PHOTOGRAPHIC EVALUATION REPORT

Mission No:	9029	Film Type:	SO 130, SO 132	Filter, Horizon:	Wratten
Launch Date:	12 Dec 61 (Z)	Slit Width:	0.15"	Evaluation No:	[redacted] 1-62
Camera No:	52	Filter, Main:	Built-in W21	Evaluated By:	[redacted]

1. Shutter Operation:
   a. Port horizon - Good
   b. Starboard horizon - Good

2. Horizon Camera Images:
   a. Port horizon - Good
   b. Starboard horizon - Out-of-focus

3. Camera Number Image: Illegible throughout mission. It "blossoms" in: pass 21, frame 9; pass 38, frame 1; pass 55, frame 148; pass 56, frames 2, 6, 8, 15, 29, 40, 42, 47, 73. Camera number overlaps main terrain format 0.05" - 0.10" throughout mission.

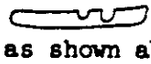
4. Digitote Operation: Ceased functioning after pass 22, frame 3. Digitote overlaps main terrain format 0.05" - 0.10" throughout mission. No difficulty in reading digitote where recorded on film.

5. End of Pass Marker Operation: Multiple image (shadow) at end of each pass. End of pass marker "blossoms" in border of first frame of each operational pass except in passes 02, 09, 40, 56. In the engineering passes 01E and 09E, the end-of-pass marker and "blossom" appear in the last frame.

6. Film Metering: 0.04" - 0.07" overlap between starboard horizon camera format and the terrain photograph having no horizon camera image. Metering is erratic in pass 56 from frames 81 through 85 possibly due to irregularities present at the end of the mission.

7. Film Tracking: Normal throughout mission.

8. Fiducials:
   a. Main Camera: Fiducials became truncated but seemed self-cleaning intermittently throughout mission.
   b. Horizon Camera: Apparently normal throughout mission.

9. Light Leaks:
   a. Characteristic pattern  is present in first frame of all passes, except pass 09; pattern, as shown above, has an angular displacement with the trailing edge and appears in the last or next to last frame of all passes.
   b. A crease pattern  and associated fogging appears in frame 2 of all passes. Crease pattern is also evident in the next to last or third frame from the end of most passes.
   c. A faint flare pattern is visible in pass 05, frame 3; pass 06, frame 3, with an increase in intensity in passes 08, 09E. A heavy branched flare is present on pass 19, frame 3. As a result of this flare, fogging is apparent through frame 4 and disappears after fogging approximately one-half of frame 5. This latter condition, as well as the heavy branched flare appearing on the third frame, exists on all subsequent passes in these same frames.

10. Forward Overlap: No forward overlap is present in the following passes: 02, first portion of pass 05. No forward overlap measurement is possible in the following passes: 01E (no imagery); first portion of pass 08 (cloud cover); second portion of pass 09 (cloud cover); pass 19 (cloud cover and water). Part one of pass 09 contains an overlap of 1%, in all other passes the measurable overlap varies from a minimum of 4% at the beginning of the pass to a maximum of 18% at the termination of the pass.

11. Static Electricity: Static electricity adjacent to horizon cameras and in metering between frames is evident throughout the mission. Edge static is evident along the leading edge of pass 05, frames 2, 8, 9, 13-29; pass 40, frames 7-109; pass 53, frames 8, 9, 10, 11-52; pass 54, frames 1-18; pass 55, frames 2, 4, 12, 13, 25-44.

12. Chemical Stains: Pass 05, frames 41, 53, 159, 161, 163; pass 06, frame 1; pass 56, frames 74, 76, 77, 79-84.

13. Abrasions and Scratches: Scratches caused by the platen rails are present throughout the mission. Other scratches are found on pass 05, frame 160; pass 06, frames 1 10, 14, 20, 96, 118, 120, 178, 181, 189; pass 07, frame 43; pass 08, frames 34, 95, 108, 131; pass 20, frames 65, 66; pass 21, frame 143; pass 53, frame 130; pass 55, frames 58, 60; pass 56, frame 28. There are minute scratches alined perpendicular to the flightline in pass 05, frames 3-60. In addition, there can be seen other minute scratches which are perpendicular to and intersect some of the aforementioned scratches. The connotation "scratches," in this case, is used with reserve since actual cause of these marks is at present unknown. Film/emulsion reaction to tensio should not be overlooked as a possible cause.

14. Tearing: Pass 23, frames 87, 88; pass 56, frames77, 85.

15. Streaks: Negative density streak, possibly from camera operation, is present in pass 05, frame 123; pass 38, frame 109. Plus density streaks are present in pass 21, frames 1, 3, 5, 7, 9, 165, 167, 173, 177, 185, 189, 199, 211; pass 40, frames 1, 2. Plus density spots are present in the film margin between terrain format and trailing edge of film in pass 55, frames 122, 123. An out-of-focus (negative density) streak is present throughout the mission 0.05" from the trailing edge of the starboard portion of the extended terrain format, intersecting the trailing edge of format $5\frac{1}{2}$" from starboard edge of photograph.

16. Pressure Marks: Pass 05, frames 108, 119, 128, 139, 147; pass 06, frames 29, 50, 54, 81, 85, 99, 139, 184, 200, 201, 220; pass 07, frames 11, 42, 45, 64, 69, 70, 77, 96, 117, 122, 124, 147; pass 09, frames 17, 25, 30, 31, 34, 69, 74, 90; pass 19, frames 5, 46; pass 21, frames 16, 38, 41, 57, 61, 64, 89, 139, 145, 212, 214; pass 22, frames 31, 34, 98, 109, 124, 133, 142, 148; pass 23, frames 70, 82, 117, 124, 134, 138; pass 38, frames 47, 77, 83, 101; pass 39, frames 90, 106, 107, 108; pass 40, frames 93, 109, 122, 144; pass 54, frames 10, 11, 36, 45, 57, 63, 87, 121, 129, 133, 142; pass 55, frames 26, 41, 61, 82, 135.

17. Possible Waxing Irregularity: Pass 06, frame 180; pass 07, frames 151-155, 157, 159, 160, 162-165; pass 23, frame 141; pass 40, frame 46; pass 56, frames 30, 31.

18. Blisters and Crimping: Few blisters - examples pass 02, frame 34; pass 05, frames 159, 161; pass 06, frame 130; pass 07, frame 17; pass 19, frame 47; pass 20, frames 1, 17; pass 22, frame 72; pass 23, frames 53, 56, 57; blisters, desensitized spot and desensitized streak - pass 38, frame 159; pass 53, frame 54; crimping is present in pass 01E from frame 1 through three-fourths of frame 14.

19. Lifted Emulsion: Numerous examples are evident throughout mission, a few examples are cited as follows: pass 01E, frame 1; pass 02, frame 26; pass 05, frames 74, 167; pass 06, frames 3, 5, 9, 12, 16, 29, 80, 119, 128, 167, 178, 183; pass 08, frames 9-144; pass 09, frames 43-76; emulsion from frame 1 adhered to frame 3, pass 20, the remainder of pass 20 exhibits numerous examples of lifted emulsion; pass 21, frames 22, 24, 30, 74, 82-151.

20. Creases: Pass 06, frames 90, 153; pass 07, frames 1-15; pass 08, frame 23; pass 20, frame 95; pass 22, frame 147; pass 23, frames 1, 8, 30, 31, 74, 75; pass 40, frames 102, 103; pass 54, frames 122, 128, 129; pass 55, frame 103; pass 56, frame 84.

21. Foreign matter embedded in base of film is found in the following: pass 06, frames 25, 76, 107, 168; pass 07, frames 60, 61, 68, 96, 152; pass 19, frame 25; pass 22, frame 81; pass 38, frame 147; pass 40, frames 75, 78, 175; pass 54, frames 1, 61; pass 55, frames 145, 146; pass 56, frames 73, 75.

22. Density: Medium 65%, heavy 35%

23. Contrast: Medium 65%, low 35%

24. Apparent Resolution: Fair - good. Recent modifications of camera system have eliminated bands of poor focus found in previous C''' missions. Degradation of resolution is due to underexposure-overdevelopment and overexposure-underdevelopment camera/processing relationship necessitated by change in film emulsions.

25. Apparent Granularity: SO 130 - Medium, SO 132 - Fine.

26. Photo Quality: Fair 35%, good 65%. Directly related to item 22.

27. Camera Operation: Fair

Although the main terrain photograph is greatly improved over previous missions, the following characteristics degraded its evaluation:

a. Overlap of starboard horizon camera image with the succeeding terrain photograph throughout the mission.
b. Out-of-focus streak extending from starboard edge of terrain format and intersecting format trailing edge 5.5" from the starboard edge.
c. Starboard horizon camera out-of-focus.
d. Scratches produced by camera platen rails, although not within the format area, may have been responsible for the skiving apparent in this mission. The condition is not critical at this time. Examples: pass 05, frame 82; pass 06, frame 44; pass 07, frame 154.
e. Slippage and subsequent fogging of the first and last frames are present in each pass. Additional fogging is present in frames of each pass throughout the mission.
f. Two possible pressure marks and associated small static marks are evident within the horizon camera image and in the metering area between the horizon camera image and the next terrain image. These marks become more evident as the mission progresses.
g. The digitote did not record after pass 22, frame 3.

28. Suitability for P.I.: Poor 15%, fair 20%, good 55%, very good 10%.

Degradation is due to exposure-processing extremes encountered, heavy cloud shadows and haze.

Remarks:

1. This is the first C''' mission having no image distortion in the usable terrain format. The imagery is degraded however, due to the use of a film emulsion (SO 132) which resulted in underexposure for that first portion of the mission through pass 06, frame 25. The remainder of pass 06 indicates an overexposure of the SO 130 film (according to D Min and D Max readings obtained with the Densitometer). This condition is rectified in later passes. Pass 53, frames 226-242 (SO 130) show characteristics of overexposure. The splice connecting the SO 130 and SO 132 film types is in pass 55, between frames 59 and 60, here again is indication that the SO 132 had been underexposed.

2. Due to wet condition of film prior to pick-up, the film suffered damage of varying extent in pass 56, frames 76-84 (the anti-halation backing was separated from film base). Frame 85 was badly torn and heavily fogged so that no image was discernible, thus it was not included as the last frame of pass 56.

3. A few small desensitized streaks and/or spots are noted throughout the mission. Examples include pass 02, frame 25; pass 05, frames 10, 41.

4. End-of-Pass Marker is recorded on the last frame of each pass as a multiple image. Also, an End-of-Pass Marker "blossom" appears usually on the first frame of the succeeding pass whenever film slippage was sufficient, i.e., between operational passes. Between the engineering passes and operational passes the End-of-Pass Marker and its "blossom" appears on the last frame of the engineering pass. This, it would seem to indicate, points to a time/film-slippage relationship within the camera metering system.

5. Two air bells are present on pass 06, frame 63. Images within these air bells are well defined in contrast to the heavy density of the remainder of this frame of photography.

6. All manufacturing splices, except one appearing in pass 21, frame 187, were cut from the negative prior to processing; thus an accurate listing of their location is not possible.

7. Density readings were made on every pass using the Eastman Kodak Reflection-Transmission Color Densitometer, Model RT. Absolute values read for the D maxs and D mins, as well as the base fog, are as follows:

Pass No.	Frame	D Max	D Min	Base Fo
02	37	2.47 (End-of-Pass Marker)	0.42	0.37
05	59	1.30	0.56	0.39
	120	1.88	0.84	0.36
	162	1.91	0.63	0.33
06	25(End of S0132)	1.75	Cloud covered	0.35
	26(Beginning of S0130)	2.92	Cloud covered	0.16
	108	3.02	0.68	0.06
	215	3.44	1.56	0.12
07	25	3.00	Cloud covered	0.12
	78	2.93	0.61	0.08
	151	2.94	1.06	0.06
08	74	2.15	0.29	0.06
	98	1.83	0.27	0.06
09	9	2.82	0.47	0.06
	80	1.74	0.30	0.08
19	38	2.02	0.19	0.05
20	50	1.93	0.39	0.05
	96	2.24	0.50	0.06
21	29	2.59	0.63	0.05
	117	1.66	0.17	0.05
	199	2.23	0.34	0.05
22	47	2.50	0.21	0.07
	179	2.19	0.20	0.06
	226	2.22	0.24	0.06
23	47	2.21	0.30	0.05
	138	2.57	0.43	0.06
38	45	1.95	0.28	0.06
	90	2.36	0.29	0.06
	154	2.44	0.32	0.06
39	17	0.92	0.14	0.06
	74	1.72	0.12	0.06
	127	2.47	0.20	0.05
40	41	2.24	0.54	0.09
	104	2.54	0.35	0.06
	173	2.27	0.22	0.06
53	33	2.16	0.32	0.08
	85	2.03	0.19	0.06
	159	2.74	0.25	0.06
	238	3.11	0.88	0.09

Pass No.	Frame	D Max	D Min	Base Fog
54	17	1.12	0.28	0.07
	75	1.86	0.38	0.07
	112	2.46	0.44	0.08
	169	2.56	0.50	0.07
55	22	1.52	0.43	0.07
	33	2.42	0.60	0.08
	59(End of SO 130)	1.74	Cloud covered	0.05
	60(Beginning of SO 132)	1.94	Cloud covered	0.36
	101	2.05	0.54	0.35
	156	2.12	0.70	0.32
56	15	2.39	0.40	0.32
	78	1.89	0.79	0.39

	D Max		D Min		Base Fog	
	SO 130	SO 132	SO 130	SO 132	SO 130	SO 132
Range	0.92-3.44	1.30-2.39	0.12-1.56	0.40-0.84	0.05-0.12	0.32-0.39
Average	2.29	1.97	0.41	0.61	0.07	0.35

	SO 130	SO 132
Minimum D Min to Maximum D Max	3.32	1.99
Average D Min to Average D Max	1.36	1.79