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E73 10808
CR-133292

TYPE I REPORT #4 JULY 3, 1973

A. TITLE OF INVESTIVATION: Multispectral Signatures in Relation to round Control Signatures Using Nested-Sampling Approach.

B. PROPOSAL #637: GSFC #UN142

C. ABSTRACT OF OBJECTIVES: Determine daily seasonal, meteorlogical, angular and statistical variation in spectral signatures for different geological target types; relation, intergration and correlation of data from ground, aircraft, and ERTS radiometric equipment for the various target types leading to their improved identification from ERTS images.

D. PRINCIPAL INVESTIGATORS:

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F. PERIOD: May 2, 1973 - July 2,1973

G. ACTION REQUIRED: Note that the Type II report for May 3 replaces Type I report #3 for that period.
ADDITIONAL TAPES ARE NEEDED TO CONTINUE WORK ON SHADE PRINTING AND TRANSMISSION MEASUREMENTS ON SELECTED GEOLOGICAL SITES.

(E73-10808) MULTISPECTRAL SIGNATURES IN RELATION TO GROUND CONTROL SIGNATURES USING NESTED SAMPLING APPROACH Progress Report, 2 May - 2 Jul. 1973 (Stanford Univ.) 20 p HC $3.00 CSCL 05B G3/13 N73-27283 Unclas 00808

K. PLANNING FOR NEXT PERIOD

1. Field data taking using the system in a mobile mode (truck operation), with one EGTR radiometer measuring 2π iriadiance of the sky concurrently with 15° FOV bidirectional reflectance of the targets being passed over. Specifically these will include the day of ERTS overpasses.
2. Moderate altitude (scale 1:12000) is planned for ERTS pass 1363, 1118 local time for several purposes.
   A. Documentation of general target appearence of the site (about 8000 areas) at the time of an ERTS pass.
   B. Enlargement (2x) to 1:6000 scale, for use as base map (field use), and for reporting purposes.

L. PUBLISHED MATERIALS

NONE

M. RECOMMENDATIONS FOR CHANGES IN OPERATIONS ADDITIONAL EFFORT OR CORRELATION OF EFFORT/RESULTS OF ERTS.

NONE

N. CHANGES IN STANDING ORDER FORMS

NONE

O. DATA REQUEST FORMS SUBMITTED

ATTACHED IN FRONT OF THIS DOCUMENT - SECTION I

ERTS IMAGES ACQUIRED OVER STANFORD UNIVERSITY TEST AREA
FROM THE STANDARD CATALOG FOR US 07/24/72 TO 5/31/73

(R=REQUESTED)

	OBSERVATION ID	MICROFILM ROLL NO.	DATE ACQUIRED	CLOUD COVER	ORBIT NUMBER	PRINCIPAL POINT (C) OF IMAGE LAT	LONG	SUN ELEV	SUN AZIM	PRODUCTS MADE M S B7 P M9	PRODUCTS RECD. AT STANFORD M S B7 P M9	QUALI
2	1021-18172	10001/1226	08/13/72	0	293	3724N	12145W	55.8	124.5	x x x x x	R R R R -	GGGG
3	1039-18172	10002/0074	08/31/72	0	544	3725N	12150W	51.9	132.5	x x x x x	R R R R -	GGGG
4	1057-18172	10002/0598	09/18/72	20	795	3721N	12149W	47.1	140.2	x x x x x	R R R R -	GGGG
5	1075-18173	10004/0236	10/06/72	0	1046	3729N	12144W	41.6	146.8	x x x x x	4 8 R 1 4	GGGG
1) 6	1093- NO FRAMES TAKEN											
7	1111-18181	10004/1570	11/11/72	60	1548	3715N	12153W	30.9	153.9	x x x x	4 8 - 2 -	GGGG
8	1129-18181	10005/0498	11/29/72	20	1799	3725N	12150W	26.7	154.6	x x x x	4 8 - 2 -	GGGG
9	1147-18181	10006/0333	12/17/72	90	2050	3718N	12151W	24.5	153.4	x x x x	- - - - -	GGGG
10	1165-18175	10006/0898	01/04/73	10	2301	3724N	12146W	24.2	151.1	x x x x x	4 8 - 2 -	PPGP
2) 11	1183-18175	10007/0170	01/22/73	20	2552	3732N	12146W	26.3	148.2	x x x x	4 8R 2 R	GGGG
12	1201-18181	10007/0782	02/09/73	80	2803	3725N	12151W	30.5	144.9	x x x	- - - - -	GGGG
13	1219-18182	10008/0440	02/27/73	100	3054	3726N	12156W	36.3	141.6	x x x	- - - - -	GGGG
14	1237-18183	10009/0470	03/17/73	40	3305	3727N	12200W	42.8	138.1	x x x	4 8 - 2 -	GGGG
3) 15	1255-18183	10009/1329	04/04/73	0	3556	3730N	12201W	49.4	134.2	x x x	4 8 - 1 -	GPPG
16	1273-18183	10010/0613	04/22/73	0	3807	3736N	12201W	55.2	129.4	x x x	4 8 - - -	GGGG
17	1291-18182	10010/1539	05/10/73	0	4058	3731N	12201W	59.6	123.3	x x x	4 4 - 1 -	GGGG
18	1309		05/28/73									
4) 19	1327		06/15/73									
20	1345		07/03/73									

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NASA Scientific and Technical Information Facility
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Stanford UGC in light tone. Alpine Road Quarry Lake and Foothill Park Lake clear, black, surroundings brighter. Golf courses now more clear with fairways appearing relative to trees.

(k) 1273-18183 (April 22) Sun 55°EL/AZ1 129°

Golf courses now the brightest areas with patterns of fairways showing clearly. Qsc = Tm = Tpb + Tbu. Campus trees a little more grey. Topography not clearly shown. Jasper Ridge about equal to Ladera.Tbu on ridges a little darker than Ksp.

(l) 1291-18182 (May 10) Sun 60EL/AZ1 123°

Image Transparency hazy, paper print better.

Golf courses clearly brightest areas with Menlo CCGC being brightest. Freeway/SLAC darker area, Lagunita Lake medium black. Field to south of Felt Lake not so dark in contrast with those around lake. General fields around SLAC more bright across creek towards Ladera (Webb Ranch) (Tus) boundry.

Natural open grass patches on skyline almost as bright as golf courses.(Why?)

(2.) MEASUREMENTS ON SPECIFIC IMAGE SETS (ALL 4 CHANNELS)

(a) DENSITOMETRY USING McBETH QUANTALOG (0.7MM APERTURE)

Conventional D LOG E curves for each channel of Frame 1075-18173 were prepared using special graph plots developed by the PI while in Australia. These show the 14 step wedge values on a logarithmitic abscissa in a radiance ($x10^{-3}$ watts.Cm^{-2}.$ster^{-1}$)

In the normal manner the density on each step of the wedge was measured to create the "characteristic curve" for that channel. Subsequently then the density of selected target areas was read, plotted, and from the curve the radiance read out.

Because it was not possible to make the aperture disc less than 0.7MM the spot size on a 70MM formal transparency was very large (2.5KM, or 70 pixels) and only major terrain elements could be measured.

The resultant spectral radiance through MSS bandpasses appear in Table I (watts.Cm^{-2}.$ster^{-1}$. .01μm $x10^{-3}$)

(b) TRANSMISSION MEASUREMENTS USING THE STANFORD 6 METER PROJECTION SYSTEM

Methods used have been explained above in special section. Spectral radiance data we tabulated in Table II.(Watt. Cm^{-2}.$ster^{-1}$.01μm.$x10^{-3}$

TABLE I

SPECTRAL RADIANCE OF ERTS TRANSPARENCIES USING McBETH QUANTALOG

(MEASUREMENT AREA = 70 PIXELS)

IMAGE 1075-18173 ($W.Cm^{-2}.ster^{-1}.0.01\mu m.x10^{-3}$)	IMAGE A OCT 6, 1972				IMAGE B 1183-18175 JAN 22, 1973
LOCALITY	CH.4	CH.5	CH.6	CH.7	CH.7
JASPER RIDGE (total)	0.51	0.34	0.42	0.65	0.44
BEAR GULCH RESERVOIR (W. MENLO PARK)	0.64	0.38	0.50	0.71	0.57
LAKE LAGUNITA (DRY)	-	0.44	0.52	0.74	0.57
SAND HILL ROAD (TUS)	0.62	0.43	0.51	0.76	0.62
FELT LAKE AREA (QSC)	0.61	0.42	0.44	0.70	0.63
SALT PONDS ON BAY MARSH ROAD REDWOOD CITY	0.79	0.75	0.58	0.51	--

NOTE: AREAS COVER 70 PIXELS (2.5 KM WIDTH)

TABLE II

SPECTRAL RADIANCE OF ERTS TRANSPARENCIES USING STANFORD 6 METER PROJECTION SYSTEM

(MEASUREMENT AREA = 15 PIXELS)

LOCATION - SEE MAP ATTACHED

IMAGE 1075 - 18173 (W. $Cm^{-2}.ster^{-1}.0.01\mu m \times 10^{-3}$)

(OCTOBER 6, 1972)

LOCALITY	Ch. 4	Ch. 5	Ch. 6	Ch. 7
A. San Francisco Bay Salt Ponds				
Pond A (Western most)	0.60	0.74	0.48	-
Pond B (Striped)	1.17	1.06	0.76	0.80
B = B_1	1.12	1.25	0.96	0.89
B = B_2	1.32	1.16	0.96	0.88
Pond C	0.63	0.66	0.41	-
B. Stanford Test Area				
Grass cover over: -				
Monterey Shale (Tm)	0.63	0.55	0.46	0.70
Santa Clara gravel (QSc)	0.65	0.58	0.51	0.76
Unnamed sandstone - Webb Ranch (Tus)	0.62	0.52	0.54	0.83
Serpentine Jasper Ridge (Total)	n.d.*	n.d.	0.45	0.50
Grass over Serpentine	0.49	0.35	n.d.	n.d.
Trees over Franciscan	0.42	0.21	n.d.	n.d.
Felt Lake area (Lake + Qsc)	0.57	0.33	0.33	0.44
C. Golf Courses				
Stanford Driving Range	0.59	0.46	0.60	0.95
Palo Alto Hills Golf Course	n.d.	n.d.	0.56	0.88
Sharon Heights Golf Course	n.d.	n.d.	0.60	0.89
Menlo Country Club Golf Course	n.d.	n.d.	0.62	1.08

*n.d. = not determined, usually not specifically locatable.

H. SIGNIFICANT RESULTS

(Relationship to applications or operational problems, including estimates of the cost benifits of any significant results)

Feasibilty of Using ERTS MSS Imagery for
Spot Transmission Measurements: A Preliminary Evaluation

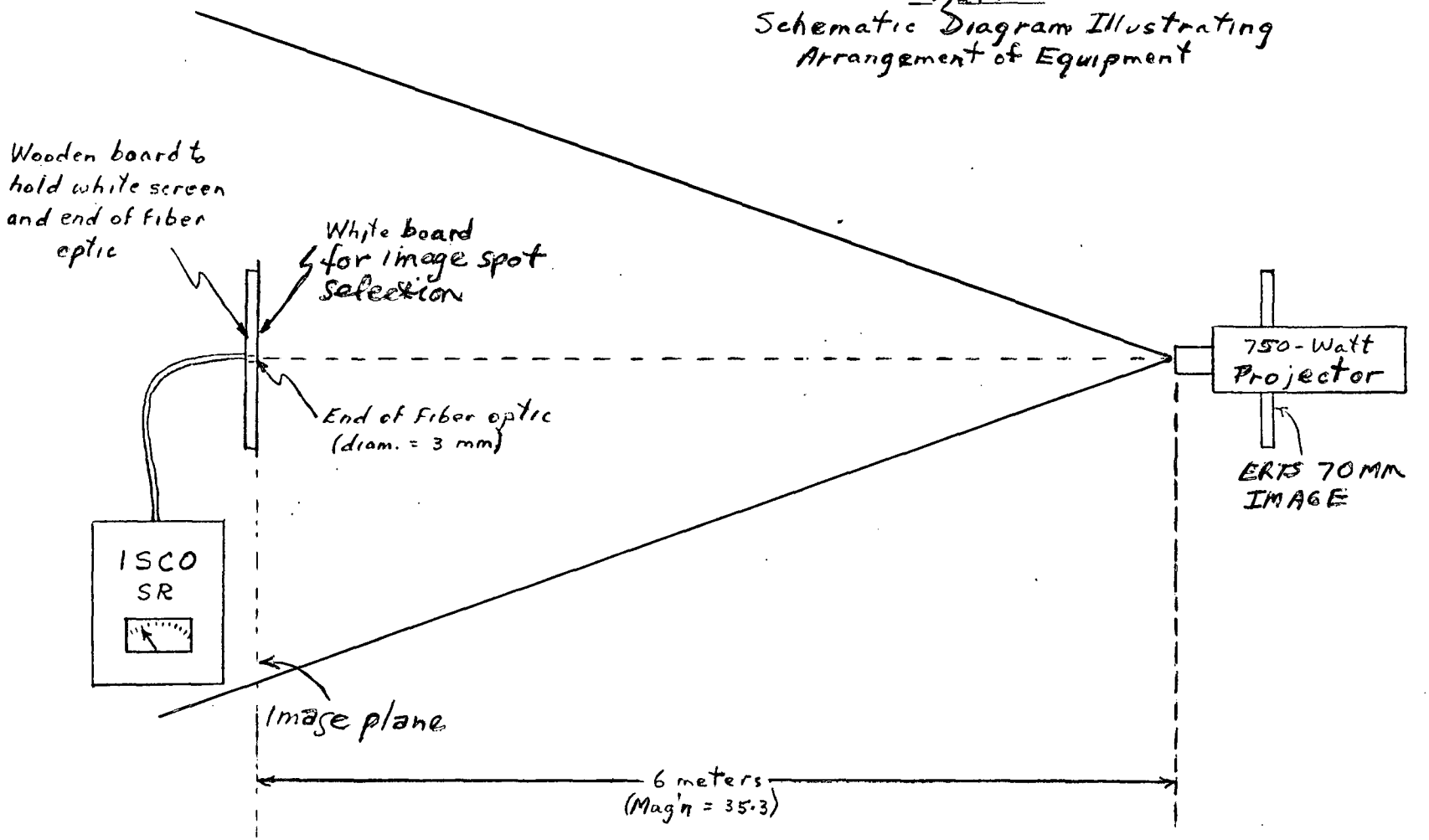
An experiment was conducted to evaluate the feasibility of using ERTS-1 MSS imagery for spot transmission measurements on selected sites. Using the 15-unit gray scale on the 70 mm positive imagery as the base of comparison, a correlation was made between the transmittance measured at each site on the imagery and the radiance values (counts) recorded on cct tape by the spacecraft over the same sites.

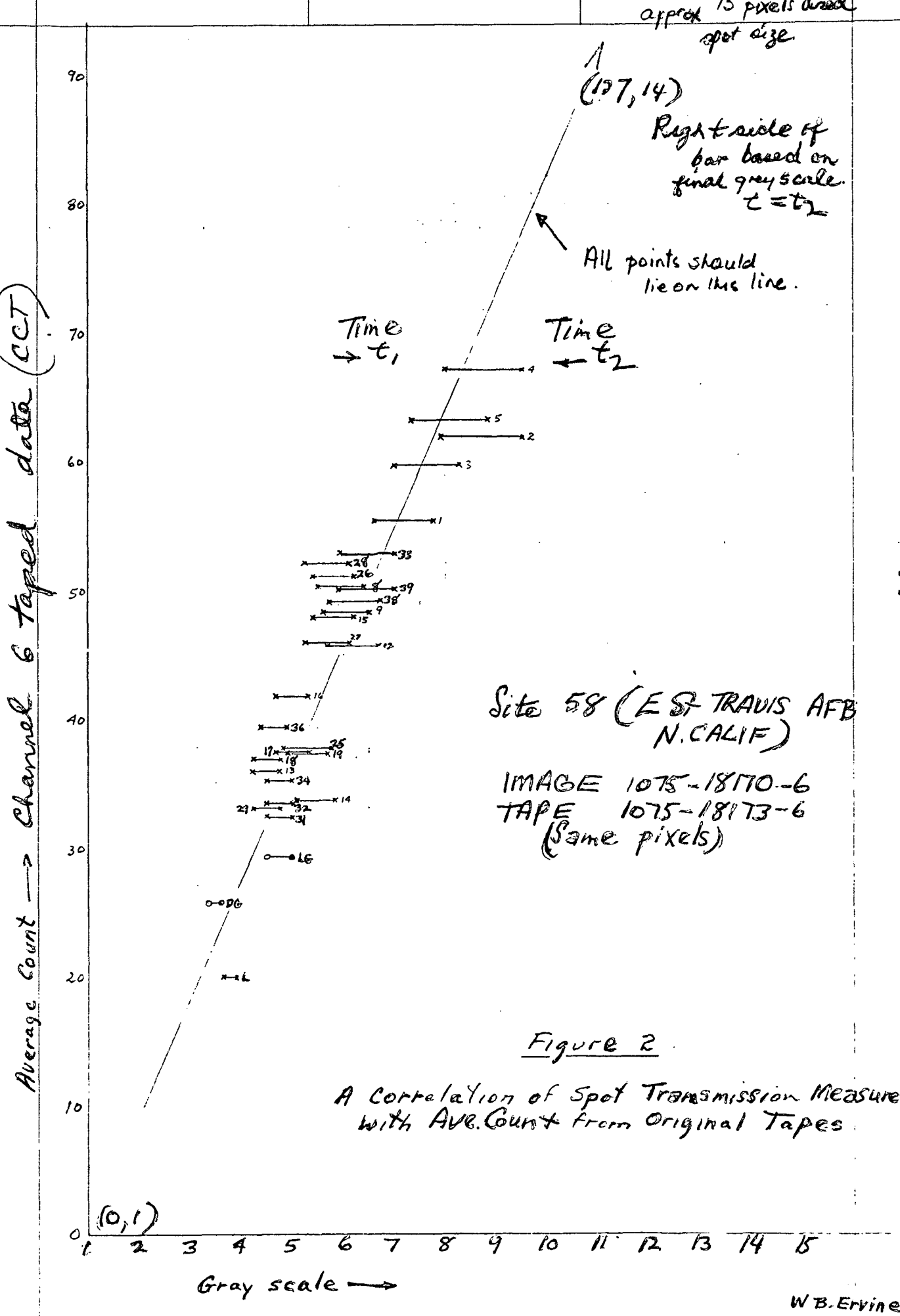
The imagery (1075-18170-6) was enlarged (35.3 diameters) by a 750-watt projector and focused on a white cardboard screen 6 meters from the lens. The end of a 3 mm fiber optic, set flush with and normal to the face of the screen, was aimed directly (critical) at the projector lens. An ISCO spectroradiometer recorded the light intensities at a wave length of 0.625 microns (selected for maximum scale readings) See Figure I.

Observations were made on 30 sub-sites (east of Travis A.F.B.) which were pre-selected for their differing image "brightness" and total area; all are dried pond beds. Observations were also made on "average" gray backrounds and on a small lake. The site observations were preceeded and followed by a series of similar readings on the 15-unit gray scale beside the image. Transmission values (ranging from 1 to 15) for each site were established from curves (essentially straight lines) of the gray scale values (ISCO readings vs 15-unit gray scale). Unfortunately, during the 3-hour experiment, there was a significant decrease in light intensity of the lamp between the two series of gray-scale readings, thus producing a time-range of transmission values for each site. This range of values was compared with the radiance values (counts) obtained from the tapes over the same sites (Figure 2). The values from the tapes had to be averaged because at 6 meters the 3mm diameter fiber optic covers an area of about 15 pixels

There is very good correlation between the density values obtained from projected imagery and radiance values received by the detector on the spacecraft. A shorter experiment time and closer integration of gray scale and site readings would avoid the variation in lamp intensities. See Figure 2

Figure 1
Schematic Diagram Illustrating
Arrangement of Equipment





Site 58 (E. St. TRAVIS AFB N. CALIF)

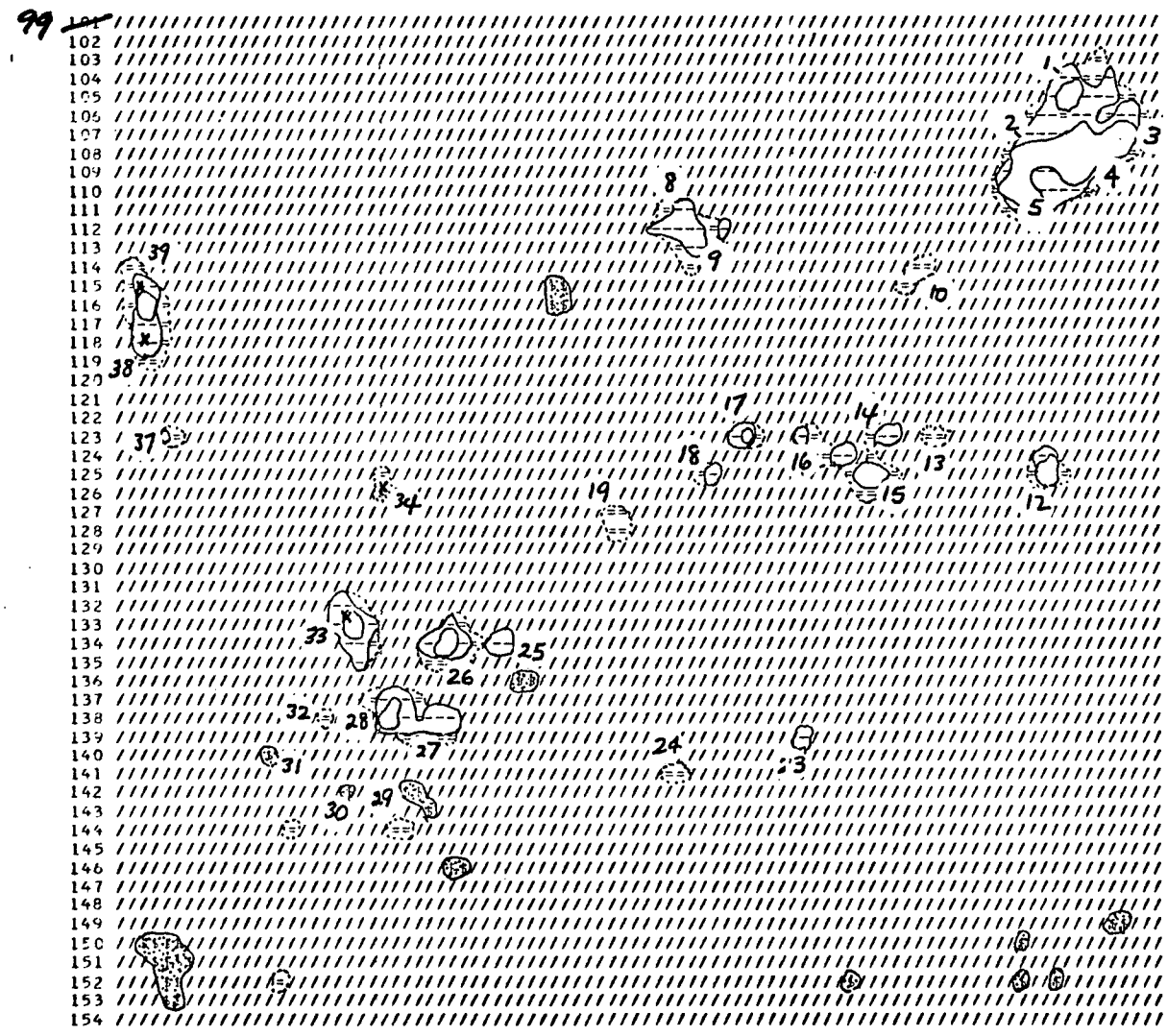
IMAGE 1075-18170-6
TAPE 1075-18173-6
(Same pixels)

Figure 2

A Correlation of Spot Transmission Measurements with Ave. Count from Original Tapes

W B. Ervine

SHADE PRINT OF ERTS FRAME 1075-18173 BAND 6
ORIGIN OF THIS STRIP AT 1017 101



SHADE PRINT FOR BAND 6
TOP LEFT CORNER OF PRINT 1017 101
BOTTOM RIGHT CORNER OF PRINT 1108 154

CHARACTER SET USED IN THIS PRINTOUT

SYMBOL	COUNT	RANGE
M		0- 7
$		8- 15
$		16- 23
/		24- 31
/		32- 39
/		40- 47
=		48- 55
-		56- 63
		64- 71
		72- 79
?	GREATER THAN 79 OR LESS THAN 0	

Site 58

SITE 58 E. OF TRAVIS AFB

NUMERICAL OUTPUT FOR ERTS FRAME 1075-18173

DRY PONDS # 1-5

DIAGONAL POINTS OF AREA 1093 101 . 1108 110

BAND 4

32	34	32	29	29	29	28	28	29	27	27	28	28	29	29	32
34	32	32	32	31	28	28	31	31	28	25	25	27	28	28	28
36	37	36	33	32	32	32	[illegible]	37	44	46	37	29	29	26	25
32	35	35	32	31	31	39	[illegible]	61	54	54	59	46	35	32	32
34	34	34	34	30	35	57	63	61	58	58	63	52	47	40	31
37	39	37	[illegible]	48	64	62	54	54	60	46	48	57	57	50	34
34	34	36	[illegible]	53	56	56	56	63	63	69	66	66	61	47	32
32	34	47	63	63	58	60	68	68	69	55	58	[illegible]	[illegible]	31	28
33	37	57	69	64	64	64	66	69	64	64	52	40	[illegible]	32	32
36	54	[illegible]	[illegible]	66	61	64	64	61	54	42	36	31	31	32	31

BAND 5

32	33	32	[illegible]	30	27	26	26	30	23	22	25	27	27	30	30
32	32	31	31	27	26	26	26	27	26	24	24	22	27	26	26
35	38	35	32	32	29	27	29	38	48	51	38	27	25	21	22
35	35	35	29	28	28	41	63	70	61	61	66	49	35	32	28
33	34	34	28	28	36	70	72	72	65	70	73	54	57	44	30
36	41	36	33	52	70	70	59	61	65	52	54	64	64	56	33
32	35	33	48	61	61	57	63	73	69	63	76	73	69	52	30
31	37	54	59	59	69	69	76	76	76	67	69	69	52	29	27
32	40	61	75	72	69	72	75	79	79	69	56	45	38	32	29
39	61	[illegible]	[illegible]	75	70	70	68	68	58	46	35	28	28	29	29

BAND 6

33	31	30	30	30	28	25	25	28	28	26	26	26	30	31	30
32	32	30	32	27	25	25	27	28	30	28	28	28	28	27	28
33	33	33	29	28	26	26	28	36	43	49	36	28	29	26	26
30	31	31	30	28	25	38	58	63	55	55	58	45	31	28	30
31	31	31	28	27	37	63	69	66	61	61	61	51	49	39	29
34	36	32	31	48	62	60	53	57	62	46	50	57	57	53	31
31	31	31	45	58	60	58	60	69	66	60	75	69	66	53	28
30	36	52	68	68	64	73	76	76	73	64	68	68	50	30	27
31	35	59	69	66	60	60	66	72	69	63	49	38	33	28	26
34	55	72	72	65	63	60	63	60	51	42	31	28	26	26	26

BAND 7

17	16	15	15	14	12	12	13	16	16	15	14	14	14	15	15
15	16	14	14	13	12	12	12	15	15	15	14	14	14	13	13
17	17	17	15	14	13	13	14	17	21	22	18	16	16	15	16
16	16	15	15	13	13	18	27	32	25	25	26	20	15	15	16
15	15	15	14	12	17	29	31	34	28	27	28	24	23	18	13
17	17	15	16	23	29	28	24	25	26	21	23	26	26	24	14
16	17	17	22	27	27	27	28	32	30	29	33	32	30	21	13
14	16	24	29	29	28	30	31	32	31	28	29	29	21	12	12
15	18	27	30	29	28	28	30	31	30	28	22	18	15	13	13
16	26	33	31	30	29	29	28	28	24	19	15	14	13	13	13

DIAGONAL POINTS OF AREA 1018 147 1024 152

BAND 4 — LAKE

35	34	34	34	34	38	35
37	34	34	37	39	37	37
29	32	34	36	32	36	34
31	27	25	25	25	31	32
33	33	32	29	28	26	29
35	35	36	32	31	32	39

BAND 5 — LAKE

34	30	33	33	33	39	33
33	32	32	33	36	36	33
26	29	32	32	29	35	33
26	20	19	19	20	29	32
33	32	24	24	22	21	26
32	35	35	24	24	29	41

BAND 6 — LAKE

35	33	33	33	33	37	31
36	34	31	34	32	34	34
31	31	33	37	31	37	33
30	21	16	16	20	33	33
33	31	20	16	22	23	26
34	34	34	19	[illegible]	31	38

BAND 7 — LAKE

17	17	15	15	17	17	16
18	17	16	17	17	17	17
16	17	17	17	15	17	16
13	[illegible]	[illegible]	[illegible]	[illegible]	15	16
16	14	[illegible]	[illegible]	[illegible]	[illegible]	11
16	17	13	[illegible]	[illegible]	14	19

DRY PONDS # 13-18

DIAGONAL POINTS OF AREA 1067 120 1090 125

BAND 4

31	32	34	32	31	32	32	31	31	31	31	31	31	31	31	31	28	28	28	27	28	31	32	31
33	32	32	33	31	33	33	32	32	32	32	29	29	32	29	32	33	33	32	32	29	33	33	32
32	31	31	31	32	42	46	32	32	28	35	43	42	31	35	39	49	43	39	35	32	32	32	31
30	30	31	35	58	[illegible]	54	35	35	41	[illegible]	54	35	38	34	31	47	[illegible]	[illegible]	57	40	49	52	41
29	30	33	30	30	33	30	30	30	34	44	57	54	62	62	[illegible]	51	48	37	33	34	39	41	39
32	49	61	47	29	29	29	29	29	32	29	29	29	38	50	66	68	66	50	36	34	34	29	32

BAND 5

29	31	31	31	31	31	31	29	29	27	27	26	27	29	31	29	27	26	26	26	27	29	29	27
32	32	29	32	32	33	32	32	32	29	29	27	27	27	27	29	33	29	32	29	29	32	33	29
29	29	28	29	32	41	46	29	29	28	32	44	39	27	35	41	53	46	39	35	32	29	29	32
28	28	28	41	63	[illegible]	57	33	33	46	[illegible]	57	34	36	33	34	57	[illegible]	[illegible]	54	44	57	59	41
30	32	32	30	32	33	30	27	27	33	47	57	59	65	64	59	56	[illegible]	55	32	32	41	46	38
32	52	67	48	27	27	29	29	29	27	27	26	29	35	54	[illegible]	[illegible]	69	52	33	32	32	27	29

BAND 6

28	32	32	30	30	30	32	32	32	30	27	27	28	28	28	30	28	25	27	25	25	30	30	30
29	29	29	31	[illegible]	29	28	29	29	28	[illegible]	28	28	26	28	28	31	[illegible]	28	28	28	[illegible]	31	29
28	28	25	26	[illegible]	39	42	28	28	26	[illegible]	42	36	[illegible]	31	40	47	[illegible]	31	31	30	[illegible]	28	28
28	[illegible]	[illegible]	41	61	60	49	29	29	42	[illegible]	51	33	[illegible]	29	35	61	63	63	47	39	51	54	37
27	[illegible]	[illegible]	29	31	31	29	27	27	31	46	53	51	[illegible]	57	43	51	45	32	29	27	39	45	34
30	51	[illegible]	45	28	28	26	28	28	28	28	26	30	39	33	[illegible]	31	55	49	35	31	28	28	26

BAND 7

15	15	16	15	15	15	15	15	15	13	14	13	14	14	14	14	13	[illegible]	12	12	12	14	15	14
13	14	14	15	15	15	14	14	14	14	14	13	14	14	14	14	15	13	14	13	14	14	15	15
14	13	12	13	14	19	19	13	13	13	17	21	17	14	16	19	22	20	16	15	14	15	14	14
13	13	13	18	27	[illegible]	23	14	14	20	29	22	15	16	14	17	25	31	29	21	18	23	24	17
13	14	14	14	15	15	13	13	13	16	22	25	25	29	26	20	23	22	16	14	15	19	20	17
16	25	27	19	13	14	14	14	14	14	13	15	15	20	26	32	33	29	19	16	16	15	14	14

DRY PONDS # 25-28; 32, 33

DIAGONAL POINTS OF AREA 1034 129 1052 138

BAND 4

31	30	31	34	34	34	34	31	31	34	31	31	31	31	31	31	31	34	34
33	33	33	30	33	34	33	33	33	30	30	30	30	30	30	33	33	34	33
32	32	29	32	32	32	34	32	32	32	29	29	28	29	29	29	29	32	32
32	37	52	58	47	32	28	32	32	32	31	31	31	31	31	31	31	32	32
32	42	54	64	66	67	44	32	33	36	36	46	61	57	40	32	36	40	36
31	32	39	59	61	51	36	31	36	39	59	[illegible]	66	63	59	43	59	66	49
31	31	31	38	54	49	34	30	35	40	49	49	47	44	42	31	31	35	31
33	33	30	33	37	39	34	41	44	33	30	30	33	30	29	29	27	29	29
32	38	43	32	41	53	61	63	63	56	43	36	36	32	29	29	29	29	29
34	47	42	34	32	38	58	63	55	53	53	53	52	34	28	28	31	31	31

BAND 5

30	28	30	30	30	30	30	30	30	33	33	30	30	33	33	33	30	33	33
30	30	30	30	33	32	30	32	30	30	30	27	27	30	30	30	32	32	33
29	29	29	29	33	32	32	32	32	29	27	26	27	27	27	29	27	29	29
31	37	57	61	47	31	31	29	31	31	27	29	31	29	29	29	27	29	31
29	40	61	69	[illegible]	64	46	29	32	33	38	51	64	61	40	32	33	40	33
30	32	44	61	56	53	39	30	36	39	63	[illegible]	[illegible]	70	63	46	63	[illegible]	49
33	30	33	41	59	50	34	30	34	44	59	57	50	52	47	30	33	36	33
30	30	32	32	38	38	33	41	43	32	30	30	32	30	27	26	26	26	26
27	42	44	29	40	61	62	67	62	59	44	33	33	27	27	27	27	26	27
35	52	42	31	31	42	61	67	61	56	59	61	54	32	27	27	27	27	27

BAND 6

28	28	28	29	31	31	28	29	31	31	31	28	29	31	29	29	28	31	29
31	27	29	27	31	31	29	29	31	29	29	27	29	29	27	31	31	31	29
31	30	30	30	[illegible]	31	31	31	31	30	26	26	28	26	26	30	28	30	31
32	40	57	59	[illegible]	32	30	30	33	30	30	[illegible]	30	28	30	28	[illegible]	28	28
31	38	56	64	66	61	45	28	31	31	35	[illegible]	61	54	35	29	[illegible]	37	31
28	30	44	59	62	53	36	28	33	36	58	[illegible]	59	63	55	44	58	[illegible]	44
29	29	31	41	55	47	31	[illegible]	35	44	54	51	47	49	42	28	31	37	29
29	[illegible]	29	29	35	36	31	[illegible]	39	31	29	27	31	29	27	26	26	26	23
28	[illegible]	43	28	41	55	63	65	60	53	37	33	30	[illegible]	28	30	26	26	28
36	54	42	30	30	42	64	68	59	54	57	62	57	[illegible]	27	28	27	28	30

BAND 7

15	13	14	14	15	15	15	15	16	16	15	15	16	15	15	14	15	16	15
15	14	14	14	15	15	15	15	16	15	13	13	13	14	14	15	16	16	15
16	15	15	16	15	15	16	15	15	15	15	14	14	14	14	14	14	16	16
15	18	23	[illegible]	[illegible]	15	15	15	16	14	14	14	14	14	14	14	14	14	14
15	20	25	27	[illegible]	26	[illegible]	15	16	16	17	21	27	24	17	15	16	17	15
15	16	20	23	27	24	17	15	17	[illegible]	23	[illegible]	[illegible]	29	25	19	28	[illegible]	18
14	15	16	20	25	22	15	14	17	21	26	25	23	23	21	15	15	17	15
14	15	16	14	13	18	16	17	18	14	14	14	15	14	13	13	12	12	12
15	20	19	14	21	26	29	[illegible]	29	24	17	16	16	14	15	14	14	14	13
17	27	19	16	19	20	29	28	26	24	25	26	24	15	13	13	13	14	13

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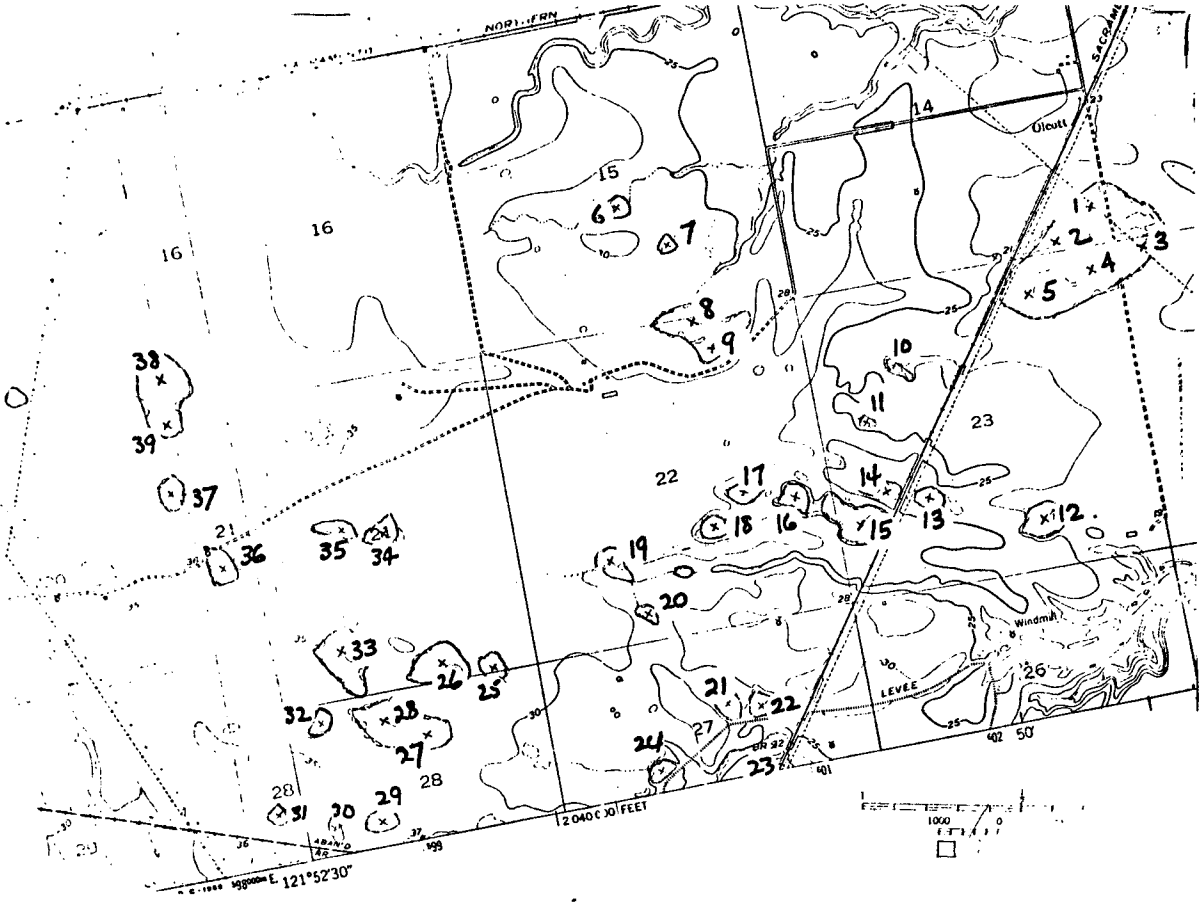

Site 58 map

July 3, 1973

I. PROBLEMS IMPEDING PROGRESS

1. Additional tapes are needed to continue the computer processing of radiance data both for comparison with the ERTS 1 images and with field gathered data. See attached copy of Data Request Form (A).

2. To more completely document the seasonal changes, imagery products prior to 9/24/73 are required. In order to decrease the load on the NDRF facility only images specifically over the Stanford test site, rather than those for the whole area of study, have been designated. See attached copy of Data Request Form (B).

3. Some image products are still missing or are of quality too poor for use. It would be appreciated if these could be supplied. See attached copy of Data Request Form.

NDPF USE ONLY

D_____
N_____
ID_____
AA_____
TM_____

DATA REQUEST FORM

A. TAPES

1. DATE July 3, 1973

2. USER ID UN 142

4. SHIP TO: R.J.P. Lyon

ADDRESS_____ ☐ NEW

School of Earth Sciences

Stanford University

Stanford, California 94305

5. TELEPHONE NO. (415) 321-2300 Ext. 4147/2747 ☐ NEW

6. CATALOGUES DESIRED

STANDARD ☐ U.S. ☐ NON-U.S.

DCS ☐

MICROFILM ☐ U.S. ☐ NON-U.S.

APPROVAL TECHNICAL MONITOR_____

ADDDHHMMS OBSERVATION IDENTIFIER	C CENTER POINT COORDINATES	B SENSOR BAND	P PRODUCT TYPE	F PRODUCT FORMAT	T TICK MARKS	NN NUMBER OF COPIES	A AREA
	TOP PRIORITY - IMMEDIATE REQUIREMENT						
1183-18175	3732N 12146W	4-7	D	9			
	LOWER PRIORITY - LATER REQUIREMENT						
1273-18183	3736N 12201W	4-7	D	9			
1291-18182	3731N 12201W	4-7	D	9			

NDPF USE ONLY

D
N
ID
AA
TM

DATA REQUEST FORM

B. PRIOR IMAGERY

1. DATE July 3, 1973

2. USER ID UN 142

4. SHIP TO: R.J.P. Lyon

ADDRESS ☐ NEW

School of Earth Sciences
Stanford University
Stanford, California 94305

5. TELEPHONE NO. (415) 321-2300 Ext 4147/2747 ☐ NEW

6. CATALOGUES DESIRED

STANDARD ☐ U.S. ☐ NON-U.S.

DCS ☐

MICROFILM ☐ U.S. ☐ NON-U.S.

APPROVAL TECHNICAL MONITOR _____

ADDDHHMMS OBSERVATION IDENTIFIER	C CENTER POINT COORDINATES	B SENSOR BAND	P PRODUCT TYPE	F PRODUCT FORMAT	T TICK MARKS	NN NUMBER OF COPIES	A AREA
1021-18172	37.403 N 121.761W	4567 4567 57 7	- - - B-7	M S P T	- - - -	1 2 1 2	
1039-18172	37.426N 121.848W	4567 4567 57 7	- - - B-7	M S P T	- - - -	1 2 1 2	
1057-18172	37.358N 121.827W	4567 4567 57 7	- - - B-7	M S P T	- - - -	1 2 1 2	

NDPF USE ONLY

D
N
ID
AA
TM

DATA REQUEST FORM

C. REPLACEMENT OR NON-RECEIVED IMAGERY

1. DATE July 3, 1973

2. USER ID UN 142

4. SHIP TO:

R.J.P. Lyon

ADDRESS ☐ NEW

School of Earth Sciences

Stanford University

Stanford, California 94305

5. TELEPHONE NO. (415)321-2300 ☐ NEW

Ext/ 4147/2747

6. CATALOGUES DESIRED

STANDARD ☐ U.S. ☐ NON-U.S.

DCS ☐

MICROFILM ☐ U.S. ☐ NON-U.S.

APPROVAL TECHNICAL MONITOR

ADDDHHMMS OBSERVATION IDENTIFIER	C CENTER POINT COORDINATES	B SENSOR BAND	P PRODUCT TYPE	F PRODUCT FORMAT	T TICK MARKS	NN NUMBER OF COPIES	A AREA
1075-18173	37.490N 121.240W	7 7	- B-7	P T	- -	1 2	
1255-18183	37.511N 122.026W	5	-	P	-	1	
1273-18183	37.36N 122.01W	5,7	-	P	-	1	
1291-18182	37.31N 122.01W	4567 5	- -	S P	- -	1 1	
1183-18175	37.32N 121.46W	7	B7	T	-	2	
1129-18181		45,6,7	-	S		2 (original set cracked)	

J. DISCUSSION OF ACCOMPLISHMENTS DURING PERIOD

1. ISCO WITH DATA SYSTEM

Considerable difficulty was found in trying to integrate the ISCO spectro-radiometer into data system because of an inherent design feature involving manually-switchable gain changes in the amplified circuit. At each switch change the "recorder output" returns to zero which necessitates either (1) some signal to the data system that a change has occurred or (2) usuage at such a low gain that all the data remain within one gain-level. For the moment therefore, we are using the ISCO and manually recording the spectroradiometric data.

2. IMAGE DENSITOMETRY AND CCT-GENERATED SHADE PRINTS

Maximum effort reported herein concerns the density/transmission measurements on selected ERTS frames, designed to be related to the MSS tape output (CCT) and shade prints.

The Stanford test area was examined initially usually and photo interpretation techniques used to obtain relative information over the total time period imagery available here (see rear table)

A. IMAGE DENSITOMETRY-POSITIVE IMAGERY-70MM

Two approaches have been used. Firstly conventional PI description of features of local geological interest were made, particulary noting tone-contrasts and changes. Secondly the positives were measured (a) using a McBeth Quantalog TD102 densitometer with a specially prepared, smaller (0.7MM) diameter aperture, and (b) with an ISCO fiber optics probe used to observe the image-plane brightness of the transparency when projected with a lantern-slide projector. These measurements can be made up to 6 meters away from the projector, by which time the fiber optics subtend only 0.5 mrad, equal to a circle containing above 15 ERTS resolution cells(magnification 35.3x.) See Figure I. A wavelength of 625 nm was used for maximum sensitivity of the ISCO and all 4 ERTS MSS images were measured, using the grey scale wedges for calibration.

All these sets of data have been tabulated and the spectral radiance (at the center of each MSS filter) plotted (mwatts $cm^{-2}.ster^{-1}.\ 0.1\mu m^{-1}$).

(1) CONVENTIONAL PHOTO INTERPRETATIONS OF ERTS CHANNEL 7, POSITIVE TRANSPARENCY IMAGES OF STANFORD TEST AREA. (GRASSY FIELDS,8000 ACRES CUT WITH INTERSTATE 280 FREEWAY)

(a) 1075-18173 (October 6) Sun El 41° / A21 146°

Freeway slightly darker than fields. Felt Lake black with white rim. Menlo

Country Club Golf course (CCGC.) while, Stanford University Golf course (SUGC) white. Santa Clara gravels (Qsc) = Monterey shales (Tm), about equally bright with Page Mill basalt (Tpb.) Butano sandstone (Tbu) darker. Stanford Linear Accelerator (SLAC) dark. Searsville Lake dark,Portola Road white. Jasper Ridge serpentine (Ksp) = enclosing sediments.

Qsc = Tm = Tpb > Tbu

(b) 1111-18181 (November 11) 60% clouds no use

(c) 1112-18181 (November 29) Sun El 27°/AZ1 155°

All transparencies badly "cracked," need new prints

General fields white, no contrast with Menlo CCGS, Stanford UGC lighter tone. SLAC dark, Freeway darker, Searsville Lake dark. Portola Road grey. POOR IMAGE.

(d) 1147-18181 (December 17) 90% clouds, no use

(e) 1165-18175 (January 4) Sun 24°/AZ1 151°

Good Contrast. Qsc light-grey peeked on hills/valleys, contrasting with Tm. Freeway darker, SLAC darker, West end of SLAC patchy topography. Tm > Tpb. Where Tbu without trees approximatly equal to Tm. Serpentine on Jasper Ridge (Ksp) lighter than sediments, both darker than Qsc.

Tm > Tpb
Tbu w/o trees = Tm
Ksp < Tbu, both > Qsc

(f) 1183-18175 (January 22) Sun 26°/AZ1 148°

Excellent Contrast. Qsc light speckled (but different to 1165) contrasting with Tm. Freeway darker, Tm lightest, Tbu little lighter than Tpb, above equal to SUGC, SLAC dark. Serpentine (Ksp) lighter than seds, darker than Qsc.

(Select this tape for further processing)

(g) 1201-18181 (Febuary 9) 80% clouds, no use

(h) 1219-18182 (Febuary 27) 100% clouds, no use

(i) 1237-18183 (March 17) 40% clouds, ground obscured

(j) 1255-18183 (April 4) Sun 49°/AZ1 134°

Good grey scale, overall tone light. Searsville Lake now very dark (full of water) Freeway and Slac dark-medium grey, trees along creek same grey. Topographic releif effect now lost. Field at south end of Felt Lake darker tone than that around the lake. Tpb = Tm and only slightly brighter, Lake Lagunita now full (black.) Qsc even toned (not speckled). Menlo CCGC equals