Adoption of Robotics: The Perspective of Healthcare Systems

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Disclosures

- I am a paid consultant to Medtronic, Boston Scientific, Abbott, Philips, Biosense Webster, Haemonetics, Shifamed, Siemens, Luma Vision

- I have equity in SoundCath, Encompass Vascular, Myra vision, Supira Medical, Tioga Cardiovascular, Akura Medical, Adona Medical, Laza Medical, DRS Vascular, S4 Medical, Beluga Medical, PhysCade

THE EP LANDSCAPE

Why Electrophysiology Demands Innovation

~600K

EP procedures/year in the US

3×

Growth in EP ablation volume since 2000

Elevated

Fluoroscopy exposure per complex ablation

>2×

Complexity growth in last decade

Sustained EP volume growth combined with increasing case complexity, radiation burden, and physician ergonomic risk **create an imperative** for healthcare systems to evaluate robotic navigation solutions.

HIGH-COMPLEXITY CASES: WHERE ROBOTICS EXCELS

Ventricular Tachycardia & Congenital Heart Disease — The Cases That Define a Program

VENTRICULAR TACHYCARDIA

The Clinical Challenge

- Scar-based re-entry circuits in ischemic & non-ischemic CMP demand prolonged, stable catheter contact in regions of dense fibrosis
- Manual catheter torque causes tip instability exactly when precision matters most — during entrainment and pace-mapping
- Hemodynamic intolerance limits mapping time; every second of contact counts

Robotic Advantage

Stable contact: Magnetic hold in fibrotic scar, independent of respiration & cardiac motion

Reduced ectopy: Atraumatic navigation minimizes mechanically-induced PVCs during mapping

CONGENITAL HEART DISEASE

The Clinical Challenge

- Repaired CHD creates complex, non-standard anatomy — baffles, patches, and conduits that defeat conventional catheter torque techniques
- Radiation exposure is disproportionately harmful in younger patients who will accumulate lifetime exposure from repeat procedures
- Arrhythmia circuits follow scar borders that are unpredictable without high-density, stable mapping

Robotic Advantage

Anatomic access: Navigate baffles & conduits magnetically where manual catheters cannot reach

Radiation protection: Near-zero operator dose — critical for high-volume pediatric/CHD centers

CLINICAL OUTCOMES

What the Evidence Shows

95%

Reduction in operator radiation

≈75%

Reduction in fluoroscopy time

Outstanding

Acute success rates vs. manual ablation

Safety Profile	Significantly lower perforation rates reported in magnetic navigation vs. manual ablation in multiple AF ablation series.
VT Ablation	Improved catheter stability in scar-related VT; reduced mechanical ectopy during mapping in ischemic cardiomyopathy patients.
Complex Cases	Magnetic navigation particularly advantageous in pediatric/congenital patients and cases with challenging vascular anatomy.
Staff Safety	Near-elimination of operator radiation exposure addresses long-term occupational hazard — a growing concern for EP program retention.

THE COMPLEX REFERRAL ADVANTAGE

Becoming the Regional Destination for High-Acuity EP

COMMUNITY & REGIONAL HOSPITALS

- Paroxysmal AF ablation
- Typical atrial flutter
- Standard SVT (AVNRT/AVRT)
- Routine device implants
- Straightforward device follow-up

COMPLEX CASES REFERRED UP

YOUR ROBOTIC EP CENTER — Complex & Tertiary Referrals

- Scar-related VT ablation
- Failed prior ablations
- CHD / Complex congenital
- Pediatric arrhythmias
- Epicardial access cases

STRATEGIC VALUE TO HEALTH SYSTEMS

Six Pillars of Healthcare System Value

Service Line Differentiation

Positions the health system as the regional destination for high-complexity EP, attracting cases competitors cannot handle.

Revenue Capture

Complex EP cases (VT ablation, redo AF) generate significantly higher RVU and reimbursement vs. routine cases.

Referral Network Expansion

Robotic capability drives new cardiologist and EP referral relationships from a broader geographic catchment.

Physician Recruitment & Retention

State-of-the-art technology is a key differentiator in recruiting top EP talent and protecting existing staff from radiation injury.

Quality & Safety Leadership

Demonstrated radiation reduction and improved safety metrics support quality reporting, accreditation, and risk management.

Strategic Halo Effect

Robotic EP signals system-wide innovation commitment, supporting broader cardiovascular program brand positioning.

GOVERNANCE & DECISION FRAMEWORK FOR EP ROBOTICS

How health system leaders evaluate and approve robotic EP programs

1	2	3	4	5
Strategic Fit	**EP Volume Assessment**	**EP Financial Pro Forma**	**Vendor & Integration**	**Launch & Govern**
Does robotic EP align with cardiovascular service line strategy, academic mission, and regional market position?	Current and projected AF/VT/complex ablation volumes; minimum 150–200 cases/yr to justify investment	10-year NPV model: capital, disposables, LOS savings, radiation liability reduction, referral capture	Stereotaxis RFP; mapping system compatibility (CARTO/EnSite); suite design; service terms & upgrade clauses	Privileging criteria; case selection protocols; radiation dose KPIs; quarterly EP quality committee review

EP Governance Pillars: Clinical Safety · Radiation Dosimetry · Procedure Volume · Physician Equity · Innovation Mission

FINANCIAL CONSIDERATIONS

Investment Framework for EP Robotic Programs

INVESTMENT CONSIDERATIONS

- Capital cost: $1.5–2.5M system acquisition (varies by configuration)
- Dedicated shielded EP lab renovation (if not existing)
- Catheter & disposable incremental cost vs. standard catheters
- Training & proctoring investment (typically 20–30 cases)
- Ongoing service contract and software updates
- Potential OR/lab time reallocation during installation phase

REVENUE & VALUE DRIVERS

- VT ablation: $15K–25K+ facility revenue per case
- Complex AF redo: premium reimbursement vs. index case
- New referral volume from expanded geographic draw area
- Reduced staff radiation injury liability & workers' comp exposure
- Physician recruitment ROI for top-quartile EP talent
- Case volume ramp typically 12–24 months to optimization

BARRIERS & RISK MITIGATION IN EP ROBOTICS

Challenges specific to cardiac electrophysiology program adoption

Financial Risk

⚠ High capital outlay; magnetic catheter add-on costs; low initial case volume during ramp-up compresses margins.

✓ Volume commitment agreements with EP physicians; phased investment starting with single platform; vendor volume guarantees.

Catheter Compatibility Limits

⚠ Only dedicated magnetic catheters work.

✓ Hybrid case design — robotic ablation catheter + manual mapping catheter; monitor PFA-compatible development roadmap. Future innovation.

Mapping System Compatibility

⚠ Stereotaxis integrates with CARTO and EnSite but not all platform versions; upgrades may break integrations.

✓ Contractual software compatibility clauses; joint validation testing with EP lab IT team before go-live.

Physician Learning Curve

⚠ Robotic catheter handling differs significantly from manual technique; 10–20 case learning curve before efficiency recovers.

✓ Simulation training; structured proctorship; case selection protocols beginning with simpler arrhythmias.

OPERATIONAL INTEGRATION

Implementing a Robotic EP Program — What to Expect

1	2	3	4	5
Assessment	**Planning**	**Installation**	**Launch**	**Scale**
• Cath lab infrastructure review	• Capital budget approval	• System commissioning	• Proctored case ramp	• Volume optimization
• Volume & case mix analysis	• Lab design & shielding	• Staff training program	• Quality metrics baseline	• Program marketing
• Staffing model evaluation	• Vendor negotiation	• Workflow redesign	• Referral network activation	• Outcome publication

STRATEGIC ROADMAP

From Decision to Destination EP Program

Horizon 1 | Months 0–6

Foundation

- → Conduct EP program strategic assessment
- → Engage Stereotaxis for site visit & demo
- → Finalize capital budget submission
- → Identify physician champion(s)
- → Develop referral outreach plan

Horizon 2 | Months 6–18

Launch & Ramp

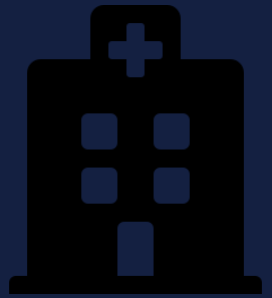
- → Complete lab installation & go-live
- → Train nursing, EP tech, and anesthesia staff
- → Initiate proctored case series
- → Launch regional cardiologist outreach
- → Track quality & efficiency KPIs monthly

Horizon 3 | Months 18–36

Scale & Lead

- → Achieve 5–8 complex robotic cases/week
- → Publish institutional outcomes data
- → Develop regional referral partnerships
- → Explore adjacent robotic cardiovascular opportunities
- → Position program nationally

Conclusions: THE OPPORTUNITY



- Robotic EP addresses the most challenging clinical cases in arrhythmia care
- Complex referral drives measurable revenue & volume growth
- Healthcare systems investing now will define the regional EP landscape for a decade
- The technology is mature — the question is strategic will and execution