

**How to map complex
atrial tachycardia
Using new automated
high-density mapping system ?**

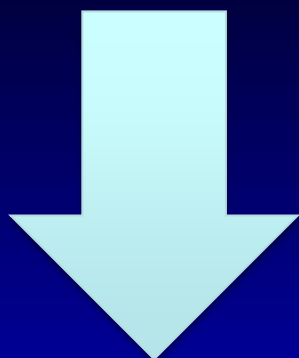
Still poorly recognized mechanisms

P Maury, University Hospital Rangueil Toulouse, France

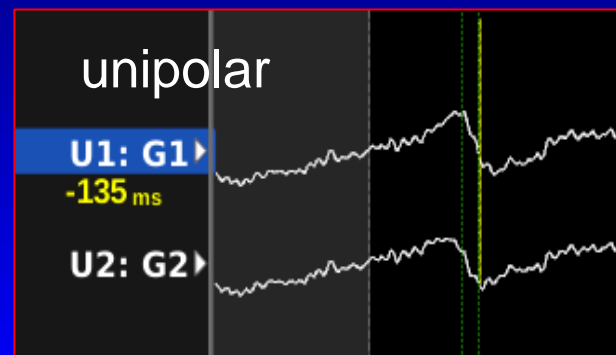
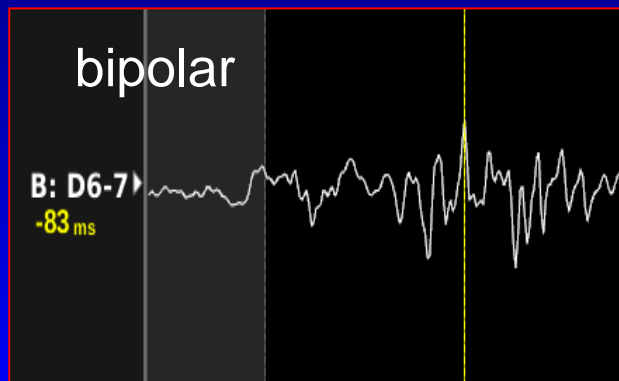
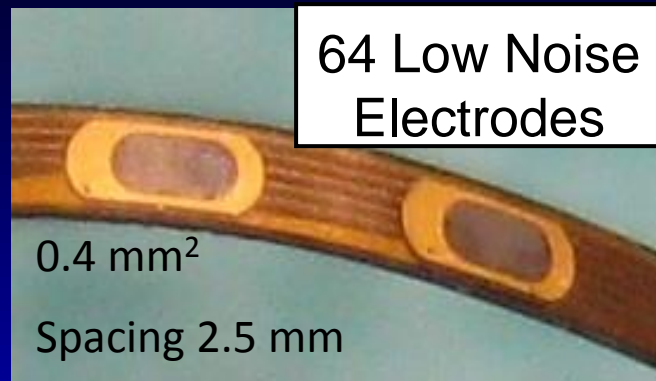
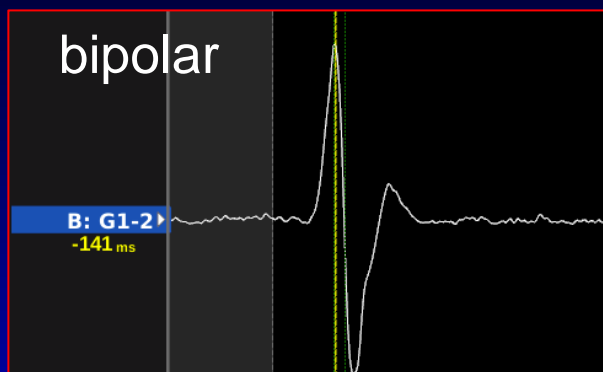
ISCAT 2016

conflict of interest: none

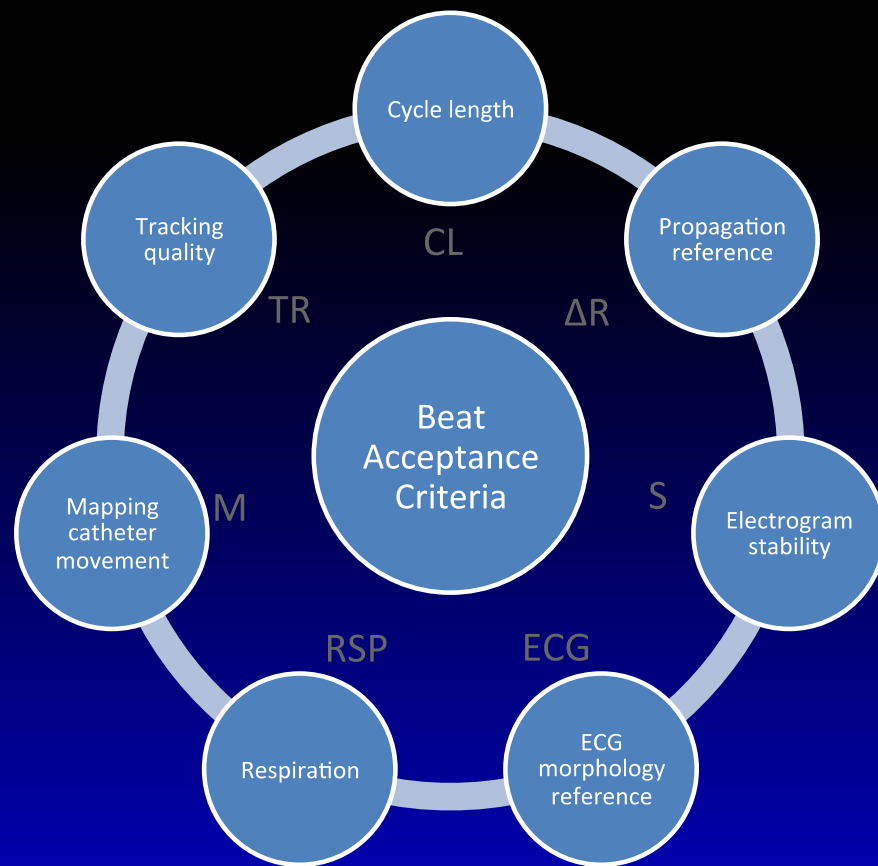
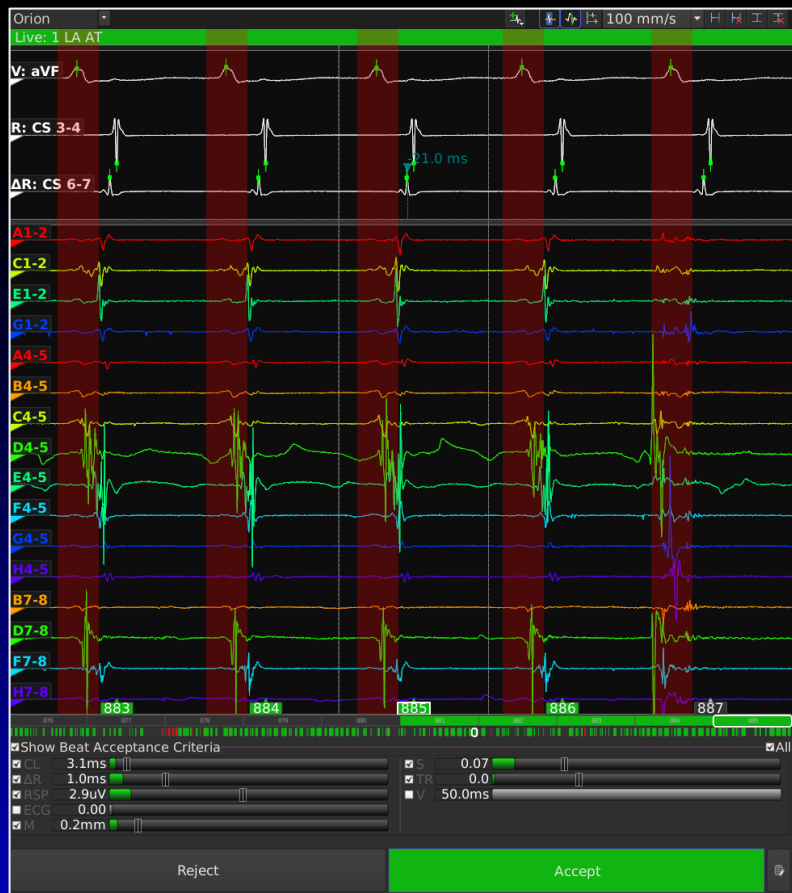
High density
Small electrodes
Quick mapping
Low signal/noise ratio
Clever algorithm
Reliable Automated detection
Precise local activation assessment



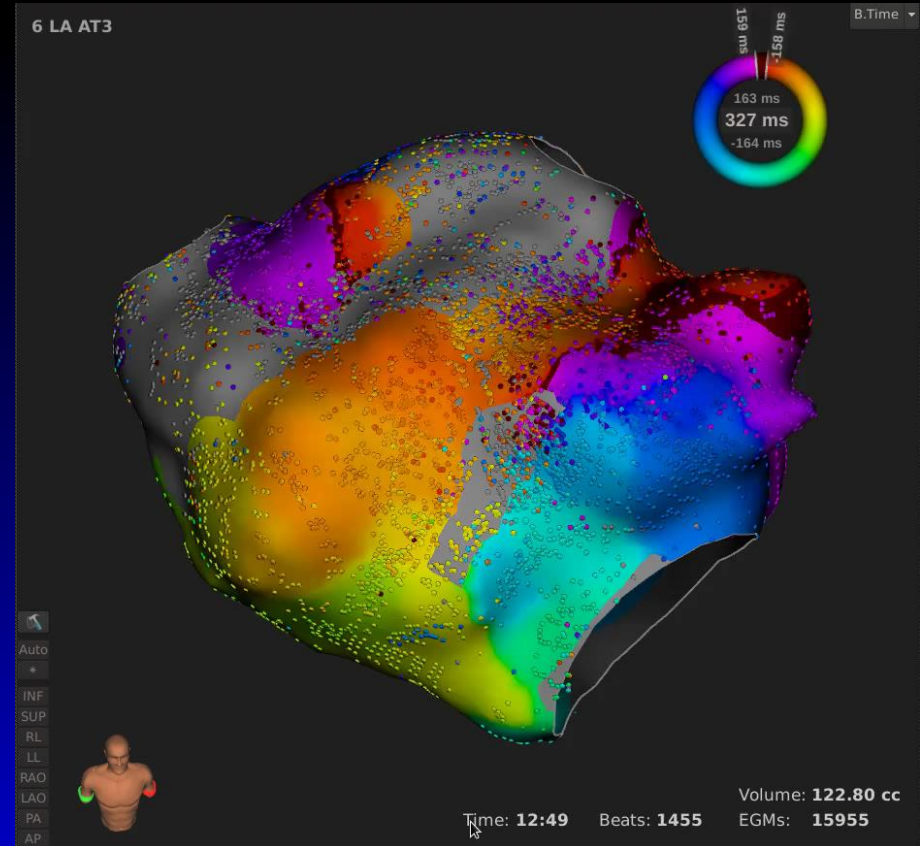
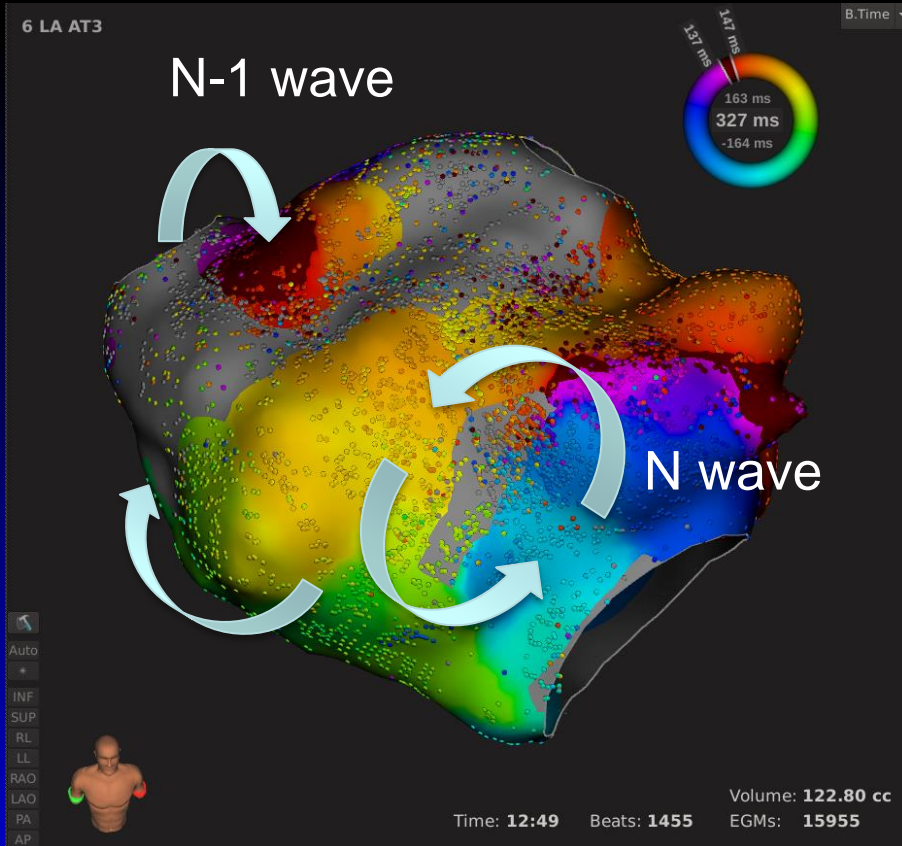
Resolution
Density
Coherence



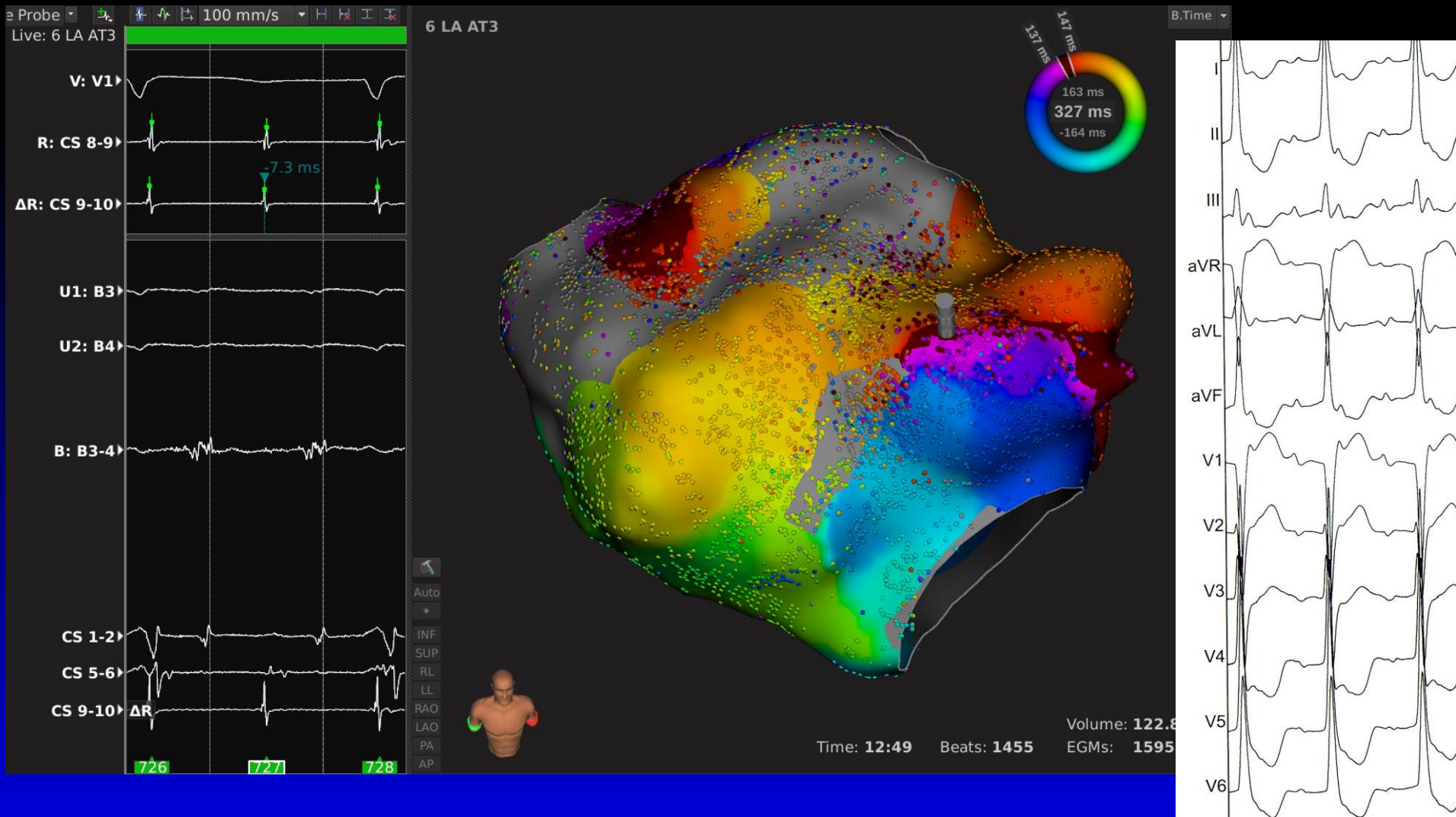
Beat Acceptance Criteria



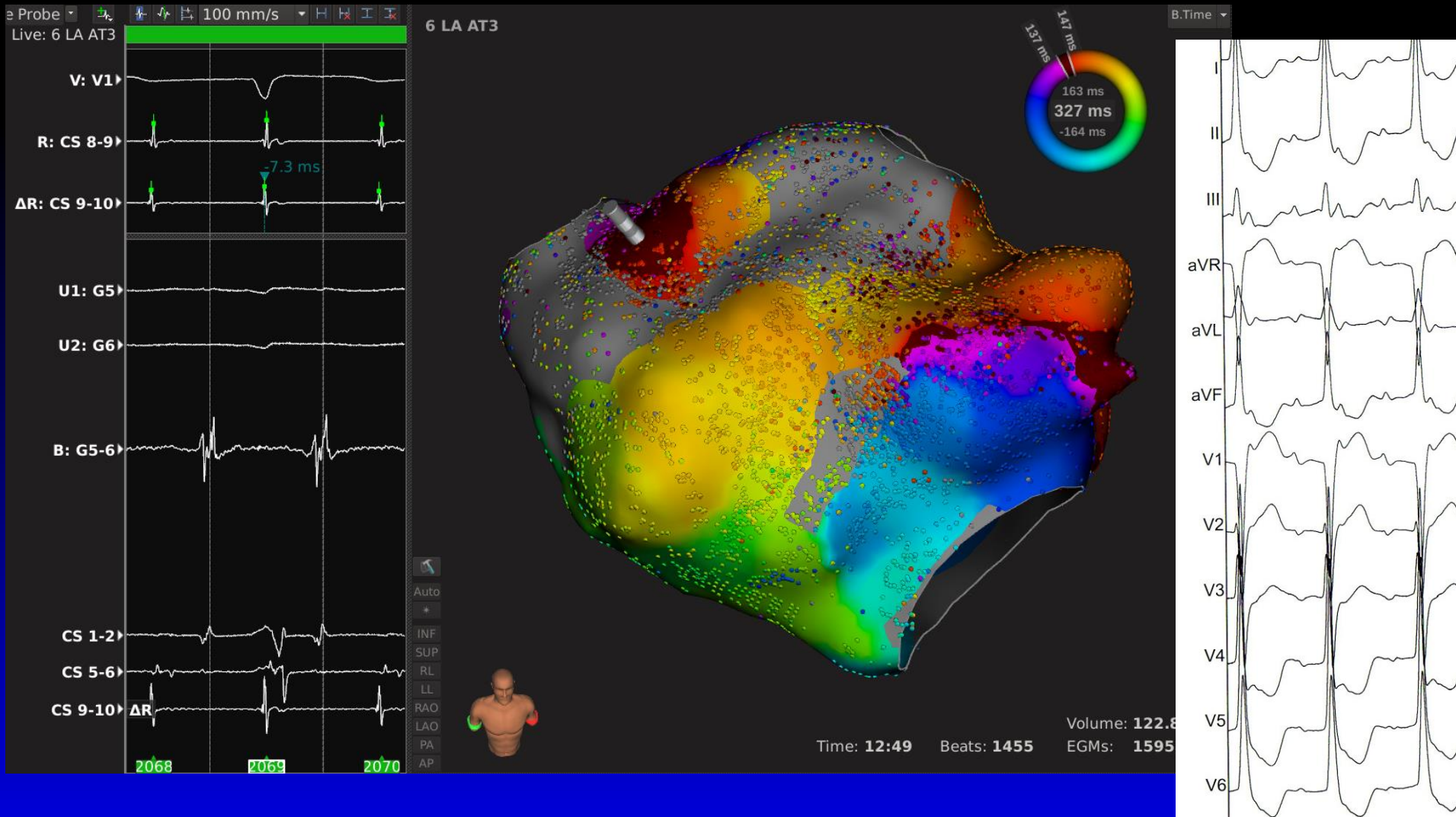
When atrial activation duration exceed tachycardia cycle length



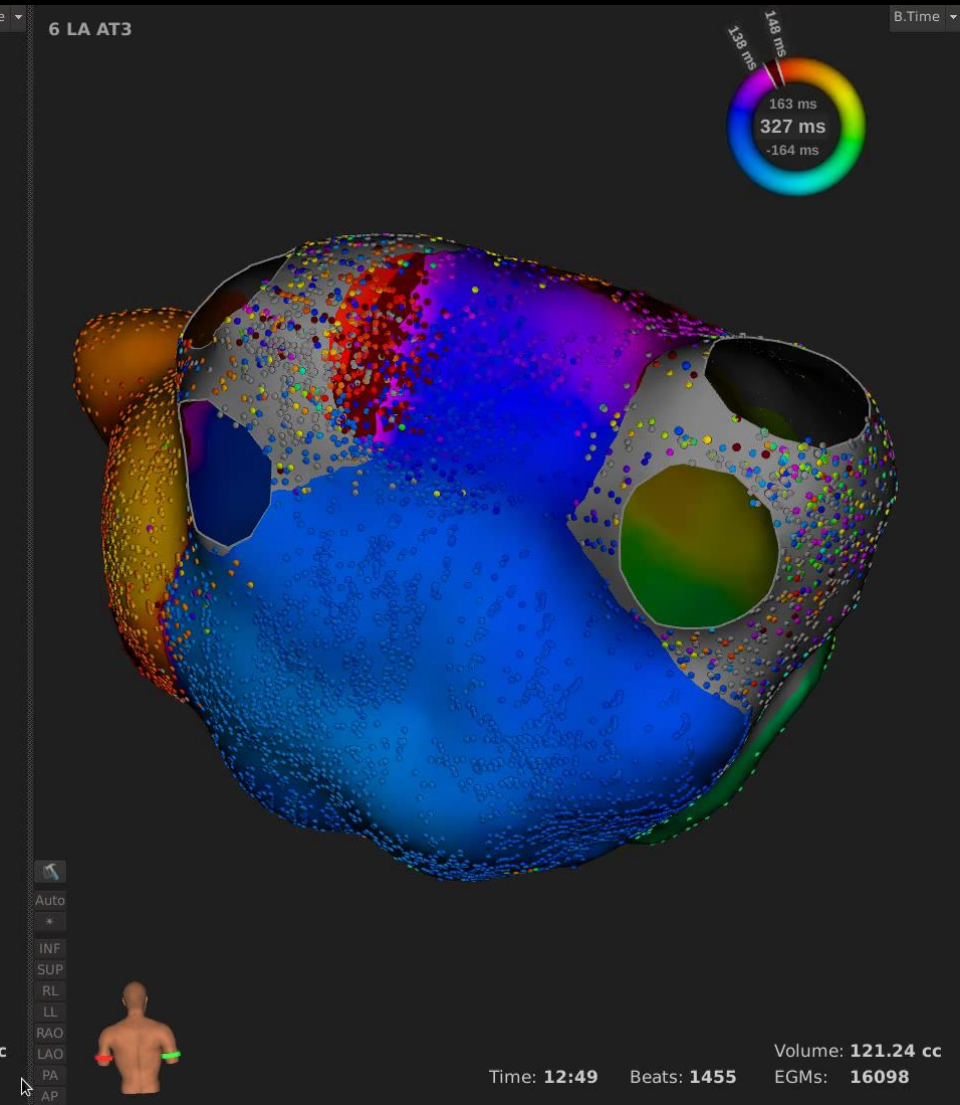
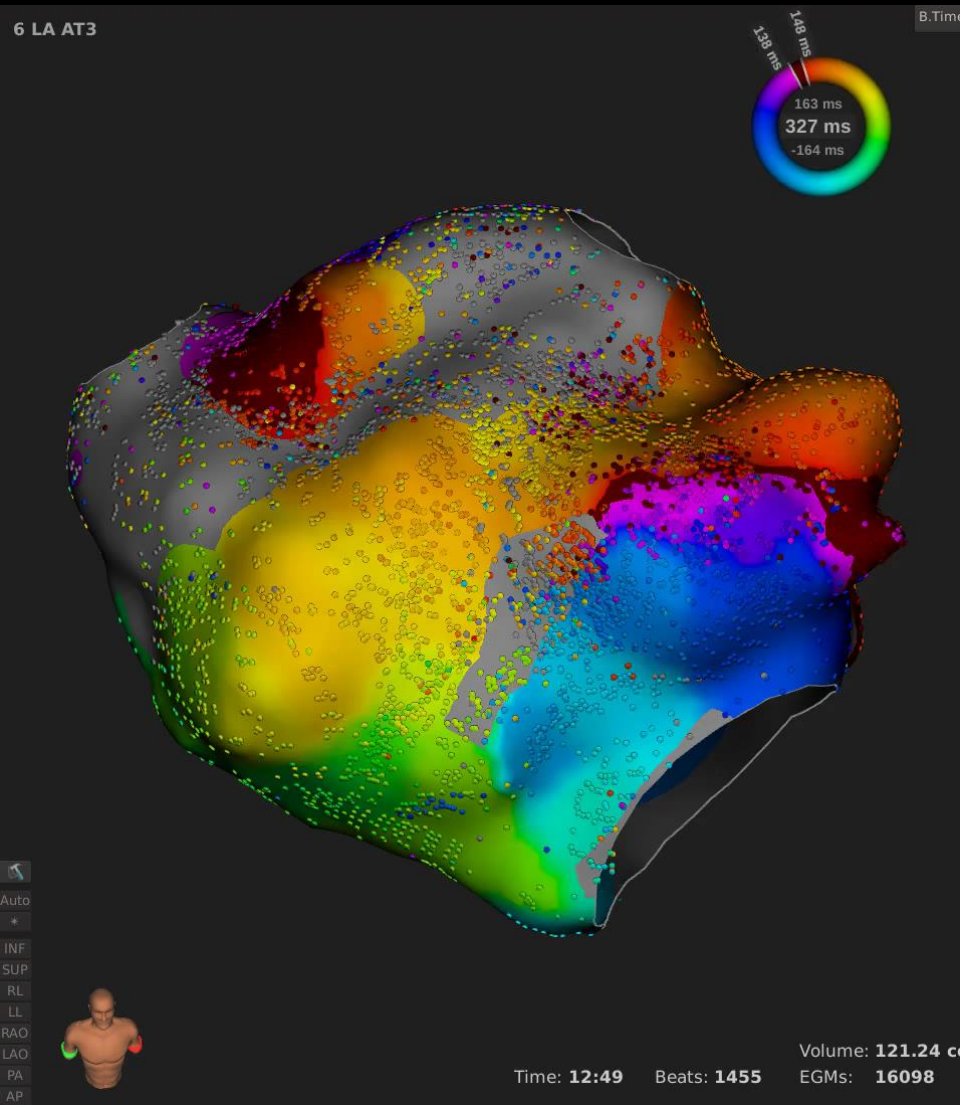
When atrial activation duration exceed tachycardia cycle length



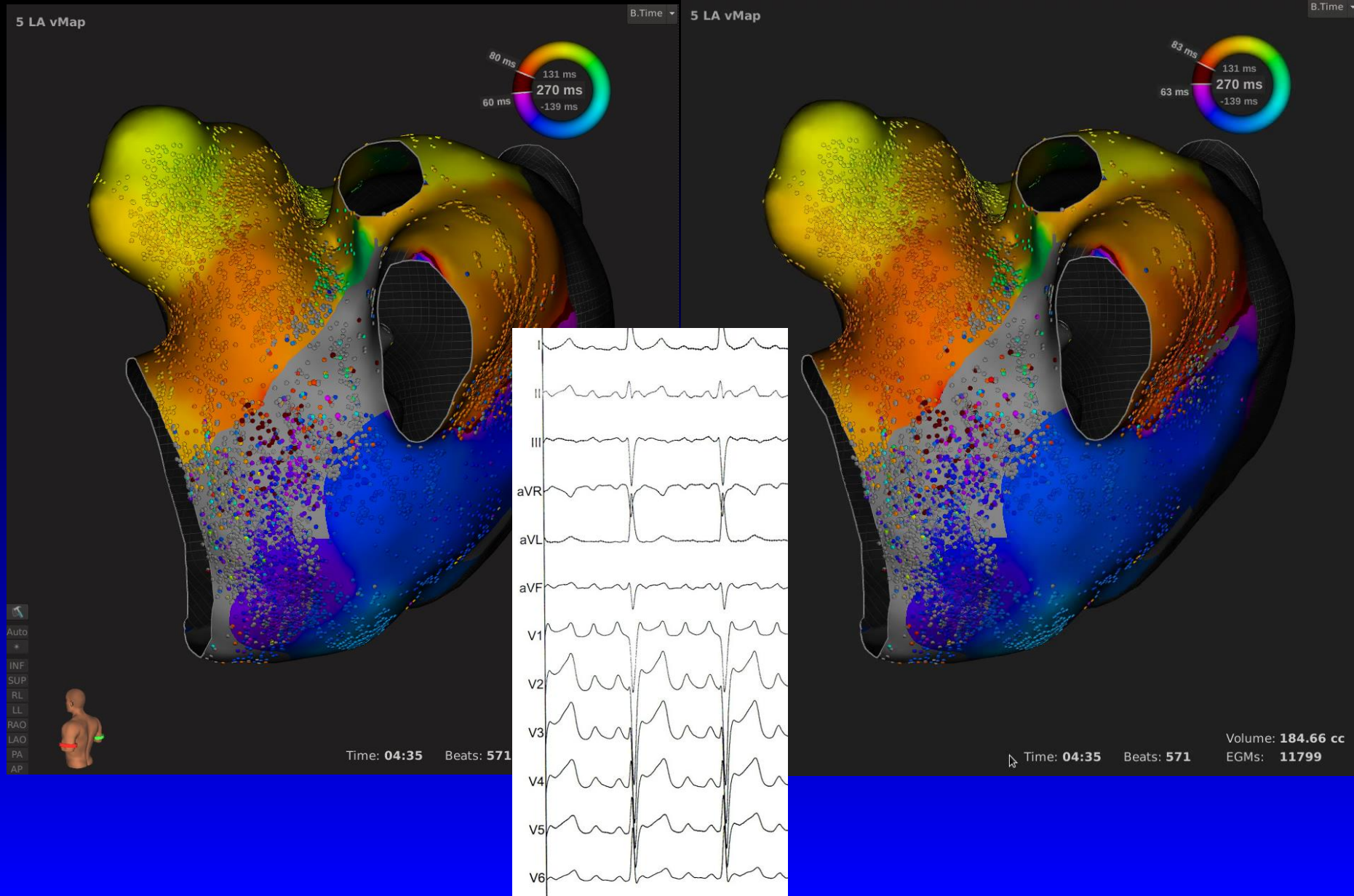
When atrial activation duration exceed tachycardia cycle length



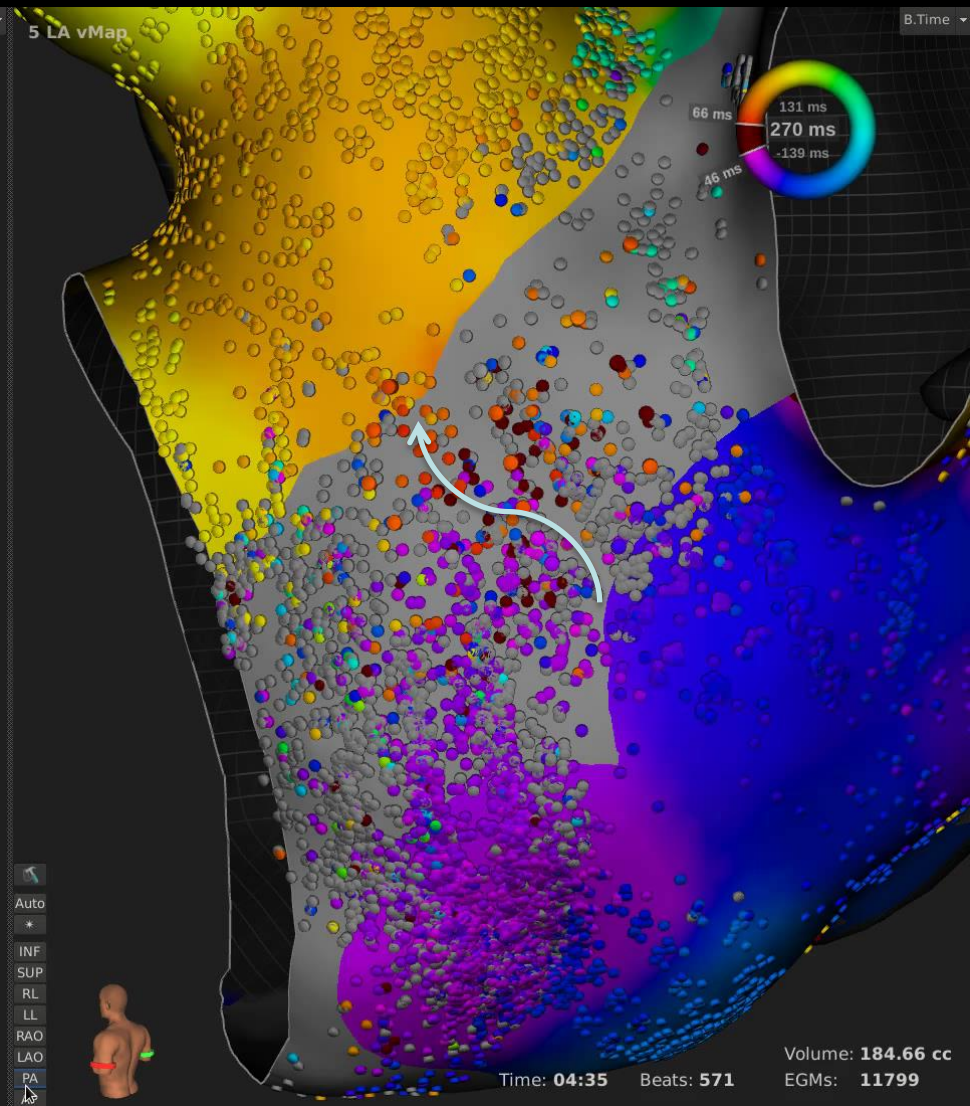
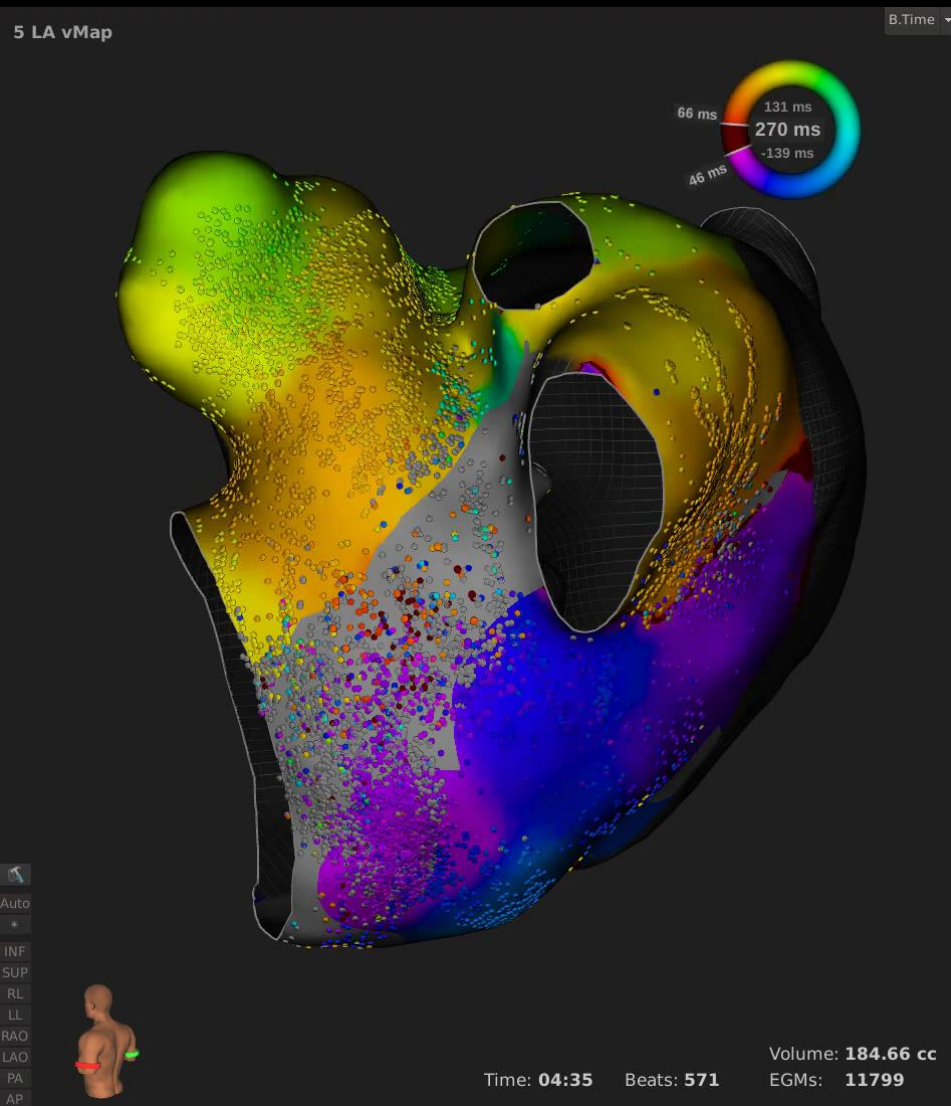
When atrial activation duration exceed tachycardia cycle length



Looking to linear ablation gaps



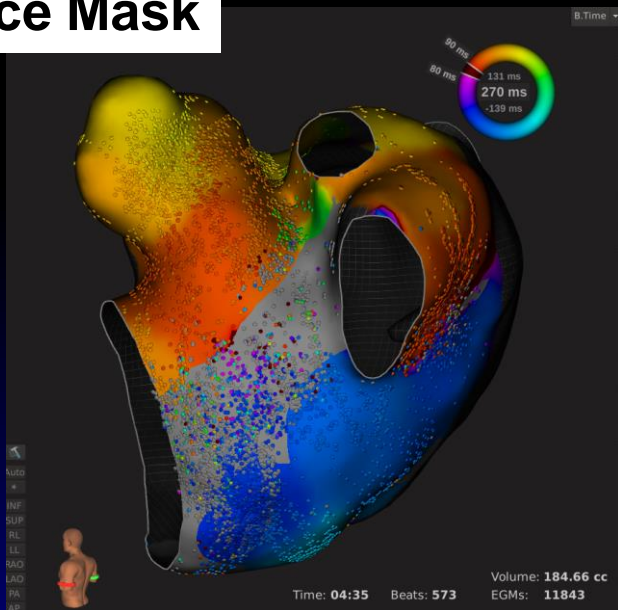
Looking to linear ablation gaps



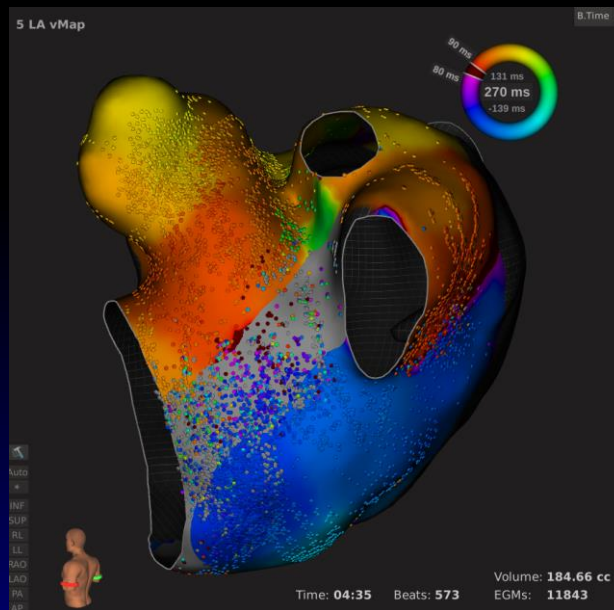
Looking to linear ablation gaps

Confidence Mask

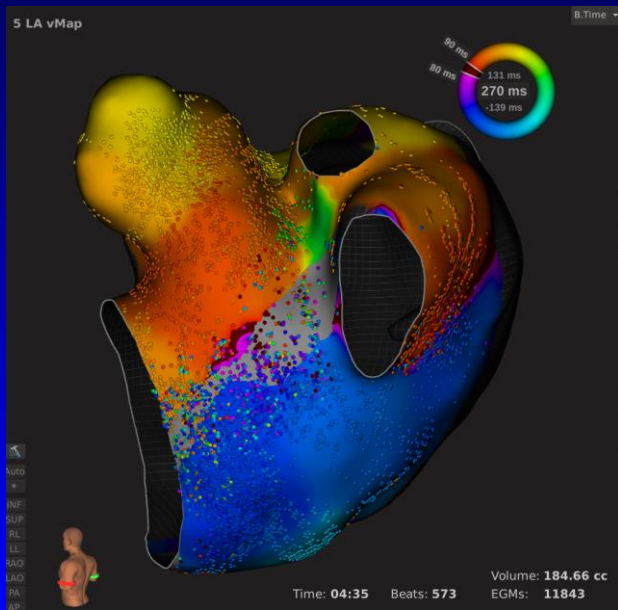
0.03 mV



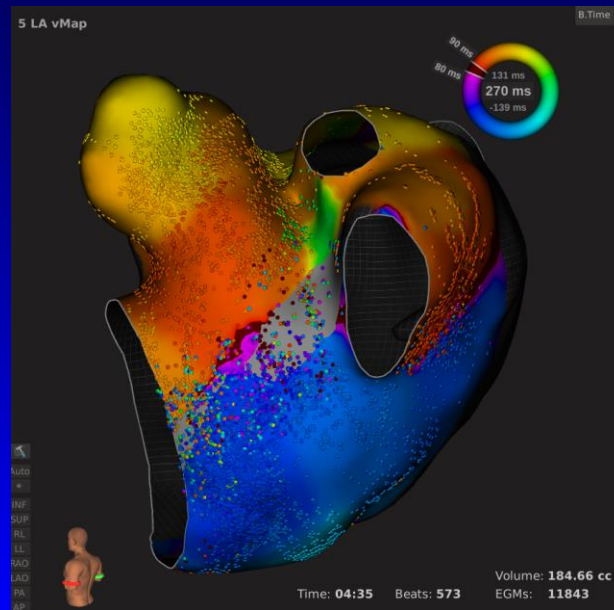
0.02 mV

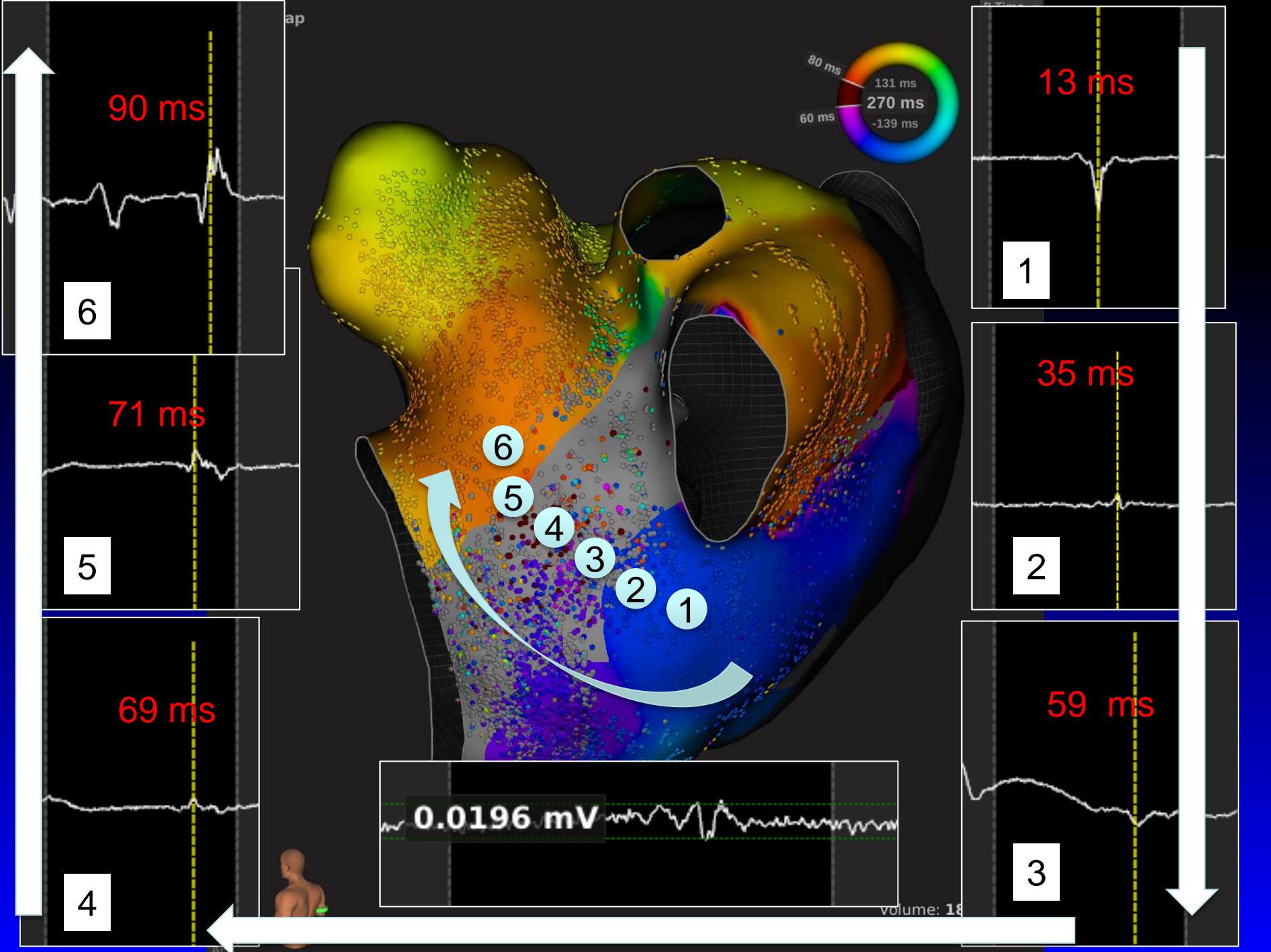


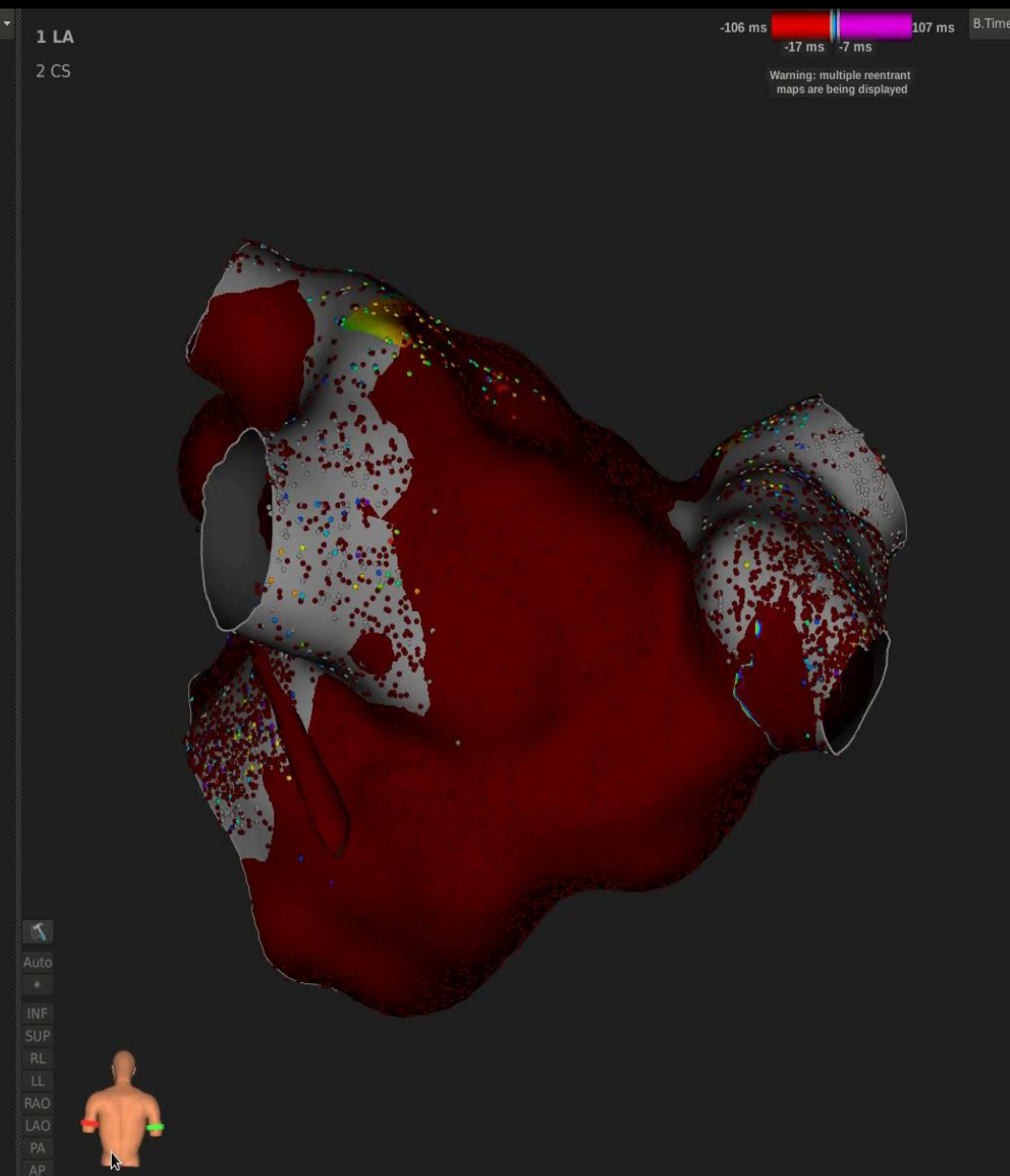
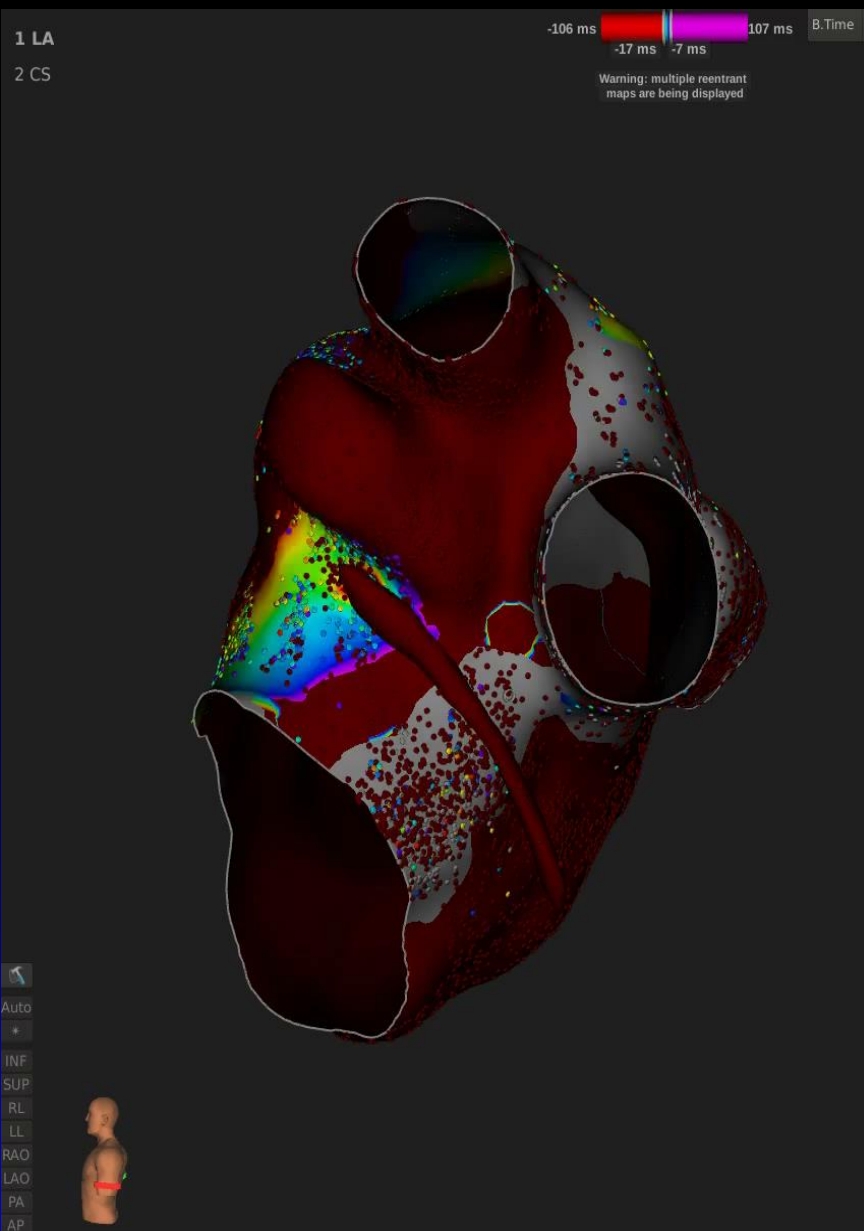
0.01 mV



0.009 mV

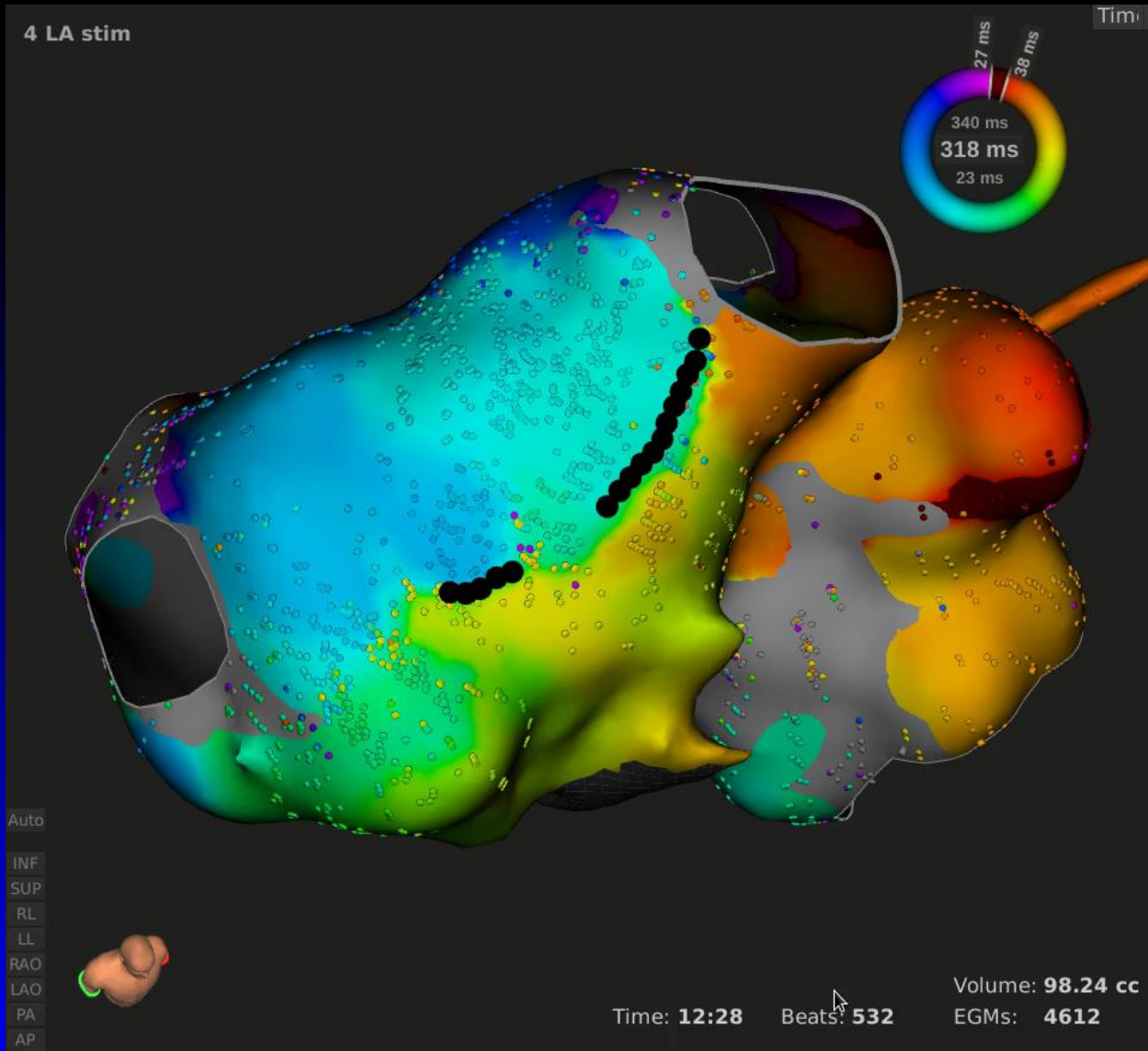






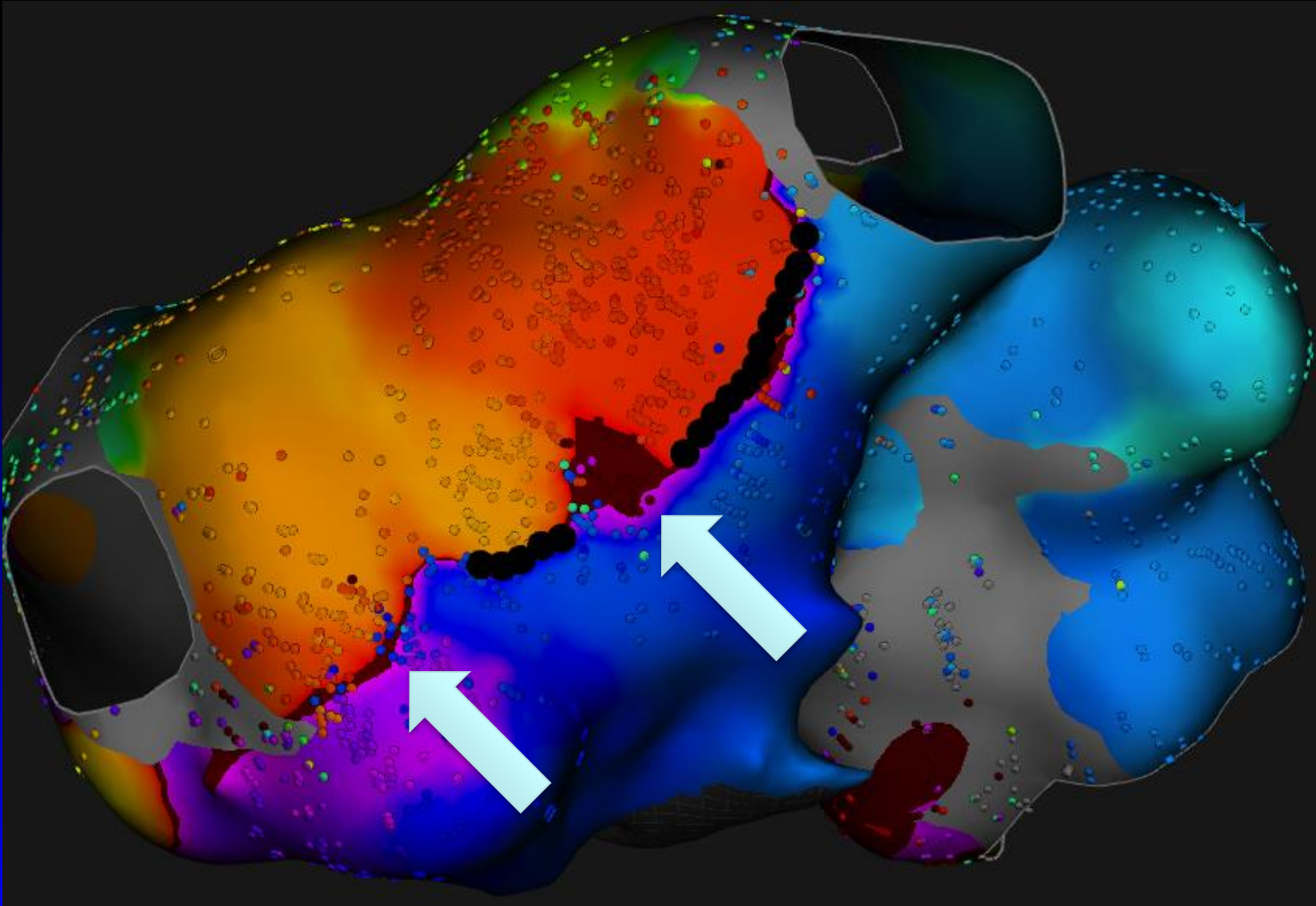
Courtesy from F Sacher

Looking to linear ablation gaps

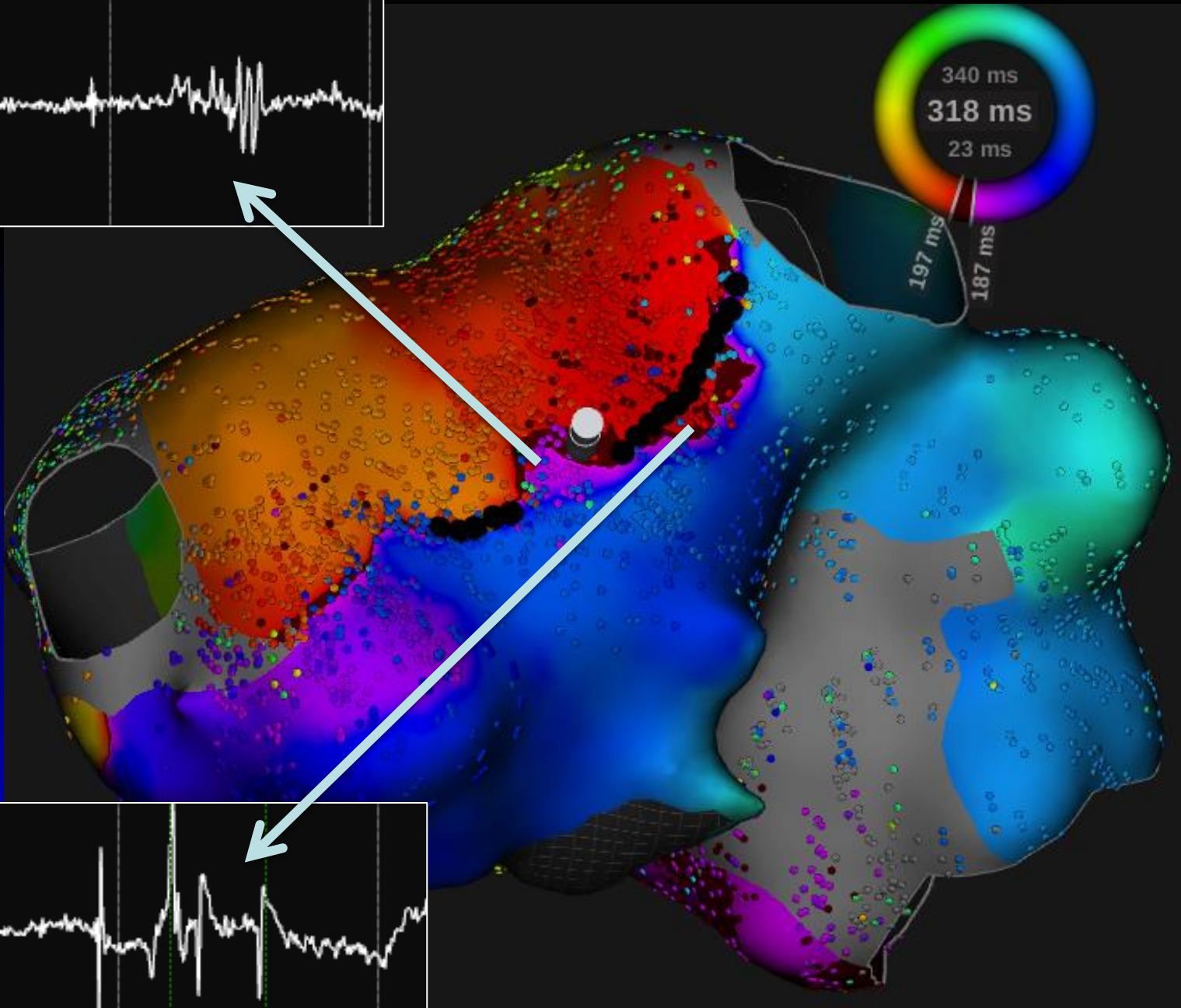
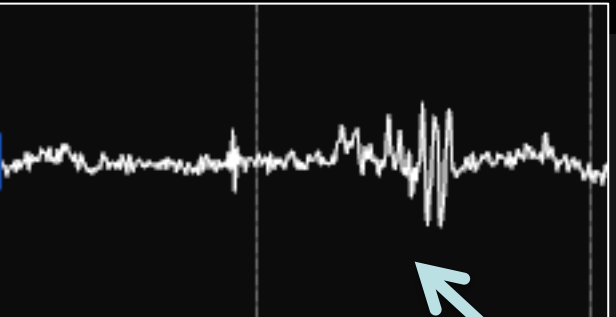


Looking to linear ablation gaps

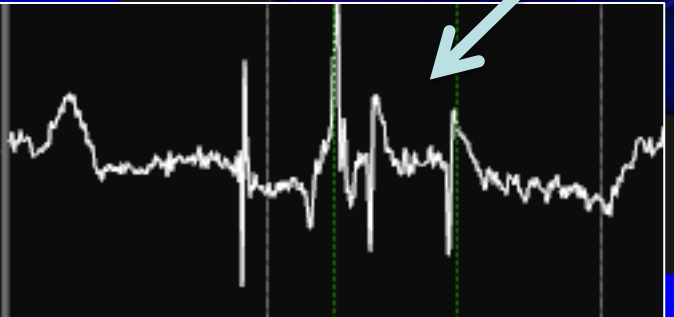
Pacing LAA

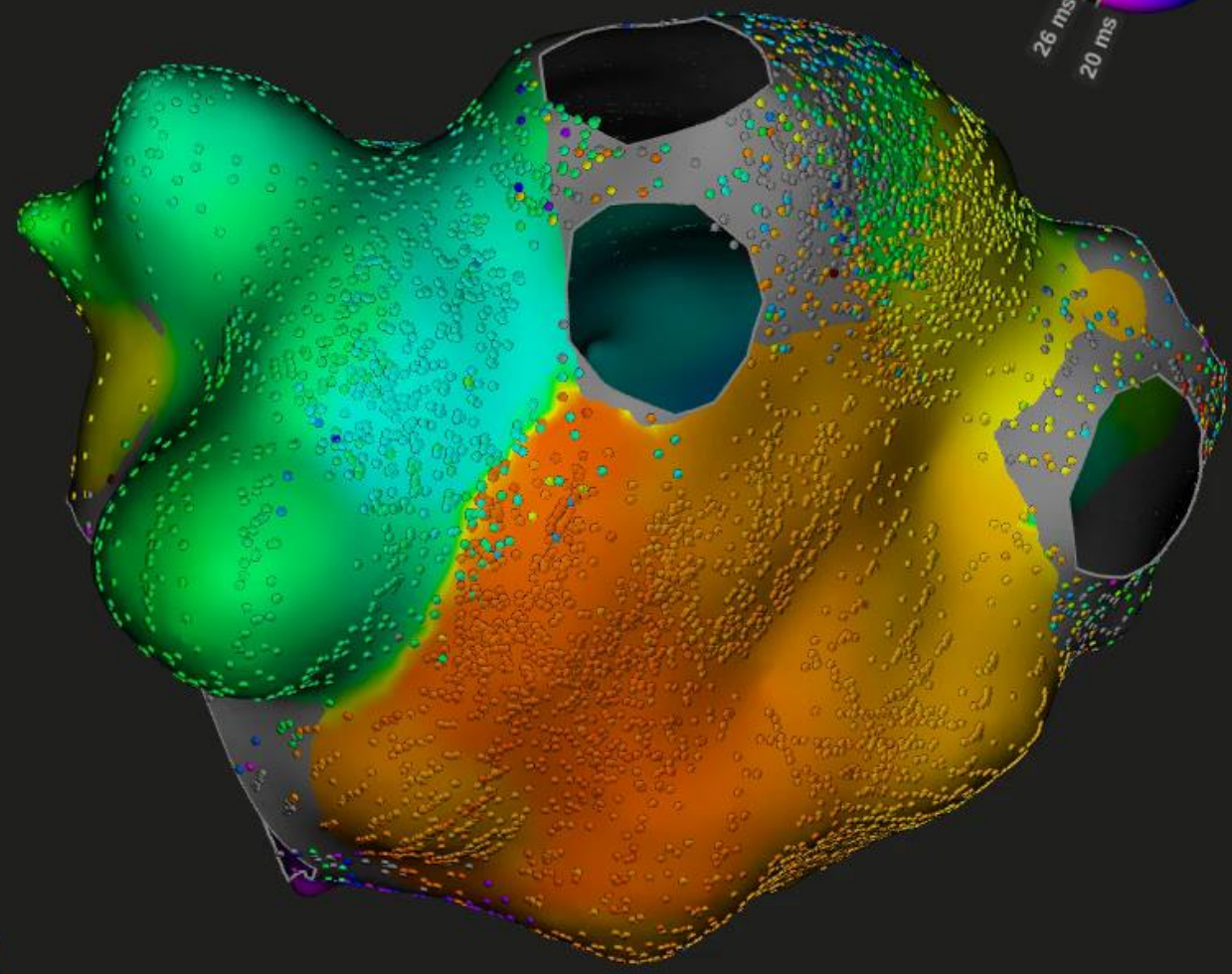


B: G6-7 ▶



B: C3-4 ▶





Auto

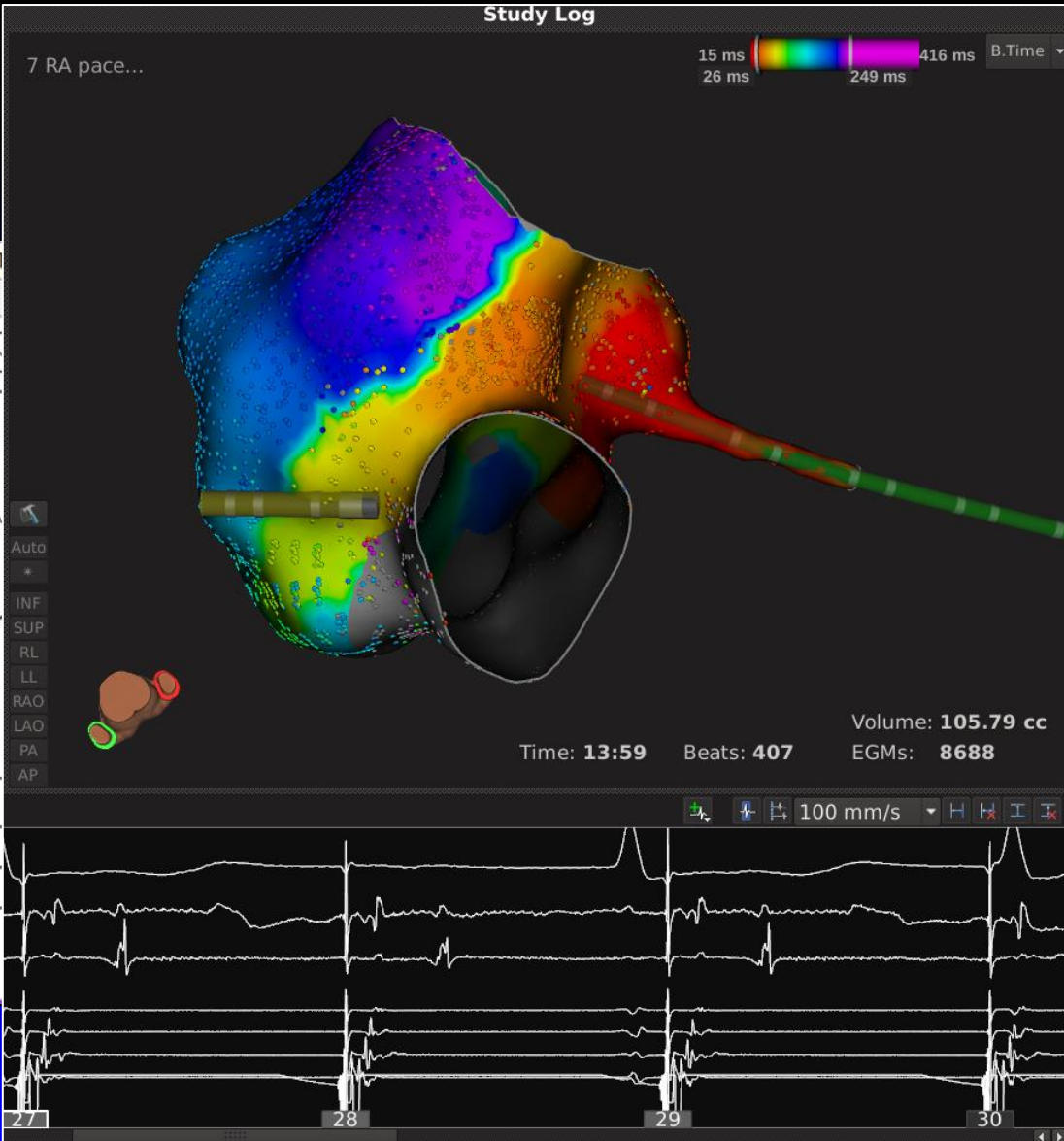
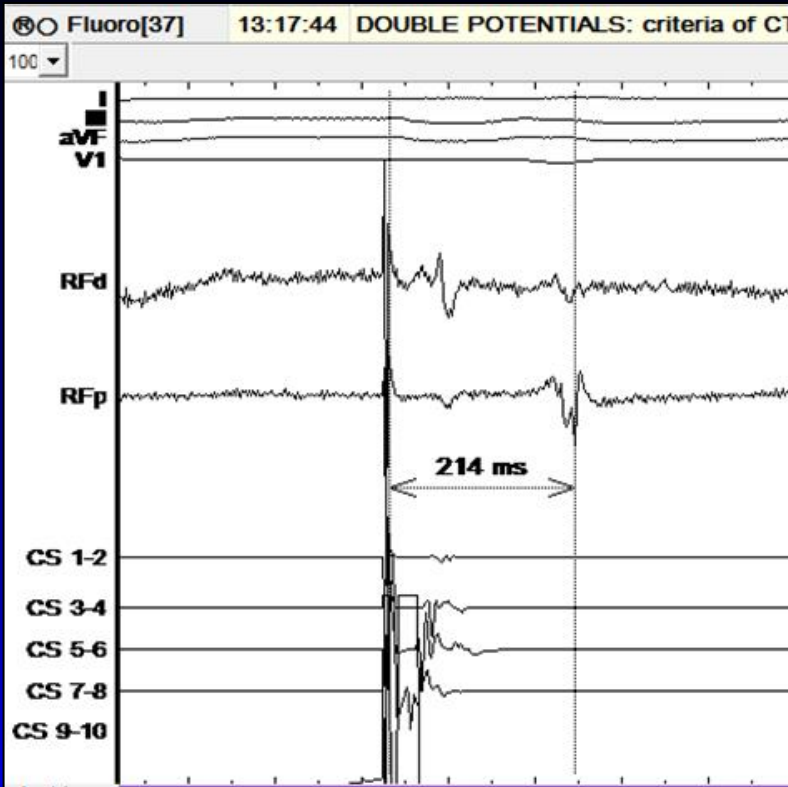
- INF
- SUP
- RL
- LL
- RAO
- LAO
- PA
- AP



Time: 12:49 Beats: 1457

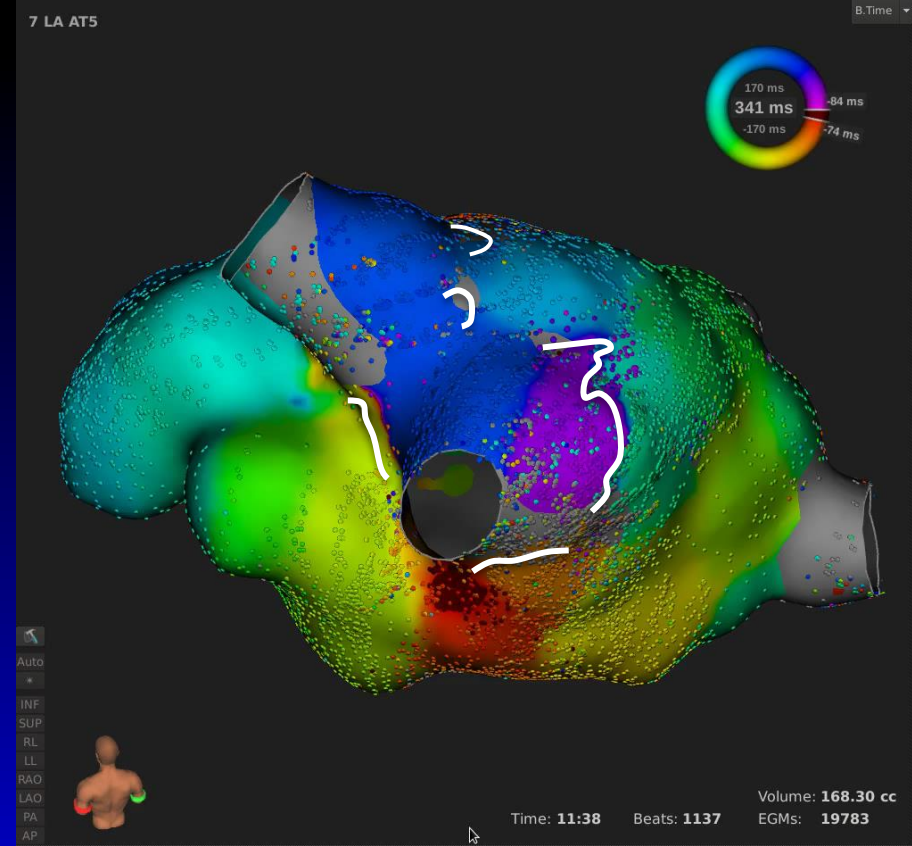
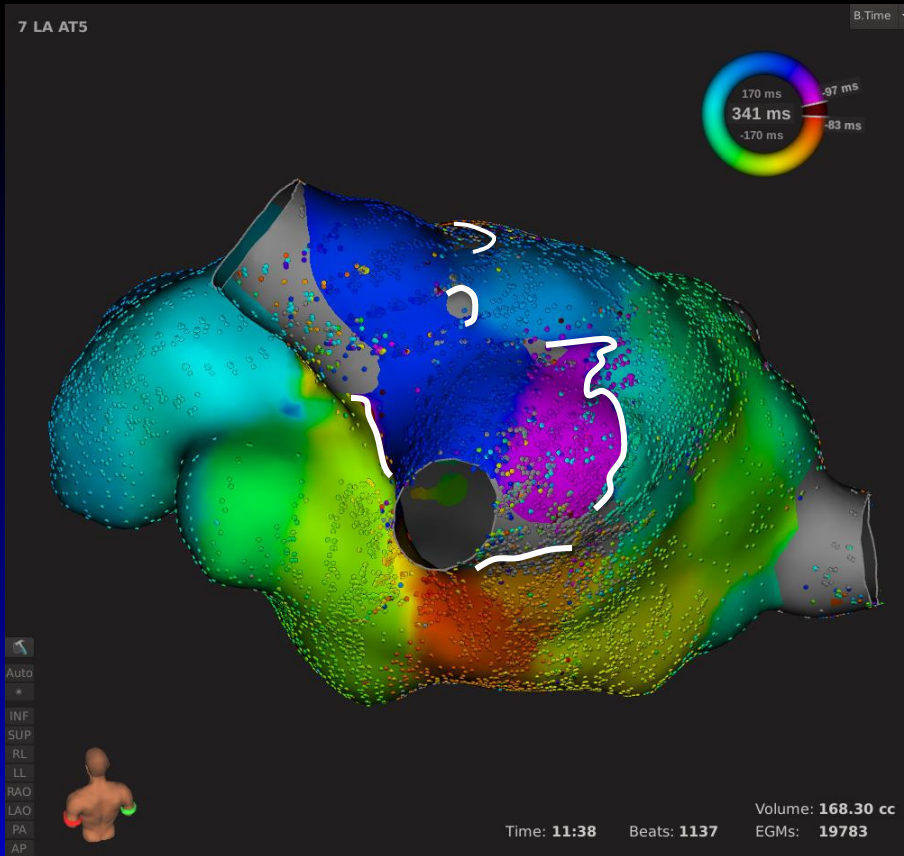
Volume: 125.48 cc
EGMs: 15840

Is CTI blocked?

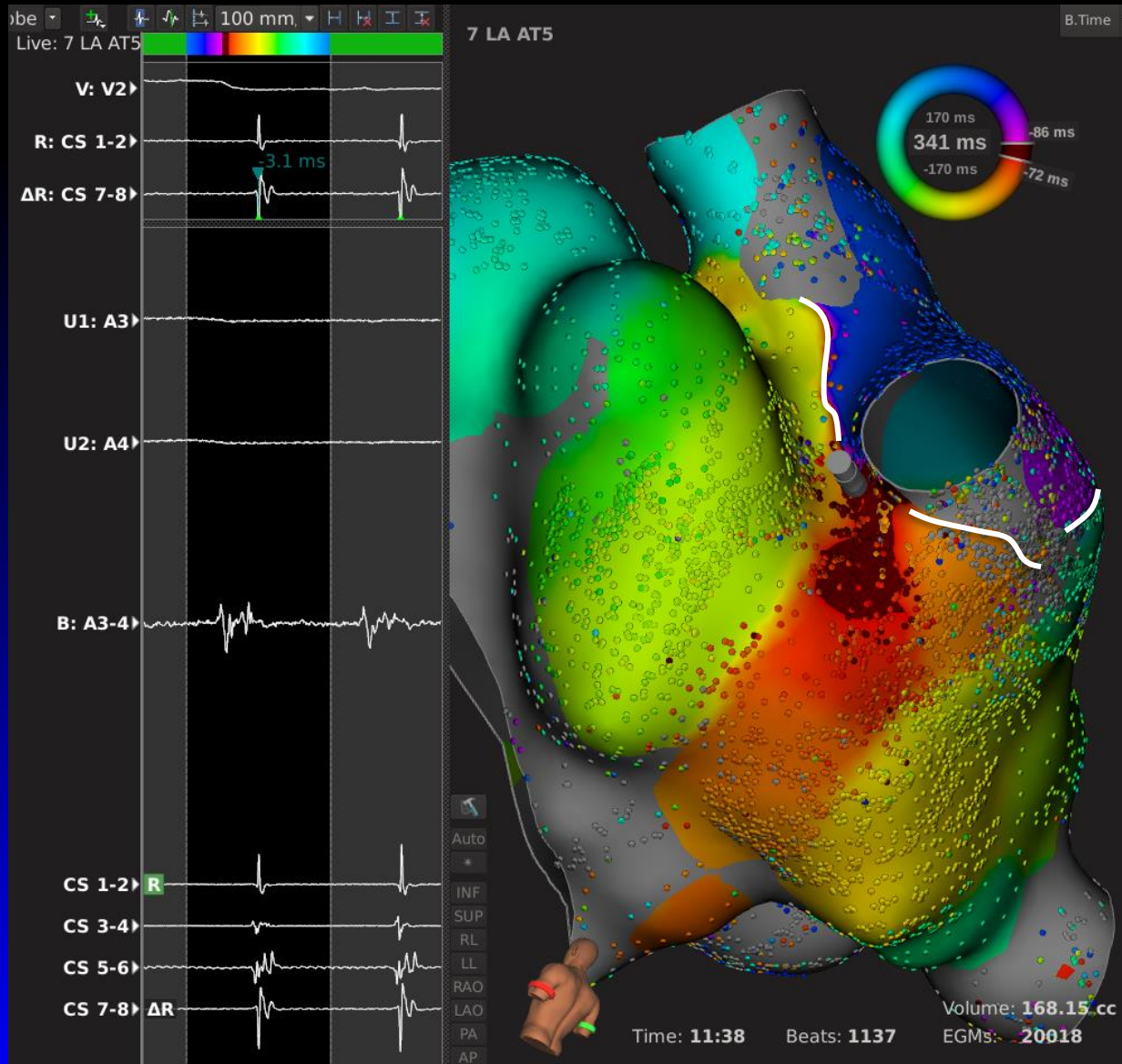


Courtesy from F Sacher

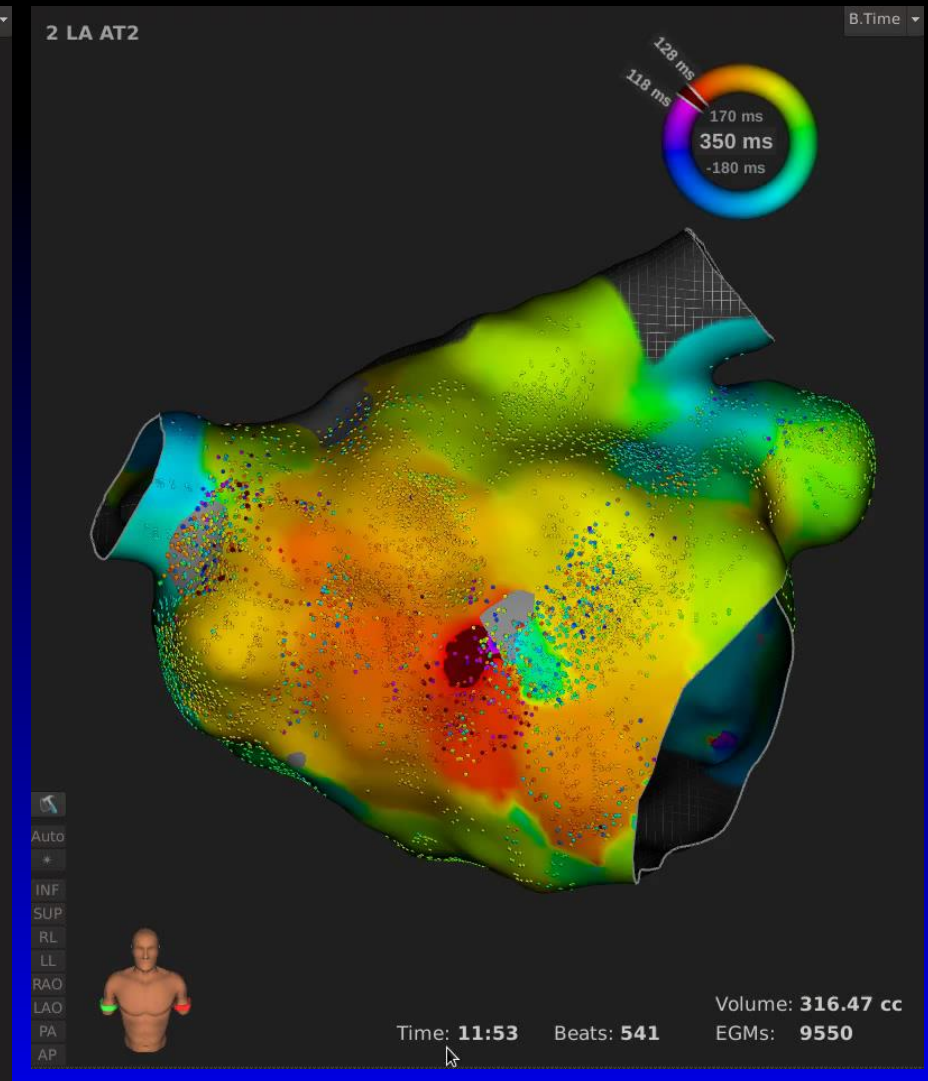
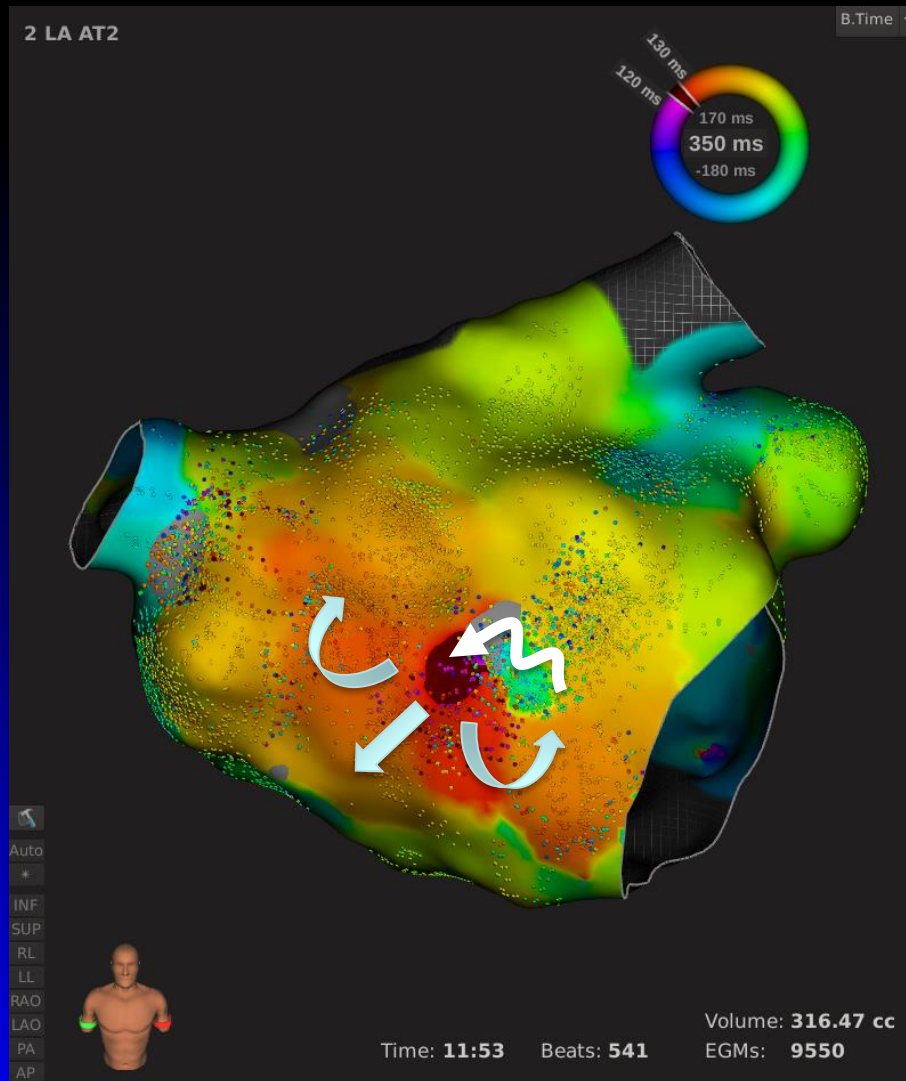
Gaps in WACA Line



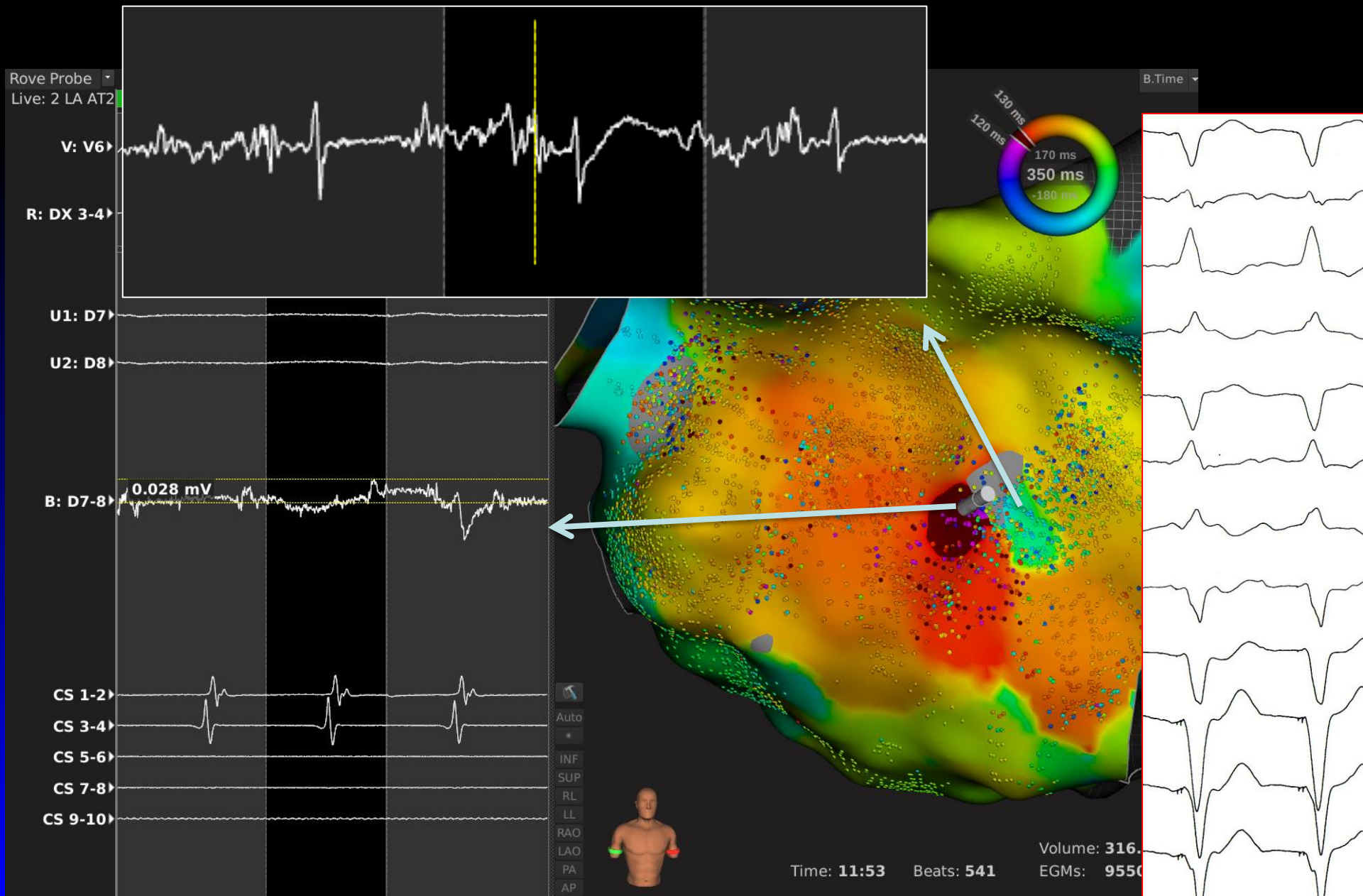
Gaps in WACA Line



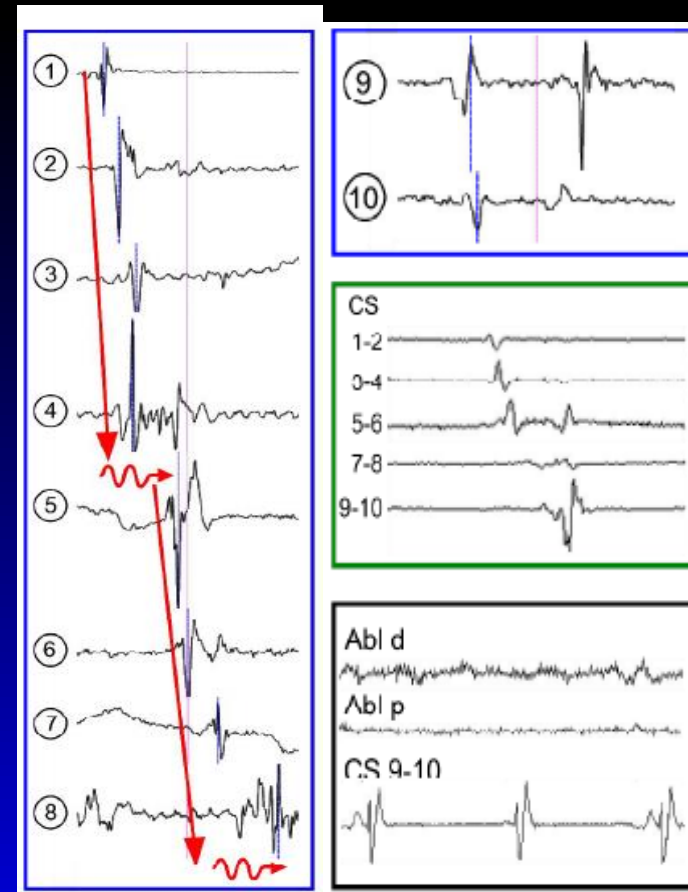
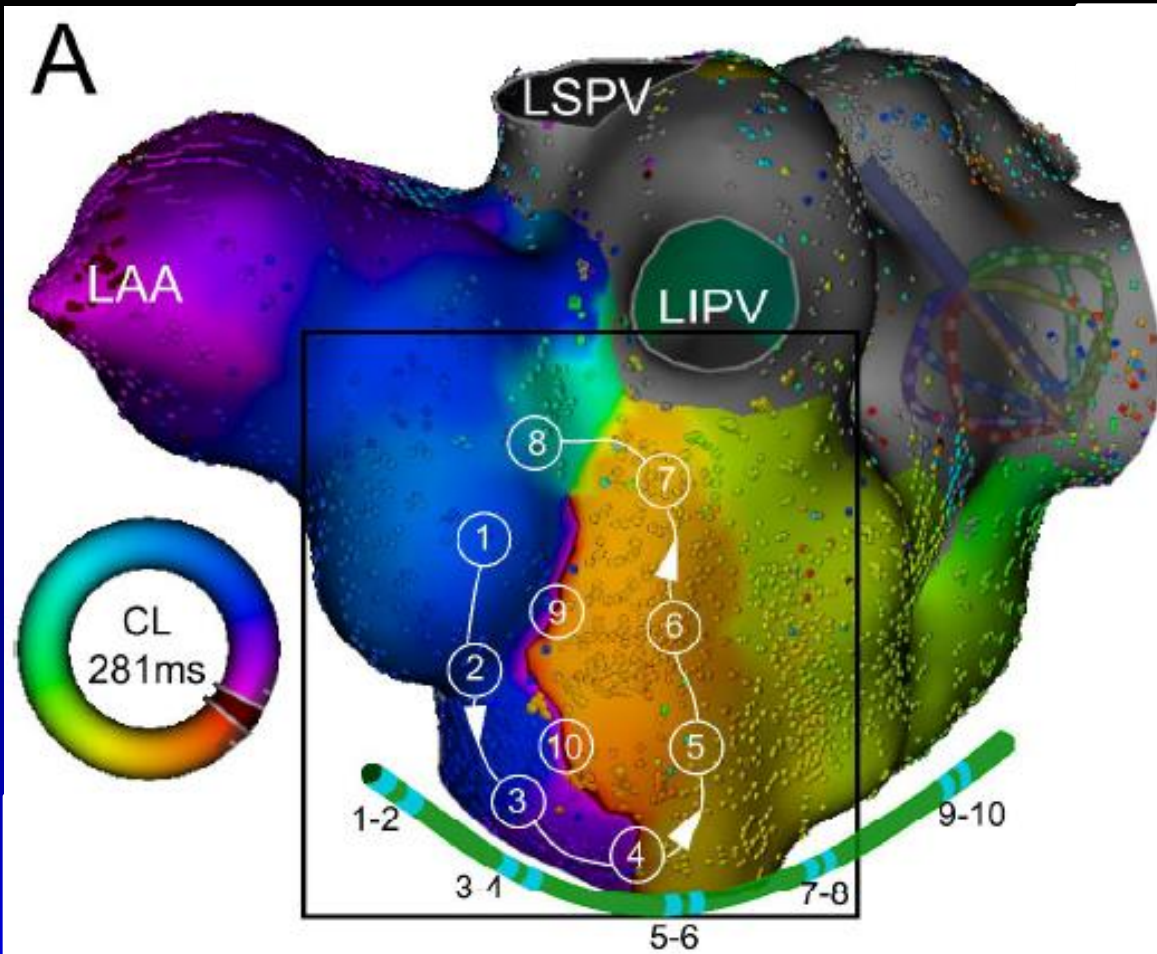
Still poorly defined micro reentrant circuits in the LA



Still poorly defined micro reentrant circuits in the LA



When micro reentry is located inside an isthmus



Still poorly defined macro reentrant circuits

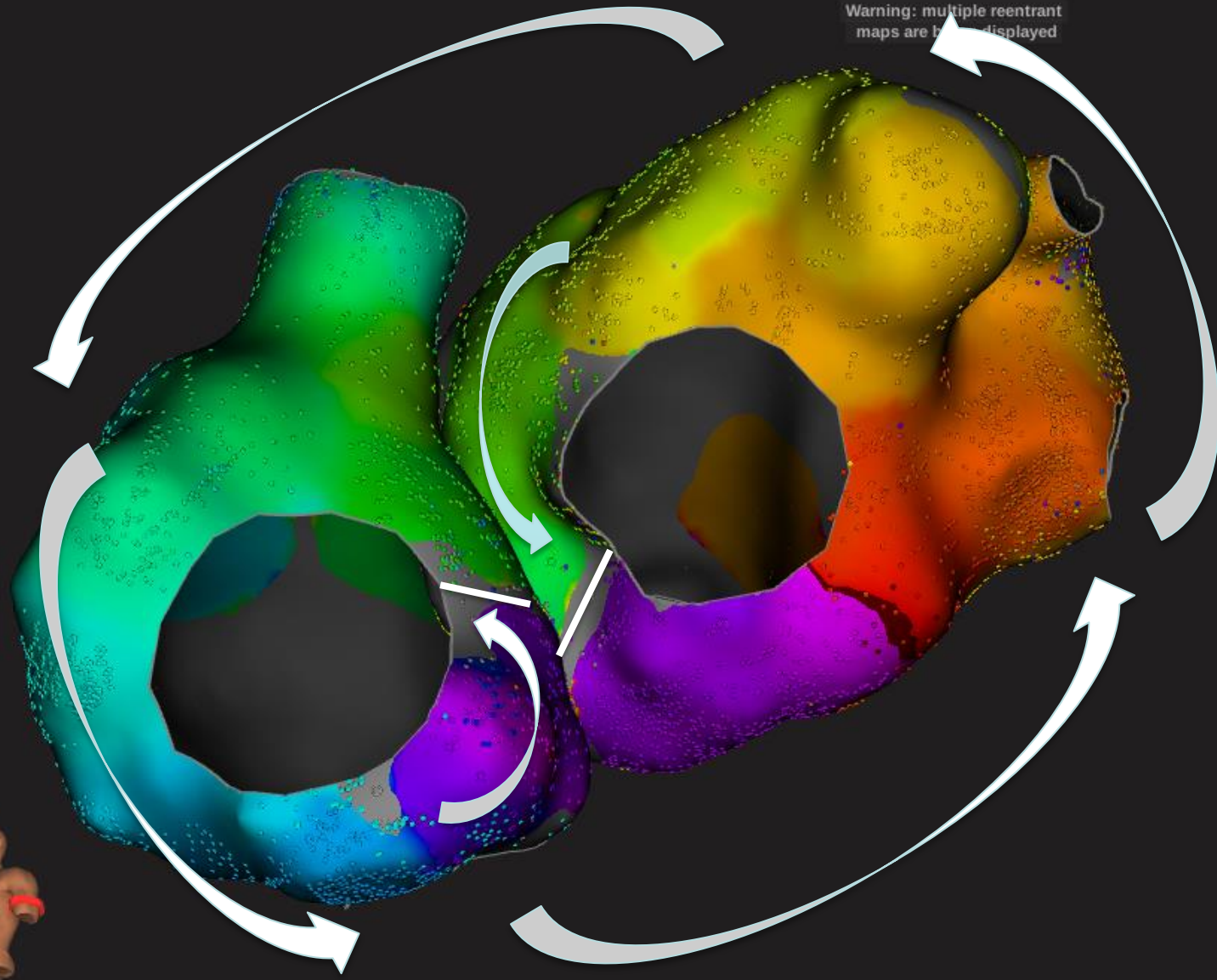
3 RA AT 2

2 LA AT2

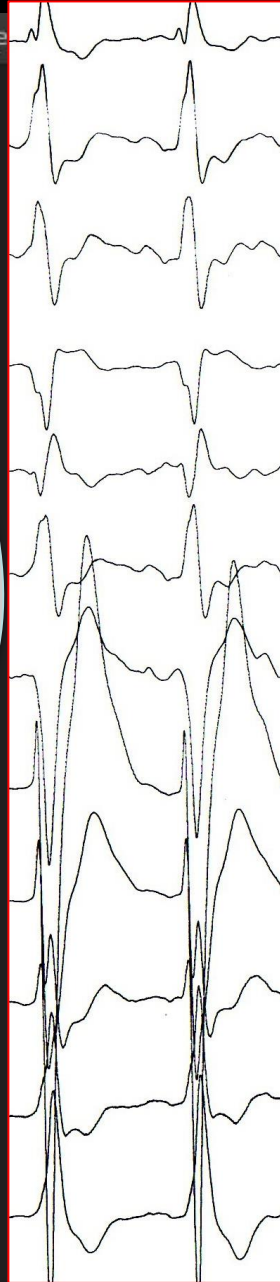
-203 ms -200 ms 217 ms 203 ms

B.Time

Warning: multiple reentrant maps are being displayed



- Auto
- +
- INF
- SUP
- RL
- LL
- RAO
- LAO
- PA
- AP

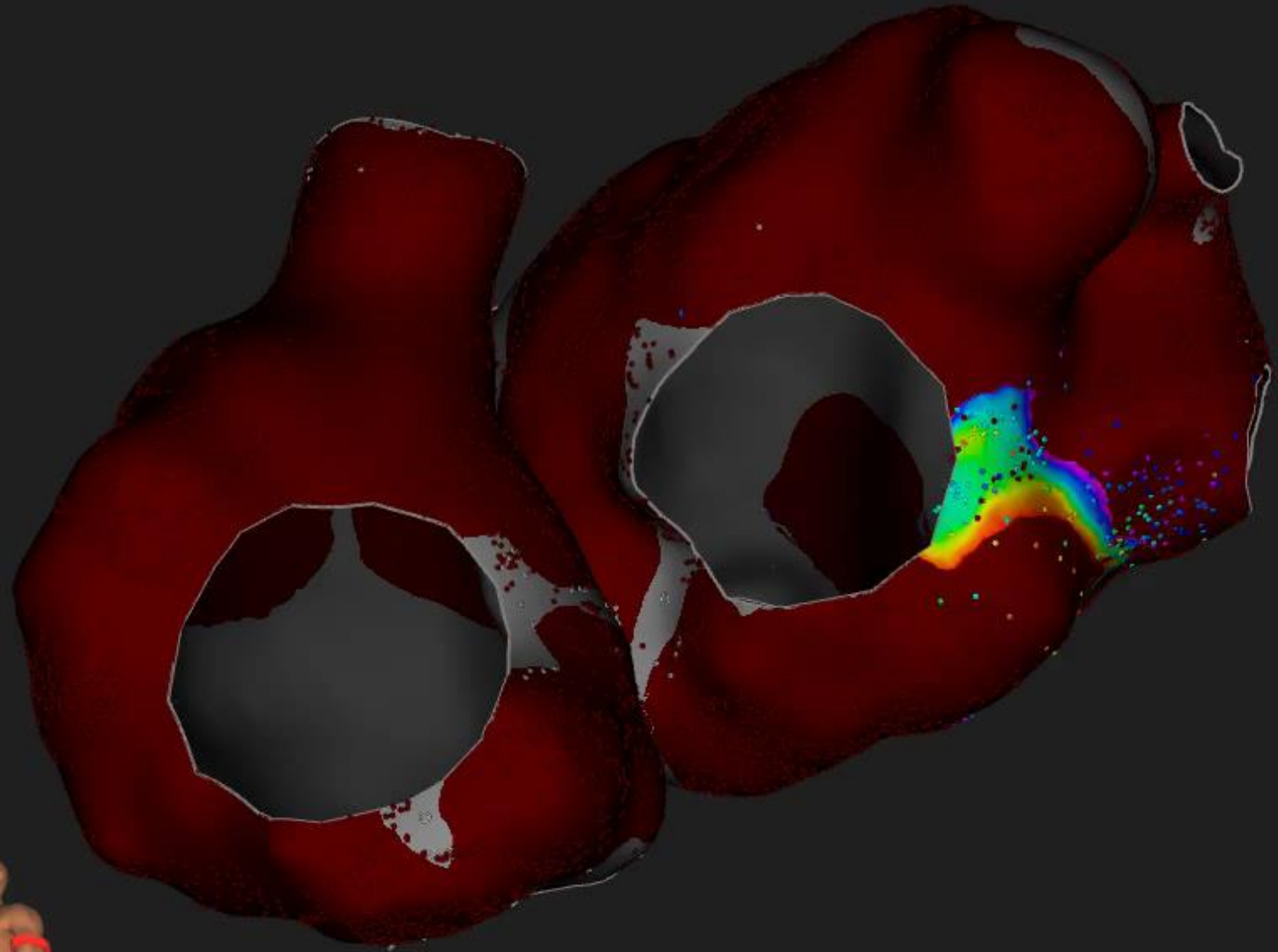


3 RA AT 2

2 LA AT2

-203 ms 217 ms B.Time
-195 ms -184 ms

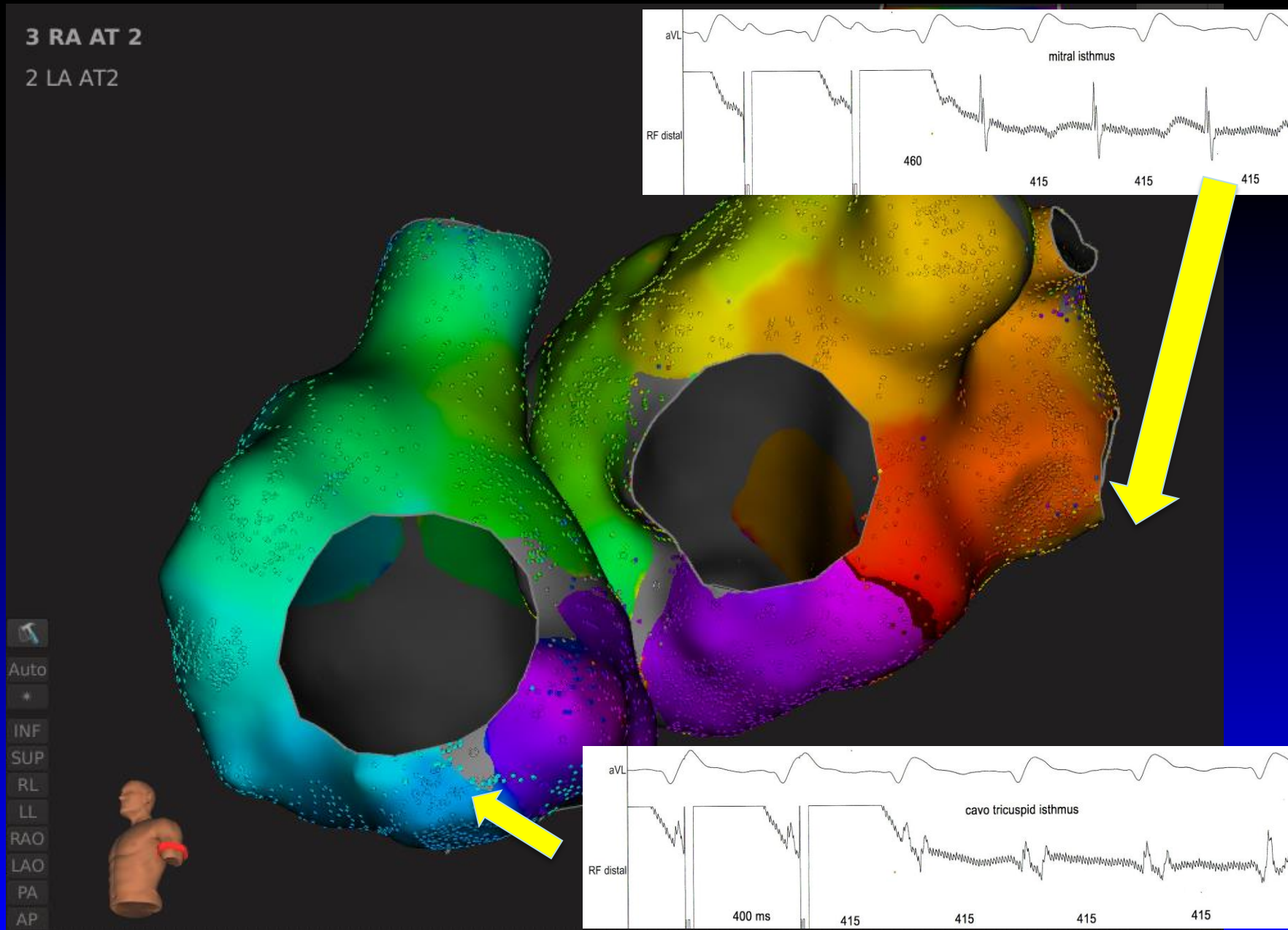
Warning: multiple reentrant maps are being displayed



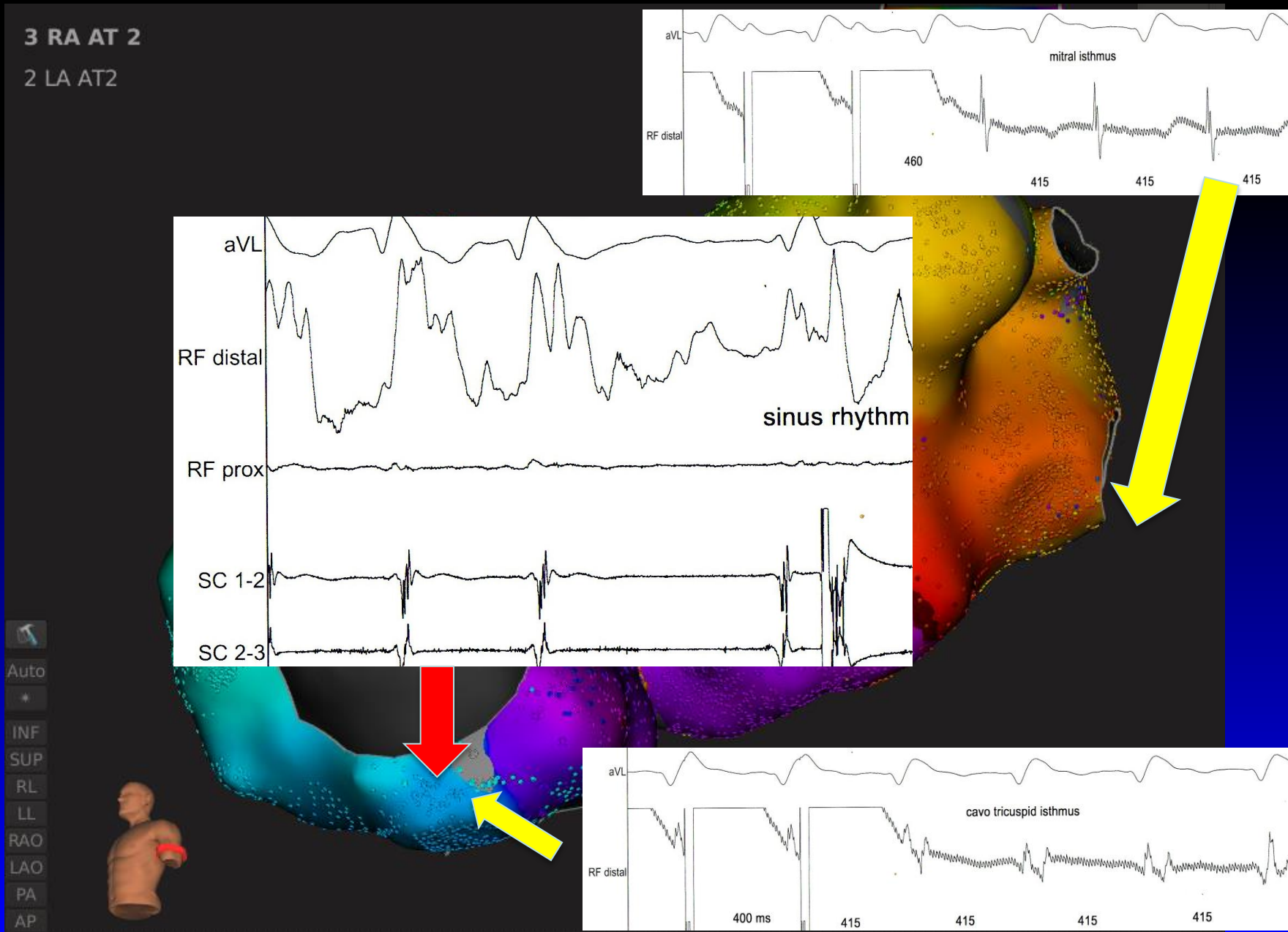
- Auto
- INF
- SUP
- RL
- LL
- RAO
- LAO
- PA
- AP



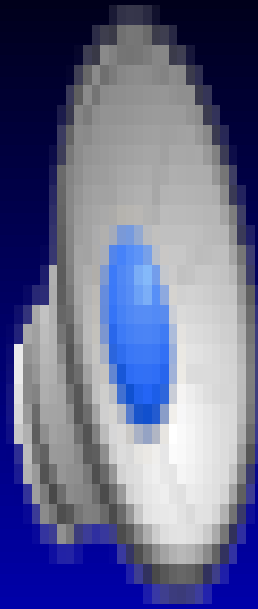
Still poorly defined macro reentrant circuits

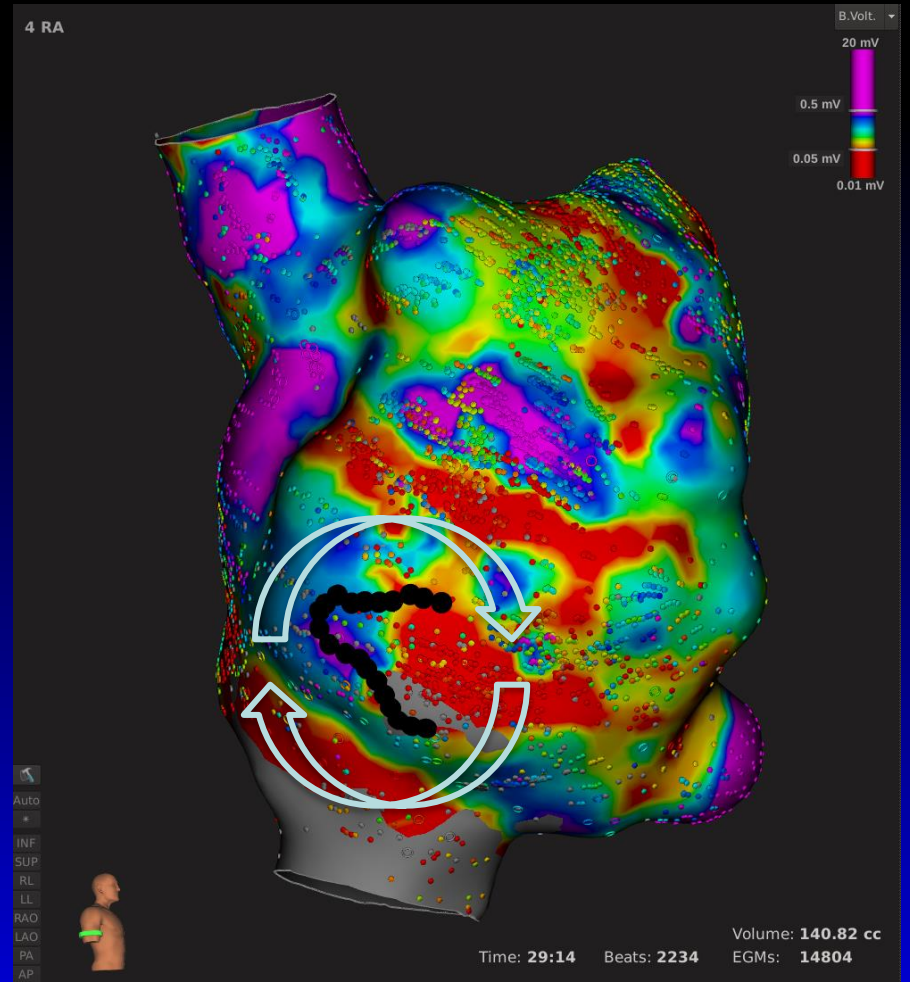
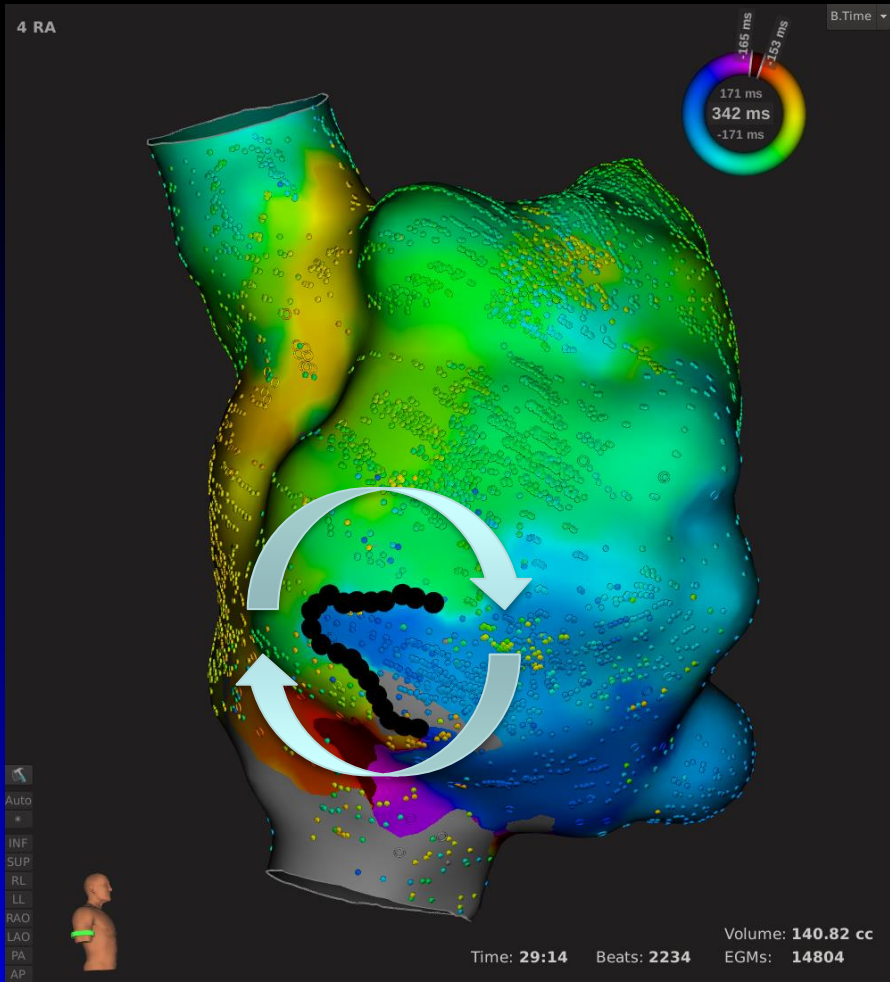


Still poorly defined macro reentrant circuits

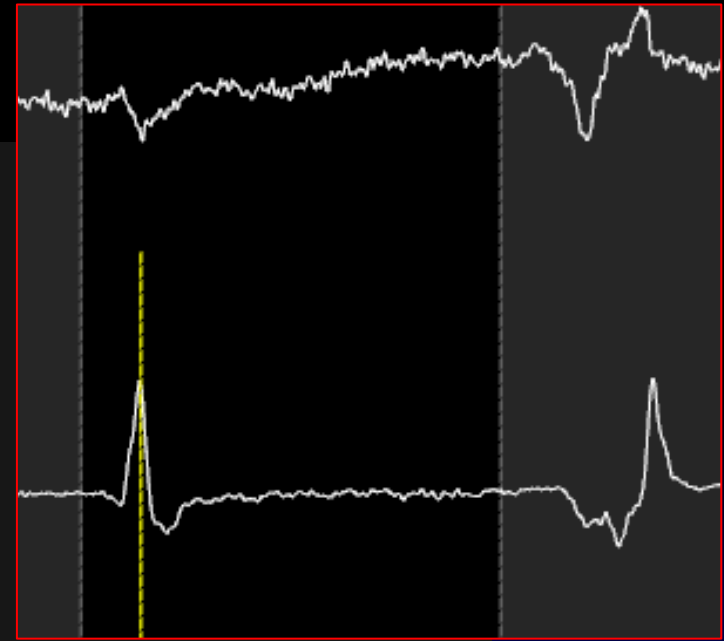
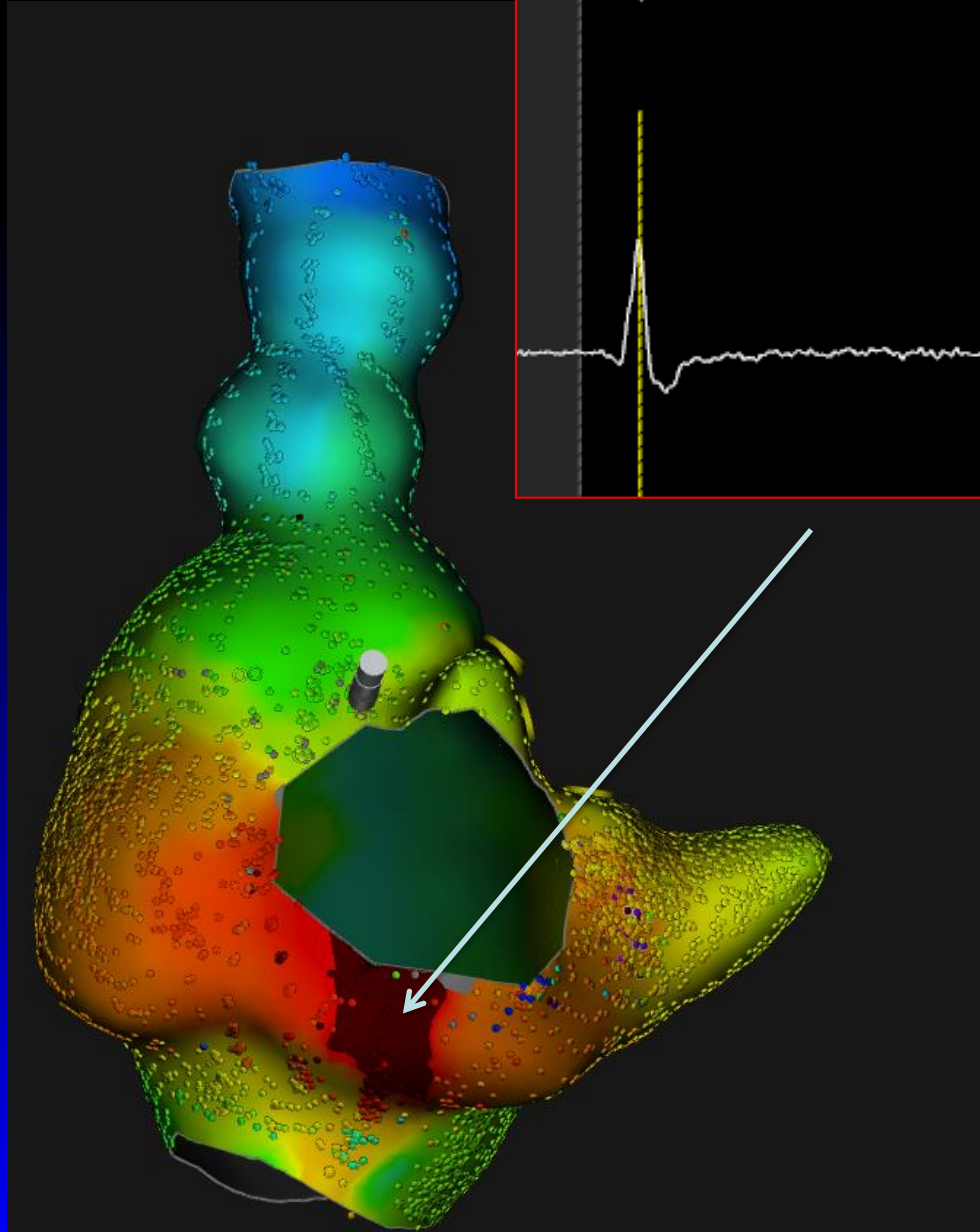
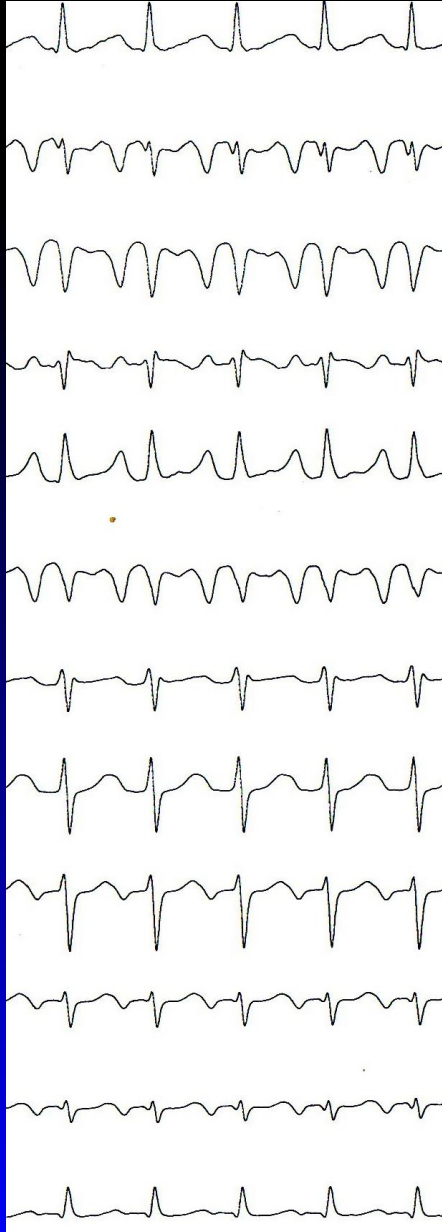


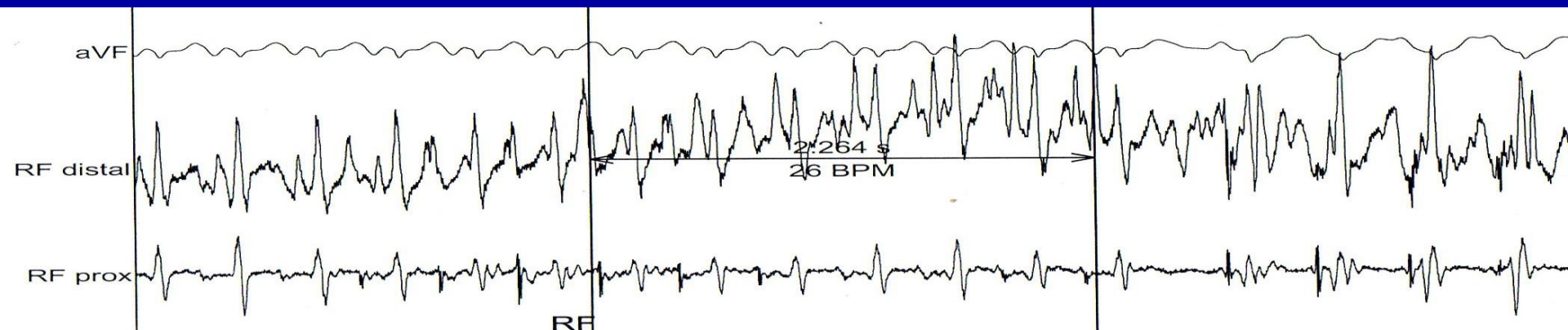
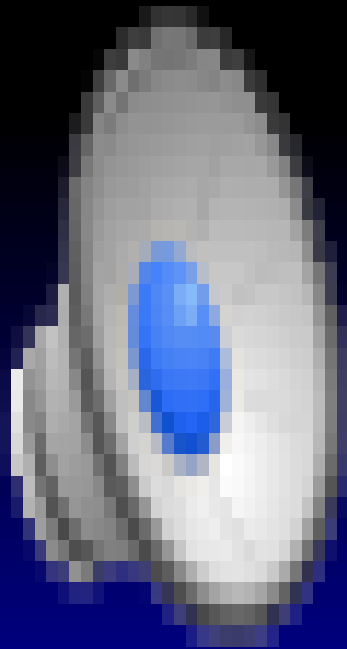
Correlation activation and voltage



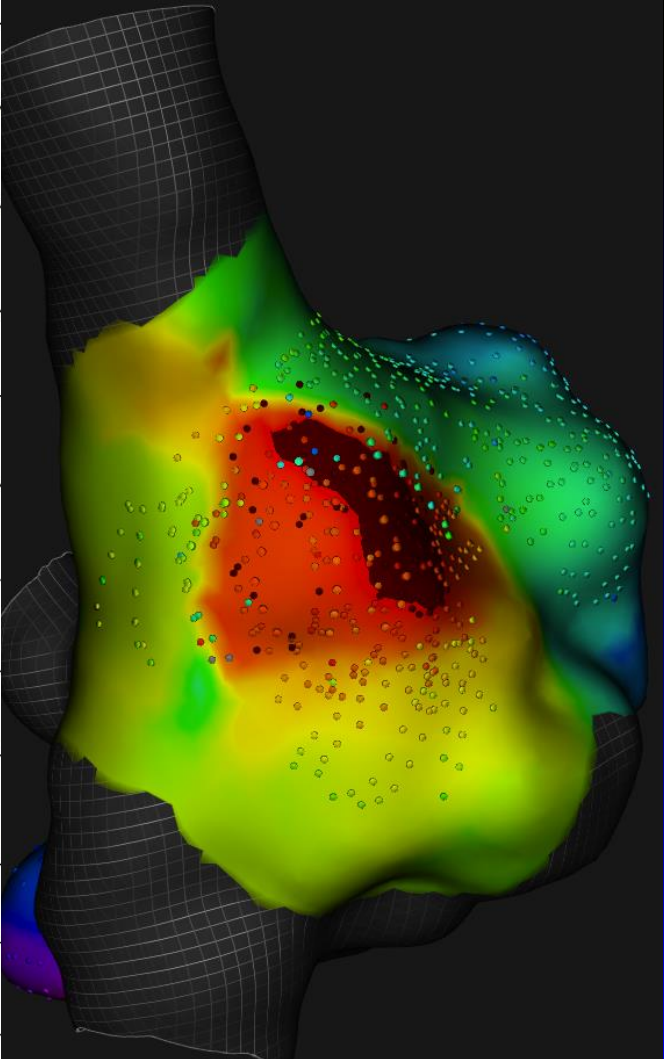
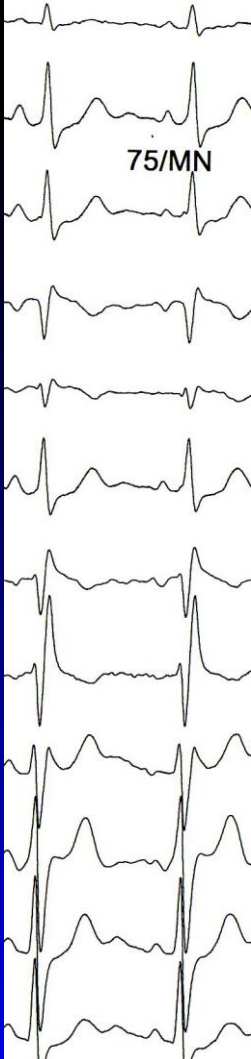


When focal AT arise from an isthmus

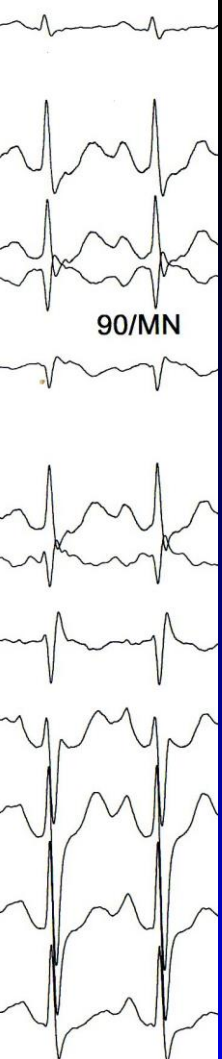
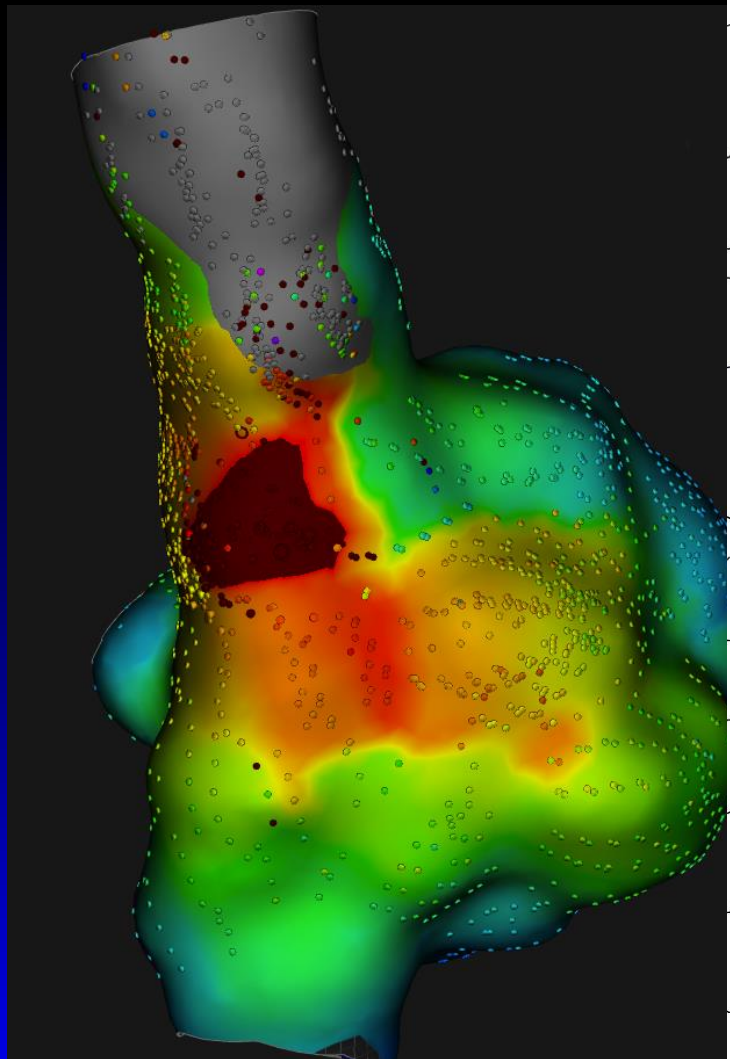




When AT came from/near the sinus node

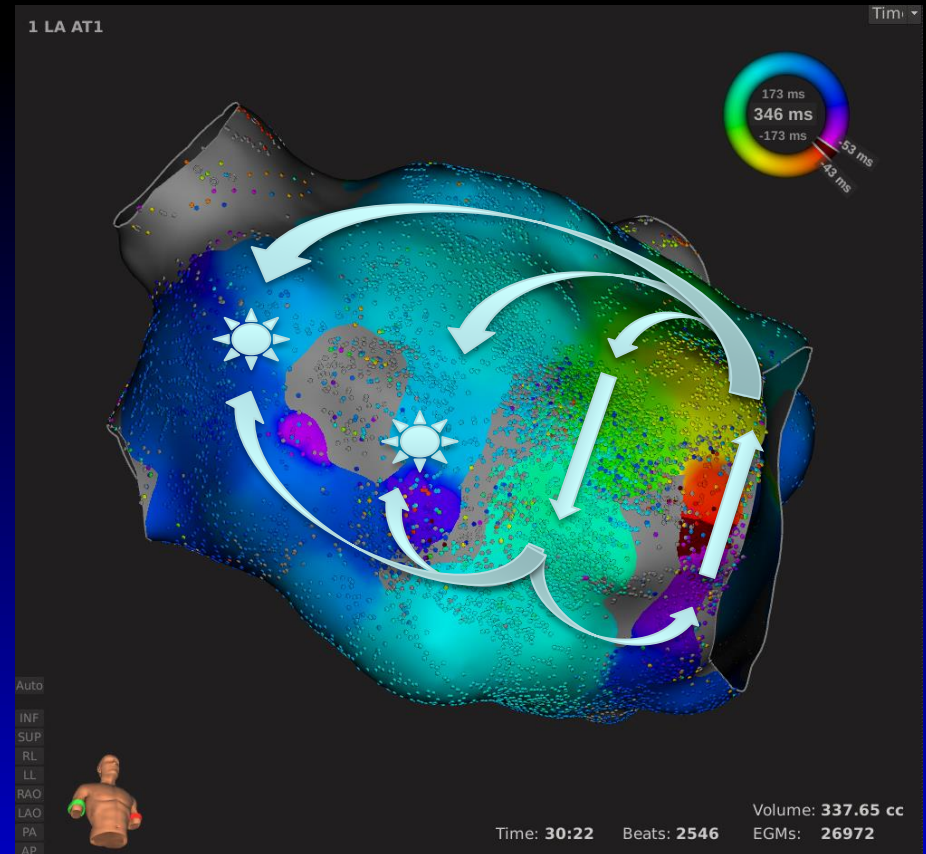
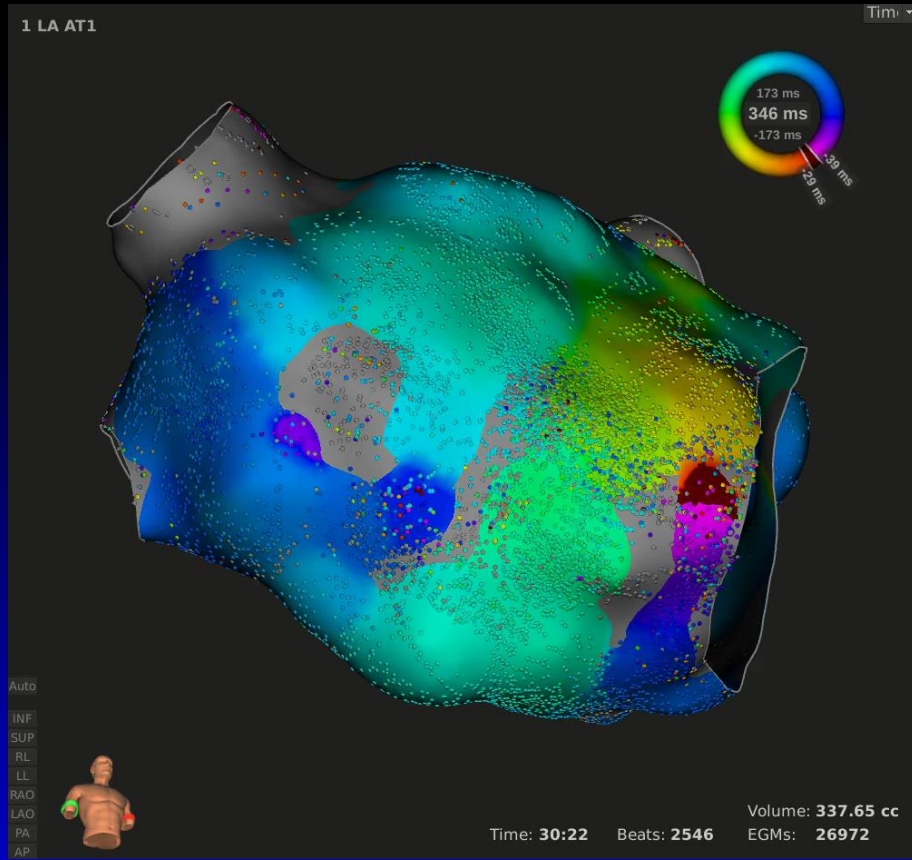


sinus

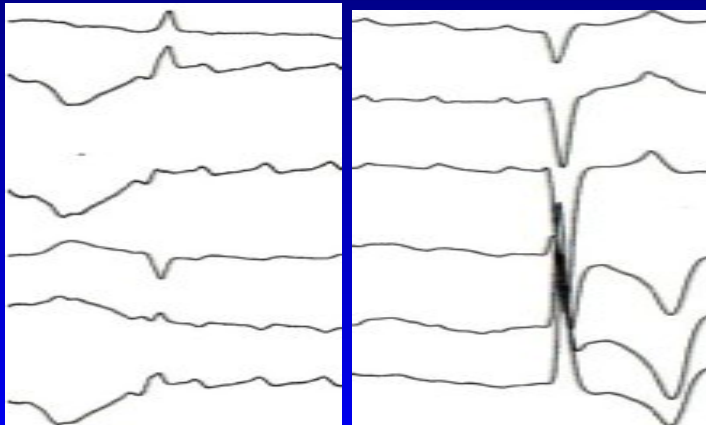
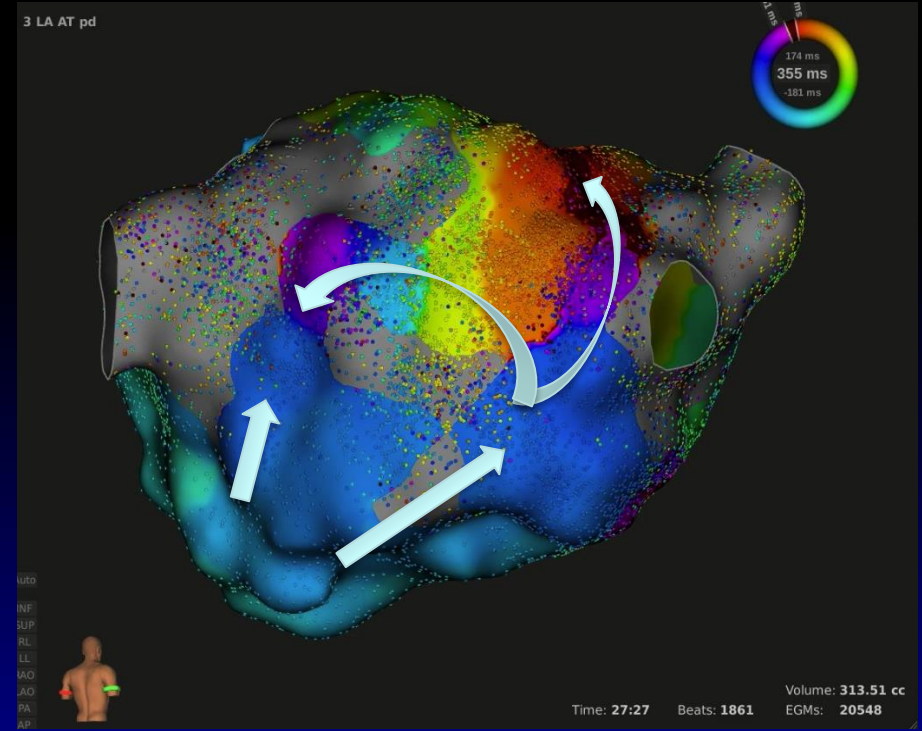
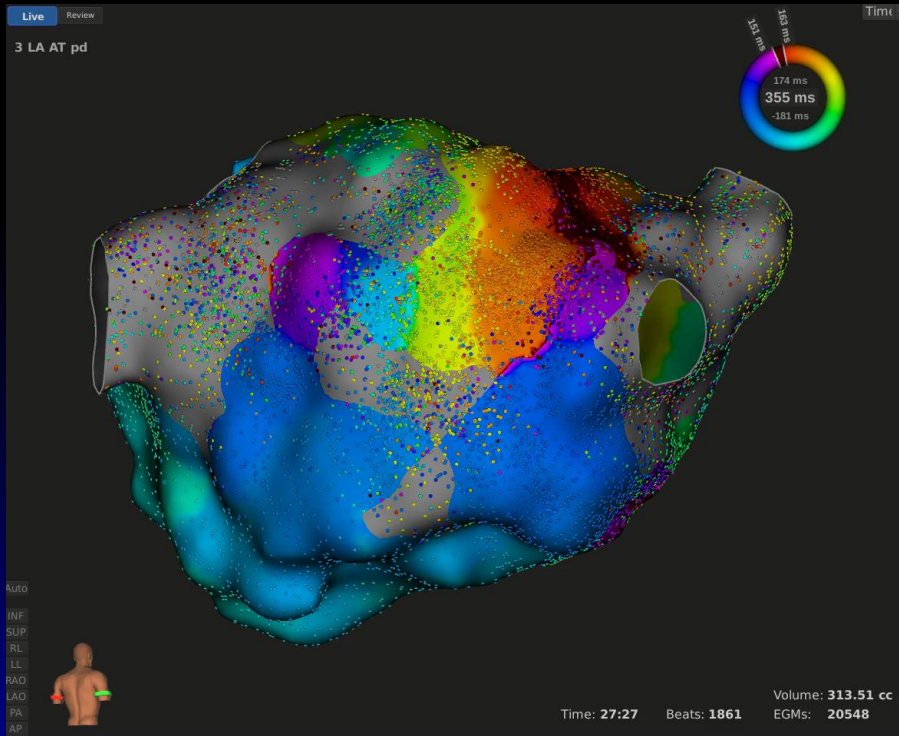


tachy

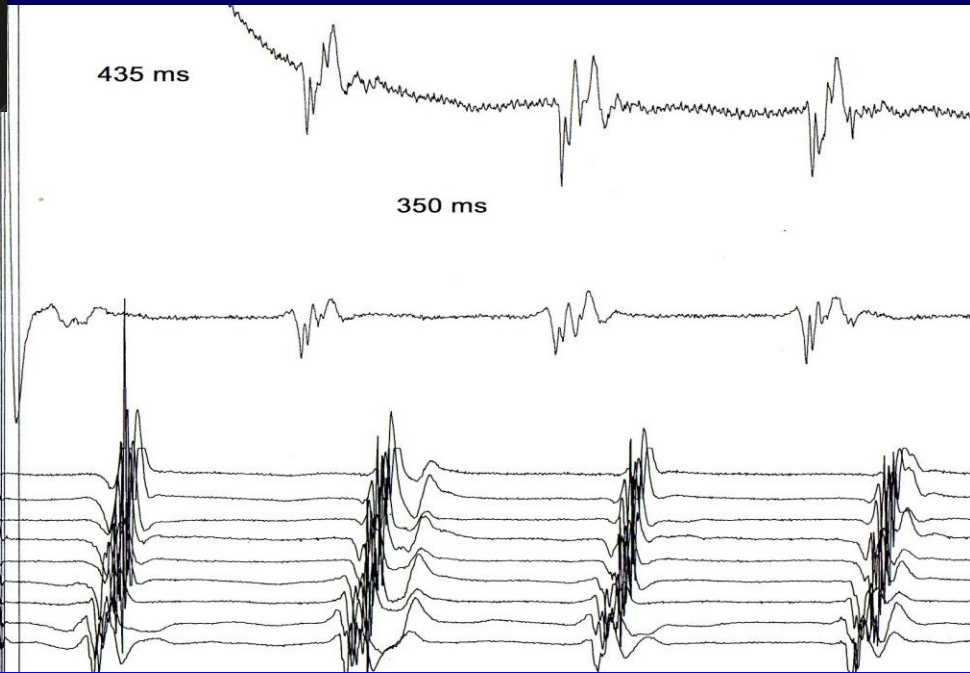
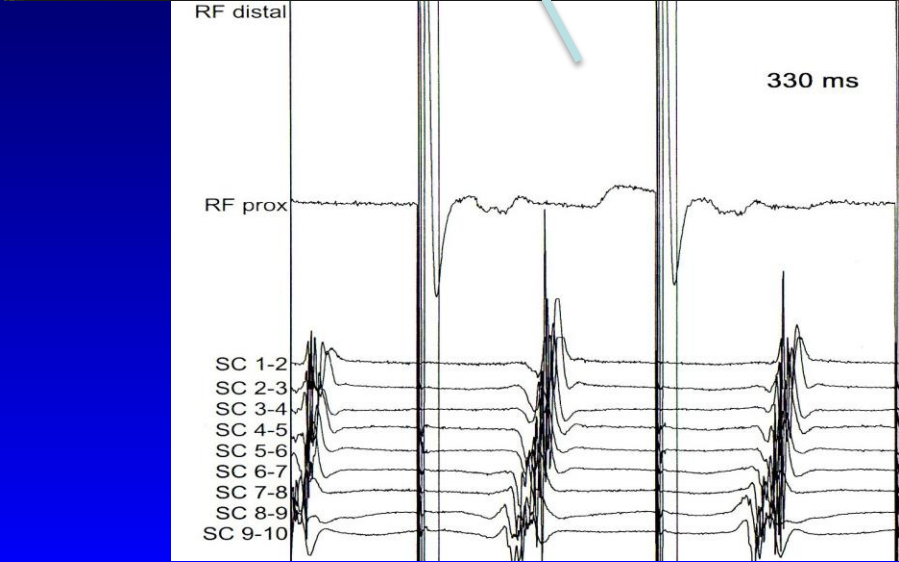
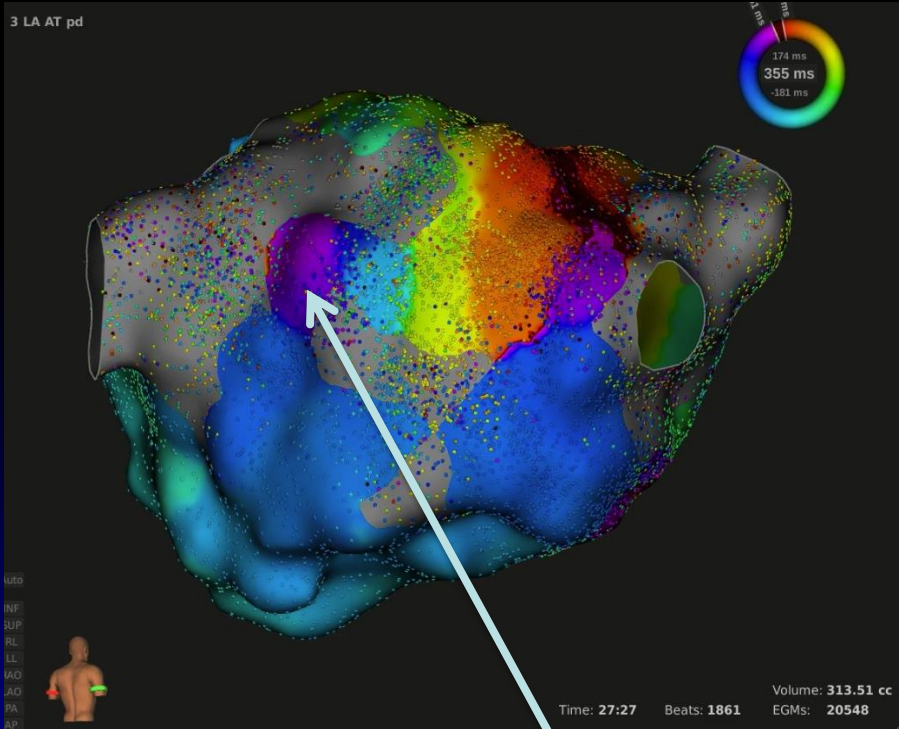
Collisions and by-stander isthmuses



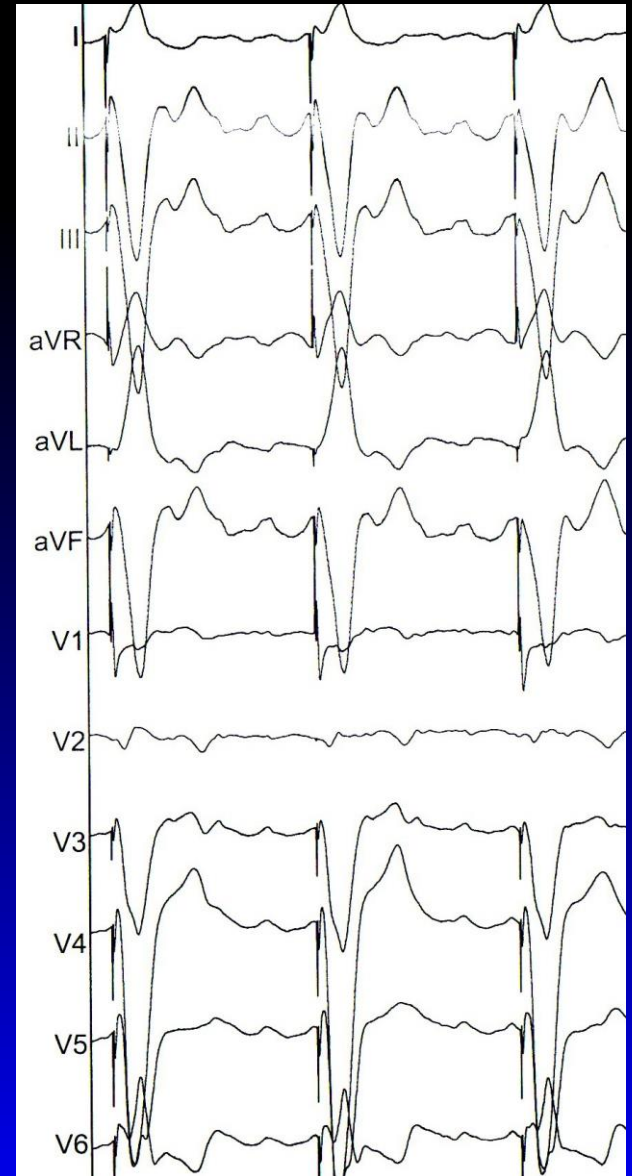
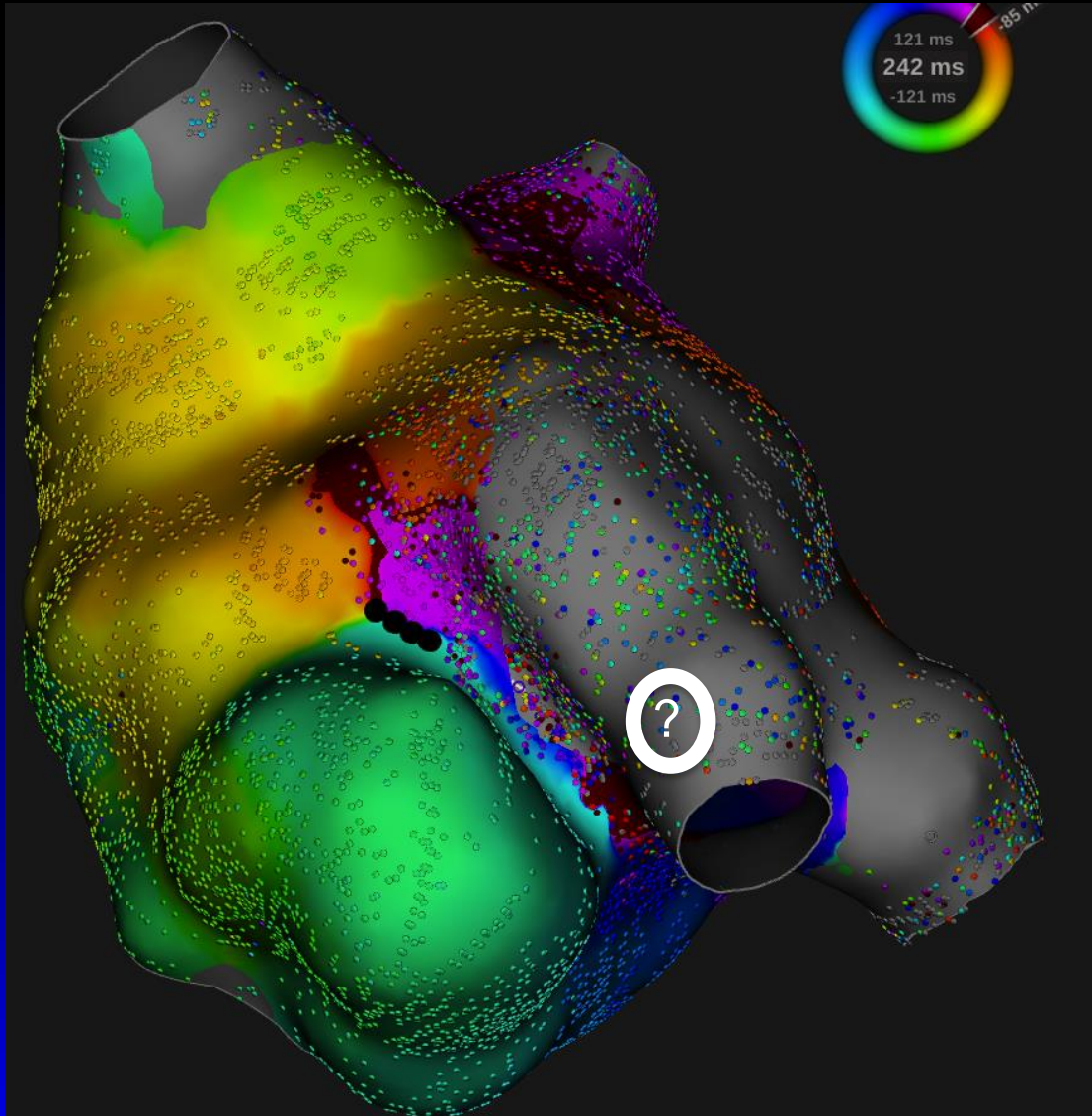
Collisions and by-stander isthmuses

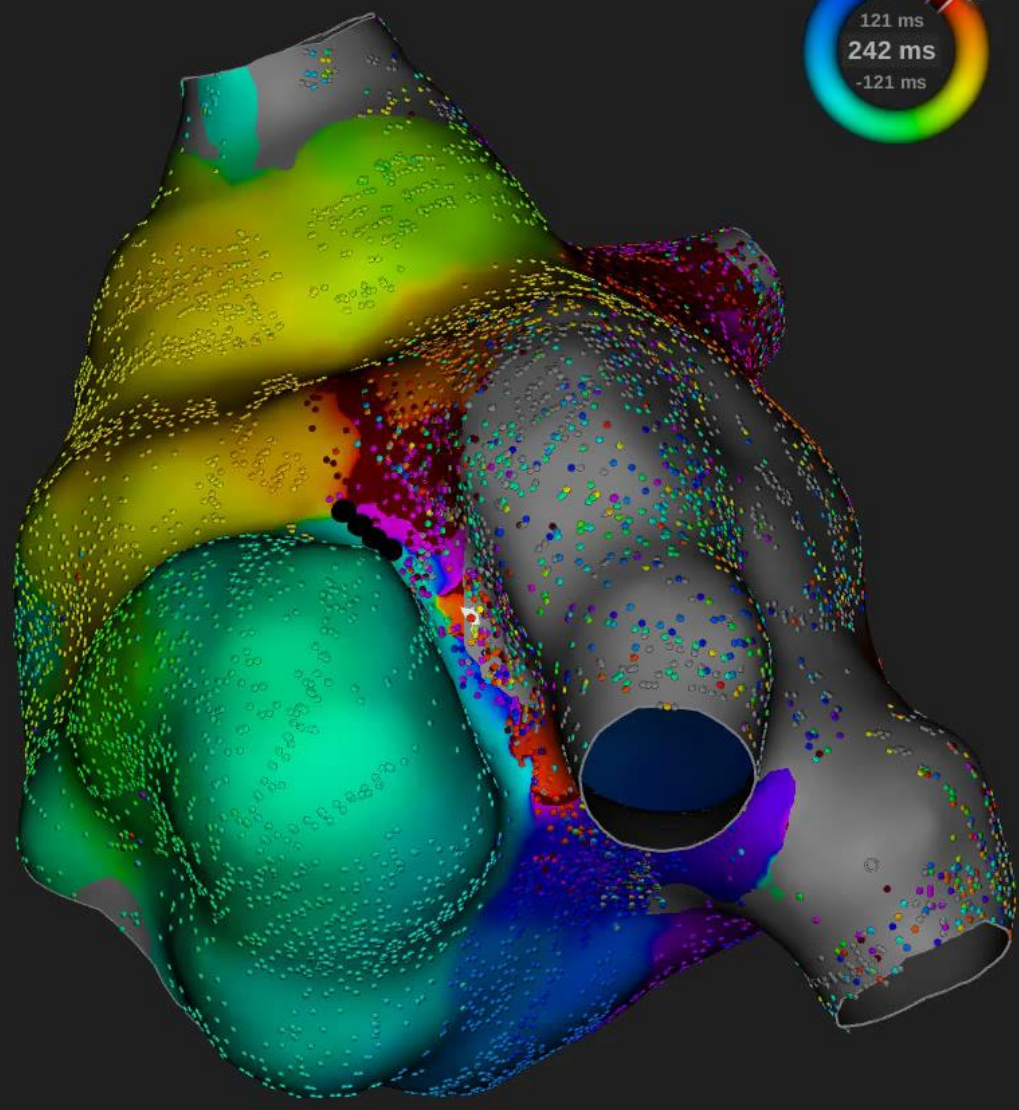


When entrainment mapping may be misleading



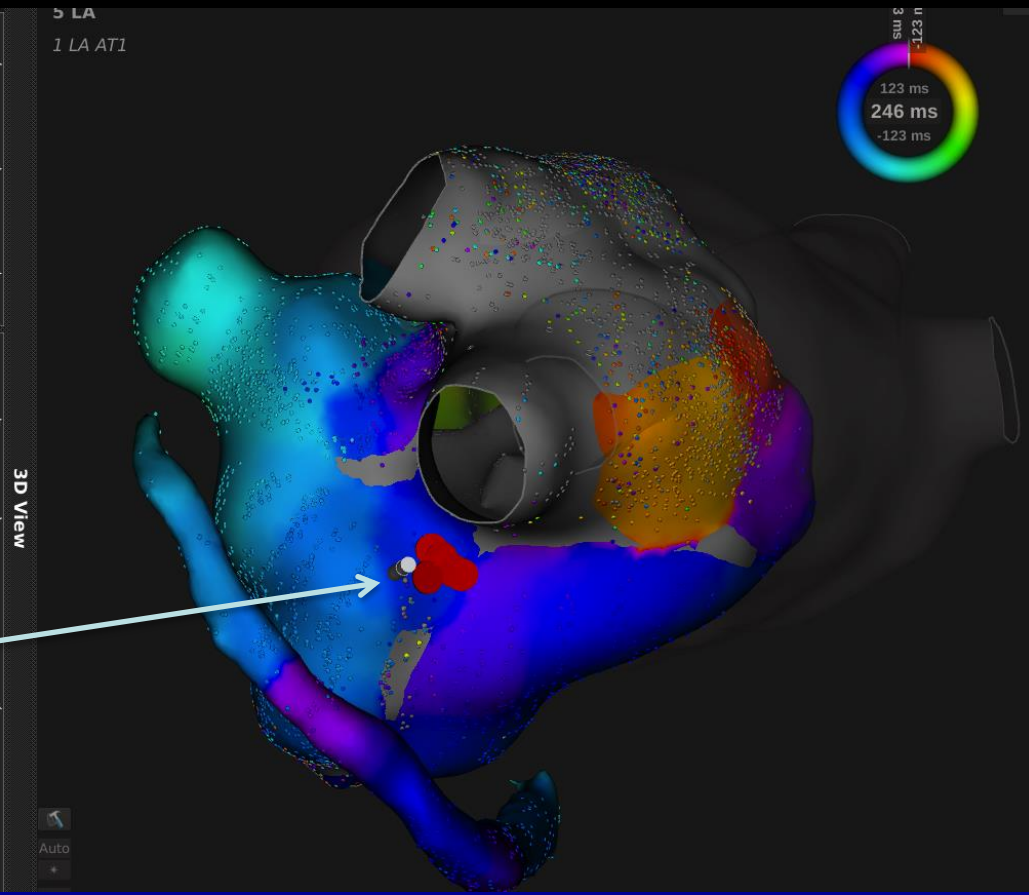
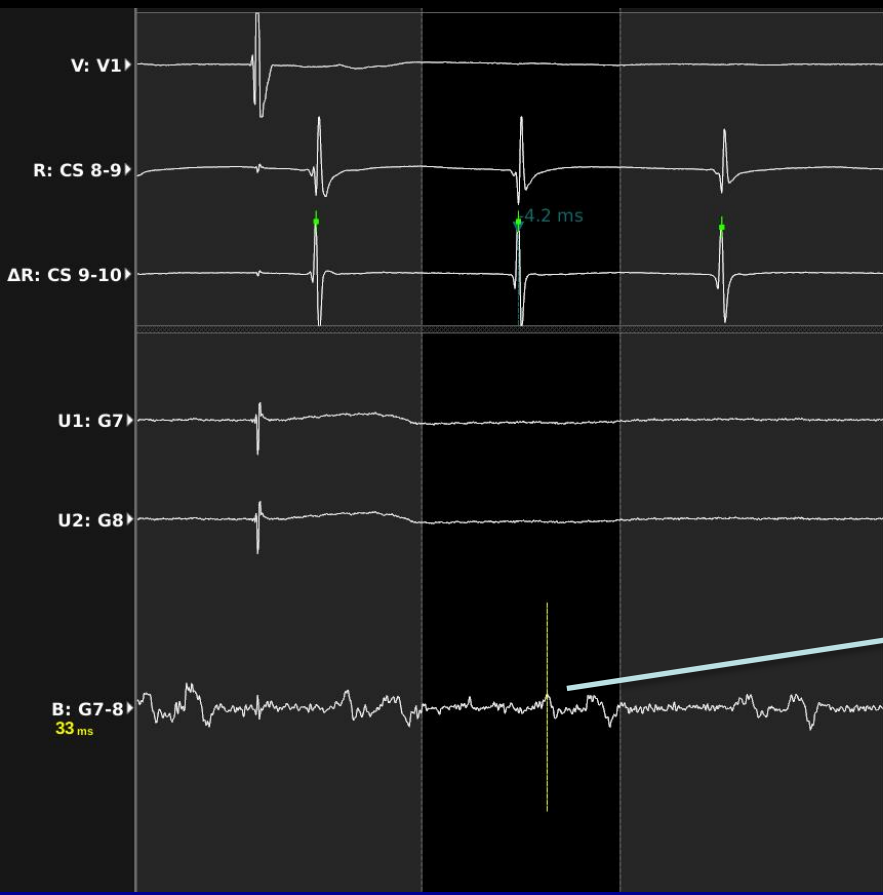
When atrial activation depends on other critical structures

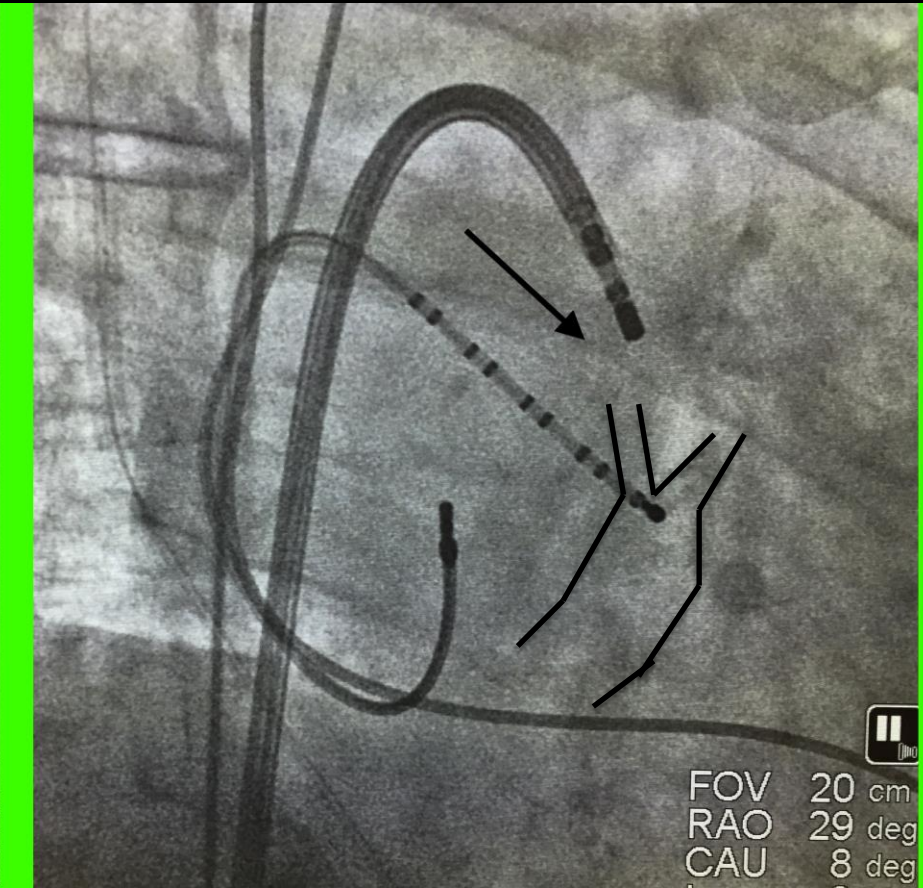
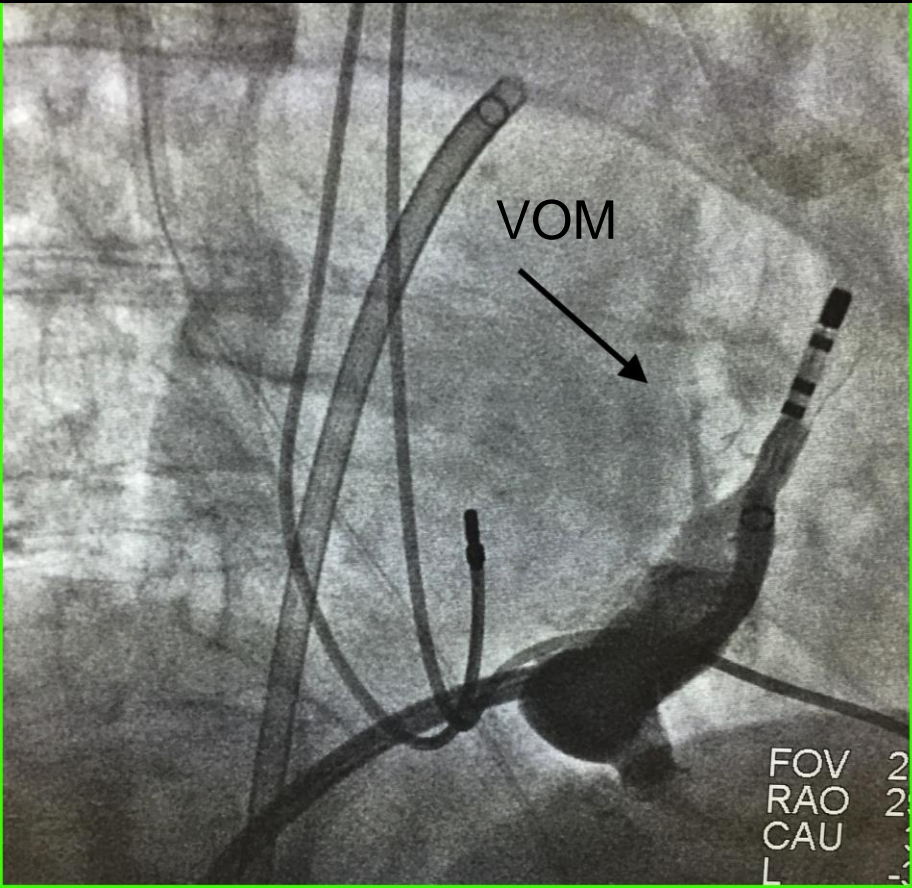




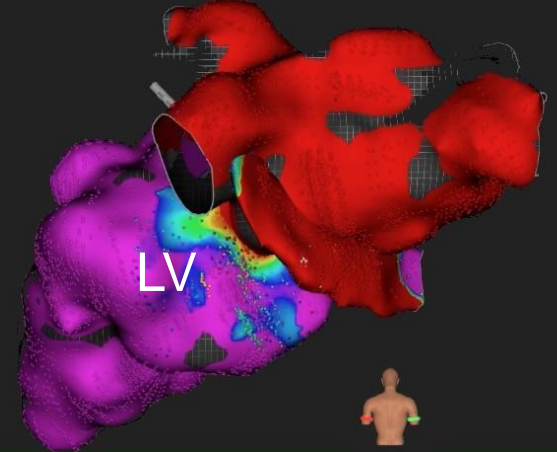
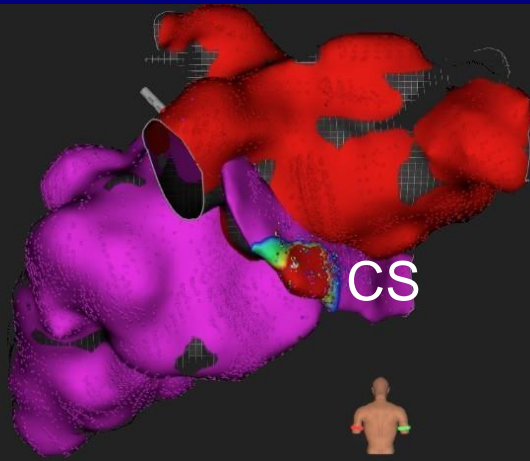
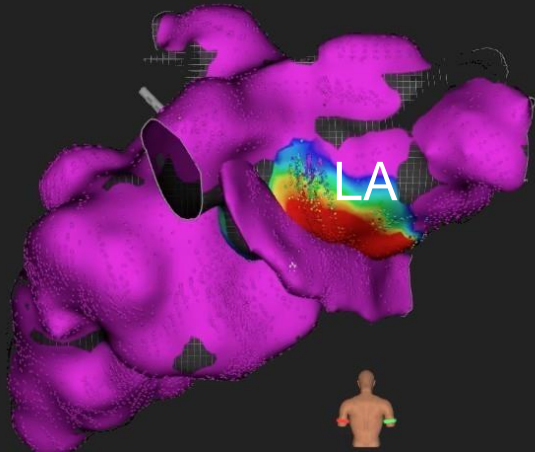
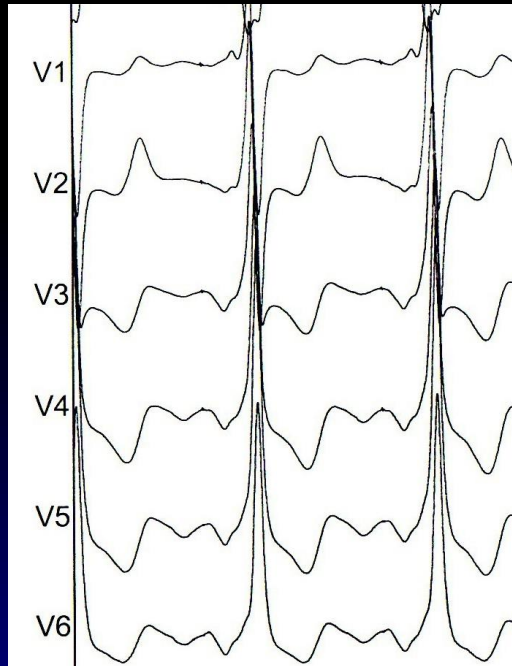
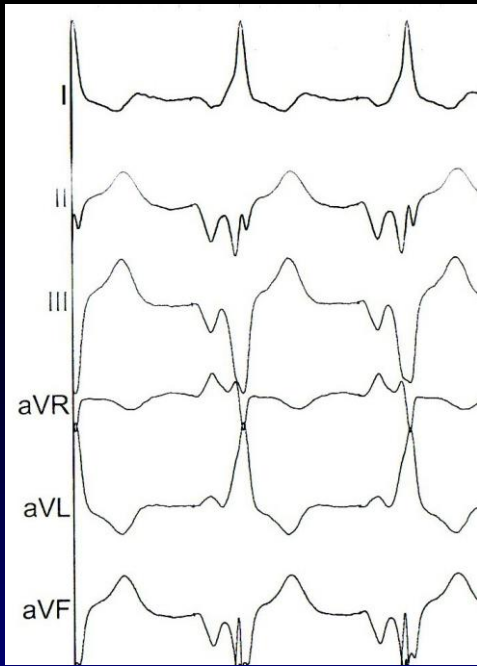
- Auto
- +
- INF
- SUP
- RL
- LL
- RAO
- LAO
- PA
- AP







High-density mapping for WPW



5 LA CS P...

2 LV A Pacing

4 CS CS ABL

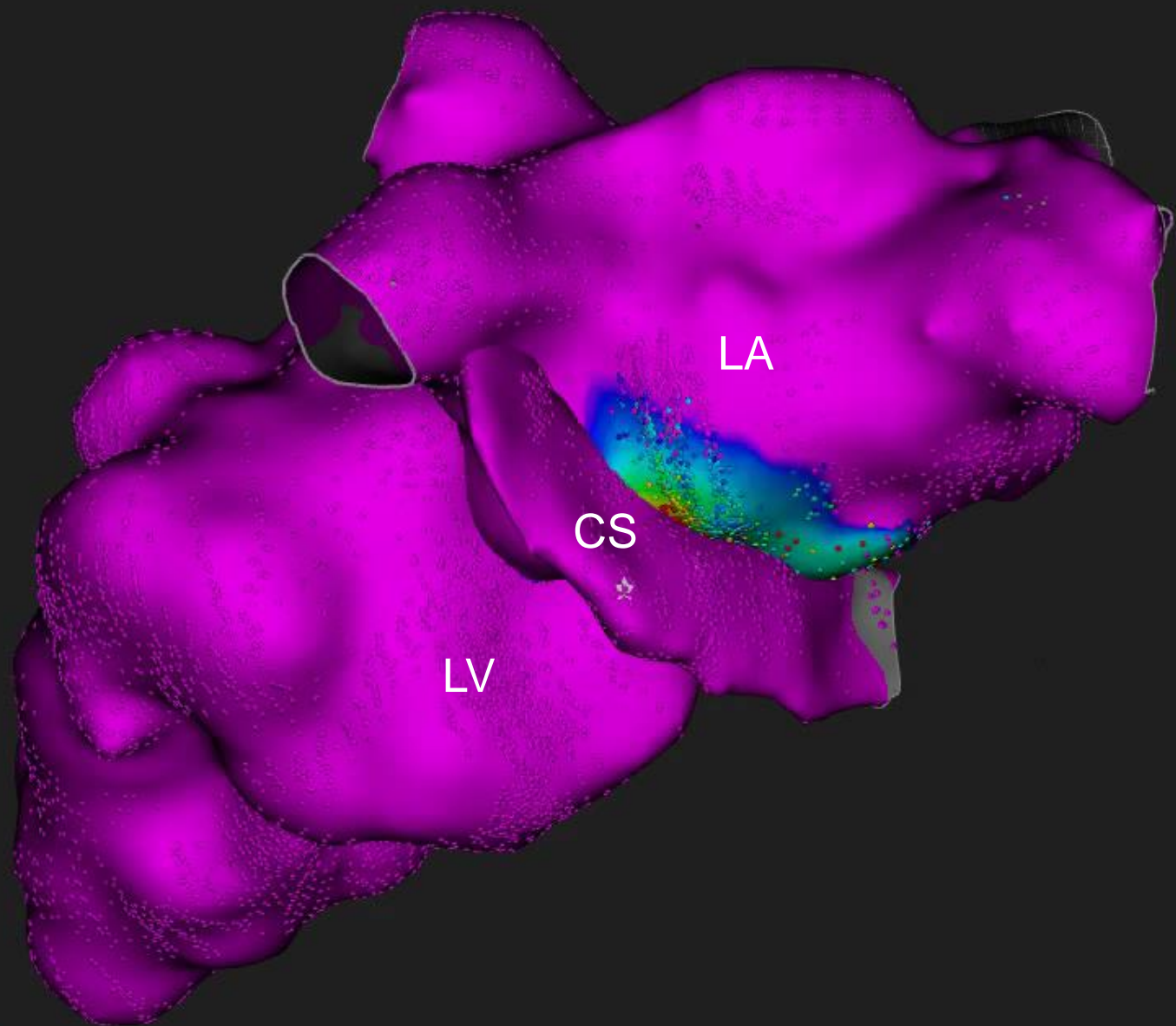
-181 ms

-175 ms



102 ms

B.Time ▾



LA

CS

LV



Auto



INF

SUP

RL

LL

RAO

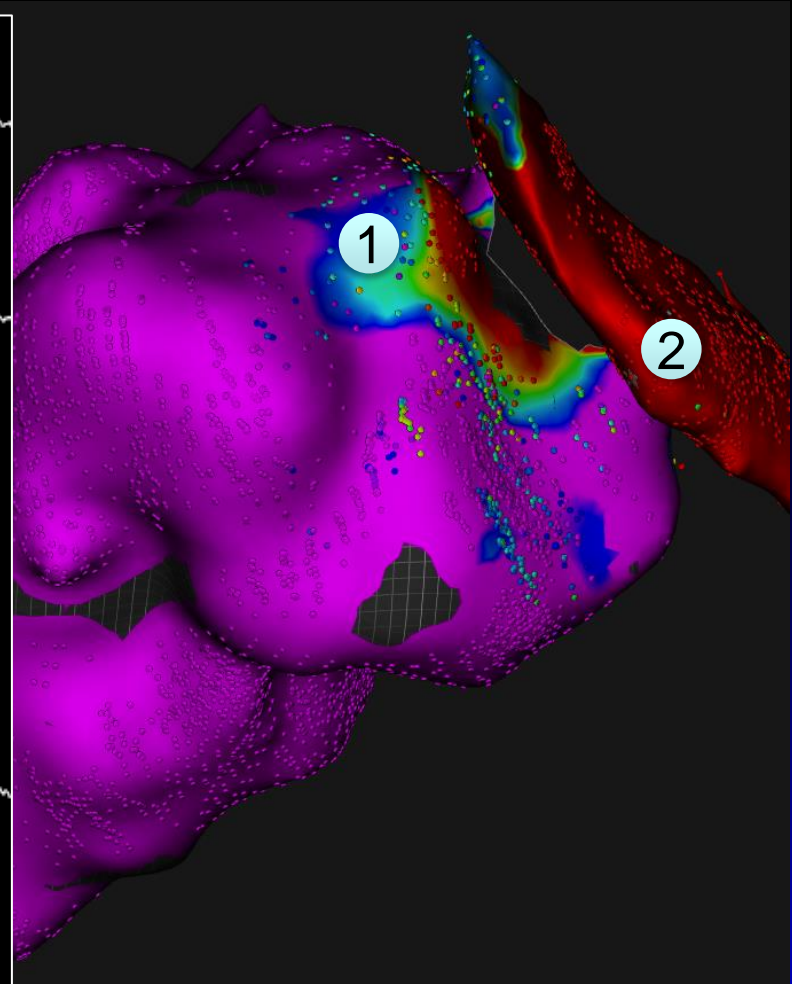
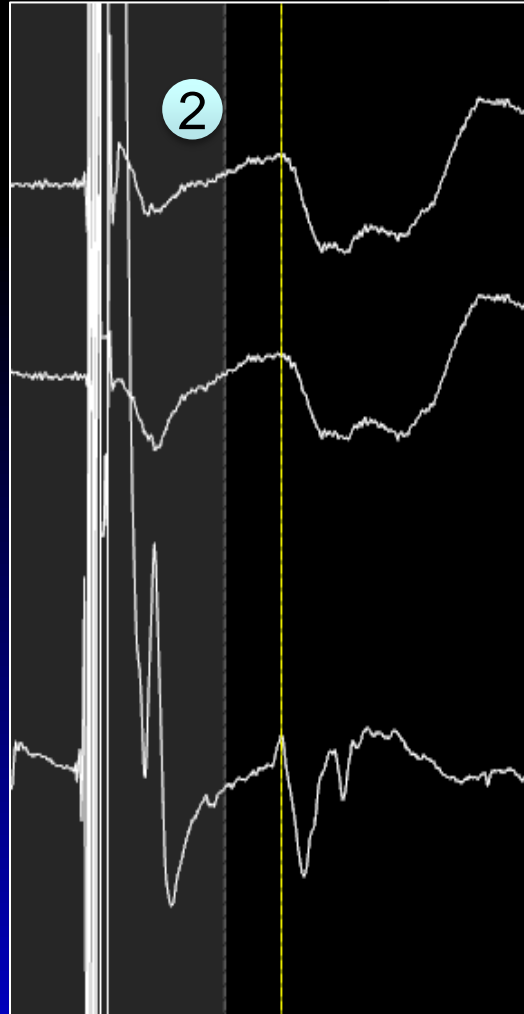
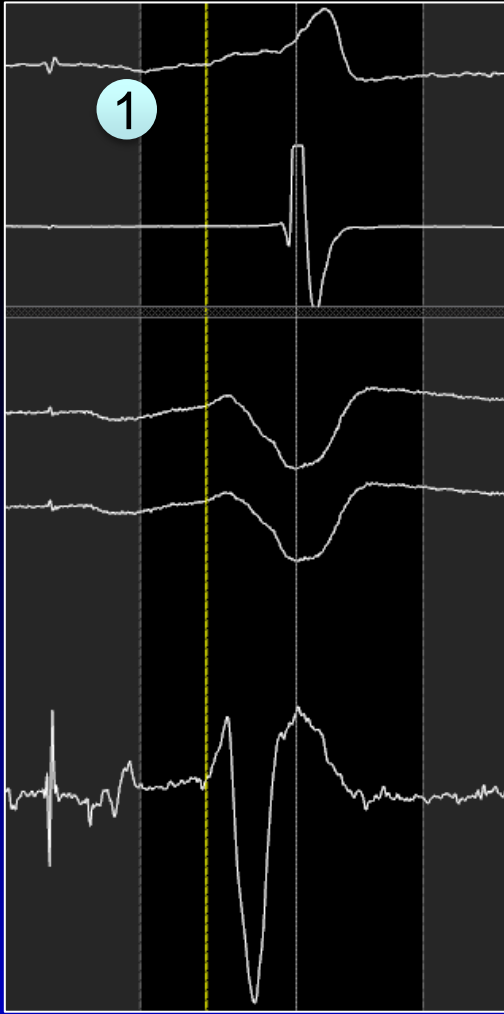
LAO

PA

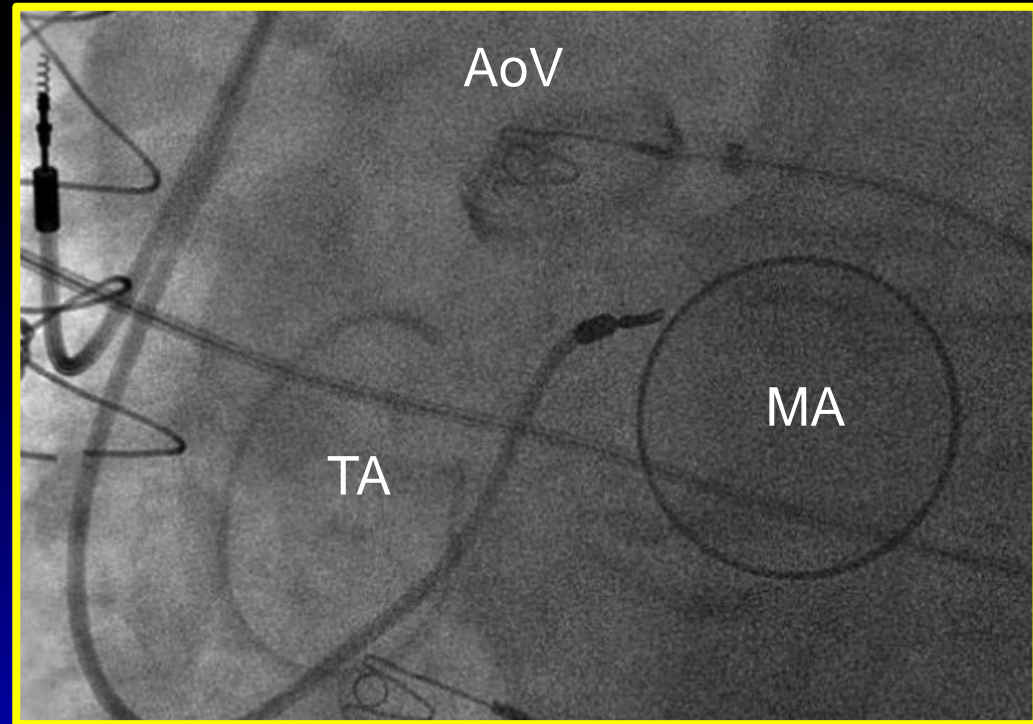
AP



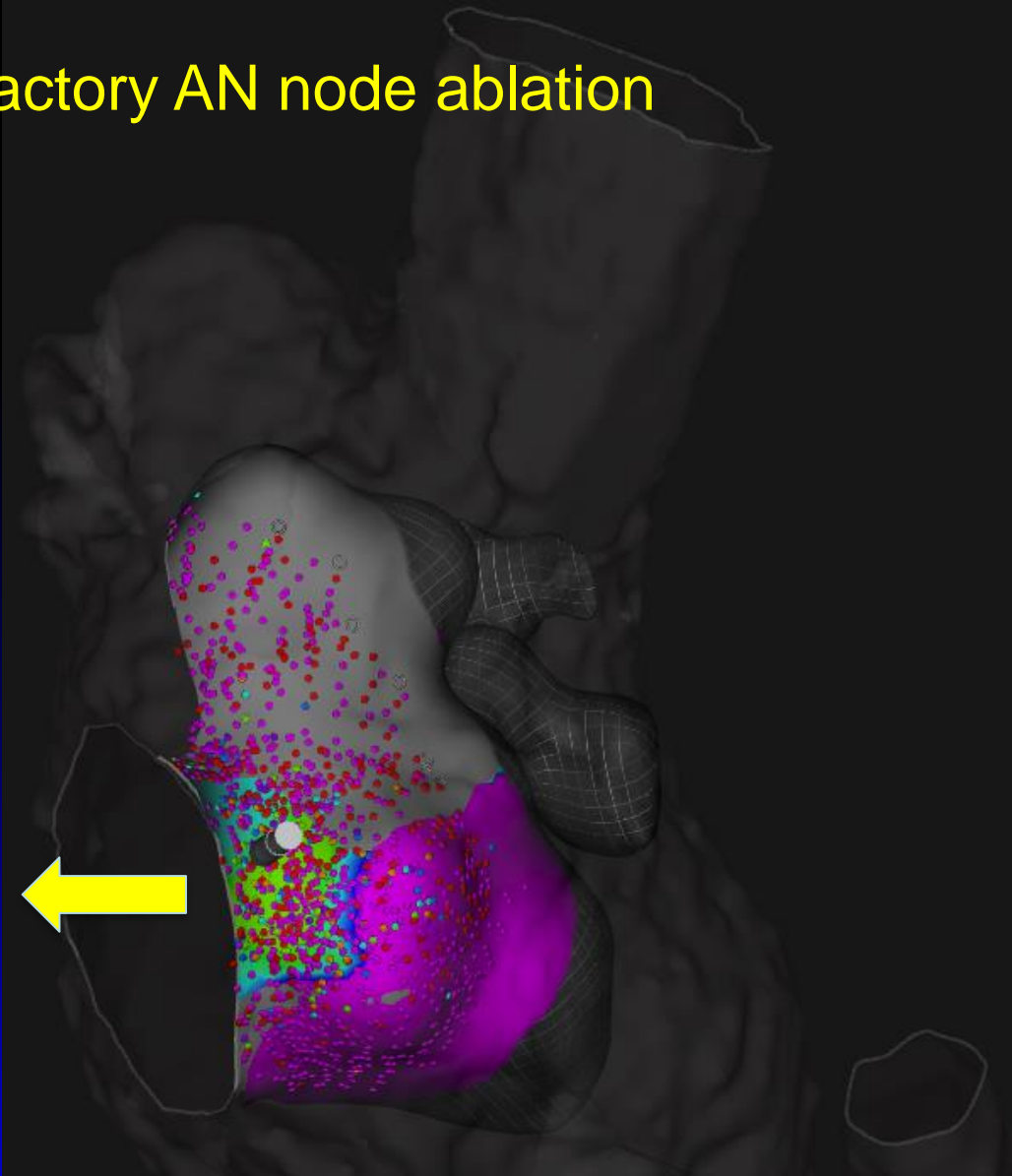
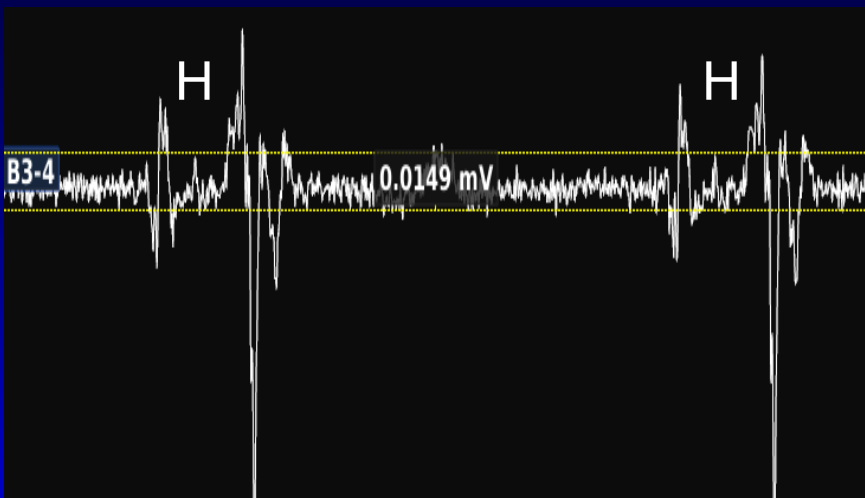
High-density mapping for WPW



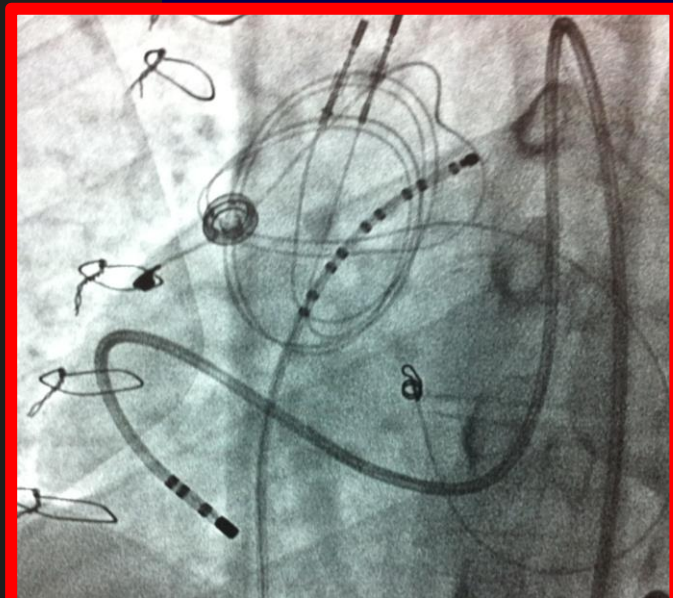
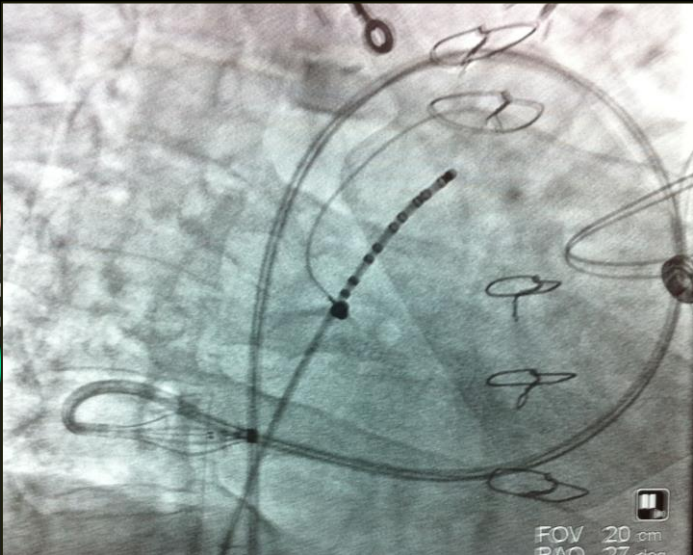
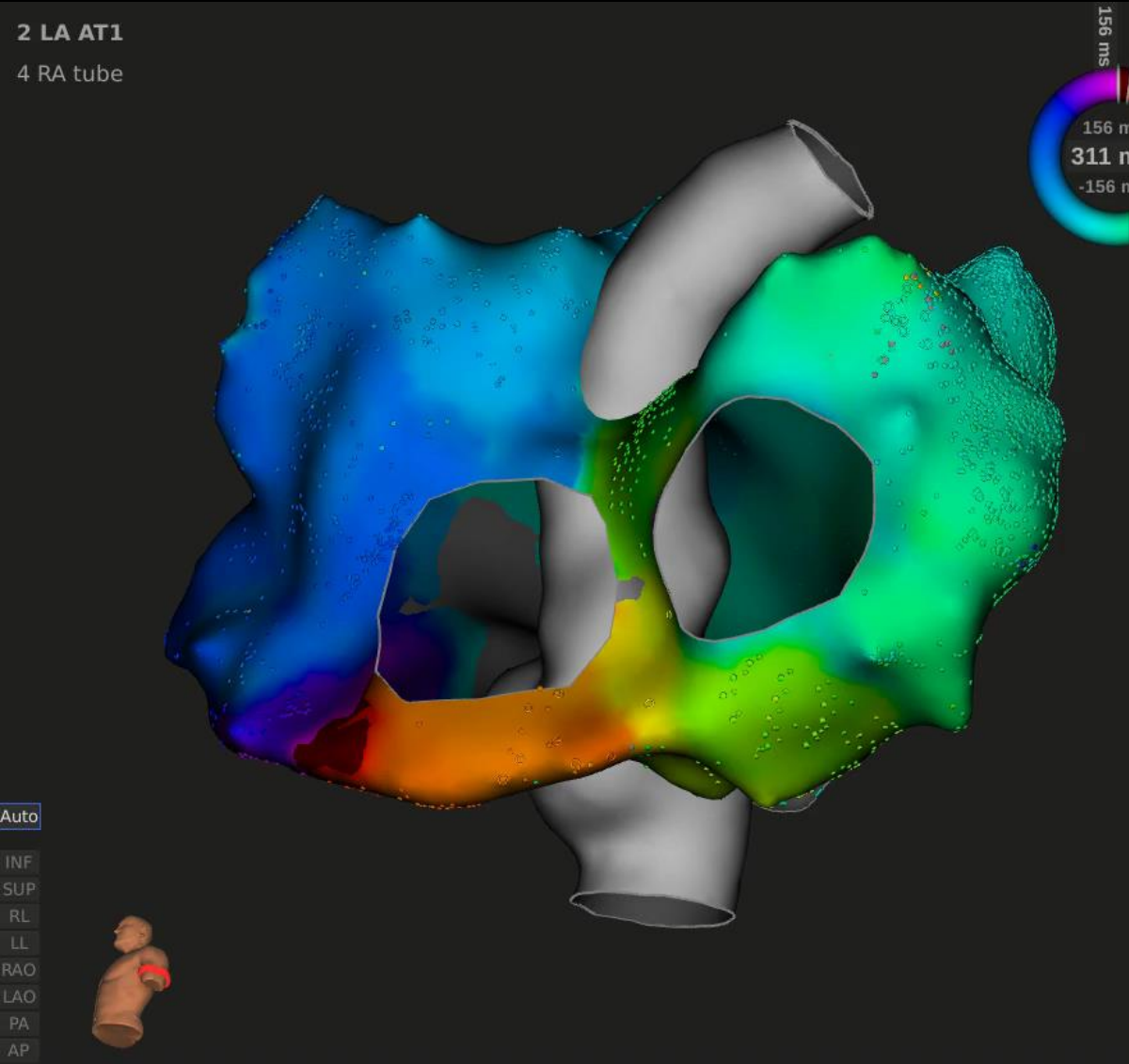
High density mapping for refractory AN node ablation



High density mapping for refractory AN node ablation



Use of Orion in distorted anatomy ?

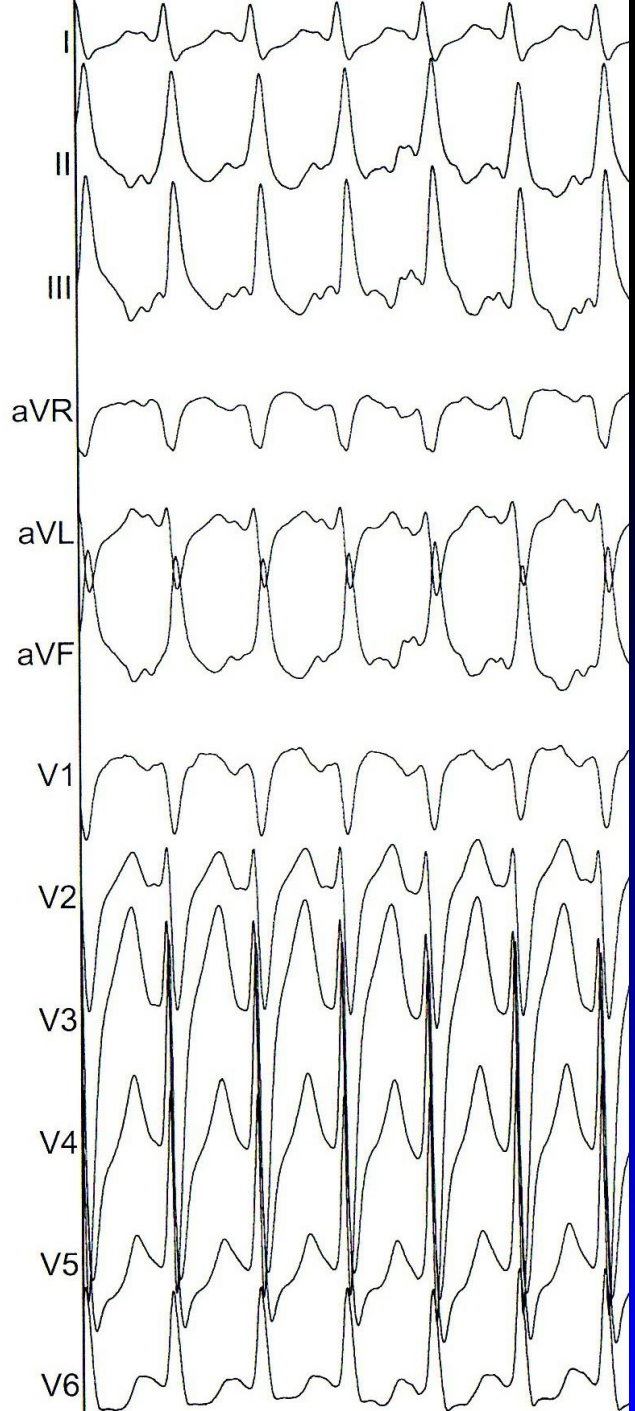
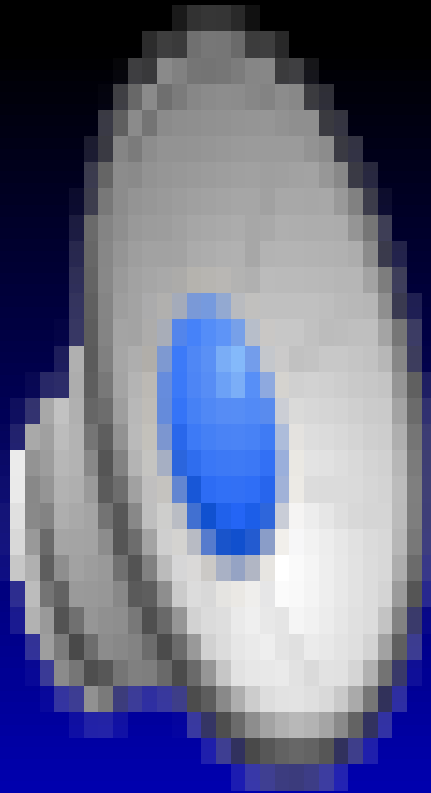


High-density biatrial activation mapping during typical atrial flutter after bicavopulmonary bypass

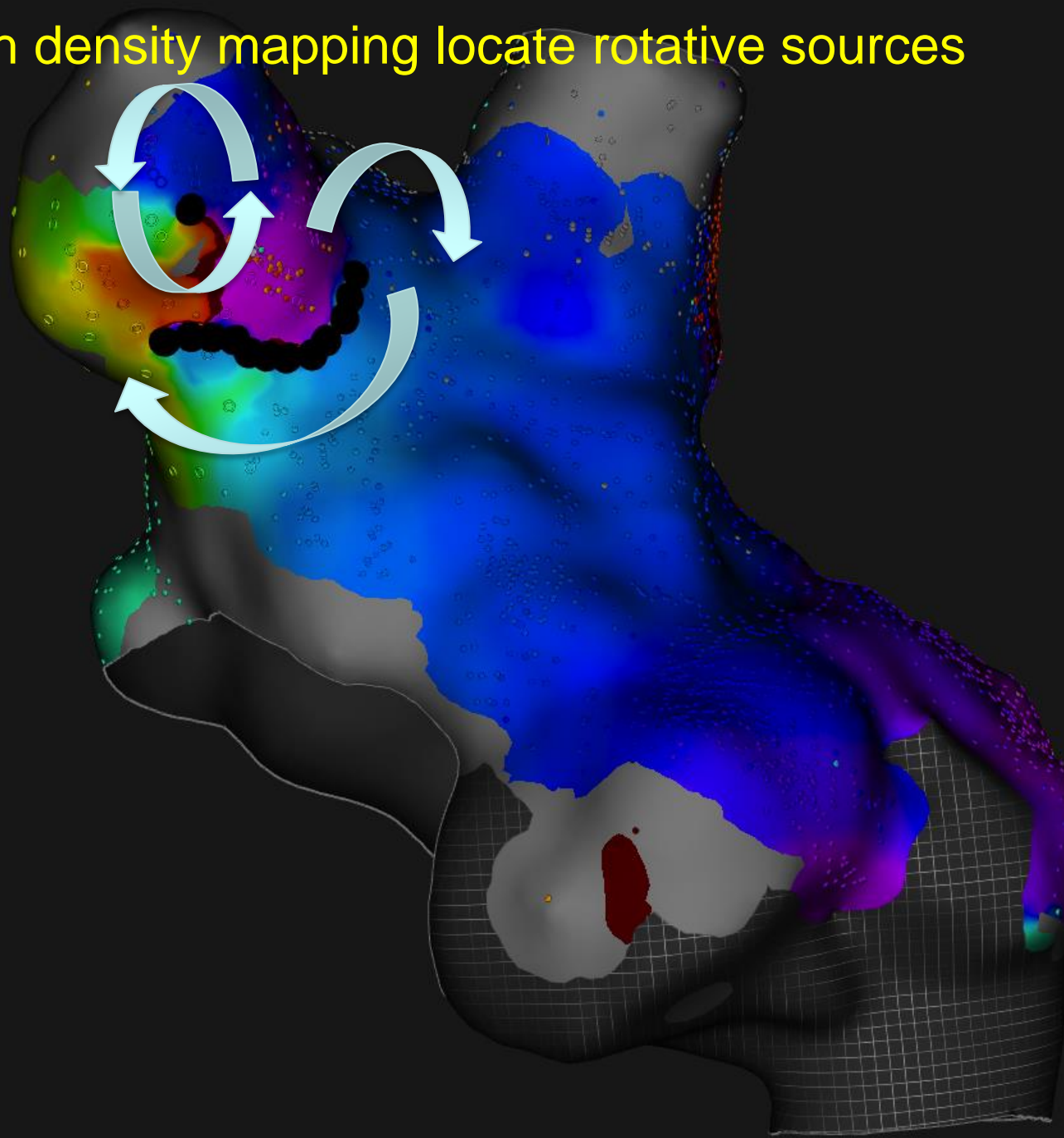
Philippe Maury^{1*}, Stefano Capellino², and Sebastien Hascoet¹

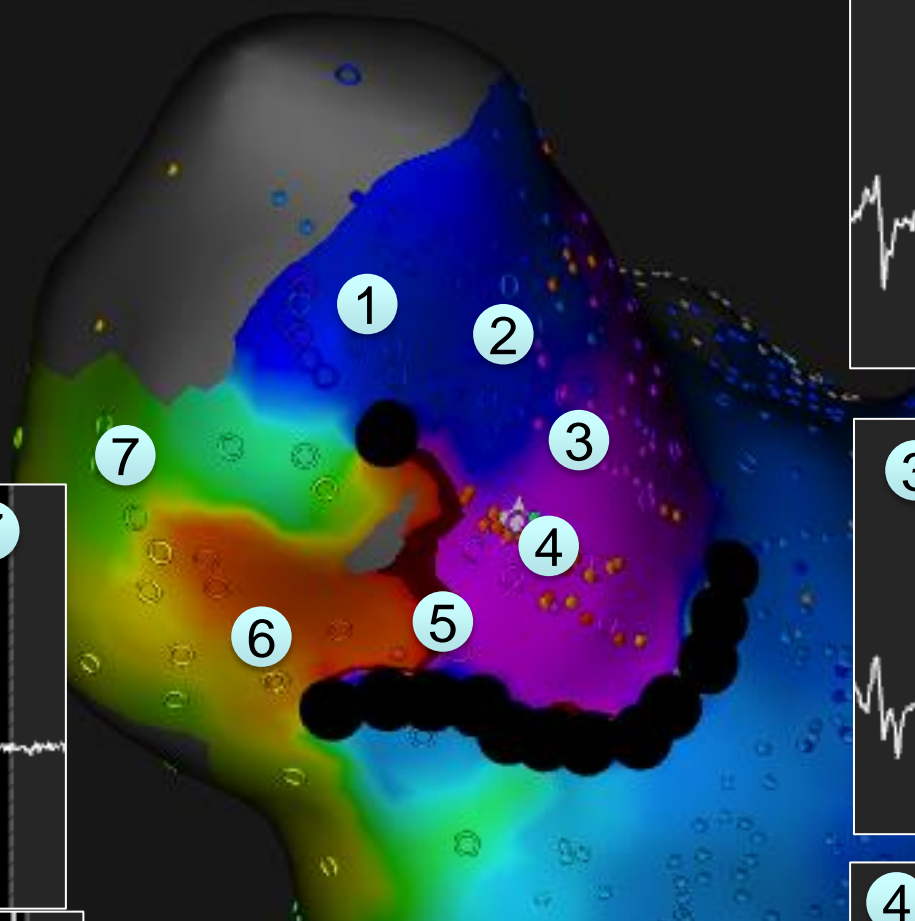
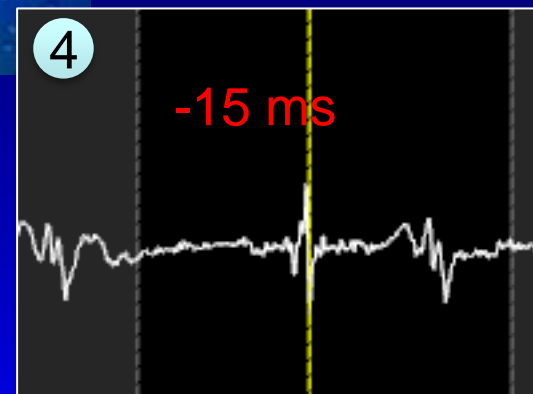
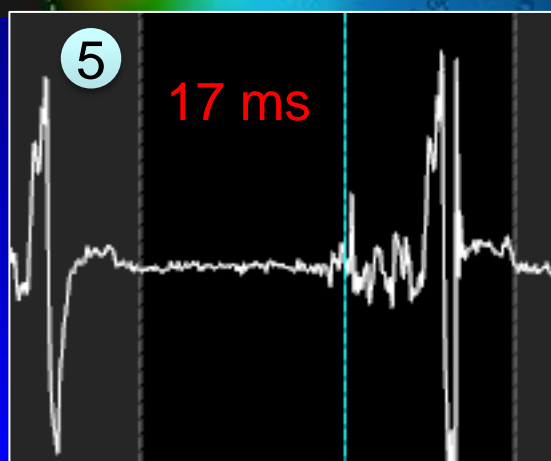
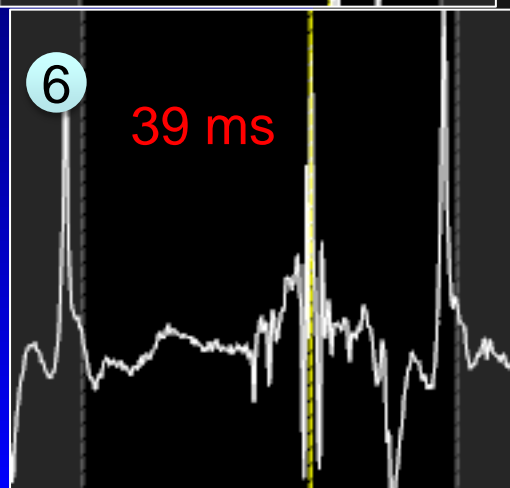
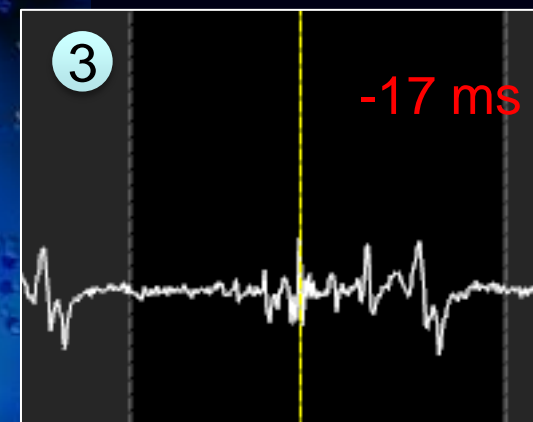
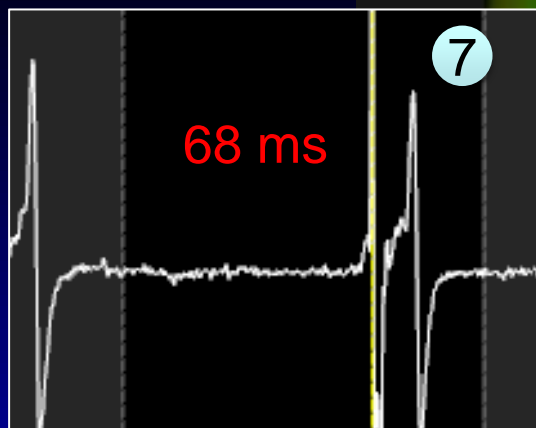
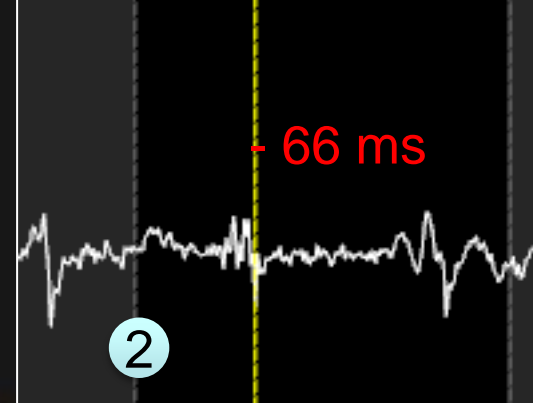
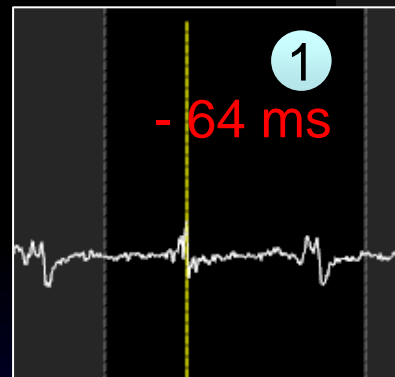
doi:10.1093/europace/euw050

When high density mapping locate rotative



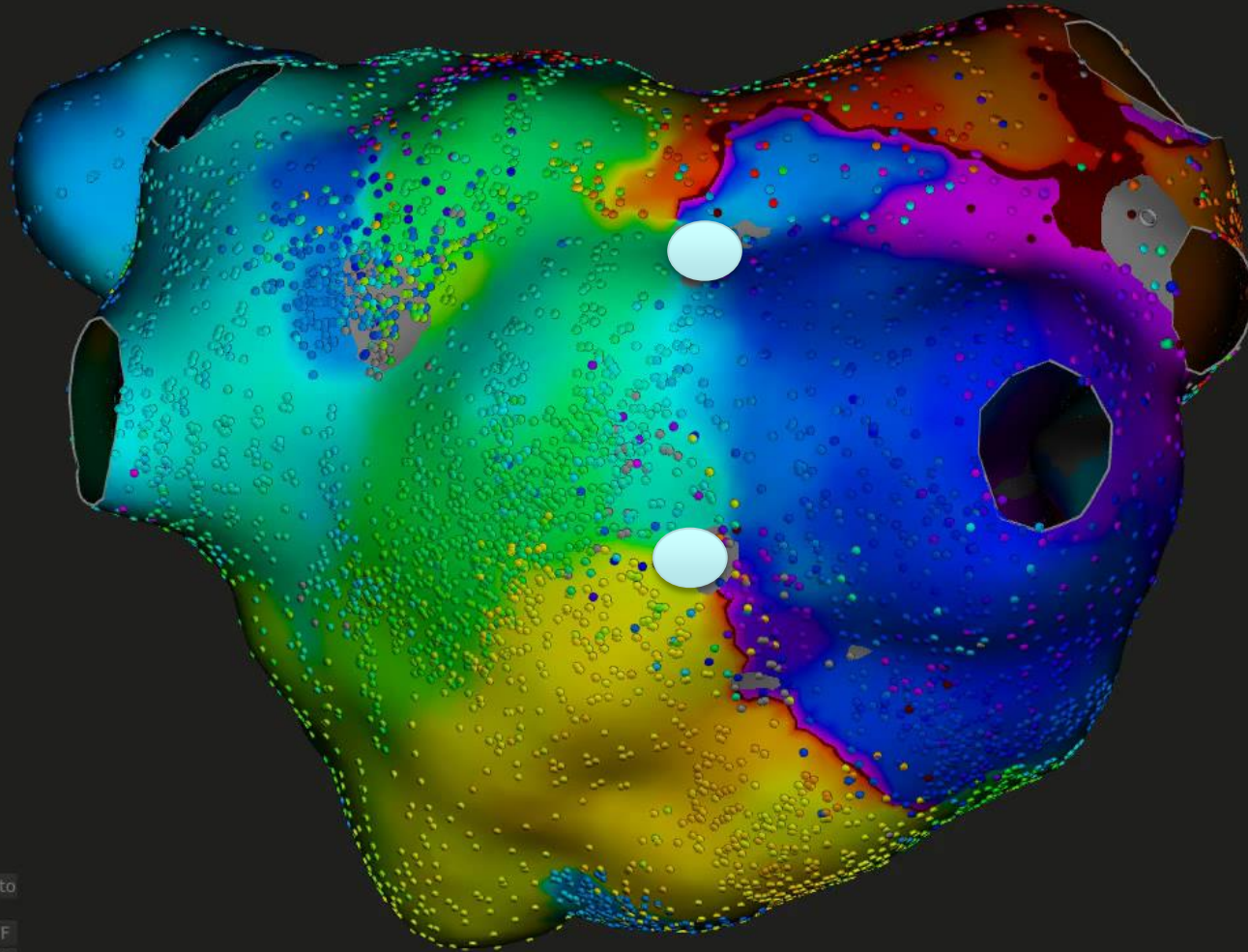
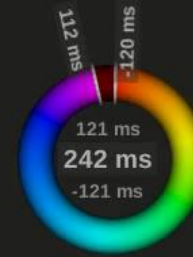
When high density mapping locate rotative sources





When h

5 LA AT



Auto

INF

SUP

RL

LL

RAO

LAO

PA

AP

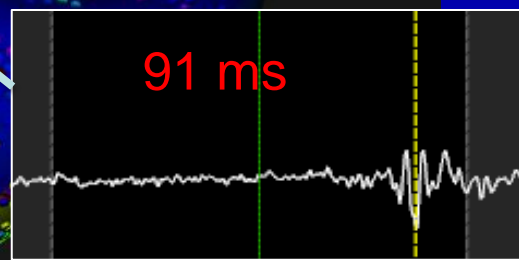
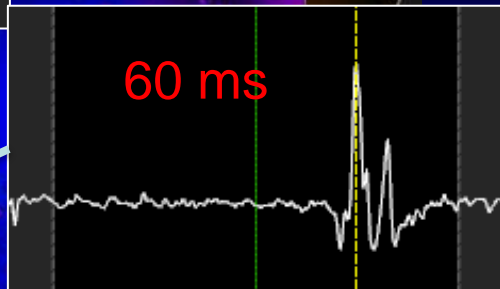
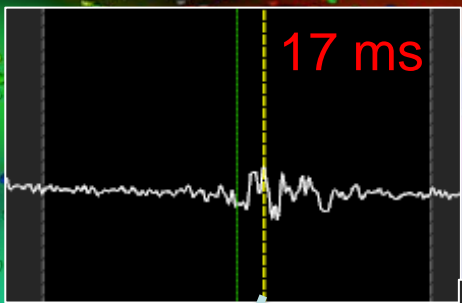
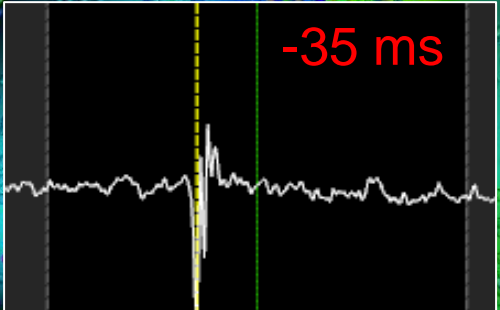
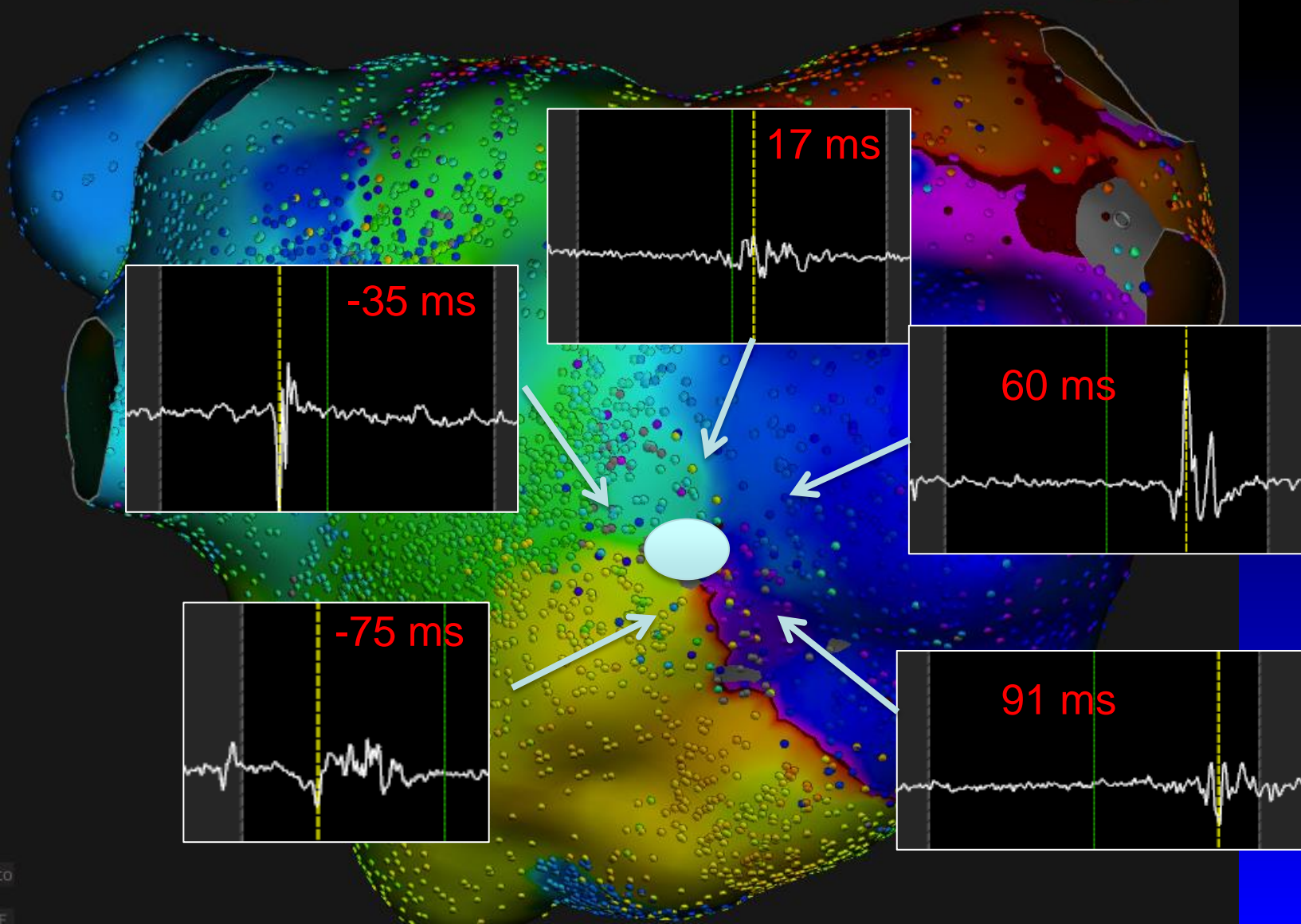
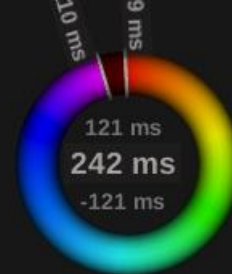


Time: 14:04

Beats: 1669

Volume: 151.03 cc

EGMs: 8760



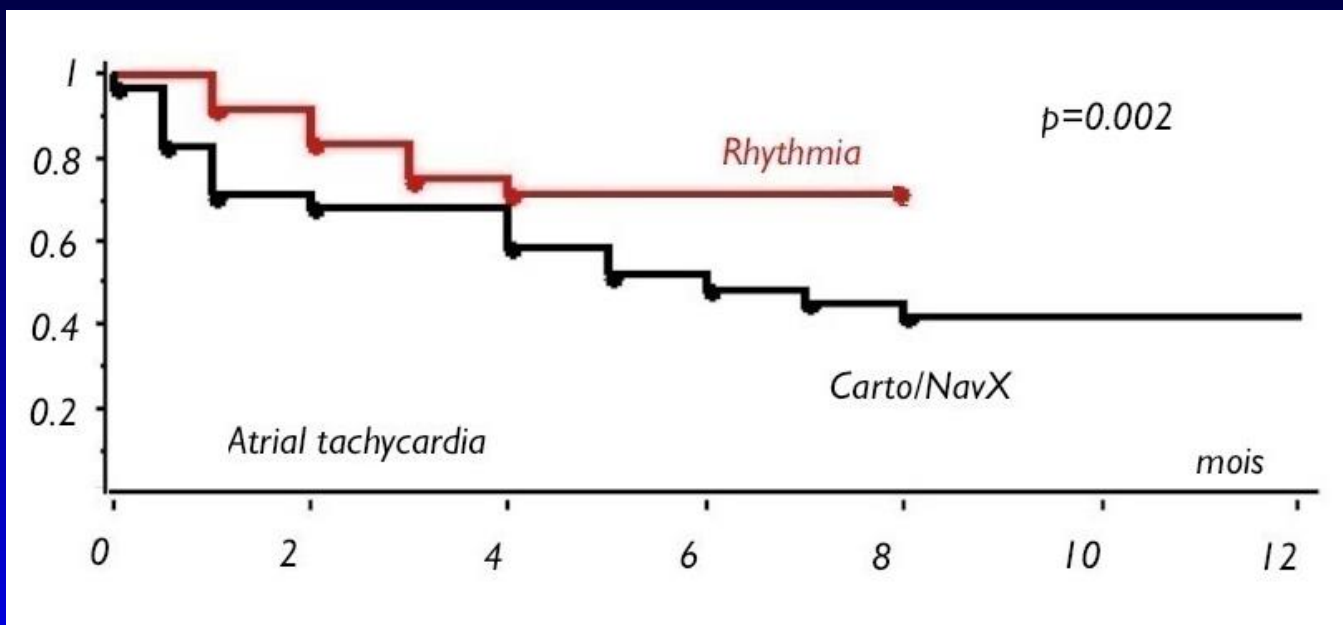
Comparison with other mapping systems

| | TOTAL n = 76 | RHYTHMIA n = 38 | CARTO/NavX n = 38 | p = |
|------------------------|-------------------------|----------------------------|------------------------------|------------|
| Age | 63 ±13 | 63 ±13 | 64 ±13 | ns |
| Males | 51 (67%) | 27 (71%) | 24 (63%) | ns |
| LA area | 27 ±8 | 26 ±9 | 28 ±7 | ns |
| LVEF | 46 ±15 | 51 ±13 | 40 ±16 | 0.001 |
| Heart failure | 45 (59%) | 18 (47%) | 27 (71%) | 0,03 |
| Cardiopathy | 71 (93%) | 34 (89%) | 37 (97%) | ns |
| Parox AFib | 7 (9%) | 4 (10%) | 3 (8%) | ns |
| Persist AFib | 51 (67%) | 24 (63%) | 27 (71%) | ns |
| Typical A Flutter | 24 (32%) | 13 (34%) | 11 (29%) | ns |
| Previous Afib ablation | 39 (51%) | 23 (60%) | 16 (42%) | ns |

(same when only high density mapping are included)

Results

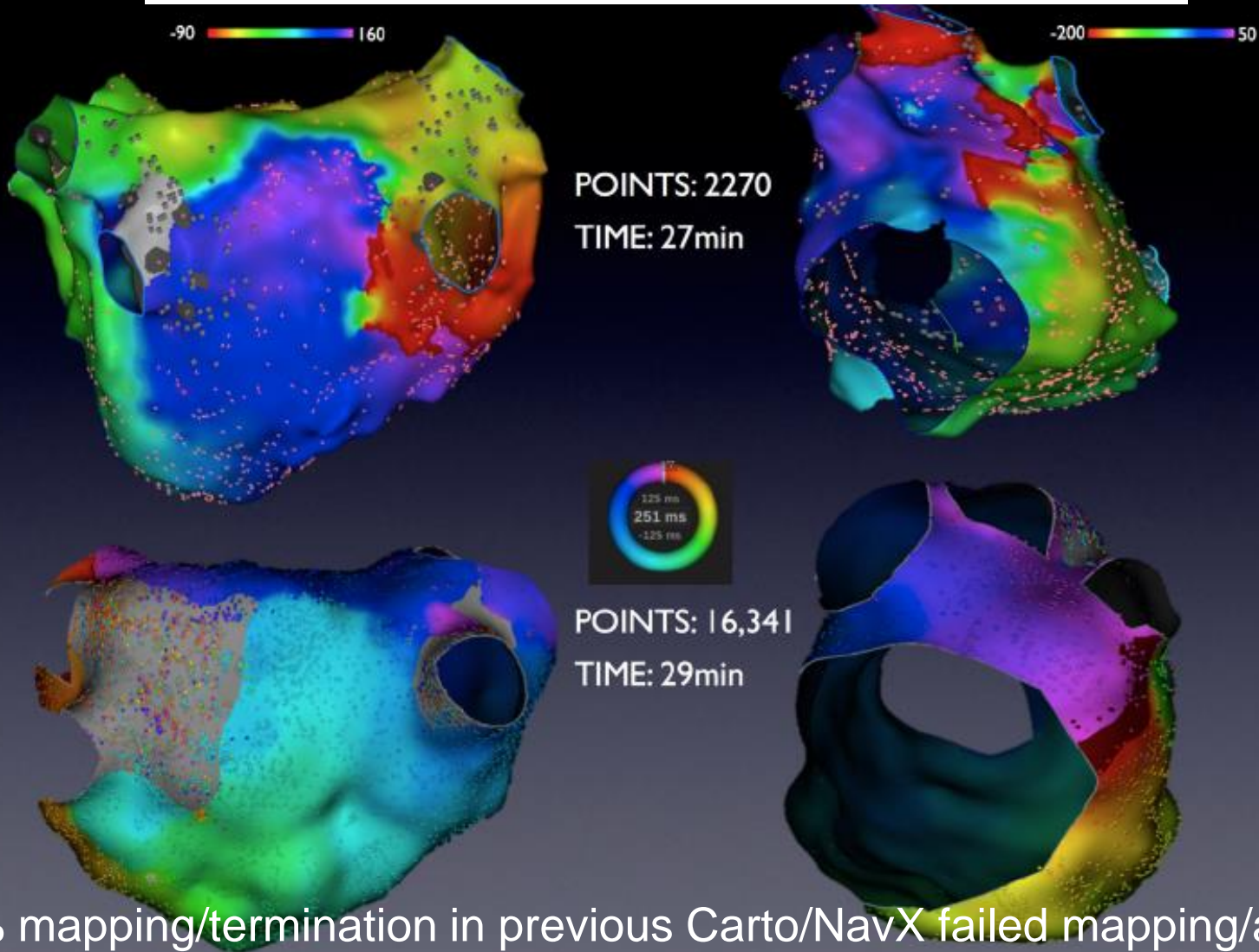
| | TOTAL n = 76 | RHYTHMIA n = 38 | CARTO/Na vX n = 38 | p= |
|-------------------------------|-------------------------|----------------------------|-----------------------------------|-----------|
| procédure duration(min) | 202 ±57 | 222 ±62 | 182 ±45 | 0,001 |
| fluoroscopy duration (min) | 33 ±14 | 36 ±15 | 29 ±11 | 0,02 |
| RF (sec) | 1354 ±1029 | 1477 ±864 | 1248 ±1155 | ns |
| Number of maps | 4,3 ±2,4 | 5,3 ±2,7 | 3,4 ±1,6 | 0,0004 |
| Map acquisition duration | 8±4 | 7±3 | 10±5 | ns |
| Points/map | 4566±3765 | 6601±2898 | 497±252 | <0,0001 |



(same when only high density mapping are included)

Evaluation of a novel high-resolution mapping technology for ablation of recurrent scar-related atrial tachycardias ^①

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92% mapping/termination in previous Carto/NavX failed mapping/ablation

Conclusions

The Rhythmia system allows to map and investigate complex atrial tachycardia in greater details than other mapping systems

Incompletely recognized mechanisms are more easy to investigate

New tool for new detailed investigations

Whether this implies better outcome deserves further study