A Deep Field Infrared Observatory Near the Lunar Pole
PI: J. Roger Angel, University of Arizona

Our goal for Phase II is to develop the LLMT concept to the point where it can enter into the planning for the future of astronomy and of exploration of the moon being undertaken by academia, industry and NASA. We plan to conduct the research jointly with our colleagues in Canada and Europe, building on the strong international collaborations developed during Phase I.

Our work will focus in three main areas. First, in order for a LLMT to proceed, it must be shown to be a cost effective way to conduct unique research at the highest level. Only then would it merit high priority in future scientific community recommendations such as decadal National Academy reports. Second, we plan to tackle many engineering issues in mechanical and thermal design and robotic and human construction that need to be better understood before even approximate costs can be developed. A critical task is to identify by lab tests a cryogenic liquid of low vapor pressure that can be silvered. Third, we need to refine potential lunar LLMT site options from current data, and understand what new remote observations or insitu
site survey instrumentation and procedures are needed to qualify the best site.

The revolutionary mission concept that will be developed could provide a scientific focus to NASA's planned exploration of the Moon, just as HST stands as a major achievement of its Shuttle program. The low cost, giant space mirror technology we are developing might also benefit other future major telescopes, by providing an affordable way to make end-to-end, full aperture optical tests. Such a test is badly needed for TPF-C, but one of adequate precision is currently discounted as being prohibitively expensive with conventional mirror technology.