IDENTIFICATION OF ROCKS ON PLANETARY SURFACE USING HUSAR-9 ROVER CAMERA: FIELD WORK SIMULATIONS WITH HUNVEYOR-9 SPACE PROBE MODEL SYSTEM AT EÖTVÖS HIGH SCHOOL, TATA, HUNGARY.
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Introduction: Last year we studied magnetic particle content of the Planetary dust blown by winds – in simulations of Mars rover works [1]. This year we studied the rock types along the Husar-9 rover's path and identified them on the basis of their shape, color and surface textures [2].

Methods: Camera was mounted on the rover with ability for rotation. The camera was directed form the "terrestrial control room" of Hunveyor. WE directed the images towrd the control room and to the Hunveyor-9 lander, too.

The camera observed the landscape in front of it and stopped at an interesting object. The rock was imaged and walked around during studies of that rock. We mapped the rover's path in order to return there at a later activity. (This year the rover worked by human control, next year we shall make automativ direction.)

The command for operations was sent to the lander, which transmitted them to the rover. Time delay was also calculated (because of the distance between Earth and Mars.) We also develop the rover command in order to act promptly (for example if it collides with a rock, right now backward motion is automatic, and turning 30 degrees forward again is also automatic.).

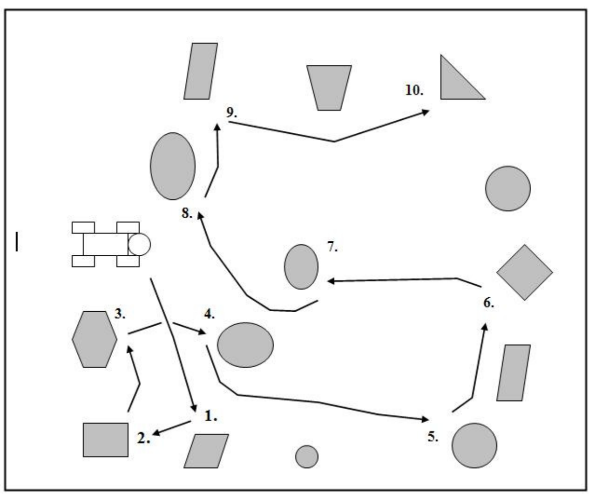

Fig. 1. The pathway of Husar-9 on the test table between the planetary rock types.

Rock types and their occurrence on planetary surfaces, photographed by the Husar-9 camera: On the test table planetary rocks were deposited (Fig. 1.).

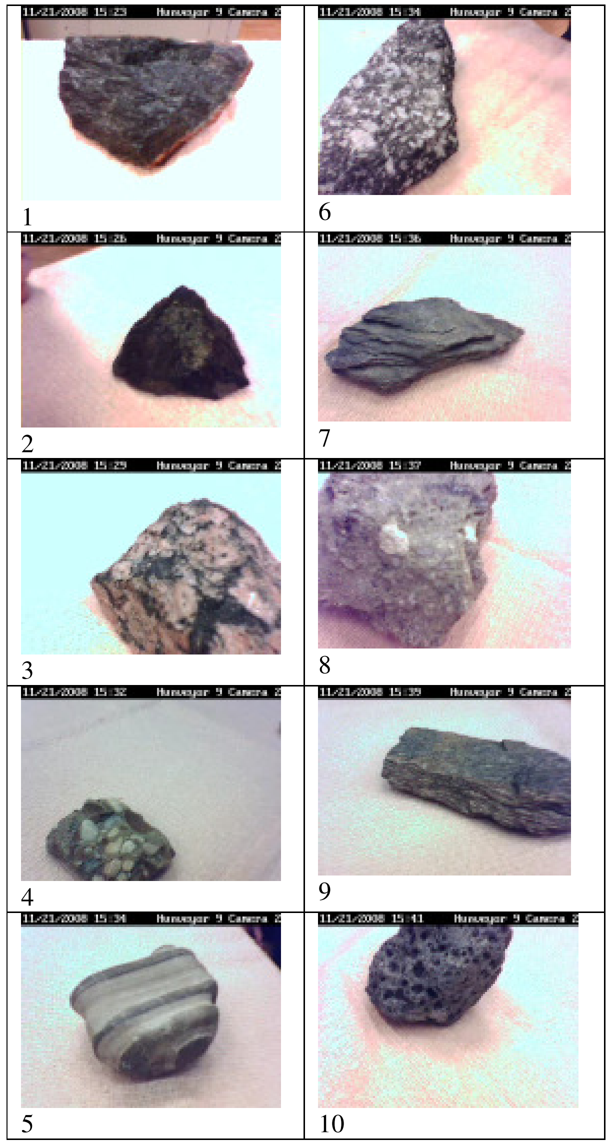

Fig. 2. Camera images of the Husar-9 rover about the rock types: 1: Komatiite, 2. Basalt, 3. Granite, 4. Konglomeráte, 5. Layered rock with windblown harder and softer layers, 6. Porphyritic granite, 7. Metamophous rock, 8. Suevite breccia, 9. Metamophous rock with mica grains, 10. Vesicular basalt.

Short overview of the rocks studied on the testtable along the pathway of Husar-9. They represented samples from the surface of different planetary bodies.

1. Komatiite: olivine needles were observable and the spinefex texture was recognized. These rocks are suggested to be present on Io on the basis of the melting temperature measured by Galileo on Io. Venera 14 suggested its presence on Venus. [3-5]

2. Basalt with peridotite inclusions. The color of basalt is dark grey and it is fine grained, on contrary the inclusion is coarse grained and its color is green. Basalt is known from the Moon, Mars and asteroids, too. [6-8]

3. Granite, with pink alkaline feldspar minerals. Known only from the Earth, but probably occurring on Venus, too.

4. Conglomerate. Light colored pebbles are embedded in a darker fine grained groundmass matrix (sandstone). The conglomerate rocks are terrestrial far neighbours to breccias on planets.

5. Windblown Layered rock with extruding (convex) harder and intruded (concave) softer layers. The work of winds preparing the surface rocks is known mainly from Earth and Mars. Martian vendifacts are well known on the rocks around the Pathfinder .

6. Porphyritic granite, which exhibits the feldspar laths on the surface texture.

7. Layered schist and shale rocks are produced in metamorphous processes. They are known over earth from Venus on the images of the Venera Venus landerspace probes.

8. Suevite breccia with gray groundmass and some embedded dark inclusions from the Ries crater, germany.

9. Metamorphous shale rock with layered structure.

10. Gas-holes are "included" in this vesicular basalt. In the magma sometimes the boubbles form a rich component and after solidifaction they give a spongy-like texture for the rock.. Such rocks are known from the Moon and Mars, too [9].

Conclusions: This year we studied the rock types on the test table with camera of Husar-9. In learning identification of rocks we get acquainted with several new rock types, we collected rocks from the country to give a rich landscape to the rover. We also selected those rocks which can be recognized by characteristic surface texture. The shape, color and surface texture were the three main characteristics in their identification.

Fig. 3. The working group of the Hunveyor-9 at Tata, Eötvös High School, Hungary.

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