Investigation of geology and topography using network resources -precursor of the desktop lunar and planetary exploration (DPLEX)-

Jun-ya Terazono[1], Jun Saito[2]

[1] JSF, [2] Technical Research Inst., NISHIMATSU Construction Co., Ltd.

http://www.terakin.com/ja/

Correlated and projected multi-spectral data of the moon has been published online at Planetary Data System (PDS). We can easily obtain, utilizing these services, lunar scientific images including monochromatic panchromatic images, RGB truecolor images and color ratio images. These images can be used to compare with ratio images by some software such as NASAView, created and distributed by NASA, and commercial image processing software.

This fact demonstrates that the user environment on usage of lunar and planetary data has been dramatically changed in these one or two years, helped by enormous spread of the broadband network.

We have been studying practical method of the desktop lunar and planetary exploration (DPLEX), and investigating what information, which is necessary for planetary research and mission construction, has been insufficient in network. In this presentation, we show our reseach result of utilization of currently-available network resources, simulating mission construction of lunar landing or rover operation. Our research area are Copernicus and Aristarchus craters and their vicinity, where has been regarded important from scientific point of view and considered as the most important candidate for future lunar landing and roving missions. We can select some points to explore from ratio images, and investigate distribution of major obstacles such as large boulders.

Our result shows that, in the central peak of Copernicus crater, the approach will be difficult because of existence of rubbles. And, as for the network resources availability, high-resolution image taken by the Lunar Orbiter mission (2-3 meter per pixel in maximum) has not been online, only we can obtain was scanned data from existing films and photographs. We suggest that we can conduct mission construction and scientific research in our desktop even under our current computer resources once these important data comes to online. This network-based research will significantly changes our style of mission construction.

Another issue we must take into account is preparation of links to existing information and future available information. One of important key for this preparation is the image resolution. In data distribution, we must serve images with unified image resolution in one area. On the other hand, too detaild resolution are sometimes not required for research. For example, Mars Global Surveyor took many images extending 2m/pixel in maximum, however, these images are directly not useful for route selection of rovers and other mission construction. These high-resolution data must be reduced first for utilizing to mission planning and wide-area research. On-line data reduction will need too much network and computer resources and practically difficult to realize. What we should know is the following points:

* What is the appropriate image resolution which represents the characteristics of each bodies (moon, planets, satellites, ...)?
* To what the image resolution should be precise ? Or, is there any suitable resolution for our purpose, such as mission planning and planetary research ?

In this presentation, we will present some proposition of mechanism which offers images with appropriate image resolution for their needs.