Viking Continuation Mission Support

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This article covers the period from 1 July through 31 August 1978. It reports on DSN support of Viking spacecraft activities during the period and continues reporting on the DSN Viking Command and Tracking support.

I. Viking Operations

A. Status

The Viking Orbiter 2 (VO-2) mission ended during this reporting period after a severe gas leak depleted its remaining supply of attitude stabilizing gas. On 20 July, the VO-2 spacecraft was brought out of its roll-drift mode of operation to collect its last sequence of scientific observations of Mars. On 24 July the VO-2 spacecraft developed a severe gas leak in the positive roll valve, and on 25 July drifted off sun acquisition.

The Mars mission officially ended for VO-2 at 11:02 p.m. on 25 July when radio signals from the spacecraft ceased. Launched from Earth on 20 August 1975, VO-2 will now slowly tumble about Mars for at least 50 years before crashing to the surface.

The Viking Orbiter 1 (VO-1) spacecraft continued to operate normally during this reporting period as it collected and returned to Earth weather data and Mars photos as well as relaying to Earth data from the two Viking Landers.

The Viking Landers continue to operate in an automatic mode of operation as they collect and relay to Earth, via VO-1, Mars weather information and photos.

B. Radio Science

Radio Science activities and experimentation continued during July and August. These activities include near-simultaneous Lander/Orbit ranging, VO-1 Earth occultation coverage and the Gravity Field Experiment.

II. Network Support

Table 1 shows the DSN tracking support for January through August 1978. A significant decrease in tracking support is notable in August. This is primarily due to the increase in tracking support required from higher priority projects such as the Voyager and Pioneer Venus Missions. The Viking Project will continue to have major conflicts with other projects for tracking support during the Continuation Mission.

Table 2 gives the total number of commands transmitted by the DSN for Viking Project during January through August 1978. The reduction in the number of commands beginning in June reflects the reduction in Viking operation activity anticipated during the Continuation Mission.

Figure 1 shows the performance of the DSN delivery of the telemetry Intermediate Data Record (IDR) during January 1977 through August 1978. The IDR is a magnetic tape,

produced by the DSN, of digital telemetry data. As a goal, within existing time constraints, the DSN attempts to provide 100 percent of the data recorded at the Deep Space Station on the Digital Original Data Record (DODR) magnetic tape. IDR's are required to be delivered within 24 hours following the end of a station pass.

During July and August 1978, the IDR delivery time significantly improved from the previous months. The delivery time dropped from 23 hours to under 7 hours.

In May of 1978 a new position was created titled DSN Data Records Engineer. The primary function of the Data Records Engineer is to coordinate the data record (IDR) production conflicts among the many DSN projects, including Viking. The improvement in IDR delivery times can be attributed to the coordination efforts of the DSN Data Records Engineer.

The percent of telemetry data delivered to the project also increased during July and August with an average of 99.1 percent of telemetry data delivered.

Table 1. DSN tracking support 1978

DSS	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
11	8[a] 72[b]	–	19 167	–	18 164	1 1	2 13	–
12	–	4 13	5 22	1 8	–	–	–	–
14	40 319	25 218	37 272	47 365	25 231	34 242	14 89	13 85
42	22 166	23 76	30 201	30 192	2 4	–	2 9	1 3
43	57 294	14 207	15 68	27 163	40 281	46 346	51 449	23 135
44	–	11 51	6 43	–	11 77	3 17	–	3 11
61	10 88	38 243	25 281	15 159	2 26	–	–	1 5
62	61 27	2 25	3 22	3 29	8 75	3 33	1 7	1 9
63	13 101	21 181	30 293	42 440	26 206	41 343	40 291	16 130
Total	156 1067	138 1014	170 1369	165 1356	132 1064	128 982	110 858	58 378

[a]Number of tracks: the summation of all Viking spacecraft tracked.
[b]Track time: scheduled station support in hours.

Table 2. Number of commands transmitted in the Viking mission during January through August 1978

DSS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
11	1947	–	119	–	1628	6	0	–
12	–	1	1	374	–	–	–	–
14	4565	1079	1326	3032	2845	1214	870	562
42	1447	1305	261	1079	0	0	0	0
43	1593	1732	124	275	1326	1567	791	7
44	–	255	3	–	373	0	–	30
61	992	3548	1073	1503	0	0	–	0
62	1	1006	461	73	0	960	0	683
63	895	128	2597	4005	669	2451	2984	2073
TOTAL	11440	9054	5965	10341	6841	6198	4645	3355

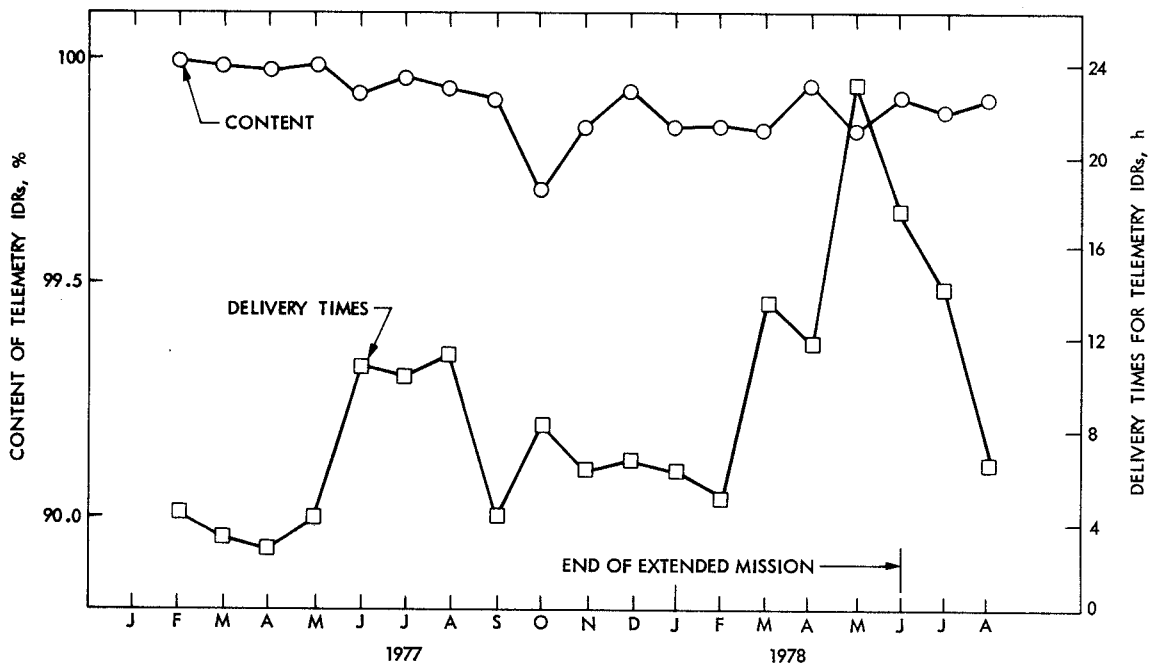

Fig. 1. Viking telemetry IDR performance