ASSIST

Streamlining and enhancing image-guided therapy

Image-guided therapy typically combines multiple data sources which makes diagnosis and treatment complex for physicians while it underutilises technologies like robot-assisted surgery and AI. The ITEA project ASSIST (Automation, Surgery Support and Intuitive 3D visualisation to optimise workflow in image-guided therapy SysTems) aims to reverse these trends to enable better health outcomes, lower costs and improved staff and patient experiences.

Addressing the challenge

Image-guided therapy plays a key role in healthcare quality and personalisation and uses multiple imaging modalities for diagnosis and treatment guidance during minimally-invasive surgery. Although this is designed to speed up processes, it typically adds complexity: physicians often struggle with the amount of data acquired and in deriving meaningful insights from it. This overload of information and high level of manual interaction leads to fatigue, increasing the risk of serious medical errors and overlooked abnormalities.

Proposed solutions

ASSIST aims to give physicians control of clinical procedures by assisting or partly automating their tasks during image-guided therapy. Firstly, precision diagnosis and personalised treatment planning technologies will automatically perform image segmentation and intuitively display relevant anatomy for optimal tailoring to the patient. Secondly, robotic systems will be combined and integrated with medical imaging equipment in order to assist physicians during device manipulation, reduce staff exposure to radiation and increase treatment accuracy and reproducibility. Finally, advanced 3D visualisation, augmented reality and virtual reality will create immersive medical images for the straightforward interpretation of complex anatomical structures and guidance during treatment. Due to the

heterogeneity of both imaging data and patient populations and the closed nature of clinical databases, ASSIST will also investigate data augmentation, synthetic data generation and federated learning to reliably train AI and Deep

and shorter, less invasive treatments with faster recovery times.

Such benefits are reflected in various goals, including a 20% improvement to liver tumour segmentation accuracy, 30% less X-ray exposure and 30% less training time to reach the same staff accuracy via robotic guidance. ASSIST's focus on AI, in particular, has the potential to improve healthcare outcomes by 30–40% and reduce treatment costs by up to 50% in the coming seven to ten years; additionally, the global AI healthcare market is projected to reach USD 36.1 billion by 2025 at a compound annual
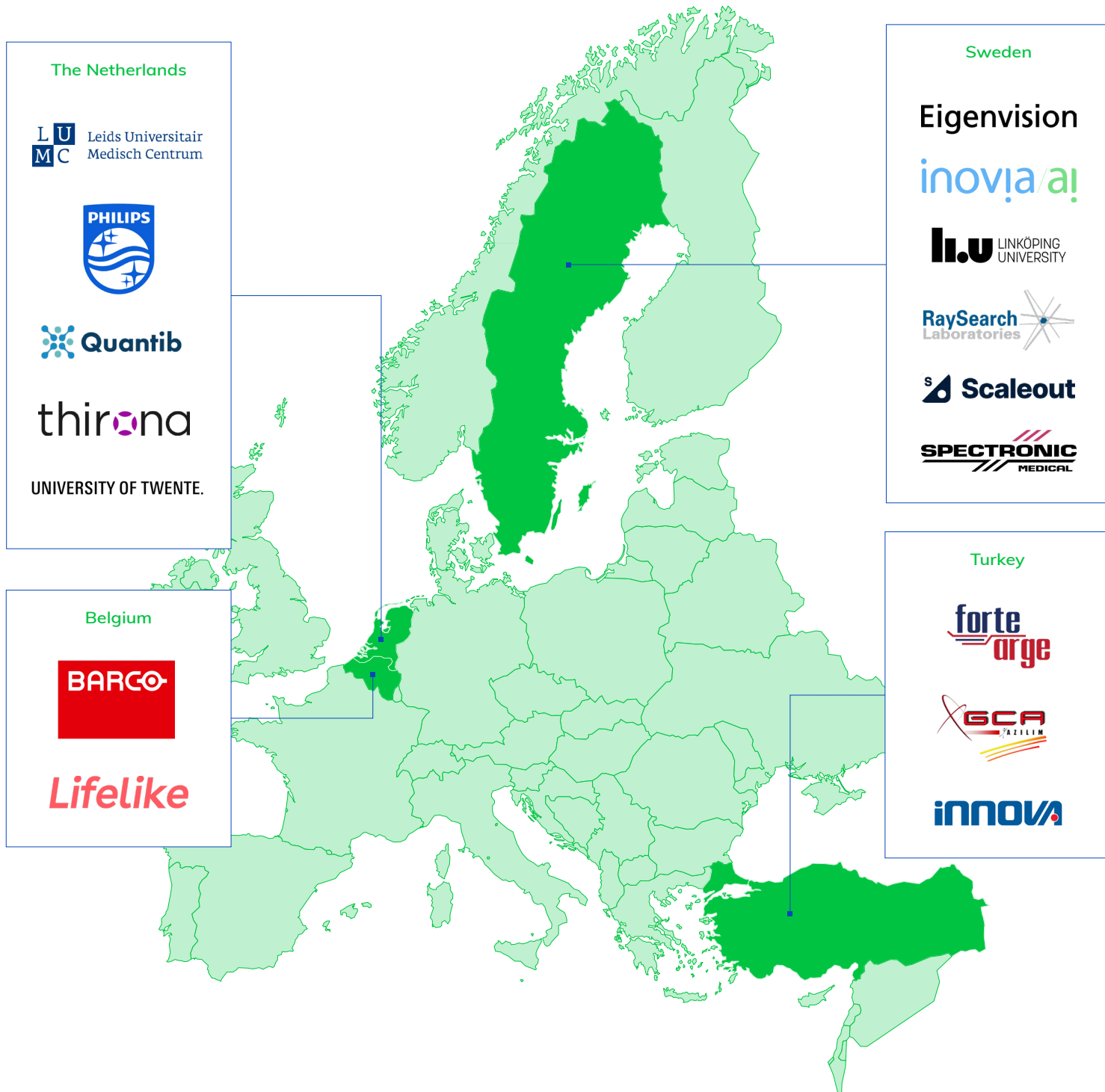

Precision Diagnosis & Treatment	Robotic assisted surgery	3D visualization & AR/VR	Data & AI
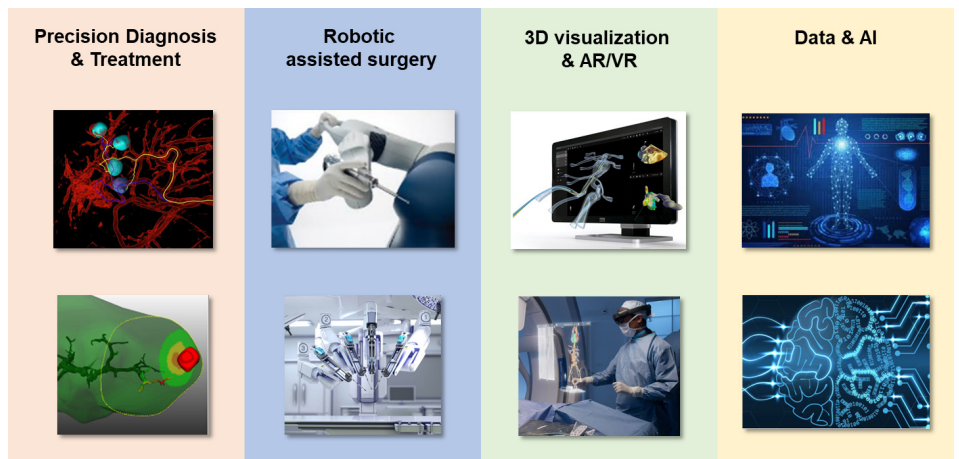
↑ The four main innovation areas that will be addressed in the ASSIST project.

Learning algorithms that support the aforementioned innovations.

Projected results and impact

For physicians, ASSIST offers relief from the labour-intensive interpretation of multiple imaging and data sources, resulting in a better staff experience. The simplification of diagnosis and treatment will also allow less experienced staff to perform complex treatments. For patients, the project means improved diagnoses

growth rate of almost 50%. As the project addresses healthcare segments with either sizeable markets or similarly substantial growth rates, ASSIST expects a great deal of collaborative exploitation that will introduce an even richer layer to medical technology solutions.

Project partners

The Netherlands

Leids Universitair Medisch Centrum

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UNIVERSITY OF TWENTE.

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Sweden

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