

# Hydra-Iris/South Atlantic Program

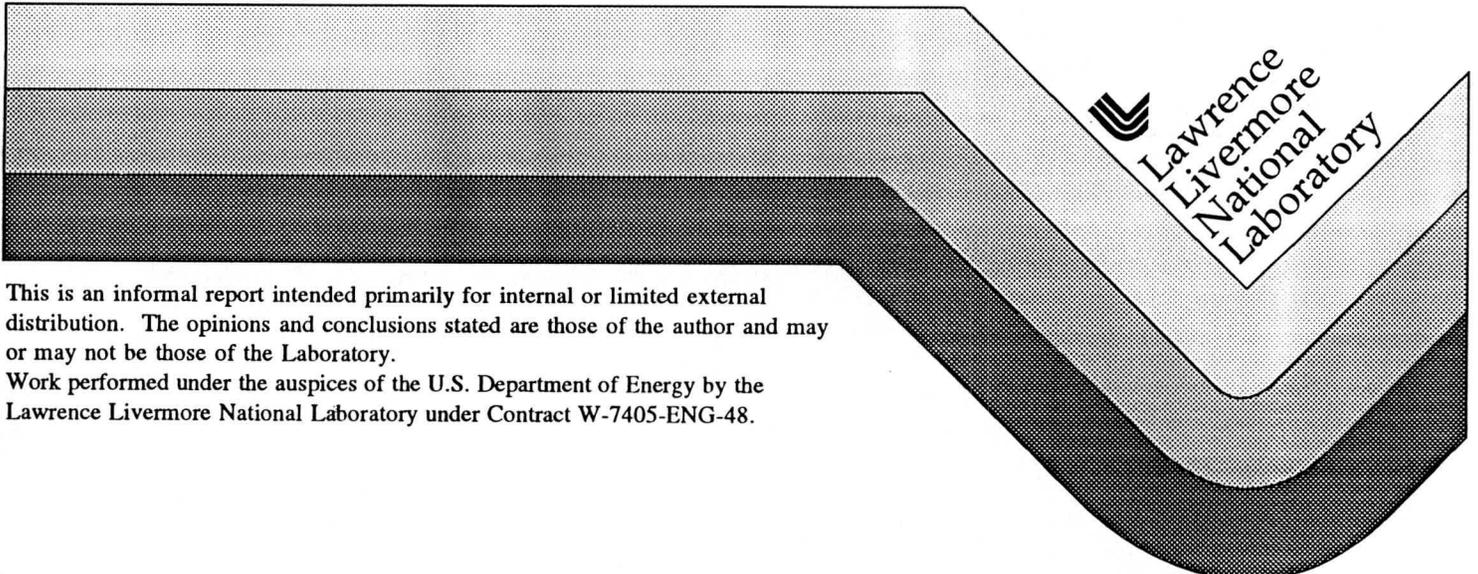
J. McCord

RECEIVED

JUL 17 1997

OSTI

October 29, 1964



This is an informal report intended primarily for internal or limited external distribution. The opinions and conclusions stated are those of the author and may or may not be those of the Laboratory.

Work performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract W-7405-ENG-48.

## **DISCLAIMER**

**This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.**

---

## **DISCLAIMER**

**Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.**

~~CONFIDENTIAL~~

UOPB 64-146

DOCUMENT NUMBER

October 29, 1964

~~CONFIDENTIAL~~

MEMORANDUM

TO: A. Hudgins  
FROM: J. McCord  
SUBJECT: Hydra-Iris/South Atlantic Program

Classification (Declassification/Review Date) Change	
27/120	<b>UNCLASSIFIED</b>
R2D2-UOPB-64-146	3/25/96
by authority of	(Authority)
by	Rune Barron 5/14/96
verified by	Stephen Hoffend 5-16-96
	(Signature of person verifying)

To satisfy the need for a companion rocket system in support of readiness requirements which could not be met by fixed sites at J. I. and Kauai, LRL has purchased six Hydra-Iris booster systems for launch and recovery evaluation. The advantage of the system being the fact that it is fired from the water and requires no fixed launcher on land or ship, and it can be supported by just about any vessel equipped for cargo handling. The U.S. Navy through the Naval Missile Center, Pt. Mugu is providing the necessary personnel and equipment support. Specifically, it appears that this system will allow proper placement of LRL RadChem samplers supporting High Altitude events which are conducted a long distance (150 km) from J. I. and could support magnetic conjugate operations if required.

Coincident with the development of diagnostic instrumentation, the ideas and hardware for an electrostatic analyzer capable of measuring electrons, protons and alpha particles in the 10 to 200 keV energy regions was developed in the High Altitude Physics group of LRL.

It was determined that two or three of these electrostatic analyzers would be developed as payloads which were compatible with the Hydra-Iris vehicle, and launched at the South Atlantic Anomaly. At that location the launch system would get a good check-out, and simultaneously, valuable scientific data could be obtained at little additional cost if launch support could be obtained from either the Navy or the Air Force Eastern Test Range (AFETR). AFETR, it developed, would be able to provide a properly instrumented ship if LRL could make a schedule sandwiched between the NASA Mariner and Surveyor programs. To comply with the ship schedule

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

This material contains information affecting the National Defense of the United States within the meaning of the espionage laws, Title 18, U. S. C., Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

as required by AFETR, the LRL/NMC team must meet the ship at either South Africa or Australia, and disembark at Recife, Brazil as stated in the subject AEC445 forms.

The trapped radiation belts only descend to the lower altitudes (200 km) at the South Atlantic Anomalies; and to place the same payloads into the belts at any other location would require, in addition to a proper launcher and support instrumentation, a booster system costing from 7 to 10 times the cost of a Hydra-Iris.

Specifically, the object of the experiment is to measure the angular and energy distributions of low energy electrons, protons and alpha particles that populate the Van Allen radiation belts. Only meager and scattered information regarding this type of data is presently available. The data is scientifically significant in that it would yield much new information on the nature of the Van Allen radiation in the low energy region and would shed light on the origin of this radiation, which is presently not well understood.

A total of four instrumentation and boost systems will be carried on the operation, but two of the systems will serve only as back-up in event of any booster or electronic failures. These back-up systems will be returned to LRL if not used, and the boosters will be used in future planned recovery operations. It should be noted that the boosters are already aboard the USNS Twin Falls, the AFETR ship which will support the operation. They were placed on the ship prior to its departure from CONUS to prevent the logistic problem of shipment of large and heavy rocket systems.

One successful launch operation was conducted about 400 miles west of Pt. Mugu on 11 August 1964. This operation placed a 125 lb. payload to about 350 km and was very impressive from the standpoint of booster simplicity and reliability. In addition to the 3 South Atlantic shots, two more operations are planned in the Pacific in late spring 1965, and recovery will be stressed.

The cost breakdown is as follows; and it should be noted that costs associated with the South Atlantic program alone are asterisked:

<u>ITEM</u>	<u>TOTAL COST</u>	<u>REMARKS</u>
6 Hydra-Iris Boosters	\$180,000	
NMC Engineering & Launch Support	40,000	Includes launch of 11 August.
AFETR Support	19,000*	Already expended.
LRL/NMC Travel/Perdiem	23,000*	Can be saved by cancellation.
Electrostatic Analyzer Construction	40,000*	Already expended, but could be modified for satellite flight.
NMC Support for Future Recovery Operations	20,000	

In summary, it can be seen that of the \$82,000 expended for the South Atlantic Program, only \$23,000 can be saved by cancellation. The scientific value of the experiment and the five man years of effort must be equated against this saving.

The electrostatic analyzers themselves are now in being, and calibration is proceeding satisfactorily pointing towards a 16 November 1964 shipping date.

JM:dl

CC: J. Carothers  
F. Seward  
F. Gilbert