KHTHQN

SEARCHING FOR THE LOST

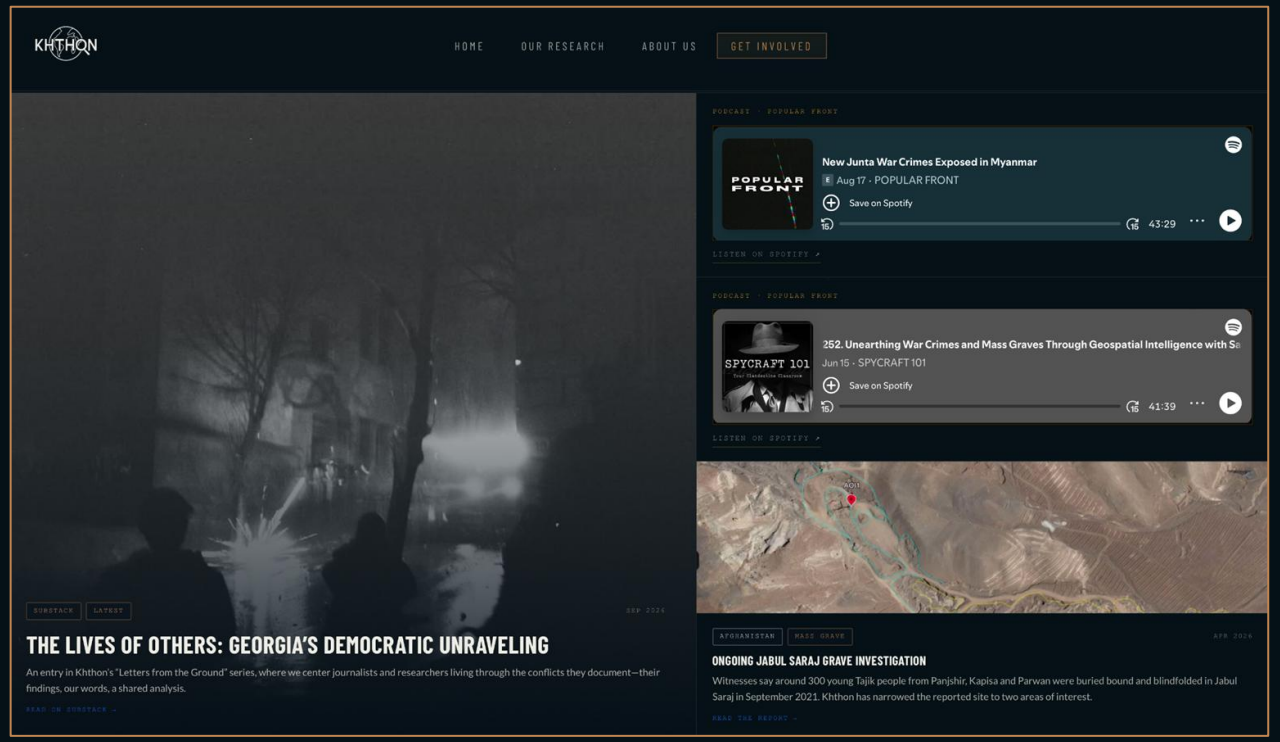
AI-Assisted Remote Detection of Clandestine Graves in Mexico

Detección remota asistida por IA de fosas clandestinas en México

What is KHTHON ?

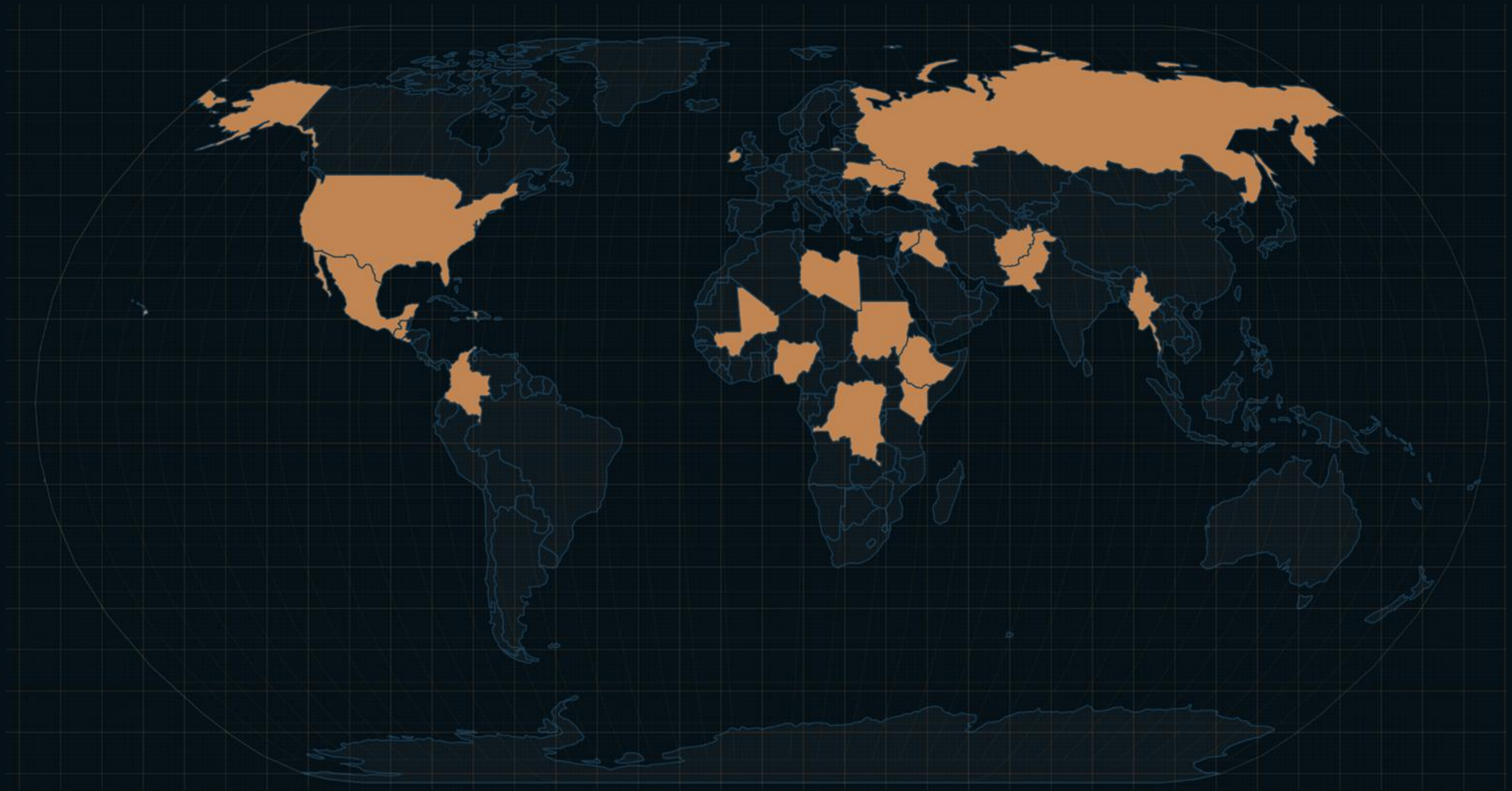
Formed in 2022, Khthon is an OSINT and GEOINT-based humanitarian NGO that locates, analyses, and reports mass graves and other war crimes in hidden conflicts around the world.

Fundada en 2022, Khthon es una ONG humanitaria basada en OSINT y GEOINT que localiza, analiza y documenta fosas comunes y otros crímenes de guerra en conflictos ocultos de todo el mundo.





100+ Volunteers



130,000+ Disappeared/
130.000+Desaparecidos

Mexico's national registry exceeds 130,000 cases, with clandestine graves and “death camps” documented in Jalisco, Colima, Veracruz, Nayarit and beyond.

Deliberate Concealment/
Ocultamiento deliberado

Sites are hidden in rural, agricultural, or restricted-access terrain.

High-Risk Ground Search/
Búsqueda Terrestre de Alto Riesgo

Collectives face serious danger, limited resources, and vast areas to cover on foot.

Remote Search/Búsqueda Remota

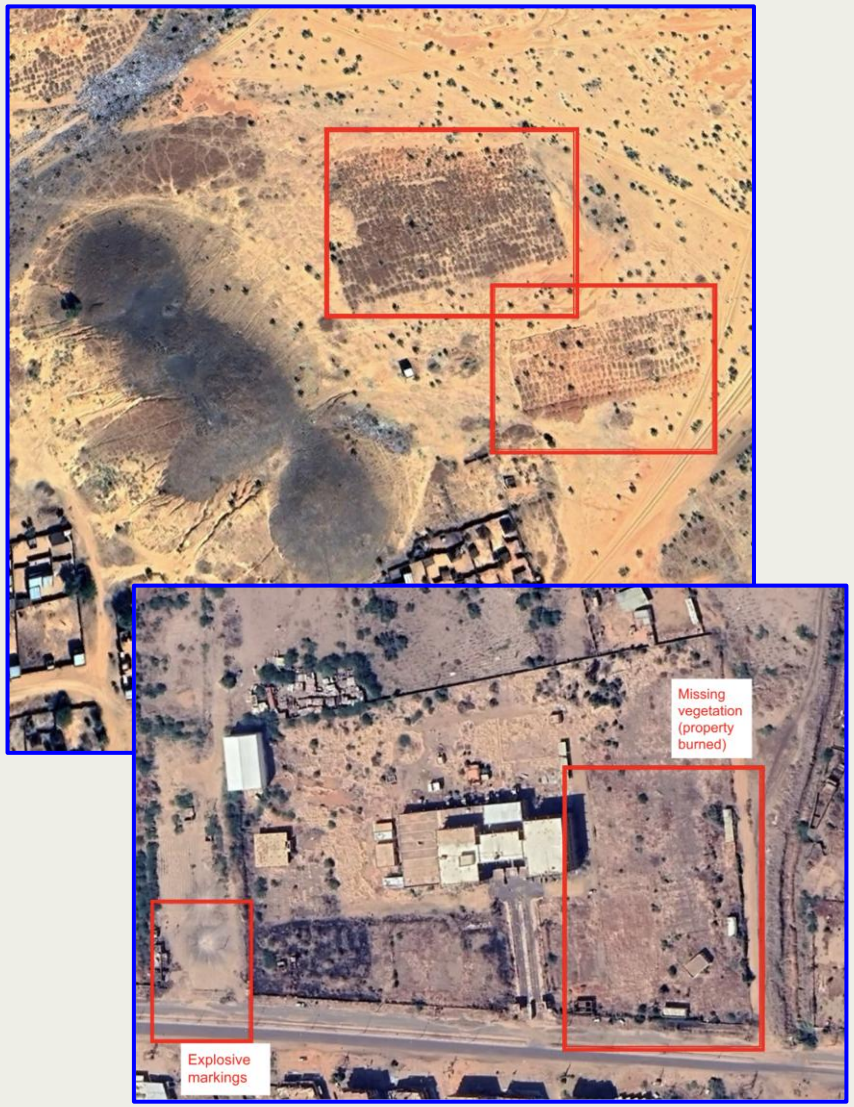
Khthon works upstream detecting and documenting potential burial sites so Comisión Nacional de Búsqueda (CNB), prosecutors, forensic institutes, universities, and collectives can prioritize physical search.

GEOINT

A remote, scalable layer upstream of ground search.

Una capa remota y escalable ascendente de la búsqueda terrestre.

- **Traditional methods** rely on tips, ground sweeps, drones and GPR at already-known sites, and post-recovery forensics.
- **Time-series SATINT/GEOINT** — Maxar, Planet, Sentinel optical and SAR — detects soil disturbance, vegetation anomalies (NDVI), vehicle tracks and trench geometry.
- **Fused with OSINT and SOCMINT** (geolocation and chronolocation of media) and ethically assessed HUMINT.
- **Complements tools** already in use or in development (tattoo identification, age progression, database matching by Lab-Co and others) by addressing the upstream location problem.
  - El análisis de series temporales SATINT/GEOINT —basado en imágenes ópticas y SAR de Maxar, Planet y Sentinel— permite detectar alteraciones del suelo, anomalías en la vegetación (NDVI), huellas de vehículos y la geometría de trincheras.



AI TRIAGE

Mass Grave Detector (MGD) ranks candidate coordinates for human analysts — hours instead of weeks of manual review across large areas.

El Detector de Fosas Comunes (MGD) clasifica las coordenadas candidatas para los analistas humanos, permitiendo realizar la tarea en horas en lugar de las semanas que requeriría una revisión manual de grandes extensiones.

Outputs are probability scores only — not determinations. Before any flag enters a record:

- *It is reviewed by a human analyst - Es revisado por un analista humano.*
- *It is corroborated by at least one independent, non-AI source - Está corroborado por al menos una fuente independiente.*



STRUCTURAL MAPPING

Deep learning models map features and landscape context across the search area.

OUTPUT: candidate structures in context

Los modelos de aprendizaje profundo mapean las características y el contexto del paisaje en toda el área de búsqueda.

RESULTADO: estructuras candidatas en su contexto.



SPATIAL PROBABILITY

Random Forest models trained on historical grave data score each location — adaptable by biome and terrain.

OUTPUT: probability-weighted coordinates

Los modelos de *Random Forest* entrenados con datos históricos de tumbas asignan una puntuación a cada ubicación, adaptable según el bioma y el terreno.

RESULTADO: coordenadas ponderadas por probabilidad.

Structural Mapping

*Using **Functional Map of The World, Sentinel 2,** and **OpenStreetMap** to build context*

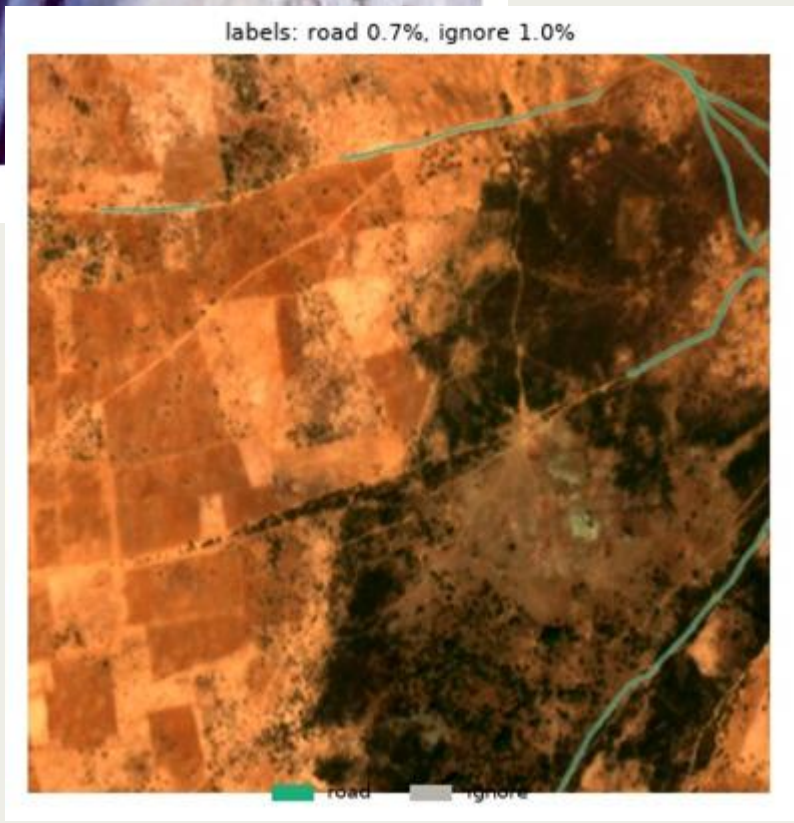
- **Functional Map of The World**: Dataset of map features. The dataset will be used to train a Convolutional Neural Network for object detection with a ResNet backbone.
- Conjunto de datos de elementos cartográficos. El conjunto de datos se utilizará para entrenar una red neuronal convolucional de detección de objetos con una arquitectura base ResNet.

- **Sentinel 2:** Multispectral, high resolution satellite imagery. Passing in Sentinel 2 data, the FMOTW model will infer the locations and dimensions of map features.
- Imágenes multiespectrales de alta resolución. Con Sentinel-2, el modelo FMOTW inferirá las ubicaciones y dimensiones de los elementos.

- **OpenStreetMap**: Worldwide dataset of streets.
- Conjunto de datos de calles a nivel mundial.

- Using the model, satellite imagery, and street data, we can build context around possible mass graves.
- Utilizando el modelo, las imágenes satelitales y los datos de las calles, podemos contextualizar las posibles fosas comunes.

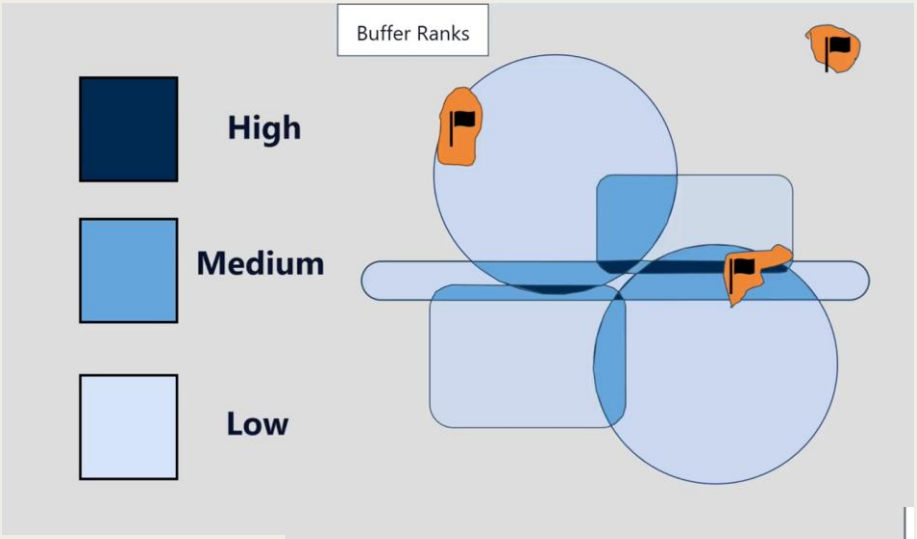




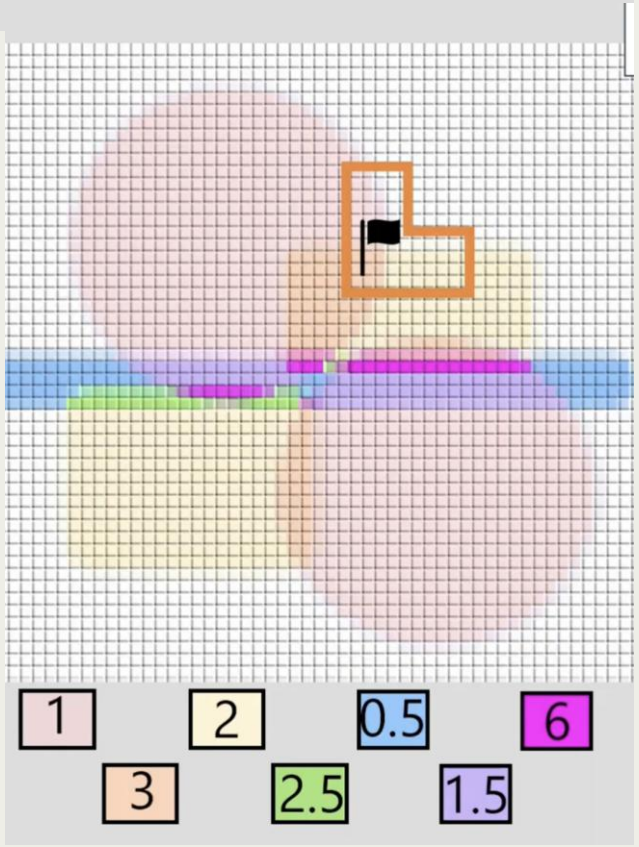
Spatial Probability

Using patterns of known graves to evaluate possible graves.

Utiliza patrones de sitios conocidos.

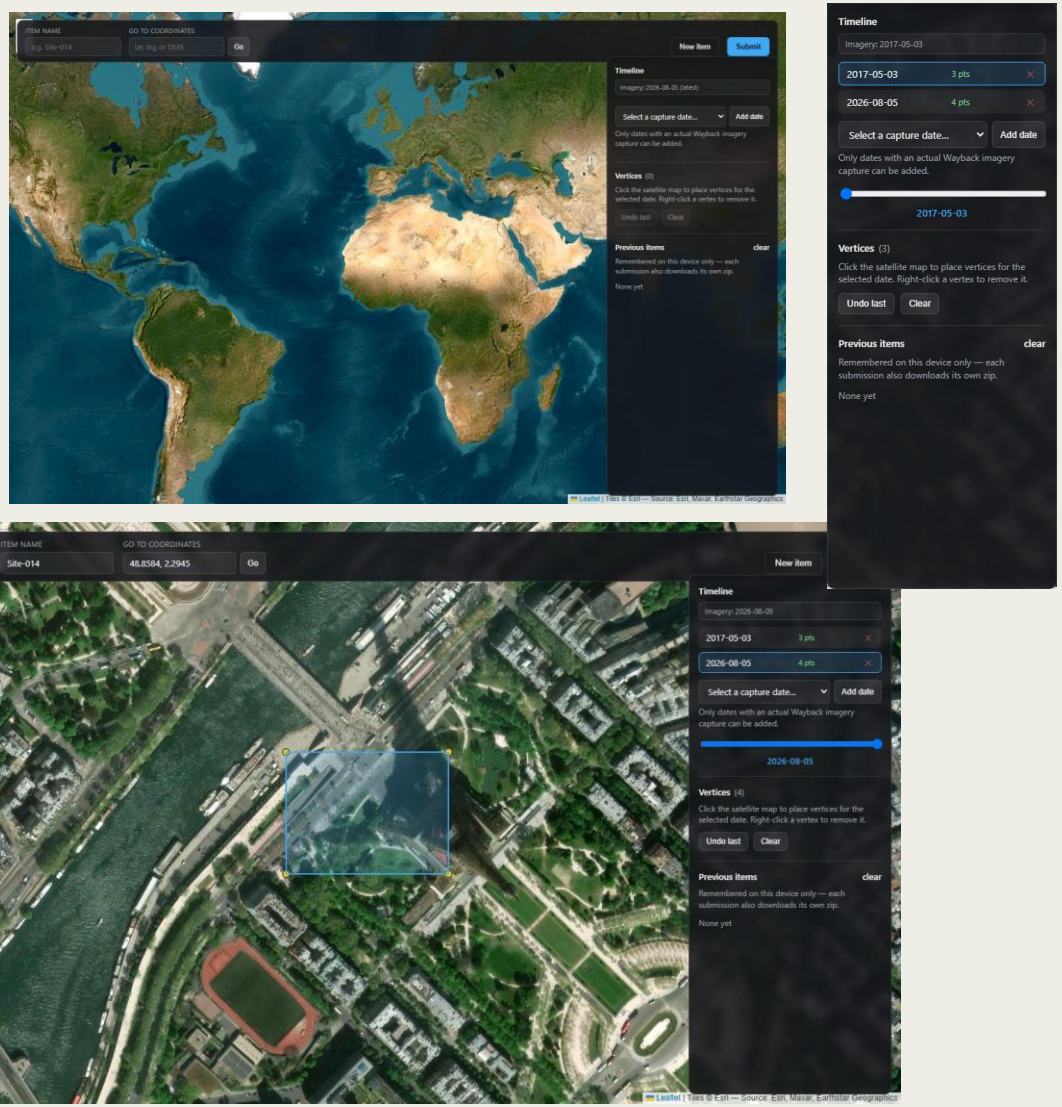


- **Distance buffers:** Roads, buildings, and other map features will have expected distances associated with know mass graves.
- **Overlapping buffers:** When two or more distance buffers overlap, it indicates a higher probability of a mass grave.
- Las carreteras, los edificios y otros elementos del mapa tendrán distancias previstas asociadas a fosas comunes conocidas.
- Cuando dos o más zonas de amortiguamiento (o radios de distancia) se superponen, ello indica una mayor probabilidad de que exista una fosa.



Dataset Building

Known graves will be needed to forecast possible graves.
Se necesitará información sobre fosas conocidas para predecir la posible existencia de otras.



- **Internal tool:** Analysts use website, created by Khthon, to produce data points later ingested by AI model. The tool is available on the public internet, free to use.

  Los analistas utilizan un sitio web creado por Khthon para generar puntos de datos para un modelo de IA. La herramienta es gratuita y pública.

- **Instructions:** https://github.com/RandSinger1/khthon-dateset-producer
- **Tool:** https://randsinger1.github.io/khthon-dateset-producer/

ADOPT AND SCALE

TECHNICAL

Imagery & compute /
Imágenes y computación
Frequent higher-resolution imagery, with funding for tasking and compute

Platform integration /
Integración de plataformas
CNB platforms, state forensic databases, IdentIA; open code and performance metrics.

Mexican training data/
Datos de entrenamiento mexicanos

Mexican biomes, agricultural patterns and concealment methods differ from other regions; models must be trained and validated locally.

INSTITUTIONAL

Ground-truth partnerships/*Alianzas*
CNB, UNAM forensic sciences, Lab-Co, collectives and state prosecutors

Shared protocols & distributed custody/
Protocolos compartidos y custodia distribuida

Joint protocols and a standard digital chain of custody

Training/*Capacitación*
Analysts and collective members trained in the human-in-the-loop workflow, ability to flag false positives, families/witnesses/searcher protection, data anonymization, Berkeley Protocol/international legal standards, knowing limits to technology.

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