



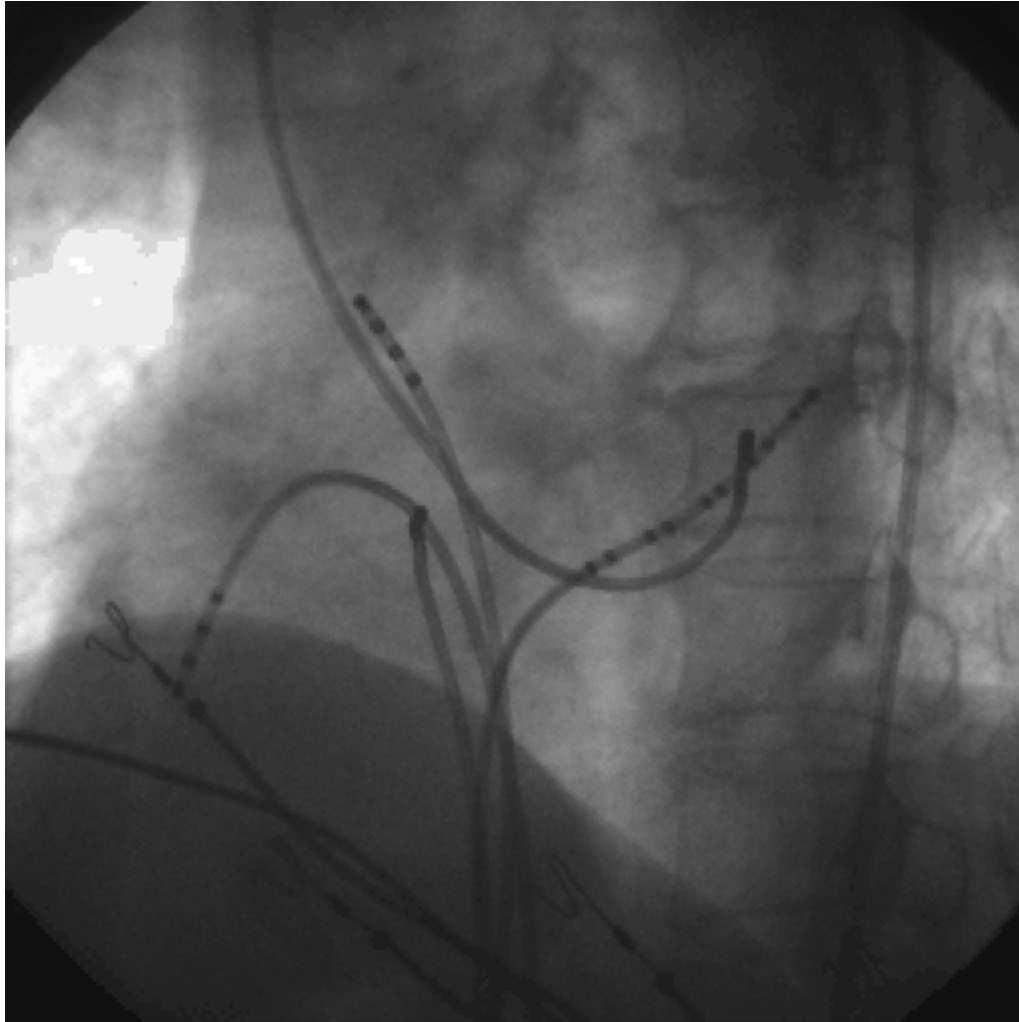
Les systèmes de cartographie 3D

Ph Mabo
CHU, Rennes



Electrophysiologie

Approche conventionnelle



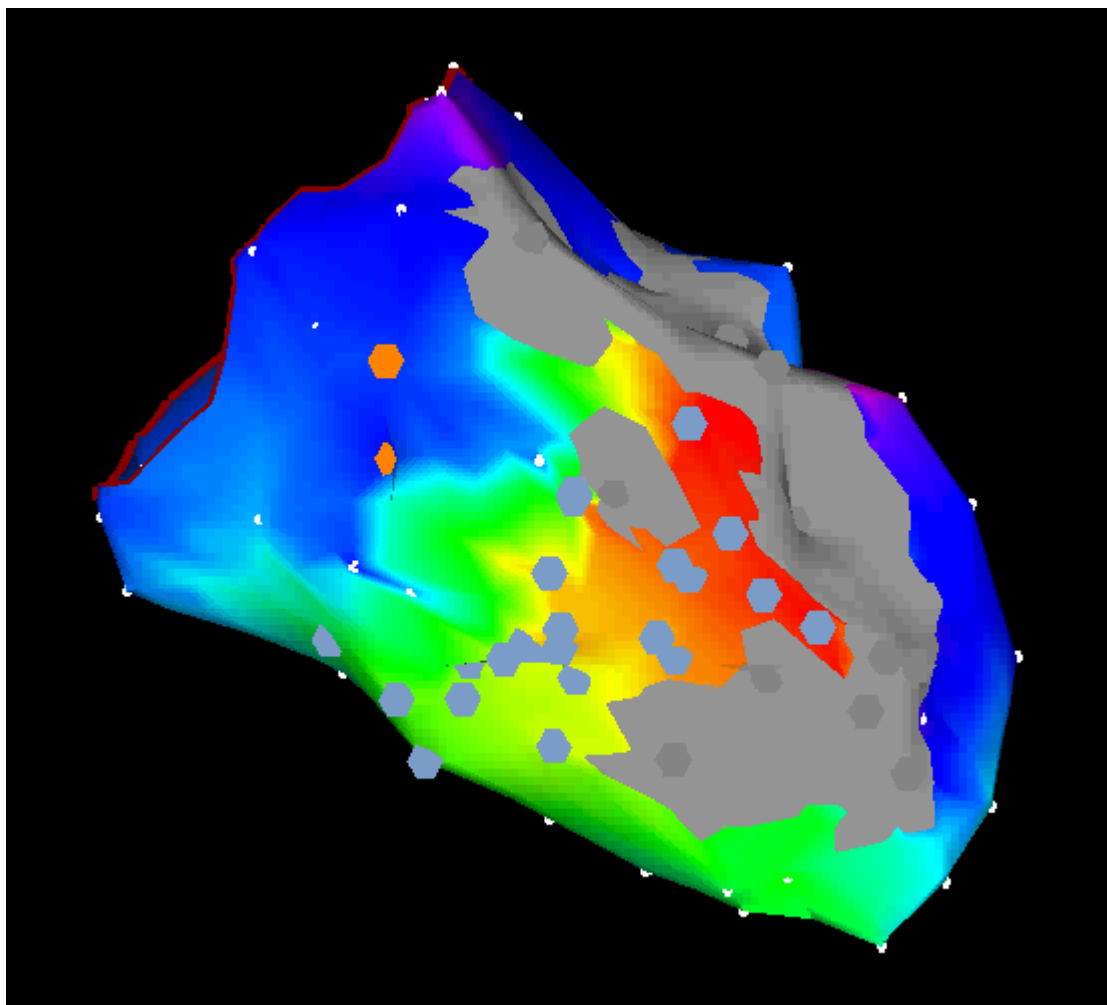
Pourquoi des nouveaux outils ?

- **Techniques ablatives:**
définir la cible et y accéder
- **Circuits complexes:**
activation 3D
- **Approche électro-anatomique:**
définir les zones cicatricielles
cibles « anatomiques »
- **Limiter le recours à la fluoroscopie**
- **Reduire le temps de procédure**

Systeme CARTO (Biosense-Webster)

- **Systeme electro-magnetique**
- **Acquisition point par point**
- **Cartes de differentes modalites:**
 - Amplitude**
 - Activation**
 - Impedance**
 - Fragmentation**
- **Fusion avec les donnees d'imagerie**
 - Cartomerge**
- **Catheters dedies (coût)**

Systeme CARTO



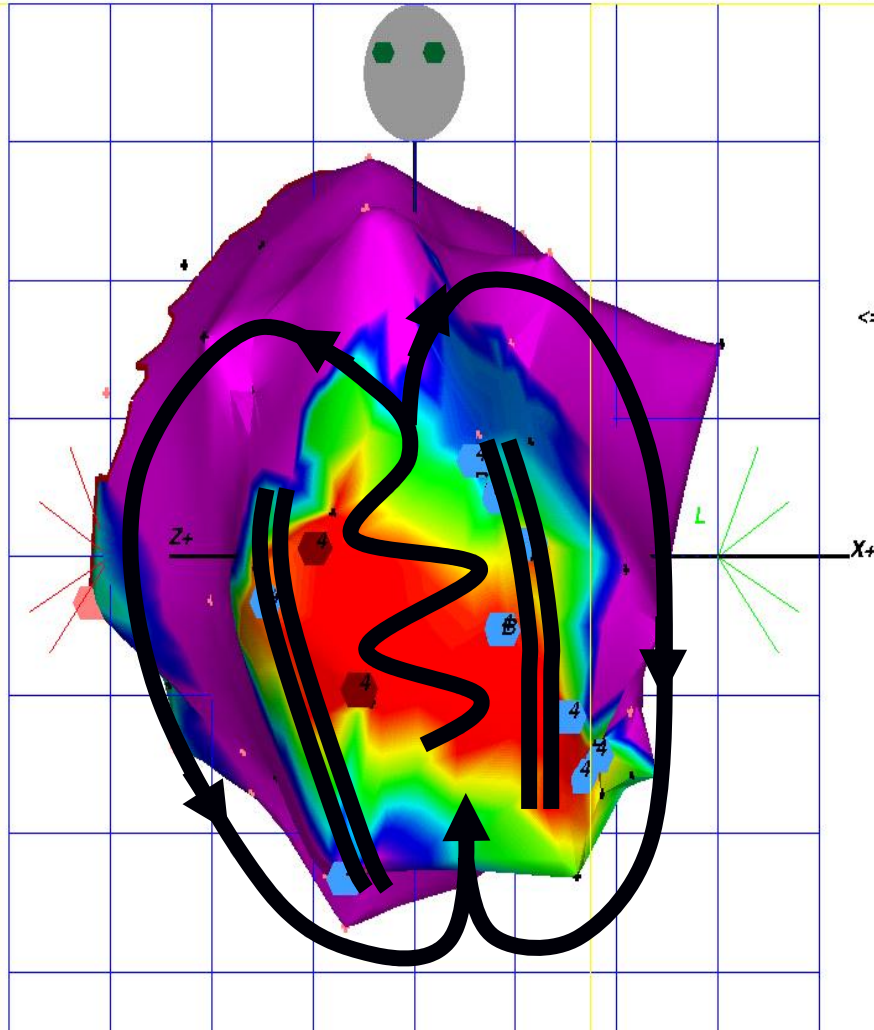
Stage: Remap 4
Display: Map 1

Y+

Bipolar Voltage

$\geq 1.50\text{mV}$

$\leq 0.50\text{mV}$



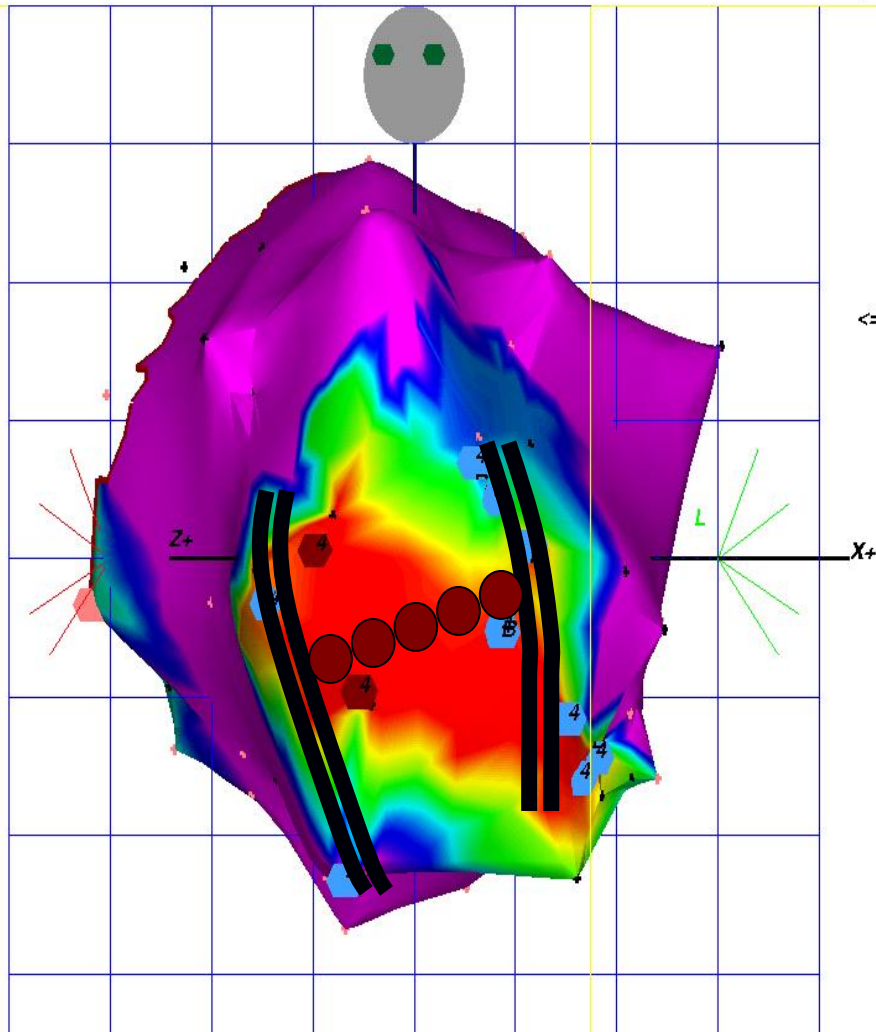
Stage: Remap 4
Display: Map 1

Y+

Bipolar Voltage

$\geq 1.50\text{mV}$

$\leq 0.50\text{mV}$



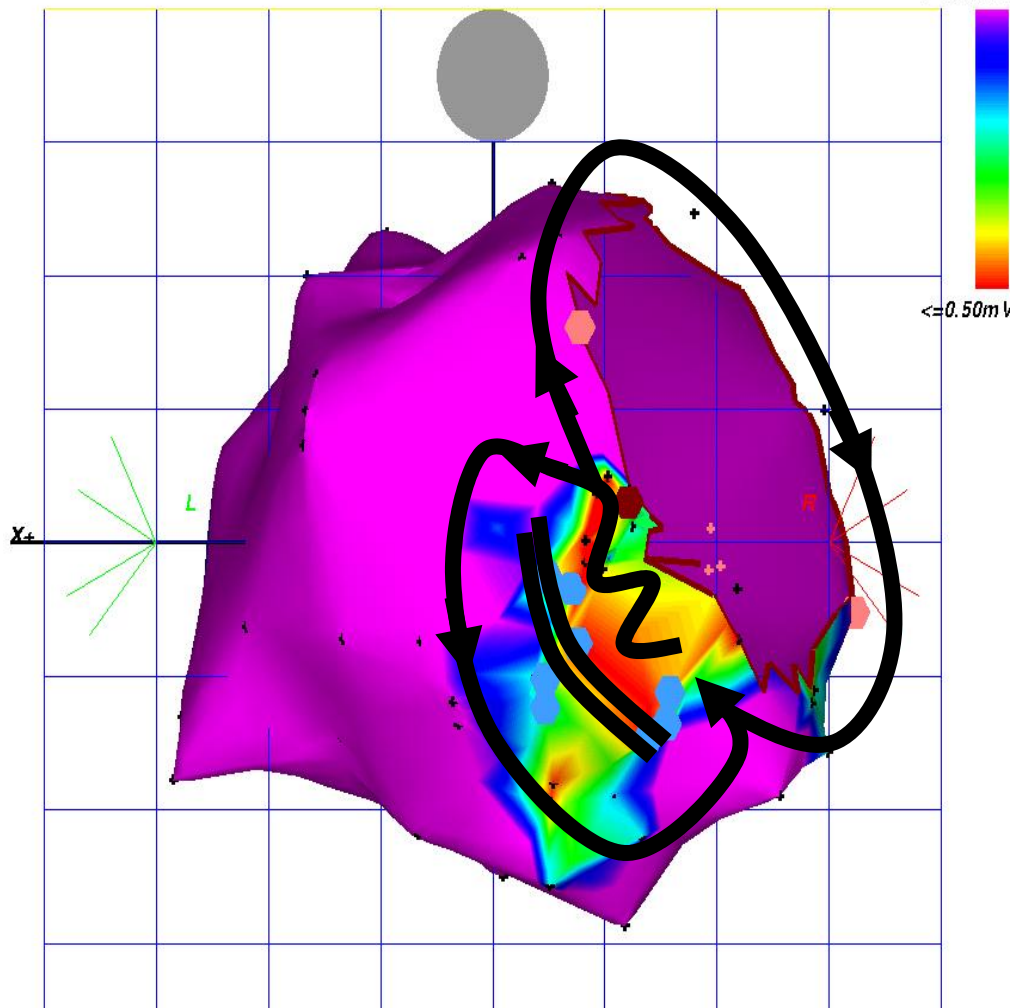
Stage: Baseline
Display: Map 1

Y+

Bipolar Voltage

$\geq 1.50\text{mV}$

$\leq -0.50\text{mV}$



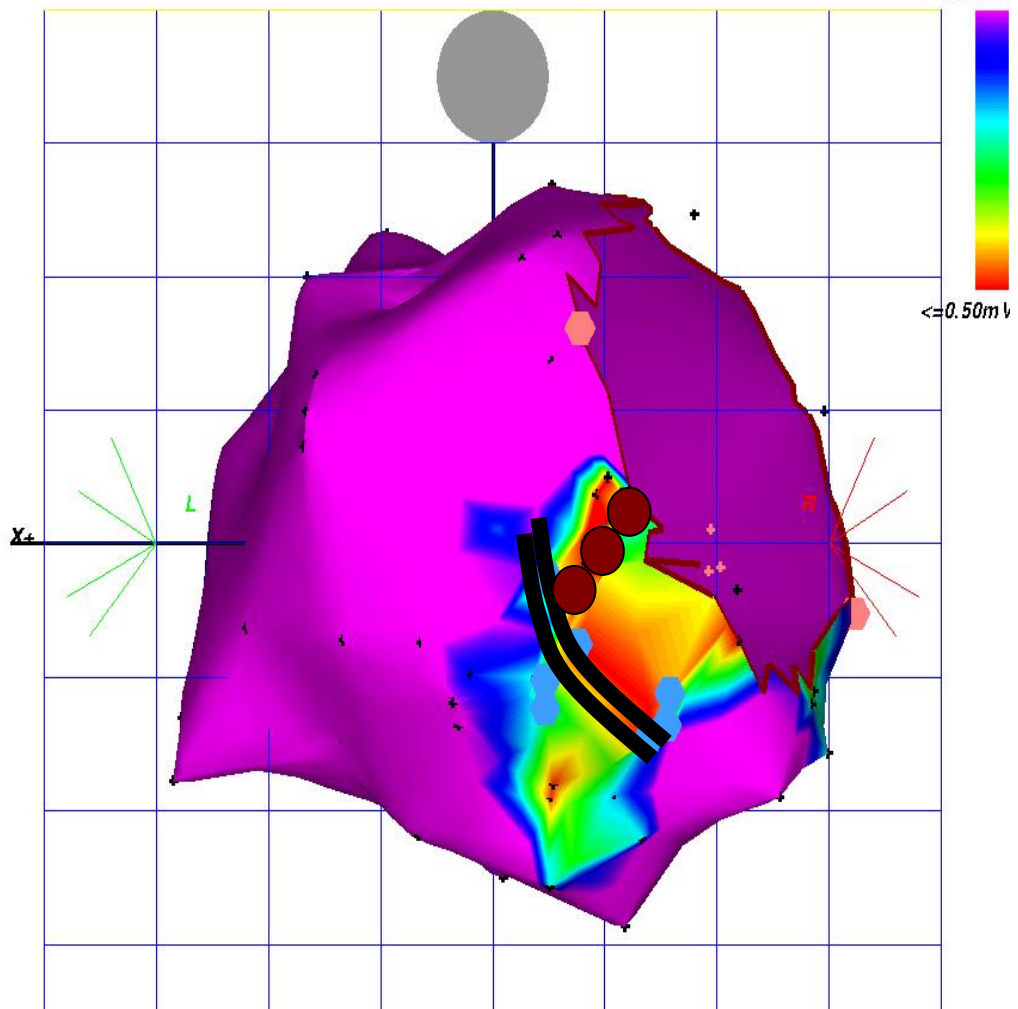
Stage: Baseline
Display: Map 1

Y+

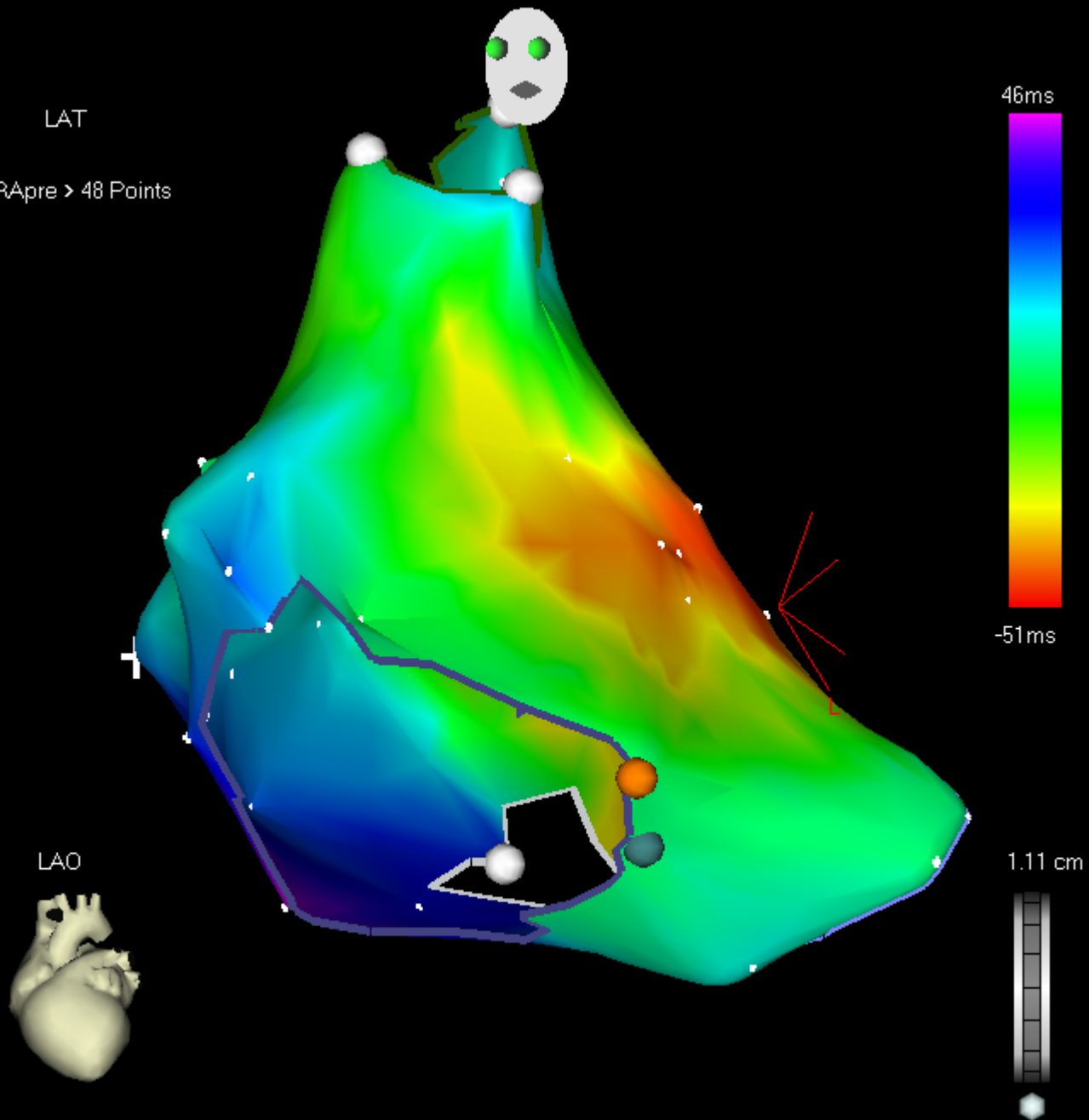
Bipolar Voltage

$\geq 1.50\text{mV}$

$\leq -0.50\text{mV}$



LAT
▶ 1-RApre > 48 Points



46ms

-51ms

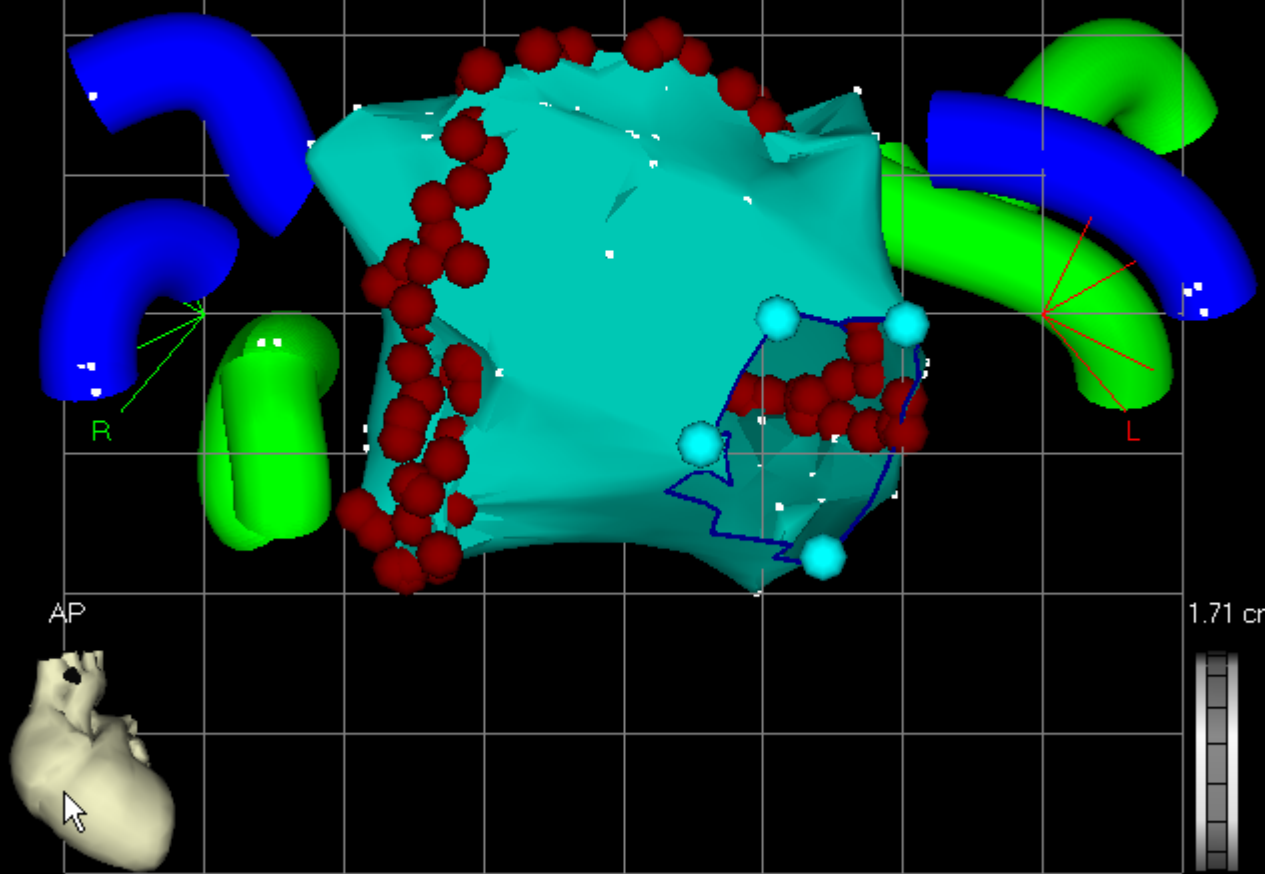
LAO

1.11 cm



LAT

1-After RF > 213 Points



AP

1.71 cm

Volume: 94.32

LAO: 0°

Cranial: 0°

Swivel: 0°



LAT

▶ 2-LA 1 > 159 Points

28ms

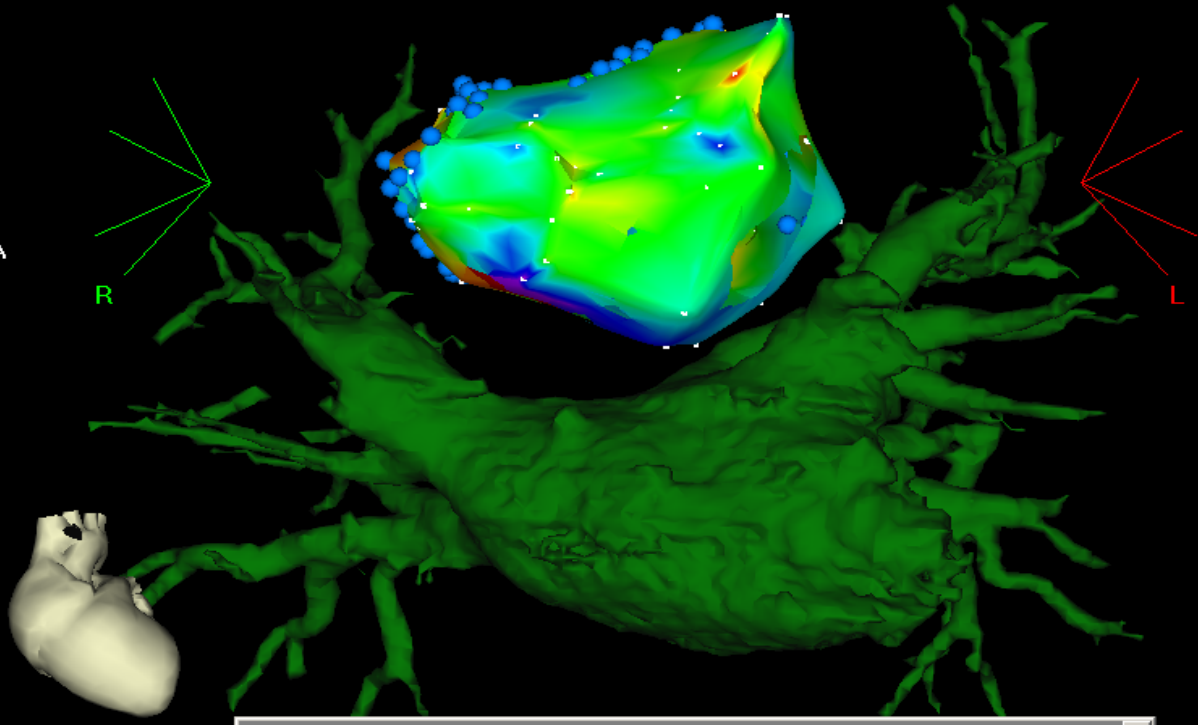


-295ms

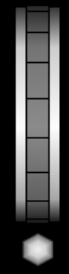
▶ LA

R

L



2.62 cm



Registration Tools

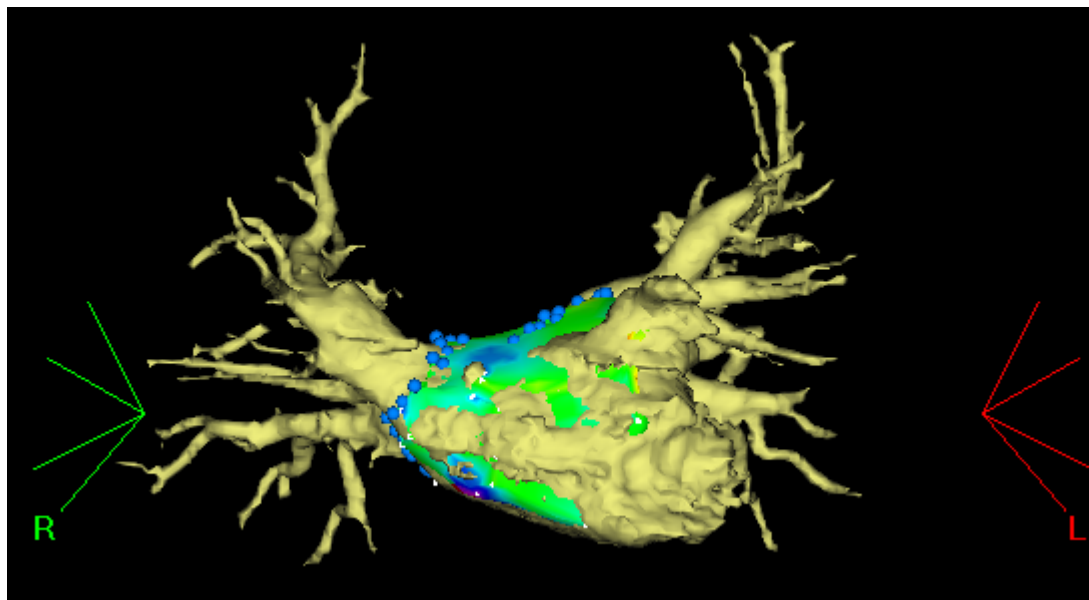
	<input type="checkbox"/> Show		<input checked="" type="checkbox"/> Active Only		
	<input type="checkbox"/> Hide		Ongoing		

Volume: 114.17

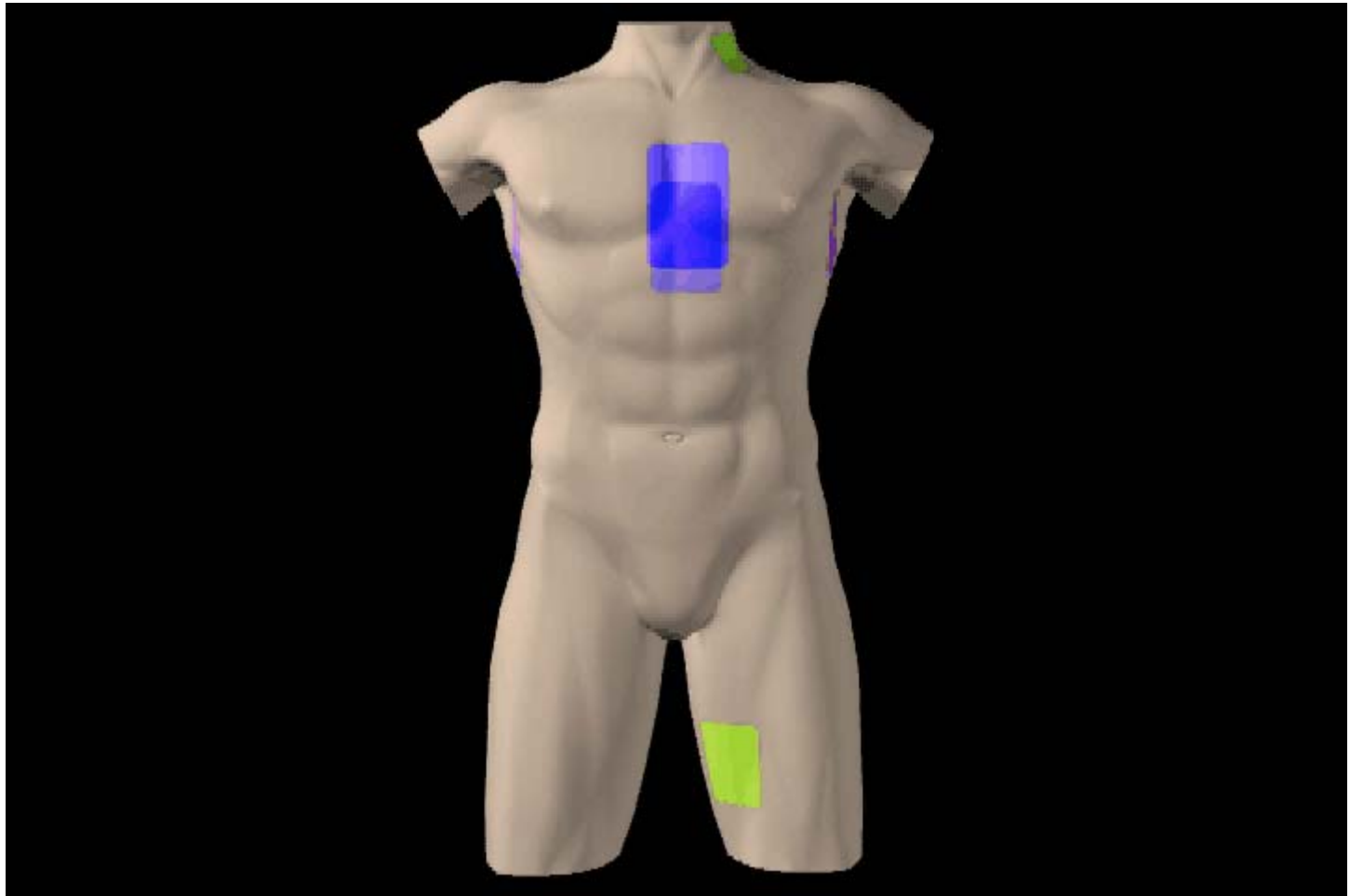
LAO: 0°

Caudal: 9°

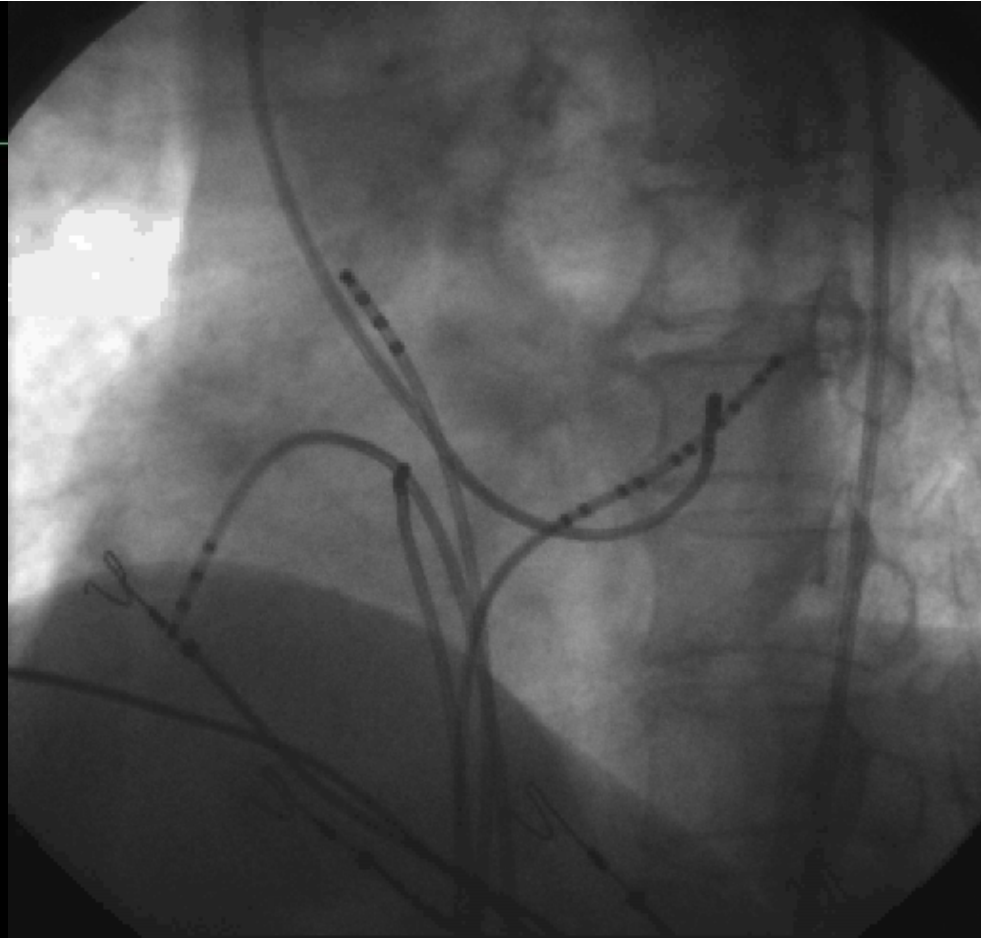
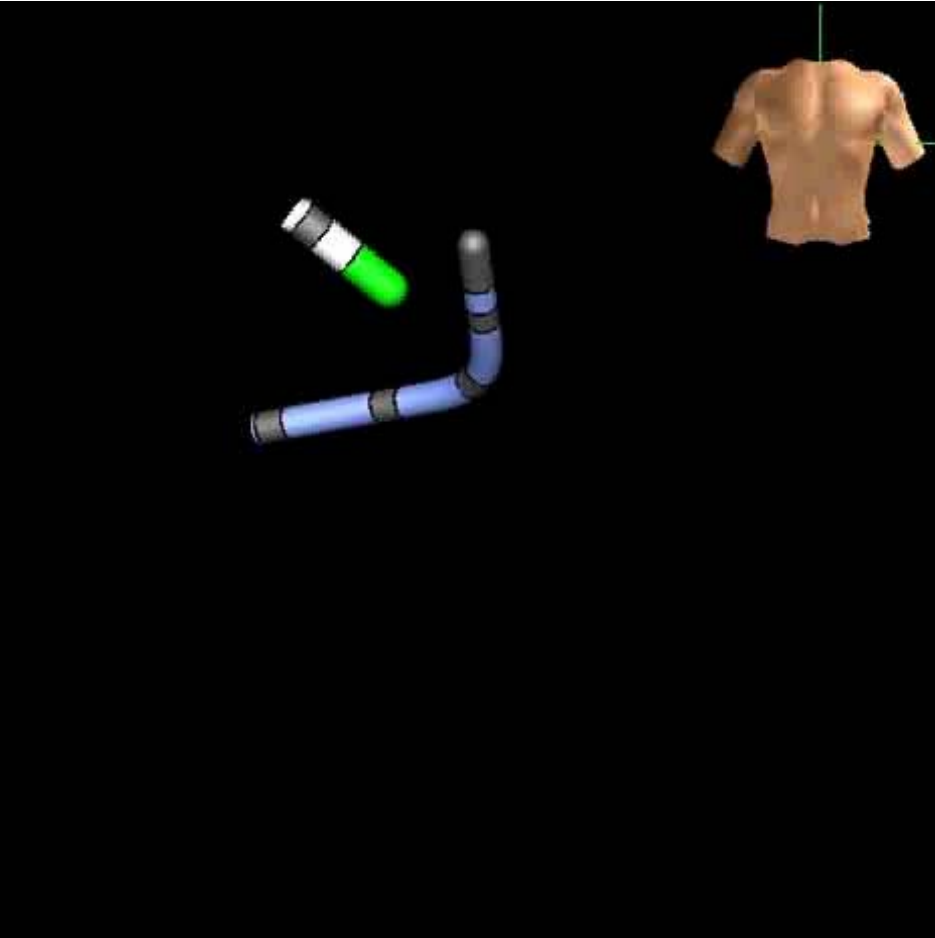
Swivel: 0°

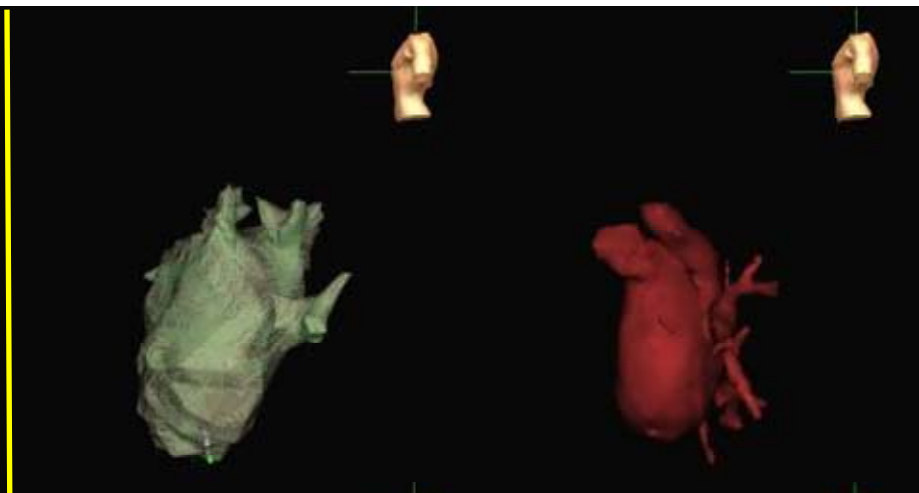
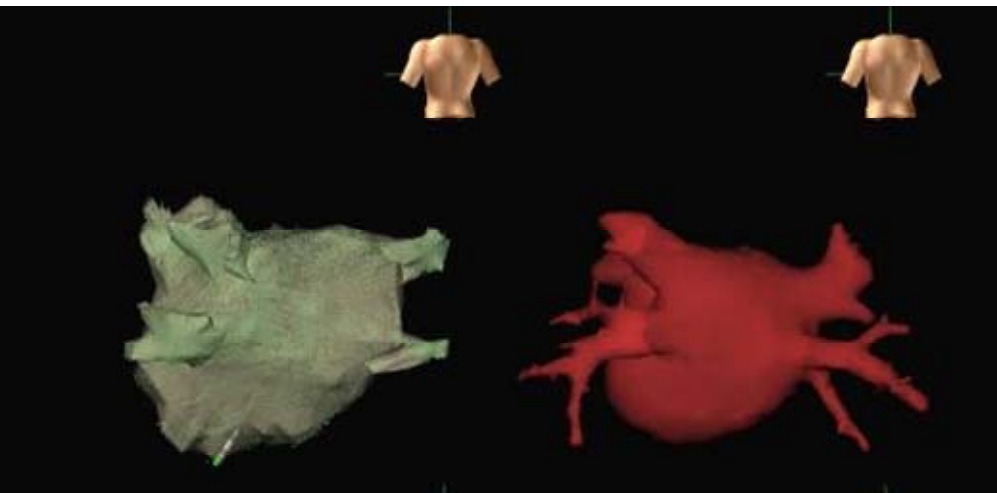


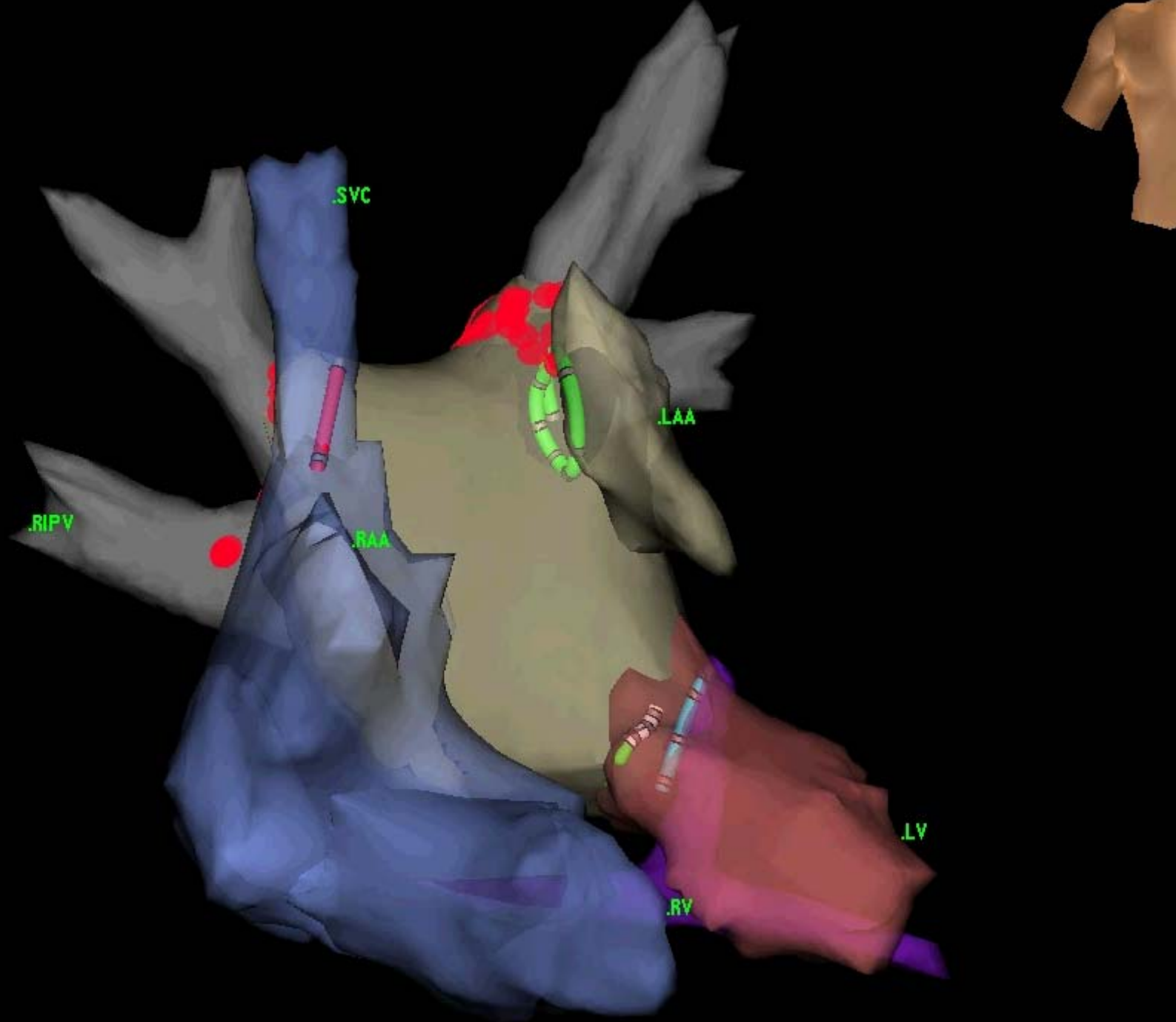
Systeme NavX (St Jude Medical)



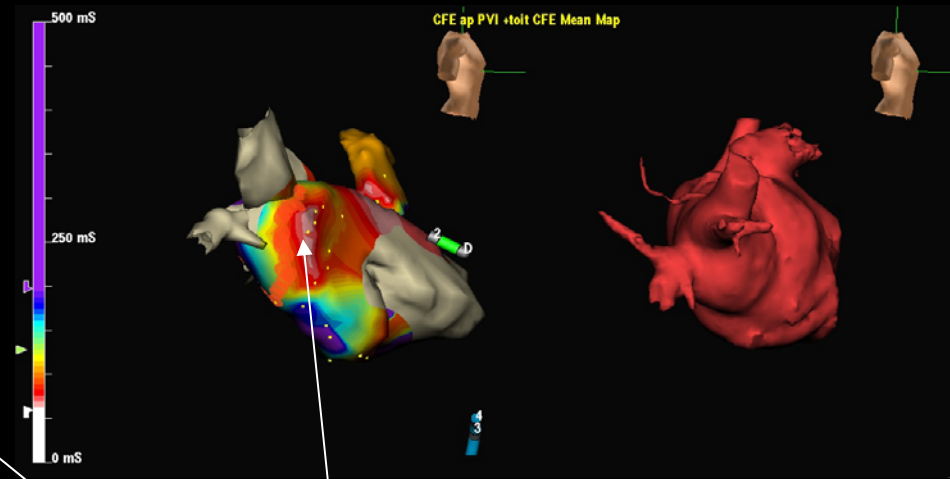
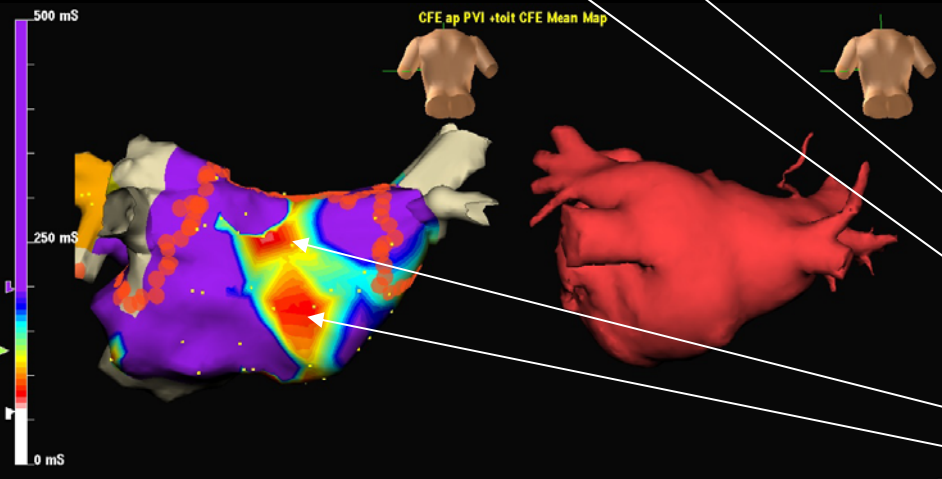
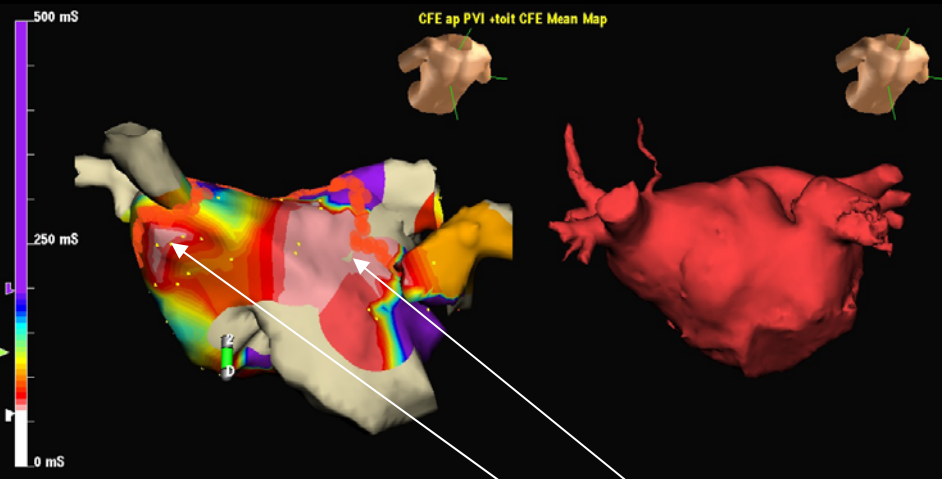
NavX: navigation temps réel





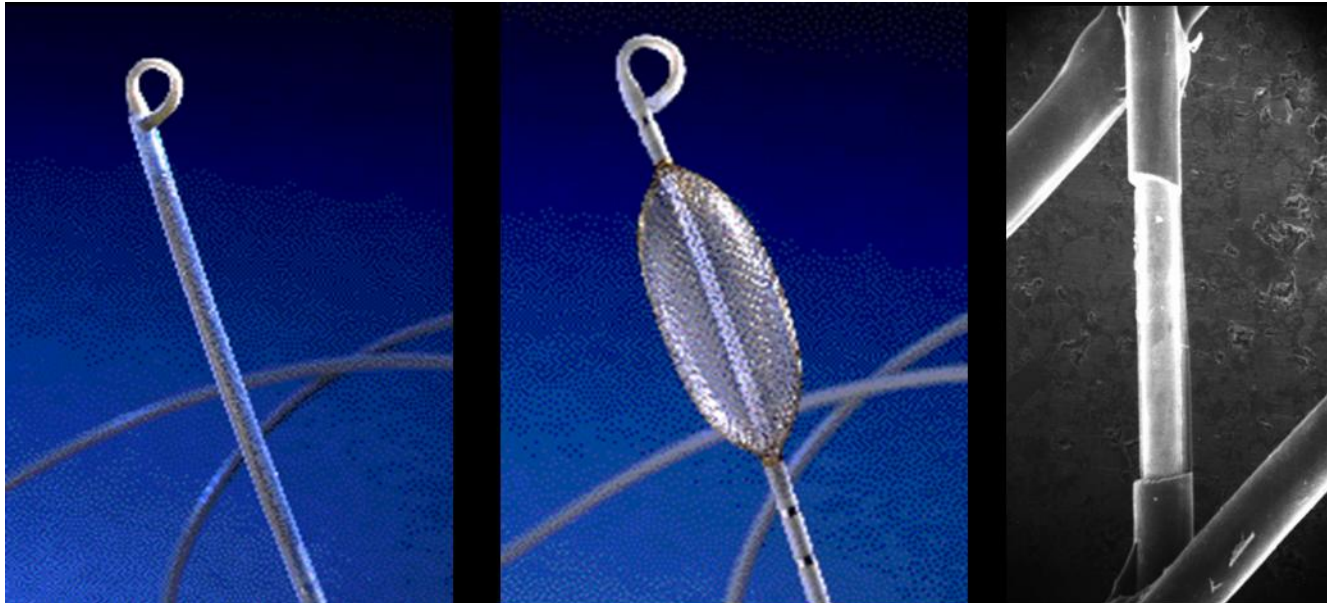


Carte CFE-Mean

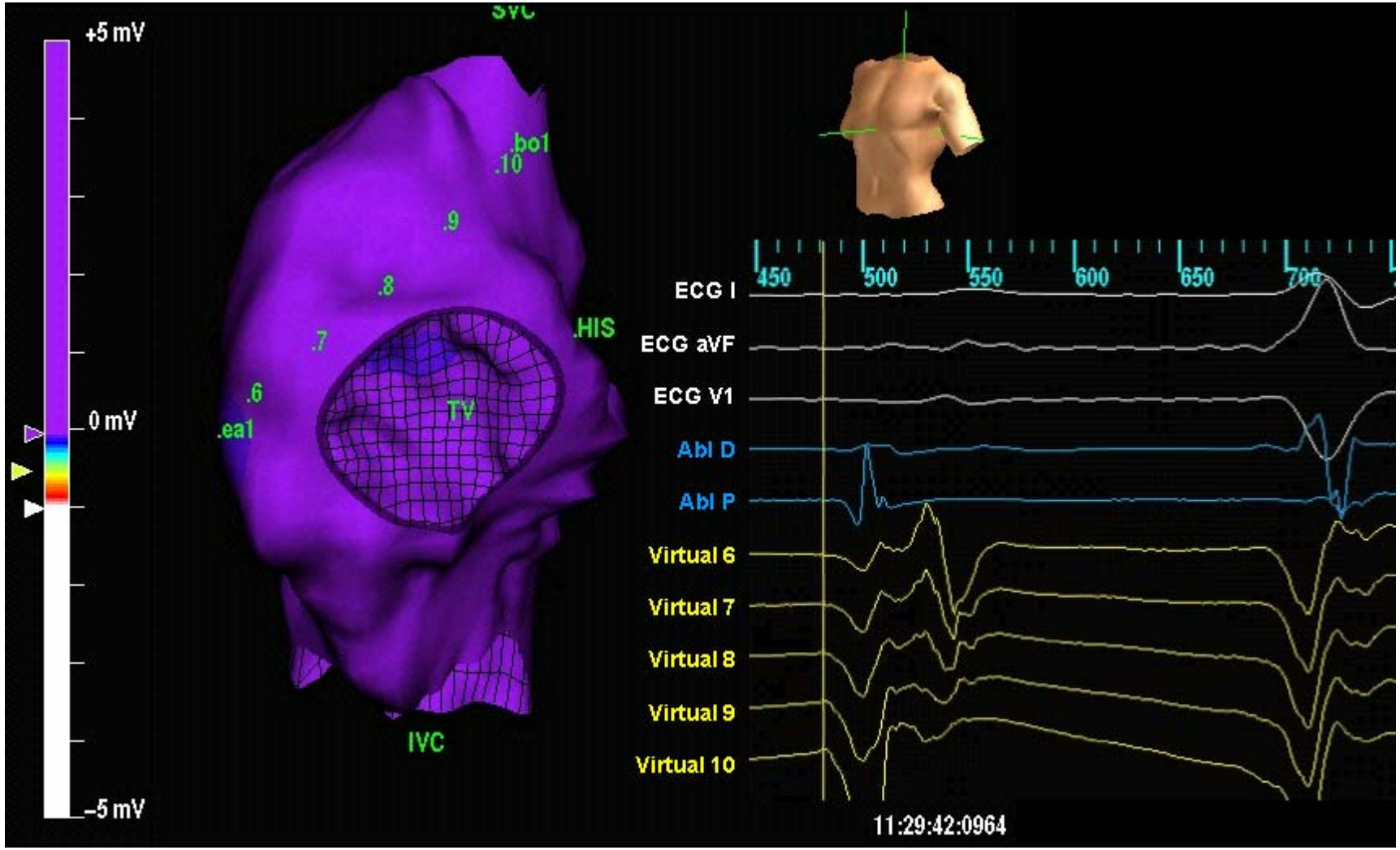


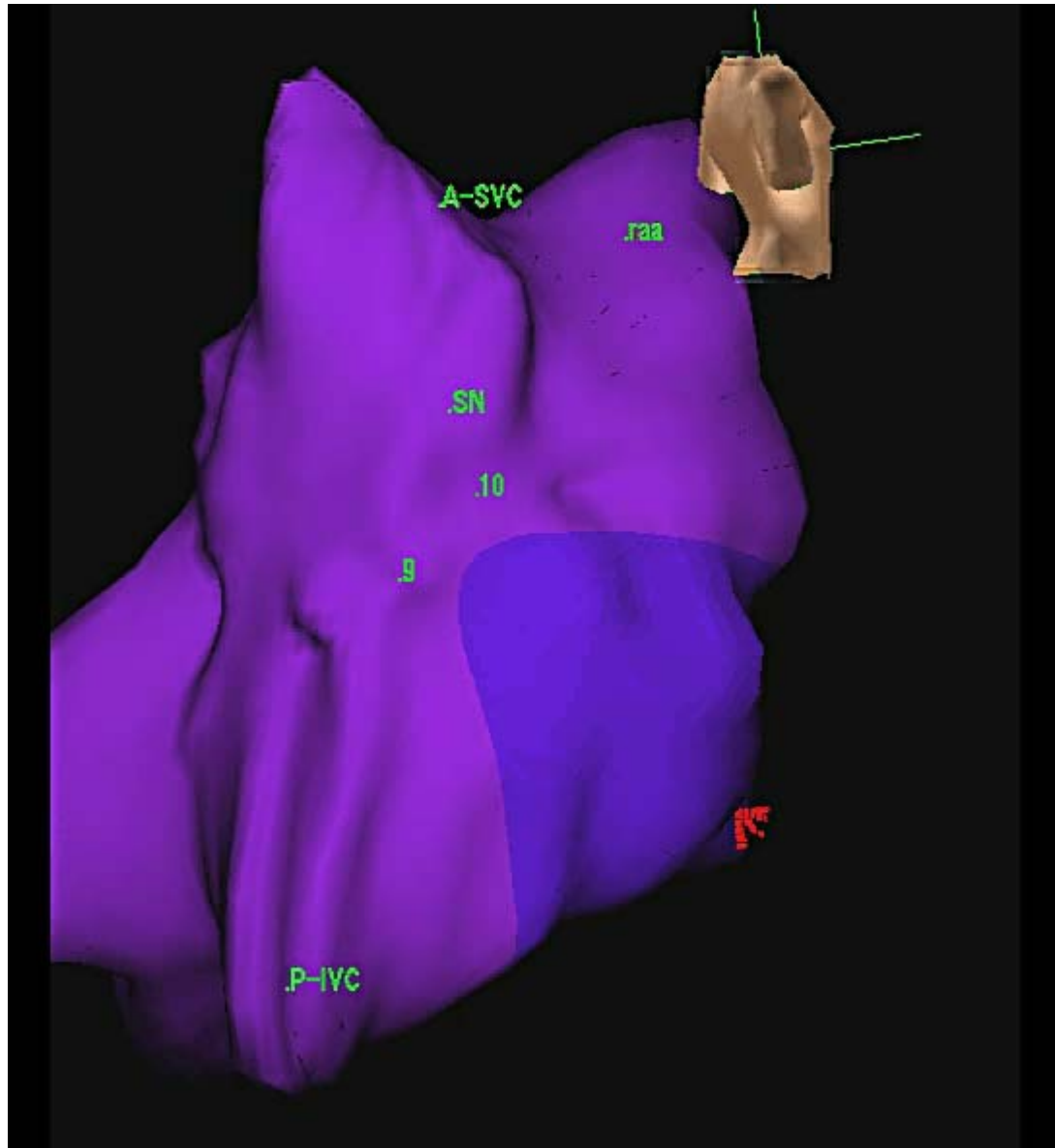
CFE mean CL < 100ms

Systeme ENSITE



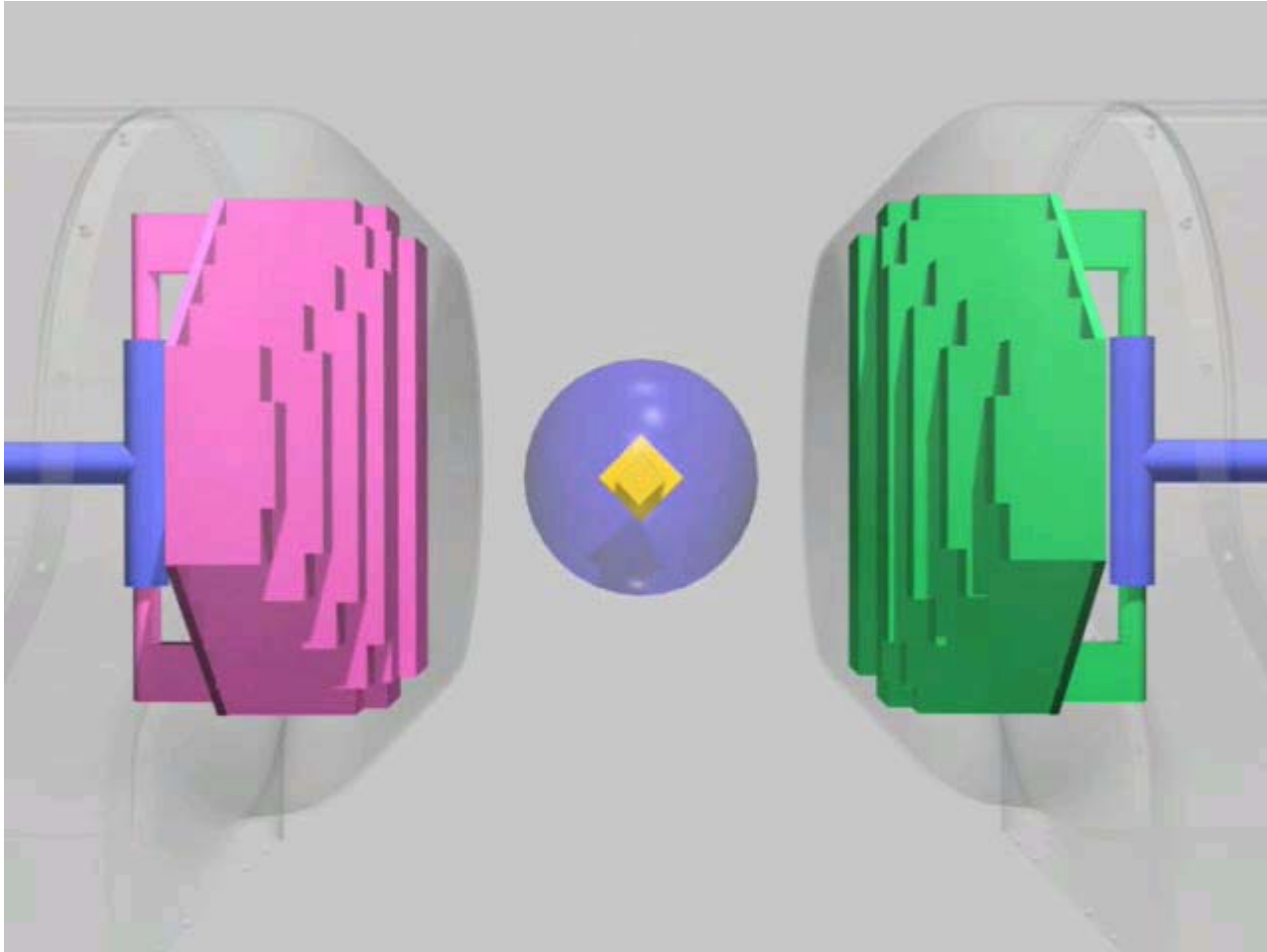
**Cartographie « Non contact »
Sur 1 battement**





La robotique 3D

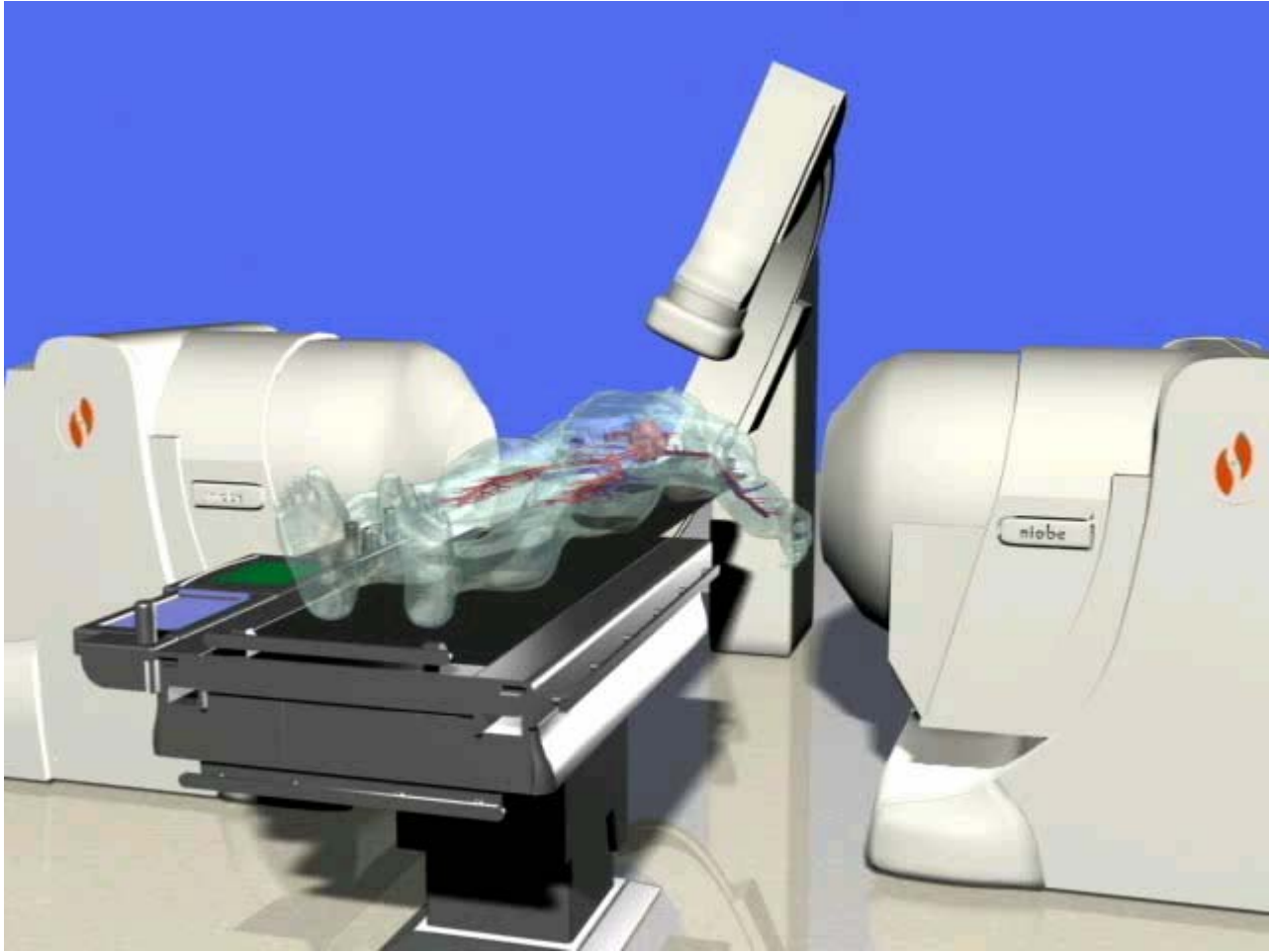
- **Les systèmes:**
 - Stereotaxis – Niobe**
 - Hansen**
- **Les indications:**
 - Ablation endocavitaire**
 - Resynchronisation cardiaque**
 - Gestes endo-vasculaires ou intracardiaques**
- **Avantages:**
 - Précision**
 - Reproductibilité**
 - Réduction de l'exposition aux rayons X**
 - Réduction des durées de procédure**
 - « Planification » des procédures**



Stereotaxis: principe



Stereotaxis: mise en œuvre



Robotique: système Hansen



Hansen Medical Guide Catheter & Control System

'All inclusive' catheter

Remote control

- 'Real' real-time 3D navigation & mapping
- Real-time assessment of RF lesions

Cartographie 3D - Conclusion

- Outils de routine dans les centres « experts »**
- Ablations complexes + FA**
- Contraintes:**
 - Acquisition et maintenance**
 - Coût des consommables si dédiés**
 - Formation des équipes (Techniciens)**
- Valorisation des GHS (T2A)**
- Développement incontournable**