

# DIGITAL SIGNAL PROCESSING (DSP) DESIGN AND IMPLEMENTATION SERVICES

This competency provides design, simulation, and embedded implementation of digital signal-processing algorithms for communication, control, and measurement applications. The activity covers the full DSP workflow from algorithm development and modelling to real-time, hardware-optimised implementation on embedded platforms and software-defined radio systems. Using professional simulation environments and hardware controllers, the work supports partners in rapid prototyping, performance optimisation, and validation of DSP solutions. The competency contributes to RDI by enabling efficient, reliable signal processing architectures for industrial, biomedical, and communication technologies.



## ACHIEVEMENTS

- Development of custom DSP algorithms for audio and communication systems implemented on embedded SoC and FPGA platforms
- Creation of biomedical DSP modules for ECG and EEG signal filtering, feature extraction, and anomaly detection in collaboration with medical researchers
- Implementation of hardware-accelerated DSP cores using Xilinx and Intel FPGA toolchains for low-latency industrial and robotics applications
- Publication of peer-reviewed research on DSP algorithm optimisation, embedded implementation, and high-performance signal-processing architectures



## INFRASTRUCTURE

- Dedicated DSP development laboratory equipped with FPGA and SoC platforms from Xilinx and Intel/Altera
- Real-time signal acquisition systems for audio, biomedical, and industrial data processing
- Professional software toolchains including Matlab/Simulink, Python/SciPy, and C/C++ for algorithm development
- Hardware-in-the-loop environments supporting embedded DSP validation and performance testing
- Measurement instruments such as oscilloscopes and spectrum analysers for complete signal-chain evaluation



## REFERENCES

- Development of a vibration-analysis card for a LEO CubeSat mission in cooperation with C3S Ltd.
- Software-defined radio workshop and applied DSP activities conducted with NMHH and the Special Service for National Security