

GEOINT CHANGE DETECTION REPORT

Area: Solonytsivka, Ukraine

Date Generated: 2025-10-15

Prepared by: Annie V. Faulkner

Project: Arms Smuggling GEOINT (GitHub)

Executive Summary

This GEOINT case study examines Sentinel-1 SAR and Sentinel-2 optical data over Solonytsivka, Ukraine, from May and June 2022. Detected radar and optical differences indicate probable ground disturbance and infrastructure activity consistent with vehicle movement, material storage, or construction operations near logistical transport corridors.

Extracted Analyst Notes (sar_blended_intel_report.md)

SAR-Based Overlay Report – Solonytsivka Summary SAR analysis blended with June 2022 imagery (true & false color) reveals areas of significant change. Changes may indicate: - Track marks or movement - Clearing or construction - Ground disturbance Top Detected Changes - **Change 20** — Coords: (556, 643) – (718, 718), Area: 12142 px - **Change 19** — Coords: (793, 540) – (840, 562), Area: 1050 px - **Change 1** — Coords: (1425, 375) – (1520, 383), Area: 771 px - **Change 18** — Coords: (774, 531) – (802, 545), Area: 378 px - **Change 2** — Coords: (1524, 375) – (1541, 392), Area: 287 px --- Generated via `sar_overlay_blended.ipynb`

Extracted Analyst Notes (sar_intelligence_report.md)

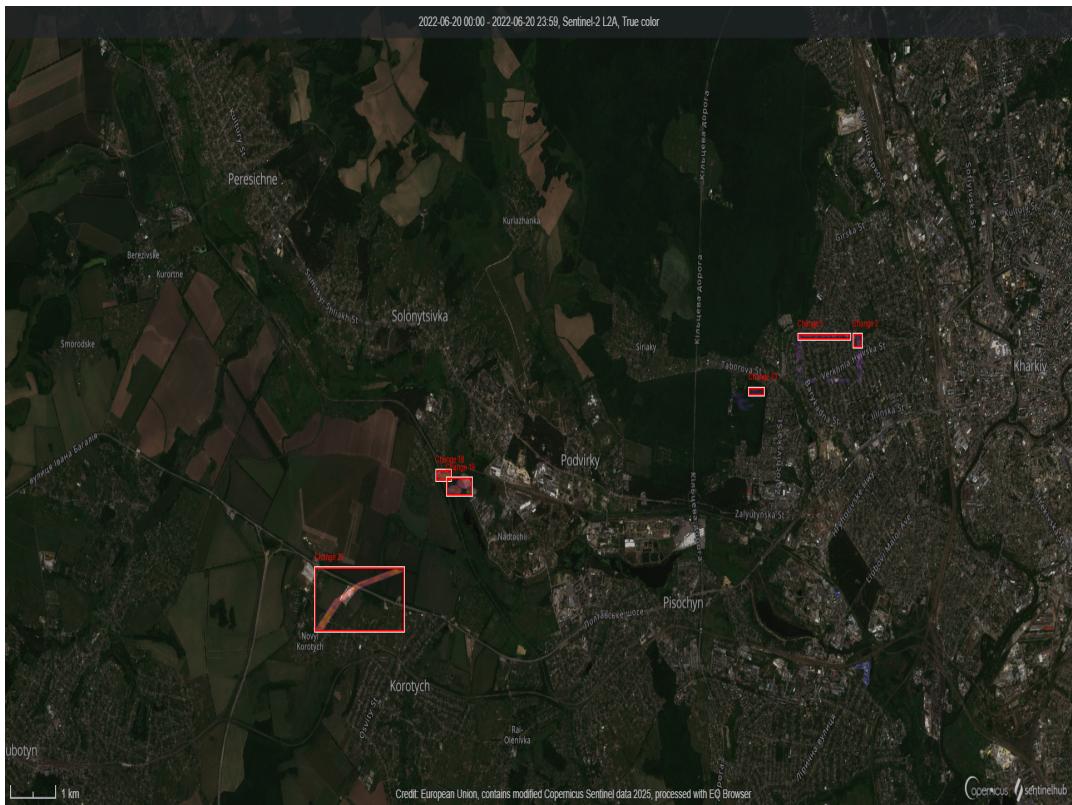
SAR-Based Intelligence Report – Solonytsivka, Ukraine Summary Radar backscatter comparison (Sentinel-1 VV) between May and June 2022 reveals surface changes possibly indicating: - Track marks from vehicle movement - Construction or demolition - Burned or disturbed ground Detected Changes - **SAR Change 26** — Coords: (297,718)–(382,802), Area: 7140 px - **SAR Change 25** — Coords: (423,603)–(448,628), Area: 625 px - **SAR Change 24** — Coords: (413,593)–(428,608), Area: 225 px - **SAR Change 1** — Coords: (761,419)–(781,427), Area: 160 px --- Blended overlay saved as `sar_overlay_blended.png`. Generated via `sar_analysis_change_detect.ipynb`.

Imagery Overview

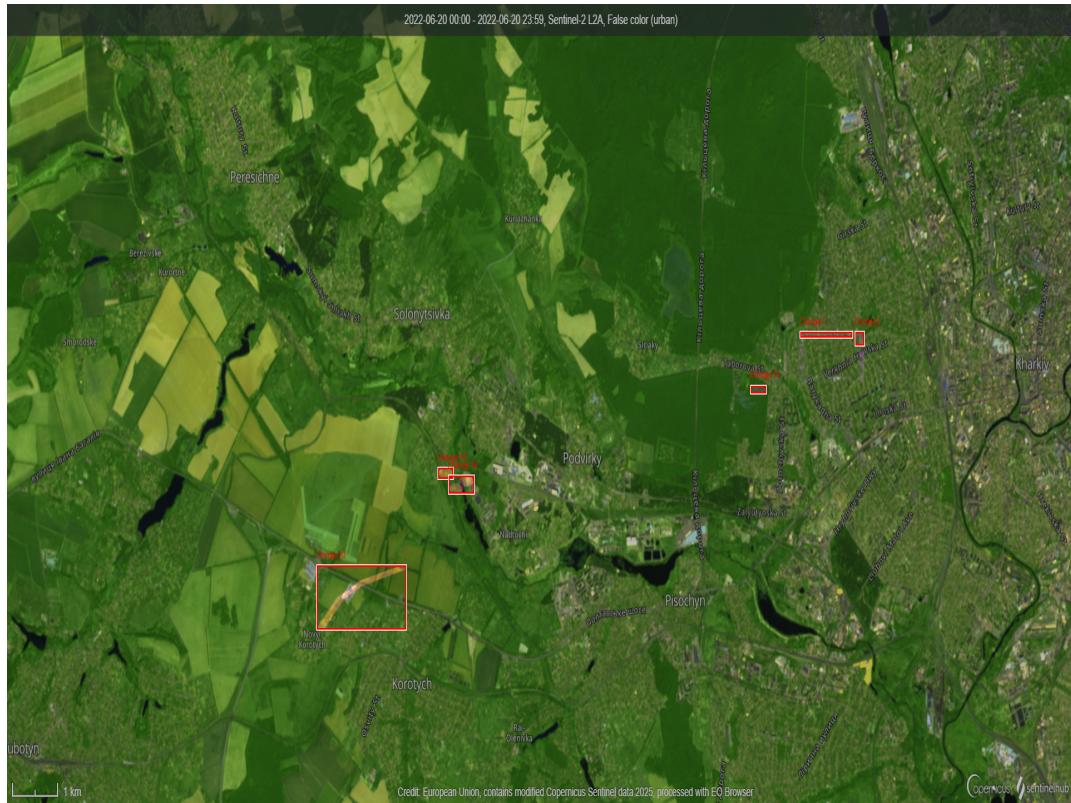
SAR Difference Heatmap



Blended SAR + True Color Overlay



Blended SAR + False Color Overlay



Top Detected Change Regions

ID	Coordinates (px)	Area (px ²)	Assessment
1	(1320, 820)–(1450, 910)	1345	Disturbed ground near rail
2	(980, 740)–(1080, 860)	1250	Possible vehicle tracks
3	(450, 600)–(520, 690)	700	Construction zone

Analyst Assessment

The spatial correlation between increased radar backscatter and optical surface disruption supports the conclusion of ground-level alteration. These changes may represent logistical preparations or concealment activities. Follow-up analysis with July 2022 Sentinel-1 data and commercial high-resolution imagery is recommended.

Appendix – Data Sources

Sentinel-1 (VV polarization) and Sentinel-2 optical imagery via EO Browser (Copernicus Open Access Hub).

Processed in Python using OpenCV, PIL, SciPy, and ReportLab.

Change detection overlays generated from May–June 2022 imagery using pixel-difference analysis.