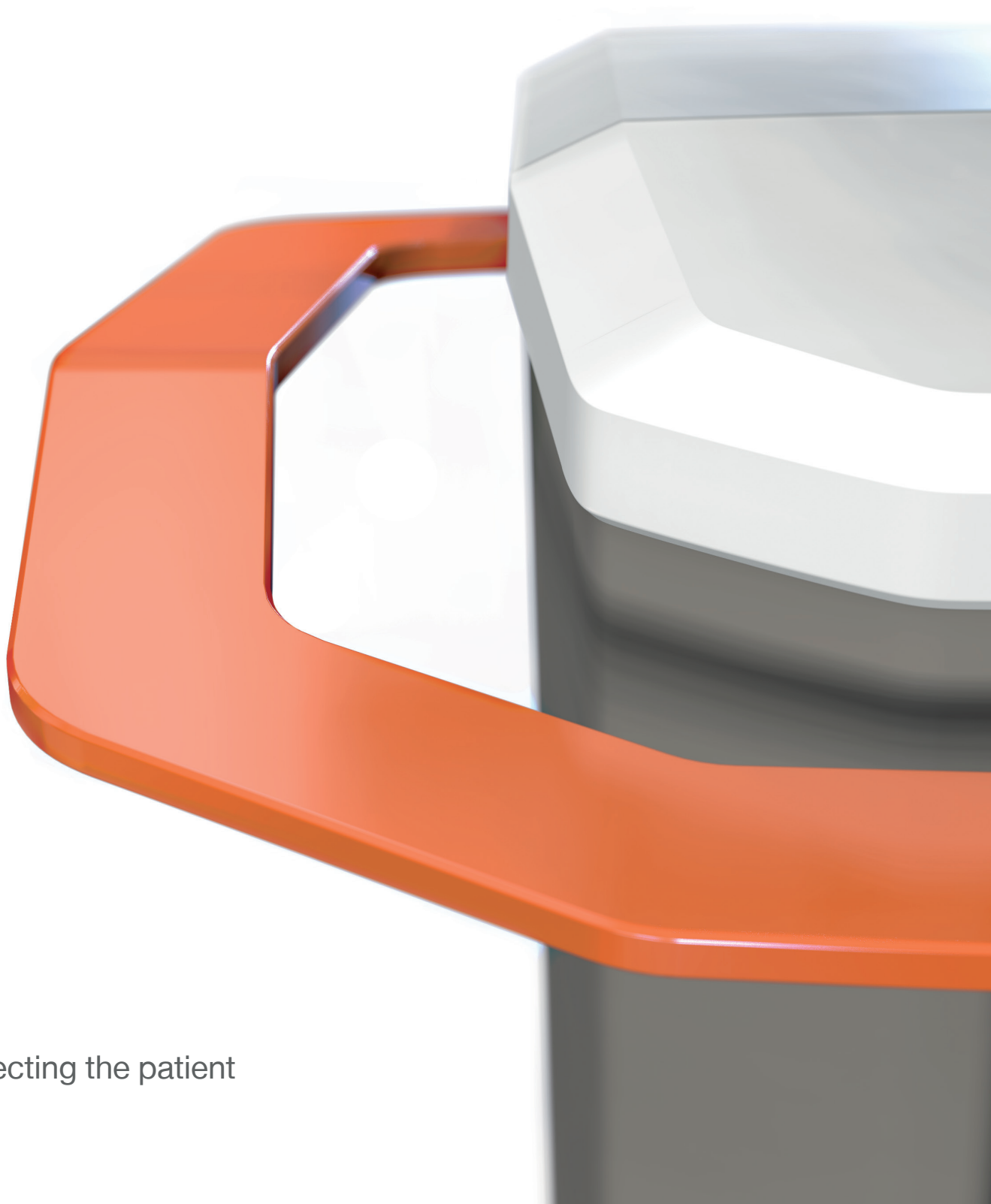


MiraQ Cardiac

Intraoperative
Imaging and TTFM



Protecting the patient

Use intraoperative ultrasound imaging and flow measurement during cardiac surgery and protect the patient.

The **MiraQ™ Cardiac** combines ultrasound imaging and transit time flow measurement (TTFM) in a single system that is specifically designed for cardiac surgery.

There is growing support of the idea that checking grafts and anastomoses during cardiac surgery should be standard of care. Reliability and ease of use is a major determinant for this to become reality.

The **MiraQ™ Cardiac** system has built-in support for Guided Workflows. These are software protocols that assist the user to a standardized approach to quality assessment. Intraoperative quality assessment has become easier to adopt, customizable to the surgeon's needs and enhancing work efficiency.

Combining imaging and flow for better quality assessment

The **MiraQ™ Cardiac** system uses Medistim's flow measurement and high-resolution ultrasound Imaging probes to provide a complete quality assessment.

Medistim's L15 High-frequency ultrasound Imaging probe provides high-resolution images that allows the surgeon to assess morphology. Medistim's flow probes utilize transit time technology to accurately measure blood volume flow intraoperatively.

Combining the spatial information from epicardial ultrasound imaging and quantitative data from TTFM enables the surgeon to perform a prompt and accurate assessment, and revise the graft when necessary.

Epicardial imaging

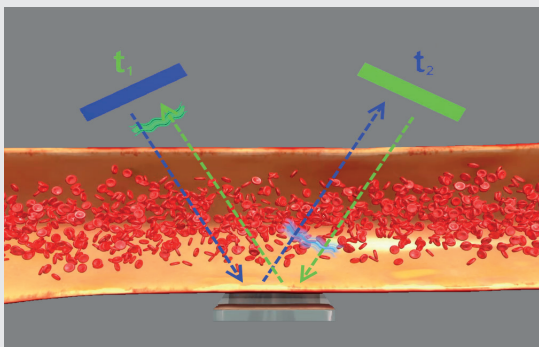
Epicardial ultrasound imaging gives a simple, fast and safe imaging of coronary stenoses and graft anastomoses, providing immediate feedback on the quality of the CABG surgery.

Transit Time Flow Measurement

Performing flow measurements with the **MiraQ™ Cardiac** is the quickest and most accurate way to verify graft patency while the patient is still in the operating room.

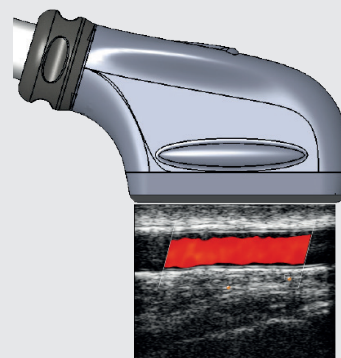
Epi-aortic imaging

Epi-aortic imaging provides a sensitive and direct diagnosis of aortic disease. This may lead to modifications of the surgical strategy and thus contribute towards reduced rates of major adverse cardiac and cerebrovascular events (MACCE).



TTFM

The TTFM principle is based on measuring the difference between upstream and downstream transit time of a wide ultrasound beam. The transit time difference is directly proportional to the blood volume flow. This measurement principle gives an accurate quantification of the real time volume flow that compliments the ultrasound imaging.



Imaging

Ultrasound imaging generates images by transmitting ultrasound pulses and receiving echoes from the pulses as they travel through the body. The received echoes are used to create an image of the target area. The color flow mode uses the doppler principle to detect and visualize blood flow. Pulsed wave doppler uses the same principle to measure blood flow velocity.

MiraQ Cardiac

Protecting the patient
with Imaging and TTFM

Adjustable display arm ensures
good visibility under all
conditions

Connect to external screens
and the hospital information
systems using the easily ac-
cessible media panel

Spatial efficient design allows
for flexible system placement
and movement in the operating
room

Easy access to imaging and
flow data through optimised
screen view and interactive user
interface

Use a Guided workflow for a
standardized approach to quality
assessment

Practical storage for user manual
and interface cables

The Medistim MiraQ™ Cardiac
System may be delivered as a
'Flow only' system, but can easily
be upgraded on-site to include an
Imaging module at a later stage



Guided Workflow

Standardized quality assessment

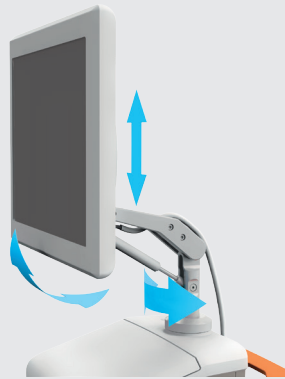


Utilize the Guided workflow software feature for a standardized approach to quality assessment. Create your own Guided workflow that describes your standard operating procedure, or use a community created template.

Minimize user interaction and increase work efficiency with preset measurement definitions and system configurations.

Full visibility

Efficient design



Optimize visibility with the flexible monitor display arm.

Rotate the screen to suit both the surgeon and the operators need.

Operating room integration

Expanded options



Connect to an external overhead screen using the easily accessible DVI port located on the media panel. The MiraQ™ Cardiac software has native support for configuring screen size and resolution.

Export and import data to the hospital's information system using the MiraQ™ Cardiac DICOM option. All systems come equipped with an isolated network connection, allowing for safe and secure access to the hospital network.

Upgrade to Imaging

Modular design

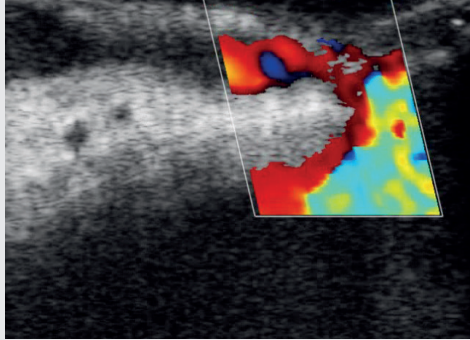


The Medistim MiraQ™ Cardiac System may be delivered as a “Flow only” system, but can easily be upgraded on-site to include an Imaging module at a later stage.

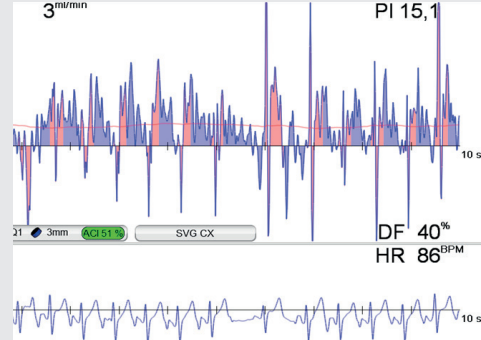
MiraQ™ Cardiac gives surgeons ultimate control, enabling planning, navigation and verification during cardiac surgery.

Instant feedback

See and measure



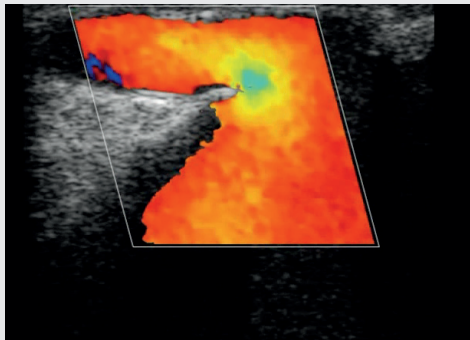
The MiraQ™ Cardiac provides instant feedback on the performance of a graft. Eliminate guesswork with ultrasound imaging visualization and quantifiable TTFM data.



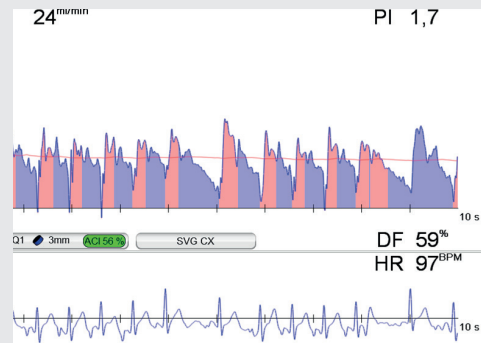
In the SVG-CX measurements presented here, ultrasound imaging was used to scan both the distal and proximal anastomosis for defects. An occluded proximal anastomosis was discovered and verified by a TTFM measurement (PI 15.1, DF 40% and Flow 3 ml/min).

Revise on the spot

Before closing



When occluded or underperforming grafts are detected they can be revised on the spot. Take every measure to avoid recalls.



The occluded SVG-CX was immediately revised, and the improved result was documented with ultrasound imaging and TTFM. As shown above, the graft flow was significantly improved (PI 1.7, DF 59% and Flow 24 ml/min).

Protecting the patient

Improved outcomes



Quality assessment with ultrasound imaging and transit time flow measurement during cardiac surgery protects the patient from serious adverse events and death.

Medistim MiraQ™ Cardiac Systems

Description	Channel configuration	Part number	System features
MiraQ Cardiac Imaging and Flow	Ultrasound Imaging 2 Flow channels 1 AUX channels	MQC12001	2D – B Mode CFM – Color Flow Mapping PW – Pulsed Wave Doppler TTFM - Flow measurement ECG Guided Workflow software
MiraQ Cardiac Flow	2 Flow channels 1 AUX channels	MQC02001	TTFM - Flow measurement ECG Guided Workflow software Upgradeable to Imaging

Field Upgrade Module

Description	Part number
Add Ultrasound Imaging module to a Flow only system	KMQC12001

Optional features

Description	Part number
2 Additional flow measurement channels	OP1
1 Additional Auxiliary measurement channel	OP3
Software support for external screen	MQ241502
1 Doppler Measurement channel	OP2
Color Printer	MQ200094
DICOM Interface	VQ100225

See Medistim's "Probe Application Guide and Product List" for an overview of available Imaging and TTFM probes.



PDF download

Guidelines for Flow and Imaging

1. Transit Time Flow Measurement (TTFM) should be used to verify graft patency, as recommended by guidelines issued jointly in 2010 by the European Society of Cardiology (ESC) and European Association for Cardio-Thoracic Surgery (EACTS).
Guidelines on myocardial revascularization.
European Heart Journal (2010) 31, 2501–2555.
2. Epiaortic imaging guidelines published in 2007 by the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists have been endorsed by the Society of Thoracic Surgeons.
Glas et al. Guidelines for the performance of a comprehensive intra-operative epiaortic ultrasonographic examination: recommendations of the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists; endorsed by the Society of Thoracic Surgeons.
J Am Soc Echocardiogr. 2007 Nov;20(11):1227-35.
3. Medistim's VeriQ™ system recommended by NICE for routine clinical use (Nov 2011):
The National Institute for Health and Clinical Excellence (NICE) has accepted the health economics derived from routine usage of the VeriQ system for assessing graft blood flow during coronary artery bypass graft (CABG) surgery, compared to clinical assessment alone. NICE reports an estimated cost saving of more than £115 per patient. NICE also support the clinical evidence, suggesting reduction of early graft failure, stroke, myocardial infarction or recurrent angina.
Medical technologies guidance MTG8. Issued November 2011.

Please refer to the User Manual for indications, contraindications, warnings, precautions, and further specifications and descriptions. Specifications may be changed without notice. For a list of probes, contact your Medistim representative.



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