AW01513

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FLIGHT ACTIVITY REPORT

MISSIONS 7305 and 7306

VEHICLE 4302

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Approved By:

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FLIGHT ACTIVITY REPORT

I. SUMMARY:

P-11 FTV 4302 was carried into orbit by an Agena S-01A vehicle on 23 October, 1964. The P-11 vehicle was separated and then stabilized by inducing a spin rate of about 65 rpm. After a delay of one orbit the P-11 was injected into a near circular orbit by its own propulsion system. The nominal altitude was 180 n.m., with an apogee of 191 n.m. and a perigee of 172 n.m. P-11 FTV 4302 operated in orbit for 123 days and reentered on 23 February 1965.

The first read-in was commanded on orbit 14, and the first read-out occurred on orbit 16. The last read-in and read-out occurred on orbit 1956 on February 23, 1965. Both payloads and tape recorder No. 1 operated normally for the entire mission. Tape recorder No. 2 (Step 13) operated intermittently during the latter part of the mission and had 305 read-outs as compared to tape recorder No. 1 which read out 487 times.

II. PAYLOAD PERFORMANCE:

A. Plymouth Rock (Serial No. 1).

This payload performed satisfactorily for the entire life of the mission with no observed failures of any components or functions. The sensitivity of the wideband channel was as expected, and the 30 db step attenuator was seen to operate during intercepts of high-power emitters, or emitters having a vertical scan, such as height finders. The accuracy of the frequency measurements made by the sweeping channel, which used a YIG filter, appeared to be satisfactory. Analysis of the response of this channel to low prf signals suggests that the sweep rate of ten scans per second was too fast for the bandwidth (approximately 30 mc/s) of the YIG filter.

The pulse width and pulse interval measurement circuits and the accompanying commutator and voltage-controlled oscillator appeared to operate very satisfactorily. Sub-commutators were also used for the first time to record payload status and timing data. Timing data were recorded by both payloads from a common time reference generator. An interface problem was discovered after launch in that the low input impedance of the Plymouth Rock sub-commutator, with no power applied, caused cross-talk during the real-time readout of the clock by the Step 13 payload. This meant that the correlation of the payload clock with time of day could not be computer processed; manual processing on selected readouts was, however, possible.

The payload time reference generator, or clock, operated satisfactorily. A sample observation for a ten-day period showed a six second error in accumulated time. Thus, a correlation of the clock with system time once a day during a real-time readout should allow timing accuracies within one second or less. The clock register was noted to jump, or shift count, whenever a P-11 low-voltage cutoff occurred due to undercharging or excessive power consumption. This occurred at least four times during the lifetime of the mission.

The 25 kc, 4:1 tape recorder used with the Plymouth Rock payload performed satisfactorily for the entire mission, as did the data link transmitters. It was demonstrated that the 25 kc reference tone (100 kc on read-out) could be used to compensate the commutated data for the wow and flutter of the tape recorder. The quality of the compensated commutated data was excellent.

B. Step 13

The operation of the Step-13 payload was satisfactory except for the calibrator and confidence-checker which failed during the early orbits of the mission. The selectable bandpass filter and the selectable 0 or 30 db attenuator functioned properly.

The performance of the superheterodyne receiver and the crystal video receiver was satisfactory. However, the superheterodyne receiver exhibited spurious responses to strong signals. These spurious responses are inherent in superheterodyne receivers.

The recorder for the Step-13 payload, recorder No. 2, operated intermittently during the latter part of the mission. The recorder would fail to read-in as well as fail to read-out.

The cause of the recorder malfunction has been attributed to the mounting of the clutch. The recorder could have sustained a blow sharp enough to have caused the clutch to move on its mountings. The manufacturer demonstrated that intermittent operation could be caused by moving the clutch on its mountings.

The quality of the video data was satisfactory. However, the quality of the commutated data was poor because there was no reference tone to compensate for tape recorder wow and flutter, which was excessive.

III. VEHICLE OPERATION:

All vehicle equipment operated satisfactorily for the entire life of the mission except for tape recorder No. 2 and the payload timer. One of the time delays (SPC 21) was noted to have malfunctioned on orbit 1059. Operation of this time delay was intermittent until about orbit 1278, after which it failed eight times in succession. It was deleted from tasking and only the remaining

three time delays were used after orbit 1362. A summary of the operation of the two tape recorders, which consisted of 511 commanded read-ins, is as follows:

		Plymouth Rock	Step 13
A.	Successful Read-outs	487	306
B.	Problems		
1.	Tracking Station Errors	1	1
2.	Extraneous Commands	9	9
3.	Time Delay Failures	14	14
4.	Tape Recorder Failures	0	181

IV. TRACKING STATION OPERATION:

Three stations, New Boston, Vandenberg and Hawaii were used for data acquisition. All stations used pre-detection recording, with Hawaii having a capability for making pre-detection recordings of only three of the four links at the start of the mission. [redacted] group scanned about 30% of the tapes received for the purpose of engineering analysis by observing the playback of the data on an oscilloscope. The quality of the pre-detection recordings improved as the mission progressed and the tracking station personnel involved became more familiar with the techniques required.

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