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Overview of ESA Lunar and Interplanetary CubeSat Missions

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The first truly low-cost lunar and deep space missions based on the CubeSat standard form factor have been flown successfully during recent years with Mars, Moon and Asteroids as destinations. These groundbreaking missions have served as pathfinders to demonstrate their potential use as tools for addressing space science and exploration objectives in a cost-effective manner, either as an augmentation to larger missions or as stand-alone missions. The hazards of operating in the deep space environment, as well as demanding requirements on propulsion, power generation, thermal control, communication and navigation capabilities have driven the development and qualification of new miniaturised technologies that are mission-enabling. At ESA, numerous lunar and deep space CubeSat projects are ongoing in various stages of design, development and verification within the frame of the Technology and Space Safety Programmes, targeted for launch in the 2024-2027 timeframe. An overview of these missions will be provided, along with their system capabilities and enabling technologies underpinning their feasibility. The topic of qualification of the CubeSat COTS electronics for the deep space environment will also be addressed.