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11 December 1967

TO: [REDACTED]

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THRU: [REDACTED]

FROM: [REDACTED]

SUBJECT: MISSION 1039-1 and 1039-2 FINAL REPORT (J-39)

Enclosed is the Final Performance Evaluation Report for
Mission 1039-1 and 1039-2.

[REDACTED]
Manager
Advanced Projects

Declassified and Released by the N R C

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CORONA J

PERFORMANCE EVALUATION REPORT

MISSION 1039-1 and 1039-2

PR 1635 J-39

1 NOVEMBER 1967

Approved [REDACTED]

Mr. [REDACTED]
Advanced Projects

Approved [REDACTED]

[REDACTED]

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FORWARD

This report details the performance of the payload system during the operational phase of the Program [REDACTED] Flight Test Vehicle 1635.

Lockheed Missiles and Space Company has the responsibility for evaluating payload performance under the Level of Effort and "J" System contracts.

This document is the final payload test and performance evaluation report for Corona Payload J-39, Mission 1039-1 and 1039-2 which was launched on 22 February 1967.

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INTRODUCTION

This report presents the final performance evaluation of Missions 1039-1 and 1039-2 of the Corona Program. The purpose of this report is to define the performance characteristics of the J-39 payload system and to identify the source of in-flight anomalies.

The performance evaluation was jointly conducted by representatives of Lockheed Missiles and Space Company (LMSC) and [REDACTED] at the facilities of NPIC and AFSPPF. The off-line evaluation using Corona engineering photography acquired over the United States was performed at the individual contractors plants. Telemetry data analysis of system performance was performed by LMSC at AP facility.

The quantitative data used for this report is obtained from government organizations. The diffuse density data, and MTF/AIM resolution are produced by AFSPPF. The vehicle attitude error values, frame correlation times are made at NPIC who also supply the Processing Summary reports published by [REDACTED].

Computer programs developed by A/P are utilized to calculate and plot the frequency distribution of the various contributors to image smear to permit analysis and correlation of the conditions of photography to the information content and quality of the acquired pictures. Computer analysis of the exposure, processing and illumination data provides the necessary data to analyze the expose criteria selected for the mission.

SECTION 1

SYSTEM PERFORMANCE

A. MISSION OBJECTIVES

The payload section of Mission 1039, placed into orbit by Flight Test Vehicle 1635 and SLV-2A booster #493, consisted of two panoramic cameras, two Stellar-Index cameras, two Mark 5A recovery capsules and a space structure to enclose the cameras and provide mounting surfaces for all equipments. Figure 1-1 presents an inboard profile of the J-39 payload system. This Corona "J" system is designed to acquire search and reconnaissance photography of selected areas of the earth from orbital altitudes. The planned mission was a 5/6 day mission followed by a 6/5 day mission.

B. MISSION DESCRIPTION

The payload was launched from Vandenberg Air Force Base (VAFB) at 2202 Z (1402 PST) on 22 February 1967. Ascent and injection were normal and the achieved orbit was within nominal tolerances. Tracking and command support was effected by the Air Force Satellite Control Facility consisting of tracking and command stations at [REDACTED] under central control of the Satellite Test Center at Sunnyvale, California. Mission 1039-1 consisted of a 5 day operation and was completed by air recovery on 27 February 1967. Mission 1039-2 was completed with an air recovery on 5 March 1967 following a 6 day photographic operation.

The comparison of the planned and actual orbit parameters is tabulated as follows:

ORBITAL PARAMETERS

<u>Parameter</u>	<u>Predicted</u>	<u>Orbit 42 Actuals</u>	<u>Orbit 122 Actuals</u>
Period (Min.)	90.11	90.069	89.857
Perigee (N.M.)	99.5	97.027	98.285
Apogee (N.M.)	204.9	207.33	201.66
Inclination (Deg.)	80.0	80.021	80.020
Perigee Latitude (Deg. N.)	20.0	30.231	47.979
Eccentricity	0.0147	0.01535	0.01441

C. PANORAMIC CAMERAS

Both cameras operated normally and produced good photographic quality.

The starboard horizon cameras exhibited "veiling" on the -1 mission only.

D. STELLAR-INDEX CAMERAS

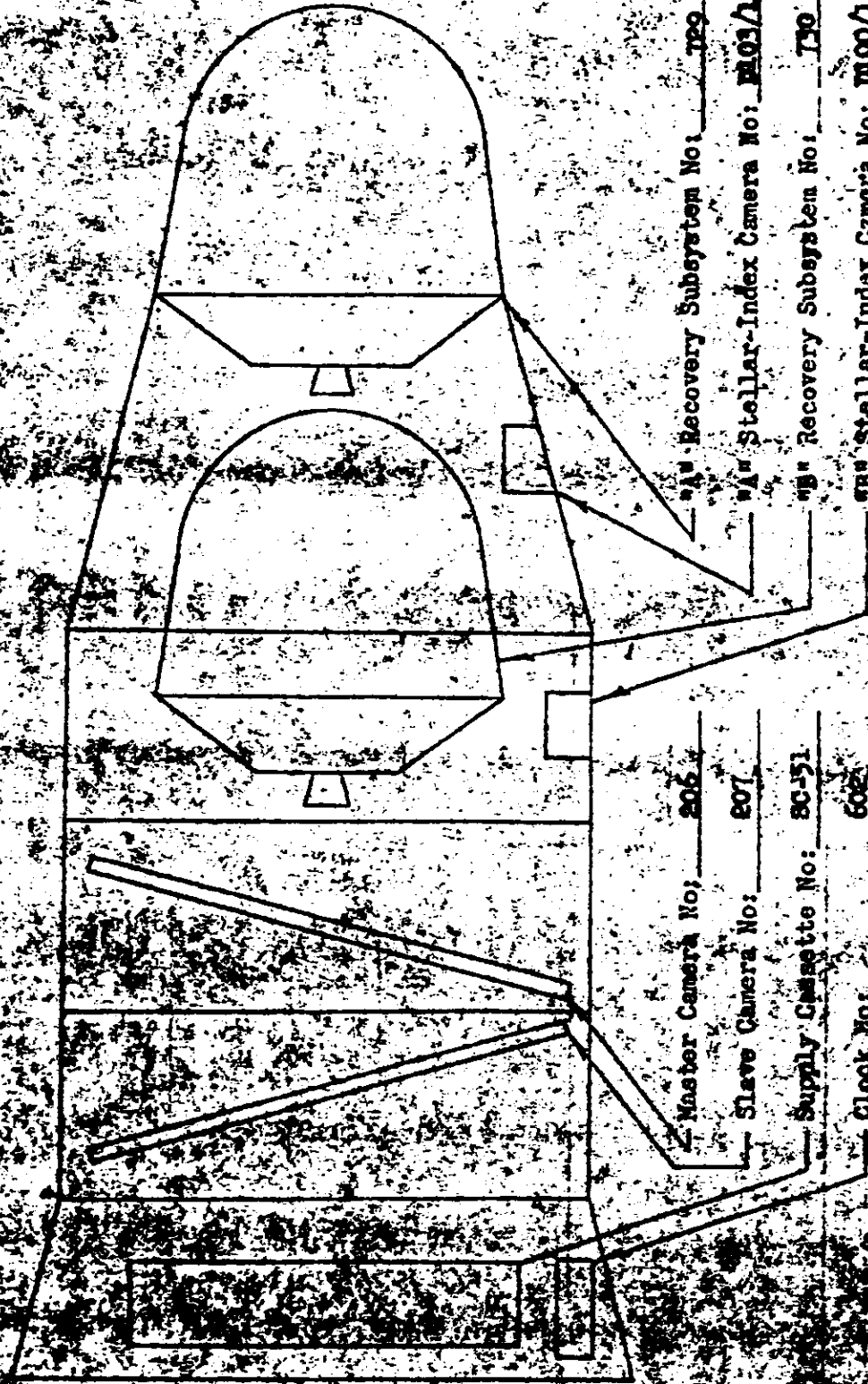
Both S/I units performed satisfactorily. The star imagery was adequate for vehicle attitude determinations and the terrain photography was good.

E. OTHER SUB-SYSTEMS

The clock, instrumentation, command, recovery and pressure make-up systems performed satisfactorily. The thermal environment was of a higher temperature than normal.

SCHEMATIC INBOARD PROFILE - CORONA J. EYSTER

MISSION 1039



Master Camera No: 206

Slave Camera No: 207

Supply Cassette No: 80-51

Clock No: 602

Yen Programmer No: 460

1A Recovery Subsystem No: 789

1B Stellar-Index Camera No: M01/13/132

1C Recovery Subsystem No: 750

1D Stellar-Index Camera No: M00/125/145

Pressure Make-up Unit No: 1022-A

FIGURE 1-2

SECTION 2

PRE-FLIGHT SYSTEMS TEST

A. ENVIRONMENTAL TESTING

1. Test Objective

As a standard procedure, the J payload systems are subjected to thermal/altitude environmental testing which simulates orbital environment. One of the purposes of this test is to demonstrate the system susceptibility to corona discharge. Such discharge fogs the film thus degrading the operational photography.

2. Test Summary

The J-39 payload system was subjected to an environmental HIVOS test from 13 June through 21 June 1966. Performance of the payload from an instrumentation standpoint was generally satisfactory.

The -1 Stellar/Index metering monitor was noisy and the index shutter monitor appeared to "Break Up" intermittently throughout the test.

The -2 Stellar/Index metering monitor was also noisy and the shutter monitor failed near the end of the test.

Clock accuracy was satisfactory.

The pressure make-up system operated normally. Average gas consumption was 8.9 PSI/min. Internal system pressure increased to 40-45 microns during PMI operation.

The Command system operated normally. The V/H delay stepper failed to home on one rev. However, data indicated the command was released prior to the stepper switch homing.

Transfer from -1 to -2 was commanded by KZ-38. All transfer functions occurred normally.

Both recovery sequences and the vehicle de-activate sequence were normal.

The O.S. P.O. operation appeared normal. One complete cycle was run in each mission. Spikes were noted on the output throughout the test however, these were correlated to the actual Barnhorn ON/OFF times.