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iFusion Demo Guide

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- Function Introduction
- Fusion kit Connection
- Operation Workflow
- Demo Tips
- FAQ

Function Introduction

- **Fusion Concept**

Car GPS	Fusion Imaging
	
■ Satellite ■ GPS receiver ■ Map ■ Eyes	■ Magnetic generator ■ Magnetic sensor ■ CT/MR data ■ Ultrasound

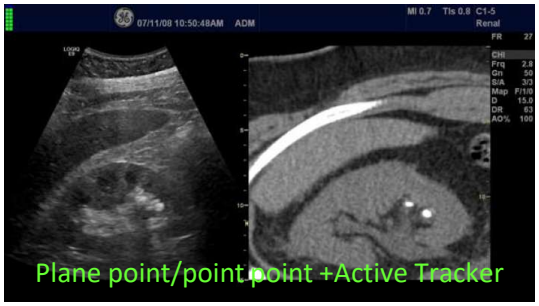
US(2D): real time

+

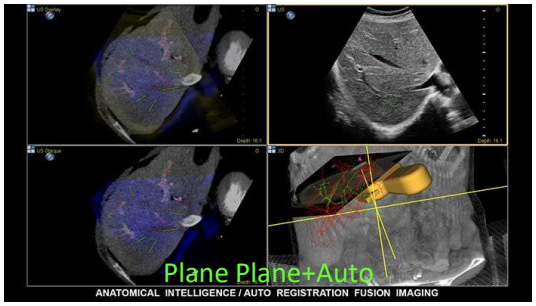
CT/MR(3D): high resolution

Function Introduction

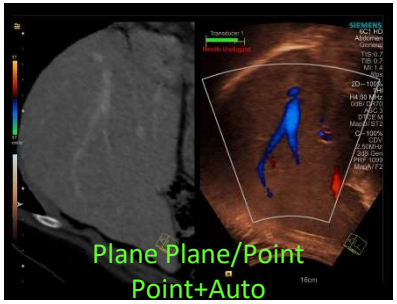
- **Fusion solutions from different vendors**



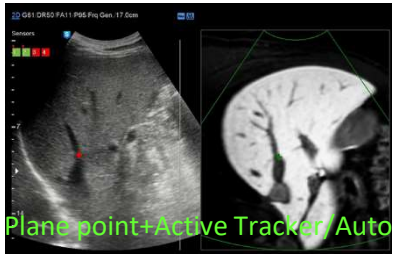
GE: Volume Navigation



Philips: PercuNav

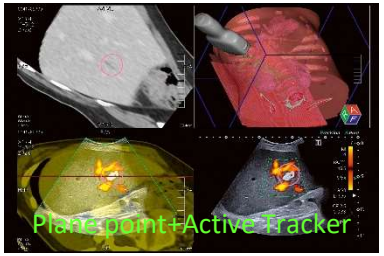


Siemens: eSie Fusion



Samsung: S-Fusion

Esaote: Virtual Navigator



Toshiba: Smart Fusion

FUSION KIT CONNECTION

Fusion kit Connection

- **Fusion Controller Connection**

Magnetic field generator

Probe Sensor

Position Tracking/Resp. Compen. Sensor

eTRAX/vTRAX

Fusion kit Connection

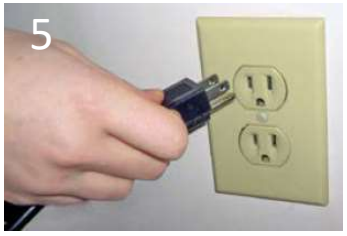
- **Cable Connection**

Connect magnetic generator to fusion controller

Connect probe sensor to fusion controller

Data transfer cable – fusion controller and ultrasound unit

Power cable to fusion controller



Power cable to power

Turn on power switch

Fusion kit Connection

- **Probe sensor holder installation**

Probe sensor holder

Make sure marker on the sensor holder is aligned with the probe

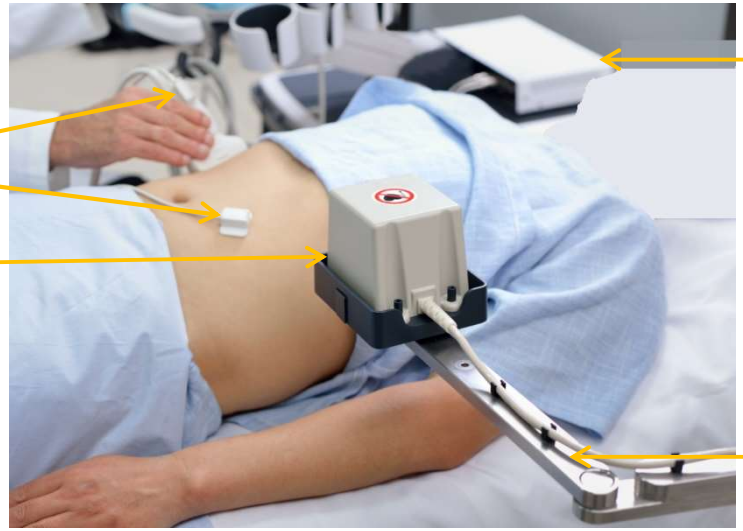
The labels should be on the same side

The arrow of sensor head to the bottom of sensor holder

Probe sensor holder installation completed

Fusion kit Connection

- **Magnetic generator positioning**



Put magnetic generator close to the region of interest

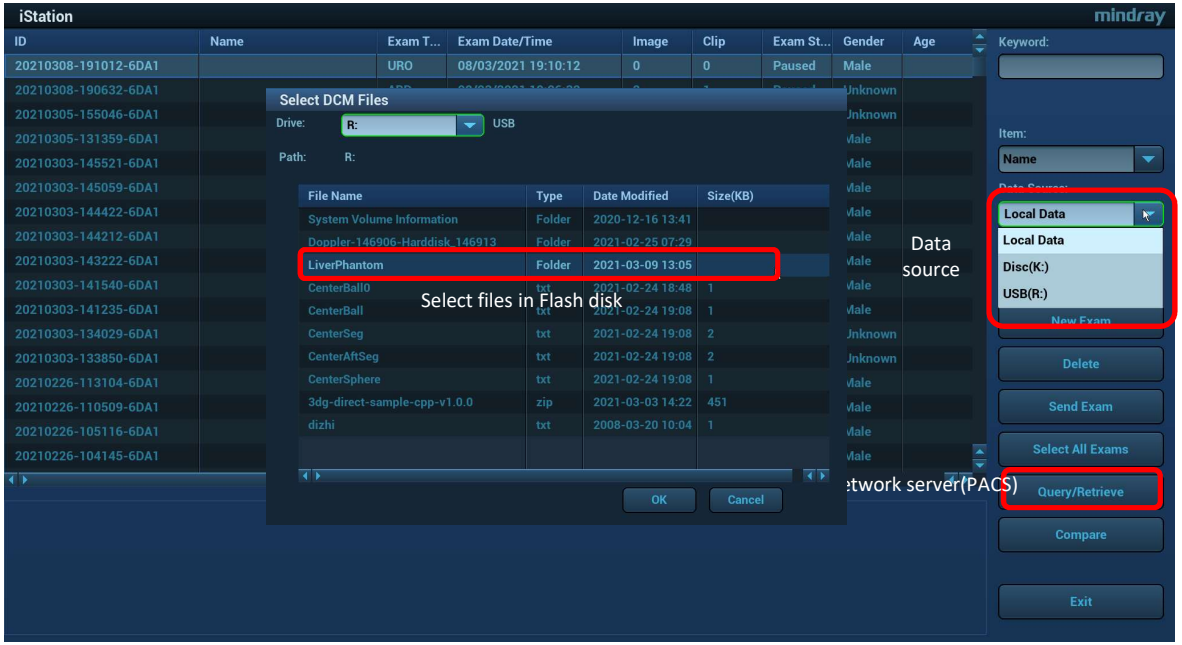
OPERATION WORKFLOW

Operation Workflow

- **Import data to iStation**

1. F2 key to iStation
2. Select DCM data

- Path：
  - Flash disk
  - DVD
  - Network server



Operation Workflow

- **Enter to Fusion**

1. Press Fusion on control panel
2. Green light refers to good sensor position

Operation Workflow

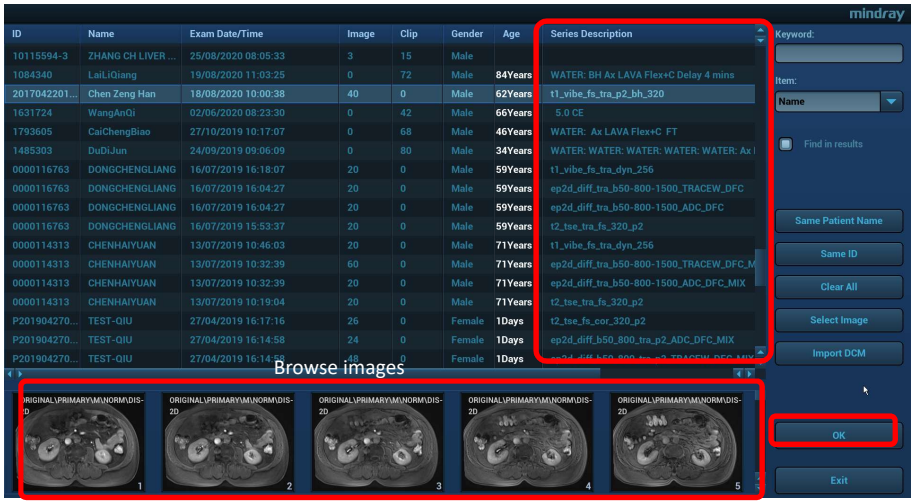
- **Registration Workflow**

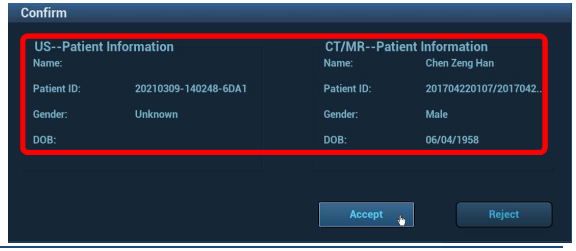
1. Import volume data
2. Mark the target
3. Plane-Plane registration
4. Registration confirmation

Operation Workflow

- **Import volume data**

1. Click “CT/MR Database”
2. Select contrast enhanced CT/MR if available for better vascular visualization from series description
3. Window at bottom shows browse images selected, click confirm to load data





Operation Workflow

- **Mark the target**
- Click “Mark on CT/MR”
- Sphere Trace
  1. Click left “set” key
  2. Drag the trace ball to other side of target
  3. Click right “set” key to complete

PS: Press “Update” key to shift to manual trace

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Operation Workflow

- **Mark the target**
- Manual trace (irregular target)
  1. Click left “set” key
  2. Drag the trace ball to trace the target
  3. Trace back to start point or click left “set” key to finish the trace on this plane
  4. Rotate the slice shift button to trace the target on the next plane
  5. Click right “set” key to finish the manual trace

PS: up to 2 irregular targets
Click “Update” key to shift to ellipsoid trace

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Operation Workflow

- **Mark the target**
- Ellipsoid trace (irregular target)
  1. Find the biggest target plane by rotate slice shift button
  2. Click “set” key to mark the long & short axis of the target
  3. Target segmented automatically

PS: up to 2 irregular targets
Click “Update” key to shift to sphere trace

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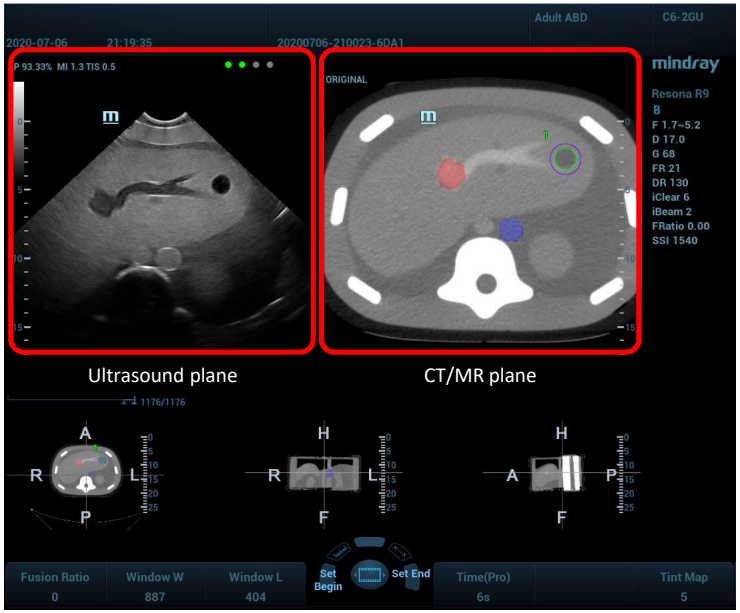
Operation Workflow

Plane plane registration

1. Select decent CT/MR plane for registration by slice shift button”3D/4D”
2. Probe shooting at axial plane, find out the same plane image of ultrasound
3. Probe positioned vertical to the ground on up-down direction, and vertical to the long axis of patient on left-right direction
4. Click “Freeze” to freeze ultrasound
5. Click “Register "to enter registration page



Operation Workflow

Plane plane registration

6. Default trace ball function is panning the current slice
7. Move trace ball to align ultrasound image to the slice image of MR/CT volume image with offset X/Y button for tiny pan tuning
8. Click left “set” key to shift functions with “Scroll”, “Cine” and “Pan”

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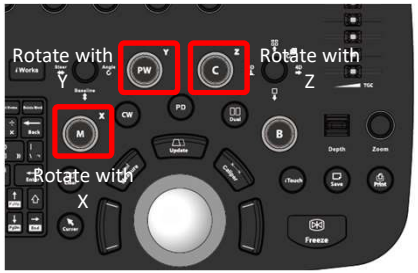
Operation Workflow

- **Plane plane registration**

9. Rotate slice shift button “3D/4D” to select another decent slice of the CT/MR volume image
10. Rotate “Fusion Ratio” button to tune the overlap ratio between US-CT/MR.
11. Rotate “X””Y””Z” button can rotate the volume image on X, Y, Z axis



Operation Workflow

- **Registration confirmation**

12. Once US-CT/MR image aligned, click right “set” button to finish registration, system go back to fusion page

DEMO TIPS

Demo Tips

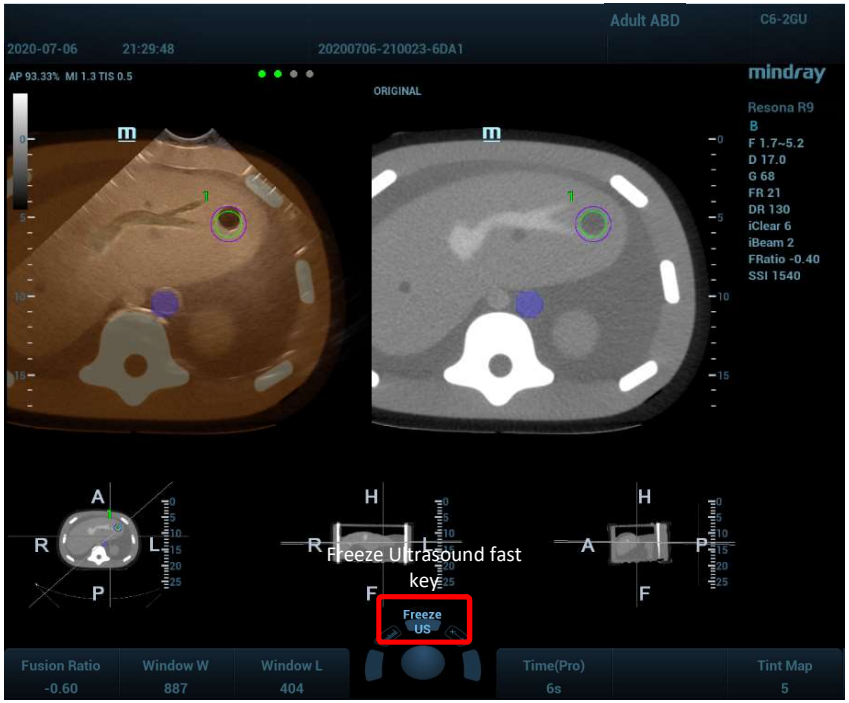
- **Fine Tuning**
- If registration result need to be adjusted, press “Fine Tuning” on the touch screen or “Update” key to optimize it

Demo Tips

- **Fine Tuning**
- Move probe to select a decent plane of CT/MR image, then “Freeze MPR” to freeze CT/MR image

Demo Tips

- **Fine Tuning**
- Move probe to find out same plane in ultrasound image, then “Freeze US” to freeze ultrasound image



Demo Tips

- **Fine Tuning**

1. Same to the registration workflow with track ball , left “set” key and rotate buttons X, Y, Z
2. Click right “set” key or “Confirm tuning” on touch screen to finish fine tuning

Demo Tips

Position Tracking

It helps to maintain registration results even magnetic generator moves accidently

1. Stick the resp. sensor and the bracket to the center of the breast bone of patient, resp. sensor cable connect to No.2 interface on fusion controller
2. Enter to fusion, finish registration workflow
3. Click “Position Tracking” button on the touch screen to activate the function

Resp. sensor and bracket

No.2 interface of fusion controller

Demo Tips

- **Needle Navi**

1. CIVCO eTRAX/vTRAX accessories required
2. Connect eTRAX/vTRAX Sensor cable to No.3 interface of fusion controller
3. Enter to “Needle Navigation” window after registration workflow finished

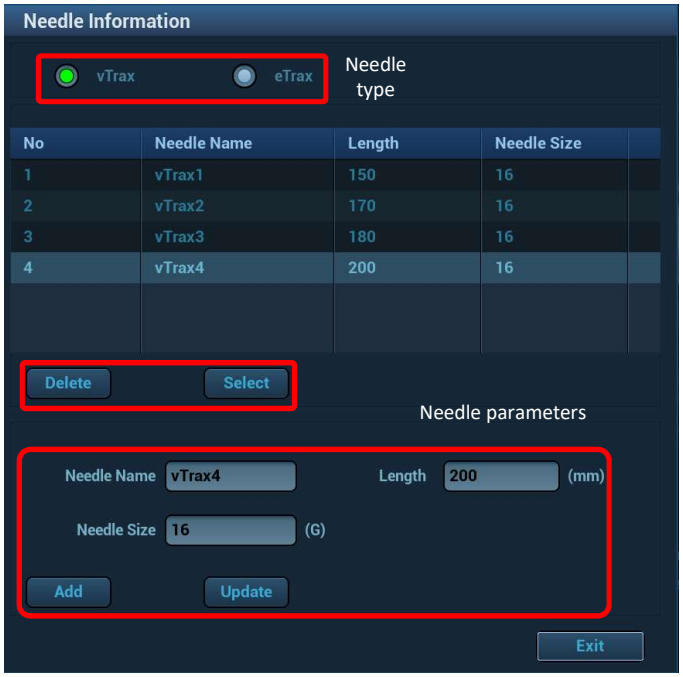
vTRAX/eTRAX

No.3 interface of fusion controller

Demo Tips

Needle Navi

1. Click “Edit Needle” to setup needle parameters
2. Select needle type (vTRAX/eTRAX)
3. Add or modify needle parameters
4. Click “select” to confirm needle selection
5. Biopsy guided by fusion imaging



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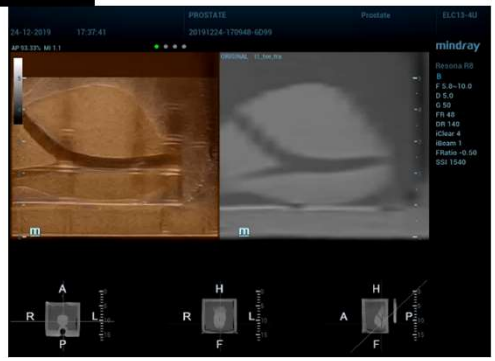
Demo Tips

- **Prostate Fusion with ELC13-4U**

1. Ultrasound scanning with ELC13-4U
2. Registration workflow same to above
3. Fusion result kept between ELC13-4UC and ELC13-4UL shift

Fusion with ELC13-4U convex

Bi-plane endocavity probe ELC13-4U

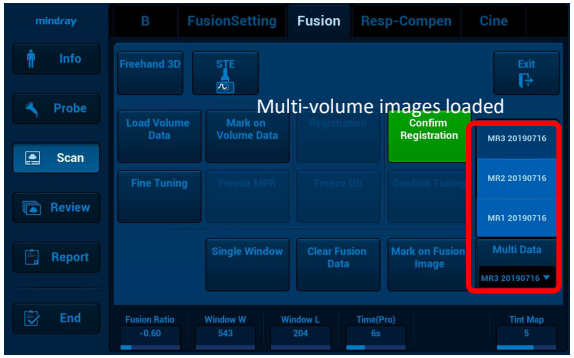


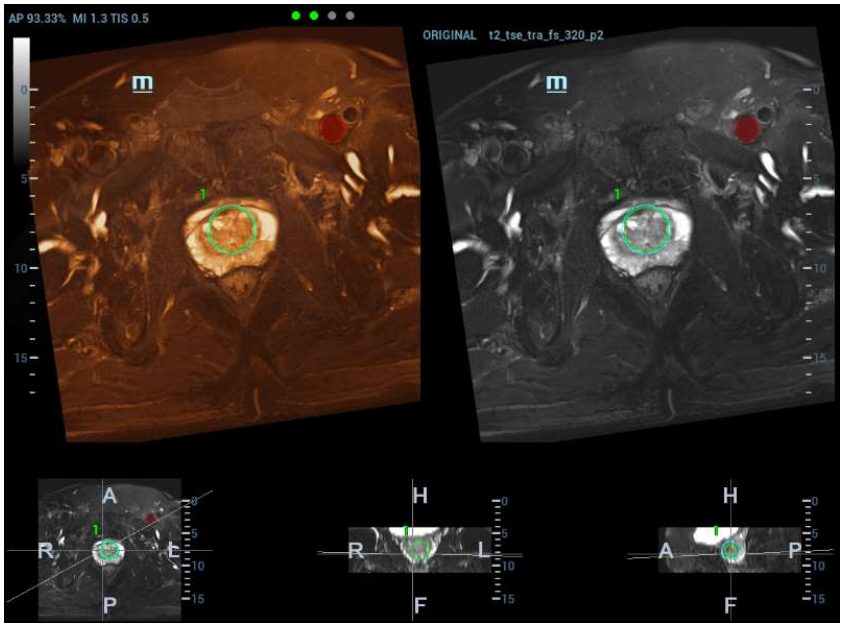
Fusion with ELC13-4U linear

Demo Tips

- **Multi-volume images import**

1. Up to 4 different volume images can be loaded, MR (4, for prostate fusion), CT(2)
2. When registration completed, the registration results and markers are remained even multi-volume images shifted





FAQ

FAQ

- **About hardware**
- The power cable of fusion controller should be connected to the ultrasound unit or same patch board that ultrasound applied;
- Turn off the power if fusion kit do not used for long period;
- Make sure the cable interfaces which have direction property are well; connected（e.g. magnetic generator cable, USB data transfer cable are prone to be damaged）
- The sensor cable cannot be placed in high magnetic field room or CT room;
- Make sure the direction of sensor (arrow) is installed in sensor holder correctly;

FAQ

About registration

Q: I cannot find the same vascular structure when “Freeze MPR”(freeze CT/MR), then registration failed

A: make sure sensor is installed correctly; structure of organ changed due to old MR/CT image scanned (suggest do not use CT/MR image more than 1 week)； find ultrasound vertical plane which close to the lesion, then try US-CT/MR registration

Q: Fusion result moved when registration completed

A: the magnetic generator or patient moves, need to re-do registration; to avoid this issue, we suggest to activate the position tracking function when registration completed

Q: CT/MR image died during fusion process when registration completed

A: Check the connection of data transfer cable, if the fusion controller light blinked, reboot the fusion controller

FAQ

Q: signal light on the monitor is in red

A: The navigation signal is poor due to interference from electronic devices or iron beds. Try to move away the electronic devices, position magnetic field generator more close to the probe then try again

Q: When left liver registered, the fusion error of right liver happened

A: It is normal issue. The morphological structure of liver will be changed more or less from the time CT/MR scanning to the time US-CT/MR fusion. It is suggested to do Fine Tuning close to the lesion

Thanks!

Demo Tips

- **Respiratory Compensation**
- For better fusion accuracy with respiratory motion control
- 2nd sensor cable and bracket needed
- Stick the bracket to patient's body and connect sensor cable to No.2 interface of fusion controller
- Click "Resp-Compen" after registration completed

Sensor cable and bracket

No.2 interface of fusion controller

Demo Tips

Respiratory Compensation

1. Click ”Display Resp Curve” then “Refresh Resp Curve” to show and update respiratory curve
2. Click “Capture US & Resp” to capture ultrasound image, setup ROI with track ball
3. Click “Set Modeling Start” and “Set Modeling End” to setup start frame and end frame of modeling
4. Click “Motion Modeling”
5. Click “Motion Compen” for motion compensation