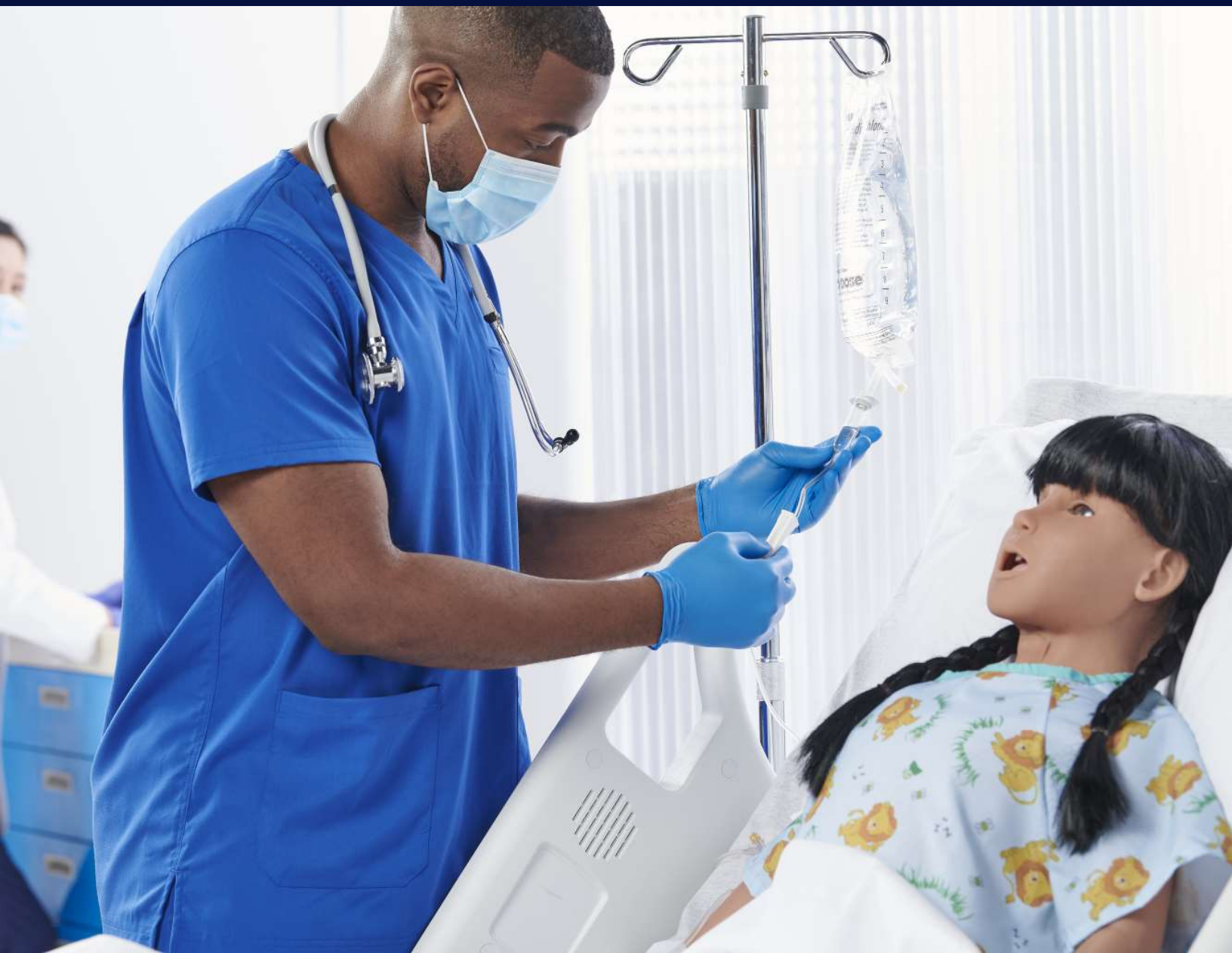


# CAE Aria User Guide



## Disclaimer

This product is a simulation device designed for training and demonstration purposes only.

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# Cautions and Warnings

It is important to read and understand these cautions and warnings before you use the Product.

CAUTION: These products are not suitable for use in locations where children may be present.

## Electrical Safety

IMPORTANT! Do not use the product in any manner other than specified, as safety features designed for protection may be impaired.

- This product must be connected to an electrical outlet that is properly grounded. Take precaution to ground or polarize correctly.
- Connect only to a 100-240 VAC 50/60Hz power source.
- Always use only the supplied power supplies, cords, and connectors. Do not substitute.
- Always use the supplied power adapter to run the simulator from AC.
- Do not allow excess fluids to flow on or into electronic parts.
- Do not attempt to disassemble the simulator or service any of the electrical components without receiving instructions from Customer Service.
- Do not operate the manikin in rain. Apply water to the manikin only in accordance with the supported clinical procedures explained in this guide.
- Always remove the power cable and have simulator turned off if replacing fuses. Not all manikins have user-serviceable fuses.
- For manikins with thermal fuses, replace with MINI® Blade Fuses Rated 32V (silver-plated) 3A (Littelfuse p/n 0297003.WXNV) UL248-compliant.
- The SymDefib accessory transmits live high-voltage electricity! Do not touch the manikin or the SymDefib unit when applying electrical therapy. Review *Appendix B* before using SymDefib for important information about use and personal safety.

## Product Use Warnings

Review all the following information and precautions in each section:

### Manikin, Tablet and Wireless Modules

- Follow the instructions for use contained in this user guide.
- Make sure the manikin is set up on a stable, sturdy work surface that will not collapse and cause injury to users.
- Operate the manikin in ambient temperatures below 104°F (40°C).

Note: This only applies when using the manikin without the tablet where CAEMaestro software is installed. For information about temperature ranges for the tablet, see *Ambient Temperature Range* in the *Specifications* section of this User Guide.

## Cautions and Warnings

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- Do not place foreign substances into the airway, with the exception of small amounts of approved lubricant. Only perform invasive procedures supported by the Product as described in the applicable sections of the User Guide.
- Do not insert any materials into the manikin except the equipment or probes supplied.
- Do not lift the manikin by its limbs. Support the head and lift it from the torso. If necessary, have another person help you lift and move the manikin using a patient transfer device such as a patient transfer board, when available.
- Keep the manikin plugged in between training sessions due to a slow drain of the battery that occurs.
- Under normal circumstances, unplugging the external DC power used for powering and charging the manikin is not necessary because the charging stops when the battery is full. A topping charge is only applied when the battery voltage drops to a certain level.
- Do not spill fluids over the manikin's chest, abdomen, or inside the manikin's torso. This could damage the system and may also present a possible hazard for the operator. Special attention should be taken while using the the various fluid features.
- Do not use the manikin or equipment in locations where children are likely to be present.

## Latex

The IV cannulation tubing in the left IV arm contains latex. The user may come into contact when changing out the IV tubing during routine maintenance. Users with latex sensitivity should use caution.

## Fluids System

For manikins such as Aria that are equipped with fluid systems:

- Use ONLY distilled water with food coloring for simulated blood. NEVER use theatrical blood or other fluids in the bleeding system because they will cause damage.
- Only use small amounts of food coloring for urine or blood and flush the system when training is complete.
- Do not modify the reservoirs or any assembly component.
- Always protect your eyes, skin, and clothing against accidental exposure.

## Skin

- Avoid contact with sharp surfaces and excessive pulling on skin.



## Simulator Batteries

- Manikins and tablets use lithium batteries that all have special handling requirements to avoid hazardous situations.
- Batteries can be charged while the manikin is between 35°F (4°C) and 95°F (35°C).
- Do not store, use or charge the battery inside of an automobile as temperatures can exceed 176°F (80°C).

## Battery Replacement

- If the simulator battery power diminishes significantly or needs to be replaced, contact Customer Service to replace the battery.
- Before disposing of a simulator battery, apply vinyl tape to its positive (+) and negative (-) terminals to avoid short circuits.
- Dispose of or recycle batteries responsibly.

## Battery Safety Information

For information about battery specifications, see the *Specifications* section of this user guide.

Important: Refer to the battery manufacturer's Safety Data Sheet (SDS) for complete safety instructions and handling information.

## Precautions for Handling

Hazards are associated with the contents of the cell or battery. Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive, as long as the cell or battery integrity remains, and the seals remain intact.

Potential exposure should not exist unless the cell or battery:

- leaks,
- is exposed to high temperatures,
- is mechanically, electrically or physically abused/damaged.

If the cell or battery is compromised and starts to leak, based upon the battery ingredients, the contents are classified as hazardous. In general, if liquid leaks from the battery or foul odor is detected, DO NOT use the battery and keep it away from heat or flame.

- Avoid short circuiting the battery. Do not store with coins, screws or other similar objects.
- Do not immerse in water.
- Do not disassemble or deform the battery.

## Cautions and Warnings

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- Do not expose to, or dispose of the battery in fire.
- Avoid excessive physical shock or vibration.
- Keep out of the reach of children.
- For rechargeable batteries, the battery must be charged in an approved charger.
- Never use a modified or damaged charger.
- Store in a cool, dry, and well-ventilated area.
- Never use a battery that has been damaged or deformed.
- Do not short-circuit the positive (+) and negative (-) terminals.
- Do not place the battery in a device with the positive (+) and negative (-) terminals in the wrong positions.
- Do not solder a battery directly.

## Potential Health Effects

- Acute (short term): In the event that the cell or pack ruptures, the electrolyte solution contained within the cell will corrode and can cause burns to skin and eyes.
- Inhalation: Inhaling materials from a sealed cell is not an expected route of exposure. Vapors or mists from a ruptured cell can cause respiratory irritation.
- Ingestion: Swallowing materials from a sealed cell is not an expected route of exposure. Swallowing the contents of an open cell can cause serious chemical burns to mouth, esophagus, and gastrointestinal tract.
- Skin: Contact between the cell and skin will not cause any harm. Skin contact with the contents of an open cell can cause severe irritation or burns to the skin.
- Eye: Contact between the cell and the eye will not cause any harm. Eye contact with the contents of an open cell can cause severe irritation or burns to the eye.
- Interactions with other chemicals: Immersion in high conductivity liquids can corrode or breach the cell or battery enclosure. The electrolyte solution inside of the cells can react with alkaline (basic) materials and present a flammability hazard.

## Safety Measures

Review the precautions for handling before replacing a battery utilizing guidance from CAE.

Should exposure to hazardous battery components occur, or in the event of a fire, follow all local first aid measures and safety protocols.

## Transport Information

CAE complies with the most current International Air Transport Association (IATA) Dangerous Goods Regulations when transporting and shipping Li-ion batteries. The following terms are defined as follows:


Consignment - Equivalent to the term "shipment," meaning one or more packages of hazardous materials accepted from one shipper at one time and at one address, receipted in one lot, and moving to one consignee at one destination address.

Equipment - The device or apparatus for which the lithium cells or batteries will provide electrical power for its operation.

It is the shipper’s responsibility to ensure that the consignment is packed in compliance to the latest edition of the applicable regulations. Regulations require appropriate training for shipping dangerous goods. Shipping regulations and requirements may vary depending upon:

- Wattage of the battery.
- Whether the battery is shipped independent of, contained within, or packed with the equipment.

When transporting batteries CAE follows these documentation and labeling requirements:

	Item	Description
	Batteries Shipped Independent of the Manikin	Batteries contained in or packed with the Manikin
UN No.	3480	3481
UN Shipping Name:	Lithium-ion Batteries	
Transport Hazard Class:	9	
Required Documentation:	Dangerous Goods Declarations must be completed.	
Labeling:		

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# Specifications

All hardware and software needed for operating the simulator are provided with the shipment.

## Size and Weight

Equipment	Size	Weight
<b>Manikin/Simulator</b>	48" H x 15" W x 8" D (121.92 cm x 38 cm x 20 cm)	50 lbs (22.7 kg)
<b>Shipping Container</b>	64" H x 40 W x 32" D (162.56 cm x 101.6 cm x 81.28 cm)	200 lbs (90.7 kg)
<b>Tablet</b>	<b>Surface Go</b> 9.65" x 6.9" x 0.33" (24.5 cm x 17.5 cm x .83 cm)	Surface Go 1.2 lb (544 g)
<b>SymDefib</b>	2.6" H x 4.9" W x 5" D (6.6 cm x x 12.4 cm x 12.7 cm)	8 oz (227 g)

## Ambient Temperature Range

Item	Operation	Storage	Relative Humidity
<b>Manikin/Simulator</b>	Wall source: 32°F to 104°F (0°C to 40°C) Battery source: 32°F to 104°F (0°C to 40°C)	40°F to 122°F (4°C to 50°C)	0% to 90% non-condensing
<b>Tablet</b>	50°F to 95°F (10°C to 35°C)	-13°F to 113°F (-24°C to 45°C)	0% to 90% non-condensing
<b>SymDefib</b>	0°C- 35°C <b>Note:</b> Indoor use only	-20°C - 60°C	45% to 85%

## Battery

Item	Description
Commercial product name	RRC2054-2
Additional information	<b>Battery-System:</b> Lithium-ion <b>Nominal Voltage:</b> 14.4 V <b>Nominal Capacity per battery:</b> 6.90 Ah
SymDefib Battery	Li-ion 3.7V 2200mAh

## Power

Item	Description
<b>Power Adapter</b>	<ul style="list-style-type: none"> <li>• AC Voltage Input: 100-240VAC 50/60Hz</li> <li>• Nominal DC Output: 20 V</li> <li>• Maximum DC Current Output: 8 A</li> <li>• Nominal Power (Watts): 160 W</li> <li>• Batteries Limited Charging Current: 4 A</li> </ul>
<b>Manikin/Simulator</b>	<ul style="list-style-type: none"> <li>• Internal Batteries (14.4 V x 2)</li> <li>• Charger DC Output: 19.5 V</li> <li>• Charger Maximum Current Output: 8 A</li> <li>• Charger Typical Current Output: 5.5 A</li> <li>• Batteries Nominal DC Output: 14.4 V</li> <li>• Batteries Minimum DC Output: 12.5 V</li> <li>• Batteries Maximum Current Output: 12 A</li> <li>• Batteries Typical Current Output: 5.5 A</li> <li>• Run Time: 4+ hours (typical with fully charged battery)</li> <li>• Both batteries discharge together at the same rate</li> </ul>
<b>StethoSym</b>	<ul style="list-style-type: none"> <li>• Run Time: 2 hr 45 min while constantly reading a RFID tag and playing audio; 4 hours when ON and receiving signal (Sleep Mode)</li> <li>• Recharge time: 50 minutes</li> </ul>
<b>SymDefib</b>	<ul style="list-style-type: none"> <li>• AC input: 100-240VAC 50/60Hz</li> <li>• Nominal DC Output: 5 V</li> <li>• Maximum DC Current Output: 4 A</li> <li>• Nominal Power: 20 W</li> <li>• Run Time: 17 hours (with Pads not on manikin), 2-3 hours (with Pads on manikin)</li> </ul>
<b>Tablet</b>	<ul style="list-style-type: none"> <li>• Power Adapter AC Input: 100-240 VAC, 50/60 Hz, 11 W (34 W charging)</li> <li>• Power Adapter DC Output; 15 V</li> <li>• Power Adapter Power Output: 24 W</li> <li>• Power Adapter DC Current Output: 1.6 A</li> <li>• Battery Typical Output Voltage: 7.66 V</li> <li>• Battery Capacity: 26.81 W hours</li> <li>• Run Time: 5 hours (typical)</li> <li>• Recharge Time: (4 hours (typical - while in use)</li> </ul>

## Communications

Item	Description
<b>Simulator Network, Instructor Tablet, Patient Monitor</b>	<ul style="list-style-type: none"><li>• Wireless: IEEE 802.11 g</li><li>• Security: WPA2</li><li>• Bands Available: 2.4 GHz and 5.0 GHz</li></ul>
<b>WiFi Modules - StethoSym, SymDefib</b>	<ul style="list-style-type: none"><li>• Wireless: IEEE 802.15.4 WPAN, Personal Area Network</li></ul>

## Electrotherapy

Item	Description
<b>Defibrillation</b>	<ul style="list-style-type: none"><li>• 20 to 200 Joules (Monophasic, Biphasic)</li></ul>
<b>Pacing</b>	<ul style="list-style-type: none"><li>• 20 mA to 180 mA</li></ul>

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# System Requirements

This section describes the minimum and optimal requirements to run the simulator. Aria is not compatible with macOS.

## CAE Maestro Software

The following table identifies the software version associated with the release of this user guide.

Document	Document Version	Software Version
Maestro for Aria	905K690152 v1.0	CAE Maestro v2.8
Aria User Guide	905K690052 v2.4	CAE Maestro v2.8

Note: Periodic system updates for Maestro can be downloaded from any device with an Internet connection. Updates are available at: <https://www.caehealthcare.com/support/software-updates/>

## Windows<sup>®</sup> Operating System

Minimum Requirements	
<b>Software</b>	<ul style="list-style-type: none"> <li>Win 10 Pro</li> <li>.NET 4.8</li> </ul>
<b>Hardware</b>	<ul style="list-style-type: none"> <li>Surface Go</li> <li>Intel Pentium Gold Processor 4425Y</li> <li>4 GB DDR3 RAM</li> <li>32 GB Hard Drive space available</li> <li>1920x1280 screen resolution</li> <li>USB-C</li> <li>Wireless 802.11 a/b/g/n/ac/ax</li> </ul>

## Approved Devices

<b>Make/Model</b>	<ul style="list-style-type: none"> <li>Microsoft Surface Go</li> </ul>
<b>Software</b>	<ul style="list-style-type: none"> <li>Windows 10</li> <li>Chrome version 62 or higher (not required for Maestro v1.8 or later)</li> </ul>
<b>Hardware</b>	<ul style="list-style-type: none"> <li>Intel Core 2 Duo, 2.0 GHz</li> <li>8 GB DDR3 RAM</li> <li>32 GB Hard Drive space available</li> <li>1366x768 screen resolution</li> <li>USB-C Port</li> <li>Wireless 802.11b/g/n Ethernet card 100BASE-T Ethernet Adapter</li> </ul>

## System Requirements

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Note: Upon installation, the software takes up 1.2 GB of hard drive space. For standalone versions of Maestro, the software can store approximately 30.8 GB of patient record files. If this storage capacity is expected to be maximized, plan for additional hard drive space.

# Equipment Overview

The manikin includes standard equipment. Optional equipment is also available to enhance learning scenarios.

## Standard Equipment

This section describes the standard equipment for CAE Aria.

### Full Body Wireless Manikin

CAE Aria supports the standard healthcare requirements for pediatric patients, from assessment to performing basic clinical skills. Depending on the configuration you purchased, the manikin may include advanced features and capabilities.

### Gender-specific Equipment

The Aria pediatric manikin features interchangeable male and female genitalia.



**Male and Female Genitalia**

### Male and Female Wigs

All Aria configurations come with interchangeable male and female wigs.

### Gown

A gown is provided for the manikin to enhance the reality of the simulation.

### Accessories Kit

An accessories kit is provided which includes the manikin's gown, male and female wigs, male and female genitalia, etc. with various replacement parts.

### NIBP Pulse Arm

The non-invasive blood pressure and pulse arm allows users to take readings using a modified blood pressure cuff, palpate radial and brachial pulses, and auscultate Korotkoff sounds with CAE StethoSym.

### Pediatric BP Cuff T-Adapter

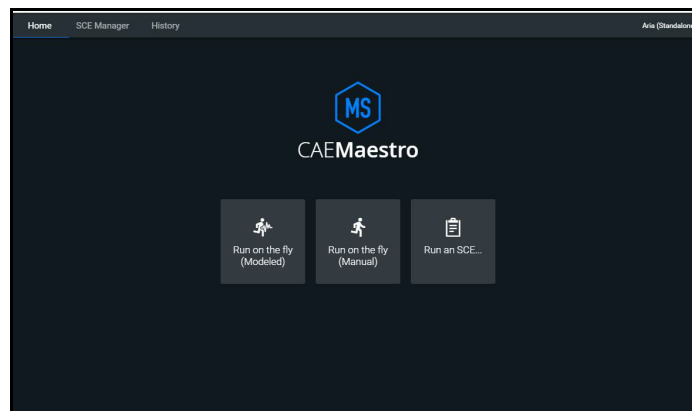
A blood pressure cuff T-adapter is included, which can be attached to a clinical blood pressure cuff. Blood pressure readings can then be taken on the manikin using palpation or auscultation.



**Pediatric BP Cuff T-Adapter**

### CAE Maestro Software

CAE Maestro™ software allows facilitators to control and monitor CAE patient simulators. Maestro allows you to run simulations “on the fly” in Manual or Modeled mode, or you can run preconfigured Simulated Clinical Experiences (SCEs) in Manual mode. See the *Maestro for Aria* user guide for more information.



**CAE Maestro™ Software**

### Surface Go Tablet

The Surface Go provides the capabilities of a laptop in an ultra-portable tablet. This mobile workstation features a Windows 10 Pro operating system, a 10.5 in (26.7 cm) touchscreen, and up to 11 hours of battery life.

The Surface Go tablet comes equipped with pre-installed CAE Maestro instructor software to control the manikin's physiological activity during simulations.



**Surface Go Tablet**

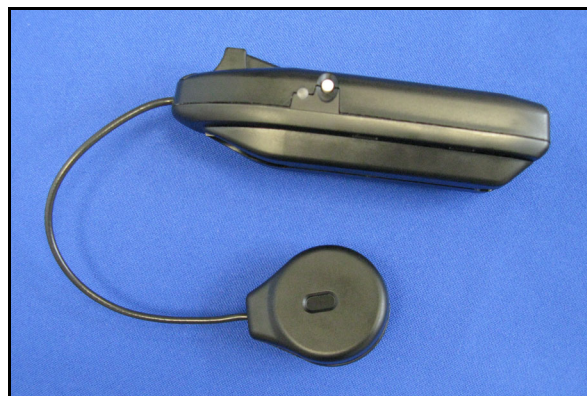
## Tablet Carrying Case

The Surface Go tablet carrying case is a way to store and protect the tablet. With an ergonomic design, users can operate their tablet with ease and comfort.

## CAE StethoSym

The CAE StethoSym™ assembly attaches to a stethoscope and pairs with the manikin via IEEE 802.15.4 protocol. This device allows users to auscultate heart, lung, bowel, and Korotkoff sounds emitted. One StethoSym assembly is included.

Note: Stethoscope not included with StethoSym assembly.



**CAE StethoSym™**

## CAE SymEyes

The Aria configurations are equipped with software controlled CAE SymEyes™.

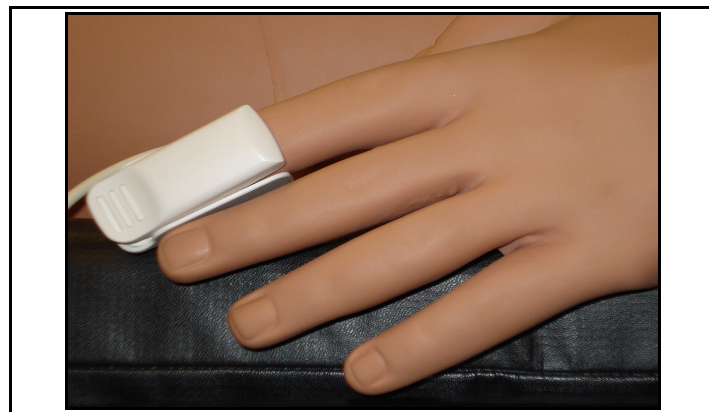
The SymEyes feature includes realistic blinking, eye panning and light-reactive pupils. Additional conditions can be selected to be displayed in the eyes, such as jaundice and hemorrhage.

### CAE SymDefib

CAE SymDefib™ connects with a commercial defibrillator to support training for defibrillation, cardioversion, and pacing in the actual clinical environment with real equipment. One SymDefib is included. See *Appendix B - SymDefib* for complete use instructions and safety information before using SymDefib.

### SpO<sub>2</sub> Finger Probe

The SpO<sub>2</sub> Finger Probe measures blood oxygen saturation with pulse rate measurements (software-controlled).



**SpO<sub>2</sub> Finger Probe**

### Optional Equipment

To enhance the simulation experience, optional equipment is available for purchase.

Optional Equipment
External Bleeding Module
Simulated Patient Monitor (CAE Maestro software-controlled)
Physiological Modeling (CAE Maestro software-controlled)
Additional Standalone CAE Maestro software licenses
CAE LearningSpace™

# Meet Aria

CAE Aria™ represents a seven-year old child and offers a wide range of pediatric training scenarios. CAE Aria's features allow for realistic training in emergency pediatric care. A wireless and tetherless patient simulator, CAE Aria helps future and current healthcare professionals practice the skills needed to increase safety, proficiency, and expertise.

Our CAE Maestro™ software (tablet included) is pre-programmed for each configuration to allow facilitators to control and monitor the simulator and create Simulated Clinical Experiences (SCEs). Its flexibility and ease of use allows for a versatile and dynamic training experience that can be tailored to meet your needs.

For CAE Maestro™ and Patient Monitor information and instructions, see the *Maestro for Aria* user guide.



CAE Aria™

## Simulator Configurations

The simulator is available in one Advanced configuration.

Configuration	Components
<b>Advanced</b>	<ul style="list-style-type: none"> <li>• Realistic articulated wireless manikin</li> <li>• Internal battery</li> <li>• Software compatible instructor tablet with case</li> <li>• Wireless facilitator control</li> <li>• CAE Maestro™ instructor-driven software</li> <li>• Emulated patient monitor software</li> <li>• Ten Simulated Clinical Experiences (SCEs) - Manual mode</li> <li>• SymEyes</li> <li>• Scripted, wireless male and female speech and vocal sounds</li> <li>• Two-way VOIP communication</li> <li>• Stiff neck</li> <li>• Head tilt/chin lift/jaw thrust</li> <li>• Spontaneous chest excursion</li> <li>• Retrograde and fiberoptic intubation</li> <li>• Right mainstem intubation with detection</li> <li>• Esophageal intubation with gastric distension</li> <li>• Surgical/Needle cricothyrotomy</li> <li>• Tracheostomy</li> </ul>

Configuration	Components
<p><b>Advanced</b></p>	<ul style="list-style-type: none"> <li>• Airway adjuncts placement</li> <li>• Manual ventilation (BVM)</li> <li>• Transtracheal Jet Ventilation</li> <li>• Nasopharyngeal suctioning (no fluids)</li> <li>• Bronchial occlusion</li> <li>• Ventilation detection</li> <li>• Simulated pulse oximeter</li> <li>• StethoSym</li> <li>• Audible breath sounds</li> <li>• Auscultation of lung, heart and bowel sounds</li> <li>• Manual right NIBP arm with Korotkoff sounds</li> <li>• Chest compression detection and advanced CPR metrics</li> <li>• Bilateral carotid, brachial, radial and femoral pulses</li> <li>• Variable pulse strength</li> <li>• Library of cardiac rhythms</li> <li>• 4-lead ECG</li> <li>• Commercial ECG device compatibility</li> <li>• Software-based 12-lead ECG</li> <li>• Defibrillation, cardioversion and pacing via software</li> <li>• Fingerstick blood glucose</li> <li>• Orogastric/nasogastric tube insertion (no fluids)</li> <li>• Gastrostomy tube with fluids</li> <li>• Interchangeable genitalia</li> <li>• Urinary catheterization with fluids</li> <li>• Suppository administration</li> <li>• Reported IV sites at subclavian and left dorsum of hand</li> <li>• Unilateral IV cannulation left arm at antecubital site</li> <li>• Left humeral (no fluids) and left tibial IO access (fluids)</li> <li>• Left humeral and left thigh IM access</li> <li>• Software-based drug administration</li> <li>• Unilateral chest tube placement for care and maintenance</li> <li>• Unilateral needle decompression with automatic detection</li> <li>• Pain response via sternal rub</li> <li>• Seizures</li> <li>• Tongue swelling</li> <li>• Laryngospasms</li> <li>• Pharyngeal swelling</li> <li>• Substernal retractions</li> <li>• Variable chest compliance and bronchial resistance</li> <li>• SymDefib</li> <li>• Commercial defibrillator compatible</li> <li>• Cyanosis</li> <li>• Capillary refill</li> <li>• Bilateral popliteal and dorsalis pedis pulses</li> </ul>



# Setup

This section provides instructions and guidelines to unpack, charge, and turn on the manikin. It also provides instructions on how to charge and power on the Instructor tablet and StethoSym. For SymDefib instructions and use, see *Appendix B - SymDefib*.

## Unpacking the Manikin

The manikin comes in a custom-designed container that provides proper placement for all parts and accessories.

Follow the guidelines below when opening your shipment:

- Exercise extreme caution when using sharp objects, such as a box cutter. A damaged container can lead to improper storage of the manikin, potentially damaging skin, body parts, and accessories.
- Reserve a space approximately 3 ft by 5 ft (91.44 cm by 152 cm) to store the shipping container. For more information, see the *Care and Maintenance* section of this user guide.
- Read and understand the Cautions and Warnings located in the beginning of this guide.
- Follow the sequence of the steps carefully. Complete all steps in order.
- Do not power on any components until instructed in the text.
- Verify the content of each item in the container against the shipping paperwork to ensure you received the correct product and parts.
- Keep original shipping materials, including boxes and foam. Warranty and repair items must be returned and shipped in their original packaging.

## Initial Preparation

Before you begin setup, complete the initial preparation below to prevent damage to the simulator:

- Prior to using the manikin, ensure it reaches room temperature.
- Ensure multi-plug AC power outlets exist in the workspace to charge the simulator and its powered components. The manikin and instructor tablet are battery-operated and enabled for wireless use.
- Do not power on components unless instructed in the *Setup Steps* section of this guide.
- Do not set up, power on, or use CAE SymDefib until the simulator set up is complete. When the simulator is ready for use, see *Appendix B - SymDefib* and review all safety information, set up, and use instructions to begin using SymDefib.

# Setup Steps

Set Up the Aria Simulator System	
1	Place the Aria manikin in the work area.
2	Connect the manikin power cord to Aria.
3	Connect the manikin power cord to a power source.
4	Charge the Instructor Tablet.
5	Charge the Accessories.
6	Power on the Aria manikin.
7	Power on the Instructor Tablet.
8	Open the CAE Maestro software application on the Instructor tablet.
9	Modify the blood pressure cuff.
10	Prime the fluid systems.

## Step 1: Place the Aria Manikin in the Work Area

Select a work area with space for all equipment and to move around the manikin. A minimum work area of 2 ft x 4 ft (61 cm x 122cm) is recommended. Ensure a multi-plug AC power outlet is nearby. The working surface or table must be able to support a minimum of 50 lbs (22.7 kg).

The Aria manikin is preassembled. Two persons should lift and move the manikin to avoid damage. Do not lift the manikin by the limbs. Support the manikin's head and lift by the torso.

Place the desired genitalia, wig, and gown on the manikin (all included with the manikin). See the *Using Aria* section of this user guide for instructions on how to change the genitalia.

## Step 2: Connect the Manikin Power Cord to Aria

Remove the manikin power cord from the shipping container. Align the pins of the manikin power cord to the black power connection located at the manikin's buttocks and connect.



**Power Cord Connected to Aria**

## Step 3: Connect the Manikin Power Cord to a Power Source

With the manikin power cord plugged in to the black power connection located at the manikin's buttocks, plug the other end of the power cord into a power source.

## Step 4: Charge the Instructor Tablet

An Instructor tablet is provided. Remove the tablet and tablet power adapter from the box. Connect the power adapter to the tablet and plug in. Allow the tablet to fully charge before using.

## Step 5: Charge the StethoSym

Attach the power cord and connect to a power source. Do not use any other power source to charge other than the one provided to avoid damage to the device.

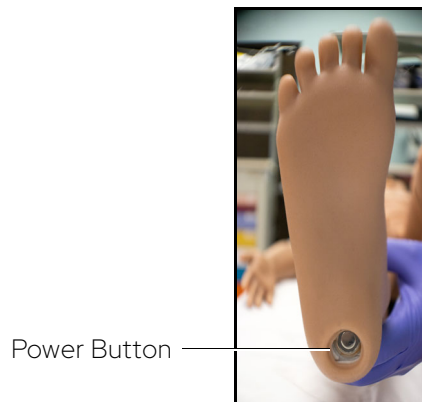
The charging status is shown by the color of the indicator light:

Light Color	Power Status
Orange	Unit is plugged into a power source and battery is charging. Orange light turns off when the unit is fully charged.
Green	Unit is on and fully charged.
Flashing Red	Battery level is low and needs to be charged.
Blue	Unit is on and receiving signal from manikin.

## Step 6: Power On the Aria Manikin

To power on the manikin.

1. Press the power button on the bottom of the right foot for one second and release.



### **Powering on the Aria Manikin**

The power light will flash Blue three times, then turn solid green while powering up. The manikin's compressor will start running and the SymEyes will open to display blue eyes.

## Setup

2. Wait for power-up initialization to complete. When done, the power light will turn solid orange (if plugged into a power source) and the manikin will say "Hello," then the SymEyes will go blank until a simulation session begins.

If not connected to power, the power light will be solid green. Battery runtime is about five hours. See the chart below for complete information about indicator light status.

Power Button LED Color	System State
Flashing blue every second	In bootloader mode with update
Flashing blue every second three times	In bootloader mode when there is no update
Solid green immediately after bootloader mode	In initialization mode
Solid green after initialization mode	In running mode, with charger unplugged
Solid orange after initialization mode	In running mode, with charger connected
Solid red after initialization mode	Battery low or other hardware errors
Flashing blue every 30 seconds	In system low power mode
Flashing green	In power-down mode
Flashing red	Battery is low and must be charged
Solid red	Battery is drained and must be charged

### *Aria Battery Management*

The percentages provided in the table below represent the average battery capacity as represented in the Maestro user interface.

Note: If Aria is connected to a power supply, the battery will not charge if the ambient temperature exceeds 86°F (30°C).

Battery Capacity - Maestro	Battery Status	Action
Average capacity is larger than 11%	Normal	The system runs normally.
Average capacity is between 4% and 11%	Low	The button LED becomes solid Red.
Average capacity is between 0% and 4%	Critical	The button LED starts blinking Red.
Capacity is 0%	Shutdown	Set the battery with low capacity to shipping mode. External power will need to be plugged in to charge and operate the system. If both batteries are in shipping mode, the manikin shuts down immediately.

If the system is left on but is not running a simulation, it will automatically go into low power mode (blue LED flashing every 30 seconds) after four hours.

If the system remains in low power mode, after seven days it will set both batteries to shipping mode (batteries off).

To remove the simulator from shipping mode, unplug the AC adapter, if attached, and plug back into Aria. The software will automatically turn the batteries back on and start the charging process.

## Step 7: Power on the Instructor Tablet

Ensure the tablet has been fully charged. Power on the tablet by pressing the power button on the top of the tablet.



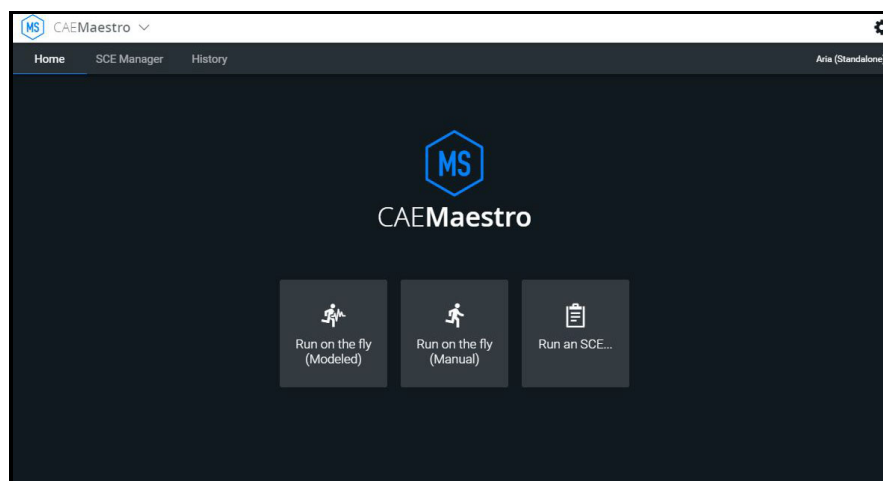
**Tablet Power Button**

## Step 8: Open the CAE Maestro Software Application

With the tablet powered on, tap the Maestro application on the home screen to open the CAE Maestro software.

Follow these instructions to start a simulation in CAE Maestro:

1. From the CAE Maestro Home Screen, select a simulator mode: Run on the Fly (Modeled) if Physiology is purchased, Run on the Fly (Manual), or Run an SCE.

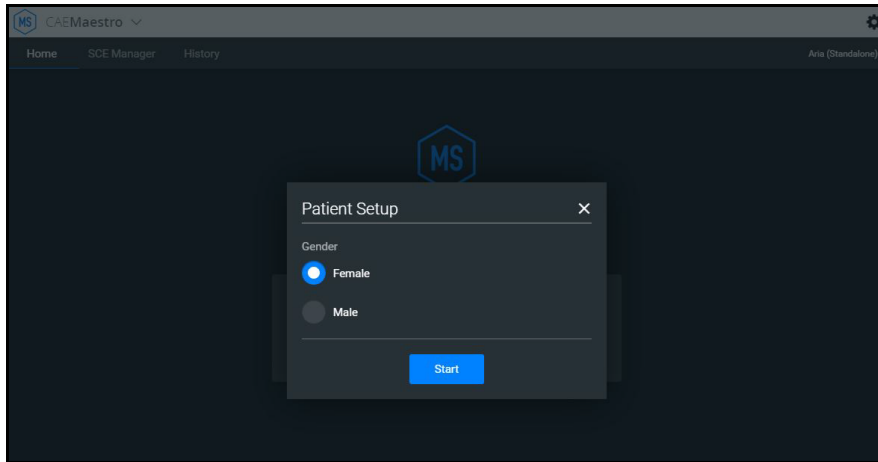


**CAE Maestro Home Screen**

## Setup

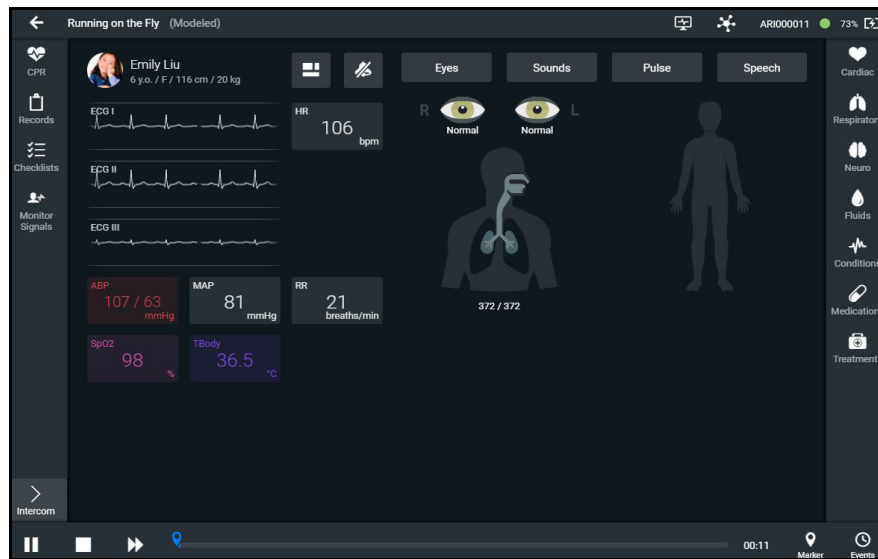
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2. The Patient Setup screen will appear. Select the patient's gender from the drop-down box.



**Patient Setup - Select Gender**

Tap the Start button and the Maestro run screen will appear.



**CAE Maestro Run Screen**

At this time, the tablet will connect wirelessly to the manikin and the manikin will begin breathing. The SymEyes will also begin blinking.

See the *Maestro for Aria User Guide* for more information on how to use the CAE Maestro software application with Aria.

## Step 9: Modify the Blood Pressure Cuff

To modify the blood pressure cuff:

1. Cut the tubing attached to the gauge approximately 9 cm from the cuff.
2. Locate the T-shaped blood pressure adapter.
3. Insert the barbed connectors into the cut ends of the blood pressure cuff tubing.
4. Secure the tubing connectors with cable ties.
5. Use scissors to trim the cable ties.
6. Connect the extension from the long end of the T-shaped blood pressure adapter to the NIBP port on Aria's right side.



**Modified Blood Pressure Cuff**

## Step 10: Prime the Fluids Systems

### *Prime the antecubital venipuncture site*

The antecubital intravenous access site can be primed in two ways: syringe priming for standard use, or priming for continuous use during longer training sessions. Priming ensures functional flashback for intravenous access practice.

### Syringe Priming

To prime the site for standard use:

1. Attach an empty fluid bag with tubing to the drain port located at the end of the black hose in the groin area of the manikin. Make sure all clamps and flow controls are open.
2. Locate the dorsal IV port on the left hand.
3. Fill a syringe with 20 ml of distilled water.  
Optional: Add red food coloring to better visualize flashback, if desired.
4. Inject the entire 20 ml of distilled water into the dorsal port.
5. Remove the syringe and replace the port cap.

The antecubital site is now ready for venipuncture.

### Priming for Continuous Use

To prime the site for a continuous supply of fluid during extended IV training:

1. Connect an empty fluid bag with tubing to the drain port located on the black hose in the groin area of the manikin.
2. Make sure all clamps and the flow control on the tubing are open.
3. Locate the IV fill port on the upper left arm and remove the cap.
4. Fill another fluid bag with distilled water.  
Optional: Add red food coloring to better visualize flashback, if desired.
5. Connect the filled fluid bag to the port.
6. Set the flow control to a drip-rate of 1 drop per second.

The antecubital site is now ready for longer sessions of training.

### *Subclavian Intravenous and Gastrostomy Ports*

The pre-placed subclavian IV port and the gastrostomy port do not require priming. These ports are for infusion of fluid only. Fluids cannot be withdrawn from these locations.

### *Prime the genito-urinary system*

To prime the GU system:

1. Insert a lubricated urinary catheter into the urethra approximately 4.5 inches (11.5 cm) for a male or 2.5 inches (6.5 cm) for a female configuration.
2. Fill a syringe with distilled water.  
Optional: Add food coloring to the distilled water for clinically-appropriate urine color.



3. Connect the syringe to the urinary filling tool.
4. Plug the filling tool into the Urinary port located in the groin area.
5. Slowly infuse the distilled water until fluid begins to drain from the catheter.



***Priming the Genitourinary System***

6. Remove the catheter.
7. Slowly infuse more distilled water until fluid drains into the overflow reservoir on the urinary filling tool. This overflow signals that the internal bladder is full.

Note: The bladder within Aria contains 10 to 15ml of fluid when full.

8. Disconnect the urinary filling tool from the Urinary port.

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# Aria Features

CAE Aria is a wireless and tetherless patient simulator that displays the physical characteristics of a seven-year old child. Aria enhances pediatric simulation-based education of healthcare workers by helping them to develop critical decision-making and patient care skills in a risk-free environment. This pediatric patient simulator offers a wide variety of features, both passive and facilitator controlled using the CAE Maestro software. This chapter will identify the various features offered with Aria and its capabilities designed specifically for training in emergency pediatric care.

## Physiological Features

Aria presents patient reactions based on complex neurological, cardiovascular, gastrointestinal, genitourinary, and respiratory models. The manikin allows for the physical assessment of various clinical signs (i.e., bowel, heart, lung and breath sounds, palpable pulses, chest excursion, airway patency, etc.) that are dynamically coupled with the mathematical models of human physiology and pharmacology.

## Articulation

Aria is wireless, tetherless, and offers realistic articulation for range of motion exercises in the hips, knees, ankles, shoulders, elbows, and neck. Aria also has cervical motion to practice patient stabilization.

## Neurological System

Aria is equipped with a number of features specifically targeted to support training for neurological care. For more information, see the *Using Aria* section of this user guide.

Neurological System
Neck articulation (allows for stiff neck).
The blink mode, light reactivity, pupil diameter and blink speed of the eyes can be controlled from the software.
SymEyes display patient symptoms and conditions, including jaundice, hemorrhage, keyhole pupil, cataracts and bloodshot or droopy eyes. Blinking, panning and reactive eyes with multiple settings.
Scripted vocal sounds and speech, as well as wireless voice with VOIP.
The manikin can simulate seizures with rhythmic movement of both the arms and legs (Advanced configuration only).
Intracranial pressure value can be set and displayed on the Patient Monitor.
Body and blood temperature can be set using software controlled temperature parameters.
Pain response can be observed by performing sternal rub (Advanced configuration only).

# Respiratory System

The simulator represents a realistic Respiratory System to achieve an extremely accurate simulation of respiration. This system is tightly integrated with the Cardiovascular System.

<b>Respiratory System</b>
Airway Adjuncts Placement
Head Tilt/Chin Lift/Jaw Thrust
Manual Ventilation (BVM) demonstrates chest rise and fall
Spontaneous Chest Excursion
Audible Breath Sounds
Bronchial Occlusion
Lung Sound Auscultation
Right Mainstem Detection
Simulated Pulse Oximeter
Nasopharyngeal Procedural Suctioning (no fluids)
Nasal and Oral Endotracheal Intubation
Fiberoptic, Retrograde, Esophageal and Right Mainstem Intubation
Surgical/Needle Cricothyrotomy
Tracheostomy
Transtracheal Jet Ventilation
Ventilation Detection
Software-based FiO <sub>2</sub>

In addition to these respiratory system features, the Advanced configuration includes the following features to enhance the fidelity of the simulator.

<b>Advanced Respiratory System</b>
Laryngospasms
Pharyngeal Swelling
Substernal Retractions
Tongue Swelling
Variable Bronchial Resistance
Variable Chest Compliance

See the *Appendix A - Recommended Clinical Supplies* section of this user guide for information associated with the Respiratory System features of the simulator.

## Cardiovascular System

Similar to the Respiratory System, the Cardiovascular System accurately simulates a wide variety of hemodynamic conditions and responses..

<b>Cardiovascular System</b>
The simulated patient generates heart sounds, including a range of pathological ones that are synchronized to the QRS complex of the ECG and are audible with a StethoSym assembly. There are four heart sound speakers which can be controlled independently.
A standard blood pressure cuff and sphygmomanometer can be used with the StethoSym assembly to assess blood pressure by palpation or by auscultating Korotkoff sounds on the right arm.
Chest compression detection and advanced CPR Metrics that can detect hand placement, rate and depth of compressions, chest recoil, ventilation volume and rate.
Carotid, brachial, radial, and femoral pulses can be palpated bilaterally and are synchronous with the cardiac cycle. A pulse deficit automatically occurs if the systolic arterial blood pressure falls below specified thresholds. The intensity of the pulse reflects current physiology or can be set to absent, weak, normal, or bounding.
Bilateral Popliteal & Dorsalis Pedis Pulses (Advanced configuration only)
Capillary Refill (Advanced configuration only)
Commercial ECG Device Compatible
Circumoral Cyanosis (Advanced configuration only)
Fingerstick Blood Glucose
Library of Cardiac Rhythms
Variable Pulse Strength
4-Lead ECG waveforms can be viewed on a standard monitor and/or the Patient Status Display in the Patient Monitor of the software.
Software-based 12-Lead dynamic ECG

## Gastrointestinal System

The Aria manikin features a realistic Gastrointestinal System for practicing clinical care skills.

<b>Gastrointestinal System</b>
Gastric Distention with esophageal intubation
Gastrostomy Tube with Fluids
Orogastric/Nasogastric Tube insertion (no fluids)
Bowel Sound Auscultation

### Genitourinary System

The Aria manikin is provided with both male and female genitalia. The genitourinary system is designed for excretion of urine upon catheterization. For more information on changing the genitalia, see the *Using Aria* section of this user guide.

### Medication Administration

The Aria manikin features Medication Administration capabilities for practicing emergency care skills.

<b>Medication Administration</b>
Peripheral IV sites
Subclavian Venous Catheter
Humeral IO (no fluids)
Tibial IO (with fluids)
IM/SQ left deltoid and left thigh injection sites
Rectum for Suppository Administration
Software-based Drug Administration

# Simulated Clinical Experiences

The Aria simulator is a manual-driven, script-controlled system designed to simulate a patient's physiological condition, clinical signs, symptoms, and responses to certain clinical interventions. Simulated Clinical Experiences, or SCEs, are process tools that enable the faculty/educator to execute a learning strategy using simulation. Each process tool provides an extensive overview and outline of the learning exercise and requires minimal additional faculty development time for use. Each SCE is comprised of a patient and the scenario.

Aria includes ten preconfigured SCEs (Manual mode), or clinical simulations, that cover a range of events and crises.

- Accidental Burn Injury
- Accidental Electrocutation
- Accidental Overdose
- Closed Head Injury
- Diabetic Keto Acidosis (DKA) with Hypoxia
- Envenomation
- Gunshot Wound with Pneumothorax
- Obstructed Airway with Anaphylaxis
- Submersion Injury
- Trauma with Pneumothorax

Each SCE includes the information below:

- Background information and patient history
- Synopsis
- Learning objectives
- Learning performance measures
- Equipment and supplies suggested for the simulation
- Facilitator notes
- Debriefing points
- Teaching Q&A
- References

## Scenarios

Each scenario is a set of simulator commands that instruct or cause the simulator to react or respond in a specific manner. Scenarios are used to determine the initial and subsequent physiological states as well as the different conditions that arise during the simulation exercise. Each scenario also includes documentation to support its use.

## Features

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By utilizing the SCE Designer feature of the Maestro software, users can copy and modify the preconfigured scenarios or create custom scenarios from scratch to meet specific educational objectives.

Instructors may also modify events within a given scenario in real-time to increase or decrease event severity and shorten or prolong the duration of an event at any time during a simulation exercise.

For instructions on modifying scenarios and creating new scenarios, refer to the *Maestro for Aria User Guide*.

## System Controls

Aria is designed to allow the instructor to focus attention on learner actions and reactions by providing a flexible set of tools that adjust to the instructor's needs.

## Application Software

CAE Maestro software is the application that provides the instructor a means to control all features of the simulator. Instructors can select SCEs as well as control the flow of the scenarios via the user interface. Various medication, cardiovascular, respiratory, fluid, and other parameters can be individually applied "on the fly" to enhance the course of a simulation exercise. A Patient Status Display and set of simulation log entries provide a real-time display of vital signs, blood gases, medications administered, and other events. This data can be exported into permanent storage or printed for future reference.



# Using Aria

Once the simulator is assembled, the Aria manikin is ready for learners to practice and master new competencies, interventions, and skills during clinical scenarios.

To create a fully immersive simulation experience with advanced intervention capabilities and realtime data feedback, the Aria simulator utilize instructor-led software with scenario programming capabilities.

For more information about features associated with each configuration of this simulator, see the *Aria Features* section of this user guide.

For recommended sizes for clinical supplies, see *Appendix A - Recommended Clinical Supply Sizes*.

Note: CAE recommends keeping the simulator plugged into a power source while it is in use to extend the longevity of the battery life. To optimize battery life, only remove the power plug during simulations where the patient will be moved or transferred as part of the scenario. For further information, refer to the *Storage* section of this user guide.

## Neurologic System

These features include:

- Blood temperature
- Body temperature
- Convulsions
- Pain response due to sternal rub

Users can also control the eyes, speech and vocal sounds from the instructor-led software.

For more information, see the *Maestro for Aria User Guide*.

## Neurologic System Controls

The clinical features for the Neurologic system are controlled manually, with the software, or both.

Neurologic System Controls			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
<b>Intracranial Pressure</b>	The intracranial pressure of a patient can be an indicator of the patient's condition.	Tap <b>Neuro</b> and tap <b>ICP</b> to adjust. Set ICP setting and onset time.	None required.
<b>Eyes</b>	Eyes can be used as an indicator of a patient's condition and/or consciousness during an assessment.	Tap <b>Eyes</b> on Run screen and tap desired status.	None required.

Neurologic System Controls			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
<b>Convulsions</b>	Simulated convulsions can be activated at the facilitator's discretion (Advanced).	Tap <b>Neuro</b> and find Convulsions in menu; use ON/OFF toggle.	None required.
<b>Temperature: Body</b>	Myocardial oxygen supply and demand automatically influence the cardiac rhythm, yielding response to hypoxemia (Modeled only).	Tap <b>Neuro</b> and tap <b>Temperature: Body</b> to adjust.	None required.
<b>Temperature: Blood</b>	Changes in arterial temperature may alter the position of the standard oxyhemoglobin dissociation curve (shift). As temperature increases or pH decreases, more oxygen is released from hemoglobin and thus the patient's saturation decreases (Modeled only).	Tap <b>Neuro</b> and tap <b>Temperature: Blood</b> to adjust.	None required.
<b>Sternal Rub</b>	Pain response can be induced through the software when performing sternal rub (Advanced). The manikin will say, "Ouch!"	Tap <b>Neuro</b> and locate <b>Sternal Rub</b> . Feature is ON by default. Can toggle to OFF if no pain response preferred.	None required.

Note: With Convulsions enabled, the manikin's eyes will remain open but on the Maestro run screen the image of the eyes will be blinking.

## Eyes

### SymEyes

The simulator comes equipped with CAE SymEyes™.

The blink mode, light reactivity, pupil diameter, and blink speed of the simulator's eyes can be controlled from the software.

From the Run Screen, tap on the eyes or Eyes button to open the Eyes state screen.

Eye states can be adjusted from the Eyes state menu by tapping the drop-boxes for the following eye states:

- Blink Speed: Normal, Slow, Fast, Rapid
- Blink Mode: Closed, Blinking
- Light Reactivity: Brisk, Sluggish, None
- Pupil Diameter: 2 - 6 mm

Note: Both eyes can be controlled together by tapping on the Control Eyes Together box.

The following eye states can also be turned on or off (Default: Off):

- Normal
- Jaundice
- Bloodshot
- Hemorrhage (Both, or Right only)
- Keyhole Pupil
- Droopy Eyelids
- Cataracts

Panning and Consensual Pupil Response can be toggled on or off (Default: On).

Eye Brightness can also be controlled in the Eyes state screen.

For more information on how to control the SymEyes, see the *Maestro for Aria User Guide*.



**CAE SymEyes™**

# Respiratory System

The Aria manikin includes respiratory features that allow learners to practice emergency assessment and life support skill sets. With the manikin, learners can:

- Manage difficult airways
- Perform intubation and procedural suctioning
- Recognize and resolve right mainstem intubation
- Perform needle decompression
- Perform chest tube insertion
- Recognize cyanosis (Advanced)
- Perform cricothyrotomy
- Maintain tracheostomy site

## Respiratory System Controls

Aria uses both physical and mathematical models to achieve an extremely accurate simulation of respiration. Aria's chest rises and falls, mimicking inspiration and expiration. Aria's lungs also react realistically to intubation as well as to pathophysiologic states.

Respiratory System Controls			
Feature	Clinical Interventions, Patient Monitoring and Scenarios	Software Control	Manual Control
<b>Spontaneous Breathing</b>	Normal tidal breathing and pathophysiological conditions such as atelectasis, pneumothorax, asthma and COPD.	None required, but adjustable. <b>VIEW:</b> Respiratory	None required.
<b>Manual Chest Excursion</b>	Synchronized with manual ventilation, spontaneous or positive pressure ventilation. Excursion depth proportional to tidal volume.	None required, but adjustable. <b>VIEW:</b> Respiratory <b>CONTROL:</b> Toggle Apnea ON	Apply ventilation via bag valve mask.
<b>Lung Sounds</b>	Normal and abnormal lung sounds are independently synchronized with ventilation of the right and left lungs. Lung sounds can be auscultated over anterior and posterior anatomic locations.	None required, but adjustable. <b>VIEW:</b> Sounds and select <b>Lung</b> . Changes can be made to both anterior and posterior lung sounds.	None required.

Respiratory System Controls			
Feature	Clinical Interventions, Patient Monitoring and Scenarios	Software Control	Manual Control
<b>Pulse Oximetry</b>	Oxyhemoglobin saturation (SpO <sub>2</sub> ) automatically correlates with the oxygen concentration in the lungs and the intrapulmonary shunt fraction.	None required, but adjustable.	Connect SpO <sub>2</sub> probe to connection on left side of manikin.
<b>Needle Decompression</b>	Decompression of a pneumothorax can be performed unilaterally on the left side by inserting a needle at the midclavicular line of the second intercostal space.	The instructor must adjust the amount of physiologic intrapleural air present.  <b>VIEW:</b> Respiratory  <b>CONTROL:</b> PLEURAL SPACE, toggle Needle Decompression Left to ON. Set Left Intrapleural Volume amount.	Perform Needle Decompression at designated sites.
<b>Laryngospasm</b>	Closes the patient's vocal cords and prevents both ventilation and intubation.	From the Run Screen, tap Respiratory and adjust <b>Laryngospasm</b> toggle.  <b>VIEW:</b> Respiratory  <b>CONTROL:</b> ON/OFF	None required.
<b>Posterior Pharynx Swelling/ Airway Occlusion</b>	Swelling of the posterior oropharynx (posterior airway occlusion) obstructs the view of the larynx and prevents intubation, but allows mask ventilation of the patient's lungs, thereby creating a "cannot intubate, can ventilate" scenario.	From the Run Screen, tap <b>Respiratory</b> and adjust <b>Airway Occlusion</b> toggle.  <b>VIEW:</b> Respiratory  <b>CONTROL:</b> ON/OFF	None required.

Respiratory System Controls			
Feature	Clinical Interventions, Patient Monitoring and Scenarios	Software Control	Manual Control
<b>Bronchial Occlusion</b>	Completely obstructs the right or left bronchi, simulating a lower airway obstruction (e.g., mucus plug).	From the Run Screen, tap Respiratory and adjust <b>Bronchial Occlusion</b> toggle. <b>VIEW:</b> Respiratory <b>CONTROL: Left/Right ON/OFF</b>	None required.
<b>Bronchial Resistance</b>	Resistance of the respiratory tract to airflow during inhalation and exhalation.	From the Run Screen, tap Respiratory and adjust <b>Bronchial Resistance Factor: Left or Right</b> <b>VIEW:</b> Respiratory <b>CONTROL: Left/Right</b> - Set desired level of resistance	None required.
<b>Substernal Retractions</b>	An inward movement of the chest wall at the end of the sternum demonstrating difficulty breathing.	From the Run Screen, tap <b>Respiratory</b> and adjust <b>Substernal Retractions</b> . <b>CONTROL: ON/OFF</b>	None required.
<b>Swollen Tongue</b>	Swelling of the tongue obstructs the view of the larynx and prevents intubation, but allows mask ventilation of the patient's lungs, thereby creating a "cannot intubate, can ventilate" scenario.	From the Run Screen, tap <b>Respiratory</b> and adjust <b>Swollen Tongue</b> toggle. <b>VIEW:</b> Respiratory <b>CONTROL: ON/OFF</b>	None required.

## Airway Management

The manikin's anatomically realistic upper airway allows intubation, while various clinical signs (e.g., lung sounds, chest excursion, airway patency) can be simulated using software commands. Other airway features include a hard and soft palate, as well as oro-, naso-, and laryngopharynxes.

## Intubation

The upper airway of the manikin is designed to allow for intubation and laryngoscopy. Direct laryngoscopy as well as oral and nasal tracheal intubation can be performed using devices such as endotracheal tubes, nasopharyngeal airways, and oropharyngeal airways.



**Oral Endotracheal Intubation**



**Nasal Endotracheal Intubation**

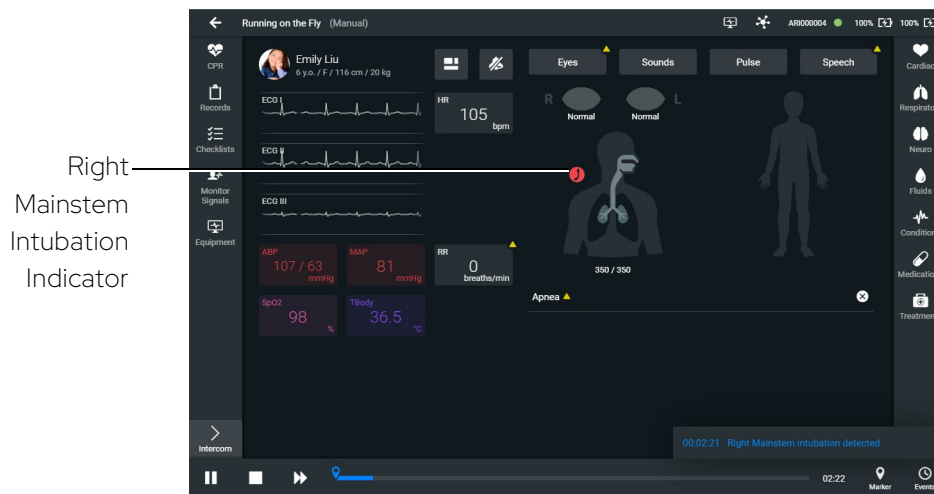
### **⚠ WARNING**

Airways can be damaged by improper insertion of an airway adjunct (i.e. endotracheal tube). To protect the airway, lubricate the adjunct prior to insertion using the silicone oil spray provided.

Use **ONLY** the provided silicone oil spray to lubricate the adjunct. **NEVER** use a water-based lubricant, which can cause residue damage.

### Right Mainstem Intubation

If a learner performs an intubation improperly that results in a right mainstem intubation, the left side of the chest will not rise when ventilated and sounds in the left lung will be absent upon auscultation. Additionally, an indicator appears on the Airway avatar in the Maestro software and an event for right mainstem intubation will be captured in the SCE Event log. Right mainstem is not logged until the first ventilation is performed.



**CAE Maestro Airway Avatar - Right Mainstem Intubation Indicator**

### Laryngospasm

The Aria Advanced configuration comes with a software-controlled laryngospasm feature to increase the difficulty of intubation and can be toggled on or off.

To activate the laryngospasm feature:

- Enable Laryngospasms in the Maestro software. Tap the Respiratory icon on the SCE run screen.
- Slide the Laryngospasm parameter toggle to the ON position.

To resolve the laryngospasm feature:

1. From the Run screen, tap on the white dot with X to the right of Laryngospasm enabled.
- OR
2. Tap the Respiratory icon on the SCE Run screen and slide the Laryngospasm parameter toggle to the OFF position.

### Bronchial Resistance

The Aria configurations include a variable bronchial resistance feature that is software-controlled.



To control bronchial resistance in the software:

1. Tap the Respiratory icon on the SCE run screen.
2. Tap on Bronchial Resistance Factor: Left or Bronchial Resistance Factor: Right and adjust the settings as desired.

Resistance settings can be toggled from 0.20 - 250000.00 (Default: 1.00)

A setting  $\geq 5$  will result in moderate resistance.

A setting  $\geq 50$  will result in occlusion.

The user can also induce bronchial occlusion by tapping the Left or Right bronchial occlusion toggle ON or OFF (Default: OFF).

Note: When bronchial occlusion is enabled, unilateral chest excursion can be observed during spontaneous or positive pressure ventilation.

## Gastric Distention

During esophageal intubation or overly aggressive bag-valve-mask ventilation, gastric distention occurs. Gastric distention is relieved by putting pressure on the abdomen.

## Tracheostomy Tube Placement and Suctioning

The following instructions provide steps for adequate tracheostomy tube placement.

Learners can:

- Clean the tracheostomy site.
- Replace the tube.
- Ventilate via tracheostomy tube.

To place a tracheostomy tube:

1. Remove the crico skin cover plate. Set it aside.
2. Prime the airway reservoir using silicone oil spray.
3. Place the tracheostomy tube into the tracheostomy site and secure it in place.



***Tracheostomy Tube Placement and Suctioning***

4. After the simulation, remove the tracheostomy tube and replace the crico neck skin plate.

## Chest Excursion

During ventilation (BVM, endotracheal intubation, etc.), the chest will rise with sufficient ventilation volume.

Aria presents with spontaneous chest excursion that simulates a patient breathing without the required external ventilation. The following chest excursion parameters can be modified in Maestro:

- **Respiratory Rate:** Defines the number of excursions (chest rise) in one minute.
- **Apnea:** Disable the spontaneous chest excursion but still allows for excursion during external ventilation.
- **Tidal Volume:** Changes the height of chest excursions.
- **Intrapleural Volume:** Disables chest excursion on the affected side but still allows for excursion on the unaffected side.

## Ventilation

Aria supports manual bag-valve-mask (BVM) ventilation via face mask, airway adjuncts, endotracheal tube, and tracheostomy tube. Proper ventilation will demonstrate chest rise and fall.



**Manual Bag-Valve-Mask (BVM) Ventilation**



**Laryngeal Mask Airway (LMA) Ventilation**

## Ventilator Support

Aria supports basic functionality of a ventilator. Low levels of PEEP (5-10) with normal volume (7-10 ml/kg depending on PEEP) can be supported. Reasonable lung compliances and resistances are supported for the scenarios of PARDS and Pneumonia as well as variable airway resistance for obstructed airway.

The simulator does not inhale so it will be unable to trigger a ventilator. Reasonable pressure/volume curves should be visible.

Aria supports a maximum ventilation of approximately 220 ml with a PEEP of 0. This volume will decrease when PEEP is used.

Note: The Advanced configuration only supports asynchronous volume and pressure controlled modes of mechanical ventilation.

## Cricothyrotomy

To replicate a needle cricothyrotomy:

1. Spray the silicone oil spray onto the airway adjunct prior to the simulation session. To prevent damage to the simulator, always lubricate the airway prior to each simulation.
2. Locate the simulated cricothyroid membrane underneath the neck skin.
3. Follow standard clinical techniques and palpate to find the cricothyroid space.
4. Puncture the space through the neck skin of the patient simulator and into the “membrane.” This puncture penetrates all the way through to the “trachea,” simulating the clinical procedure.



**Needle Cricothyrotomy**

Note:

- When ventilating through a surgical airway, the Laryngospasm feature must be deactivated in the Maestro software, or the chest rise is not observed.

## Pneumothorax (Needle Decompression)

By inserting a needle into the second intercostal space, mid-clavicular line, the sound of air being released can be heard and the intrapleural volume is reduced. Chest excursion and breath sounds automatically resume on the affected side.



***Aria Needle Decompression***

## Chest Tube

To perform a chest tube insertion:

1. Lubricate the chest tube with silicone oil spray.
2. Insert into the insertion point at the mid-axillary line of the fifth intercostal space on the left side of the manikin and secure in place.



***Chest Tube***

Note: For manikins equipped with the bleeding option, when the chest tube is inserted chest tube drainage is attained.

For supported chest tube size, see *Appendix A - Recommended Clinical Supply Sizes*.

## Cardiovascular System

Aria includes cardiovascular features that allow learners to practice basic assessment and emergency life support skill sets. Learners can:

- Palpate pulses
- Perform venipuncture
- Administer IM and SQ injections
- Perform IO procedures
- Auscultate realistic heart sounds using a StethoSym assembly
- Perform chest compressions
- Perform fingerstick blood glucose testing
- Perform simulated defibrillation, cardioversion and pacing via the Maestro software or with real equipment
- Perform ECG monitoring

## Cardiovascular System Controls

With Aria's Cardiovascular system, users can replicate the clinical signs associated with cardiac activity, including palpable pulses, heart sounds, and electrical activity.

Cardiovascular System Controls			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
<b>Heart Sounds</b>	Normal and abnormal heart sounds are synchronized to the cardiac cycle and audible with a standard stethoscope and a StethoSym assembly. Heart sounds can be auscultated over the upper left and right sternal border, the lower left sternal border and apex.	None required; specific sounds can be selected.  From the Run screen, tap <b>Sounds</b> and select Heart tab.	None required.
<b>4-Lead ECG</b>	ECG waveforms can be viewed on a standard monitor and/or on the Patient Monitor. Normal and abnormal cardiac rhythms are linked to patient physiology (e.g. blood pressure, cardiac output).	None required; specific rhythms can be selected.	Attach 4 ECG leads to the ECG posts and attach to the cardiac monitor.

Cardiovascular System Controls			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
<b>Palpable Pulses</b>	Pulses can be palpated bilaterally and are synchronous with the cardiac cycle. A pulse deficit automatically occurs if the systolic arterial blood pressure falls below specified thresholds.	None required, but adjustable.  VIEW: From the Run screen, tap Pulse and tap on the pulse location desired to change intensity and/or pulse deficit.	None required.
<b>Non-Invasive Blood Pressure Measurement</b>	Systemic blood pressure can be measured using the return-to-flow technique. Korotkoff sounds can also be auscultated.	Volume of Korotkoff sounds can be adjusted by tapping <b>Sounds</b> on the Run screen and then the Korotkoff tab.	Use of modified blood pressure cuff with T-adapter. Connect T-adapter to NIBP connection on manikin's right side.

## Pulses

Aria includes bilateral pulses at the following locations:

- Carotid
- Brachial and Radial
- Femoral
- Popliteal and Dorsalis Pedis (Advanced configuration)

Each pulse location represents a zone. Settings of a pulse will affect the zone if both zones are touched at the same time. For example, if you set the right brachial to weak and the right radial to strong and touch both the brachial and radial pulses you will feel one strength.

There is a dominant pulse location within each zone. This means if the two pulse locations are palpated at the same time, the following will occur:

- a. Brachial pulse settings take precedence over Radial pulse settings in the Brachial and Radial Zone.
- b. Femoral right pulse settings take precedence in the Femoral Zone.
- c. Popliteal pulse settings take precedence in the Popliteal and Dorsalis Pedis Zone.

The system supports all functions including variable pulse strength (weak, normal, and bounding), outside of this zone.



## IV Administration

There are two IV sites on Aria's left arm, located on the dorsum of the hand and the antecubital fossa.

For instructions on how to prime and fill the IV sites, see the *Setup* section of this user guide.

For instructions on how to flush and drain the IV sites, see the *Care and Maintenance* section of this user guide.

## IV Cannulation

Veins for the IV Cannulation feature are located in the left antecubital fossa region of the left arm.



**IV Arm**

To simulate realistic flashback, the system must be primed prior to use. See *Step 10: Prime the Fluids Systems* in the *Setup* section of this user guide for instructions.



**IV Cannulation**

### **⚠ WARNING**

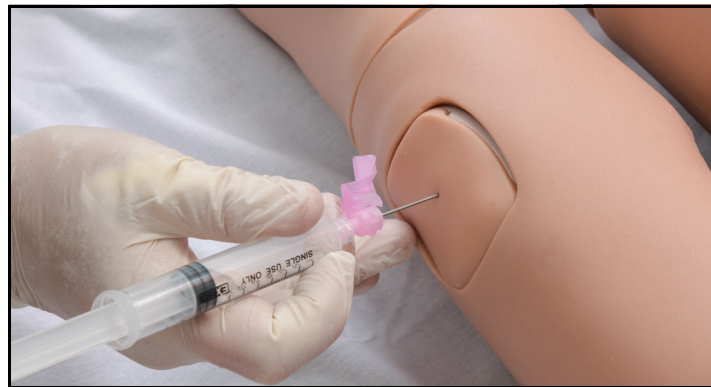
If flashback does not occur, do NOT inject any fluid and remove the needle immediately. Repeat the priming directions and ensure you have inserted the needle properly and into the simulated vein.

---

## Intramuscular (IM) Subcutaneous (SQ) Injection

Aria supports IM/SQ injection of the left humeral site located on Aria's left arm and the left vastus lateralis site located on Aria's left thigh.

Note: The IM/SQ pads can sustain multiple injections and can be removed and replaced after each injection to empty fluids.



**IM/SQ Injection**

Please see the *Care and Maintenance* section of this user guide for instructions on how to maintain the IM injection site, including how to remove and replace the IM pads.

## Intraosseous (IO) Cannulation and Administration

Aria also allows for humeral and tibial intraosseous (IO) cannulation. The designated IO sites are located on Aria's left shoulder and left leg .

Note: Do not administer fluids through either the humeral or tibial IO sites. They are for dry access training only.

The IO pucks have a finite lifespan and must be replaced when no longer viable for IO access. Additional IO humeral and tibial pucks are available for purchase.

To replace the IO puck:

1. Pull the used IO puck out to remove it.



***Removing Humeral IO Puck***



***Removing Tibial IO Puck***

2. Push the new IO puck in to replace it.

### Chest Compressions

The manikin supports normal hand placement and standard compression techniques so that chest compressions can be performed.



***Administering Chest Compressions***

### *CPR Monitor*

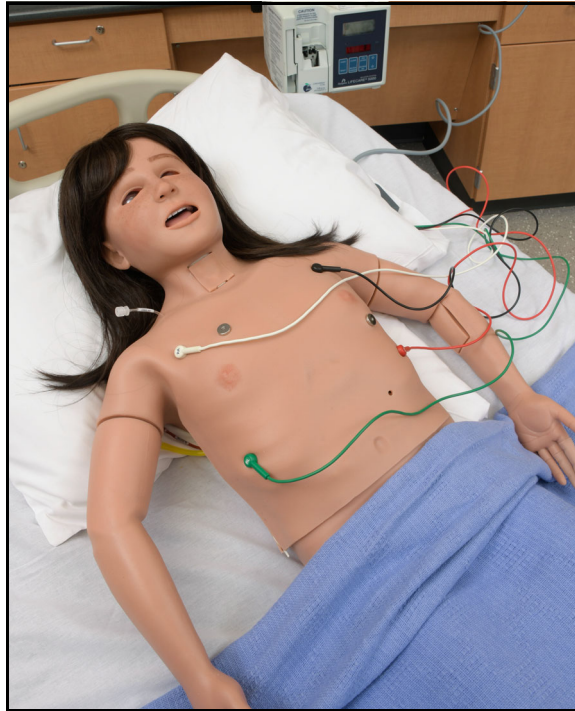
The CPR Monitor captures the chest compression metrics in the Maestro software and saves the data collected during this intervention in SCE History.

For more information on how to use the CPR Monitor, see the *Maestro for Aria User Guide*.

## ECG

On Aria, a 4-lead ECG signal is emitted from the appropriate positions for display on a standard monitor. The ECG posts are pre-installed on the manikin.

To produce ECG signals on a standard patient monitor, connect the ECG leads to the posts.



**ECG Leads Connected to Aria**

## Defibrillation, Cardioversion, and Pacing

Aria supports cardioversion, defibrillation, and pacing.

The manikin can receive simulated electrical therapy :through the software or by using the SymDefib device with a live defibrillator.

### *Simulated Defibrillation*

For instructions on administering defibrillation through the software, refer to the *Maestro for Aria User Guide*.

### *Commercial Defibrillation*

The manikin can safely absorb the energy from commercial defibrillators only with SymDefib. See *Appendix B - SymDefib* for information and instructions.

### *Cardioversion*

The cardioversion procedure will vary depending upon the brand of defibrillator that is being used. However, the setup steps for the defibrillator will be the same as that described in *Appendix B*. Refer to defibrillator manufacturer's user guide for proper use.

### *Pacing*

Pacing can be achieved by selecting the appropriate intervention in Electrical Therapy within the Treatments button on the right side of the Run screen in the Maestro software.

Connect the ECG leads to the posts on the manikin. This provides ECG signals for leads I – III. The learner may choose to shock either synchronously or asynchronously to the ECG rhythm. The Pacing Capture Threshold can be modified in the Maestro software. **The default threshold is set at 50 mA.**

When the current exceeds the Pacing Capture Threshold set in Maestro, the learner begins to see the effect of pacing on the ECG and Maestro logs the current being provided.

A standard transthoracic cardiac pacemaker can be connected to the simulator using the anterior contacts. The simulator automatically detects and responds to pacing signals (from 20 mA to 200 mA, in increments of 10).

For more information, see the *Maestro for Aria User Guide*.

## Blood Pressure

Aria supports non-invasive blood pressure measurements, and systolic and diastolic readings can be obtained and manipulated through the software.

### *Systolic and Diastolic Blood Pressure*

To manually adjust the systolic and/or diastolic blood pressure:

1. From the Cardiovascular panel, select the parameter of desired blood pressure.
2. Set the pressure by moving the blue slider left or right, or by typing in a value.

### *Non-Invasive Blood Pressure Measurement*

Blood pressure can be taken manually on the right arm. Non-invasive blood pressure (NIBP) monitoring techniques can be used by attaching a standard cuff modified with a T-fitting and adapters.

To get a blood pressure reading:

1. Connect the extension from the T-fitting on the blood pressure cuff adapter to the NIBP port on Aria's right side.



***Pediatric BP T-Fitting Adapter Connection***

2. Take the non-invasive blood pressure reading using the return-to-flow technique or by monitoring Korotkoff sounds.

At appropriate cuff pressures, the radial pulse disappears and Korotkoff sounds are produced.

## Blood Glucose Fingers

Aria includes the ability to perform fingerstick blood glucose testing. The second and third fingers on the left hand can be removed and filled with fluid.

To fill the glucose fingers with the simulated test blood:

1. Gently remove the glucose fingers from the hand.
2. Insert a 1 ml syringe and needle into the bottom opening of the finger. Stop when you hit the plastic stop wall and pull back slightly.



***Inserting Syringe into Glucose Finger***

3. Withdraw as much air or fluid as possible with the syringe and remove syringe.

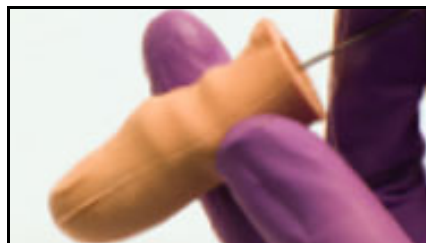


4. Fill a syringe with 0.5 ml of the simulated test blood.



***Syringe Filled with Simulated Test Blood***

5. Insert the syringe and needle into the bottom opening of the glucose finger until you hit the plastic stop wall and pull back slightly. Inject 0.2 ml of the simulated test blood and remove syringe.



***Injecting Simulated Test Blood into Glucose Finger***

6. Reattach the glucose fingers to the simulator hand.

Recommended formula for simulated test blood:

Component	mls	mls	mls	mls
<b>Distilled Water</b>	10	10	10	10
<b>Fake Blood Gel</b>	7.5	7.5	7.5	7.5
<b>Glucose</b>	0.5	1	2	4
<b>Anticipated Glucose Range</b>	<70	70 - 120	150 - 300	>300

Note: Fake blood gel must have thick consistency. Suggested products are Rubies® Fake Blood Theatrical or Smooth-On Sim Blood. The glucose product should yield approximately 80 calories per 12 fluid ounces. Suggested product is Gatorade® G Series sports drink. After mixing, check glucose level with glucometer. Add additional glucose product for the desired results.



To use the glucose fingers:

1. Prime the glucose fingers as noted above and place them back on the hand.



***Place Glucose Finger on Hand***

2. Prepare glucose test kit lancet (not included).
3. Find designated window port on either side of the glucose finger.
4. Prepare glucometer by inserting test strip into device (not included).
5. Place lancet against the window area on the glucose finger and trigger the needle. (Recommended to use the lowest setting on the lancet device).



***Place Lancet on Glucose Finger***

6. Massage area gently to get a droplet of the simulated test blood.



***Droplet of Simulated Test Blood***

7. Place droplet on designated test strip until it is registered by the glucometer.



**Place Droplet on Test Strip**

8. Wipe off any excess simulated test blood from the glucose finger with alcohol pad.

To reseal the glucose fingers:

1. Open the tube of silpoxy (included).
2. Touch the top of the silpoxy tube with a gloved finger.
3. Gently apply a thin layer of the silpoxy over the puncture area on the glucose finger and allow it to dry.
4. Recap the silpoxy tube.

Note: The blood glucose fingers can withstand two finger pricks (one on each side) before they need to be resealed using the silpoxy.

To drain the glucose fingers:

1. Gently remove the glucose fingers from the hand.
2. Insert a 1 ml syringe and needle into the bottom opening of the finger. Stop when you hit the plastic stop wall and pull back slightly.
3. Withdraw as much air or fluid as possible with the syringe and remove syringe.

## SpO<sub>2</sub> Finger Probe

The SpO<sub>2</sub> finger probe is used to display the plethysmogram and is associated with SpO<sub>2</sub> numeric value on the virtual Patient Monitor. When the probe is connected to the SpO<sub>2</sub> port, the Patient Monitor will display the plethysmogram if the SpO<sub>2</sub> probe is on the finger. If the finger probe is removed or falls off, the plethysmogram will not display.

Note: If the SpO<sub>2</sub> probe is not being used and not connected to the manikin, the Patient Monitor automatically displays the plethysmogram.

To connect the SpO<sub>2</sub> finger probe to Aria:

1. Locate the SpO<sub>2</sub> port on Aria's left side. It is behind the uppermost of the two small holes.
2. To access the port with the connector, reach underneath the skin from the rectangular opening and pull the connector through the small hole in the skin.



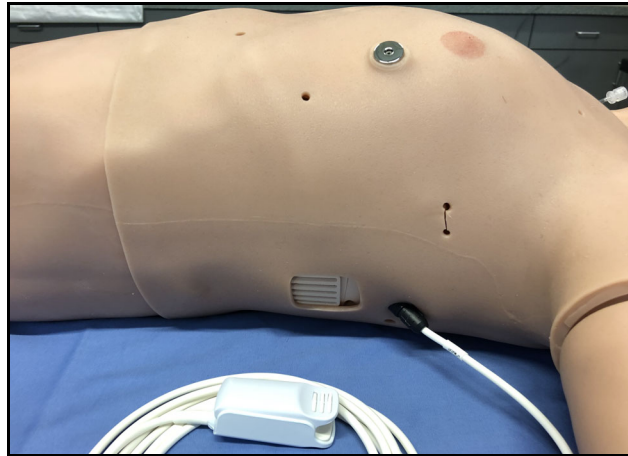
**SpO<sub>2</sub> Port Location**

3. Push the connector in and it will lock in place. Do not twist, screw, or force the connector or it can be damaged.



**SpO<sub>2</sub> Connection**

4. Adjust and re-align the skin around the connection as needed.

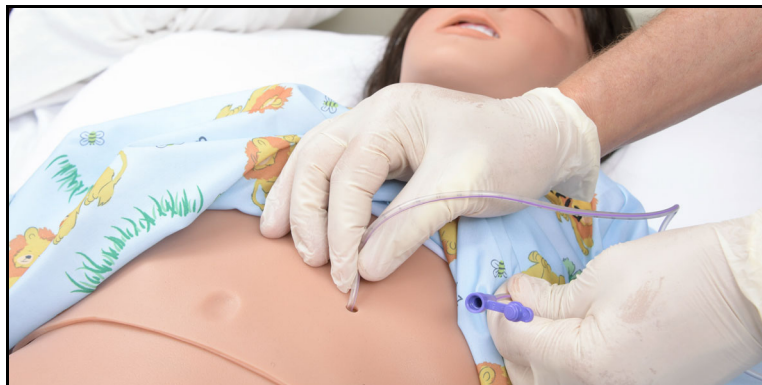


**SpO<sub>2</sub> Probe Connected**

5. When training is complete, disconnect the SpO<sub>2</sub> probe connector. To do this, move the slider around the connector in the opposite direction of the arrow and gently pull the connector out.

## Gastrointestinal System

Aria produces realistic bowel sounds. Auscultation of normal and abnormal bowel sounds can be performed with the StethoSym utilizing the RFID tags. For further information, see *Using the StethoSym* in this user guide.



**Gastrostomy Feeding Tube Site Connection**

Note: Feeding tube is not included.

## Genitourinary System

Aria is configured for male and female genitalia, either of which allows for the insertion of a urinary catheter. The genitourinary system also provides for the excretion of urine.

The simulator allows for the insertion of a 10 Fr 3 ml balloon urinary catheter.

The genitourinary (GU) system must be primed prior to use. See the *Setup* section of this guide.

**IMPORTANT:** Use only clear distilled water or distilled water tinted with food coloring inside the manikin. Administration of any other type of fluid is NOT supported and may damage the system.

Be sure to clean the system before storing the manikin. For more information, see the *Care and Maintenance* section.

## Urinary Catheterization

Prior to catheterizing the simulator, the genitourinary (GU) system must be primed. See the *Setup* section of this user guide for instructions.

To perform catheterization, use the following items:

- 10 Fr 3 ml balloon urinary catheter
- Syringe to inflate catheter balloon
- Silicone oil spray (included)

### *Inserting a Urinary Catheter*

Note: Before catheterization, see the *Setup* section of this user guide for instructions on how to prime the genitourinary (GU) system.

After the GU system has been primed, catheterize the simulator using a standard 10 Fr urinary catheter lubricated with silicone oil spray.

When the catheter is inserted, simulated urine begins to flow until the internal bladder is empty.

Note: The urinary catheter must be inserted approximately 2.5 inches (6.35 cm) for the female genitalia and 4.5 inches (11.43 cm) for the male genitalia to achieve urine flow.



***Urinary Catheterization***

## Changing the Simulator's Genitalia

Aria comes with male and female genitalia.

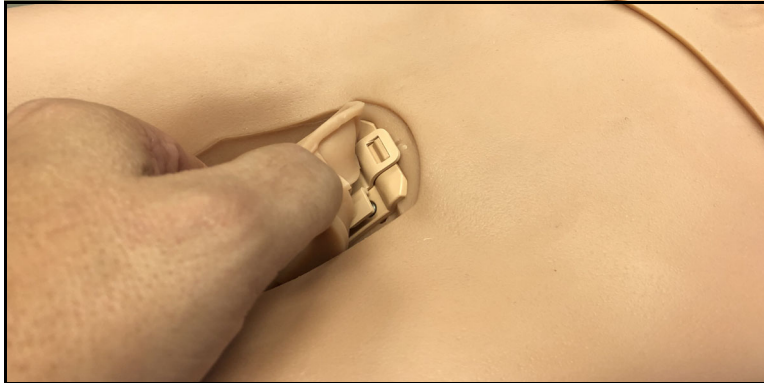
## Using Aria

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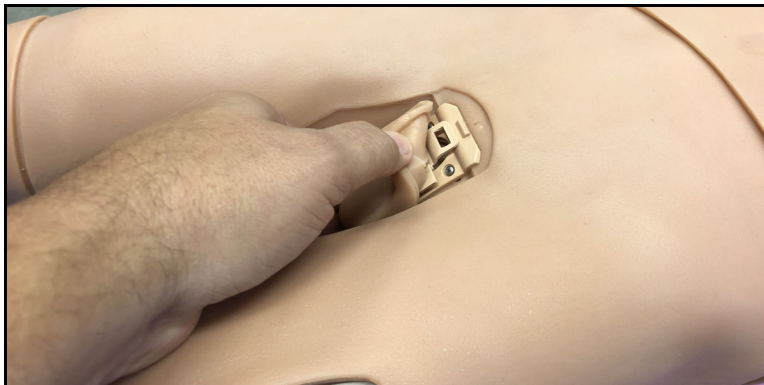
Note: Prop the manikin's buttocks up with a pillow or folded sheet/towel to allow for easier access to the manikin's genitalia.

To remove the genitalia:

1. Gently pull the top tab up to unlatch it.

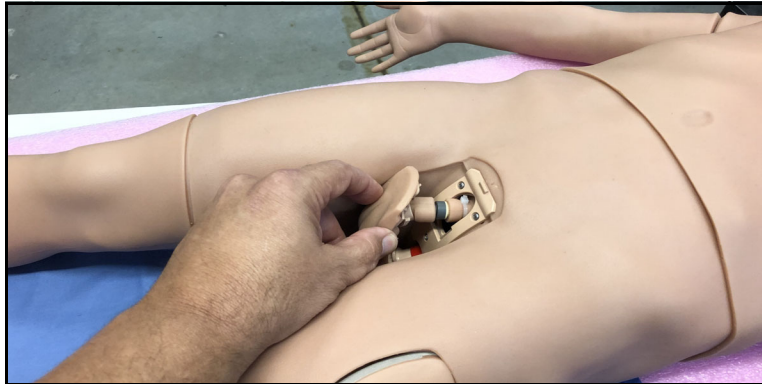


***Latched Tab in Place***



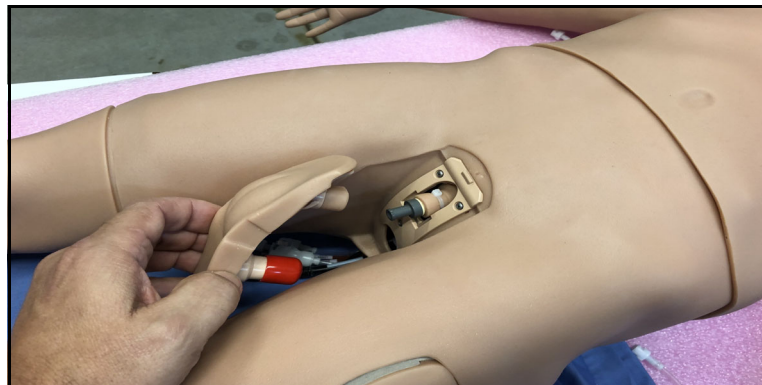
***Tab Unlatched***

2. Slide the genital insert downward, then gently pull it outward, about halfway until the bottom plug is visible.



***Pulling the Genital Insert Downward***

3. With the bottom plug visible, grip the bottom of the genital insert and pull outward to remove it. Gently separate the genitalia from the black bladder tube.



***Removing the Genital Insert***

To insert the genitalia:

1. Place the desired genital insert into position by flexing the bottom of the genitalia and directing it into the frame.
2. Extend the black bladder tube from the opening and attached it to the genital insert.
3. Push the genital insert toward the mounting plate until flush, then slide it upward until it latches in place.

## Sounds

A variety of simulated sounds are available to enhance realism. Sounds are controlled through the instructor software.

To auscultate sounds on the Aria manikin, be sure to locate a stethoscope and set up the StethoSym prior to beginning a simulation.

# Auscultated Sounds

Note: A patient must be running in the software for any sounds to be available. By default, Normal sounds are selected.

To change the sounds from normal, tap any one of the sounds on the Type drop-down menu.

To adjust the volume, tap and drag the Volume slider.

Sounds in specific/individual or all regions can be turned off using the ON/OFF toggle.

For more information on using these parameters, see the *Maestro for Aria User Guide*.

## *Heart, Lung, Bowel and Korotkoff Sounds*

Heart sounds are synchronized with the cardiac cycle and lung sounds are independently synchronized with ventilation of the left and right lungs. Sounds can be adjusted by tapping the Sounds button on the Run screen in Maestro. When the Sounds panel appears, select one of the tabs: Heart, Lungs, or Bowel, or Korotkoff. Adjust all areas or isolate by changing the sound type per region, if applicable. Select the sounds from the Type drop-down menu. See the *Maestro for Aria User Guide* for complete details.

# Speech

A variety of programmable vocal sounds are available. Select Vocal Speech Sounds or Speech Sounds from the Run Screen. A patient must be running in the Maestro software for the Speech sounds to work properly. The Vocal Speech is emitted immediately and plays continuously until turned off or another speech sound is selected. The Speech sounds contain predefined phrases and are arranged in Conversation and Symptom categories.



## StethoSym

To set up StethoSym:

1. Connect the StethoSym's speaker module to the diaphragm of the stethoscope with the two elastic bands.



***StethoSym Speaker Module Connected to Diaphragm***

2. Pull back the lever on the StethoSym module to open the clamp and attach it to the tubing of the stethoscope.



***StethoSym Clipped to Tubing***

### *Charging the StethoSym*

To charge the StethoSym, use the included power supply and micro-USB cable. Refer to the table below for status light information.

Light Color	Power Status
<b>Orange</b>	Unit is plugged into a power source and battery is charging. Orange light turns off when the unit is fully charged.
<b>Green</b>	Unit is on and fully charged.
<b>Flashing Red</b>	Battery level is low and needs to be charged.
<b>Blue</b>	Unit is on and receiving signal from manikin.

### *Operating the StethoSym*

To connect StethoSym to the manikin:

1. Press the power button on the side of the StethoSym module.

The unit powers on and the indicator light should be Green until it synchronizes with the manikin and then turns Blue. The indicator light flashes Red if the battery is low.

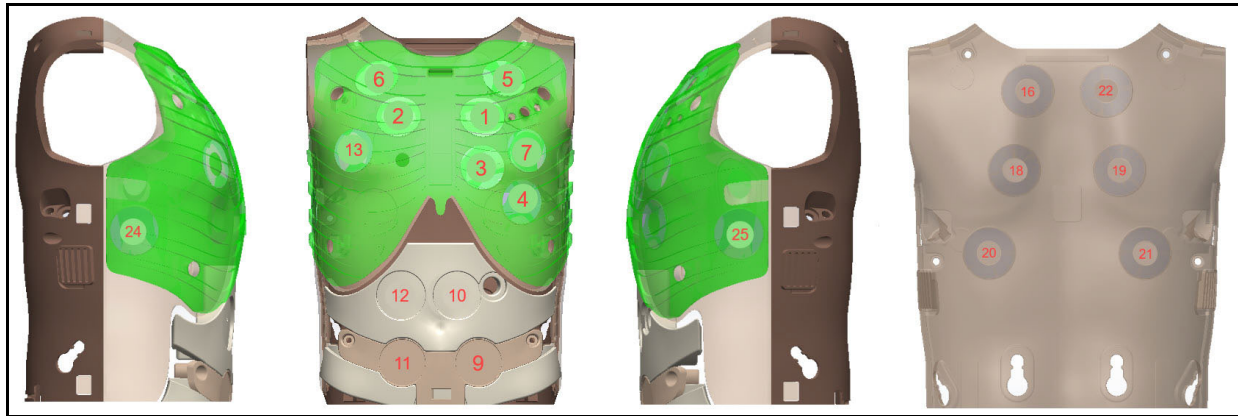
2. Place the StethoSym speaker module over a sound tag on the manikin for approximately 10 seconds. This ensures that StethoSym connects to the proper manikin. StethoSym displays a solid blue light when it is connected to the manikin.

Note: This step is only required when moving the StethoSym to a new manikin which it is not already paired to.

With a patient running in Maestro, listen to any available physiologic sounds by placing StethoSym on the correct location. To control the volume and specific sound played at a sound location, use the Sounds controls on Maestro.

3. To turn StethoSym off, press the power button.

The following shows the RFID tag locations under the skin. Do not remove the manikin's skin. Contact CAE Customer Support if assistance is needed.



**Aria RFID Tag Locations**

Tag #	Location Sound
1	Heart: Pulmonary Valve
2	Heart: Aortic Valve
3	Heart: Mitral
4	Heart: Tricupsid
5	Lungs: Anterior - Left Upper Lobe
6	Lungs: Anterior - Right Upper Lobe
7	Lungs: Anterior - Left Lower Lobe
8	Lungs: Anterior - Right Lower Lobe
9	Bowel: Lower Left Quadrant
10	Bowel: Upper Left Quadrant
11	Bowel: Lower Right Quadrant
12	Bowel: Upper Right Quadrant
13	Right Arm: Korotkoff Sound (not pictured)
16	Lungs: Posterior - Left Upper Lobe
17	Lungs: Posterior - Right Upper Lobe
18	Lungs: Posterior - Left Middle Lobe¥
19	Lungs: Posterior - Right Middle Lobe¥¥
20	Lungs: Posterior - Left Lower Lobe
21	Lungs: Posterior - Right Lower Lobe
24	Lungs: Anterior - Right Lateral Lobe**
25	Lungs: Anterior - Left Lateral Lobe*

## Using Aria

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\* Controlled by the anterior Left Lower lung sound control

\*\* Controlled by the anterior Right Lower lung sound control

¥ Controlled by the posterior Left Upper lung sound control

¥¥ Controlled by the posterior Right Upper lung sound control

# Care and Maintenance

Maintaining the simulator requires careful treatment of electronic and mechanical components. After use, make sure all components are properly handled and correctly removed or placed into storage.

Note: Many hardware components of the simulator and the Instructor Workstation are not user-serviceable. The SymDefib unit is also not user-serviceable and must be returned to CAE Healthcare if repair is needed. Contact CAE Healthcare Customer Support for any questions and concerns regarding hardware maintenance.

## CAUTION

Do not attempt to open or repair any simulator components without authorization from CAE Customer Support. Doing so may void the warranty.

## General Simulator Care

- Avoid the use of writing instruments and sharp objects near the patient simulator to prevent tears or unattractive markings in or on the skin.
- A mild detergent and warm water will remove most marks and stains. Gently rub the soiled area with a soft cloth. DO NOT use ABRASIVE soaps or pads.
- Lubricate airway adjuncts, urinary catheters, nasogastric tubes, and enema tubes with silicone spray prior to insertion. DO NOT use water-based lubricant.
- Prior to using moulage of any kind, and to make cleansing the simulator's skin easier, lightly apply petroleum jelly to the simulator's skin, followed by a light amount of talcum powder (unscented baby powder).
- If the IV sites have been used, remove the fluid as described in the breakdown procedure. Failure to drain and clean the systems may cause problems with the system.
- If the IM injection site(s) have been used, remove the fluid from the sponge inside the injection site pad as described in the breakdown procedure.

## Breakdown

To keep the simulator in good working condition, follow the breakdown procedures prior to storing.

Break down the Aria Simulator	
1	Clean the Manikin
2	Flush and Drain the IV system and Gastrostomy Site
3	Maintain IM Injection Site
4	Flush and Drain the Urinary System
5	Power Off the Instructor Tablet
6	Power Off the Manikin

### Step 1: Clean the Manikin

To clean the simulator, use a soft cloth and warm water with a mild detergent to wipe off any moulage materials on the manikin's skin. Gently rub the soiled area with a soft cloth to remove most marks and stains. DO NOT use solvents or abrasive pads.

Inspect the manikin for damage or puncture marks. If damage exists, contact CAE Healthcare Customer Service immediately for a repair. Prompt repair prevents expansion of the damaged area.

### Step 2: Flush and Drain the IV and Gastrostomy Sites

To flush any sites where colored distilled water was used:

1. Verify an IV bag is still connected to the fluid drain port to capture expelled water.
2. Connect a syringe filled with distilled water and inject 20ml into each fluid port used during training.
3. Repeat until the fluid draining into the bag is clear.

To remove fluid and drain the system:

1. Verify an IV bag is connected to the drain port to capture expelled water.
2. Inject a syringe of air into each fluid port used during training.
3. Replace any port caps.
4. Remove the IV drain bag.
5. Connect an empty syringe to the fluid drain port.
6. Pull the plunger back quickly. This action will remove any remaining fluid from the system.
7. Remove the syringe and place cap on the drain port.

## Step 3: Maintain IM Injection Site

If the simulation included use of IM injection equipment, perform the following steps prior to storing the manikin:

1. Remove the pad from the injection site.



***Removing the IM Pad***

2. Remove the sponge from inside the pad.



***Removing Sponge from the IM Pad***

3. Squeeze all the fluid from the sponge and let air dry.



***Squeezing Fluids from the Sponge***

4. When dry, replace the sponge back inside pad.
5. Replace the pad into the injection site.

## Step 4: Flush and Drain the Urinary System

To flush and drain the urinary system:

1. Insert catheter in the urethra approximately 2.5 inches (6.35 cm) for the female genitalia or 4.5 inches (11.43 cm) for the male genitalia.
2. Attach the urinary module assembly filling tool with clear distilled water.
3. Flush until clear water comes out of the catheter.
4. Fill tool with air and flush until no water can be seen entering the catheter.
5. Remove the catheter.

## Step 5: Power off the Instructor Tablet

To power off the Surface Go 2 instructor tablet:

1. Tap the white back arrow at the top left of the Maestro run screen to exit the current simulation session.
2. Tap Stop and Exit.
3. Tap the X in the upper-right corner of the screen to exit Maestro.
4. The tablet desktop screen appears.
5. Tap the Start menu icon in the lower-left corner of the desktop screen.
6. Tap Power and then tap Shut Down.



## Step 6: Power Off the Manikin

To power off the manikin, press and release the Power button located on the bottom of the manikin's right foot.

The LED will flash Green for approximately 45 seconds, then turn off when the unit has completely powered down. After the unit is powered down, the LED will blink Blue approximately every 30 seconds indicating the unit is in low power mode.

Note: The power button will flash blue every 30 seconds to indicate the low power mode is enabled. If the button no longer flashes, the battery has been turned off and external power will need to be plugged in to charge and operate the system.

## Maintenance

Simple care and maintenance will ensure Aria stays in good working condition. Many problems are caused by inadequate or improper maintenance. Check all parts and components each time the simulator is used. Failure to follow these guidelines can lead to damage not covered by warranty.

### Airway Inspection

Aria is equipped with an anatomically accurate airway that supports the practice of difficult airway management techniques. In the process of performing these techniques improperly or aggressively, the upper airway can be damaged.

Because damage can occur, occasional visual inspection of the airway is recommended. Using the light of a laryngoscope blade or a flashlight, visually examine the airway. While tears in the upper airway resulting from intubation may be obvious, needle holes in the lower trachea resulting from techniques such as transtracheal jet ventilation may not be readily apparent.

If damage to the airway is found, contact CAE Customer Service.

# Storage

**IMPORTANT:** Do not attempt to open or repair any simulator components. Doing so may void the warranty. If damage exists, contact CAE Customer Service immediately for a repair. Prompt repair prevents expansion of the damaged area.

Prior to storing the product:

- Make certain all fluids have been flushed and drained from the manikin.
- Charge the manikin batteries.

Store all equipment and the manikin:

- Indoors
- In a dry location
- Protected from dust
- Away from direct sunlight
- Within the temperature ranges listed in the *Specifications* section of this user guide

Refer to the following short-term and long-term storage instructions for additional details.

## Short-Term Storage

Follow these guidelines for short-term storage (less than two months):

- Charge the computer and manikin to 100% to increase shelf life.
- Store the manikin on a work table and cover with a sheet.
- Store the manikin and battery in a cool location to extend the life and capacity of the battery.

## Long-Term Storage

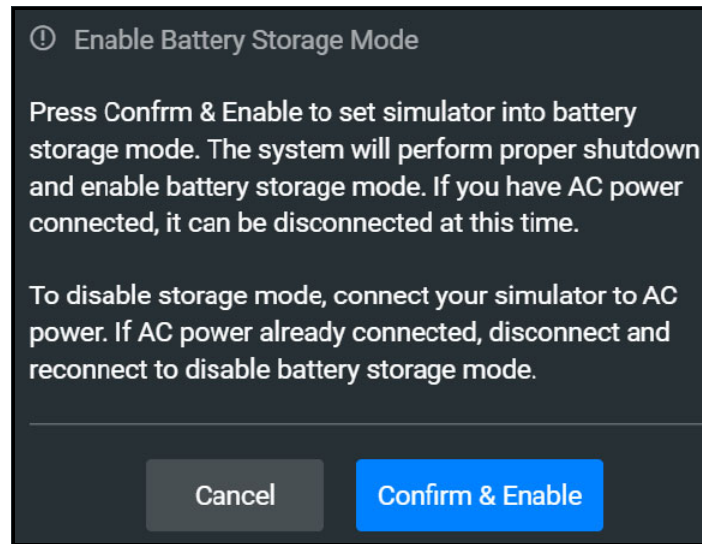
Follow these guidelines for long-term storage (up to twelve months):

Always charge the battery before storage. Charge the computer and manikin to 100% in order to maximize shelf-life. Follow the *Battery Safety Information* detailed in this User Guide.

Aria supports Battery Storage Mode for long-term storage. To enable:

7. Start Maestro, tap the Gear icon, and select System.
8. Tap on the Maintenance tab.
9. Enter the six-digit password for the simulator: "#####" (this is the numerical serial number with leading zeros to fill six digits. Example: AR1000125 = Password: 000125)

10. Locate Battery Storage Mode, then tap on the Enable button.



***Enable Battery Storage Mode***

11. A popup window displays information about this feature. Tap on the Confirm & Enable button to place the batteries in storage mode. The manikin will begin a safe shutdown.

Complete the storage preparation:

1. Quit Maestro.
2. Turn off the computer.
3. Remove the power plug from the manikin when it turns off.
4. Verify the Power Indicator on the right foot no longer flashes blue every 30 seconds.
5. Place equipment into the storage box for safekeeping.

Store the manikin in the container the simulator arrived in and refer to the *Unpack and Repack Manual* (this document also was included when the simulator was shipped). Do not stand the container on its side with the manikin stored inside for long periods of time.

Aria supports storage up to twelve months. After that period of time, the user will need to charge the simulator again.

To charge Aria after storage, plug the AC adapter back into Aria to remove the batteries from storage mode. The software will automatically turn the batteries back on and start the charging process.

**Note:** Prior to using the manikin again, ensure it reaches room temperature.

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# Appendix A – Recommended Clinical Supplies

The following clinical supply sizes are recommended for use with Aria. Other sizes may cause damage to Aria and should not be used.

Recommended Clinical Supply Sizes	
Urinary Catheter	10 Fr, 3ml balloon
Nasogastric Tube (NGT)	10 Fr (moulage only, no fluids)
MIC-Key Bolus Extension Set	0124-12
Laryngoscope Blade Miller	#2
Laryngoscope Blade Mac	#3
Endotracheal (ETT)	6.0 mm cuffed
Manual Resuscitator	Child
Face Mask	Small Adult/Youth
Laryngeal Mask Airway (LMA)	#2.5
King Airway	#3
i-gel Supraglottic Airway	#2.5
Oropharyngeal Airway	2, 70 mm
Nasaopharyngeal Airway	24 Fr, 6 mm
Tracheostomy Tube	5.0 cuffed
Peripheral IV Cannula	22 g
Chest Tube	20 Fr
Needle Decompression	14 or 16 ga., 1.5 inch needle
IO Needle	15 ga. adjustable depth
BP Cuff	Pediatric
Medical Eye Pen Light	Standard

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# Appendix B – SymDefib

SymDefib uses live electricity. Review all warnings and instructions before using SymDefib.

IMPORTANT! This equipment is not suitable for use in locations where children are likely to be present.

## Cautions and Warnings

SymDefib is used in conjunction with real biphasic defibrillators that transmit live electrical current at the same energy levels used with real patients. Observe the following precautions >

IMPORTANT! All safety precautions for the use of defibrillators MUST be followed exactly as if the simulator were a real patient. Consult the defibrillator’s user manual for model-specific information.

- Defibrillate with the SymDefib defibrillation pads only. If defibrillation is attempted with ECG electrodes, high voltage may be discharged from the remaining ECG connectors during the shock. This can cause personal injury and damage ECG circuitry.
- Do not connect defibrillator pads to ECG nodes on the chest. Defibrillating via an ECG node can damage the ECG circuitry. Connect pads only to the defibrillation nodes.
- Do not do more than three (3) defibrillator discharges (maximum 200 joules with a biphasic defibrillator) in a sequence, and do not exceed an average of two (2) defibrillator discharges per minute during the training session. Too many discharges may cause overheating.
- Avoid a large number of consecutive discharges. For example, 20 or 25 discharges without any recovery interval may damage the system.
- Keep electrically conductive surfaces or objects away from the simulator during defibrillation.
- Keep the simulator’s chest dry. Special attention should be taken when using the urinary system or the chest tube feature with fluids.
- Do not apply conductive gel or use real conductive defibrillation pads intended for patient use. This could damage the chest skin electrodes.
- Do not use cables or connectors with visible damage.
- Do not touch the manikin or the SymDefib unit when applying electrical therapy. SymDefib uses live electricity and misuse can cause personal harm or injury. Use the same precautions when using SymDefib in simulation as in real defibrillation. The person operating the equipment must:
  - a. review the scene for safety,
  - b. make sure all people have stepped away and are not touching the simulator,
  - c. loudly announce “CLEAR” so all are aware of the imminent use of electricity.

Observe the symbols on the warning notice label on the product:



# Equipment Overview

The SymDefib equipment package includes the SymDefib unit, a power supply, connector cable, SymDefib pediatric pads, and various connectors.

When a shock is delivered, the live electrical current is absorbed by the SymDefib unit and does not travel to the SymDefib pads or simulator. Make sure to review the *Cautions and Warnings* section above before proceeding with setup and operation of SymDefib.



**SymDefib Pads**

Note: Similar to real defibrillation pads, the SymDefib pads show proper pad placement on the pads.

## Using SymDefib

When using a commercial defibrillator in simulation, connect only the SymDefib magnetic defibrillator pads. (As noted in the *Cautions and Warnings* section, do not use real defibrillation pads with the simulator.) The electrocardiograph (ECG) will appear on the monitor, and shockable rhythms such as coarse ventricular fibrillation and high-rate ventricular tachycardia are automatically recognized.

With each defibrillation, Maestro automatically records the energy discharged and the time. The simulated patient response to defibrillation is determined either automatically by the scenario script or manually by instructor intervention. Thus, cardioversion is not determined by the physiological models.

## Charging SymDefib

To reduce the number of cords and cables in the simulation area, the SymDefib has an internal battery to power the device during a training session. Charge the battery with the included power supply prior to use.



Note: The SymDefib power switch must be on to charge the battery.



***Charging the SymDefib***

If preferred, or for longer training sessions, SymDefib can also be used with the power supply connected.

## Setting Up SymDefib

Follow the steps below to prepare the Symdefib for electrical therapy:

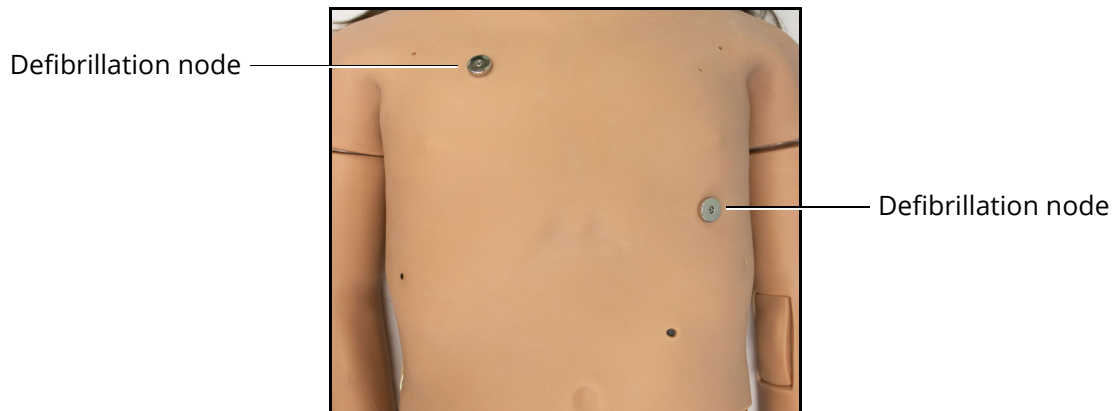
1. Connect the SymDefib to the commercial defibrillator using the cable provided.
2. If not using the internal battery, plug the power supply into the SymDefib unit (optional).
3. Connect the SymDefib defibrillator pads cable to the front of the SymDefib unit.
4. Be sure the manikin is on, then power on the SymDefib. The status light on the unit blinks green when it is ready for use.

Note: The SymDefib was paired to the simulator in the factory and should automatically connect wirelessly. It will connect only to the simulator specified on the serial number label.

## Operating SymDefib

With the SymDefib on and ready, attach the Symdefib defibrillator pads to the defibrillation nodes on the manikin. The pads and nodes will connect magnetically.

SymDefib pads must be placed only on the defibrillation nodes, as shown in the following image:



### ***SymDefib Pad Nodes***

When the SymDefib pads are connected, the monitor begins to display the ECG and the SymDefib status light turns solid green.

Operate the commercial defibrillator in the same way as in a real environment: use the automated external defibrillation (AED) function to automatically defibrillate, or train using advanced skills to set joules and deliver shocks manually. Refer to the user guide for the defibrillator for operating instructions.

Note: The minimum electrical charge recognized by the circuitry within the simulator is 20 joules.

When a shock is delivered, the live electrical current is absorbed by the SymDefib unit and does not travel to the SymDefib pads or simulator. Always review the *Cautions and Warnings* section above before operating SymDefib.



## Healthcare

For more information about CAE products, contact your regional sales manager or the CAE distributor in your country, or visit [caehealthcare.com](http://caehealthcare.com).

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