EFFECTS OF SHUTTLE ENVIRONMENT ON INSTRUMENT PERFORMANCE

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OSTA-1 PAYLOAD

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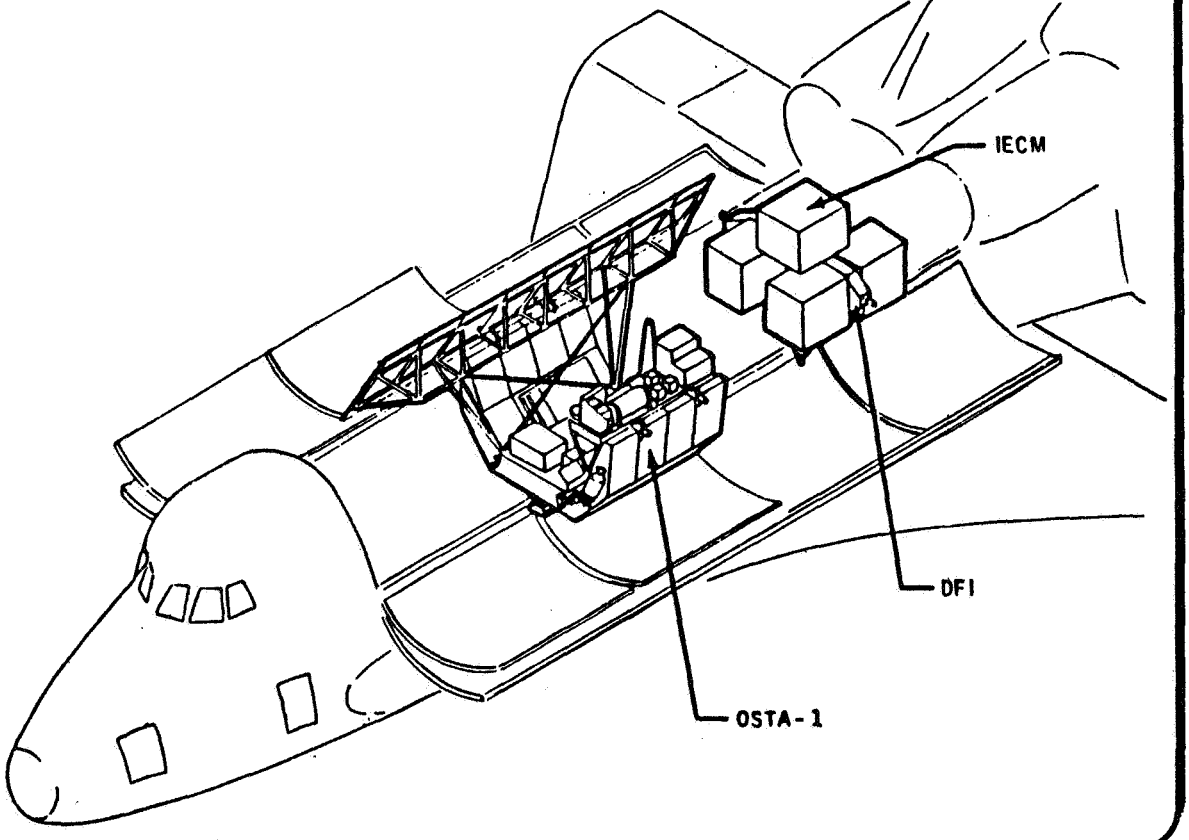
STS-2 CARGO



OSTA-1 PAYLOAD ON STS-2

- 6 EARTH-VIEWING EXPERIMENTS IN PAYLOAD BAY.
  - 5 OPTICAL, 1 RADAR.
- 2 EXPERIMENTS IN CABIN.
  - LIGHTNING SURVEY, PLANT GROWTH EXPERIMENT.
- LAUNCHED 9:10 AM CST NOV 12, 1981, 140x139 NM ORBIT, 38° INCLINATION.
- PAYLOAD ACTIVATED +4.5 HRS, DEACTIVATED -7.5 HRS.
- TOTAL OPERATION TIME 54.25 HRS.

EXPERIMENT-BAY INSTRUMENTS FOR OSTA-1

- SHUTTLE MULTISPECTRAL INFRARED RADIOMETER (SMIRR) - ALEX GOETZ, JPL.
  - INFRARED SPECTRAL RADIANCE IN 10 BANDS FOR LITHOLOGIC CLASSIFICATION.
  - 3&1/4 HOURS DATA, 1 HOUR CLOUD-FREE.
- FEATURE IDENTIFICATION AND LOCATION EXPERIMENT (FILE), ROGER SCHAPPELL, MARTIN-MARIETTA.
  - TWO-COLOR TV IMAGERY FOR AUTOMATIC CLASSIFICATION OF SCENES AND FEATURES.
  - 0.7 FRAME OF IMAGERY (INSTRUMENT MALFUNCTION).
- MEASUREMENT OF AIR POLLUTION FROM SATELLITES (MAPS) - H. REICHELE, LARC
  - 4.3 MICRON INFRARED RADIOMETER FOR MAPPING CO.
  - 39 HRS DATA, ~8HRS ESSENTIALLY CLOUD-FREE DATA.
- OCEAN COLOR EXPERIMENT (OCE) - H. KIM, GSFC.
  - MULTISPECTRAL SCANNER FOR MAPPING OCEAN CHLOROPHYLL.
  - 6 HRS DATA, 1/2 HR CLOUD-FREE DATA.
- SHUTTLE IMAGING RADAR (SIR-A) - C. ELACHI, JPL.
  - SYNTHETIC APERTURE RADAR FOR NATURAL RESOURCE MAPPING (EMPHASIS GEOLOGY).
  - 7.5 HOURS GOOD DATA (10-MILLION SQ. KILOMETERS).

OSTA-1 OPTICAL EXPERIMENTS

EFFECT OF SHUTTLE ENVIRONMENT

EXPERIMENT	EXPOSURE TIME OF OPTICS, HRS.	COMPARISON PRE & POST-FLIGHT CALIBRATIONS	REMARKS
MAPS	39	CONST. WITHIN 1%	DUST, PALLET TEMPERATURE FLUCTUATIONS, SCORCH MARKS ON BETA CLOTH.
OCE	8	CONST. WITHIN 0.5%	NO DUST, UNAFFECTED BY TEMP. FLUCTUATIONS
FILE	42	~10% CHANGE, CAMERA 1* ~20% CHANGE, CAMERA 2*	NO DUST, NO TEMP. PROBLEMS. 1/8" PRISM LOST POST-FLIGHT. SCORCH MARKS ON BETA CLOTH.
SMIRR	5	CONSTANT WITHIN 3 COUNTS. (PEAK SIGNAL LEVEL ~2500 COUNTS)	NO DUST. PALLET TEMP. FLUCTUATIONS.

* ~2 YEARS BETWEEN PRE- AND POST-FLIGHT CALIBRATION. FILTER DEGRADATION IN GROUND STORAGE SUSPECTED.

SHUTTLE-BASED EXPERIMENTS: LESSONS LEARNED FROM OSTA-1

- FLIGHT SIMULATIONS ESSENTIAL
  - EXPERIMENT REPLANNING PRACTICE
- GROUND CONTROL OF EXPERIMENTS DESIREABLE
  - MALFUNCTIONS OF TOTALLY AUTOMATED EXPERIMENTS CANNOT BE FIXED IN FLIGHT
- ALARM LIMITS FOR EXPERIMENTS MUST BE REALISTIC
  - CREW LOSES INTEREST AFTER A FEW ALARMS
- SHUTTLE ENVIRONMENT HAS NO MEASUREABLE EFFECT ON EARTH-VIEWING EXPERIMENTS (54 HR MISSION EXPERIENCE)