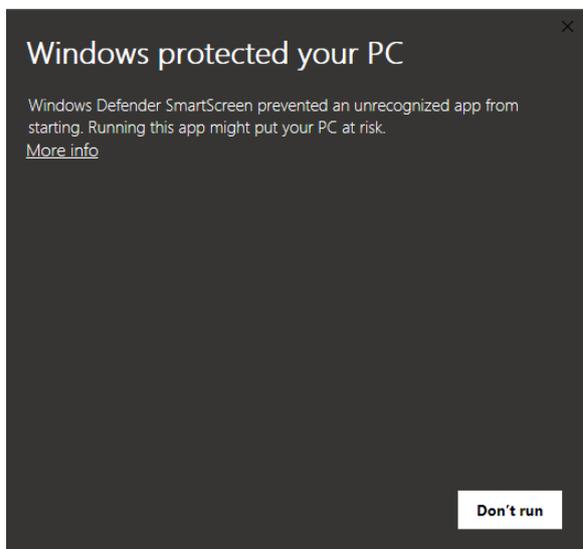Instructions for use

UnitySim 1.0.0.

Notice:

Please note that these instructions for use only cover some of the less obvious features. They do not represent a complete set of instructions for using the simulation software.
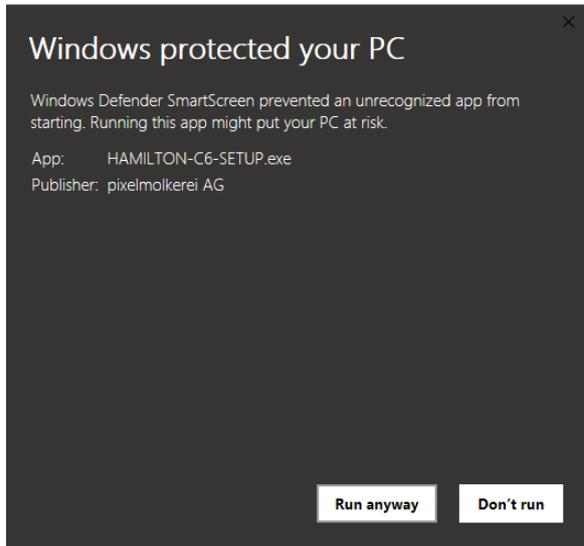
1. Installation

Windows

Double-click on HAMILTON-C6-SETUP.exe.

Depending on your settings and your version of Windows, a message may appear as shown below.

If this message appears, click on "More info" and then select "Run anyway".

Windows protected your PC

Windows Defender SmartScreen prevented an unrecognized app from starting. Running this app might put your PC at risk.

App: HAMILTON-C6-SETUP.exe
Publisher: pixelmolkerei AG

Run anyway   Don't run

2. Simulation concept

The simulation consists of two parts:

- The ventilator's graphical user interface (GUI), including ventilation modes
- A patient model

Ventilator GUI

The ventilator's GUI mimics the operation of the HAMILTON-C6. If you have a device with a touch screen, operating the simulation will be very similar to operating the real device. However, please be aware that not all the device's features have been implemented in this simulation.

Patient model

The patient model is a ventilation/perfusion model combined with a mechanical-lung model to provide the lung mechanics. In addition to the monitoring values for lung mechanics, the model also offers values for ventilation and oxygenation, and even allows you to run a blood gas analysis.

The model responds to the ventilator settings.

3. Login screen
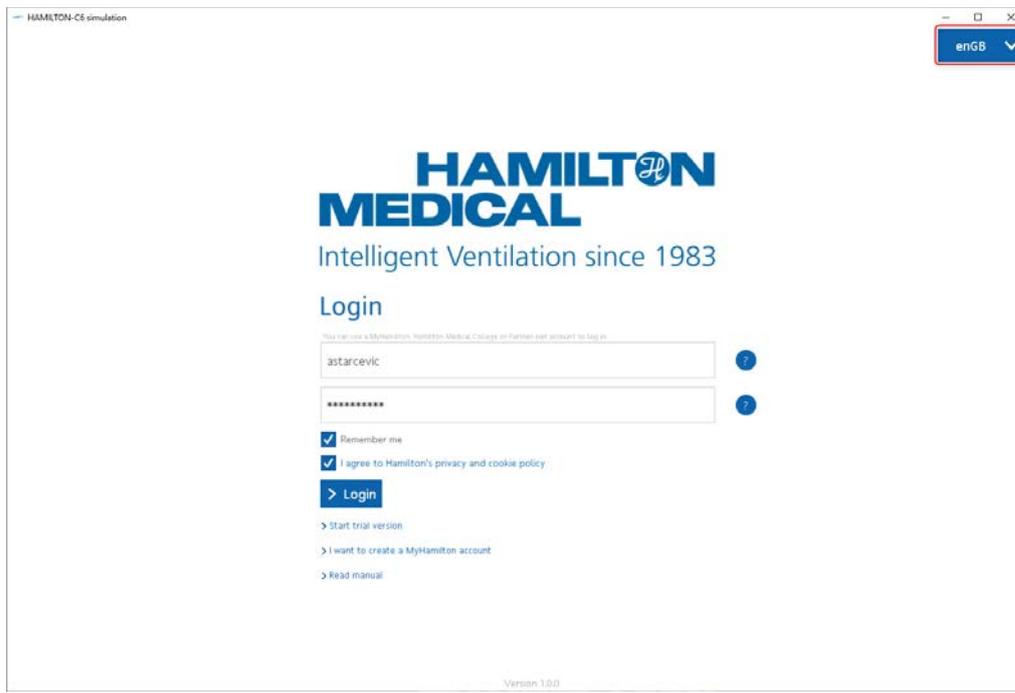
Create a MyHamilton account

To use the simulation, please register here:

https://www.hamilton-medical.com/Services/MyHamilton/Login/Registration.html

An internet connection is required to complete the registration.

After registering and logging in successfully for the first time through the simulation software, you can also use the simulation without an internet connection.

Trial version

You can test the simulation for 30 minutes without registering. After the trial period has expired, you need to register to continue using the simulation.

Language settings

Change the language in the top right corner.

Please note: Not all contents are available in all languages. However, the ventilator's graphical user interface (GUI) has been translated in full into all the available languages.

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Switzerland

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info@hamilton-medical.com
www.hamilton-medical.com

4. Start screen

Select the patient condition on the top left.

Change any additional patient parameters.

Compliance can only be changed once the simulation is running.

Changing Metabolism (setting only available when patient is set to Passive) will increase/decrease the patient's CO_2 production.

Changing Respiratory drive (setting only available when patient is set to Active) will increase/decrease the patient's breathing frequency and/or effort.

Click Configuration to open the Configuration screen

5. Configuration screen

In Configuration you can change:

- Timing philosophy

- Units for pressure, CO2, and length

- Language

- High-quality graphics: This influences the quality of the displayed curves. The standard setting is No. Change this setting only to Yes if your device (computer, tablet) has sufficient resources (graphic card).

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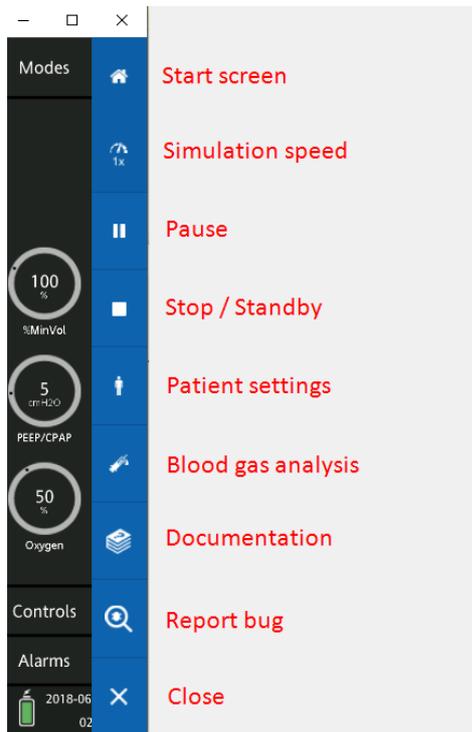**www.hamilton-medical.com**

6. Main screen
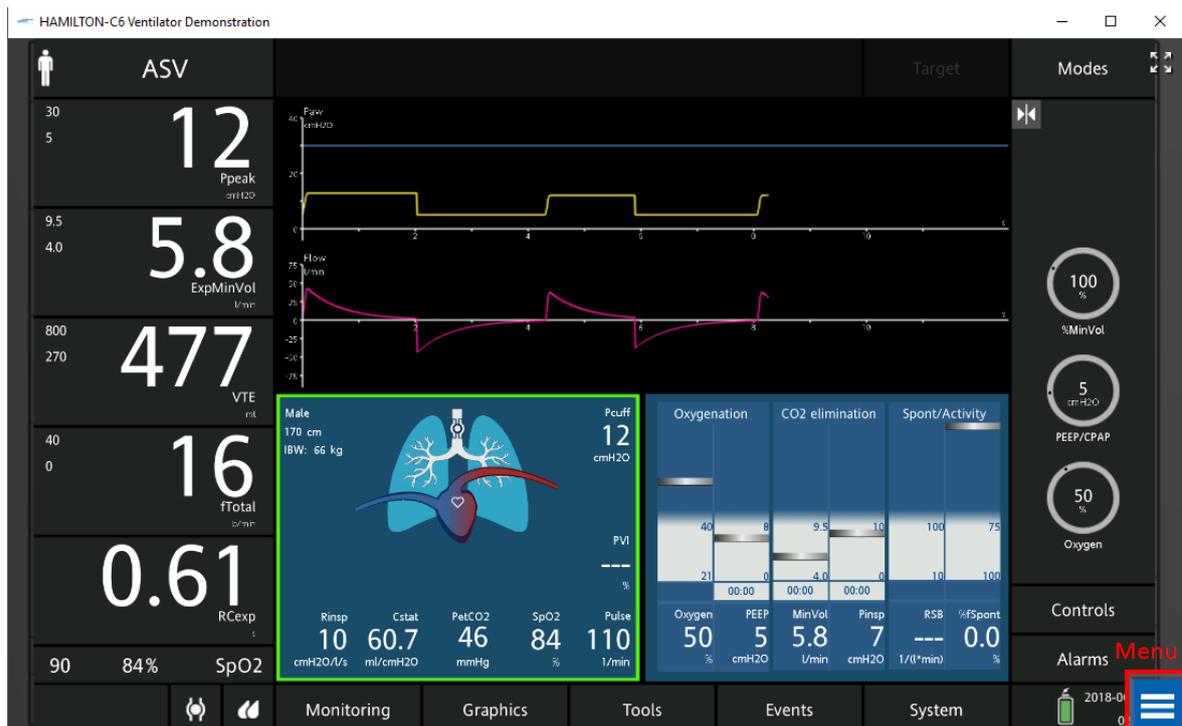
Operating the ventilator

Operation is the same as on the real ventilator. However, some features may not be implemented on the simulation.

Open the Menu (bottom right) to access features specific to the simulation software.

Menu

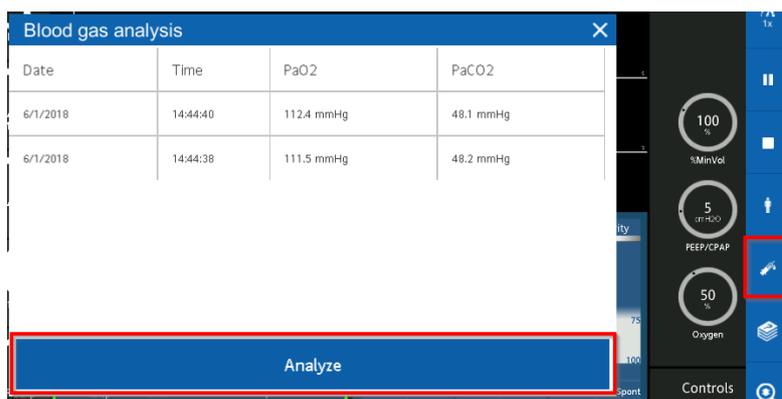Start screen: Return to the Start screen.

Simulation speed: Change the speed of the simulation (ventilator and patient model) from 1x (reality) to 2x or 4x.

Pause: Pause the simulation. Both the ventilator and patient will be paused. No changes occur during Pause.

Stop / Standby: The patient simulation stops and the ventilator returns to Standby.

Patient settings: Change the patient settings during ventilation (as on the Start screen).

Blood gas analysis: Perform a blood gas analysis (BGA) at any time during the simulation by pressing Analyze.

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Previous BGAs are stored.

Documentation: Link to documentation on www.hamilton-medical.com

Report bug: If you come across any software bugs, please use this feature to inform Hamilton Medical about it.

Close: Close the menu.

Shortcuts to change patient condition

The patient model can be changed with some keyboard shortcuts. In a presentation or training setting, this will allow the presenter to modify the patient model without opening the menu. Please note: As with other changes to the patient model, the changes will be applied gradually (not immediately).

The following shortcuts are available:

C-key and "up" arrow => Increase compliance by one step (approx. 10%)
C-key and "down" arrow => Decrease compliance by one step
R-key and "up" arrow => Increase resistance by one step (1 cmH2O/l/s)
R-key and "down" arrow => Decrease resistance by one step
M-key and "up" arrow => Increase metabolic rate
M-key and "down" arrow => Decrease metabolic rate
P-key and "up" arrow => Switch to active patient (if patient is already active, no change)
P-key and "down" arrow => Switch to passive patient (if patient is already passive, no change)

7. Known limitations

− When the patient's PaCO2 is around 38 mmHg or less, the patient may cease to trigger spontaneous breaths, even if set to active. The current patient model is very sensitive to hyperventilation. This is a current limitation of the patient model.

− The patient model in this simulation does not support spontaneous breathing in (S)CMV and SIMV. Choose another mode like APVcmv or APVsimv instead.

− Parameters such as Pramp, ETS or flow shape (in volume-controlled modes) do not influence the patient model and therefore do not influence the monitoring parameters (e.g. VTE) either, although changes are visible in the curves. This is a limitation of the patient model.

2018-09-28 S.Starcevic