

7.4 Command and Data Handling (C&DH)

The concept for command and data handling is based on the Communications and Data Handling module of the Fairchild Multi-Mission Spacecraft (MMS) design.

It contains the spacecraft master computer which implements the attitude control and homing laws, handles all telemetry and telecommand functions and routes the data generated by the payload sensors either to the tape recorders or directly to the ground stations.

The C&DH also includes a communications transponder and its associated antenna which provide the link between the spacecraft and the ground station. A half meter aperture high gain antenna mounted on a 2-axis gimbal provides the primary high rate data link through which information passes to and from the satellite. The gimbal system allows antenna repositioning so that the link is maintained during Paxisat maneuvers and in different flight attitudes.

A second low rate data link is provided through two omni-directional antennas which give 4 Str (whole hemisphere) coverage, so that contact with the satellite can be maintained even if the high gain antenna is inactive.

Two tape recorders are provided for data storage. Initially, it was considered that a record rate of 2 Mb/S and a total storage of 10^9 bits would be sufficient. However, the record/playback frequency and the data storage requirements will need further analysis in order that a storage system with the required capacity and reliability can be configured.

Alternatives to on-board storage exists. One is the provision of a link through other satellites (as in TDRSS, the NASA tracking and data relay system) in which Paxisat would relay information continuously to stations not visible directly via another satellite or satellites to which both Paxisat and the station are visible. Another possibility is to provide data relay stations spread throughout a large number of countries which would record downlinked Paxisat data and then relay it to the main processing center again via a communications satellite. Of course, a combination of on-board storage