

# **Detection of regolith buried water stream channels on Mars with the help of synthetic aperture radar**

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The major problem of Mars research is search of water on its surface. Biological life is connected to water. In this connection the intense interest represents detection of water stream channels, which in the past flew on Mars. In these areas the petrified rests of the former life on Mars may be found out. Now these channels may be under regolith layer. However radio waves penetrating ability allows seeing these channels under a regolith.

The radio wave falls on a regolith surface under some angle. The part of the falling wave power is reflected by regolith. Other part of it refracts under a regolith surface and reaches bottom of a channel. Here there is reflection because of a difference in refraction index of regolith and bedrock of a channel bottom. The part of reflected power gets back to the spacecraft. Passage through regolith is accompanied by electric losses. In result we receive the image of a channel which contrast depends on regolith depth, difference in refraction index of regolith and bedrock of a channel bottom as well as wavelength.

In this work in some assumptions concerning regolith and bedrock electric properties the model of the channel image is received. The optimum wavelength for detection of the water stream channels, now buried by regolith, is determined. The analysis of the reflected signal level dependence from an angle under which SAR onboard aerial is directed to a planet surface is carried out. It is shown, that power of the SAR transmitter and the size of the onboard aerial will be moderate if radar survey to carry out under a small angle to a local vertical. The way, which allows suppressing the altimetric clutter arising in nadir, is specified.

Here one method of search of water on Mars indications – detection of a regolith buried water stream channels is advanced only. However the radar with similar characteristics may be used as well for global survey a planet surface. Owing to a difference in character of reflection and penetrating ability of radio waves, radar survey of Mars allows receiving a lot of the new information in comparison with optical range.