TEAM NAME: **Derdio**

CHOSEN THEME: **Life in Space**

TEAM MEMBERS NAME: **Rostislav Stroin, David Jasek, Elisej Raskind, Simon Dockal, Krystof Halfar, Ondrej Kalas**

ORGANIZATION NAME: **1.Scioskola Praha, zakladni skola**

COUNTRY: **Czech Republic**

INTRODUCTION

Our main goal was to investigate an influence of force of gravity, sun light and cosmic radiation on the parameters of a surrounding atmosphere in the interior of ISS. We were looking for any differences in Temperature, Atmospheric pressure, Humidity and Air density between an interior atmosphere in ISS and common interior room air on the Earth.

Our original question was, is the interior atmosphere on ISS similar or different to a common room or an office interior atmosphere on the Earth?

Together with this fundamental question we wanted to know, if and how that interior atmosphere is influenced with different sun light, cosmic radiation and absence of the gravity force.

So, we decided to measure and investigate these main atmospheric parameters in the ISS interior and compare it to the same measurement in the room on the Earth.

We estimated that the climate difference between the ISS and the Earth will not be significant because the ISS uses special features to stimulate the most comfortable and suitable conditions for human life. As well we expected some impact of the Sun shine on the Columbus module as it´s location is much closer to the Sun than the Earth surface.

METHOD

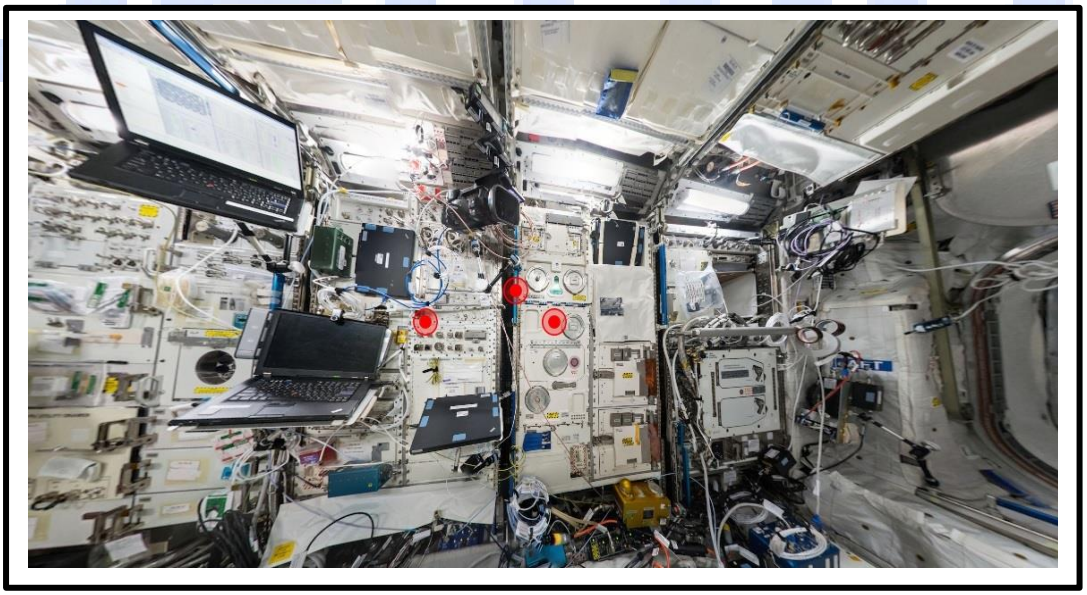
To measure and gather the data we developed a procedure and wrote the computer program in python language. The computer program was running on ISS via ASTRO PI KIT (APK) and was measuring and collecting data (temperature, humidity and pressure).

On the Earth, we performed two data measurements. First, with an influence of a computer ventilation and the second without it. The same computer program via APK measured and recorded data in the room.

On ISS our experiment was running for 150 minutes. APK has recorded pressure, temperature and humidity for 16 times (each 10 minutes). The parameters were measured during the day and night, always under an artificial illumination of the ISS interior.

On the ground we did an open and a closed case measurement of inside room pressure, temperature and humidity. The experiment was running for 210 minutes. The first 60 minutes were used for computer warm up, simulating continues data measuring run, as it is on ISS. The APK has recorded inside air pressure, temperature and humidity for 21 times (each 10 minutes). And we have used for data analyse the last 15 records.

The measurement covered the day light, artificial illumination and total darkness conditions.



RESULTS

The volume of radiation on ISS could not be measured by ASTRO PI KIT.

From the temperature measurement we can say that there is no temperature deviation influenced by factors like gravitation or cosmic radiation. The outcome from ASTRO PI KIT on ISS is almost constant 28-29 °C. The volume is influenced by ASTRO PI KIT ventilation and to have a real volume it has to be decreased by approximately 7°C. The actual temperature on ISS is probably regulated and could be around 21°C. Very similar situation has been recorded on the Earth, with the only difference, that the plastic computer case causes slightly higher volume of the measured temperature.

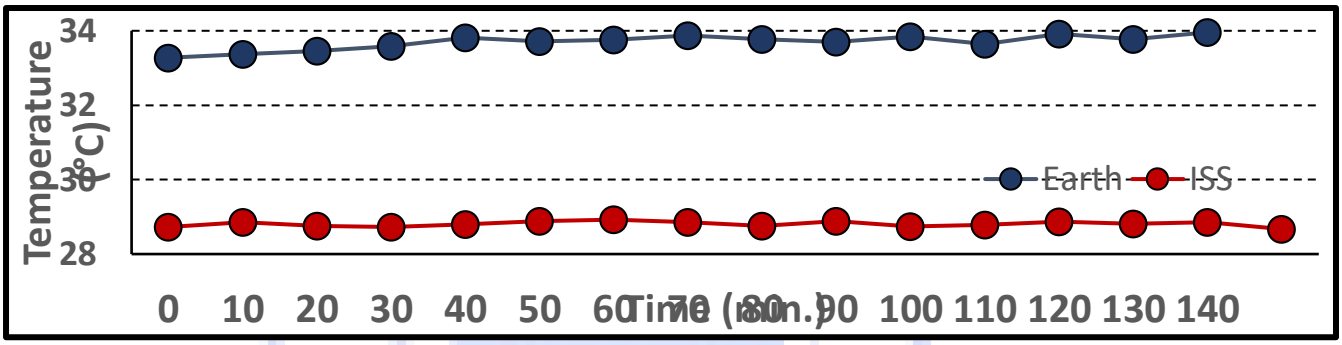
From our humidity measurement we can observe that the changes of the humidity in the ISS and in our room on the Earth were minimal. Nevertheless, the difference in humidity throughout the entire experiment between the ISS and room on the Earth was very constant of 8%. We think that the higher relative humidity on the ISS is caused by artificial humidity regulation or by astronauts working there.

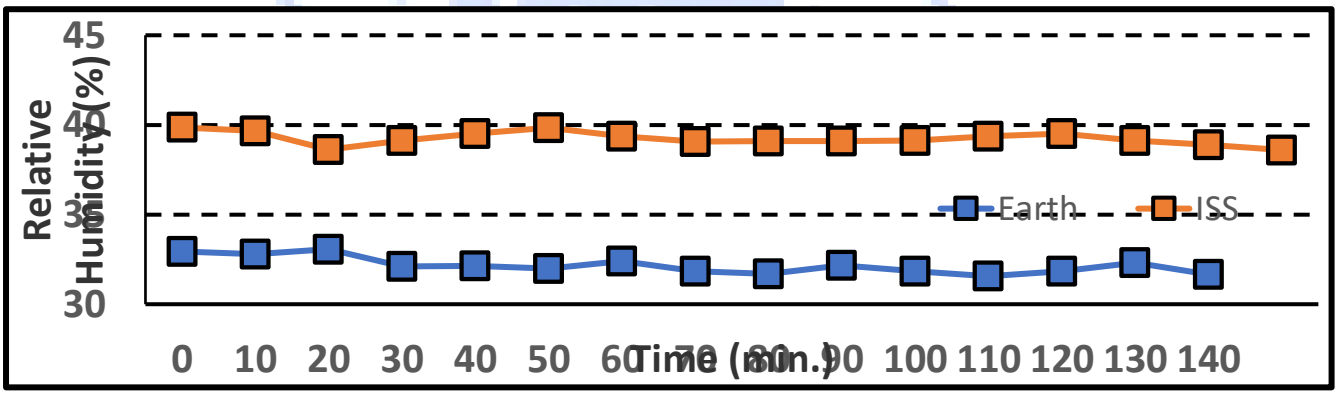
From the pressure measured data we can see that the air pressure on the ISS is almost the same during the entire experiment. We think, that is because the pressure is artificially regulated and maintained on the constant level. The standard atmospheric pressure on the Sea level and temperature +15°C is 1013,25 hPa. The measured volume of the ISS atmospheric pressure is cca 985 hPa. It indicates a slight under pressure and equals the volume of the pressure on the Earth at elevation of 273meters. Based on our measurement we derived a density of the ISS air at 1,130 kg/m3.

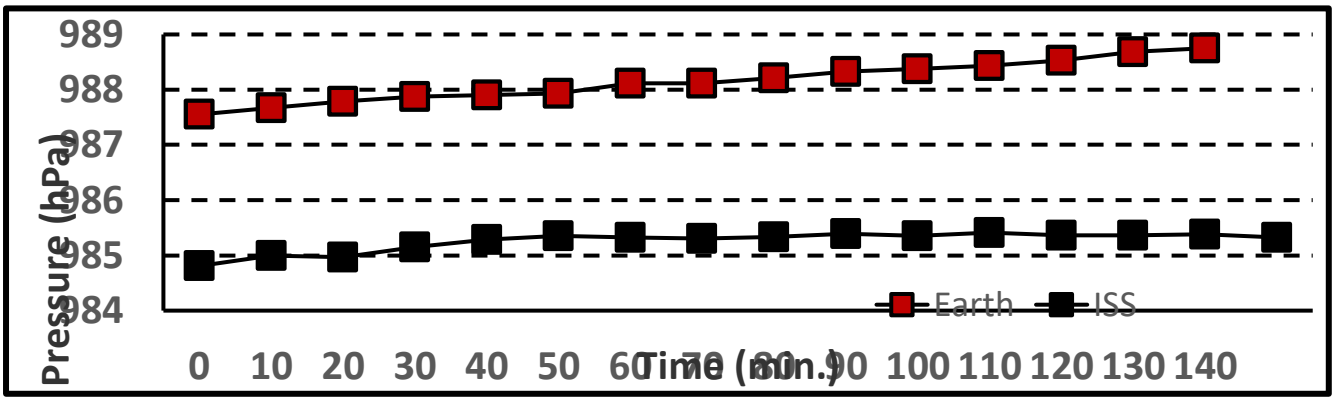
	Time	**Temperature**	**Temperature**	**RH humidity**	**RH humidity**	**Pressure**	**Pressure**
		Open case on Earth	Closed case ISSS	Open case on Earth	Closed case ISSS	Open case on Earth	Closed case ISSS
No,	(min,)	(°C)	(°C)	(%)	(%)	(hPa)	(hPa)
1	0	33,27705383300780	28,72666549682610	32,95306396	39,85647964	987,5515137	984,8083496
2	10	33,36925506591790	28,85287857055660	32,79269791	39,6558075	987,6711426	984,9943848
3	20	33,46145629882810	28,76272773742670	33,07040405	38,63454056	987,7856445	984,963623
4	30	33,59053802490230	28,72666549682610	32,09647751	39,12188339	987,8769531	985,1462402
5	40	33,81182098388670	28,79878807067870	32,13950348	39,51963806	987,9038086	985,2854004
6	50	33,71961975097650	28,88893890380850	31,9947834	39,83856201	987,9318848	985,3493652
7	60	33,75650024414060	28,92499923706050	32,40547562	39,36555481	988,1132813	985,3259277
8	70	33,86714172363280	28,85287857055660	31,84615326	39,07529831	988,1108398	985,3098145
9	80	33,77494049072260	28,76272773742670	31,70143318	39,11113358	988,2102051	985,3337402
10	90	33,70117950439450	28,88893890380850	32,1629715	39,10396576	988,3251953	985,3928223
11	100	33,84870147705070	28,74469757080070	31,83050728	39,13263321	988,3776855	985,3515625
12	110	33,64585876464840	28,78075790405270	31,56062508	39,37271881	988,4333496	985,4123535
13	120	33,92246246337890	28,87091064453120	31,83833122	39,50172424	988,5273438	985,3671875
14	130	33,77494049072260	28,81681823730460	32,31551361	39,12546539	988,6872559	985,3613281
15	140	33,95934295654290	28,85287857055660	31,65058517	38,87821198	988,7507324	985,3864746
16			28,67257690429680		38,60229111		985,3198242

CONCLUSION

As a conclusion we may state that several systems are currently used on board the ISS to maintain the spacecraft´s atmosphere. The ISS atmosphere is similar to the Earth´s office or room. There is a constant regulated temperature of 21°C, artificially regulated humidity of around 40%. The atmospheric pressure is same as on the Earth. The gravity force, cosmic radiation, Sun light or heat have no effect on the ISS artificially regulated atmospheric parameters.







We realized a lot about the life on ISS and in space general. We have learned the basics of coding in Python and have improved in our IT skills, such is a building of a computer and understanding its specific components and functions. We have learned to use the ASTRO PI KIT. We have improved our teamwork capabilities, scheduling execution, communication skills with the team members and other expert partners and consultants.