

Biomed

Getting Started with Califia

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Contents

Table of Contents

Important Information	2
Contents	3
System components and setup	4
CPM connections for CPB	5
CPM connections for ECMO	6
For VA ECMO	6
Circuit preparation	7
A brief tour of the Calafia Simulator software	8
Modes of Simulation: SIM and CPM	8
Modes of Operation: CPB and ECMO.....	9

Introduction to the Califa Perfusion Simulator

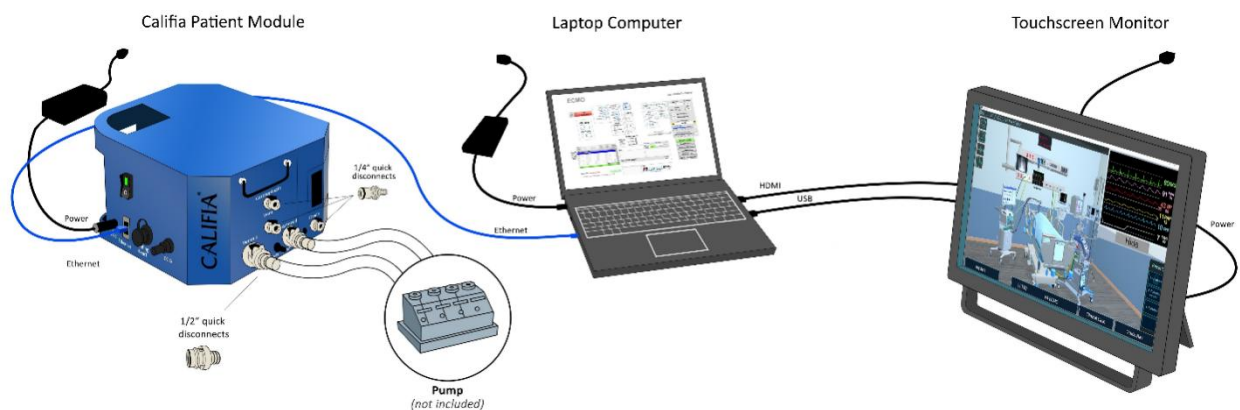
The Califa Simulator system can simulate a patient before, during and after cardiopulmonary bypass for open heart surgery or for a long-term support with extracorporeal membrane oxygenation (ECMO).

Among the more significant features of the Califa simulator is its wide range of automatic, physiological responses.

It is intended both as a teaching tool, and as a tool for evaluating the performance of a clinician in clinical simulation case.

System components and setup

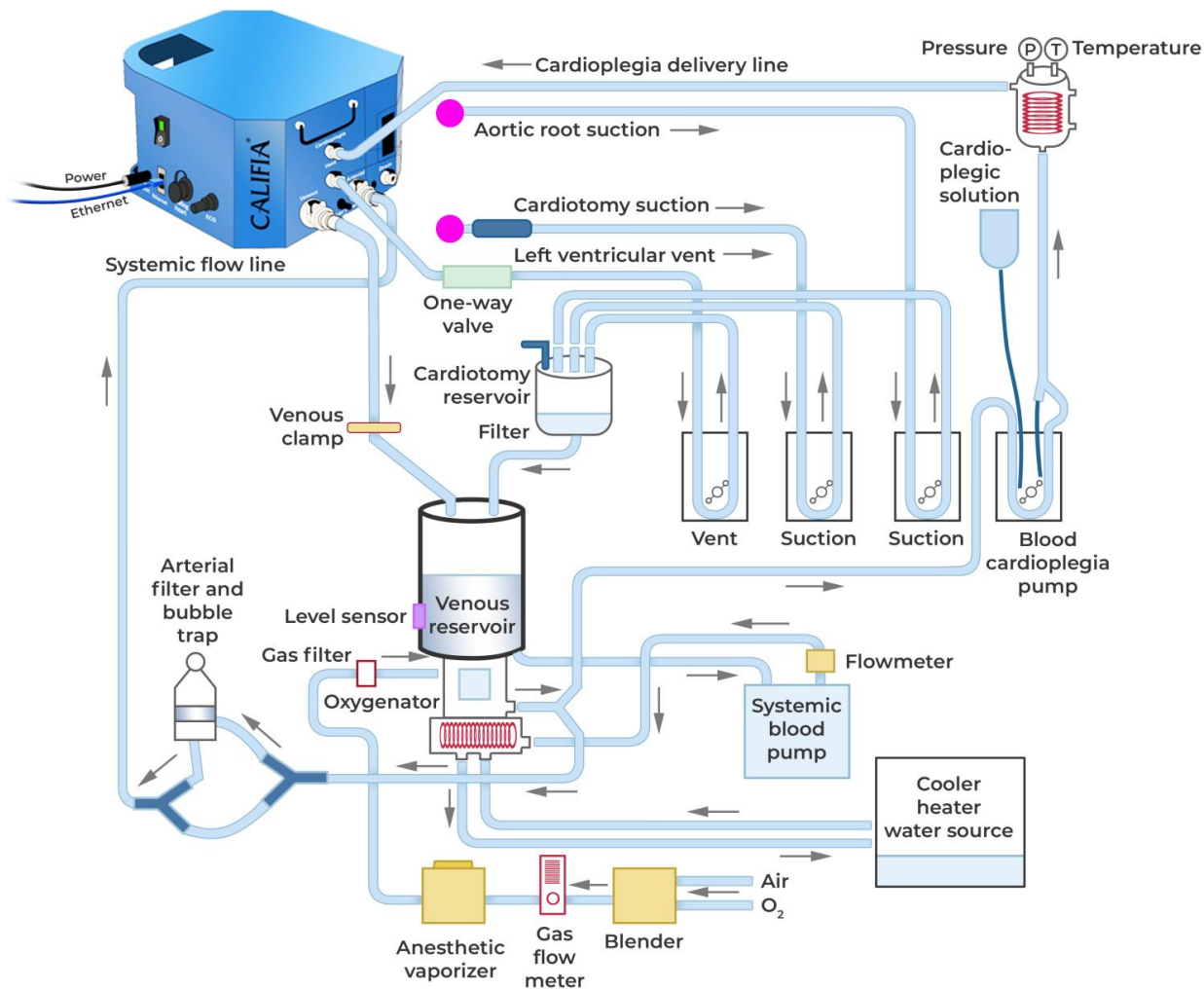
Describe this diagram: In this image Califa Patient Module machine is connected to laptop and laptop further connected to touch screen, in laptop monitor we can see instructor panel and on touchscreen monitor we can see the 3D ICU unit. User can operate the 3D ICU unit from touchscreen monitor.



CPM connections for CPB

Cardiopulmonary Bypass (CPB)

CPB technology temporarily replaces cardiac and pulm functions during surgery. CPB is a form of extracorporeal circulation. Full CPB requires an oxygenator and a blood pump. Systemic venous blood is drained (via venous cannula) to a venous reservoir.



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CPM - Calafia patient module. We can connect the CPM to CPB (Cardiopulmonary Bypass) For connection, connect the **Systemic blood pump** from HLM (Heart Lung Machine) to **Arterial port** of CPM. **Venous Reservoir** connect to the **Venous port** of CPM, **Cardioplegiadelivery** to the **Cardioplegiaport** of CPM and **Ventricular pump** to the **Vent port** of CPM.

HLM	CPM port	Refer to CPB Overview.png
Systemic blood pump	Arterial	
Venous Reservoir	Venous	
Cardioplegia delivery	Cardioplegia	
Ventricular pump	Vent	

CPM connections for ECMO

There are three types of ECMO, VA ECMO, VV ECMO, VAV ECMO.

For VA ECMO - Venoarterial extracorporeal membrane oxygenation (VA-ECMO) is a form of temporary mechanical circulatory support and simultaneous extracorporeal gas exchange for acute cardiorespiratory failure.

- Connect the oxygenator output port to the Arterial port of CPM.
- Connect the ECMO pump inlet to the Venous port of CPM.
- Connect the cardioplegia and Vent to each other.

VV ECMO	CPM port	Refer to VV ECMO.png
Oxygenator output port	Arterial	
ECMO Pump inlet	Venous	
	Cardioplegia	Connect these two together
	Vent	

VV ECMO - VV ECMO provides respiratory support, but the patient is dependent upon his or her own hemodynamics. During VA ECMO, blood is extracted from the right atrium and returned to the arterial system, bypassing the heart and lungs.

VA ECMO provides both respiratory and hemodynamic support.

- Connect the oxygenator output port to the Arterial port of CPM.
- Connect the ECMO pump inlet to the Venous port of CPM.
- Connect the cardioplegia and Vent to each other.

VV ECMO	CPM port	Refer to VV ECMO.png
Oxygenator output port	Arterial	
ECMO Pump inlet	Venous	
	Cardioplegia	Connect these two together
	Vent	

VAV ECMO - Veno-arterio-venous ECMO (VAV). VAV-ECMO drains venous blood from the right atrium and returns balanced volumes blood after reoxygenation and decarboxylation to the iliac artery toward the aorta and to the right atrium toward the pulmonary circulation.

- Connect the oxygenator output port to the Arterial port of CPM.
- Connect the ECMO pump inlet to the Venous port of CPM.
- Connect the cardioplegia and Vent to each other.
- Delivery IJ branch connect to the Cardioplegia port of CPM.

VAV ECMO	CPM port	Refer to VAV ECMO.png
Delivery main branch	Arterial	
ECMO Pump inlet	Venous	
Delivery IJ branch	Cardioplegia	

Circuit preparation

Filling up Califia reservoir and priming, start at 5:47 of this video:

<https://www.youtube.com/watch?v=75OjN5GOkIo&t=346s>

The Califia Setup Map.jpg includes the same priming sequence as in above video

Note: the Instructor's panel used in this process is introduced in section 2.4.

A brief tour of the Califia Simulator software

Modes of Simulation: SIM and CPM

CPM mode connects software to the Califia Patient Module, the most common way to use the Califia Simulator. Once software detects the CPM, this option becomes available.

CPM -

The Patient Module - The "Patient Module" is comprised of a reservoir and valve system with several transducers and controllers attached to a Windows based laptop computer via an Ethernet cable (Cat 5) connection. Information from the Patient Module, such as extracorporeal blood flow, cardioplegia flow and circulating blood volume is sent back to the laptop to provide feedback related to the conduct of cardiopulmonary bypass or ECMO. With this information, the laptop drives a separate monitor which serves as the "OR (or ICU) Monitor" and is typical of monitors used in surgical operating rooms or ICUs displaying a wide variety of patient data.

SIM mode virtualizes either a full ECMO or HLM circuit. A mode convenient when no hardware is available.

Modes of Operation: CPB and ECMO

- The program starts with the opening screen providing at least two major categories of simulation options. These can be found under the two uppermost tabs labelled "CPB" and "ECMO"
- Clinical Scenarios" - up to 7 pre-programmed scenario files can be stored for each simulator or a custom scenario can be selected by using the "Other" button.



