The feasibility of a CubeSat constellation about Mars to provide telecommunication relay for surface assets is the focus of this investigation. The rapid technology development, flight testing, and small form-factor make CubeSats a viable alternative for addressing the expanding telecommunication needs at Mars. The investigation assesses a constellation of four 6U CubeSats that provides telecommunication relay capability via UHF between surface assets and existing orbiters as well as direct-to-Earth capability via Ka-Band. The constellation is targeted for deployment from the 2022 Mars Telecom Orbiter into a 350 km circular orbit at 70° inclination with the CubeSats evenly phased RAAN for each orbit. The implementation of the constellation allows significantly increased frequency of communication with ground assets, totaling 15 overflights per sol. The CubeSat constellation provides commanding and data return capabilities that represent a major benefit to surface missions at Mars.