



Universidad de Oviedo

UAV-mounted GPR for non-invasive detection of hidden objects



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ABSTRACT

WHAT?

System for obtaining electromagnetic images based on Ground Penetrating Radar (GPR).

WHAT FOR?

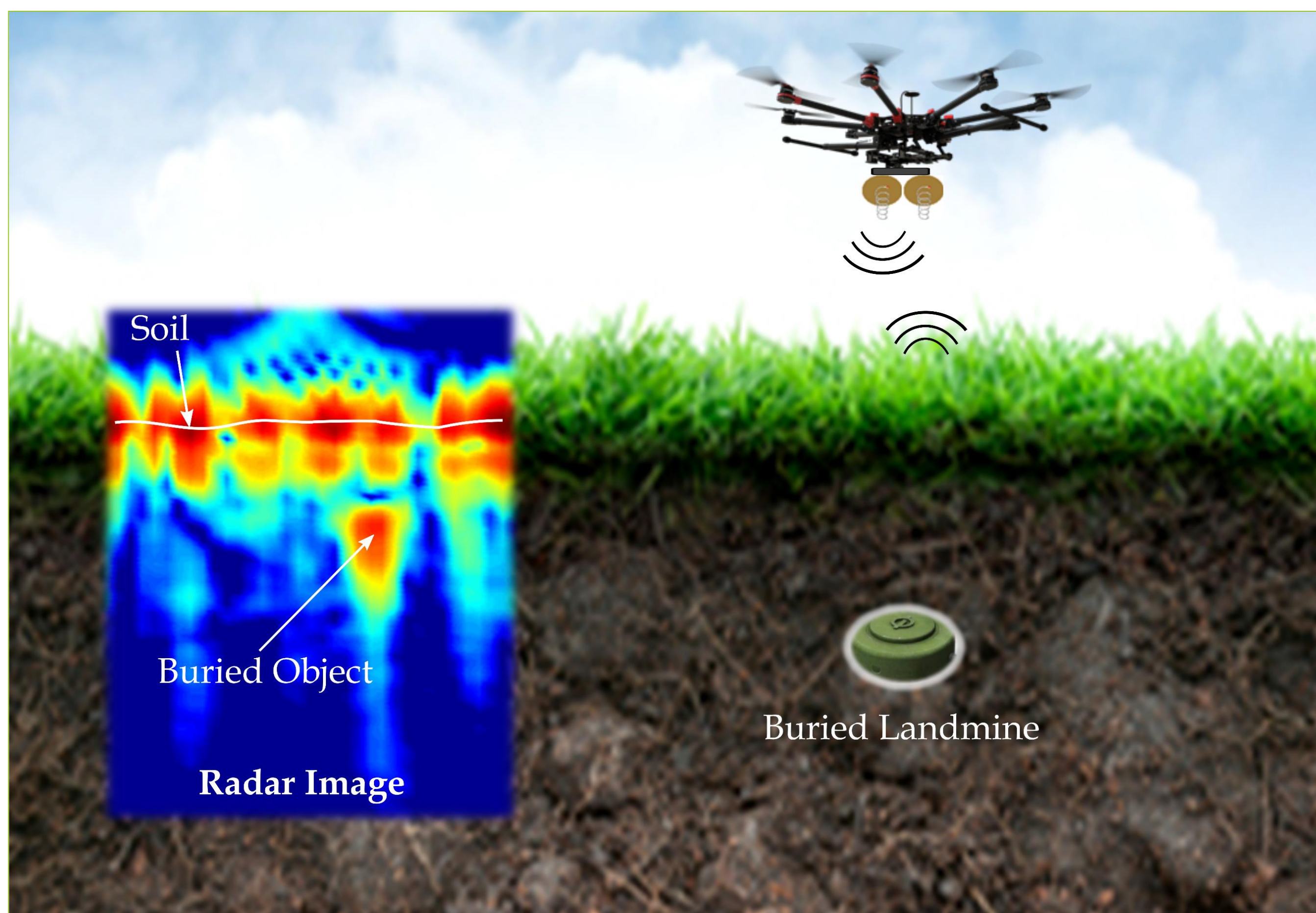
Detection of dangerous objects (landmines).

WHY?

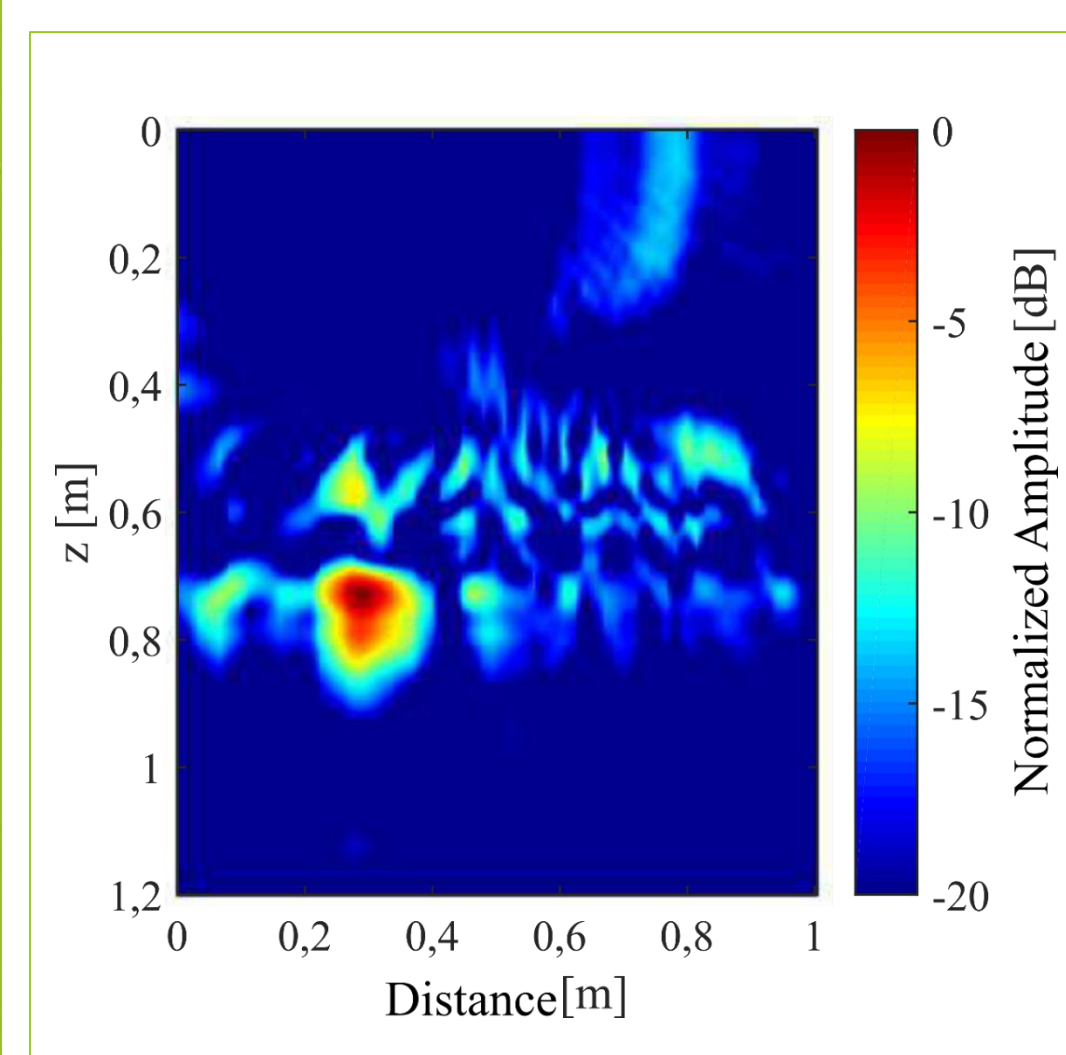
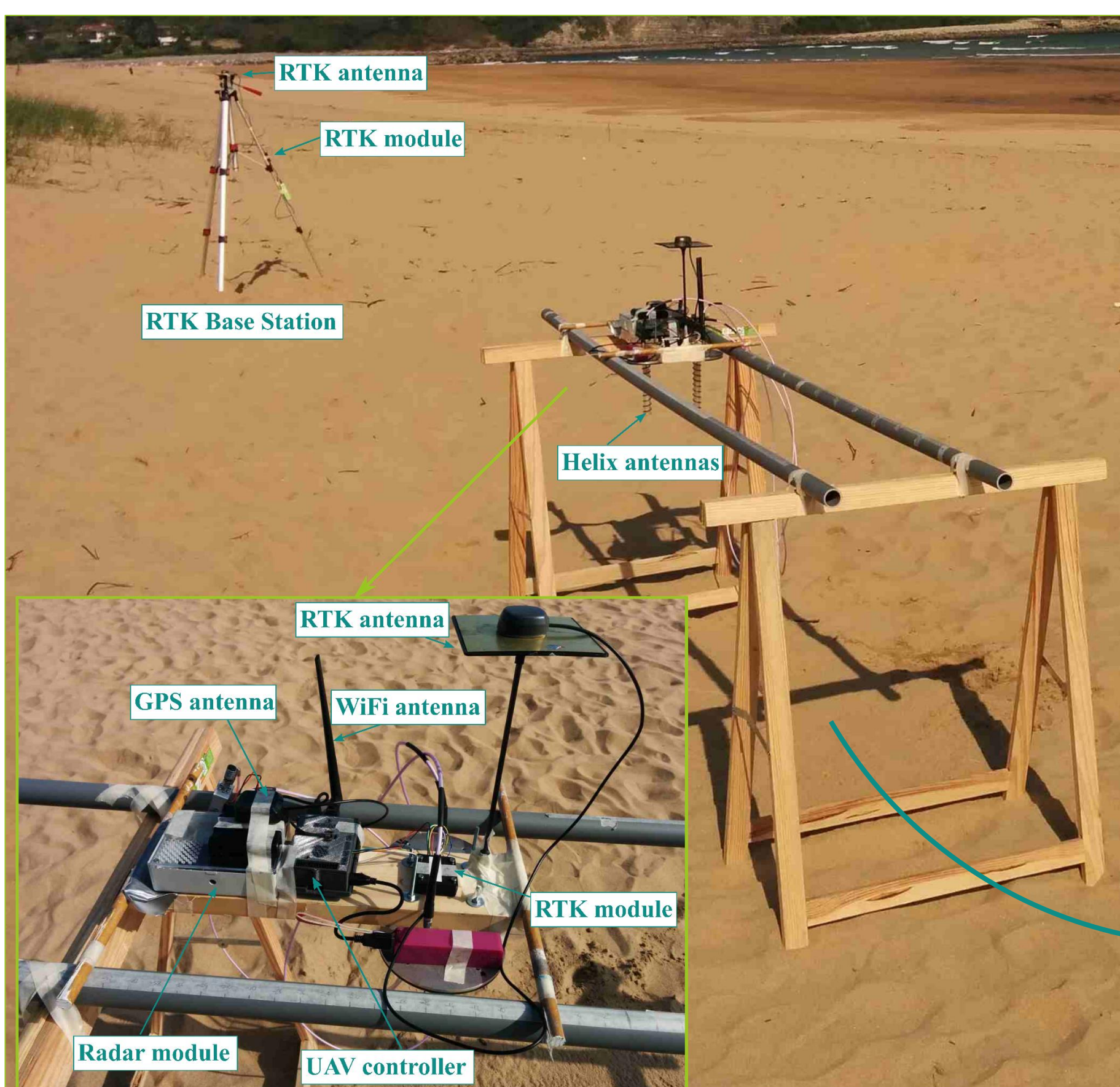
3 challenges:

- Safe, low cost and fast equipment.
- Clutter mitigation.
- Soil characterization.

HOW?



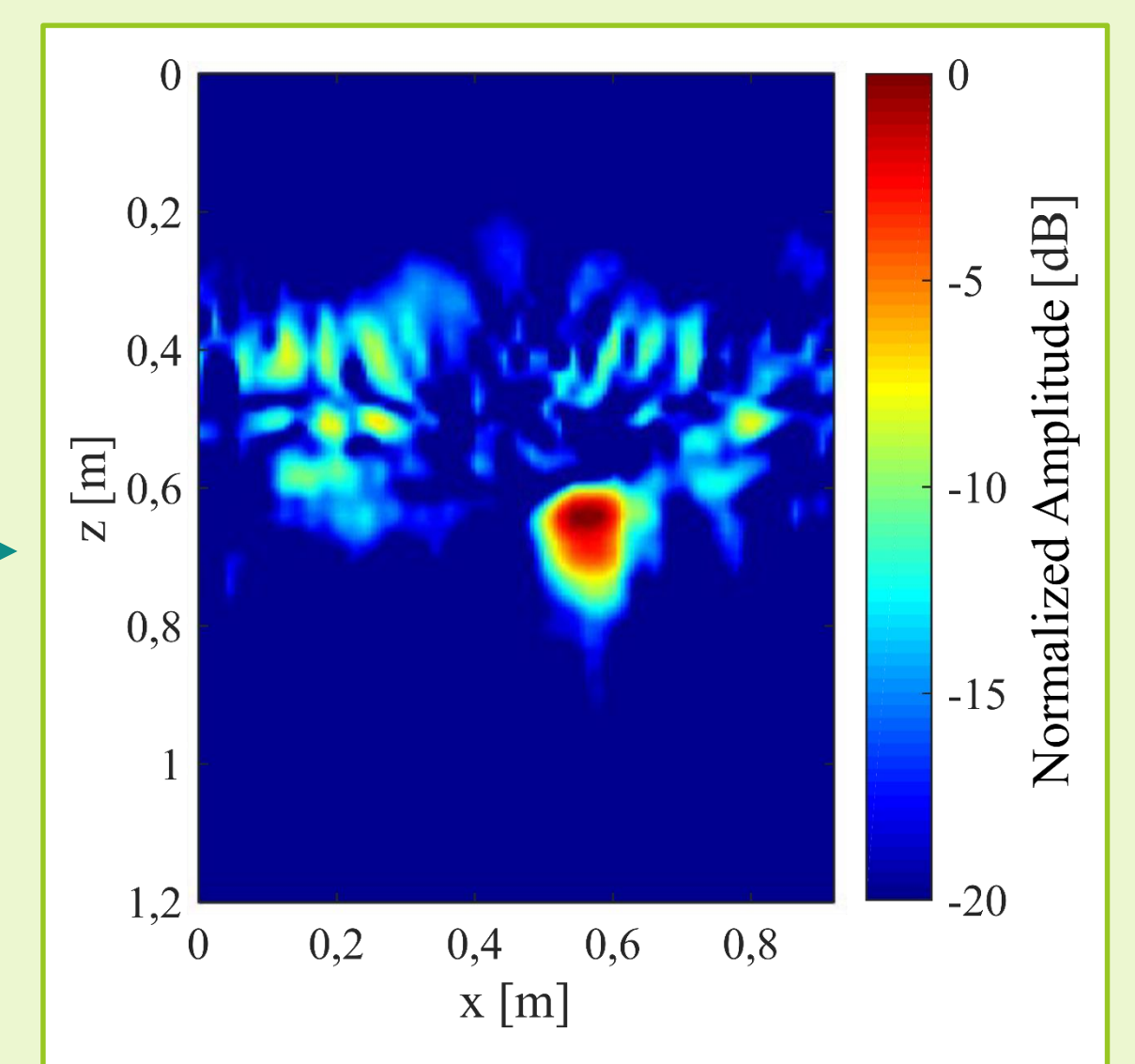
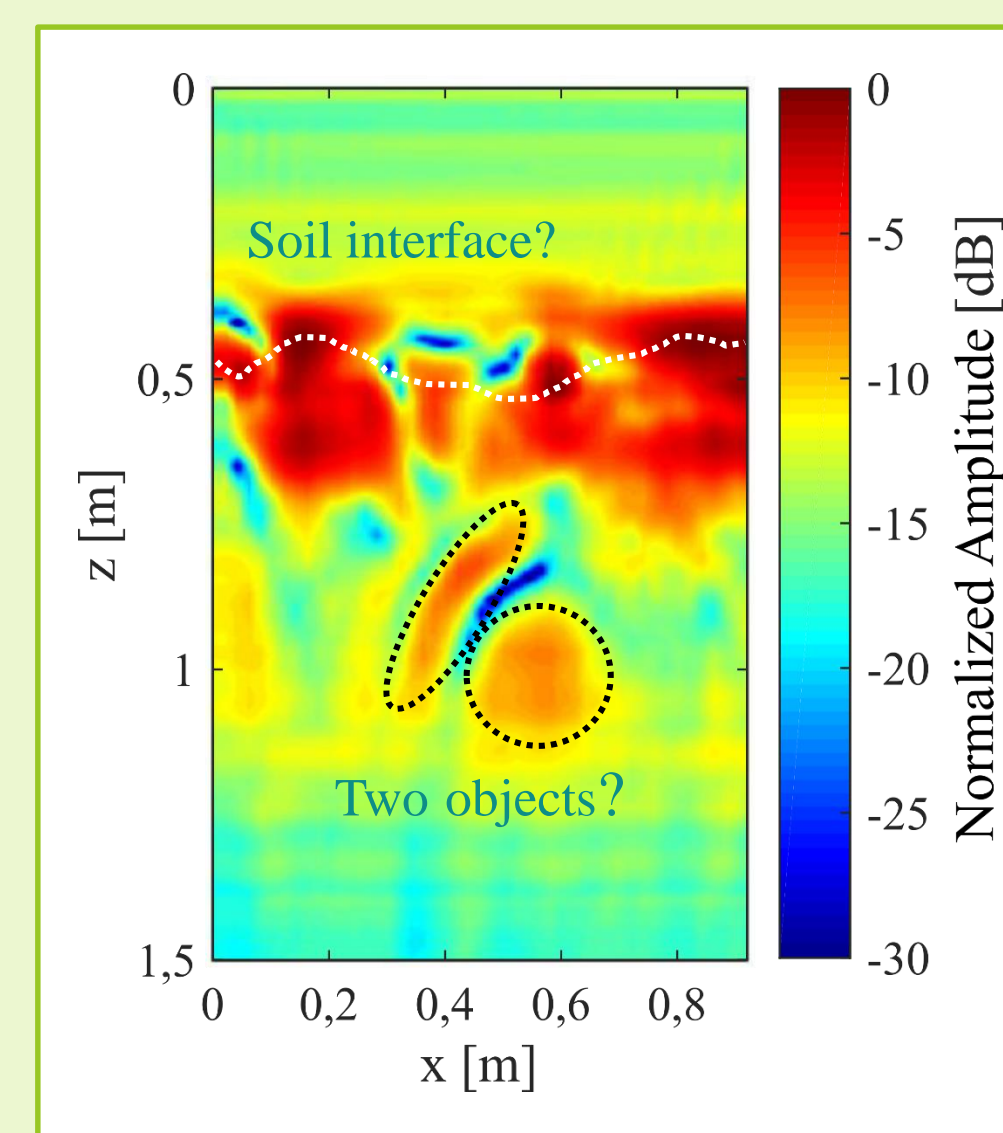
RESULTS



GOALS AND METHOD

Development of a GPR mounted on an Unmanned Aerial Vehicle (UAV):

- New model-based methods to improve accuracy and detection capability.*
- Hybridization of SAR (Synthetic Aperture Radar) and model-based techniques.*



III. *Development of the UAV-mounted GPR.*

IV. *Experimental validation.*

TIMELINE

	2016/2017	2017/2018	2018/2019
I			
II			
III			
IV			

CONCLUSIONS

- ✓ Non-invasive detection of both metallic and dielectric targets.
- ✓ Safe and fast inspection of remote areas.
- ✓ Compact and low cost system.

IMPACT

B. González Valdés, Y. Álvarez López, A. Arboleya Arboleya, Y. Rodríguez Vaqueiro, M. García Fernández, F. Las-Heras Andrés, A. García Pino, "Sistema aerotransportado y métodos para la detección, localización y obtención de imágenes de objetos enterrados y la caracterización de la composición del subsuelo," ES Patent 2577403 B2, January 2016.

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GEODRON Project selected in the first phase of "Programa Ignicia proba de concepto" (Plan de Estrategia de Especialización Inteligente de Galicia RIS3).

2nd Prize in EbIC Awards to the best final degree projects in Information and Communications Technology (ICT) sector, organized by "Informática el Corte Inglés", October 2016.

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O. Lopera, *An Integrated Detection and Identification Methodology Applied to Ground-Penetrating Radar Data for Humanitarian Demining Applications*, PhD Thesis, March 2008.

H. M. Jol, *Ground Penetrating Radar Theory and Applications*, Elsevier Science, 2009.

J. A. Martínez-Lorenzo, C. M. Rappaport, F. Quivira, "Physical Limitations on Detecting Tunnels Using Underground-Focusing Spotlight Synthetic Aperture Radar," *IEEE Trans. on Geoscience and Remote Sensing*, vol. 49, no. 1, pp. 65-70, January 2011.