
S. Krueger1, R. Holthuizen2, J. Smink3, S. Weiss1, O. Lips1, B. David4, D. Wirtz1, S. F. Pedersen1, D. Caulfield4, J. Bostock4, G. Gao4, P. Chinchapatnam4, T. Schaeffter1, and R. Razavi4

1Philips Research Europe, Hamburg, Hamburg, Germany, 2Philips Healthcare, Best, Netherlands, 3MR Research Centre, Skejby Hospital, Aarhus, Denmark, 4Division of Imaging Sciences, King's College, London, United Kingdom

Introduction: Cardiac arrhythmias, e.g. atrial fibrillation and ventricular tachycardia, are increasingly treated by electrophysiological (EP) interventions [1]. Applying MR for guiding these interventions offers advantages like 3D visualization of the cardiac soft tissue in relation to the catheter, visualization of the treatment effect and absence of ionizing radiation [2,3].

The step towards clinical MR-guided EP interventions requires a focus on RF safety of the devices, localization accuracy of the catheters, guidance of the procedure, intra-cardiac signal quality and procedure workflow.


The MR-EP Navigator is based on a rapid prototyping platform that allows a flexible combination of the visualization and control techniques for the MR-guided EP workflow.

Results: The MR-EP suite allowed performing EP interventions very efficiently and accurately under MR-guidance. The in vivo tracking jitter with the catheter resting in the vena cava was 0.49mm. This jitter includes some residual physiologic motion. Due to the excellent guidance achieved by combining high resolution 3D soft tissue images with angiograms, real-time images and accurate tracking, fast mapping of e.g. 40 points in RV in 20min was typically possible.
