

Logistics of the Construction of a Lunar-based Observatory

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The Moon presents some advantages over Earth- and space-based platforms for astronomical observations, as it gives more stability and there's no atmosphere. For the best performing of the observatory we propose to develop it following a 'step-by-step' philosophy. In that way, each of the steps has a well-defined objective and a closed structure. At the end of each step the observatory must be capable of producing new and usable scientific data. The final goal of the observatory is to reach a complete coverage of the electromagnetic spectrum. A brief description of the steps follows: a) Installation of the first instruments, using available technology. Obtaining first scientific data (surveys). Evaluation and calibration of instruments. The low complexity of telescopes and detectors (similar to active astronomical satellites) avoids dependence on existing lunar facilities. b) Complete coverage at all wavelengths. Implementation of future technologies and techniques like interferometry in IR and optical. Some lunar infrastructure is required, and human assistance is desirable. c) Completion and maintenance of the observatory. Implementation of new technologies as they become available. Need for a developed lunar colony and industry. Implementation of advanced projects (Arecibo-like radiotelescope, Moon-Earth radio interferometry, ...). Criteria for the definition of each step's objectives are based on the scientific return and technological requirements involved. Thus, we discuss the different spectral ranges that should be covered at each stage. After defining the main objectives for each step, we focus on the development of the first phase. The results and experience acquired in this stage will provide a guideline for subsequent steps. Many interesting science projects can be developed with this observatory, including Heliophysics, Extrasolar Planets Search and Characterization and Study of Supernova Explosions and Evolution. These projects can be started as soon as the first instruments are operative.