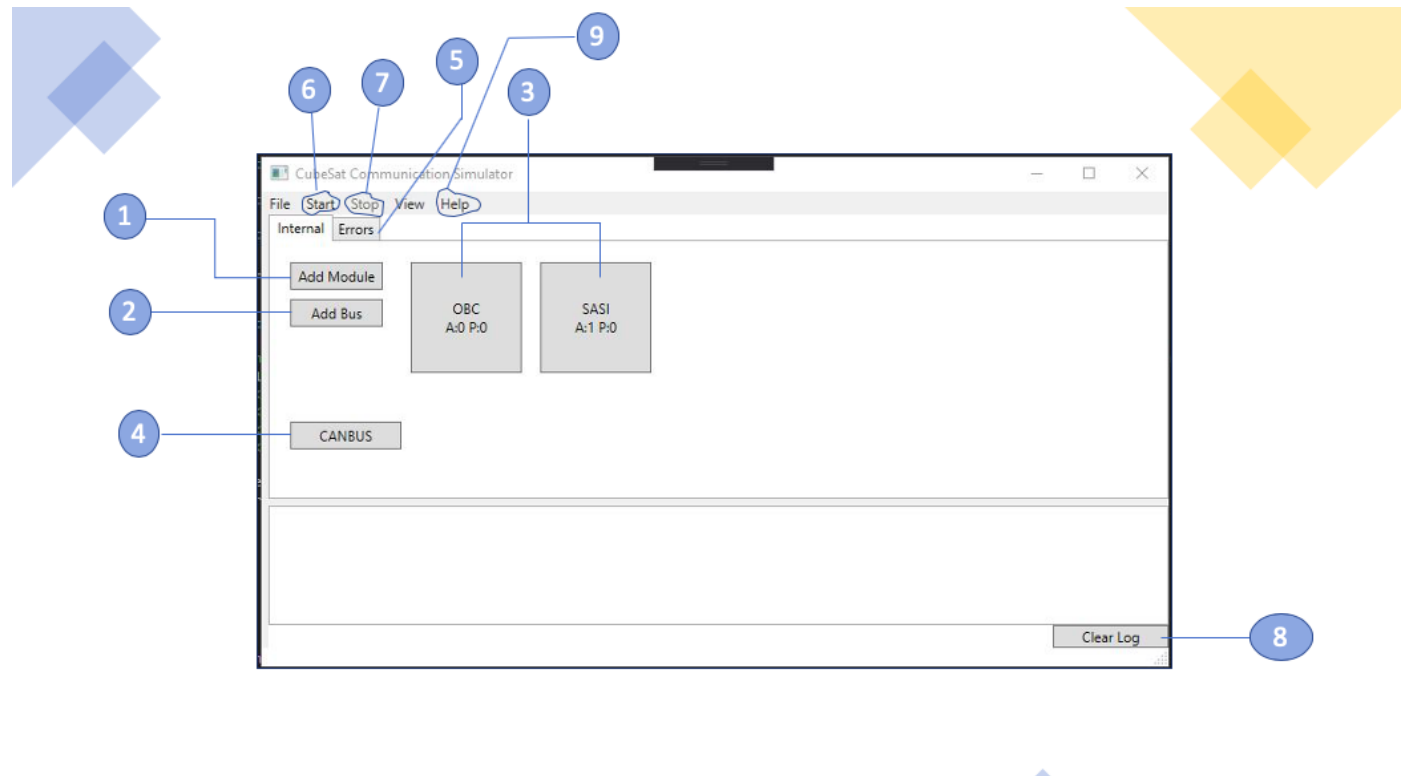# CubeSat Communication Simulation
User Manual

A guide on how to use the CubeSat Communication Simulation Application.

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Requirements:
1. A computer with Visual Studio installed.
2. Onboard boards: GRIPS, SASI, RF, EPS, ACS.
3. 1 user.
4. Connection to the CubeSat.

Steps:

1. Add Module
   To add module, click on the "Add Module". The Add Module window, similar to Figure 1.0, will pop up.
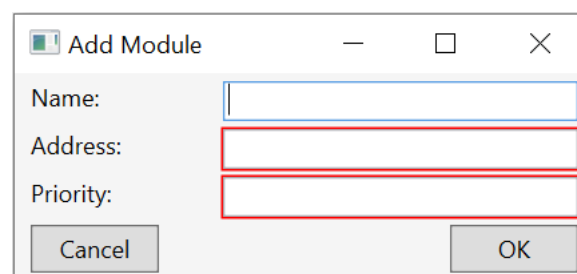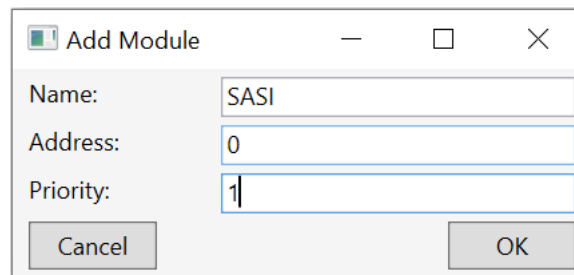

Figure 1.0

Fill the name, address and priority of the new module, as shown in example Figure 1.1.
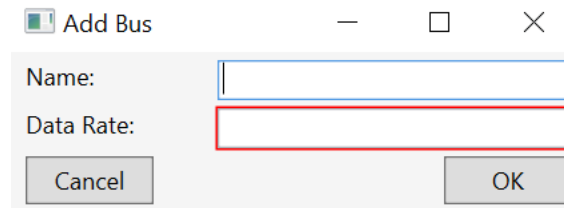

Figure 1.1

When you click on "OK", the new module will be added to the simulator, as shown in Figure 1.2.

Figure 1.2

2. Add Bus
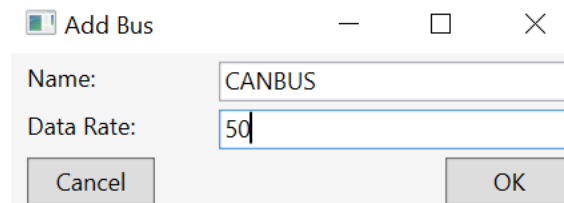
To add module, click on the "Add Module". The Add Module window, similar to Figure 2.0, will pop up.

Figure 2.0

Fill the name and data rate of the new bus, as shown in example Figure 2.1.

Figure 2.1

When you click on "OK", the new bus will be added to the simulator, as shown in Figure 2.2.

Figure 2.2

3. Edit Module
   Click on the module to be edited. The Edit Module window, similar to example Figure 3.0, will pop up. Do the necessary changes, for example, edit name, edit priority, edit the address. Edit module also allows us to connect the module to busses. To do so, assert the checkbox besides the chosen busses. To disconnect, de-assert the checkbox.
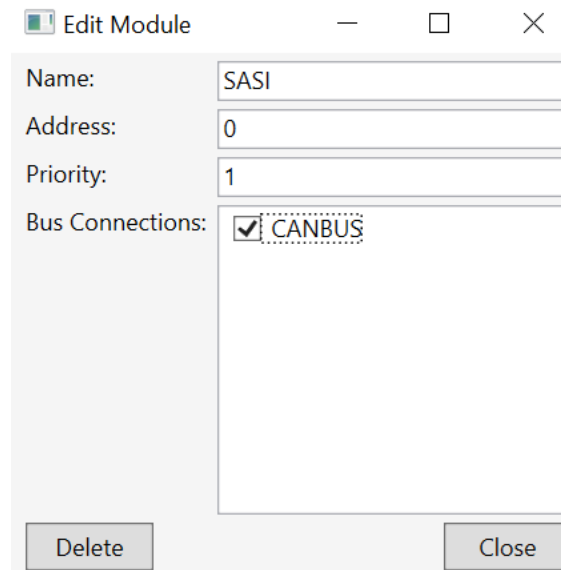
Figure 3.0

Click on "Close" and the editions will be applied to the simulator as shown in example Figure 3.1.
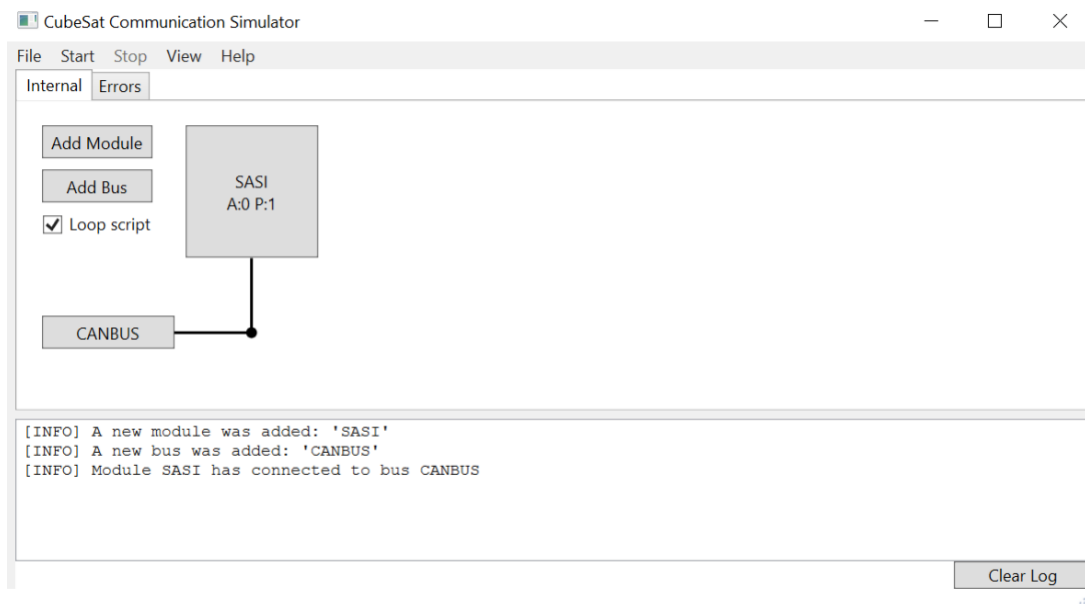
Figure 3.1

4. Edit Bus

In order to edit a bus, click on the bus you would like to edit. The Edit Bus window, as shown in example Figure 4.0, will pop up. Do the necessary changes, for example, edit name, edit Data Rate. Click on "Close" and the changes will be applied to the simulator.
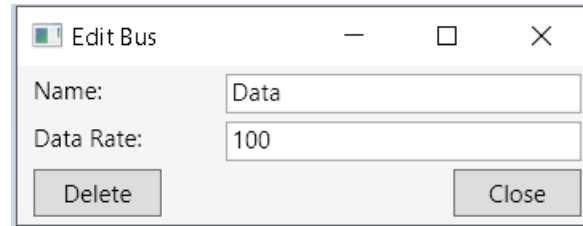
Figure 4.0

5. Errors

To check how the module(s) is/are affected by errors. Click on the Errors tab. Assert the checkbox besides selected module(s).
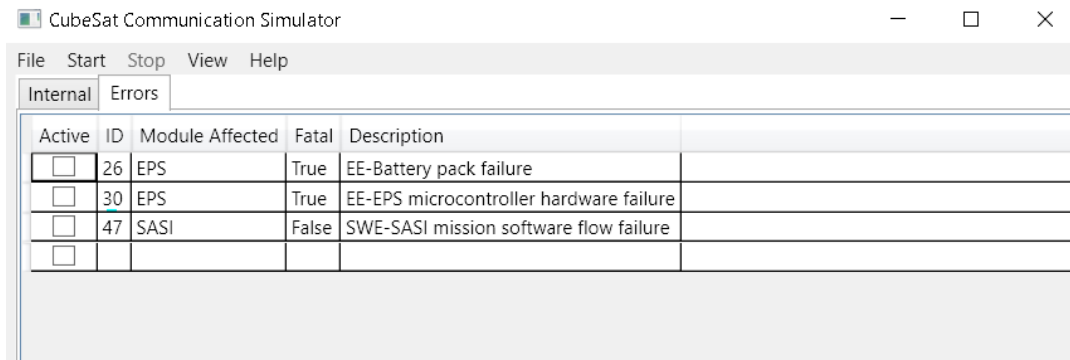
Figure 5.0

6. Start

To start the simulation, click on "Start". Select the .csv testscript file required in the pop-up window. Figure 6.1 is an example of the .csv file.
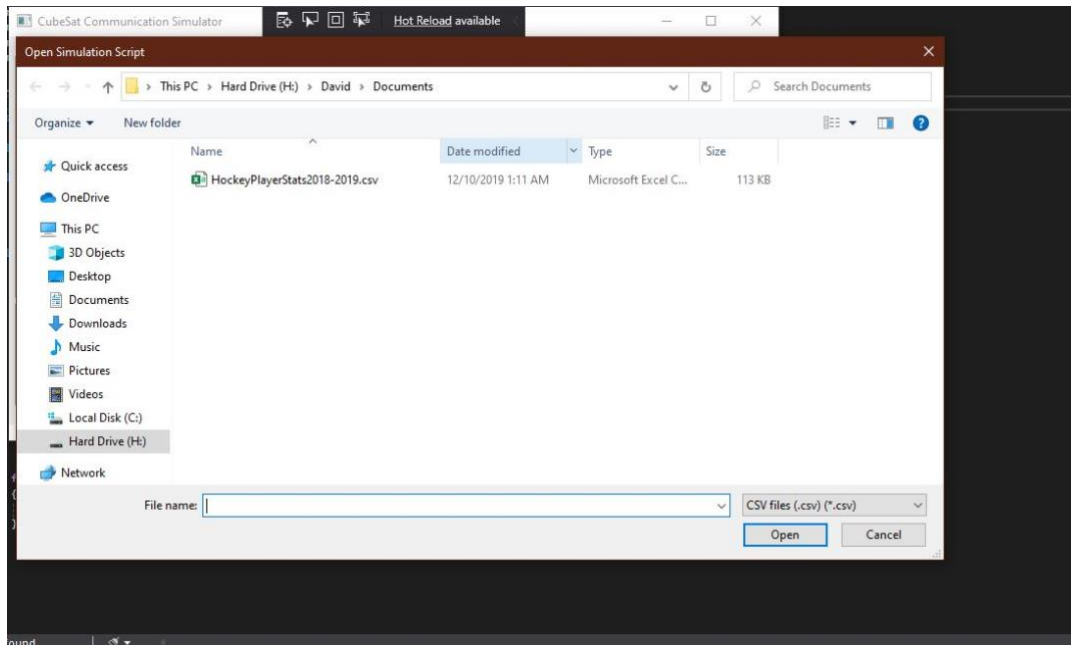
Figure 6.0

testscript

2	OBC	SEND	1	Control	100
2	SASI	SEND	0	Control	200
6	OBC	SEND	1	Control	100
7	SASI	SEND	0	Control	400
11	OBC	SEND	1	Control	100
11	SASI	SEND	0	Control	100
14	OBC	SEND	2	Control	200

Figure 6.1

Click on "Open". The simulation will start as shown in example Figure 6.2.

Active	ID	Module Affected	Fatal	Description
☐	26	EPS	True	EE-Battery pack failure
☐	30	EPS	True	EE-EPS microcontroller hardware failure
☐	47	SASI	False	SWE-SASI mission software flow failure
☐				

```
[IMPORTANT] Starting simulation...
[INFO] Module OBC sends packet Header={0 0 1 0 0 0 0 0 0 0},Tx/Size=0/100 to bus Control
[INFO] Module SASI sends packet Header={0 1 0 0 0 0 0 0 0 0},Tx/Size=0/200 to bus Control
[INFO] New packet transmitting on bus Control: Header={0 0 1 0 0 0 0 0 0 0},Tx/Size=0/100
[INFO] Module SASI received packet: Header={0 0 1 0 0 0 0 0 0 0},Tx/Size=100/100
[INFO] New packet transmitting on bus Control: Header={0 1 0 0 0 0 0 0 0 0},Tx/Size=0/200
[INFO] Module OBC received packet: Header={0 1 0 0 0 0 0 0 0 0},Tx/Size=200/200
[INFO] Module OBC sends packet Header={0 0 1 0 0 0 0 0 0 0},Tx/Size=0/100 to bus Control
[INFO] New packet transmitting on bus Control: Header={0 0 1 0 0 0 0 0 0 0},Tx/Size=0/100
[INFO] Module SASI received packet: Header={0 0 1 0 0 0 0 0 0 0},Tx/Size=100/100
```
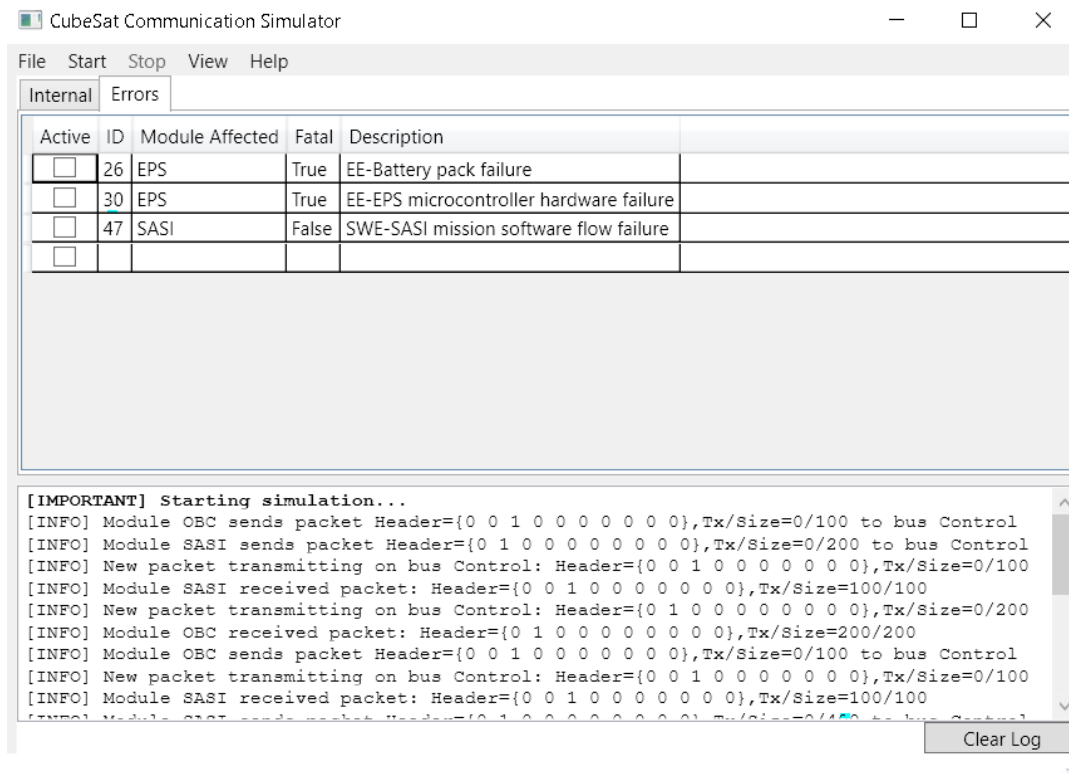
Clear Log

Figure 6.2

7. Click on "Stop" in the menu bar to stop the simulation.
8. Click on "Clear Log" to clear the log.
9. Click on "Help" in the menu bar to view the user manual.