



ASANO

USER GUIDE

SDP Group 11

Product Overview

Introduction

Asano is a boat that can collect water samples from lakes for any purpose. The most common application is those of scientific studies and analysis, where samples would normally be taken by hand. An overview of the main features and user interactions can be found below:

Remote Control

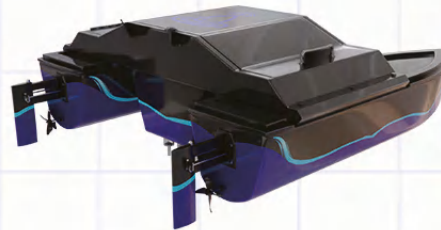
You can take manual, remote control of Asano via the provided iPhone app. The app includes the ability to direct the boat where to take samples, manually control the boat's speed and direction, view the boat's live location, and a database of previously collected samples.

Navigation

If not manually controlling the boat, the boat has an autonomous navigation mode that will find the most efficient way to visit and collect samples from the points you have provided. This mode should only be used in relatively calm and simplistic environments. Manual control is preferred in harsher environments with more potential obstacles.

Sample Collections

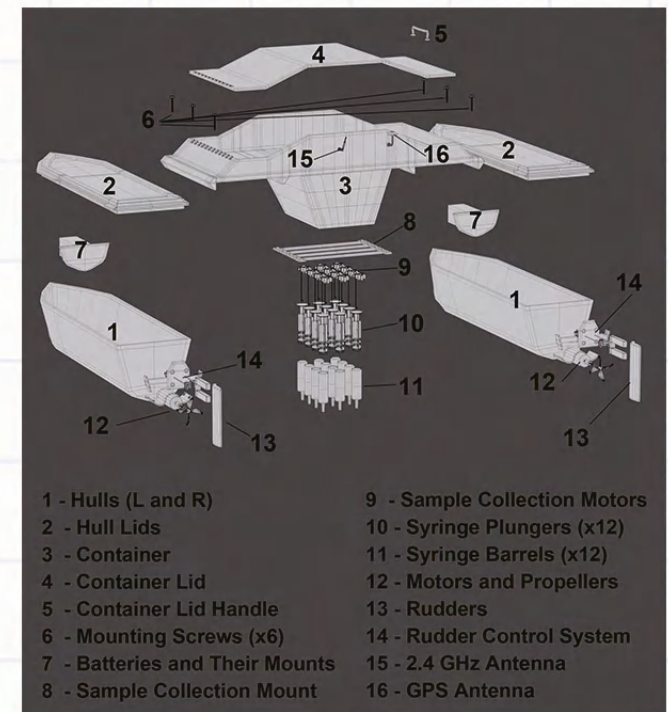
The boat will collect samples from the points you enter on the map, upto a maximum of 12. The app itself handily tells you the next collection point, which allows you to track where you should be visiting next if controlling the boat manually.



Hardware

Components

The components of the boat are shown in the image below. This is NOT a guide on how to assemble the boat (visit Assembly section instead). The image should be treated as an enumeration of all required parts.



Note: the main controller board (Raspberry Pi) inside the container is not shown here due to the angle

Technical Support

Hardware

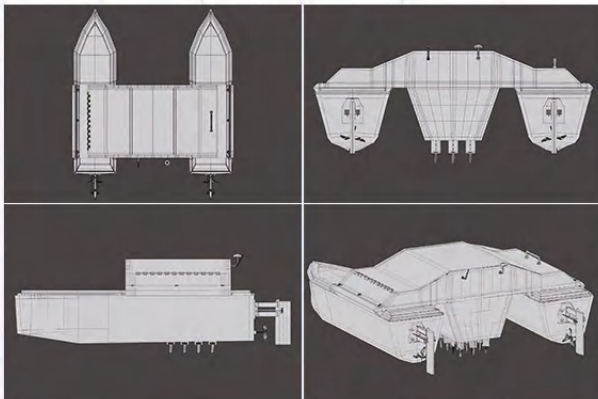
Assembly

WARNING: For maintenance or storage purposes only, the user should only be able to detach, place or replace the following parts:

- Container Lids
- Propellers
- Syringes
- Propelling Motors
- Sample Collection Motors
- Rudder Control Motors
- Rudder
- 2.4 GHz Antenna (Approximately 300m outdoor range)
- GPS Antenna
- Mounting Screws
- Batteries

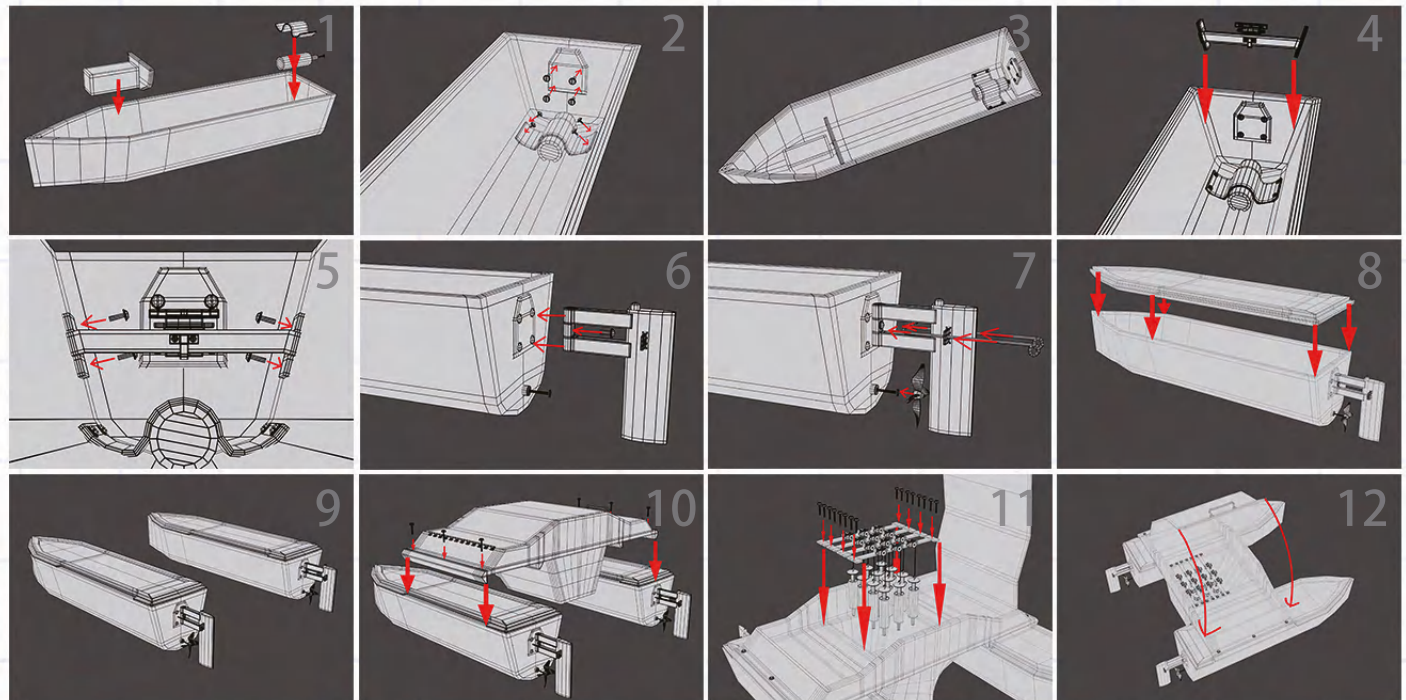
Other parts **SHOULD NOT** be disassembled or modified in any way without professional care.

Once assembled, the user is recommended to compare the result to the following references to confirm the overall assembly correctness:



Start up Asano

1. Unscrew the 6 mounting screws
2. Open both lids of each hull
3. Carefully mount the charged batteries
4. Connect both batteries to the boat which will power the main controller board
5. Start the server on your end
6. Open the mobile App
7. Through the App, confirm that the connection between the server and the boat has been established
8. Through the App, place the points on the map for the boat to collect samples from
9. Put the boat on the water
10. Through the App, commence the mission



Technical Support

Maintenance & Safety

Batteries

Charging:

- Never charge batteries placed inside the model
- Never charge batteries if they are hot to the touch
- Never charge batteries in below freezing temperatures
- Always charge batteries with a compatible and approved charger
- Always charge batteries in an open area away from liquids, surfaces and flammable materials
- In an emergency, disconnect the battery (if safely possible) and place it in an open safe area
- Recommendation: always monitor and attend the charging
- Recommendation: stop charging timely when battery is fully charged

Storage:

- Store batteries in a specialized non-conductive and fireproof container
- Never store loose batteries together
- Store batteries in a safe temperature environment (ranging from -10°C to 45°C)
- To maximize battery lifetime, store batteries in room temperature
- Recommended storage humidity 65±20%RH
- Never connect/short the terminals with metal objects

Sample Collectors

The samples are collected by syringes on the bottom of the boat. After each use, it is recommended that the syringes are fully sterilized to ensure accurate sample readings for the next session. To do this, carefully rinse the syringes (the plungers, as well as syringe barrels) with soft water and non-aggressive alcohol-free anti-bacterial cleaning wipes. For best results, replace the syringes entirely at least every 10 runs. The syringes are not custom-made and should be available at your local drugstore - please make sure to order the correct size before making a purchase.

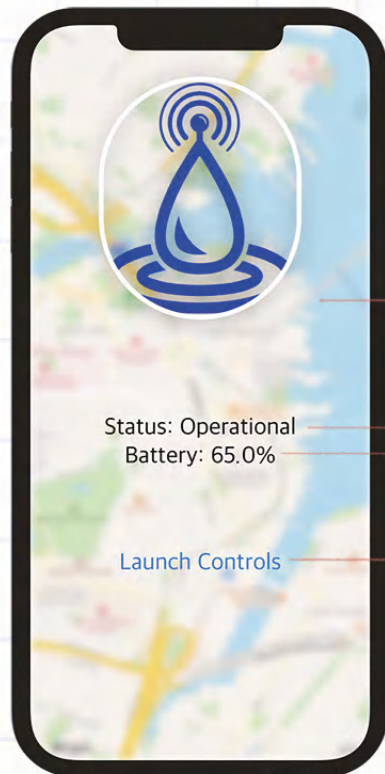
General Safety Guidelines and Regulations

- Never start the boat outside of water.
- Do not place any objects near the propellers outside of water or when placing in water. May cause serious injuries.
- Take care when placing the boat in water and when removing it, so as not to damage any parts.
- Do not use the boat in circumstances where any wildlife may be harmed, such as in the water environments like ponds that are overcrowded with wildlife.
- Do not dispose of the boat in a fire, as general waste, or as a recyclable. Contact Support which will provide guidance or will collect the boat, disassemble it, and dispose of separate parts in accordance with the regulations. Note that syringes can be disposed of without assistance. In order to do so, check the user manual for removing them, and dispose accordingly depending on the chemical content inside.

App Instructions

Loading Screen

When you open the Asano's app, on the first page you will see a blurred view of the map as the background, on the top of that is the Asano's logo with the boat's operative status and the battery percentage in the centre, and on the bottom of the page you can see the text in blue for **control manually**, where you can click on it to toggle the manual control mode of Asano.



Asano's logo

Current status

Status: Operational
Battery: 65.0%

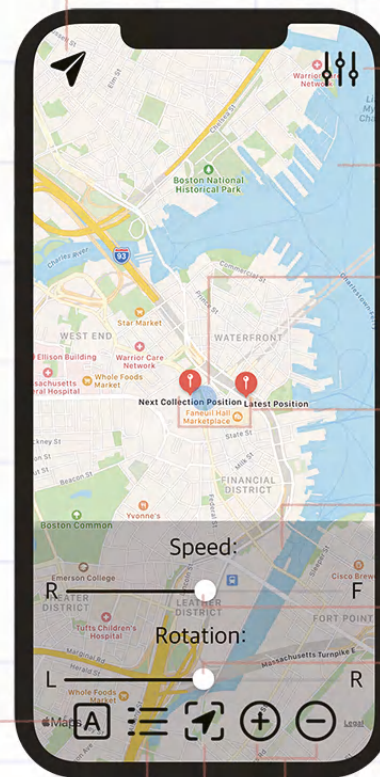
Battery percentage

Launch Controls

Manual mode toggle

Manual Control

After you switch to the manual mode, you can see the map displaying the area where your boat is at.



Click to send a list of points to the server and clear the points from the map.



Enter the **Boat Settings** page. →

Double tap the map to zoom in/out (or use 2 fingers)



Click on the map to set a new point.



Points that have been added by the user.

Control panel for the boat

Slide right to increase the speed, vice versa.

Slide right to rotate right, vice versa.



Add a new point.



Delete a selected point.



Switch back to **automatic mode**.



Enter the **Sample List** page. →



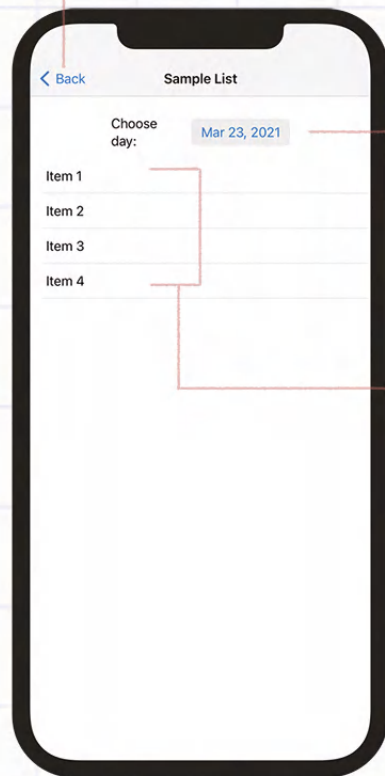
Re-centres the location and rotation over the boat.

App Instructions

Sample List

This page shows the samples collected for the date you have chosen (uses today's date by default).

Back to the manual control page



Date selection

Samples collected

Boat Settings

This page displays the appearance of the boat and the current connection quality with your device, also enables more configuration options.



Click to display further connection information.



Represents the connection quality of the boat with your device, and this state on the left indicates that the connection is none.



Click to enter the general **App Settings** page. →



IP Address: localhost

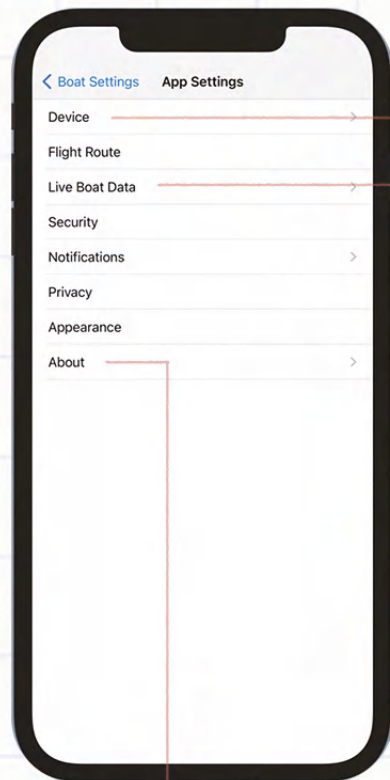
Port: 1337

App Instructions

App Settings

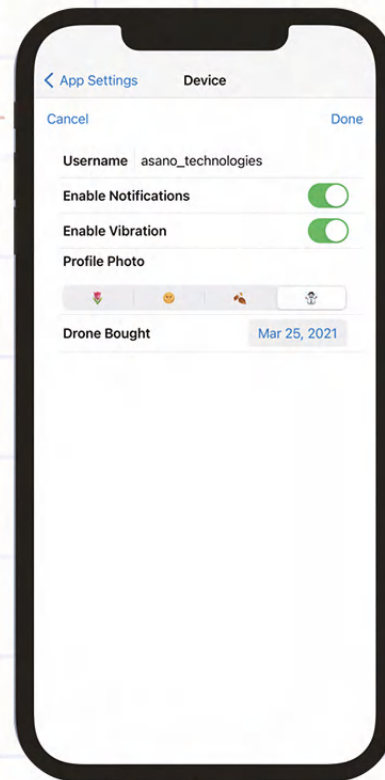
This page covers the general configurations for the app and some systematic information. Each row leads to a different page for settings.

As explained on the right →



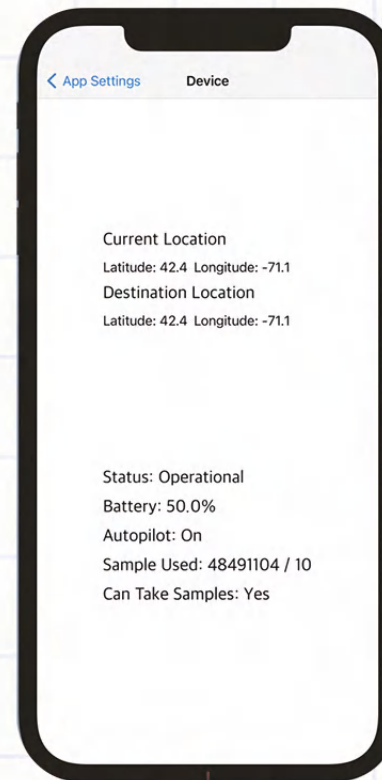
Device

This page allows you to customize your personal details on this device, by modifying the top row to edit your **Username**, or selecting an icon from the preset emojis on the **Profile Photo**. Also, you can choose to turn on/off the app **Notifications** or **Vibration** feedback using the switches provided. Lastly, the date when you purchase your Asano device is shown on the bottom, which can serve as a reminder for you to do a maintenance check.



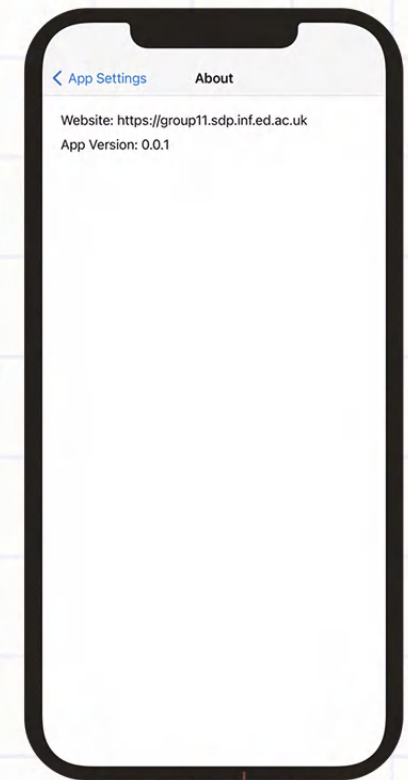
Live Boat Data

This page contains the statistical information for your boat including the **Current Location**, **Destination**, **Status**, etc., and these can be helpful in cases such as you lose track of the boat on the map, or it runs out of power and needs to be collected back manually.



About

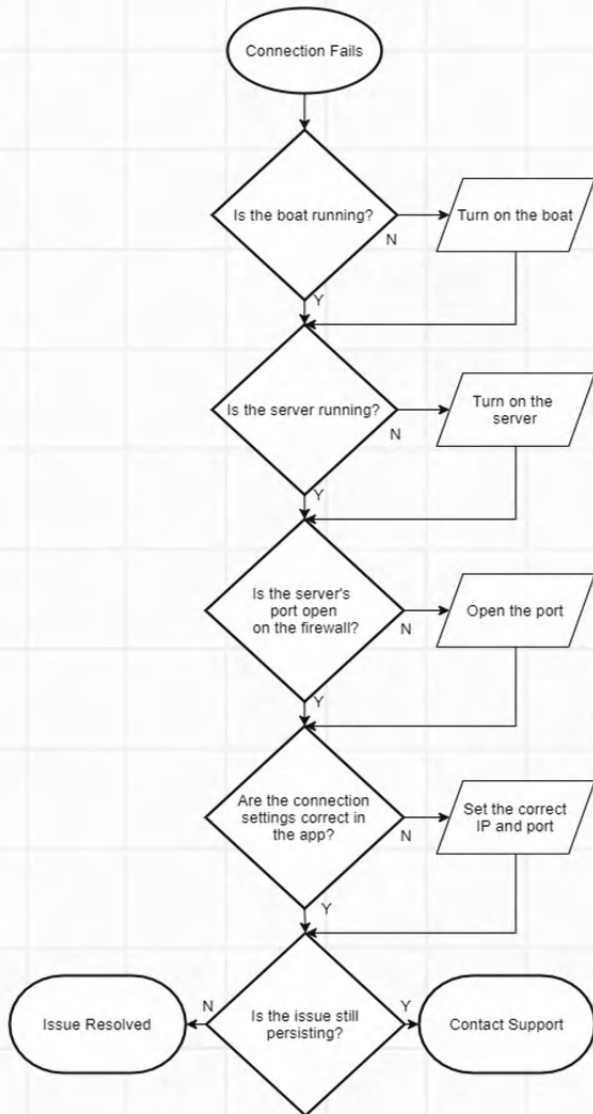
This page shows the link to the Asano's official website where you can browse more details about this project, as well as the current app version.



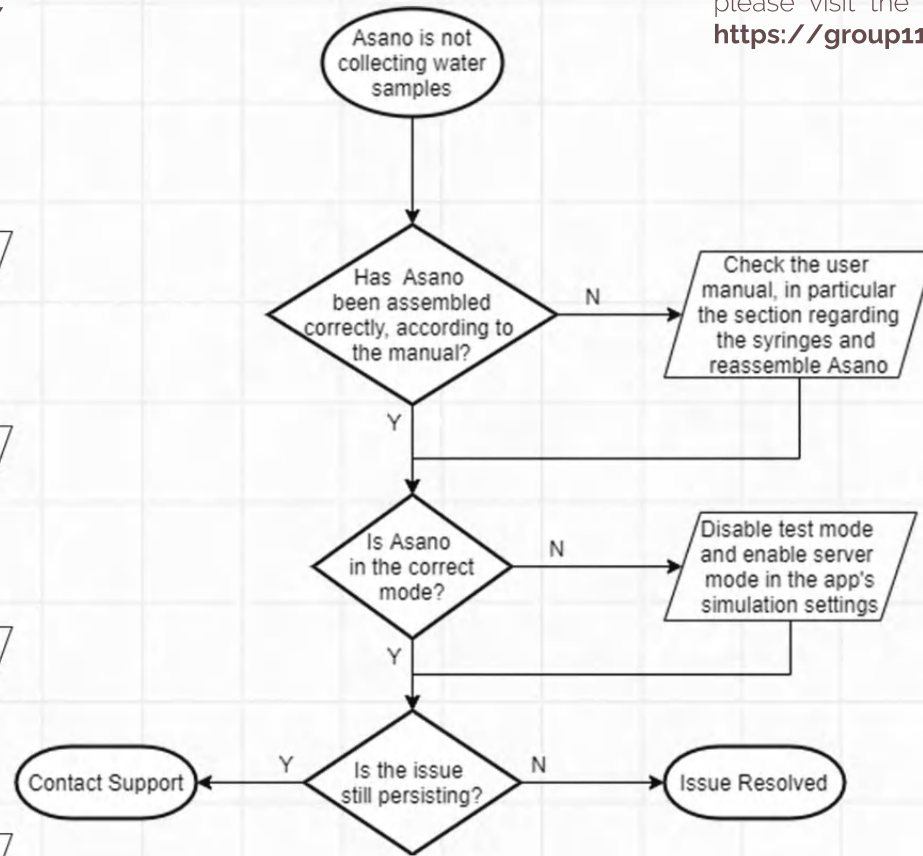
Troubleshooting Guidelines

Flowcharts

Troubleshooting Flowchart 1 ↓



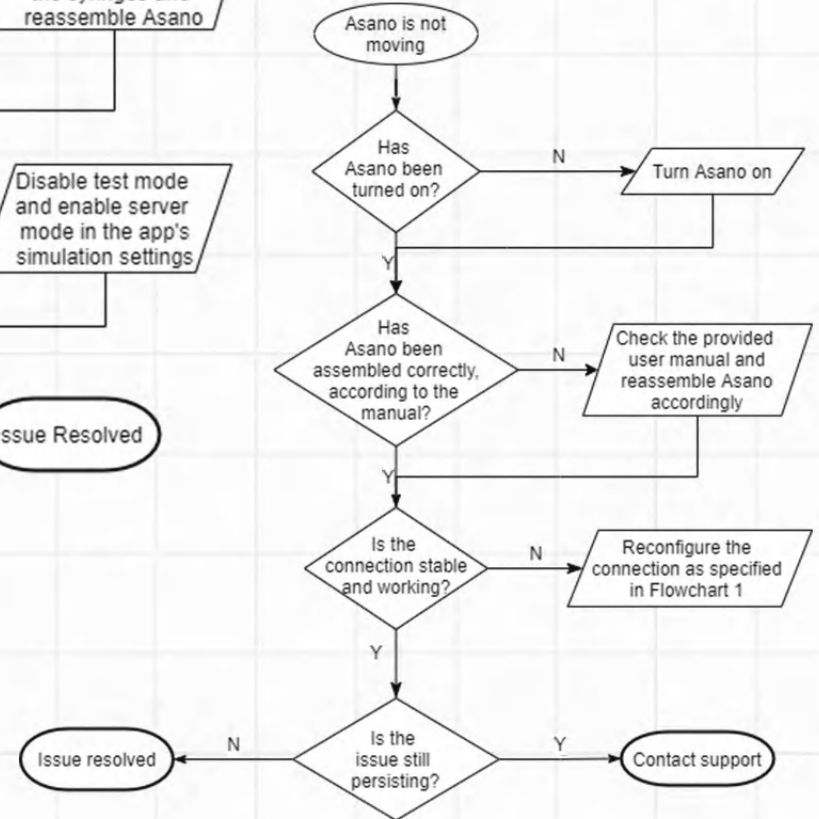
Troubleshooting Flowchart 2 ↑



Contact Support

If you could not find the technical help you required in our guide, please visit the following URL to contact the support team: <https://group11.sdp.inf.ed.ac.uk/contact-us>

Troubleshooting Flowchart 3 ↓



Troubleshooting Guidelines

Problem	Possible Cause	Solution
Physical		
Asano is not collecting samples	<ul style="list-style-type: none"> Asano has not been assembled correctly Asano is in the wrong mode 	See 'Troubleshooting Flowchart 3'
Inaccurate moving routes	<ul style="list-style-type: none"> Poor connection strength 	<ul style="list-style-type: none"> Please only use asano in the recommended range (see hardware section)
Asano does not start	<ul style="list-style-type: none"> Battery is dead Connection isn't configured correctly 	<ul style="list-style-type: none"> Please ensure Asano has a fully charged battery (see hardware section) See below for resolving connection failure issues
Asano is not moving	<ul style="list-style-type: none"> Asano has not been turned on Asano has not been assembled correctly 	See 'Troubleshooting Flowchart 2'
Asano does not return to the start position after finishing all tasks	<ul style="list-style-type: none"> Asano's battery is not sufficient to return to the original location Asano has a poor GPS connection 	<ul style="list-style-type: none"> Ensure the battery is fully charged before starting the session Remove anything from the local area that may cause interference
App		
Connection fails	<ul style="list-style-type: none"> Connection settings are incorrect Server is not running Boat is not running Firewall for server host is configured incorrectly 	See 'Troubleshooting Flowchart 1'
Not tracking the boat	<ul style="list-style-type: none"> Boat is in test/demo mode Connection is configured incorrectly (see above) 	<ul style="list-style-type: none"> See above for resolving connection failure problems Disable the test mode, and enable the server mode in the simulation settings
Not able to configure the robot settings (speed, depth, etc.)	<ul style="list-style-type: none"> Boat is in test/demo mode Connection is configured incorrectly (see above) 	<ul style="list-style-type: none"> See above for resolving connection failure problems Disable the test mode, and enable the server mode in the simulation settings
Not able to control the robot manually (change directions, etc.)	<ul style="list-style-type: none"> Boat is in test/demo mode Connection is configured incorrectly (see above) 	<ul style="list-style-type: none"> Disable the test mode, and enable the server mode in the simulation settings See above for resolving connection failure problems
Not able to configure the routes (fail to import positions, etc.)	<ul style="list-style-type: none"> Boat is in test/demo mode Connection is configured incorrectly (see above) 	<ul style="list-style-type: none"> See above for resolving connection failure problems Disable the test mode, and enable the server mode in the simulation settings
Not able to view records of samples taken for a chosen date	<ul style="list-style-type: none"> Incorrect date chosen Connected to the wrong boat/server Changed device, deleted data from settings (the database is not stored online at the moment) 	<ul style="list-style-type: none"> Restart the app Check Asano device name that the app is connected to Check that Asano has been deployed on the chosen date