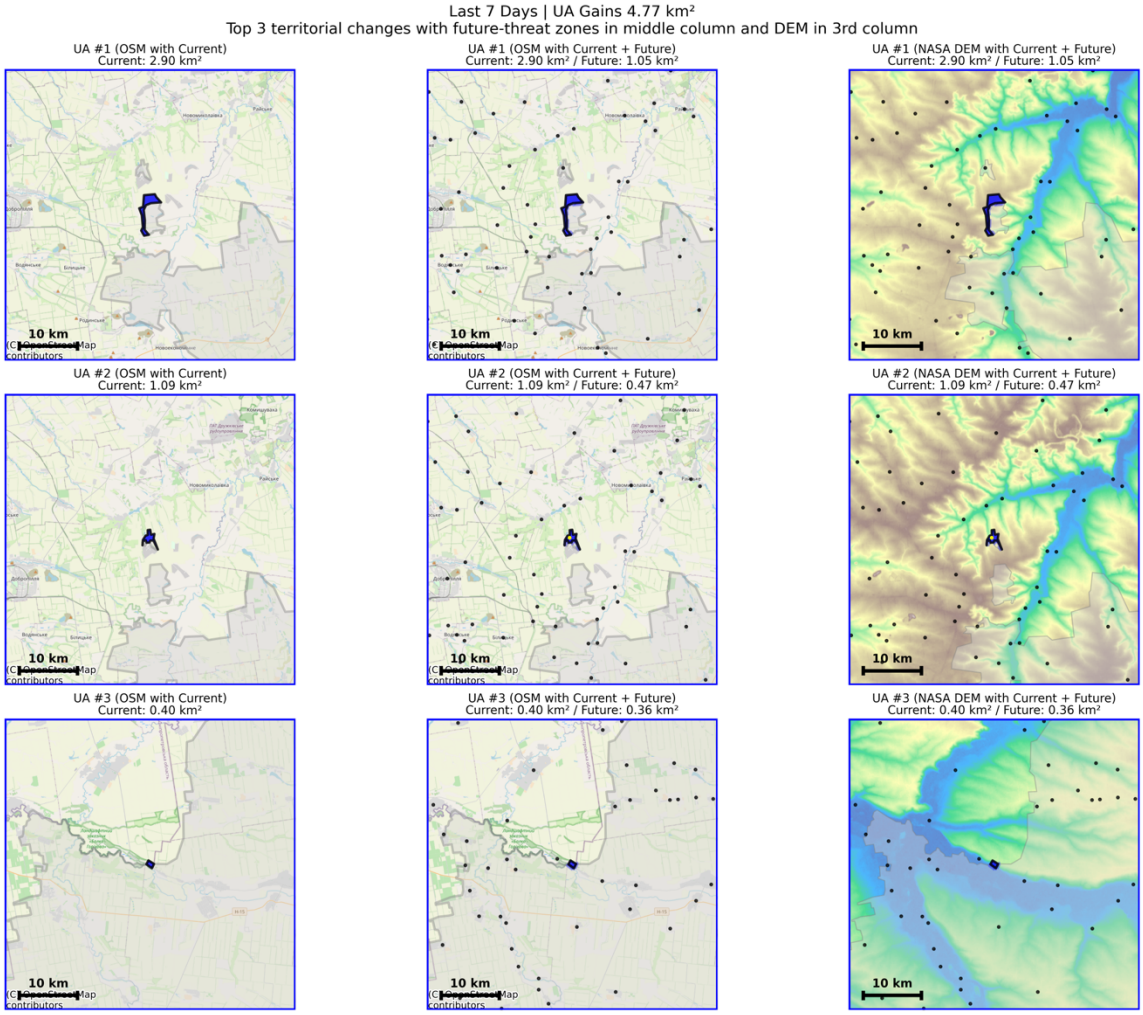
7-Day Comparative Summary

Over the past week, RU forces have gained a total of 81.58 km², with the top three territorial gains accounting for 35.56 km² (44% of the total). In comparison, the opposing side has gained 4.77 km² (top three gains: 4.39 km²).

RU Top Territorial Changes Narrative

The #1 largest gain by RU forces covers approximately 17.87 km², which represents about 22% of total gains this week. Currently, no settlements are affected by this gain. If the advance continues, the settlement Вербове may soon fall within the contested area. The #2 largest gain by RU forces covers approximately 9.05 km², which represents about 11% of total gains this week. Currently, the gain affects the settlement Нововасилівське. If the advance continues, the settlement Новогригорівка may soon fall within the contested area. The #3 largest gain by RU forces covers approximately 8.64 km², which represents about 11% of total gains this week.

Currently, no settlements are affected by this gain. No additional settlements are predicted to be affected in the near future.



🇺🇦 UA Narrative:According to DeepStateMap data between 2025-10-18 and 2025-10-25, the following territorial developments were observed for UA forces.

7-Day Comparative Summary

Over the past week, UA forces have gained a total of 4.77 km², with the top three territorial gains accounting for 4.39 km² (92% of the total). In comparison, the opposing side has gained 81.58 km² (top three gains: 35.56 km²).

UA Top Territorial Changes Narrative

The #1 largest gain by UA forces covers approximately 2.90 km², which represents about 61% of total gains this week. Currently, no settlements are affected by this gain. No additional settlements are predicted to be affected in the near future. The #2 largest gain by UA forces covers approximately 1.09 km², which represents about 23% of total gains this week. Currently, the gain affects the settlement Кучерів Яр. No additional settlements are predicted to be

affected in the near future. The #3 largest gain by UA forces covers approximately 0.40 km², which represents about 8% of total gains this week. Currently, no settlements are affected by this gain. No additional settlements are predicted to be affected in the near future.

Module 4: Settlements (DeepStateMap) — Narrative

According to data reported by the DeepStateMap project, between 2025-10-19 to 2025-10-25, the following territorial developments were observed:
Russian forces expanded their control between 2025-10-19 to 2025-10-25, with Russia gaining 183.1 km² (57.7% more than the previous week, which was 116.1 km²), and Ukraine gaining 25.0 km² (98.7% more than the previous week, which was 12.6 km²).

The most occupied oblast was Donetsk Oblast (Біла Гора). Newly occupied settlements include: Біла Гора (village, Donetsk Oblast), Куп'янськ (town, Kharkiv Oblast), Нововасилівське (village, Zaporizhia Oblast).

Based on the local weekly advance (median ≈ 0.84 km, dynamic buffer 842 m), settlements likely next affected by Russian advances include Новоторецьке (village, Donetsk Oblast) (150 m), Новогригорівка (village, Zaporizhia Oblast) (303 m), Вовчанськ (town, Kharkiv Oblast) (319 m), Плавні (village, Zaporizhia Oblast) (423 m), Полтавка (village, Zaporizhia Oblast) (443 m), Вербове (village, Dnipropetrovsk Oblast) (475 m), Бойківка (village, Donetsk Oblast) (603 m). Based on the local weekly retreat (median ≈ 0.22 km, dynamic buffer 500 m), settlements likely next affected by Ukrainian advances include Малі Щербаки (village, Zaporizhia Oblast) (47 m), Кучерів Яр (village, Donetsk Oblast) (467 m).

Module 1: Equipment Losses Weekly Comparison (WarSpotting)— Narrative

According to data reported by the WarSpotting project, between 2025-10-17 and 2025-10-23, Russian forces lost 35 pieces of equipment (cumulative total: 21548), representing a decrease of 30.0% compared to the previous week.

The largest increase was seen in Command posts, communication, which rose to 1 units (+1, +0.0%). Meanwhile, Infantry fighting vehicles losses dropped to 22 units (-6, -21.4%).

📅 Weekly Retrospective (last 52 weeks):
- Average weekly losses over the past year: 112.2, current week below average (35 units).
- Largest weekly spike: 740 units in week ending 2022-03-28.
- Cumulative total: 21548

Equipment categories with the highest relative increase compared to their yearly average:
- Command posts, communication (+940.0%)
- Rocket and missile artillery (+13.0%)
- Transport (+-34.5%)

Categories with the largest decreases:
- Airplanes (-100.0%)
- Ambulances, medical vehicles (-100.0%)
- Anti-aircraft systems (-100.0%)

Geolocation data was available for 21 of these losses (60.0%), compared to 37 (74.0%) the week before.

The 254th Motor Rifle Regiment recorded the highest number of equipment losses among identifiable Russian units last week.
The most frequently reported location was Mala Tokmachka, Polohy raion, indicating sustained or intensified activity in the area.

Module 2: Equipment Losses Weekly Comparison (Oryx)— Narrative with Retrospective & Category Context

According to data reported by the Oryx project, between 2025-10-19 and 2025-10-25, Russian forces lost 305 units (cumulative total: 23214), while Ukrainian forces lost 214 units (cumulative total: 10188). This represents a increase of 1.3% for Russia and a increase of 2.1% for Ukraine compared to the previous week. The RU/UA loss ratio was 2.28, compared to 2.30 the previous week.

📆 Weekly Retrospective (last 52 weeks):
- Russia: average weekly losses over the past year 12.4, current week above average (305 units), largest weekly spike: 252 units in week ending 2025-10-24.
- Ukraine: average weekly losses over the past year 9.1, current week above average (214 units), largest weekly spike: 236 units in week ending 2025-03-20.
- Cumulative totals: Russia 23214, Ukraine 10188

🔷 Per-Category Weekly Context and Top 3 Highlights:

Russia:
- Tanks: 47 (above average 1.9)
- AFV: 44 (above average 1.7)
- IFV: 78 (above average 3.8)
- APC: 9 (above average 0.5)
- IMV: 2 (above average 0.3)
- Engineering: 13 (above average 0.3)
- Coms: 0 (below average 0.0)
- Vehicles: 70 (above average 1.6)
- Aircraft: 3 (above average 0.2)
- Infantry: 89 (above average 4.5)
- Logistics: 13 (above average 0.3)
- Armor: 91 (above average 3.6)
- Antiair: 4 (above average 0.3)

- Artillery: 20 (above average 0.3)
  🔺 Top 3 increases this week: Armor (+87.4), Infantry (+84.5), IFV (+74.2)
  🔻 Top 3 decreases this week: Coms (-0.0)

Ukraine:
- Tanks: 19.0 (above average 0.9)
- AFV: 1.0 (above average 0.2)
- IFV: 18.0 (above average 1.1)
- APC: 32.0 (above average 1.5)
- IMV: 54.0 (above average 1.7)
- Engineering: 0.0 (below average 0.2)
- Coms: 2.0 (above average 0.1)
- Vehicles: 22.0 (above average 0.7)
- Aircraft: 0.0 (below average 0.0)
- Infantry: 104.0 (above average 4.3)
- Logistics: 2.0 (above average 0.3)
- Armor: 20.0 (above average 1.2)
- Antiair: 3.0 (above average 0.1)
- Artillery: 20.0 (above average 0.7)
  🔺 Top 3 increases this week: Infantry (+99.7), IMV (+52.3), APC (+30.5)
  🔻 Top 3 decreases this week: Aircraft (-0.0), Engineering (-0.2)

Russia units with the highest relative increase compared to their weekly average were Armor (+87.4), Infantry (+84.5), IFV (+74.2). Units showing the largest decreases were Coms (-0.0). This indicates which equipment types were most active or affected on the frontlines this week.
Ukraine units with the highest relative increase compared to their weekly average were Infantry (+99.7), IMV (+52.3), APC (+30.5). Units showing the largest decreases were Aircraft (-0.0), Engineering (-0.2). This indicates which equipment types were most active or affected on the frontlines this week.

Module 3: Occupation Change Analysis (DeepStateMap) — Narrative

According to data reported by the DeepStateMap project, as of 2025-10-25, Russian forces occupy approximately 95449.60 km² in Ukraine, which is 15.88% of the country's total territory. In the last 7 days, the occupied territory has increased by 76.81 km², a growth of 0.01%. Luhansk Oblast has 26548.88 km² occupied, accounting for 99.53% of its territory, which changed by 0.00 km² (0.00%) over the past week. Autonomous Republic of Crimea has 26846.21 km² occupied, accounting for 98.96% of its territory, which changed by 0.00 km² (0.00%) over the past week. Donetsk Oblast has 20234.15 km² occupied, accounting for 75.81% of its territory, which changed by 25.85 km² (0.10%) over the past week.

Module 4: Settlements (DeepStateMap) — Narrative - Future

Settlements likely to be next affected based on current frontline dynamics:

- Potentially threatened by Russian advance (avg advance ≈ 0.84 km, buffer 842 m):

- Новоторецьке (village, Donetsk Oblast) (150 m)
- Новогригорівка (village, Zaporizhia Oblast) (303 m)
- Вовчанськ (town, Kharkiv Oblast) (319 m)
- Плавні (village, Zaporizhia Oblast) (423 m)
- Полтавка (village, Zaporizhia Oblast) (443 m)
- Вербове (village, Dnipropetrovsk Oblast) (475 m)
- Бойківка (village, Donetsk Oblast) (603 m)

- Potentially threatened by Ukrainian advance (avg retreat ≈ 0.22 km, buffer 500 m):
  - Малі Щербаки (village, Zaporizhia Oblast) (47 m)
  - Кучерів Яр (village, Donetsk Oblast) (467 m)

Module 5: Settlements (DeepStateMap) — Narrative

This briefing focuses on Ukraine overall and on oblasts where occupation levels are between 2% and 95%. Oblasts with less than 2% occupation or more than 95% occupation are excluded from this analysis.

As of the latest update, Ukraine overall is 15.9% occupied. At the current weekly pace, full occupation of Ukraine would take approximately 6583.6 weeks, or about 126.6 years.

Key oblasts under partial occupation:
Donetsk Oblast is currently 75.8% occupied. Over the past week, the occupied area changed by 25.9 km² (0.10%). current trends suggest full occupation could occur in approximately 249.8 weeks (~4.8 years). Zaporizhia Oblast is currently 73.8% occupied. Over the past week, the occupied area changed by 28.5 km² (0.11%). current trends suggest full occupation could occur in approximately 249.2 weeks (~4.8 years). Kharkiv Oblast is currently 4.3% occupied. Over the past week, the occupied area changed by 2.2 km² (0.01%). current trends suggest full occupation could occur in approximately 13816.1 weeks (~265.7 years).

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RAW DATA REPORTS

Module 1: Equipment Losses Weekly Comparison (WarSpotting)— RAW

📊 Equipment Losses Report (2025-10-17 to 2025-10-23):

- Total reported equipment losses: 35 (📉 15 from previous week, -30.0%)

🔷 Breakdown by equipment type:
- Command posts, communication: 1 (📈 +1, +0.0%)
- Drones: 0 (📉 -2, -100.0%)
- Engineering: 0 (📉 -2, -100.0%)
- Infantry fighting vehicles: 22 (📉 -6, -21.4%)
- Infantry mobility vehicles: 0 (📉 -1, -100.0%)
- Rocket and missile artillery: 2 (📈 +1, +100.0%)
- Tanks: 3 (📉 -4, -57.1%)
- Towed artillery: 0 (📉 -1, -100.0%)
- Transport: 7 (📉 -1, -12.5%)

🧭 Geolocation Summary:
- Last week: 21 geolocated out of 35 (60.0%)
- Previous week: 37 geolocated out of 50 (74.0%)

🏷️ Units Most Affected (Last Week):
- 254th Motor Rifle Regiment: 3 losses
- 42nd Guards Motor Rifle Division: 2 losses

📍 Locations with Most Losses (Last Week):
- Mala Tokmachka, Polohy raion: 6 losses
- Nesterianka, Polohy raion: 3 losses
- Pokrovsk raion, Donetsk oblast: 3 losses

Module 2: Equipment Losses Weekly Comparison (Oryx)— RAW

📊 Weekly Equipment Losses Report (2025-10-19 to 2025-10-25):

🇷🇺 Russia (cumulative): 23214 (Δ +305, +1.3%)
🇺🇦 Ukraine (cumulative): 10188 (Δ +214, +2.1%)
⚖️ RU/UA Ratio: 2.28 (prev 2.30)

🔷 Breakdown by equipment type (Russia, weekly increments):
- Tanks: 47 (📈 +47, +0.0%)
- AFV: 44 (📈 +44, +0.0%)
- IFV: 78 (📈 +78, +0.0%)

- APC: 9 (📈 +9, +0.0%)
- IMV: 2 (📈 +2, +0.0%)
- Engineering: 13 (📈 +13, +0.0%)
- Coms: 0 (➖ +0, +0.0%)
- Vehicles: 70 (📈 +70, +0.0%)
- Aircraft: 3 (📈 +3, +0.0%)
- Infantry: 89 (📈 +89, +0.0%)
- Logistics: 13 (📈 +13, +0.0%)
- Armor: 91 (📈 +91, +0.0%)
- Antiair: 4 (📈 +4, +0.0%)
- Artillery: 20 (📈 +20, +0.0%)

🔷 Breakdown by equipment type (Ukraine, weekly increments):
- Tanks: 19.0 (📈 +19.0, +0.0%)
- AFV: 1.0 (📈 +1.0, +0.0%)
- IFV: 18.0 (📈 +18.0, +0.0%)
- APC: 32.0 (📈 +32.0, +0.0%)
- IMV: 54.0 (📈 +54.0, +0.0%)
- Engineering: 0.0 (➖ +0.0, +0.0%)
- Coms: 2.0 (📈 +2.0, +0.0%)
- Vehicles: 22.0 (📈 +22.0, +0.0%)
- Aircraft: 0.0 (➖ +0.0, +0.0%)
- Infantry: 104.0 (📈 +104.0, +0.0%)
- Logistics: 2.0 (📈 +2.0, +0.0%)
- Armor: 20.0 (📈 +20.0, +0.0%)
- Antiair: 3.0 (📈 +3.0, +0.0%)
- Artillery: 20.0 (📈 +20.0, +0.0%)

Module 3: Occupation Change Analysis (DeepStateMap) — Detailed

Occupation report for Ukraine comparing 2025-10-18 to 2025-10-25:
Overall, occupied territory has increased by 76.81 km² (0.01 percentage points).

Top 3 oblasts with increased occupation:
- Zaporizhia Oblast: +28.54 km² (0.11%)
- Donetsk Oblast: +25.85 km² (0.10%)
- Dnipropetrovsk Oblast: +20.23 km² (0.06%)

Top 3 oblasts with decreased occupation:
- Luhansk Oblast: 0.00 km² (0.00%)
- Autonomous Republic of Crimea: 0.00 km² (0.00%)
- Sumy Oblast: 0.00 km² (0.00%)

Oblasts with significant occupation (>10% occupied):
- Luhansk Oblast: 99.53%
- Autonomous Republic of Crimea: 98.96%

- Donetsk Oblast: 75.81%
- Zaporizhia Oblast: 73.75%

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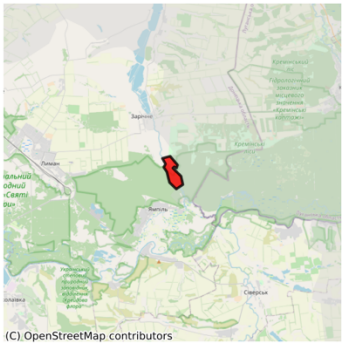
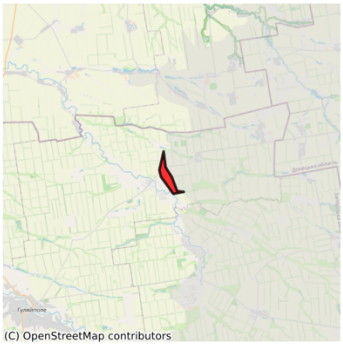
Module 6: Frontline Map Report

2025-10-19 | Daily Total: RU: 7.36 km² | UA: 0.00 km² (Top 3 gains shown)

RU #1
3.17 km²



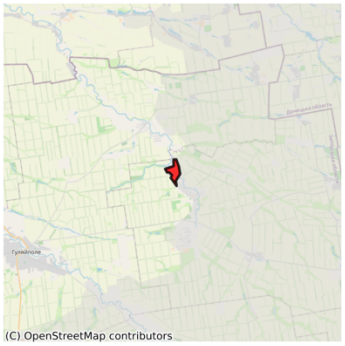
RU #2
2.65 km²



RU #3
1.54 km²

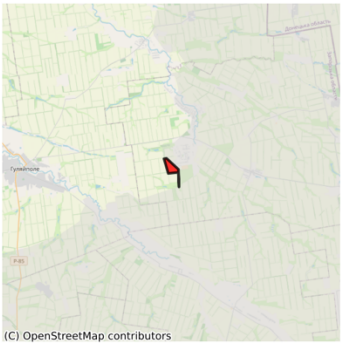
2025-10-20 | Daily Total: RU: 4.27 km² | UA: 0.00 km² (Top 3 gains shown)

RU #1
1.67 km²



RU #2
1.42 km²

RU #3
1.18 km²



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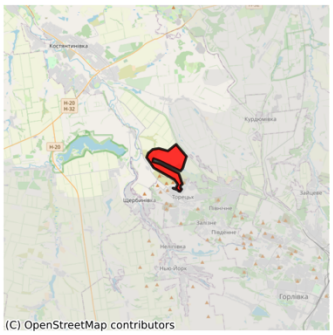
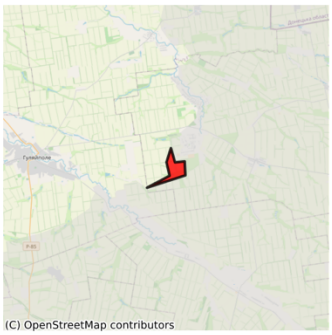
2025-10-21 | Daily Total: RU: 32.80 km² | UA: 0.90 km² (Top 3 gains shown)

RU #1
8.64 km²

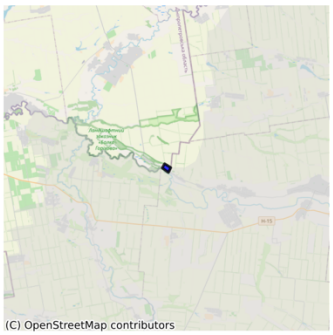


RU #2
7.39 km²

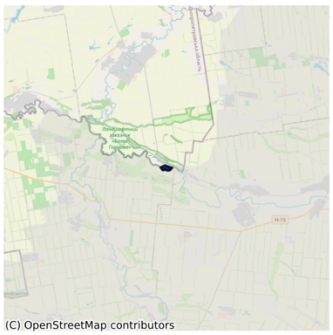
RU #3
4.09 km²



UA #1
0.40 km²

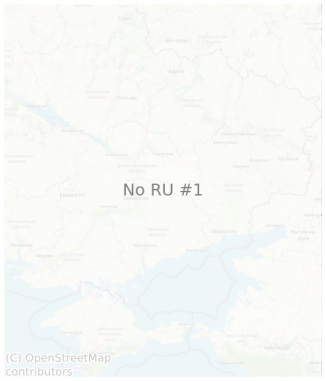


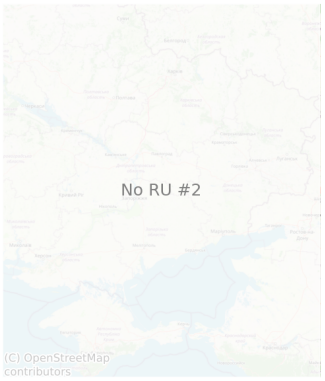
UA #2
0.35 km²

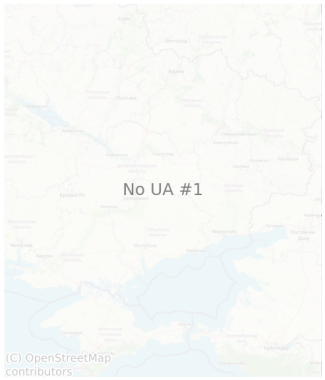


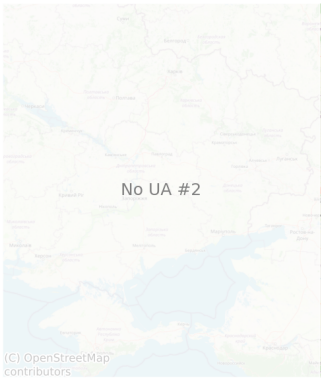
UA #3
0.14 km²

2025-10-22 | Daily Total: RU: 0.00 km² | UA: 0.00 km² (Top 3 gains shown)









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Powered entirely by publicly available OSINT datasets and Python-based data analysis pipelines.
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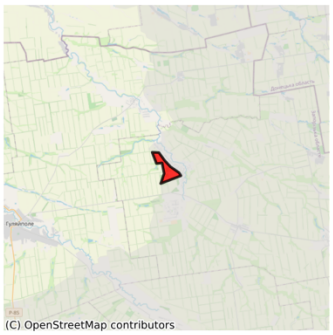
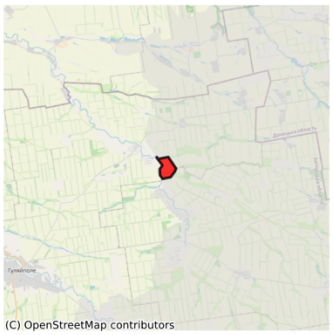
2025-10-23 | Daily Total: RU: 12.58 km² | UA: 3.69 km² (Top 3 gains shown)

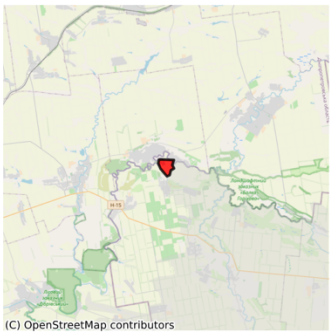
RU #1
3.20 km²



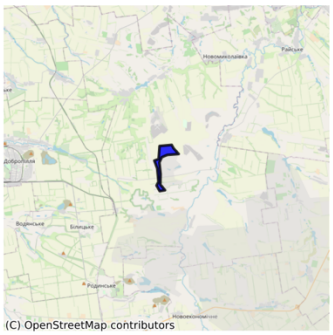
RU #2
2.75 km²



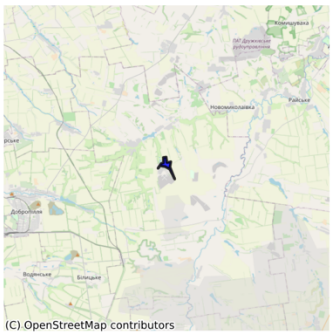
RU #3
1.88 km²



UA #1
2.90 km²



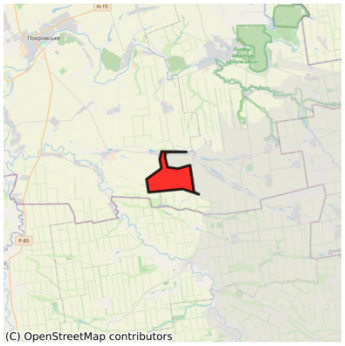
UA #2
0.73 km²



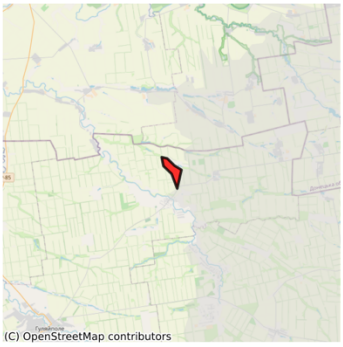
UA #3
0.06 km²

2025-10-24 | Daily Total: RU: 14.47 km² | UA: 0.00 km² (Top 3 gains shown)

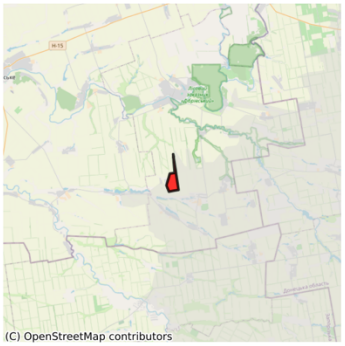
RU #1
10.47 km²



RU #2
2.26 km²



RU #3
1.74 km²



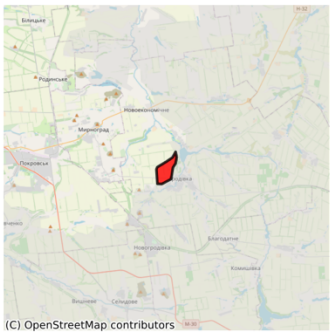
FRONT_BOT is a research prototype for automated military conflict reporting.
Powered entirely by publicly available OSINT datasets and Python-based data analysis pipelines.
⚠️ All data is interpreted algorithmically — inaccuracies may occur. Use at your own discretion.

FRONT_BOT (Frontline Reporting & OSINT Node Tracker Bot)

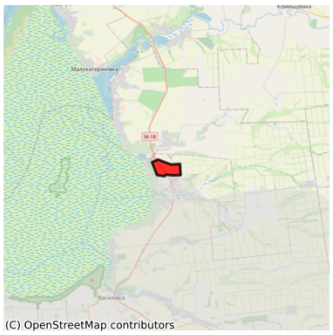
Developed by Zsolt Lazar – OSINT Homelab

2025-10-25 | Daily Total: RU: 10.28 km² | UA: 0.36 km² (Top 3 gains shown)

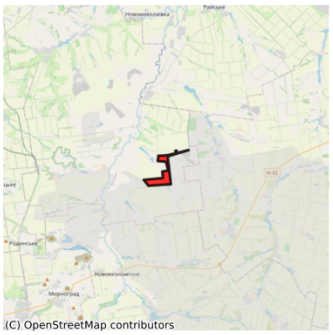
RU #1
3.56 km²



RU #2
3.54 km²



RU #3
3.18 km²



UA #1
0.36 km²

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METHODOLOGY

Module 1: Equipment Losses Weekly Comparison (WarSpotting) relies on open-source intelligence from the WarSpotting database, which aggregates visually confirmed Russian equipment losses reported during the conflict in Ukraine. The module uses an automated pipeline to download the most recent dataset from a controlled Kaggle repository if it is not already present locally. After ingestion, the data is cleaned by parsing the date field, removing invalid entries, and retaining key attributes such as equipment type, unit affiliation, nearest location, and geocoordinates where available. The analytical approach is based on a comparative weekly framework: the last seven-day period ending on the most recent entry is contrasted with the preceding week. For both timeframes, the module calculates total losses, the distribution of equipment types, the proportion of geolocated cases, and the most frequently affected units and locations. It then determines absolute and percentage changes in losses across weeks, identifying the largest increases or decreases by equipment category. Outputs are generated in two forms: a structured statistical summary presenting detailed counts and trends, and a natural-language narrative that highlights key findings in descriptive form.

Module 2: Equipment Losses Weekly Comparison (Oryx) performs a similar comparative analysis of equipment losses but uses the Oryx dataset, which is based on visually verified equipment losses for both Russian and Ukrainian forces. The data is sourced from an automated Kaggle repository and is structured as daily cumulative counts across multiple equipment categories for each side. After loading, dates are standardized and all numerical fields are converted to consistent numeric formats to ensure accuracy in time-series calculations. The analysis computes weekly increments by subtracting cumulative totals from the previous week, producing absolute and percentage changes for Russia and Ukraine separately. It also calculates the ratio of Russian to Ukrainian losses and compares these to the prior week to assess relative attrition trends. Beyond weekly differences, the module incorporates a retrospective component, analyzing up to one year of historical data to contextualize the current week's figures against long-term averages and identifying the most significant weekly spikes. The analysis extends to category-level dynamics, evaluating which equipment types recorded the highest increases or decreases relative to their historical averages, thereby identifying emerging tactical or operational trends. The results are formatted as two outputs: a structured statistical summary and a natural-language narrative enriched with retrospective context and category-level interpretation.

Module 3: Occupation Change Analysis (DeepStateMap) evaluates territorial control dynamics by comparing geospatial frontline data from DeepStateMap across a one-week interval. The module combines daily polygons of occupied areas with official oblast-level administrative boundaries, both projected into an equal-area coordinate system to enable precise areal calculations. Occupied and total oblast areas are computed through geometric intersections, producing the absolute extent of occupied territory in square kilometers as well as the percentage of each oblast under control. The analysis first establishes national-level occupation figures for the latest date and contrasts them with values from seven days earlier, calculating absolute and percentage changes to capture weekly territorial shifts. It then disaggregates results at the oblast level, ranking regions by occupation percentage and highlighting the three with the largest increases and decreases in occupied area. A significance filter is applied to identify oblasts with more than ten percent of their territory under occupation, providing a concise set of regions for targeted monitoring. The narrative consists of a short executive-style summary describing national-level occupation and change, and a more detailed report listing oblast-level increases, decreases, and significant cases.

Module 4: Settlements (DeepStateMap) extends the frontline analysis by linking geospatial control changes to populated places, providing a settlement-level perspective on the war's dynamics. The module integrates daily occupied-area polygons from DeepStateMap with point data of Ukrainian settlements (cities, towns, villages) and oblast boundaries derived from official administrative datasets. Geometries are reprojected into a metric coordinate system to ensure accurate distance and area measurements. Weekly gains and losses are computed by differencing occupied-area unions from the most recent seven-day period with those from the preceding week, yielding net Russian gains and Ukrainian recaptures in square kilometers. These figures are contextualized against the previous two weeks to calculate percentage changes in control dynamics. Newly occupied and newly liberated settlements are identified through geometric intersections of the frontline change polygons with settlement points, while oblast-level aggregation highlights the regions experiencing the most pronounced shifts in control. The analysis further estimates the average advance and retreat distances of frontline segments and applies dynamic buffers to detect settlements most at risk of being directly affected in the near term. The outputs consist of a narrative summary describing weekly territorial dynamics, settlement gains and losses, and oblast-level hotspots, supplemented by a forward-looking report listing threatened settlements based on proximity to recent frontline movement.

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Module 5: Occupation Projections (DeepStateMap) extends the static occupation analysis by introducing forward-looking estimates of territorial control. The module begins with daily DeepStateMap frontline polygons reprojected into an equal-area system and intersects them with oblast-level administrative boundaries. Occupied area and percentage are calculated for both the most recent and the preceding week, producing absolute and relative changes. These figures form the basis of simple linear projections: if an oblast's occupied area has increased, the weekly increment is extrapolated to estimate the time required for full occupation, expressed in both weeks and years. Conversely, where no gains are observed, occupation is assessed as stalled and no projection is generated. The results are organized hierarchically, beginning with national-level occupation dynamics and continuing with oblast-level projections for regions with partial occupation—defined as between two and ninety-five percent. This filtering ensures that analytical attention is focused on contested territories rather than those almost fully occupied or almost entirely liberated. Outputs consist of structured CSV tables with current, past, and projected values, accompanied by a narrative report. The narrative provides an OSINT-style briefing summarizing overall occupation trends, highlighting oblasts with significant changes, and discussing likely trajectories under current conditions. While the projections offer intuitive insights into possible future scenarios, they remain conditional, assuming the continuation of short-term trends. As with all extrapolations, the results are sensitive to fluctuations in operational tempo, sudden offensives, or withdrawals, and should therefore be treated as indicative rather than predictive.

Module 6: Maps (DeepStateMap) provides a visual representation of frontline developments by converting territorial change into geospatial figures. The module processes daily occupied-area polygons from DeepStateMap, reprojects them into a metric coordinate system, and calculates differences between consecutive days over the past week. Gains and losses are expressed as new geometries, each with associated area in square kilometers. The largest three gains and losses for each day are extracted and visualized on static maps, using red polygons for Russian advances and blue polygons for Ukrainian recaptures, overlaid on an OpenStreetMap basemap for geographic context. Each map includes an inset annotation of the areal extent of the change, while a centered title reports daily totals of territorial gains and losses. These daily map panels are structured as a chronological sequence of figures with headings summarizing the balance of territorial shifts for each day. The report provides both a high-level overview of weekly dynamics and a fine-grained spatial account of where control has changed. By integrating geospatial analysis with cartographic outputs, the module transforms numerical calculations of gains and losses into immediately interpretable visual evidence, ensuring that territorial trends are communicated in an accessible form. Limitations include the resolution of input polygons, which may generalize frontline positions, and the focus on the top three changes per side, which may omit smaller but operationally relevant shifts.

Module 7: Graphs and Pie Charts (DeepStateMap) complements the cartographic outputs with a quantitative visualization of territorial changes over the past week. The module calculates daily gains and losses by comparing consecutive occupied-area polygons, intersecting the resulting geometries with administrative oblast boundaries to attribute changes to specific regions. The outputs are aggregated into a structured dataset capturing Russian and Ukrainian area changes in square kilometers, disaggregated by date and oblast. This information is then transformed into a stacked bar chart showing the scale and composition of daily advances and retreats, with separate columns for Russian occupation and Ukrainian liberation. Distinctive colors assigned to each oblast allow for quick identification of where changes occurred, while patterned hatching differentiates Ukrainian gains from Russian gains. Complementing the time-series perspective, proportional pie charts summarize the distribution of total gains by oblast for each side, scaled in size according to overall magnitude. This dual visualization highlights both temporal dynamics and spatial concentration of activity, making it clear which regions contributed most to shifts in control. The module also generates a statistical summary of the week's developments, including total gains for each side, the three most affected oblasts, and the dates on which peak advances occurred. Limitations stem from the resolution of frontline data and the aggregation of small-scale fluctuations, which may mask micro-level tactical shifts while still capturing operational-level trends.

Module 8: Weekly Territorial Map (DeepStateMap) builds a weekly territorial overview by comparing occupied frontline geometries from the DeepStateMap dataset. The method first identifies the seven most recent days of data and establishes a baseline by selecting the last available date before this weekly window. For longer-term context, a secondary baseline is also taken from one year earlier. By applying geometric operations, the method calculates both newly occupied territories (Russian gains) and liberated areas (Ukrainian gains) over the past seven days. These areas are measured in square kilometers and ranked, allowing the identification of the three largest changes on each side. The visualization combines two layers of analysis: side panels zoom into the three most significant gains for Russia and Ukraine, while the central map shows the full Ukrainian theater. This central view highlights one-year-old occupation zones in gray, overlays recent gains in red and blue, and uses directional arrows to link the side maps with

their precise locations. To ensure interpretability, all geometries are reprojected into equal-area coordinates for accurate measurement, and then into web-mercator projection for basemap rendering. The resulting figure situates short-term developments within the broader strategic picture, showing both the absolute scale of weekly gains and their spatial distribution across the front. A concise summary quantifies total Russian and Ukrainian gains, while the side panels and arrows guide the reader to the most dynamic hotspots of the week.

Module 9: TOP3 Territorial Maps (DeepStateMap) expands the territorial change analysis by focusing on the three largest weekly gains for each side and enriching them with predictive and contextual layers. After isolating the top three polygons of change, the method generates a three-by-three grid of maps: the first column displays current occupation zones overlaid on OpenStreetMap basemaps, the second column projects possible near-future contested areas by buffering the current gains and intersecting them with opposing control, and the third column adds a terrain perspective by draping these areas over a reprojected NASA digital elevation model. To enhance interpretability, each map includes dynamic scale bars, highlighted settlement markers, and frames that visually emphasize the change area. A narrative generator complements the maps by describing the absolute and relative scale of each gain, its share of the weekly total, and the settlements currently or potentially affected if the advance continues. This produces not only cartographic but also textual intelligence, making the output suitable for briefing contexts where both visual and written situational awareness are required.