SATELLITE EXTRA ★★★★★★

The Huntsville Times

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Jupiter-C Puts Up Moon

Wail Of Sirens Brings In Era On Space Here

Thousands Gather On The Square For Noisy Success Demonstration

By ALEX THOMAS
Of The Times Staff

The wail of sirens, blasting horns and the fiery trails of store-bought rockets ushered in the country's first step toward the conquest of space at Huntsville last night.

Less than an hour after a Jupiter-C missile built at Huntsville hurled America's first satellite into an orbit around the earth's surface, the ear-splitting whine of dozens of sirens told local people of the Army Ballistic Missile Agency's success.

Success was sweet, but it came after several years of frustration, setbacks and delays before the Army and its Redstone Arsenal scientists were allowed to prove themselves.

As thousands of people gathered on the Courthouse Square, the one generally held responsible for much of the Army's troubles—former secretary of Defense Charles E. Wilson—was burned in effigy, while thousands cheered and waved American and Confederate flags.

The din grew louder on the Square as word spread of the satellite's success. People crowded to the center of town from outlying areas and distant towns.

Placards proclaiming "Move Over Sputnik," "Our Missiles Never Miss" and "We Dood It" appeared in the crowd and waved above the mass of people. The sound of sirens and tooting horns were punctuated by the streak of skyrockets and exploding firecrackers.

"The South did rise again," a voice shouted above the racket. The chant was taken up and spread through the crowd before dissipating into "War Eagle" cheers.

I'd like to have the concession for recharging all these batteries," a wag shouted aloud to friends as the roar of horns rose in the Square.

As in all crowds, there were those who wondered what the confusion was about. "What's going on here?" a puzzled visitor asked a man waving a placard." "The satellite's up,' he was told. The man shook his head and walked away.

"He thinks a satellite is something a farmer hangs from his horse's saddle," another voice said.

The 40 & 8's fire engine raced onto the Square with tooting horns, transporting dozens of people. They shouted and waved as the engine pulled out to circle the block.

Huntsville representatives at Decatur's annual Chamber of Commerce banquet left in a rush and headed back to Huntsville followed by a sizeable convoy of Decatur residents. Other cars lining the Square bore license plates from Limestone, Marshall and Morgan counties.

The nation's press took immediate notice of the celebration going on in the streets of Huntsville. A Times reporter spent more than an hour on a telephone in a restaurant on the Square relaying details of the celebration to The Associated Press, United Press and International News Service.

Representatives of Life magazine mingled with the crowds along with newsmen from area newspapers.

At midnight, the wire service flashed the news that official Washington announcements revealed that the Explorer, the nation's first satellite, was circling the earth.

This news had no effect here, for it was reliably known that the satellite was in orbit before Mayor R. B. Searcy ordered the City's sirens into action at 11 p.m.

According to unofficial reports, top officials and scientists were expected to return here early this morning from Cape Canaveral, Fla.

Tentatively, a more formal recognition of the Jupiter-C's success—perhaps a parade—is being planned sometime Monday. After 2 a.m., as this is being written, no official decision has been announced about the continued celebration.

9 Labs Here Aided Project Of Launching

It Took Every One To Successfully Put Up Moon Vehicle

The concerted efforts of all laboratory facilities of the Army Ballistic Missile Agency, lie behind the Army's successful launching of a scientific earth satellite.

Each of the agency's nine labs, which comprise the Development Operations Division, had a share in the integrated teamwork that led to the development and firing of the rocket. Dr. Wernher von Braun is director of Development Operations.

The satellite project, assigned to the Army, was a joint undertaking of the Army Ballistic Missile Agency and the Jet Propulsion Laboratory. ABMA supplied the main stage of the rocket (a modification of the Jupiter C), and JPL furnished the upper stages assembly, plus the satellite vehicle.

Responsibility for the preliminary design, and the later detailed structural, propulsion and mechanical design of the vehicle, was assigned to the ABMA Structures and Mechanics Laboratory. This included, among other things, increasing the size of the thrust unit while reducing tank skin thickness; modifying the thrust unit to accommodate the use of a special fuel; and develpoment of a system to accomplish separation of the thrust unit and instrument compartment. The lab also designed and developed the spin launchers for the JPL upper stages. Spinning the upper stages by means of electrical motors provided a stabilization similar to that of a rifle bullet.

Structures and Mechanics, in addition, was responsible for technical coordination with JPL, and was the project engineering unit within Development Operations.

The Aeroballistics Lab had charge of the flight performance and aerodynamic problems. In particular, this lab and JPL studied the feasibility of the project in its beginning. Aeroballistics Lab planned the ascending trajectory and established the exact flight data for the firing, including the possible pattern of expected largest deviations. The Lab's duties also included responsibility for the aerodynamic behavior of

Turn To Page 2, Column 7

Satellite Gets Official Name; It's 'Explorer'

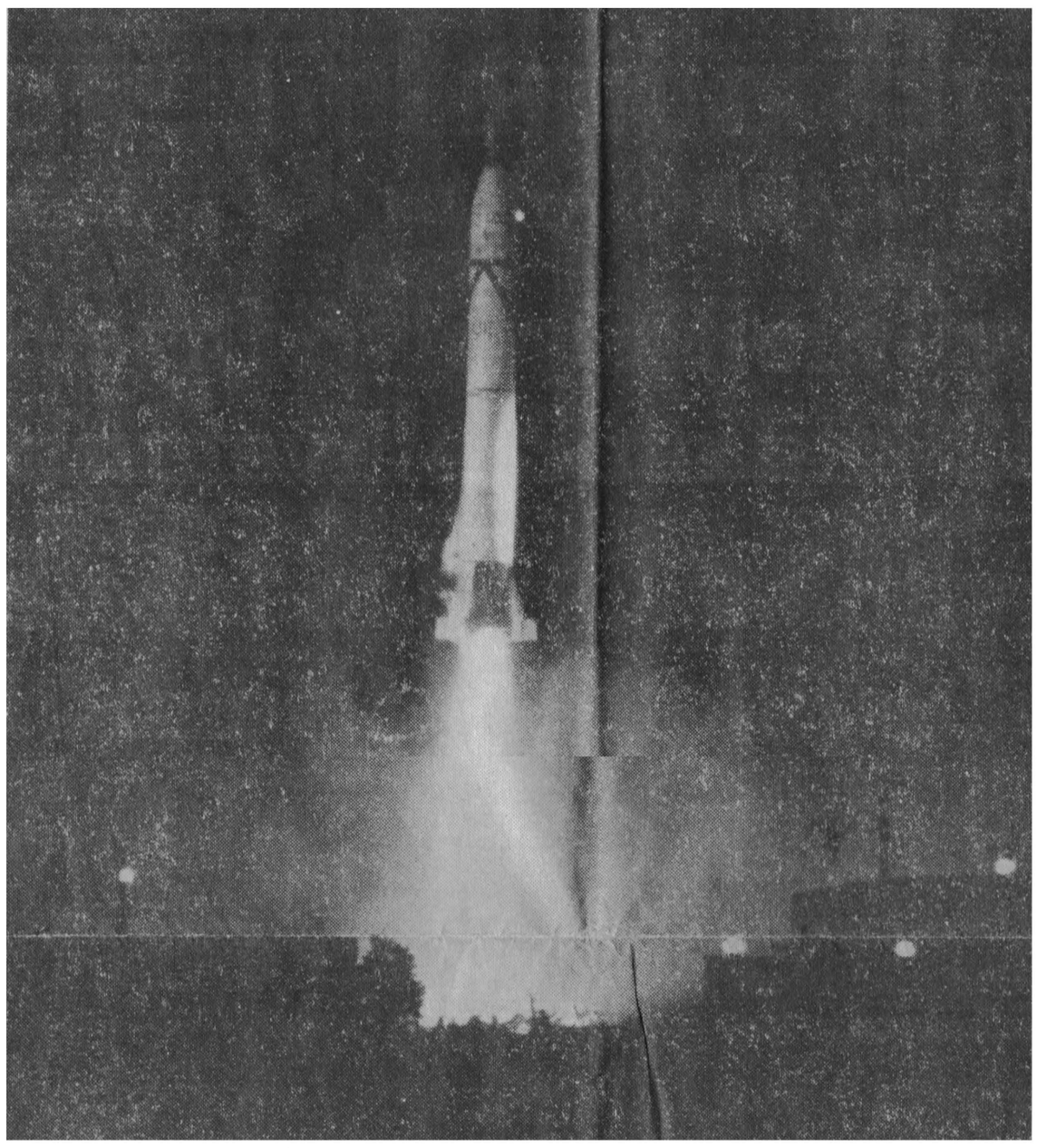
WASHINGTON, Jan. 31 (AP)—The American earth satellite shot into the heavens at Cape Canaveral, Fla., tonight was christened Explorer by the Defense Department.

The name was announced by officials at the Pentagon shortly after the launching of the Jupiter-C rocket carrying the satellite.

In announcing the name, officials emphasized they did not yet know whether the satellite had actually gone into orbit.

Shortly after the launching, Secretary of the Army Brucker sent word to President Eisenhower at Augusta, Ga., of the successful firing.

Eisenhower Officially Announces Huntsville Satellite Circles Globe



JUPITER-C IN TAKEOFF—The Jupiter-C rocket is shown at the moment of takeoff from Cape Canaveral, Fla. At the left is the missile service tower. (AP Wirephoto).

Here Are The Basic Facts

Weight of satellite proper—18.13 pounds.
Weight of final stage—12.67 (after burnout).
Total weight orbiting—30.80 pounds.

The Army satellite was launched by direction of the Department of Defense as a part of America's contribution to the International Geophysical Year scientific research program. Within the Army, the project was undertaken jointly by the Army Ballistic Missile Agency and the Jet Propulsion Laboratory. The satellite was launched by the modified Jupiter-C missile, which is an Army vehicle developed for nose cone re-entry tests.

Instrumentation and telemetry in the satellite is gathering and transmitting four types of information.

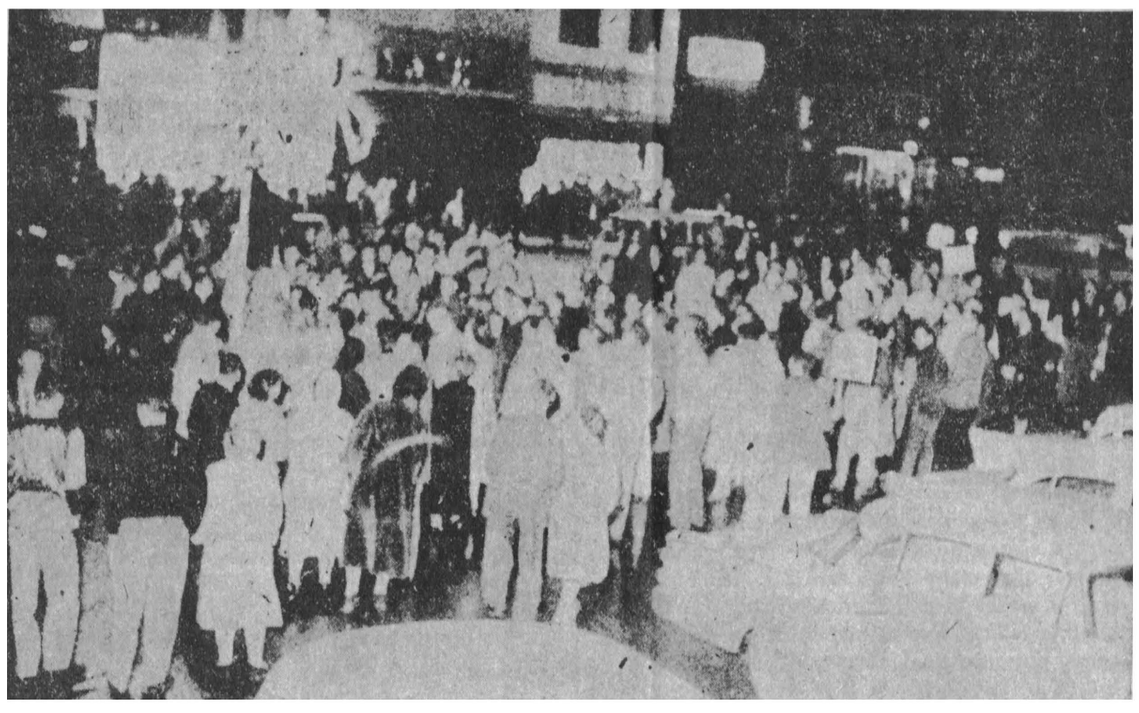
These are: skin temperature (i.e., surface of the projectile), internal temperature, cosmic dust erosion and cosmic ray data. The main part of the package is a cosmic radiation experiment designed by Dr. James A. Van Allen of the State University of Iowa. The major element of this experiment is a Geiger counter.

The data gathered by the instruments is continuously dispatched by two transmitters.

The most powerful transmitter operates on 108.03 megacycles, transmitting with 60 milliwatts, or six hundredths of a watt. This signal can be readily received by ham radio operators. It is expected that this transmitter, the more powerful one, will operate for a period of two to three weeks.

Second of the transmitters is operating on 108.00

Turn To Page 2, Column 3



THOUSANDS THRONG THE SQUARE—Here are some of the thousands of persons who crowded into the Square in downtown Huntsville about 11 o'clock last night after word was received that the Army missile team from Huntsville had orbited the nation's first earth satellite. Screeching sirens, whistles and horns proclaimed the news.

Weather Change Sped Launching

AUGUSTA, Ga., Feb. 1 (AP)—President Eisenhower announced early today America's first satellite is in orbit around the earth.

The President's dramatic announcement was issued at his vacation headquarters a few minutes before 1 a.m. EST by White House press secretary James C. Hagerty.

The satellite was launched at Cape Canaveral, Fla., at 10:48 p.m., EST, last night.

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The baby moon was rammed into space by an Army Jupiter-C rocket.

With thousands of other Americans all over the country, Eisenhower waited about two hours after the launching for word the satellite was in orbit.

* * *

The text of the President's statement:

"Dr. J. Wallace Joyce, head of the International Geophysical Year office of National Science Foundation, has just informed me that the United States has successfully placed a scientific earth satellite in orbit around the earth.

The satellite was orbited by a modified Jupiter-C rocket.

This launching is part of our country's participation in the International Geophysical Year. All information received from this satellite promptly will be made available to the scientific community of the world."

The three paragraphs constituted the President's official announcement.

Eisenhower was kept closely posted regarding the launching preparations and the actual firing from late yesterday afternoon until word of the orbiting was received here.

* * *

Eisenhower flew here from Washington this afternoon for a weekend of golf and relaxation. It was his first time on a golf course since he suffered a stroke Nov. 25. He played 15 holes and reported he enjoyed it very much.

As a former five-star general and an Army man for 40 years, Eisenhower was even more deeply interested in the satellite launching than otherwise would have been the case.

The Navy a few days ago had to give up temporarily in its efforts to launch a Vanguard test satellite. Its first effort Dec. 6 failed.

At the Augusta National Golf Club, the President's weekend headquarters, the chief executive was kept informed regarding steps leading to the Jupiter launching.

* * *

Word when he left Washington had been the Army probably would not make another launching attempt until early next week. But weather and wind conditions at Cape Canaveral improved unexpectedly and Eisenhower was advised late yesterday afternoon that there might be a launching during the night after all.

When the launching did come at 10:48 p.m., EST Eisenhower personally got on the telephone to Washington — on a line which had been open and manned by Hagerty for some time — and received reports on the flight progress of the Jupiter-C.

A word picture of that progress into space was relayed to the President from Cape Canaveral by way of the White House and the Pentagon.

Those reports were made every 20 to 25 seconds during the first few minutes of the flight. Eisenhower was on the phone for slightly more than 10 minutes.

* * *

Here is Hagerty's version of how the word came to the President:

At 5:30 p.m. EST yesterday, Brig. Gen. Andrew J. Goodpaster, White House staff secretary and liaison man with the Pentagon, phoned from Washington and reported the weather at Canaveral was improving. He said it looked then as though the Jupiter-C rocket could be fired during the evening. The firing target time at that point was 10:34 p.m.

That message was relayed to Eisenhower who had just come off the golf course and had settled

Turn To Page 3 Column 6

Army Reveals Second Moon Is Scheduled

70-Foot Carrier Roars Into Starry Night At Cape Canaveral

CAPE CANAVERAL, Fla. (AP)—The United States' first man-made satellite whirled around the earth today and the Army disclosed it is preparing to hurl another into orbit.

It was the Army's Jupiter-C missile that fired a 30.8-pound moon aloft last night; recovering some of the U.S. prestige lost wh Russia boosted her two Sputniks into space last fall.

Eisenhower exclaimed when news of the Army's success reached him at Augusta, Ga., where he had gone for a weekend of relaxation.

With a huge burst of flame and a thunderous rorar that could be heard for miles along Florida's east coast, the Jupiter-C blasted off from this top-secret firing base at 10:48 p.m. (EST) yesterday.

About an hour and three-quarters later, its satellite had completed its first journey around the world and tracking stations were receiving its radio signals.

It was so well established in orbit, said Maj. Gen. John B. Medaris, head of the Army's missile test program, that it will remain aloft from 2 to 10 years.

It is unlikely the Army's satellite will be visible to the naked eye. In an announcement, the Army said: "It will appear in its orbit with about the brilliance of a one-fifth to one-sixth magnitude star, and a star of this brightness can barely be seen without some magnification."

There was confusion in early reports about the altitude of the satellite. Medaris said the distance from the earth in its eliptical orbit would range between 185 and 1,230 miles. Dr. Wernher von Braun, designed of the rocket, said it would swing as high as 2,000 miles and as low as 230.

Von Braun said the 6-foot-long

Turn To Page 2, Column 8

Launching Hits ABMA Birth Eve

The successful launching of ABMA's Jupiter-C and its now orbiting Explorer satellite came appropriately on the eve of the second birthday of the missile agency.

Although the previously planned anniversary program began yesterday at 4 p.m., the Army moon carrier and its passenger satellite certainly will now be the highlight event.

Established on Feb. 1, 1956, ABMA will open its birthday program this morning at 9 a.m. with a parade.

Maj. Gen. J. B. Medaris, ABMA commanding general, will arrive at the Redstone Arsenal airstrip at 8:30 a.m. today and proceed directly to the birthday parade, despite his strenuous evening yesterday.

Included in the overall program will be exhibits of missile guidance equipment, communications equipment, models of missiles and demonstrations of agency activities.

Satellite Will Provide Much Scientific Data

Here Are A Few Of Moon's Uses

Orb's Weight Given As 30.80 Pounds

The U. S. scientific earth satellite launched by the Army from Cape Canaveral, Fla. last night wiill provide basic scientific data of great value in man's effort to understand the earth and its enviroment, according to Maj. Gen. J. B. Medaris,

The satelljite launching was assigned to the Army by the Department of Defense Nov. 8, 1957. It is a joint undertaking of the ABMA and the Jet Propulsion Laboratory of California Institute of Technology.

The State University of Iowa, represented by Dr. James A. Van Allen, furnished instrumentation to collect cosmic ray measurements.

The launching vehicle was redesigned from the Jupiter C reentry test vehicle developed by the Missile Agency and JPL.

Telemetered information from the satellite, which is 80 inches long and weighs about 30.80 pounds in its cylindrical shell casing, was being received even before it left the launching pad at the Missile Test Center.

Two miniaturized radio transmitters in the forward part of the satellite provide much scientific information which will add to man's knowledge of the earth and its enviroment, Dr. Pickering reported. It will also help to improve further satellite designs.

The total electronic payload weighs 11 pounds. Total payload weight, including structure and antennae, is 18.13 pounds. Total weight of the orbiting satellite is 30.8 pounds.

Each of the transmitters telemeters information to ground stations located around the world.

The first transmitter is sending data on the skin temperature of the rear area of the satellite, internal temperature, micrometeorite impact, and cosmic ray counts.

The low power tranmitter sends information on the skin temperature of the satellite forward area, the nose cone temperature, micrometeorite impact, and cosmic ray counts.

Information on the low power frequency will be received on 108 megacycles. The high power transmitter broadcasts on 108.03 megacycles. The low power transmitter is expected to transmit data for two to three months; the high power transmitter for two weeks.

Both transmitters are independent, from batteries to antenna, to insure reliability in the event of accident or malfunction of an essential part.

All of the instrumentation including the sensing devices was designed and installed in such manner as to withstand the tremendous shock and vibration that occurred during the powered phase of the launch. It is estimated this was equivalent to a force of 100 gravities.

During the power phase of the launch, a temperature sensing instrument inside the nose cone tip telemetered information to ground stations on the aerodynamic heating of the nose cone. This information came in via the low power transmitter.

"This temperature," said Dr. Pickering, "is difficult to determine analytically, but the range of heating is extremely important to provide launch design information for future satellites of space vehicles."

"The exterior shell and internal temperatures are instrumented to provide data on primary environment and effectiveness of head insulation techniques," Dr. Pickering said, "These data will be compared with calculated shell temperatures and experimentally determined internal temperatures to improve satellite design."

The satellite is at nature's mercy outside the earth's atmosphere. When it is on the dark side of the earth, it radiates heat to the coldness of empty space. When it is on the sun side of earth, it absorbs heat at a high rate. As a result, the temperature of the satellite can fluctuate widely.

JPL scientists tried to control this wide temperature range to some degree by coating the instruments section and the nose cone with stripes of aluminum oxide.

The forward section of the satellite is partially covered by eight equally spaced stripes of aluminum oxide and each is one-quarter inch in width. The striping is expected to keep the temperature range within a reasonable figure to project the sensitive electronic components carried on board the satellite.

Calculations by Dr. Van Allen indicated the external skin temperature might range from 70 degrees below zero Fahrenheit to 100 degrees above. The insulation is expected to reduce these limits inside the satellite to approximately 40 and 70 degrees.

Sensors for these temperatures are located in the following places: internal temperature of instrument section, at the aft end of the high power transmitter; skin temperature No. 1, at the fiberglass ring between the instrument section and the final stage motor; skin temperature No. 2, at the fiberglass ring between the instrument section and nose cone.

The other telemetered data includes cosmic ray counts of heavy primary cosmic rays as they occur above the earth's atmosphere, and information on the distribution, density and relative momentum of micrometeorites in space.

In addition to collecting information on the rate and density of tiny particulate bits of meteors in space, the satellite is equipped to detect the abrasive effect of dust-like clouds of micrometeorite particles which have a sand blast effect. For this dual task the satellite carries two sets of instrumentation.

An erosion gauge is located near the aft end of the final stage motor. It contains a wire grid made up of 12 wires arranged in parallel.

If the satellite runs into a sand blasting cloud of micrometeorite matter, the wire grid will undergo erosion from the abrasive effect so the wires may be cut. As each grid is severed, there will be a small increase in frequency in the low power transmitter, indicating a micrometeorite five microns in size or larger.

In addition to the wire grid, the satellite carries an impact microphone with amplifier and scaler. The microphone is in spring contact with the outer shell of the satellite. When a particle of sufficient size and momentum impacts against the shell, the amplified pulse will actuate the scaler.

The output of this scaler controls the frequency of one telemeter channel of the Minitrack transmitter so that when the frequency changes from low to high in the band, it will mean the satellite encountered a large particle.

When the frequency changes from high to low, the satellite will have encountered a large or small particle. Analysis of relative times in the high and low states will indicate the relative size distribution of the micrometeorites. Estimate of the absolute size and momentum of the particles will be made by calibrations selected prior to the launching.

This experiment is being performed in cooperation with the Air Force Cambridge Research Center.

The continuous cosmic ray count will be measured and telemetered simultaneously by both transmitters. Total count of cosmic rays hitting the satellite Geiger-Mueller tube has been scaled down to 32 so that each unit of 32 cosmic rays will cause a step change in frequency in the instrumentation.

The average counting rate expected will produce approximately 32 pulses per second which will cause a frequency change once each second. On this basis, the system is capable of transmitting cosmic ray information at 40 times the normal rate if such activity comes during intense solar or magnetic storms.

In addition to information received directly from the satellite through its instruments, the vehicle also will provide basis scientific information simply by being in orbit.

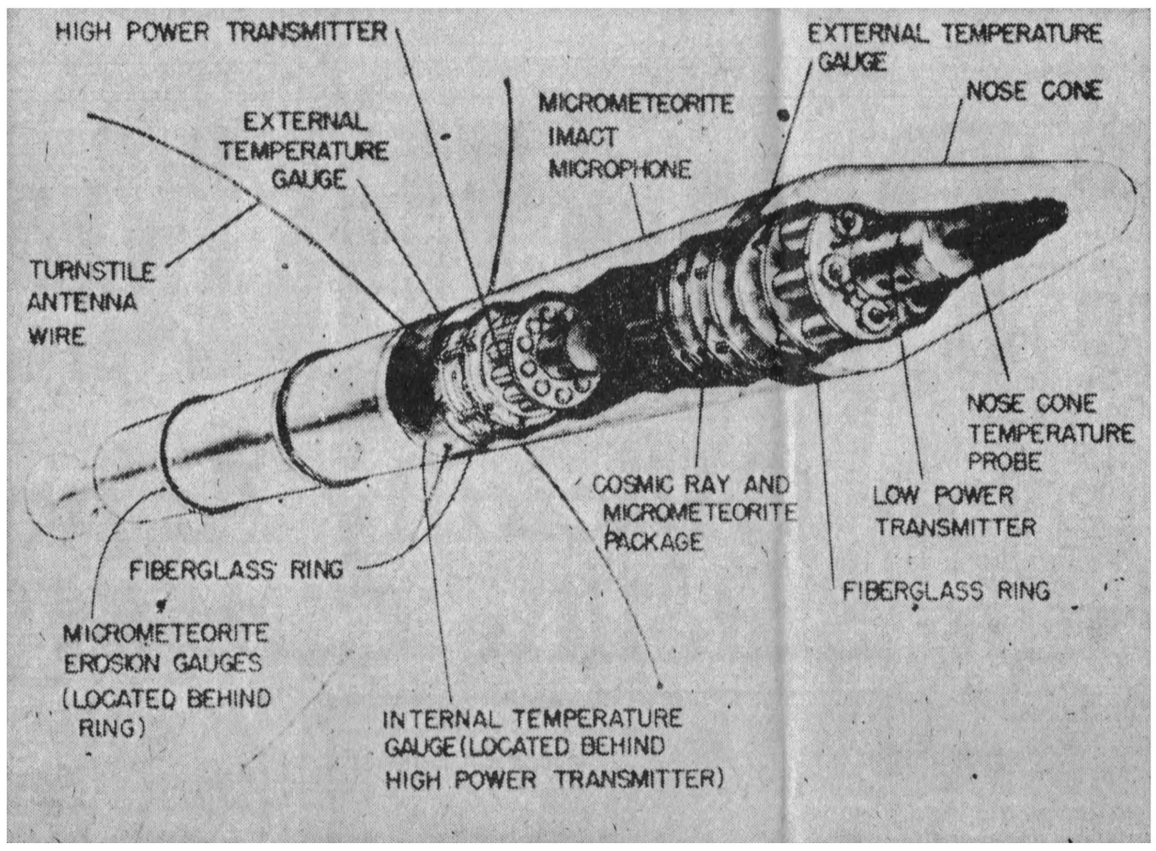
Ground observations of the satellite will provide information about the inosphere, geomagnetic field intensity and atmospheric density—information that until now was arrived at by calculations based upon indirect evidence.

Accurate optical and radio observation of changes in the satellite orbit may provide basic information as to gravitational anomalies in the earth. The exact amount to which the earth's shape deviates from an ideal sphere can be determined from such observations.

Additionally, world-wide maps may be changed from observations made of the satellite. Geologists have long desired some precise method of accurately measuring distances between continents.

It has not been possible to stretch a tape measure between great land masses, so distances have been computed by triangulation and other methods which are not quite accurate; possible errors may be as large as about half a mile.

Geologists believe that continents drift a few feet a year but up until now there has been no method to establish this as a fact. Observations made of the satellite from two stations simultaneously can lead to a precise calculation of distances between continents.



THE SATELLITE—The scientific earth satellite put into orbit by the Army is 80 inches long and weighs 30.80 pounds. The instrument carrying section (forward) and the final stage rocket (rear) orbit as a single unit. Fanning out from the midsection is the antenna, made up of whip-like rods with weighted balls on the ends of the rods. The rotational spin of the satellite forces the antenna out from the satellite. Both the high power transmitter (radiating 60 milliwatts of radio frequency power) and the low power transmitter (radiating between 10-20 milliwatts of power) transmit information continuously on eight channels to ground stations.

JPL Has Three Prime Missions

Government Owns California Facility

The Jet Propulsion Laboratory is a government-owned research and development center operated by the California Institute of Technology for the Army Ordnance Corps and other military agencies.

JPL was the nation's first jet-propulsion research center. It is directed by Dr. William H. Pickering.

The laboratory has three primary missions:

First, to conduct research investigations for future application to guided missile problems. Studies are carried out in the fields of electronics, chemistry, metallurgy, physics, applied mechanics, and aerodynamics. Results of these studies are made available to government-sponsored research, development and production groups. Research data having general application are published in the open literature.

Second, to originate, develop, and evaluate missile systems. The development of complete systems involves not only the missile but also the associated tactical handling equipment and instrumentation.

Third, to conduct feasibility studies and aid in the development of special programs of important national interest. Analytical studies are conducted by mathematicians and specialists in the physical sciences. Proposed programs are examined, and recommendations are made for further action as required.

What is now known as the Jet Propulsion Laboratory had its beginning in 1936 when the California Institute of Technology began theoretical investigations. In 1939, a Guggenheim Aeronautical Laboratory rocket research program was instituted. This project was eventually reorganized and renamed the Jet Propulsion Laboratory.

Today, the installation encompasses over 80 acres and employs 2,000 persons. The laboratory also maintains a static testing area at Edwards Air Force Base, Calif., and a field test operational unit to conduct test flights of missiles at the Army's White Sands Proving Ground, N. M.

DIRECTION OF MISSILE LAUNCHING—Map shows direction, based on an early report, of the launching of Army Jupiter-C missile from Cape Canaveral, Fla. The missile, carrying a satellite into space, was launched slightly to the south of east. (AP Wirephoto Map).

OLD HAND AT HIS GAME

Dr. Van Allen Conceived Cosmic Radition Inquiry

The man who designed the cosmic radiation experiment being flown in the Army scientific earth satellite is recognized as the world pioneer in that field.

He is Dr. James A. Van Allen, chairman of the department of physics at the State University of Iowa, Iowa City, Iowa.

Dr. Van Allen has been firing cosmic radiation measuring equipment into the upper atmosphere since 1946, when he became the first man to launch a scientific experiment aboard a captured German V-2 rocket. This was done at White Sands Proving Ground, N.M., in cooperation with the U.S. Army.

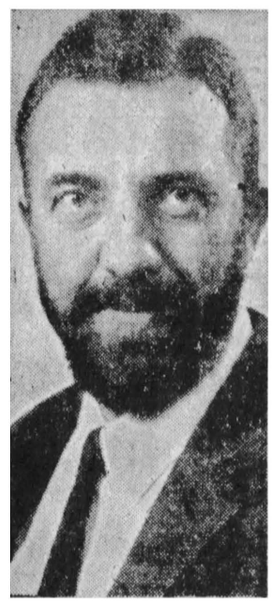
Since that time he has sent aloft hundreds of rockets bearing cosmic ray equipment from many parts of the world, gaining valuable information on cosmic ray activity and the earth's relationship to outer space.

But the research date gleaned from the heavens in this twelve-year period will be more than supplanted by the orbiting satellite in one week's time. Such is the value of an earth satellite as a research instrument.

The Army satellite, launched in connection with the International Geophysical Year, is a joint project of the Army Ballistic Missile Agency, Huntsville, and the Jet Propulsion Laboratory, Pasadena, California. The Army modified an existing re-entry vehicle, the Jupiter-C, to launch scientific experiments that were originally scheduled in the Vanguard program.

The Iowa experiment is the principal apparatus in the Army satellite. It is measuring total cosmic ray intensity with respect to position and time.

Another experiment, prepared by the Air Force Cambridge Research Center, is measuring the density of small meteoric particles. Still another experiment will determine the temperature inside and outside the vehicle.



DR. JAMES VAN ALLEN

Dr. Van Allen's cosmic radiation apparatus for the satellite is remarkably similar to the experiments he rigged in V-2's in the middle and late 1940's. It has been miniaturized and refined, but he calls it "essentially the same equipment."

The V-2, with limited range, was capable of carrying a one-ton payload, so there was no need for compact, light instruments. On the other hand the total instrument payload for the satellite is in the neighborhood of ten pounds.

The great difference in the relative merit of rocket and satellite observation is endurance. A rocket flight lasts only a few minutes at best, but a satellite placed in a durable orbit becomes a semi-permanent observation post. Also, the continuous data flowing from an orbiting vehicle comes back from a considerably higher altitude than any "point" soundings taken to this time.

Following his early experience with the Army V-2 at White Sands, Dr. Van Allen set out on a series of scientific expeditions to fire sounding rockets from many parts of the globe.

In 1948 he organized and led an expedition to Peru. Following that he made similar trips to the Gulf of Alaska in 1950 and Greenland in 1952. He made two such expeditions in 1957 in connection with the IGY, firing more than 100 small rockets on a route stringing from Thule, Greenland, to the Antarctic ice pack.

The firings made near the South Pole, checking magnetic field, cosmic ray and auroral phenomena, were the first to be made in the Antarctic. Dr. Van Allen reports that the Soviet Union is preparing to make similar tests from the icebreaker Ob in Antarctica and in Siberia.

The rocket used in the recent experiments was the Army Ordnance Loki II, which Dr. Van Allen modified and rechristened the Loki II "Rockoon." The name comes from the fact that the rocket is floated to an altitude of 75,000 feet by balloon, and then fired to some 80 miles.

Science Teamed With Industry

Many Firms Had Part In Jupiter C Efforts

Jupiter-C was developed jointly by the Army Ballistic Missile Agency and the Jet Propulsion Laboratory for the re-entry program associated with the Jupiter IRBM development.

It was later modified for the role of launching an earth satellite. The nose cone displayed by the President on his recent nationwide TV address came from a Jupiter-C re-entry experiment which was entirely successful.

The first stage power plant was made by the Rocketdyne Division, North American Aviation Co. of Canoga Park, Calif. This is a modified Redstone missile power plant. Fuel tanks have been elongated, giving a longer burning time.

The ballistic shell was produced by ABMA.

Most guidance and control components were supplied by the Ford Instrument Co. of Garden City, N.Y. The Army Ballistic Missile Agency made some of the parts, and modified still others.

The launcher base for the second stage was made by the Reynolds Metal Co. of Sheffield.

The major scientific experiment was designed by the State University of Iowa (cosmic ray experiment). The Air Force Cambridge Research Center designed and JPL was responsible for the temperature sensors.

The rocket fabricated most of the missile hardware, including such components as the container section, instrument compartment, lightweight air rudders, etc. It performed the missile pre-assembly for static firing, plus the final assembly and final alignment. The lab also fabricated and installed the electrical harnesses and network.

Among its contributions, the Launching and Handling Equipment Laboratory developed a means of reducing the number of cables inside the missile, thereby making a considerable reduction in the total weight of cables. The lab also developed the mobile launcher which supported the rocket, all ground firing accessories such as electrical control and checkout equipment, and a new missile transporter with a suspension system which allowes the loading of a completed missile aboard an aircraft.

The Test Laboratory was charged with performing a variety of tests on the vehicle's main and upper stages. In August of 1956 a spin test was performed on the upper stages. This was done in cooperation with the Structures and Mechanics Lab. Two months later the main stage underwent a successful static firing, and was returned to the Fabrication Lab for storage. That phase of the testing was completed 15 months ago, as part of the Jupiter—C program.

* * *

The last stage of work on the rocket at Huntsville was the functional testing of all systems and sub-systems by the Systems Analysis and Reliability Laboratory. Such testing culminated in a simulated flight during which all componets performed in accordance with predicted flight functions. Analysis of the data thus generated determined that the vehicle was completely flight worthy, and ready for shipment to Cape Canaveral.

In the meantime, the Computation Laboratory had worked with the Research Project Office and the Aeroballistics Laboratory in the determination of orbit injection conditions. The Computation Lab also conducted a minimal orbit calculation for the purpose of temperature and altitude studies. Programs designed to lead to quick orbit calculations were prepared for the IBM 704 computer, with emphasis on speed and accuracy.

After the vehicle arrived at Cape Canaveral, the Missile Firing Laboratory took over to perform pre-flight tests and otherwise make ready the main stage for the firing. The JPL upper stages were checked out by that agency's technicians. JPL and Missile Firing Lab personnel joined the upper stages to the main stage, and worked together throughout the countdown.

9 Labs Here

Continued From Page One

the missile to assure a stable, well controlled flight. The aerodynamic heating problem was still another element of Aeroballistics' concern.

Assuring the proper guidance of the vehicle was the function of the agency's Guidance and Control Laboratory. Years of research—and gradual evolution—have gone into the inertial guidance system that placed the satellite into its durable orbit. The Guidance and Control Lab, as the name implies, is responsible for the intricate equipment which performs all aspects of guiding and controlling the rocket.

Turning to another area, the Fabrication Laboratory developed all manufacturing methods and tooling for the special lightweight and lengthened ballistic shell, and for the upper stage spin launcher. The lab fabricated

Army Reveals

Continued From Page One

metal tube is circling the earth once every 113 minutes. Medaris said the time was 106 minutes.

They disagreed also on the baby moon's speed. Von Braun figured it at 19,400 m.p.h.; Medaris said almost exactly 18,000.

The satellite — christened the Explorer by its Army sponsors—has the only radio voice coming to earth from outer space. Sputnik I has disintegrated and the radio batteries of the dog-carrying Sputnik II have long been dead.

Two hours afetr the firing, Medaris told a news conference here that the Army "has been directed to fire one more (satellite) at the present time."

The date has been set, he said, but will be kept secret.

The Army received a go-ahad to launch its little space traveler after the Russians had fired their two Sputniks. Previously, the space program had been assigned exclusively to the Navy.

Efforts to get the Navy's Vanguard rocket off the ground have failed. The first Vanguard blew up on its launching pad here Dec. 6. The firing was highly publicized in advance and the failure was a severe blow to U.S. pride.

Last night's spectacular success was no surprise to the Army, which claimed it could have done the job long before the Sputniks if it had been given the chance.

Medaris was so confident that in a statement prepared several day ago he predicted "about a 99 per cent degree probability" for success on the Army's first try.

Maj. Gen. J. B. Medaris ABMA's commanding general went to nearby Patrick Air Force Base soon after the firing to meet with newsmen in a theater there.

After answering hundreds of questions, Medaris begged the reporters to end the conference "so I can get a couple of hours sleep."

Asked what the Army will do next, Medaris said it had made several proposals for other programs.

While Medaris and several scientists associated with the Jupiter-C program talked to newsmen here, Von Braun met with reporters in Washington.

The German scientist, who built the V-2 rocket with which London was bombarded in the losing stages of World War II, smiled happily and answered all questions.

It might take scientists some time to figure out the exact schedule upon which the new satellite is operating, and the route it follows.

But the slender, rod-like space traveler passed high over the Southwestern United States and Mexico in its early orbits, and thereafter moved farther and farther west.

Here Are The Basic Facts

Continued From Page One

megacycles, with 10 milliwatts or one-hundredth of a watt of power. Amateur radio operators will not receive this signal. Lifetime of this one is predicted at two to three months.

It is not likely that the Army satellite will be visible to the naked eye at any time, Army scientists predict. It will appear in its orbit about the size of a fifth to sixth magnitude star, and a star of this size can hardly be seen without some magnification.

The final stage of the vehicle was not separated from the satellite. The two are orbiting together. They will not be recovered. (The launching button at Cape Canaveral was to be pressed by Dr. Kurt H. Debus or Dr. Hans F. Gruene. Biographies on both men are included in this package).

Some facts on the carrier vehicle and the launching method:

The first stage of the modified Jupiter-C is a liquid propellant missile. The entire length of the composite missile (all stages) is 823.3 inches. The main stage is 672.8 inches long, and 70 inches in diameter. The high speed assembly which was launched from the first stage, plus the final stage and orbiting satellite, was 150.0 inches in length.

During the latter stages of the ascent, the main power plant was expended. It separated and fell back to the earth. The upper stages shortly after ward reached the apex of the arc. When the vehicle attained its maximum height, the second stage was fired.

The nose section of the main stage missile, then completely detached from the upper stages, continued its normal trajectory to the earth's surface, just as it would if it were a military weapon carrying a warhead.

The first stage of the missile carried the payload (satellite) to its perigee distance from the earth. All other stages of the missile increased the speed for orbiting, but did not send the satellite to a greater height. The upper stages were spin-stabilized, in much the manner of a rifle bullet. This was done by electric motors mounted within the nose section of the main stage.

The upper stages were solid propellant systems. The final stage motor and the satellite were not separated. They are orbiting together. They have a total length of approximately 80 inches, and weigh 30.80 pounds.

The orbiting portion is made up as follows:

Final stage—46 inches long and 12.67 pounds in weight (after burnout).

Satellite Instrument Section—34 inches long and 18.13 pounds in weight.

Before the launching, Maj. Gen. J. B Medaris, commander of the Army Ballistic Missile Agency, predicted "about a 90 per cent degree of probability" for success on the Army's first try

It's Nose First, Then Tail First

No, U.S. Moon Won't Stay Pointed 1 Way

CAPE CANAVERAL, Fla. (AP) — The Army's satellite, if it performs according to expectations, will be sailing along, day after day; nose first halfway around the world and tail first the other half.

No, it won't be pointed like an arrow in the same direction all the time. It won't turn around, or tumble, or flipflop or anything like that.

All this slender tube, more than 6½ feet long, is expected to do, as it orbits at 18,000 miles an hour from 300 to 1,500 miles out in space, is to retain a fixed attitude—and we don't mean altitude—in space.

The authority for this is the spokesman for the government-owned Jet Propulsion Laboratory at Pasadena, Calif., builder of the Army satellite.

The satellite, actually the final stage of the Jupiter-C rocket, resembles an enormous pencil 80 inches long, 6 inches in diameter and weighing about 30 pounds. Most of this weight consists of the instruments inside the object.

A laboratory spokesman said the principle of the satellite's flight could be explained by holding a pencil, representing the satellite, aboye a ball, apple or other sphere, representing the earth

The Army satellite, JPL says, will retain throughout its flight as a satellite the attitude—and we still don't mean altitude—it assumes at the start of the orbit. At that point, the pencil used to illustrate the principle is horizontal or parellel to the surface of the sphere.

One-fourth the way around the "earth," instead of curving with the "earth," the pencil is vertical with relation to the ground, 300 or more miles beneath it. The nose or point of the pencil is pointing directly out into space.

From here the pencil moves on below the "earth." This time, since its tail or blunt end is in front, it would appear to be trav eling backward.

Now: Opposite the starting place of the orbit, the satellite again would be horizontal to the earth. And when it is three-fourths of the way around the earth, again it would be in a vertical position regarding the earth. This time, however, the nose is pointing straight at the earth.

And in this position again, the missile finds itself starting around that half of the earth in which it once more is moving forward, or, nose first.

Von Braun, 46, Long Famous

He Had Great Share In Developing V-2

Dr. Wernher von Braun was born in Wirsitz, Germany, March 23, 1912.

He won his bachelor's degree at the age of 20 at the University of Berlin, and received his doctorate in physics at age 22 at the same institution.

In 1930 he joined a group of inventors who constituted the German Society for Space Travel. In 1932 he was employed by the ordnance department of the German government. From 1932-1937 he was chief of a small, liquid-fueled rocket development station near Berlin. The rockets identified as A-1, A-2, and A-3, forerunners of the V-2, were developed there.

In 1937, he became technical director of the Peenemuende Rocket Center, where the V-2 was developed. Dr. von Braun and mor than 100 associates came to the U. S. in 1945 under contract with the U. S. Army Ordnance Corps.

He worked on high-altitude firings of captured V-2 rockets at White Sands, N. M., Proving Ground. Later he became project director of a guided missile development unit at Fort Bliss, Texas. In April, 1950, the entire group was transferred to Redstone Arsenal at Huntsville, then designated the development center for Army rockets and ballistim missiles. Dr. von Braun was appointed director, of development operations.

Dr. von Braun and 102 of his colleagues and their families received American citizenship April 14, 1955, in Huntsville.

On Feb. 1, 1956, the ballistic missile activity concerning long-range rockets was shifted from Redstone Arsenal to the Army Ballistic Missile Agency at the same location. Dr. von Braun continued as development operations director.

Dr. von Braun is a member of the Special Committee for Space Technology, National Advisory Committee for Aeronautics, Washington, D. C., and a fellow of the American Rocket Society, American Interplanetary Society, British Interplanetary Society, German Rocket Society, and Norwegian Interplanetary Society. He is president of the Rocket City Astronomical Association in Huntsville.

Hearty German dish: Cooked noodles teamed with shredded cabbage and onion that have been fried together in butter or margarine.

SATELLITE CRAFTSMEN

Behind Moon Victory

MAJ. GEN. J. B. MEDARIS

DR. WERNHER VON BRAUN

DR. EKNST STUHLINGER

BRIG. GEN. J. A. BARCLAY

HEINZ HERMAN KOELLE

WILLIAM MRAZEK

HANS H. MAUS

DR. ERNST D. GEISSLER

TEAMWORK PAYS OFF

After Hectic Night, Times Puts Out Extra

"History is made at night" says the old adage, much to the despair of newspapermen.

History was made in Huntsville last night. The first flash that the Jupiter-C has started its fiery, upward journey from the sands of Cape Canaveral came to The Huntsville Times a scant three minutes after the missile had streaked heavenward bearing this nation's first earth satellite.

The newspaper's staff had left the quiet plant on Memorial Parkway late Friday afternoon knowing that news, big news, was no respector of timetables, fearing yet hoping that their weekend rest would be disturbed by a flash from Florida.

Shortly after 10 p.m. The Times' publisher, J. M. Langhorne, ordered an Extra put out.

From all points of the city, the newspaper staff streamed back to the plant, ready for action. All departments of the paper were represented, editorial, composing room, press room, circulation and the advertising department— all ready to help.

As the plant sprang to life, the wire services machines ticked madly, furnishing pictures of the firing and background information on the event.

Not all news was incoming, however, A Times' reporter kept the long distance wires humming to wire services with reports on the frenzied celebration with which the city greeted the news that it's home town boy, Jupiter-C, has made good. The principal wire services, the Associated Press, the United Press and the International News Services relayed the details to other busy newsrooms throughout the world.

Times photographers battled downtown traffic and crowds to record pictorially one of the most exciting nights in their city's history. Linotype operators warmed up their machines, preparatory to setting the local and wire stories into type.

Friday's paper was torn up and discarded and the staff began the task of putting the historic event into a tangible record.

Phones jangled incessantly.

By telephone, radio and word of mouth the circulation manager sent word to his carriers to be ready to carry the extra edition to eager readers.

As the first story came off the linotype shortly after midnight, an operator was pressed into service as a proof reader. A visitor was put in charge of making coffee to sustain the newsmen through the hectic hours ahead.

In short, it was quite a night!

If your coffee does not have the flavor or strength you like and you make it in a drip pot, it may be you are adding the water too fast.

3-Stage Rocket Forecast In '38

Story In The Times Foretold Future

Twenty years ago a rocket-firing was a long way off but some other ideas sound like 1958, according to an article appearing as Page 1 news in the issue of The Times of Jan. 26, 1938.

There was no argument about long and short-range missiles or solid propellants. The idea of a three-stage rocket had been conceived, however.

Any objectives of work on rockets, however, was strictly nonbelligerent.

The article, in full, is reproduced below.

SCHEME TO SEND ROCKET UP 967 MILES IS REVEALED

NEW YORK, Jan. 26 (AP)— A scheme for shooting an exploratory rocket to a height of 967 miles above the earth was unfolded today before a convention of aeronautical engineers.

The idea works in theory, Frank J. Malina and A. M. O. Smith of the California Institute of Technology said in a paper written for the annual meeting of the Institute of Aeronautical Sciences.

Whether it will work in fact, they added, depends on the efficiency of the rocket and its "motor."

Most rocket "motors" consist of a combustion chamber where fuel is fired, transformed into gas, and shot through a nozzle-like exhaust to provide propelling force. Perhaps the most successful of the fuels is alcohol. Sometimes a mixture of hydroegn and oxygen is used.

The Californians' problem was solely one of calculated speeds in relation to atmosphere density.

"This analysis," they said of their study, "definitely shows that if a rocket motor of high efficiency can be constructed, far greater altitudes can be reached than is possible by any other known means."

Their proposed rocket would actually consist of three separate rockets, one within the other, to be launched successively.

"A rocket made up of three steps, respectively of 600, 200 and 100 pounds," they explained, the lightest being fired last. . . reaches a calculated altitude of 5,100,000 feet, and a maximum velocity of 11,000 miles per hour."

They proposed to launch the rocket from a mountain top to save fuel, because the high velocity of flight through dense lower levels of the atmosphere causes fuel to be rapidly eaten up. Once the three-in-one rocket had cleared denser air, theiy said it would "coast" to higher altitudes.

The purpose of the proposed experimental flight would be to gain knowledge of meteorological conditions in the upper atmospheres.

ABMA's PIO Had Press Data Ready For Use

Much of the material contained in this special issue was made available to The Times at midnight last night, immedately after announcement of successful orbit of the satellite, by the Army Ballistic Missile Agency's Public Information Office. Other material came from the Associated Press and The Times' own staff. All of the type and engravings were set after word of the launching was received.

ABMA's Deputy Chief Is Barclay

Brig. Gen. John A. Barclay was born on Aug. 27, 1909 in Colorado Springs, Col. He attended primary and secondary schools in Salt Lake City, Utah. He was graduated from the U. S. Military Academy in 1931. He received a Master of Science degree in engineering from the Massachusetts Institute of Technology in 1936. Among the service schools he has completed are the Armed Forces Staff College and the National War College.

General Barclay's Army duty has been in the field artillery and ordnance fields. His overseas duty has been in the Canal Zone and China. More recent assignments include: Executive officer of the Research and Development Division, Office, Chief of Ordnance, 1951 to 1954; commanding officer of Picatinny Arsenal, 1954-1956.

He was promoted to brigadier general in September, 1955.

SIGNS PLENTIFUL—Contributing to the color of Huntsville's satellite celebration at the Square last night were these hastily printed signs that were quickly handed out by well prepared Redstone Arsenal supporters.

Medaris Took Up Job In 1956

ABMA Commander Started As A Marine

Maj. Gen. John Bruce Medaris commands the Army Ballistic Missile Agency, a position he has held since the agency was activated on Feb. 1, 1956.

Medaris was born in Milford, Ohio, May 12, 1902, and enlisted in the Marine Corps in 1918. He served in France during World War I. He returned to study mechanical engineering at Ohio State University. In 1921 he received a regular Army (Infantry) commission as a second lieutenant.

In 1927 the general resigned from the Army and for 10 years was engaged in merchandising and management advisory activities. Having retained his status in the Reserve Corps, Medaris returned to active duty in 1939. For three years thereafter he served in the Cincinnati Ordnance District and in Washington, D.C.

Medaris went overseas in 1942 and served successively as battalion commander and as ordnance officer, II Corps in the campaign in Tunisia, invasion of Sicily and Sicilian campaign. He transferred to England and became ordnance officer of the First Army. His postwar assignments include that of chief of the first Army mission to Argentina, 1949 to 1952.

In 1952 he was assigned to the office of Chief of Ordnance, where he served as executive and assistant chief of the Ammunition Branch, Industrial Division. The next year he became assistant chief of Ordnance and chief of the Industrial Division. He supervised all production and procurement of standard ordnance material. He was promoted to major general in that position in September, 1955, and was designated commanding general of the new ABMA in November, 1955.

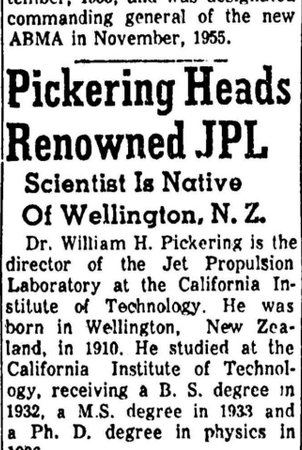
Pickering Heads Renowned JPL

Scientist Is Native Of Wellington, N. Z.

Dr. William H. Pickering is the director of the Jet Propulsion Laboratory at the California Institute of Technology. He was born in Wellington, New Zealand, in 1910. He studied at the California Institute of Technology, receiving a B. S. degree in 1932, a M.S. degree in 1933 and a Ph. D. degree in physics in 1936.

Pickering performed graduate and post-graduate work in cosmic ray physics at Cal Tech. He has been associated with JPL since 1944 and has been director of the laboratory since September, 1954. He has been a member of the Scientific Advisory Board of the Air Force and chairman of the Research and Development Board Panel on guided missile test ranges and instrumentation.

He is a member of the American Institute of Electrical Engineers, a fellow of the Institute of Radio Engineers and the American Rocket Society, a member of the United States National Committee Technical Panel on the Earth Satellite Program, and chairman of its work group on tracking and computation.



DR. W. H. PICKERING

MORE FIREWORKS—Leaders of the demonstration on the Square last night included these Chamber of Commerce officials, Jimmy Walker and Dorsey Uptain, left and right, Mayor R. B. Searcy, center, and Stuart Jones, personnel manager of Redstone Arsenal, behind Uptain and Searcy. Skyrockets, firecrackers and bonfires added to the din and confusion as residents celebrated successful launching of the nation's first satellite by the missile scientists from Redstone Arsenal.

—Timesfotos By McMEANS

THIS WAS CHARLIE—Bonfires were not the only fires lighted by celebrating Huntsville residents last night. Former Secretary of Defense Charles Wilson was burned in effigy. Here lie his remains. Wilson is blamed by many people as the main obstacle to Army missile and satellite efforts in the past.

Eisenhower Announces Satellite Orbiting

Continued From Page One

down to a game of bridge with friends.

* * *

At 8:30 p.m. Hagerty — headquartered at an Augusta hotel a few miles from Eisenhower's cottage at the golf club — received a second phone call from Goodpaster. The general reported weather continuing good and that the missile was being fueled. Hagerty immediately went to the President's cottage and delivered the message.

Eisenhower was at dinner when Hagerty arrived.

At 9:50 p.m. Goodpaster called Hagerty a third time and said a firing seemed virtually certain. Goodpaster then left his Washington home for his office at the White House.

* * *

At 10:23 p.m. — 33 minutes before the launching — Hagerty got another phone call from Goodpaster, who reported the launching team at Canaveral was in the final minutes of the preparatory countdown. It was estimated then the firing would come about 10:45 p.m.

Hagerty, back at his hotel, immediately phoned the President at his cottage.

"I told him Gen. Goodpaster would be calling me back in 10 minutes," Hagerty informed newsmen.

* * *

Goodpaster did. He said he was in touch by phone with the Army communications room at the Pentagon, which in turn was in touch with Canaveral.

Goodpaster ticked off the countdown to Hagerty. Then Hagerty phoned Eisenhower, who came on the direct line to Washington for a report on the rocket's flight progress after it was launched.

Almost two hours later the President got word from Hagerty the satellite was in orbit.

"That's wonderful," said Eisenhower.

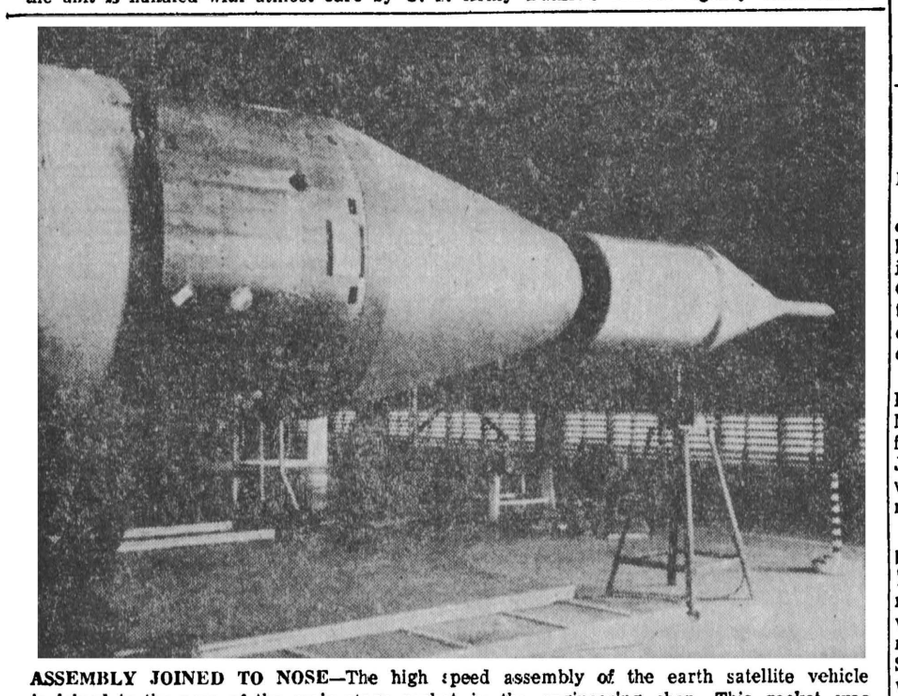
Then he went to bed at close to 1 a.m.

Make some good stock out of giblets, wing tips and necks of chicken, adding onion, carrot, celery, parsley, bay leaf, pepper corns, allspice and salt. Strain the stock and mix with tomato juice, adding more salt and pepper if needed, and a suspicion of sugar. Serve very hot in cups.

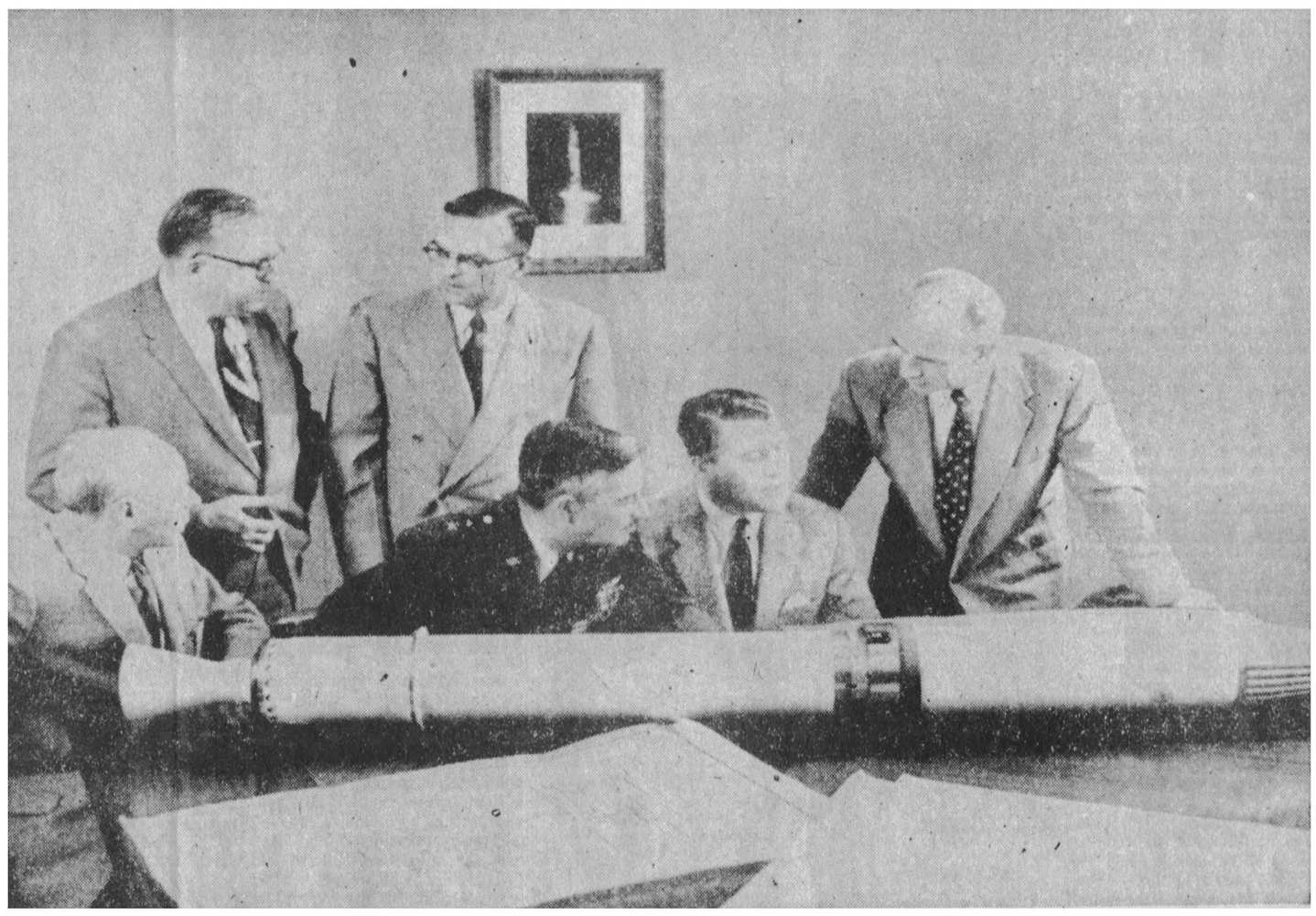
Here Are Scenes Of Jupiter-C And Its Builders

IT'S ASSEMBLED—Satellite and final stage rocket, designed to orbit as one unit, are assembled by technicians at the Army's Ballistic Missile Agency in Huntsville. Last night an Army Jupiter-C missile, carrying a satellite of this type, blasted off from Cape Canaveral, Fla. The final stage, plus the pointed cylindrical satellite case, is 80 inches long and has a nominal diameter of six inches. (U. S. Army Photo via AP Wirephoto).

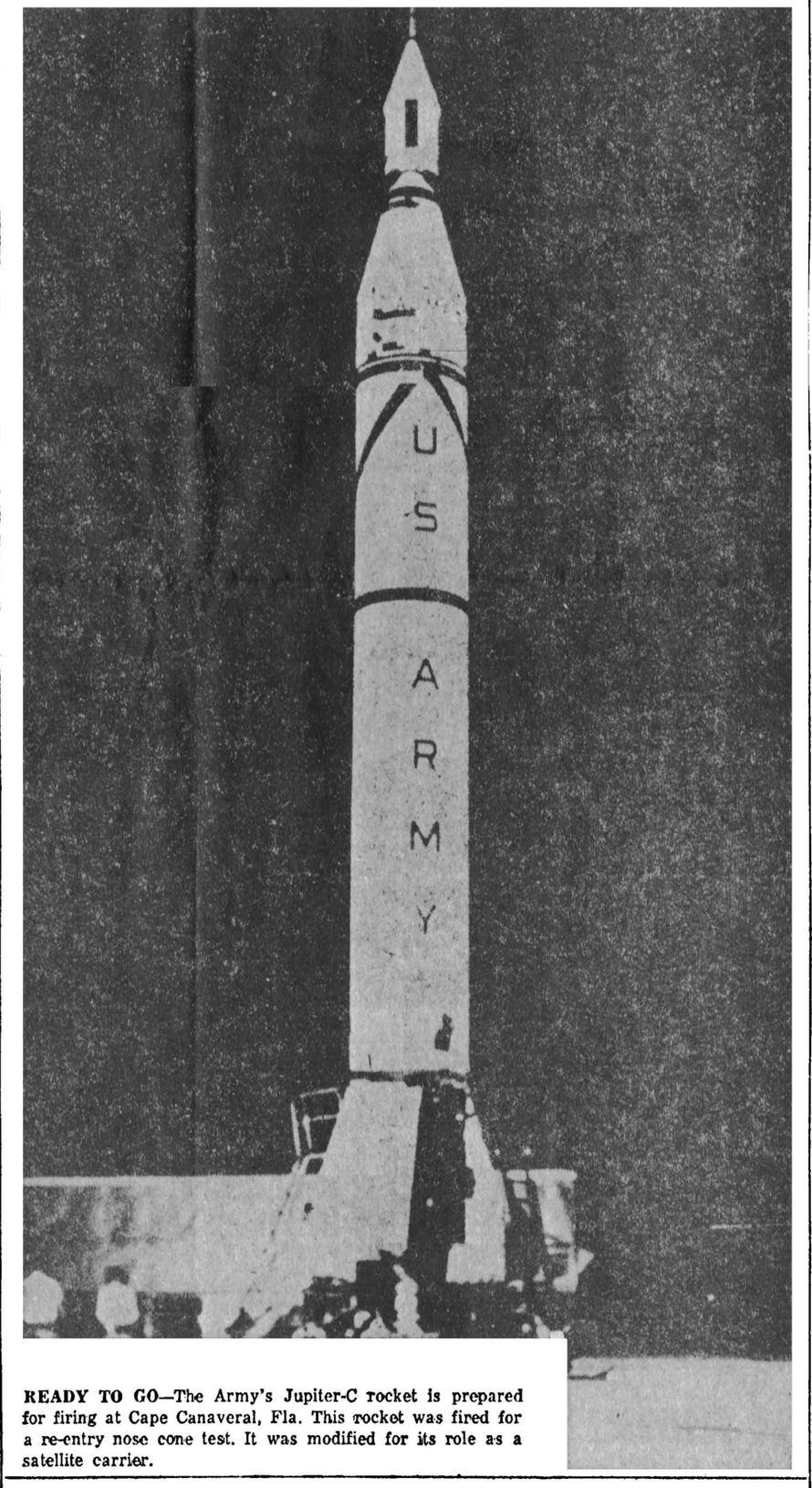
NOSE—The modified Jupiter-C nose section is removed from its trailer transporter. The guidance system of the long-range rocket cortains some of the most precise and delicate instrumentation ever devised. Although packaged to resist injury by shock or vibration, the unit is handled with utmost care by U. S. Army Ballistic Missile Agency technicians.



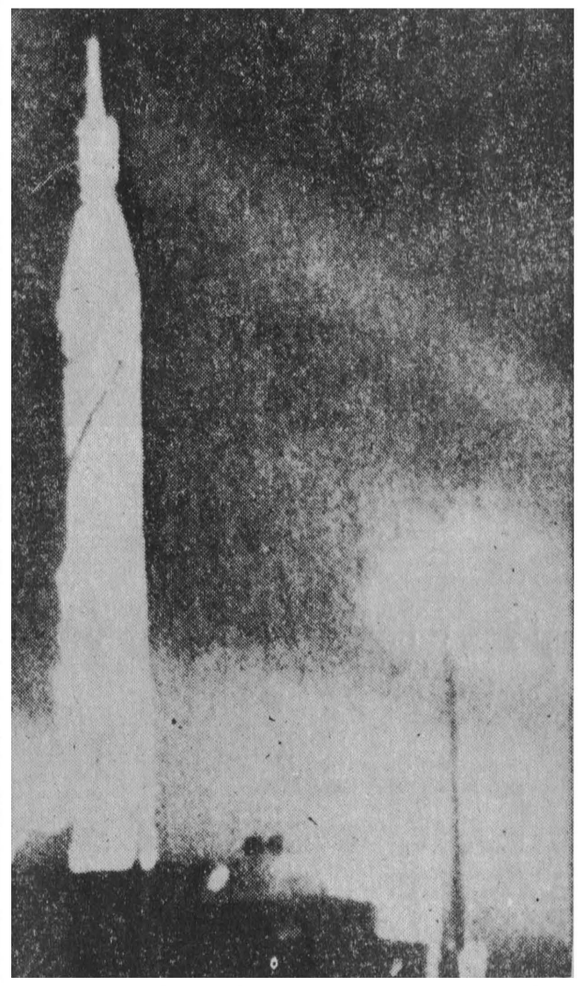
ASSEMBLY JOINED TO NOSE—The high speed assembly of the earth satellite vehicle is joined to the nose of the main stage rocket in the engineering shop. This rocket was used for a nose cone re-entry test and has been modified for use with the satellite orbited by the U. S. Army.



TEAM LEADERS—Prototype of the scientific earth satellite launched by the Army is examined by key project officers at the Army Ballistic Missile Agency. The model which is actual size shows the assembled satellite and the final stage rocket which will orbit together as a single unit. Left to right (seated): Eberhard Rees, Maj. Gen. J. B. Medaris, Dr. Wernher von Braun and Dr. Ernst Stuhlinger; (standing) W. A. Mrazek and Dr. Walter Haeussermann.



READY TO GO—The Army's Jupiter-C rocket is prepared for firing at Cape Canaveral, Fla. This rocket was fired for a re-entry nose cone test. It was modified for its role as a satellite carrier.



BEFORE TAKEOFF—This was the scene two minutes before the ignition of the Army's Jupiter-C missile. The missile carried on its nose a satellite which authorities hoped would go into orbit. At the right is part of the gantry tower used to prepare the missile for launching. (AP Wirephoto).

HEADS FOR OUTER SPACE—The missile Jupiter-C, carrying on its nose an earth satellite, heads for the heavens on a launch from the missile test center in Florida. Beneath it is the steam and gas which formed around the launching pad at the initial stages of the launch. (AP Wirephoto).

Leaders' Statements

By MAJ. GEN. J. B. MEDARIS

The success of the scientific earth satellite project directed by the Department of Defense in support of the International Geophysical Year, demonstrates the capabilities of the Army-science-industry team in the realm of outer space explbration.

The task of launching a satellite was assigned to my agency Nov. 8, 1957. We utilized the efficient and thoroughly tested Jupiter-C missile system. This was modified for the satellite mission.

The Jupiter-C was employed by the Army in late 1956 and in 1957 for re-entry test experiments in connection with the development of the Jupiter Intermediate Range Ballistic Missile System. It has other capabilities which will be put to good use in the future.

Using existing hardware, with some modifications, it was possible to carry out the satellite mission in less than 90 days. In this complex undertaking we enjoyed the cooperative assistance of the Jet Propulsion Laboratory, the State University of Iowa and industrial fabricators and suppliers. It is a balanced, highly-capable team which will make other notable contributions in the interests of science and the national defense.

* * *

By Dr. Wernher von Braun

The Army Ballistic Missile Agency development team accomplished rather extensive modifications of the Jupiter-C missile system for the purpose of achieving an orbital capability.

Assembly of the liquid propelled booster and the high-speed upper stages was carried out in Army facilities at the launching site. Checkout, fueling and launching operations were carried out by Missile Agency and Jet Propulsion Laboratory teams. It was a splendid example of coordinated teamwork.

This is a beginning in the long-range program to conquer outer space. Satellites have many uses of great value in scientific, military and communications fields. We will move still onward to more challenging missions as fast as our resources permit.

* * *

By DR. JAMES A. VAN ALLEN

"This flight is the culmination of several years of work by our research group at State University of Iowa. The assembled observations from this flight will mark an important new scientific step in understanding cosmic radiation and the relationship of our earth to outer space. This is only the beginning. We hope that the U. S. satellite program will be continued on a vigorous basis.