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# DIGEST OF NASA EARTH OBSERVATION SENSORS

ROBERT R. DRUMMOND

(NASA-TM-X-66144) DIGEST OF NASA EARTH  
OBSERVATION SENSORS (NASA) 328 p HC  
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GOLDARD SPACE FLIGHT CENTER  
GREENBELT, MARYLAND

**INSTRUMENT RESUME**  
**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
**GODDARD SPACE FLIGHT CENTER**  
**GREENBELT, MD. 20771**

<b>1. TITLE</b>		<b>2. ACRONYM</b>	<b>3. EXP NO</b>
LOW-RESOLUTION OMNIDIRECTIONAL RADIOMETER (TITLE CONT.)		LROR	
		<b>4. RESUME DATE</b>	<b>5. VERSION</b>
		09/01/72	0004
<b>6. PRINCIPAL INVESTIGATOR</b>	<b>7. ORGANIZATION</b>	<b>8. TELEPHONE</b>	
SUOMI, DR. V.E.	UNIVERSITY OF WISCONSIN	608-262-5938	
<b>9. CO-INVESTIGATOR</b>	<b>10. ORGANIZATION</b>	<b>11. TELEPHONE</b>	
<b>12. CONTRACT TYPE</b>	<b>13. CONTRACT NUMBER</b>	<b>14. FLASH INDEX NUMBER</b>	<b>15. REPORT DATE</b>
			<b>17. STATUS</b>
			POST FLIGHT
<b>19. MONITOR</b>	<b>20. AGENCY</b>	<b>23. PSM OFFICE</b>	<b>21. TELEPHONE</b>
HOLTZ, J.R.	NASA HDQTRS	OSS/SG	202-755-2322
<b>22. VENDOR</b>	<b>24. LOCATION</b>	<b>26. FLIGHT DATE</b>	<b>25. LEAD TIME</b>
UNIVERSITY OF WISCONSIN	MADISON, WISCONSIN	10/59	NA
<b>28. INSTRUMENT TYPE</b>			<b>27.</b>
RADIOMETER, IR OMNIDIPECTIONAL NON-SCANNING LOW-RESOLUTION			UNC
<b>29. APPLICATION</b>		<b>28. SPACECRAFT</b>	
MET		EXPLORER 7	
<b>30. PURPOSE</b>			
<p>PRIMARY-TO MEASURE THE GROSS HEAT BUDGET OF THE EARTH.***  SECONDARY-TO DETERMINE HOW MUCH SOLAR ENERGY IS ABSORBED,  REFLECTED, AND EMITTED BY THE EARTH AND ITS ATMOSPHERE.</p>			
<b>31. PRINCIPAL EXPERIMENT</b>			
<p>EXPERIMENTS SIMILAR TO THIS WERE ALSO FLOWN ON TIROS 3,4, AND 7.  ON EXPLORER 7, THREE RADIATION CURRENTS ARE MEASURED WITH SIMPLE  BOLOMETERS IN THE FORM OF HOLLOW SILVER HEMISPHERES. THE HEMI-  SPHERES ARE THERMALLY ISOLATED FROM, BUT IN CLOSE PROXIMITY TO  SPECIALLY ALUMINIZED MIRRORS. THESE MIRROR BACKED BOLOMETERS ARE  MOUNTED ON THE EQUATOR OF THE SATELLITE. THE BOLOMETER'S TEMPERA-  TURE IS MEASURED BY A GLASS COATED BEAD THERMISTOR MOUNTED ON  THE HEMISPHERE. ALSO, PROVISION IS MADE TO MEASURE THE TEMPERA-  TURE OF THE MIRRORS. TWO OF THE HEMISPHERES HAVE A BLACK COATING  AND RESPOND ABOUT EQUALLY TO SOLAR AND TERRESTRIAL RADIATION. A  THIRD HEMISPHERE, WHITE, IS MORE SENSITIVE TO TERRESTRIAL RADI-  ATION THAN TO SOLAR RADIATION. A FOURTH WITH A GOLD METAL SURFACE  IS MORE SENSITIVE TO SOLAR RADIATION THAN TO TERRESTRIAL RADI-  ATION. A BLACK SPHERE, ON THE AXIS OF THE SATELLITE AT THE TOP,  IS USED TO DETERMINE ANY DETERIORATION IN THE MIRROR SURFACES BY  COMPARISON WITH BLACKENED HEMISPHERES. A SMALL TABOR-SURFACED  HEMISPHERE, PROTECTED FROM DIRECT SUNLIGHT CAN BE USED TO MEA-  SURE REFLECTED SUNLIGHT WHEN THE AXIS OF THE SATELLITE POINTS  TO THE EARTH'S SURFACE. THE RADIATION CURRENTS ARE OBTAINED BY  USING THESE TEMPERATURES IN HEAT BALANCE EQUATIONS.</p>			
<b>SOLAR AND TERRESTRIAL RADIATION</b>			
128 DEG K TO 488 DEG K			
0.1 KELVIN DEGREE			

<b>35. SPECTRAL RANGE</b>		<b>36. SPECTRAL RESOLUTION</b>		<b>37. TIME CONSTANT</b>	
0.3 TO 60.0 MICRON		NA		5. SECONDS	
<b>38. FIELD OF VIEW</b>			<b>39. GROUND SWATH</b>		
30.0			DEF 300 NM DIAM CIRCLE FROM 375 NM ALTITUDE		
<b>40. ANGULAR RESOLUTION</b>		<b>41. SPATIAL RESOLUTION</b>			
NA					
<b>42. POINTING ACCURACY</b>		<b>43. POINTING RATE</b>		<b>44. ALTITUDE</b>	
NA		NA		MED ECCENTRIC HIGH POSIGRADE	
<b>45. SPECIAL REQUIREMENTS</b>					
<b>47. COMPONENTS</b>					
5 MIRROR-BACKED BOLOMETERS					
<b>48. WEIGHT</b>		<b>49. VOLUME</b>		<b>50. AVERAGE POWER</b>	
3 LB					
				<b>51. STANDBY POWER</b>	
				<b>52. PEAK POWER</b>	
				<b>53. MTBF</b>	
				3 YRS	
<b>54. RF INTERFERENCE</b>		<b>55. MAGNETIC INTERFERENCE</b>		<b>56. SHIELDING</b>	
				SENSITIVE MIRRORS SHIELD SENSORS	
<b>58. CALIBRATION</b>			<b>59. DATA RECOVERY</b>		<b>61. FREQUENCY OF OBSERVATION</b>
			REALTIME TELEMETRY		CONTINUOUS
<b>62. TELEMETRY REQUIREMENTS</b>					
DATA SENT ON THE 730 HZ SUBCARRIER IN THE FORM OF A TEN-BIT NATURAL BINARY-CODED WORD. BANDWIDTH USED FOR TRANSMISSION IS 10 HZ.					
<b>63. ADVANTAGES AND LIMITATIONS</b>					
NO DATA STORAGE, DATA LIMITED TO TIME WHEN SATELLITE IN VIEW OF RECEIVING STATION.					
<b>64. REFERENCES</b>					
1) JUNO 2 SUMMARY PROJECT REPORT, VOL 1. EXPLORER 7 SAT. NASA TECH NOTE D-608, JULY 1961.***2) TELEMETRY CODE AND CALIBRATIONS FOR SATELLITE 1959 IOTA (EXPLORER 7). NASA TECH NOTE D-484, MAY 1960.***3) DATA AVAILABLE FROM NASA/NATIONAL SPACE SCIENCE DATA CENTER.					
<b>65. HISTORICAL REMARKS</b>					