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Author: Ms. Krisjani Angkasa

National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States,  
krisjani.s.angkasa@jpl.nasa.gov

Mr. Sami Asmar

National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States,  
sami.asmar@jpl.nasa.gov

Ms. Zsarina Benecken

National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States,  
zsarina.m.bulchand@jpl.nasa.gov

Mr. Brian Giovannoni

National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States,  
brian.j.giovannoni@jpl.nasa.gov

Mr. Serjik Zadourian

National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States,  
serjik.zadourian@jpl.nasa.gov

FROM EARTH TO MARS - THE DEEP SPACE NETWORK SERVICES FOR THE UAE HOPE  
MISSION, NASA'S PERSEVERANCE ROVER, AND THE UPCOMING ESA'S EXOMARS SURFACE  
MISSION

**Abstract**

NASA's Deep Space Network (DSN) is a multi-mission system that provides space communication services i.e., acquisition, tracking, telemetry, command, and delivery of science data over the terrestrial link to mission operation centers. This paper describes the services recently provided from launch to the orbit insertion of the UAE's Hope (Emirates Mars mission), as well as, the launch, Entry, Descent and Landing (EDL), and early surface operations of the NASA/JPL Mars 2020 Perseverance Rover. To bring data to the DSN, Mars 2020 was aided by the Mars Reconnaissance Orbiter (MRO) & Mars Atmosphere and Volatile Evolution (MAVEN) for EDL, and by Odyssey & ExoMars Trace Gas Orbiter (TGO) as the first NASA & ESA Mars relay respectively, for early surface operations. Lessons-learned will be applied to the support of future Mars missions using the DSN such as, the ExoMars Rover Surface Platform (RSP) to be launched in 2022 and arrive in 2023.