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Measuring planetary field parameters by scattered “SSSS” from the Husar-5 Rover

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1. Introduction: HUSAR-5 Rover reloaded

For 2 years ago the Hunveyor-Husar Team in our school made yet a similar project. The ground idea was, we try to keep step with the main trends in the space research, in our recent case with the so called MSSM (Micro Sized Space- Mothership) and NPSDR (Nano, Pico Space Devices and Robots). [1]Of course, we do not want to scatter the smaller probe-cubes from a mothership, but from the Husar rover, and to do it on the planetary surface after landing. We have fabricated the rover with the ejecting tower and we have shown it on the EPSC 2015.

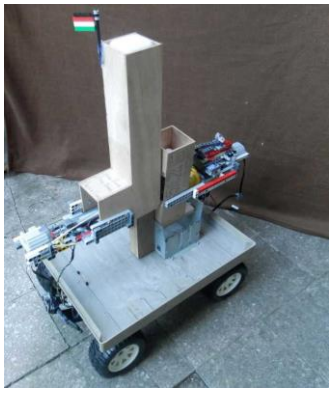

Figure 1: the rover before it

2. The SSSS: Shell-Shape Sensor Sheath

The new shape of the bullet let the SSSS better rolling on the surface. The sensors and the electronic equipment should be placed on the surface and inside the SSSS. The shells would be scatterred on the surface therefore it is worthy to measure and to map that kind of parameters which are non-uniform on the surface. We plan to include inside the cubes a Hall-

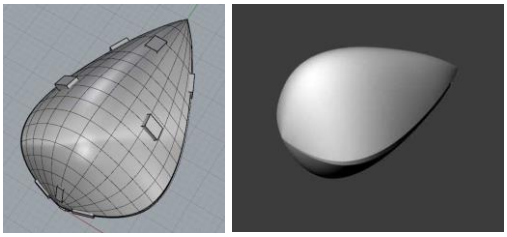

Figure 2: the plans of SSSS

sensor to measure the magnetic field, a pressure sensor to measure the atmospheric pressure, and a vapor content and a temperature sensor, too. The communication with the Husar rover (or the landing unit Hunveyor) should be organized through Wifi.

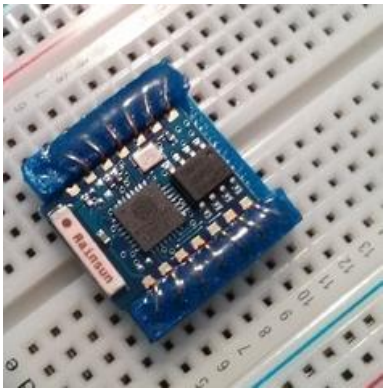

Figure 3: the microcontroller

The „brain” of the cubes will be an microcontroller, which synchronizes the measurements and the transportation of the data. The type of microcontroller is esp 8266-03, it can be programmed with Arduino.

3. The Mission and the Ejection Event

The mission would be carried out in the following way. The rover starts from the lander and advances forward with a uniform speed. (By its distance sensor the rover observes the obstacles and tries to bypass them). This way the pathway of the rover can be traced and the positions of the shells can be estimated. After covering a unit distance the rover stops. A motor draws the string. After that the magazine wheel rotates and the next shell falls in the tube. The motor let the tube off and the limb and the string launch the shell in a specific direction. (This direction is perpendicular to the rover's.) During the stops the rover measures local gravity. The gravity sensor should not be built to the cubes, because it probably does not change in this distance. The rover is controlled by MyRio, the instrument of NI.

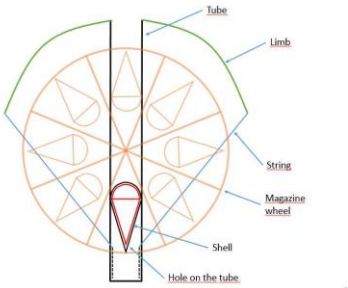

Figure 4: the ejecting system from the top

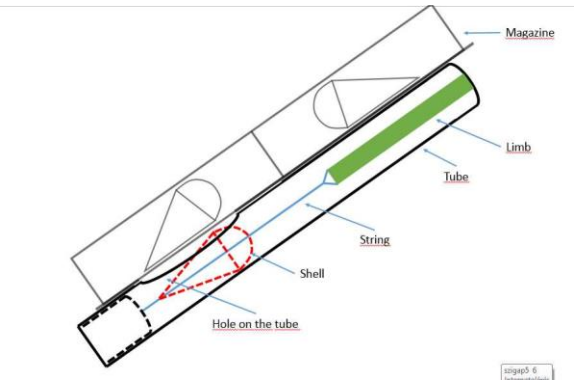

Figure 5: the ejecting system from the side

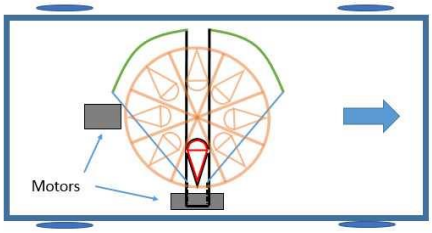

Figure 6: the new HUSAR-5 rover

4. Summary and Conclusions

In this abstract we report a new type of the Hunveyor-HUSAR project planned by students. It based on an earlier mission, but the rover will be rebuilt and the scattered objects have a new forms. The students have got a lot of experience about the problems connecting of constructing a spaceprobe.

References

[1] [1] Vizi P.G., Bérczi, Sz., Horváth I., Horváth A.F, Vizi J.Cs.: APPLICATION OF THE FLEET OF MICRO SIZED SPACE-MOTHERSHIPS (MSSM) WITH NANO, PICO SPACE DEVICES AND ROBOTS (NPSDR) FOR LIFE SIGNAL SEARCH ON DDS SITES USING GLOBAL DIGITAL DUNE DATABASE OF MARS 46th Lunar and Planetary Science Conference (2015) 2788.pdf