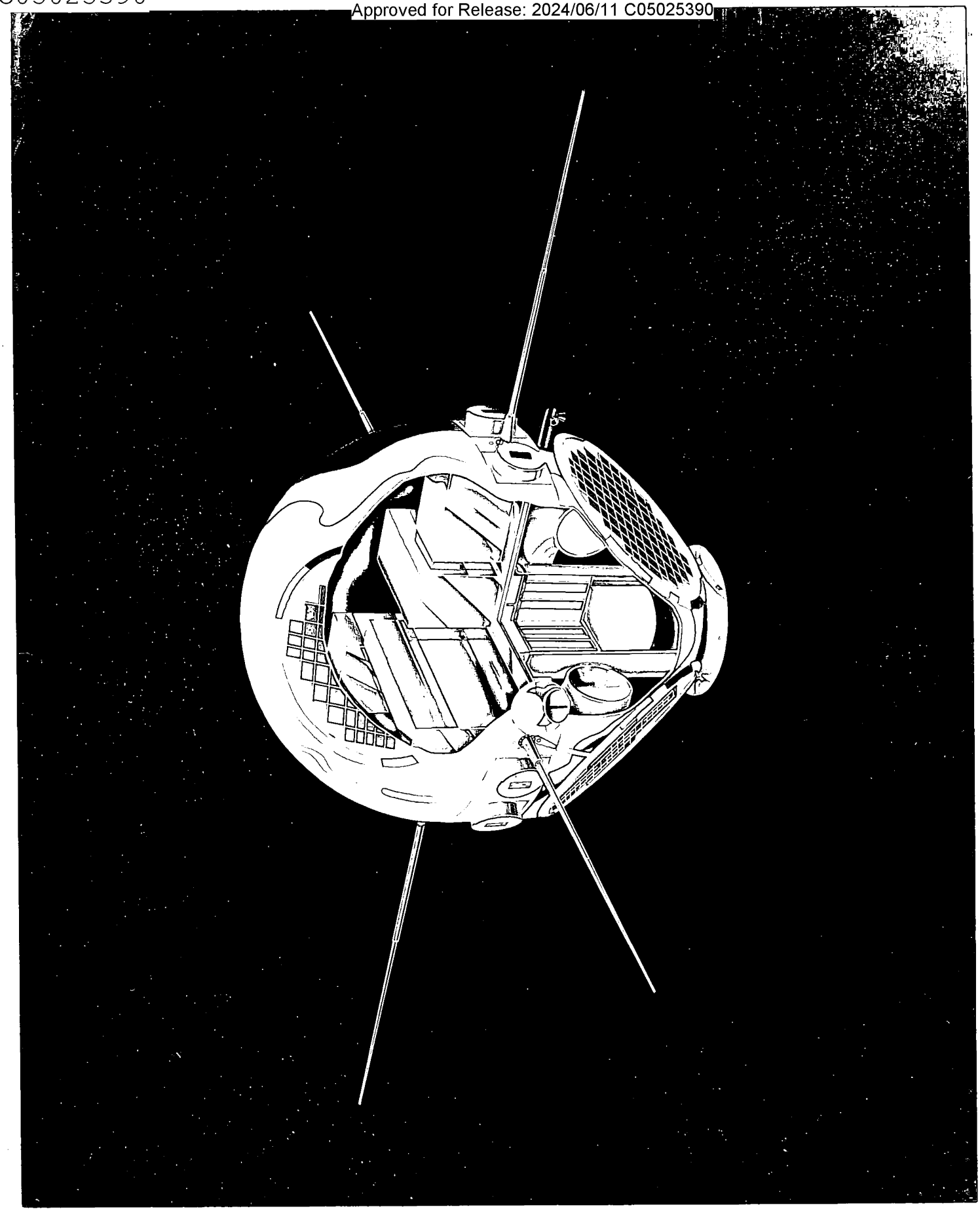
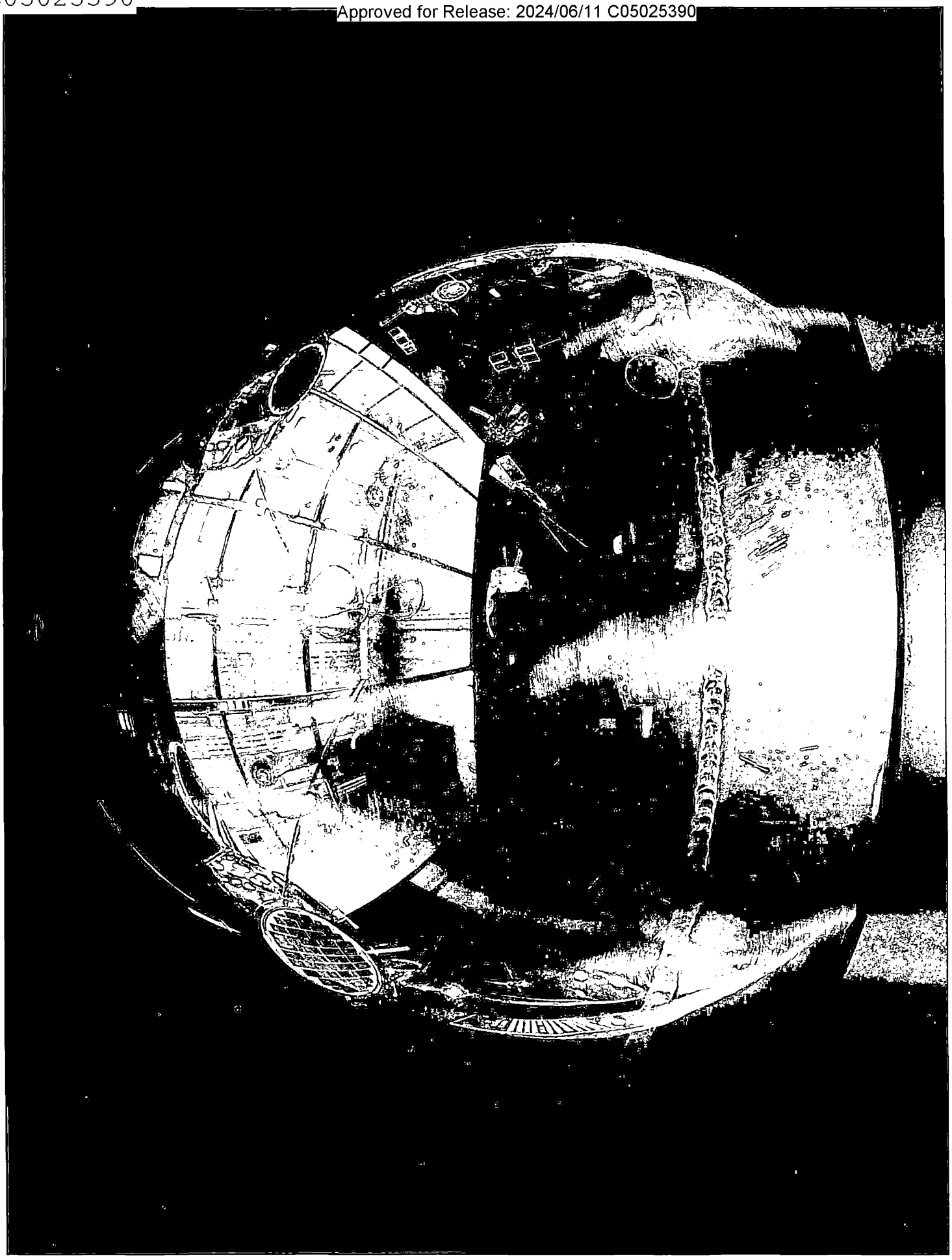
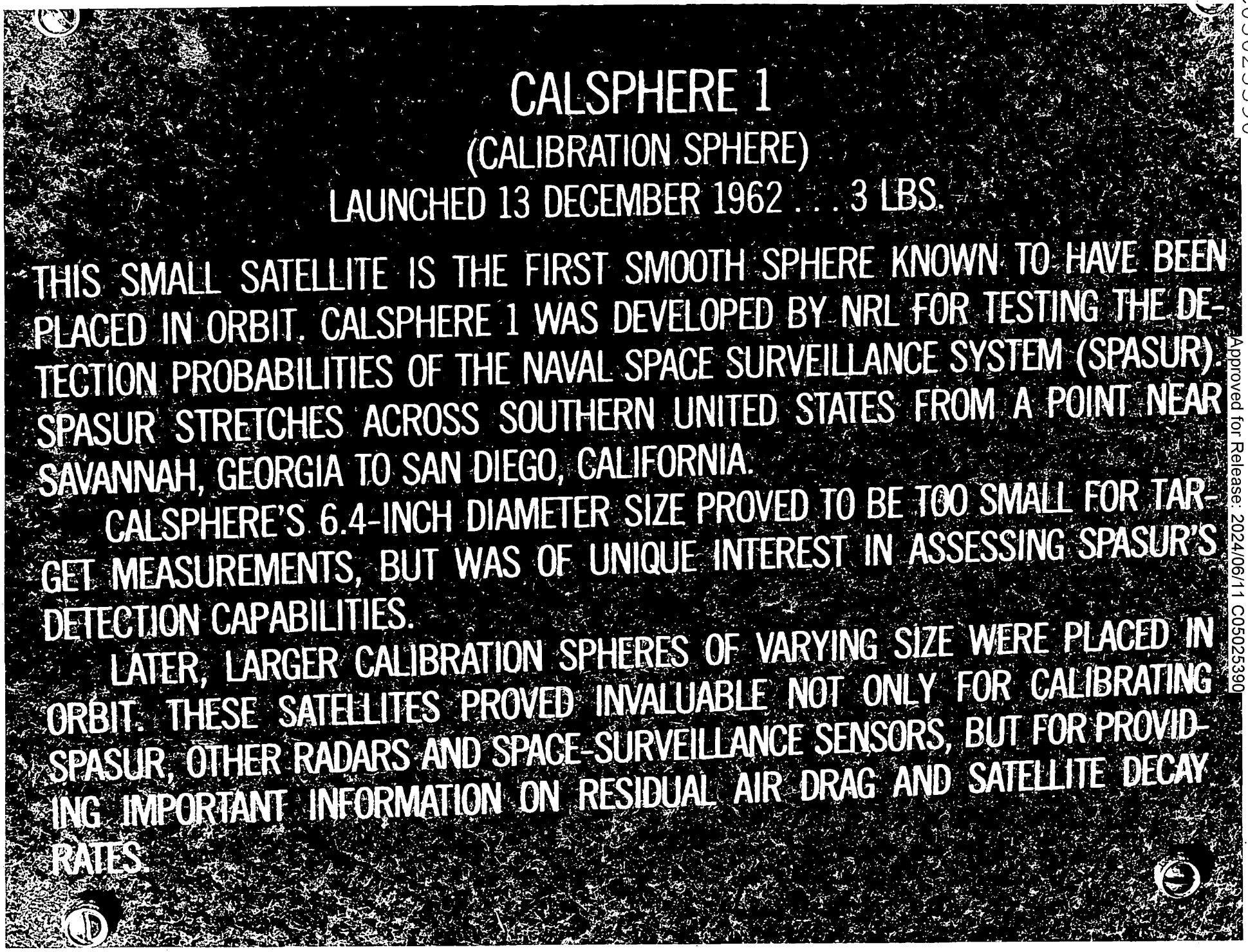
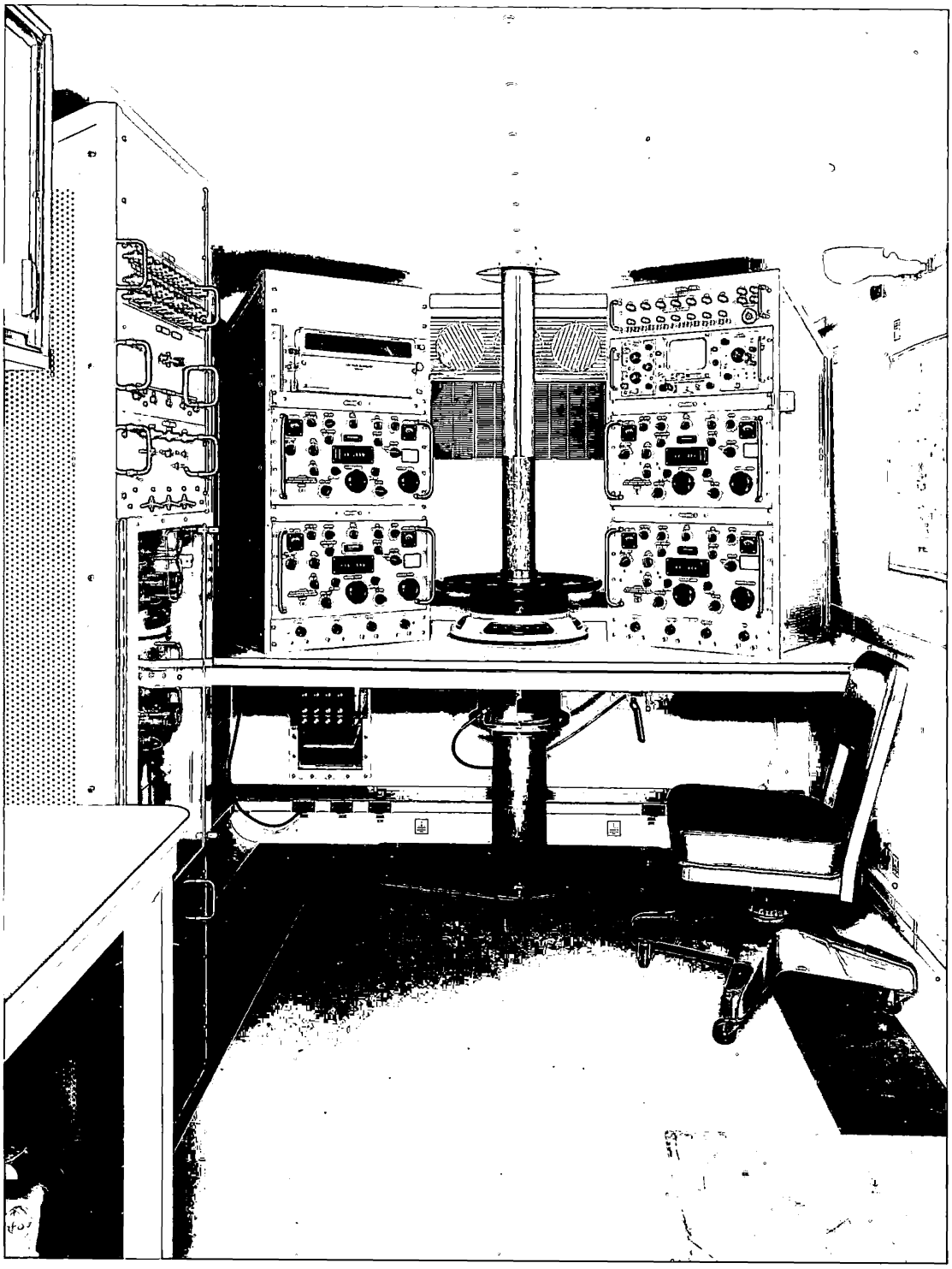








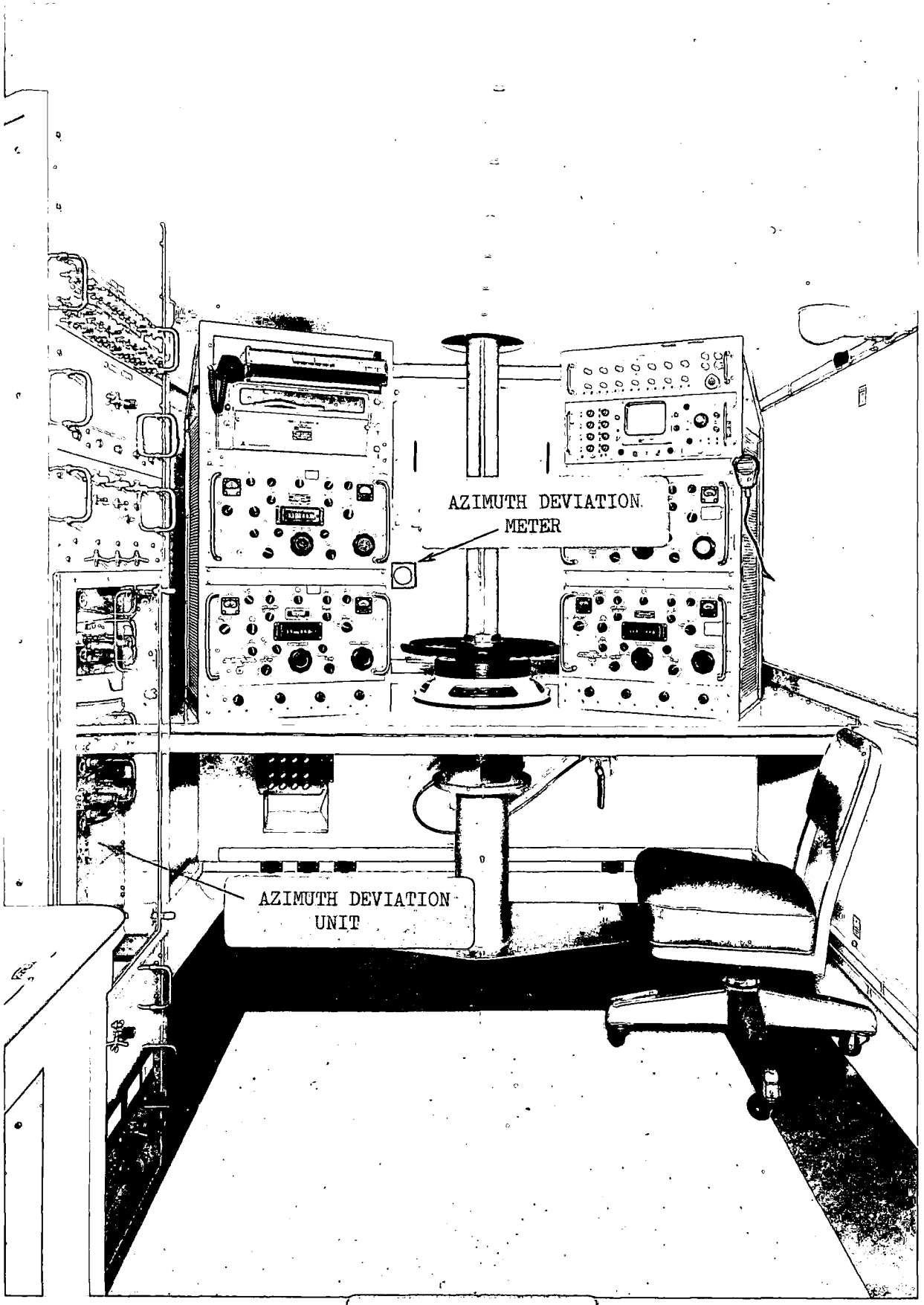
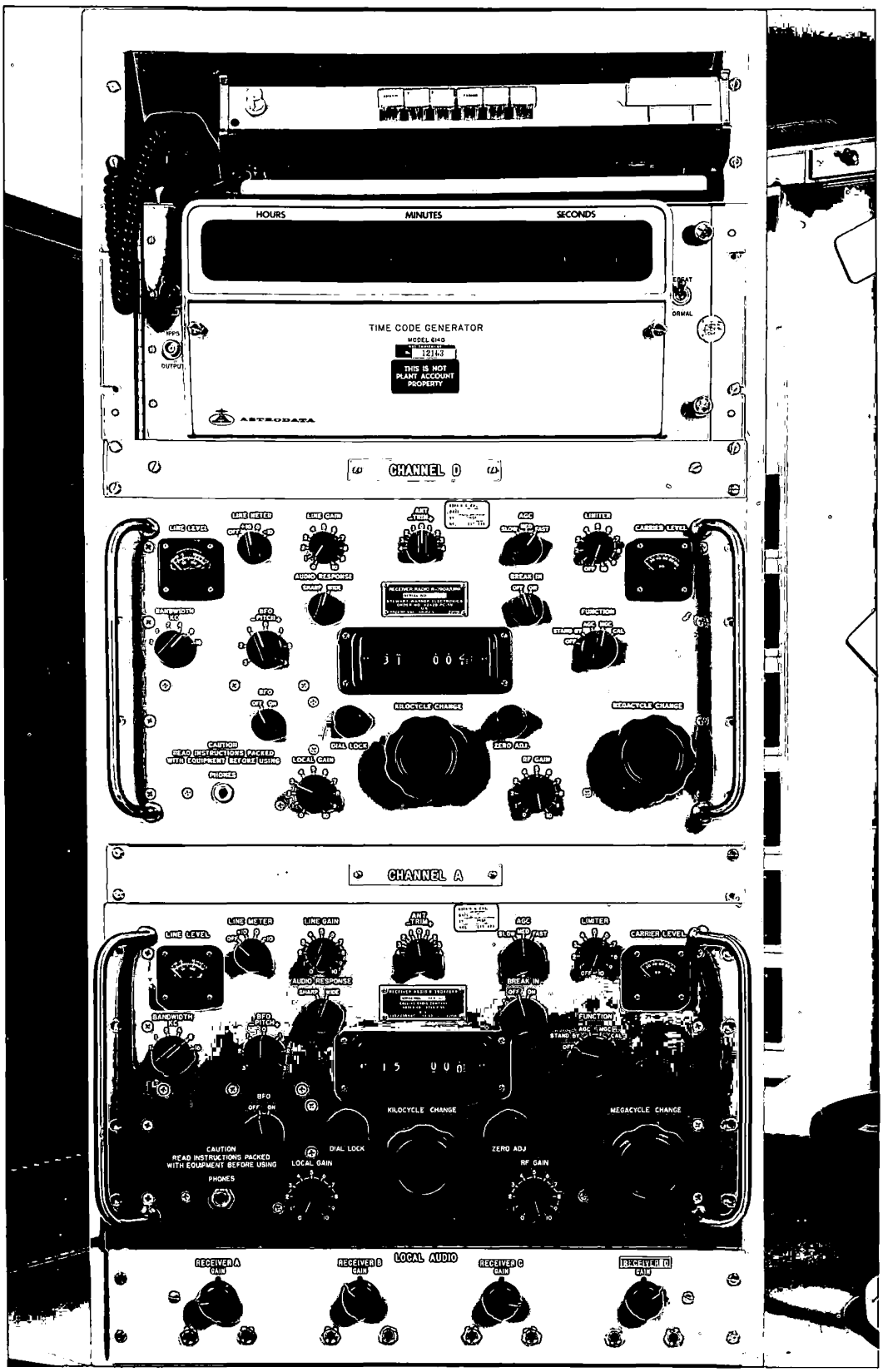
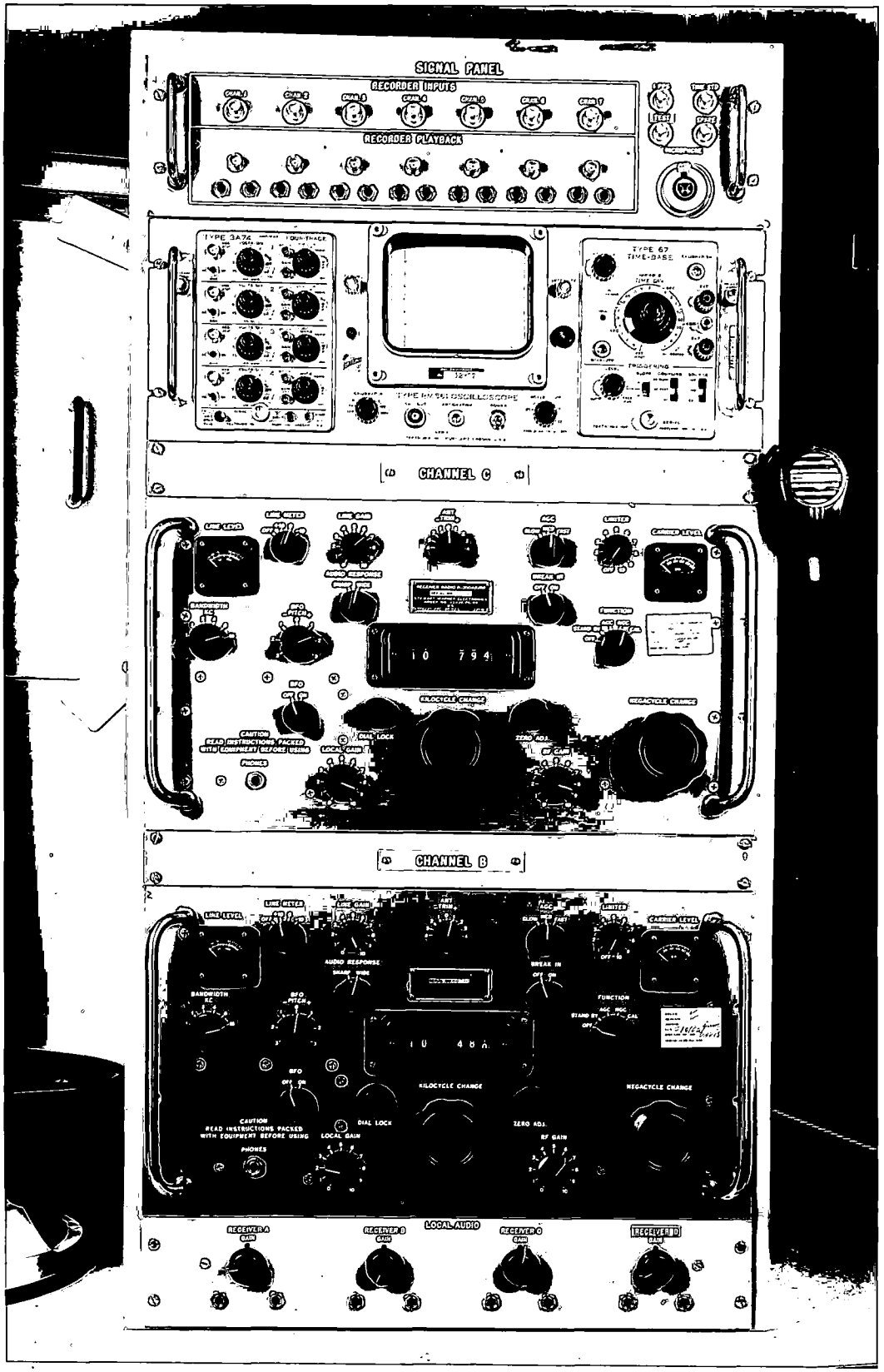
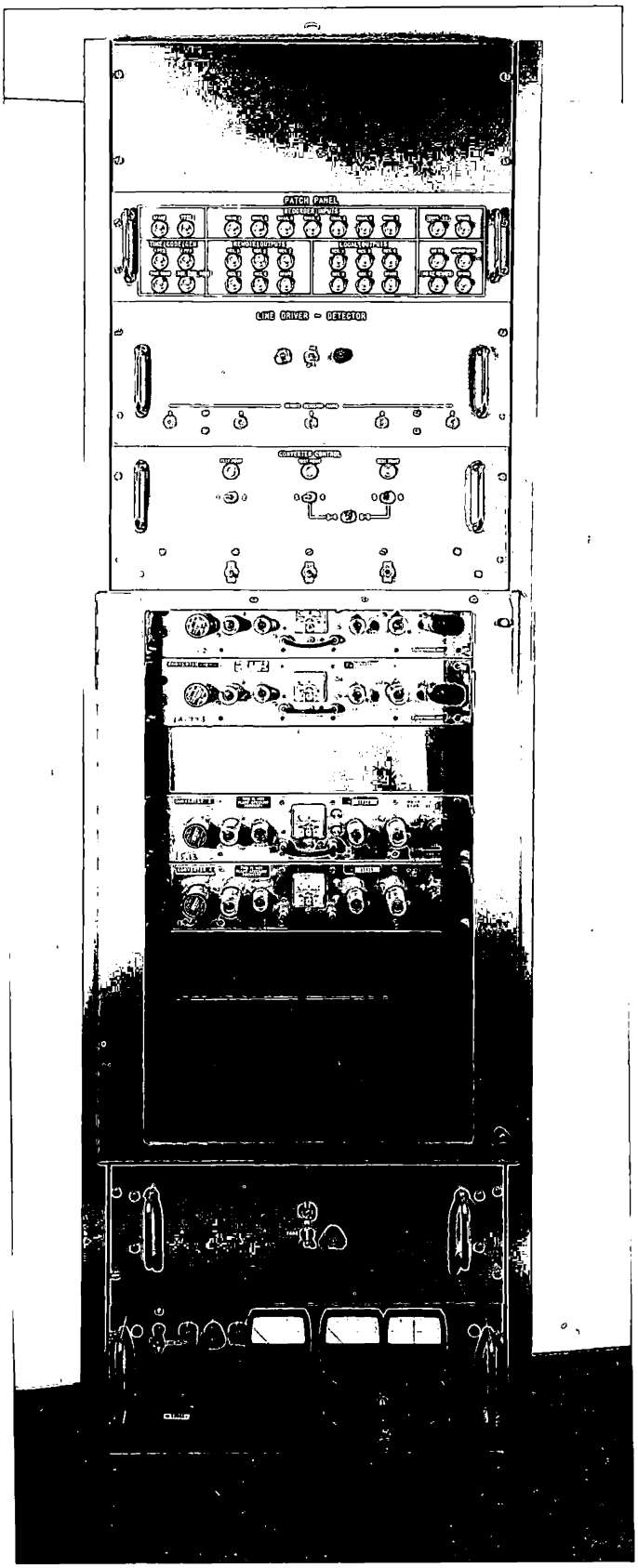


FIGURE 1







U.S. Naval Research Laboratory

Washington, D.C.

Awards Program

Wednesday, 10:30 AM

February 13, 1963

The Government Employees' Incentive Awards Act (Title III of Public Law 763, 83d Congress) provided legislative authority for a Government-wide program designed to encourage all civilian officers and employees of the Federal Government to participate in the common task of improving the efficiency and economy of Government operation.

Through the Department of Navy's Incentive Awards Program three NRL scientists are receiving today the Distinguished Civilian Service Award. This is the highest civilian honorary award granted by the Department of the Navy. Also, being presented today are monetary awards totalling $20,250.

Program

Welcome . . . . . CAPT. A. E. Krapf
Director, NRL

Remarks . . . . . Honorable James H. Wakelin, Jr.
Assistant Secretary of Navy (R&D)

* * *

PRESENTATION OF MONETARY AWARDS

by

The Honorable James H. Wakelin, Jr.
Assistant Secretary of Navy for Research and Development

In recognition of individual superior accomplishment the Secretary of the Navy has authorized incentive awards in the amount of $20,250. The names of recipients granted monetary incentive awards are listed below.

Harris F. Hastings
Paul P. Bey
Orrin R. Buchanan
James A. Murray, Jr.
Robert R. Stone, Jr.
Robert D. Misner
Mack J. Sheets
Gerald G. Bartholomew
Charles L. Burns
Donald B. Christman
Darwin A. Gildner
Rodney F. Henley
Jack D. Hortman
Elmer L. Smith
James E. Gerken*

*Deceased

Department of the Navy
Distinguished Civilian Service Awards

Presentation by

The Honorable James H. Wakelin, Jr.
Assistant Secretary of Navy for Research and Development

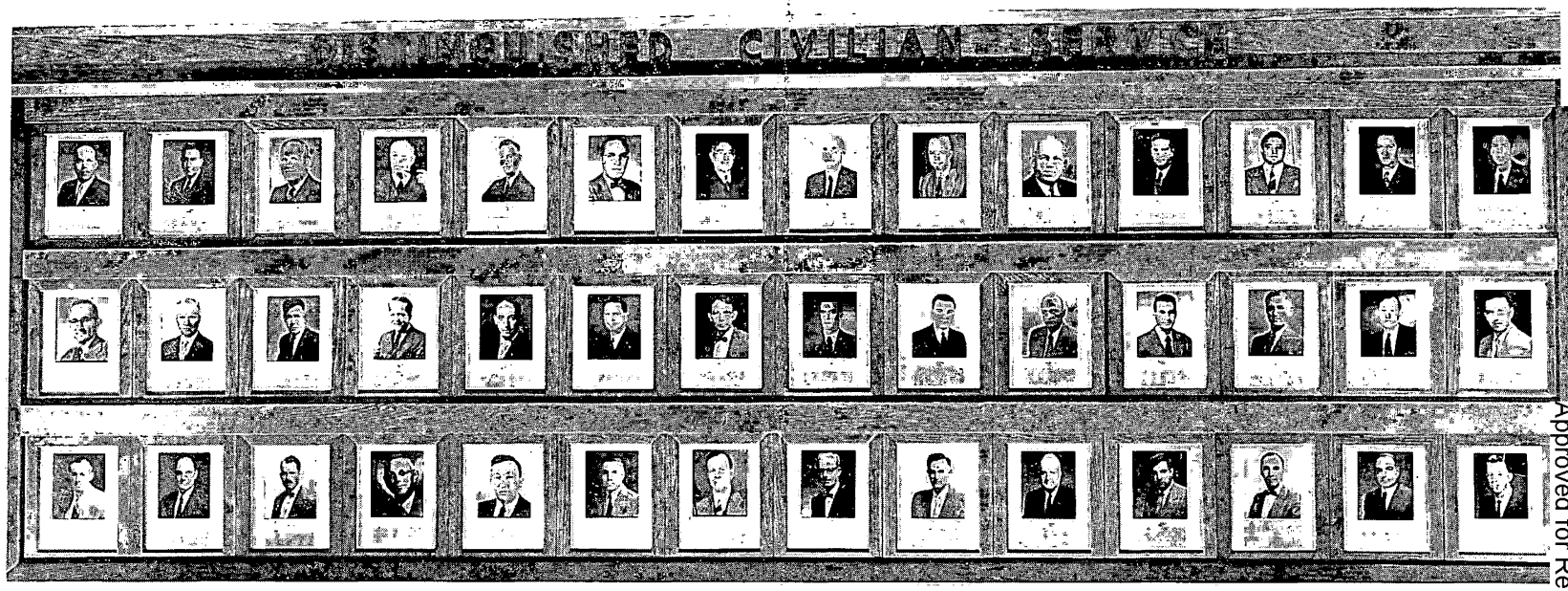
Harris F. Hastings

Robert D. Misner

Mack J. Sheets

Messrs. Hastings, Misner, and Sheets will join the illustrious group of NRL's distinguished scientists honored in the NRL "Hall of Fame."
(See reverse side)

U.S. Naval Research Laboratory's Hall of Fame



In 1945, two of the earliest Department of the Navy Distinguished Civilian Service Awards were granted to NRL scientists for their work in the separation of radioisotopes which contributed to the development of the atomic bomb and ultimately to the development of the nuclear powered submarine. The Laboratory has, over the years, continued to receive recognition for the significant achievements of its scientists and engineers. The above photograph taken in NRL's "Hall of Fame" shows past recipients of the Navy's most coveted award. These awards have been given in recognition of work ranging from underwater research to outer space research.

Messrs. Hastings, Misner, and Sheets now join this illustrious group with the recognition accorded them by the Secretary of the Navy, in granting them the Navy's highest award. These awards bring to 46 the total number of NRL recipients of the Navy Distinguished Civilian Service Award.

LABSTRACTS

U.S. NAVAL RESEARCH LABORATORY WASHINGTON 25, D. C.

21 May 1963 Number 47

FAREWELL DINNER REMINDER

If you act immediately, you can still get your tickets for Captain Krapf's farewell dinner.

When: May 23; cocktails at 7:00 p.m., dinner at 8:00 p.m.

Where: Officers' Mess, U. S. Naval Station, Navy Yard Annex

How: See your administrative assistant; the price is $3.15 per person, exclusive of cocktails.

REPORTING ON-THE-JOB INJURIES

All Laboratory personnel who report to the Dispensary for treatment of an on-the-job injury, however slight, must report to the Safety Office, Building 50, Room 129, to complete Form CA-1, "Employee's Notice of Injury or Occupational Disease."

It is important that a record of injury be on file since it establishes the fact that the employee was injured on the job, and, therefore, entitled to treatment and/or compensation should the injury, at some future date, cause physical disability or loss of time.

FACTS ABOUT FIRE AND CLEAN-UP

Every 12 minutes a home in this nation is destroyed or damaged by a fire starting in rubbish, according to National Fire Protection Association records.

The three storage areas of the home--attic, basement, closets--are the spots where 16.4% of all dwelling fires originate, National Fire Protection Association studies show.

About 550,000 U. S. homes are hit by fire each year, and over 6,000 persons--30 percent of them children--die in these fires.

Figures compiled by the National Fire Protection Association show that last year (1962) Americans burned up more than $1.5 billion worth of property in over two million fires.

REMEMBER, it is better to be safe than sorry.

AWARDS PRESENTATION

On Friday, 10 May 1963, the Director, CAPT A. E. Krapf, presented the following awards in the Auditorium of Building 69:

Superior Accomplishment

For scientific skill and engineering competence which resulted in significant contributions to a program which meets a critical need in the defense area, the following individuals of the Radio Division received cash awards and letters of commendation:

Reid D. Mayo	John R. Williams
Howard O. Lorenzen	Arthur Q. Tool
Robert D. Misner	William B. Bachelor
Donald B. Christman	John M. Miles
Charles W. Price	Ralph A. Carpenter
George W. Kelly	Raymond B. Owens

Albert P. Boyd (E.S.D.)

In 1961 an initial award was made. Subsequent investigations and tests revealed that the full potential of this development exceeds earlier expectations and as a result, Vincent S. Rose, William E. Withrow, and Bruce Wald were each presented the Meritorious Civilian Service Award.

Also, Mr. Charles W. Hughes, Sound Division, was presented a Superior Accomplishment Award for his contributions toward the work on the USS Rockville. Mr. Hughes is one of several employees who were recommended by a co-worker for consideration of appropriate recognition through the Incentive Awards Program.

Invention Awards

John E. Abel, Radar
Arthur B. Cooke, Radio
Howard M. Day, Electronics
William J. Finney, Sound
Morton Fischman, Radio
Bert Fisk, Radio

(Continued--Page 2, Column 1)

LABSTRACTS is the official medium for announcement of administrative and semitechnical activities which are of interest to all NRL employees. Personal items may not be included unless the information relates to NRL work. The publication schedule is Monday, Wednesday, and Thursday. Items should be submitted by 10:00 a.m. at least two days prior to their publication date to Code 1851, Extension 2702.

AWARDS--(Continued)

Frederick R. Fluhr, Applications Research
Jervis J. Gennari, Sound
Thure E. Hanley, Electronics
Garold K. Jensen, Radar
Oliver K. Larison, Electronics
Alan C. Macpherson, Electronics
James E. McGeogh, Radar
Carlyle V. Parker, Electronics
Herbert L. Peterson, Sound
Dwight L. Randall, Electronics
Richard K. Royce, Radio
Robert R. Stone, Radio

25-Years at NRL

Claud E. Cleeton, Applications Research

20-Year Length of Service Emblem

Raymond H. Ferris, Sound
Victor J. Gagner, Electronics

Blood Donor Certificates

Donald M. Horan, 8 pints, Electronics
Arthur M. Knopp, 8 pints, Radar
Eilliam H. Lucke, 16 pints, Electronics
Donald H. Ringler, 6 gallons, Radio
Theodore A. Veilleux, 4 gallons, Radio

AN EFFECTIVE SPEAKING COURSE AT NRL

A course in effective speaking for those who present papers at scientific meetings will begin at 10:00 o'clock on Wednesday, 5 June 1963, in Room 218 of Building 50, and will continue once a week for five weeks.

The objective of the course is to increase self-confidence and improve speaking skills. The first session is for the relatively inexperienced speakers. Later sessions will be conducted for the more skilled speakers. Each participant will be expected to present a five minute talk on a scientific topic of his own choice at each session except the first. Each talk will be evaluated in terms of specific criteria for effective speaking. It is essential that all participants attend the first session. Nominations will be accepted until 3 June 1963.

For additional information, please call Miss Nethken, Training Branch, Personnel Division, on Extension 856.

WELCOME ABOARD

The following individuals reported to the Laboratory for full-time employment on Monday, 15 April 1963:

Richard S. Baker reported to the Laboratory as an Apprentice Electrician in the Public Works Division. He was formerly employed by the D. C. Government, Department of Sanitary Engineering. A native of Washington, D. C., he attended the Capital Radio Engineering Institute. He has approximately four years of Government service.

Hal L. Croft was reassigned to the Laboratory from the Naval Ordnance Laboratory. He reported to the Electronics Division as an Electronic Maintenance Technician (General). A native of Bedford, Virginia, he received a certificate from Cornette School of Business in Roanoke, Virginia. Mr. Croft has approximately 15 years of Government service.

Thomas G. Hughes was reinstated to Government service and reported to the Engineering Services Division as a Machinist. He was previously employed with Litton Industries Inc., College Park, Maryland. A native Washingtonian, Mr. Hughes has approximately 13 years of Government service.

James W. Harvill reported to the Laboratory as an Electronic Development Technician, Engineering Services Division. He was previously employed by the Technical Material Corporation, Alexandria, Virginia. Mr. Harvill hails from Atlanta, Georgia, and has approximately 22 years of Government (military) service.

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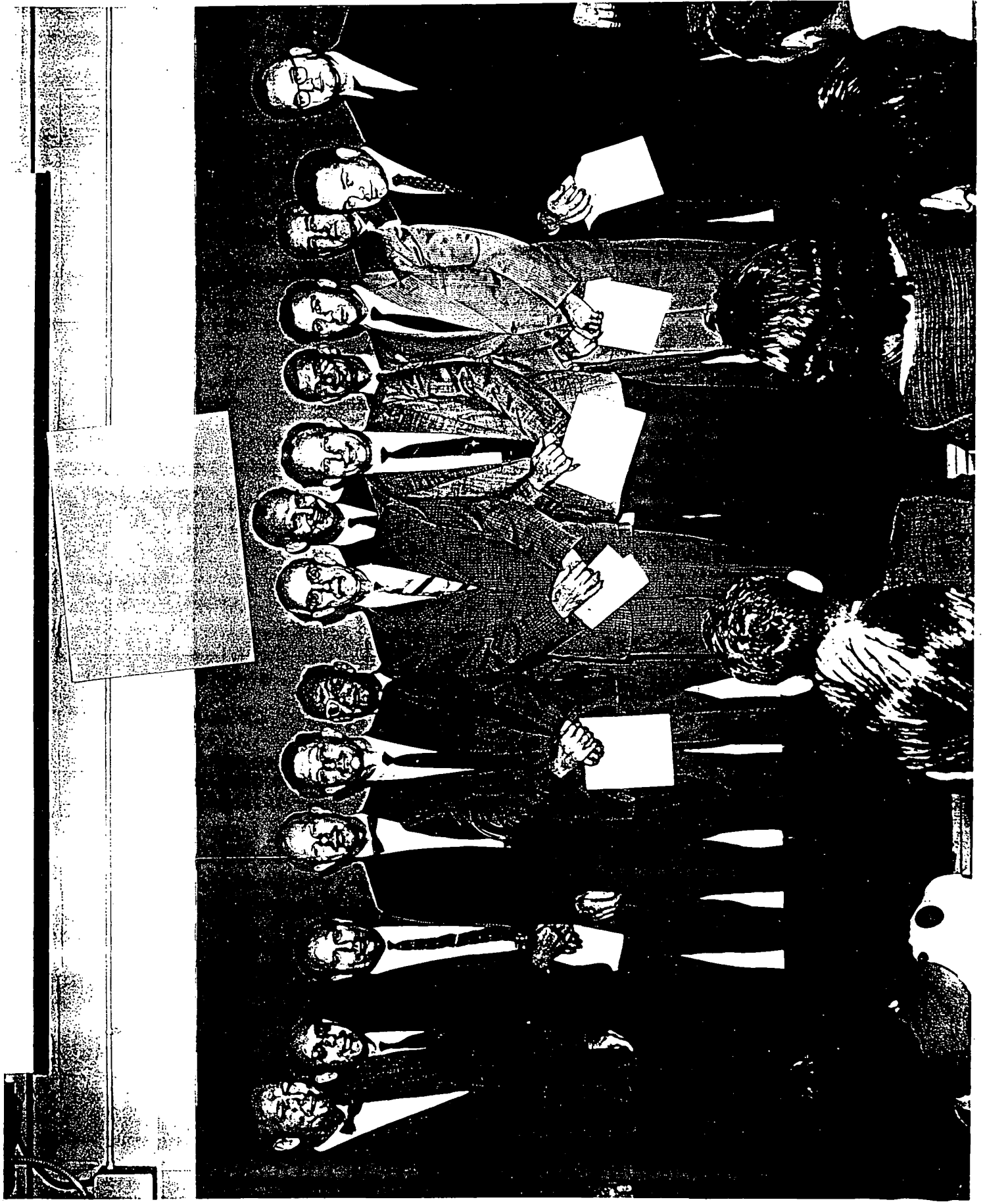

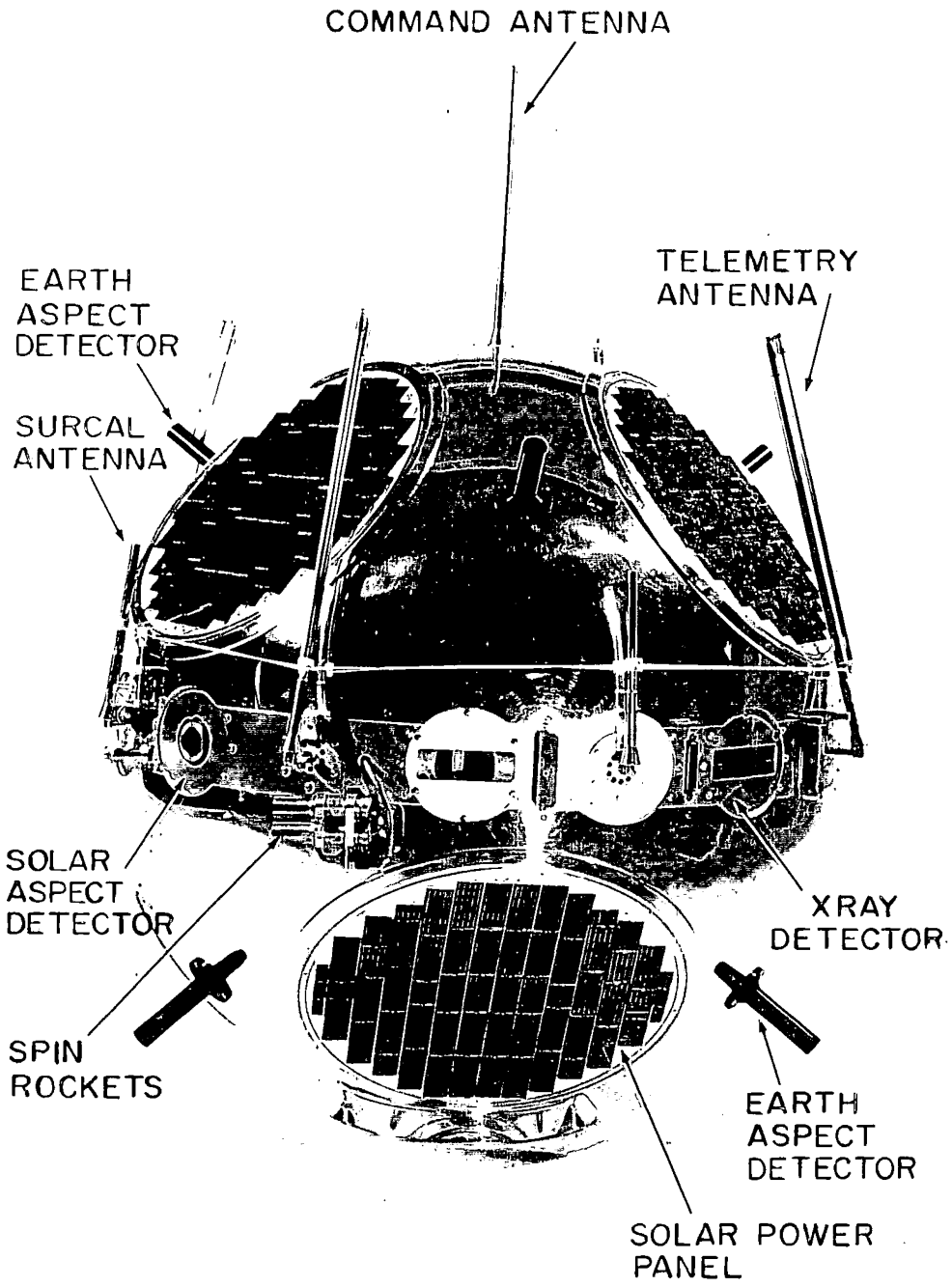

SOLAR RADIATION 6

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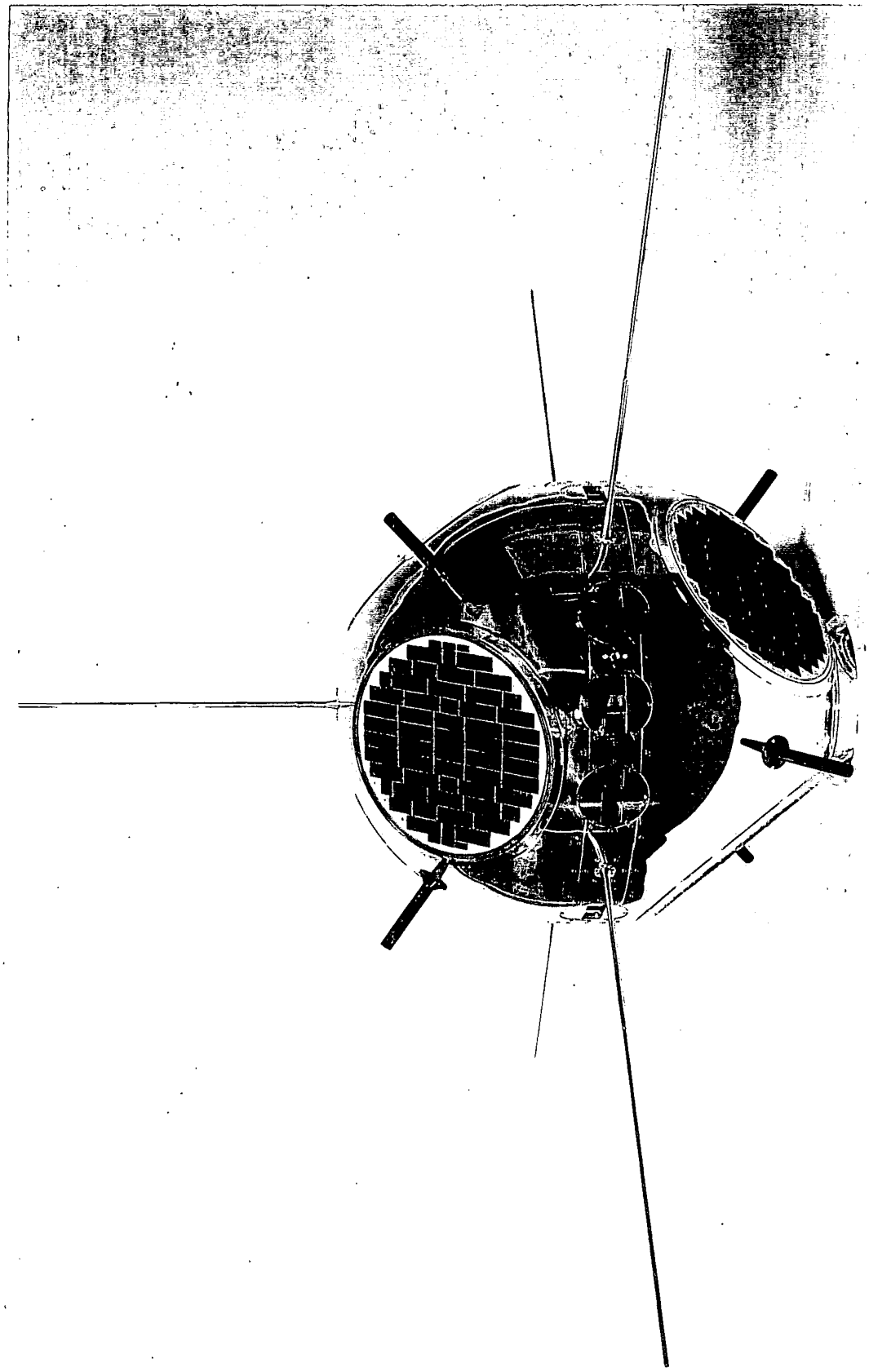
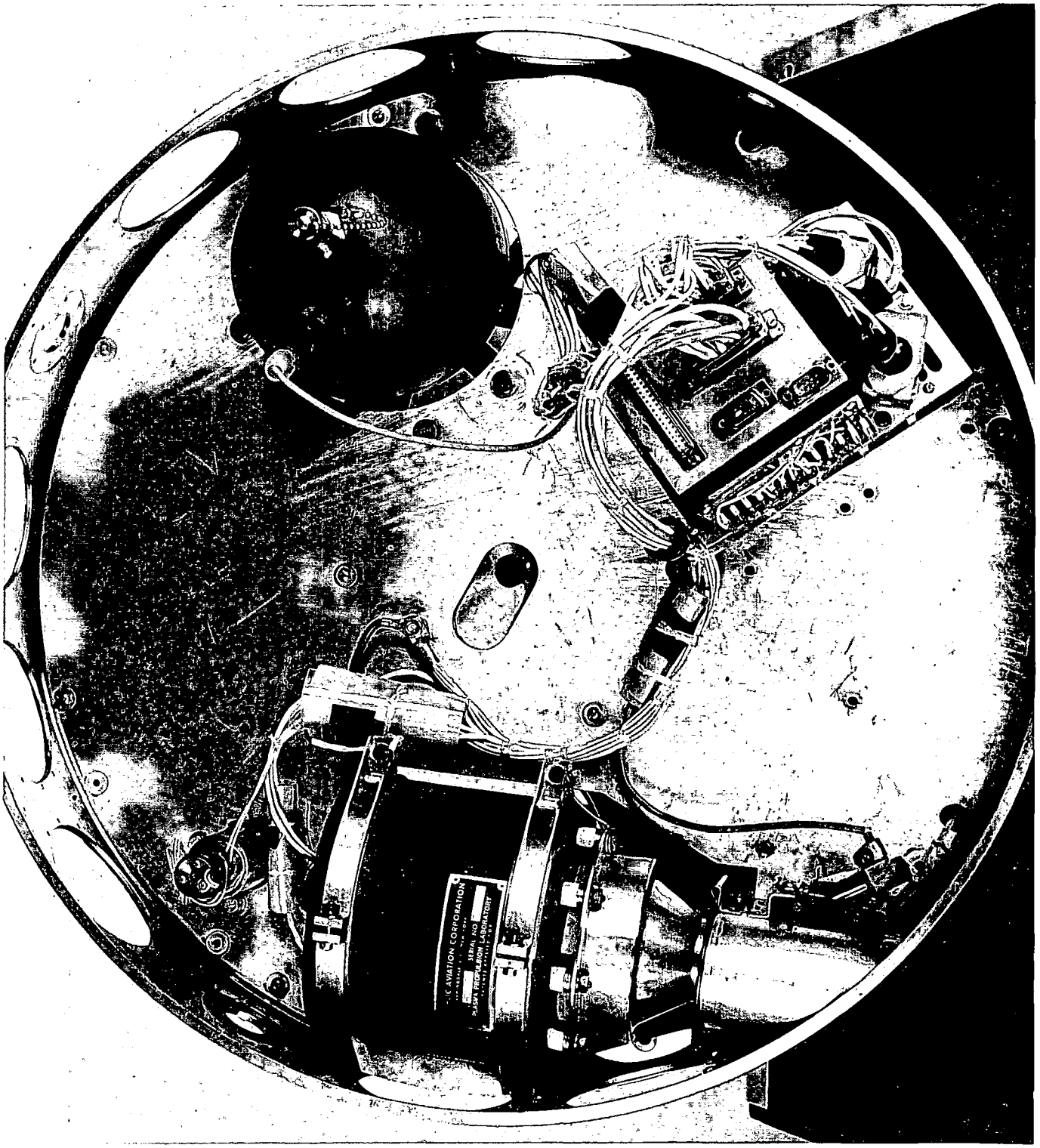
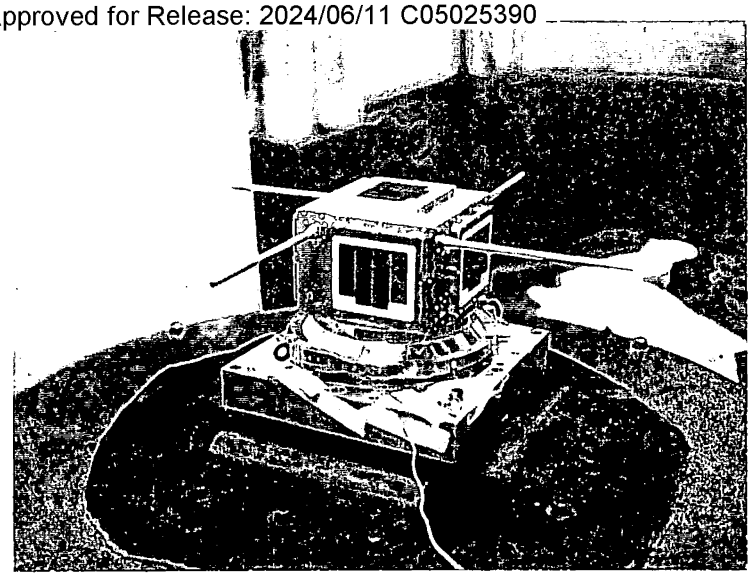
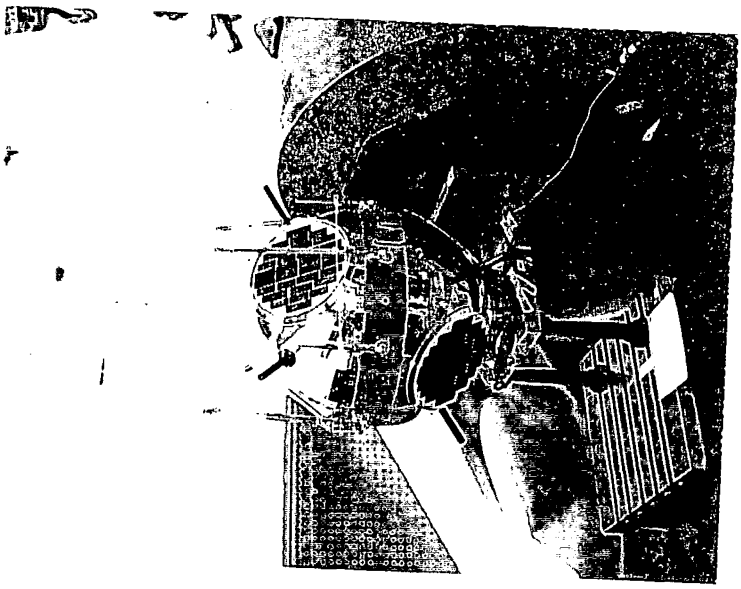
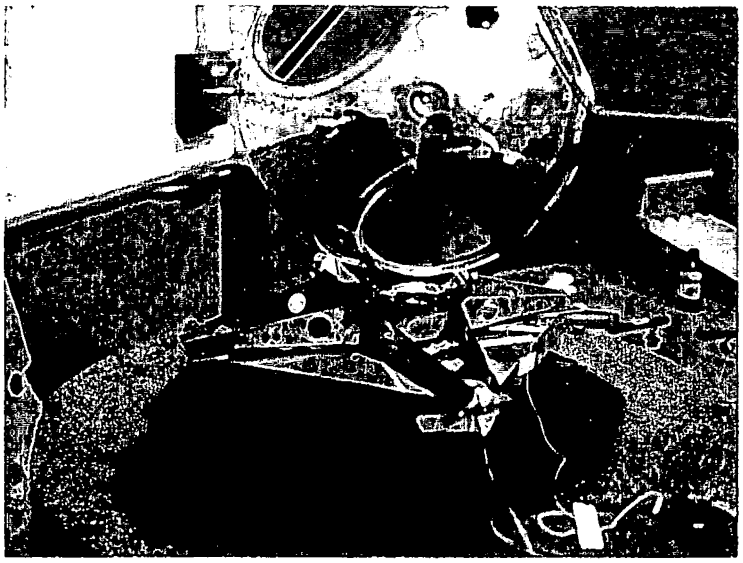


Solar Radiation Vi









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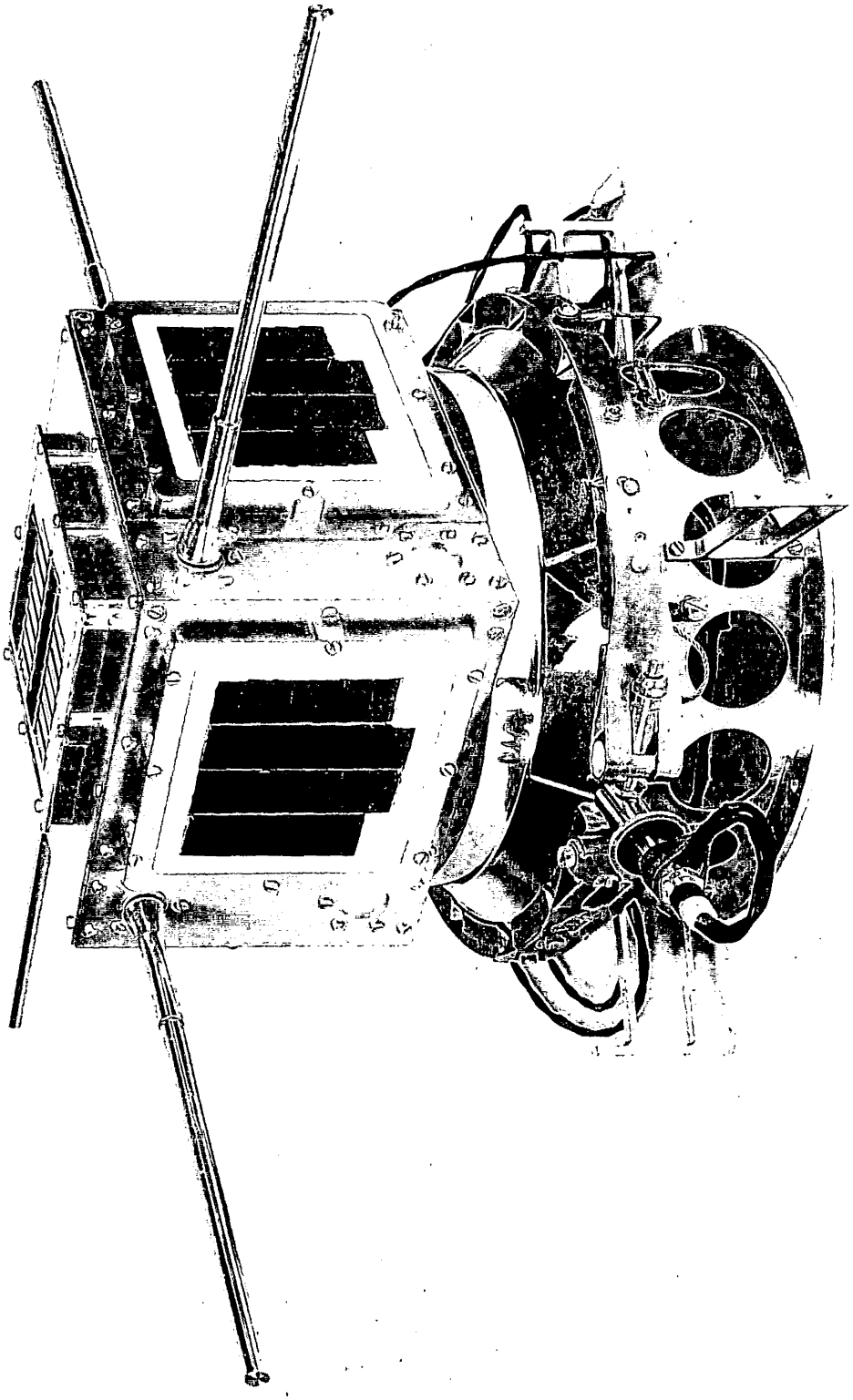

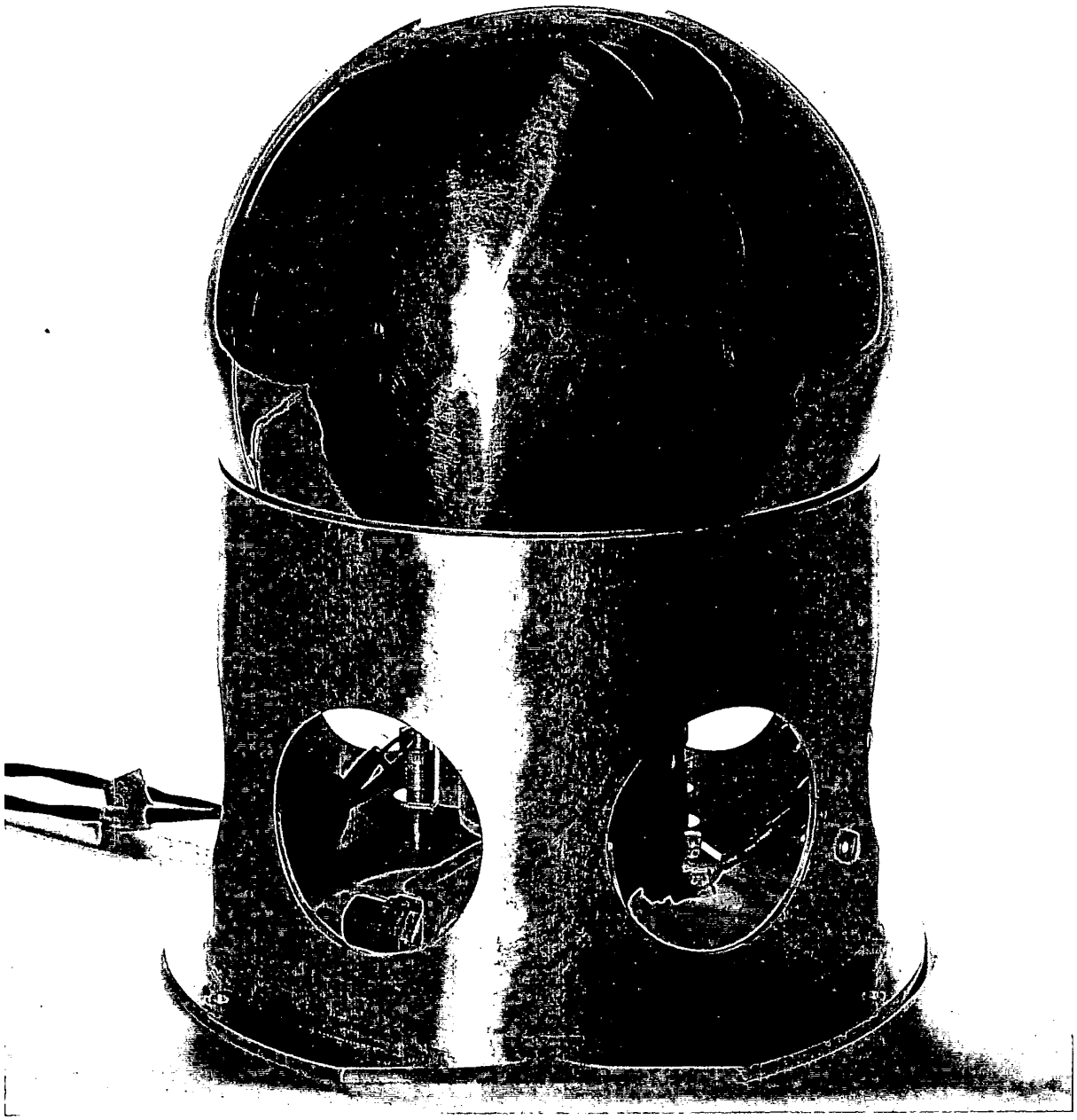

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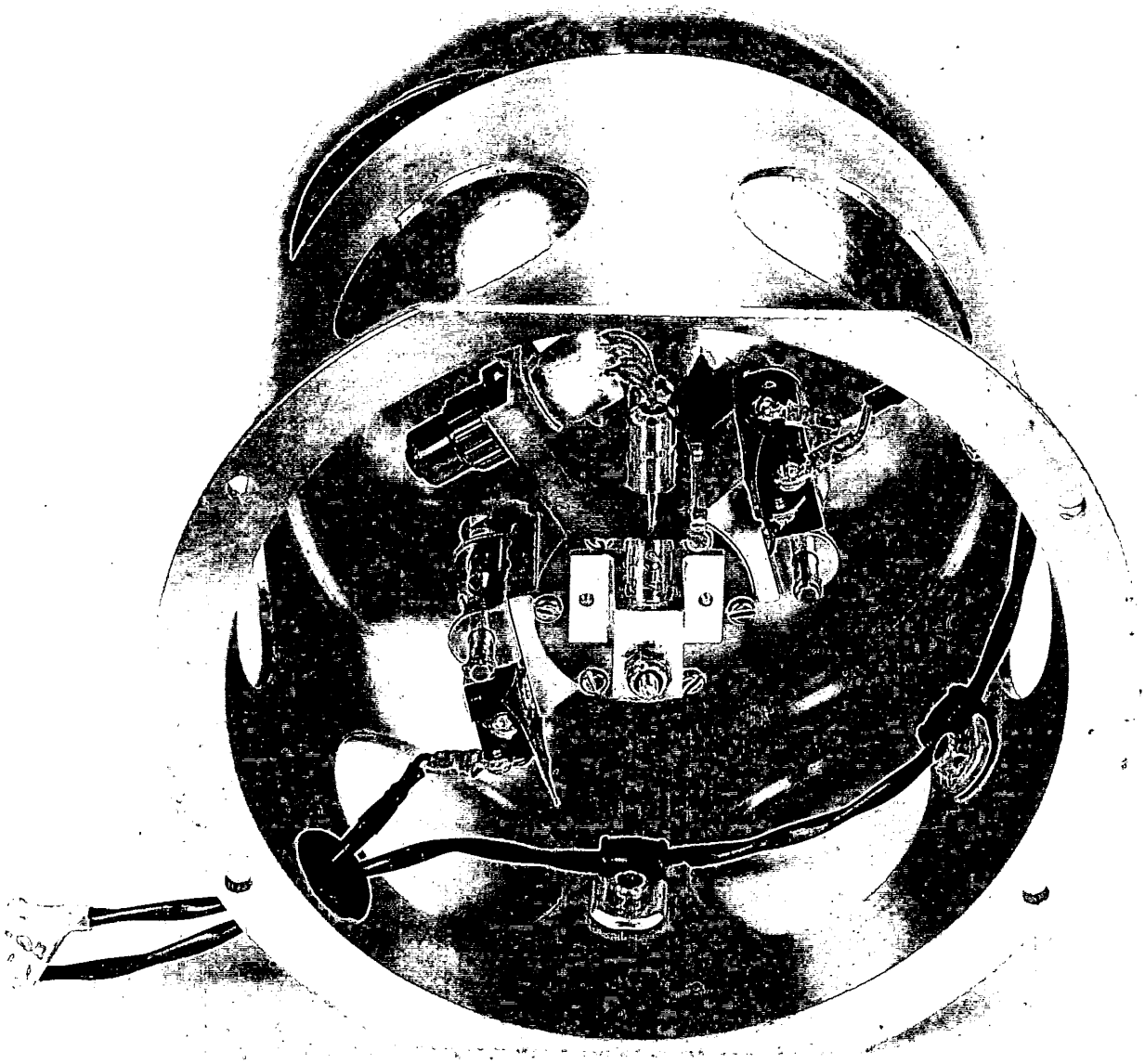

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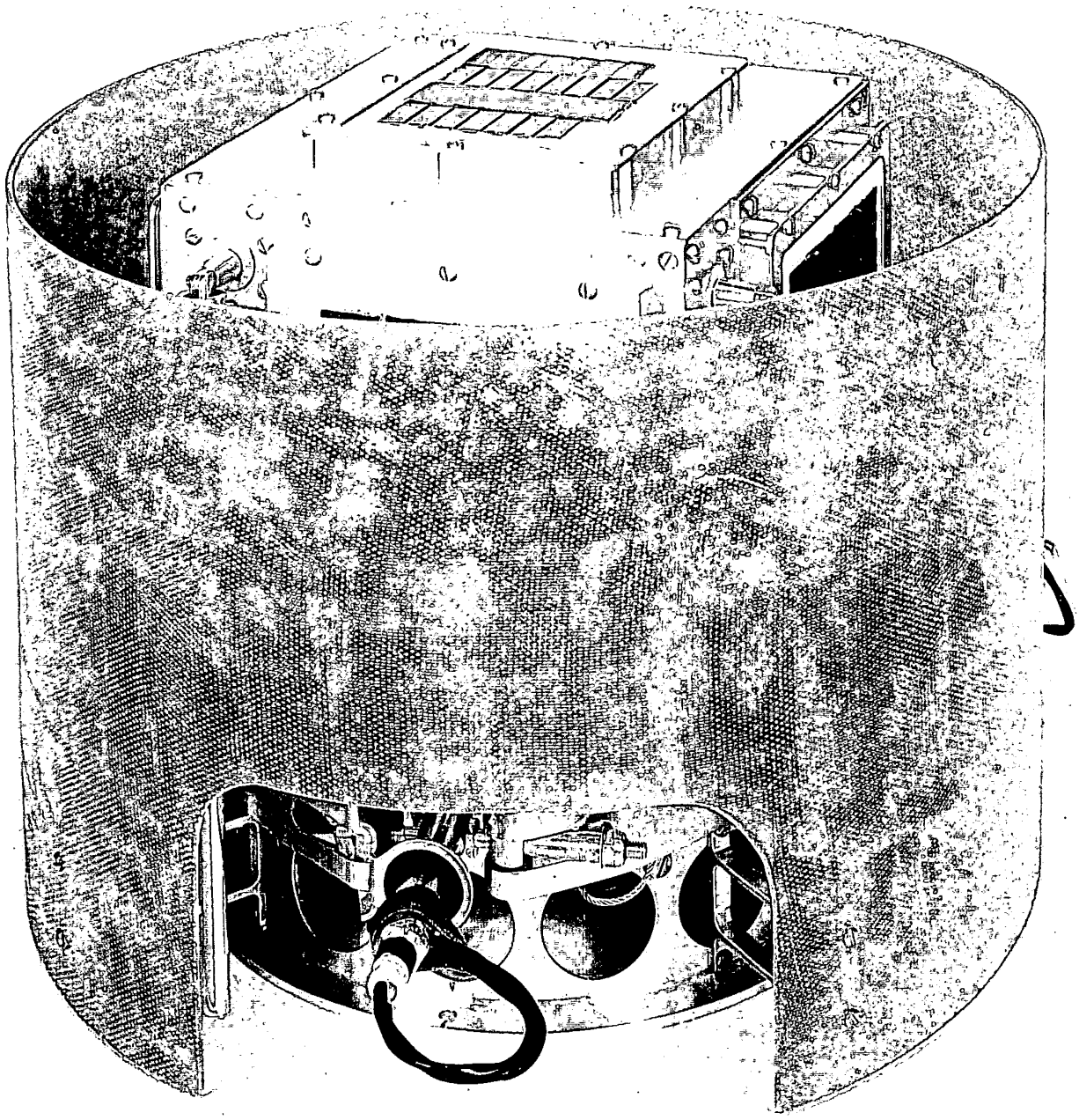

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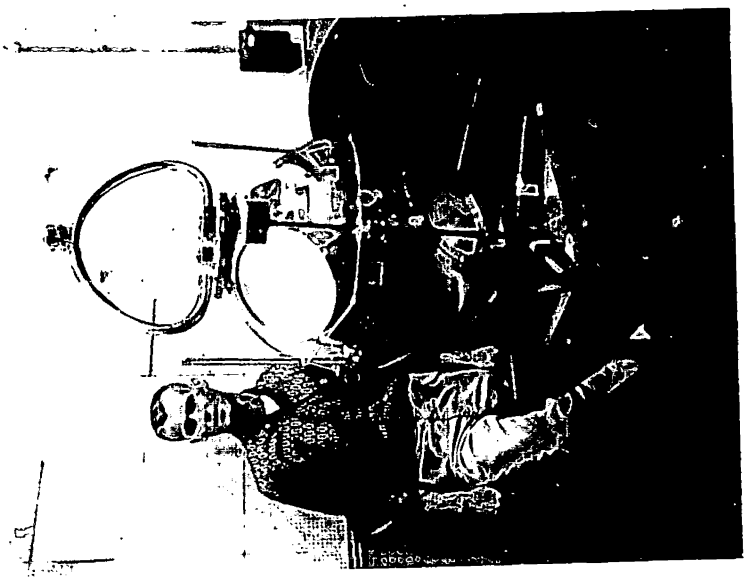

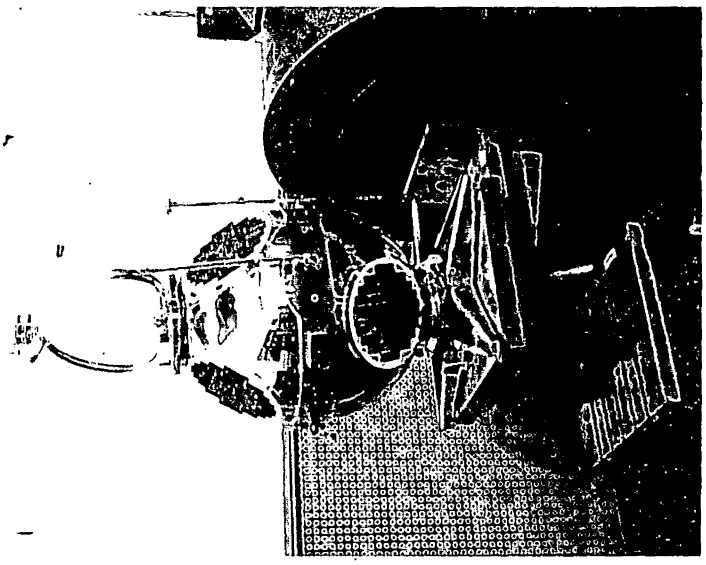

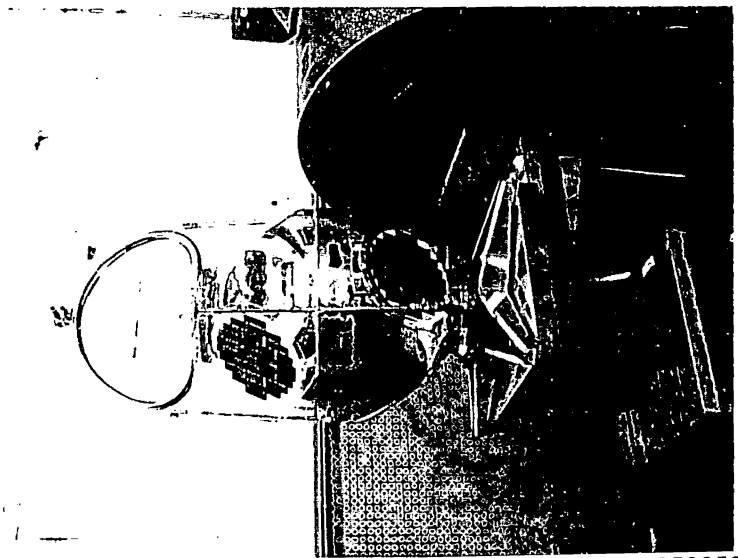

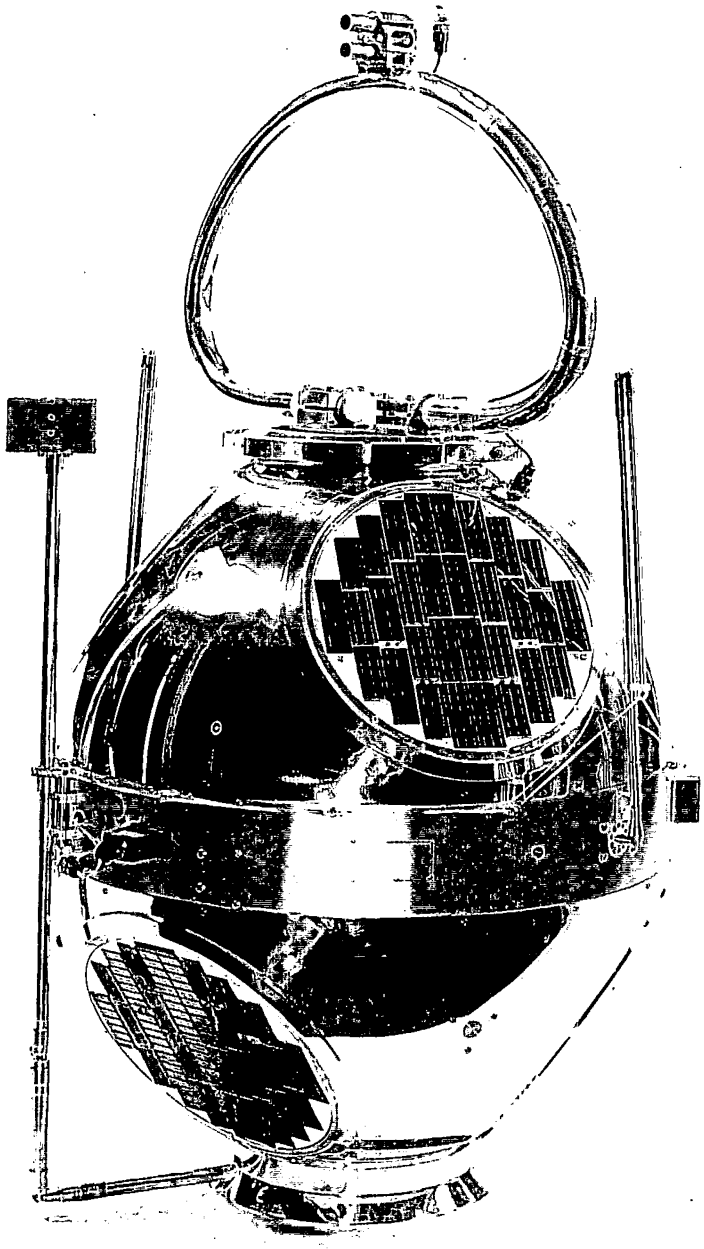

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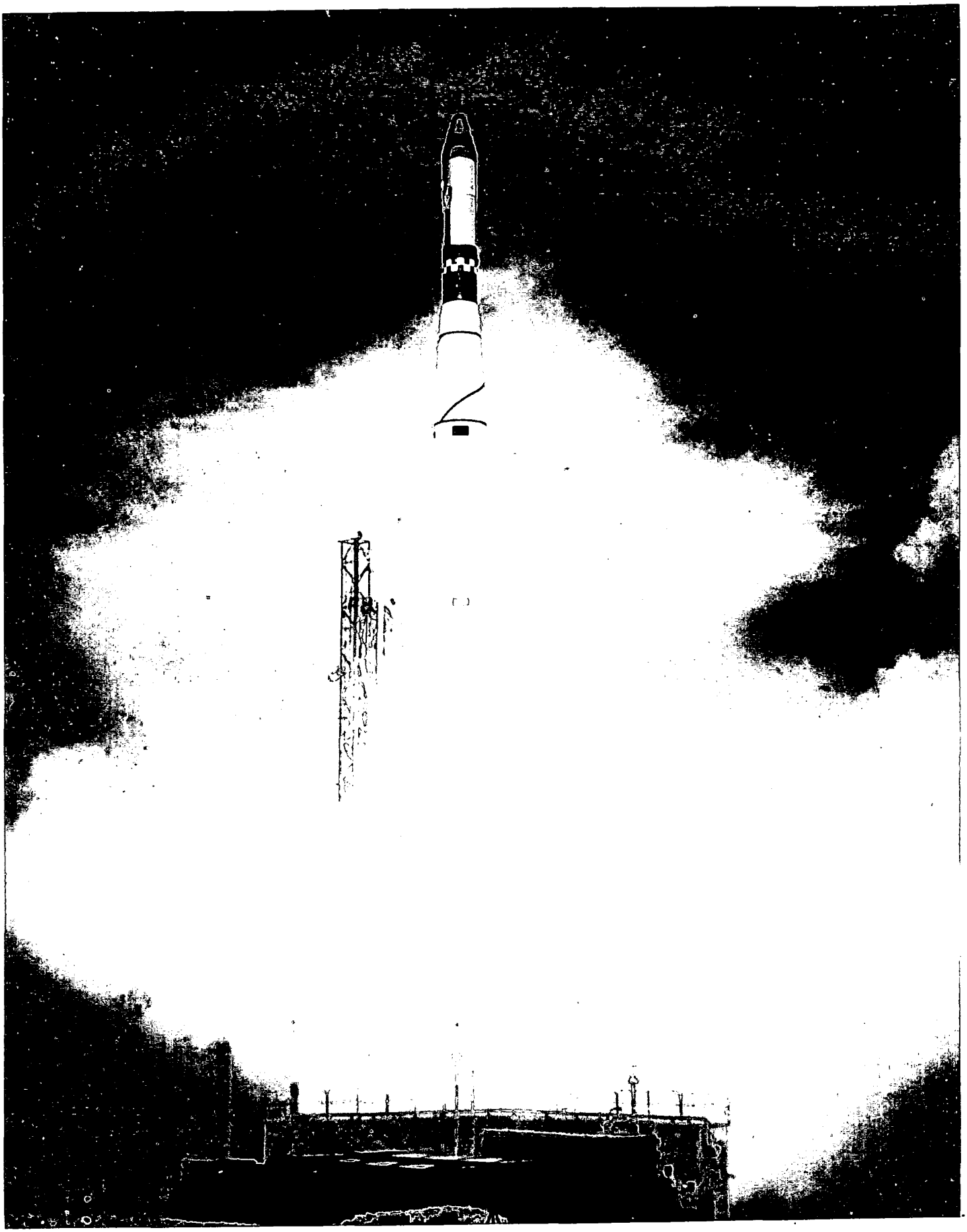

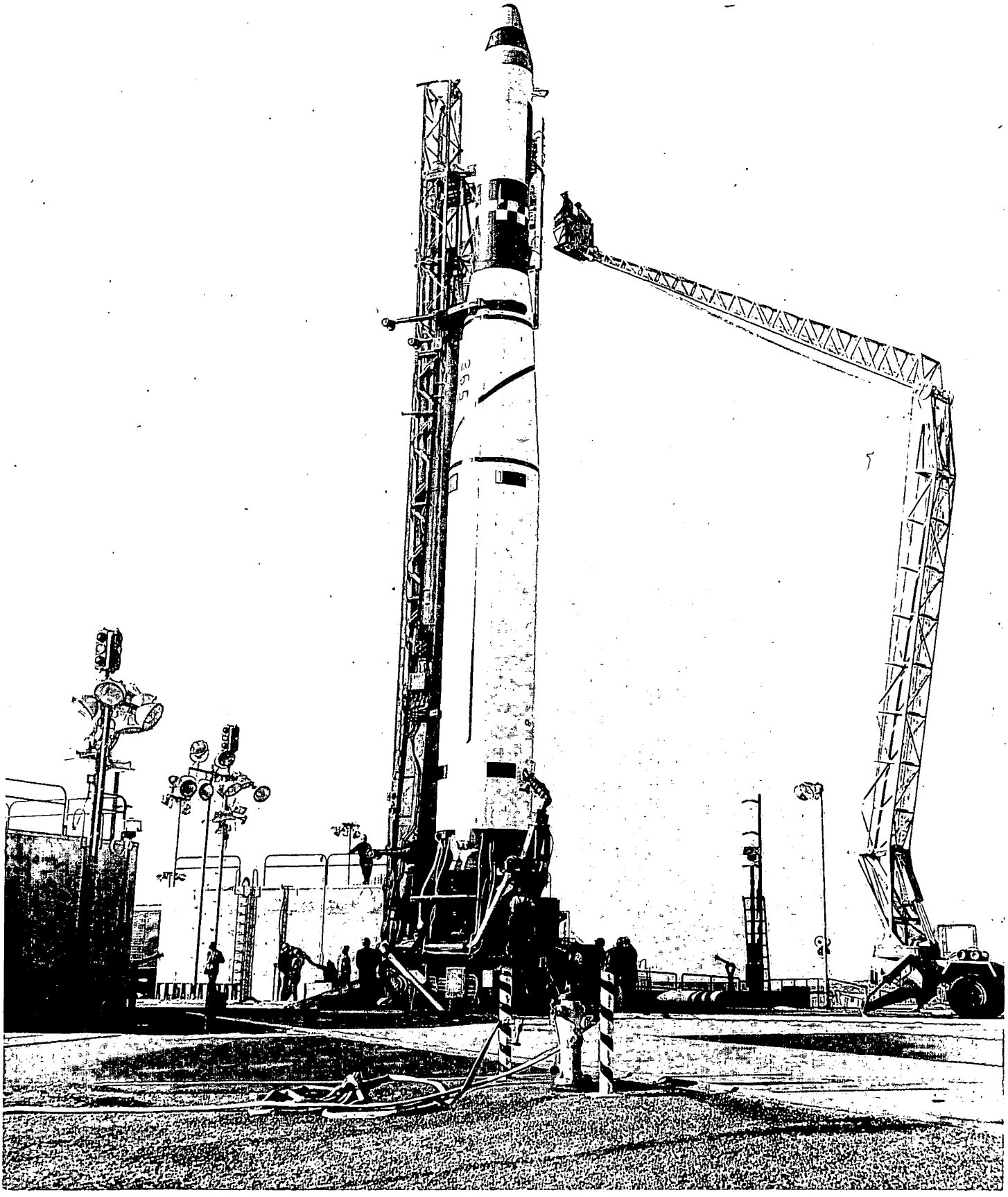

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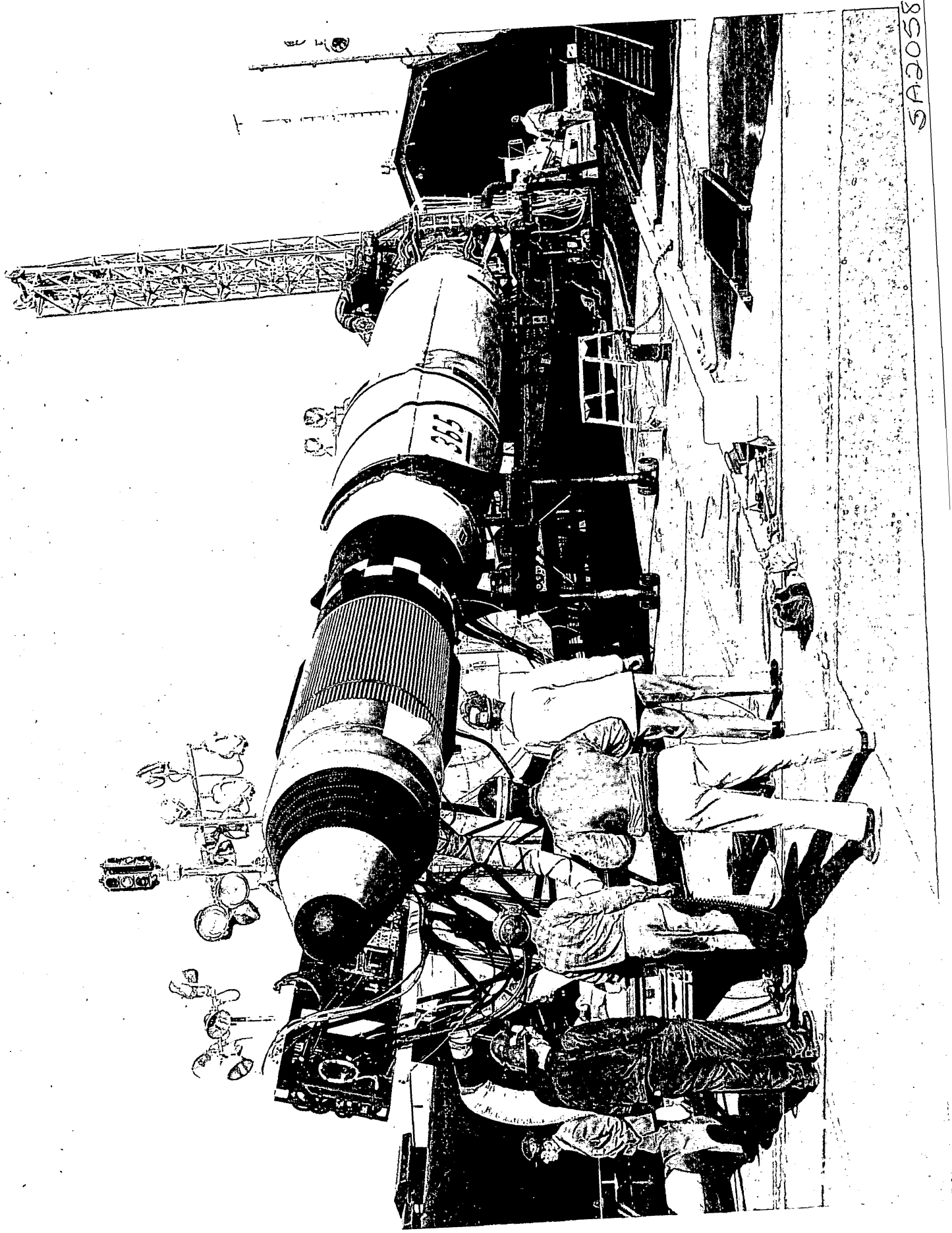


NRL LABSTRACTS

No. 88 **U.S. NAVAL RESEARCH LABORATORY, WASHINGTON, D.C.** October 4, 1963

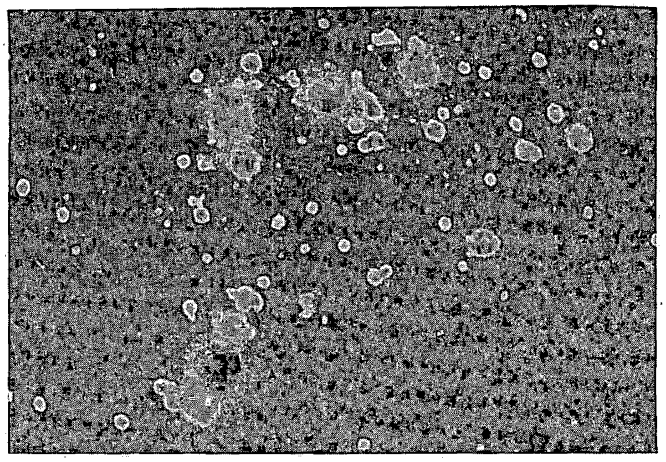
Television by Starlight

Closed-circuit television systems, which require very little artificial light for illuminating the subject being photographed, are still somewhat of a wonder, even in this scientific age. A system that can record pictures of surprisingly good quality when the only source of illumination is starlight or moonlight would be even more astonishing. Yet just such a system has been developed by Mr. Grady Hicks, of the Atmosphere and Astrophysics Division. With it he has obtained photographs of orbiting satellites and +9 magnitude stars that are invisible to the naked eye. And surprisingly clear pictures have been made of terrain illuminated only by an overcast moon.

Mr. Hicks, a very modest man, insisted on reminding us that he did not invent the camera which does such wonderful things. The system was originally designed for shipboard use but modified at NRL for upper-atmosphere research.

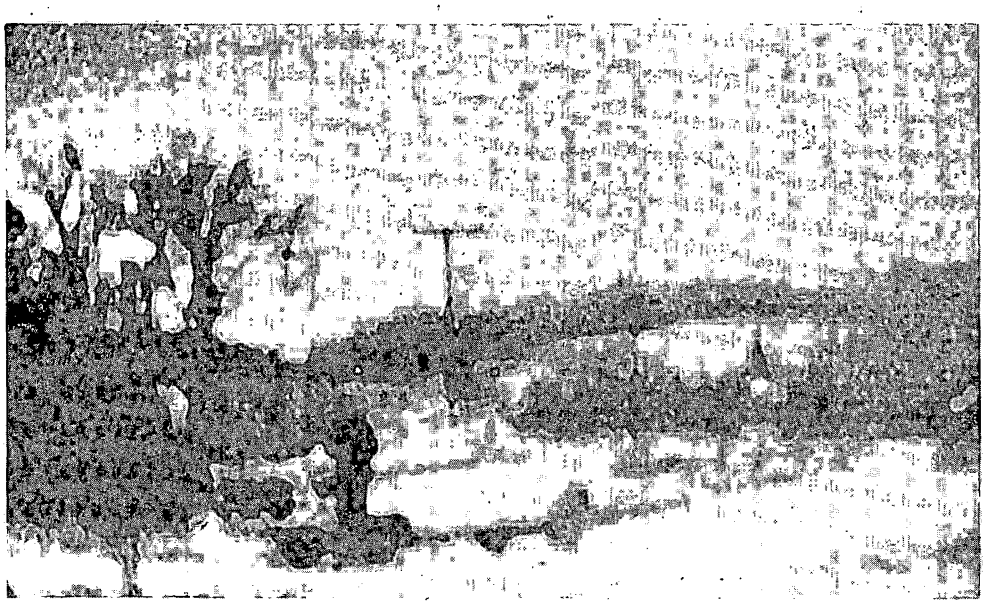
The heart of the system is an image orthicon (intensifier) tube with an improved target design which greatly reduces lateral leakage of the electronic signal. The result is a significantly higher signal-to-noise ratio and better resolution than is possible with commercial studio tubes. Used with this tube is a large collecting lens, the combination of which gives an 18-degree field of view. The image is displayed in final form on two monitor screens, at a luminance level adequate for conventional motion-picture photography.

Mr. Hicks also said that, in adapting the camera for its present use, testing it out, obtaining pictures, monitoring the screens, and recording data, he was assisted by two co-workers, Carey Whitfield and William Dambeck, and by two of the Laboratory's motion-picture photographers, Donald Berryhill and Perry Green, of the Technical Information Division. Recently, the group collaborated on a ten-minute film report which describes the system in some detail and demonstrates the quality of the pictures by a comparison of scenes photographed by the NRL camera at night with identical scenes photographed by a commercial camera under day-light conditions. This film (ONR 1-63) is now in the NRL Library.



Another photograph obtained with the NRL camera shows the belt and sword in the constellation Orion. The stars in the belt are roughly of + 1.75 magnitude.

In the study of meteors, in the detection of weak flashing lights, and in observations of the terrain at



Nighttime landscape photographed from a monitor screen of NRL's experimental closed-circuit television system. The only source of illumination was a completely overcast moon; the street lights were not burning.

night, NRL's closed-circuit television system has already proved its value, even though it is still in the experimental stage. Its outstanding feature is that images of faint objects are increased in brightness to such an extent that motion-picture photography is possible.

Toastmasters Elect Officers

NRL's three toastmasters clubs have elected officers for the next six-month term, which begins in October. The results are as follows:

NRL Toastmasters
(The "Parent" Organization)

President, Charles V. Strain
Educational Vice President, Carlyle V. Parker
Admin. Vice President, John M. Leonard
Secretary, William M. Leak
Treasurer, Joseph M. Krafft
Sergeant-at-Arms, Sigmund Schuldiner

NRL Forum Toastmasters

President, Richard J. Schumacher
Educational Vice President, Lawrence A. Brauch
Admin. Vice President, Herschel L. Smith
Secretary, Joseph T. Leonard
Treasurer, C. Edward Holland
Sergeant-at-Arms, Donald L. Hammond

NRL Thomas Edison Toastmasters

President, Perry B. Alers
Educational Vice President, Clifford M. Gordon
Admin. Vice President, Kingsley P. Thompson
Secretary, Herbert S. Poole
Treasurer, Roger J. Zampell
Sergeant-at-Arms, John F. Reynolds

Let's Get Rid of It! Says Public Works

Lack of storage space is a serious problem in many of our buildings, one that is often partially solved by moving excess material and equipment into halls or other public areas. This is a dangerous solution, however, because blocked hallways are a fire hazard. In other instances, roofs are used to store such things as unused antenna structures and equipment. This contributes to roof leaks and general deterioration of the roofing membrane.

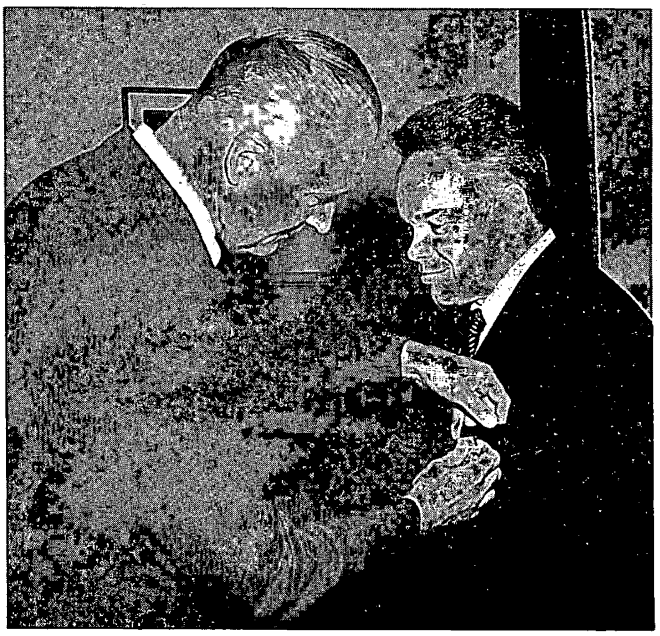
A clean-up campaign is in progress by the Public Works Division to clear all halls, roofs, and alleyways. Within the past few weeks several truck loads of unused material–work benches, desks, chairs, cabinets, cannibalized scientific gear, and scrap pipe–were removed from four buildings.

Mr. Weidman, of the Public Works Division, says, "If you want to get the jump on us, call the service desk (Ext. 2508) and let us dispose of your surplus equipment now."

Reid Mayo Receives DCSA

In impressive ceremonies at the Pentagon on September 17, The Honorable James H. Wakelin, Jr., Assistant Secretary of the Navy (Research and Development), presented the Navy Distinguished Civilian Service Award to Mr. Reid D. Mayo, of the Radio Division, for his work in devising important new electronic techniques and systems. His contribution was based on simple engineering concepts which resulted in an inexpensive, highly reliable, compact, and efficient electronic package.

Guests at the ceremony from NRL included CAPT B. F. Bennett, CAPT T. B. Owen, Dr. Robert Page, Dr. Peter King, Dr. Wayne Hall, Mr. Louis Gebhard, Mr. Howard Lorenzen, Mr. Vincent Rose, an associate of Mr. Mayo, Mr. Raymond Owens, a former associate (now retired), and Miss Margaret Canfield, of the Personnel Division. Also present were Mrs. Mayo and two of the Mayo children, Michael and Kathleen.



The Honorable James H. Wakelin, Jr., Assistant Secretary of the Navy (Research and Development), pins the Distinguished Civilian Service medal on Mr. Reid Mayo during recent ceremonies at the Pentagon.

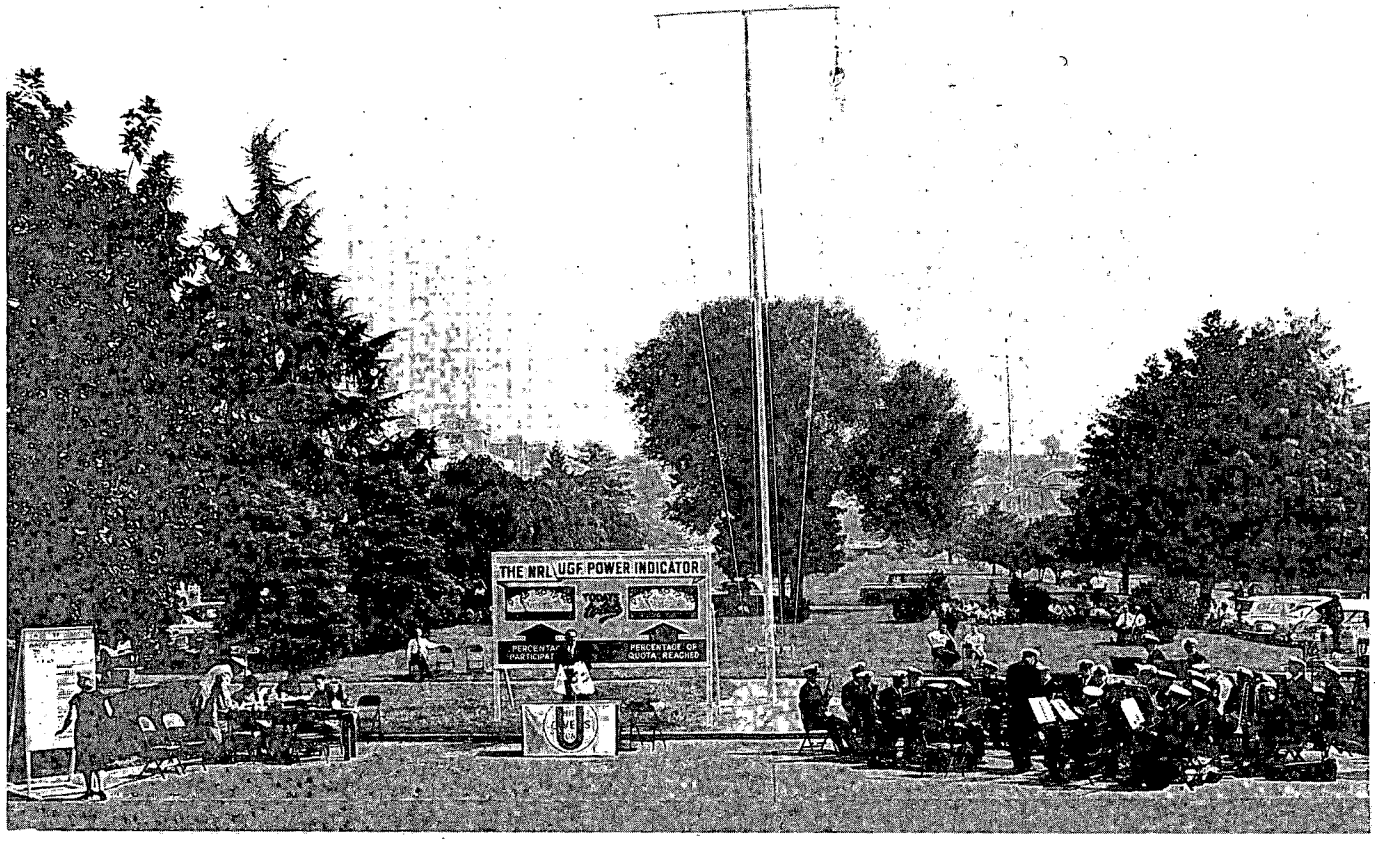
THRESHER Search Ship Refitted

The small ship that was in view all last week from the South Capitol and Eleventh Street Bridges — at the U. S. Naval Station dock on the Anacostia River — played one of the leading roles in the search for the THRESHER, with NRL scientists carrying out many of the search operations aboard her. The vessel, the USNS JAMES M. GILLISS, was sent to the area in which the submarine disappeared, arriving ten days after the tragedy, which occurred on April 10. She remained on the scene night and day until September 15, except for short periods spent in port to repair and change search instrumentation. During this time, Mr. C. L. Buchanan, head of NRL's Sonar Systems Branch, was responsible for the NRL endeavor associated with the THRESHER search.

No. 88 NRL LABSTRACTS October 4, 1963

Bulletin Board

Eighth Annual United Givers Fund Campaign



This scene will be re-enacted on October 11, when NRL pledges are collected for the Eighth Annual United Givers Fund Campaign.

Have you Pledged?

Friday, October 11, will be "a day of special emphasis" at NRL. On that day it is hoped that the climax of a successful UGF campaign will be reached. A special ceremony will be held in front of Building 43, from 12:00 noon to 1:30 p.m., during which the U. S. Navy Band will entertain and all NRL pledges will be collected.

Mr. Kulikowski, co-chairman of the drive, urges every NRL employee to turn in his pledge to his keyman as soon as possible and thus help NRL to meet its goal.

In the event of inclement weather, the ceremony will be held in the auditorium of Building 28.

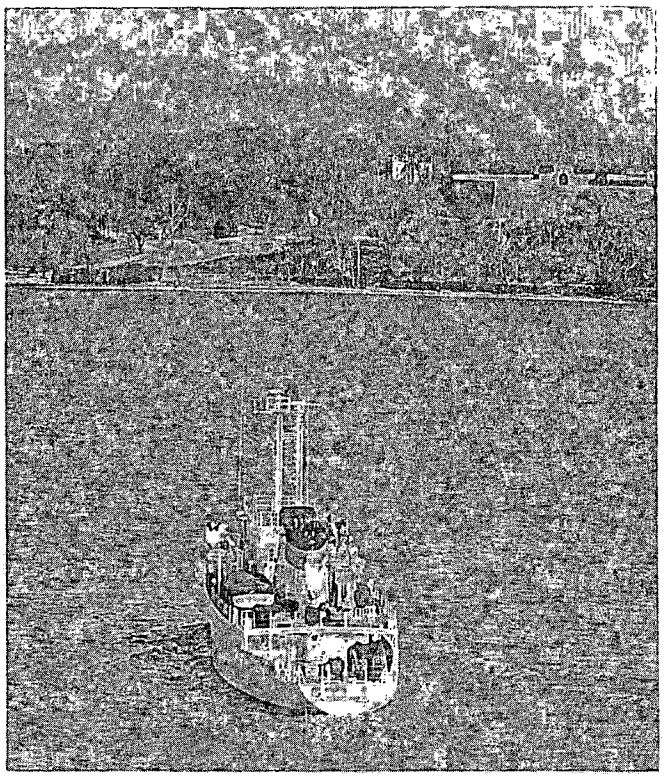
UNITED GIVERS FUND

The GILLISS, which displaces 1400 tons, is the second ship built for the U. S. Navy from the keel up specifically for oceanographic research. Thus she is loaded from stem to stern with equipment capable of performing almost every kind of modern oceanographic research and survey work. She is operated by the Military Sea Transportation Service (under the technical direction of the Naval Oceanographic Office) for use by all Naval laboratories on the East Coast.

Among the investigations made from the GILLISS as part of the THRESHER search were radiation surveys (to determine if leaks had developed in the sunken submarine's reactor); underwater television and still-picture photography, for which an NRL TV and camera system was used (more than 60,000 photographs of the ocean bottom were taken); and measurements of disturbances of the magnetic field that might have been created by the submarine (made by means of a magnetometer towed by the ship). The GILLISS also served as the tracking ship for the bathyscaph TRIESTE while that craft made its deep dives in search of the THRESHER. During many of the operations, the OMEGA navigation system – developed by NRL and the Naval Electronics Laboratory – was used to assist in making accurate position determinations.

The GILLISS came to Washington to be fitted out with new electronic instruments which will be used during the ship's next research cruise, to be made from New London, Connecticut, later this fall.

The ship sailed from Washington for New London last Tuesday.



The USNS JAMES S. GILLISS moves up the Potomac during her last visit to Washington.

Dr. Dinger a Fellow in ISA

On September 10, Dr. Jacob E. Dinger was awarded a Fellowship in the Instrument Society of America. The presentation was made at the Honors and Awards lunch during the week of the ISA Conference in Chicago. This recognition is given only for scientific or engineering attainments in the field of instrumentation. Dr. Dinger's award was for "distinguished achievements in research and development in the field of geophysical instrumentation."

Dr. Dinger has been at NRL since 1941. For many years he has been head of what is now known as the Atmospheric Physics Branch of the Atmosphere and Astrophysics Division. Work under his guidance includes research and development of instrumentation for studies in meteorology, oceanography, and seismology.

CAPT Bennett Discusses NRL Research

The scope and mission of NRL research programs are explained in a report by CAPT B.F. Bennett, USN, which appears in the September 1963 issue of Data magazine. The discussion touches on many of the Laboratory's activities, past and present, including its pioneering work on radar, its role in the development of the POLARIS submarine missile system, and its research on cosmic rays, space surveillance, the ARTEMIS submarine detection system, radio astronomy, and energy conversion.

The entire September issue of Data is devoted to basic research by the Navy. Articles, in addition to the report by CAPT Bennett, were written by Dr. James H. Wakelin, Jr., Assistant Secretary of the Navy (R&D); RADM L. D. Coates, USN, Chief of Naval Research; and a number of other directors of basic research programs.

Concerning the magnitude of the effort at NRL, CAPT Bennett comments that research now under way at the Laboratory "has probably a greater scope than the total program of any other single military or civilian laboratory in the world."

Persons wishing to read the September issue of Data will find copies in the Library at the Reference Librarian's Desk.

Registration for Russian Classes Extended

The time during which NRL employees may register for classes in beginning and advanced Russian has been extended. Mr. Allan Zamansky, the instructor, has announced that registration will be held on both October 4 and 11, at 7:00 p.m., in Room 205 of Stoddard Junior High School, Marlow Heights, Maryland. Further information may be obtained from Mr. Zamansky, ADams 2-5033, before 9:00 a.m.

Lost

Round, gold, Omega wristwatch with expandable bracelet, left in Ladies Washroom, Building 43, First Floor. Has sentimental value. Finder please call Miss Chrysler, Ext. 584.

Halloween Dance

Now is the time to limber up those limbs for the "Limbo" at the upcoming Halloween Dance, Saturday, October 26.

The meeting place for the reunion of the ghosts will be the Recreation Club Ballroom, festooned to fit the festivities.

The orchestration and syncopation will be provided by that incomparable and least expensive thirteen-piece dance band, "The Sylvanians."

Refreshments and other ancillary material will be provided as usual.

Come one come-er, come two, come four, with next of kin but be there when the Saints come marching in!

D. Whitlock has the vouchers at $5.00 a duet and the resting place layout. Call Ext. 416, or visit Bldg. 58, Room 102. —D.S.T.

Course Offered in Operations Research

A course in operations research will be held in the General Accounting Office Building, 4th and G Streets, N.W., from 8:45 to 5:00, on November 4-8.

Emphasis will be on management concepts, responsibilities, and organizational structure needed to derive maximum benefits from operational research. Seven interesting topics will be covered.

The course is limited to personnel in grades GS-11 and above. The cost is approximately $25.00 per person. Nominations should be received in the Training Branch, Personnel Division, by October 8. Nomination cards, additional information on the course, or information on similar courses may be obtained from Miss Nethkin, Ext. 856.

Transportation Exchange

Ride Wanted

June Hamel, Ext. 2354
Vicinity of Elmira and S. Capitol Sts., S.W.
Hours: 8:00 to 4:30

Emmett Young, Ext. 2354
8th St. and South Dakota Ave., N.E.
Hours: 8:00 to 4:30

Judith Cottone, Ext. 430
602 Spring Street, SE.
Vienna, Virginia
Hours: 8:00 to 4:30
(earlier if possible)

Join or Form Car Pool

Bill Taylor, Ext. 2736
Carrollton, Maryland, area
Hours: 8:00 to 4:30

Addition to Telephone Directory

Jenkins, Robert W., Code 7450, Radiation Division, Bldg. 65, Rm. 308, Ext. 2256.

Awards

During several recent ceremonies held throughout the Laboratory, forty-two NRL employees were presented Length of Service certificates. The recipients are listed here by name, division, and total years of service.

Twenty Years

Elizabeth W. Allen, Support Services
Carlos H. Apple, Engineering Services
Willie T. Baker, Public Works
Edward C. Bean, Electronics
Blanche R. Brooks, Public Works
Virgil T. Bushong, Engineering Services
Elizabeth England, Public Works
Savannah M. Gillis, Supply
Robert M. Harmon, Technical Information
Antonio H. Harris, Public Works
Allen C. Hawkins, Public Works
Hester M. Helms, Sound
David R. Hudson, Engineering Services
Troy Hunt, Public Works
Lewis R. Johnson, Solid State
Richard S. Johnson, Supply
Earl J. Kohn, Chemistry
Joseph F. Korbas, Supply
Curtis L. Lamb, Mechanics
Robert P. Little, Electronics
Timothy P. McCullough, Atmosphere and Astrophysics
Fred D. McKee, Public Works
Joseph T. Mihm, Chesapeake Bay Annex
Edwin C. Orndorff, Public Works
William H. Reed, Public Works
Kurt Rosenwald, Technical Information
John D. Shipman, Radiation
Estella E. Sims, Supply
Charles R. Stewart, Engineering Services
Robert L. Stone, Public Works
Theresa Stone, Public Works
James W. Titus, Radar
James R. Ward, Chesapeake Bay Annex
Ezra Washington, Public Works
Vincent R. Welch, Public Works
Vance C. Winfree, Applications Research
Emmett S. Young, Technical Information
Marbin P. Young, Radiation
Floyd H. Younger, Public Works

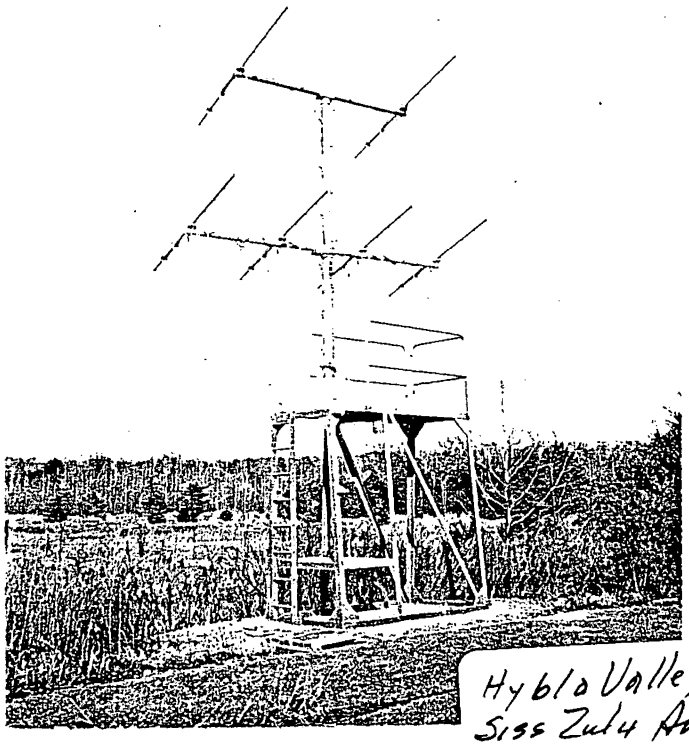
Twenty-Five Years

Walter C. Larson, Public Works
Charles M. Murphy, Jr., Chemistry

Forty Years

John C. Redman, Public Works

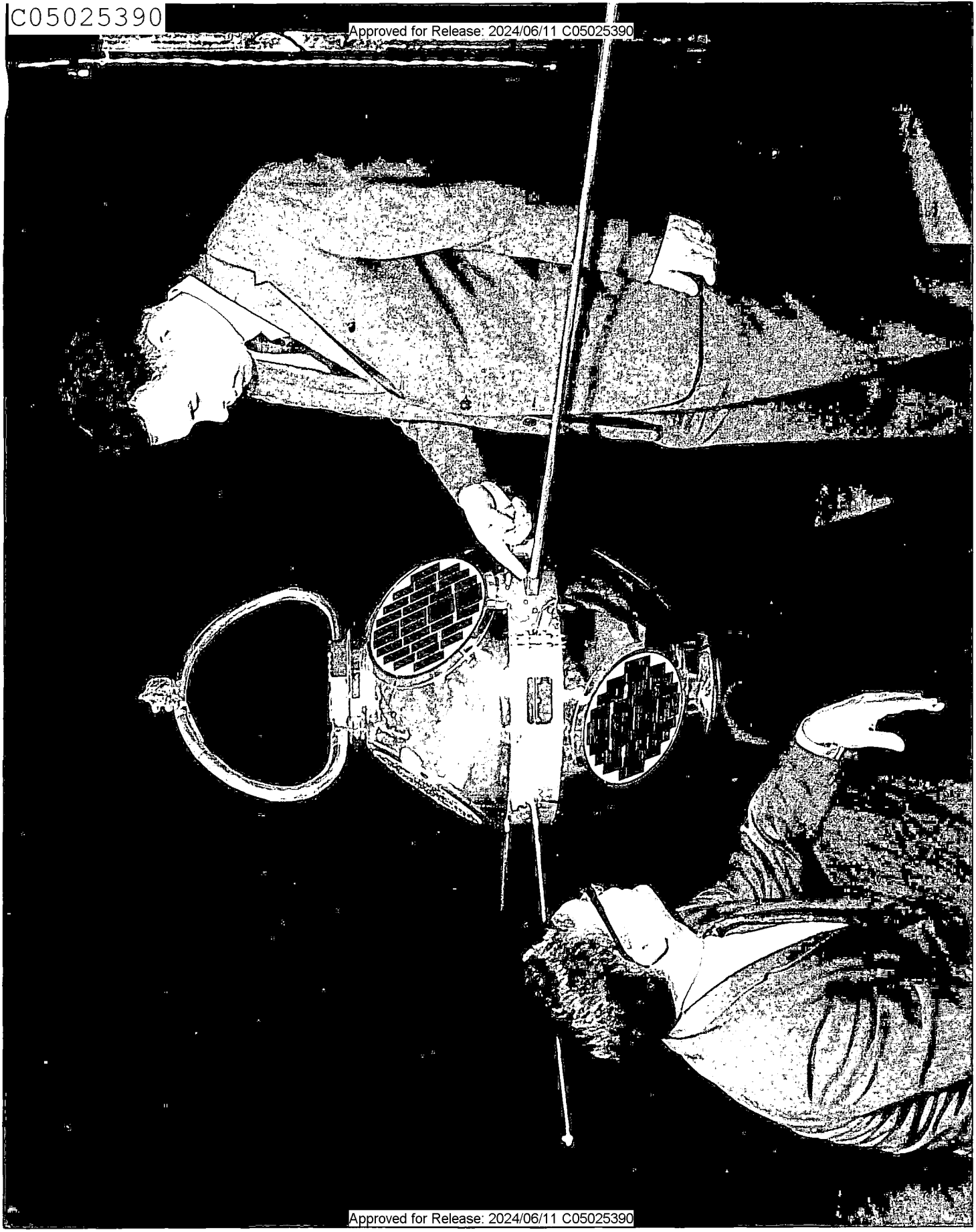
LABSTRACTS is an official Laboratory medium for communicating with employees about topics of general interest and for publishing news about their work and achievements. It is a weekly publication distributed on Friday. Short notices and announcements should be submitted to the Technical Information Division, Code 2040 (Ext. 2702), by Friday for inclusion in LABSTRACTS one week later. Longer articles should be allowed a two-week lead time.

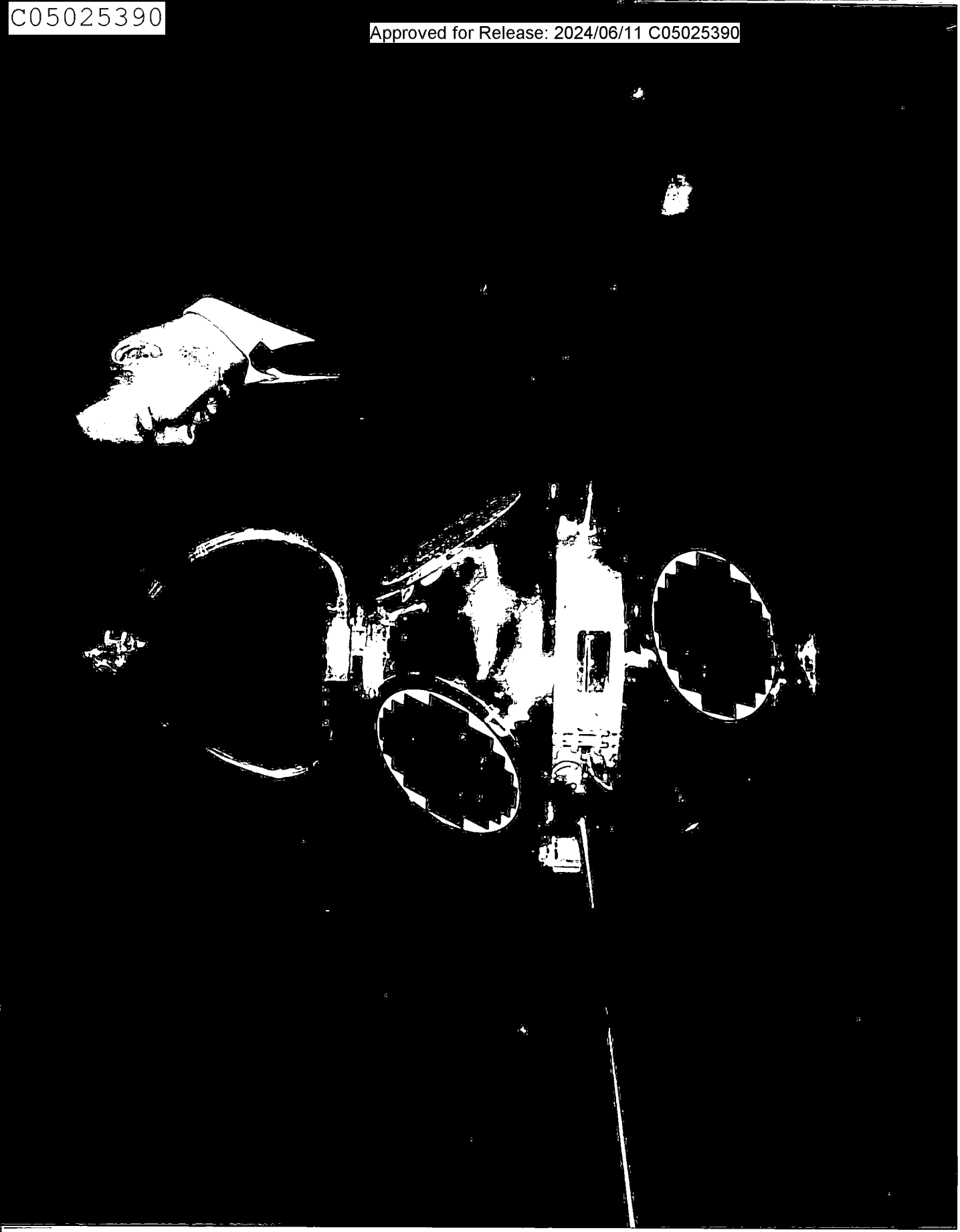


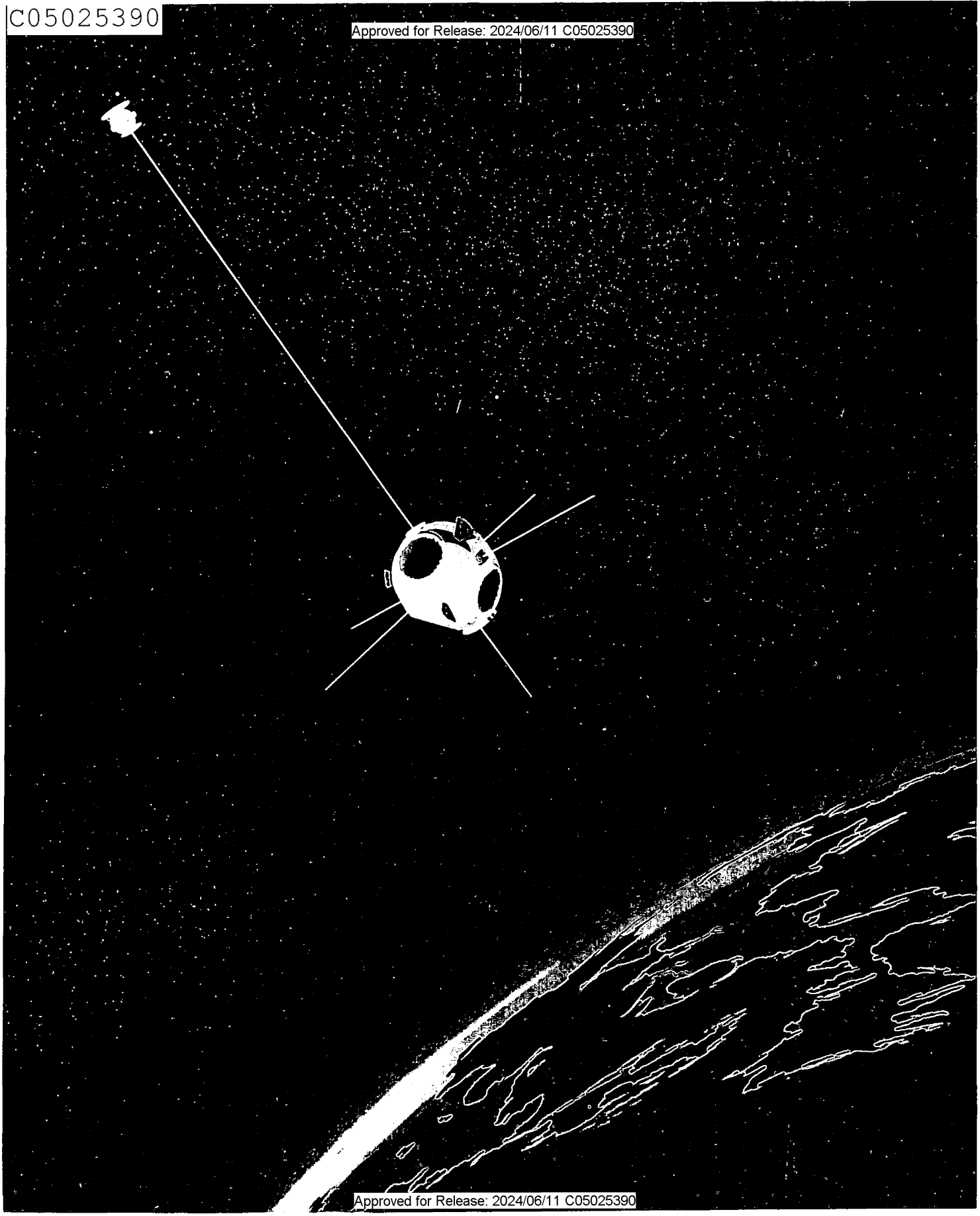
Hybla Valley
Sisc Zulu Ant
~1963-1965

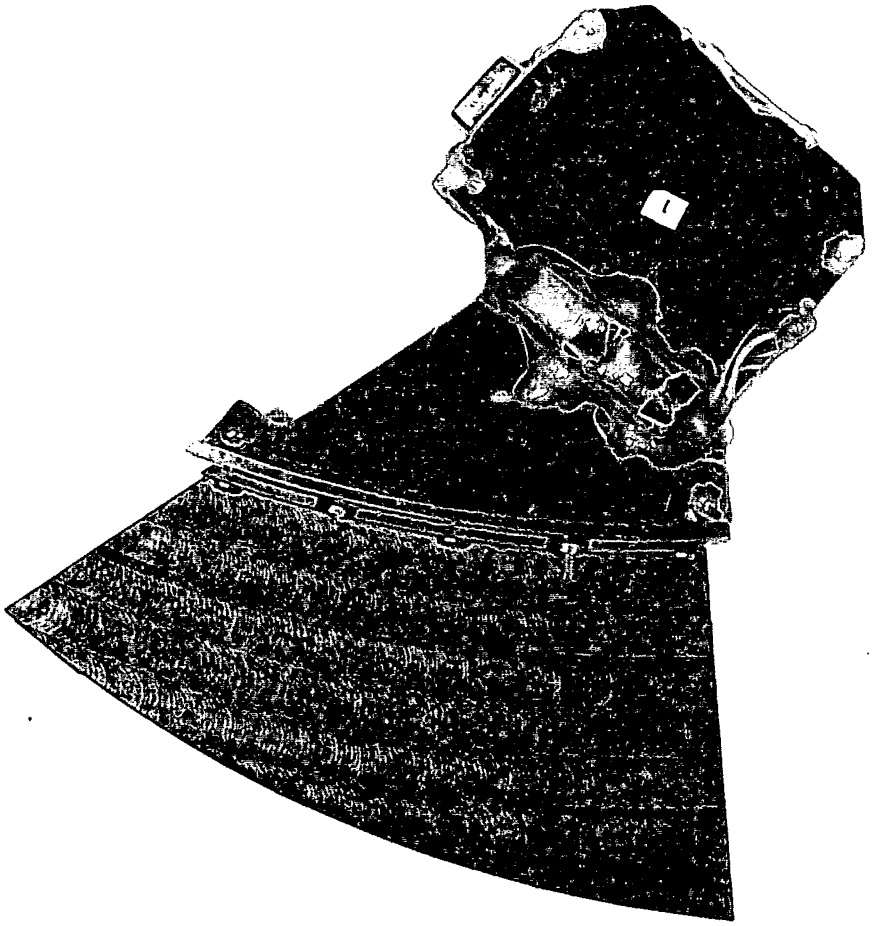
Reid D. Mayo
1963

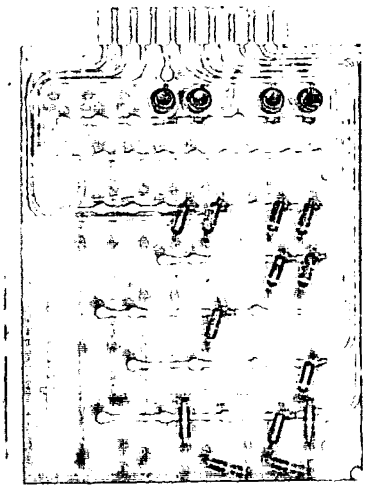
"For development of a new scientific method to secure critical military knowledge for the United States. This technical achievement has effected a major advancement in the operational capability of the Navy. By his intellectual and technical competence in the development of new concepts, and for his related contributions. . . Mr. Mayo has contributed immeasurably to the Navy's mission and objectives of the national defense program. His important contributions are of inestimable value to the Nation . . ."

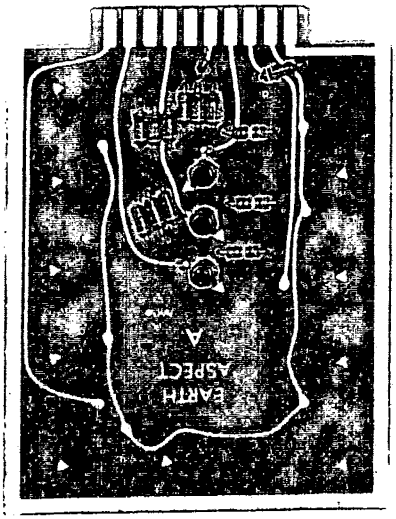


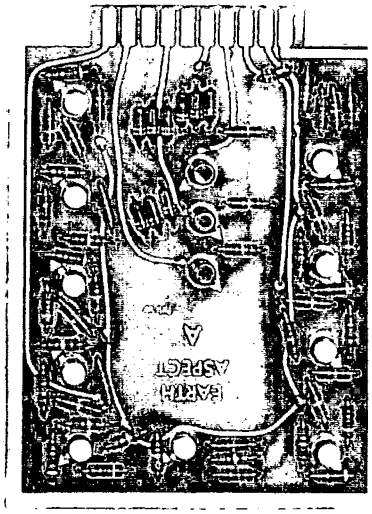












57303

GGSE-1

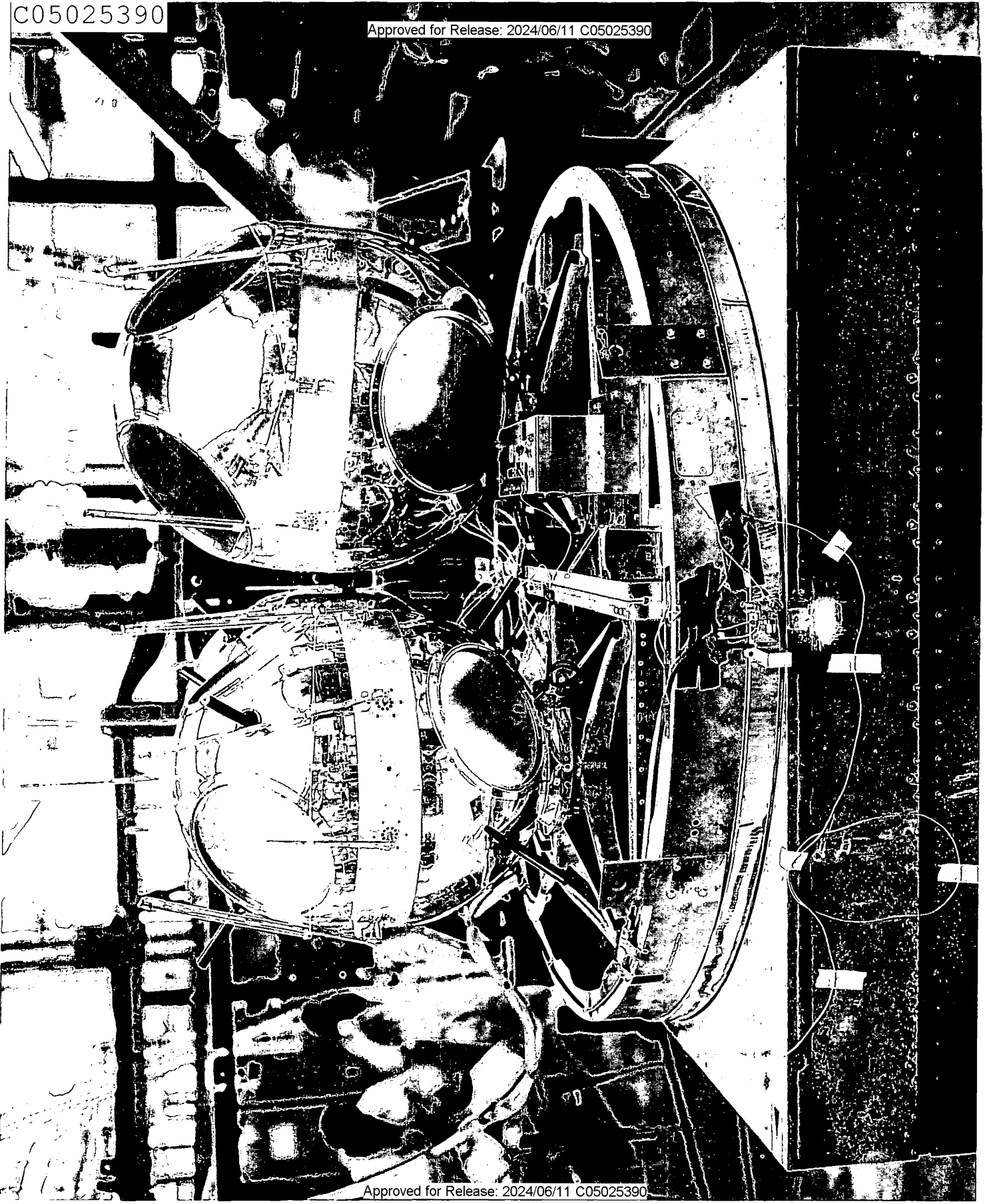
(GRAVITY GRADIENT STABILIZATION EXPERIMENT)

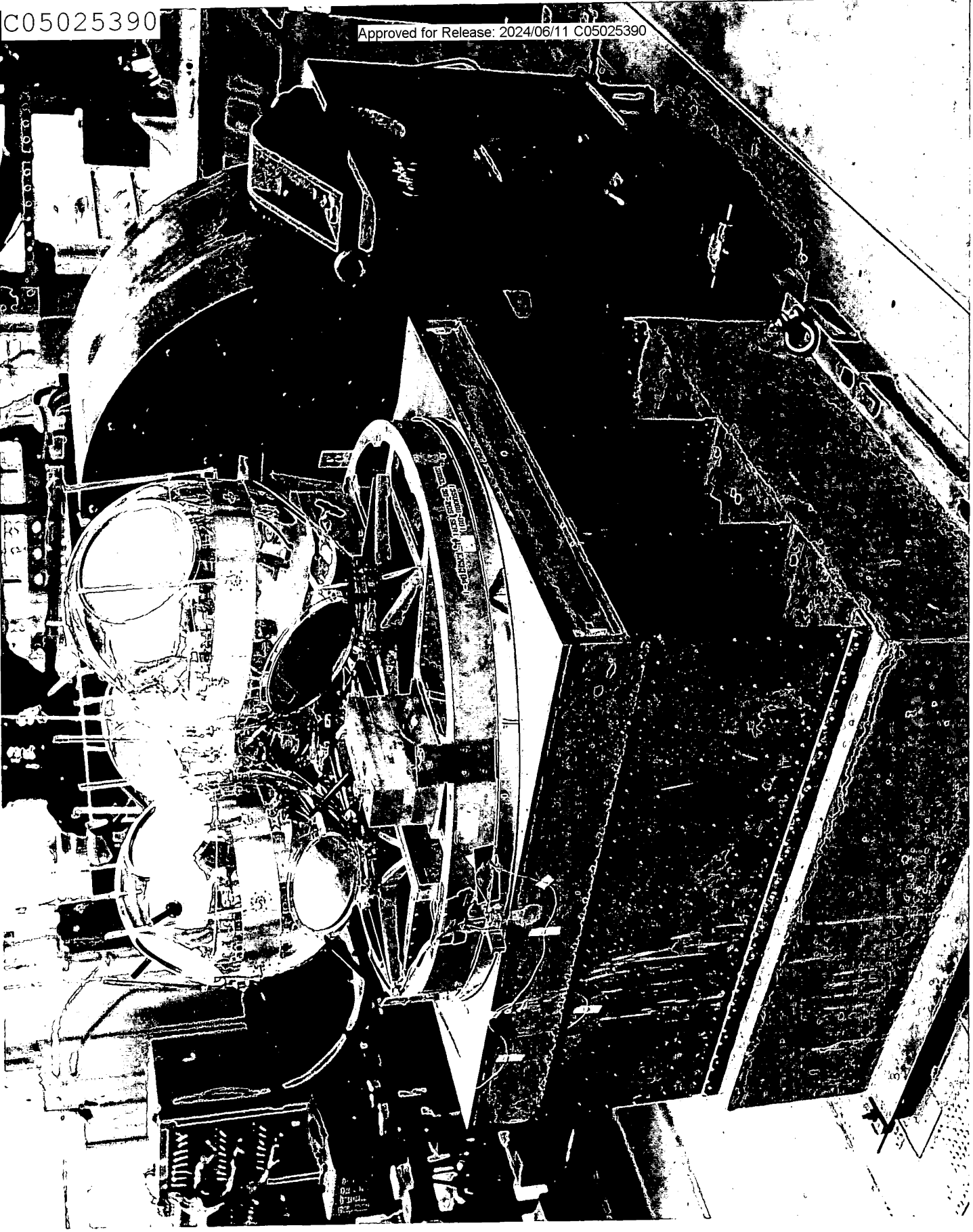
LAUNCHED 11 JANUARY 1964 . . . 84 LBS.

THE IMMEDIATE NEED FOR A SIMPLE, LOW COST, PASSIVE ATTITUDE CONTROL SYSTEM, CAPABLE OF ALIGNING A SATELLITE'S AXIS ALONG THE VERTICAL, PROMPTED NRL TO FLIGHT TEST SEVERAL SATELLITES HOUSING EXPERIMENTAL GRAVITY GRADIENT CONTROL SYSTEMS. MAJOR GOALS OF THE GRAVITY GRADIENT EXPERIMENTS WERE:

1. CONTROL OF SATELLITE BOOM-UP OR BOOM-DOWN POSITION.
2. DAMPING OF SATELLITE OSCILLATION.
3. REDUCTION OF SATELLITE TUMBLE.
4. CONTROL OF THE RATIO OF THE PITCH AND ROLL AXIS TO YAW AXIS MOMENT OF INERTIA.

ALL FOUR GOALS WERE REACHED BY THE NRL EXPERIMENTAL GRAVITY GRADIENT SATELLITES.





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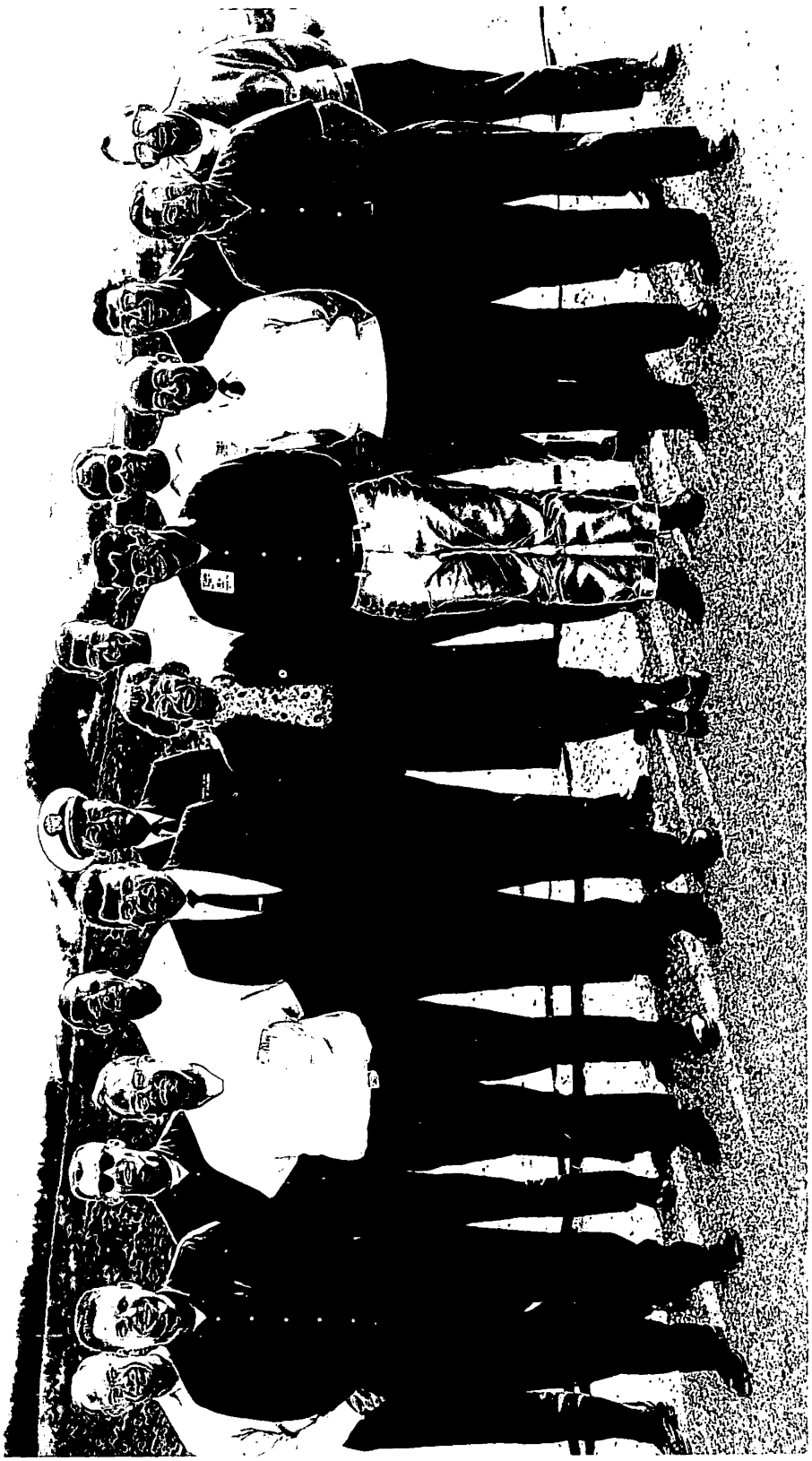
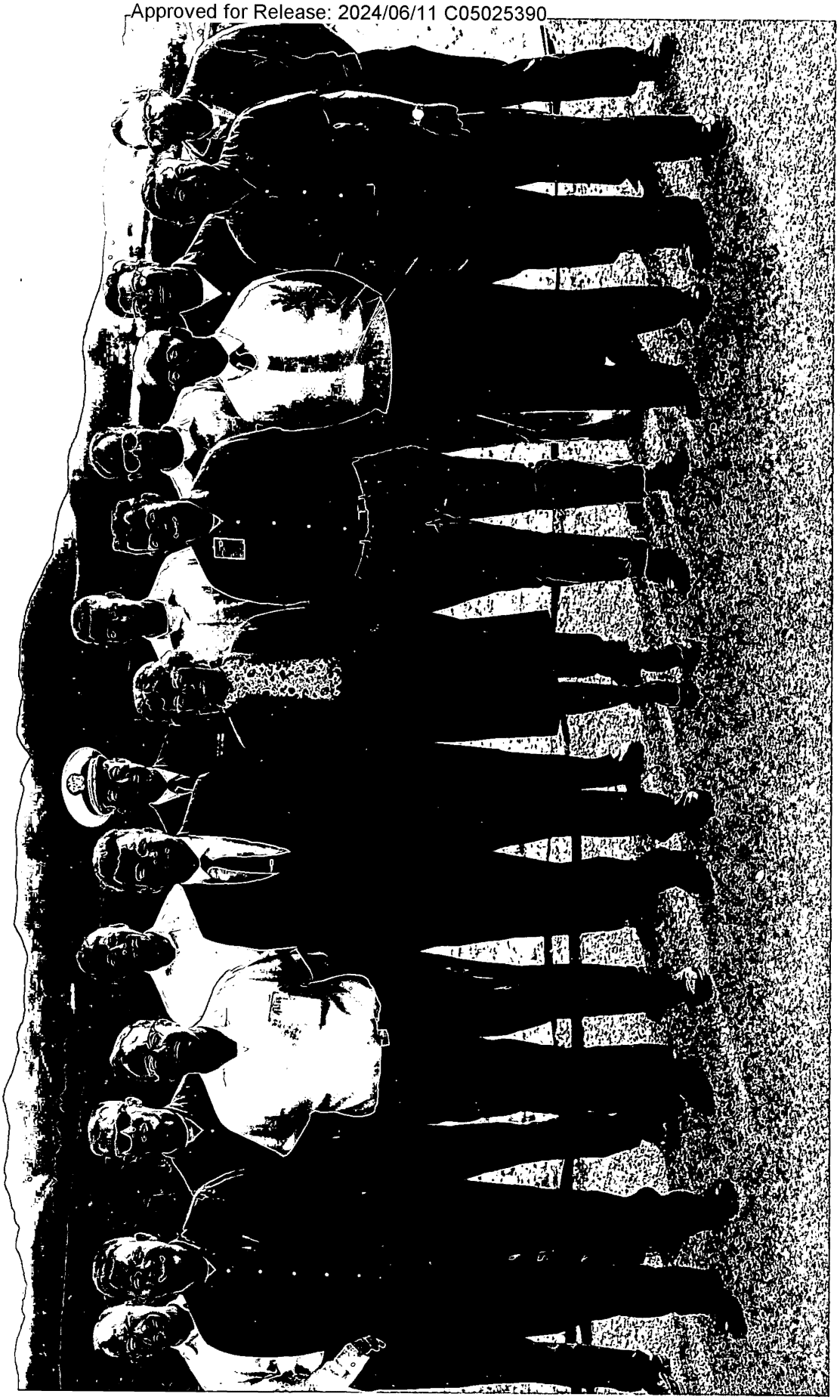




NRL LABSTRACTS

No. 9 U. S. NAVAL RESEARCH LABORATORY, WASHINGTON, D.C. Feb. 28, 1964

NRL "Watches" the Quiet Sun

A satellite to monitor solar x-ray emission, instrumented by scientists of the Naval Research Laboratory, was launched recently to inaugurate a continuous "watch on the sun" during the International Year of the Quiet Sun (IQSY), 1964-65.

The first signals from the new satellite show that the sun is now close to its minimum of activity, according to NRL Atmosphere and Astrophysics Division's scientists, Mr. Robert W. Kreplin, Dr. Talbot A. Chubb, and Dr. Herbert Friedman.

X-ray emission in the shortest wavelength band (2A to 8A) is already too faint to detect. At 10A the sun is only 1/50th as bright as at solar maximum, and at 50A only 1/10th as bright.

Solar x-rays and ultraviolet rays create the ionosphere, an electrified region at altitudes above 50 miles, which acts as a radio mirror and makes possible round-the-world short wave radio communication. Signals beamed from short wave transmitters bounce back and forth between the ground and the ionosphere, thereby following the curvature of the earth instead of escaping into space.

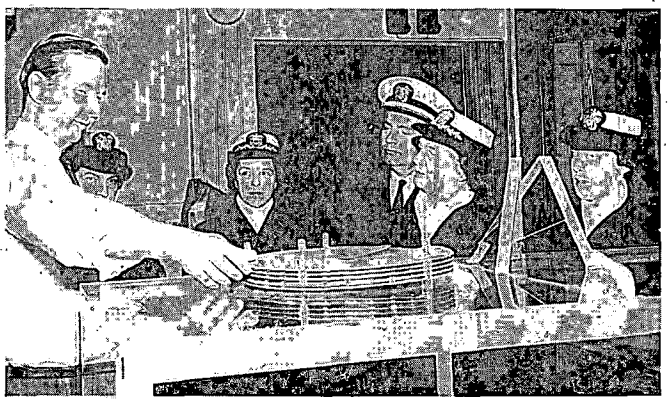
Because the sun is now entering its quietest phase, scientists are especially interested in determining its x-ray and ultraviolet brightness. The satellite data will establish the basic minimum flux of energy in the absence of all storminess in the solar atmosphere.

At times when the sun will become active this year, the disturbed centers should be isolated and relatively uncomplicated, permitting the satellite to record the behavior of individual storm centers. The few spectacular flare events that do occur during the IQSY period should present clean models of the basic flare process. This will be in contrast to the International Geophysical Year, in 1957-58, which was chosen to cover the period of maximum sunspot and storm activity, and which was marked throughout by a succession of overlapping storms that made it difficult to disentangle the individual phenomena.

The world-wide scientific interest in accurate monitoring of solar radiation is evidenced by the fact that observatories in Argentina, Canada, Czechoslovakia, Denmark, England, France, Germany, India, Ireland, Italy, Japan, The Netherlands, Scotland, and Sweden have prepared to utilize the continuous data transmissions from the NRL satellite. Signals reporting x-ray intensities can easily be followed for 10 to 20 minutes as the satellite passes within range of a ground station. Although no data storage is provided, widespread

(continued on page 2)

Director of the WAVES Visits NRL



On her recent visit to NRL, CAPT Sanders, the Director of the WAVES, learned of the many adventures into research in engineering and the physical sciences which are carried out here at NRL. In this photo Dr. R. T. Swim (far left) explains how NRL's high field electromagnets are constructed to (left to right) CWO Vanita Parrett, CDR Eleanor Casey, CAPT J. J. Santry, Jr., CAPT Viola Sanders, and ENS Georgia R. Prentice.

CAPT Viola Sanders, Director of the WAVES, paid an official visit to the Naval Research Laboratory Tuesday, February 18. This was the first such visit by the director of the women's branch of the Navy since World War II days. The visit by the head of the 5,000-member women's organization was planned to familiarize CAPT Sanders with the scope of the scientific work at the Laboratory.

While at the Laboratory, CAPT Sanders met with ENS Georgia R. Prentice, Communications Officer, and CWO Vanita Parrett, Disbursing Officer (CHSUP-CLK), who are the only WAVES now assigned to NRL.

Following a greeting by NRL's Director, CAPT B. F. Bennett, CAPT Sanders and her aide, CDR Eleanor Casey, were escorted on a tour of the Laboratory by NRL's Chief Staff Officer, CAPT J. J. Santry, Jr. During the tour, CAPT Sanders saw the Solid State Division's electromagnet, considered to be the world's most powerful; the Atmosphere and Astrophysics Division's work on the instrumentation of research rockets; the Applications Research Division's satellite detection devices; the Radiation Division's nuclear reactor; and many other wonders of engineering and the physical sciences that are here at NRL.

NRL "WATCHES" THE QUIET SUN

(continued from page 1)

coverage by the foreign observatories will add up to a substantial fraction of full-time monitoring.

At the present time, the new satellite is the only active solar monitor in orbit. It measures x-ray emission in five wavelength bands between 1 and 60 angstroms. Radiation in this range of wavelengths exerts a direct influence on the clarity of short wave radio communications. It is believed that the accumulation of monitored x-ray data will eventually lead to greatly improved accuracy in communications forecasts and possibly provide important clues to flare prediction.

NRL Exhibit in California

At the 5th National Convention on Military Electronics held February 5 to 7 in Los Angeles, California, NRL was represented by an exhibit prepared by NRL's Media Relations Branch, which touched on the highlights of the Laboratory's research program during the last four decades. Featured in the exhibit were two devices recently developed at NRL—the optimascope and the optical magnetometer.

The optimascope uses a cathode-ray tube that has been modified to combine the presentation of an optically projected image and the normal electron beam trace on the phosphor coating of the inner tube face. A system of small plane mirrors is employed in the neck of the tube and may be used to project images optically, photograph scope information, or do both simultaneously.

The optimascope may be used to:

Provide aircraft pilots with a radar tracking scope on which various optical images can be projected,

Display optical information with radar or sonar,

Project an optical picture of the visual space ahead of the aircraft into the face of a scope, enabling the pilot to see ahead while tracking the radar,

Project information from aircraft instruments,

Project moving pictures and other information on the optimascope for training purposes,

Record photographically a composite optical display.

The optical magnetometer is used to measure high magnetic fields and present the results at remote locations.

Chemistry Movies

March 4 and 6

The first in the series of chemistry films (schedule in LABSTRACTS No. 7) being presented by the Training Branch will be shown on March the 4th and 6th in the Auditorium of Building 28. Please be in the Auditorium by 11:00 a.m. so the films may begin promptly on the hour. The films to be presented the 4th and 6th are "Gases and How They Combine" and "Gas Pressure and Molecular Collisions."

George C. Pimentel of the University of California, Berkeley, is the collaborator on the film "Gases and How They Combine" which shows experimental evidence for Avogadro's hypothesis. The film initially demonstrates some of the properties that characterize gases. Then quantitative measurements are made to determine the volume of ammonia and hydrogen chloride that will chemically combine and the resultant ratio of 1.0 is noted. Similarly, simple integer volume ratios are found for the combination of hydrogen and oxygen, nitric oxide and oxygen, and for hydrogen and chlorine. These simple integer ratios of combination logically lead to Avogadro's hypothesis.

J. Arthur Campbell of Harvey Mudd College is the collaborator on the film "Gas Pressure and Molecular Collisions" which explores the relationship between gaseous pressure and molecular collisions. The effects of varying the number of molecules per unit of volume and of varying the temperature of the gas are studied. Then experimental studies are shown of the relative rates of effusion of hydrogen, oxygen, carbon dioxide, and sulfur hexafluoride which leads to the quantitative relationship between molecular weight, molecular velocity, and absolute temperature. Mechanical models are used to illustrate the experimental observations.

Toastmistress Club May Form

There is some indication of an interest in forming a Toastmistress Club at NRL. As you may guess, it is the ladies' counterpart of a Toastmasters Club of which there are now three at NRL. This is <u>not</u> for those ladies who are polished public speakers but rather for those who need to learn to speak before an audience but are now timid or unsure of themselves in front of a group. The meetings will probably be held at noon for one hour during which time lunch is eaten. This use of an hour once a week has the approval of management for those in jobs where speaking will increase their effectiveness. If you are interested, call Extension 2357 and leave your name, code, and extension or send a memo to Code 2020.

NRL Rec Club to Hold Spring Dance

Yes, the NRL Recreation Club will hold a spring dance on Saturday, April 11, from 9:00 p.m. to 1:00 p.m. The music will be by the "distinctive musical stylists," The Music Men. This is the fifteen piece band and vocalists you have probably heard on radio and seen on TV and at the highlight clubs around town. So reserve the evening of April 11 to dance.

Details concerning the spring dance will be published in future issues of LABSTRACTS.

Recent Publications About Engineers, Scientists, and Their Education

Those interested in trends in the scientific professions and preparation for them will find useful several reports which have been received in the Library and placed on the new book table. These are:

"The Engineer Today; the Supply, His Development, Needs, Status, and Treatment," which was prepared for Esso Research and Engineering Co. by New England Consultants, Inc., contains information obtained from various printed sources as well as interviews. The bibliography lists some 500 references.

"Two Years after the College Degree; Work and Further Study Patterns," a National Science Foundation publication, indicates the extent to which holders of baccalaureate degrees in different fields enroll for graduate study and relates fields of study to early occupations of graduates.

Another National Science Foundation publication, "Profiles of Manpower in Science and Technology," concisely presents data concerning fields of specialization, types of work, employment (by sector of economy), age, and geographical location.

"The Function of the Engineer and the Scientist" is a booklet published by the National Society of Professional Engineers, which gives information mainly in terms of definitions quoted from the officers of scientific organizations.

Publications for the Library

In the past the divisions have been sending their surplus journals (division copies) to the library to be sent to the U. S. Book Exchange (USBE). It would be appreciated if in the future a representative of the division would call the library (Mr. Briggles, Ext. 734, or Miss Morgan, Ext. 2357) before sending the surplus journals.

Bloodmobile Visit March 6

The Red Cross Bloodmobile Unit will make its 64th visit to NRL on March 6. The Unit will be at Building 52 between 10:00 a.m. and 2:30 p.m.

Call for Papers

19th Annual Conference of the Instrument Society of America, October 12-15, 1964, New York, New York. Deadline date: Abstract by March 31, 1964.

WESCON (Western Electronics Show & Convention and IEEE Summer General Meeting), August 25-28, 1964, Los Angeles, California. Deadline date: Abstract and summary by April 15, 1964.

13th Annual Conference on Application of X-Ray Analysis, August 12-14, 1964, Albany Hotel, Denver, Colo. Deadline date: Title and abstract by April 15, 1964.

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Announcing the Spring 1964 NRL Fund Raising Campaign

Concurrent campaigns for the recognized National Health Agencies and Federal Service Joint Crusade for the International Agencies will be conducted March 2 through April 15, 1964, at NRL for the eighth consecutive year.

Our late President, John F. Kennedy, in memoranda to heads of all Executive Departments and Agencies, urged all Federal personnel, military and civilian, to give generously to the forthcoming campaigns. Through support of the Health Agencies we help in the struggle for the eradication of disease, the prolonging of life, and the enjoyment of better health for all mankind. The International Agencies enable us personally to share in the alleviation of human suffering throughout the world. All NRL personnel are urged to support these campaigns generously.

Your keyman will visit you soon to answer your questions and to pick up your gift.

Health Movies to be Shown the 5th, March 5

"Working for Better Health" and "The Strongest Bridge in the World" are two movies which will be shown on March 5 in the Auditorium of Building 28. These movies, produced respectively by the National Health Agencies and the Joint Crusade, have a viewing time of a half hour and will be shown continuously from 11 a.m. to 1 p.m.

Tours to Europe and Middle East

The Navy Department Recreation Council is sponsoring three all-expense tours of Western Europe, Spain-Portugal, and the Middle East. The complete tours will cost $789, $898, and $1290, respectively. All tours will leave Washington's Dulles Airport on July 24, 1964, and will return on August 21, 1964. Transatlantic travel will be via chartered 707 jet aircraft, nonstop to London and returning nonstop from Paris. A limited number of seats will be available (at $290 for the round trip) for those wishing to take the flight alone, without the tour. The flight and tours are open to employees and military personnel assigned to the Navy Department in the Washington area (including NRL), and their family dependents. For application forms and copies of the itineraries, call Art Nehman, Code 11, Extension 64700, or Chick Czajkowski, Code 11, Extension 65615.

Transportation Exchange

Rides Wanted

Geraldine Cooper, Ext. 680
3911 Kansas Ave., N.W.
Hours: 8:00 to 4:30

Bernice Scoville, Ext. 2200
1608 Trinidad Ave., N.E.
Hours: 7:45 to 4:15 or
8:00 to 4:30

Join or Form Car Pool

June Silverman
Ext. 2200
College Avenue
College Park, Md.
Hours: 8:00 to 4:30

Performance Rating Act

Navy Civilian Personnel Instruction 430 is the plan established by the Navy Department for appraising and rating the performance of most graded and ungraded civilian employees of the Navy. This plan has been approved by the Civil Service Commission as required by the Performance Rating Act of 1950.

This plan provides that appraisals of employee performance will be made and used as a part of the regular day-by-day supervisory processes. Such performance appraisals are not ordinarily written, but are the appraisals that are made in the minds of the supervisors as they oversee the performance of the work.

The major objectives of this performance appraisal program are: (1) to increase the effectiveness of supervision through the continuous, constructive use of performance appraisals in the regular supervisory processes; (2) to improve the effectiveness of all employees in the performance of their work; and (3) to improve the efficiency and economy of the service through the improvement of performance of both supervisory and nonsupervisory employees.

Under this program you will be kept advised of the accomplishments that are properly expected of you, and you will be currently informed of the extent to which you are meeting, falling short of, or exceeding the requirements properly expected. You will also be given appropriate supervisory assistance, consistent with your needs as shown by the current appraisals of your performance. In addition, your supervisor will endeavor to provide you appropriate recognition for your accomplishments through all available means. Also, he will endeavor to give you all proper incentives to do the best work of which you are capable. It is desirable that you and he work together as a team to your mutual advantage in accomplishing the work for which your jobs have been established in the organization.

At annual dates scheduled by the activity in which you are employed, you will be given official performance ratings, of which you will be promptly notified. These ratings will be recorded, and will be indicative of your value on your job. They will help to determine certain of your rights and opportunities as an employee. They will be based upon the continuing appraisals of your performance in relation to the performance requirements of your job.

The performance ratings will be "Outstanding," "Satisfactory," or "Unsatisfactory," and may contain written appraisals of your work performance on the rating factors of "Adaptability," "Quantity of Work," and "Quality of Work," and on the various tasks you have performed. The Performance Rating Act of 1950 provides that an "Outstanding" rating shall be given "only when all aspects of performance not only exceed normal requirements but are outstanding and deserve special commendation." No employee can be rated "Unsatisfactory" unless he has been given a prior ninety-day warning in writing that his performance is unsatisfactory, and given assistance during the ninety-day period to bring his performance up to the satisfactory level.

(continued in column 2)

NRL's Merit Promotion Program

The NRL Merit Promotion Program was announced and published (NRLINST 12340.3A) as required by the U. S. Civil Service Commission Regulations. The program in its present form has been in existence with only minor changes for approximately five years. During this time, it has met the requirements of the Civil Service Regulations and has been generally accepted by NRL employees. A recent issue of the Federal Personnel Manual stated:

> "Employees should be made aware that the Merit Promotion Program does not guarantee that every employee gets a promotion, but that it does give them an opportunity for fair consideration under their agencies' specific guidelines and plans. They should be informed of the Commission's desire that concurrent consideration be given to persons outside the agency and that employee rights are not infringed upon when the agency fills a vacancy by action other than promotion."

Employees should understand that while referral to the selecting official under the Merit Promotion Program assures that the employee receives consideration for the vacancy, it does not guarantee his selection, and it is still possible that the position may be filled from outside NRL by the selection of someone considered to be better qualified.

PERFORMANCE RATING ACT

(continued from column 1)

You have the right to appeal your official performance ratings of "Satisfactory" or "Unsatisfactory" if you believe they are incorrect in any respect. An "Unsatisfactory" rating may be appealed to either the Performance Rating Board of the activity where you were rated, or directly to the statutory Board of Review; or it may be appealed first to the Performance Rating Board and further appealed to the statutory Board of Review. A "Satisfactory" rating may be appealed to either the Performance Rating Board or the statutory Board of Review but not to both. The statutory Board of Review will consider only cases where you believe the adjective rating to be wrong; whereas the Performance Rating Board of your activity will consider any correction that you believe should be made. You may appeal within 30 days after receiving notice of your rating, and the further appeal to the statutory Board may be made within 30 days after receiving notice of the decision on your initial appeal; or if you withdraw your appeal to the Performance Rating Board you may still appeal to the statutory Board of Review within 10 days after the withdrawal even though more than 30 days have elapsed since you received notice of your rating.

A copy of Navy Civilian Personnel Instruction 430 is available for your examination and study in the Library of Building 43. The Employee Relations Branch of the Personnel Division is prepared to answer any questions you may have regarding the Performance Rating Program.