“Great Innovations in Cardiology and Advances in Cardiac Arrhythmias” XXIX edition

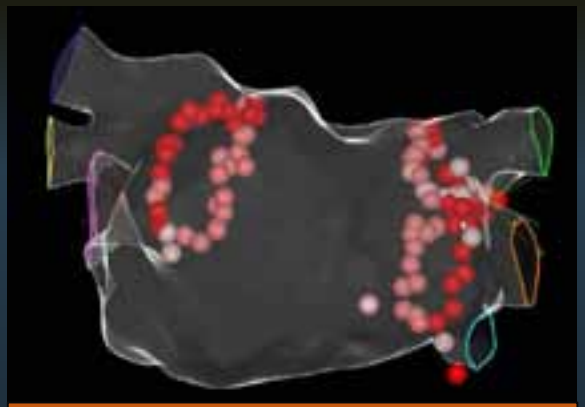
High definition mapping and signal clarity: new more effective tools in the hands of electrophysiologists?

Dr. Federico Ferraris

Cardiology Department - University of Turin, Italy

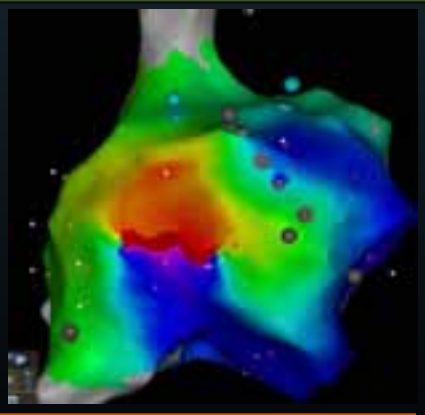
Ablazioni con target anatomico

Flutter Comune

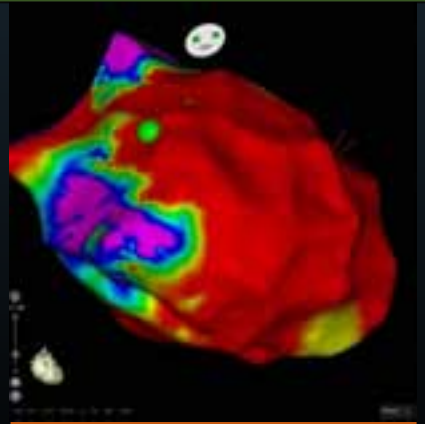


Fibrillazione Atriale

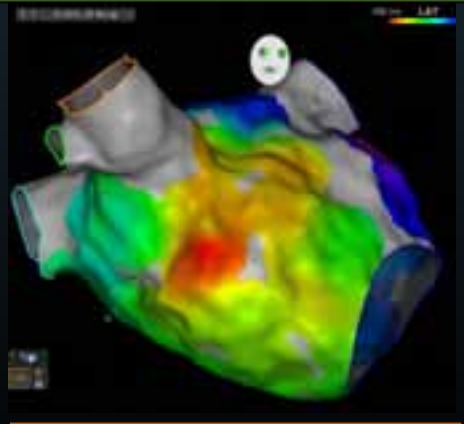
Ablazioni con target elettrofisiologico



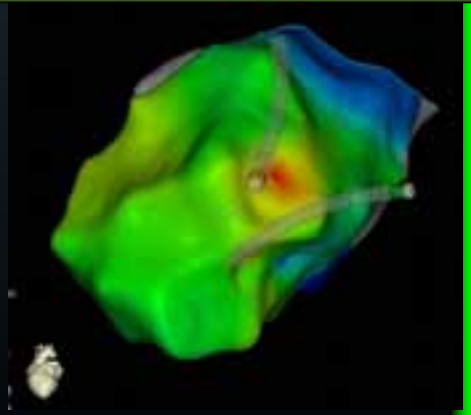
Flutter Atipico



Tachicardia ventricolare



Forme Focali Atriali

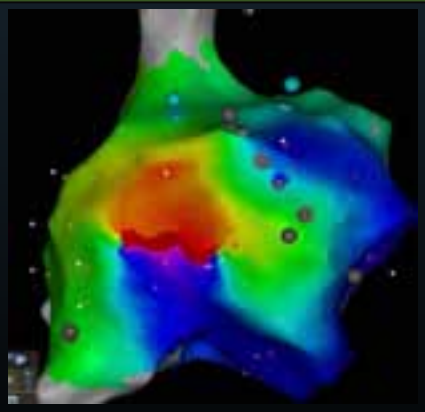


Forme Focali Ventricolari

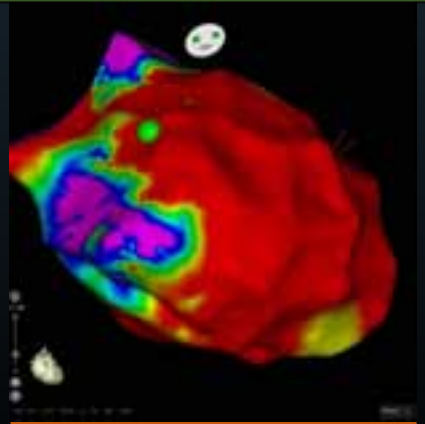
Ablazioni con target anatomico

Dettaglio e qualità della mappa

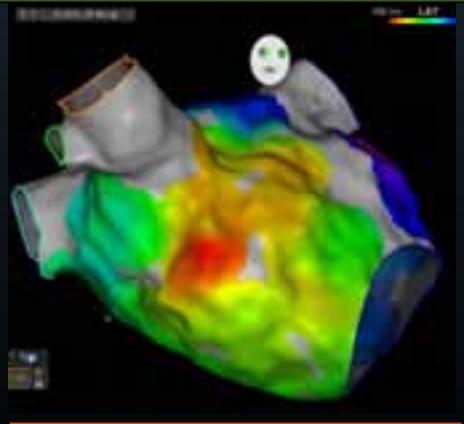
Ablazioni con target elettrofisiologico



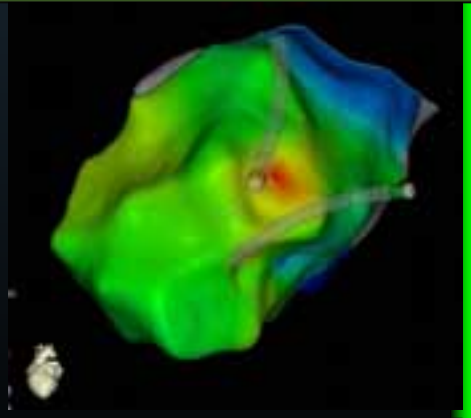
Flutter Atipico



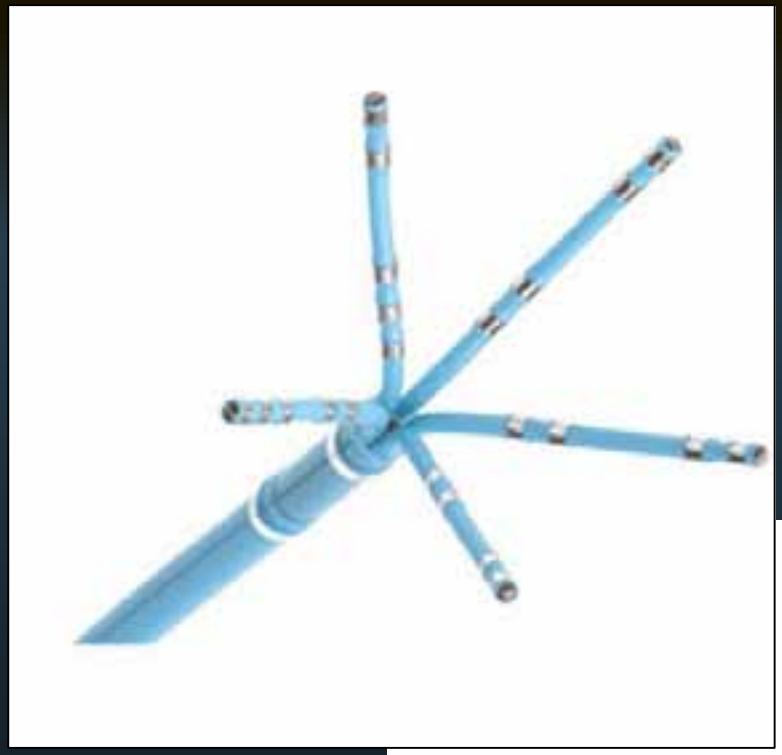
Tachicardia ventricolare



Forme Focali Atriali

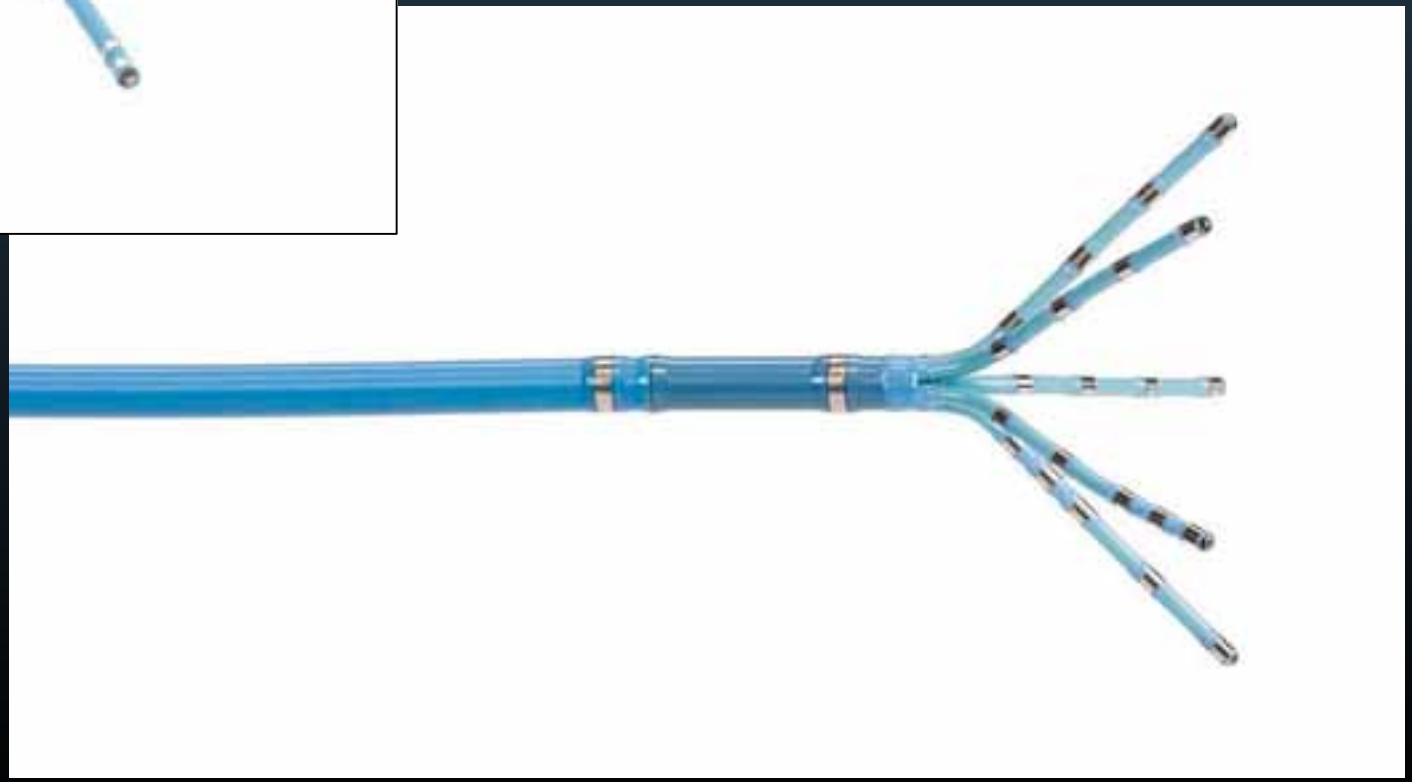


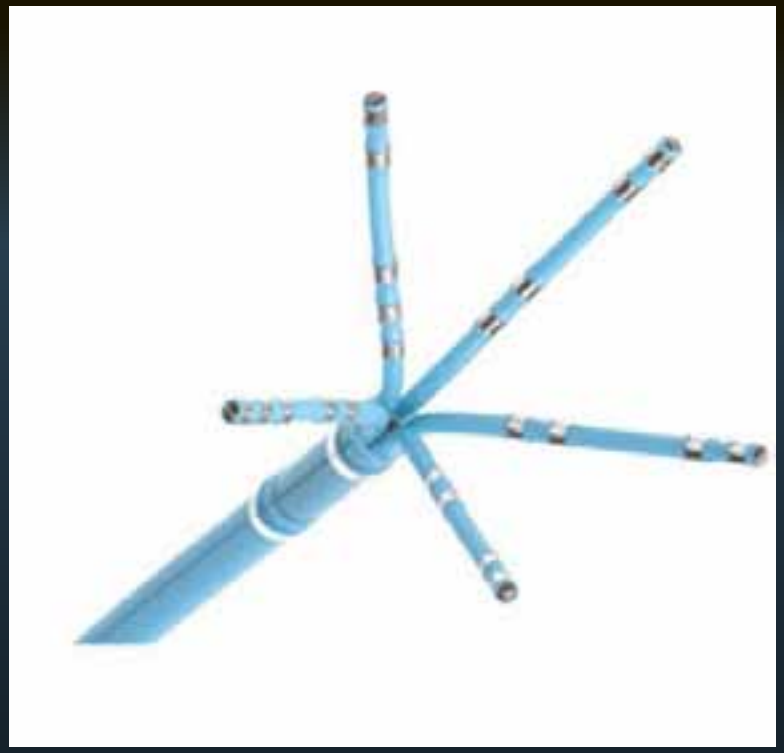
Forme Focali Ventricolari



PENTARAY® NAV eco
CATHETER

Biosense Webster
PART OF THE Johnson & Johnson FAMILY OF COMPANIES





5 bracci 3 F
ognuno 4 elettrodi:
20 elettrodi in totale

Elettrodi 1 mm

Catetere
Ablatore

Elettrodi 3,5 mm

Spaziatura 2 mm

5 bracci 3 F
ognuno 4 elettrodi:
20 elettrodi in totale

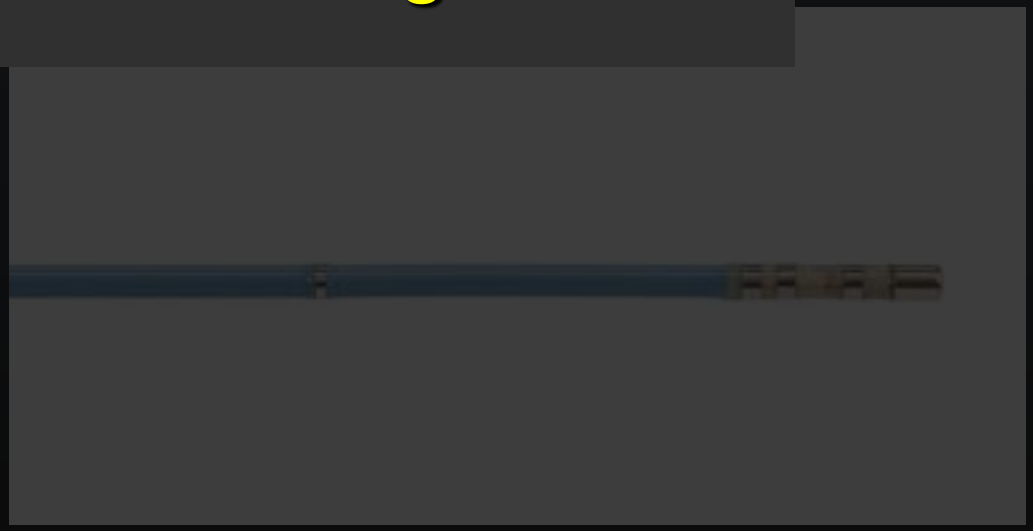
Elettrodi 1 mm

Maggiore sensibilità bassi voltaggi
Maggior risoluzione spaziale
Maggior numero di segnali

Catetere
Ablatore

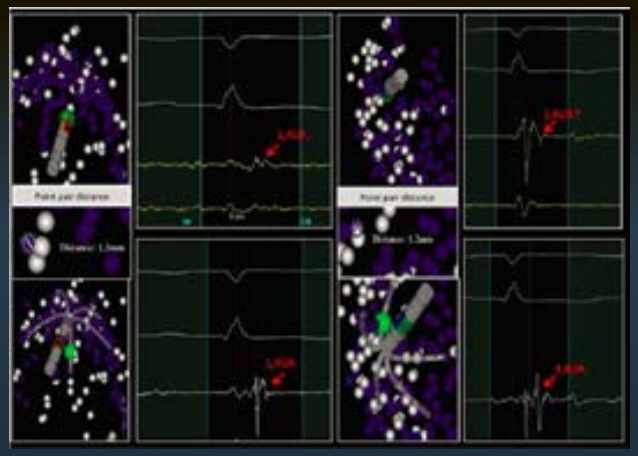
Elettrodi 3,5 mm

Spaziatura 2 mm

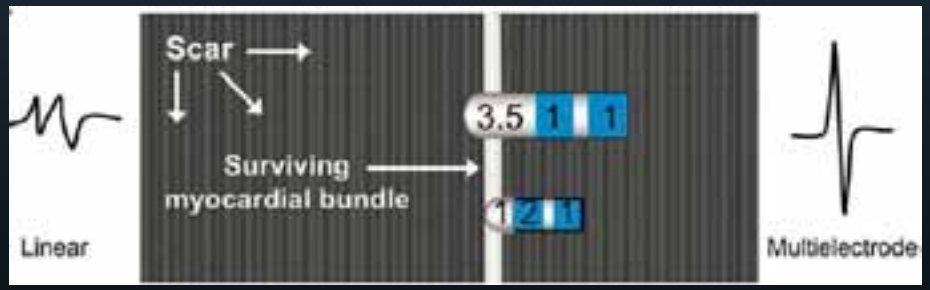


Lavori di confronto con catetere ablatore:

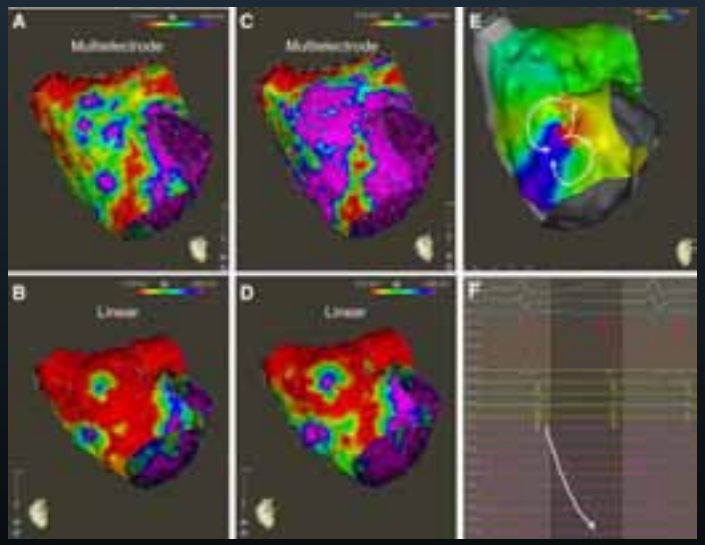
Maggiore sensibilità bassi voltaggi
Maggior risoluzione spaziale
Maggior numero di segnali



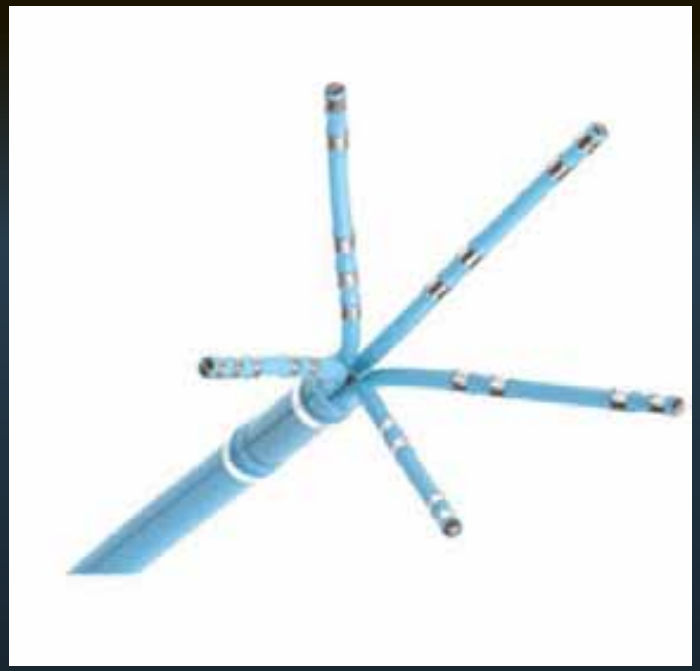
Jais et al. - Cardiovasc Electrophysiol, Vol. 26, pp. 1213-1223, November 2015



Anter et al. - Circulation: Arrhythmia and Electrophysiology, 9.6 (2016)



Josephson et al. -Circulation: Arrhythmia and Electrophysiology, 2015

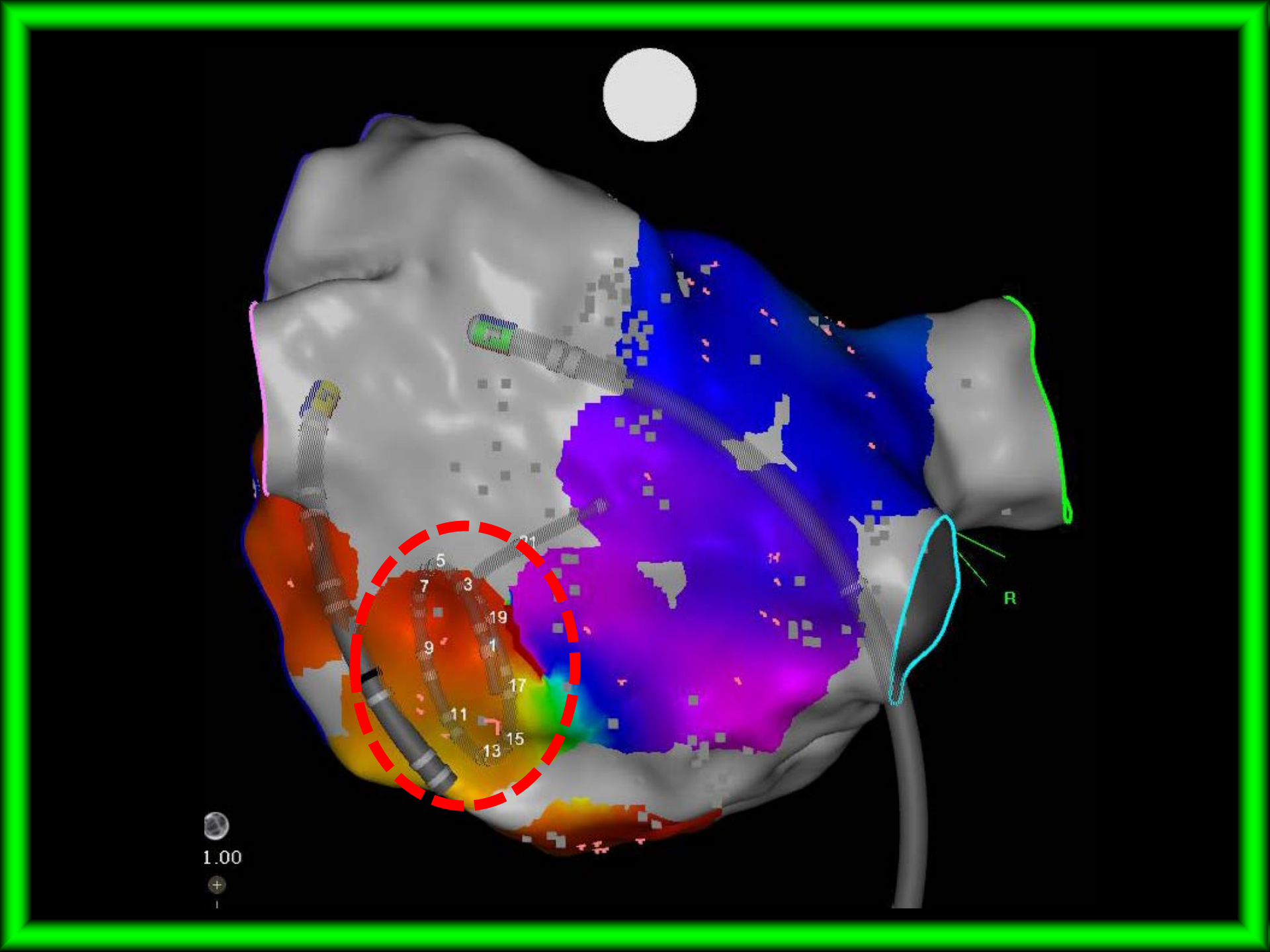


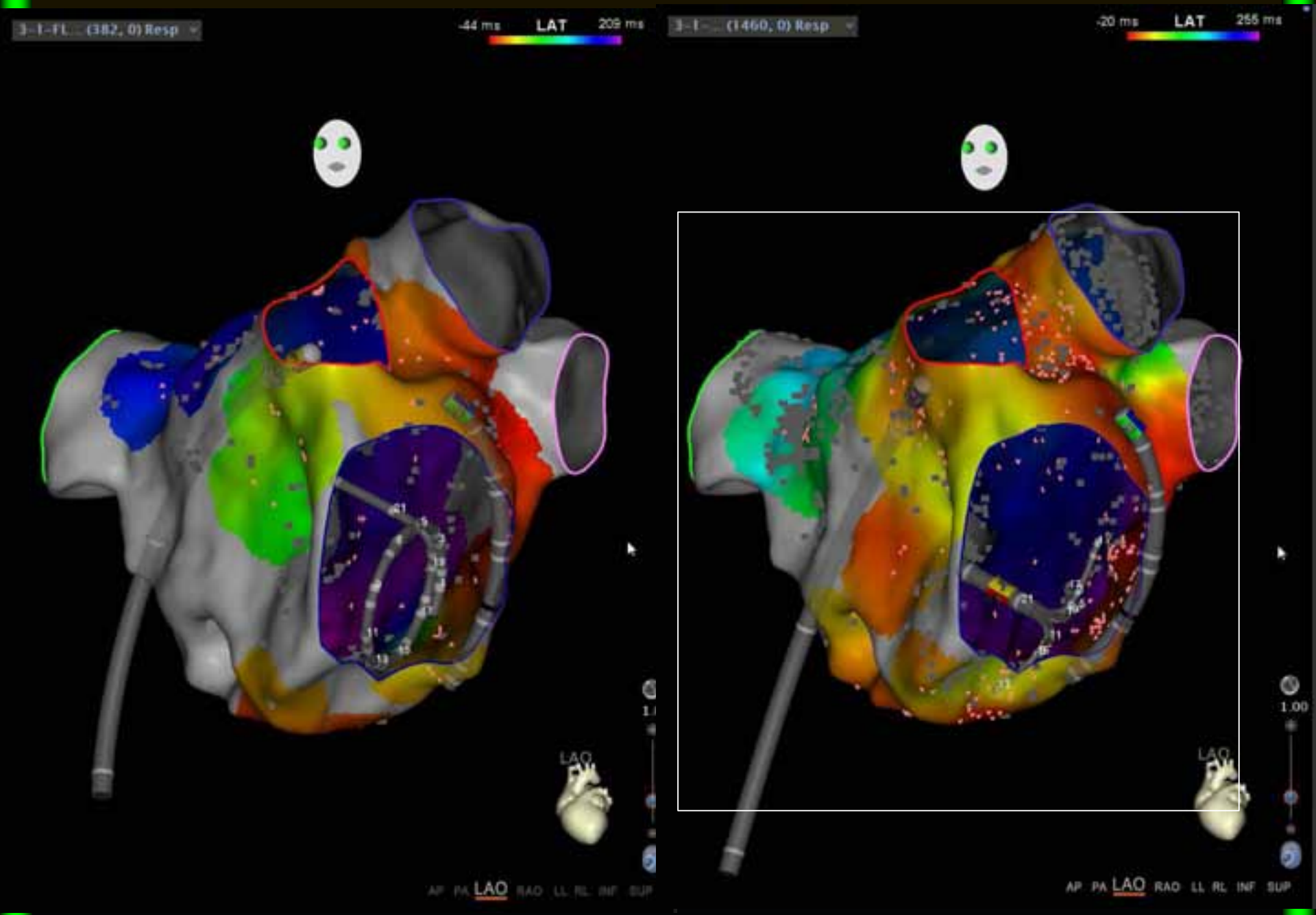
5 bracci
ognuno 4 elettrodi:
20 elettrodi in totale

- Elettrodi 1 mm
- Spaziatura 2 mm
- Calibro splines 3 F
- Curva D e F

20 elettrodi in totale

- Elettrodi 1 mm
- Spaziatura 2 mm
- Calibro loop 4 F
- Curva D


5
7
3
19
9
1
17
11
15
13
R
1.00


-44 ms
LAT
209 ms
-20 ms
LAT
255 ms
LAO
AP PA LAO RAO LL RL INF SUP
1.00

Pentaray
2013
(2005)

Limiti

Molti segnali da elaborare
(e annotare)

In certe sedi (ventricoli) il contatto innesca extrasistoli

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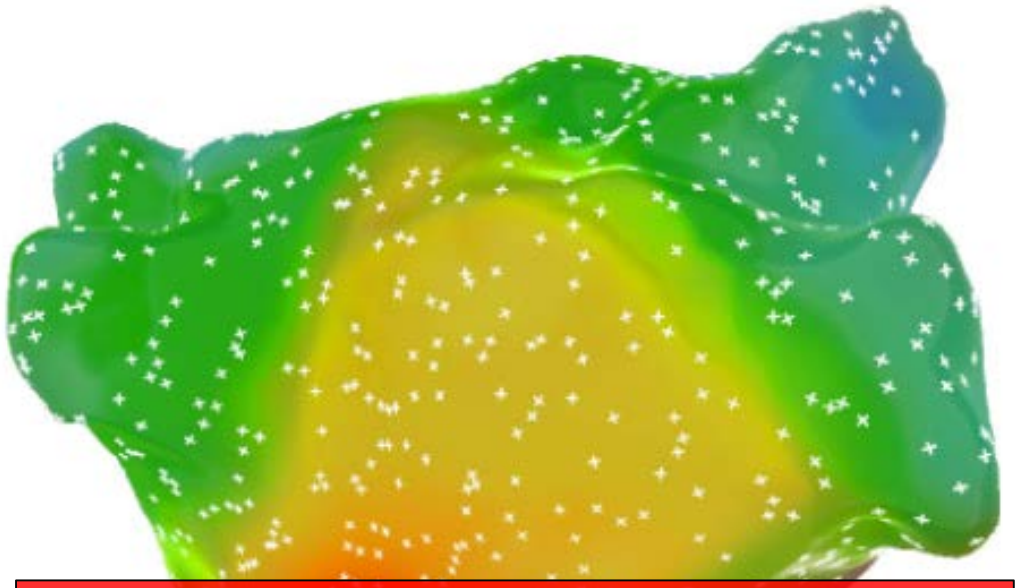
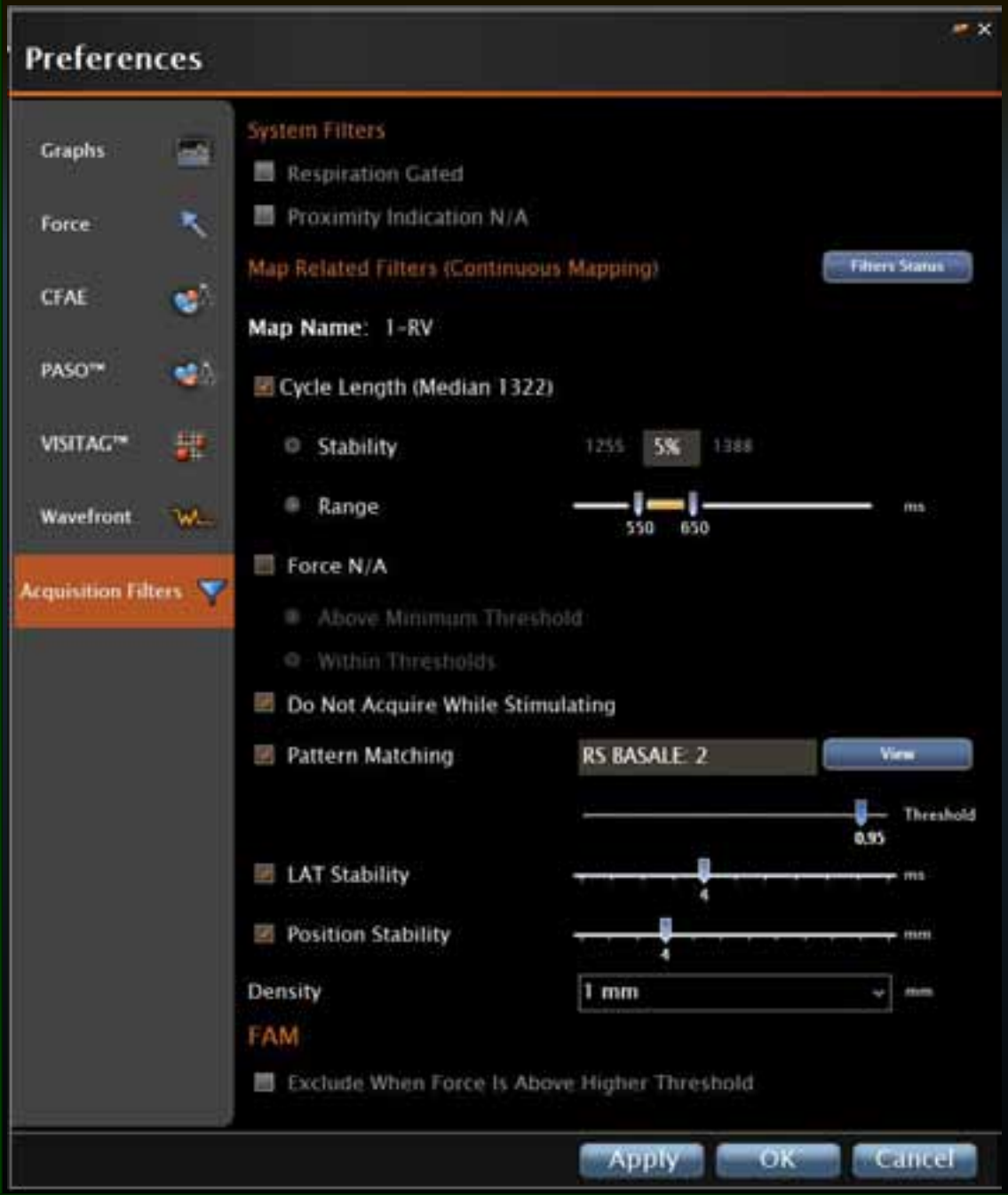
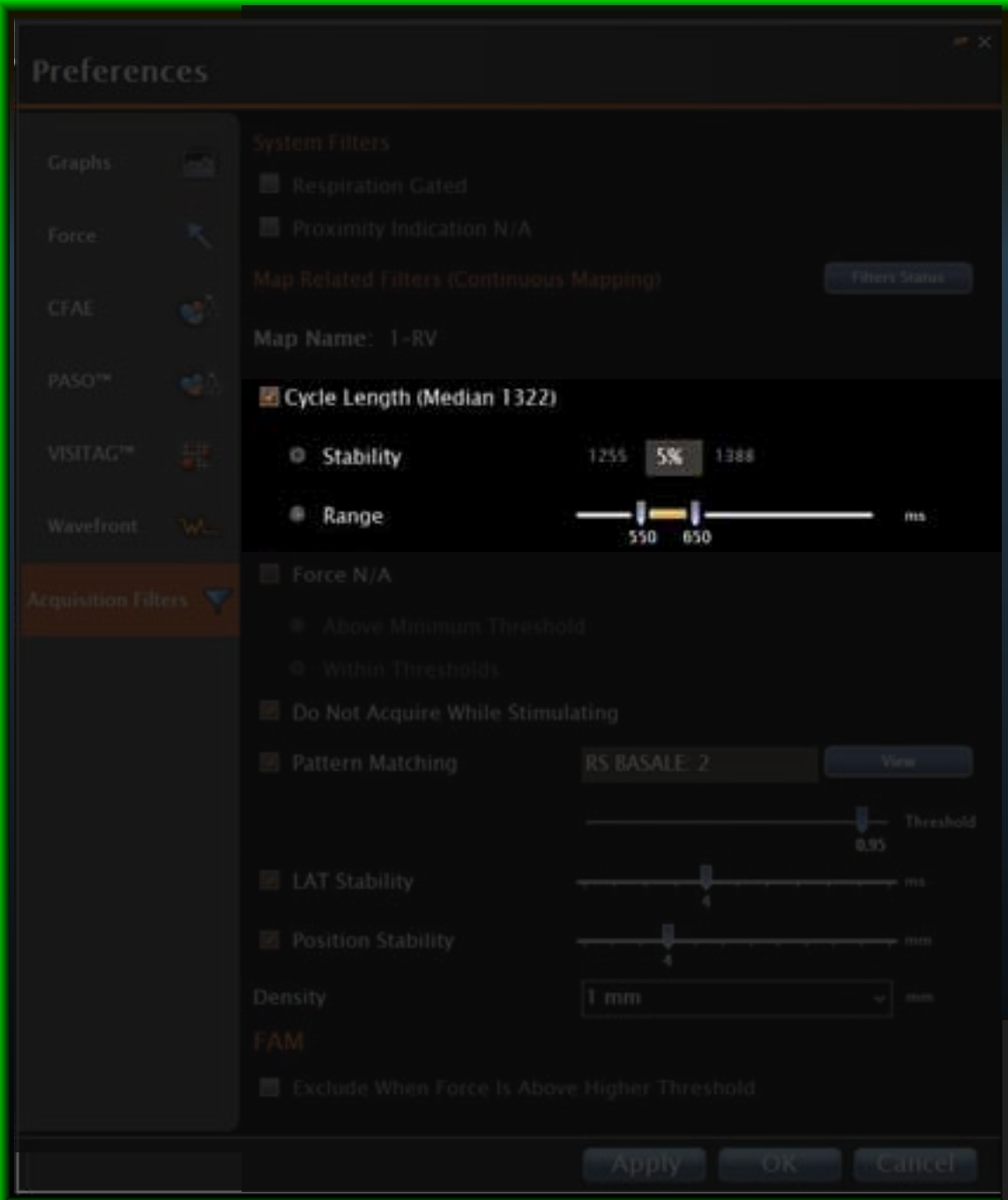
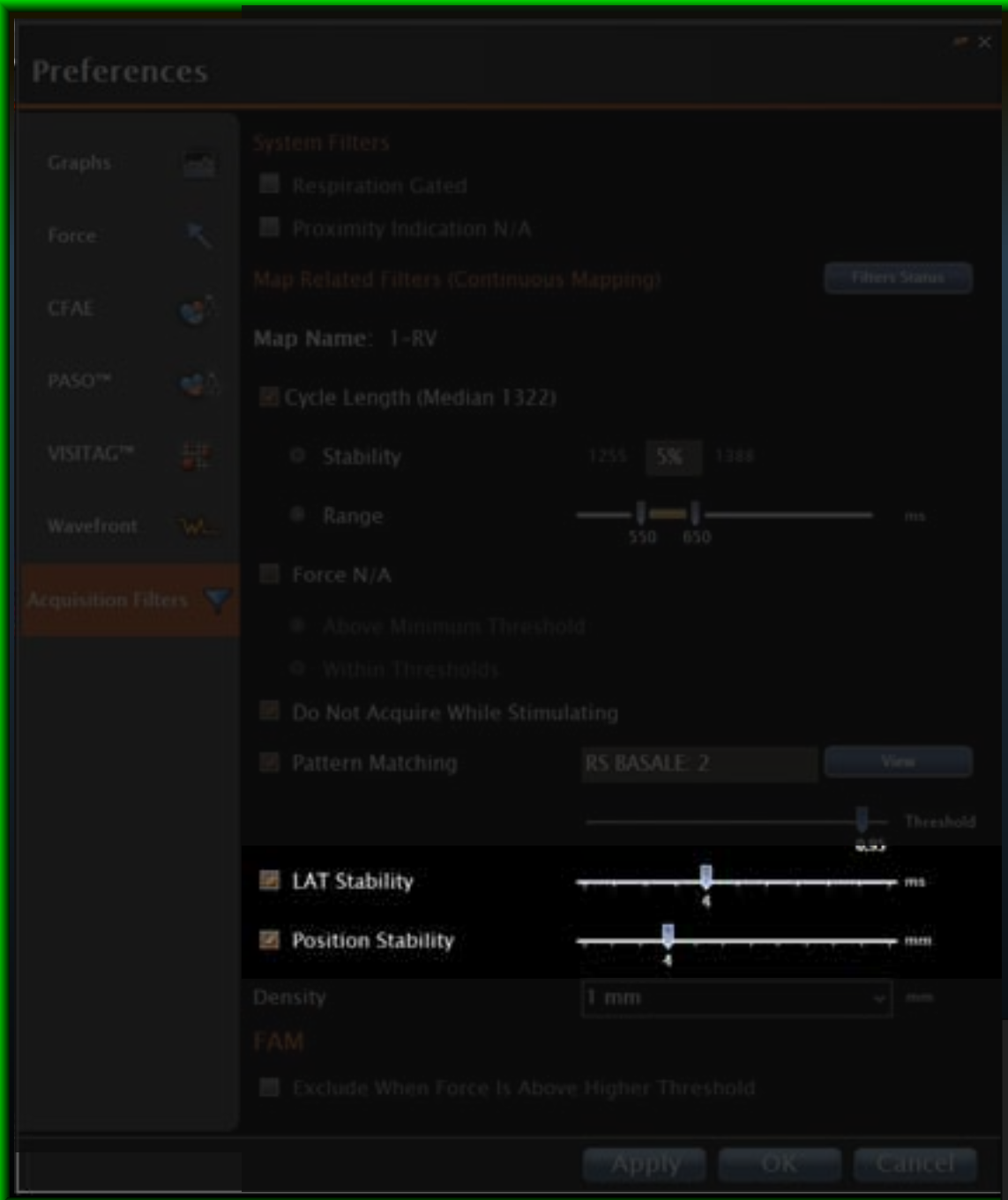


Mappa con acquisizione e annotazione automatica dei punti

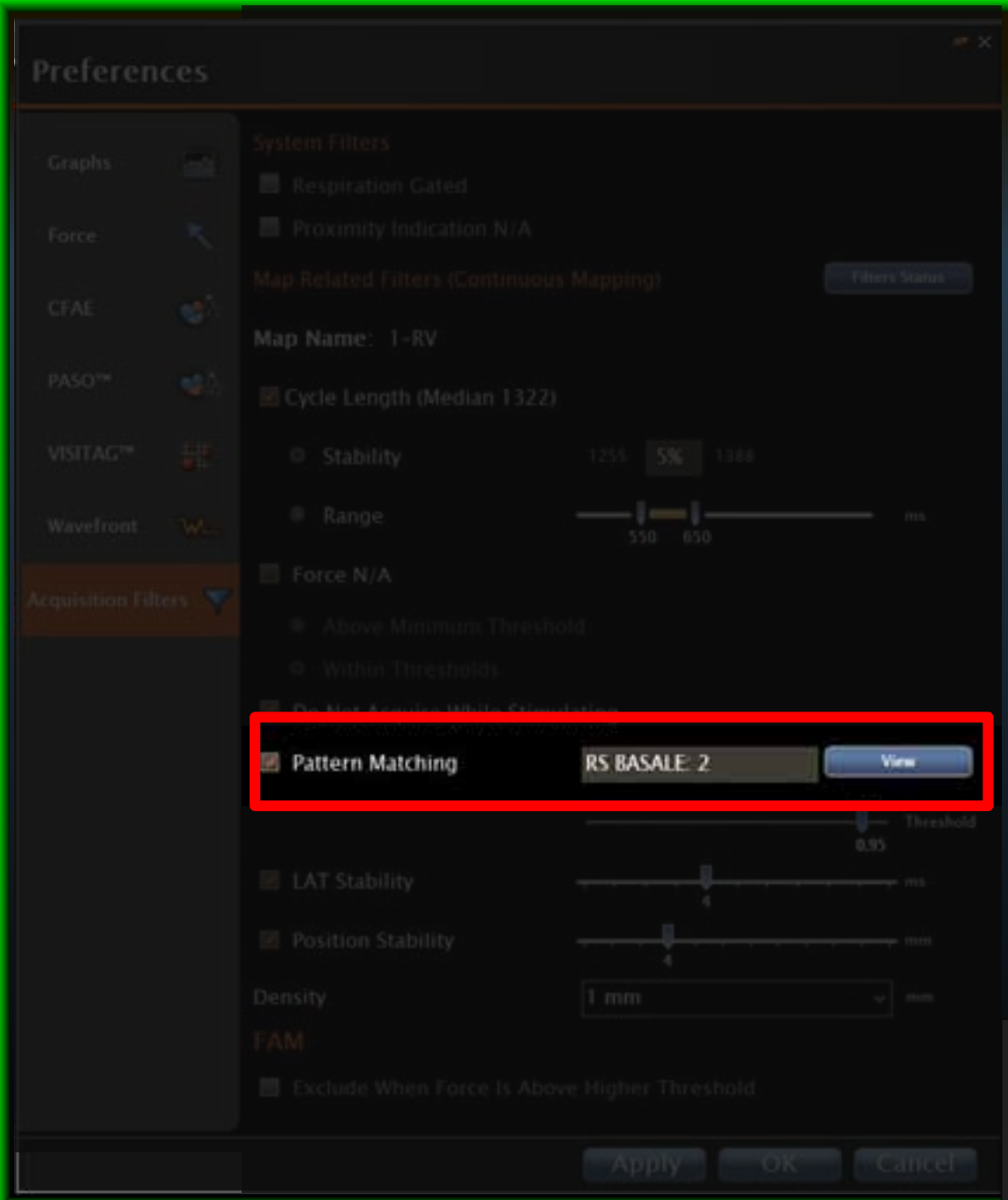

Preferences
Graphs
Force
CFAE
PASO™
VISITAG™
Wavefront
Acquisition Filters
System Filters
Respiration Gated
Proximity Indication N/A
Map Related Filters (Continuous Mapping)
Filters Status
Map Name: 1-RV
Cycle Length (Median 1322)
Stability
1255
5%
1388
Range
550
650
ms
Force N/A
Above Minimum Threshold
Within Thresholds
Do Not Acquire While Stimulating
Pattern Matching
RS BASALE 2
View
Threshold
0.95
LAT Stability
ms
4
Position Stability
mm
4
Density
1 mm
mm
FAM
Exclude When Force Is Above Higher Threshold
Apply
OK
Cancel



Evento con ciclo dell’aritmia



Posizione stabile e attivazione congruente



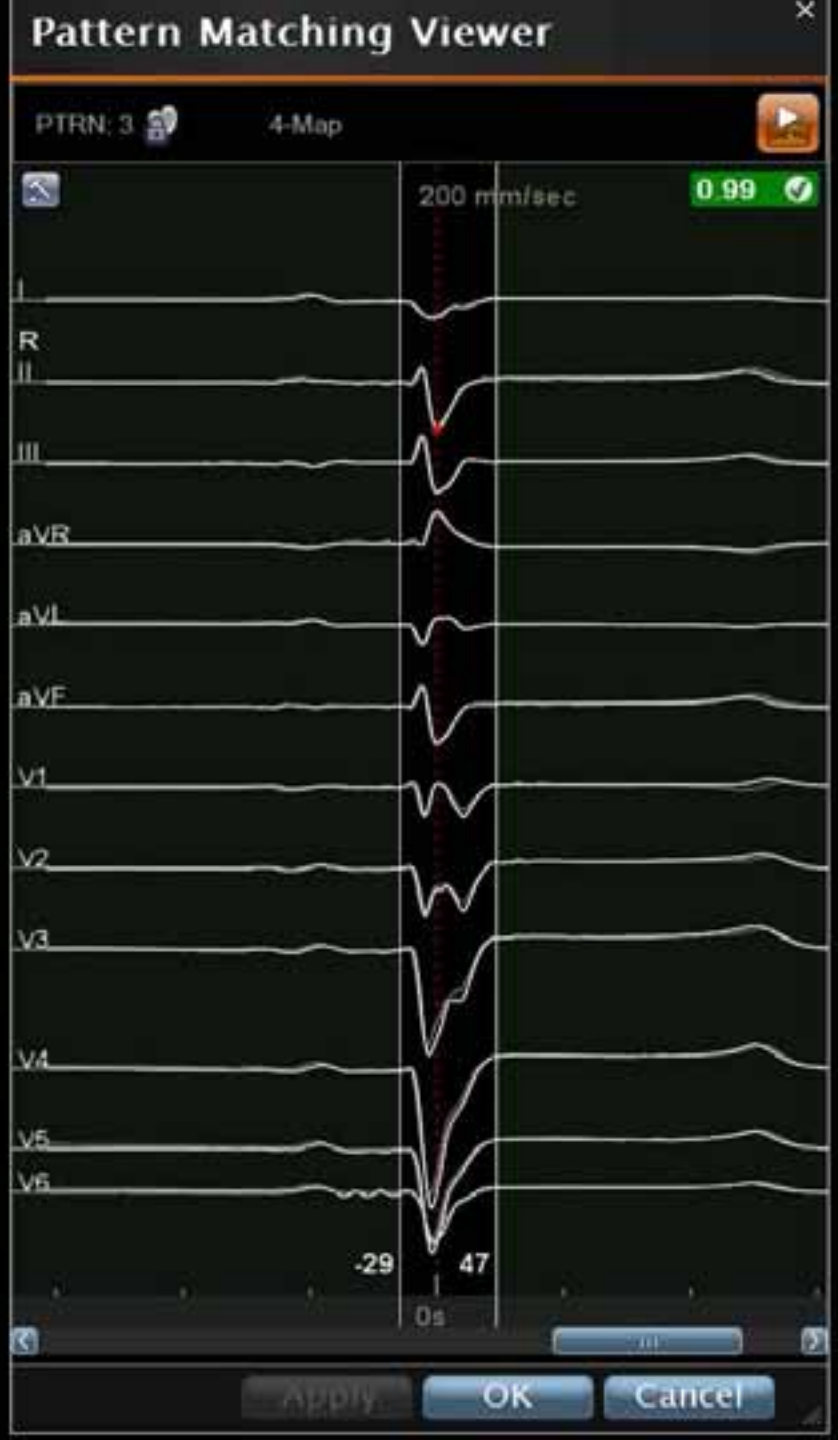
Morfologia ECG

Morfologia ECG

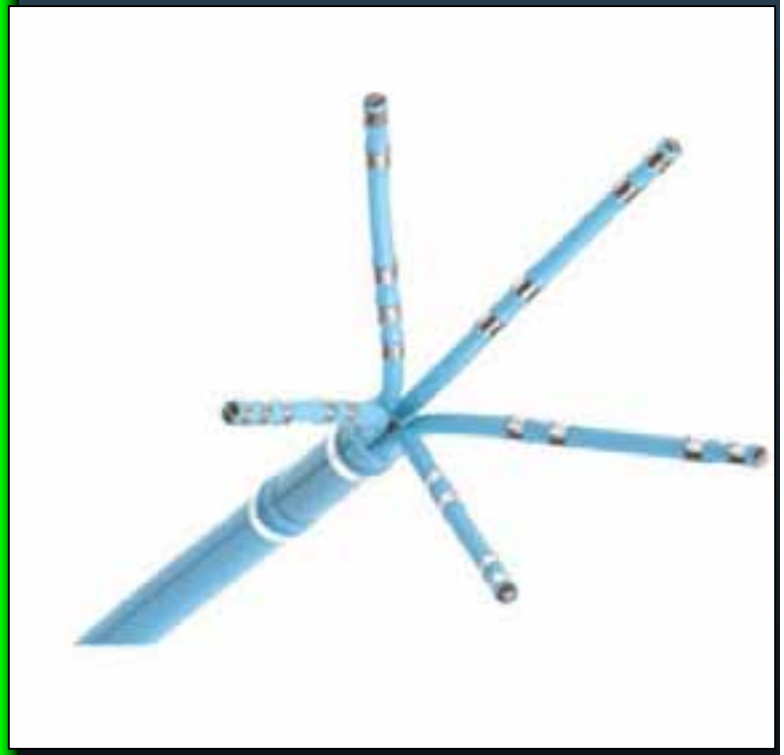
Deve corrispondere a un template

Template: aritmia per mappare solo una morfologia

Template: ritmo sinusale *per escludere extra*


Pattern Matching Viewer
PTRN: 3
4-Map
200 mm/sec
0.99
I
R
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
-29
47
0s
Apply
OK
Cancel


1-2
3-4
5-6
7-8
9-10
11-12
13-14
15-16
17-18
19-20
CL
STIM
PTRN
TPI
POS
LAT
DEN



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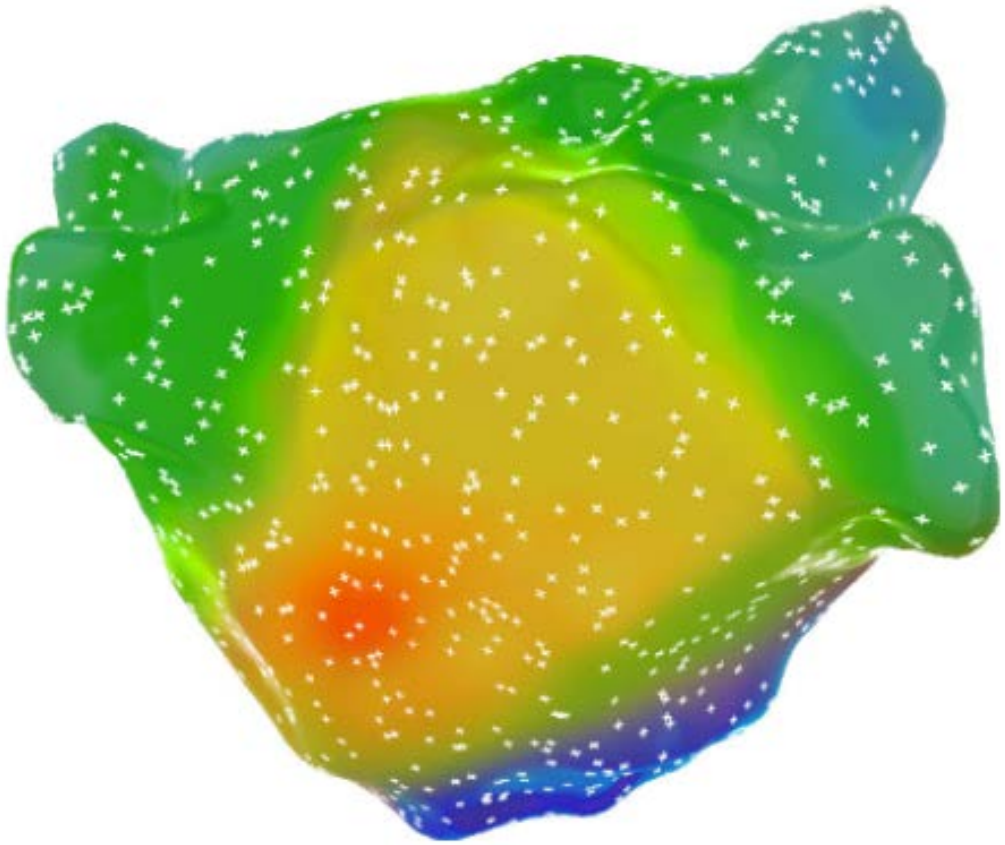
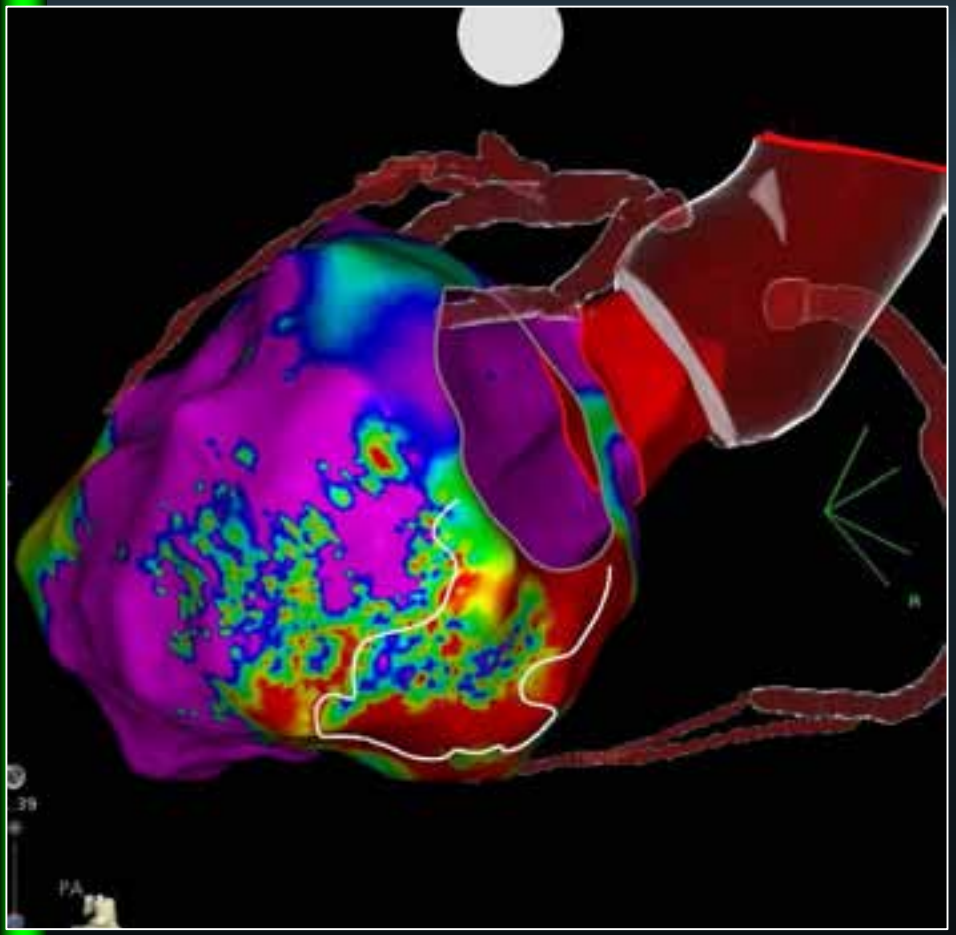
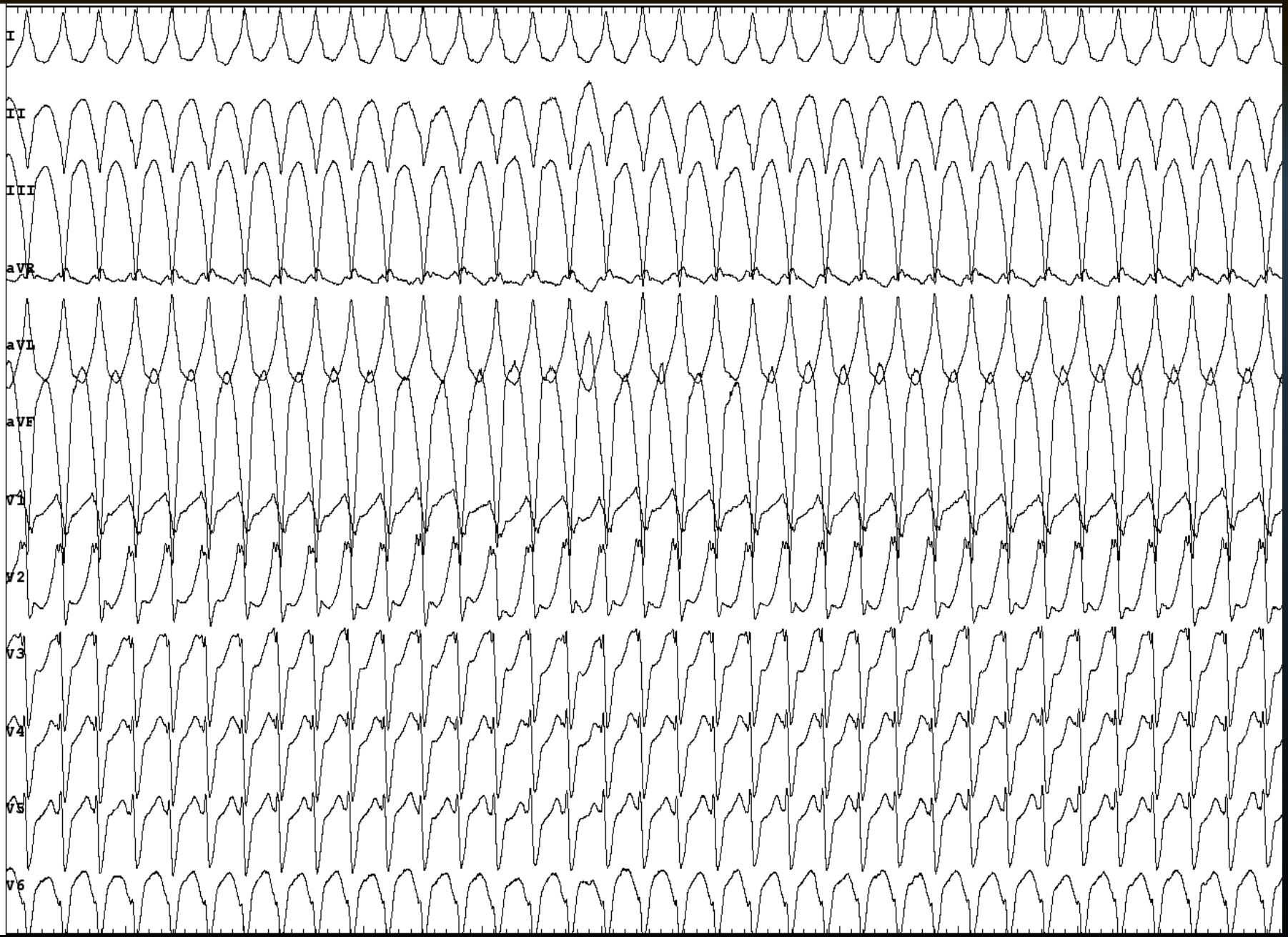


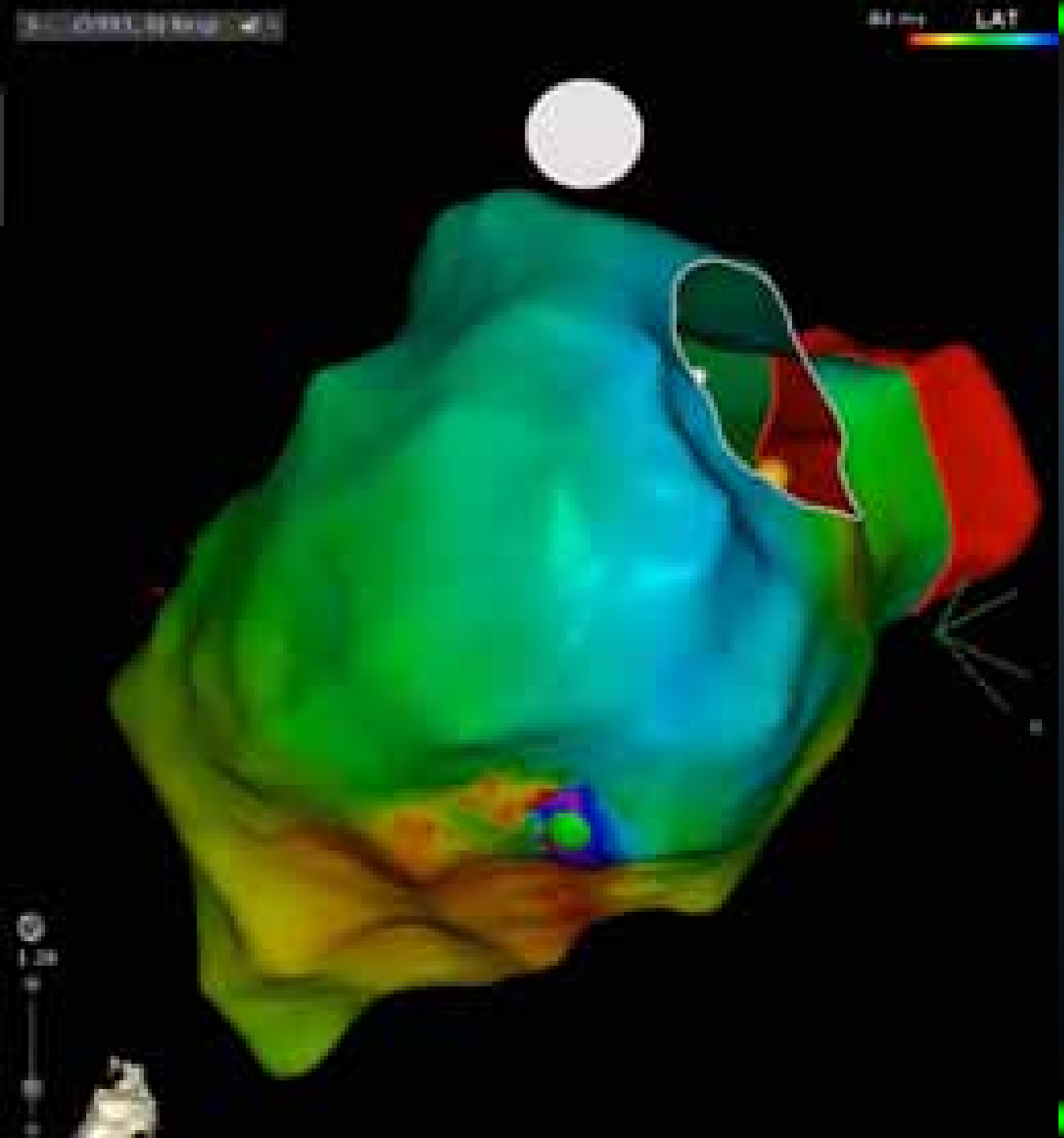
Esempio 1

Mappa di voltaggio



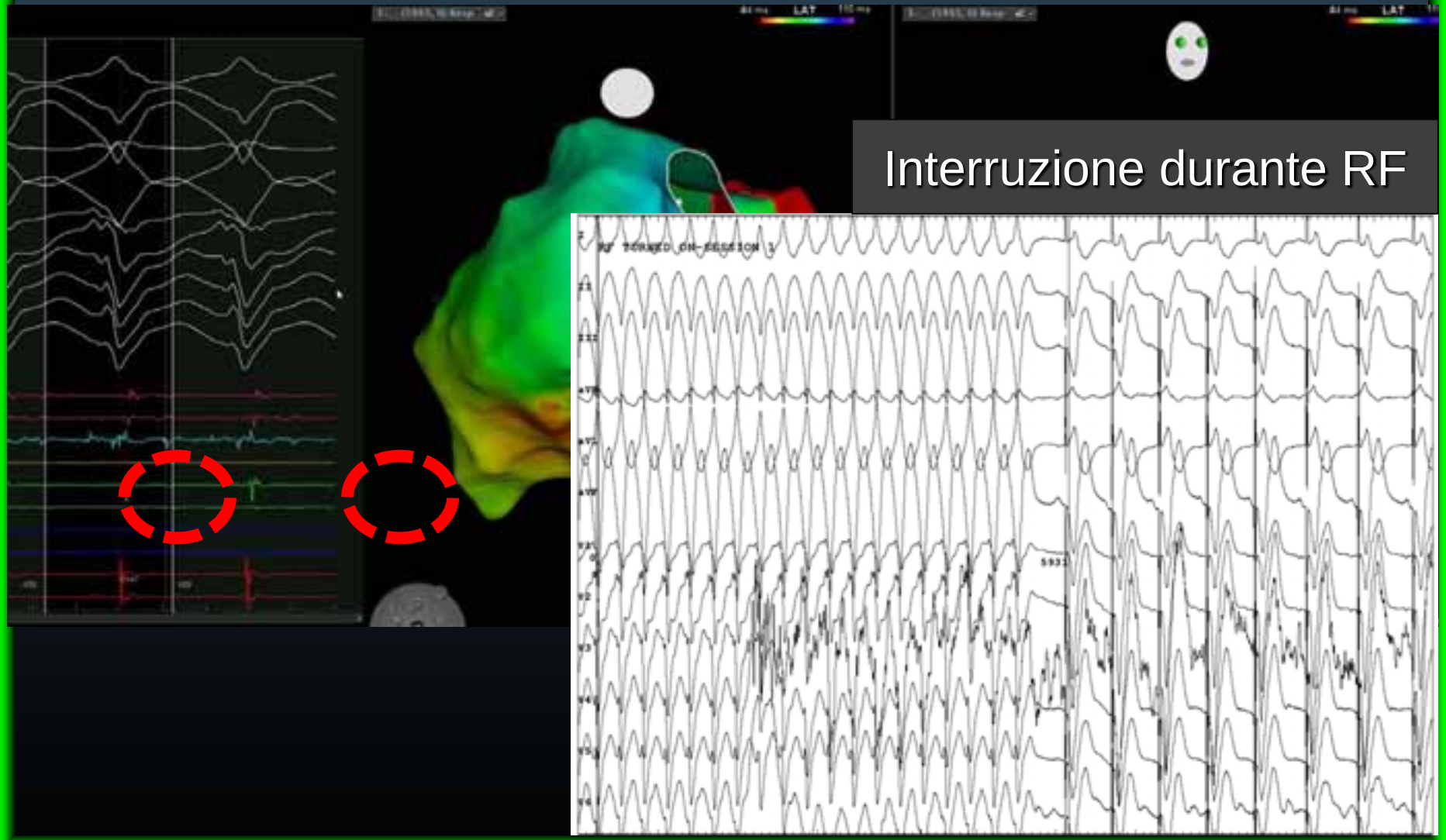
Mappa dei potenziali tardivi


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6



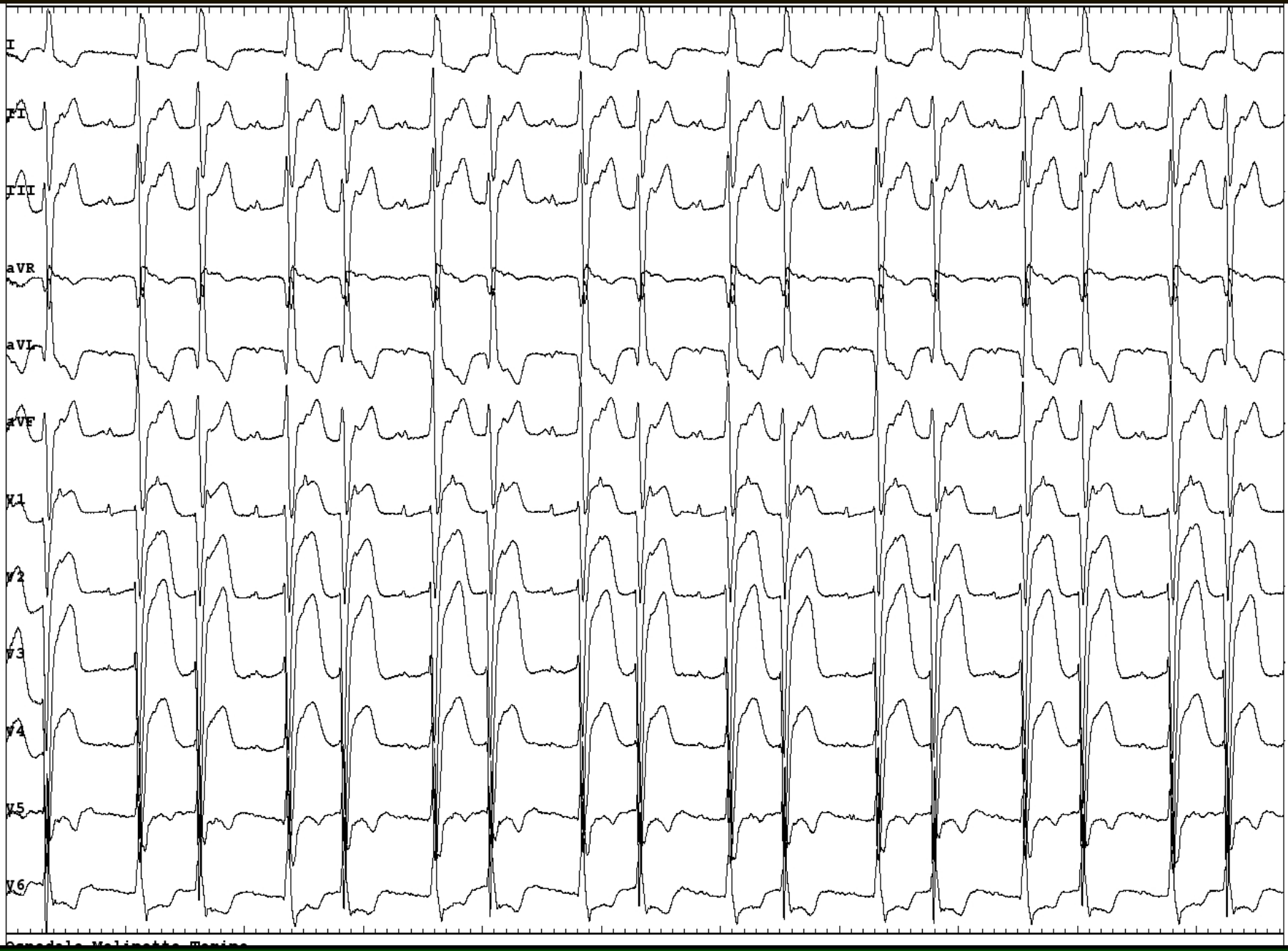
Mappa di
attivazione

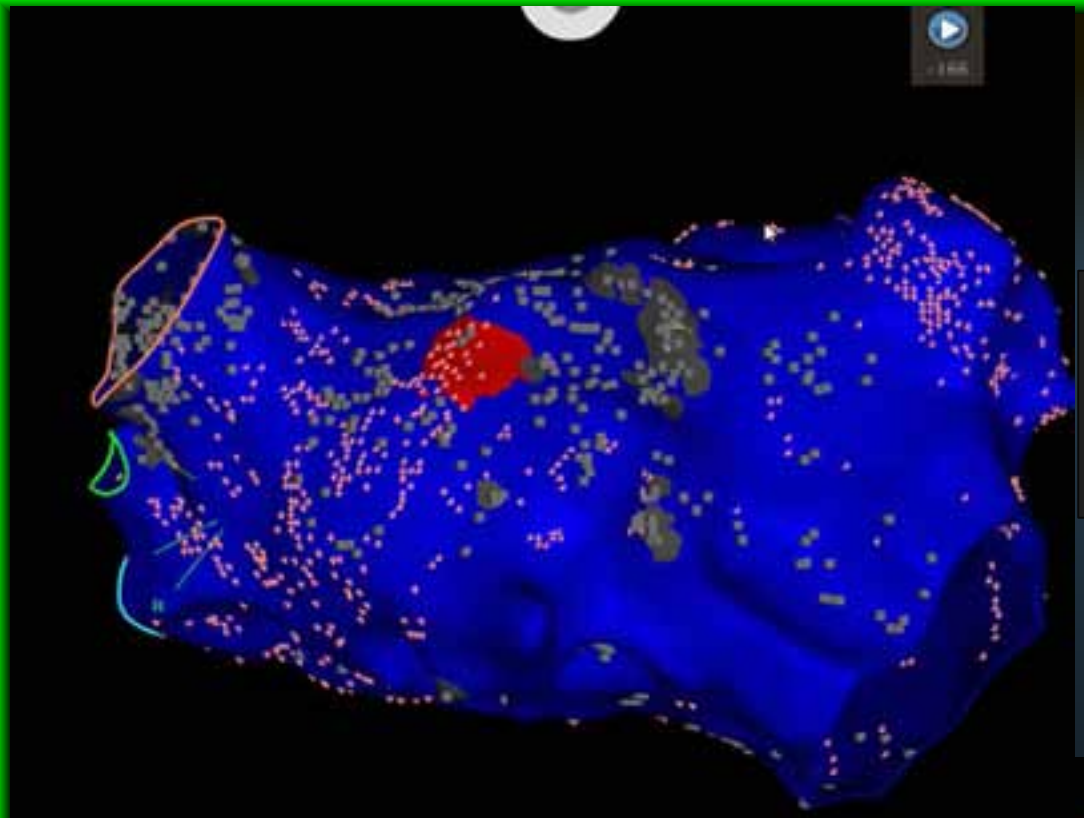
Sito ottimale



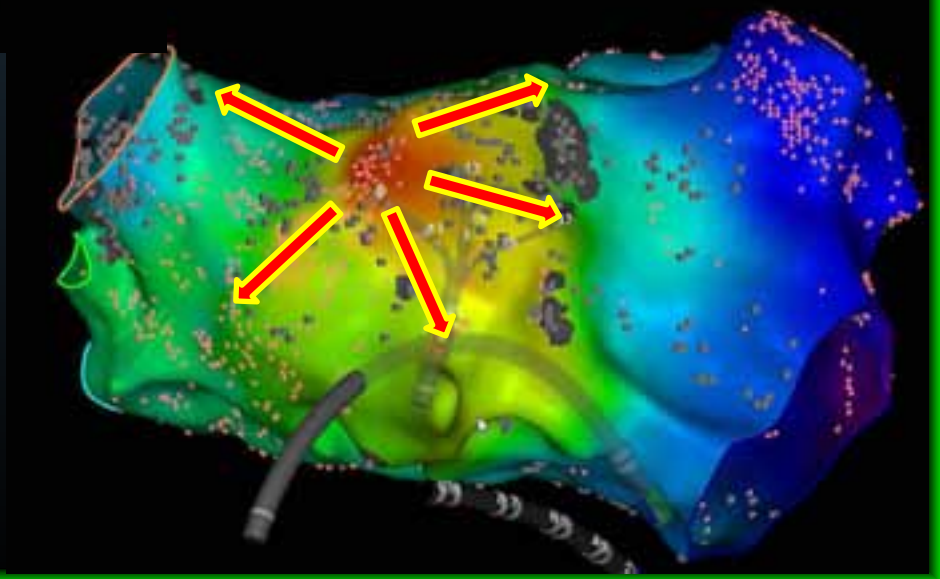
Interruzione durante RF

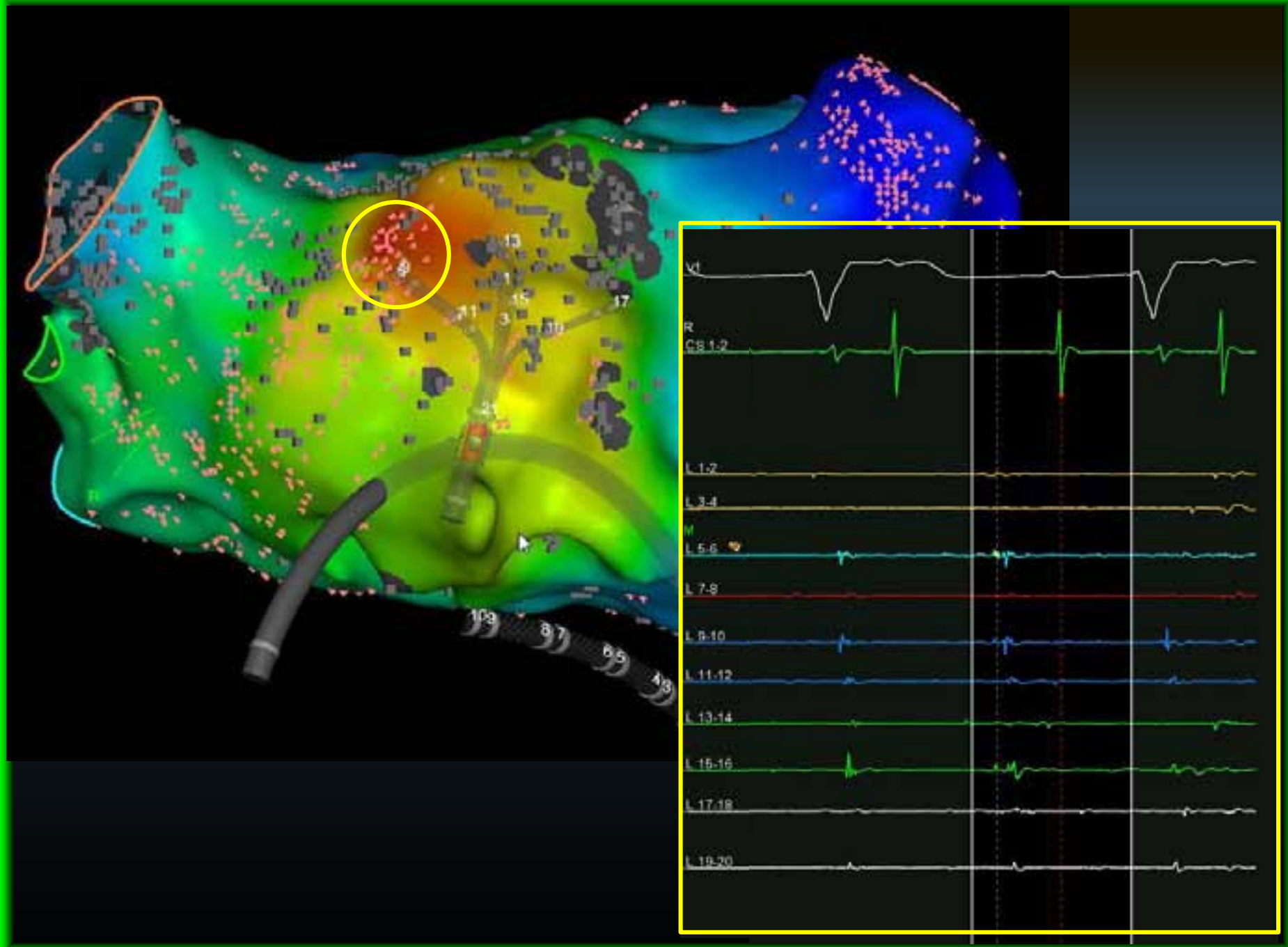
Esempio 2


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

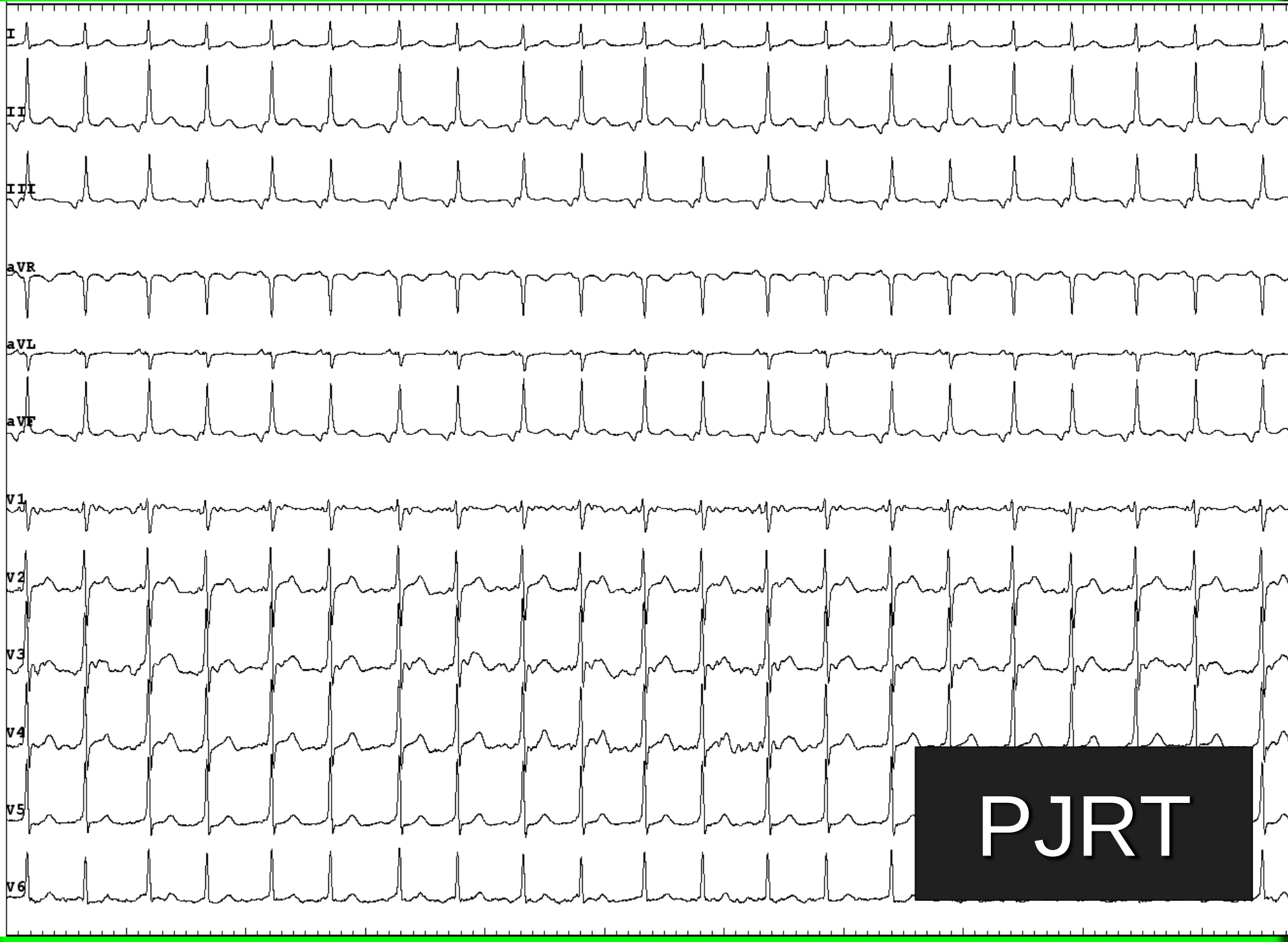


Attivazione focale



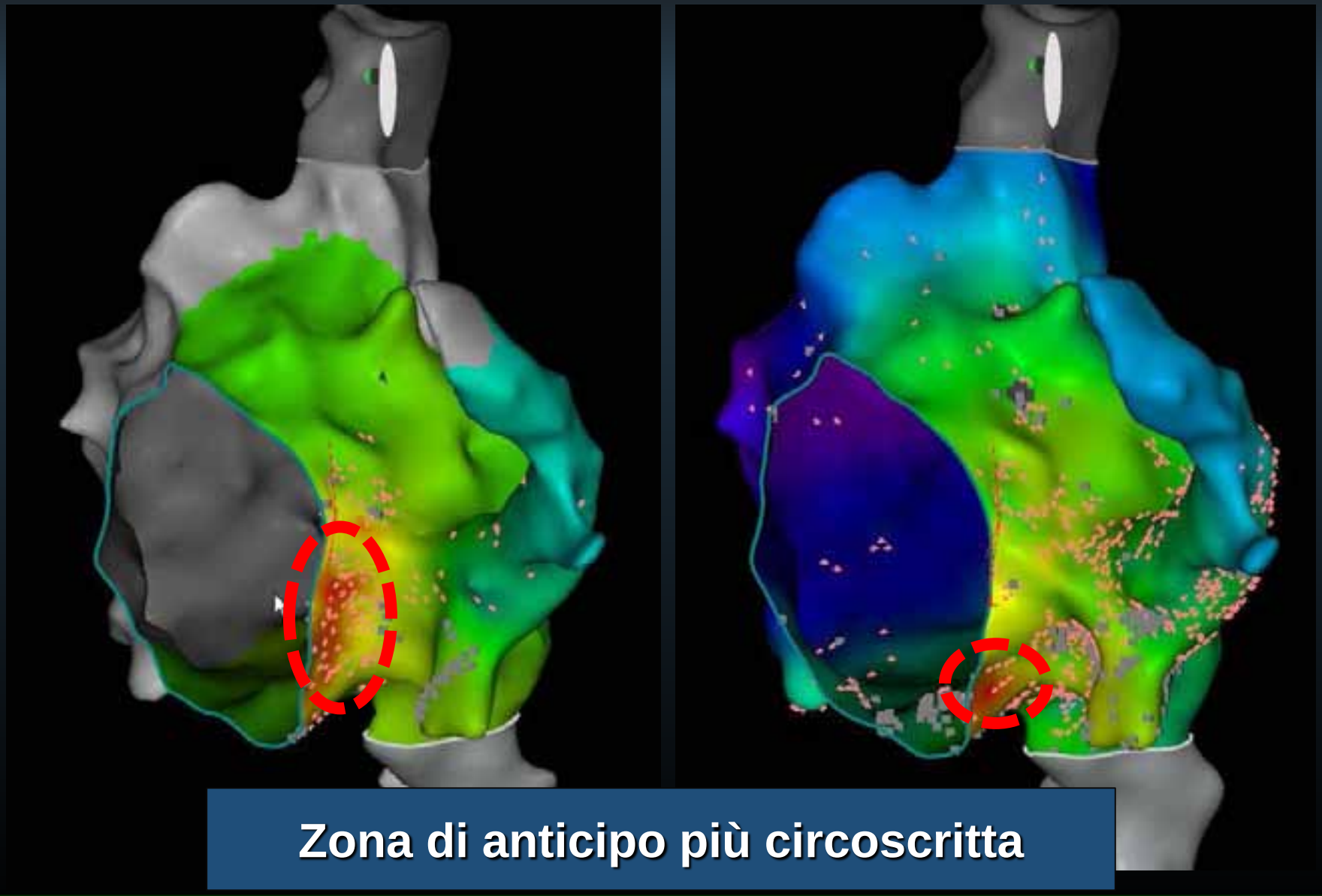

V1
R
CS 1-2
L 1-2
L 3-4
M
L 5-6
L 7-8
L 9-10
L 11-12
L 13-14
L 15-16
L 17-18
L 19-20

Esempio 3


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
PJRT

Mappa SmartTouch

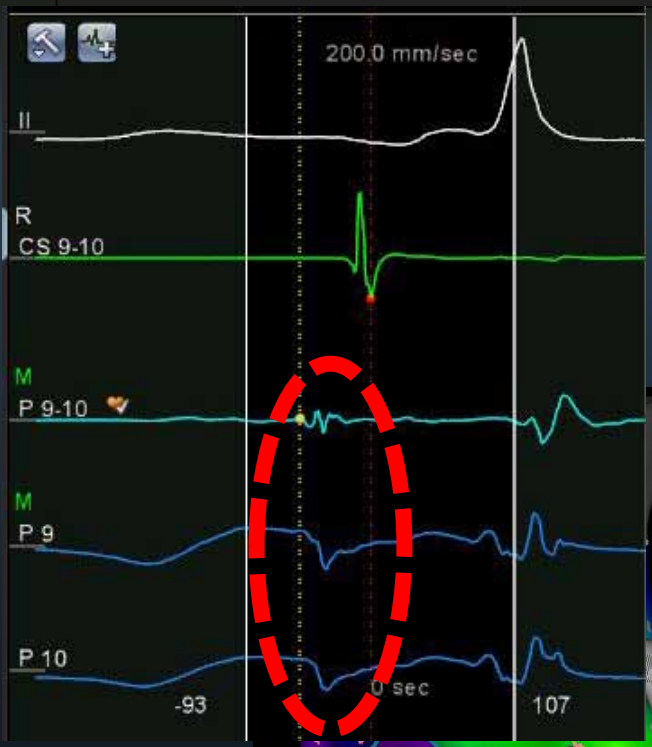
Mappa PentaRay

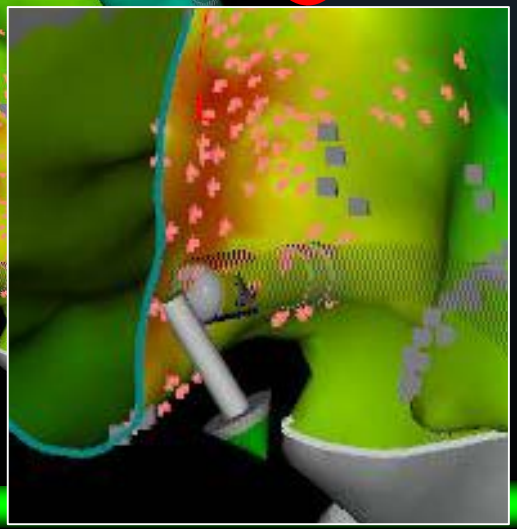


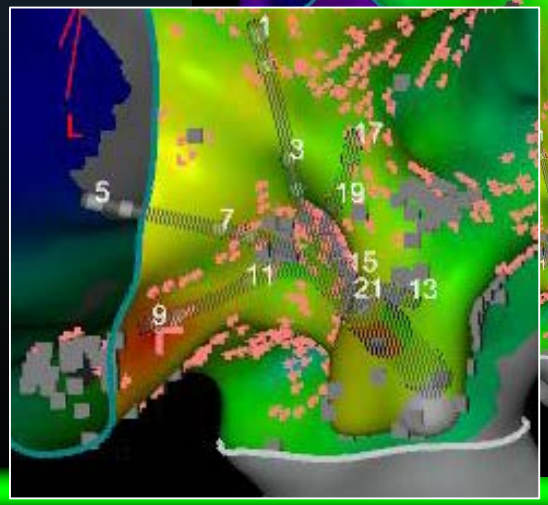
Zona di anticipo più circoscritta

Mappa SmartTouch

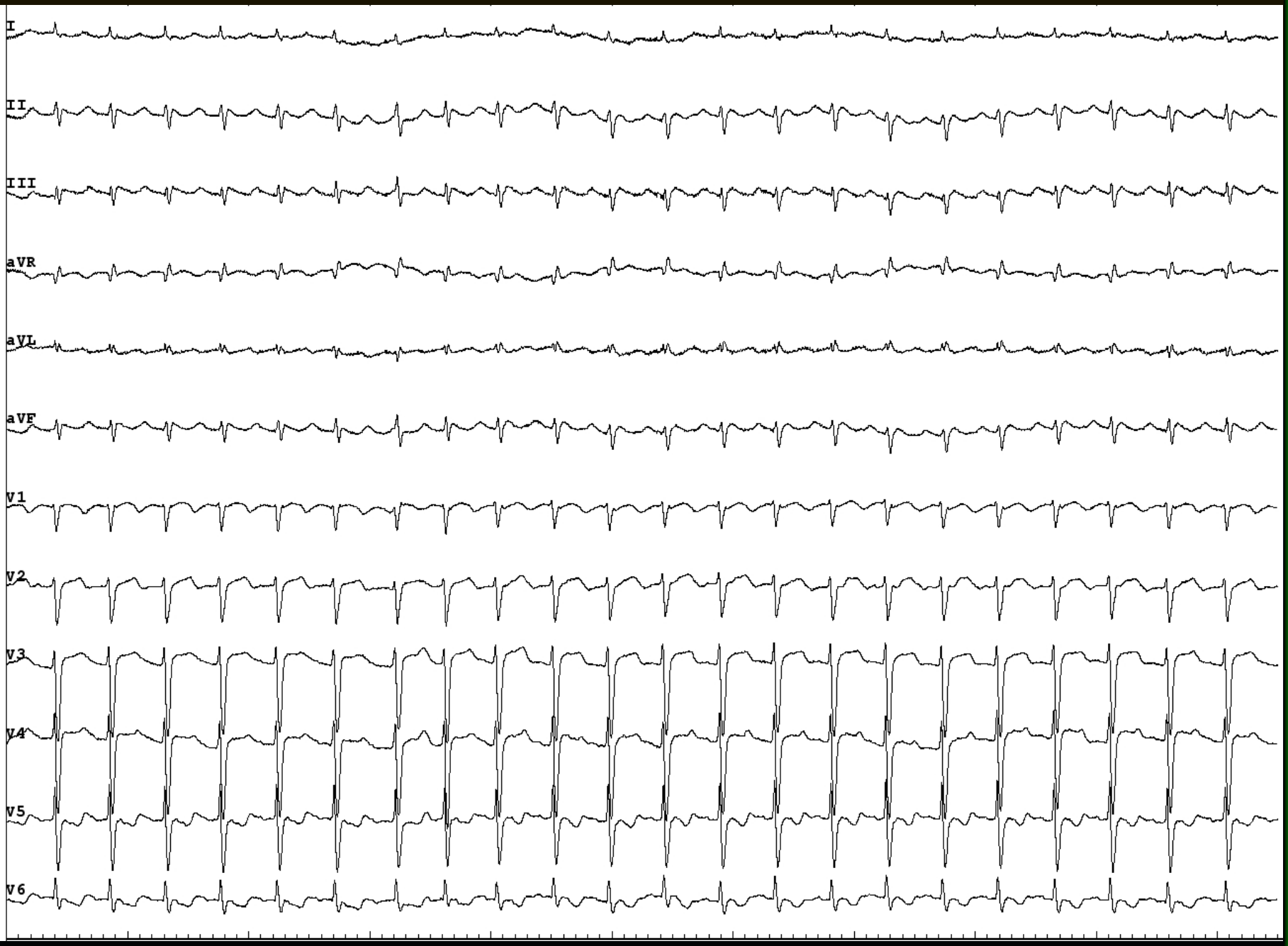
Mappa PentaRay



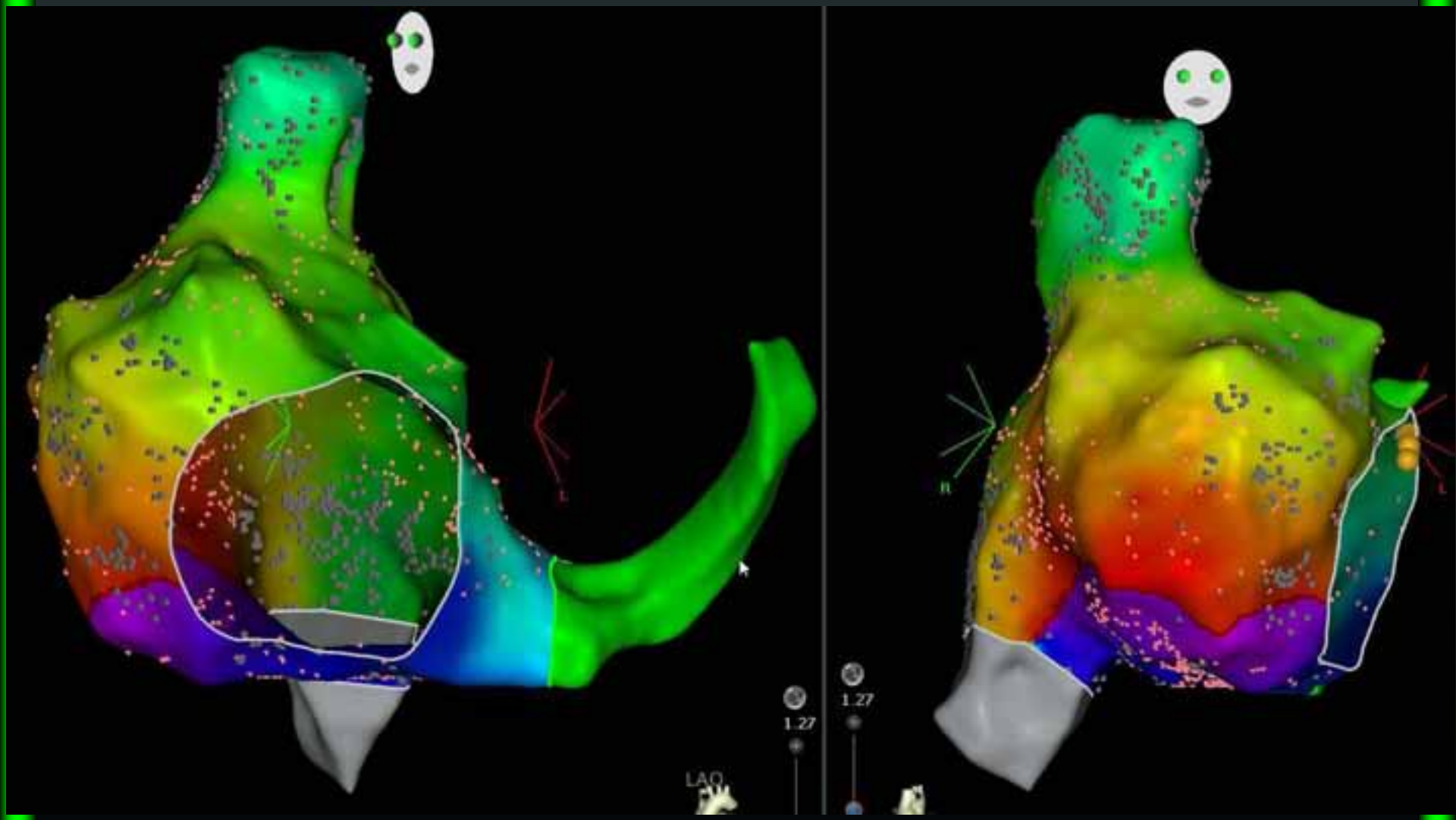




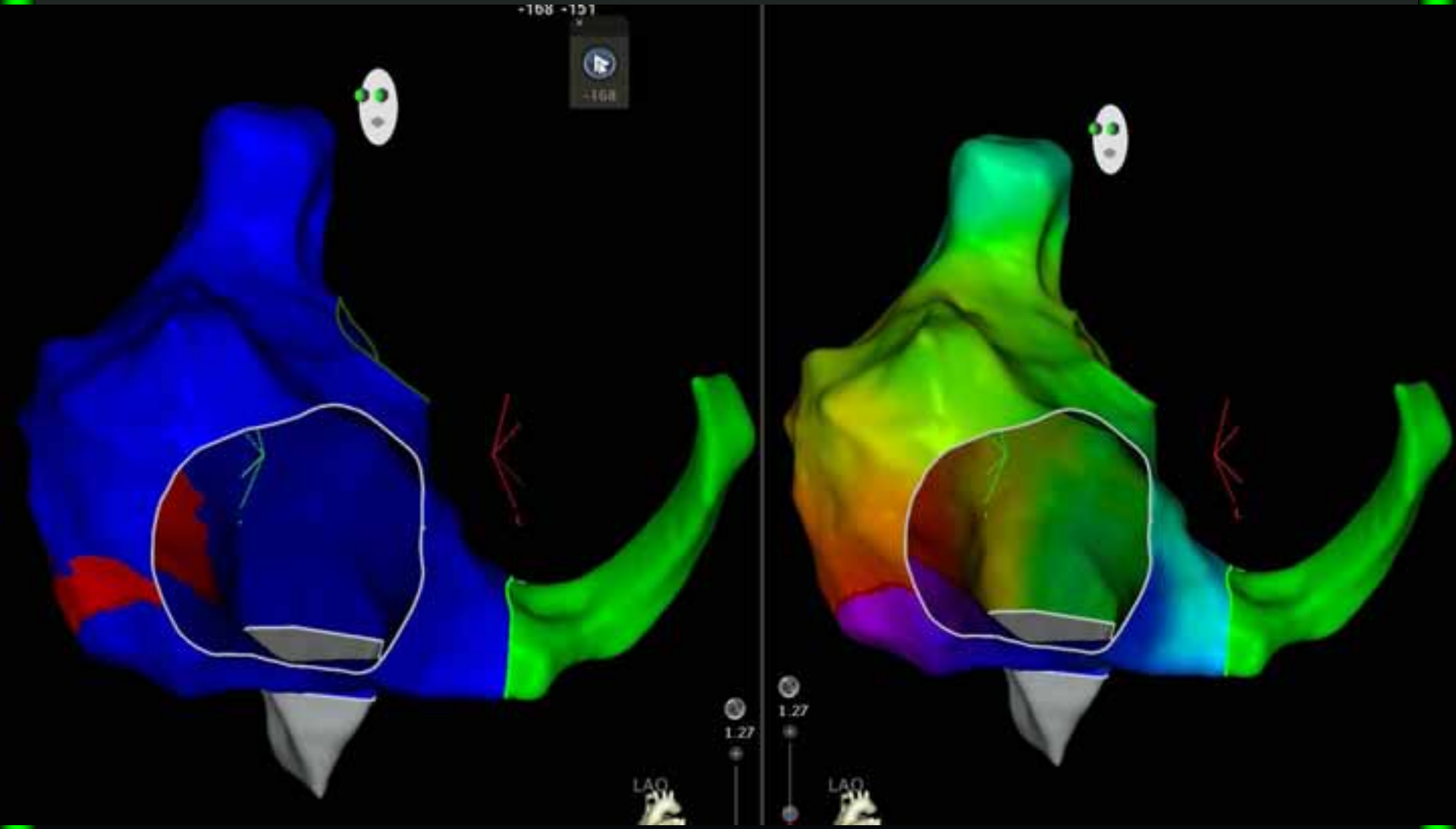
Esempio 4


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

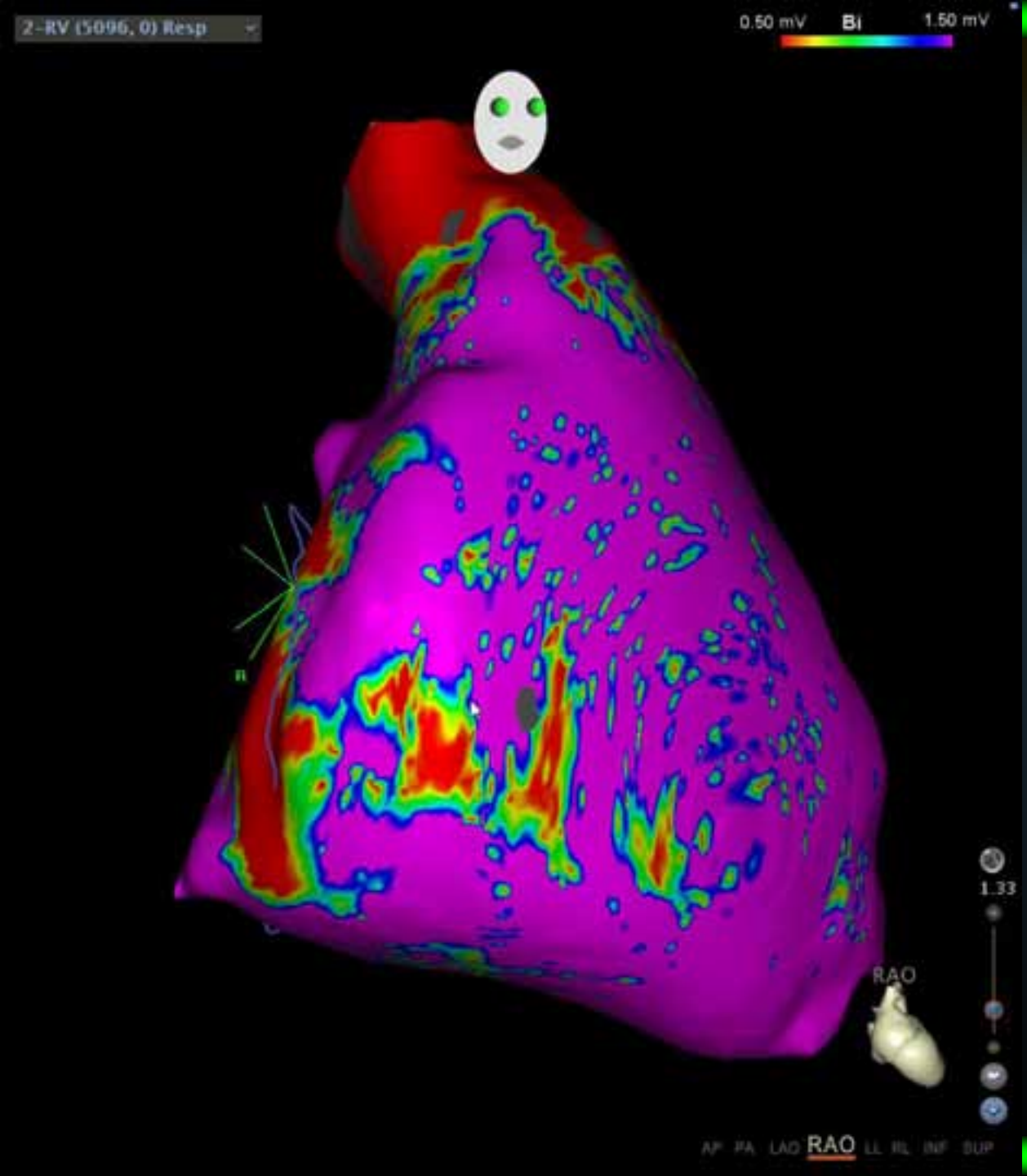
Mappa di attivazione



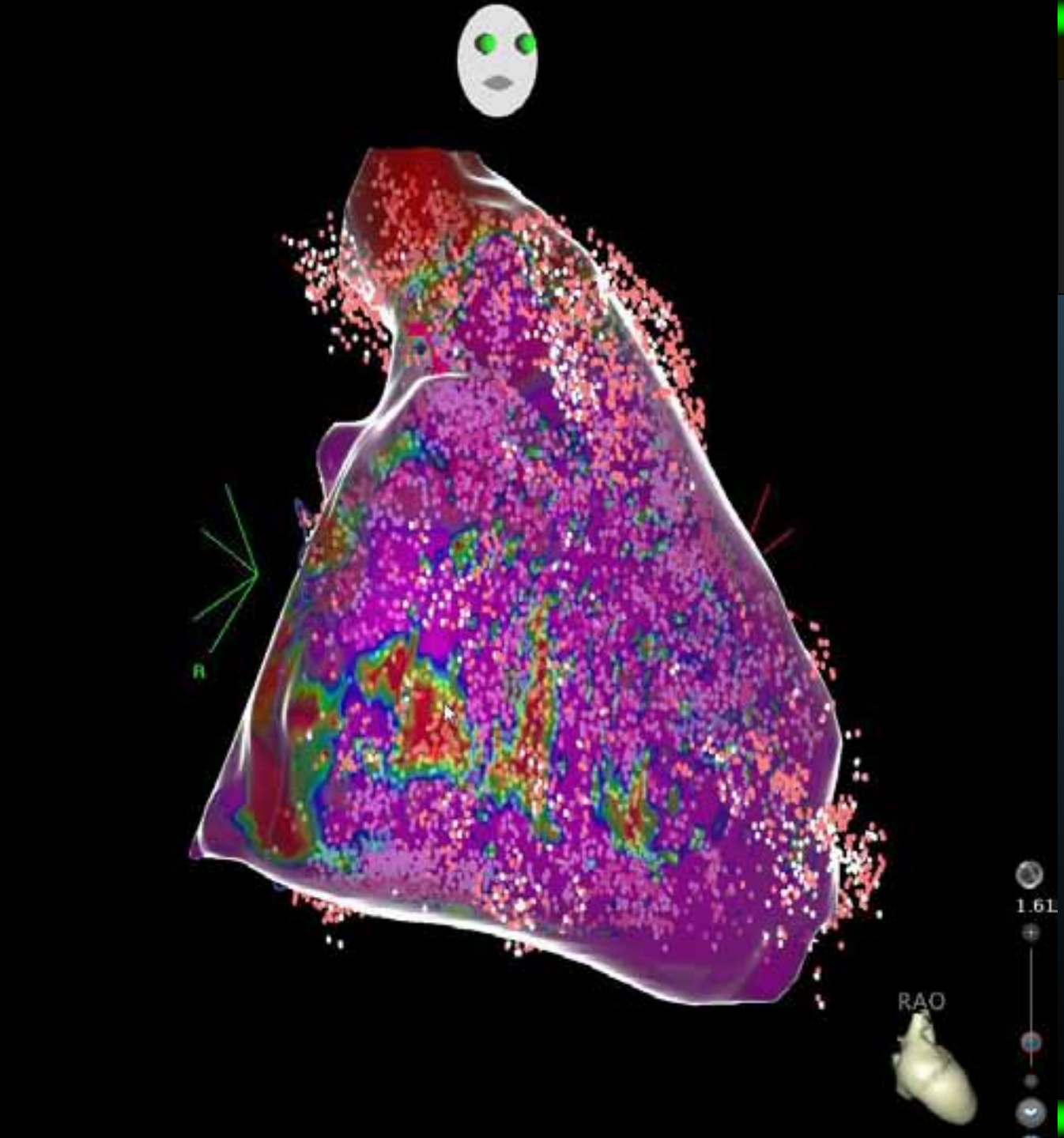
Mappa di propagazione



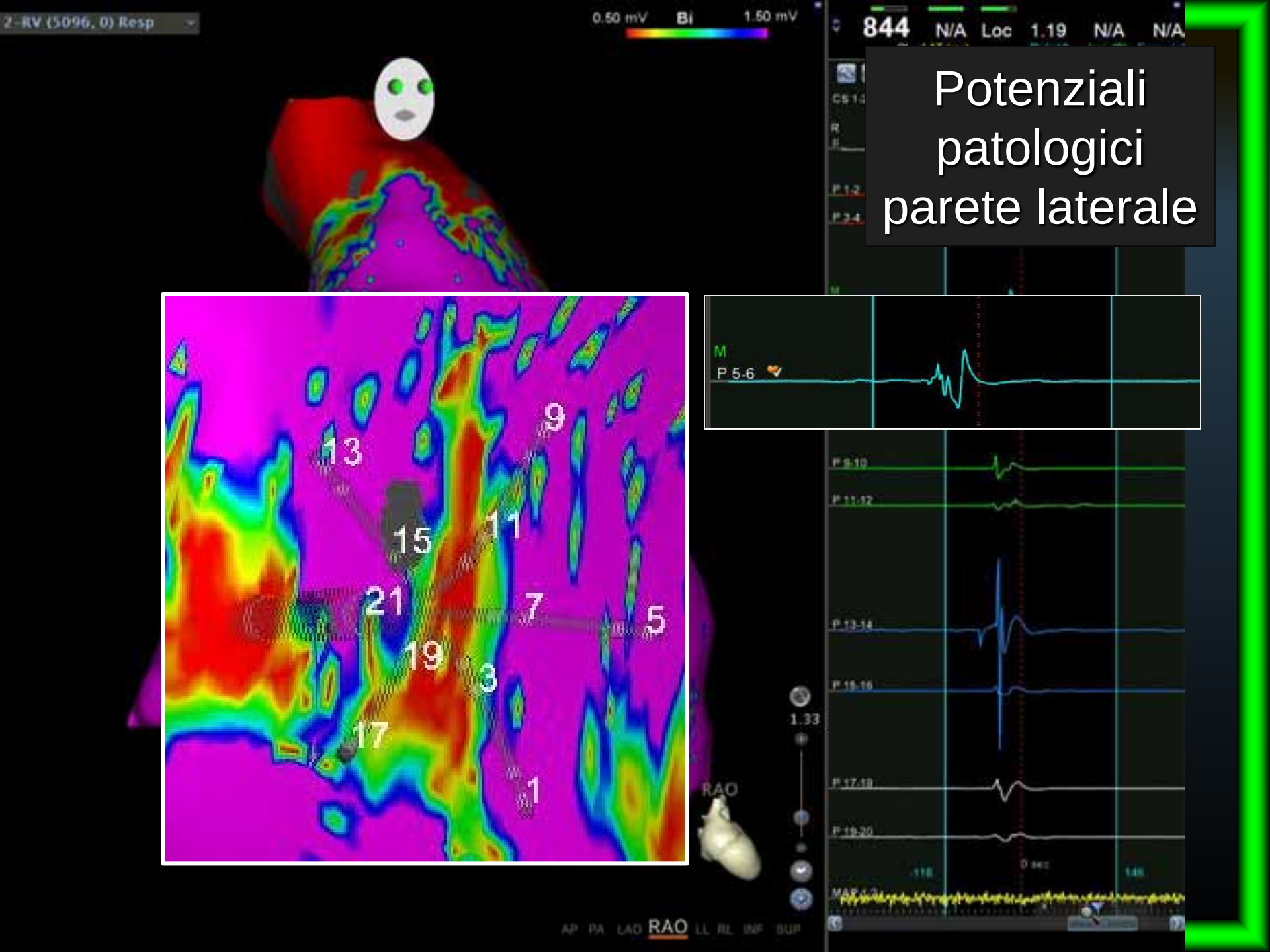
Esempio 5



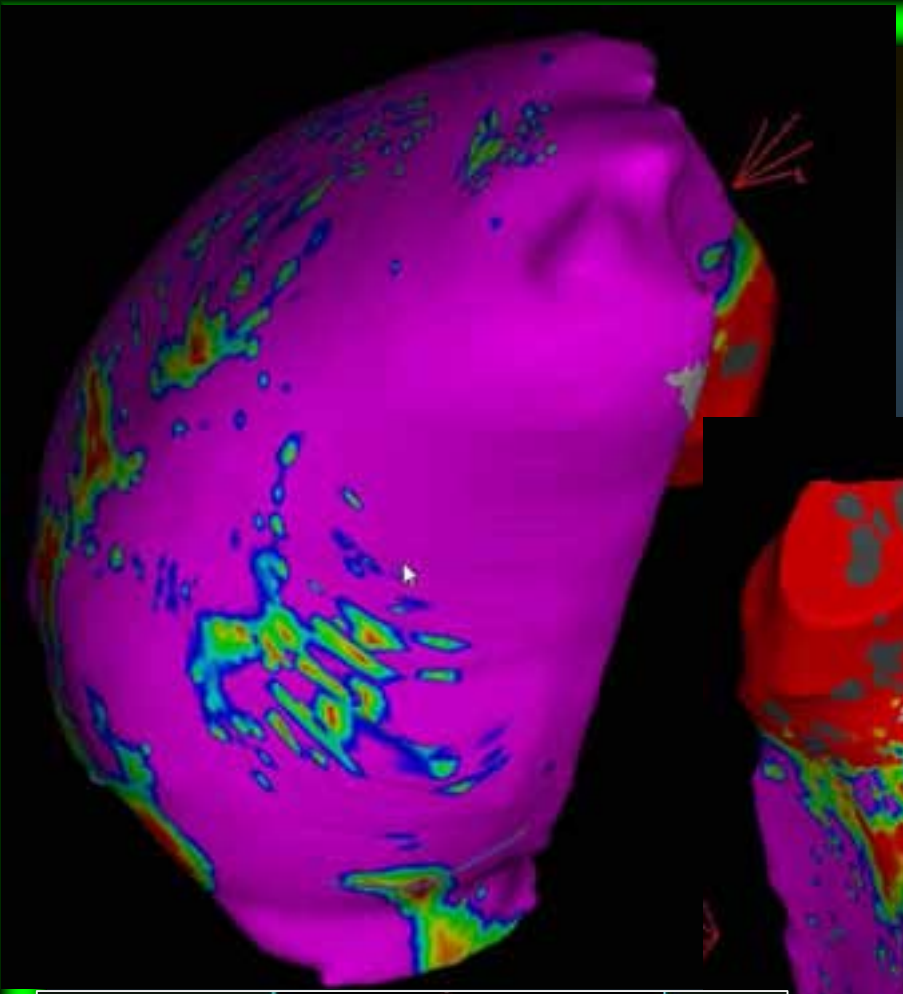
Mappa di voltaggio

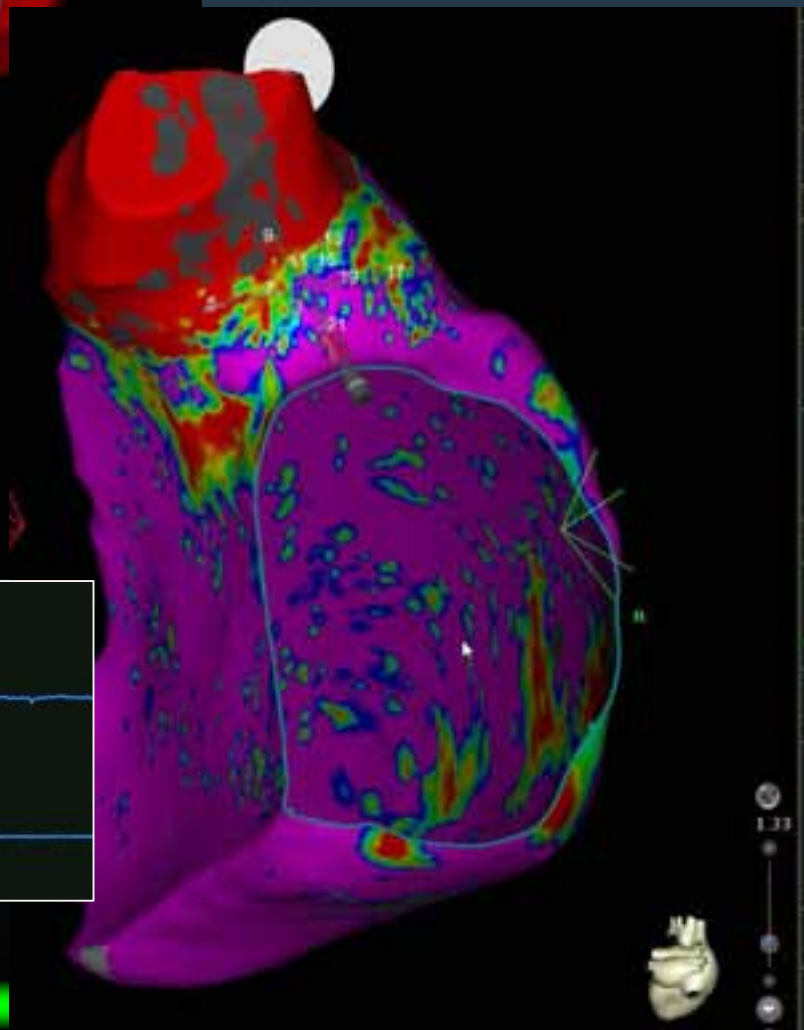


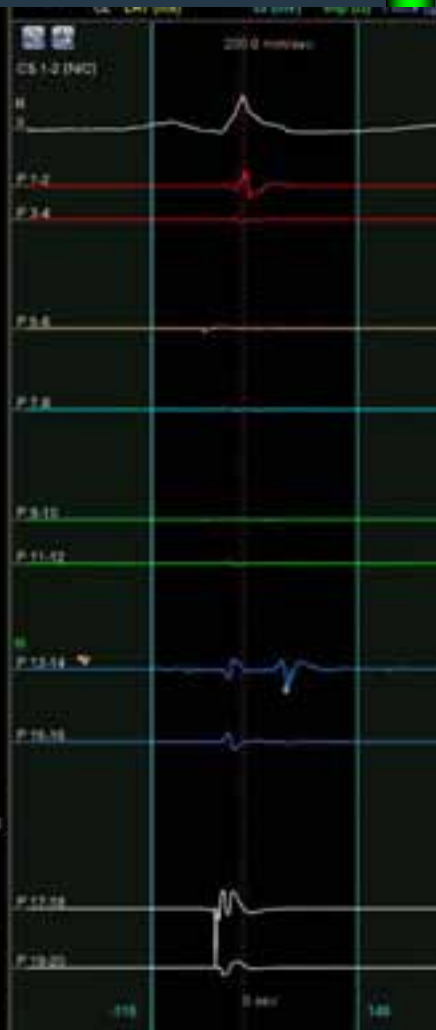
Mappa di voltaggio

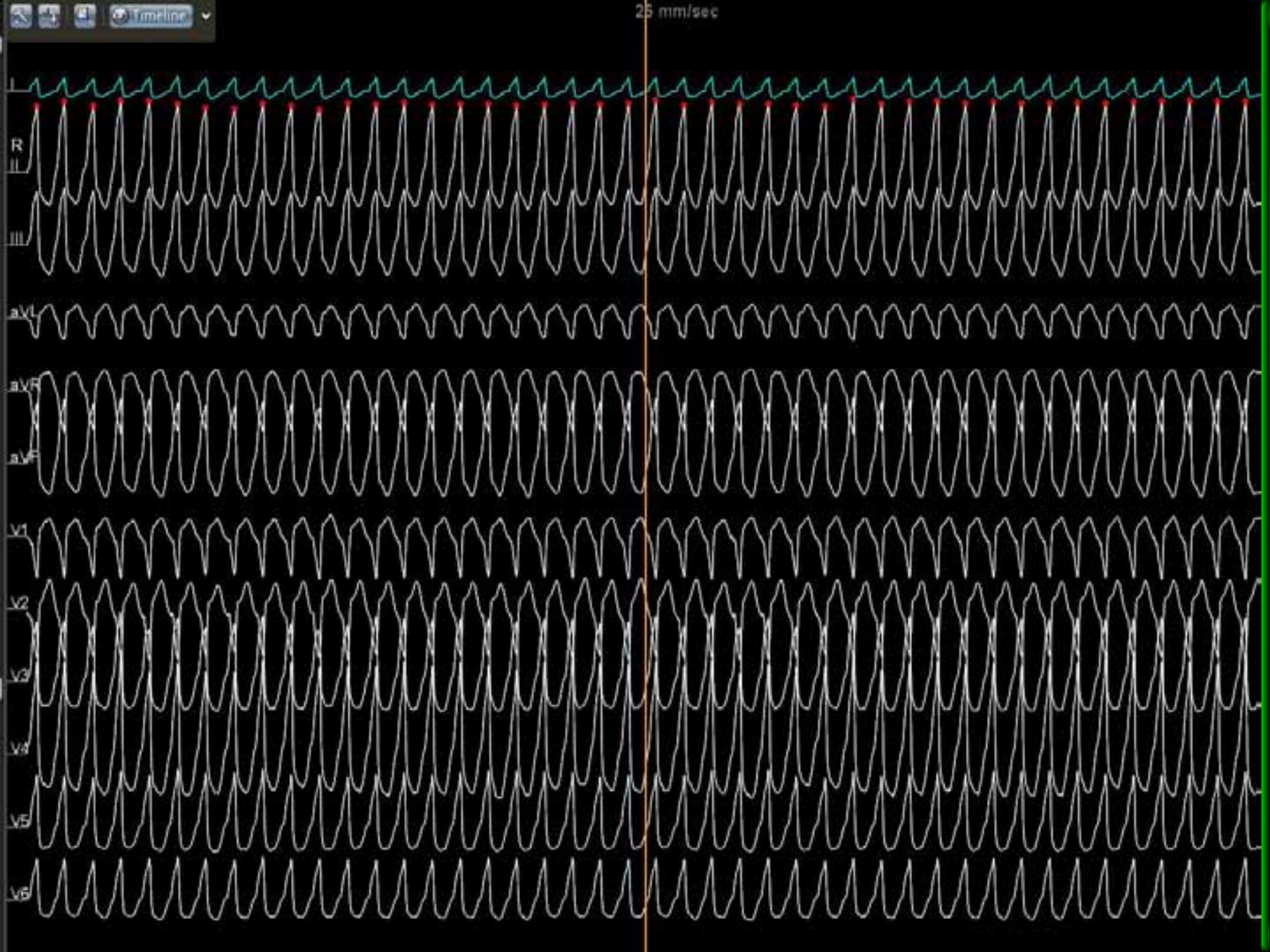

Potenziali patologici parete laterale
2-RV (5096, 0) Resp
0.50 mV
Bi
1.50 mV
844
N/A
Loc
1.19
N/A
N/A
M
P 5-6
13
9
15
11
21
7
5
19
3
17
1
RAO
1.33
AP PA LAO RAO LL RL INF SUP

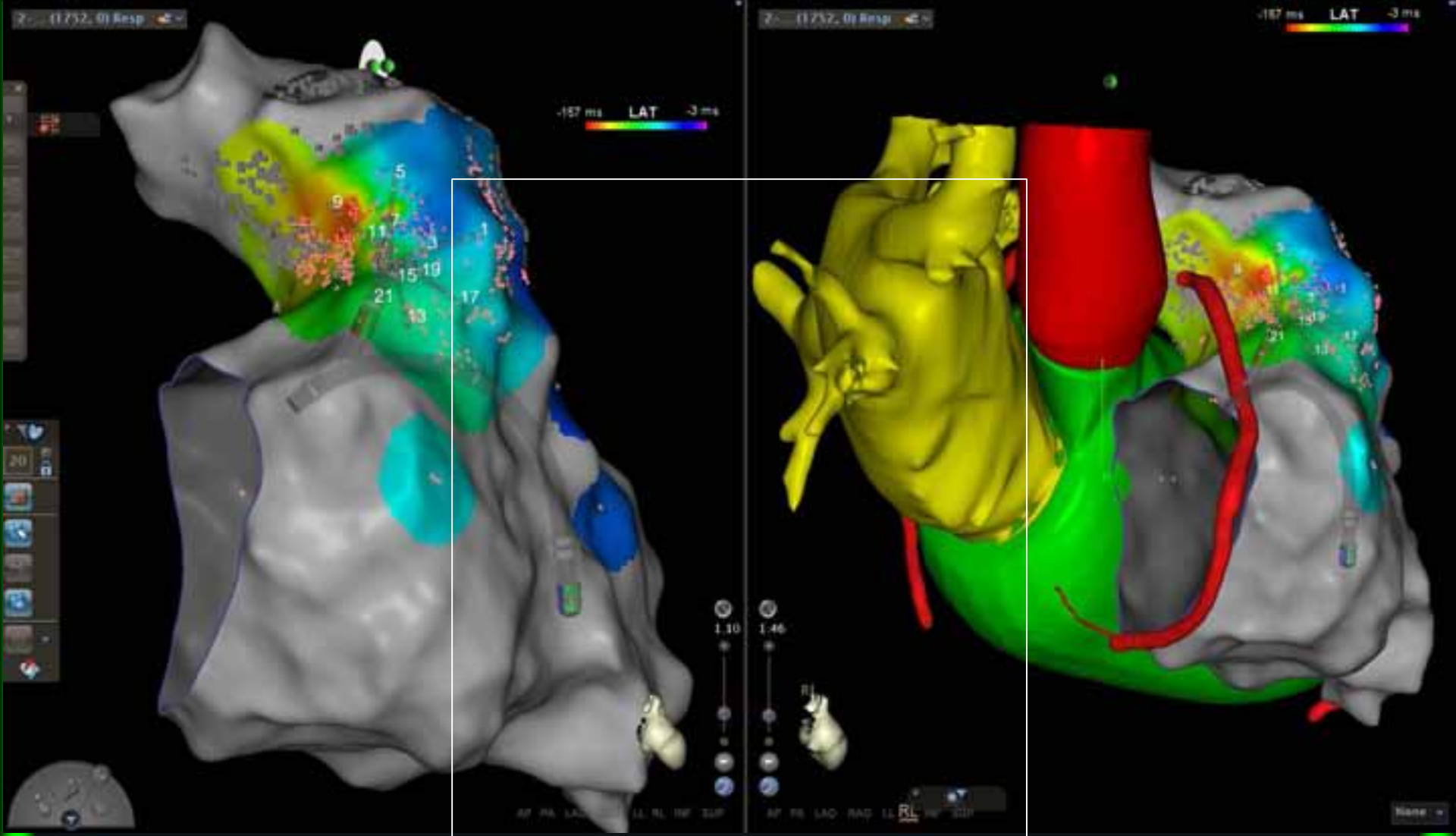
Potenziali patologici in parete inferiore e infundibolo



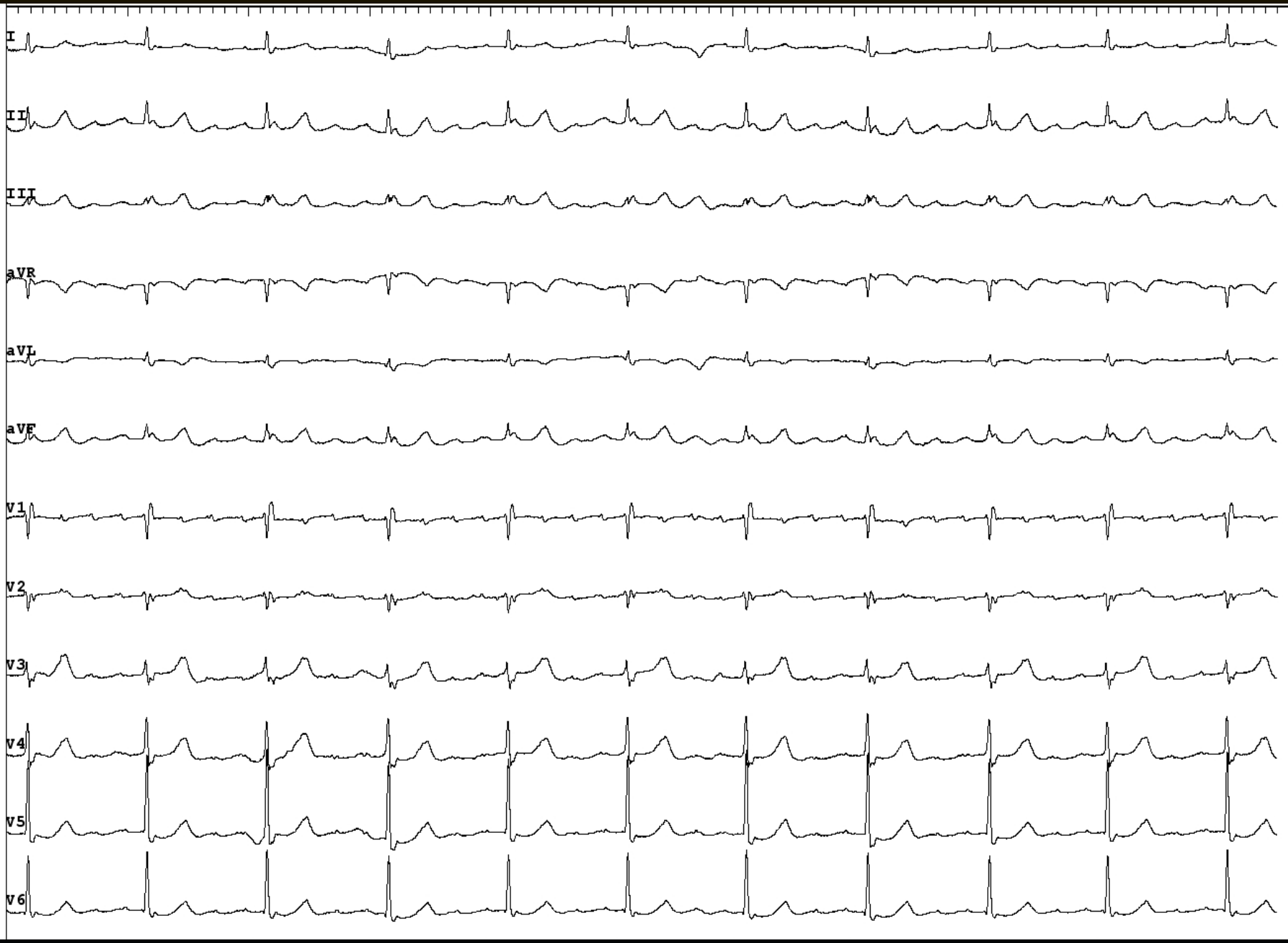




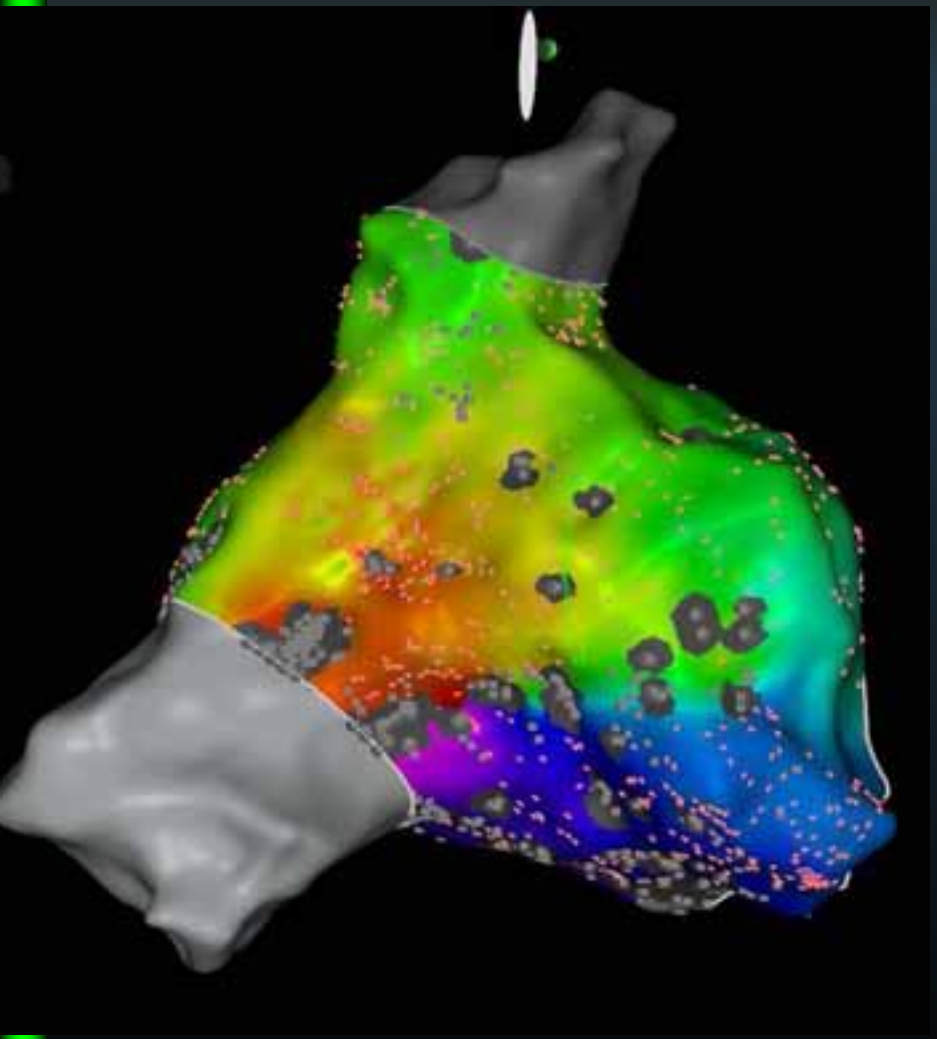

Timeline
25 mm/sec
I
II
III
aVL
aVR
aVF
V1
V2
V3
V4
V5
V6


LAT
-157 ms
-3 ms
5
9
11
7
3
1
15
19
21
17
13
1.10
1.46

Esempio 6

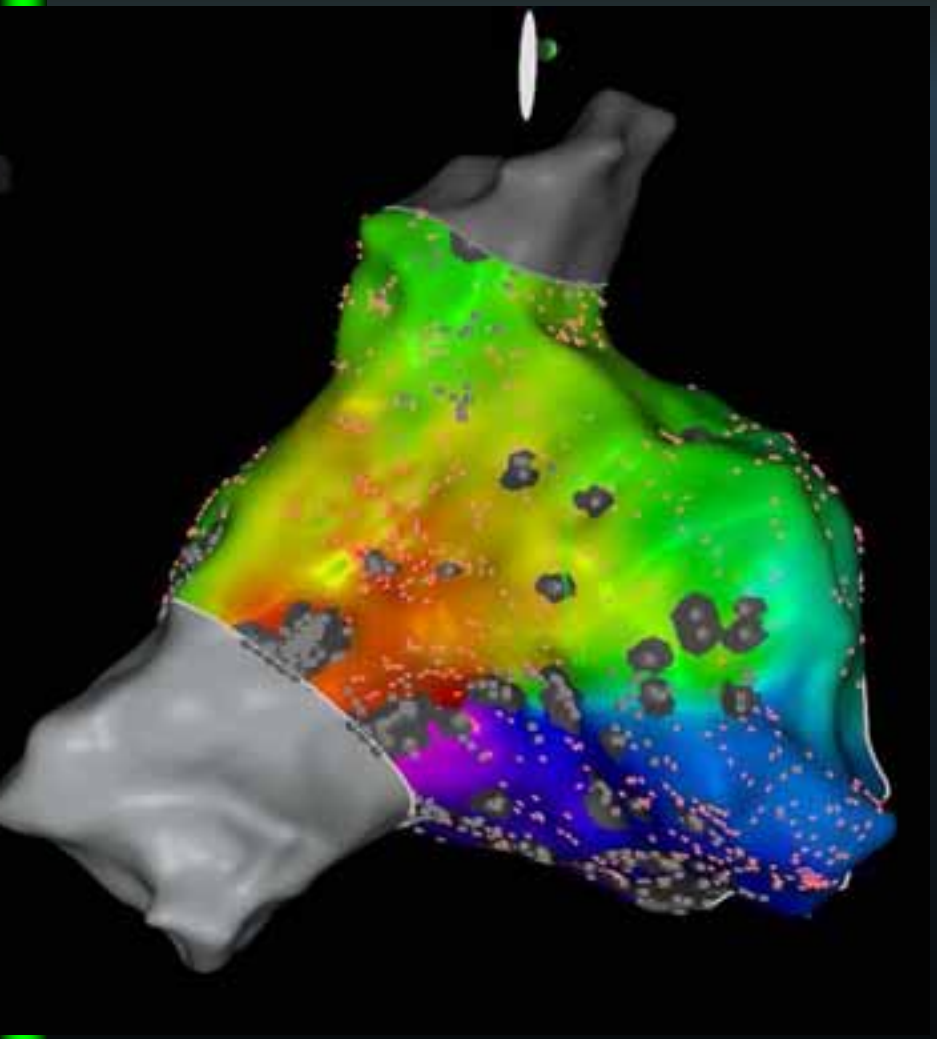

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

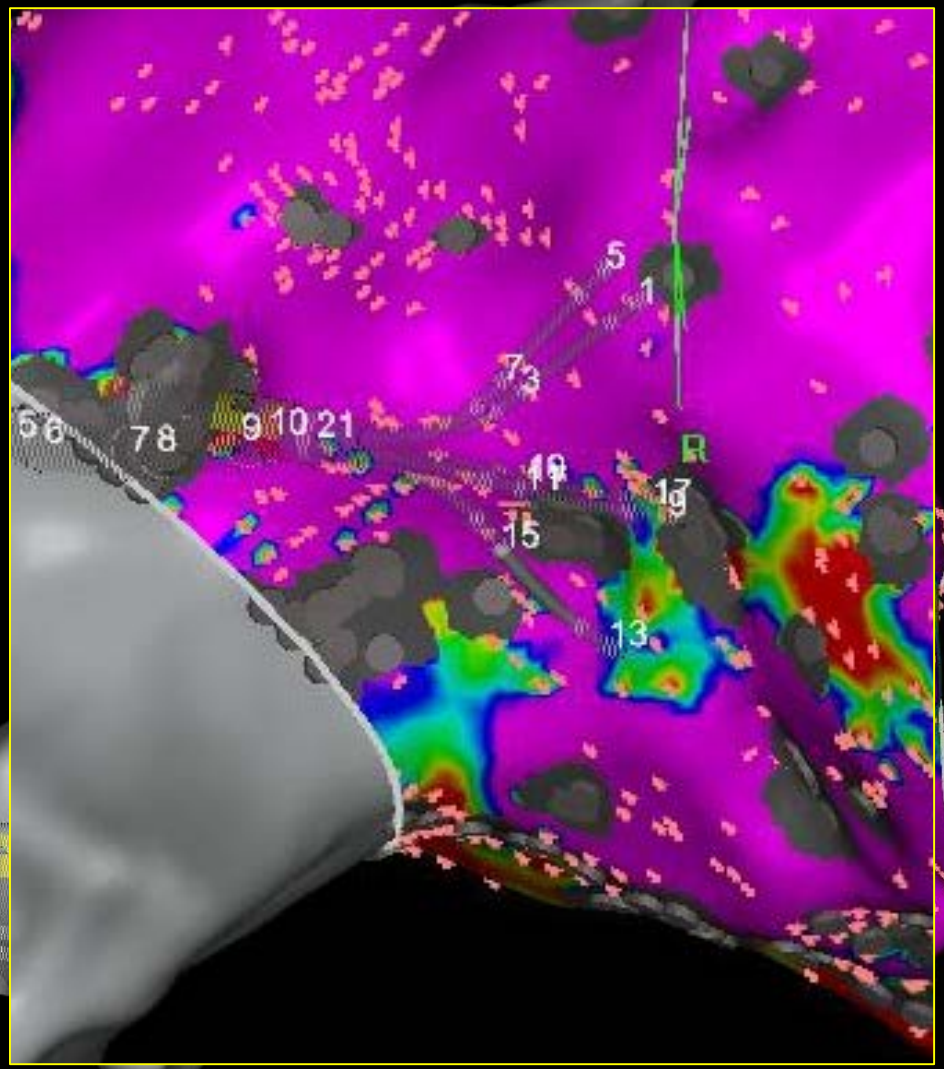
Mappa di attivazione



Mappa di attivazione

Mappa di propagazione




5
1
3
7
6
8
9
10
21
19
17
15
13
R

Conclusioni

Cateteri con **elettrodi ridotta dimensione** e **bassa spaziatura interelettrodica** registrano segnali patologici di bassa ampiezza meglio del tradizionale ablatore

Aumentando **numero** e **densità** dei punti di mappaggio si migliora la definizione dei circuiti di rientro

Queste informazioni sono inutili senza idonei **algoritmi software** in grado di filtrare e organizzare le informazioni

L'impiego dei cateteri ad alta densità unito ad algoritmi dedicati **facilita il trattamento delle aritmie complesse**