For Network Personnel Only

TECHNICAL INFORMATION BULLETIN

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TIDBINBILLA COMPLETING GIANT DSN ANTENNA COMPLEX

The Tidbinbilla Deep Space Communications Complex (TDSCC) comprising: right, DSS42A (DSS43 when operational) 64-meter antenna (210 ft); left, DSS42 26-meter antenna (85 ft); microwave link dish and tower to HSK at center; and the MSFN wing is in the blank walled building in the center, added to the existing DSN operations building.

The Tidbinbilla Deep Space Communication complex is located in an undulating valley about 25 miles southwest of Canberra.

The MSFN 85-foot wing site was officially opened in 1965, and since then has supported many of NASA's deep space missions as well as Apollo missions 6 through 14 and will support the forthcoming Apollo 15 in July.

In 1966, several additions to the building and additional equipment provided the MSFN with an Apollo support capability to the nearby MSFN prime 85-foot site at Honeysuckle Creek (HSK). Linked by a microwave system, the link path from Tidbinbilla to HSK is about 11 miles to a passive repeater on a mountain top, and then about 2 miles to the HSK terminal.

At present, construction work is in progress at Tidbinbilla on a 210-foot DSN antenna system and on modifications in the MSFN wing to contain the DSN equipment. Continuing support will be provided to both MSFN and DSN missions using the 85-foot antenna.

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Honeysuckle Isolated By Cave-in

Honeysuckle recently was isolated when a 100-yard stretch of the mountain road leading to the station collapsed. The road had been undermined by floods.

Some of the staff were able to leave the station before nightfall. It was, however, thought to be too dangerous to attempt to cross after dark, and the remaining staff prepared for a night at the station.

About 12 technicians who were to have relieved a team working on Apollo 12 and Apollo 14 ALSEP equipment on the moon were unable to reach the station. The on-station personnel had to work a double shift, but with adequate food rations and accommodations, were able to meet the night-long emergency.

A temporary dirt road was used for several weeks following the incident while the station road was under repair.

The station is preparing for the upcoming Apollo 15 mission, presently scheduled for July.

Guam Laser Facility Determines Geodetic Coordinates

Using precise survey instruments, a survey team consisting of B. Myers and C. Nichols of the Field Facilities Branch has determined the geodetic coordinates of the Guam laser facility. The laser measures the precise distance between the satellite (Explorer-36/Geos-B launched in 1968) and the exact spot on earth upon which the laser itself rests. NASA's tracking stations must be geodetically tied and referenced to a common datum to minimize the errors in the positioning between the tracking facilities. The laser is part of the International Satellite Geodesy Experiments (ISAGEX).

The geodetic survey for the laser was extended from the first order triangulation stations Alifan and Talofofo 2, and was established by the Surveying and Mapping, Public Works Command, at Guam in August, 1965. An intermediate station named Dandan was established on a hilltop within the station's vicinity to allow the survey to be extended into the laser area. Utlizing precise optical surveying equipment, a triangle was formed by using the previously established control stations and the new station, Dandan. A closed traverse was tied into the monumentation previously established for the USB antenna, thus tying the laser position to the tracking station and checking the established control of the facility.

The elevation above the sea level of the laser was established from the center

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APOLLO 15 WILL USE ELECTRIC DRILL FOR THE FIRST TIME

The Apollo 15 astronauts will probe the moon's interior with an electric drill.

The drill will be used for the first time at the Apollo 15 landing site near a gorge called Hadley Rille at the foot of the Moon's Apennine Mountains about 465 miles north of the lunar equator.

Astronauts David Scott and James Irwin will also use the electric drill to bore a hole, about seven feet deep, to obtain cores of lunar material from deeper into the Moon than the samples brought back for analysis from previous landings.

The drill, powered by silver-zinc batteries and a 0.4-horsepower motor, delivers 2,270 rotary-percussive blows a minute through a hollow boron-fiberglass composite bore stem tipped by tungsten-carbide cutters that can bite through as much as five feet of simulated lunar soil, or three to five inches of basaltic rock, a minute.

The astronaut holds it by two protruding handles, like a jackhammer,

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LASER

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tablet of the Apollo USB antenna. The elevations of the concrete pad and the elevation axis of the laser were also obtained.

The measurements from the laser to the boresight target were made in conjunction with the geodetic survey. The azimuth, elevation angle, and slant range distance from the center of the elevation axis of the laser to the center of the boresight board was accurately measured by using a precision theodolite (an optical surveying instrument with an accuracy of circle readings of 1:259, 200), a geodometer (an electro-optical instrument for measuring distances by means of a modulated light beam with an accuracy of 13 mm in one mile), and a precise level. All measurements were made at night to take advantage of more stable temperature conditions.

The computation of the latitude and longitude position of the laser resulted in a first order accuracy with an error not exceeding one part in 50,000 or about 12mm in 2400 meters. The elevation of the laser was established to a third order accuracy. The slant range distance, used for calibration of the laser, had an error of only one inch in five miles.

This type of survey will be performed periodically for all tracking and ranging antennas to ensure that pointing accuracy of the antennas is constantly maintained.

The above information was submitted by S. John Nastopka of the Field Facilities Branch.

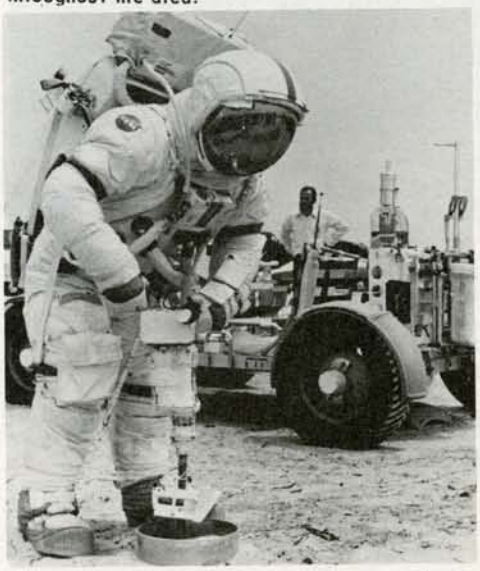
Guam Students Receive NTTF Certificates

The Guam Tracking Station has recently issued NT&TF remote site training certificates to six graduates of a course of instruction in basic electronics. The course also included physics, vacuum systems, refrigeration systems, mathematics, and use of basic test equipment including oscilloscopes.

The course consisted of 128 hours of classroom participation and testing. Students who have completed the course are: Mr. Howard Caracol; Mr. Robert Clavet; Mr. Frankie Cruz; Mr. Larry J. Cude; Mrs. Gayle Mackay; Mr. Justino Vega.

This course began in July 1970 and was completed in December 1970. All lesson guides, student handouts, and student worksheets were prepared according to standard NT&TF formats. Instructor for the course was Mr. R. L. Prewett. Practical use of the oscilloscope was taught and demonstrated by Mr. S. Yurko.

The main road to the HSK site recently caved in due to persistent rainstorms and flooding throughout the area.



The lunar drill is demonstrated by astronaut David R. Scott. The Lunar Roving Vehicle is in background.

Crew patch for the Apollo 15 mission. Colors are red, white, and blue, featuring Hadley–Apennie landing site.

Apollo Will Use Drill

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and presses it vertically into the surface. The hollow bore stem comes in 22-inch sections that he adds as the drill penetrates deeper, and these provide a casing for the hole into which the heat probe is inserted.

For taking the core sample, the stem, assembled from six 17-inch sections, has an open tungsten carbide bit at the tip to admit lunar material as the drill cuts through the soil and rock.

The rotary-percussive motion minimizes torque that would make the drill difficult for an astronaut to control in the Moon's low gravity and also keeps operating temperatures low enough so that there is no need for air or water to cool the drill bit.

TIDBINBILLA

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The 210-foot antenna will become operational in 1973 and Tidbinbilla will then be a fully operational complex of two stations: an 85-foot antenna system (HSKX/DSS 42), and a 210-foot antenna system (DSS 43).

Serving as Director is Tom Reid; with Frank Northe as Stadir of DSS 43, and Mike Dinn as Stadir of HSKX/DSS 42.

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