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C3Po1F-06: Development and projected capabilities of Chamber D

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Chamber D is a Thermal Vacuum (TVAC) chamber that is currently being developed by the National Aeronautics and Space Administration (NASA) Crew and Thermal Systems Division (CTSD) Systems Test Branch (EC4) to simulate the thermal profile of a lunar Permanently Shadowed Region (PSR). To achieve the target thermal environments, a gaseous helium cooled shroud is being integrated into an existing vacuum chamber. Chamber D is in the NASA Johnson Space Center (JSC) Space Environment Simulation Laboratory (SESL) which also includes the large TVAC chamber, Chamber A. A liquid nitrogen thermosiphon system and a state-of-the-art helium refrigeration system are used to control the temperature of the Chamber A shrouds. The same helium refrigeration system that cools the inner shroud of Chamber A is being used to cool the gaseous helium cooled shroud of Chamber D. Despite a significant smaller working area, Chamber D will have a similar cooling capacity to Chamber A. Chamber D also includes a mechanical actuation system in the lunar PSR simulated environment to perform thermal contact testing with test articles, including space suit components, and an actively cooled surface. The development and projected capabilities of Chamber D will be discussed.

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