

LONG ECLIPSE MANAGEMENT FOR CHANDRAYAAN-2 ORBITER. Debashish Paul¹, M Srikanth², Ritu Karidhal², Leo Jackson John¹, Manjusha², Pooja Prasad¹, Depanshu Garg¹, Amit Kumar Singh¹, Boyapati Ujjwala¹, ¹ISTRAC-ISRO, debashish@istrac.gov.in, ²URSC-ISRO, msrikant@ursc.gov.in

Chandrayaan-2, the second lunar mission by the Indian Space Research Organization was successfully launched on 22nd July 2019 from Satish Dhawan Space Centre, Sriharikota. After a series of Earth-bound and lunar bound maneuvers the orbiter entered into 100 km science orbit around Moon on 24th-Sep 2019. Satellites orbiting around the moon generally encounters eclipse of around 47 min/orbit due to its primary body. Satellites main frame systems e.g. power system (battery) and thermal system generally design to handle such periodical eclipses. In the total lunar eclipse the earth's shadow covers the moon entirely for about ~180 min. However, the duration may vary based on eclipse geometry. This is a survival challenge for any satellites around the moon because of non-availability of the solar power for longer duration to charge the battery, and the satellite also experiences a cooler environment than usual during the eclipse. Till January 2023, Chandrayaan-2 has undergone four such total eclipses two each in 2021 and 2022. A strategically planned mission and operation management was envisaged to protect the main frame systems from freezing temperature and also to protect the battery from over-discharge. This paper intended to discuss mission strategies adopted for long eclipse management and it should be useful for space agencies involved in lunar missions to handle up-coming lunar eclipses in 2025 and 2028.