



Microwave Sensors and Electronics





About MWSE

Microwave Sensors and Electronics is an electronic engineering enterprise. The Company specializes in flexible radio frequency electronics for communication and microwave remote sensing applications.

In **Orbit**, MWSE develops custom RF solutions for satellite missions. MWSE has developed the GNSS-R + L-band radiometer front-end for the FSSCat mission, the hardware for GASPER (GAlileo SPace receiver) as part of a consortium led by Deimos Space, and the Minerva modular SDR—featuring UHF, L-, S-, X-, and Ka-band communication capabilities—for the i2CAT Foundation.

On **Ground**, MWSE designs RF sensors for near-ground remote sensing for Cal/Val activities. The company has developed the first fully polarimetric, multi-frequency GBSAR, capable of operating at all current and near future SAR satellite missions. MWSE has also developed the ARIEL compact L-band radiometer for soil moisture and sea ice thickness retrieval in the Arctic, and was in charge of refurbishing the HUTRAD2.0 multifrequency radiometer.

The following pages present relevant projects developed over the past 10 years

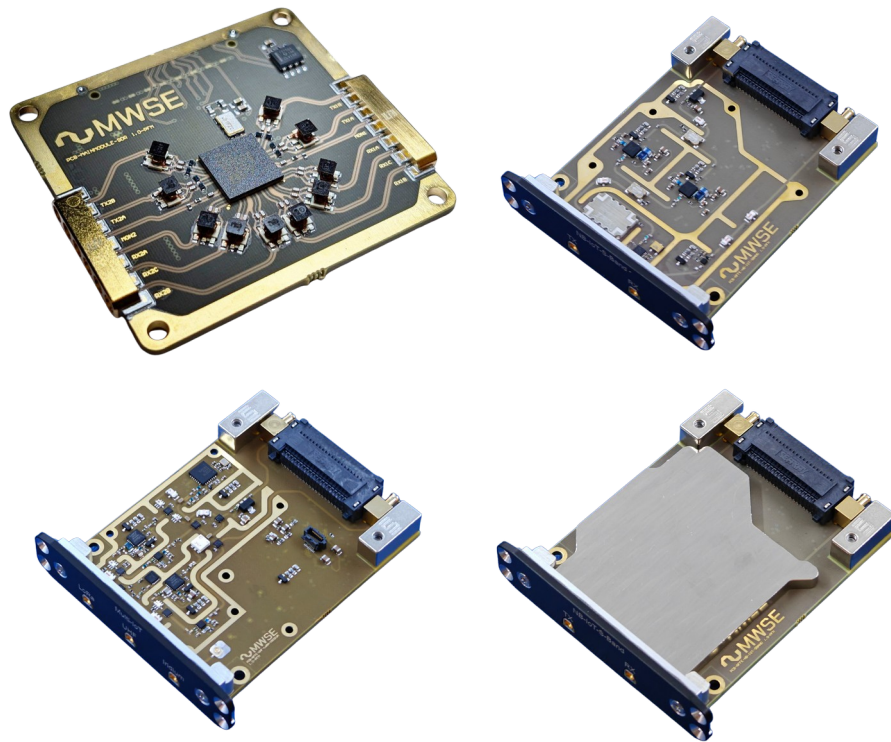


In orbit – 6GStarLab mission

The MWSE team developed the Minerva Modular payload computer for the 6GStarLab mission.

The 6GStarLab, a pioneering project led by i2CAT, focuses on the research and development of non-terrestrial networks (NTN). It enables the experimental validation of new communication technologies in a real space environment. It is the first satellite of its kind promoted across Europe.

The payload developed by MWSE incorporates RF Front-Ends at UHF, S, X, Ku and Ka bands for NTN communication purposes.





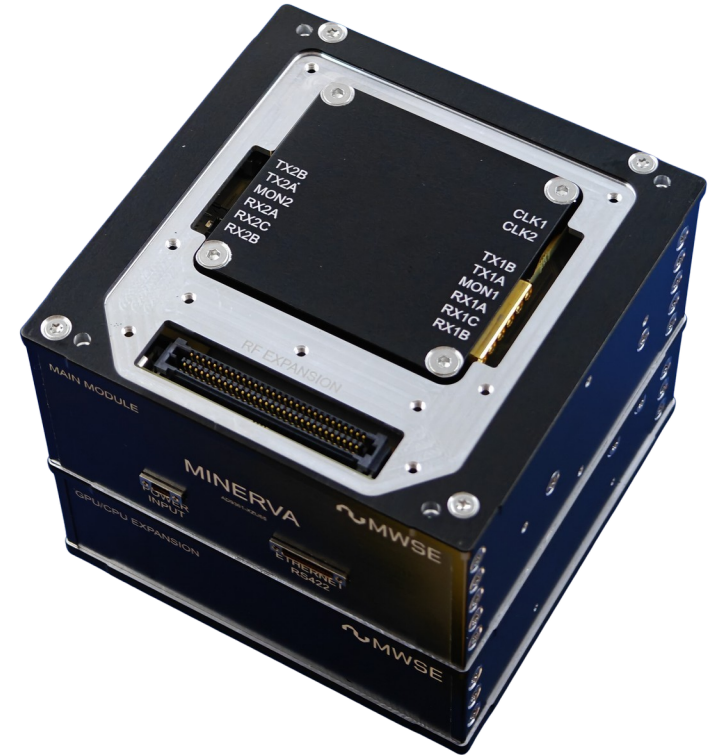
In orbit – Minerva NVIDIA expansion

Developed from the experience gained with the 6GStarLab, MWSE has created the Minerva NVIDIA expansion.

The purpose of this expansion is enabling high performance computing in orbit. It combines an FPGA with an NVIDIA card for parallel and artificial intelligence algorithm processing in Space.

The NVIDIA graphic card allow satellites to perform AI computations in orbit.

The system has currently passed its qualification tests, and is set to fly by mid-2026.





In orbit – Galileo Space receiver

GASPER (GAlileo SPace receiver) is a compact GNSS receiver developed for the European Commission Galileo In-Orbit Demonstration and Validation program.

GASPER uses multiple frequency bands to enable high precision positioning and timing for spacecraft, allowing accurate on-board Precise Orbit Determination.

The project was led by Deimos with MWSE in charge of the development of the RF Front-Ends, and the System-on-Chip hardware integration.

Other members of the consortium include Anywaves, Alter Technology and the University of Padova.



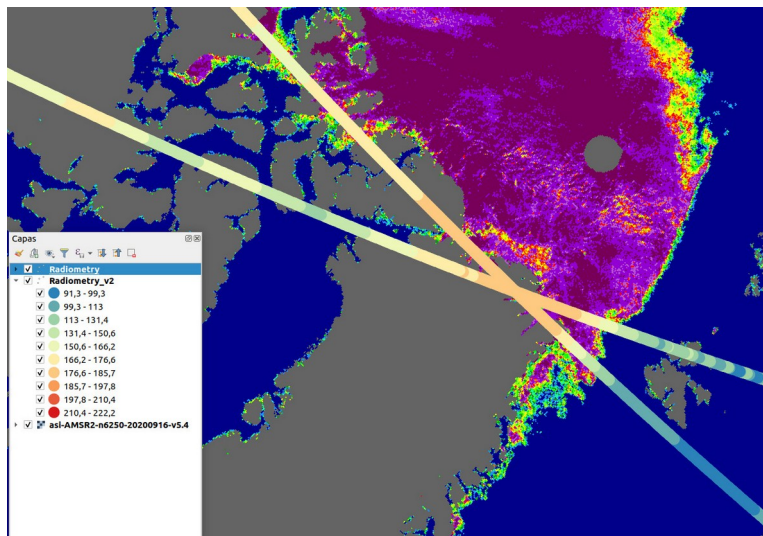
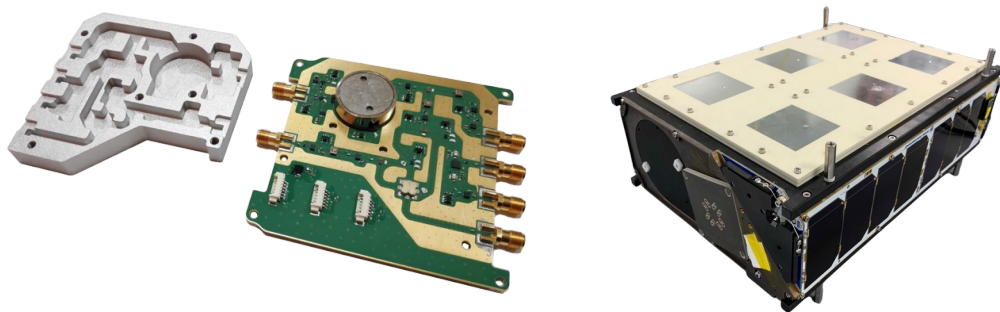


In orbit – FSSCat mission

The MWSE team developed the RF front-end of the FSSCat mission. The front-end, along with its SDR, was part of the Flexible Microwave Payload-2 (FMPL-2).

Using a combination of **GNSS-R** and **L-band radiometer** measurements, FMPL-2 provided data for **sea ice detection and thickness monitoring**, **water pond mapping over ice**, and **low-resolution soil moisture** estimation. When combined with multispectral optical data, it became possible to achieve high-resolution soil moisture mapping.

The mission was developed by a European consortium led by Deimos in conjunction with the Technical University of Catalonia.





On ground – SARGUS multifrequency full-pol GBSAR

SARGUS is the MWSE Multifrequency Ground-Based Synthetic Aperture Radar with full-polarization and interferometry capabilities. It is intended to be used for **landslide monitoring** under vegetation cover. It can be also use for near-ground truth in calibration and validation research.

SARGUS can measure at all frequencies used in current and near future SAR satellite missions:

P-band, for BIOMASS

L-band, for ROSE-L, ALOS and NISAR

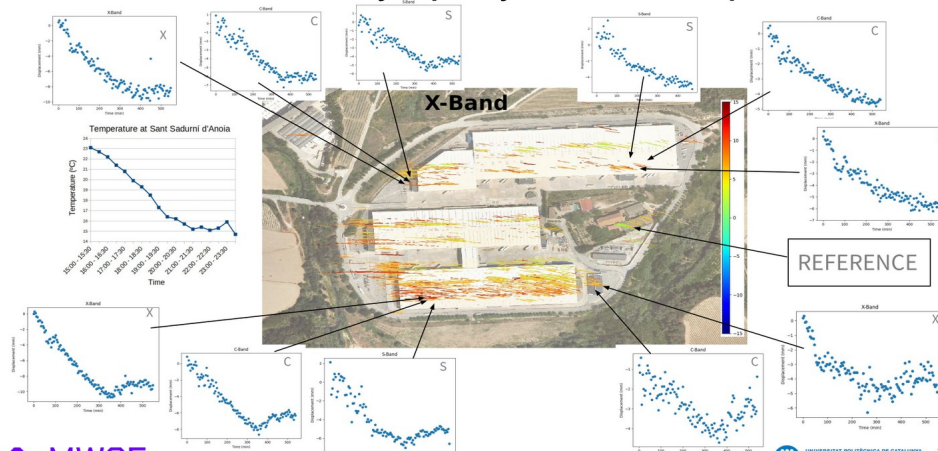
S-band, for NISAR

C-band, Sentinel-1

X-band, PAZ, TerraSAR-X and CSMed



Differential interferometry capacity - Calibrated displacements

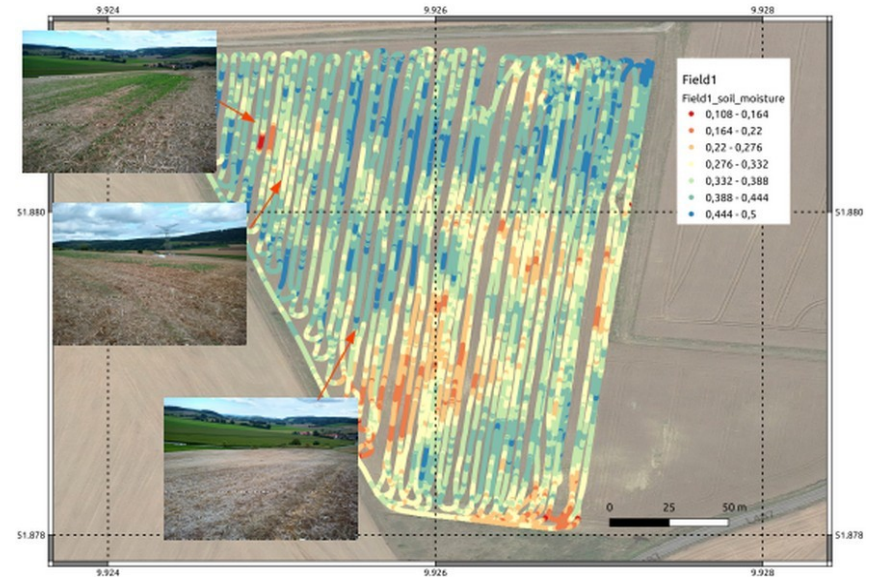




On ground – ARIEL L-band radiometer

ARIEL is the MWSE L-band radiometer. It measures soil moisture and ocean ice thickness over large areas. It is mainly used in calibration and validation campaigns of satellite missions.

With different configurations available, ARIEL can be used on-board aircraft, drones and ground vehicles.





On ground – HUTRAD 2.0 radiometer

The one-year long MOSAiC campaign in the Central Arctic offered a unique opportunity to obtain comprehensive **snow and sea ice measurements** for a complete seasonal cycle. MOSAiC expedition took the closest look ever at the Arctic as the epicenter of global warming and to gain fundamental insights that are key to better understand global climate change.

The MWSE team was responsible for refurbishing and preparing the HUTRAD2.0 radiometer for this expedition.

HUTRAD2.0 radiometer provided its multifrequency (C-, X-, and Ku-band) CIMR compatible data on-site.





Looking forward to meeting you

The key to the projects presented lies in the talented, hard-working, and motivated team behind them. **The current MWSE team is composed of 30% PhDs and 60% MSc** holders in electronics, communications and mechanical engineering.

Please, let us know how we can help you.

Thank you very much for your patience and attention.

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Microwave Sensors and Electronics SL

C/ General Cortijo 23, local

08720 Vilafranca del Penedes (SPAIN)

Tel: +34 93 131 77 88

Mail: info@mwse.tech

www.mwse.tech