

ACCOMPLISHMENTS

During the fourth two-month period of this contract data analysis, now using the computer compatible tapes, was continued. Ground-truth measurements were made at the Salton Sea test site.

GROUND-TRUTH MEASUREMENTS

The previous report stated that considerable cloud cover existed at the time of the NASA aircraft overflight at the Salton Sea/desert test site on February 4, 1973. The ERTS photographs since received have confirmed that the test-site was almost totally covered with high cloud so that no data useful for this investigation could be obtained from either the satellite or the aircraft measurements. A definite data for another NASA aircraft overflight has not yet been scheduled by Houston.

The photographic aircraft MSS data for one channel were received from Houston in March. On the basis of examining these data, and the satellite data analysis to date, the requirements for NASA aircraft support have been revised. The target area to be covered by the aircraft has been approximately halved, and the number of spectral channels reduced by four, eliminating coverage of MSS 7 which is not useful for this investigation due to atmospheric water vapor.

Ground-based observations of the aerosol optical thickness with the Volz photometer have been made twice at the Salton Sea coinciding with ERTS-1 overpasses. These measurements are shown in Fig. 1 with previous Volz data. No measurements were made in this reporting period at San Diego due to cloud cover at the time of the ERTS-1 overpasses.

DATA ANALYSIS

Photographic Data Analysis

The previous report discussed the problem with the grey-scale calibration at high densities (low radiance). This is due to the inherent inaccuracies in producing the photographic images. This is a severe problem in this investigation since we are particularly concerned with the low radiances over water surfaces. Hence, densitometric analysis of the transparencies has been discontinued in this investigation; all future analysis will use the digital data on the CCT.

Software Development

The program to read data from the CCT is prescribed geographical areas has been completed and successfully used on actual ERTS-1 data.

Digital Data Analysis

The digital data for three overpasses for the Salton Sea/desert test site have been printed out and a preliminary analysis made. The data are more consistent than the photographic data as expected.

To analyze the data, an area, about 1000 x 1000 ft, is selected on the Salton Sea and on the desert. The water area is selected away from the shoreline where the radiance is essentially uniform within the area. The desert area is selected for high radiance and uniformity. An average radiance for each area is estimated for each MSS band. Of course, we did not plan on using MSS7 due to the atmospheric water vapor effect; in any case it would not be useful over water surfaces due to the very low (counts 0, 1, 2) and inaccurate radiance values.

The spectral variations of the radiance over the desert and Salton Sea are shown in Fig. 2 and 3. The desert radiance increases with decreasing wavelength and with sun elevation. The radiance for two areas (2-1) and (3-1) for 10-1-72 show different variations at the shorter wavelengths, although the difference is within the data errors. The water radiance, as expected, shows a sharp decrease as the wavelength increases. For 11-6-72 it was found that the radiance near the shoreline was higher than in the center of the sea, as shown by the two curves for this date. It was necessary to go 1300 ft from the shoreline to obtain constant radiance values. However, this effect was not apparent on the other two dates analyzed. Further investigation of this effect is necessary. If the data for 11-6-72 close to the shoreline are ignored, then the water radiance increases with increasing sun elevation.

Preliminary use of these data to investigate the contrast relationship are not consistent as a function of wavelength, indicating that the theoretical relationship, as expected, must be modified, and will be discussed in the next reporting period.

Future Plans

In the next reporting period it is planned to continue analysis of the digital data to investigate both the contrast and radiance relationships.

Significant Results

There are no significant results to report in this period.

Data Requests

Digital data for seven more sets of data (two at San Diego and five at the Salton Sea) have been requested. In addition, a replacement set for

one previously received was requested since numerous parity errors on the tape prevented our obtaining data from it. Copies of the Data Request Forms are included at the end of this report.

Standing Order Change

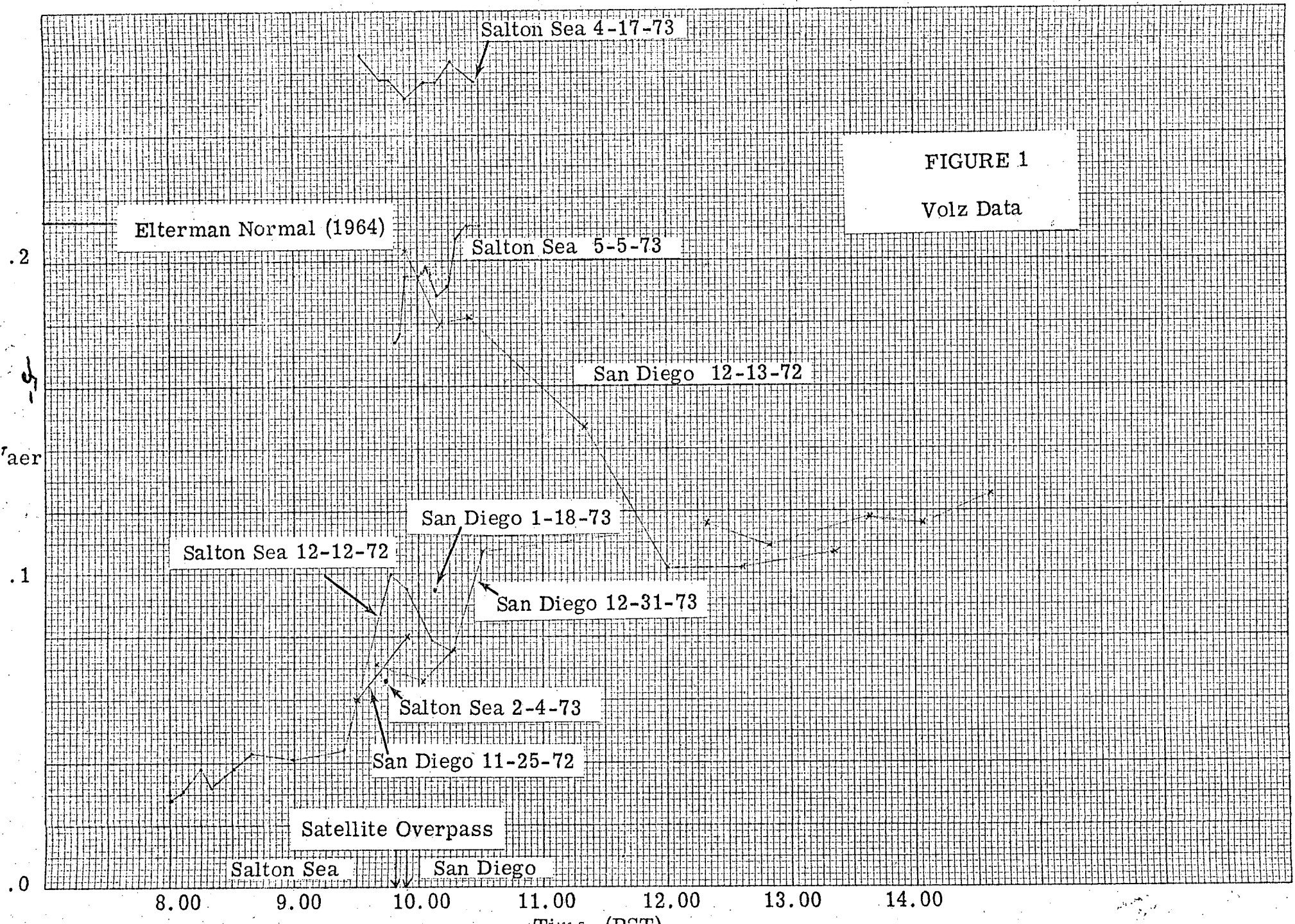
A change in our Standing Order was made to extend the coverage period to 9-30-73, to obtain the maximum data for the duration of the contract, and to increase the acceptable cloud cover to 60%. A copy of the form is included at the end of this report.

Presentation

A paper, "Determination of Aerosol Content in the Atmosphere," discussing the results of this study was presented at the ERTS-1 Symposium by M. Griggs in Washington, D. C. in March. Many requests for a copy of this paper have been received.

Miscellaneous

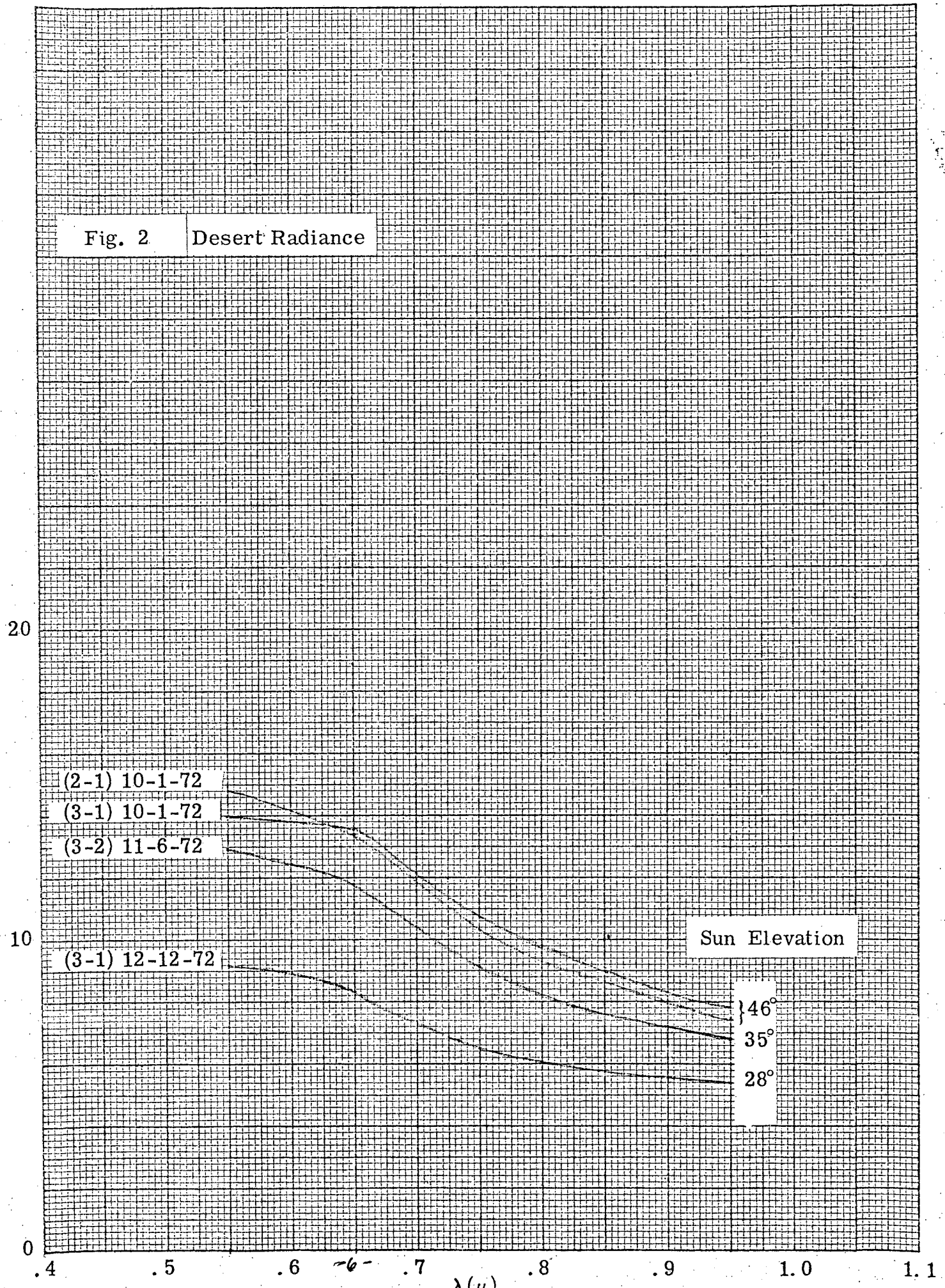
M. Griggs visited R. F. Fraser at Goddard in March to discuss the results and status of the investigation.



K&E 10 X 10 TO 1/2 INCH 46 1323
7 X 10 INCHES
MADE IN U.S.A.
REUFFEL & ESSER CO.

Fig. 2 Desert Radiance

Radiance (mw/cm²/μ/sr)



(2-1) 10-1-72

(3-1) 10-1-72

(3-2) 11-6-72

(3-1) 12-12-72

Sun Elevation

46°
35°
28°

20

10

0

.4

.5

.6

.7

.8

.9

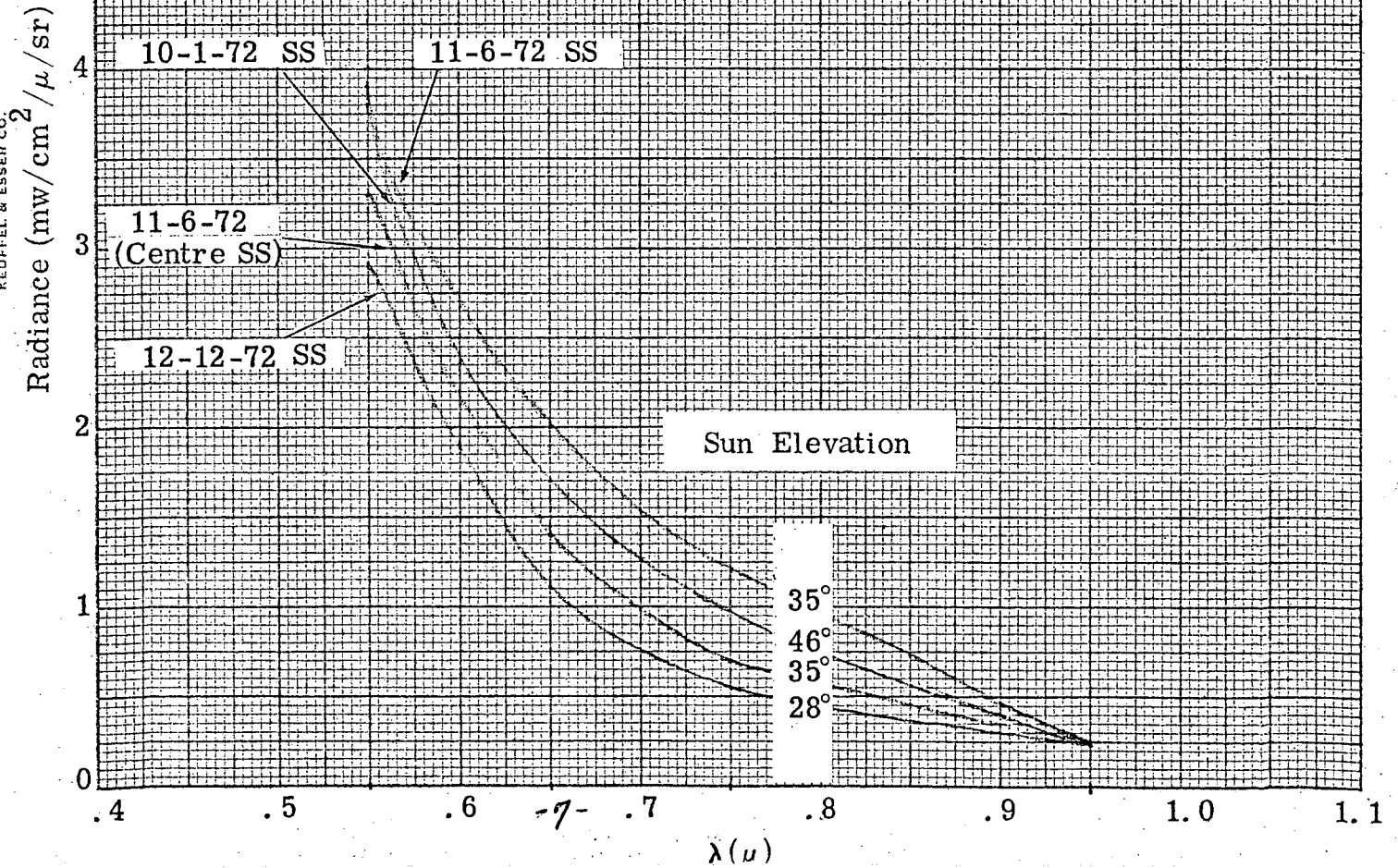
1.0

1.1

λ (μ)

K&E 10 X 10 TO 1/2 INCH 46 1323
7 X 10 INCHES
MADE IN U.S.A.
KEUFFEL & ESSER CO.

Fig. 3 Water Radiance



NDPF USE ONLY

D _____
 N _____
 ID _____
 AA _____
 TM _____

DATA REQUEST FORM

1. DATE April 19th 1973

5. TELEPHONE NO. (714) 4590211 NEW

2. USER ID PR 135

6. CATALOGUES DESIRED _____

4. SHIP TO:

STANDARD U.S. NON-U.S.

ADDRESS Dr. M. GRIGGS NEW

DCS

SCIENCE APPLICATIONS INC.

MICROFILM U.S. NON-U.S.

P.O. BOX 2351

LA JOLLA CA 92037

APPROVAL TECHNICAL MONITOR _____

| ADDDHMS OBSERVATION IDENTIFIER | C CENTER POINT COORDINATES | B SENSOR BAND | P PRODUCT TYPE | F PRODUCT FORMAT | T TICK MARKS | NN NUMBER OF COPIES | A AREA |
|--------------------------------------|----------------------------------|---------------------|----------------------|------------------------|--------------------|---------------------------|-----------|
| 053-17554 | N33-07/ W117-24 | M | D | 7 | | 1 | U |
| 52-17495 | N33-07/ W115-58 | M | D | 7 | | 1 | U |
| 178-17501 | N33-48/ W115-43 | M | D | 7 | | 1 | U |
| 24-17504 | N33-07/ W116-00 | M | D | 7 | | 1 | U |
| 179-17561 | N33-17/ W117-20 | M | D | 7 | | 1 | U |
| 160-17503 | N33-11/ W115-58 | M | D | 7 | | 1 | U |
| 034-17500 | N33-02/ W116-01 | M | D | 7 | | 1 | U |

DATA REQUEST FORM

NDPF USE ONLY

D _____
 N _____
 ID _____
 AA _____
 TM _____

1. DATE April 26th 1973

5. TELEPHONE NO. (714) 4590211 NEW

2. USER ID PR 135

6. CATALOGUES DESIRED

4. SHIP TO:

STANDARD U.S. NON-U.S.

ADDRESS Dr M. GRIGGS NEW

DCS

SCIENCE APPLICATIONS INC

MICROFILM U.S. NON-U.S.

PO. BOX 2351

LA JOLLA CA 92037

APPROVAL TECHNICAL MONITOR _____

| ADDDHRRMS OBSERVATION IDENTIFIER | C CENTER POINT COORDINATES | B SENSOR BAND | P PRODUCT TYPE | F PRODUCT FORMAT | T TICK MARKS | NN NUMBER OF COPIES | A AREA |
|--|----------------------------------|---------------------|----------------------|------------------------|--------------------|---------------------------|-----------|
| 161-17561 | N 33-08/ W 117-23 | M | D | 7 | | 1 | U |
| <p><i>This tape was previously requested and received. However, numerous parity errors on the tape prevented our obtaining data from it.</i></p> | | | | | | | |

ERTS 1 STANDING ORDER FORM

(See Instructions on Back)

DATE April 18th 1973
 GSFC ID NUMBER PR 135
 PRINCIPAL INVESTIGATOR Dr M. GRIGGS
 TELEPHONE NO. (714) 459 0211 NEW
 SHIP TO: Dr M. GRIGGS
SCIENCE APPLICATIONS INC (NAME)
P.O. BOX 2351 (AGENCY)
LA JOLLA CA 92037 (CITY) (STATE) (ZIP)

- ADDITION
 CHANGE
 DELETION

NDPF USE ONLY
 D _____
 N _____
 ID _____
 OTM _____
 TM _____
 TM APP _____

- CATALOGS DESIRED
 STANDARD U.S. NON-U.S.
 DCS
 MICROFILM U.S. NON-U.S.
 CHECK IF ADDRESS IS NEW

| NUMBER | GEOGRAPHIC POINTS | | COVERED AREA C C L O V % U E D R | Q U A L I T Y | COVERAGE PERIOD | | PROD T Y P E | T I C K M A R K | Q U A N T I T Y | RBV BANDS | | | MSS BANDS | | | | D E L E T E |
|--------|-------------------|-----------|--|---------------------------------|-----------------|-----------|--------------------------|--------------------------------------|--------------------------------------|-----------|---|---|-----------|---|---|---|----------------------------|
| | LATITUDE | LONGITUDE | | | START DATE | STOP DATE | | | | 1 | 2 | 3 | 1 | 2 | 3 | 4 | |
| FROM | 33 20'N | 115 50'W | 20 | | 08172 | 072673 | P | / | | | | | X | X | X | X | |
| | | | | | | | T | / | | | | | X | X | X | X | |
| | 32 45'W | 117 10'N | 20 | | 08172 | 072673 | P | / | | | | | X | X | X | X | |
| | | | | | | | T | / | | | | | X | X | X | X | |
| TO | 33 20'N | 115 50'W | 60 | | 08172 | 093073 | P | / | | | | | X | X | X | X | |
| | | | | | | | T | / | | | | | X | X | X | X | |
| | 32 45'W | 117 10'W | 60 | | 08172 | 093073 | P | / | | | | | X | X | X | X | |
| | | | | | | | T | / | | | | | X | X | X | X | |