Mr Watson

NEWS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546
TELS. WO 2-4155
WO 3-6925

FOR RELEASE: SUNDAY
June 2, 1968

RELEASE NO: 68-97K

PRESS KIT

PROJECT: SOUTH ATLANTIC ANOMALY PROBE (SAAP)

GPO PRICE $ ________

CFSTI PRICE(S) $ ________

Hard copy (HC) 3.00

Microfiche (MF) .65

ff 653 July 65

contents

5/28/68

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SOUTH ATLANTIC ANOMALY PROBE

The National Aeronautics and Space Administration will launch from Natal, Brazil, a scientific payload to evaluate the radiation environment over the South Atlantic. The launch is scheduled for no earlier than June 11.

The South Atlantic Anomaly Probe (SAAP) is in support of NASA's Apollo Program of manned flights. It provides the capability for a "fast response" evaluation of the South Atlantic Anomaly, a region of trapped radiation located over the South Atlantic Ocean.

NASA will be assisted in the launch by the Brazilian Comissao Nacional de Actividades Espaciais and personnel at the Barreria do Inferno range near Natal.

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Launch vehicle for SAAP is the Black Brant IV, a two-stage solid-propellant vehicle. The 37-foot-tall Brant will boost the scientific payload to an altitude of 480 nautical miles above the South Atlantic.

The experiment package, which weighs approximately 80 pounds, consists of magnetometers for magnetic field measurements, a five-channel electron spectrometer for defining the electron flux of the Anomaly, three ion chambers for radiation dose measurements and a heavy ion detector.

Measurements within the Anomaly will begin when the rocket reaches 360,000 feet at 50 seconds into the flight. The experiment package will transmit data to ground stations at Barreria do Inferno range. Data will be collected on magnetic tapes for evaluation by the NASA Manned Spacecraft Center, Houston, which is managing the SAAP Program.

The second stage of the Black Brant IV is scheduled to land in the ocean 280 miles downrange from the launch site. It is not planned to recover the instrument package.

Launch window for the SAAP is June 10 through 18. This is based on correct position of the Moon for the lunar aspect (sensor) device aboard the rocket.

MSC's Space Physics Division, of the Science and Applications Directorate, which designed and fabricated the experiment instrumentation, is directing the program. The Sounding Rocket Branch of NASA's Goddard Space Flight Center, Greenbelt, Md., is assisting in the launch and data recovery.

The Black Brant is manufactured by Bristol Aerospace Ltd., Winnipeg, Canada. In addition to furnishing the rockets and related hardware, Bristol is responsible for the training of Brazilian launch crews at Natal.

Subsequent SAAP flights are planned at one-year intervals and are scheduled to carry additional scientific experiments to be provided by NASA and various scientific organizations.

(END OF GENERAL RELEASE; BACKGROUND INFORMATION FOLLOWS)

PRE-LAUNCH EVENTS

The launch vehicle buildup, the assembling of the two stages and placement of the SAAP payload, begins at T-5 days and is scheduled for completion at T-2. The launch vehicle is installed on the launch rails at T-4 hours.

T - 150 mins.	installation of telemetry antennas
T - 50 mins.	launcher is elevated to launch setting of 85 degrees
T - 4 mins.	payload switched to internal power
T - 2 mins.	range telemetry recorders "on"
T - 30 secs.	all lights GREEN on console, confirm clearance to L/V
T - 0	booster motors ignite

FLIGHT EVENTS

T plus 0 secs.	First stage ignition	
T plus 18 secs.	First stage burnout	60,000 ft.
T plus 21 secs.	Second stage ignition	75,000 ft.
T plus 28 secs.	Second stage burnout	150,000 ft.
T plus 33 secs.	Vehicle approaches max velocity	(Mach 11)
T plus 50 secs.	Scientific instrument initiated	65 miles
T plus 103 secs.	First stage apogee	200 miles
T plus 207 secs.	First stage impact	200 miles downrange
T plus 473 secs.	Second stage apogee	535 miles altitude
T plus 918 secs.	Second stage and instrument unit impact	280 miles downrange

EXPERIMENT HARDWARE

ION CHAMBER DOSIMETER

There are three ion chamber dosimeters on the SAAP payload for measuring the radiation dose rate (See Fig. 1). Each ion chamber dosimeter is identical in mechanical and electrical characteristics, with the exception of removable shields over the ion chambers. One instrument will have no shield; the second instrument will have a shield equivalent to the thickness of the Lunar Module (LM) structure; and the third dosimeter's shield will be equivalent to the wall thickness of the Command Module crew compartment (CM).

Each ion chamber contains three sub-assemblies; (See Fig. 2) ion chamber, electrometer module and filter module.

Ion Chamber - the ion chamber consists of two hemispherical domes separated by a 0.150 inch air gap, with an outer cover which is at ground potential (Fig. 3 Cross section sketch). Radiation penetration of the chamber causes ionization of the gas between the two electrodes and a current flow occurs.

Electrometer Module - the electrometer amplifies the linear output current of the ion chamber, converts it to a logerithmic voltage which is further amplified and produces it as a 0 to 5-volt DC level analog output signal.

Filter Module - the filter module is used to filter radio frequency (RF) interference from the voltage supply lines and to prevent the possibility of short circuit to the main power buss in the event of a catastrophic failure.

Specifications Ion Chamber Dosimeter

Weight	1 pound
Size	2½ x 3 x 4.5 inches
Volume	19.0 cubic inches

SAAP HARDWARE

GEIGER TUBE SPECTROMETER

There is one Geiger tube spectrometer package on the SAAP payload for measuring integral electron energy levels above 0.35, 1.0, 2.0, 3.5 and 6.0 million electron volts (MEV). Data from the spectrometer will be used to define the electron spectrum in the anomaly. (See Fig. 4). Each spectrometer contains five basic sub-assemblies: Geiger tube, high voltage power supply, printed wiring boards, mother board, and filter module (See Fig. 5).

Geiger Tube Sub-assembly - The Geiger tube sub-assembly contains high density shielding material, mounting blocks and Geiger tubes. The Geiger tubes are Halogen-quenched detectors filled with helium and neon for the measurement of gamma and high energy beta radiation.

High Voltage power supply - The high voltage power supply produces a +575 volt output that is required as the operating voltage for the five Geiger tubes.

Printed Wiring Board Sub-assembly - Three printed wiring boards are used to mount discrete components for voltage regulators and the count rate meter circuits.

Mother Board Sub-assembly - The mother board, a printed wiring board, electrically connects and provides a mounting surface for the filter module, high voltage power supply, printed wiring boards and Geiger tube sub-assemblies.

Filter Module Sub-assembly - The filter module design is the same as the filter module used with the ion chamber dosimeter. Filters and fuses are used to maintain electrically clear power lines and prevent possibilities of short circuit to main power in the event of catastrophic failures.

Specifications for Geiger Tube Spectrometer

Weight	5 pounds
Size	4.5 x 4.5 x 4.5 inches
Volume	92 cubic inches

HEAVY ION EXPERIMENT

There is one five-channel Heavy Ion Detector on the SAAP. The six-pound experiment package, composed of three separate components, is designed to determine the identity and energy spectrum of low energy particles for which extremely large total fluxes have recently been observed.

Dr. B. J. O'Brien, Rice University, is co-investigator for this experiment. The Space Physics Division of MSC's Science and Applications Directorate, in cooperation with Dr. O'Brien, performed experiment conception, design, integration and analysis.

The Heavy Ion Detector is made up of the velocity selector sensor, electronics package and data processor unit. The total package occupies approximately 140 cubic inches in the SAAP payload.

Velocity Selector Sensor - This five-channel device guides the heavy ions in the proper direction for measurement. (See Fig. 6).

Size	2 x 2 x 7½ in.
Volume	33 cubic inches

Data Processing Unit - This unit processes the data collected by the selector sensors and puts it into the proper form for transmission to ground stations.

Size	6½ x 3¼ x 2 3/4 inches
Volume	67 cubic inches

Electronic Package - Contains basic high voltage supply and electronic switching equipment. (See Fig. 7).

Size	3 x 4 x 3 in.
Volume	40 cubic inches

EXPERIMENT BATTERY PACK

There will be one battery pack (See Fig. 8) on the SAAP payload for supplying power to all experiment hardware. The batteries are dry cell mercury-energized, packaged in two cylindrical tubes with 12 cells per tube (See Fig. 9).

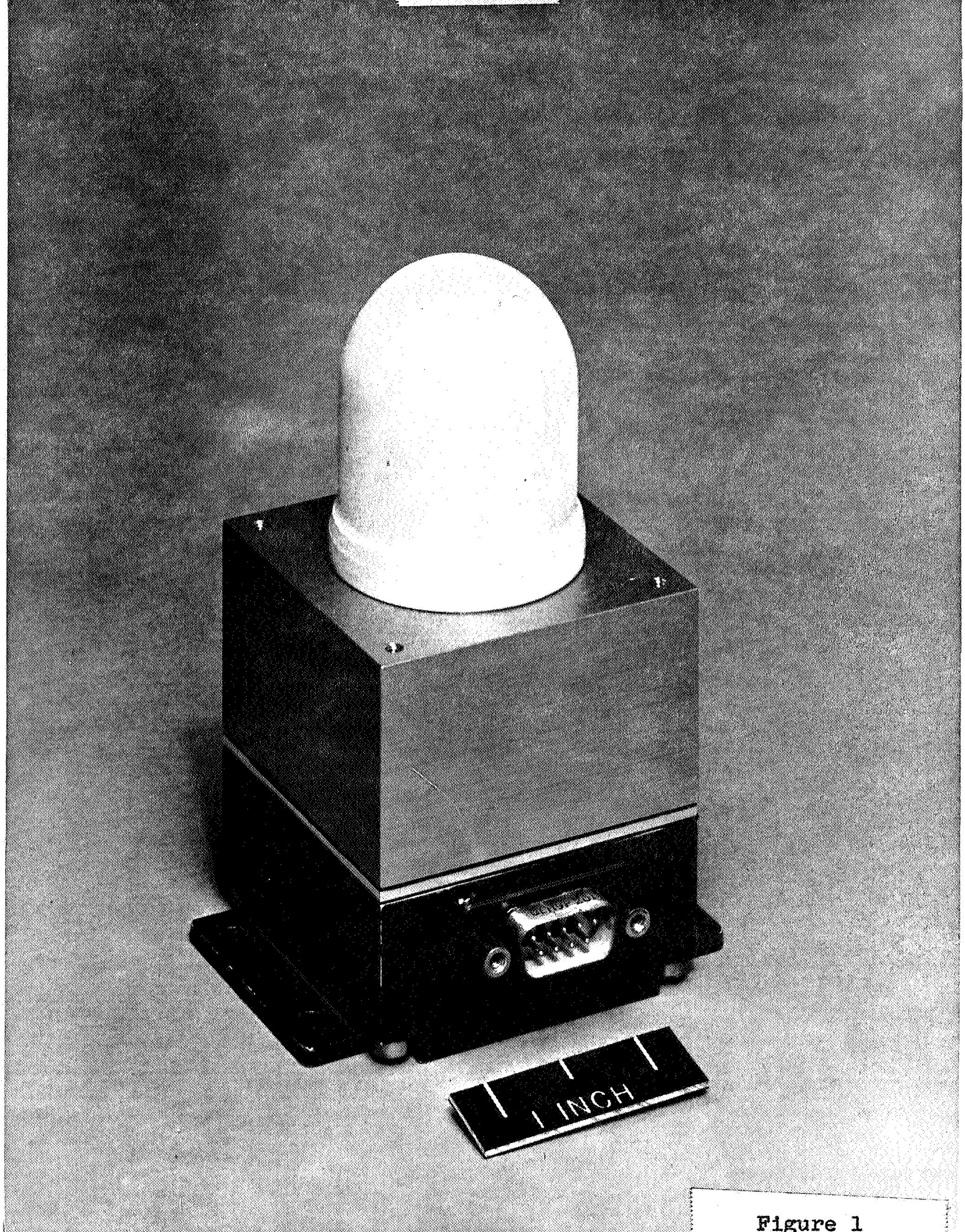


Figure 1

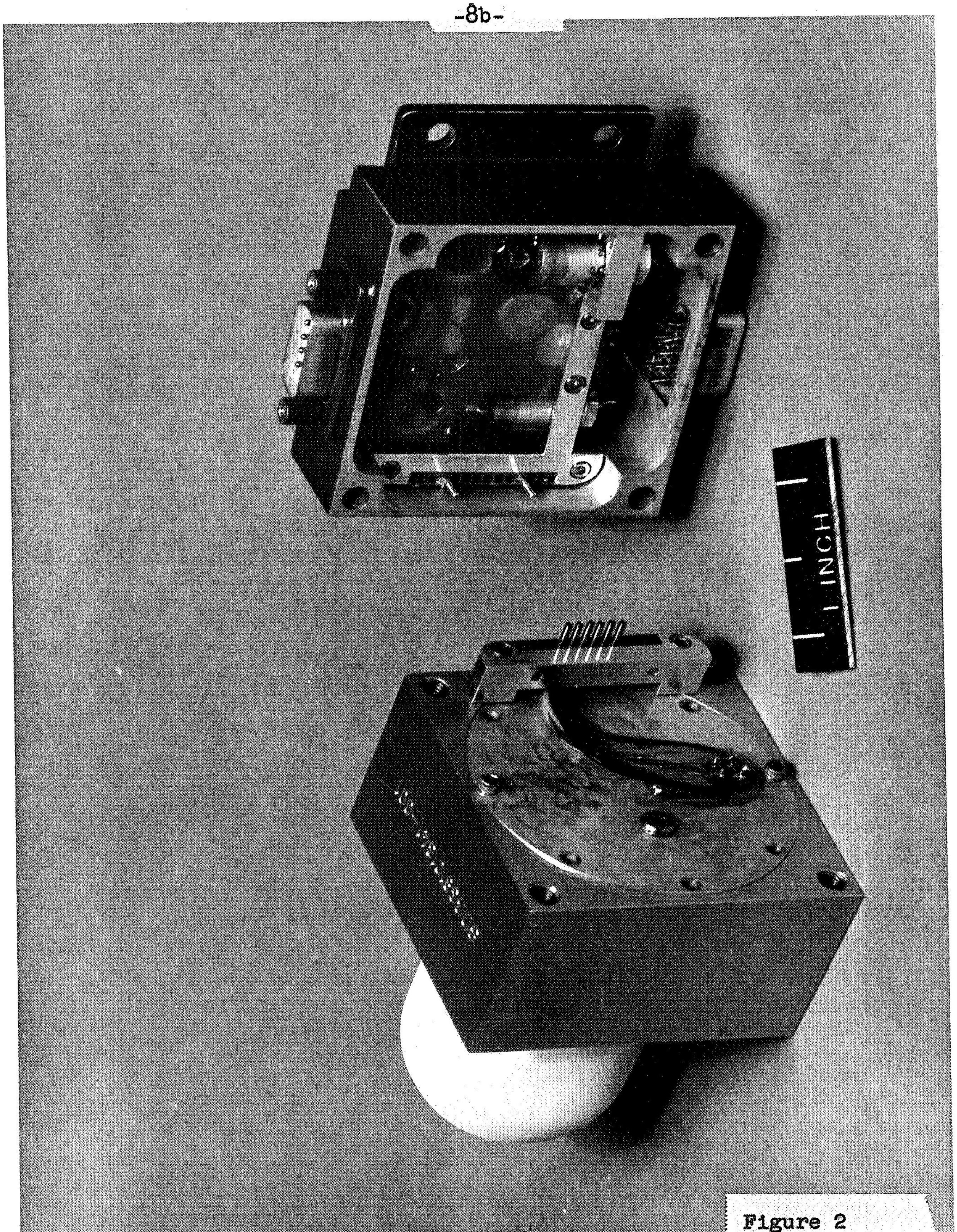
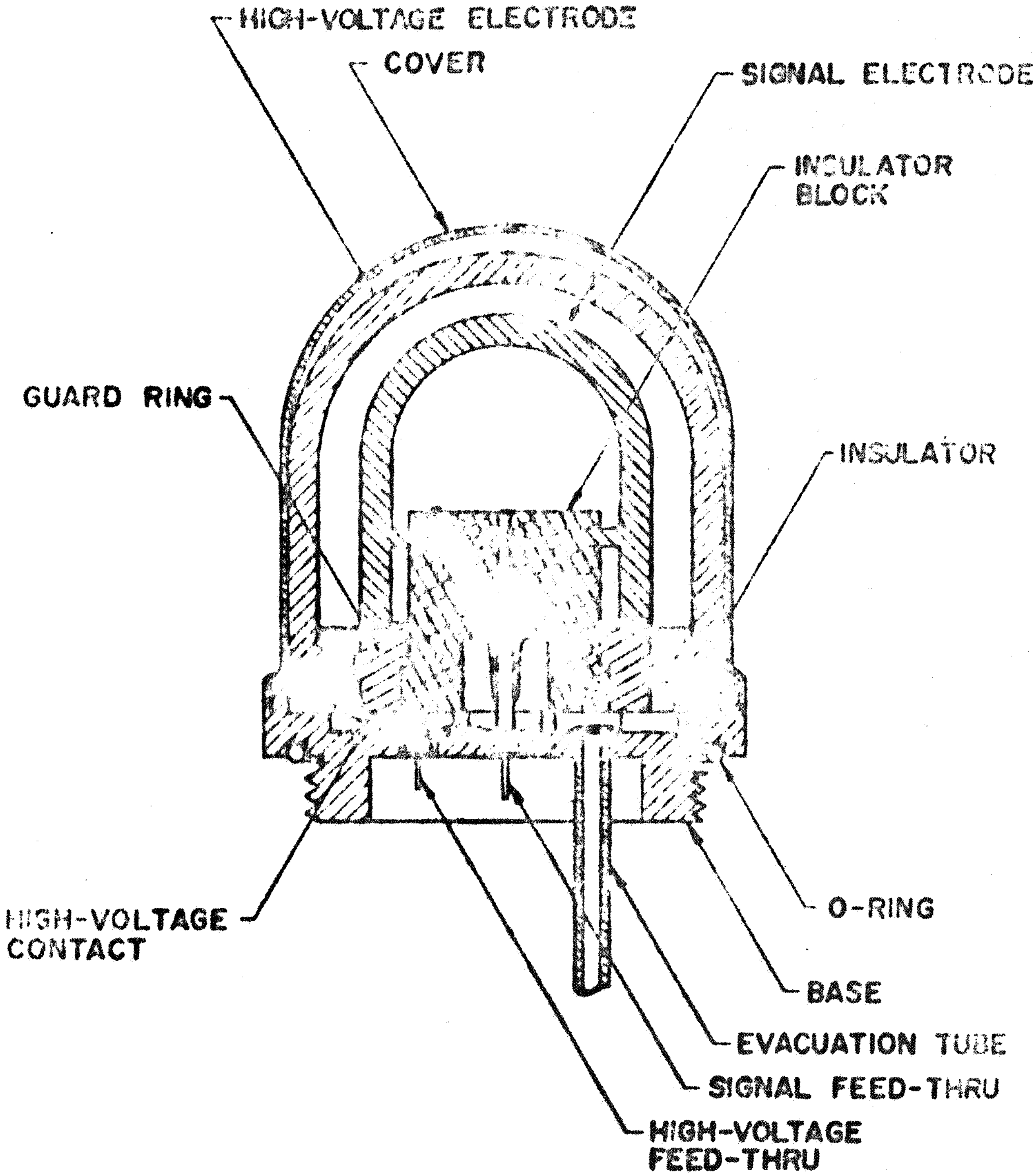


Figure 2



ION CHAMBER CROSS SECTION
FIG. 3

Figure 3

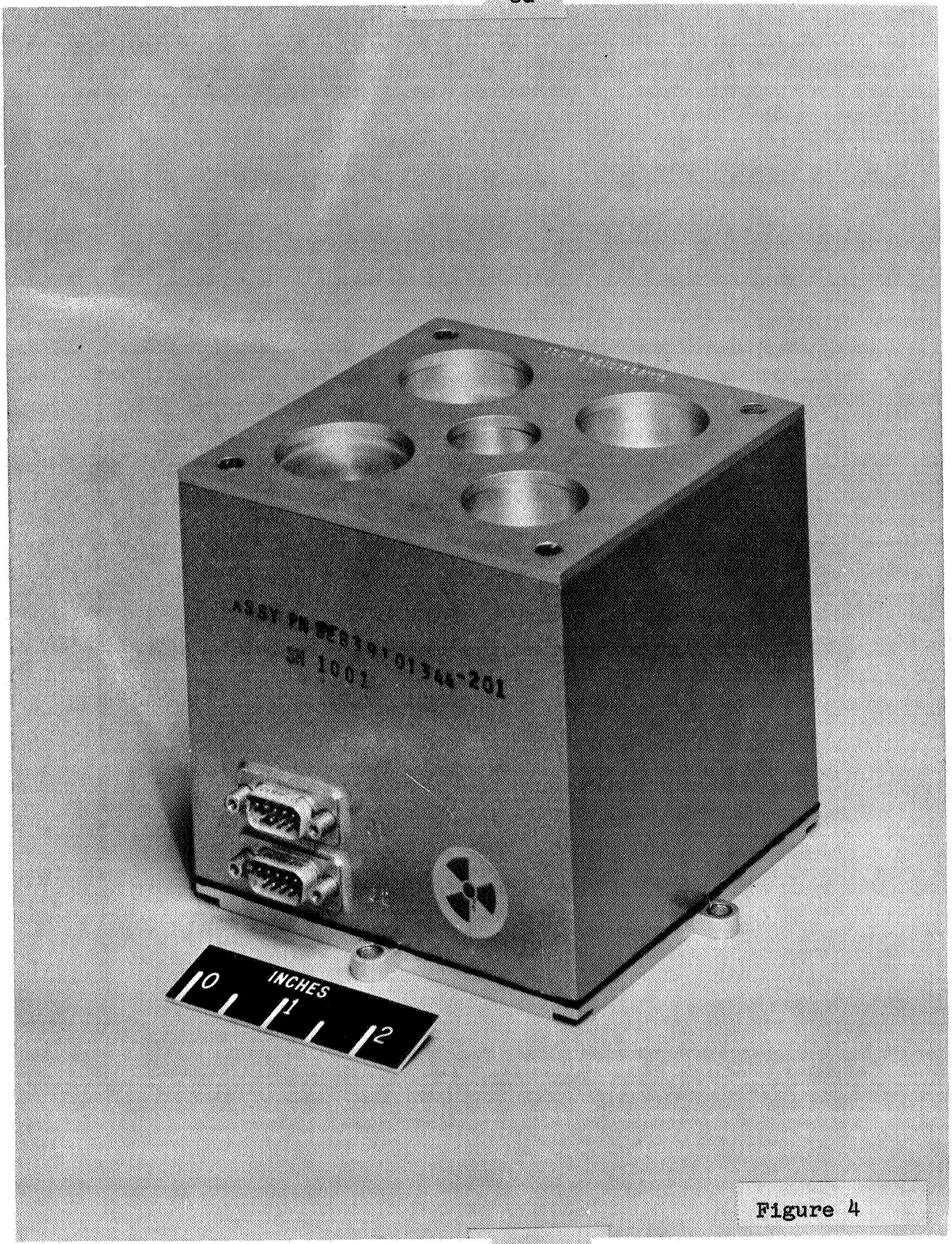


Figure 4

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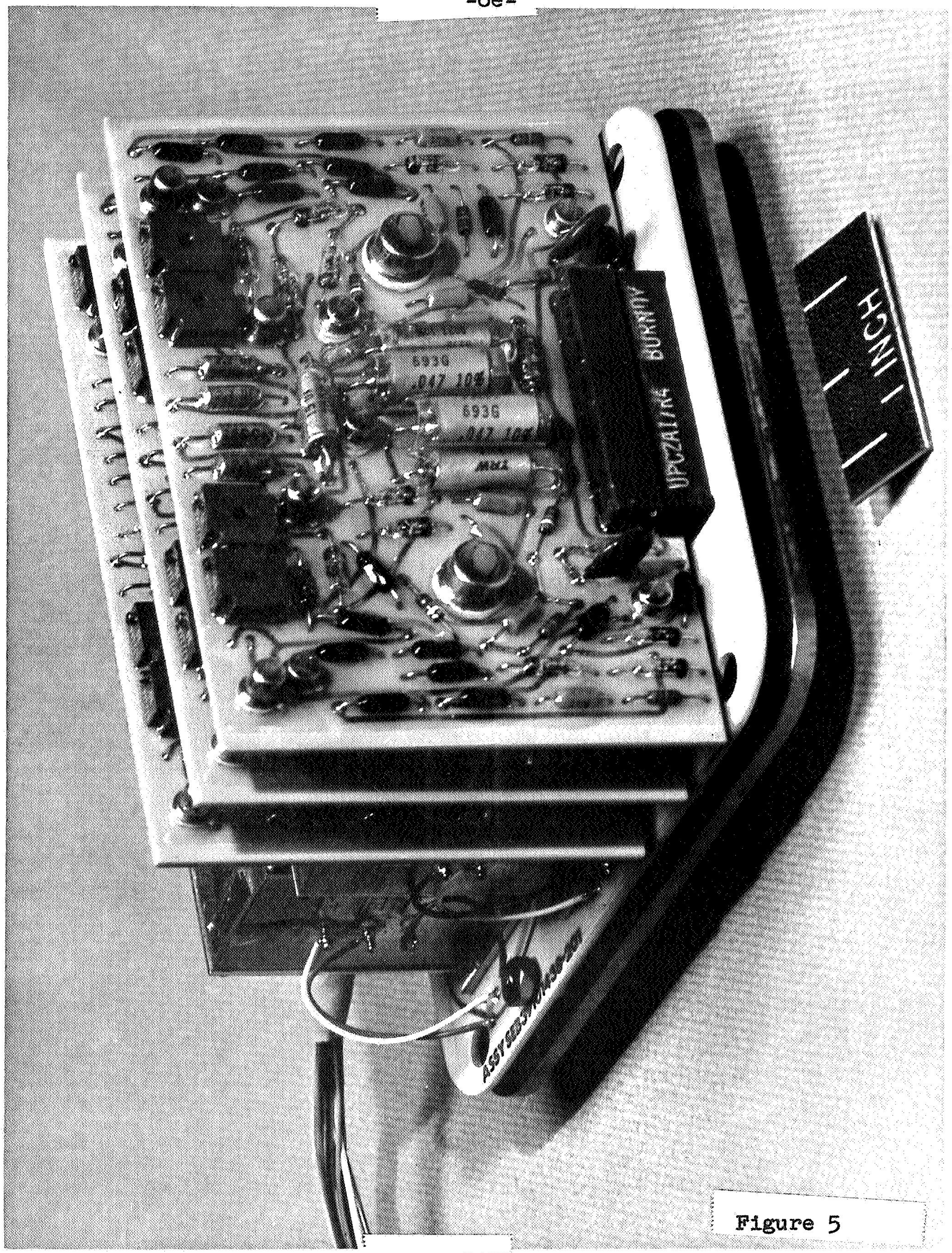

Figure 5

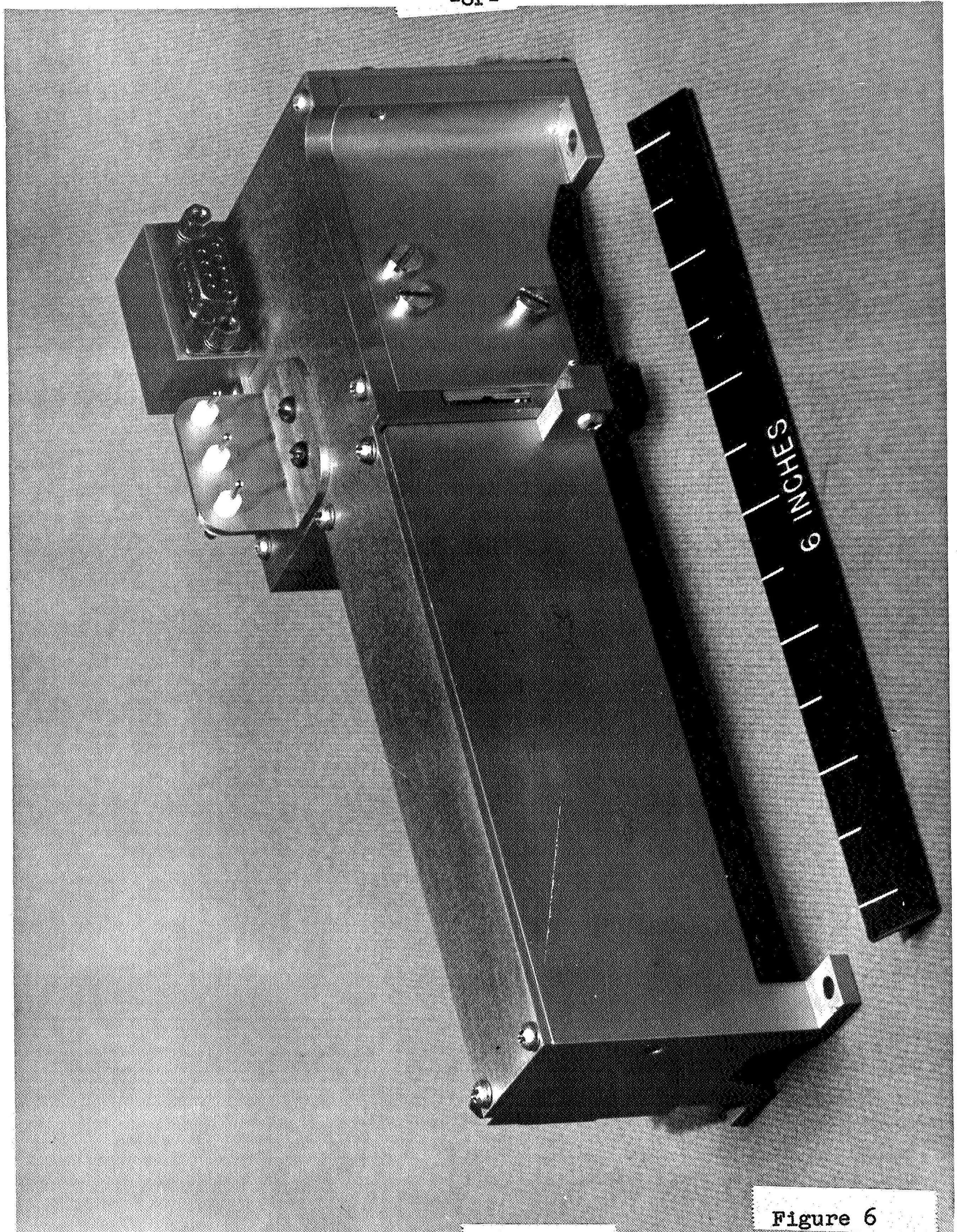

Figure 6

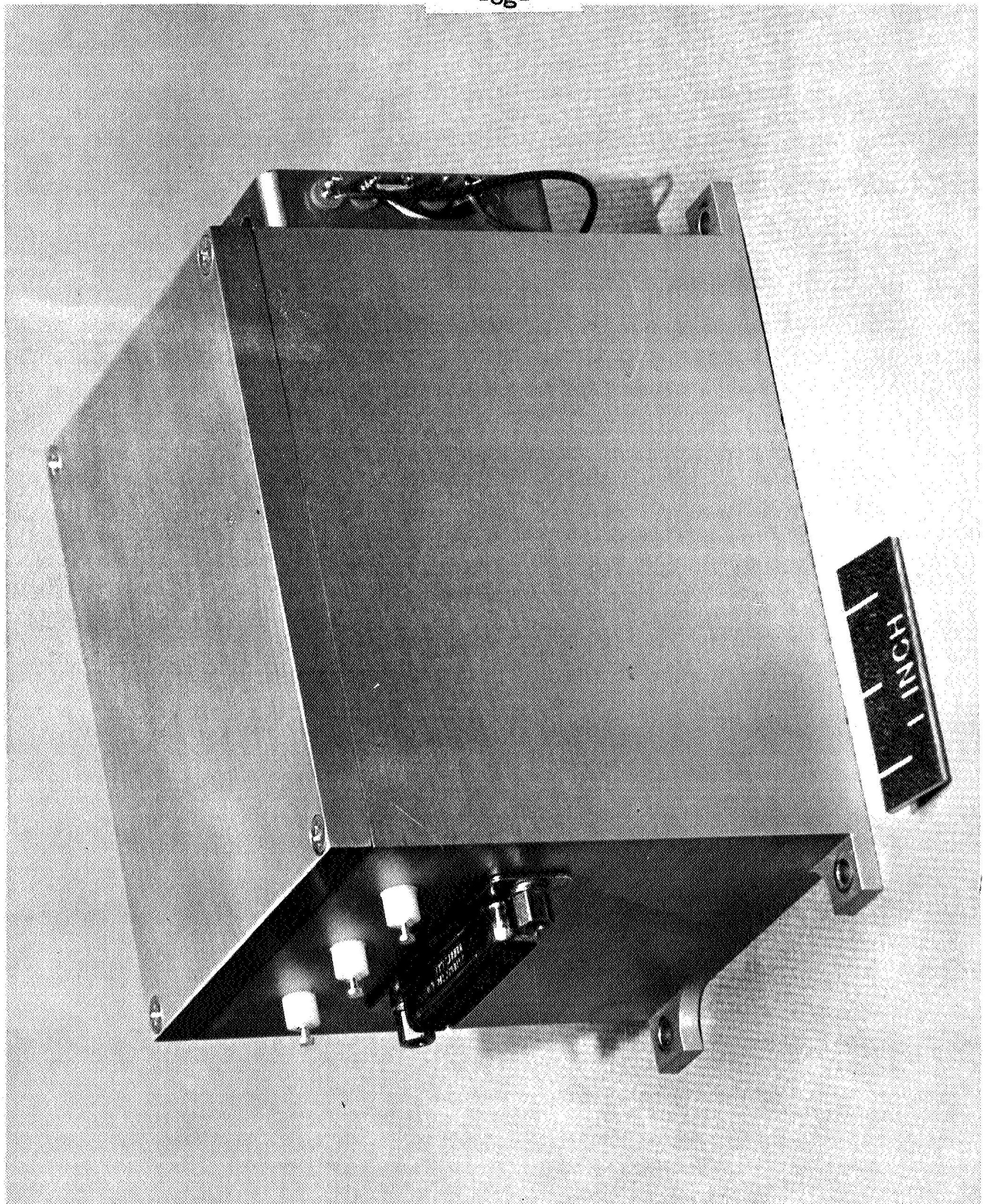

Figure 7

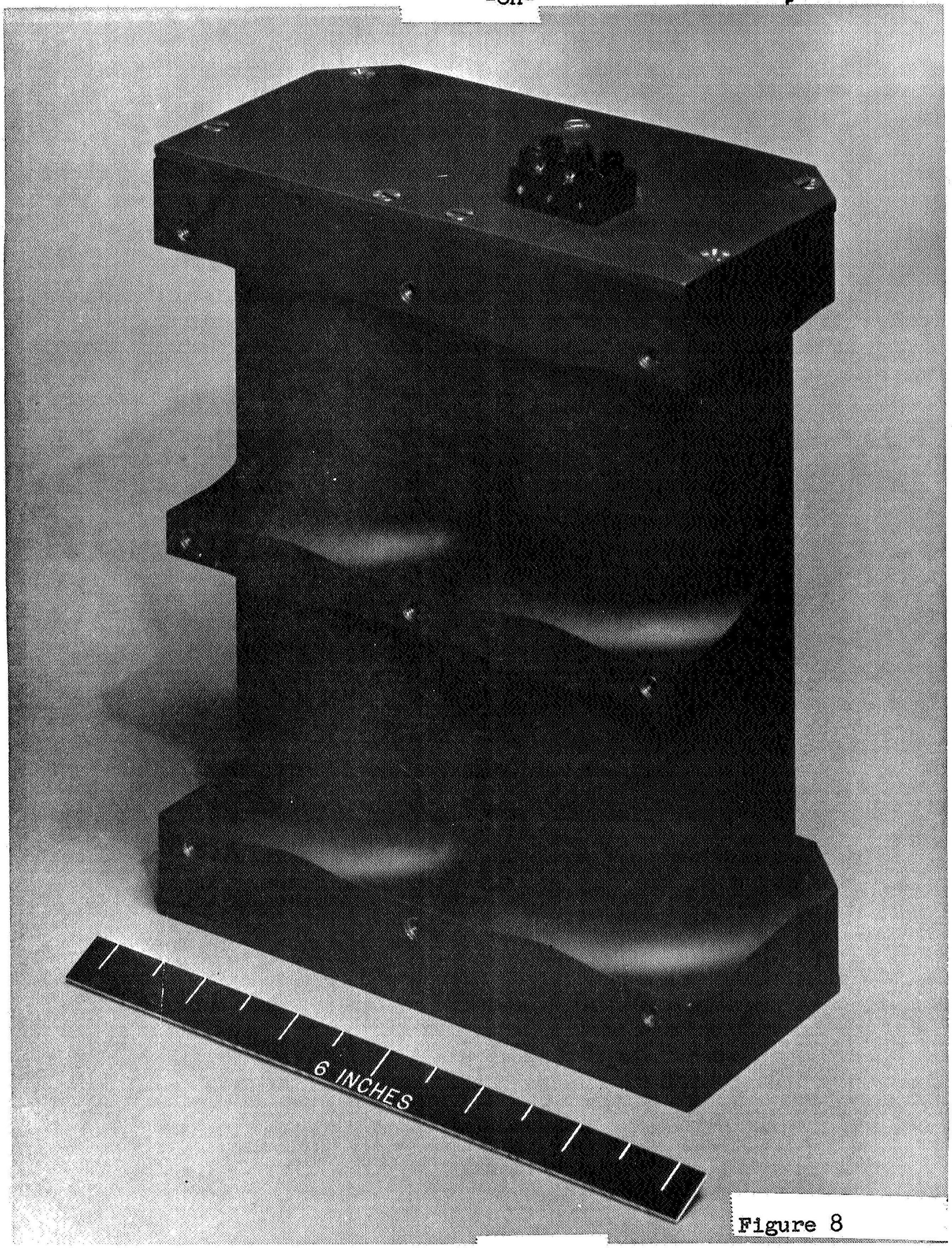

Figure 8

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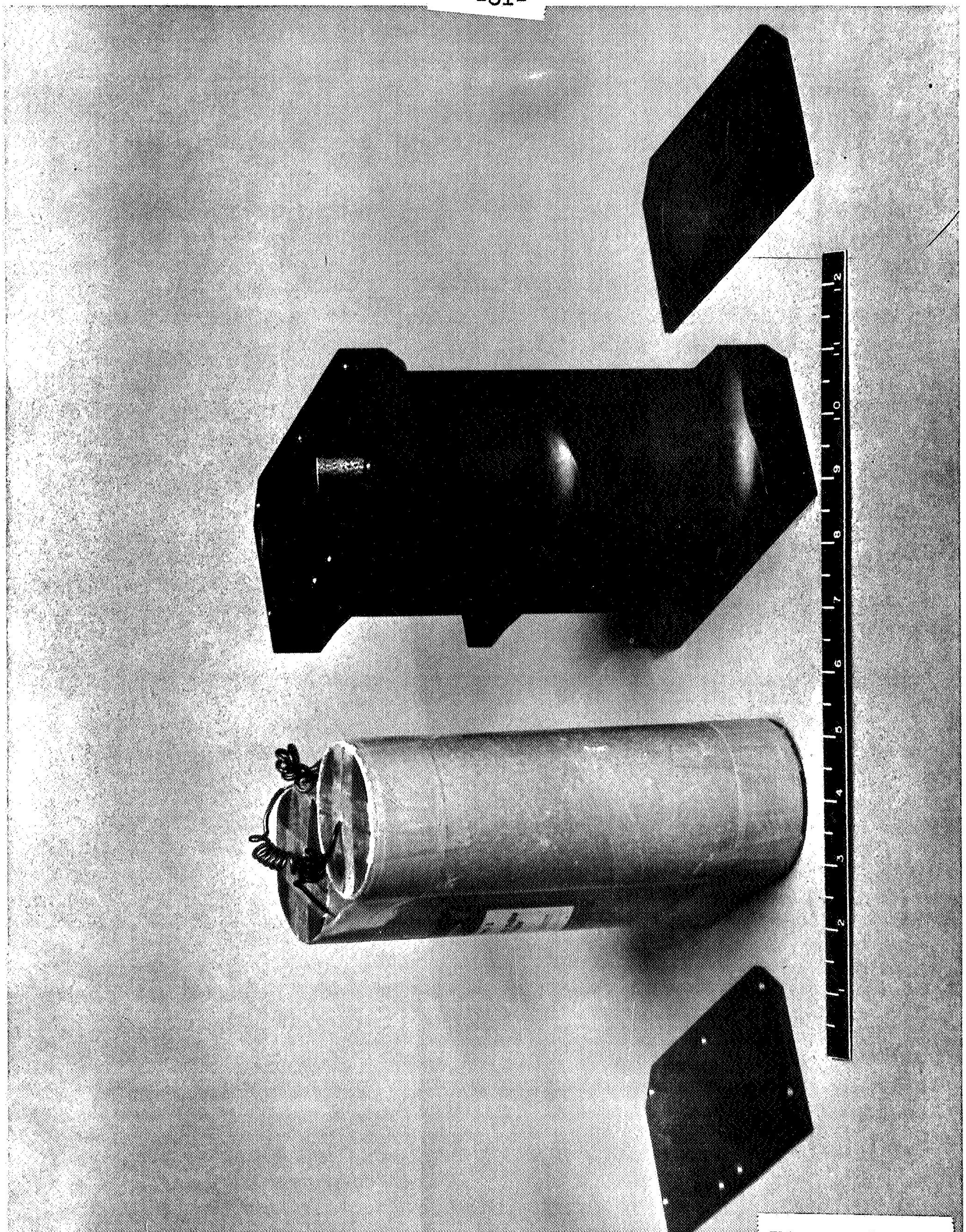


Figure 9

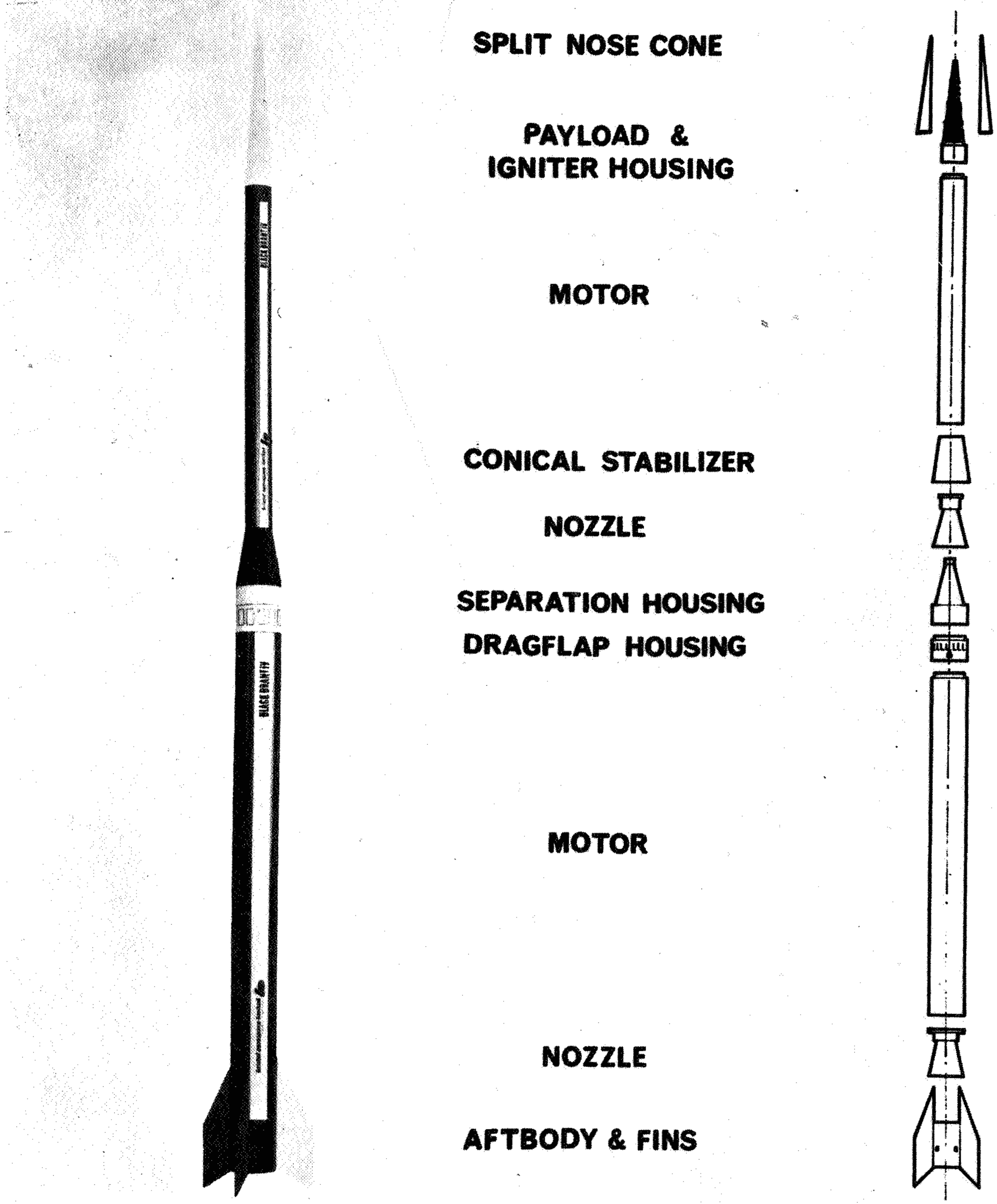
Specifications for Experiment Battery Pack

Size	7 x 5 x 3 inches
Volume	105 cubic inches
Weight	12 pounds
Cells per tube	12
Cells per pack	24
Rated capacity	13 amp-hours

BLACK BRANT IV

Number of stages	Two
Overall length	37 feet 2 inches
Gross weight	3,038 pounds

	First Stage	Second Stage
Length	210 inches	154 inches
Diameter	17.2 inches	10.2 inches
Propellant weight	1,760 pounds	447 pounds
Propellant - solid	Ammonium-perchlorate Polyurethane-aluminum	Ammonium-perchlorate Polyurethane-aluminum
Thrust	25,000 pounds	10,800 pounds
Burning time	13.2 seconds	7.5 seconds



BLACK BRANT IV

Figure 10

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PROJECT OFFICIALS

Dr. Jerry L. Modisette	Project Scientist, Chief, Space Physics Division, Manned Spacecraft Center, Houston.
George Brandon	Project Manager, Space Physics Division
W. Dan Womack	Payload Engineer, Space Physics Div.
John Lange	Sounding Rocket Branch, Goddard Space Flight Center, Greenbelt, Md.

SAAP CONTRACTORS

Bristol Aerospace Limited Winnipeg, Canada	Black Brant sounding rocket and preflight training, test and launch support.
Houston Aerospace Systems Div., Lockheed Missiles and Space Corp.	Experiment integration and ground support.

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