ITEA 4

Project Profile

SIGNET

Reducing complexity in clinical diagnosis and treatment pathways

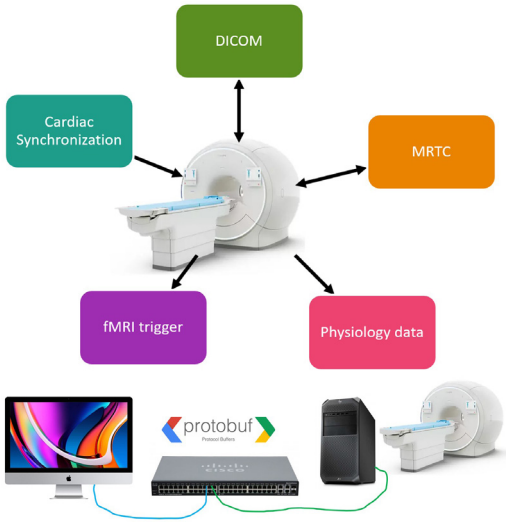
The ITEA project SIGNET (Sensing and Image-Guided Neurological therapies, cardiac Electrophysiology and Tumour treatments) will develop solutions for Magnetic Resonance (MR)-guided interventions via a generic, standardised and customisable control and data architecture, thereby reducing patient visits, recovery periods and practitioner workload.

Addressing the challenge

Cardiovascular, neurological and oncological patients, who bear the majority of disease burden in Europe, face clinical diagnosis and treatment pathways involving multiple hospital visits and complicated workflows that include multi-modality data fusion. This results in stress for both patients, their attendants and practitioners, which could be reduced by a single-modality treatment. Recent advances in MR-guided radiation therapy, including image-guidance technology and motion-adaptive treatment, are now being generalised and customised to other MR-guided treatments to replace multi-step workflows.

Proposed solutions

To achieve this, SIGNET will develop AI-enabled technologies for personalised, single-episode, dose-adaptive, high-precision MR-guided treatments. The core of this will be a standardised, configurable interface for safe, secure low-latency mutual communication to control treatment and imaging systems in the operating theatre, for which no standard currently exists. This will include APIs, RESTful interfaces and real-time data & control flow which can be customised without the need for new software releases. To provide a generic interface between scanner and treatment devices, SIGNET will focus on use-cases in three domains: arrhythmia ablation using catheters (cardiology); robotic-mediated MR-guided biopsies (oncology); functional Magnetic Resonance Imaging (fMRI)-guided transcranial magnetic stimulation (TMS), fMRI-guided radiation therapy planning (RTP) and epileptic foci laser ablation (neurology). The ultimate result will be a generic control and data architecture for independent yet functionally-integrated systems.



SIGNET technology building blocks

Projected results and impact

SIGNET's solutions are multifaceted, aiming to improve patient comfort and safety, treatment outcome, staff availability and economic viability. Personalised breathing guidance, for instance, will lead to an estimated 30% efficiency gain in imaging and treatment delivery, while the connection of intra-procedural fMRI to TMS can improve treatment efficiency by up to 50%. Through these innovations and others, the number of pre-procedural patient interactions can be reduced from four or five to one, procedure time by several hours, hospitalisation to one day and recovery time by a week. This represents significant quality of life improvements for patients and reduced workload for practitioners. In financial terms, MR-guided EP is expected to serve around 40,000 cases per year in Europe, corresponding to EUR 400 million in cost savings annually, and similar numbers are predicted in oncology and neurology. Factoring in reduced disease burden, such as fewer lost days of labour, the project expects its direct annual societal gains to exceed EUR 1 billion by the end of this decade. With project-related revenues expected to reach EUR 100-150 million annually within five years of completion, SIGNET will also offer greater global competition, placing the European health industry in a stronger position for the long-term future.

Project partners

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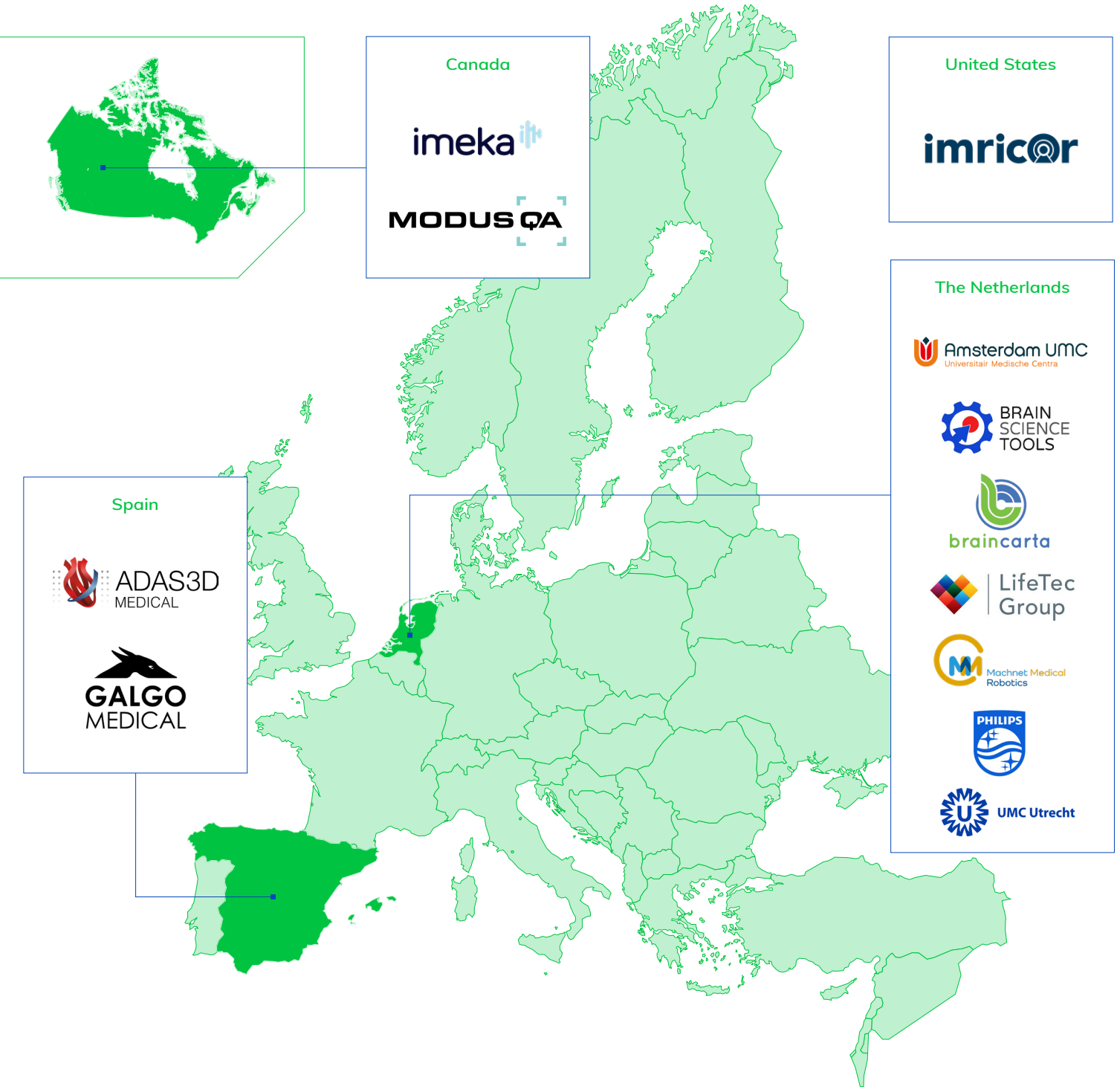

Project start
November 2021

Project end
October 2024

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ITEA is the Eureka R&D&I Cluster on software innovation, enabling a large international community of large industry, SMEs, start-ups, academia and customer organisations, to collaborate in funded projects that turn innovative ideas into new businesses, jobs, economic growth and benefits for society. ITEA is part of the Eureka Clusters Programme (ECP).

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