Mission Space Lab Phase 4 report outline

Team name: CDV-CDI2

Chosen theme: Life in Space

Organisation name: CoderDojo Votanikos / CoderDojo Iraq

Country: Greece (collaboration with Iraq)

1. Introduction

This team consists of 3 children from Greece and 3 children from Iraq.

The idea of this experiment came to us when we checked the previous projects and we came across the Juno team's experiment from Spain. We knew how important it was to maintain a certain temperature and humidity to avoid fire and equipment damage hazards. We then wondered about earth! And to be exact, "What about Greece and Iraq?" We wanted to know the heat index (h-index) for Athens in Greece and Maysan in Iraq then compare it to the h-index from the ISS.

Our initial thoughts was that ISS has a better h-index.

2. Method

In our experiment we used the Sense Hat to read temperature, humidity and pressure every 30 seconds. We also realised that we need the CPU temperature from the Raspberry Pi as "the temperature of the Astro Pi may be slightly different to the temperature of the ISS". We contacted Astro Pi support and they provided us with an alternative command. The LED matrix would show the iteration of the current reading, we had 300 iterations to get approximately 3 hours of collected data.

When we received the data from the ISS (in csv format), our Ninjas discussed measuring the same parameters in Athens and in Maysan. However, they realised that it is summertime and the temperature readings might be different from inside the house (where airconditioning is working) and the outside. Therefore, they decided to get both readings and compare them to the ISS readings. They run the experiment for three hours. TeamB in Greece started collecting their data at 17:00

and TeamB in Iraq started collecting their data at 16:00. We then used Google Sheets to compare the results.

To compare the temperature, we needed to exclude the CPU temperature from the sense hat reading. We didn't have a DHT22 sensor so we worked approximately using the following formula we found in the Raspberry Pi forum:

 temperature = sensehat_temp - (CPU - sensehat_temp)
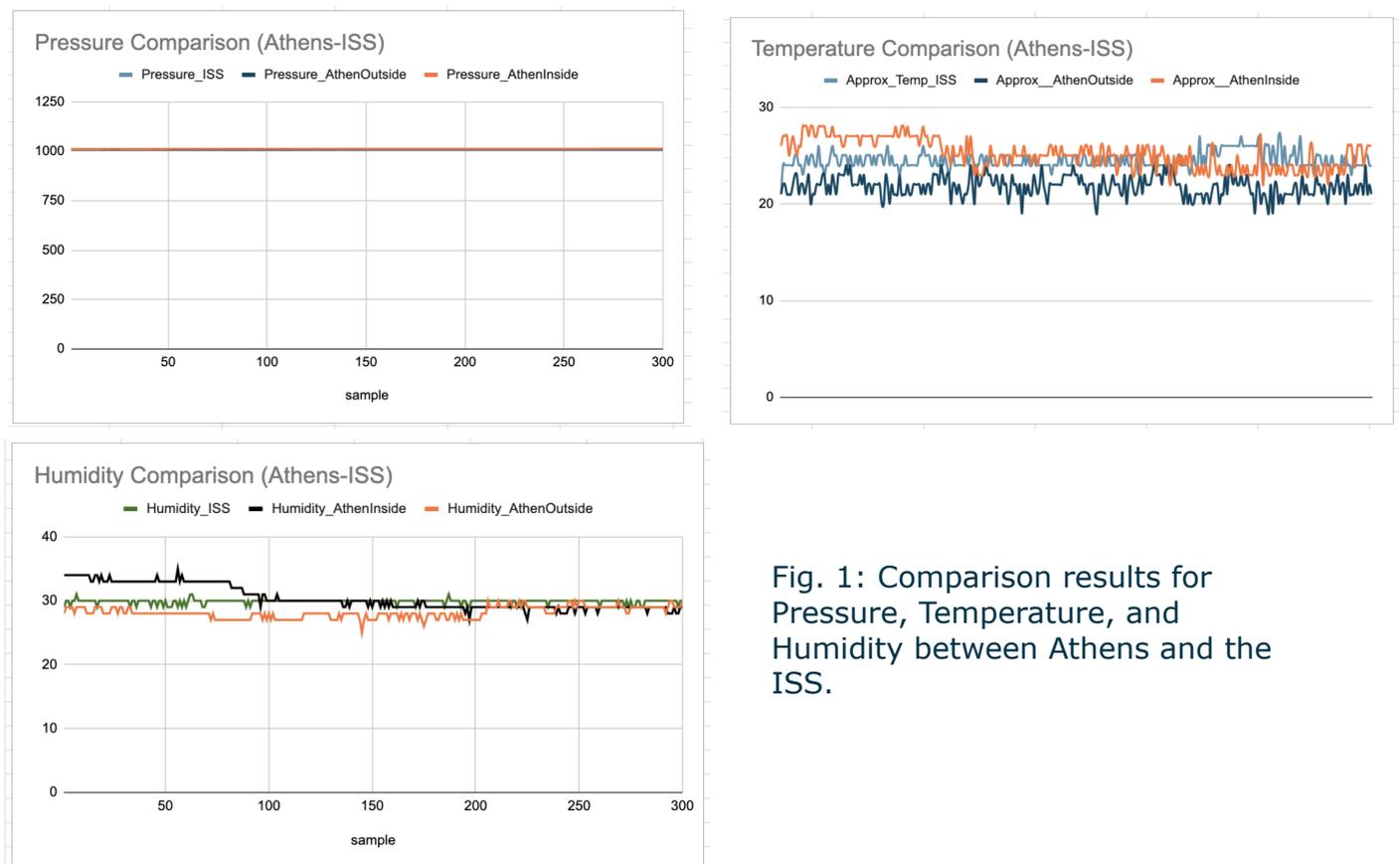
3. Experiment results

Fig. 1: Comparison results for Pressure, Temperature, and Humidity between Athens and the ISS.
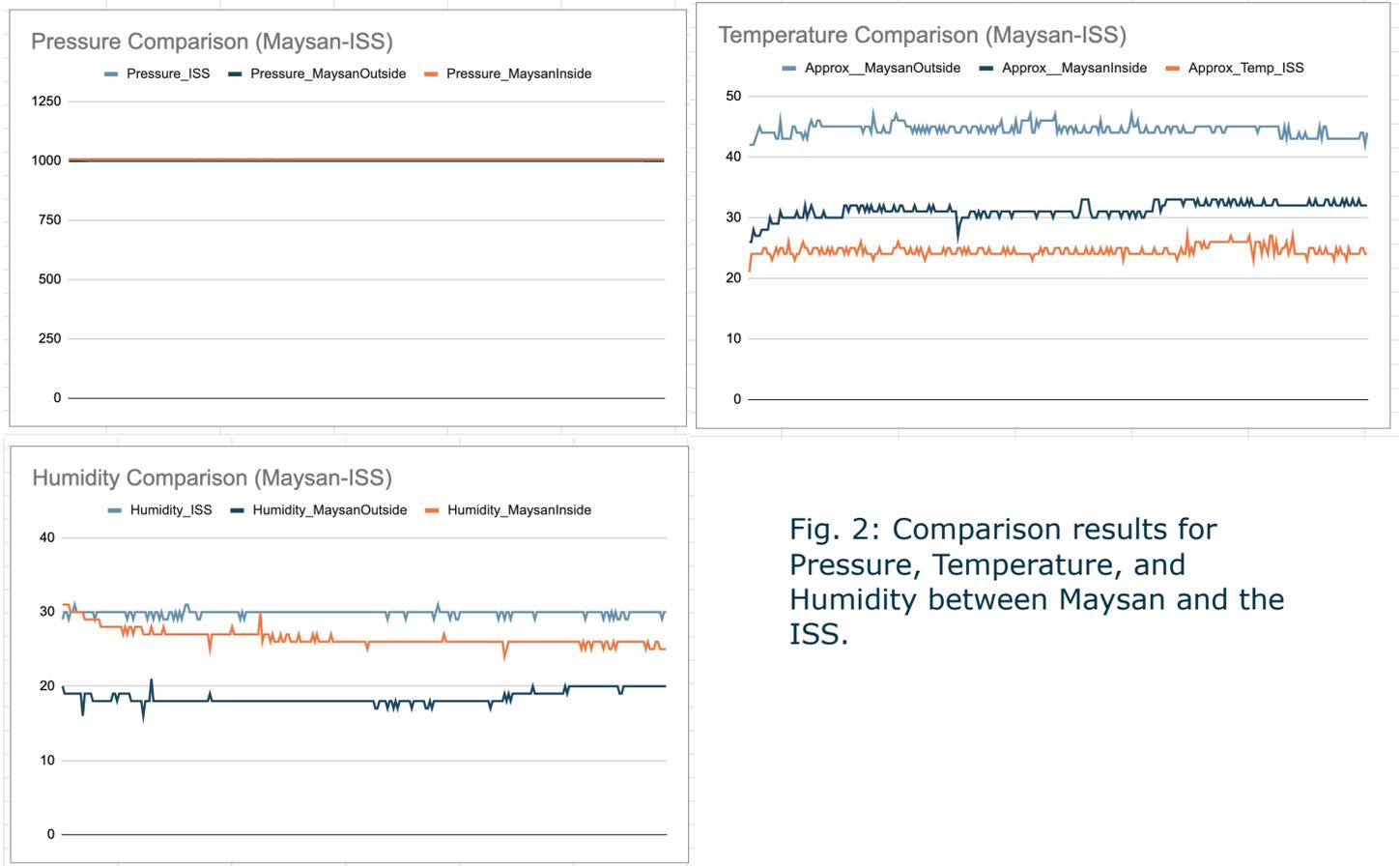
Fig. 2: Comparison results for Pressure, Temperature, and Humidity between Maysan and the ISS.

4. Learnings

The challenges we experienced

1. At the beginning we could not use the command we knew in order to measure the CPU temperature. We contacted Astro Pi support and they provided us with an alternative command.
2. End of year exams that the Ninja had in June along with data collection electricity problem disturbed the local experiment in Iraq.

What we learnt

1. We learnt that there are some commands that could be dangerous for the ISS network and they are prohibited.
2. We learnt how to find the temperature difference to get the actual temperature from the Sense Hat.
3. We learnt a lot about the effect of temperature and pressure on the human body and realised why pressure is the same in the ISS and on earth. If the pressure changes, it will affect the human joints and make it hard to walk.

Next time

1. It would be useful to have more data for more days. ESA could give us access to their data and give them access to our data as well. So that we all have access to data that come from more than three hours without keeping the Astro Pi's for our own experiment.

5. Conclusion

1. We found that the environment on the ISS is closer to that in Greece as expected. We know that we did not invent the wheel, but through this experiment the Ninjas learned how to handle data and get familiarised with the scientific procedure. Which for our clubs is the outcome of this experiment.
2. The temperature inside the house in Athens could be higher than outside. We believe this is probably because of the CPU temperature. Outside there was wind and cooling was more efficient. Also the Astro Pi outside was in the shade at all times.
3. There is a big difference in temperature inside and outside houses in Iraq during summer.