PROJECT SUMMARY

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The students and faculty of the University of Wisconsin-Milwaukee School of Architecture and Urban Planning can be proud of the quality of effort put forth in this first studio class on Lunar Base Architecture. In the approaching era of long duration space operations, the ideals and fundamentals of architecture must be applied to efficiently, productively, and comfortably support the activities of humans beyond our terrestrial, everyday life. A major architectural challenge exists to derive a new set of references and criteria because standards of terrestrial architecture do not apply. However, the ultimate architectural design objectives remain applicable. The process of applying architectural objectives and approaches to the lunar base in this studio created an innovative learning environment for students, faculty, and ourselves.

Members of the aerospace industry, including the Astronautics Technology Center in Madison, Wisconsin, met with the class throughout the semester to provide specific information as input to the architectural design of an evolutionary lunar base as well as comments on the students' design approaches. The interaction of students with private industry created an excellent environment for innovative ideas. At the start of the class, students were provided with data on the lunar environment and lunar surface characteristics. Information on previous lunar base concepts was reviewed and basic design requirements for construction and operation on the Lunar surface were determined. Each team of one to three students began design work on their own lunar base concepts using computer-aided design techniques. Each team took a unique approach to the problem covering many aspects of establishing a lunar base. Major concerns included minimization of transportation costs, use of modularity for expansion, use of internal volume, protection from the lunar environment, base construction, and safety.

The students presented their concepts and showed how they dealt with major concerns of lunar base development in "pin-up" sessions. These sessions provided an excellent forum for student-faculty-industry interaction. The students demonstrated a remarkable increase in awareness of the technical problems and human factors associated with costly transportation and long duration operations of an evolutionary lunar base. Some concepts demonstrated initial construction objectives including module placement and regolith management operations for radiation protection. Others stressed the strategic placement of these modules to maximize safety, base operation efficiency, and future base expansion. Specific innovative concepts which should be continued include: use of truss structures for radiation shielding with lunar regolith, evolution from small modular components to large enclosed volumes, regolith management for radiation protection, material selection for internal habitat components/structures, site preparation techniques, and the use of lunar resources. Overall, the students' concepts demonstrated good comprehension of critical issues in lunar base development.

The students, under the direction of Tony Schnarsky and interaction with professionals in advanced space development fields, gained valuable architectural experience and knowledge working on what may be one of the greatest accomplishments of the architectural, engineering, and human factors disciplines -- a permanently manned extraterrestrial base.

We look forward to a continued working relationship.