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CAMERA ~~TECHNICAL~~ DATA

(~~TECHNICAL~~ SYSTEM)

CORONA-L PROGRAM

DESIGN TECHNICAL DATA

AND

NUMERICAL SUMMARY

27 September 1962

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DESIGN TECHNICAL DATA

The following is a brief summary of the pertinent technical data for the Corona-Lanyard Program to provide a quick reference of orbital parameters, system capabilities and operational summary.

I. NUMERICAL SUMMARY

A. Orbital Parameters:

Nominal Operational Altitude	120 N.M.
Inclination	65° to 80°
Orbital Period	89 to 94 Min.
Mission Life	4 days

B. Guidance Parameters

Attitude errors	± 0.3°
Altitude rates	12° per hour

C. Panoramic Instrument

Focal length	66"
Aperture	f/5.0 , T 7
Type of Photography	Mono or stereo
Film width	5"
Film length	7600'
Format size	4 1/2" x 25"
System Resolution AT 2:1 CONTRAST DYNAMIC	80 l/mm
Stereo mirror angles (CAMERA PITCH)	-15°, 0°, +15°
Roll Angles	-30°, -15°, 0°, +15°, +30°

C. Panoramic Instrument (cont'd)

Altitude	80 N.M.	110 N.M.	140 N.M.
Scale NUMBER	88436	121600	154764
Frame Cycle Time (10% overlap)	1.204 sec.	1.655 sec.	2.106 sec.
Photo scan time	0.295 sec.	0.405 sec.	0.515 sec.
Ground track per frame	4.91 N.M.	6.75 N.M.	8.59 N.M.
Swath width	30.72 N.M.	42.24 N.M.	53.76 N.M.
Ground Coverage (max. - square N.M.)	49×10^4	93×10^4	151×10^4
Ground track for 8 stereo frames	39.3 N.M.	54.0 N.M.	68.7 N.M.
Non-overlapped stereo-ground track	3.6 N.M.	4.9 N.M.	6.3 N.M.
Ground resolution	4'	5'	6'

D. S/I Instrument: (THIS AUXILARY SYSTEM CAN BE PROGRAMMED TO OPERATE INDEPENDENTLY OF THE PAN SYSTEM)

Index (Terrain) Camera: SYSTEM IS SIMILAR TO THE S/I UNIT ON KH-4 EXCEPT THAT A TIME READ HEAD HAS BEEN ADDED

Focal Length	38 mm WILL BE CALIBRATED
Aperture	f/4.5
Type of photography	Mono
Frame overlap	60%
Convergence Angle	34.2
Film width	70 mm
Film length	150'
Format size	2 1/4" x 2 1/4"
System Resolution	100 1/mm

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Altitude	80 N.M.	110 N.M.	140 N.M.
Scale NUMBER	3,901,600≅	5,364,700≅	6,827,800≅
Ground track and width	120:3 N.M.	165.4 N.M.	210.6 N.M.
Cycle time	12:04 sec.	16.55 sec.	21.06 sec.
Ground resolution	120'	170'	210'
Ground coverage (max. -square NM)	5.38×10^6	10.1×10^6	16.2×10^6

E. Stellar Camera

Focal length	85 mm – WILL BE CALIBRATED
RESEAU	WILL BE CALIBRATED
Aperture	f/1.9
Type of photography	mono
Film width	35 mm
Film length	75'
Format size (CIRCULAR)	0.937 dia.

F. Film Parameters:

Types	SO 132	SO-206	SO 130	SO 102
Speed	1.7	5.4	20.4	84.9
Resolution: (1000:1)	417	220	154	105
(8:1)	309		138	92
(4:1)		165		
(2:1)	243	120	110	65
Thickness (Mils)	2.9	2.9	2.9	3.1
Nominal Exposure Time (sec)	1/100	1/200	1/500	1/1000

1G —

1H —

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II. OPERATIONAL SUMMARY

During ascent and the orbital phase of a mission, instrument operation and related payload functions are regulated by the LMSC Command Decoder which receives its time and event signals in the form of pulses from the Fairchild Mod 8 Orbital Timer.

After the Rev 1 and 2 acquisitions when the actual orbit parameters are more clearly defined, computer programs will predict the best of the programs to use for most effective coverage of the target mosaic. It may be that a combination of programs or switching from one to the other during the course of the mission will give the best results.

After one or two photographic passes with the roll joint caged (for purpose of comparison with later photography,) an orbital timer signal through the Command Decoder, for zero roll fires the roll joint pin pullers extends the roll joint, and leaves the instrument free to roll to any of the live roll positions as commanded.

The perforations punched in the orbital timer tape for each program are used to form a binary code ward which determines not only the roll angle but also the mode of instrument operation. The following modes of operation may be pre-programmed; pulse mode (a sixteen-frame burst), or continuous mode (a consecutive series, of any duration, of 16-frame bursts); either of which may be stereo or monoscopic photography. Selection of mode will pre-programmed depending upon size and nature of the target at the direction of the customer.

A real time command can disable the stereo mode at any time so that any operations which had been programmed for stereo mode would still turn on and off at the programmed times but would be in mono mode only.

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II. OPERATIONAL SUMMARY (CONT'D)

Besides having a set of ten V/h ramps for IMC from which to choose while in flight, the orbital timer has eleven different V/h programmer start times, one of which can be selected by a real-time command to give extremely accurate IMC no matter how extreme a shift in perigee latitude results from the achieved orbit.

Flexibility in instrument on or off command is provided by an intermix circuit in the LMSC Command Decoder. By use of this, an in-flight selection can be made from among a matrix of On and Off combinations for the revolutions which will follow the last rev acquired at a tracking station.

During tracking station acquisitions, some measure of security is provided by disabling continuous channel telemetry of payload functions. However, commands in the orbital timer can enable the programming of continuous channel tlm on at any desired time. The orbital timer also contains a means of interrogating the clock for time correlation purposes during any tlm pass.

Some flexibility is provided for stellar-index camera operation in that operate commands can be programmed in the orbital timer for S/I operation without the panoramic instrument if desired.

Another extremely important type of programming flexibility is the Pioneer mode. Any number or length of Pioneer operations can be punched into the orbital timer for every revolution and this mode of operation may be selected by real time command at any time and for any reason. By real time command, any fixed roll angle, in either stereo or mono mode, may be selected. Pioneer may turn out to be the only mode in which certain top

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II. OPERATIONAL SUMMARY (CONT'D)

priority targets can be acquired, should orbit deviations from the norm be such that the other four programs are not suitable. It also offers a means for rapid payload utilization in the event a mission suddenly has to be shortened for any reason.

After successful completion of the photographs mission the orbital timer function ceases and the few remaining payload functions are initiated by the Subsystem D Guidance Timer: The Arm signal slews any remaining S/I payload into the REC, the Transfer Signals actuates the water seals, and the recovery sequence is initiated.

(II) ~~III~~. AUXILIARY DATA

The addition to the telemetered data a time word is exposed onto the 5" Pan Instrument film and the 70 mm Index Camera Film. The data block in the Pan Instrument will also record the ~~roll~~ ROLL position of the payload and the stereo position of the mirror onto the 5" film.

Ⓧ The Index Camera data block and the Pan Instrument data block are both machine readable for rapid data reduction.

THE BINARY TIME WORD CONSISTS OF 29 BITS SIMILAR TO THE KH-4 TIME WORD. ROLL POSITION AND STEREO POSITION OF MIRROR BOTH ARE RECORDED AS 3 BIT WORDS.

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(16) ~~13~~ CAMERA ORIENTATION

Pitch ~~and roll~~ and yaw are determined from the stellar photography. This vehicle has a yaw programmer which operates as a function of latitude. The vehicle is yawed to point the vehicle in the direction of the velocity vector, which is the [redacted] motion vector and the Coriolis component.