Overseas 64-m Station Implementation Status

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Activities associated with implementing the overseas 64-m-diam antenna stations in Australia (DSS 43) and Spain (DSS 63) are presented. The article gives the current status of the project, describes the system configuration as implemented, and discusses the activities involved in reaching the desired configuration.

I. Purpose

The purpose of this article is to present the activities associated with implementing the overseas 64-m-diam antenna stations: DSS 43 in Australia and DSS 63 in Spain. The article will show the current status of the project, describe the system configuration as implemented, and discuss the activities involved in reaching the desired configuration.

II. Implementation Status at DSS 43

The DSS 43 antenna was completed in July 1972. Subreflector and multicone installation and control room electronic equipment installation are in process with a scheduled completion date of April 1973. Subsystem testing is accomplished as the equipment is installed, and system testing will start in March 1973 and be completed by April 30, 1973. This completes the mission-independent implementation.

III. Implementation Status at DSS 63

The DSS 63 antenna was accepted in January 1973. Subreflector and multicone installation is in process and scheduled for completion on May 2, 1973 with an additional weather allowance of up to 30 days.

The Angle Data Assembly will be installed in parallel with the multicone installation and should be completed by May 30, 1973. Control room electronics installation and subsystem testing are in process and should be completed by June 30, 1973. System testing is scheduled for completion by August 30, 1973.

In the event that weather does not unduly impact installation of equipment upon the antenna, the mission-independent operational readiness date could improve by as much as 30 days.

IV. System Configuration

The system configuration, as shown in Fig. 1, consists of separate 26-m and 64-m antennae and associated servo systems. The 64-m antenna is controlled by an Antenna Pointing Subsystem and the 26-m antenna is controlled by a combination of a Spaceflight Tracking and Data Network (STDN) Antenna Position Programmer and the Simulation Conversion Assembly, which provides simulation for both the 26-m and 64-m stations. A Tracking Data Handling Subsystem processes radio metric data for the

64-m antenna and an STDN Tracking Data Processor handles the 26-m radio metric data. Each station has separate antenna microwave, receiver/exciter, ranging and monitor subsystems. Each station has one telemetry and command functional system and shares a second system by means of a switching network. Additional shared electronic equipment consists of frequency and timing, communications (tactical intercom, teletype, high-speed data, and voice), system control, and monitor and simulation. Shared facilities equipment consists of power generation and distribution, heating, ventilation, and air conditioning.

JPL drawing 9456098, "Functional Block Diagram 1973 Model Conjoint Stations" functionally depicts the configuration. With this configuration, each station can track a spacecraft simultaneously, and at the completion of the implementation, both stations will be capable of supporting the Pioneer Project. Additional equipment and testing will be required to support Mariner and Viking. Note that the configuration of DSS 61/63 is identical to DSS 42/43.

V. Implementation Activities

Because of the interrelationship between the 26-m and 64-m stations, a description of the implementation activities must include both stations. As the 64-m antennae were being built, the 26-m stations were being prepared for the new configuration. This was a two-step process.

Step one, as described in Ref. 1, consisted of removing the Deep Space Network (DSN) equipment from the DSN control room and installing sufficient equipment in the Manned Spaceflight Network (MSFN) (now identified as STDN) control room to allow the 26-m stations to continue to support the Apollo, Pioneer, and Mariner Projects while the 64-m stations were being built. This Integration Program also provided some equipment and facilities which were needed for the 64-m station. When the 26-m stations resumed tracking, the empty control rooms at DSS 42 and DSS 61 were upgraded and expanded to provide room for the equipment needed to support projects through 1975. At the same time, the power generation and distribution, heating, ventilation, and air conditioning modifications were made for simultaneous two-station support.

After the facility modifications were completed, step two of the implementation activities was initiated. The 26-m stations were shut down and DSN equipment was removed from the 26-m control room and reinstalled in the 64-m control room. This move was conducted in a manner which would allow the 26-m stations to return to an operational status, for Apollo support only, when required by STDN. The modifications to existing equipment and installation of new equipment which was needed to allow the 26-m station to return to a DSN as well as STDN operational condition was then implemented. In November 1972, DSS 42 became a fully operational station. In addition, the implementation of DSS 43 had progressed to the point where the 64-m station successfully supported Apollo 17 on a best effort basis. DSS 61 became operational for Apollo support in November 1972 and DSN support in January 1973.

With both 26-m stations operational, the implementation of the 64-m stations continues on a noninterference basis to the 26-m stations in accordance with the schedule outlined in the status section of this article.

Reference

1. Weber, R., "MSFN/DSN Integration Program for the DSS 11 26-m Antenna Prototype Station," in *The Deep Space Network Progress Report,* Technical Report 32-1526, Vol. III, pp. 197–202. Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1971.

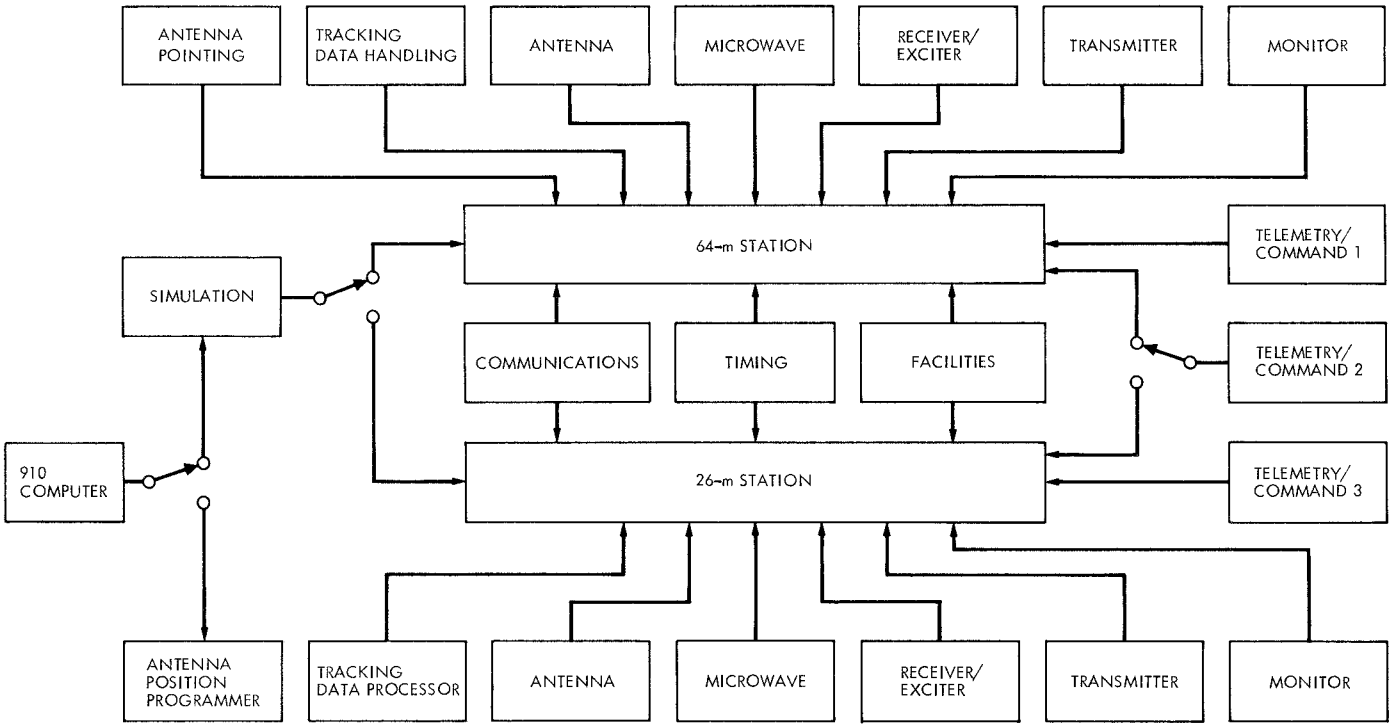

Fig. 1. Conjoint station configuration of DSS 42/43 and DSS 61/63