

## CHARM - Challenging environments tolerant smart systems for IoT & AI

Digitalization has been identified as one of the key enablers for renewal and competitiveness of European manufacturing industries. However, grasping the digitalization and IoT-related opportunities can be limited by the harsh environmental conditions of the manufacturing processes and end use environments. The ECSEL-IA 2019 project initiative CHARM aims to contribute to solving this problem by developing ECS technologies that tolerate harsh industrial environments. The project concept centres around real industrial challenges from different types of end use industries. The synergies and impacts arise from similarities in technology solutions serving different applications and industry sectors.

The CHARM use cases include six different industry sectors, majority of them presented by innovative cutting-edge large enterprises that belong to the world-wide market leaders of their own sectors – while most of them being new to the ECSEL ecosystem: mining (Sandvik Mining and Construction Oy, FI), paper mills (Valmet Technologies Oy, FI), machining (Tornos SA, CH), solar panel manufacturing lines (Applied Materials Italia SRL, IT), nuclear power plants maintenance and decommissioning (ÚJV Řež a.s., CZ), and professional digital printing (Canon Production Printing Netherlands B.V). The planned demonstrators engage these big players with European ECS value chains and showcase capabilities that serve manufacturing industries’ needs at large. The new technologies to be developed include novel multi-gas sensors, robust high temperature and pressure sensors, flexible sensors for paper machine rolls, wireless power transfer systems, connectivity solutions for rotating parts, advanced vision systems, and enablers for autonomous driving. These will be packaged with beyond the state-of-the-art packaging technologies to withstand the harsh conditions and demonstrated in use cases.

The project consortium includes 11 SMEs, 14 LEs and 12 RTOs, and covers the industrial value chains from simulations, sensors and components to packaging, integration and reliability as well as connectivity, cloud and cyber security solutions.

The planned activities go beyond the state of the art, contributing to the leadership of European ECS ecosystem, fostering it not only by the new knowhow and competitiveness, but also by providing new business opportunities and value chains within European markets. Simultaneously the project fosters the manufacturing industries by enabling new digitalization capabilities as well as new contacts to European ECS community that can deliver the needed solutions.

