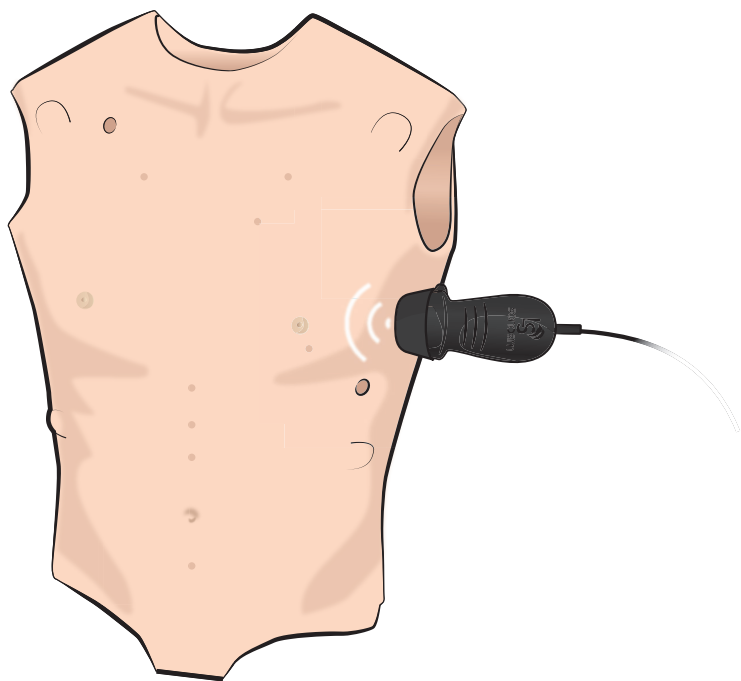


Laerdal-SonoSim Ultrasound Solution

User Guide



Contents

Introduction	4
Tag Location Overview	5
For SimMan	5
For SimMom - White Tags	6
For SimMom - Blue Tags	7
System Configuration	8
Network Setup Overview	9
Ultrasound PC Overview	10
LS-Probe Calibration	12
Probe Calibration for SimMan Family	12
On The Simulator	12
Probe Calibration for SimMom	13
On The Simulator	13
Using the LS Probe	14
Recalibrate the Probe	14
Scanning	14
Accessing / Downloading Scenarios from Scenario Cloud	15
Log into Scenario Cloud Account	15
Syncing My Scenario folder with Instructor PC	16
On the Instructor PC	17
Running Laerdal SonoSim Scenarios - Automatic Mode	17
On the Ultrasound PC	18
On The Instructor PC	19
Running Laerdal SonoSim Scenarios - Manual Mode	20
Running a Healthy Patient Ultrasound Case - SimMan	21
On the Ultrasound PC	21
Running a Healthy Patient Ultrasound Case - SimMom	22
On the Ultrasound PC	22

Contents

Preparation & Setup of a Scenario in LLEAP	24
Blood Pressure Settings	24
Learner Modes	25
Set Learner Mode	25
Scenario Flow	26
Starting the Scenario	26
Scenario Progressing	26
Completing Essential Events	27
Exceeding Allotted Time	27
Requesting the Next Phase	28
Debriefing	29
Laerdal Software	29
Simulation Information	30
Event Log	31
SonoSimulator	32

Introduction

The Laerdal-SonoSim Ultrasound Solution (LSUS) enables real patient-based ultrasound cases into the SimMan family and SimMom simulators. Users can now incorporate real ultrasound cases diagnostic scanning into full-scale simulations with pathological findings.

The LSUS 2.0 software features dynamic control of the heart and respiratory rate resulting in immediate changes to the ultrasound images on the Ultrasound PC. This feature can be utilized during the set-up of a scenario, or in the middle of a scenario.

Paired with a complementary subscription to Scenario Cloud, the LSUS offers a complete simulation package for the SimMan family and SimMom simulators. Credentials are needed in order to access and download the ultrasound LLEAP scenarios. Contact your Laerdal representative if you have not received your login credentials.

This User Guide outlines how to set up and run the LSUS.

Items included in this Upgrade Kit:

SimMan and SimMom

- Laerdal-SonoSim Tags,
- LS Probe,
- Quick Setup Guide.

SimMom only

- Gravid and non-gravid,
- chest skin,
- supporting foam for additional skins.

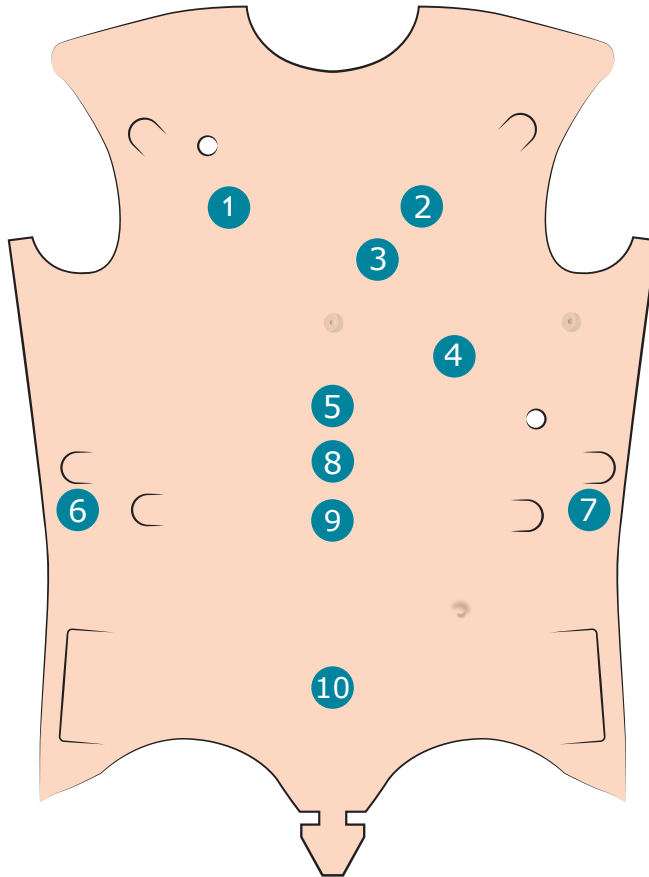
Additional items needed

- Ultrasound PC (purchased separately),
- LSUS 2.0 subscription to access to all compatible simulator Content Bundles (purchased separately).

Tag Location Overview

For SimMan

Laerdal-SonoSim Tags are embedded in the skin for easy identification.



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

 Caution

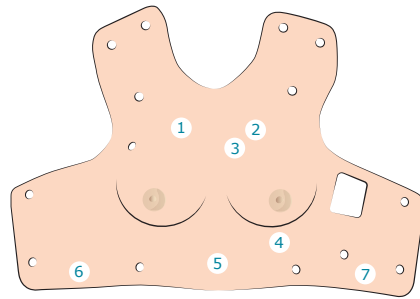
Do not bend or apply excessive force on the Laerdal-SonoSim tags, as this could damage them.

Tag Location Overview

For SimMom - White Tags

Chest Skin

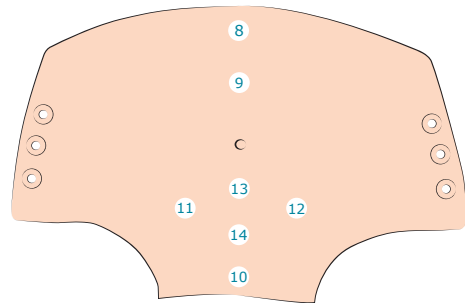
1. Right Chest
2. Left Chest
3. Parasternal
4. Apical
5. Subcostal
6. Right Upper Quadrant
7. Left Upper Quadrant



Chest Skin

Non-Gravid Belly Skin

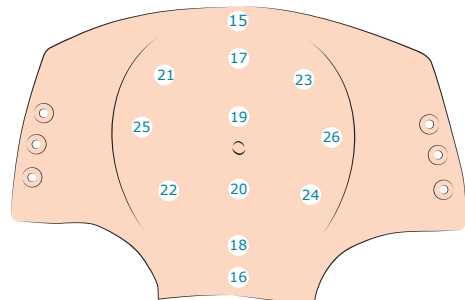
8. Proximal IVC
9. Mid Aorta
10. Suprapubic
11. Right Adnexa
12. Left Adnexa
13. Upper Uterus
14. Lower Uterus



Non-Gravid Belly Skin

Gravid Belly Skin

15. Proximal IVC
16. Suprapubic
17. Upper Uterus
18. Lower Uterus
19. Supraumbilical
20. Infraumbilical
21. Parauterine Right Upper Quadrant
22. Parauterine Right Lower Quadrant
23. Parauterine LUQ
24. Parauterine LLQ
25. Parauterine RMQ
26. Parauterine LMQ



Gravid Belly Skin



Caution

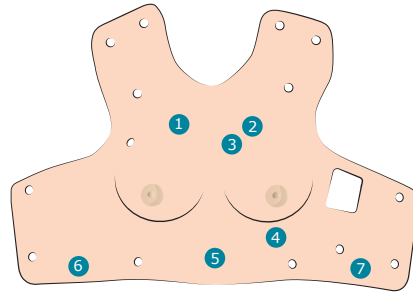
Do not bend or apply excessive force on the Laerdal-SonoSim tags, as this could damage them.

Tag Location Overview

For SimMom - Blue Tags

Chest Skin

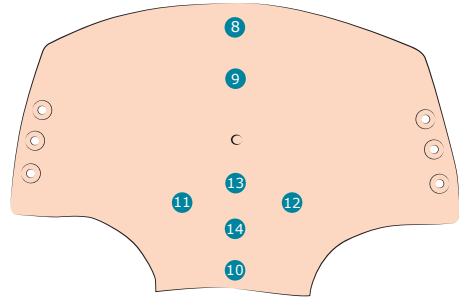
1. Right Chest
2. Left Chest
3. Parasternal
4. Apical
5. Subcostal
6. Right Upper Quadrant
7. Left Upper Quadrant



Chest Skin

Non-Gravid Belly Skin

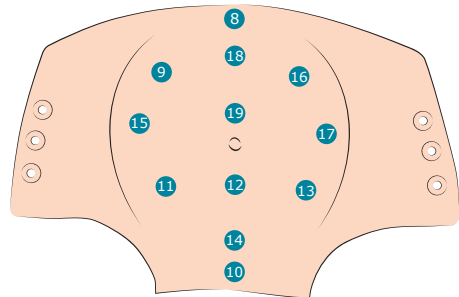
8. Proximal IVC
9. Mid Aorta
10. Suprapubic
11. Right Adnexa
12. Left Adnexa
13. Upper Uterus
14. Lower Uterus



Non-Gravid Belly Skin

Gravid Belly Skin

15. Proximal IVC
16. Parauterine Right Upper Quadrant
17. Suprapubic
18. Parauterine Right Lower Quadrant
19. Infraumbilical
20. Parauterine Left Lower Quadrant
21. Lower Uterus
22. Parauterine Right Mid Quadrant
23. Parauterine Left Upper Quadrant
24. Parauterine Left Mid Quadrant
25. Upper Uterus
26. Supraumbilical



Gravid Belly Skin

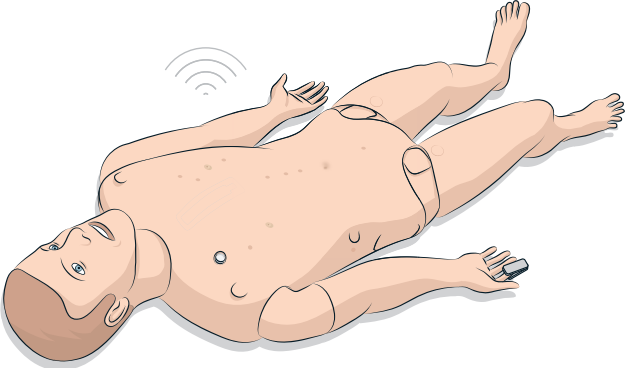
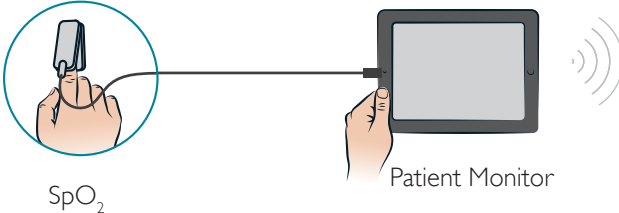
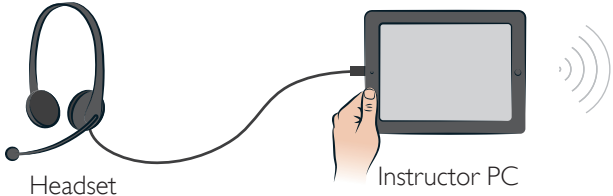
⚠ Caution

Do not bend or apply excessive force on the Laerdal-SonoSim tags, as this could damage them.

📄 Note

LSUS software version 2.27.4 or lower for SimMom were shipped with blue tags embedded into the skins. LSUS software version 2.31.0 and higher are shipped with white tags embedded into the skin. Both tags are compatible with the product.

System Configuration

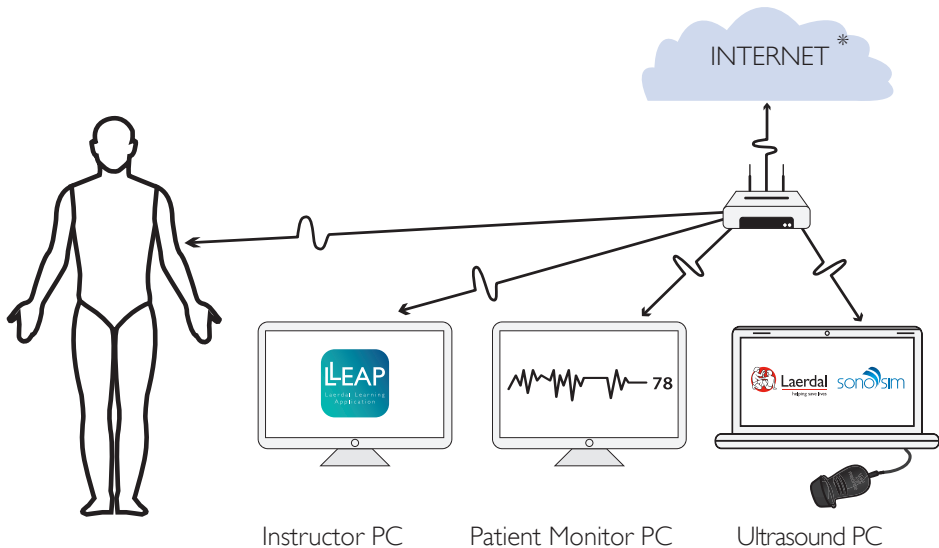
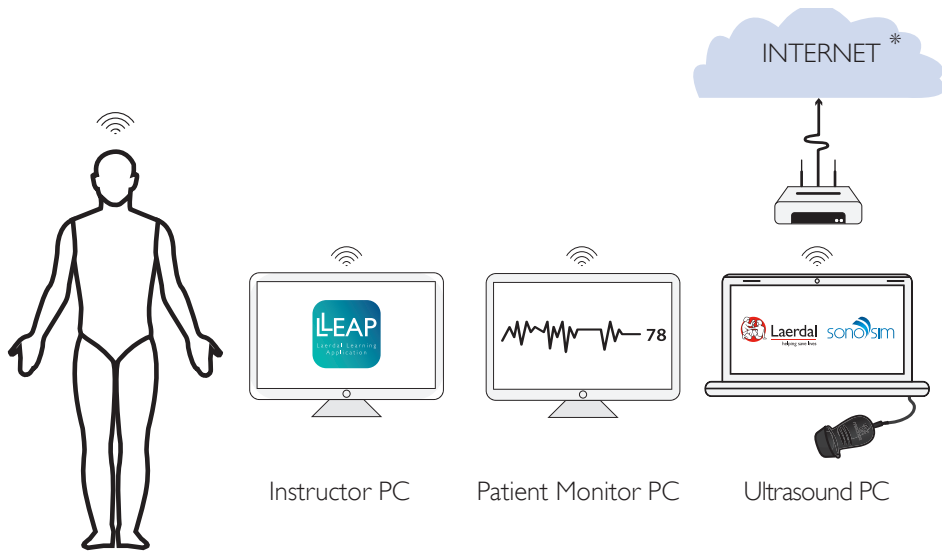


Note

SimMan ALS / SimMom Link Box network must be configured to be found via the High Bandwidth Internet Network.

Network Setup Overview

Connect to the Internet to enable all features.



**For LSUS software version 2.31.0 and above, Internet connection is optional. However, Internet connection is necessary to receive the most up-to-date content (Findings videos, Doppler clips, etc.) and to download software updates.*

Ultrasound PC Overview

The screenshot shows the main interface of the Laerdal SonoSim Ultrasound Solution. At the top left, it displays 'Case in progress' with patient information: 'Healthy Patient SimMan Case 1 LUQ'. The central area is a 'Window for ultrasound image' showing a grayscale B-mode scan. To the right is the 'Ultrasound Control Toolbar' with various icons for adjusting the view. A 'Caliper' tool is shown in a separate window at the bottom left, used for measurements. A 'Simulation Controls Toolbar' is shown at the bottom right, containing controls for Depth, Gain, Doppler, Flip, Freeze, Save, Review, and Annotate.

Case in progress

Window for ultrasound image

Ultrasound Control Toolbar

Caliper

Measure length, area, and volume.

Click arrows to adjust depth of ultrasound view.

Displays power, color-flow, pulsed-wave, and M-mode Doppler as available.

Click to freeze view. Click again to un-freeze view.

Review saved images.

Click arrows to adjust brightness of ultrasound view.

Allows displayed image to be flipped for different imaging conventions.

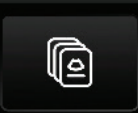
Saves the frozen view.

Only available when the image is frozen. Saved image can be annotated and archived for future use.

Simulation Controls Toolbar

Case List

Available training cases sorted by emergency care protocol



Case

Navigate through hands-on training cases.



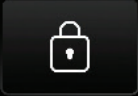
Case History

Brief patient history.



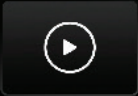
Lock

Locking the ultrasound image.



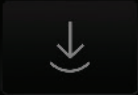
Findings

Plays ultrasound scan findings with narration by an expert.



Compress button

Click and hold to perform compression when available.



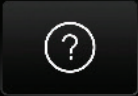
Calibrate

Instructions on how to calibrate the Probe.



Help

Access User Guide.



Close

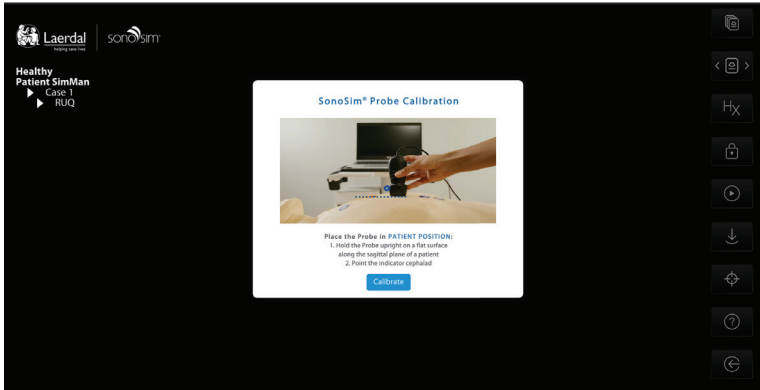
Quits the application.



LS-Probe Calibration

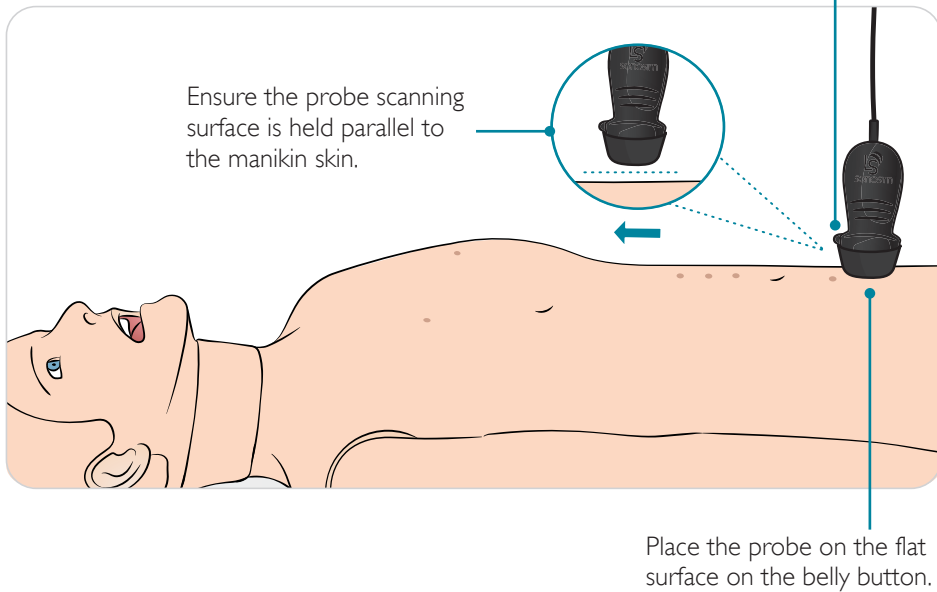
Probe Calibration for SimMan Family

Follow the on-screen instructions to calibrate the probe for SimMan.



On The Simulator

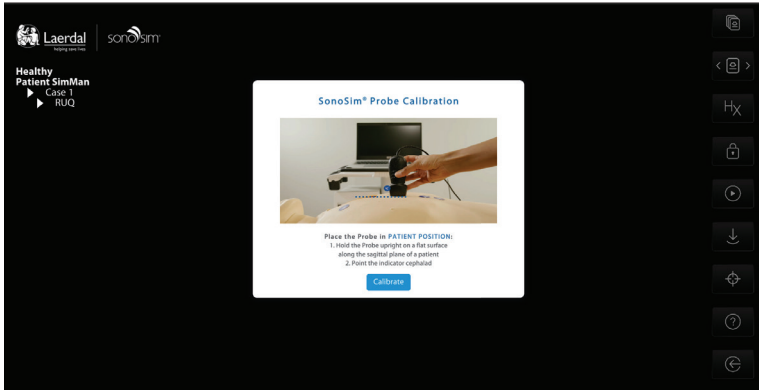
Point the probe indicator towards the head of the manikin, then click OK.



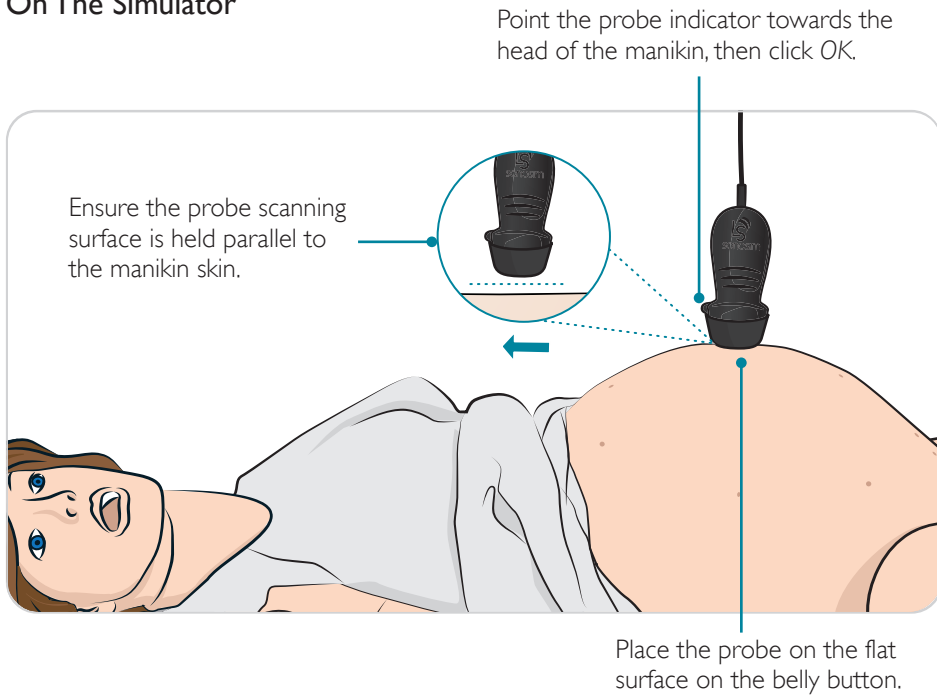
The probe is now ready for use.

Probe Calibration for SimMom

Follow the on-screen instructions to calibrate the probe for SimMom.



On The Simulator



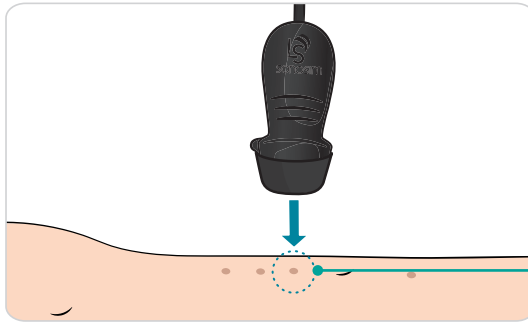
The probe is now ready for use.

Using the LS Probe

Recalibrate the Probe

Recalibrate the probe according to Probe Calibration at the beginning of each new scenario. See [Calibration](#).

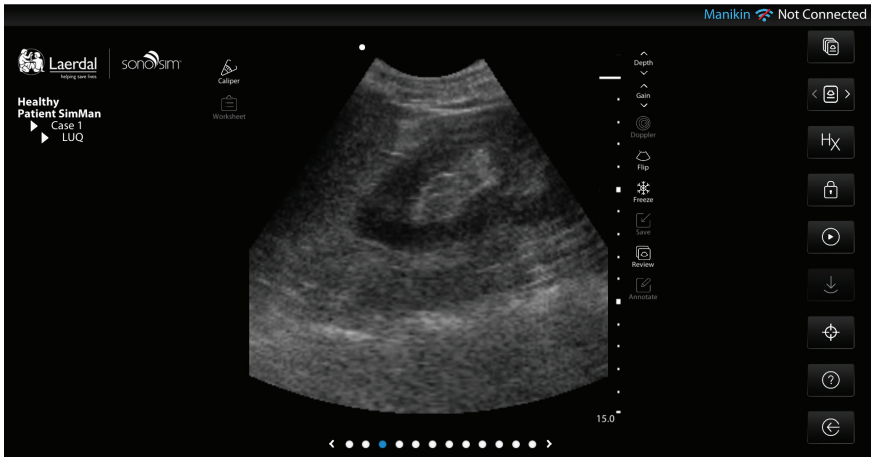
Scanning



Place the Probe on one of the imaging-window indicator symbols on the manikin skin to start scanning.

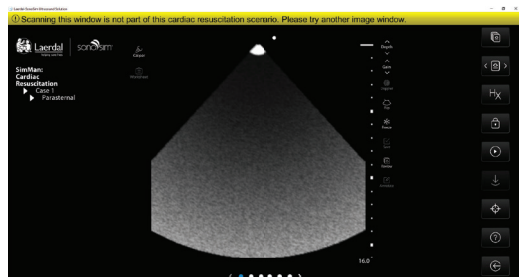
Imaging-window indicator symbols

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 the selected case, a message will be displayed, e.g., "This image window is not part of this trauma care case."

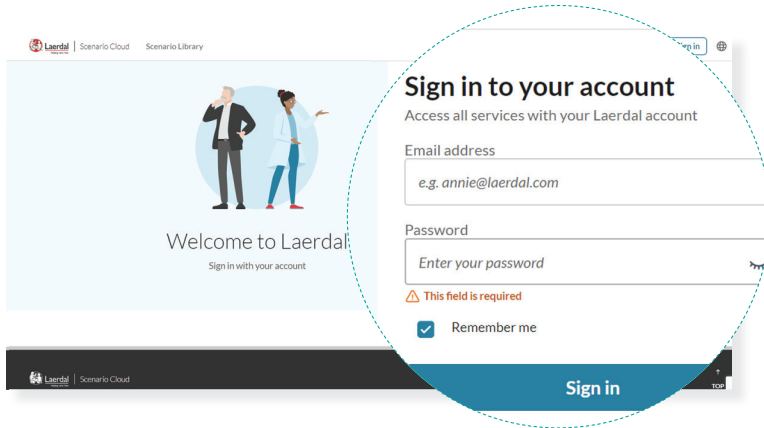


Accessing / Downloading Scenarios from Scenario Cloud

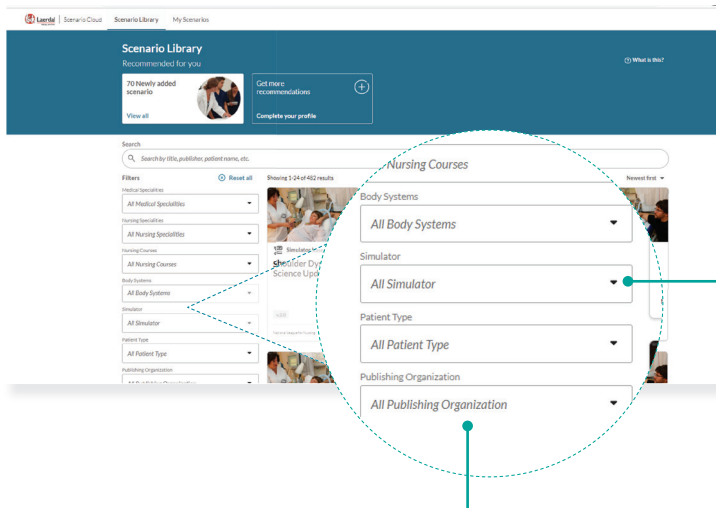
A subscription to Scenario Cloud is included with the LSUS to access and download the Laerdal SonoSim LLEAP Scenarios.

Log into Scenario Cloud Account

1. On a computer, go to <https://scenariocloud.laerdal.com/>
2. Sign into the Scenario Cloud account using the provided credentials.



3. Use *Filters* to locate the Laerdal SonoSim LLEAP scenarios.



4. Select either SimMan3G or SimMom.

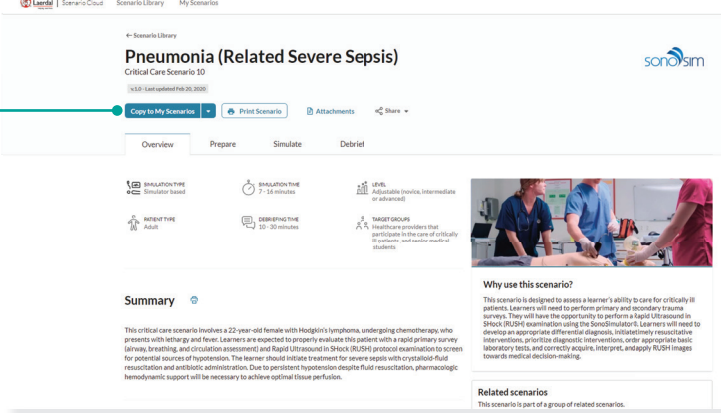
5. Select SonoSim.

Once the filters are applied, all corresponding Laerdal SonoSim LLEAP scenarios are displayed.

Accessing / Downloading Scenarios from Scenario Cloud

6. Select the scenarios you want to download on the Instructor PC.

Select **Copy to My Scenarios**

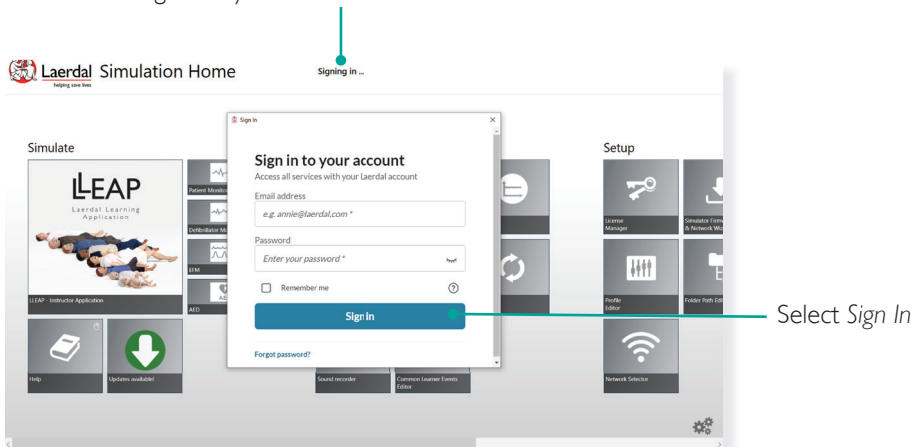


7. Repeat this step to download more scenarios.

Syncing My Scenario folder with Instructor PC

Ensure that the Instructor PC is connected to internet.

Sign into your Scenario Clouds account



Once signed in, the *My Scenarios* folder on the Instructor PC synchronizes with the *My Scenarios* folder on the Ultrasound PC.

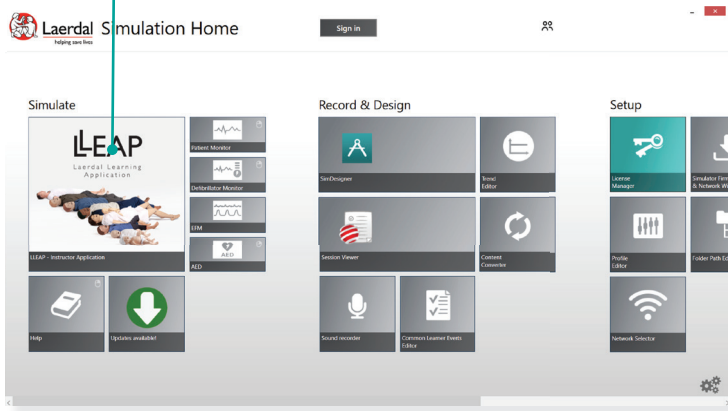
Running Laerdal SonoSim Scenarios - Automatic Mode

Ensure the System is set up as shown in [Wireless / Wired Setup Overview](#).

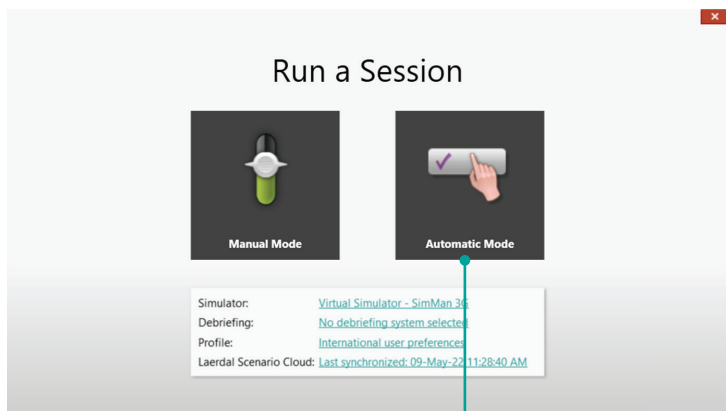
1. Select the Laerdal SonoSim scenario from the *My Scenario* folder.
2. Select the simulator and debriefing system and connect.
3. Select *OK*.

On the Instructor PC

1. Select *LLEAP Instructor Application*.



2. Select the Simulator.
3. Select the Debriefing System.



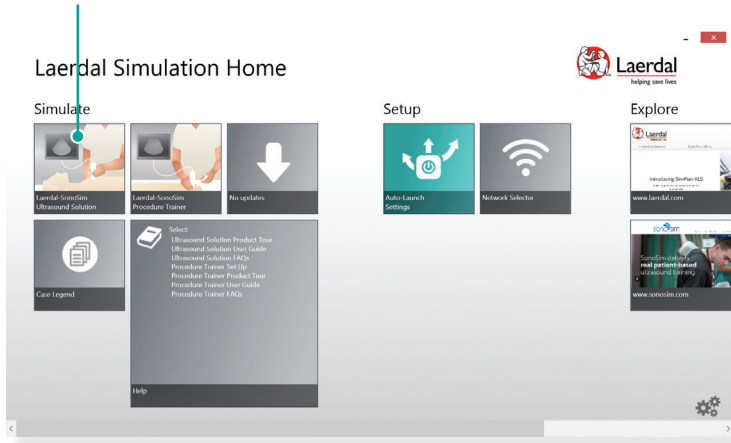
4. Select *Automatic Mode*.

5. From the *My Scenario* list select Laerdal SonoSim Scenario to be run and select *OK*.

Running Laerdal SonoSim Scenarios - Automatic Mode

On the Ultrasound PC

1. Select *Laerdal-SonoSim Ultrasound Solution*.



2. In the Laerdal Selector window, select to connect to the same simulator that is connected to on the Instructor PC.

The ultrasound case selected on the Instructor PC will automatically load.

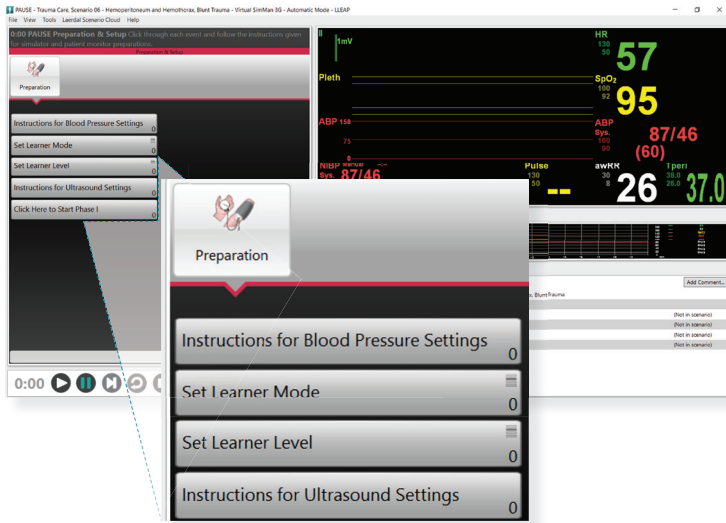
3. Follow the on-screen prompts to calibrate the probe.

The ultrasound case is now ready to be used.

Running Laerdal SonoSim Scenarios - Automatic Mode

On The Instructor PC

Before starting the programmed scenario you can configure it using the following *Preperation* tabs. More detailed information about scenario configuration can be found in the scenario support material.



Once configured select *Click here to Start Phase 1*.

Click Here to Start Phase 1

0

Running Laerdal SonoSim Scenarios - Manual Mode

See [Running Laerdal SonoSim Scenarios Automatic Mode](#) and follow the scenario selection steps on the Instructor PC and Ultrasound PC. Then follow these steps:

1. Select Set Learner Mode.

2. Select Manual Mode.

3. Select OK.

4. Select OK.

A window opens confirming that *You are now in Manual Mode.*

5. Select OK to close the window.

Scenario starts with an Instructor message.

Note

All physiological parameters and simulator functions can be changed by the Instructor. The ultrasound image shows the heart and respiratory rate set in LLEAP.

Running a Healthy Patient Ultrasound Case - SimMan

Allows the Instructor to show a normal ultrasound pathology at all ultrasounds image locations available.

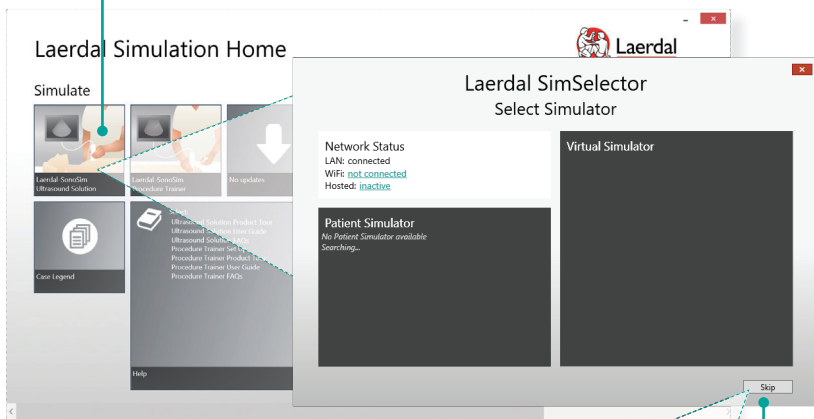


Note

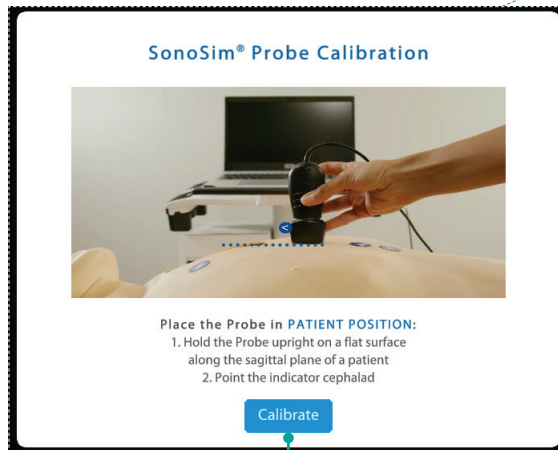
When using the SimMan Simulator, the Healthy Patient SimMan Case will load by default. Follow the on-screen prompt to calibrate the probe before starting the Case.

On the Ultrasound PC

1. Select Laerdal-SonoSim Ultrasound Solution.



2. Select Skip



3. Select Calibrate

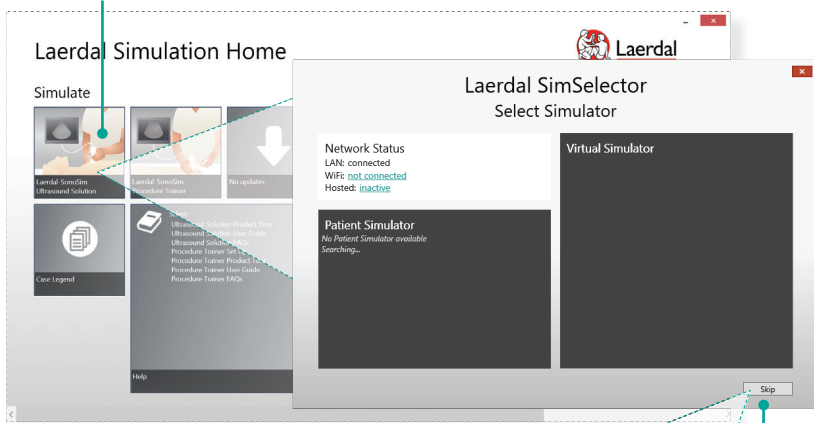
The Healthy Patient Ultrasound Case is ready to use.

Running a Healthy Patient Ultrasound Case - SimMom

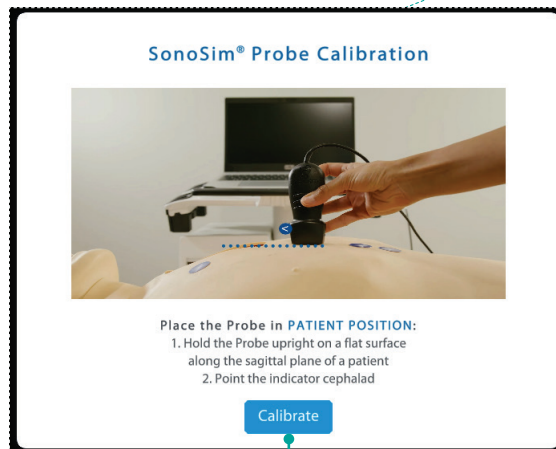
Allows the Instructor to show a normal ultrasound pathology at all ultrasounds image locations available.

On the Ultrasound PC

1. Select Laerdal-SonoSim Ultrasound Solution.



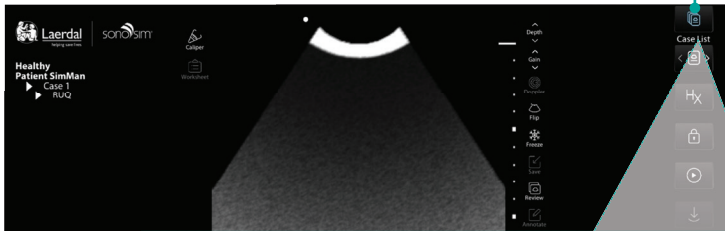
2. Select Skip



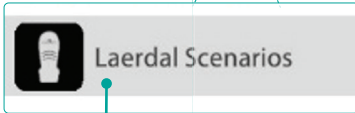
3. Select Calibrate

Running a Healthy Patient Ultrasound Case - SimMom

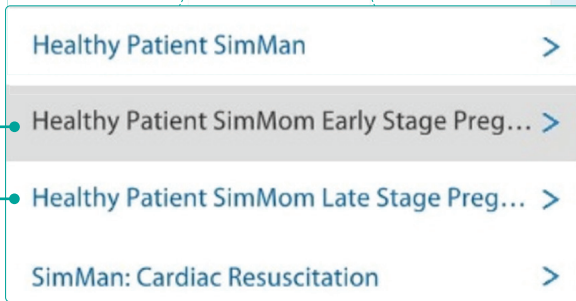
4. Select Case List.



5. Select Laerdal Scenarios.



6. Select early or late pregnancy dependant on the configuration being used.



7. Select Case 1.

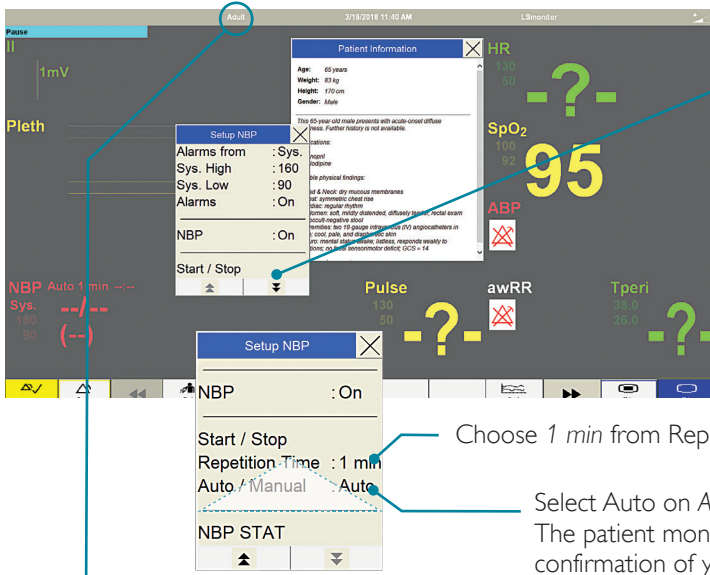
8. Follow the on-screen prompt to calibrate the probe.

The Healthy Patient Ultrasound Case is ready for use.

Preparation & Setup of a Scenario in LLEAP

Blood Pressure Settings

On the Patient Monitor, select the NBP (non-invasive blood pressure) parameter setting.

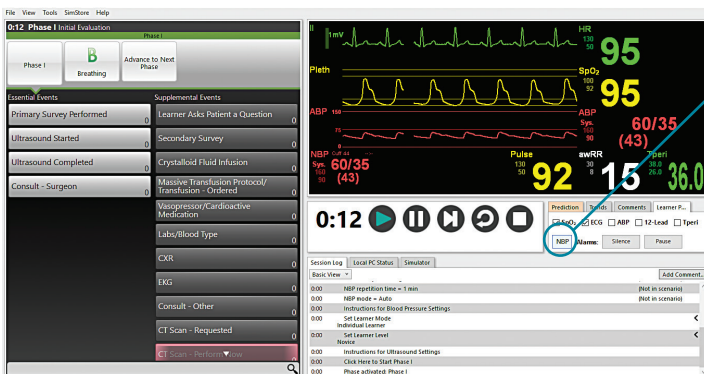


Click the downward arrows to reveal options for *Repetition Time* and *Auto/Manual* modes

Choose 1 min from Repetition Time sub-menu

Select Auto on Auto/Manual sub-menu. The patient monitor will now display confirmation of your configuration

Redisplay the Learner Brief/Patient Information on the Patient Monitor by clicking *Adult* at the top of the screen.



On the Instructor Monitor click the *Learner Patient Monitor Buttons* tab and select *NBP* to start cycling blood pressure on the Patient Monitor.

Preparation & Setup of a Scenario in LLEAP

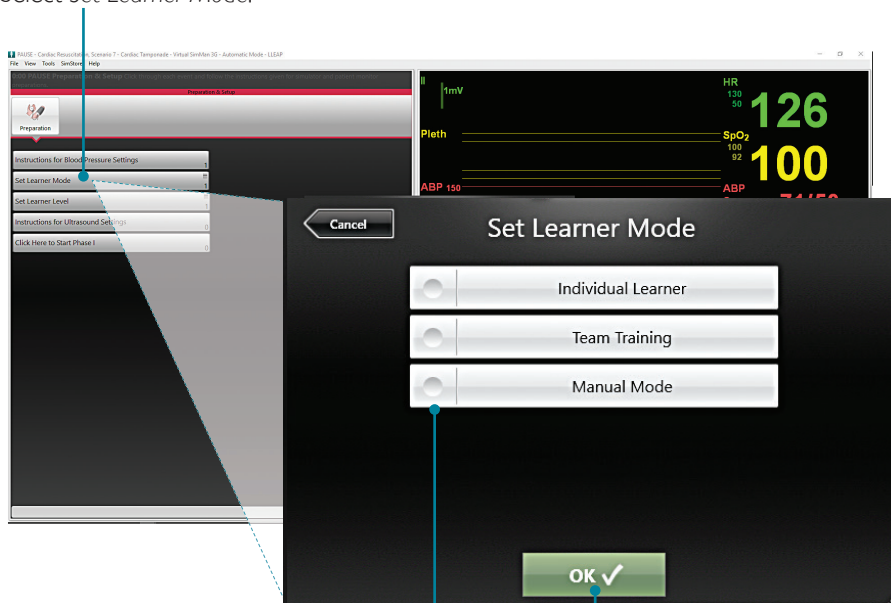
Learner Modes

There are three modes in each scenario:

- **Individual-Learner Mode**
Used to examine an individual learner's medical decision-making. Includes Pre-programmed audio responses for every order requested in the scenario. Also provides closed-loop communication between the learner and the scenario itself.
- **Team-Training Mode**
Used to examine an individual learner's medical decision-making. Includes Pre-programmed audio responses for every order requested in the scenario. Also provides closed-loop communication between the learner and the scenario itself.
- **Manual Mode**
Allows instructors to program their own scenarios using LLEAP software.

Set Learner Mode

1. Select *Set Learner Mode*.



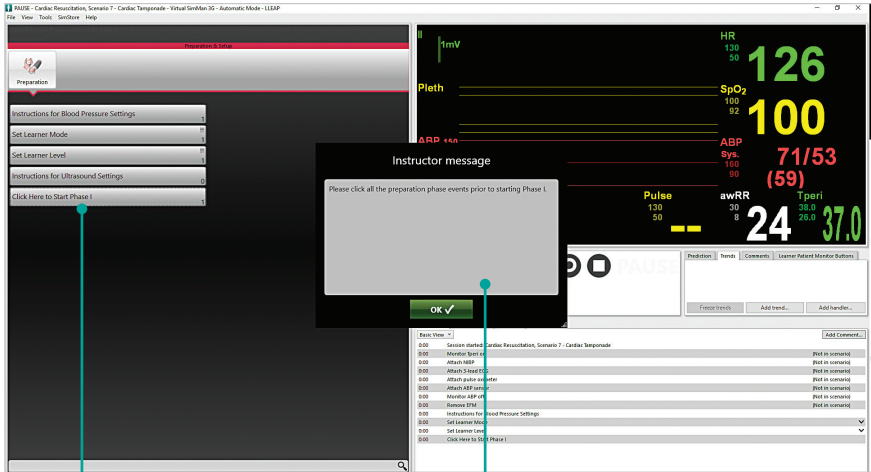
2. Select the desired mode.

3. Select OK.

Scenario Flow

Starting the Scenario

As the final step, the instructor will have to select *Click Here to Start Phase I* to proceed.



Select *Click Here to Start Phase I*

If all preparation events have not been selected, the instructor will receive a message reminding them to select all preparations.

Scenario Progressing

A scenario is made of one or multiple phases, each providing a selection of specific relevant events. Once the scenario has started, the Instructor registers every event as they occur during the session.

There are three different ways to go from one scenario to another:

- Complete all essential events,
- exceed allotted time,
- skip to the next phase.

Completing Essential Events

The Learner needs to perform all essential events in order to complete a phase of patient care.

The screenshot shows a simulation interface for 'Critical Care, Scenario 6 - Rightward AAA, Hemorrhagic Shock - Virtual SimMan 3G - Automatic Mode - L165P'. On the left, a list of 'Essential Events' is shown, including 'Primary Survey Performed', 'Ultrasound Started', 'Consult - Surgeon', and 'Endotracheal Intubation - Attempted'. On the right, a patient monitor displays vital signs: HR 94, SpO2 95, ABP 60/35 (43), Pulse 91, awRR 15, and Tperi 36.0. The monitor also shows waveforms for ECG, Pleth, and ABP.

Exceeding Allotted Time

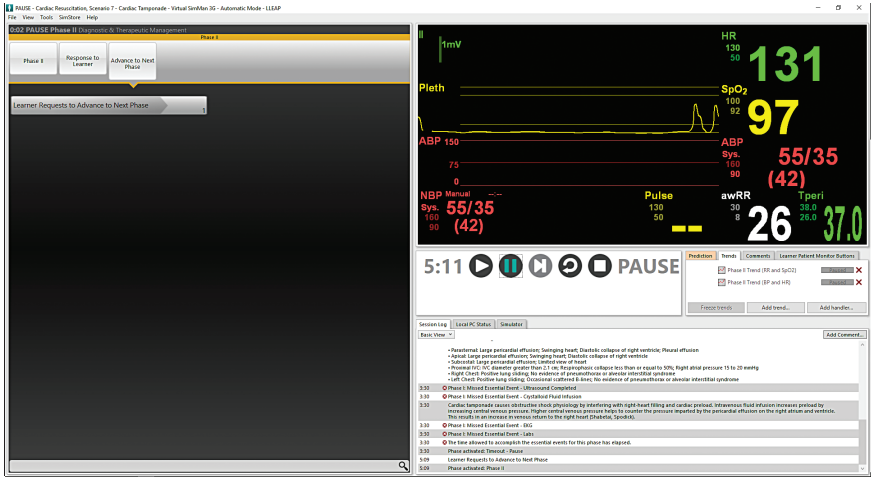
Each learner is given a specific time to complete a phase dependent on the learner mode selected. This allotted time gets shorter the more advanced the learner is.

The screenshot shows a simulation interface for 'Cardiac Resuscitation, Scenario 7 - Cardiac Tamponade - Virtual SimMan 3G - Automatic Mode - L165P'. A '1:00 TIMEOUT - Pause' message is displayed at the top left. An 'Instructor message' dialog box is shown in the center, stating: 'The time allowed to accomplish the essential events for this phase has elapsed. This phase of patient care is complete. The learner will notify you when they are ready to resume patient care.' The monitor on the right shows vital signs: HR 145, SpO2 100, ABP 40/27 (31), Pulse 26, and Tperi 37.0. The monitor also shows waveforms for ECG, Pleth, and ABP.

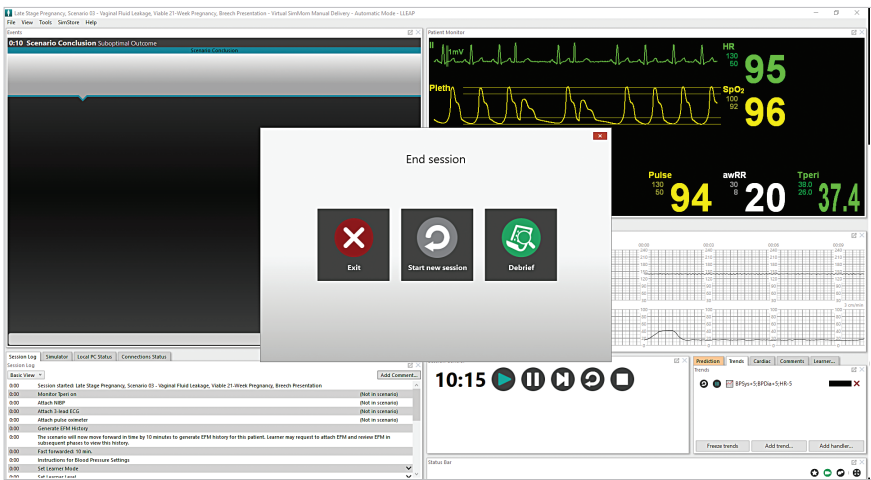
Scenario Flow

Requesting the Next Phase

The Learner can request to advance to the next *Phase* of patient care.

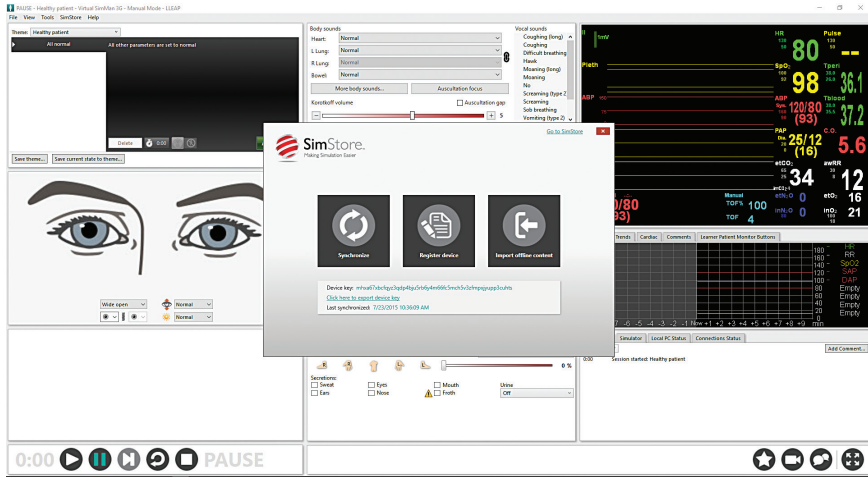


Once the Learner has completed the session, the Instructor selects *End the Session*. This will end the current scenario and store all relevant details to be used for the debriefing session. The Instructor can conduct a debriefing session using a combination of the *Session Viewer* and the *SonoSimulator*.



Laerdal Software

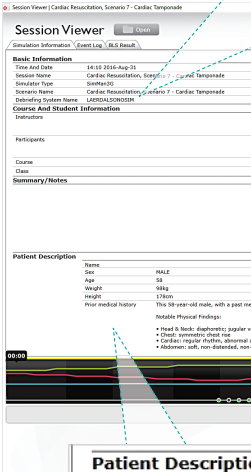
The Instructor can use either *Session Viewer*, which is part of the LLEAP platform, or purchase *SimView Server* separately. Both debriefing applications include a *Simulation Information* and an *Event Log* tab that record each session run. Video camera and screen capture recordings made during the session can also be reviewed.



Debriefing

Simulation Information

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



Session Viewer Open

Simulation Information
Event Log
BLS Result

Basic Information

Time And Date	14:10 2016-Aug-31
Session Name	Cardiac Resuscitation, Scenario 7 - Cardiac Tamponade
Simulator Type	SimMan3G
Scenario Name	Cardiac Resuscitation, Scenario 7 - Cardiac Tamponade
Debriefing System Name	LAERDALSONOSIM

Course And Student Information

Instructors

Participants

Course

Class

Summary/Notes

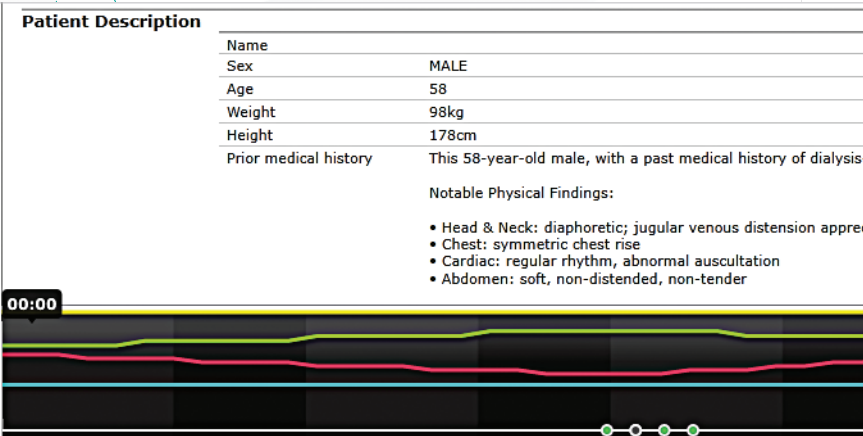
Patient Description

Name	
Sex	MALE
Age	58
Weight	98kg
Height	178cm

Prior medical history This 58-year-old male, with a past medical history of dialysis-dependent chronic renal insufficiency, presents from a dialysis center complaining of weakness and shortness of breath.

Notable Physical Findings:

- Head & Neck: diaphoretic; jugular venous distension appreciated; nasal cannula, with 2L, in place
- Chest: symmetric chest rise
- Cardiac: regular rhythm, abnormal auscultation
- Abdomen: soft, non-distended, non-tender



Event Log

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

The screenshot displays the 'Session Viewer' interface, specifically the 'Event Log' section. The window title is 'Session Viewer' and it includes a 'Print' button and a language dropdown set to 'English'. The 'Simulation Information' tab is active, showing 'Event Log' and 'RS Result'.

The 'Basic View' section contains a list of events with timestamps and descriptions:

- 00:00 Monitor Taped on
- 00:00 Attach NIBP
- 00:00 Attach 3-lead ECG
- 00:00 Attach pulse oximeter
- 00:00 Attach SPO2 sensor
- 00:00 Monitor ABP off
- 00:00 Remove EBN
- 00:00 Instructions for Blood Pressure Settings
- 00:00 Individual Learner
- 00:00 Set Learner Mode
- 00:00 Notice
- 00:00 Set Learner Level
- 00:00 Instructions for Ultrasound Settings
- 00:00 Session started: Cardiac Resuscitation, Scenario 7 - Cardiac Tamponade
- 00:00 Click here to Start Phase 1
- 00:01 Primary Survey Performed
- 00:21 Phase 1: Correct Essential Event - Primary Survey Performed
- 00:22 Crystalloid Fluid Infusion
- 00:22 Phase 1: Correct Essential Event - Crystalloid Fluid Infusion
- 00:22 Cardiac tamponade causes obstructive shock, primarily by interfering with right heart filling and cardiac output. Intravenous fluid infusion increases preload by increasing central venous pressure. Higher central venous pressure helps to counter the pressure imparted by the pericardial effusion on the right atrium and ventricle. This results in an increase in venous return to the right heart (Shabeta, Spodis).
- 00:23 Labs
- 00:23 Phase 1: Correct Essential Event - Labs
- 00:24 EKG
- 00:24 Phase 1: Correct Essential Event - EKG
- 00:27 Endotracheal Intubation - Requested
- 00:28 Vasopressor/Cardioactive Medication
- 00:32 Antibiotics
- 00:36 Resuscitation Transfers/Protocols/Intubation - Ordered
- 00:36 This patient does not have a history of, or clinical findings (e.g., gastrointestinal hemorrhage), to suggest the need for emergent transfusion. Based on the potential risks of blood product transfusion (e.g., transfusion reaction, disease transmission, finite resources), its administration

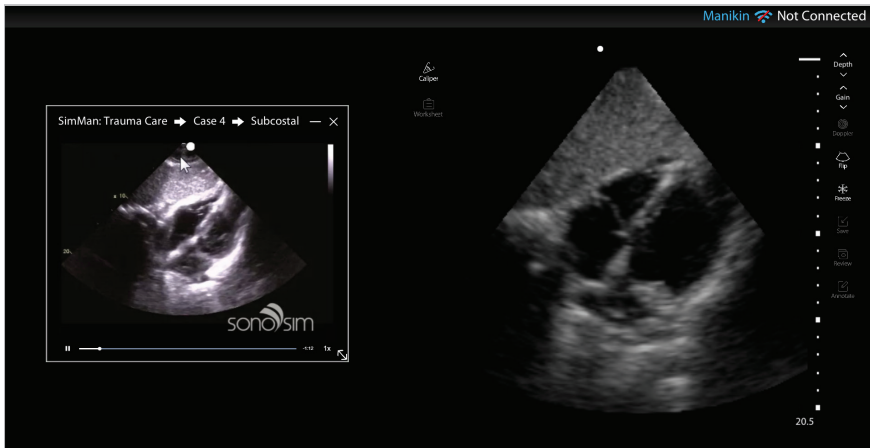
At the bottom of the interface, there is a timeline graph showing various data points over time, with a play button and a 'Print' button.

Debriefing

SonoSimulator

The Instructor can provide the Learner with a comprehensive summary of the ultrasound findings for the scenario by using the SonoSimulator:

Using the case that was 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 explains what learners should recognize while scanning a corresponding SonoSim case.









© 2022 Laerdal Medical AS. All rights reserved.



Manufacturer: Laerdal Medical AS
P.O. Box 377
Tanke Svilandsgate 30, 4002 Stavanger, Norway
T: (+47) 51 51 17 00

20-12745 Rev C

www.laerdal.com



Laerdal
helping save lives