EXAMPLES OF POSSIBLE ASTRONOMICAL RESEARCH FROM THE MOON

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As stressed at the second International Lunar Exploration Working Group meeting (Kyoto, October 1996), the Moon, if kept free from pollution, contains a series of remarkable astronomical sites. In particular the following fields of instrumentation and research emerge :

(1) very low frequency radio-astronomical arrays to be located on the lunar far side for surveying an entirely new spectrum, albeit at fairly low angular resolution;

(2) interferometers in several wavebands to search for extrasolar planets as well as to perform other observations (morphological studies e.g.);

(3) transit optical telescopes for the detailed observation of dark matter and other targets;

(4) millimeter-wave telescopes for high sensitivity cosmic background mapping;

(5) infrared telescopes in permanently cryogenic environment (e.g. the lunar South pole);

(6) gravitational wave detectors;

(7) cosmic-ray and high energy detectors;

Although the Moon undoubtedly appears as a unique site for astronomy, some fundamental questions do remain, such as : should interferometry or VLF radio-astronomy be performed preferentially from the Moon rather than from free-flyers ? Of course one could combine the Moon, the Earth and free-flyers in order to achieve very long baseline interferometry !

A transit telescope seems quite appealing, not only for the interesting science it may provide, but also as an elegant way of gaining experience with an automatic equipment operating on the surface of the Moon.

It is clear that in the above cases intensive studies and trade-offs are definitely to be carried out in the near future. This reinforces the conclusion of the Working Group on Science from the Moon at the 1996 Kyoto workshop emphasizing the importance of near term technology demonstrations on the lunar surface, which could (should ?) lead to a variety of large scale astronomical instruments to be located on our natural satellite.

J. Andersen (ed.), Highlights of Astronomy, Volume 11B, 984.