PhD Thesis (agreed): Open source armed conflict monitoring system using OSINT,
crowdsourcing and remote sensing (AXO-UXO and mass grave identification).

Director/s: Professor Luis Angel Ruiz Fernández

Abstract: The emergence of new information technologies and the advance of Geospatial Intelligence techniques, added to the evolution of Image Intelligence (IMINT) and the strengthening of Open Source Intelligence (OSINT), has opened the possibility of the emergence of new research and applicability approaches, which with a strong component of innovation and technological disruption, enable the development of platforms, mainly EWS (Early Warning Systems) - EWRS (Early Warning and Response Systems) and other types of projects or functional analysis for the monitoring of social, political and armed conflicts. For some time, remote sensing and geospatial technologies have been configured as a powerful conflict monitoring tool to contribute to the strengthening and guarantee of human rights.
Many of the procedures, such as documentation management, identification of vulnerable areas, definition of potential conflict zones, destruction of heritage, damage to infrastructure
as a result of fighting, negative effects on the environment or the evolution of refugee camps, are being approached from an innovative perspective, incorporating collective mapping, crowsourcing and the use of satellite images for monitoring war scenarios. Both researchers and entities linked to the protection of human rights have made progress in this area. Although these projects have made significant progress, they are still insufficient in the face of the magnitude of the set of challenges and phenomena involved in combining geospatial technology with the protection of human rights in the context of armed conflicts.
It is important to note that one of the least studied topics, both in remote sensing projects applied to conflict monitoring and in the discipline in general, has been the detection of mass graves. Remote sensing research initiatives for this purpose have been developed within the framework of studies coming mainly from forensic anthropology. On the other hand, the major task of monitoring hostilities involves taking on the challenge of geo-referenced recording of events in complex political, geographical and technical scenarios, which are also of vital importance for human rights investigations. Therefore, it is considered essential to collaborate with the lines of research that address war monitoring through the implementation of a geospatial information management system that integrates the detection of mass graves, AXO and UXO, the latter advancing the research developed by the PhD student.

Available resources: For the development of our research we have a PC optimized for the analysis of geospatial information and a one-year Esri license (2024). The development of the research is framed within the Atlas project of the CLACSO Working Group: Socio- territorial movements in critical and comparative perspective, where research teams from 16 Latin American countries participate. This allows us to access and manage the group's database on a continental scale. In parallel, we will work with data from the ACLED project, complementing the work of the CLACSO team. For the development of remote sensing analysis, we will initially

work with Sentinel 1 y 2 images. As the project progresses, we will consider obtaining high-resolution images from a company. The financing of the project will be managed once it is accepted by the university.

Bibliography:

1. Alegría, AC, Sahli, H., & Zimányi, E. (2011). Application of density analysis for landmine risk mapping. Fuzhou, China (pp. 223e228).
2. American Association for the Advancement of Science (2021). https://www.aaas.org. Retrieved July 12, 2021, from https://www.aaas.org/programs/geospatial-technologies
3. Geospatial Commission.(2019). Review of future technologies.
4. Dozal, L., Silván-Cárdenas, JL, Moctezuma-Ochoa, DA, Siordia, OS, & Naredo, E. (2018). Evolutionary approach for the detection of buried remains using hyperspectral imagery. Photogrammetric Engineering and Remote Sensing.
5. Gasser, R., Knezevic, G. and Carrier, M. (2011). Mining risk management through mapping. Journal of ERW and mine action, 15(2), pp. 46-49.
6. Harrys, T. (2021). https://www.openglobalrights.org/. Retrieved July 20, 2021, from https://www.openglobalrights.org/geospatial-technology-can-improve-human- rightsdocumentation/?lang=Spanish.
7. Lacroix, Pierre Marcel Anselme, et al. (2013). Methods for visualizing explosive remnants of war. Applied Geography, 41, pp. 179-191.
8. Lacroix, V., Acheroy, M. and Wolff, E. (2002). PARADIS: A prototype to assist rational humanitarian demining activities using satellite imagery. The Journal of ERW and Mine Action , 6 (1).
9. Laboratory of New Technologies and Human Rights of the University of Seville (2010). https://www.idhc.org. Retrieved July 10, 2021, from https://www.idhc.org/arxius/recerca/nuevas-tecnologias-web.pdf.
10. Mobasheri, AP (2020). Open source geospatial tools and technologies for urban and environmental studies. Open geospatial data, software and standards, 5, 1-5.
11. Rykker Evers, Prime Minister (2018). The application of low-altitude near-infrared aerial photography for the detection of clandestine burials using an unmanned aerial vehicle and a low-cost unmodified digital camera. International Forensic Science, 408-418.
12. Silván-Cárdenas, JL, Corona-Romero, N., Madrigal-Gómez, JM, Saavedra-Guerrero, A., Cortés-Villafranco, T., & Coronado-Juárez, E. (2017). On the detectability of buried remains with hyperspectral measurements. In M.-TJ-L. Carrasco-Ochoa J. (Ed.), Mexican Congress on Pattern Recognition , 10267, pp. 201-212. Springer, Cham.
13. Silván-Cárdenas, J., Corona-Romero, N., Madrigal-Gomez, J., & Saavedra-Guerrero, A. (2017). Use of hyperspectral imagery for the detection of

clandestine graves in Mexico. Proceedings of the IGTF 2017 conference (poster session). Baltimore, USA: ASPRS.

14. Silván-Cárdenas, J., Dozal, L., Madrigal-Gómez, & JM (2018). Remote Sensing in Forensic Investigations. In J. Valdés, & M. Quinto, Advances in Forensic Anthropology (p. 30). Mexico: UNAM-ENAH.
15. Ushahidi. (sf). https://www.ushahidi.com/. Retrieved July 3, 2021, from https://www.ushahidi.com/about
16. Williams, C. (2013). Crowdsourcing research: A methodology for investigating state crime. State Crime Journal , 30-51.