

First phase abstract

The first stage of the ACCURATE project **“Development of conceptual solutions for the family of innovative needle insertion devices”** has started the development of the ACCURATE modules for the diagnosis and treatment of cancer through biopsy, brachytherapy and radiofrequency ablation. A thorough analysis of the state-of-the-art in such systems, has emphasized the need of development of advanced systems which would enable the achievement of positioning accuracies of the medical device at higher values than the existing ones in order to improve the medical task and to improve the oncologic prognosis. The critical analysis of the current achievements and concerns underline the fact that the objectives of ACCURATE are among the worldwide topics of interest committing to provide innovative contributions in the field of medical robotics in oncology. The critical functionalities of the ACCURATE modules were identified and prioritized through competitive engineering tools (AHP) to identify the technical characteristics that have to be included in the ACCURATE modules. A number of conceptual modules were developed covering all the three procedures: biopsy, brachytherapy and radiofrequency ablation aiming also their integration on existing robotic structures. Several visits were made at the Surgical Clinic III, within the Regional Gastroenterology and Hepatology Institute “Prof. dr. Octavian Fodor” Cluj-Napoca where the team of engineers assisted to several medical procedures for biopsies and radiofrequency ablation for the liver. A protocol for robotic brachytherapy was defined to describe separately the motions of the robotic system and the needle insertion device in such way that during the next project phase work will start on the constructive development of the first ACCURATE module for brachytherapy.