

# PRODUCT

Mixed Reality Tool for Surgical Planning of Aortic Valve Repair / Replacement

## INDICATION

Cardiology, Structural Heart, Valve repair, Pre-planning surgical tool

### VALUE PROPOSITION

- Patient specific workflow
- Guide with significant anatomic landmarks
- 3D/4D tool to view surgical plan

### **DEVELOPMENT STAGE**

Workflow and landmarks identified from Preclinical studies.

#### INTELLECTUAL PROPERTY

Internal data set Inventor know-how

#### **RELATED PUBLICATIONS**

Tretter, J., Burbano-Vera, N., Najm, H.. Multi Modality Imaging Evaluation And Pre-Surgical Planning For Aortic Valve-Sparing Operations In Patients With Aortic Root aneurysm. **Annals of Cardiothoracic Surgery**, https://www.annalscts.com/article/view/17037.

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IDF 2024-088

# Aortic Valve Interventional Planning in Mixed Reality

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# **UNMET NEED**

The aortic root is a complex, dynamic three-dimensional structure which includes the aortic valve, sinuses, interleaflet triangles, and the proximal aorta. Multiple imaging modalities such as computed tomography (CT), echocardiography (echo), and cardiac magnetic resonance (CMR) are used to understand the intricacies of the anatomy, timing of surgery, planning the optimal surgical/interventional approach, and predicting patient outcome. Reliance on surgical expertise alone for intraoperative evaluation and decision making could be suboptimal due to the unloaded condition of the aortic root and the variance of experience of the surgeons to successfully repair the aortic valve. Combining information from multiple imaging modalities to this complex anatomy is currently tedious, time-consuming, and has a steep learning curve. This is especially true in terms of applying the relatively new standardized approach to the description of the anatomy and function of the aortic valve, thus allowing increased probably of preservation of the native valve (vs. replacement).

# SOLUTION

The proposed invention is a 3D/4D tool that will utilize the comprehensive measurement approach of combining multiple imaging modalities based on detailed anatomical and clinical investigations for pre-surgical planning involving the aortic root. The standardized workflows provide detailed assessment for surgical decision making for aortic valve disease. This utilizes combination of the aortic valve Procedural Planning Program and 3D/4D virtual reality imaging tools to observe patient-specific personalized surgical plans.



Planning using ECG-gated 4D cardiac CT scan of an adolescent patient