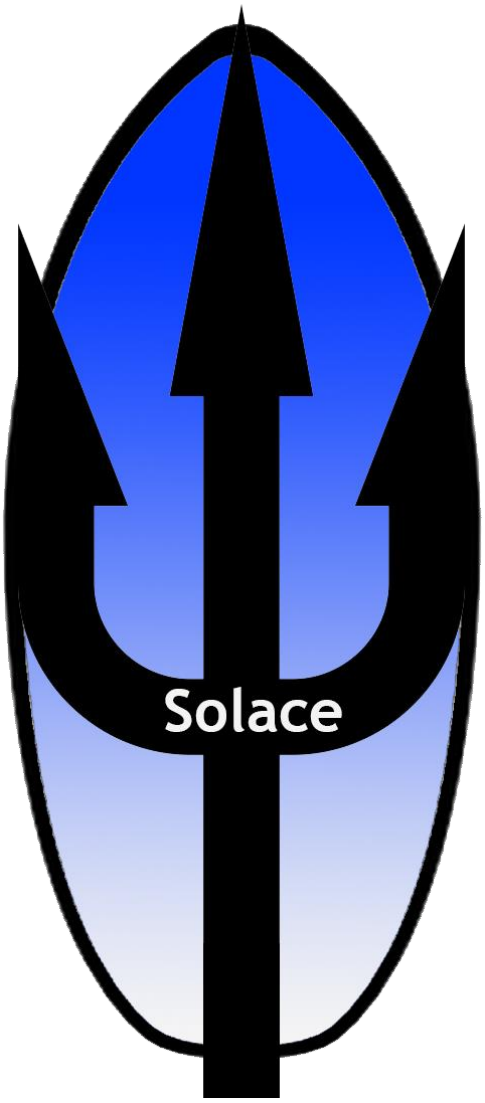
SOUTHAMPTON SOLENT UNIVERSITY
School of Media Arts and Technology

Solace – Solent Autonomous Circumnavigation of the Earth : GUI User Guide



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Documents Purpose:

The purpose of this document is to teach a user how to use the Solace GUI, this includes:

- Deploying the application
- GUI Navigation
- Overview of the mission control Page
- Reading sensors from the vessel
- Loading waypoint files
- Saving waypoint files
- Adding Waypoints
- Map Scrolling
- Uploading waypoints
- Clearing waypoints
- Loading current waypoints
- Emergency Stopping a run
- Communication status messages
- Boat status messages
- Reading saved sensor data
- Exiting the GUI correctly

Deploying the Application

To be done

GUI Navigation

The first screen shown to the user is the Control System Homepage.

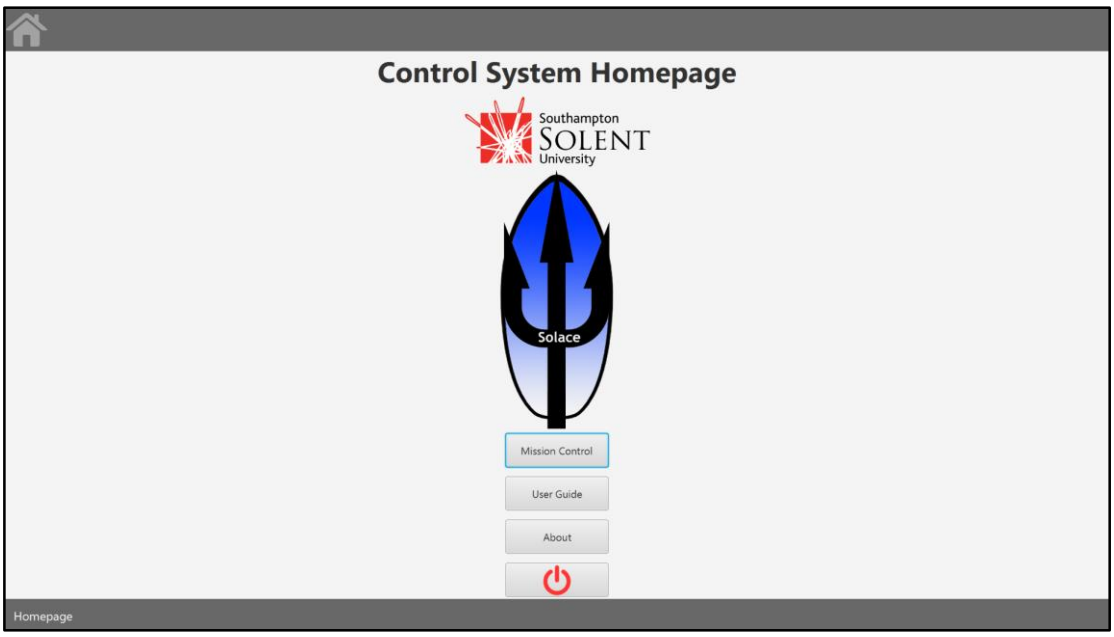


Figure 1: Homepage

On this page there's a four buttons, the first is Mission Control.

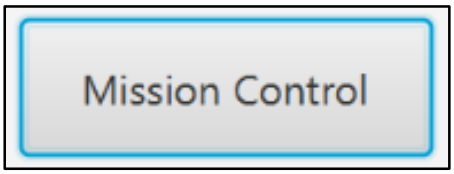


Figure 2: Mission Control Button - Homepage

By left clicking on this button the user will be taken to the Mission Control Page.

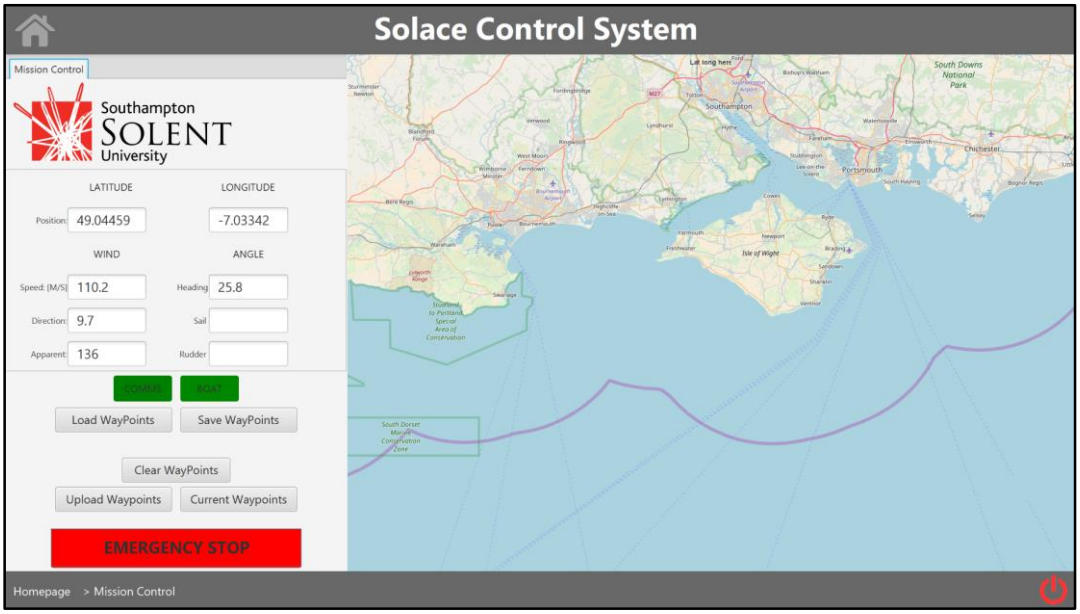


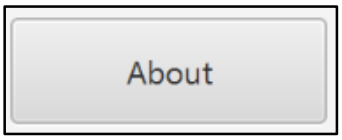
Figure 3: Mission Control Page

The next button on the main menu is the User Guide button.

Figure 4: User Guide Button - Homepage

By left clicking on this button the user will open up this document in a new window. It can be closed by left clicking on the xxxxxxx

The next button in the list is the About button.



By left clicking on this button the user will be displayed information about the GUI as seen below.

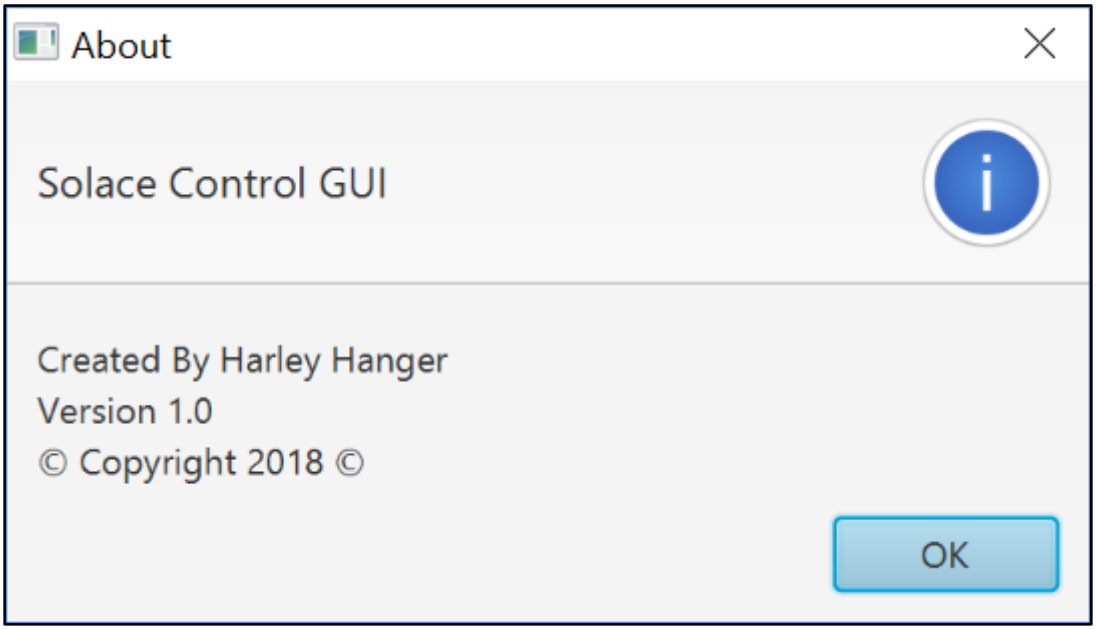


Figure 5: About Window - Homepage

The final button on the homepage is the Exit button.

Figure 6: Exit Button - Homepage

By left clicking on this button the user will exit the GUI application safely closing all running processing in the application.

Mission Control Page Overview

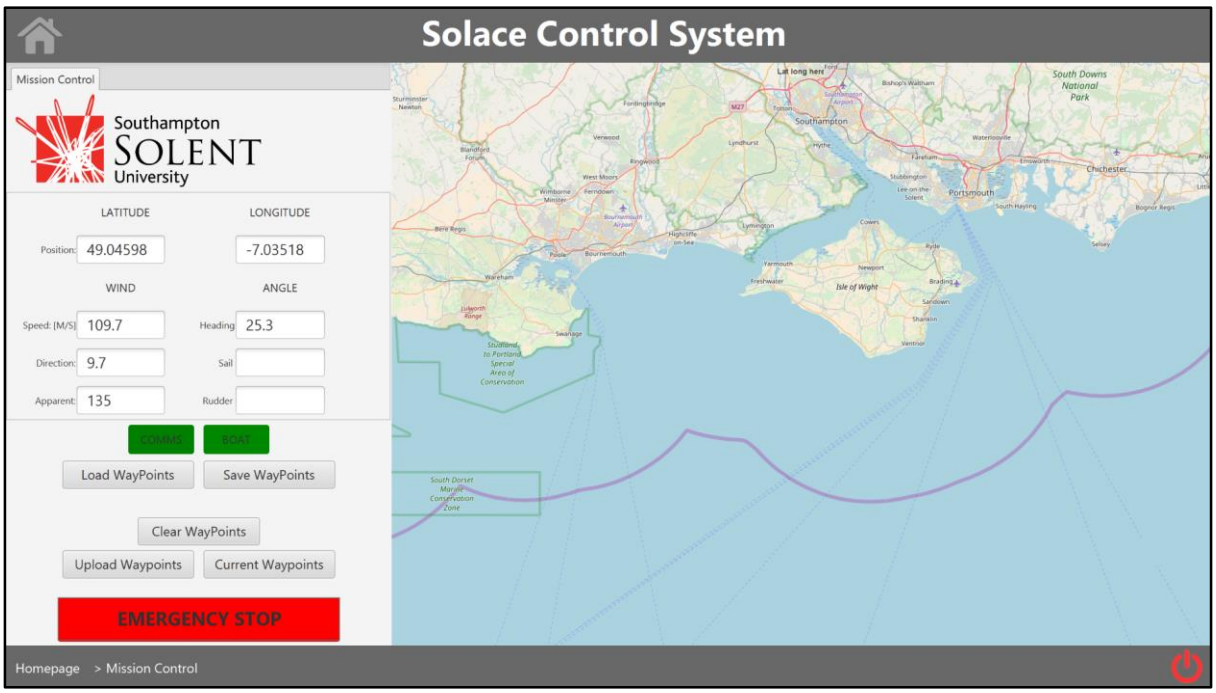


Figure 7: Mission Control Page

As seen on screen there are two main elements on the Mission control page, on the left there is the Mission Control Tab and on the right there is the Map.

The Mission Control Tab displays Solace boat position, boat sensor data, error alerts, five buttons that perform waypoint actions and an Emergency Stop button.

The Map contains a world map that is used to display and plot waypoints as well as display the current Solace boat position.

Loading waypoints from files

To load waypoints from a file on to the map the user must left click on the ‘Load WayPoints’ button.

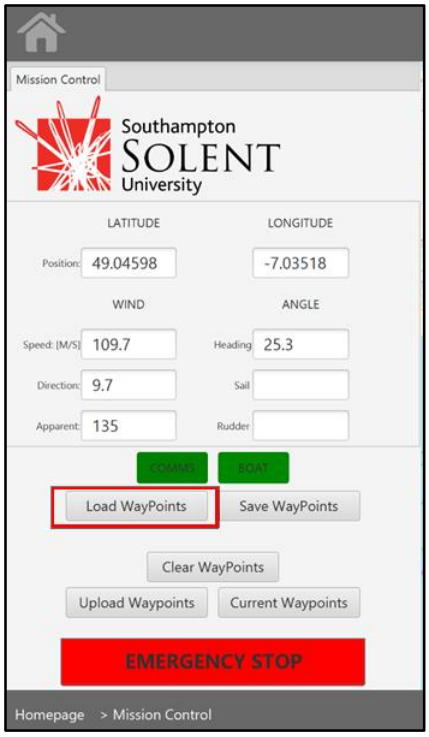


Figure 8: Load Waypoints Button - Mission Control Page

After left clicking on this button the user will be prompted with a Windows file chooser. The user can then select any JSON file containing the correct format. By default, the file chooser will open in the waypoints file directory but this can be changed by the user in the usual way of file choosing in Windows.

After clicking on a filename the user then left clicks on the Open in the bottom right of the file chooser.

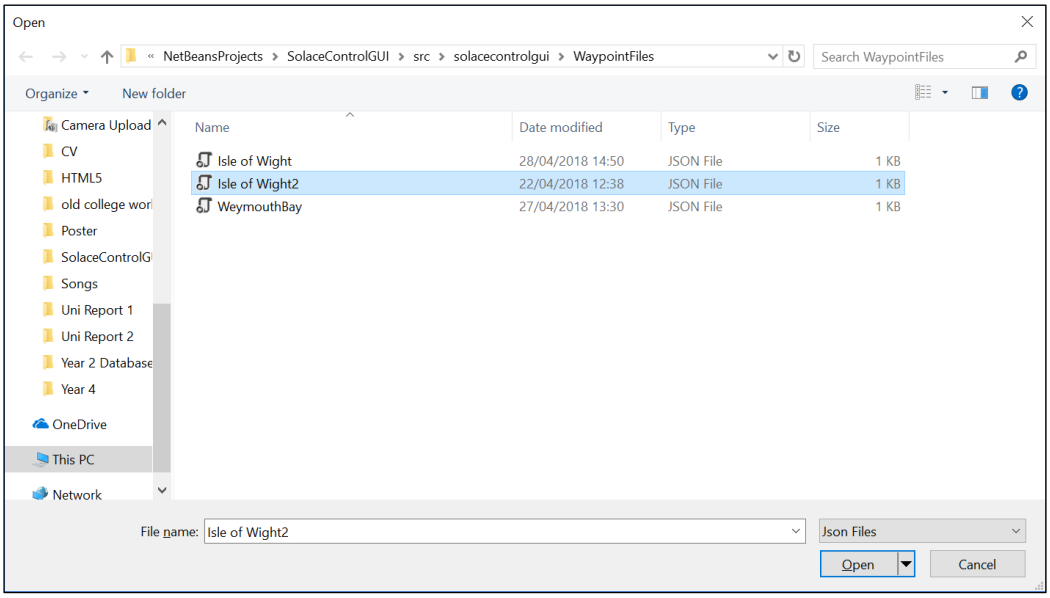


Figure 9: File Chooser - Mission Control Page

After opening JSON file, if it contains the correct file structure, the map will display the specified waypoints markers.

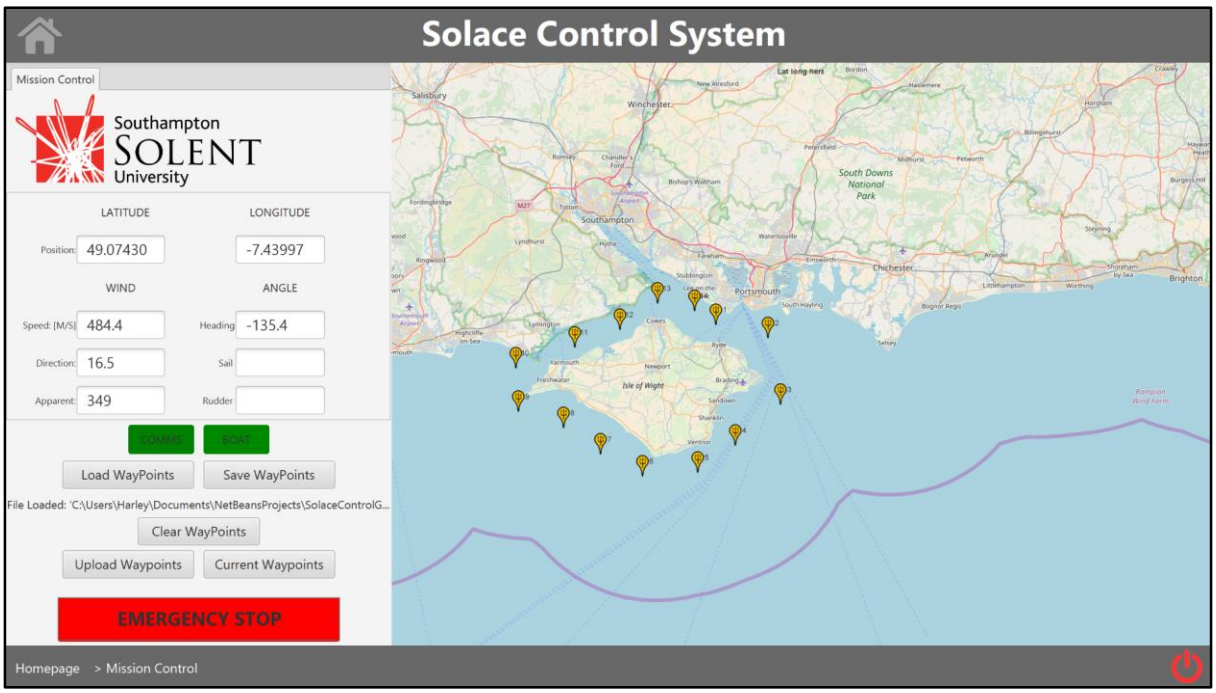


Figure 10: Waypoints loaded from file - Mission Control Page

Note: The waypoint JSON file can be read by applications such as Notepad and Visual Studio. This file when opened shows the latitude and longitude position of each waypoint marker.

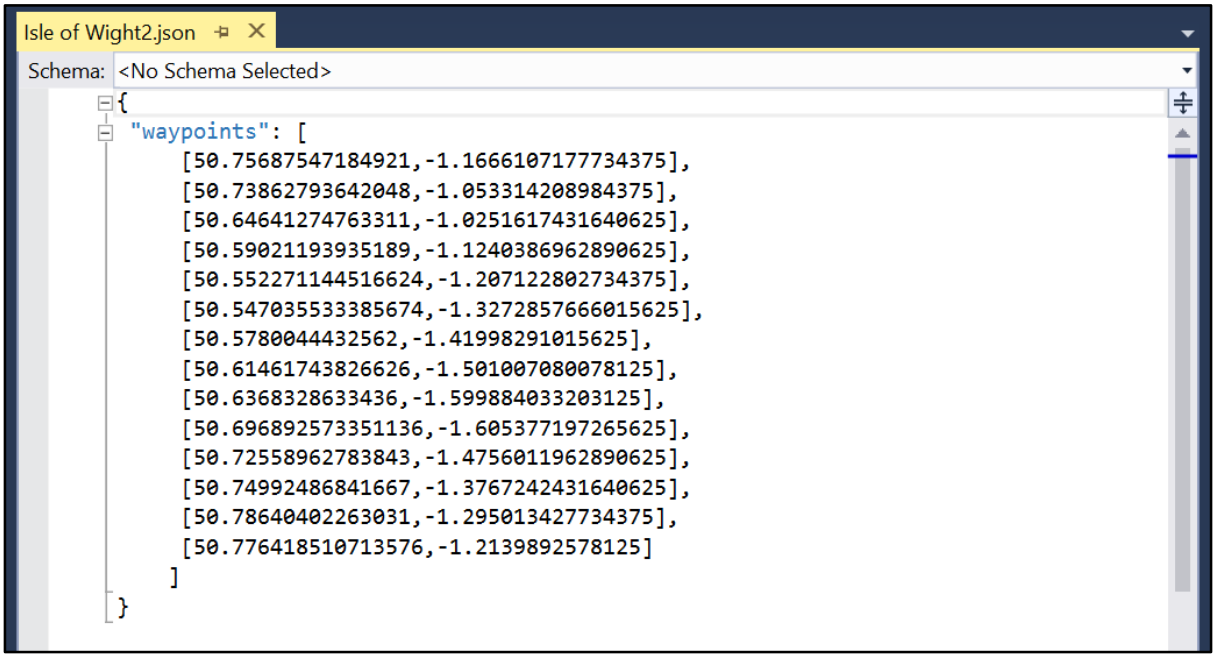


Figure 11: Json File Open In Visual Studio

Saving waypoint files

To save waypoints from the map in to a JSON file the user must left click on the ‘Save WayPoints’ button.

Figure 12: Save waypoints button - Mission Control Page

Once this button has been pressed, a similar file chooser to the Load Waypoint file chooser will open. The user can specify a name and directory of the file and then left click the ‘Save’ button in the bottom right hand of the page to save the file. The window will then close and the file will be saved in the JSON file format.

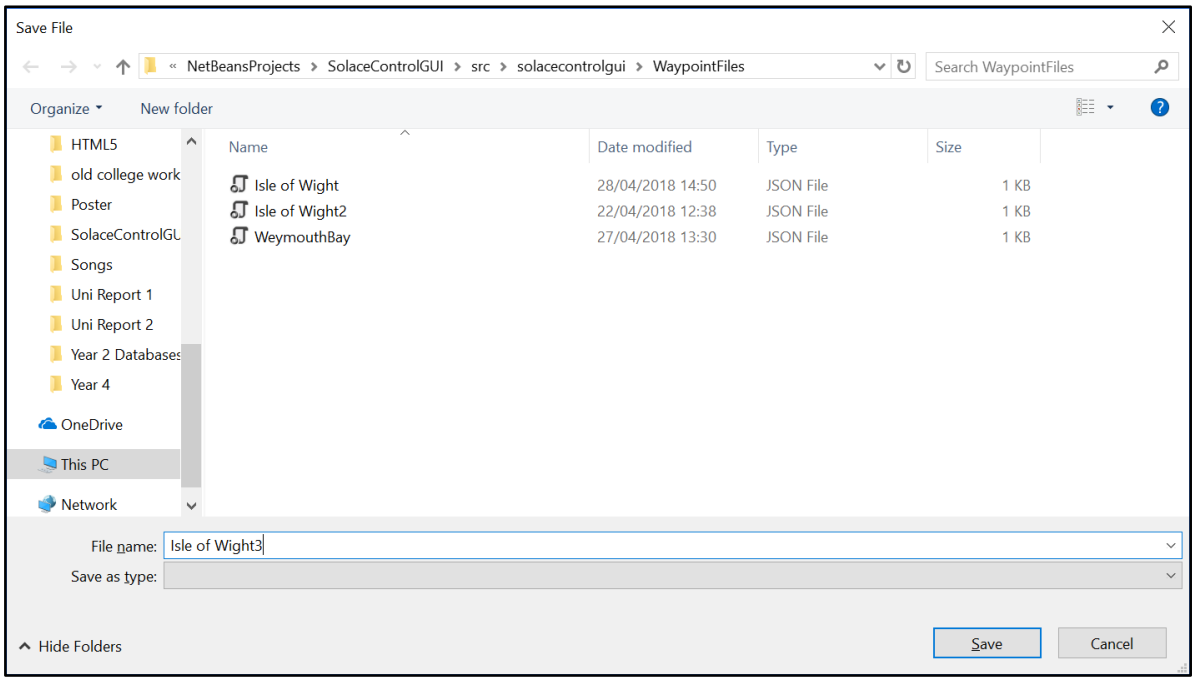


Figure 13: Save File Chooser - Mission Control Page

Adding Waypoints to the Map

To add a waypoint marker on the map the user can right click at any position on the sea. The user continues to add waypoints, with each waypoint numbered in order.

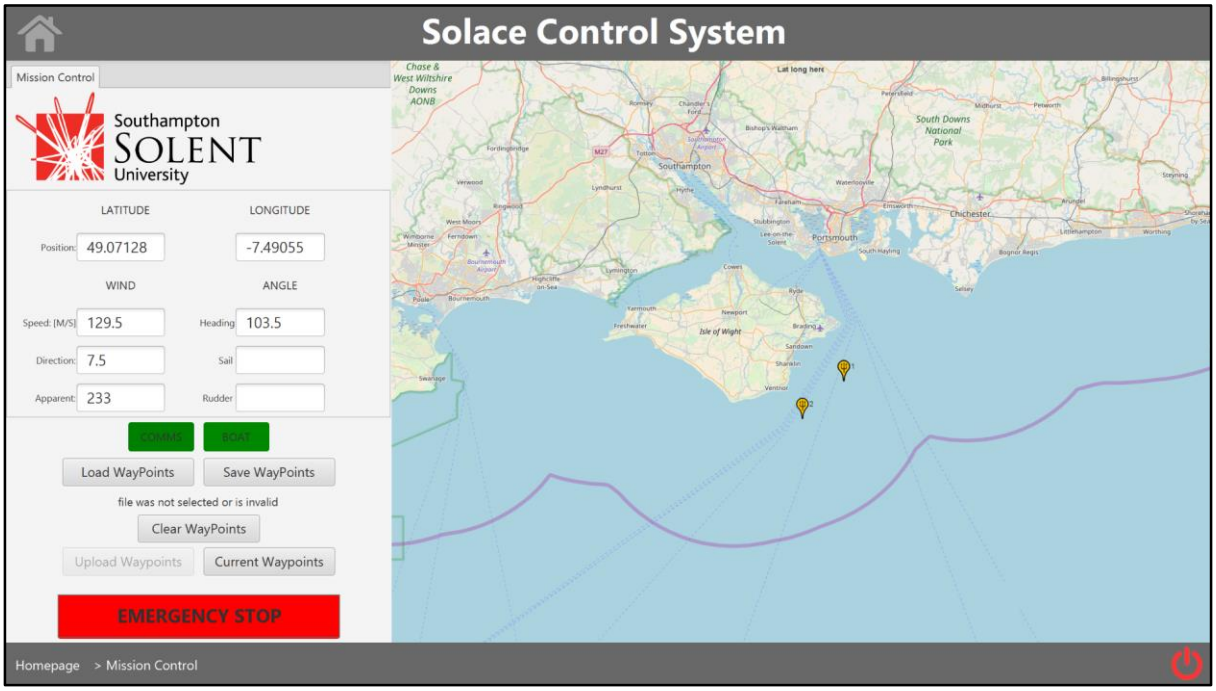


Figure 14: Added Waypoints - Mission Control Page

Map Scrolling

To scroll the map left, right, up and down the user left clicks on the map and drags.

To zoom, the use the mouse wheel and scroll in (forward) to zoom in and scroll out (back) to zoom out.

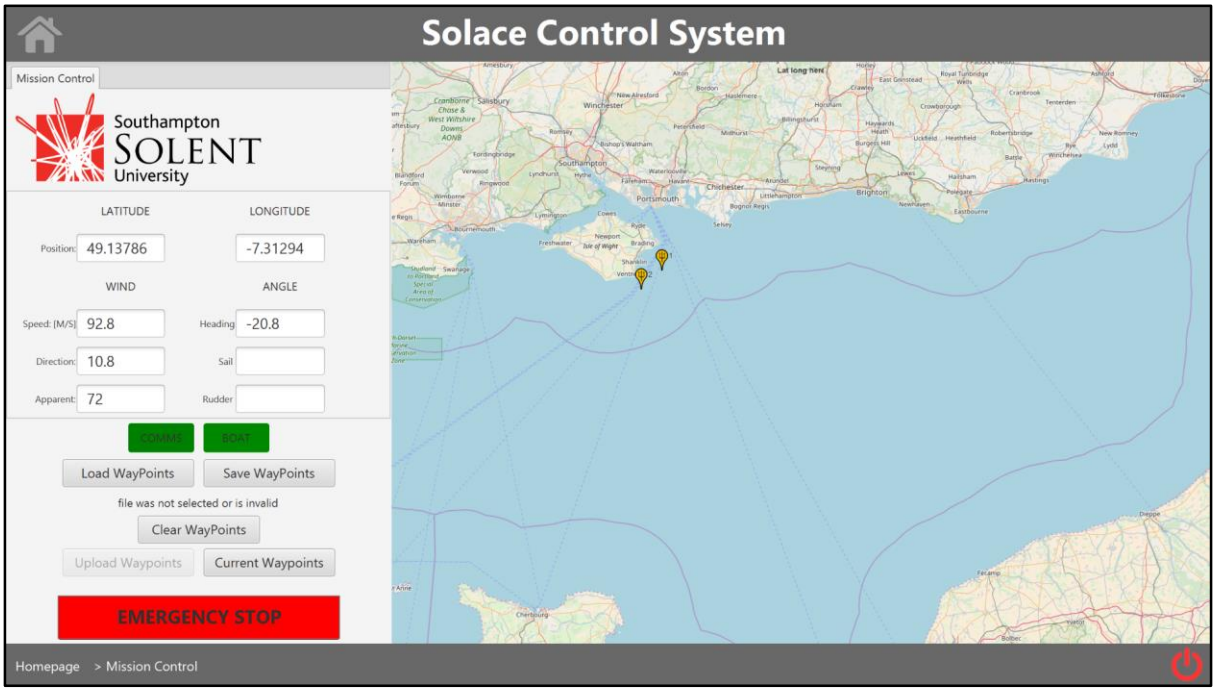


Figure 15: Zoomed Out Map - Mission Control Page

Reading sensors from the vessel

Sensor data appears at the top left of the Mission Control Tab. The vessel position values in the form of latitude and longitude, wind values in speed (m/s), direction (angle) and Wind apparent (UNIT)and finally the vessel heading angle. The angle of the vessel's sail and rudder are not currently supplied by BoatD simulation so these values are left blank.

Figure 16: Sensor Data - Mission Control Page

Uploading waypoints

For safety and to keep a record of a mission the user can upload the waypoint to the vessel only if it has been first saved. If the waypoints on the map have not been saved the Upload Waypoint button is greyed out and will not operate.

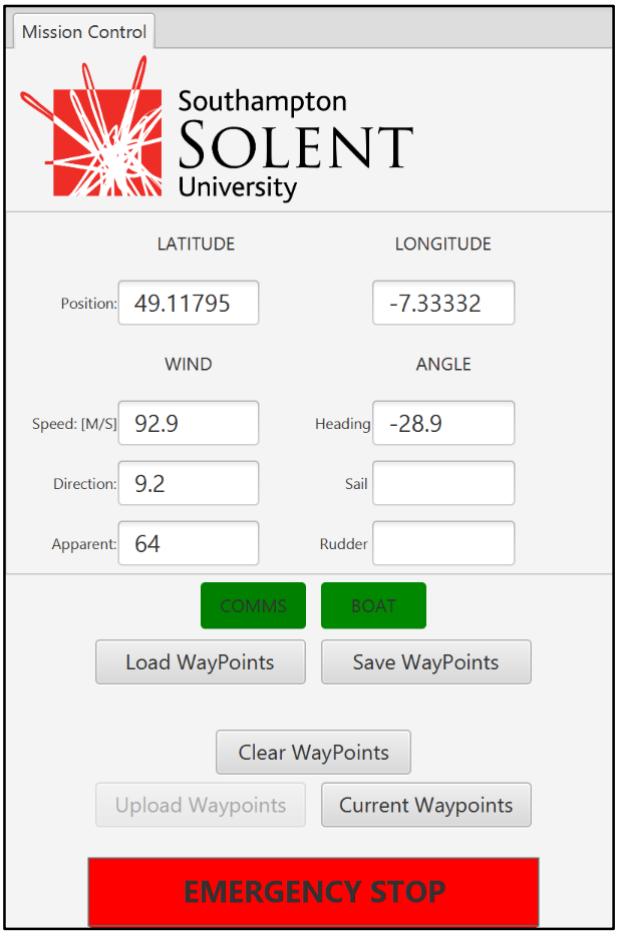


Figure 17: Blanked Out Upload Waypoints Button - Mission Control Page

After the JSON waypoints file has been saved, the user can left click on the Upload Waypoints button to send the waypoints to the BoatD server.

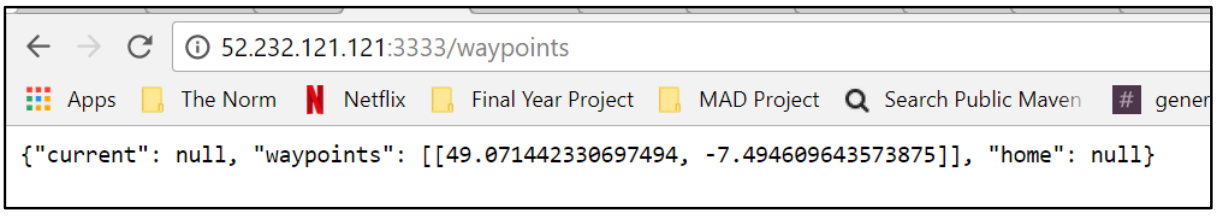


Figure 18: Waypoints Uploaded to the BoatD server

Clearing waypoints

By left clicking on the ‘Clear Waypoints’ button all waypoint markers on the map will be removed.

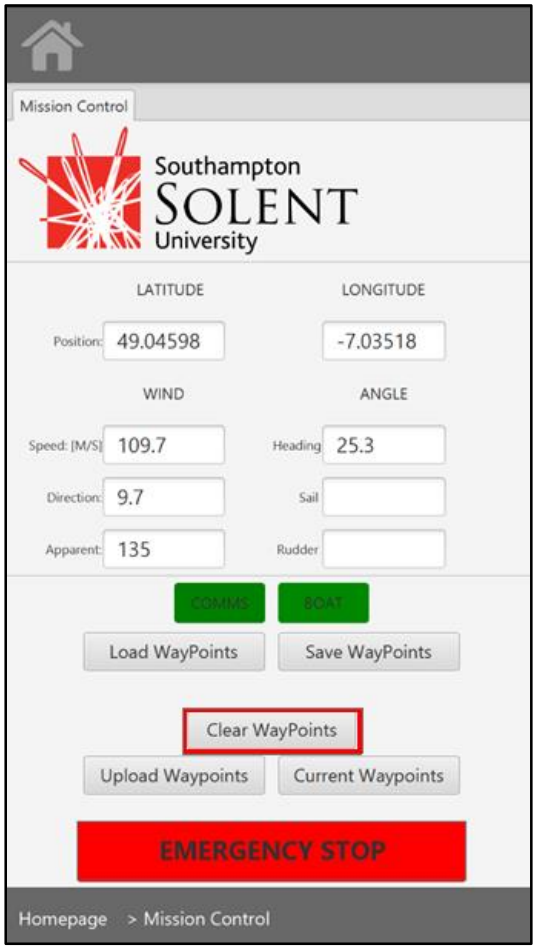


Figure 19: Clear Waypoint’s Button - Mission Control Page

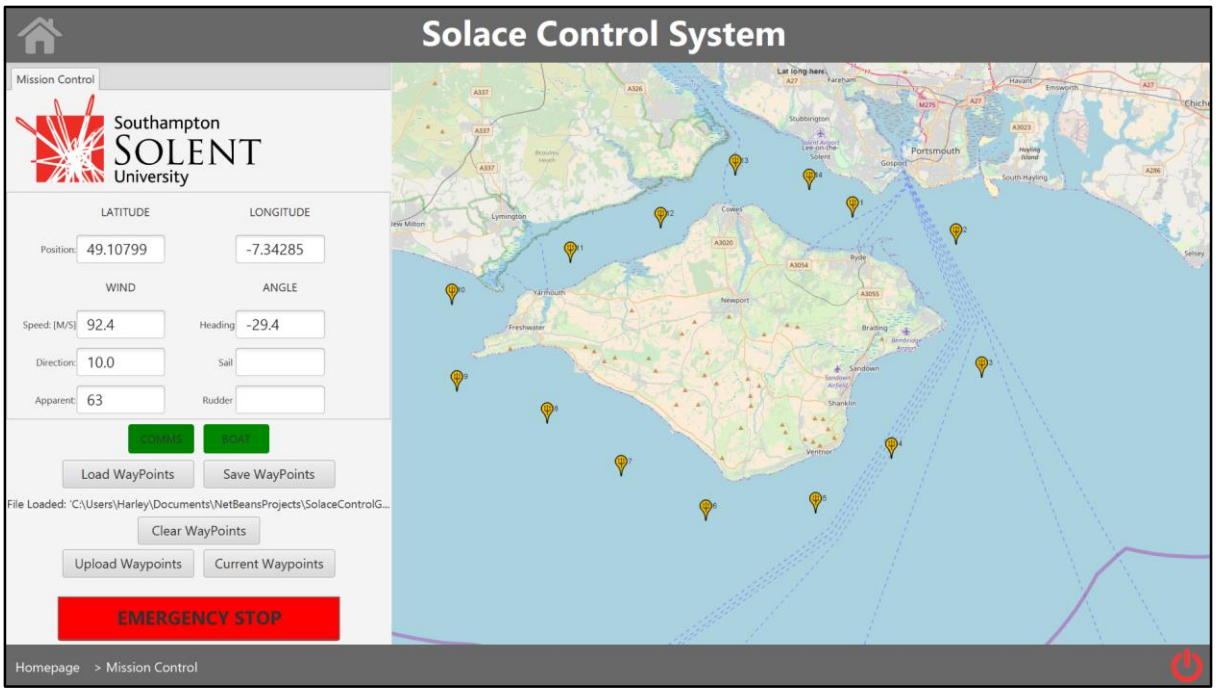


Figure 20: Waypoints Before Clearing - Mission Control Page

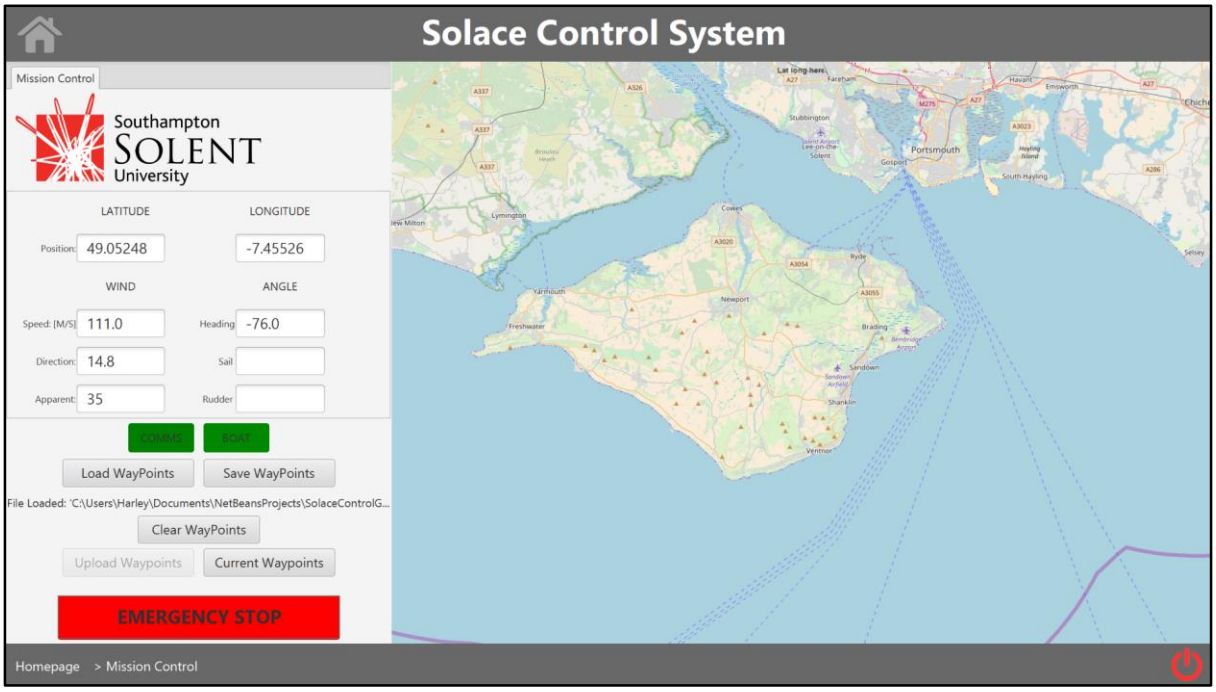


Figure 21: Waypoints After Clearing - Mission Control Page

Loading current waypoints

By left clicking the Current Waypoints button, the waypoints currently uploaded to the BoatD server are displayed to the map.

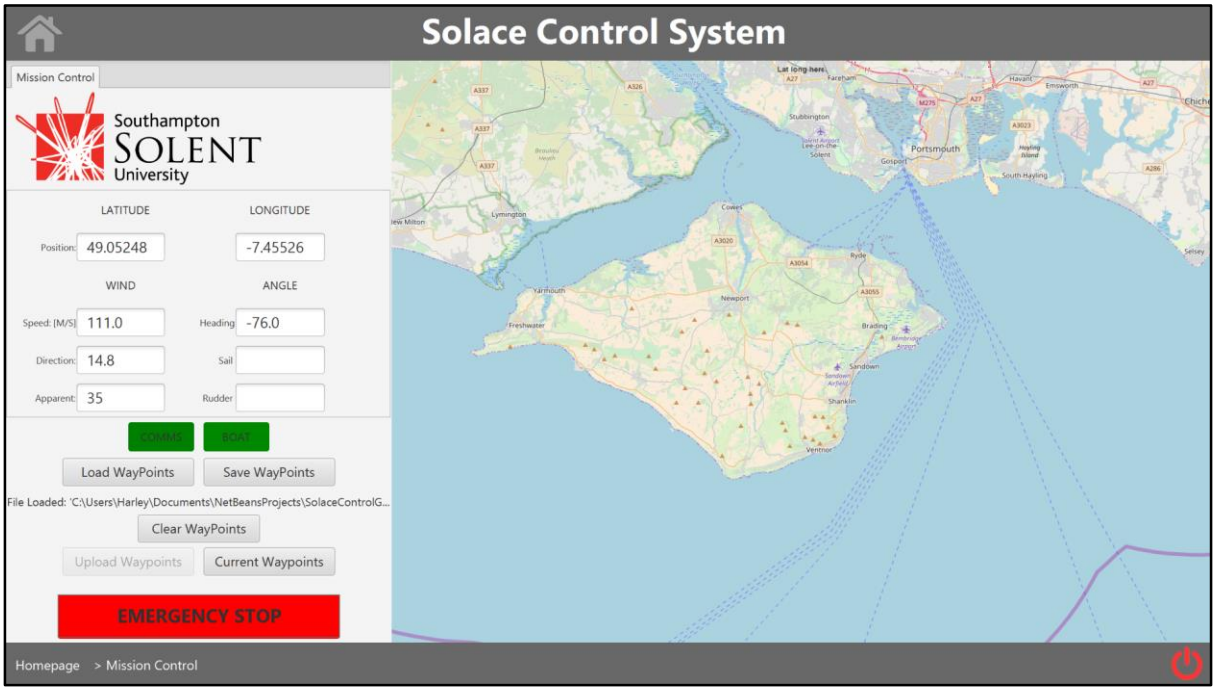


Figure 22: Before Loading Current Waypoints - Mission Control Page

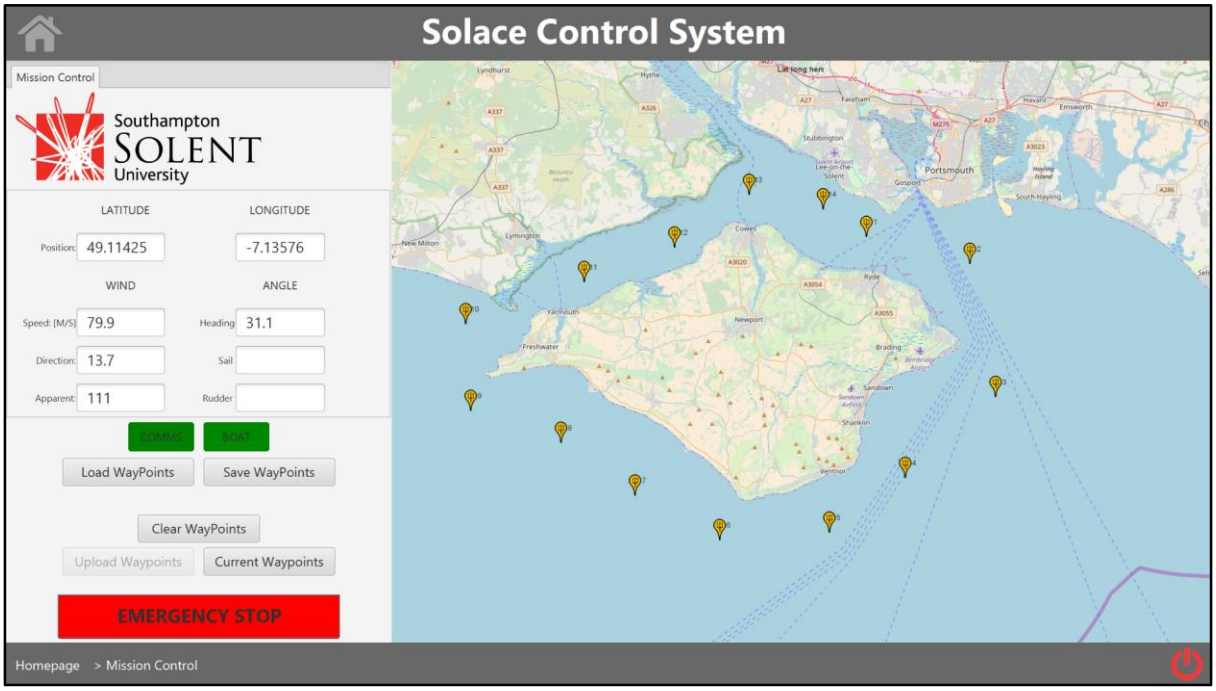


Figure 23: After Loading Current Waypoints - Mission Control Page

Emergency stopping a run

By pressing the emergency stop button the vessel will clear all of its current waypoints and set its current position as the new waypoint keeping it in place until commanded otherwise.

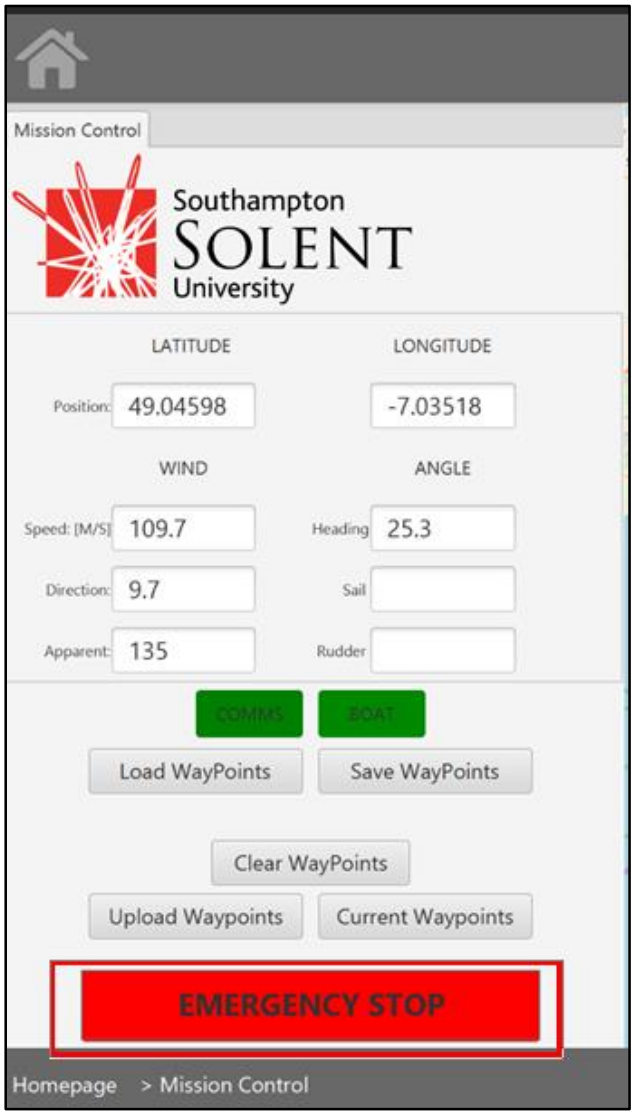


Figure 24: Emergency Stop Button - Mission Control Page

Communication Status Error Messages

The communications status message lets the user know if there's an issue with communications to the BoatD server. If the COMMS button is green then the communication is good. However, if the 'COMMS' button is red there is a communications issue, either the Internet connection on the computer might be disabled or the boatD server is not running.

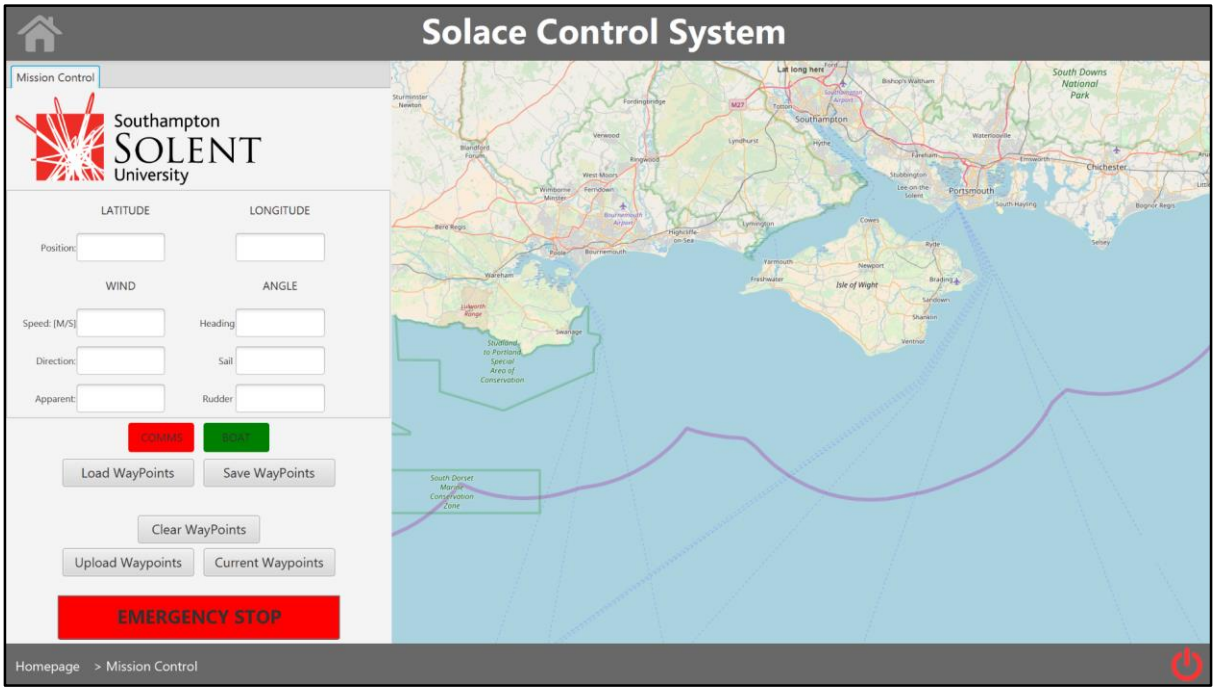


Figure 25: COMMS Button Red - Mission Control Page

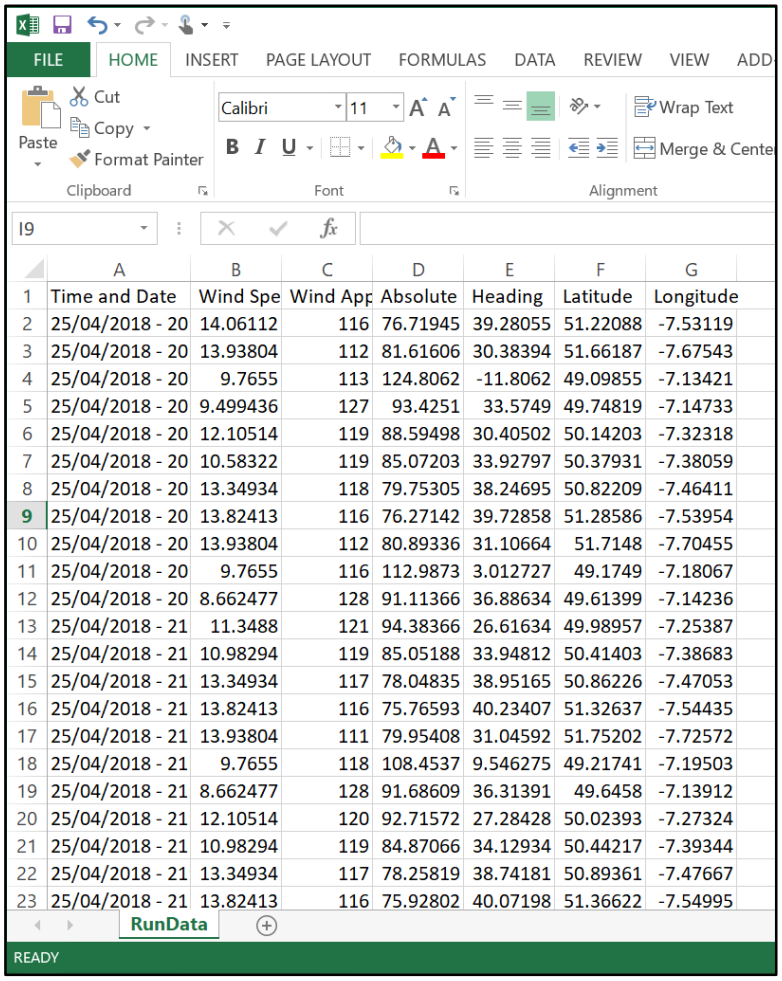
By clicking on the COMMS button the user can manually check to see if connection has been remade or wait for the button to automatically turn green again once the error is fixed.

Boat Status Error Messages

This status message will appear red until the boat status is returned true and then revert back to green. If this button is red it means that a vessel is currently not running although connection to BoatD has been met.

Reading Saved Vessel Sensor Data

As the GUI runs data is recorded to a csv file. To access this data the user can go to the workspace directory then to SolaceControlGUI\src\solacecontrolgui\RecordedData\. Alternatively posting \SolaceControlGUI\src\solacecontrolgui\RecordedData\RunData.csv after the working directory will open the CSV file usually by default in Excel.



	A	B	C	D	E	F	G
1	Time and Date	Wind Spe	Wind App	Absolute	Heading	Latitude	Longitude
2	25/04/2018 - 20	14.06112	116	76.71945	39.28055	51.22088	-7.53119
3	25/04/2018 - 20	13.93804	112	81.61606	30.38394	51.66187	-7.67543
4	25/04/2018 - 20	9.7655	113	124.8062	-11.8062	49.09855	-7.13421
5	25/04/2018 - 20	9.499436	127	93.4251	33.5749	49.74819	-7.14733
6	25/04/2018 - 20	12.10514	119	88.59498	30.40502	50.14203	-7.32318
7	25/04/2018 - 20	10.58322	119	85.07203	33.92797	50.37931	-7.38059
8	25/04/2018 - 20	13.34934	118	79.75305	38.24695	50.82209	-7.46411
9	25/04/2018 - 20	13.82413	116	76.27142	39.72858	51.28586	-7.53954
10	25/04/2018 - 20	13.93804	112	80.89336	31.10664	51.7148	-7.70455
11	25/04/2018 - 20	9.7655	116	112.9873	3.012727	49.1749	-7.18067
12	25/04/2018 - 20	8.662477	128	91.11366	36.88634	49.61399	-7.14236
13	25/04/2018 - 21	11.3488	121	94.38366	26.61634	49.98957	-7.25387
14	25/04/2018 - 21	10.98294	119	85.05188	33.94812	50.41403	-7.38683
15	25/04/2018 - 21	13.34934	117	78.04835	38.95165	50.86226	-7.47053
16	25/04/2018 - 21	13.82413	116	75.76593	40.23407	51.32637	-7.54435
17	25/04/2018 - 21	13.93804	111	79.95408	31.04592	51.75202	-7.72572
18	25/04/2018 - 21	9.7655	118	108.4537	9.546275	49.21741	-7.19503
19	25/04/2018 - 21	8.662477	128	91.68609	36.31391	49.6458	-7.13912
20	25/04/2018 - 21	12.10514	120	92.71572	27.28428	50.02393	-7.27324
21	25/04/2018 - 21	10.98294	119	84.87066	34.12934	50.44217	-7.39344
22	25/04/2018 - 21	13.34934	117	78.25819	38.74181	50.89361	-7.47667
23	25/04/2018 - 21	13.82413	116	75.92802	40.07198	51.36622	-7.54995

Figure 26: Excel Sensor Data

The user can now see the recorded data.

Exiting the GUI

Exiting the Control System correctly is an important part of using the GUI. By correctly exiting the GUI, the application will be safely closed making sure to end all processes, loops and anything else that was running in the application.

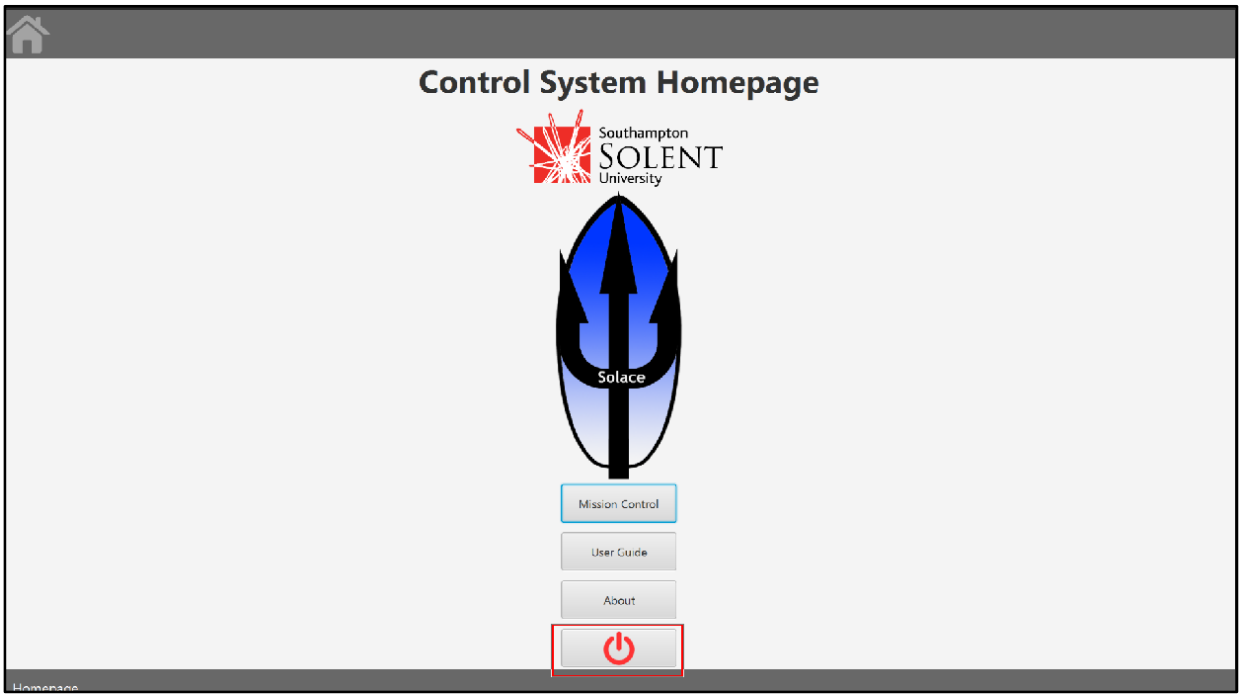


Figure 27: Exit GUI Button - Homepage

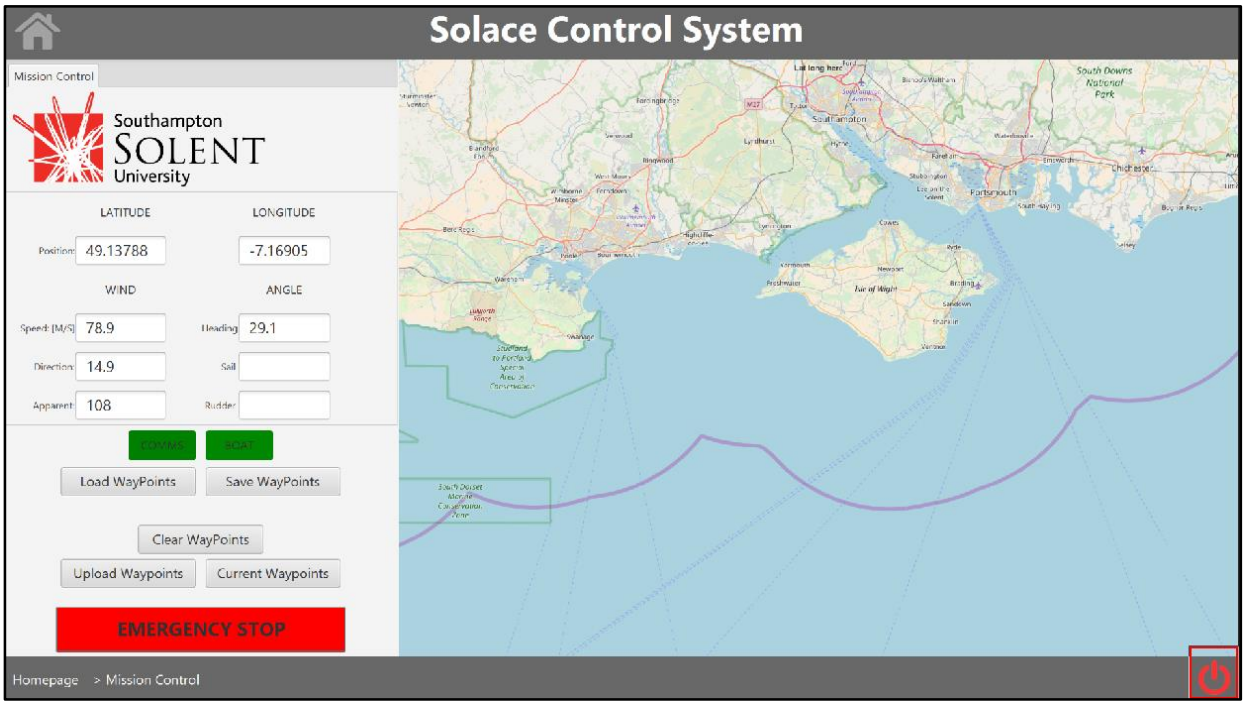


Figure 28: Exit GUI Button - Mission Control Page

By pressing either of these button the user will be prompted by a warning alert box that informs the user that they are exiting the GUI.

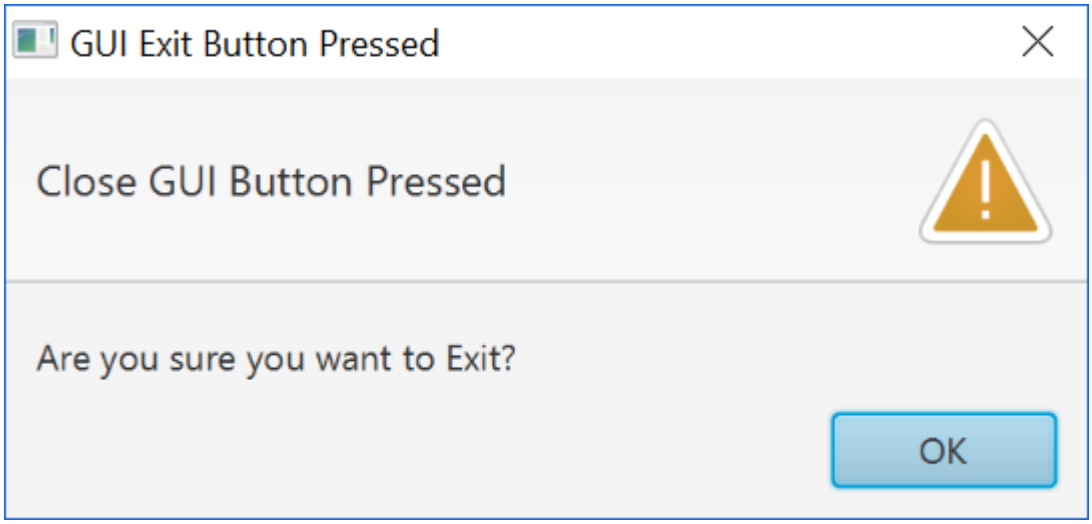


Figure 29: Close GUI Button

If the user presses the 'OK' button on this alert the application will close else if they press the X the GUI will continue to function.