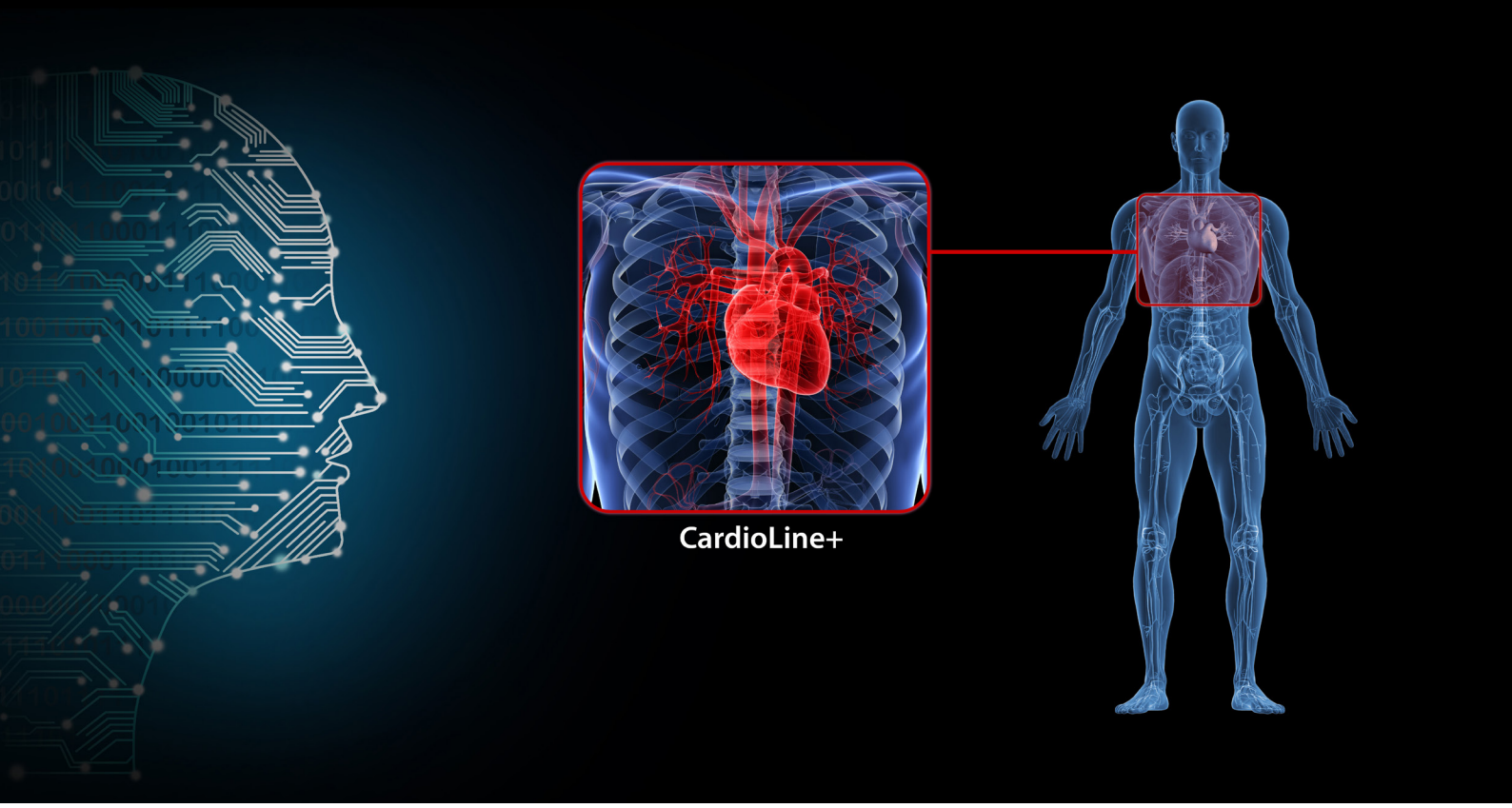
Canon

Auto Scan Assist

SUREVOI Cardiac and CardioLine+



SUREVOI Cardiac and CardioLine+ Provide Increased Throughput and Ease of Use: A Customer Perspective

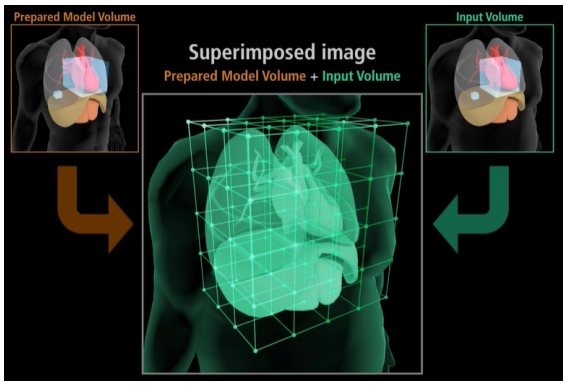
Heart disease is the leading cause of death in the United States. More than 650,000 Americans die of heart disease each year.[1] That's one in every four deaths in this country.

Cardiac MR is continuing to gain momentum as the modality of choice for diagnosis and characterization of myocardial tissues related to heart disease. It provides detailed MR images of the anatomy and structures within and around the heart, which can be used to detect or monitor cardiac disease and evaluate the heart's anatomy and function.

Due to the complexity of cardiac anatomy Cardiac MR can be time consuming and at times difficult to perform. Time is required to acquire initial locators and set up for each of the individual cardiac planes. Because of this, sites will occasionally designate one of the technologists as the "cardiac tech" which can limit the access that a patient may have to a cardiac exam. By automating and streamlining workflow, CardioLine+ brings Cardiac MR to the routine clinical exam environment.

Auto Scan Assist: Cardiac Package

The Auto Scan Assist Cardiac Package includes tools that provide positioning support functions for cardiac scans, making the exams quicker, reproducible, and more accessible.



SURE VOI Cardiac, included in the Auto Scan Assist Cardiac Package, uses a 3D image as an input to check the patient's position. This information can be used to adjust the couch so that the heart will be centered in the magnet and the appropriate coil elements can be selected. This will improve homogeneity and automatically set up the coverage for shim scan, MAP scan, and multi-slice axial scan for CardioLine+. SURE VOI also assists with whole heart coronary scanning by determining placement of the probe scan used for free breathing Real-time Motion Correction (RMC) based on organ recognition of the heart and liver.

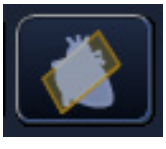
CardioLine+, Cardiac Plane Positioning Support Function, automatically detects anatomic landmarks for accurate and reproducible positioning of the standard views recommended by SCMR.[2] The software uses a set of 3D images, acquired through the chest in a single breath hold, to determine the anatomy and orientation of the heart, automatically aligning for 14 different anatomic views plus one straight axial of the heart.

Left ventricular standard planes
Left ventricular Vertical Long Axis
Left ventricular Horizontal Long Axis
Left ventricular Short Axis
Left ventricular 4-chamber
Left ventricular 2-chamber
Left ventricular 3-chamber

Right ventricular standard planes
Right ventricular Short Axis
Right ventricular 4-chamber
Right ventricular 2-chamber
Right ventricular 3-chamber

Cardiac valve standard planes
Left Ventricular Outflow Tract
Right Ventricular Outflow Tract
Aortic Valve
Pulmonary Valve

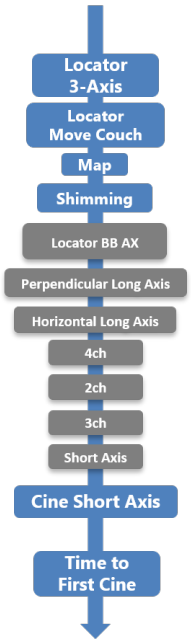
CardioLine+ provides cross reference images in the preview window for each plane that is detected. At any time, the technologist is able to override the detected planes and customize angles for congenital abnormalities or unusual anatomy if necessary. Default views, for automatic detection, can be customized for the pathology being evaluated, or to a clinician's preference. The cardiac exam can extend to the right heart or valve planes without fully imaging the left heart.



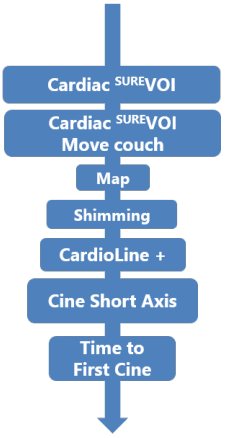
Once the standard views are determined by the CardioLine+ software those views can be applied to any sequence used for the cardiac exam.

The software flexibility allows alignment of cardiac planes to be manually adjusted by the technologist or fully automated, reducing multi-operator variability and standardizing the MR cardiac exam. CardioLine+ shortens exam duration by reducing the time involved in acquisition of additional locators, manually positioning individual planes, and total number of breath-holds. Thus, improving workflow efficiency and the overall patient experience.

Number of BH	Conventional Sequence	Estimated time savings
1	Locator	Acquisition 0:12
2	Locator with move couch	Acquisition 0:12 Set up 0:10
3	Map	Acquisition 0:16 Set up 0:15
4	Shim	Acquisition 0:15 Set up 0:15
5	Loc BB	Acquisition 1:00 Set up 0:15
6	Perp LA	Acquisition 0:04 Set up 0:15
7	Horizontal LA	Acquisition 0:04 Set up 0:15
8	4 CH	Acquisition 0:04 Set up 0:15
9	2 CH	Acquisition 0:04 Set up 0:15
10	3 CH	Acquisition 0:04 Set up 0:15
11	SA	Acquisition 0:04 Set up 0:15
12	Cine Short Axis	
		Acquisition 2:19 Set Up 2:25
Time to First Cine		4:44



Number of BH	SUREVOI and CardioLine	Acquisition Time
1	Cardiac SUREVOI	0:09
2	SUREVOIMove Couch	0:09
3	Map	0:16
4	Shim	0:15
5	CardioLine	0:21
6	Cine Short Axis	
Time to First Cine		1:10



Times for manual set up are approximated and may be longer or shorter depending on the level of the technologist's cardiac expertise.

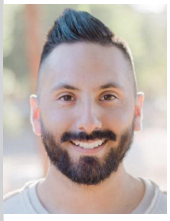
Customer Experience

Salinas Valley Memorial Healthcare System has a well-established, dedicated non-invasive cardiovascular facility in Central California lead by Medical Director, Kanae Mukai MD. This site employs the expertise of dedicated cardiac technologists and uses CardioLine+ to perform cardiac exams on a daily basis.

Technologist Testimonial:

"Time savings, which is critical to our center and patient care, is a major benefit of using CardioLine. As a tech, CardioLine helps streamline the views. I don't have to spend as much time finding the perfect angle and view and can focus more on the patient."

"Currently it saves me about 10-15 minutes per study. Love it!"



Nehemiah Gallardo, R.T.(R)(MR)(CT)(ARRT), MR technologist, SVMHS

Technologist Testimonial:

"I have been performing cardiac MRI scans for 12 years. CardioLine is able to assist in my day to day workflow by allowing me to spend more time focusing on other parts of an exam like reviewing already acquired images for quality, additional pathology or abnormalities."

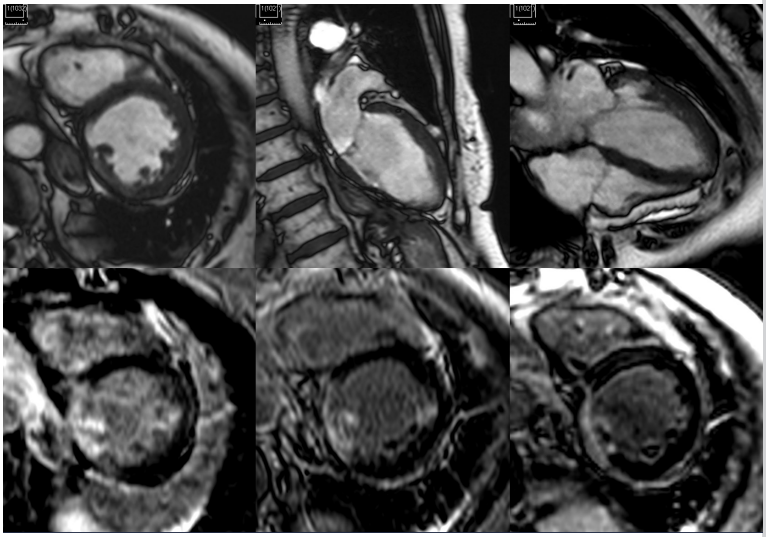
"CardioLine is a time saver, cuts approximately 30-50% off manual cardiac planning time."

Michael Lake, CNMT, R.T. (N)(MR)(ARRT), MR technologist, SVMHS

CardioLine can be applied to any of the site's cardiac protocols.

Testimonial:

"CardioLine+ reduced table time on average between 10 to 15 minutes with a seasoned technologist and as much as 25 minutes with a new technologist in training. Leveraging the semi-automated features has been instrumental in improving scan efficiency and patient experience as a result."



Kanae Mukai, MD, FACC, FSCMR
Level 3, Cardiovascular MRI, CT, Echo, and Nuclear Imaging
Diplomate, CBCMR, CBCCT, NBE, and CBNC

References:

[1]National Vital Statistics Reports Volume 70, Number 9 July 26, 2021.U.S. Department of Health and Human Services, Center for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics Reports Volume 70, Number 9 July 26, 2021 Deaths: Leading Causes for 2019 (cdc.gov).

[2]Society for Cardiovascular Magnetic Resonance (SCMR).

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