DEEP SPACE TELECOMMUNICATIONS-PIONEER MISSION TO JUPITER

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Abstract The Telecommunication subsystem for the Pioneer 10 and 11 spacecraft is described in terms of the exacting design requirements which have been met and the operational performance which has been achieved. Those features which are unique or novel and which contribute substantially to our knowledge of advanced techniques for future interplanetary missions, are emphasized. The discussion includes earth-pointing of the spacecraft high gain antenna by an on-board conical scan system, tracking, telemetry, and command functions at multi-million kilometer distances complicated by round trip communication delays of 90 minutes, and the versatility of special data formats which cater to certain instrument high rate sampling requirements during selected phases of the mission.

With the successful flyby of the planet Jupiter by Pioneer 10 in December 1973, the technology and experience for much more ambitious, challenging, and complex missions to the outer planets has been demonstrated.