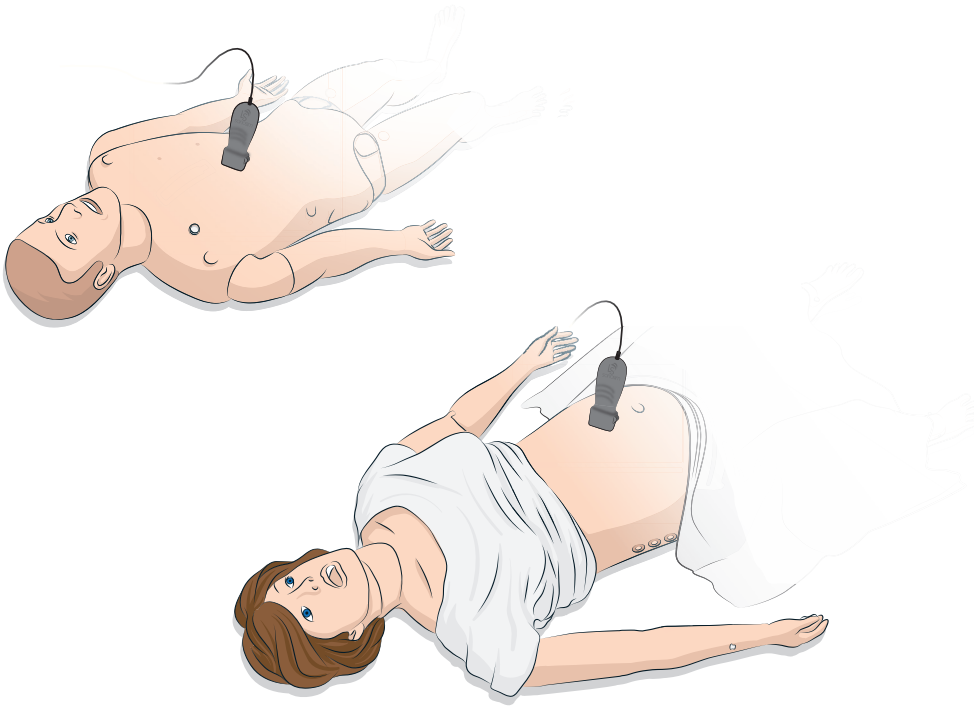
Laerdal-SonoSim Ultrasound Solution

User Guide



Introduction

The Laerdal-SonoSim Ultrasound Solution integrates real-patient based ultrasound cases into SimMan 3G and SimMom, making it easy to perform a simulated ultrasound examination at any time. You can now incorporate diagnostic ultrasound scanning of real ultrasound cases with pathological findings into full-scale simulations. The Laerdal-SonoSim Ultrasound Solution comprises the manikin skin with embedded LS tags, LS Probe, Quick Setup Guide, and a Laerdal-SonoSim Computer (purchased separately to the Content Bundles*). Together with SimMan 3G or SimMom, the Laerdal-SonoSim Ultrasound Solution offers the complete simulation package. This User Guide outlines how to set up and run the Laerdal-SonoSim Ultrasound Solution.

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Download Scenarios to the Instructor PC

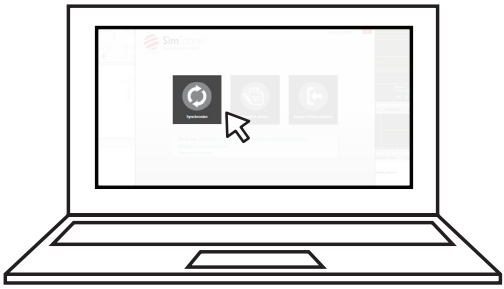
Download the Laerdal-SonoSim Ultrasound Solution Scenarios from the Laerdal SimStore

1. Registration

Via online registration, register your Instructor PC or tablet with the SimStore.

2. Download & Synchronize Scenarios

Download and synchronize the scenarios to the Instructor PC/tablet. The synchronized content is now ready to use in the Instructor application.



Set Up your manikin (as per Quick Setup Guide)

Set Up LLEAP

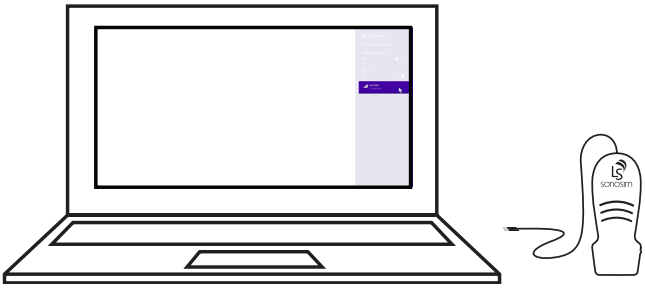
Starting LLEAP

Start the Instructor PC and Patient Monitor and connect to the manikin. Follow on-screen prompts to fully connect your manikin to the LLEAP interface. Open the desired Laerdal SonoSim Scenario you have downloaded from SimStore. For more information on LLEAP start up, please refer to the LLEAP help files.

Set Up the Laerdal-SonoSim Computer

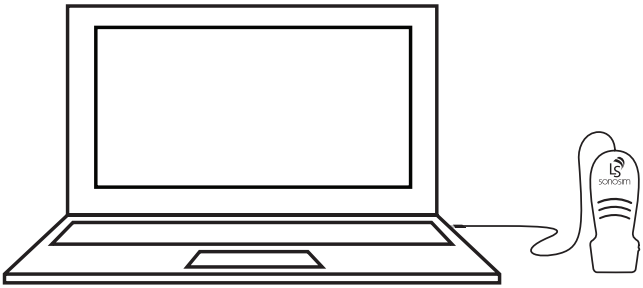
1. Internet Connection

Ensure the Laerdal-SonoSim Computer is connected to the 'LOCAL INTERNET NETWORK' to access data used in the scenarios. This is not the SimMan 3G or SimLink network, which is used by the LLEAP interface. A high-bandwith internet connection is required for optimal performance.



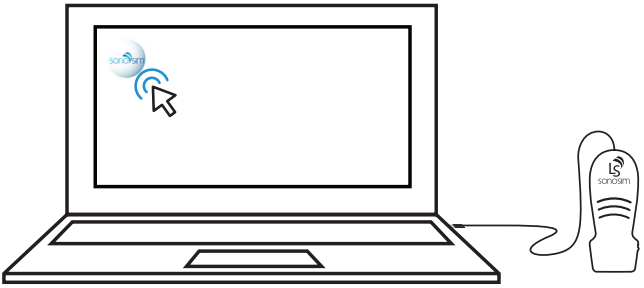
2. Plug in the LS Probe

Plug your LS Probe into an active USB port on your computer. The LS Probe is designed to work with Laerdal-SonoSim cases.



3. Launch the Software

Double-click on the SonoSim icon on the desktop screen to launch the Laerdal-SonoSim Ultrasound Solution software.

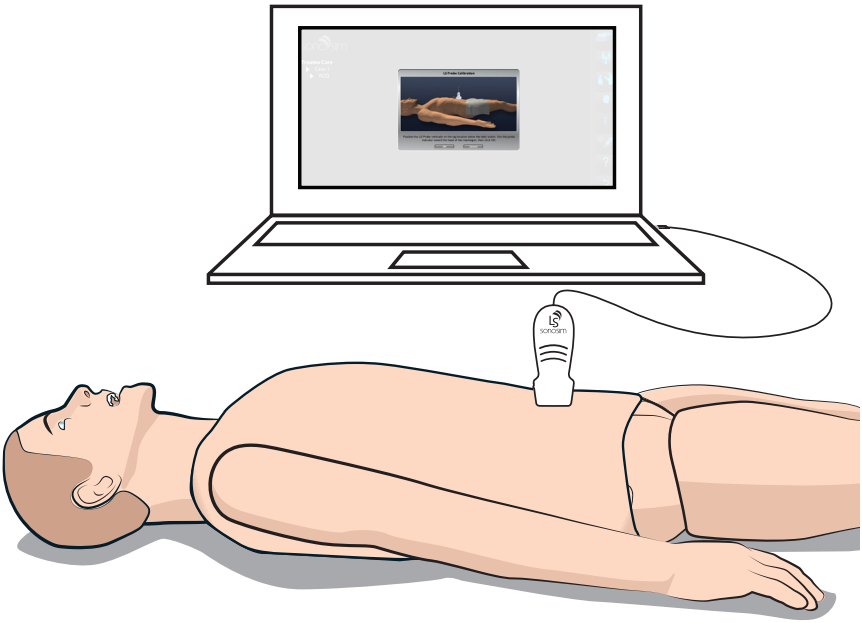


4. Open SonoSimulator®

From the main menu, choose 'SONOSIMULATOR®' to launch the application.

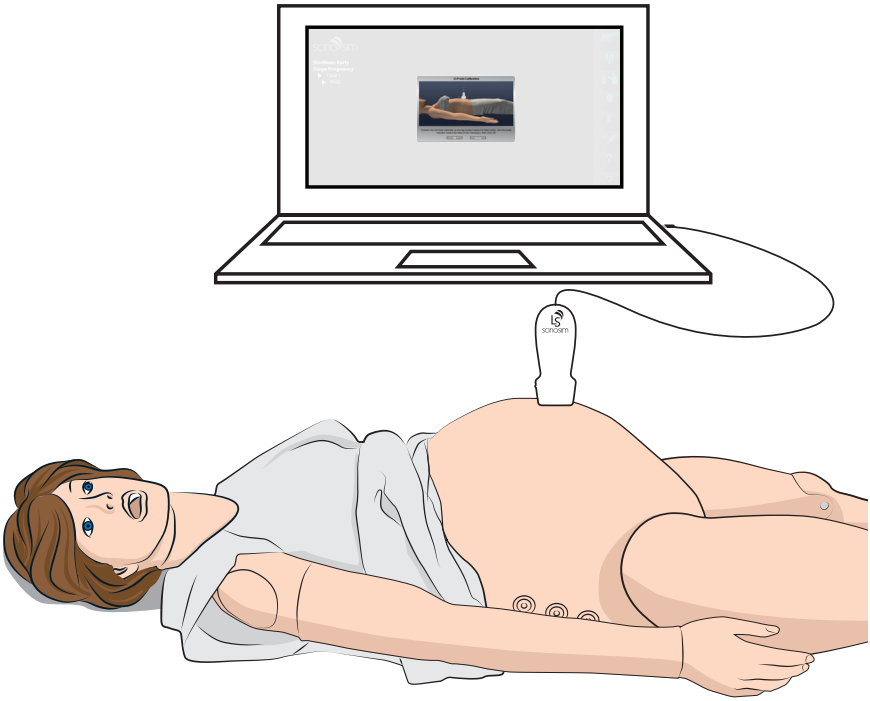
5a. Probe Calibration for SimMan 3G

Follow the on screen instructions to calibrate the LS Probe for SimMan 3G. Ensure the probe head scanning surface is held parallel to the manikin skin. Place the probe on the flat surface below the belly button. Point the probe indicator toward the head of the manikin, then click 'OK'. Your LS Probe is now ready for use.



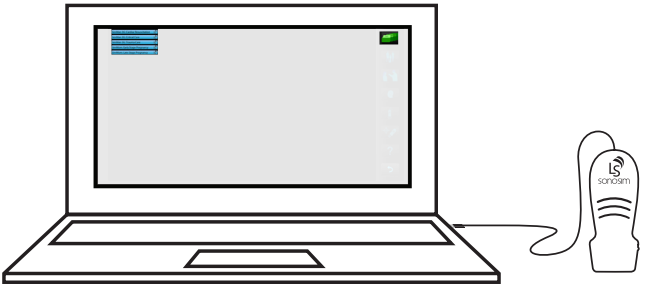
5b. Probe Calibration for SimMom

Follow the on screen instructions to calibrate the LS Probe for SimMom. Ensure the probe head scanning surface is held parallel to the manikin skin. Place the probe on the belly button. Point the probe indicator toward the head of the manikin, then click 'OK'. Your LS Probe is now ready for use.



6. Select the Laerdal-SonoSim Ultrasound Case

The Laerdal-SonoSim Ultrasound case needs to correspond to your previously selected scenario, selected on the LLEAP Instructor PC. To make your case selection, click on the 'CASE LIST' button. A menu of your purchased Laerdal-Sonosim Ultrasound case bundles will appear.



7. Select the Appropriate Case Bundle

Select the appropriate case bundle and another sub-menu, listing the cases, will appear. Select the case number that corresponds with the scenario number selected on the Instructor PC. This will ensure that the SonoSimulator®, is in sync with the LLEAP interface.

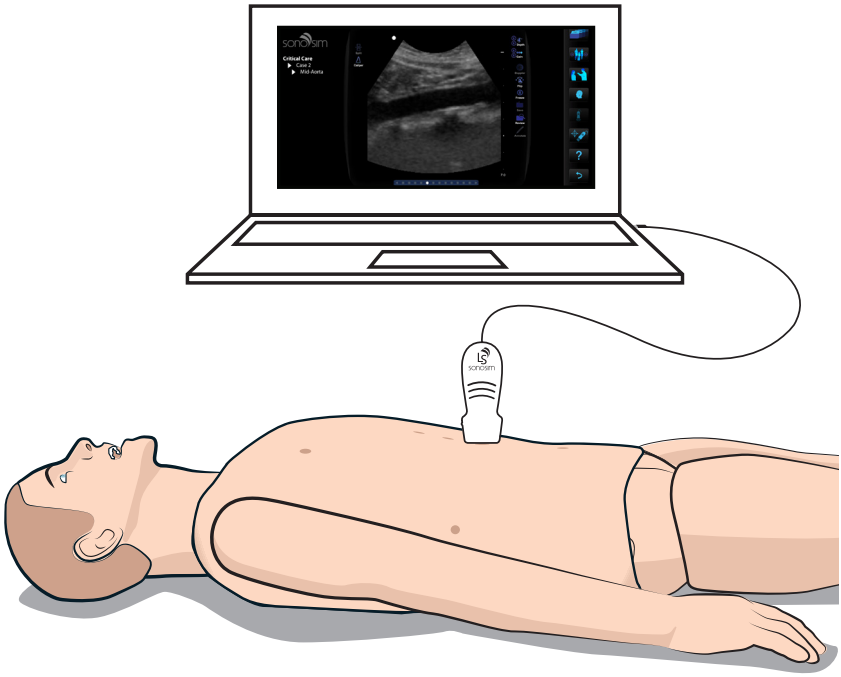
8. Stand-By Mode

The SonoSimulator® is now ready to be used by the learner. No further action is required by the instructor, as the SonoSimulator® case, the LLEAP interface, and selected Laerdal-SonoSim scenario are synchronized. The instructor can now use the SonoSimulator® as indicated during the course of the scenario.

9. Scanning

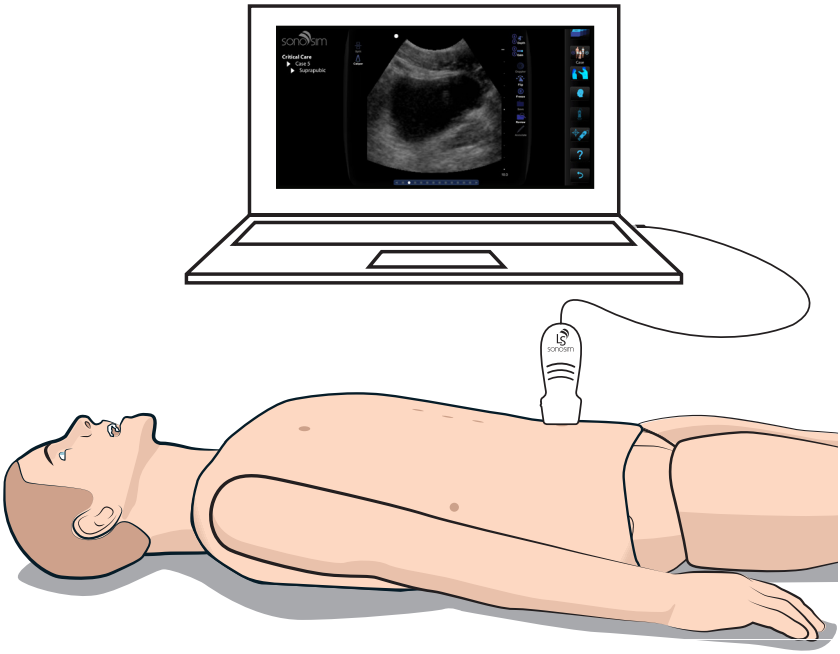
When 'ULTRASOUND' is requested by the learner during the scenario session, scanning can commence. Place the LS probe on one of the imaging-window indicator dots on the manikin skin to start scanning. Each point is positioned over designated imaging windows that display real patient-based ultrasound images.

Note: If you scan over an imaging window that is not part of your case, you will receive immediate feedback, e.g., "This image window is not part of your eFAST scan protocol."



10. Scanning a Different Body Location

To scan a different body location, simply lift the LS Probe and position it over another imaging window, identified by a corresponding indicator dot.



11. Recalibrate the Probe

Recalibrate the probe according to Step 5 at the beginning of each new scenario.

Laerdal-SonoSim Computer Main Menu Items

SonoSimulator®

The SonoSimulator® enables hands-on training and allows learners to scan through a variety of real-patient cases using the LS Probe. These cases correspond with the scenarios run on the LLEAP interface.

Scenario Briefs

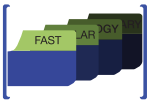
The Scenario Briefs section connects to the SimStore, which contains the support material for each individual Laerdal-SonoSim Ultrasound Solution scenario. The support material comprises several tabs, including Case Overview, Curricular Information, Setup & Preparation, Information for Learners, Information for Faculty, Debriefing, and tabs with details for running each scenario.

Case Legend

The Case Legend summarizes pathologic findings for each ultrasound case included in the Laerdal-SonoSim Case Bundle.

Product Information

The Product Information section provides a Product Tour Video, Frequently Asked Questions (FAQs), a User Guide, and Technical Support.

Case List		Selecting the Case List allows you to view a list of available training cases sorted by topic.
Case		This feature allows you to navigate forward or backward to the next hands-on training case by clicking on the arrow icons on the Case button.
Case History		This button provides a brief patient history including information such as age, gender, vital signs, and chief complaint.
Findings		The Findings button provides immediate expert feedback. A narrated version of the original ultrasound clip provides what users should recognize while scanning a corresponding SonoSim® case. This feature should only be used during the debriefing session.
Compression*		This feature is available for select cases and allows a user to compress a target vessel by selecting and holding to compress. This feature is inactive if it remains dim in appearance when you move your cursor over it.
Calibrate		This feature allows you to calibrate the LS Probe prior to use. Upon clicking the Calibrate button, you will be prompted to position the probe on a flat skin surface along the sagittal, or midline long axis of the manikin. Point the probe indicator toward the head of the manikin. Once "OK" is selected the probe is ready for use.
Help		Selecting this button will open the Laerdal-SonoSim User Guide or the Align Tag feature.
Main Menu		Selecting this button will return you to the Main Menu.

Depth		Selecting these arrows adjusts the image depth displayed within the virtual ultrasound image.
Gain		Selecting these arrows makes the displayed ultrasound image brighter or darker.
Doppler		When available, this button will turn on the Doppler display within the ultrasound image.
Flip		Selecting on this icon will flip the probe indicator to the opposite side of the virtual ultrasound screen (e.g., cardiac versus abdominal imaging preset mode) and display the mirror ultrasound image.
Freeze		Selecting this button will freeze the current obtained ultrasound view, and a subsequent click will unfreeze the image.
Save		Selecting this button saves the frozen ultrasound views.
Review		This button allows you to review saved views.
Annotate		This feature allows the user to type annotations associated with the ultrasound views. This button is only available when the image is frozen.
Split		When available, this button will cause two images to display: the ultrasound image plus a corresponding MRI, CT, X-Ray. A subsequent click will return the display to ultrasound image only.
Calipers		The calipers button activates the D1-D2-D3 measurement dimensions within the ultrasound window. This allows you to measure length, area, and volume of the structures of interest.

*This feature is inactive if it remains dim in appearance when you move your cursor over it.

Preparation & Set Up of a Scenario

To commence a simulation session, preparation and set up of a scenario is required on the Patient Monitor and Instructor PC. Using on-screen prompts, the instructor will need to perform all preparation events listed in LLEAP. These preparation events include: "INSTRUCTIONS FOR BLOOD PRESSURE SETTINGS', 'SET LEARNER MODE', 'SET LEARNER LEVEL', and 'INSTRUCTIONS FOR ULTRASOUND SETTINGS'.

1. Blood Pressure Settings

These must be made on the Patient Monitor (not the Instructor PC). Select the non-invasive blood pressure (NBP) parameter setting. This will bring up a pop-up window, 'SETUP NBP'. Click on the downward arrows to reveal options for 'REPETITION TIME' and 'AUTO/MANUAL' modes. Click on 'REPETITION TIME' and choose '1 MIN' from the sub-menu. Next, click on 'AUTO/MANUAL' and select 'AUTO'. The Patient Monitor will now display confirmation of your configuration. Then redisplay the Learner Brief/Patient Information on the Patient Monitor by clicking on "Adult" at the top of the screen.

2. Set Learner Mode

There are three modes offered with each scenario: 'INDIVIDUAL-LEARNER', 'TEAM-TRAINING' and 'MANUAL'. Select which mode is applicable. When Individual-Learner Mode is selected, the simulator gives pre-programmed audio responses for every order requested in the scenario. This mode is useful to examine the learner's medical decision making and provides closed-loop communication between the learner and the scenario itself. When Team-Training Mode is selected, the simulator does not respond with audio responses for every order requested in the scenario. This mode is useful to examine communication between team members and to assess the logistics of real

patient care. It also can be used to assess learner medical decision making. Team-Training Mode requires verbal dialog between team members to achieve closed-loop communication. Manual Mode allows instructors to program their own scenarios using LLEAP software. The Case History, Ultrasound Findings, and Findings Video are provided, but instructors are free to program their customized scenarios. The patient's initial vital signs will be programmed in accordance with ultrasound-image physiology (i.e., heart rate and respiratory rate).

Note, Instructors should not allow learners to use the Findings Video feature during the scenario session. This feature is designed to be used for the debriefing session.

3. Set Learner Level

There are three learner levels associated with each scenario: 'NOVICE', 'INTERMEDIATE', and 'ADVANCED'. The difference in the levels is based on time allocated to complete the scenario in the simulated environment. The Novice level allows the learner the greatest amount of time, the Intermediate level slightly less time, and the Advanced level the least amount of time to complete the scenario. Performing ultrasound adds time to the overall Scenario length. Based on the experience of the learner, select the appropriate button.

4. Instructions for Ultrasound Settings

With the Laerdal-SonoSim Computer already setup as previously instructed, follow the individual scenario instructions for setting up the ultrasound settings. These instructions will guide the instructor when to make the Laerdal-SonoSim Computer available or unavailable to the learner. Instructor messages are also provided throughout the scenario as reminders to make the unit available or unavailable.

5. Starting the Scenario

As the final step, the instructor will have to select 'CLICK HERE TO START SCENARIO' to proceed. If all preparation events have not been selected, the instructor will receive a message reminding him or her to select all preparations.

Progressing through a Scenario

Scenarios can consist of one or multiple phases. Progressing through the scenarios occurs in three different ways.

1. Completing Essential Events

The learner performs all Essential Events in a Phase of patient care.

2. Exceeding Allotted Time

The learner exceeds the allotted time for a Phase of patient care (alloted time can be configured for novice, intermediate, and advanced learners).

3. Requesting the Next Phase

The learner requests to advance to the next Phase of patient care.

Debriefing

Once the learner has completed the session, the instructor 'ENDS THE SESSION'. This will end the current scenario and store all relevant details to that scenario to be used for the debriefing session, e.g., if the scenario completed was Trauma Care 6, information relating to Trauma Care 6 will be available. The instructor can conduct a debriefing session using both the Laerdal software and the SonoSimulator®.

1. Laerdal Software

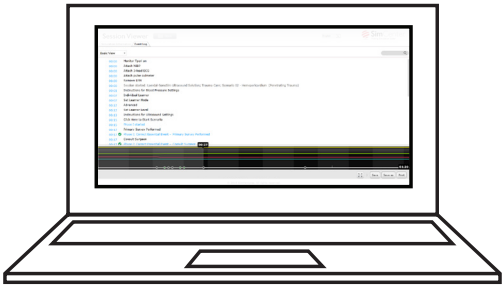
The instructor can use either 'SESSION VIEWER', which is part of the LLEAP platform, or purchase 'SIMVIEW SYSTEM' separately. Both debriefing applications include a 'SIMULATION INFORMATION' tab and an 'EVENT LOG' tab that record each session run. Videos from Webcam or SimView cameras used to record the session can also be reviewed.

1a. Simulation Information

This section is an overview of the session and includes information such as the date and time, instructors, participants, and summary notes.

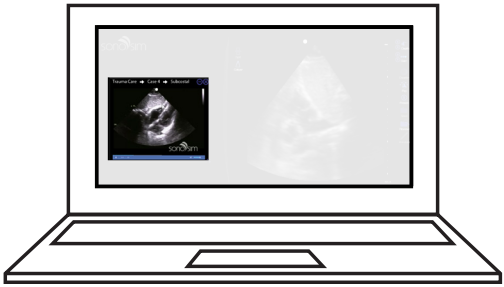
1b. Event Log

This section provides a time-stamped log of all events that have occurred during the scenario session. This includes events that have been performed by the learner as well as events that have not been executed. Examples of events noted include the start and end of a phase, explanations for critical events with cited references, and ultrasound findings if ultrasound has been initiated.



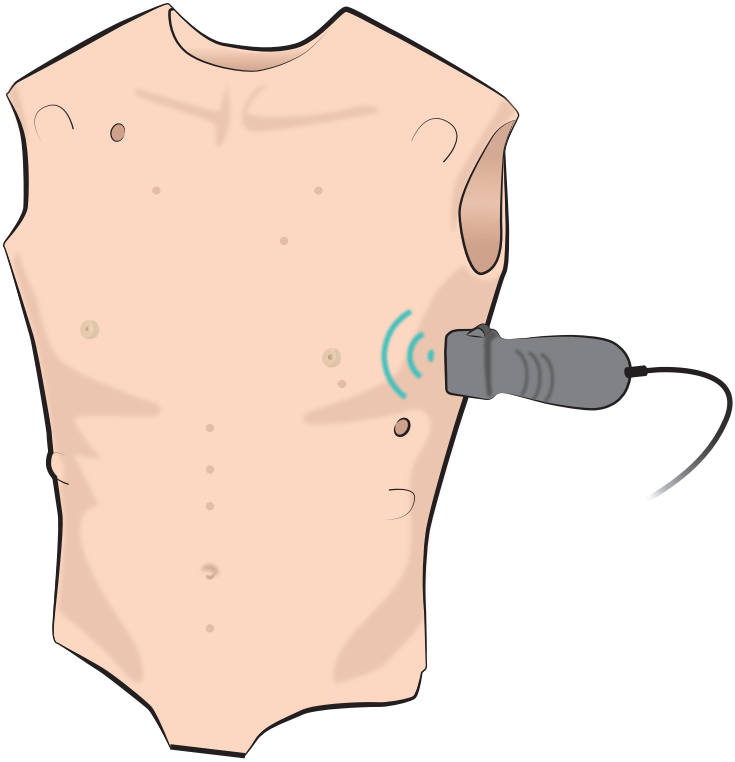
2. SonoSimulator®

The instructor can provide a comprehensive summary of the ultrasound findings for the scenario to the learner by using the SonoSimulator®. Using the case that has just been completed (e.g., Trauma Care 6) select the 'FINDINGS' button on the SonoSimulator® interface. This provides a narrated version of the original ultrasound clip and provides what learners should recognize while scanning a corresponding SonoSim case.



SimMan 3G

Laerdal-SonoSim Ultrasound Solution
Quick Setup Guide



This Quick Setup Guide describes how to assemble and setup your Laerdal-SonoSim Ultrasound Solution for SimMan 3G. For more information about using the Laerdal-SonoSim Ultrasound Solution software, reference the User Guide and the Product Tutorial Videos found in the main menu of the software.

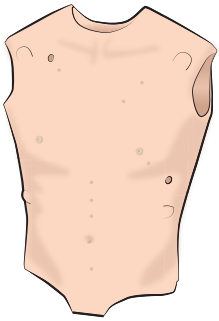
For information about how to use SimMan 3G, please refer to the SimMan 3G User Guide and LLEAP help files.

Download the latest SimMan 3G User Guide at www.laerdal.com/download

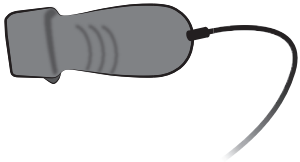
Cautions and Warnings:

1. LS Tags must not be used on anyone using a pacemaker, implantable cardioverter defibrillator, or other electronic medical device. Components of the technology may interfere with such medical devices.
2. Do not use ultrasound gel and avoid exposing the LS Tags and LS Probe to any liquids.
3. Avoid bending and applying excessive force to the LS Tags. This will damage the tag.
4. Manikin skins should be cleaned with a damp cloth only.
5. Use the product only as intended and described in the User Guides.

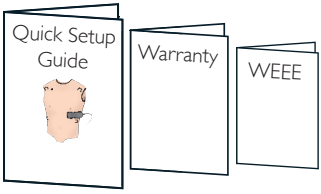
Items Included



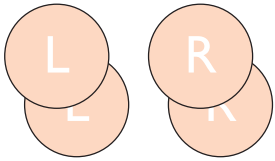
3G Torso Skin
with LS Tags



LS Probe



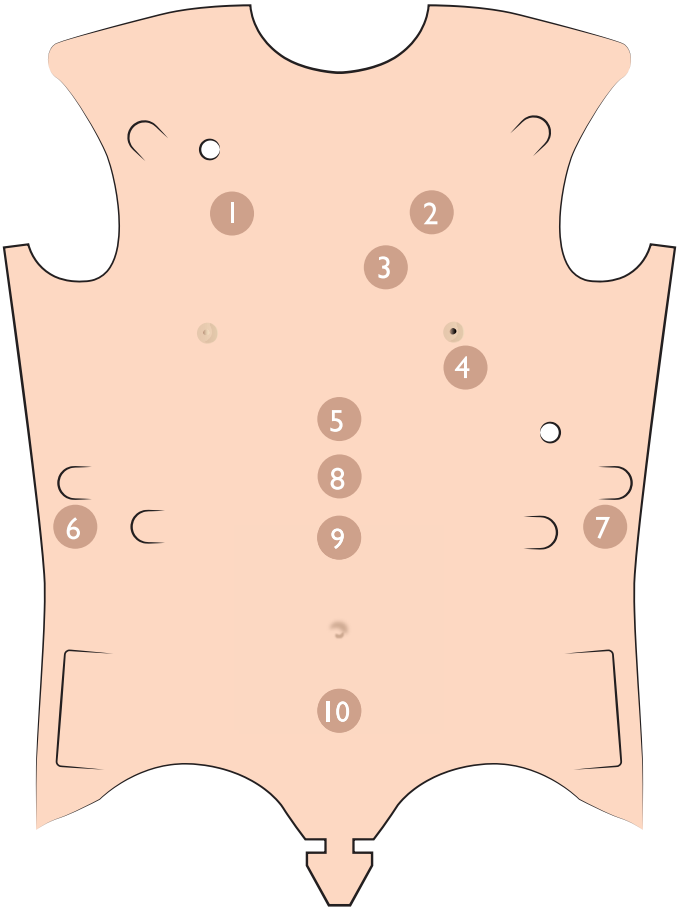
User Information



Left and Right LS GroinTags

Laerdal-SonoSim Computer
(sold separately)

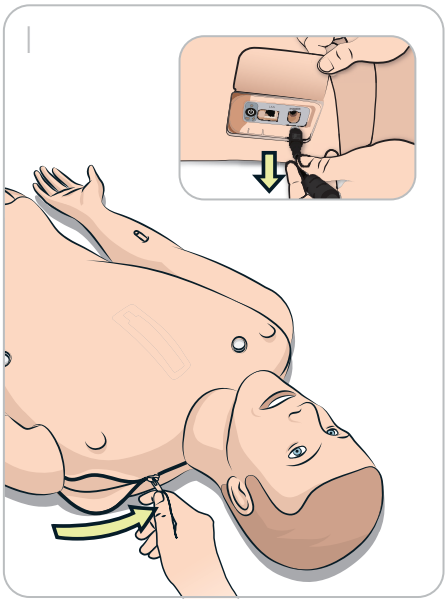
LS Tag Locations

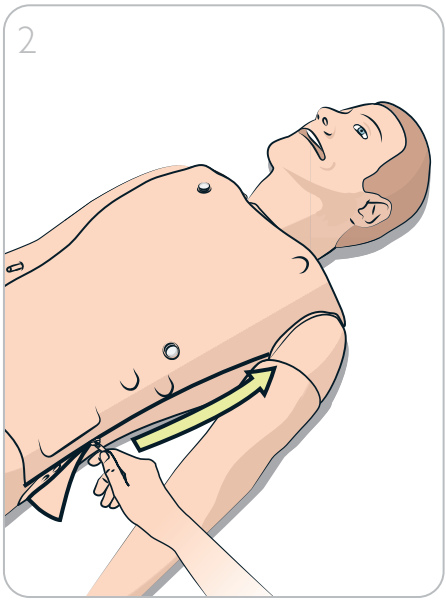


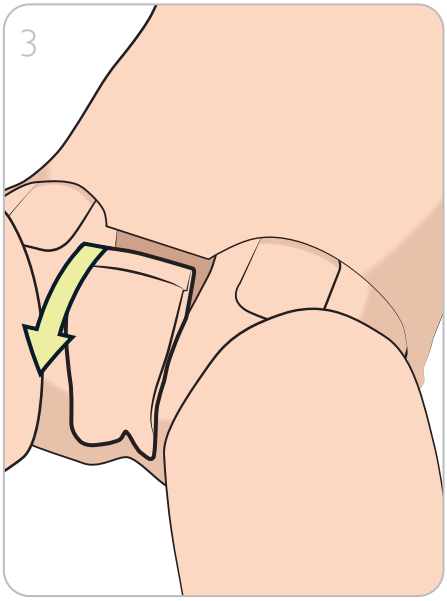
1. Right Chest
2. Left Chest
3. Parasternal
4. Apical
5. Subcostal
6. Right Upper Quadrant
7. Left Upper Quadrant
8. Proximal IVC
9. Mid Aorta
10. Suprapubicw

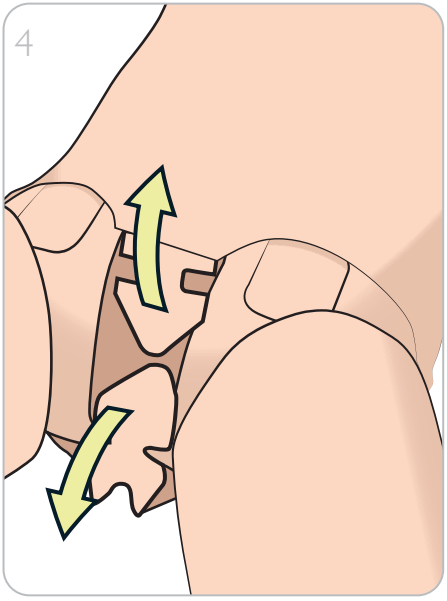
Note:
LS Tags are embedded in the skin. Exterior surface is marked for easy identification of tag location.

1 Remove and Install 3G Torso Skin with LS Tags









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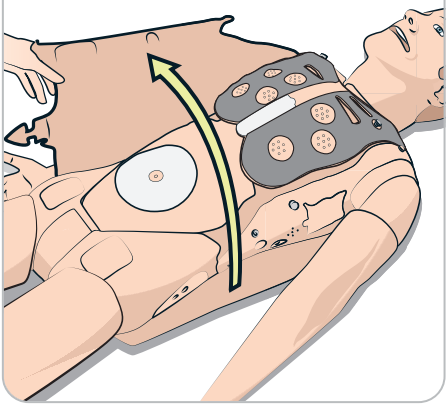
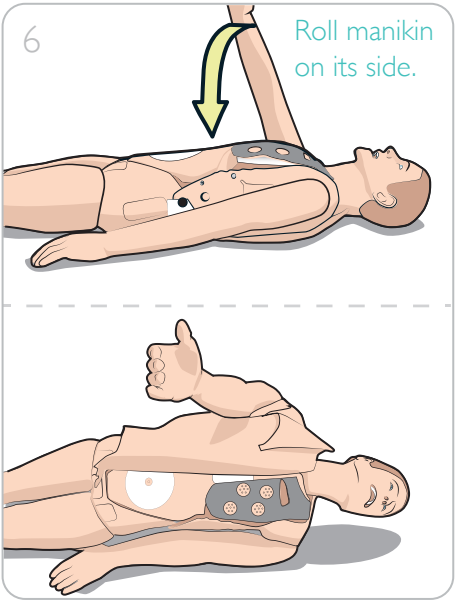


6

Roll manikin on its side.



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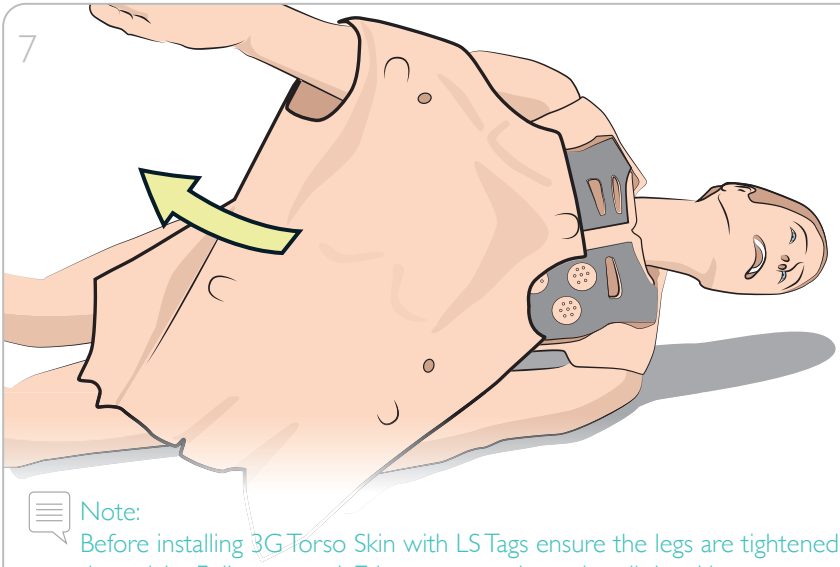


Note:
Before installing 3G Torso Skin with LS Tags ensure the legs are tightened inside the pelvis. Follow steps 1-7 in reverse order to install the skin.

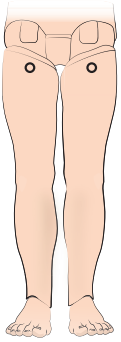
2 Apply LS Groin Tags

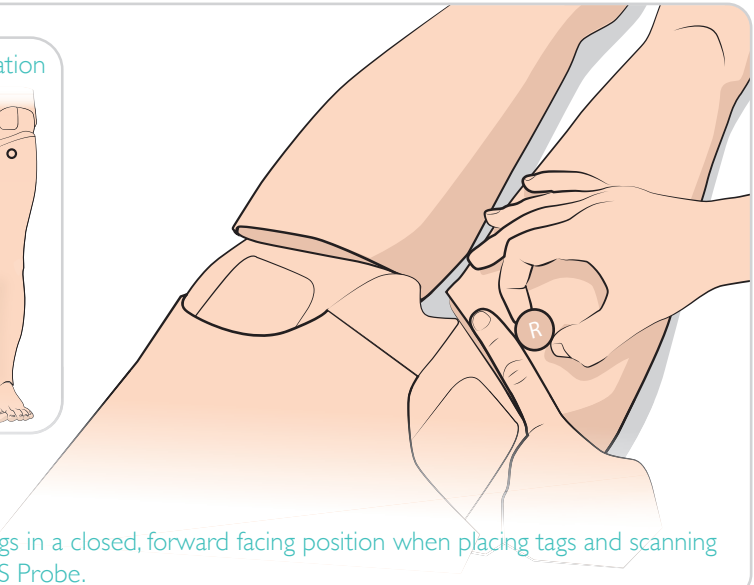
1

Note:
Ensure the skin is clean and dry before placing the LS Groin Tags.

2

Tag Location

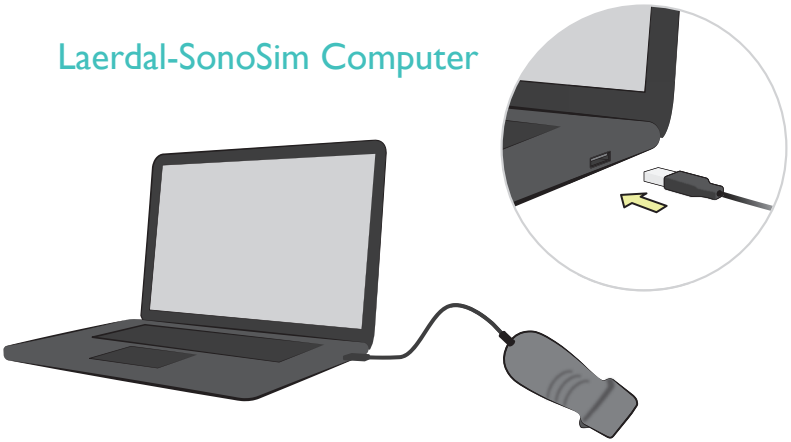




Note:
Position legs in a closed, forward facing position when placing tags and scanning with the LS Probe.

3 Connect to LS Probe and Internet

Laerdal-SonoSim Computer

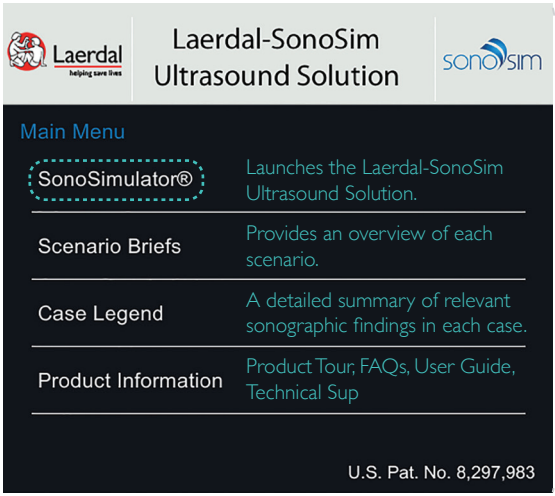


Ensure the Laerdal-SonoSim Computer is connected to the LS Probe and the Internet before starting the Laerdal-SonoSim Ultrasound Solution software for the first time to activate the product.

Note:
Included videos will only work with a connection to the Internet.

4 Launch Application and Calibrate LS Probe

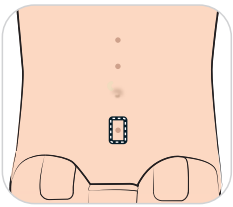
1



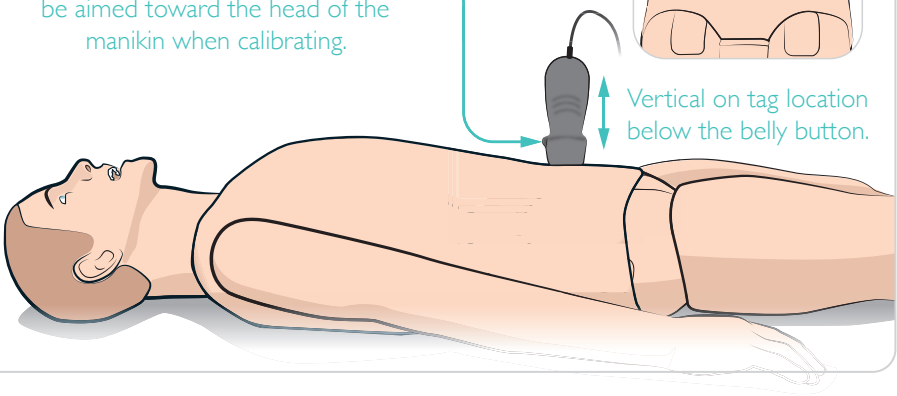
2

⚠ **Ensure spontaneous breathing is turned off before calibrating the probe and the manikin is lying flat.**

The **probe indicator** should be aimed toward the head of the manikin when calibrating.



Vertical on tag location below the belly button.

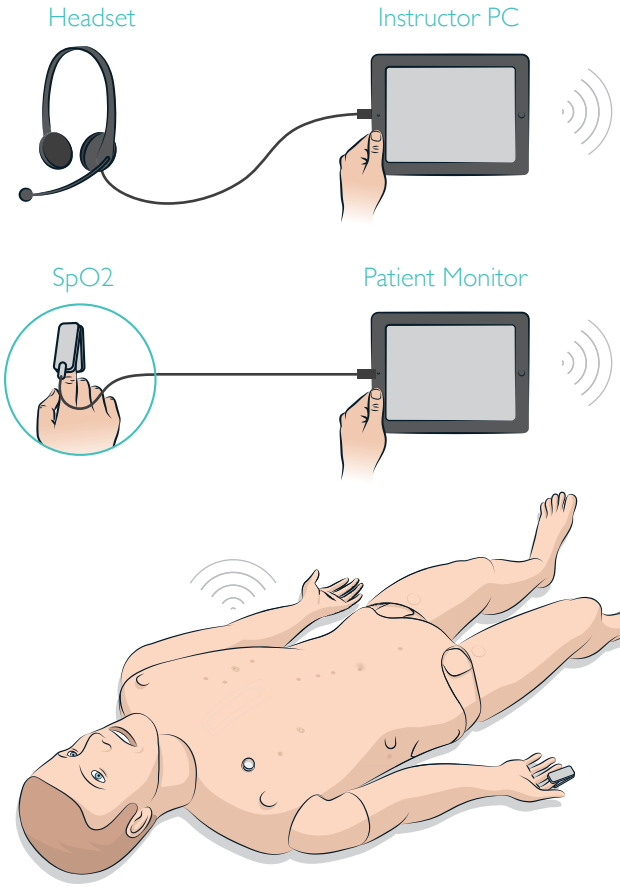


5 Download Scenarios from SimStore to Instructor PC

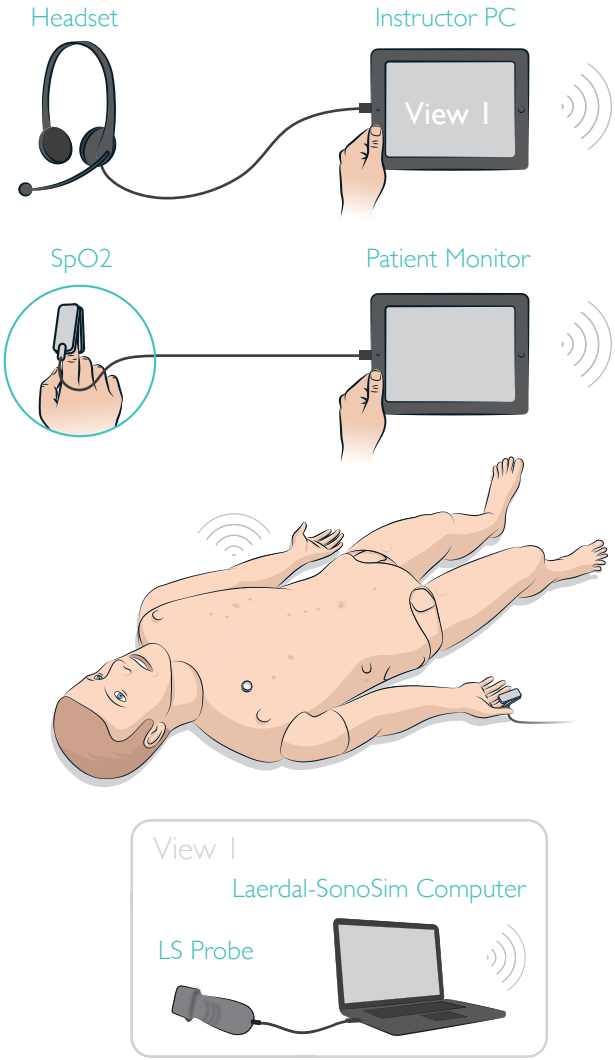
Instructor PC

Log in to your SimStore account on the Instructor PC.
Download the Laerdal-SonoSim Scenarios that you have purchased.

Start the Scenario that matches the Ultrasound Case.

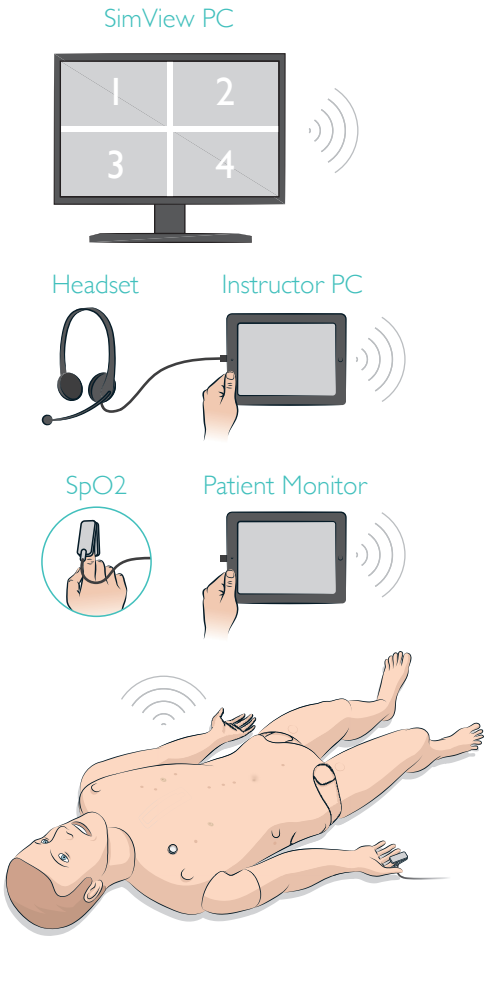

Headset
Instructor PC
SpO2
Patient Monitor
LS Probe
Laerdal-SonoSim Computer
USB cable
Wireless Network Connection

6b Session Viewer System Configuration



Note:
A stand-alone network connection is required to view the Laerdal-SonoSim Computer in Session Viewer. To add the Laerdal-SonoSim Computer as a view, select "Add Equipment" in the Equipment Configuration section.

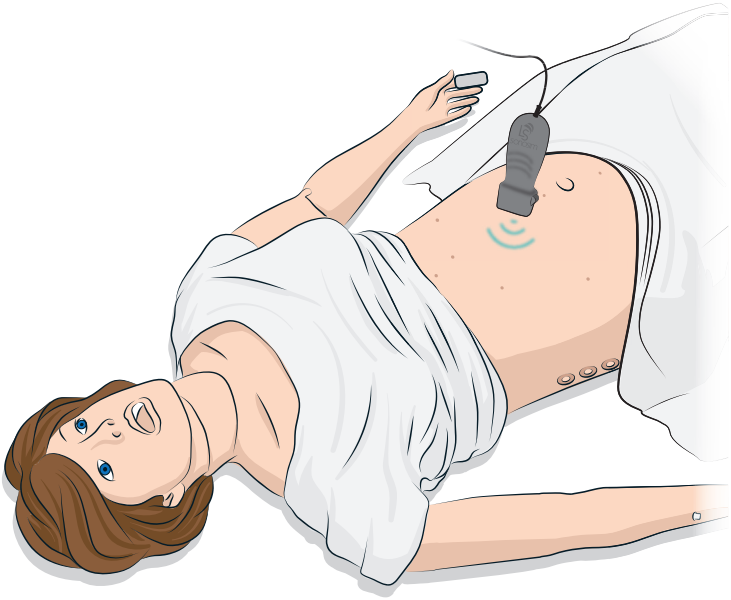
6c SimView System Configuration



Note:
The SimView System is sold separately. You must be logged into the SimView software as an Administrator. To add the Laerdal-SonoSim Computer as 1 of the 4 views, in the Equipment Configuration section select "Add Equipment" then select "Laerdal Patient Monitor" or "Unified Patient Monitor". A stand-alone network connection is required. Please refer to the SimView User Guide for more information.

SimMom

Laerdal-SonoSim Ultrasound Solution
Quick Setup Guide



This Quick Setup Guide describes how to assemble and setup your Laerdal-SonoSim Ultrasound Solution for SimMom. For more information about using the Laerdal-SonoSim Ultrasound Solution software, reference the User Guide and the Product Tutorial Videos found in the main menu of the software.

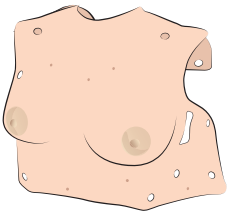
For information about how to use SimMom, please refer to the SimMom User Guide and LLEAP help files. SimMom has been developed in partnership by Limbs & Things and Laerdal, combining the best that both companies have to offer in healthcare simulation products.

Download the latest SimMom User Guide at www.laerdal.com/download

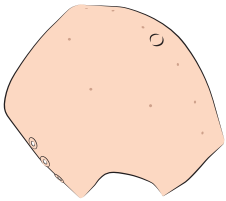
Cautions and Warnings:

1. LS Tags must not be used on anyone using a pacemaker, implantable cardioverter defibrillator, or other electronic medical device. Components of the technology may interfere with such medical devices.
2. The LS chest, gravid, and non-gravid skins should not be used during manual or automatic birthing simulations.
3. Do not use ultrasound gel and avoid exposing the LS Tags and LS Probe to any liquids.
4. Avoid bending or applying excessive force to the LS Tags. This will damage the tag.
5. Do not cut or puncture the LS chest, gravid, and non-gravid skins.
6. Manikin skins should be cleaned with a damp cloth only.
7. Use the product only as intended and described in the User Guides.

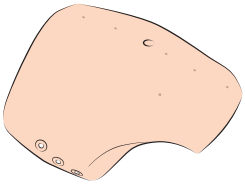
Items Included



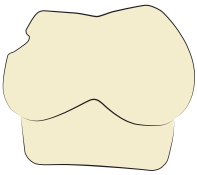
Chest Skin



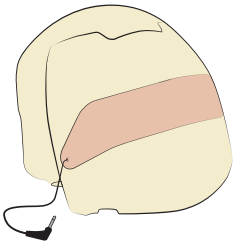
Gravid Belly Skin



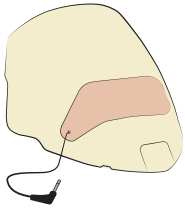
Non-Gravid Belly Skin



Chest Foam

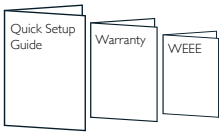


Gravid Belly Foam



Non-Gravid Belly Foam

LS Probe

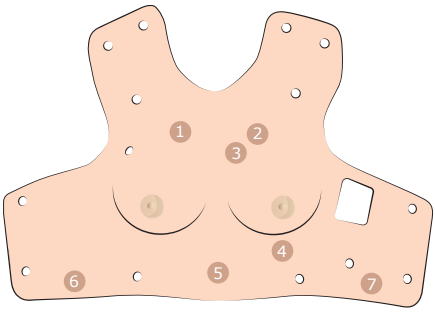


User Information

Laerdal-SonoSim Computer
(sold separately)

Chest Skin

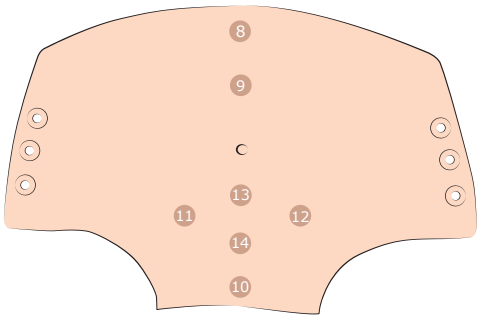
1. Right Chest
2. Left Chest
3. Parasternal
4. Apical
5. Subcostal
6. Right Upper Quadrant
7. Left Upper Quadrant



Chest Skin

Non-Gravid Belly Skin

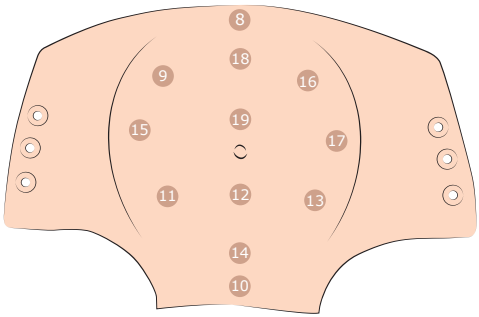
8. Proximal IVC
9. Mid Aorta
10. Suprapubic
11. Right Adnexa
12. Left Adnexa
13. Upper Uterus
14. Lower Uterus



Non-Gravid Belly Skin

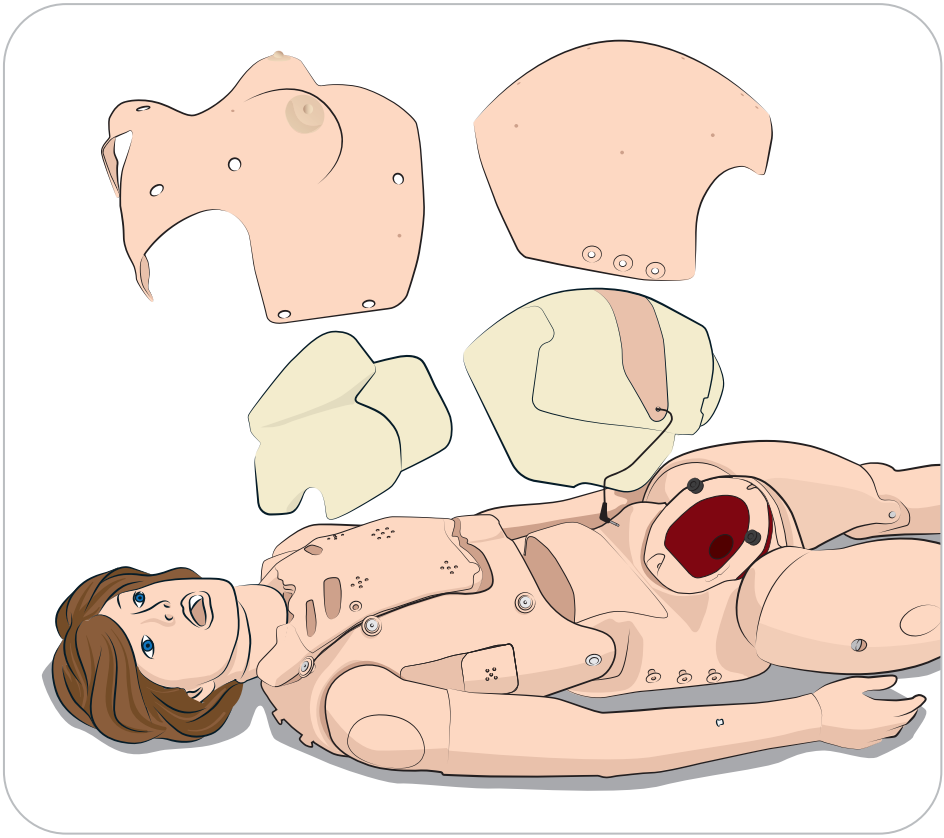
Gravid Belly Skin

8. Proximal IVC
9. Parauterine Right Upper Quadrant
10. Suprapubic
11. Parauterine Right Lower Quadrant
12. Infraumbilical
13. Parauterine Left Lower Quadrant
14. Lower Uterus
15. Parauterine Right Mid Quadrant
16. Parauterine Left Upper Quadrant
17. Parauterine Left Mid Quadrant
18. Upper Uterus
19. Supraumbilical

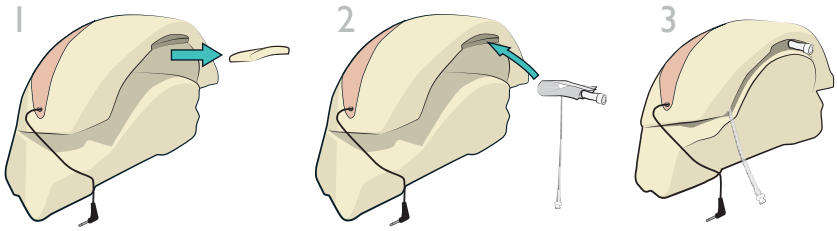


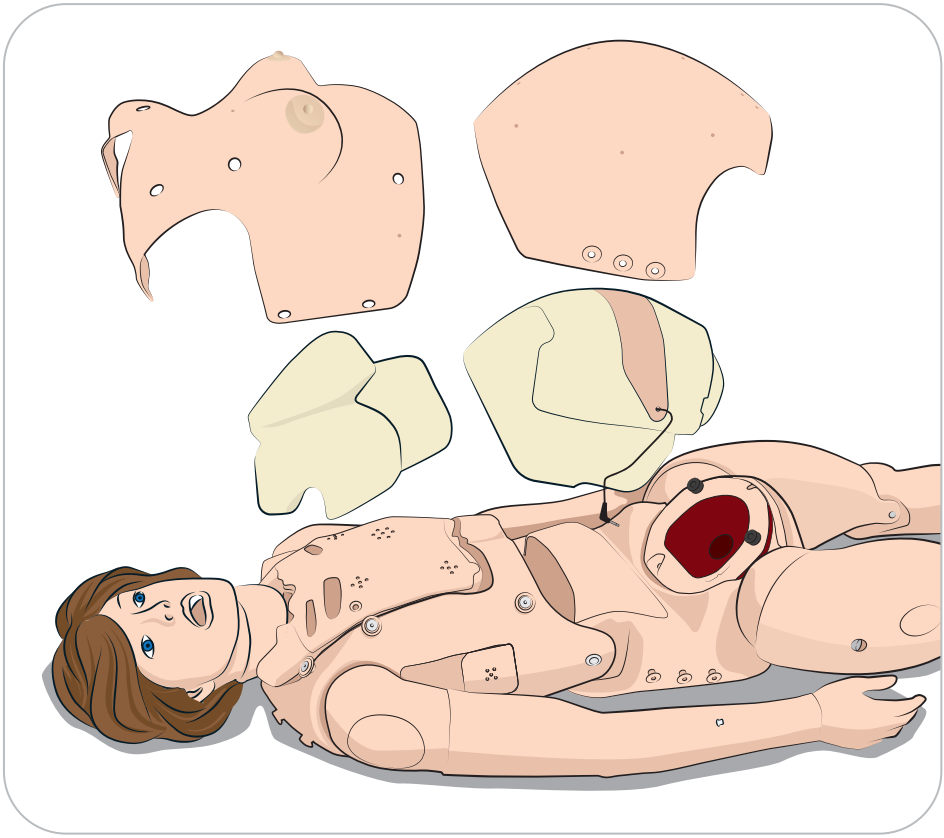
Gravid Belly Skin

Note:
LS Tags are embedded in the skin. Exterior surface is marked for easy identification of tag location.

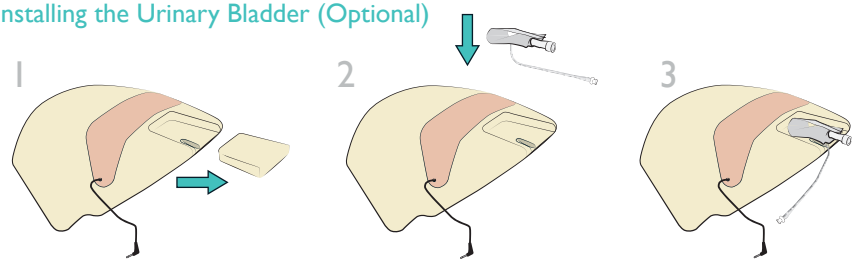


Installing the Urinary Bladder (Optional)



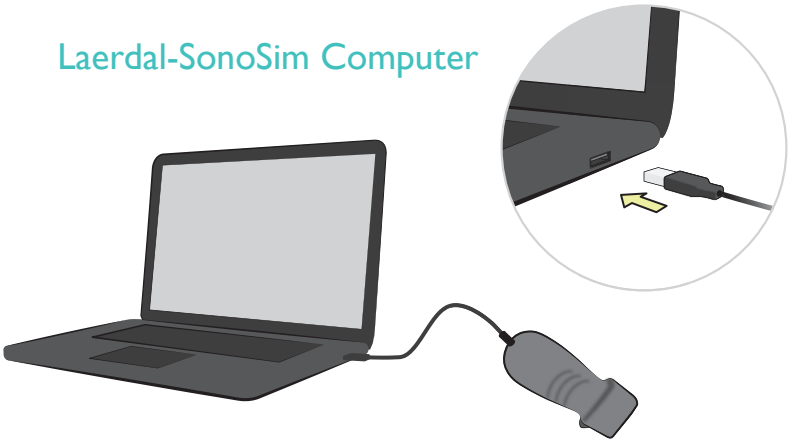


Installing the Urinary Bladder (Optional)



2 Connect LS Probe and Internet

Laerdal-SonoSim Computer

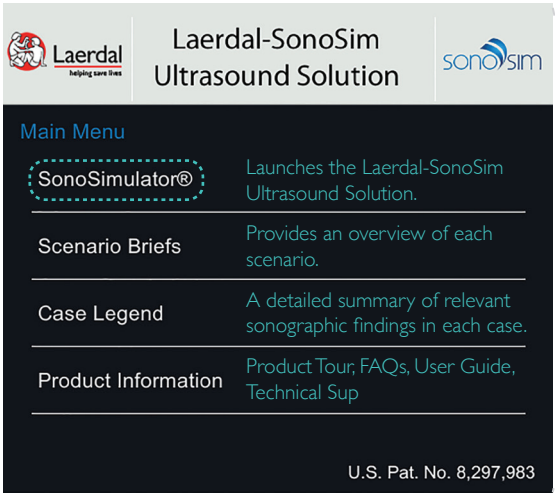


Ensure the Laerdal-SonoSim Computer is connected to the LS Probe and the Internet before starting the Laerdal-SonoSim Ultrasound Solution software for the first time to activate the product.

Note:
Included videos will only work with a connection to the Internet.

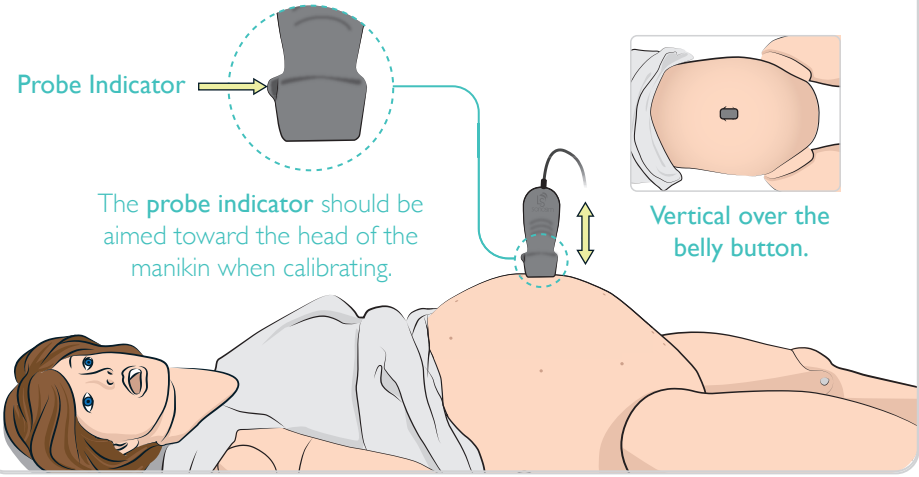
3 Launch Application and Calibrate LS Probe

1



2

Ensure the manikin is lying flat before calibrating the probe. Follow this procedure for both gravid and non-gravid skins.

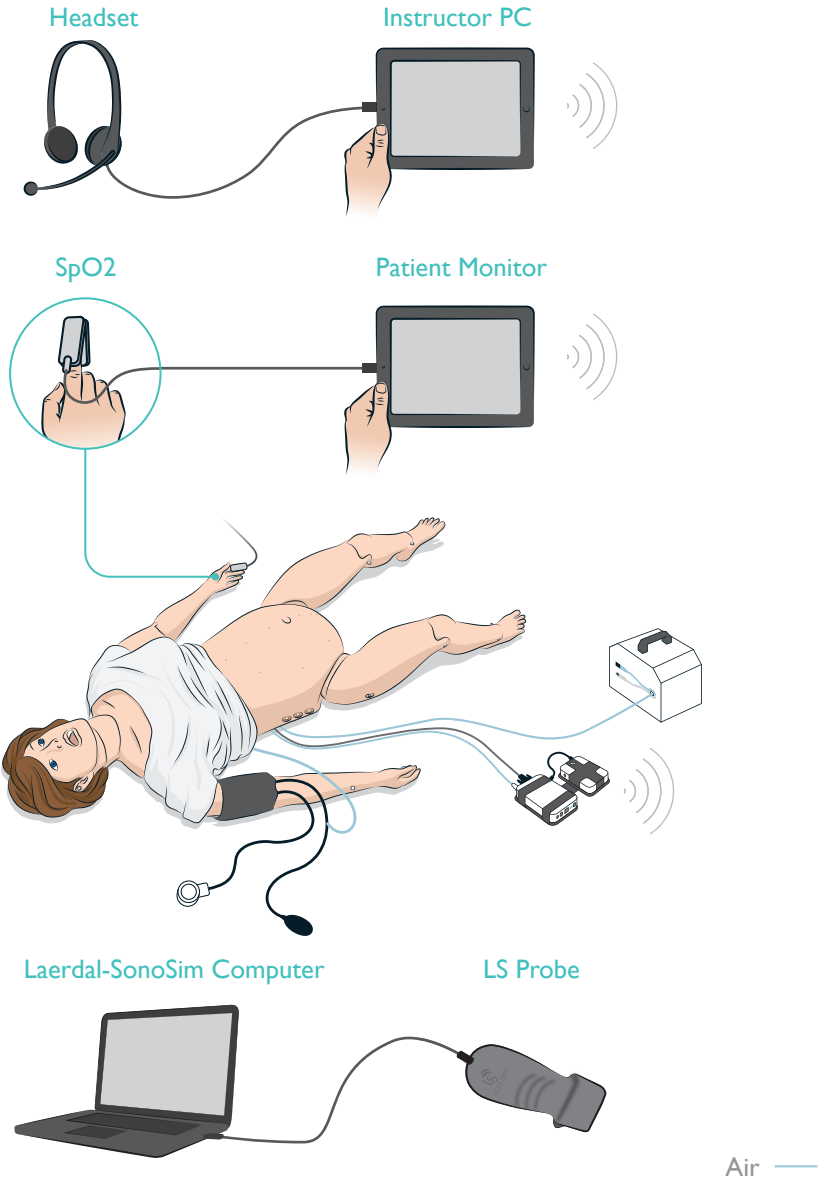


4 Download Scenarios from SimStore to Instructor PC

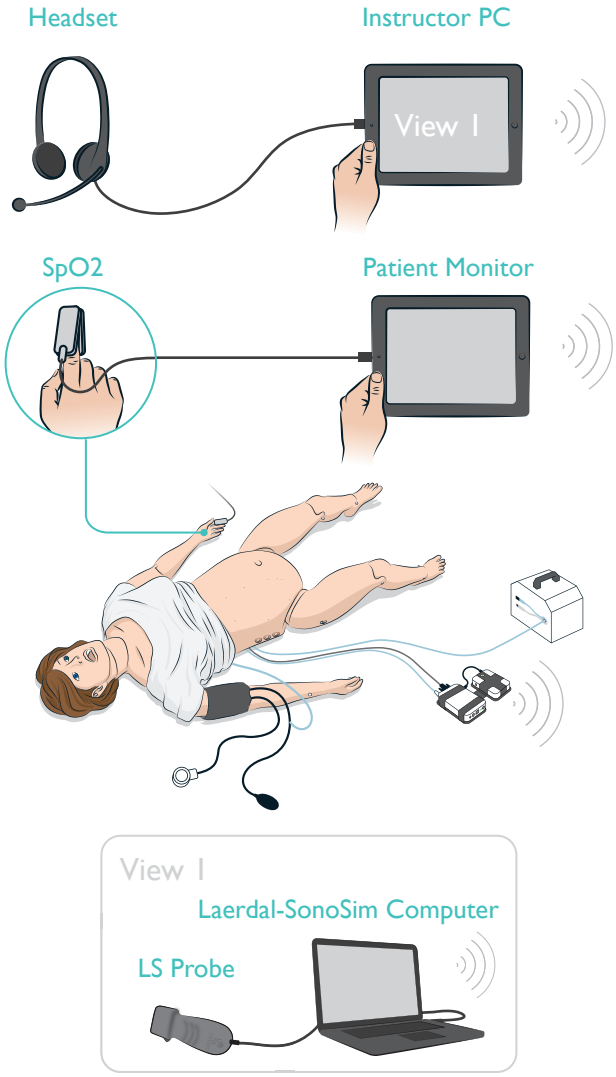
Instructor PC

Log in to your SimStore account on the Instructor PC.
Download the Laerdal-SonoSim Scenarios that you have purchased.

Start the Scenario that matches the selected Ultrasound Case.

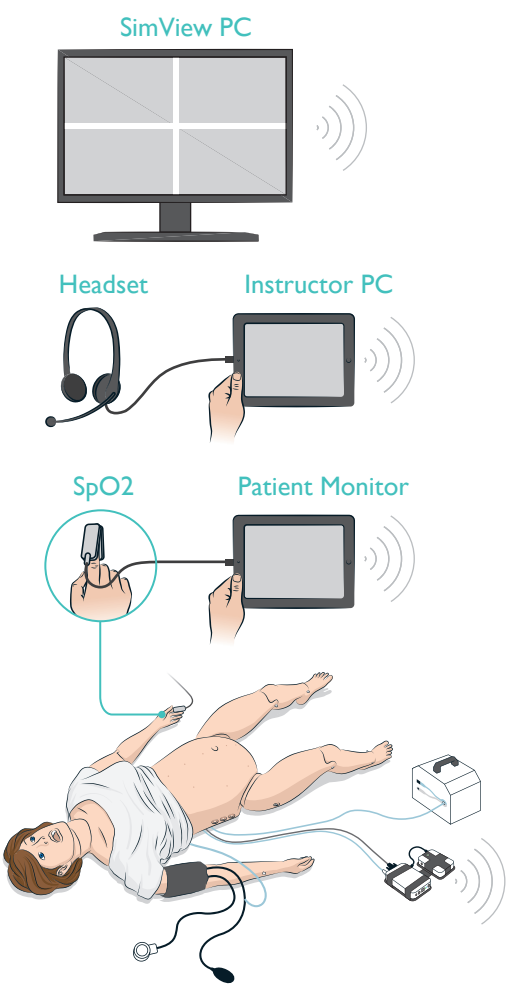

Headset
Instructor PC
SpO2
Patient Monitor
Laerdal-SonoSim Computer
LS Probe
Air
Manikin Cable
Wireless Network Connection

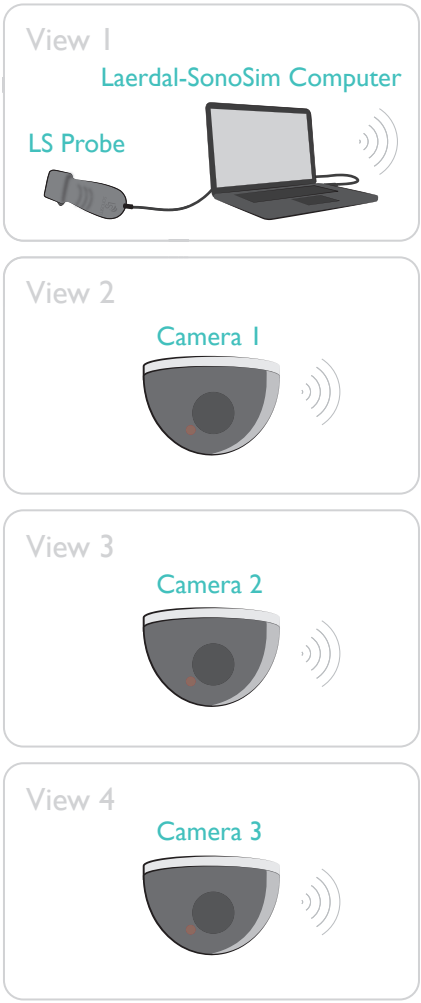
5b Session Viewer System Configuration



Note:
A stand-alone network connection with Internet access is required to view the Laerdal-SonoSim Computer in Session Viewer. Ensure the Laerdal-SonoSim Computer has Screen Capture turned on. To add the Laerdal-SonoSim Computer as a view, select "Add Equipment" in the Equipment Configuration section.

5c SimView System Configuration





Air —— USB Cable ——
Wireless Network Connection

Note:
The SimView System is sold separately. Ensure the Laerdal-SonoSim Computer has screen capture turned on. You must be logged into the SimView software as an Administrator. To add the Laerdal-SonoSim Computer as 1 of the 4 views, in the Equipment Configuration section select "Add Equipment" then select "Laerdal Patient Monitor" or "Unified Patient Monitor". A stand-alone network connection with Internet access is required. Please refer to the SimView User Guide for more information.

Laerdal and SonoSim are committed to providing clients with the "gold standard" of customer service. Laerdal Customer Service Representatives will provide the first line of customer support.

If you are experiencing technical issues with your Laerdal-SonoSim Ultrasound Solution, please contact us at http://www.laerdal.com/pages/contactforms - and choose your country for support.

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules and RSS-210 of IC rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
– Reorient or relocate the receiving antenna
– Increase the separation between the equipment and the receiver
– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
– Consult the dealer or an experienced radio/TV technician for help.

The term "IC" before the equipment certification number only signifies that the Industry Canada technical specifications were met.
Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Déclaration de la Commission Fédérale des Communications

Cet appareil est conforme à la section 15 des règles de la FCC et RSS-210 des règles IC. Son fonctionnement est sujet aux deux conditions suivantes :
1. Cet appareil ne doit pas causer des interférences nuisibles, et
2. Cet appareil doit accepter toute interférence reçue, y compris les interférences qui peuvent provoquer un fonctionnement indésirable.
Cet équipement a été testé et jugé conforme aux limites d'un appareil numérique de classe B, conformément à la section 15 des règles de la FCC. Ces limites sont conçues pour fournir une protection raisonnable contre les interférences nuisibles dans une installation résidentielle. Cet équipement génère, utilise et peut émettre une énergie radiofréquence et, s'il n'est pas installé et utilisé conformément aux instructions, peut causer des interférences nuisibles aux communications radio. Cependant, il n'y a aucune garantie que des interférences ne se produiront pas dans une installation particulière. Si cet équipement provoque des interférences nuisibles à la réception radio ou télévision, ce qui peut être déterminé en allumant et en éteignant l'équipement, l'utilisateur est encouragé à essayer de corriger l'interférence par une ou plusieurs des mesures suivantes :
- Réorienter ou déplacer l'antenne réceptrice.
- Augmenter la distance entre l'équipement et le récepteur.
- Connecter l'équipement à une prise sur un circuit différent de celui sur lequel le récepteur est branché.
- Consulter le revendeur ou un technicien radio/TV expérimenté pour obtenir de l'aide.

Le terme "IC" avant le numéro de certification de l'équipement signifie uniquement que les spécifications techniques d'Industrie Canada ont été respectées.
Les changements ou modifications non expressément approuvés par la partie responsable de conformité pourrait annuler l'autorité de l'utilisateur à utiliser l'équipement .

Waste Handling

Dispose of in accordance with local requirements and regulations.

Certification

CE

The product is in compliance with the essential requirements of Council Directive 1999/5/EC on radio and telecommunications terminal equipment (R&TTE). The product is in compliance with Council Directive 2011/65/EU on restriction of the use of certain hazardous substances (RoHS).

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