Device specifications and testing

The device we are creating is based on a raspberry Pi Pico H, and makes use of the following modules:

- Grove GPS (Air530)
- 0.96" LCD display
- Fasizi V2.0 5V GSM GPRS module Quad-band
- Battery module

I won't know how to assemble the hardware until we actually physically have it, however I have devised a simple testing plan which should ensure that each module is working correctly.

As each module is fitted to the device, it will be tested before any further assembly is carried out. This will help to ensure that we are not placed in a situation where one of the modules is not functioning correctly and is "buried" beneath subsequently fitted modules which may have to be removed in order to access the faulty module.

GPS module

The GPS module will be tested by running code that will simply get the current location of the device, and then taking the device to another location. GPS is usually accurate within 3 to 5 metres so the new location should be at least twice that distance, ideally closer to 20 metres minimum.

LCD display

The display can be tested by displaying an image and text. Additionally, it comes with two buttons and a joystick, which can be tested by writing code that changes the contents of the screen based on input.

GPRS hat

The GPRS hat will be the most difficult module to test, as it requires a SIM card. At present, I am expecting to test it by implementing a command-line style ping mechanic and monitoring the results on the target machine. Since the Raspberry Pi Pico H has no built in WiFi module, in the event that the test is successful it can be inferred that the unit is functioning correctly.

Batteries

If the device powers on, the batteries are functioning correctly.

All of these tests will be performed during assembly, and once again after assembly is completed. In order to ensure reliability it may also be worth the time to take the assembled devices into a wooded area such as Woodbury common to test the GPS tracking capability, and a remote area such as Dartmoor or Bodmin moor to test the reliability of the GPRS unit.

Locations

The assembled devices will be tested in the following locations:

- Haytor, Dartmoor
- Haytor quarry, Dartmoor
- Woodbury Castle, Woodbury (forested area)
- Woodbury plain
- Plymouth city centre

Appropriate risk assessments will be carried out prior to the start of testing, however all of these locations are publicly accessible and safe for normal walking.

Results grid

Test location	Does the device function? (Y/N)	GPRS latency (seconds)	GPS accuracy (metres)
Haytor			
Haytor Quarry			
Woodbury Castle			
Woodbury plain			
Plymouth city centre			