



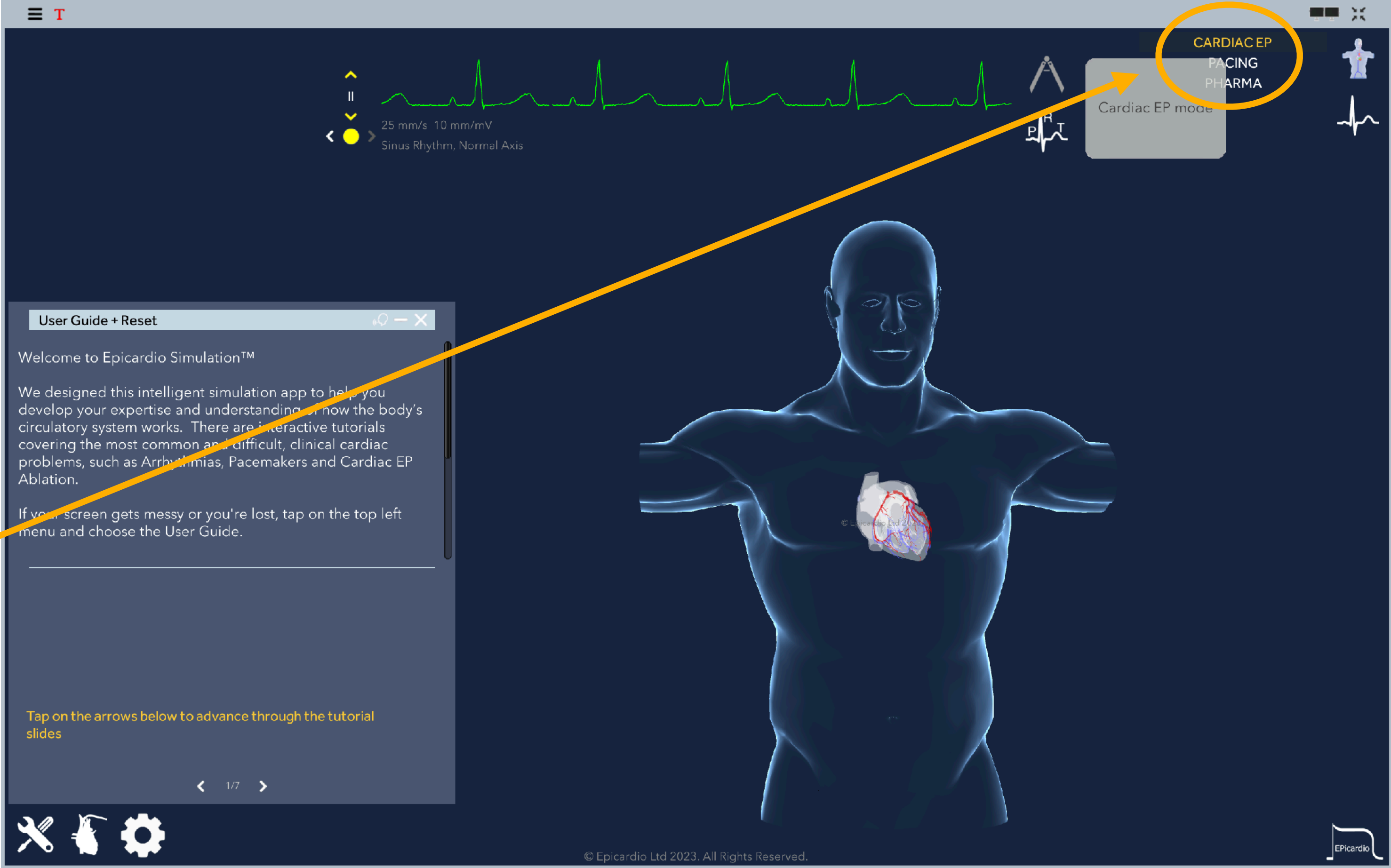
Epicardio Cardiac EP User Guide

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www.epicard.io

The Epicardio 'Cardiac EP' module has all the tools you need to perform an EP study.

Action: From the home screen, click on CARDIAC EP



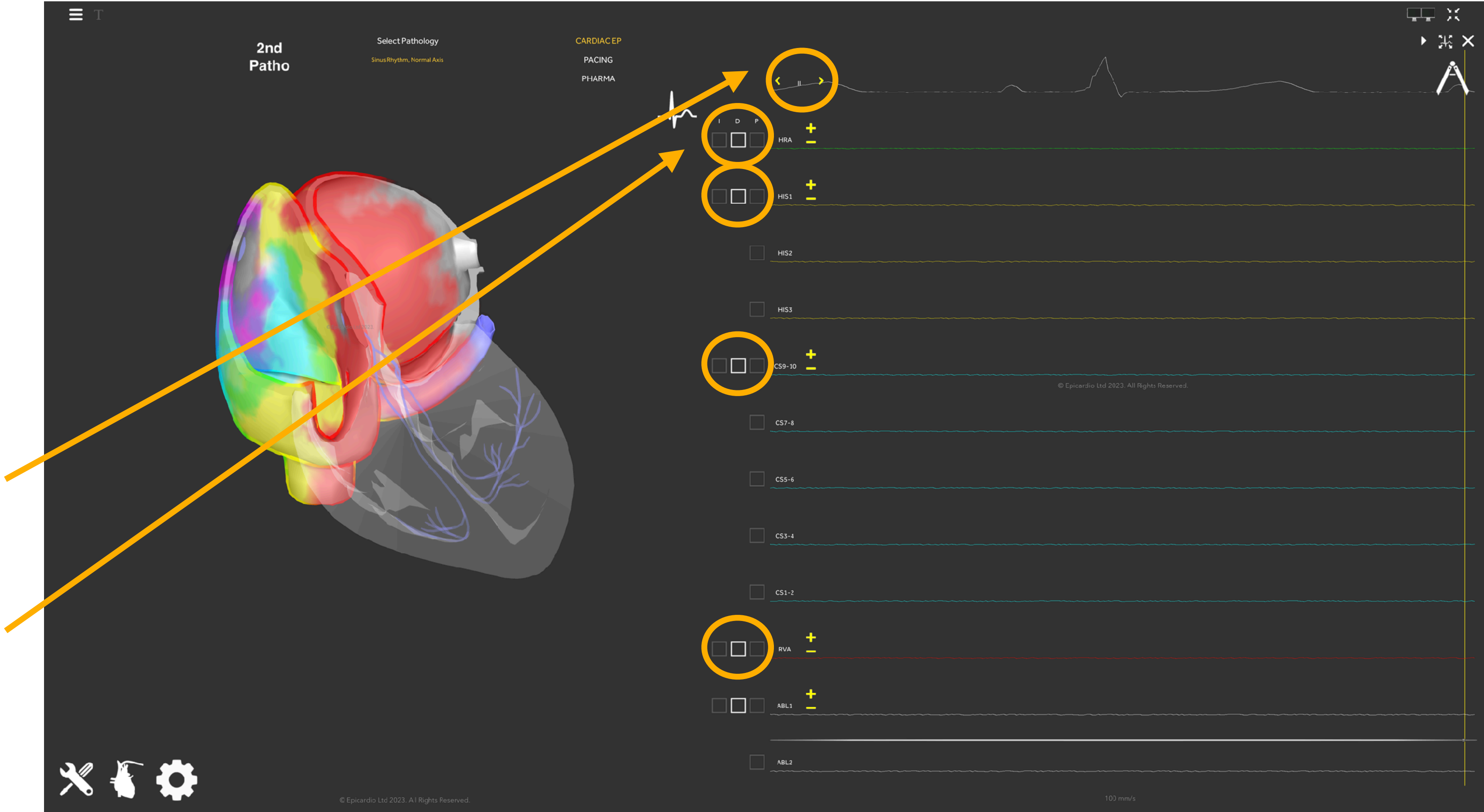
The left half of the screen shows the 3D heart with the live action potential wavefront. You may control the view using your mouse or pad.

The right half of the screen shows one ECG signal at the top, and the signals from the diagnostic catheters HRA, HIS, CS, RVA, and the ablation catheter ABL, below.

Action 1: Click on < > to select one of the 12 ECG leads at the top.

Action 2: Check the 'D' box (D = Default) next to each of the 4 diagnostic catheters: HRA, HIS, CS, RVA, to insert the respective catheter to its default position.

Ablation can only be performed by the ablation catheter. We will insert this catheter later, once we have a diagnosis.



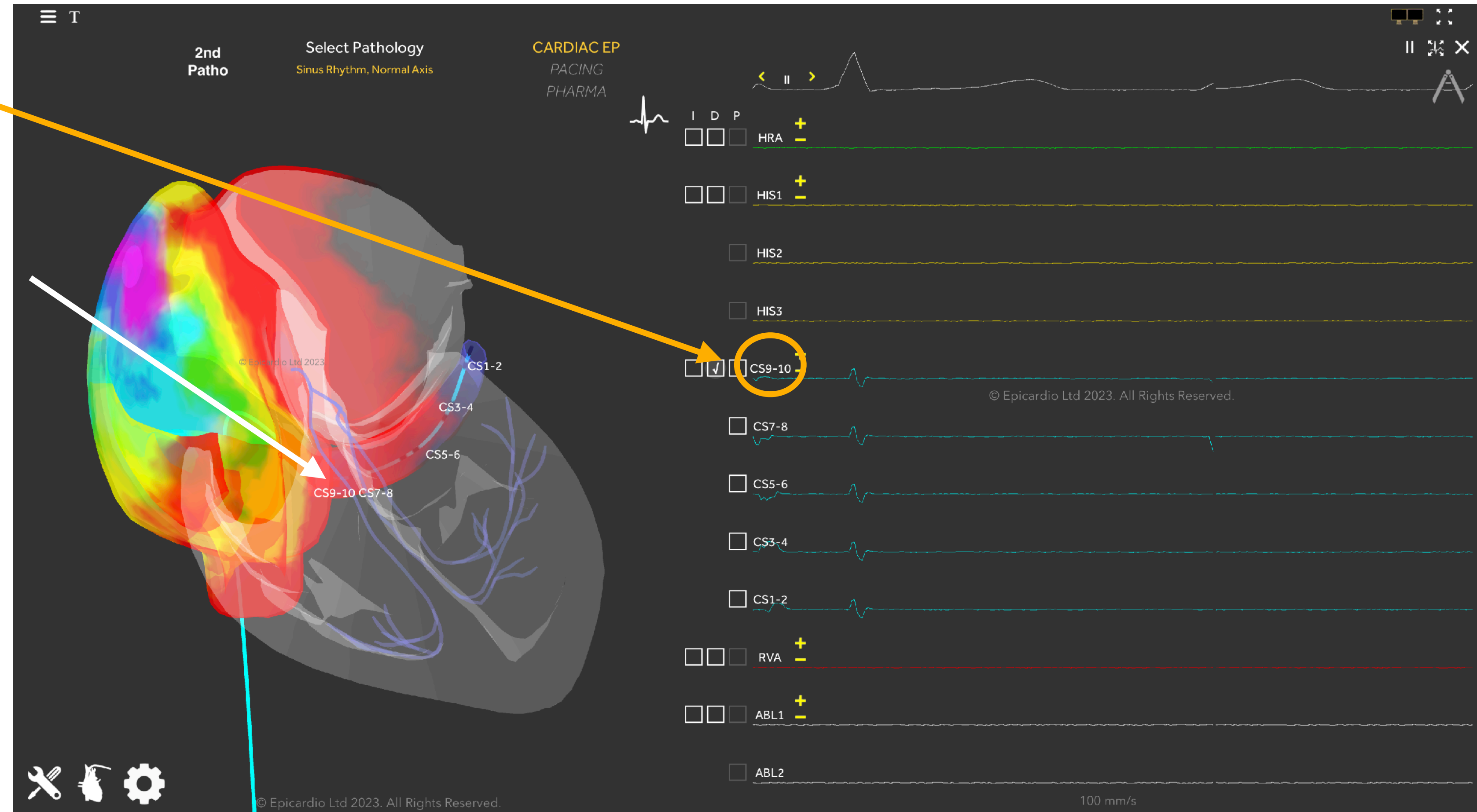
Key: HRA = High right atrium. HIS = Bundle of His. CS = Coronary sinus. RVA = Right ventricular apex. ABL = Ablation Catheter.

Observation 1: The numbers after the catheter name (e.g. CS9-10) refer to the bipole formed between pairs of electrodes on each catheter.

Observation 2: visualise CS9-10 at the ostium of the coronary sinus, found at the inter-atrial septum.

Clinical relevance: Marking the septum is very useful in differentiating left from right atrial rhythms:

- Any electrical signal progressing from CS9-10 leftwards must be coming from the septum or right atrium.
- The site of earliest activity at any CS bipole other than CS9-10 demonstrates a site of interest on the left side of the heart.
- Remember, most EP procedures don't have a handy heart model to guide us!



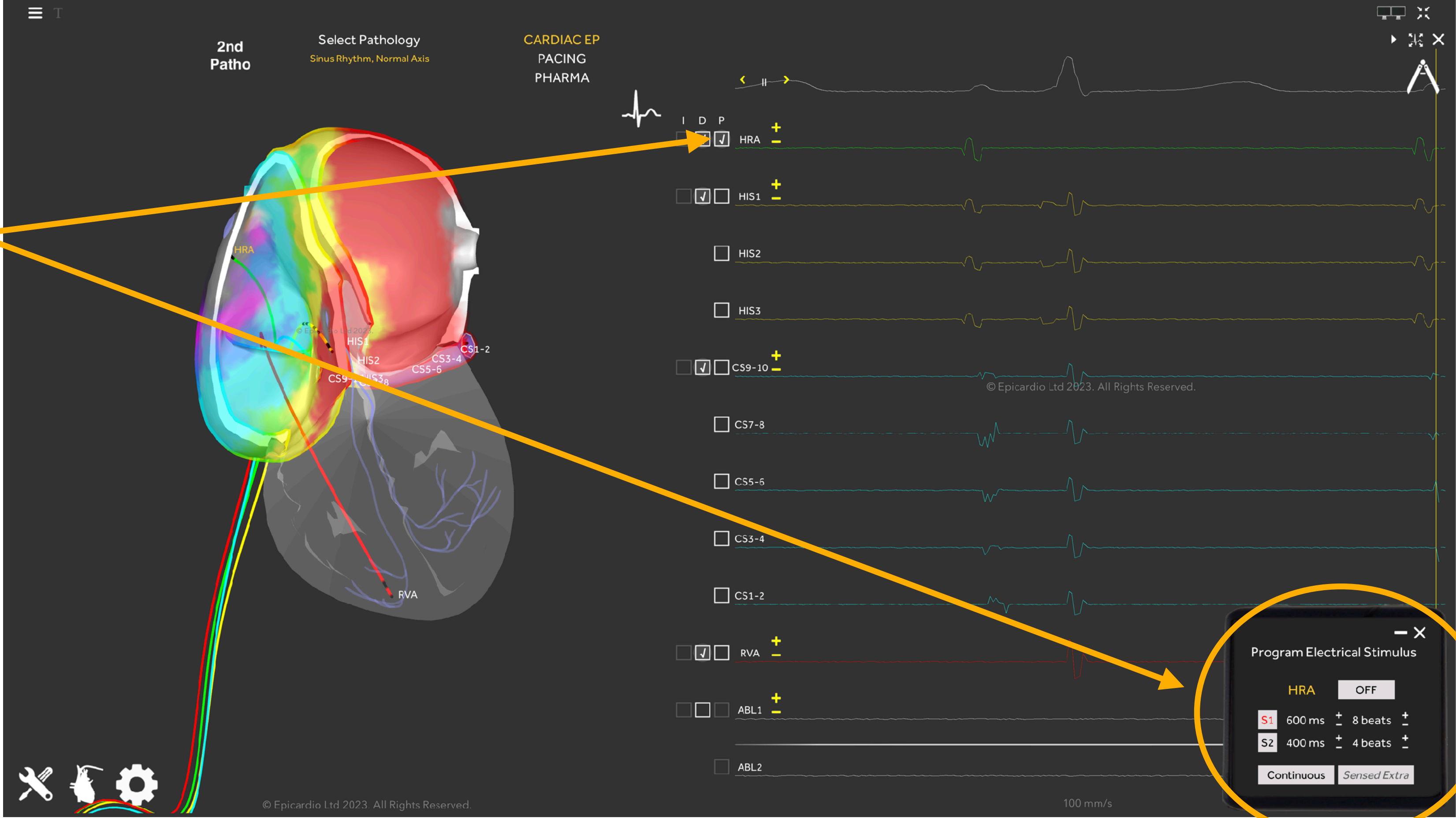
Once a catheter is inserted, the electrical signal (electrogram or EGM) from each each bipole will run in real time next to it's corresponding bipole pair name (e.g. CS9-10).

Observation: Note the high frequency His signal on the 3 HIS bipoles.



Action: Check the 'P' (P = Pacing) next to one of the bipole channels. You will see the Programmed Electrical Stimulus box appear in the bottom right corner.

Clinical relevance: We will use this pacing box to stimulate the heart and test various structures, such as the AV Node.

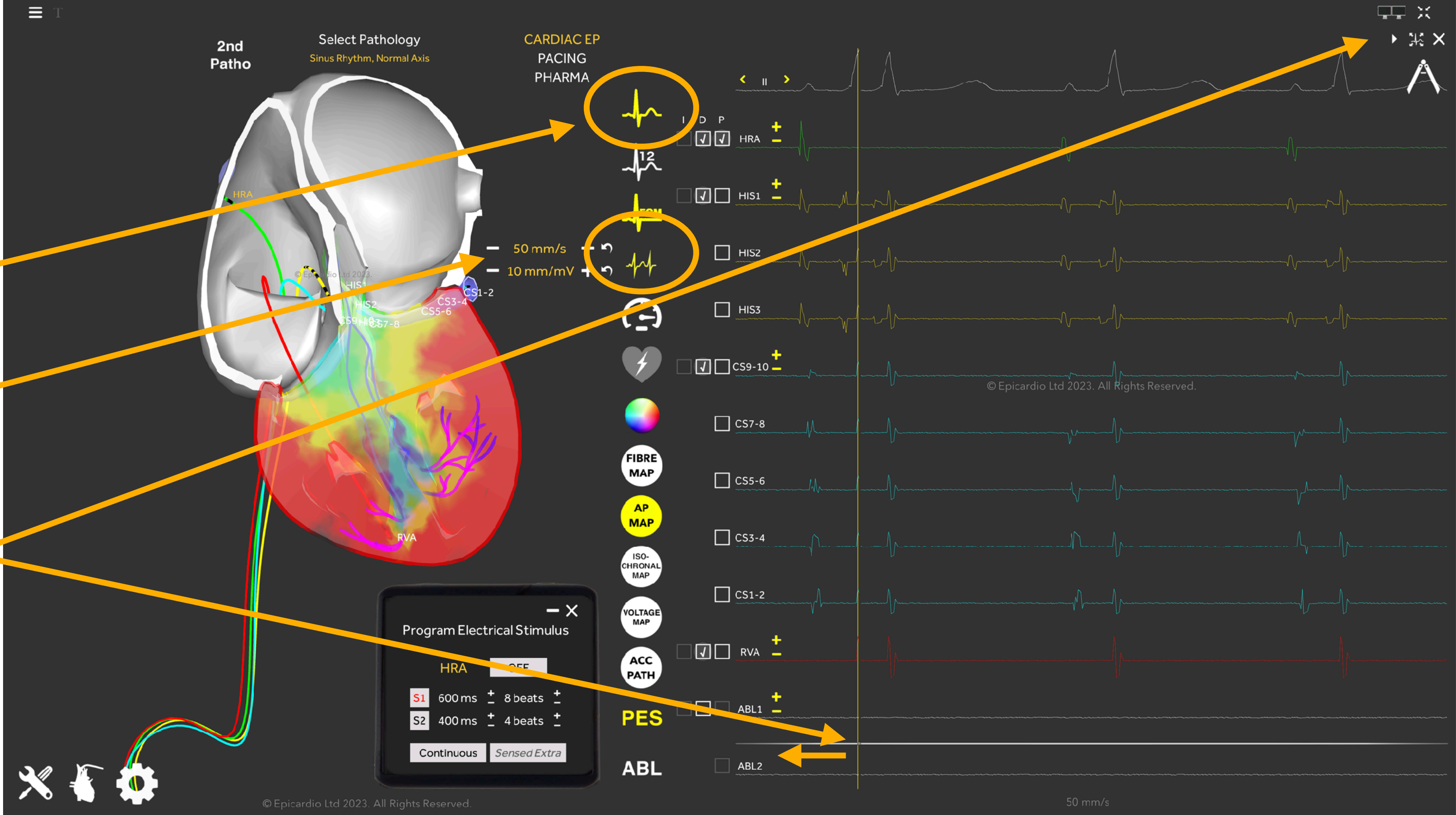


Action 1: Open the 'ECG Tools' menu

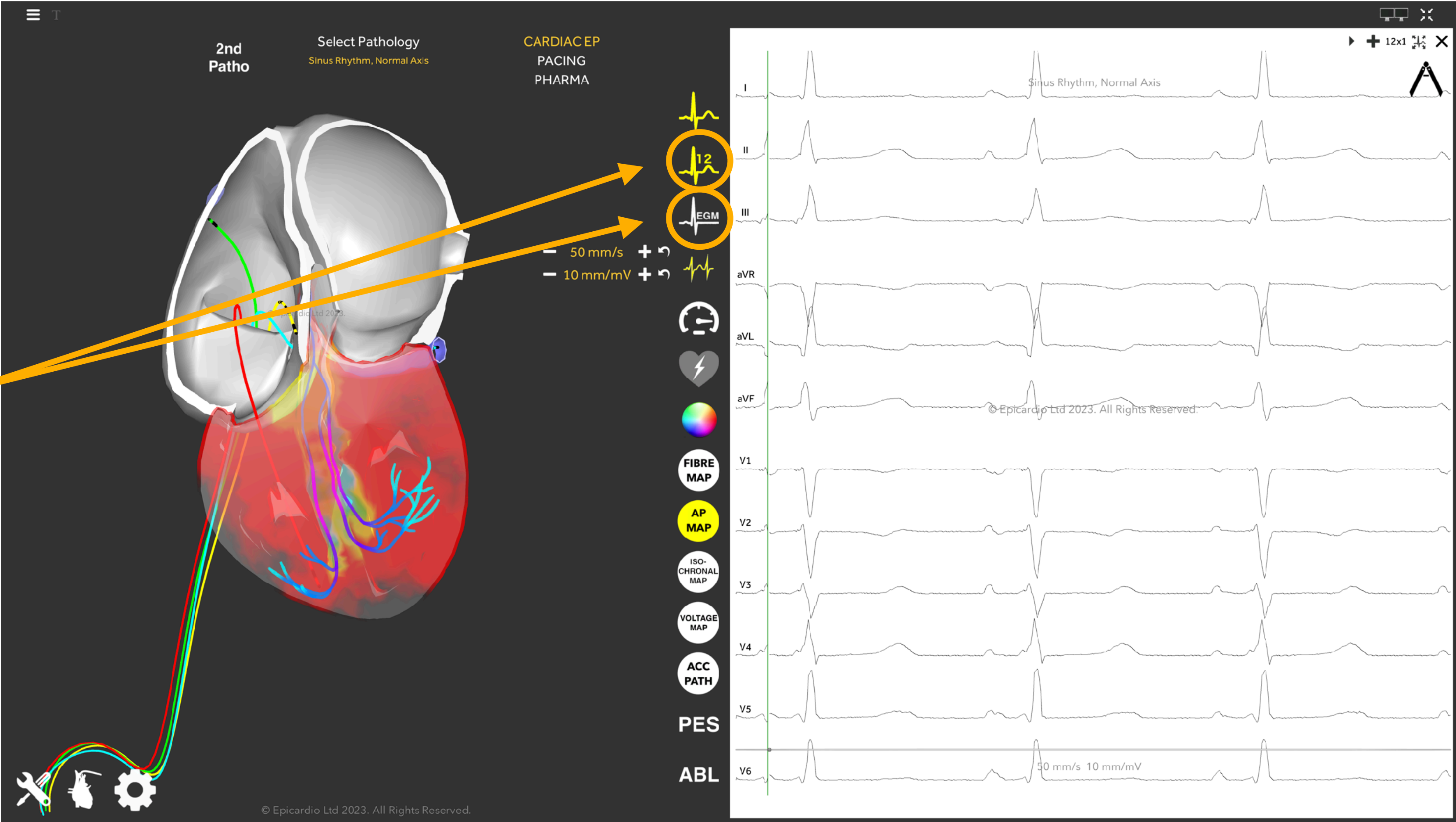
Action 2: click on 'ECG Speed and Voltage' icon. Change the ECG speed to 50mm/s. This will display more electrogram events on the page.

Action 3: Click on the Pause/Play button. The grey slider below allows you to scroll backwards through completed cardiac cycles.

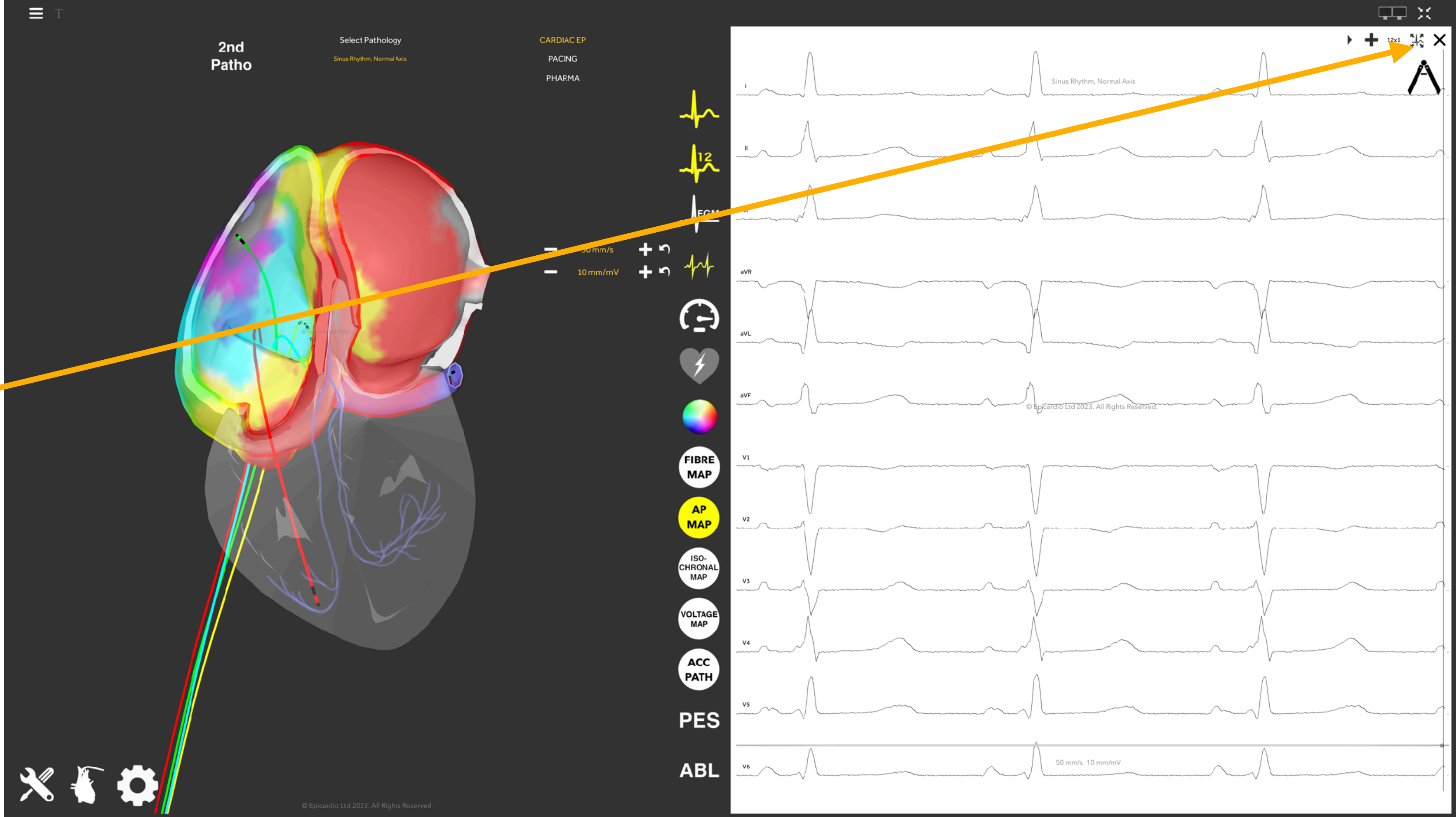
Action 4: Now interact with the rest of the tools on the screen. Pop-up tool-tips appear when the cursor is hovered over each tool icon.



Action: You can toggle between the '12-lead ECG' and the 'Electrograms' pages with the two icons here.

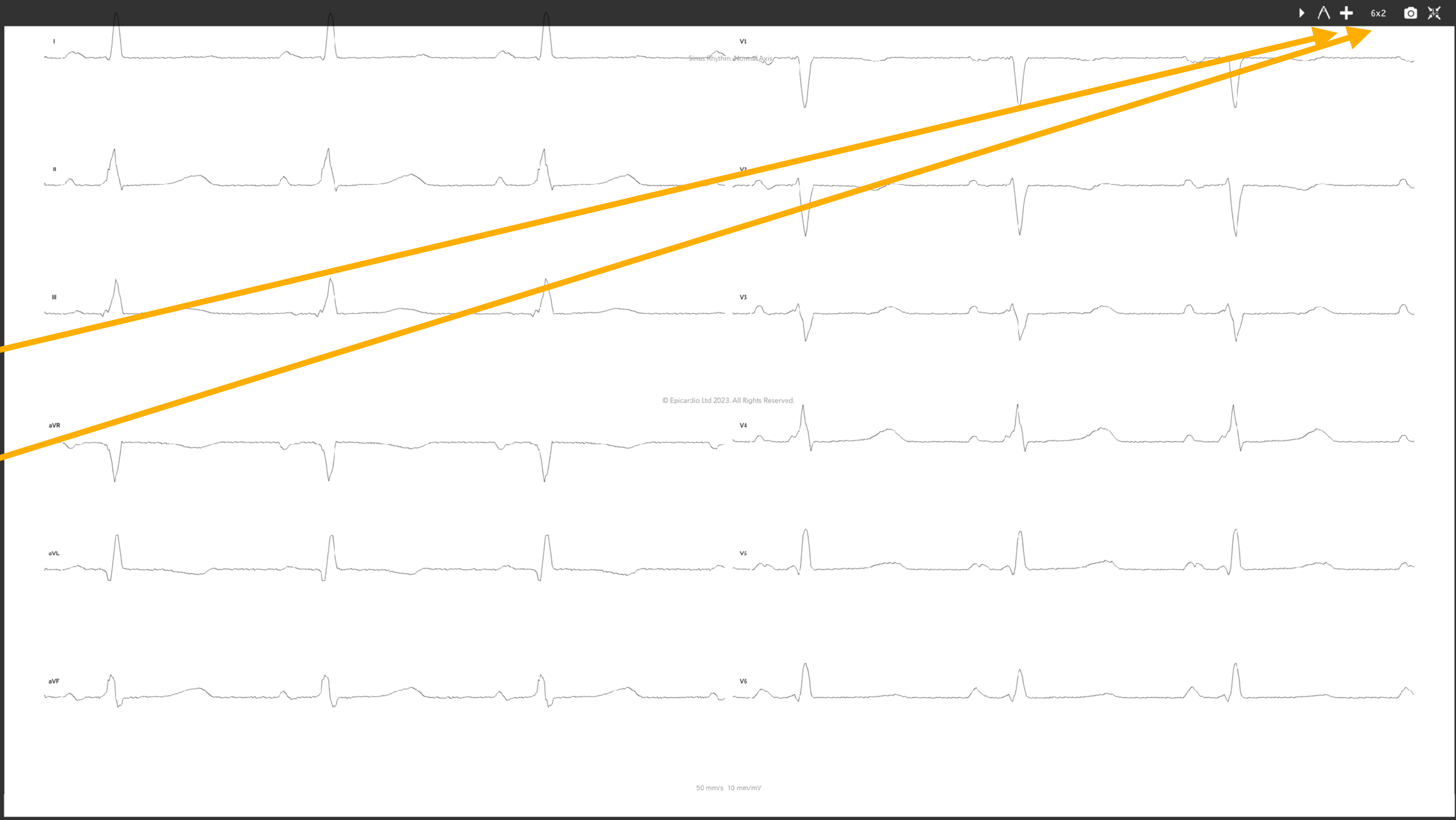


Action: Toggle between 'full window' and 'half window 12-lead ECG' here.



Action 1: The plus icon allows you to add an ECG paper layer to replicate clinical practice.

Action 2: In full window 12-lead ECG there is then option to change the ECG display format to 6x2, 3x4 and 12x1.



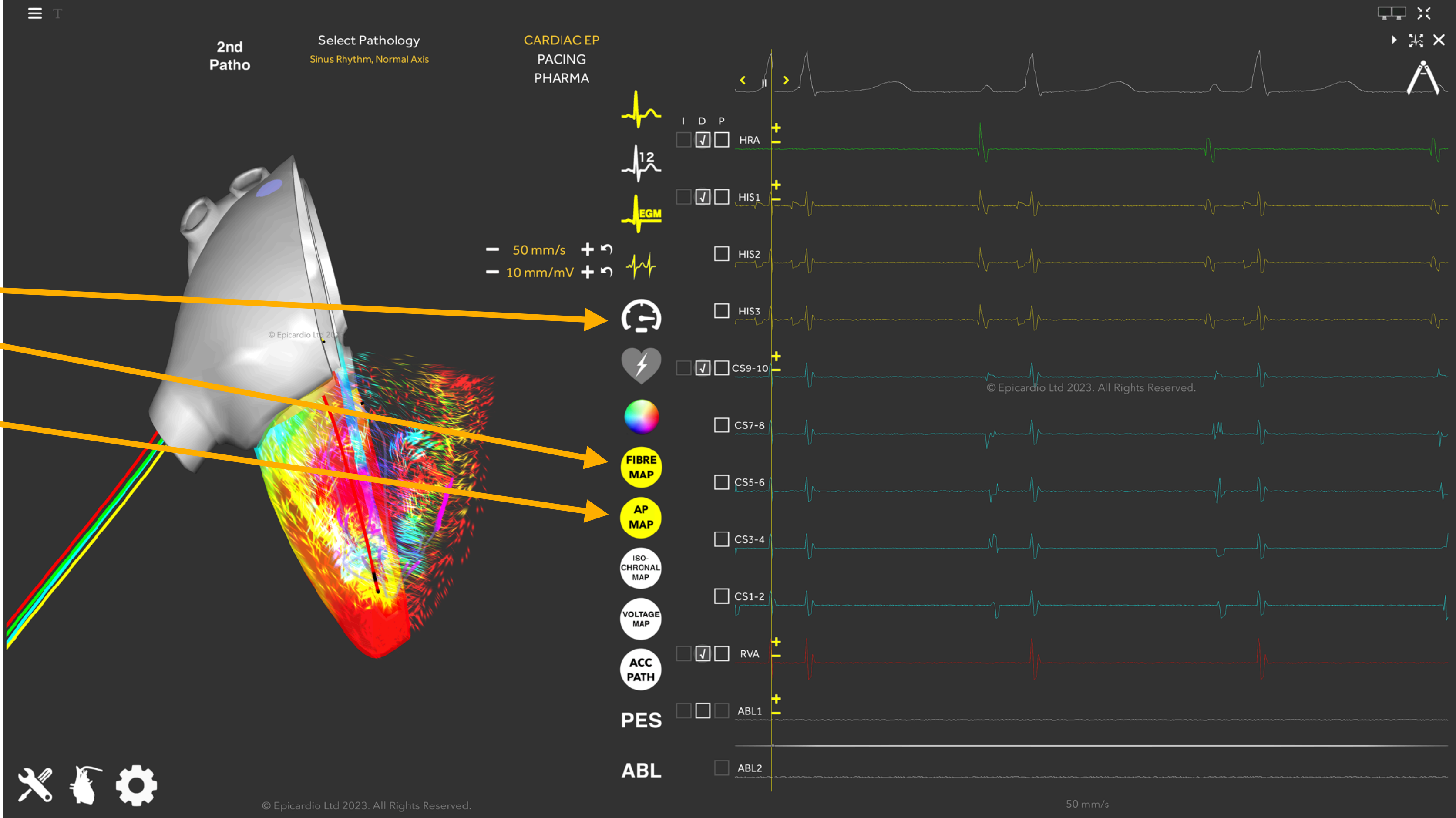
Action 1: The full window for EGM also has the option to turn on/off the display of the live heart model.

Action 2: You may also click on 'Pause/Play Simulation' button and use the grey slider below to scroll backwards through completed cardiac cycles.



Actions:

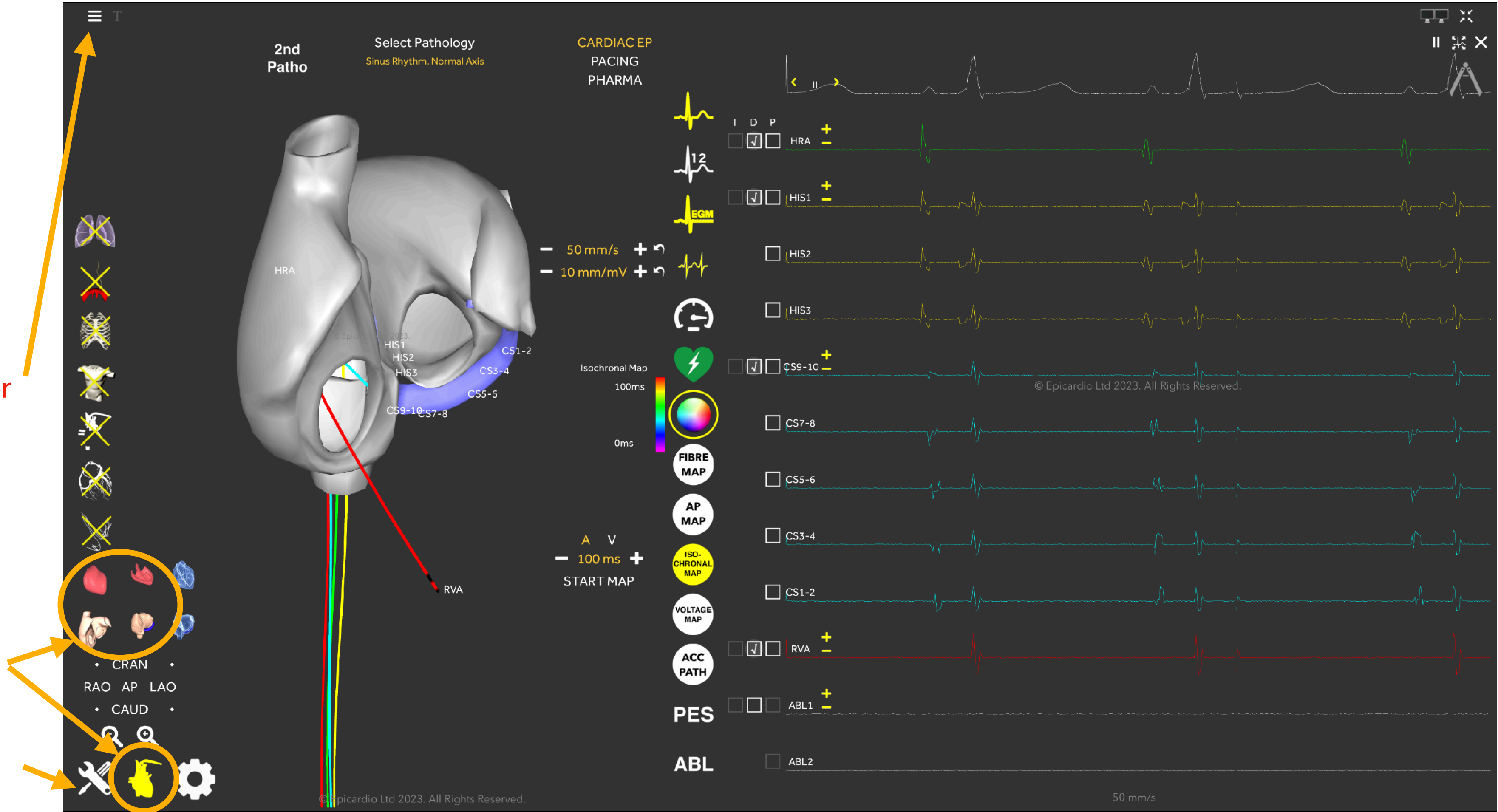
- Change the speed that the simulation runs at
- Turn the display of the myocardial fibre orientation ('FIBRE MAP') on and off
- Turn the display of the action potential ('AP MAP') on and off
- Perform manual:
 - 'Isochronal maps' (*in progress*)
 - 'Voltage maps' (*in progress*)



Action 1: If the page layout becomes too busy or complicated, select 'Main Menu', then 'User Guide and Reset'. This will take you back to the initial Epicardio home page.

Action 2: click on the 'Anatomical Views' icon. Click on 'Ventricles' or 'Atria On/Off' and 'Ventricles' or 'Atria in cross-section'.

Action 3: The 'Tools/settings' icon allows you to do some general layout formatting.



Action: The 'Intrinsic Heart Rate' cog icon allows you to change parameters of the cardiac structures, such as:

- Sinoatrial Node (SAN) rate
- Direction of conduction across the Atrioventricular Node (AVN)
- AVN conduction velocity
- AVN refractory point

