LVI TECHNOLOGY
• LVI catheter enables real-time, three-dimensional (4D) visualization for intracardiac surgeries
• Provides instantaneous, full-volume views at the point of surgery, with greater field-of-view and continuous imaging of the dynamic anatomic environment
• Existing intracardiac echo (ICE) catheters produce only two-dimensional images, limiting surgeon’s field-of-view

ENVISIONED APPLICATION
• Pulmonary vein ablation
• Atrial fibrillation affects over 5 million people
• 75,000 procedures per year in U.S.
• Failure rate >30% due in part to inadequate image guidance, leading to underablation
• LVI can potentially increase efficacy by providing a continuous intracardiac view of the catheter tip
• LVI can potentially reduce injury by providing better, continuous views of adjacent anatomy

BREAKTHROUGH TRANSDUCER TECHNOLOGY
• MEMS-based Matrix Phased Array transducer
  – 256-512 elements for 4D imaging
  – Semiconductor processing for manufacturability and miniaturization
  – No cutting and assembly of piezoceramic plates
  – Transducer arrays produced in batches of silicon wafers
• Novel cable assemblies integrated using semiconductor packaging and interconnection technologies

RECENT PROGRESS
• Demonstrated real-time 3D imaging from 5 to 12.5 MHz, ideally suited for intracardiac imaging
• Fabricated operational 14F intracardiac catheter prototypes and completed initial in vivo animal imaging experiments

EXPECTED BENEFITS
• Fewer complications—Improved visibility of moving anatomy
• Efficient imaging—Real-time data capture, full-volume views that can be manipulated to change vantage point
• More patients—Reduced procedure/exam time
• Better outcomes—Shorter, more accurate procedures

ICE CATHETER PROTOTYPE
• Real-time, volumetric imaging
• Matrix phased array
• 14F, side-looking
• 5 MHz
• Steerable
• 35” working length

REFERENCES

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