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ICUBE-Q: PAKISTAN'S LUNAR CUBESAT ONBOARD CHANG'E 6 LUNAR MISSION

Abstract

The Chang'E-6 probe, consisting of an orbiter, lander, lunar ascent vehicle and re-entry capsule, will target the South Pole-Aitken (SPA) basin. The SPA basin is a colossal, ancient impact crater roughly 1,550 miles (2,500 kilometers) in diameter that covers almost a quarter of the moon's far side. The impact basin, considered to be the oldest on the moon, holds vital clues about the history of the moon and the solar system, according to a new report.

The Chang'e 6 mission, which will be launched this year in 2024, will also carry several payloads from international partners. The Asia Pacific Space Cooperation Organization (APSCO) in collaboration with China National Space Administration (CNSA) has provided its member states the opportunity to launch a payload/ CubeSat onboard the Orbiter and deployment of CubeSat in lunar orbit. The proposal of a CubeSat (ICUBE-Q) submitted by the Institute of Space Technology (IST) of Pakistan was accepted after a rigorous review process by CNSA.

The paper presents the scientific objectives and mission design, platform, and payload level design details of ICUBE-Q; a lunar CubeSat set to be deployed this year onboard Chang'E-6. The CubeSat consists of multiple payloads including a visible/ spectral imager for further understanding of the lunar surface. One of the payloads in ICUBE-Q is the surveillance camera to capture the images of the separation process and send it to ground station using an X band link. The single channel data volume is approximately 10 Mbps whereas the size of the single photo captured is approximately 500 kbits.

In summary, in addition to the Chang'e-6 mission's primary objectives, the ICUBE-Q CubeSat will contribute valuable scientific data, thereby assisting in further understanding of the lunar orbit and its environment. Moreover, the international collaboration demonstrates the growing role of small sized spacecrafts in lunar exploration which will pave the way for future scientific discoveries.