E-GantryMate (MRI)

Compact MR-compatible patient-mounted device for percutaneous needle interventions-- extended Gantry Mate Project

Programm / Ausschreibung	COIN, Kooperation und Netzwerke, IraSME 23. Ausschreibung	**Status**	abgeschlossen
Projektstart	01.10.2019	**Projektende**	31.03.2022
Zeitraum	2019 - 2022	**Projektlaufzeit**	30 Monate
Keywords	Minimally invasive percutaneous procedures, magnetic resonance tomography, medical device technology (instrumentation, medical imaging, radiology),MR-compatible patient-mounted device for percutaneous needle interventions		

Projektbeschreibung

Project description:

Minimally invasive interventions are difficult to perform in clinical magnetic resonance imaging (MRI) systems due to the limited space and the presence of strong magnetic fields. To overcome these limitations, GantryMate will deliver a positioning platform for MR-guided percutaneous interventions. It will allow for safe, accurate, real-time instrument positioning with real-time MR-image control during diagnostic and therapeutic procedures in the prostate, liver and other internal organs.

Project Goal and Results

GantryMate aims at providing a comprehensive guidance solution, which consists of an extremely compact patient-mounted guidance device with 4 degrees of freedom that acts as a third hand of the surgeon inside the MR-Gantry. The kinematics of GantryMate will feature a fix tool-pivot-point to intuitively manipulate the tool from outside the MR-gantry. In combination with the tracking pulse sequence, clinical targets can be identified and aligned with the instrument in real time to perform high-precision interventional procedures.

Methods and Development

Development (dvp) starts with design & realization of the gross positioning unit (GPU) which includes a patient immobilization system to fix GantryMate directly on the patient in the intervention region. First mechanical tests of the setup, usability tests and accuracy studies can be run from the research partners to establish project communication & give experiences with MR materials & set-up limitation from e.g. the narrow bore of the MRI.

With the dvp of a first prototype of the micro positioning unit (MPU) & the knowledge about MR passive markers from dvp with the university partner, passive markers & tool holders are developed. All these stages are accompanied by extensive material & usability tests, regular design-reviews are performed within the whole development group as part of the development process.

The first complete setup now enrolls dvp of specific MR sequences for near to real time imaging & MR navigation software.

At the time the first set of valid & proven MR protocols are established & prototypes to partners are delivered, extensive testing demanding accuracy, repeatability & usability starts. While these tests go on, second generation with automatic driven end effectors is developed.
Splitting dvp in parallel & sequential tasks enables fast dvp cycles & iterations due not to have partners waiting a long time for first prototypes.
Exploitation potential
The GantryMate project will sell • capital equipment: the hardware components for gross and micro positioning and (optional) the software for real-time MR navigation • sterile disposables: needles, tool holders, markers and patient immobilization devices • pulse sequence MR imaging packages: real-time MRI with automated device detection • service contracts with the hospitals and training courses for clinical end-users. Customers of GantryMate will be hospitals, distributors, and OEMs.

Abstract

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Projektkoordinator

- iSYS Medizintechnik GmbH

Projektpartner

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