For Network Personnel Only

TECHNICAL INFORMATION BULLETIN

MANNED SPACE FLIGHT NETWORK

GODDARD SPACE FLIGHT CENTER, GREENBELT, MARYLAND

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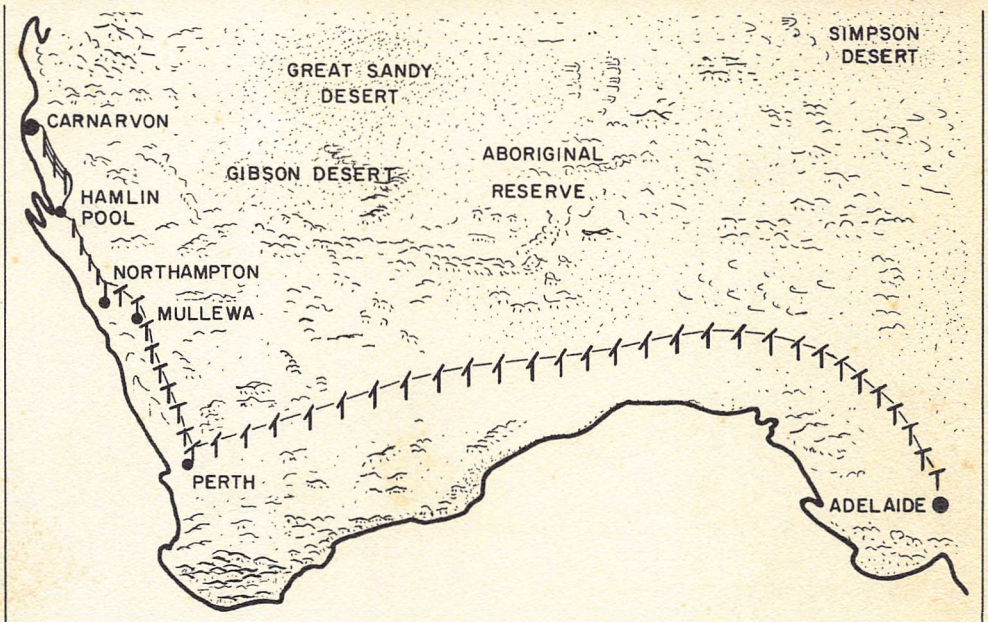
CRO Uses Bush Telegraph During GT-1

Although CRO is still incomplete, their spirit of "follow through and support the network" is strong. At T-1:37 (10:22 P.M., Western Australian Time), all contact with Carnarvon was lost when lightning severed the lines in Western Australia, about 65 miles southeast of the station. The official report states that "during the communications outage, alternate means of communications were used" to pass GT-1 acquisition data to CRO. Behind the "alternate means" is quite a story.

Shortly after midnight, Mrs. O'Donoghue, operator of the weather station at Hamil Pool, Australia, received a telephone call from the Northampton operator and was asked if she could contact Carnarvon. Utilizing the bush telegraph, which is nothing more than a party line made up of telephones connected to the top strand of ranch fence lines, or sometimes a line strung on the fenceposts above the fence wire. Mrs. O'Donoghue contacted the operator at Carnarvon, over 150 miles away.

As acquisition data was received at Adelaide, Australia, it was phoned to the test room at Perth. Perth then relayed the information to the technician at Mullewa. A phone patch was made from Mullewa, through Northampton, to Hamlin Pool, where Mrs. O'Donoghue and her husband relayed the messages by bush telegraph the 150 miles to the town of Carnarvon. The Carnarvon operator relayed the information to the T&C building, which in turn relayed the data to the CRO radar site. This operation was carried on until 3:00 A.M. local time, while the land line repair crews battled 65 miles of wild country in a driving rain and through several wash-outs to make repairs on the regular land line.

CRO expects to get additional communications facilities (probably tropo-scatter) worked out in the near future. Whatever form of alternate communications are ultimately installed, one might assume that there will always be some recollections of the night when the bush telegraph was the only means of reaching the outside world, and of the couple who stayed up most of the night to help make GT-1 a success for CRO's first participation in the network.



Map of Southwestern Australia showing approximate route of alternate communications used during GT-1.

Remote Loading Of DCS's Being Conducted

A test to determine the feasibility of loading remote site digital command systems from a central point was successfully carried out from GSFC last month.

Valid words in all memory addresses (a total of 365 words) were loaded into the CRO digital command system from UNV via TTY. The complete load was successfully transmitted and properly entered into the DCS with only one invalid word. A jammed chad on the TTY tape at UNV caused the invalid word. Loading of the DCS was confirmed by SCAMA.

This test was the first time that a network DCS had been remotely loaded. Eventually all network DCS's will be tested in a like manner, although the CYI, CSQ, and RKV DCS's will be loaded via an HF link instead of hard-wire communications.

The CRO unit will undergo more testing during the week of May 11.

"16" Range Being Extended At HAW

HAW is boosting its C-band radar coverage to 32,000 nautical miles (n.m.) by adding a digital range machine (DIRAM) to their FPS-16.

The DIRAM is a long range, all electronic, digital range tracking system that provides acquisition and continuous unambiguous tracking of skin and beacon targets from 500 yards to 32,000 n.m., with capability for extension to 256,000 n.m. It incorporates the following features:

- Target detection circuits to increase the probability of acquisition.
- Fast slew rates (240,000 yards per second).
- Nth-time-around-tracking techniques to increase the range of the radar without having to reduce the radar pulse repetition frequencies (PRF) as range increases.
- A "find" process, used during Nth-time-around-tracking to eliminate range ambiguity.
- A "verify" process, also used during Nth-time-around-tracking to confirm that the range data is the true range of the target.
- PRF sequencing which may be used when several radars are in operation so that output pulses from the radars do not arrive at the target beacon at the same time.
- Overall precision (exclusive of propagation errors or beacon delay variations) of 3 yards rms for a target whose S/N is 20 db at the input of the radar receiver IF amplifier.
- Range resolution (granularity) of 1.953125 yards nominally.

(Continued on next page)

Upon completion of the DIRAM installation, HAW's 16 will be capable of tracking targets at range rates from 0 to 20,000 yards per second and acceleration from 0 to 600 yards per second squared.

In addition to the DIRAM installation, HAW is also adding a circular polarization unit and a real time data correction unit.

Installation of the DIRAM at HAW should be completed by early June. The DIRAM is already in use with the FPQ-6's at CRO, ANT, and PAFB.

About EI's

The following Engineering Instructions were issued during the past two weeks:

EI 566 Attachment 10 - Acq Bus Implementation (WLP)

EI 690 Command Antenna Installation (CNV)

EI 693 Conversion of BCD Stores to ON-OFF Stores (CNV, BDA, RKV, CYI, CSQ, CRO, HAW, GYM, TEX, WLP, IMCC)

EI 721 AGAVE Frequency Changes for SA-6 (HAW, GYM, EGL)

EI 731 Removal of M-28 RT Units and Sequencer Selector from MUC

EI 734 ON/OFF Store Noise Lockout (CNV, BDA, RKV, CYI, CSQ, HAW, GYM, TEX, WLP, CRO, IMCC)

EI 735 DRED Implementation (CNV)

EI 739 Installation of TJO Control (MCC)

EI 740 Removal of M-28 RO Unit from WOM

About Documentation

The following documents were completed and distributed to the appropriate stations:

ME-315 Series FR-100B Recorder/Reproducer Magnetic Tape Recorder; revised April 22, 1964

ME-1115 Kato Generators Instruction and Parts Book; new

MH-1015 Teletypewriter Set Types 1257, 1259, 1262, 1268, 1269, 1450; new August 15, 1963

MS-210-9 Acq Bus System for CNV; Preliminary, April 30, 1964

SA-6 Network Operations Plan

Supplement to DST/BST-101(C)

Revision No. 1 has been issued for the following documents:

SA-6 Network Operations Plan

AC-3 Network Support Plan

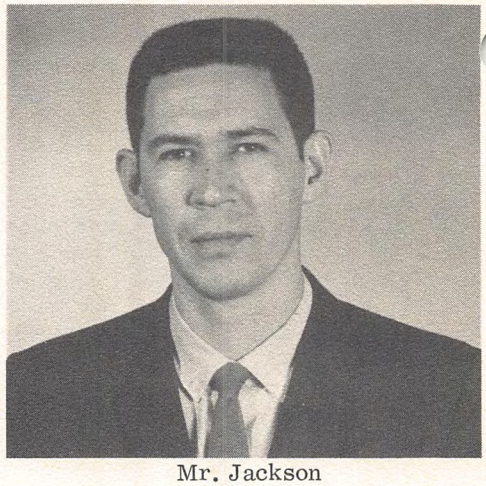
AC-3 Network Operations Plan

OR 2460

Jackson Named Assistant Chief, MFOD

Mr. James C. Jackson has been appointed Assistant Chief of the Manned Flight Operations Division. The appointment became effective April 1, 1964.

No newcomer to the space project, Mr. Jackson joined NASA in 1959 at the Langley Research Center in Hampton, Virginia, where he was assigned to the Tracking and Ground Instrumentation Unit, the group of systems engineers responsible for technical management and design of the MSFN. Upon completion of this effort, he was assigned to GSFC as head of the MSFN Procedures and Evaluation Branch. Last September he was appointed head of the Manned Flight Support Office Plans Staff and has held that position until now.



Mr. Jackson

Mr. James Donegan (far left with microphone), head of the Data Operations Branch, is shown briefing attendees of the two day Manned Space Flight Network briefing conference held at GSFC last week. The conference, attended by top management personnel of prime Gemini systems contractors, covered all phases of network engineering, operations, and communications.

SA-5, placed into orbit January 29, has been continually skin tracked by various stations since its beacon died. Between February 4 and May 1, the records compiled by Saturn Control at GSFC show that the FPQ-6's at CRO, PAFB, and ANT have been averaging 5 minutes 18 seconds of track per pass; the 5-megawatt FPS-16 at EGL has been averaging 1 minute 25 seconds of track per pass; the 3-megawatt FPS-16 at WHS has been averaging 1 minute 47 seconds of track per pass; and the Spandar (space and range radar) at Wallops Island has been averaging 9 minutes 12 seconds of track per pass. These averages are based on automatic skin track obtained by the stations during the three-month period. Nearly all of the other radar stations have had momentary or aux track on a number of passes but, because of the range of the vehicle and radar power limitations, these stations were unable to obtain a substantial amount of auto track.

T.I.B. B.I.S.

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