PHILIPS

HeartNavigator

Structural Heart
Disease procedures

Making the difference
with Live Image Guidance

Philips HeartNavigator – Insightful planning and guidance for Structural Heart Disease procedures

Key advantages

· Deeper anatomical
understanding to plan and
perform TAVR/TAVI, mitral
valve replacement and LAAC
procedures

· Immersive user experience
and fully automated
tasks simplify planning,
measurement, device
selection and choice of
optimal X-ray viewing angle

· Enhanced insight into
calcification distribution

Our Live Image Guidance intuitively integrates multi-modality imaging and workflow guidance to help you open doors to new procedures and techniques, and deliver relevant clinical value where it's needed most – at the point of patient treatment.

Planning is key

When planning a structural heart disease (SHD) procedure, an objective assessment on vascular anatomy can help you work with greater confidence and avoid complications. Understanding the patient's individual anatomy when planning a transcatheter aortic valve replacement or implantation (TAVR/TAVI), mitral valve replacement, left atrial appendage closure (LAAC) or other SHD procedure helps you select the appropriate approach, and size and type of a device. In addition, safely navigating the valve delivery devices through anatomy and deploying the valve in the correct position are recognized as technical challenges when performing TAVR/TAVI procedures.

Today, CT-based planning is the gold standard for annulus sizing before a TAVR/TAVI procedure.[1] The CT volume can also be overlaid on the live fluoro image to provide real-time 3D insight during the procedure. At the same time, CT imaging can be used to plan mitral valve replacement procedures.

Designed to help you stay focused

We've made HeartNavigator, our CT-based solution, simpler and more adaptable to meet your challenges. Now you can make your planning decisions based on a deep understanding of all anatomical parameters and calcification. HeartNavigator is designed to simplify planning, device selection and projection angle selection. The immersive user experience is highly automated to help you stay focused on the patient and the task at hand. During the procedure, HeartNavigator provides live image guidance to support you in positioning a device.

Greater insight and confidence
in finding and treating the problem

Our Live Image Guidance expands clinical capabilities through intelligent and intuitive integration of multi-modality images at the point of treatment, enabling confident diagnosis and real-time therapy monitoring.

Fast, simple planning support
and live image guidance in one

With HeartNavigator, you get fast, comprehensive support to help simplify planning for complex structural heart disease procedures. It creates an excellent volume-rendered 3D image of the heart from previously acquired DICOM compliant CT datasets. The heart is automatically segmented according to the type of procedures – TAVR/TAVI and other SHD procedures – to visualize relevant anatomical structures and landmarks.

For TAVR/TAVI, HeartNavigator automatically segments tissue, anatomical structures, landmarks, calcium and anatomical planes within the cardiac CT data. To facilitate mitral valve replacement, LAAC and other structural heart disease procedures, HeartNavigator automatically segments the entire heart. Different visualization options are available to inspect the 3D data. The 3D volume can also be rotated along two axes to view it from all perspectives.

Automatic landmarks
For additional guidance, HeartNavigator automatically places landmarks on a large variety of anatomical structures, including the ostia of the coronaries, 3 nadirs, etc. They can be manually adapted as needed.

Automatic measurements
Our quick measurement tool generates all industry standard measurements in one overview. A single click creates area, perimeter, diameter and distance measurements of anatomical structures for TAVR or TAVI procedures. The measurements are performed within the automatically detected anatomical planes and are highly robust compared to manual measurements. They can be manually adapted as needed. The area, perimeter, diameter and distance measurements are shown on the centerline displayed on the image, and can be freely positioned to support precise planning.
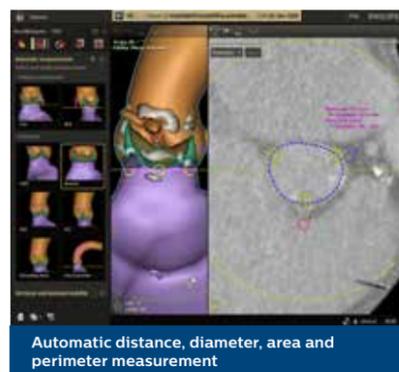
Automatic distance, diameter, area and perimeter measurement

Automatic centerline measurement along the ascending aorta
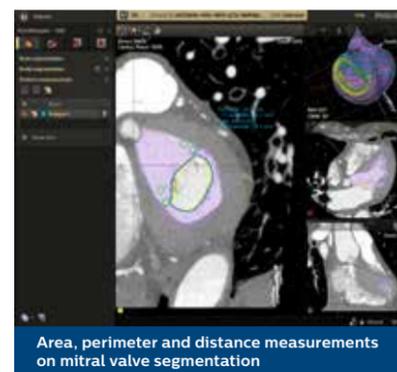
Area, perimeter and distance measurements on mitral valve segmentation

Calcification visualization
HeartNavigator provides enhanced insight into the distribution of calcifications in the ascending aorta, aortic valve annulus, and left ventricle. This can help you determine the severity and location of calcification and thereby avoid potential complications during procedures. Calcification is shown as a semi-transparent mass with the standard measurement parameters and as a colored object on the 3D volume. Knowing where aortic calcifications are located can be helpful for access planning as well.

Automatic selection of optimal projection angles
To provide additional planning support, HeartNavigator automatically determines the most optimal projection angles to use during the procedure. This can avoid the need to acquire multiple aortagrams. The position of these projection angles can be recalled with one click at tableside, so no additional X-ray runs or image planes are required during the procedure.

3D virtual device templates
3D virtual device templates of many of the latest TAVR/TAVI devices can be overlaid on the segmented CT data to assess the appropriate device size. Different sizes and shapes of virtual devices, modelled to the manufacturer's specifications, can be visualized on the CT data to give a reference fit for the patient.

Integrated 3D live image guidance
After planning, your pre-operative CT-based planning data is available on the Philips X-ray system as live guidance to support device navigation. This reduces the need for additional X-ray and contrast medium during the procedure. The live fluoroscopy image can be matched with the 3D image of the ascending aorta to show the exact position of all catheters and devices in relation to the reference image. Having these visual reference points available on screen provides feedback for navigation through the vasculature.

Table and L-arm movements are automatically compensated, to keep the 3D volume matched with the live fluoroscopy image when the table or L-arm is moved.

During the course of the procedure, the optimal X-ray views as determined by the HeartNavigator and can be recalled on the X-ray system from tableside.

Comprehensive report
HeartNavigator automatically generates a report with all relevant measurements, optimal viewing angles and the selected device. The report can be printed out for use in the exam room or stored on the PACS for record keeping purposes.

Automatic calcification visualization and segmentation

Up to date virtual device library
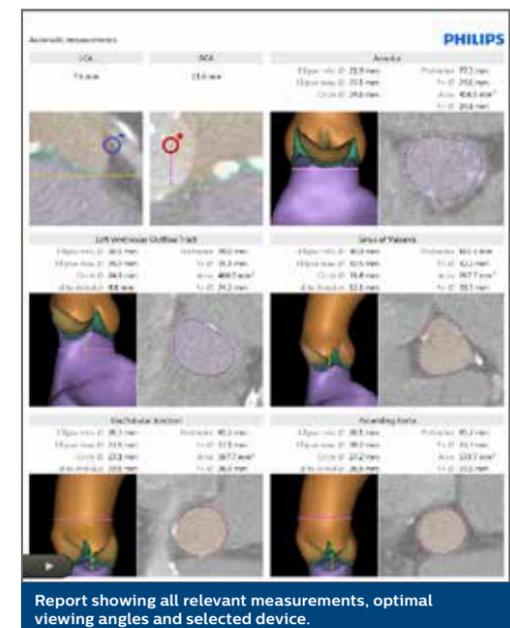
Report showing all relevant measurements, optimal viewing angles and selected device.

Immerse yourself
in the procedure

Planning a SHD procedure should be easy and understandable for all clinicians, no matter what level of experience they have. During planning and the procedure, it is critical to maintain full focus on the clinical question at hand.

This makes the intuitive use of HeartNavigator of utmost importance. Through its advanced imaging capabilities and immersive user experience, HeartNavigator creates a seamless clinical workflow from planning through navigation. It guides you through five simple steps:

Step 1 Segmentation	**Step 2** Measurement	**Step 3** Planning	**Step 4** Registration	**Step 5** Live Image Guidance

- **Step 1** Segmentation
  - Automatic segmentation showing 3D anatomical structures and landmarks
  - Automatic calcium visualization and segmentation

- **Step 2** Measurement
  - Automatic TAVR/TAVI distance, diameter, perimeter and area measurements

- **Step 3** Planning
  - Automatic projection angles (based on the calculated planes and landmarks).
  - Personal projection angles can be stored.
  - Real virtual device templates for most commonly used TAVR/TAVI devices

- **Step 4** Registration
  - Automatic import of live X-ray images.
  - The 2D X-ray images can be manually matched with the 3D volume.
  - Live x-ray images can be stored for reuse

- **Step 5** Live Image Guidance
  - 3D live overlay on live X-ray image to get real-time feedback during navigation.
  - Automatic image orientation during C-arm and table movements
  - Automatically provided and manually stored viewing angles can be recalled from tableside

Case gallery
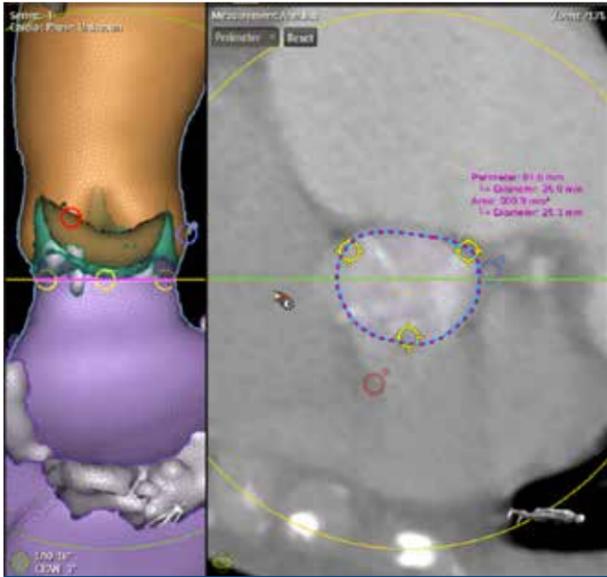
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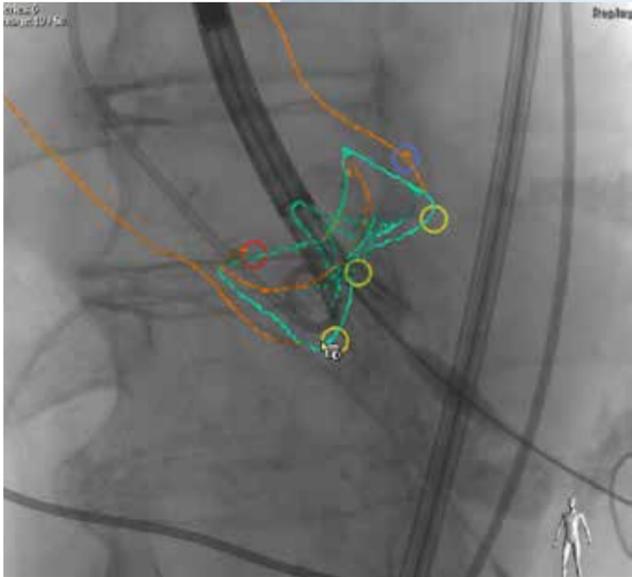
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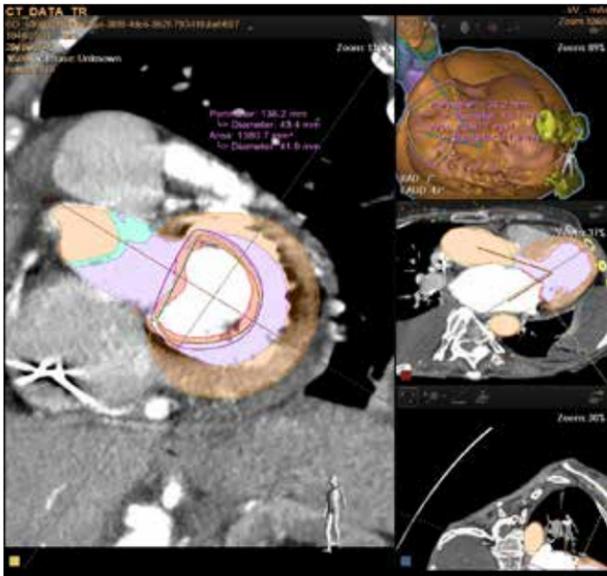
Mitral Valve Replacement procedure planning

LAAC procedure planning

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