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Charles D. Edwards, Jr.* (chad.edwards@sbcglobal.net). *How an International Martian Telecommunications Relay Network Is Enabling the Robotic Exploration of The Red Planet.*

The mass and power constraints of Mars rovers significantly constrain the quantity of science and engineering telemetry that can be returned on Direct-To-Earth (DTE) communications links over the large Earth-Mars distances of up to 400 million kilometers. To greatly increase our communications capabilities to support Mars exploration, the National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA) have deployed a series of Mars science orbiters equipped with telecommunication relay payloads. Today, NASA's Odyssey and Mars Reconnaissance Orbiters support the return of over 500 megabits per sol from the Curiosity Rover. ESA's Mars Express Orbiter is also on orbit and has demonstrated interoperable relay capabilities with NASA landers. Augmenting this current network, NASA's Mars Atmosphere and Volatile Evolution Mission (MAVEN) arrived at the Red Planet in September 2014, and ESA plans to launch the ExoMars/Trace Gas Orbiter mission in January 2016, carrying NASA-supplied Electra relay payloads. With the infusion of new error-correcting codes, this network stands ready to provide Gigabits per sol of data return for future Mars landers and rovers. (Received August 27, 2015)