Advances in Cardiac Arrhythmias and Great Innovations in Cardiology

A novel three-dimensional catheter tracking system (Mediguide): Current and future applications

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Agenda

- Role of 3D mapping in interventional EP
- Limitations of current catheter navigation
- Introduction of the gMPS technology (MediGuide)
- Potential fields in clinical interventional EP
- Future applications

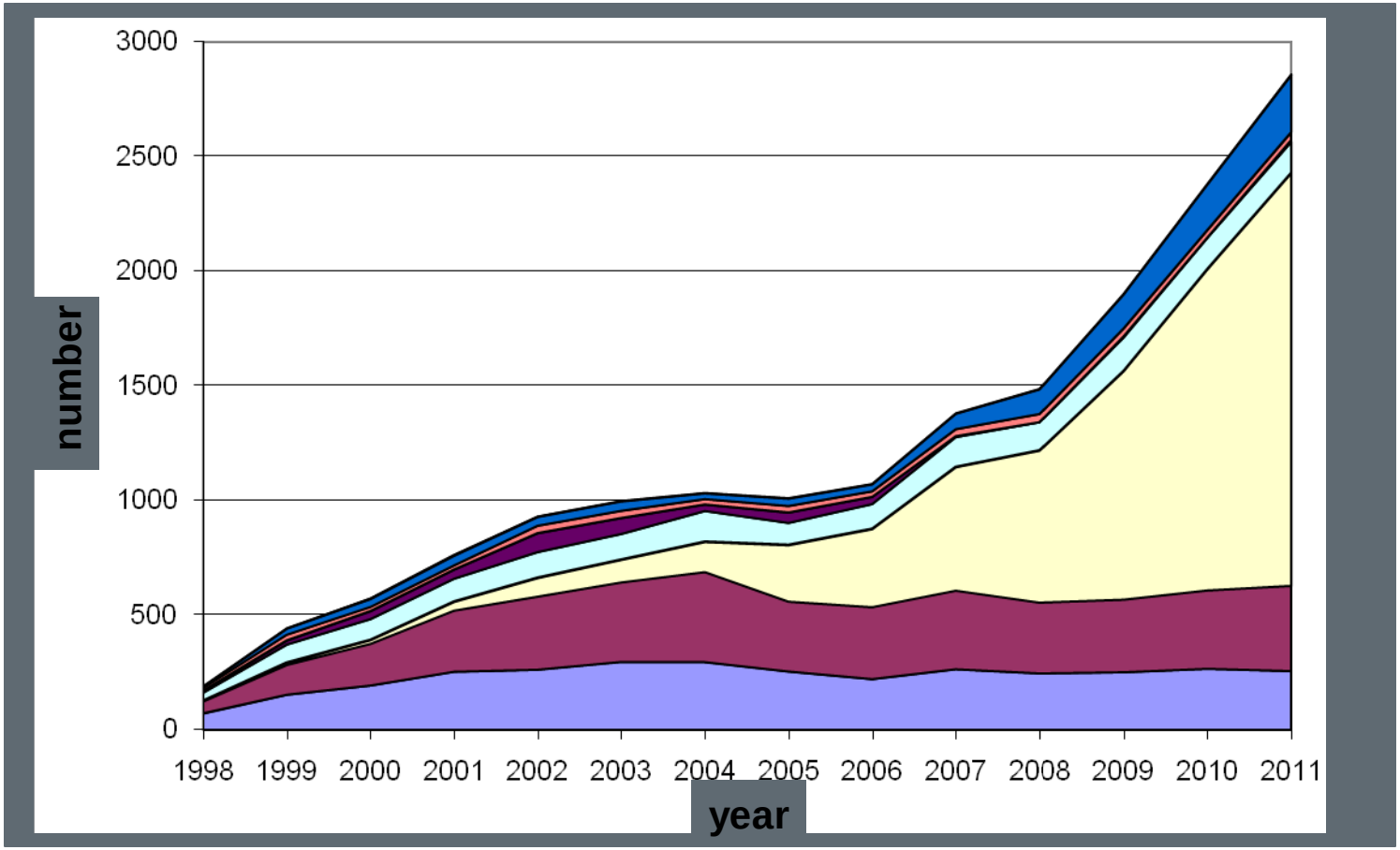
Interventional EP – the picture is changing

- diagnosis and therapy (ablation) of tachycardic arrhythmias
  - ablation of „simple“ arrhythmias

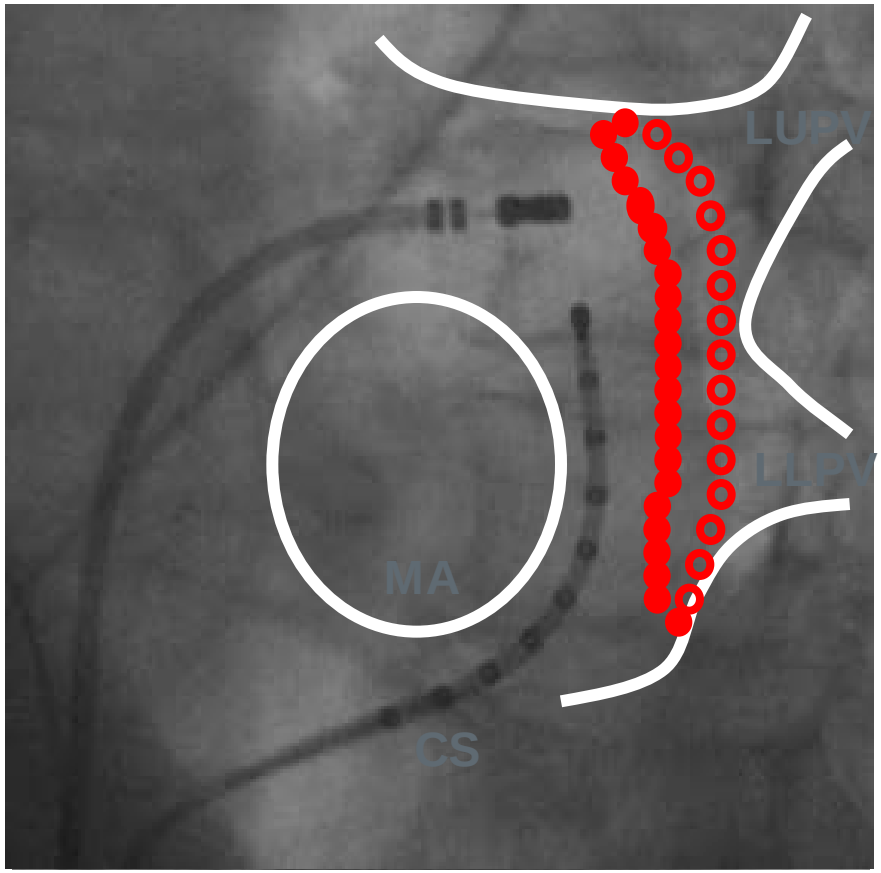
    AVNRT, typical atrial flutter, accessory pathway
  - ablation of „complex“ arrhythmias

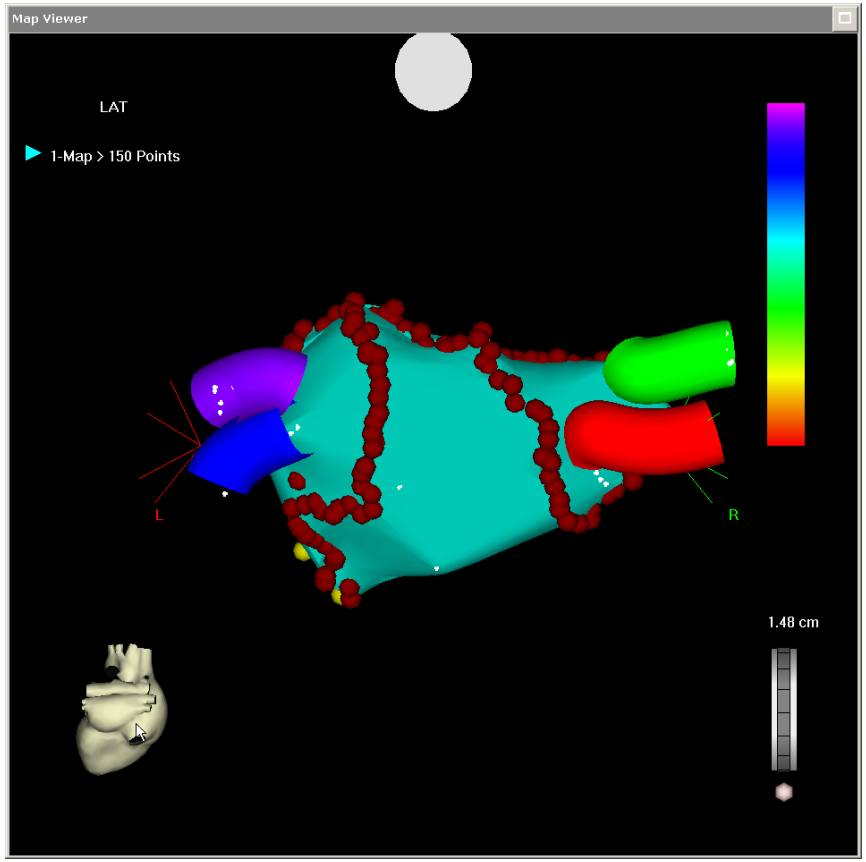
    AF, atypical atrial flutter, VT

Indications for catheter ablation @ Heart Center Leipzig



Role of 3D mapping systems in interventional EP





AF ablation: Relevance of individual 3D anatomy

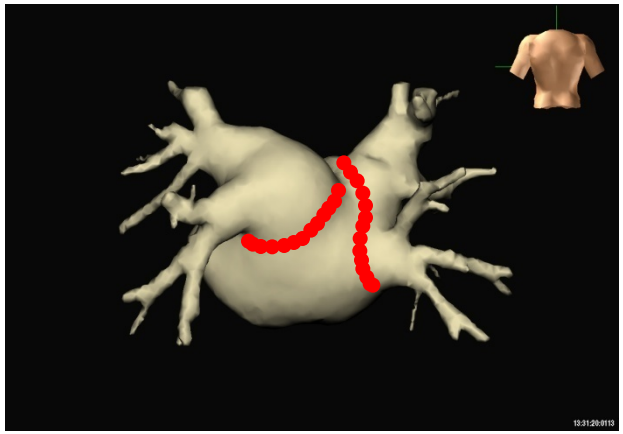
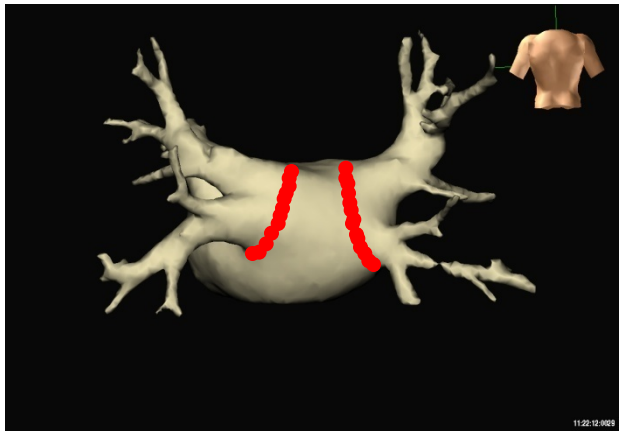
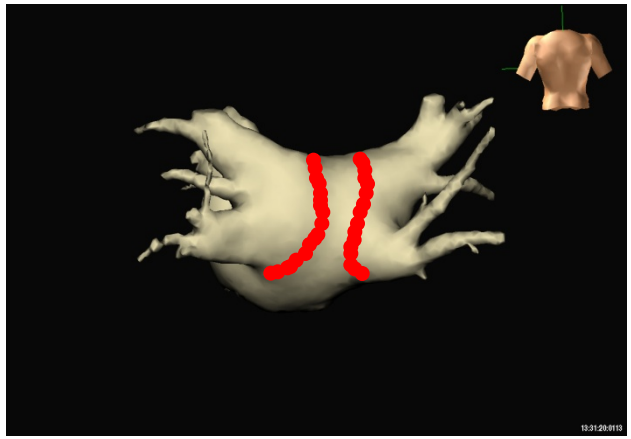
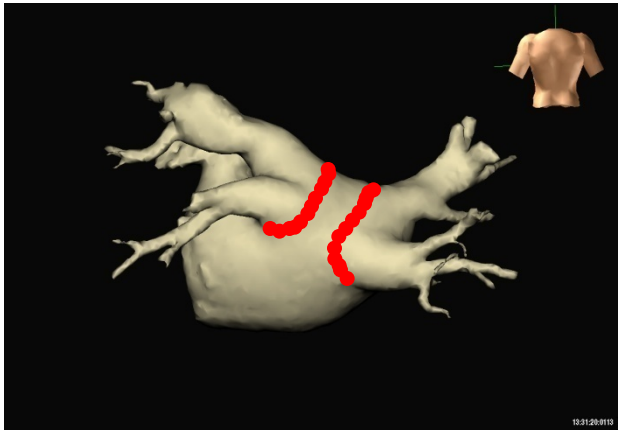
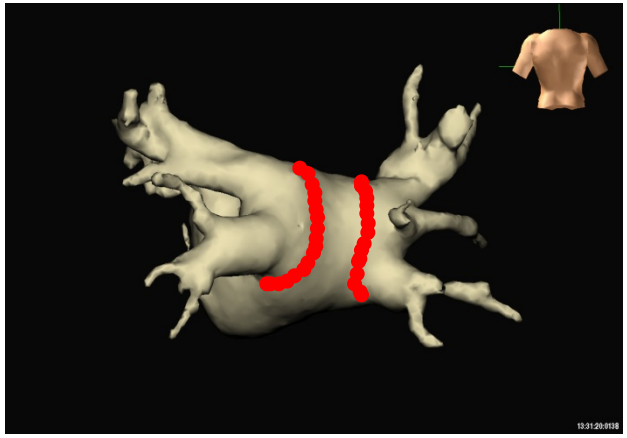
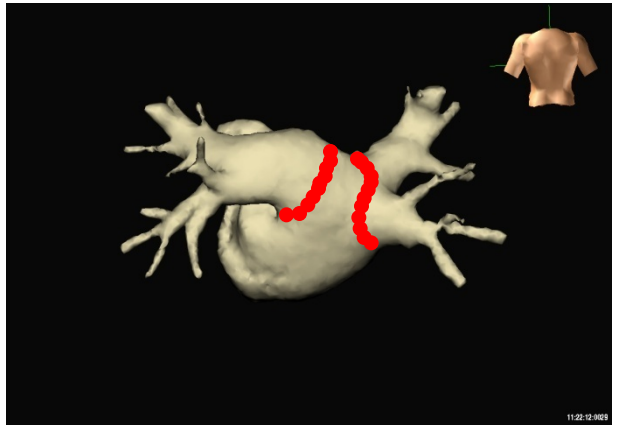
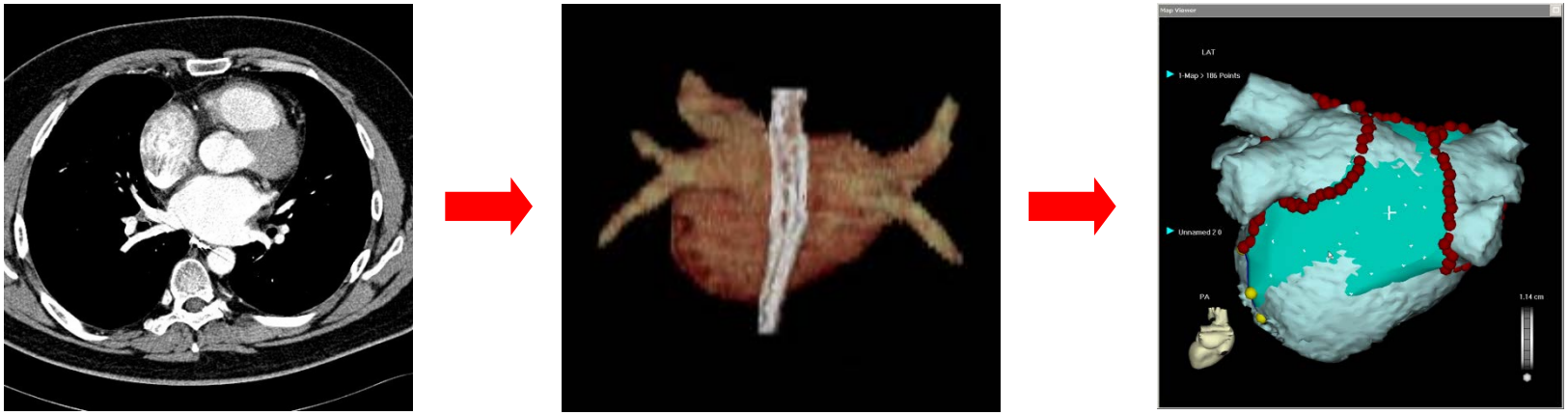







Image integration into 3D mapping systems



- clinical data on image integration are contradictory
- limitations are mainly registration difficulties due to
  - cardiac and respiratory motion
  - lack of adequate ‘landmarks’ (aorta?, CS?, LA points?)
  - inaccuracies of the electroanatomical LA reconstruction

Limitations of current 3D catheter navigation

Moving mapping and ablation targets due to

- cardiac and respiratory motion

Static map/image with moving catheters results in

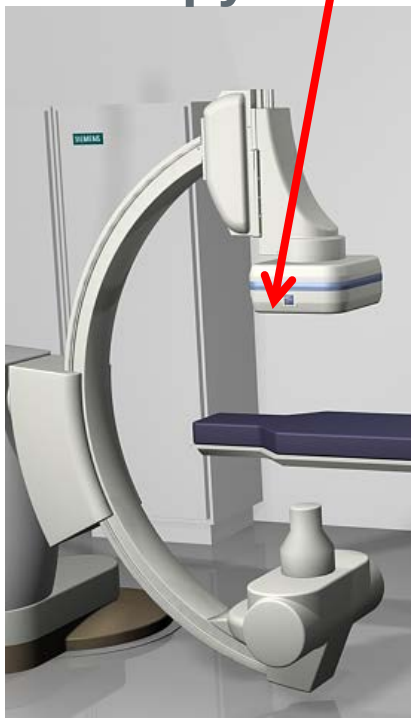
- misleading catheter positions and loss of 3D accuracy

Inherent mapping inaccuracies and limitations of 3D reconstruction

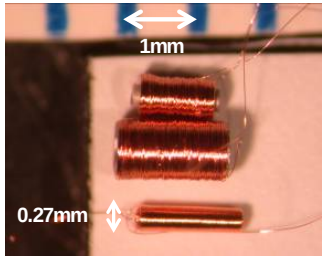
Result: Impact on procedure duration, fluoroscopy, efficacy, complications

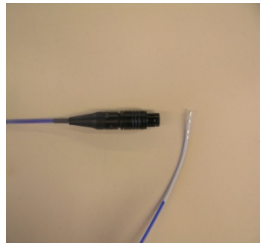
The gMPS technology (Mediguide)

3D electromagnetic field integrated into the fluoroscopy detector



miniaturized sensor technology





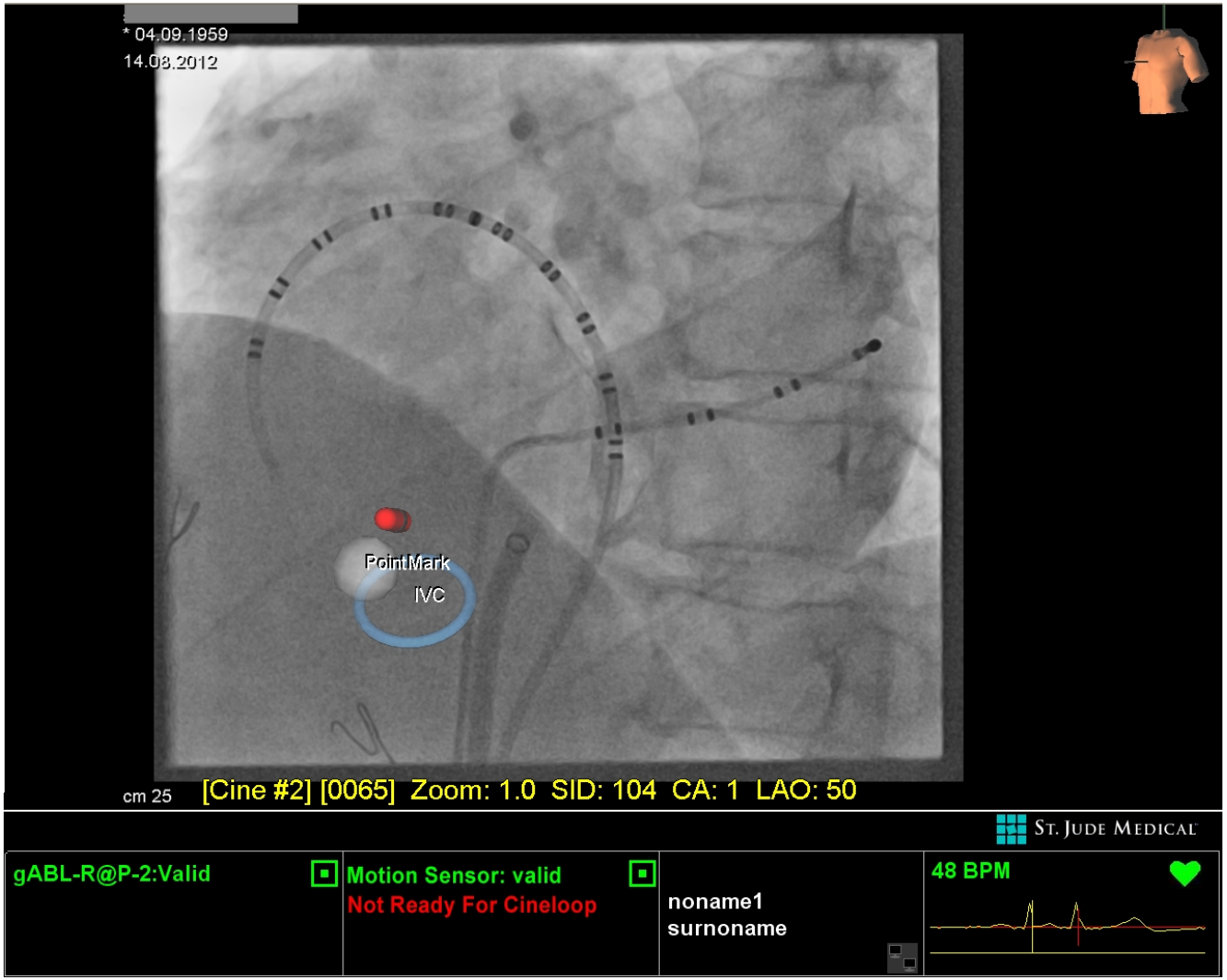
integration with 3D cardiac mapping system (NavX)

Clinical Experience with the Mediguide System (Elisabethinen Hospital Linz/October 2012)

- n=87 procedures using MediGuide

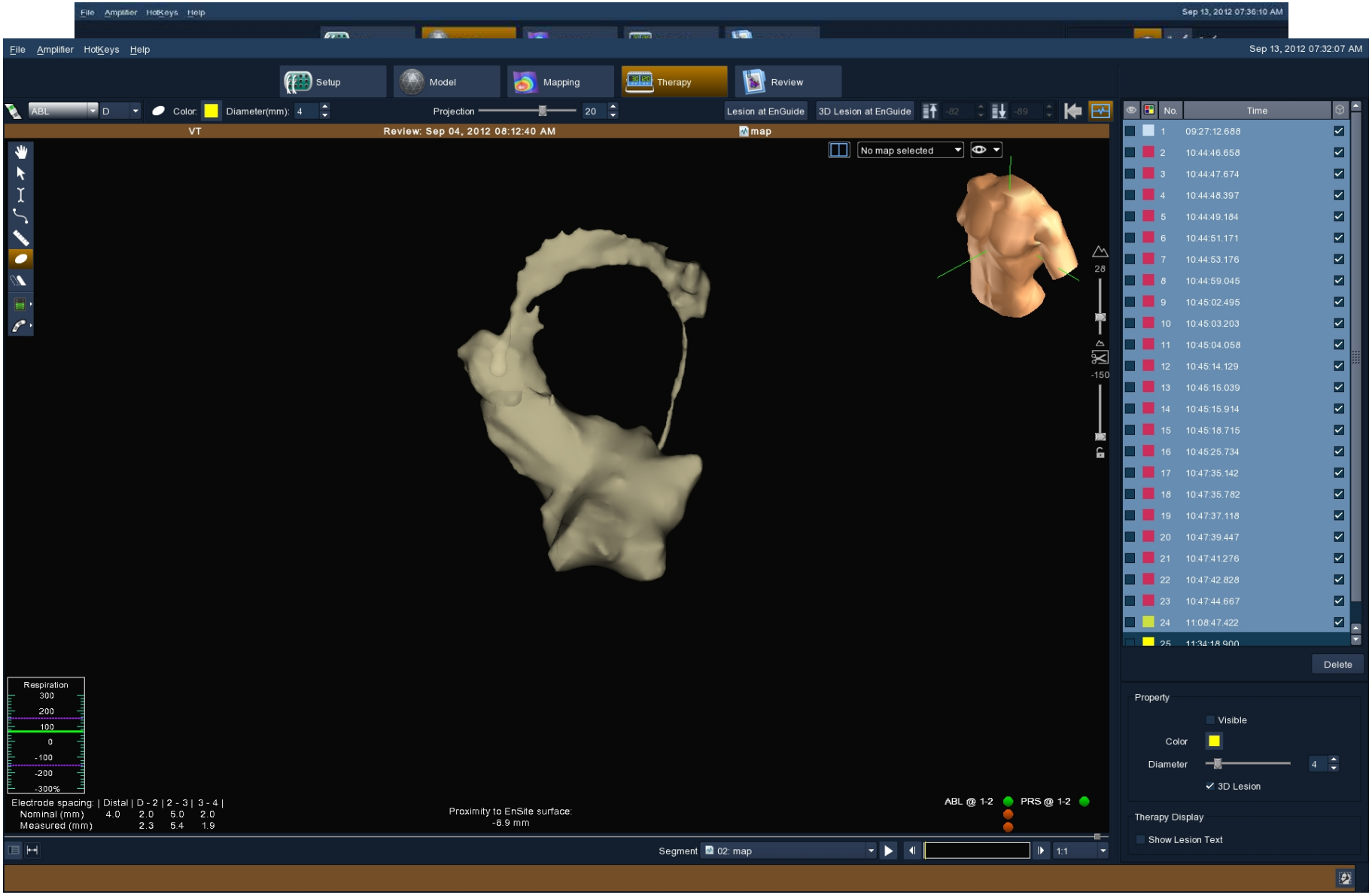
- 30 procedures including ablation catheter (Safire Duo MG, Cool Path Duo MB)
  - 19 Atrial Fibrillation
  - 5 VTs
  - 4 Atrial Flutter
  - 2 WPW

Atrial Flutter



Point Mark = TV annulus

LVT - Geometry



RVOT

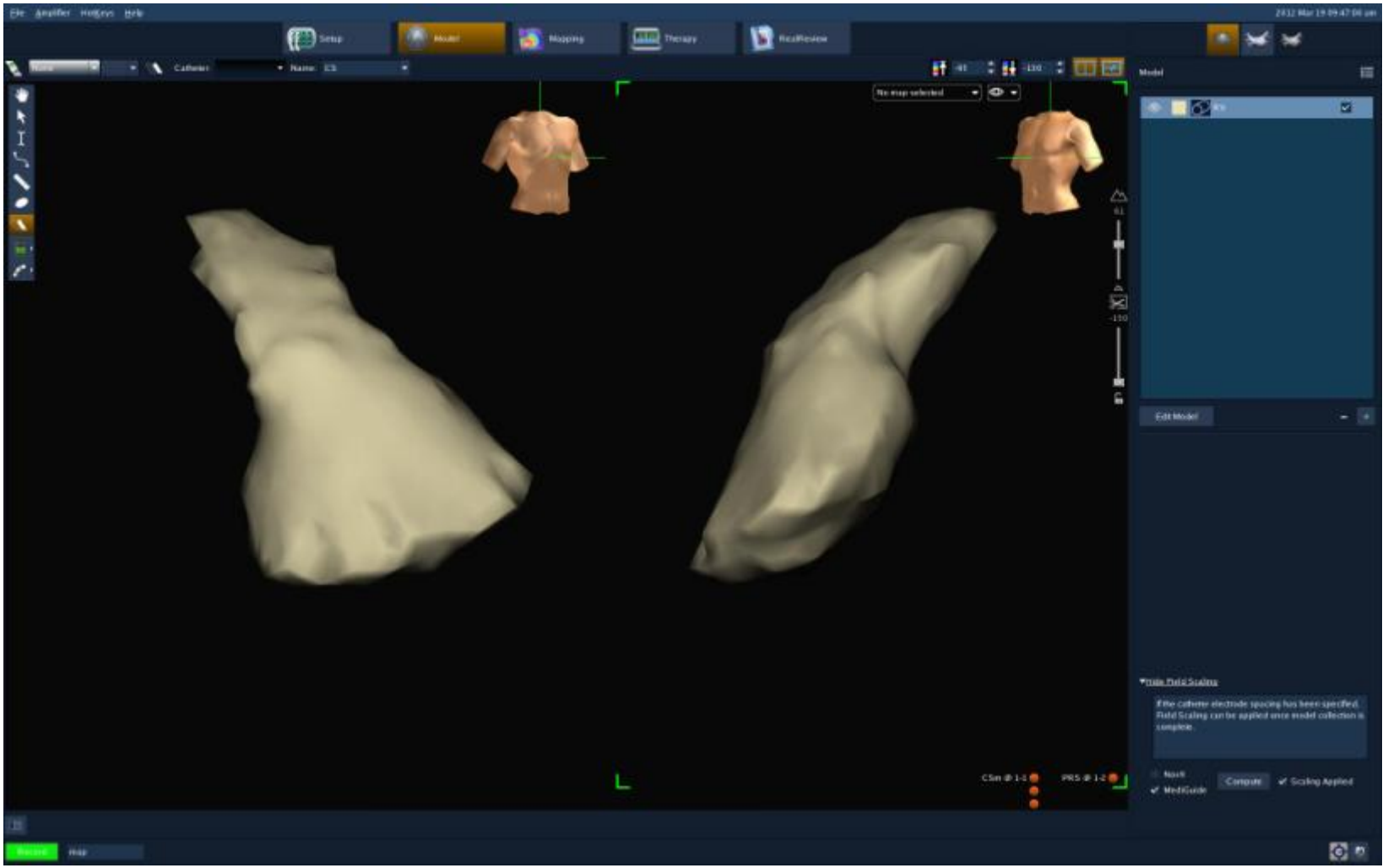
NavX Model

RVOT

MediGuide Model

RVOT

MediGuide Model



RVOT Video 1

RVOT Video 2

First AF Procedure

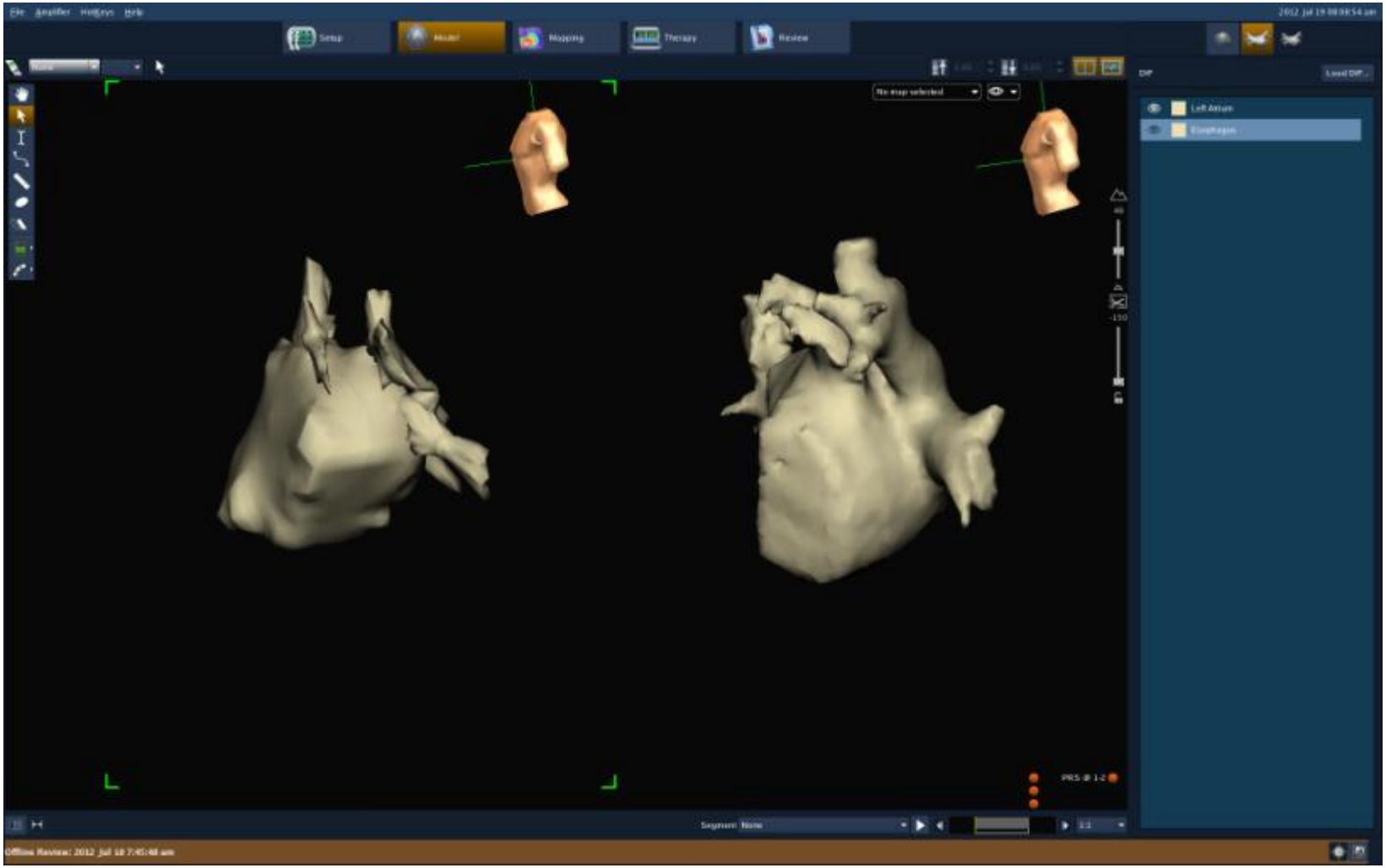
Safire Duo MediGuide enabled

July 2012

Model – Safire (1)

Model Points taken with Safire only

Model – Safire (2)

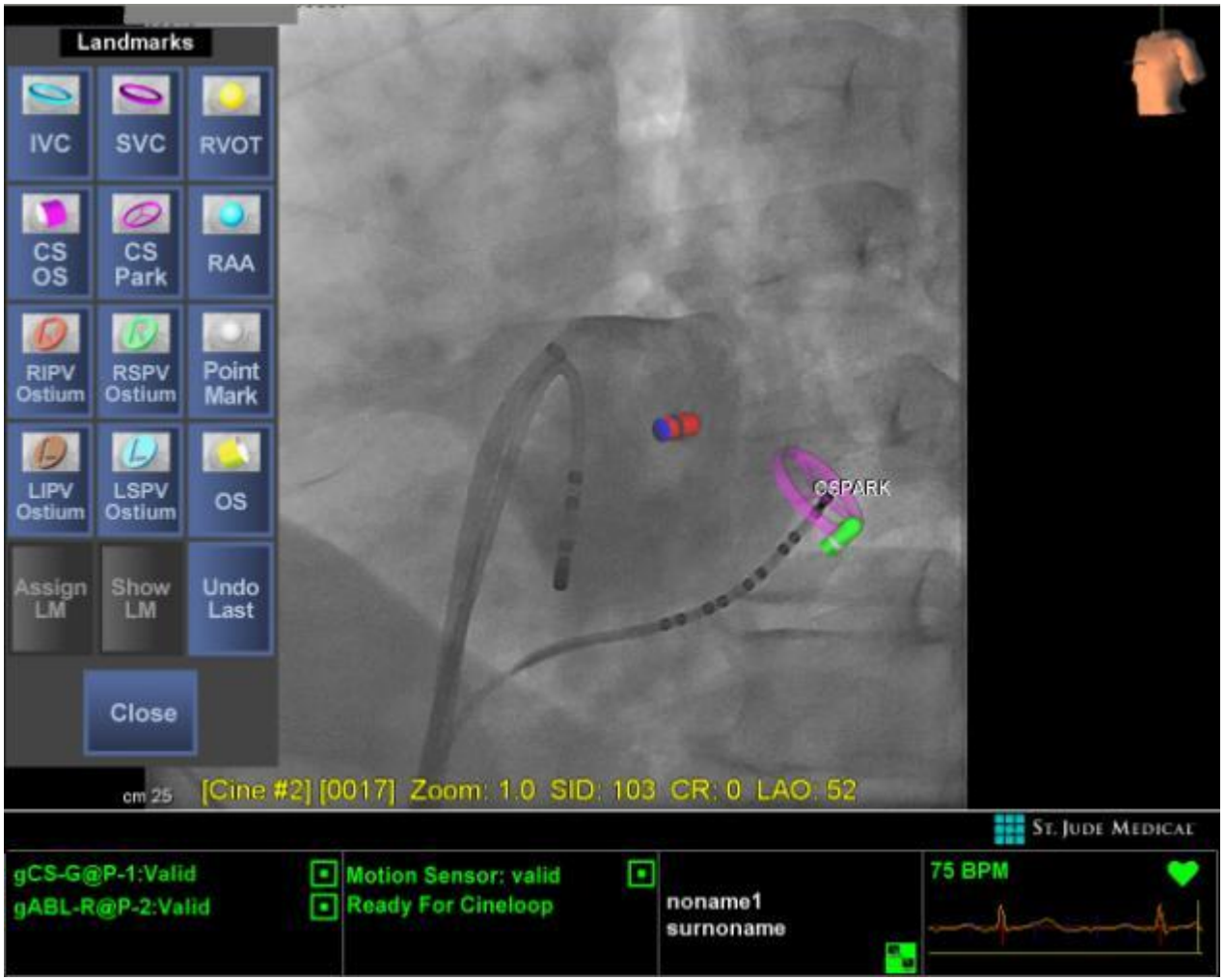


Model – Safire (3)

AF Procedure (1)

Atriography of left atrium in AP Projection – Contrast Agent applied through transseptal sheath

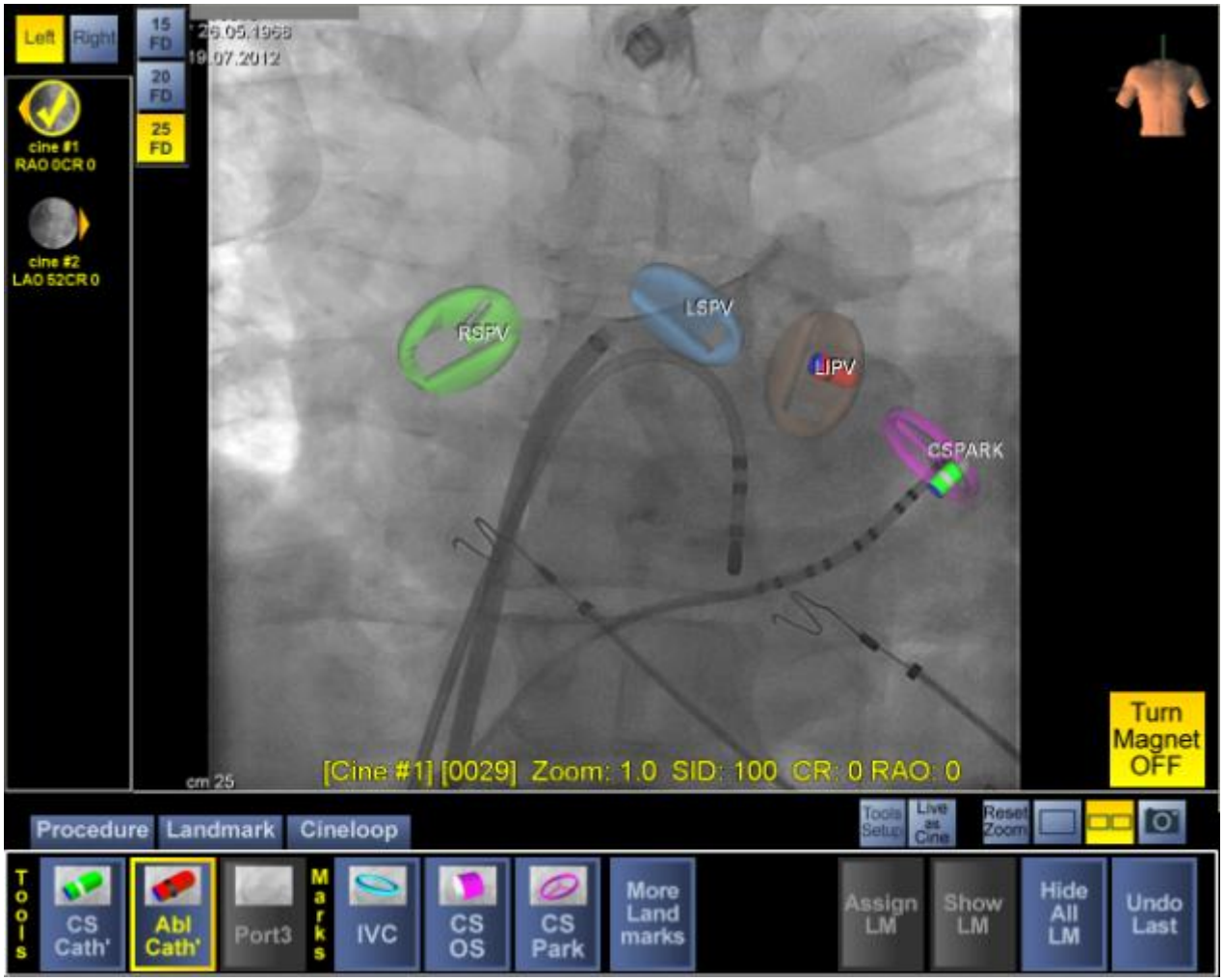
AF Procedure (2)



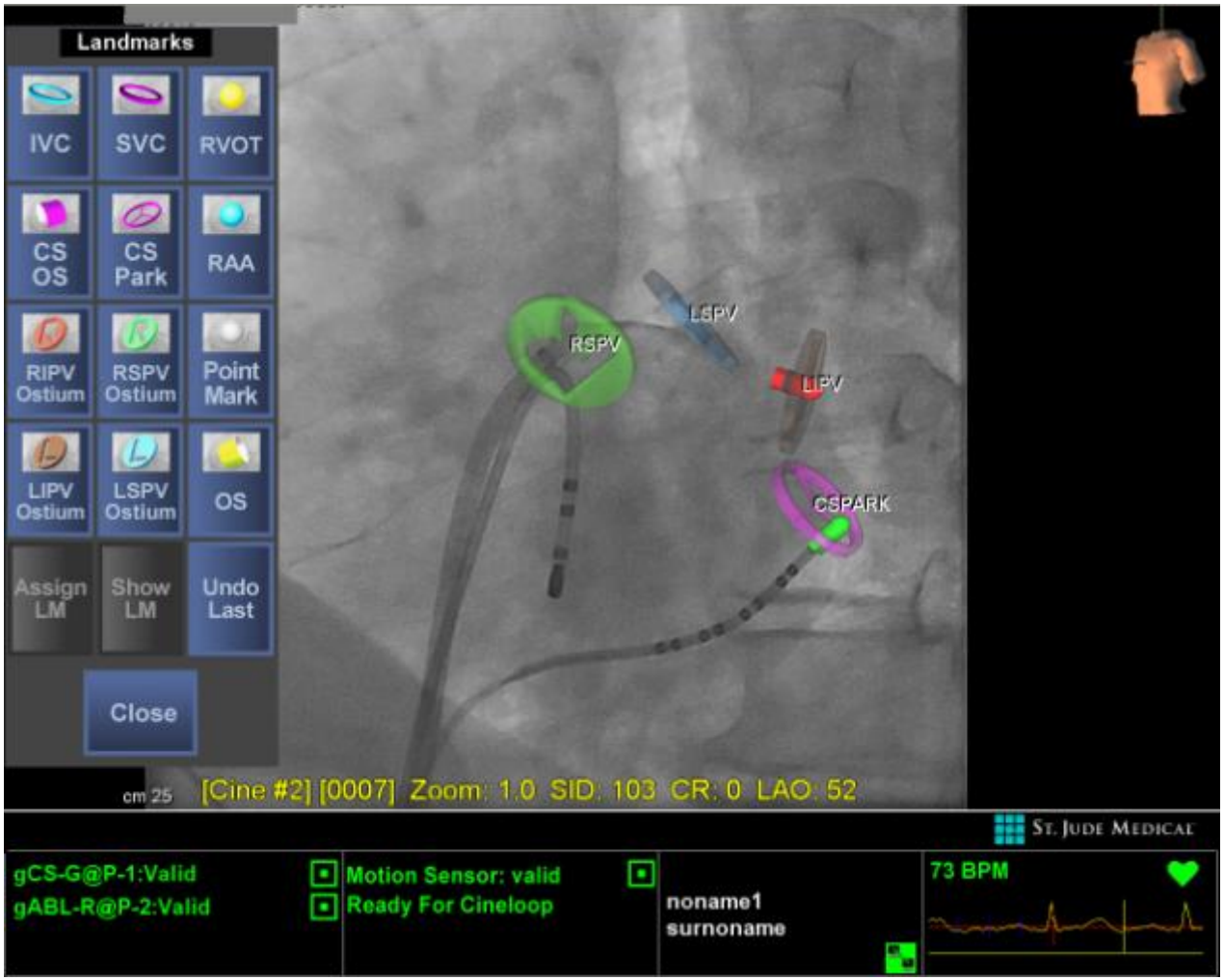
Atriography of left atrium in LAO projection

AF Video 1
AF Video 2

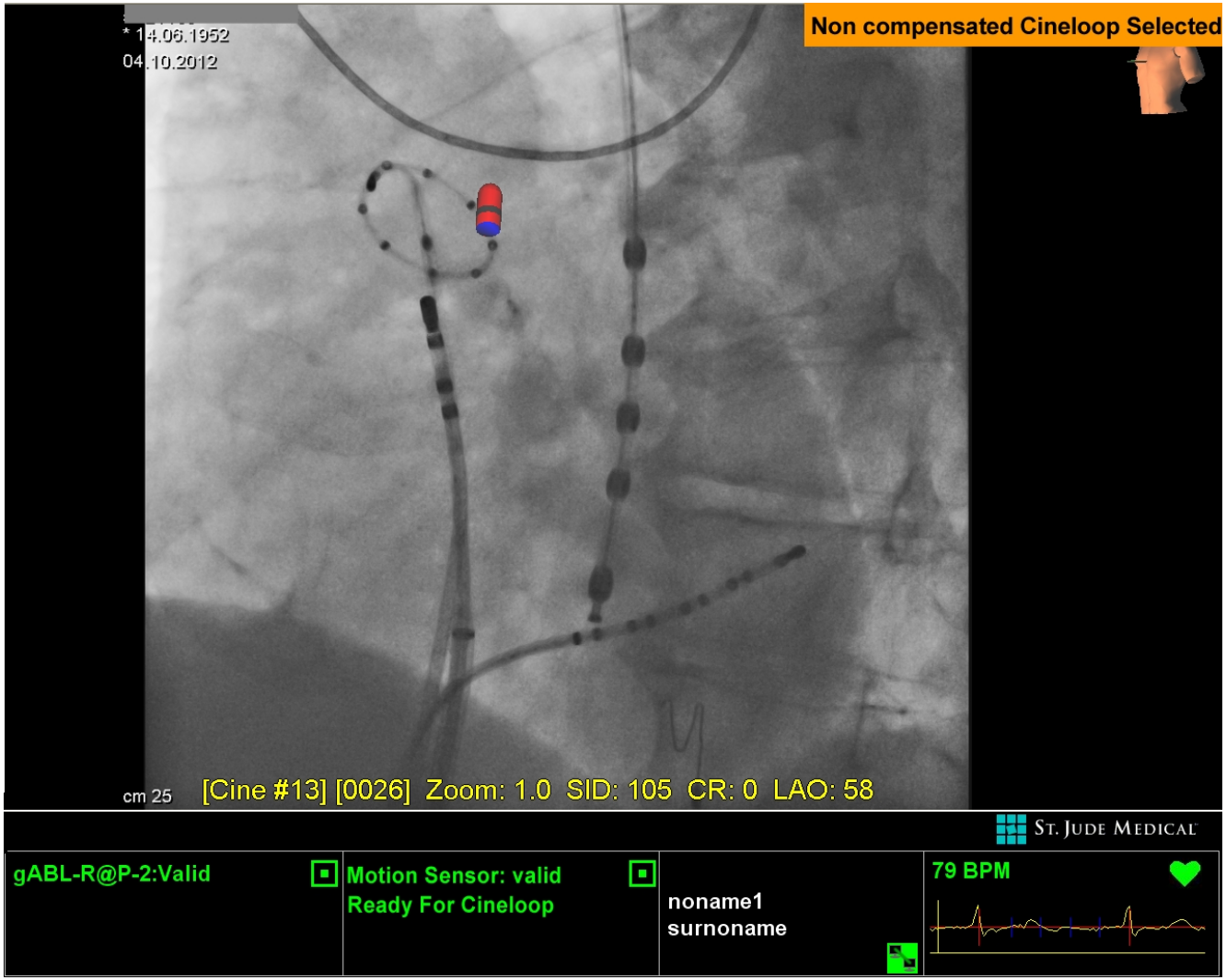
AF Procedure – Marker (1)



AF Procedure – Marker (2)



Atrial Fibrillation



AF Procedure – Summary

- Procedure Duration: 155min
- Total Fluoro Time: 4,1min
  - Catheter Positioning: 0,6min (Biplane Mode)
  - Transseptal Puncture: 1,4min (Biplane Mode)
  - Geometry Creation: 0,7min
  - Ablation: 1,4min
- Total Dosage: 3631,1 µGym² (NTA Settings: 15F/s)

AFib Ablation – The Leipzig Experience

Table 2. Procedural Parameters and Follow-Up Data

	All Patients (n=98)	MGT Group (n=49)	Control Group (n=49)	*P* Value
Fluoroscopy time, min*	24 (16, 33)	16 (10, 23)	31 (25, 43)	<0.001
Irradiation dose, cGy*cm^2	10 835±7509	7363±5827	14 453±7403	<0.001
Procedural time, min	166±48	174±43	157±51	0.06
RF time, s	2067±1014	1900±799	2250±1191	0.19
RF pulses, n	34±21	31±16	38±25	0.16
Documented PVI	100%	100%	100%	1.00
AF/AT freedom at 6 mo (%)	67 (68%)	33 (67%)	34 (69%)	0.83

Rolf et al, Circ Arrh. 2012;5:684-690

Summary

“Mediguide” is an electromagnetic sensor technology

unique features are:

- full integration with fluoroscopy
- miniaturized sensor technology

that allows:

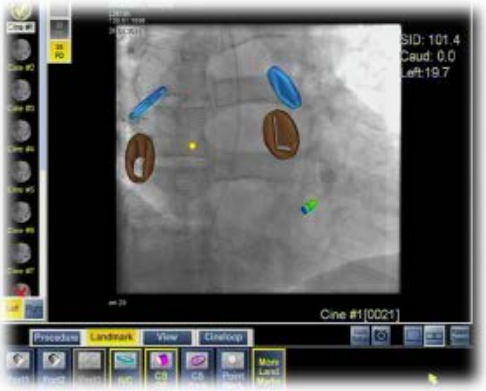
- compensation of cardiac, respiratory and patient motion

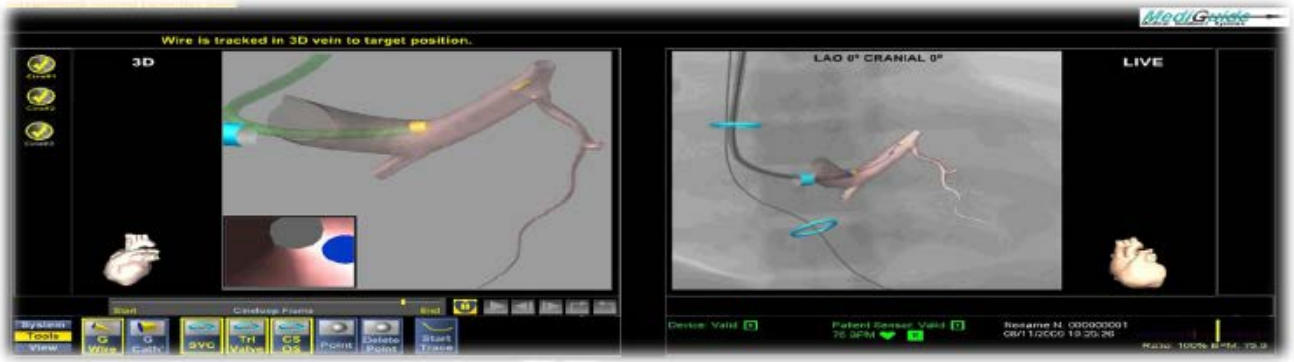
potential clinical EP applications

- non-fluoroscopic 2D intracardiac catheter navigation
- enhancement of 3D mapping accuracy
- automatic image integration

Future Applications

MediGuide™ Technology Monitors and Software





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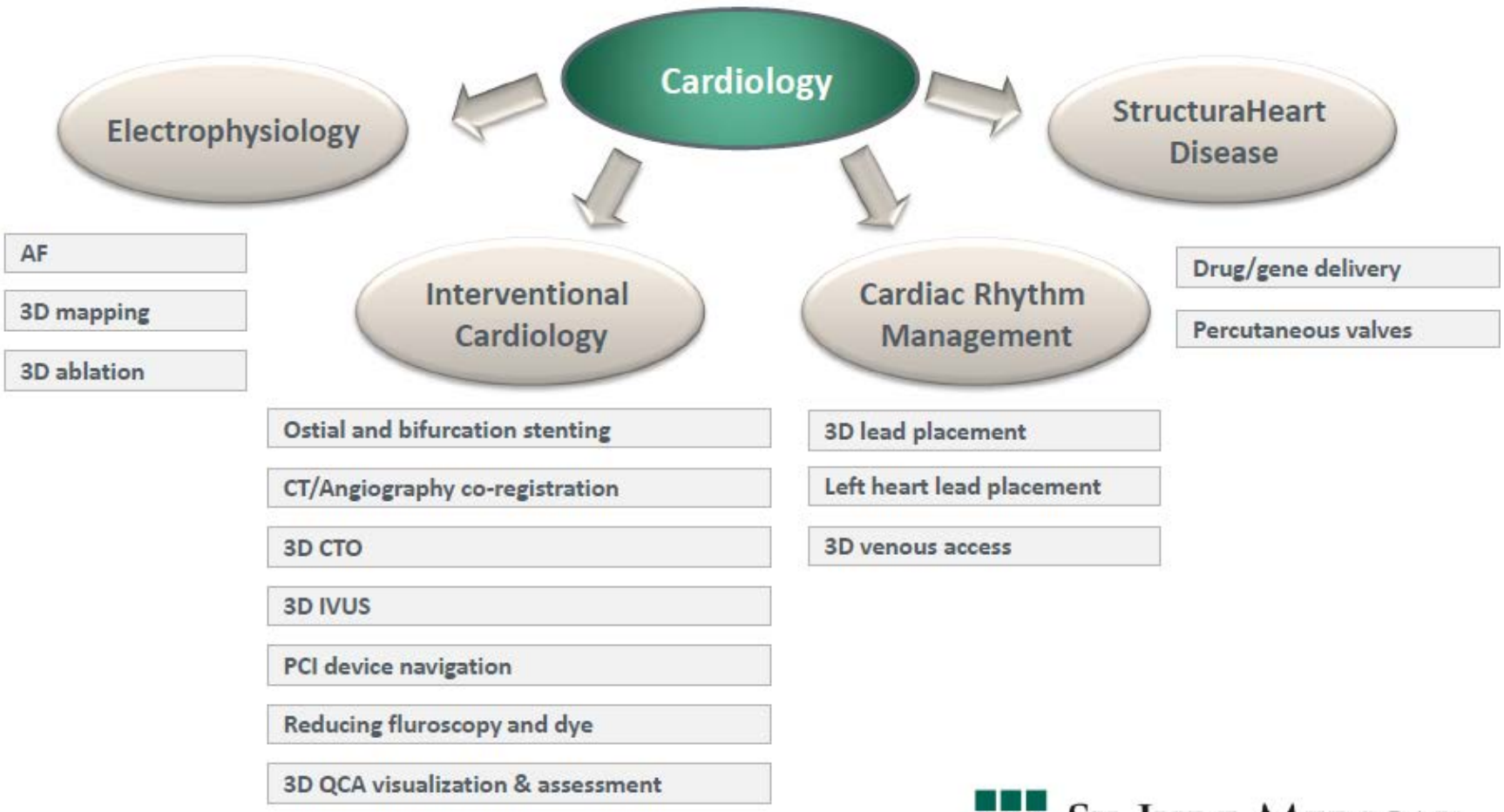
MediGuide™ Technology Cardiology Platform



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