

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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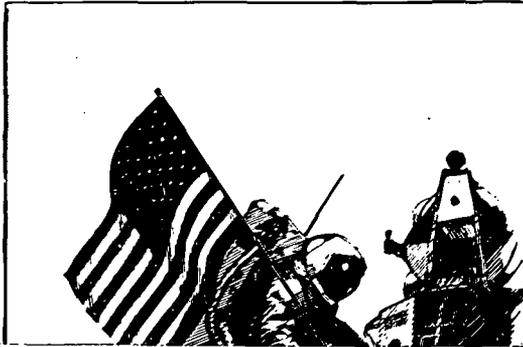
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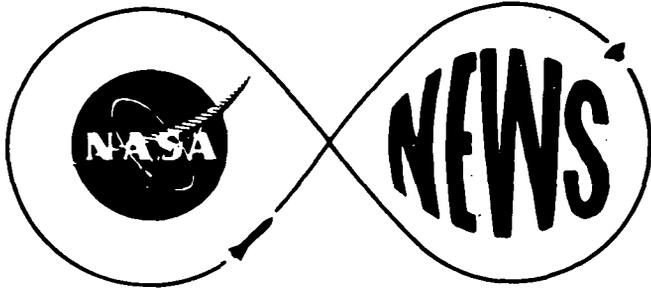
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**NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION**

Washington, D. C. 20546

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FOR RELEASE:

UPON RECEIPT

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Headquarters, Washington, D.C.
(Phone: 202/755-2354)

RELEASE NO: 74-157

NASA MARKS 5TH ANNIVERSARY OF FIRST LUNAR LANDING

For thousands of years, indeed since creation, creatures on Earth looked up at the Moon in the sky. In the last month of 1968 A.D. Earth creatures first looked down on the Moon, from 60 nautical miles above its surface.

Then: July 20, 1969, 4:17:40 p.m. Eastern Daylight Time, "Houston, Tranquility Base here. The Eagle has landed."

-more-

June 13, 1974

Explorers from Earth, Neil Armstrong, 38, and Edwin E. Aldrin, 39, had landed on the Moon. In lunar orbit above, in the ferry spacecraft which would return them to Earth, was Michael Collins, 38.

Less than seven hours later, at 10:56:19 p.m. EDT, Armstrong cautiously placed his foot on the Moon as he stepped off the Apollo Lunar Module "Eagle."

"That's one small step for a man, one giant leap for mankind," he said.

Minutes later Aldrin joined Armstrong on the surface. They spent more than two hours on the lunar surface, taking photographs, collecting rock and soil samples and deploying scientific instruments. Forty-six pounds of the Moon were collected for return to Earth.

The mission to the Moon began in May, 1961, when President John F. Kennedy pledged the nation to place a man on the Moon and return him safely to Earth "before this decade is out."

At that time, only one American had even approached the threshold of space. Astronaut Alan Shepard on May 5, 1961 in a 15-minute suborbital flight reached an altitude of 101 nautical miles.

One Soviet spaceman, Cosmonaut Yuri Gagarin, earlier, on April 12, 1961, had completed a single orbit of the Earth.

Six Mercury flights between 1961 and 1963 proved man could survive in space; 10 manned Earth-orbiting Gemini flights in 1965 and 1966 proved man could work in space, that he could control spacecraft to rendezvous and dock with another, that he could stay in space for up to two weeks and that he could work outside the spacecraft and do meaningful work on these "space walks."

Three unmanned flights, testing the Saturn 1B rocket and Apollo command and service modules, also were conducted.

Each flight built on the experience and knowledge of the previous flight. Government and industry learned to organize and manage the ground-based facilities and manpower needed to support this national effort.

The price was high: \$392 million for Mercury, \$1.28 billion for Gemini and \$21.349 billion for Apollo through the first manned lunar landing. Three astronauts -- Virgil I. Grissom, Edward H. White and Roger Chaffee died in the Apollo 204 fire while testing their spacecraft on the launch pad less than a month before their scheduled Earth-orbital flight. Their deaths delayed the program but resulted in improvements in the spacecraft which made it a safer and more reliable vehicle.

Unmanned Apollo flights were made to test the Saturn V Moon rocket and the Lunar Module. Manned flights began with Apollo 7 when Astronauts Walter Shirra, Donn Eisele and Walter Cunningham orbited the Earth in an Apollo Command Module for 10 days beginning October 11, 1968.

In December 1968, on the first manned flight of the Saturn V, following only two unmanned flights of the rocket, Astronauts Frank Borman, James Lovell and William Anders became the first men to go out to the Moon. Their mission, flown without the Lunar Module, completed 10 orbits of the Moon on Christmas Eve and Christmas Day.

Two more manned Apollo-Saturn V flights -- Apollo 9 with Astronauts James McDivitt, David Scott and Russel Schweickart which tested the full Apollo spacecraft and rendezvous and docking techniques in Earth orbit and Apollo 10 with Astronauts Thomas Stafford, John Young and Eugene Cernan which tested the system in orbit about the Moon -- paved the way for Apollo 11.

Objective of Apollo 11 was stated simply: "Perform a manned lunar landing and return".

Nearly 400,000 persons in industry and government had worked toward this moment. At 9:32 a.m. EDT July 16 the world watched as Apollo 11 with its crew of Armstrong, Aldrin and Collins lifted off Earth.

Four days later Apollo 11 was circling the Moon in the Command Module named "Columbia." Armstrong and Aldrin entered Lunar Module "Eagle" and Collins was left alone in Columbia.

A few minutes later Armstrong announced, "The Eagle has wings," and he began the two-hour descent to the surface.

Armstrong and Aldrin were on the Moon for 21 hours and 36 minutes. They lifted off at 1:54 p.m. EDT July 21. After joining Command Module Pilot Collins in the Moon-orbiting Columbia, the Apollo 11 crewmen set out for their home planet. Landing was in the Pacific Ocean at 12:50:35 p.m. EDT July 24. President Richard Nixon, who had talked by phone to Armstrong and Aldrin while they were on the Moon, was aboard the recovery ship USS Hornet to greet the Moon explorers.

The national goal established by President Kennedy was met. Twice before the end of the decade, man explored the lunar surface.

Those two landings and the four that followed in the early 1970's gave lunar scientists around the world a variety of sample material, photographs, and electronic data that will keep them busy for years.

Five of the six scientific stations left on the surface still were transmitting data when the Apollo follow-on manned flight program -- Skylab -- was launched.

The 12 Americans who left their footprints in the lunar dust totaled 166 man-hours of surface exploration. They traversed almost 60 miles and brought about 850 pounds of rock and soil samples back to Earth. They left 60 major scientific experiments on the Moon and conducted 34 more in lunar orbit.

Apollo, in early planning, was scheduled for 10 landing attempts; but one and then two more were cancelled because of cuts in NASA funding. Apollo's final cost: \$25 billion. Some of the preliminary findings from Apollo:

- A rather definite and reliable lunar history time scale;
- General agreement that the dark mare on "sea" regions are extensive lava flows and that most of the craters are projectile impacts;

- A much stronger than expected and variable magnetic field and a hotter than expected interior; and
- Distinct differentiation between the chemical composition of the Moon and that of Earth, a significant constraint on the theory that the Moon originally was a part of Earth. End-of-Apollo data did not rule out any of the three major theories on the Moon's origin - separation, capture from circumsolar orbit, or formation from a dust cloud surrounding Earth.

THE FLIGHT OF APOLLO 11

FACT SHEET

COLUMBIA

EAGLE

TRANQUILLITY BASE



LIFTOFF: 9:32 a.m., July 16, 1969, Pad 39-A, Kennedy Space Center, Fla., aboard a Saturn V launch vehicle.

SPLASHDOWN: 12:50:35 p.m. EDT, July 24, 1969, Pacific Ocean 169:09° W longitude by 13:18° N latitude, 13 nautical miles from the prime recovery ship the aircraft carrier USS Hornet. The splashdown site was 920 miles southwest of Hawaii and 210 miles southwest of Johnston Island.

RECOVERY: The Apollo 11 crew was recovered from the spacecraft by helicopter and flown to the deck of the Hornet where they entered the Mobile Quarantine Facility. President Nixon, aboard the recovery ship to watch the splashdown, congratulated the crew by intercommunication.

MISSION DURATION: 195 hours 18 minutes 35 seconds (eight days, three hours, 18 minutes and 35 seconds).

THE CREW: Neil Alden Armstrong, then 38, 39th birthday Aug. 5, a civilian, Commander of Apollo 11, born in Wapakoneta, Ohio.

Command Module (Columbia) Pilot Michael Collins, 38, then a United States Air Force lieutenant colonel, promoted to colonel July 24, born in Rome, Italy.

Lunar Module (Eagle) Pilot Edwin Eugene Aldrin, Jr., 39, colonel, United States Air Force, born in Montclair, New Jersey.

Armstrong flew as command pilot of Gemini 8; Collins was pilot on Gemini 10; Aldrin was pilot of Gemini 12, all in 1966.

TOTAL MILES TRAVELED: 952,700

DISTANCE TO MOON: 238,857 miles

MOON TEMPERATURES: 243°F with Sun at Zenith, minus 279°F at lunar night (the lunar night is the equivalent of 14 Earth days).

MISSION HIGHLIGHTS

(all times Eastern Daylight)

Wednesday, July 16

9:32 a.m. Liftoff

Sunday, July 20

4:17 p.m. Lunar Module (Eagle) touches down on Moon in the Sea of Tranquillity; Astronaut Armstrong reports: "Houston, Tranquillity Base here-- the Eagle has landed."

10:56 p.m. Astronaut Armstrong places his left foot on the Moon and says: "That's one small step for a man, one giant leap for mankind."

11:14 p.m. Astronaut Aldrin joins Armstrong on lunar surface.

- 11:24 p.m. Astronauts read plaque which was left on Moon.
"Here Men From the Planet Earth
First Set Foot Upon the Moon
July 1969 A.D.
We Came in Peace for All Mankind."
(The plaque bears the signature of
President Nixon and the three Apollo 11
crew members).
- 11:41 p.m. Armstrong and Aldrin erect on an eight-foot aluminum staff a three-by-five foot nylon United States flag.
- 11:48 p.m. President Nixon speaks to the astronauts from Washington. During their stay on the lunar surface, the astronauts placed a microdot disc on the surface containing messages from numerous world leaders.

Monday, July 21

- 12:57 a.m. Astronaut Aldrin reenters Eagle.
- 1:09 a.m. Astronaut Armstrong reenters Eagle.
- 1:34 p.m. Eagle lifts off of lunar surface.

Thursday, July 24

- 12:50 p.m. Splashdown in Pacific Ocean.
- 2:12 p.m. Arrive aboard Hornet.



HERE MEN FROM THE PLANET EARTH
FIRST SET FOOT UPON THE MOON

JULY 1969, A. D.

WE CAME IN PEACE FOR ALL MANKIND

NEIL A. ARMSTRONG
ASTRONAUT

MICHAEL COLLINS
ASTRONAUT

EDWIN E. ALDRIN, JR.
ASTRONAUT

RICHARD NIXON
PRESIDENT, UNITED STATES OF AMERICA

What Apollo Contributed to Science

(Edited excerpts from "Introduction to Apollo 17 Preliminary Science Report" by Anthony J. Calio, Director of Science and Applications, NASA Lyndon B. Johnson Space Center)

Before the Apollo Program, astronomical observations provided an early picture of the details of the lunar surface. In those days, intelligent speculation about the origin and history of the Moon was greatly inhibited because the scientific data required about its chemistry and internal condition could not be furnished even by the most powerful telescopes. Some of the most important scientific observations concerning the nature of the Moon which existed prior to Apollo 11 are summarized below.

The discovery of the surface features of the Moon dates back to Galileo, who observed that the side of the Moon facing the Earth consisted of mountainous regions that he designated terra and smoother regions that he designated mare, similar to continents and oceans on Earth. He also observed that the mare was much darker than the terra. Further astronomical studies added much detail to Galileo's discovery, including rather fine features such as the rilles. Later, some scientists felt that the relatively smooth mare basins were very extensive lava flows. Others thought that they were extensive dust deposits, in fact, dust bowls. Still other scientists seriously suggested that the maria were filled by a type of sedimentary rock that was deposited at a very early stage in lunar history when the Moon had an atmosphere.

Before man landed on the lunar surface, two explanations for the origin of craters were continuously debated: (1) that the craters were of volcanic origin, and (2) that the craters were produced by projectiles impacting the lunar surface, in the same way that meteorites occasionally excavate craters on Earth. Now it is fully realized that the surface of the Moon could be sculpted both by impacts and by volcanic craters, but primarily by impacts.

Dialogue on the activity of the Moon and on the role of vulcanism on the lunar surface developed into three schools of thought on the thermal history of the Moon. One school held that the Moon had been relatively inactive and had undergone some chemical differentiation only very early in lunar history. Another school propounded that the history of the Moon was similar to the Earth's long and continuous record of vulcanism and chemical differentiation, and that lunar volcanoes were active in the recent past. Others thought the Moon had undergone no volcanic activity at all.

The pre-Apollo data obtained by unmanned satellites discovered (1) the mascons, which suggested a remarkably rigid or strong lunar interior; (2) either a very weak lunar magnetic field or no field whatever; and (3) a significant difference in the surface between the lunar far side and the near side.

As we now look back on the six Apollo landings, we are infinitely richer in facts concerning the Moon. Some of these facts and observations have already been tentatively assembled in models that are leading to a much fuller understanding of lunar history. Although it is extremely difficult to account for the remaining facts with a consistent explanation, major areas of understanding can be briefly outlined.

It has been established with some confidence that the filling of the mare basins largely took place between 3.2 and 3.8 billion years ago. This has been demonstrated from analysis of the mare basalts obtained from the Apollo 11, 12, 15 and 17 missions and Luna 16. Because these mare fillings represent a major feature on the lunar surface, it has been inferred that the time of formation of more than 90 percent of the cratering on the Moon was 4 billion years ago or earlier. In comparison, the ocean basins of the Earth are younger than 300 million years. (Earth rocks older than 3 billion years are almost unknown).

The analysis of the highland material collected on the Apollo 14, 15, 16, and 17 missions and Luna 20 has shown the widespread occurrence of breccias with an apparent age of 3.8 to 4.1 billion years.

There is strong circumstantial evidence that rocks dating back to 4.5 to 4.6 billion years ago must exist within the Moon, although very few of the Apollo rocks have crystallization dates lying between 4.0 and 4.6 billion years. It now appears that heat from the intense bombardment of the lunar surface by projectiles, ranging in size from microscopic to tens of kilometers in diameter, was effective in resetting most of the clocks used to determine the absolute age of the rocks.

There seems to be almost unanimous agreement that the dark mare regions are underlain by extensive lava flows, shown both by rocks returned by the Apollo 11, 12, 15, and 17 missions and Luna 16 and by the high-resolution photographs that give convincing pictures of features comparable to lava flows on Earth. Almost all craters appear to be caused by impacting projectiles, thus leaving the questions of volcanic rocks in the terra regions unanswered. With the conclusion of Apollo 17, it has been suggested that volcanic activity in the highland region during the last 3 billion years may be highly restricted or virtually nonexistent.

Apollo experiments investigating whether the Moon is "alive" or "dead" indicate that, compared to Earth, the Moon is seismically quiet. However, there are many very small quakes, possibly triggered by tides, at approximately 800 km below the lunar surface.

Below 1000 km, the Moon is partially molten. A quiet Moon is consistent with the conclusion that vulcanism and other types of tectonic activity have been rare or absent from the lunar surface for the last 2 to 3 billion years. Lunar seismology reveals that the Moon has a crust more than 60 km thick. Both the precise origin of this crust and the compositions causing the discontinuity in seismic velocity are still subjects of debate. From the Apollo Program, we can conclude that the Moon, at one time, was very much alive and now is very quiet.

The overall magnetic field of the Moon has been found to be negligible, as was thought before the Apollo missions. However, the magnetometers placed on the lunar surface reveal surprisingly strong local fields, variable both in direction and in intensity. Studies have also determined that mare lava flows crystallized in a magnetic field that was much stronger than that of the present Moon. These discoveries raise the possibility that, during its early history, the Moon either was exposed to a relatively strong interplanetary magnetic field or had a magnetic field of its own that has since disappeared.

The thermal history of the Moon was investigated on the Apollo 15 and 17 missions through measurements of the heat escaping from the Moon.

These measurements indicate that the rate of energy flow escaping from the Moon is approximately half that of the Earth. This is surprisingly high, considering the relative size of the two planets. If these measurements prove to be characteristic of the Moon, perhaps the explanation is that the Moon is richer than the Earth and that these elements are strongly concentrated in the upper parts of the Moon.

Two current theories of lunar evolution have resulted from information concerning (1) the concentration and location of radioactive materials, (2) the inferred volcanic history of the Moon, and (3) the inferred upper limits of internal temperature. The first is that the planet was chemically layered during its formation. The low initial temperature of the lunar interior (below 500 km) gradually increased, perhaps reaching the melting point during the last billion years, while the initial hot temperature of the lunar exterior gradually decreased. The other theory is that much of the Moon was molten at its origin. Of course, both of these theories will undergo discussion and revision in the coming years.

The most extensive and diverse data obtained on the lunar surface are concerned with the chemistry and mineralogy of the surface materials.

The study of samples from the six Apollo sites and the two Luna sites reveals a number of chemical characteristics. Although it is very early to generalize from these relatively few samples of the whole lunar surface, two orbital experiments provide excellent data regarding the regional distribution of various rock types. These experiments are the X-ray fluorescence experiment and the gamma ray experiment.

The X-ray fluorescence experiment defined the prime difference between the chemistry of the mare and highland regions. The mare regions have aluminum concentrations 2 to 3 times lower than those of the terra or highland regions and magnesium concentrations 1.5 to 2 times greater than those of the terra regions. These differences in chemical concentrations throughout the equatorial region of the Moon are consistent with the chemical analysis of the returned samples. All mare basalts have been found to be unusually rich in iron and sometimes rich in titanium.

The orbital gamma ray experiment results show that the region north and south of the crater Copernicus is remarkably rich in radioactive elements. A band going from north of the Fra Mauro site to west of the Apollo 15 site contains soil 20 times richer in uranium and thorium than either mare or terra in other parts of the Moon. The existence of a rock rich in these elements was also inferred from samples from the Apollo 12, 14, and 15 missions. The differences between lunar rocks and terrestrial rocks are so marked that the Moon must be chemically different from the Earth.

The Moon appears to be much richer in elements that form refractory compounds at temperatures of approximately 1600 to 1800 K. Many scientists are now coming to the conclusion that the chemistry of the lunar surface reveals that some separation of solid material and gas in the lunar dust cloud took place at temperatures in excess of 1600 K. The strong depletion of elements that are volatile at high temperatures in the outer portion of the Moon is consistent with the enrichment of refractory elements.

None of the three theories regarding the origin of the Moon—separation from the Earth, capture from a circum-solar orbit, or formation from a dust cloud surrounding the Earth, can be absolutely eliminated by the present data. However, the chemical differences between the Earth and the Moon, the depletion of volatile elements, and the enrichment of refractory elements in lunar samples make it unlikely that the Moon was torn out of the Earth.

In summary, the age of the Moon is well determined, and the Moon has a crust (the chemical composition of which is fairly well understood), a mantle, and a partially molten deep interior. The understanding of the mascons is well underway. Facts substantiating the early theories of the atmosphere have been obtained. Basic questions that were asked 5 years ago, such as whether the Moon is hot or cold, alive or dead, or has craters formed by vulcanism or impact, are no longer asked. Apollo data have changed the types of questions asked. Post-Apollo questions are more detailed, more specific, and more sophisticated. Yet, despite the great strides taken in knowledge about the Moon, its origin and formation are still unknown.

A storehouse of resources has been returned from the Moon: almost 385 kg of lunar materials (obtained from six different landing sites on the near side of the Moon), 37 drive tubes, and 20 drill stems. To date, only 10 percent of this lunar material has been examined in detail. Approximately 33,000 lunar photographs and 20,000 reels of tapes of geophysical data have been collected. Thus, in 4 years of lunar exploration, our knowledge of lunar characteristics has been substantially increased, and vast resources of scientific data have been collected that will lead to a decade of data analysis.

In the past decade, there have been two revolutions in planetary science studies. There has been a revolution in the new global tectonics describing the motions of continents and the generation and destruction of the sea floor. The Apollo Program has led to a revolution in providing the first deep understanding of a planet other than the Earth through the development of new techniques of exploration, investigation, and analysis, and through the integration of the scientific knowledge gained in interdisciplinary fields. The Apollo Program provided Earth scientists with 4 years of anxiety, excitement, and fulfillment. Apollo lessons may force a reconsideration of many of the techniques and models that are currently used in understanding the early history of the Earth.

In decades to come, the analysis of Apollo data may indeed lead to a polar orbital flight around the Moon or to a lunar base where men may explore the entire surface of the Moon.

"Here man completed his first explorations of the Moon December 1972 A.D. May the spirit of peace in which we came be reflected in the lives of all mankind."

These words, inscribed on a plaque and signed by the Apollo 17 astronauts and President Nixon, were left on the Moon by the crew of the final Apollo lunar landing. Fittingly, the plaque echoes the first message taken to the Moon by the Apollo 11 astronauts. Affixed to the Eagle, the plaque was signed by President Nixon, Neil Armstrong and his Apollo 11 companions, Michael Collins and Edwin E. Aldrin, Jr. It bears a map of the Earth and this inscription:

"Here men from the planet Earth first set foot upon the Moon July 1969 A.D. We came in peace for all mankind."

On the first flight to the Moon, certain other ceremonial articles also were carried.

Besides three American flags, the crew carried with them the flags of the 50 states, of U.S. territories, of the United Nations and of each nation diplomatically recognized by the United States. Two of the American flags were brought back for presentation to the Senate and the House of Representatives.

The crew also had medals in memory of astronauts Grissom, Chaffee and White who were to have been the crew of the first manned space flight in the Apollo program. These men lost their lives in a 1967 spacecraft fire.

A memorial in the form of a gold replica of an olive branch, the traditional symbol of peace, was left on the Moon's surface. Armstrong and Aldrin also left a memorial to the two Soviet cosmonauts who lost their lives.

A small disc carrying statements by Presidents Eisenhower, Kennedy, Johnson and Nixon and messages of goodwill from leaders of 73 countries around the world was left on the Moon by the Apollo 11 astronauts.

The disc also carried a list of Congressional leaders and a list of members of the four committees of the House and Senate responsible for NASA legislation. Additionally, the names of NASA's top management, including past Administrators and Deputy Administrators, were included.

At the top of the disc is the inscription: "Goodwill messages from around the world brought to the Moon by the Astronauts of Apollo 11." Around the rim is the statement: "From Planet Earth -- July 1969."

The messages from foreign leaders congratulate the United States and its astronauts and also express hope for peace to all nations of the world. Some are handwritten, others typed and many are in native languages. A highly decorative message from the Vatican is signed by Pope Paul.

The disc, about the size of a 50-cent piece, is made of silicon. Through a process used to make microminiature electronic circuits, the statements, the messages, and names were etched on the grey-colored disc. Each message was reduced 200 times to a size much smaller than the head of a pin and appears on the disc as a barely visible dot. Although not visible to the naked eye, the words are readable through a microscope.

Following is a listing of the disc inscriptions:

PRESIDENTIAL STATEMENTS

"...The Congress hereby declares that it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind..."

National Aeronautics and Space
Act of 1958
Signed by President
Dwight D. Eisenhower
July 29, 1958

"...We go into space because whatever mankind must undertake, free men must fully share. . . .I believe that this Nation should commit itself to achieving the goal before this decade is out, of landing a man on the moon and returning him safely to earth. No single space project in this period will be more exciting, or more impressive to mankind, or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish...."

President John F. Kennedy
May 25, 1961

"...We expect to explore the moon, not just visit it or photograph it. We plan to explore and chart planets as well. We shall expand our earth laboratories into space laboratories and extend our national strength into the space dimension. The purpose of the American people -- expressed in the earliest days of the Space Age -- remains unchanged and unwavering. We are determined that space shall be an avenue toward peace and we both invite and welcome all men to join with us in this great opportunity..."

President Lyndon B. Johnson
January 27, 1965

"...Our current exploration of space makes the point vividly: Here is testimony to man's vision and to man's courage. The journey of the astronauts is more than a technical achievement; it is a reaching-out of the human spirit. It lifts our sights; it demonstrates that magnificent conceptions can be made real. They inspire us and at the same time they teach us true humility. What could bring home to us more the limitations of the human scale than the hauntingly beautiful picture of our earth seen from the moon? ..."

President Richard M. Nixon
June 4, 1969

-more-

ETCHED ON APOLLO 11 DISC

THE UNITED STATES HOUSE OF REPRESENTATIVES

John W. McCormack, Speaker
Carl Albert
Hale Boggs

Gerald R. Ford
Leslie C. Arends

Committee on Science and Astronautics

George P. Miller, Chairman
Olin E. Teague
Joseph E. Karth
Ken Hechler
Emilio Q. Daddario
John W. Davis
Thomas N. Downing
Joe D. Waggoner, Jr.
Don Fuqua
George E. Brown, Jr.
Earle Cabell
Bertram L. Podell
Wayne N. Aspinall
Roy A. Taylor
Henry Helstoski
Mario Biaggi
James W. Symington
Edward I. Koch

James G. Fulton
Charles A. Mosher
Richard L. Roudebush
Alphonzo Bell
Thomas M. Pelly
John W. Wydler
Guy Vander Jagt
Larry Winn, Jr.
Jerry L. Pettis
Donald E. Lukens
Robert Price
Lowell P. Weicker, Jr.
Louis Frey, Jr.
Barry Goldwater, Jr.

Committee on Appropriations

George H. Mahon, Chairman

Frank T. Bow

Subcommittee on Independent Offices
and Department of Housing and Urban Development

Joe L. Evins, Chairman
Edward P. Boland
George E. Shipley
Robert N. Giaimo
John O. Marsh, Jr.
David H. Pryor

Charles R. Jonas
Louis C. Wyman
Burt L. Talcott
Joseph M. McDade

ETCHED ON APOLLO 11 DISC

THE UNITED STATES SENATE

Spiro T. Agnew
President of the Senate

Richard B. Russell, President pro tempore
Michael J. Mansfield
Edward M. Kennedy
Everett McKinley Dirksen
Hugh Scott

Committee on Aeronautical and Space Sciences

Clinton P. Anderson, Chairman
Richard B. Russell
Warren G. Magnuson
Stuart Symington
John Stennis
Stephen M. Young
Thomas J. Dodd
Howard W. Cannon
Spessard L. Holland
Margaret Chase Smith
Carl T. Curtis
Mark O. Hatfield
Barry Goldwater
Charles McC. Mathias, Jr.
William B. Saxbe

Committee on Appropriations

Richard B. Russell, Chairman
Milton R. Young

Subcommittee on Independent Offices
and Department of Housing and Urban Development

John O. Pastore, Chairman
Warren G. Magnuson
Allen J. Ellender
Richard B. Russell
Spessard L. Holland
John Stennis
Michael J. Mansfield
Gordon Allott
Margaret Chase Smith
Roman L. Hruska
Norris Cotton
Clifford P. Case

NATIONS REPRESENTED BY GOODWILL MESSAGES ON APOLLO 11 DISC

Afghanistan
Argentina
Australia

Belgium
Brazil

Canada
Chad
Chile
China
Colombia
Congo
Costa Rica
Cyprus

Dahomey
Denmark
Dominican Republic

Ecuador
Estonia
Ethiopia

Ghana
Greece
Guyana

Iceland
India
Iran
Ireland
Israel
Italy
Ivory Coast

Jamaica
Japan

Kenya
Korea

Laos
Latvia
Lebanon
Lesotho
Liberia

Malagasy
Malaysia
Maldives
Mali
Malta
Mauritius
Mexico
Morocco

Netherlands
Nicaragua
New Zealand
Norway

Pakistan
Panama
Peru
Philippines
Poland
Portugal

Romania

Senegal
Sierra Leone
South Africa
Swaziland

Thailand
Togo
Trinidad and Tobago
Tunisia
Turkey

United Kingdom
Upper Volta
Uruguay

Viet Nam
Vatican

Yugoslavia

Zambia

Following are translations of goodwill messages from heads of state which will be deposited on the lunar surface during the Apollo 11 mission.

Afghanistan

"The Afghan people join me in most warmly congratulating the American people, particularly the intrepid astronauts and all those who have played a role in this historic and incredible journey.

The Afghan people express the hope that the expanded knowledge man now has of his universe will be used wisely in the cause of peace on earth and for the betterment of the condition of mankind."

Mohammad Zahir
King of Afghanistan

* * *

Argentina

"In the name of the Government and people of Argentina I have the honor to wish you the very best for the success of the great exploit that the brave crew of the Apollo XI is going to undertake. The effort and the risks that this extraordinary scientific enterprise demands open unlimited possibilities for the creative ability of the human spirit and it will constitute without any doubts an incentive that will commit all people in order to make a better and finer world. I present, Mr. President, my highest consideration to you."

Juan Carlos Ongania
President

* * *

Australia

"Australians are pleased and proud to have played a part in helping to make it possible for the first man from earth to land on the moon. This is a dramatic fulfillment of man's urge to go 'always a little further'; to explore and know the formerly unknown; to strive, to seek, to find, and not to yield. May the high courage and the technical genius which made this achievement possible be so used in the future that mankind will live in a universe in which peace, self expression, and the chance of dangerous adventure are available to all.

John Gorton
Prime Minister

-more-

Belgium

"Now that, for the very first time, men will land on the moon, we consider this memorable event with wonder and respect.

We feel admiration and confidence toward all those who have cooperated in this performance, and especially towards the three courageous men who take with them our hopes, as well as those, from all nations, who were their forerunners or who will follow them in space.

With awe we consider the power with which man has been entrusted and the duties which devolve on him.

We are deeply conscious of our responsibility with respect to the tasks which may be open to us in the universe, but also to those which remain to be fulfilled on this earth, so to bring more justice and more happiness to mankind.

May God help us to realize with this new step in world history better understanding between nations and a closer brotherhood between men."

Baudouin
King of the Belgians

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Brazil

"In rejoicing together with the government and the people of the United States of America for the event of the century, I pray God that this brilliant achievement of science remain always at the service of peace and of mankind."

Arthur Da Costa E Silva
President

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Canada

"Man has reached out and touched the tranquil moon. Puisse ce haut fait permettre a l'homme de redécouvrir la terre et d'y trouver la paix. (May that high accomplishment allow man to rediscover the Earth and find peace.)"

Pierre Elliott-Trudeau
Prime Minister

Chad

"Let this important step in the cosmic conquest remain for generation to come a mark of an epoch of fellowship and of universal peace. These are the earnest wishes of the Chadian people and of its government."

Francois Tombalbaye
President

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Chile

"May the men of our planet take to the moon a message of peace and good will from this place on the Earth that is Chile."

Eduardo Frei
President

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China

"It is our sincere desire that the astronauts, upon the date of their landing on the moon, will have made a significant contribution to a world utopia and peace through the universe."

Chiang Kai-Shek
President, Republic of China

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Colombia

"As you prepare to undertake one of the most extraordinary feats in history, I wish to send you on behalf of the people and the Government of Colombia, a warm greeting with our wishes for the complete success of your mission. I also want to express the admiration of all Colombians for your personal heroism, for the scientists and technicians that have contributed their knowledge to this enterprise and for the great North American nation whose support has made possible a project that only yesterday appeared to be unfeasible."

"Please leave on the moon along with the other objects that will bear witness of man's first arrival to our satellite, this message, as a symbol of friendship between Colombia and the United States.

"You will descend upon the moon on our national holiday, when we observe the 159th anniversary of our independence. We, in Colombia, will be honoring the memory of the patriots that changed the course of our history on the same day when you will be writing an immortal page in the annals of mankind."

Carlos Lleras Restrepo
President

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Congo

"The government of the Democratic Republic of the Congo follows with constant attention the achievements of human genius in the conquest of space in order to make man its master. The Congolese people, its party, its government, and myself express our ardent wish to see Apollo 11 successfully accomplish the mission which is our own. May these victories which have cost man so much energy and sacrifice contribute to the reinforcement of cooperation among peoples and serve peace for the greatest good of mankind. Best regards."

J. D. Mobutu
President

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Costa Rica

"I join in the wish of all Costa Ricans for the success of the historical exploit to be carried out by Apollo 11, in that it represents the scientific and technical progress attained by man in his peaceful struggle for the conquest of space and in that the crew of this ship represents human valor, will, spirit of adventure and ingenuity.

"The enormous scientific and technical effort deployed in order to take the first men to the moon deserves the gratitude of mankind because from this effort will come new benefits for improving the well-being of the human race.

"With faith we hope for better days for all mankind if there is later added to this successful endeavor - new determination for justice and liberty, as they correspond to the respect owed each human being and in favor of a major diffusion of love of one's neighbor, whose efforts we can hope will be stimulated by the spirit of humility derived from a more clear and vivid awareness of the minuteness of this planet, which serves as our home in the cosmos.

"As representative of the Costa Rican Nation, I extend my greetings to the heroes of Apollo 11 and to all those who are making this historical feat possible."

J. J. Trejos Fernandez
President

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Cyprus

"Man has conquered the moon and widened his horizons. The spaceship Apollo 11 is touching down on the surface of the moon and the first human beings are setting foot on it. The landing on the moon is the culminating achievement of a great scientific effort. That which could be captured only by the boldest imagination has now become a reality. With this historic event a new era in the life of mankind begins, and further achievements in the space world are certain to follow. We express our admiration to the valiant astronauts of Apollo 11 and to all those whose work made the conquest of space possible.

"We join in the rejoicing of the American nation who must feel very proud because their sons were the first humans to land on the moon."

Archbishop Makarios
President

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Dahomey

"The genius and daring of a great nation today open to mankind the secrets of a planet, which, for centuries, it has been able only to probe and to admire from a great distance, through the narrow hole of its telescopes.

"Today the dream has been realized. It is thanks to the talent and sacrifices of the great American nation. But it is also thanks to that which has been achieved through the ages and centuries by the knowledge, science, and technology of men, of all men. The lunar epic of the Apollo 11 astronauts thus opens in the history of mankind a new, grandiose cycle of space exploits and gives rise to great hopes.

"On this day of triumph and in this historic hour, I express personally, and in the name of the People of Dahomey, my wishes for Peace, Brotherhood, and Good Fortune for all mankind and for all men. May man's first steps on the moon convince those on earth to vow one day soon to employ science and technology only in the service of Peace and Progress."

Doctor Emile-Derlin Zinsou
President

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Denmark

"Denmark conveys, through the space pioneers, her warmest wishes that this spectacular landing on the moon may herald for all mankind a new era of peace and good will."

Frederik R
King of Denmark

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Dominican Republic

"The Dominican People follow with growing interest the development of the space exploration program being carried out by the National Aeronautics and Space Administration, which has extended the universal view of contemporary mankind.

"In view of the historic flight of Apollo 11, set for July 16, with the spectacular mission of landing two men on the moon, I, together with the Dominican People, am pleased to send my best wishes to NASA that this new scientific exploit will attain complete success. Space science of the United States will reach new heights in the exploration of outer space."

Joaquin Balaguer
President

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Ecuador

"I express my sincere wishes for the success of the heroic young astronauts who, with sublime valor, will set foot on the Moon, dominating the laws of outer space and consecrating the grandeur of human understanding and goodwill. Best regards."

Jose Maria Velasco Ibarra
President

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Estonia

"The people of Estonia join those who hope and work for freedom and a better world."

Ernst Jaakson
Consul General

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Ethiopia

"Today's successful lunar landing is a momentous occasion for all mankind. This marvelous feat is a proof of the gigantic strides man has made in the field of science and technology. We are fully confident that this great milestone in man's search for the unknown will give the American genius and the valiant American astronauts greater encouragement in their further probe of the solar system. We are hopeful that the results achieved in this regard will only be used for the welfare and well-being of mankind and the great cause of the world peace."

Haile Selassie I
Emperor

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Ghana

"We pray that your historic landing on the moon may usher in an era of peace and prosperity and goodwill among all men here on earth."

Brigadier A. A. Afrifa, D.S.O.
Chairman, National Liberation
Council

Greece

"At this historical moment, when man lands on the moon, I express on behalf of the Greek people my heartfelt congratulations to the Government of the U.S.A. and the distinguished men of the American nation, who led the way towards new horizons for the human race.

"I am particularly proud speaking on behalf of the Greek nation, whose ancestors had the privilege to be forerunners in the philosophical thought and scientific research, which first penetrated the universe.

"It is a happy coincidence that the amazing program of man's flight to space, which has been so magnificently fulfilled today, bears the name of the Greek God Apollo; this symbolic name demonstrates the never ending effort of man to achieve knowledge, beyond time and place.

"The difficulties, which had once broken the wings of Ikarus, are surpassed by man's persistence in his search for truth, and he is staring from the moon at the earth, whose peace and welfare should be now, more than ever, his main preoccupation."

George Zoitakis
Lieutenant General
Regent

Guyana

"To those coming after: We cannot tell on what future day - beings of our own kind or perhaps from some other corner of the cosmos, will come upon this message but for those coming after, we wish to record three things:

First, we salute these astronauts, the first two of our human race who with faith and courage have voyaged far beyond the familiar limits of our earthly home to the Moon. It is certain that their mission ushers in the greatest adventure of life since its primaevael beginnings on this planet, Earth.

Second, as members of our human race thus thrust among the stars, we pledge ourselves to work towards ensuring that the technology which has made it possible and the resources which may be discovered will be used for the benefit of all mankind irrespective of terrestrial divisions of race or creed or levels of development.

Third and finally, we wish to set down the facts about the people for whom I speak. We are a small nation of some 700,000 souls living on the shoulder of South America in a country some 83,000 square miles in area. Our ancestors came from nearly every corner of the planet Earth and our people today profess a variety of creeds and of ways of living. But in a world in which divisions deepen and where too often one man's hand is set against his brother, we are proud that we have given to our time an example of how out of diversity we have made one people, one nation - with one destiny.

In working out this destiny, we have developed institutions based on the recognition of the equality of all men, forms of government in which all can participate and a system of justice which protects the weak. With the help of friendly nations, and working together, we are embarked on the challenging task of abolishing disease and poverty from our midst, and of developing our economy so that it can support a worthy level of living for our people. We have, likewise, striven hard to ensure that men everywhere are free to determine their own way of life.

We do not know what shall be the judgment of history but we would be well pleased if on some later day when this is read, it is said of us that we strove greatly to advance the dignity of all men."

Linden Forbes Sampson Burnham
Prime Minister

Iceland

"The people of Iceland convey their greetings by Apollo 11 and wish the astronauts good fortune on their historic voyage. May the great achievements of space research inaugurate an era of peace and happiness for all mankind."

Kristjan Eldjarn
President

*India

"On this unique occasion when man traverses outer space to set foot on Earth's nearest neighbour, Moon, I send my greetings and good wishes to the brave astronauts who have launched on this great venture. I fervently hope that this event will usher in an era of peaceful endeavour for all mankind."

Indira Gandhi
Prime Minister

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Iran

"On this occasion when Mr. Neil Armstrong and Colonel Edwin Aldrin set foot for the first time on the surface of the Moon from the Earth, we pray the Almighty God to guide mankind towards ever increasing success in the establishment of peace and the progress of culture, knowledge and human civilization."

Mohammad Reza Pahlavi Aryamehr
Shahanshah

Ireland

"May God grant that the skill and courage which have enabled man to alight upon the Moon will enable him, also, to secure peace and happiness upon the Earth and avoid the danger of self-destruction."

Eamon de Valera
President

Israel

"From the President of Israel in Jerusalem with hope for 'abundance of peace so long as the Moon endureth' (Psalms 72,7)."

Zalman Shazar

Italy

"The courage and the technology of the United States of America have brought to our satellite this message of the Head of the Italian Nation which prides itself to number amongst its sons Galileo Galilei, whose genius paved the ways for modern science.

The conquest of the Moon is a glorious milestone along the road of all mankind towards the achievement of peace, freedom and justice.

Guiseppe Sarget
President

Ivory Coast

"At the moment when man's oldest dream is becoming a reality, I am very thankful for NASA's kind attention in offering me the services of the first human messenger to set foot on the Moon and carry the words of the Ivory Coast.

I would hope that when this passenger from the sky leaves man's imprint on lunar soil, he will feel how proud we are to belong to the generation which has accomplished this feat.

I hope also that he would tell the Moon how beautiful it is when it illuminates the nights of the Ivory Coast.

I especially wish that he would turn towards our planet Earth and cry out how insignificant the problems which torture men are, when viewed from up there.

May his word, descending from the sky, find in the Cosmos the force and light which will permit him to convince humanity of the beauty of progress in brotherhood and peace."

Felix Houphouet-Boigny
President

Jamaica

"May He whose glory the heavens declare grant that mankind may grow in the knowledge of His purposes as we probe into the secrets of His universe."

Hugh Lawson Shearer

Japan

"In congratulation of the outstanding achievement of humanity's arrival on the Moon."

Eisaku Sato
Prime Minister

Kenya

"On behalf of all the people of Kenya, I congratulate the people of America for accomplishing arrival on the Moon. It is a very inspiring event for all mankind that we have been able to reach the Moon. It is clear that we all are brothers here on Earth and that is our obligation to cooperate together in all endeavors."

President Kenyatta

Korea

"The landing on the Moon by Apollo 11 is a brilliant feat of all mankind which makes men's dreams a reality and marks a new chapter of human history. This great achievement is a result of man's constant striving for progress towards a brighter destiny. Now, realization of man's adventure into yet further reaches of space seems but a few steps away.

On this historic occasion, we do solemnly pledge ourselves to work together on this Earth for the better world with lasting peace and prosperity for all mankind. Let us celebrate the first landing of men on the Moon, the symbol of eternal grace and the mirror of man's true heart, with a new spirit which will inspire mankind to realize the ideal of civilization in which men live in justice, freedom, and unity."

Park Chung Hee
President

Laos

"As the representative of a people and a nation of the Earth, I feel the immeasurable pride and I share the intensely felt emotion of the American people and the American Nation in the first human contact with the lunar planet."

SRI(HM) Savang Vatthana

Latvia

"On behalf of the Latvian nation I salute the first men on the Moon and pray for their safe return.

"May their achievement contribute to world peace and restoration of freedom to all nations."

A. Dinbergs
Counselor

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Lebanon

"As a final result of the combined efforts of science and technology and all to the honor of its initiators, man is reaching the Moon and is setting foot on it for the first time. At this glorious moment when man is freed from the physical constraints of the human condition, Lebanon adds her living testimonial as a land of encounter and of coexistence of many spiritual families to reaffirm her faith in the advancement of man through the virtues of peace, justice and of liberty."

Charles Helou
President

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Lesotho

"The government and people of Lesotho wish the government and people of the United States of America every success in their attempt to land the first human being on the moon. Our sincere warm wishes for a safe journey to and from the moon to Apollo 11 Astronauts."

Leabua Jonathan
Prime Minister

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Liberia

"It is extraordinary, almost incredible that what was but an idea, even a little over a decade ago, seems now an attainable reality. Man's imagination, ingenuity and technology have not only impelled him to look up but has also enabled him to reach the celestial bodies.

"The journey to the Moon which these three Americans, Commander Neil Armstrong, Colonel Edwin E. Aldrin, Jr., and Lt. Colonel Michael Collins have successfully undertaken is a voyage to the celestial and these messengers of discovery represent the people of every country.

"We salute these explorers of outer space and pray for their security and safety while we admire their courage and intrepidity.

"I ask them to bear this message to the inhabitants of the Moon if they find any there. If they do not, it is my desire that this message be one of greetings from the people of Liberia and myself to the Moon, Nebulous satellite of the Earth."

W. V. S. Tubman
President

Malagasy

"In this twentieth century when for the first time man has reached the Moon, Mr. Philibert Tsiranana, President of the Malagasy Republic, and the people of Madagascar sincerely wish that the marvelous accomplishments of the knowledge and courage of man will bring the world liberty, peace and progress.

"May these accomplishments, their development and their consequences not be transformed into instruments of destruction but may they bring physical, intellectual and moral well-being to all living beings.

"Such is the sincere desire of the Malagache people that they would like transmitted to the Moon by the American astronauts of Apollo 11.

"Long live the world founded on the wisdom and knowledge that God has given to man."

Philibert Tsiranana
President

Malaysia

" The people of Malaysia join the rest of the world today in congratulating the Government and people of the United States of America on the success of the Apollo 11 mission to land man for the first time on the moon. May the knowledge gained in the efforts to fulfill this historic mission add to the wisdom of mankind in our search for greater peace and prosperity."

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Maldives

"This message of peace and goodwill from the people of Maldives came with the first men from planet Earth to set foot on the Moon."

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Mali

"In the name of the People and the Government of the Republic of Mali, I wish to express my warmest respect to all those who by their intelligence and by their courage have permitted man to land on the Moon, thus opening to humanity a new horizon full of promise.

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"Our People and our Government hope that this historic step in the march towards progress will contribute essentially to the reinforcement of peace, to the bringing together of all men and to the liquidation of misery on our planet."

Lieutenant Moussa TRAORE
Chief of State

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Malta

"On this unique and historic occasion when man first set foot on a planet outside his own, the people of Malta join the rest of the world in saluting the men whose courage and dedication, backed by the untiring efforts of scientists and countless collaborators, have made possible this new conquest in space and in the same way as Malta has advocated peace below the waters of the world she fervently prays that peace shall continue to reign in the vastness of space beyond it."

Giorgio Borg Olivier
Prime Minister

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Mauritius

"Your bold venture commands admiration of government and people of Mauritius wish you God's speed and happy perfect landing. Safe return."

Seewoosagar Ramgoolam
Prime Minister

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Mexico

"It is an honor for Mexico, with this most modest symbolic testimony, to form part of the event which for the first time takes man to a soil away from his home planet. And, in doing so, Mexico extends most enthusiastic congratulations to the dedicated, gallant astronauts and to the scientists and technicians, as well as, in a broader sense, to the American people and their Government for this undertaking that, hitherto, only had precedents in the realm of imagination.

"Mexico's very own emblem-its traditional seal-with the eagle and the serpent, already embodies the double sign inspiring man since his remote origins and which in a particular manner may be equated to coming humanity: the serpent is a sign of Earth and of all that holds us here; the eagle represents flight, undaunted and far-seeing, a fearless pilgrimage which makes it possible for the legacy of the centuries to reach ever increasing circling horizons. Far from being contradictory to each other, both images are complementary and placed together reflect our temporal, earthly, nature and the visions which nurture all progress.

"In 1492, the discovery of the American Continent transformed geography and the course of human events. Today, conquest of ultraterrestrial space-with its attendant unknowns-recreates our perspectives and enhances our paradigms.

"Mexico, while expressing its hope that this human accomplishment will result in good for mankind and that all the peoples on Earth will participate in its fulfillment with clear conscience of their common destiny, for the development of this new stage, offers not a power nor richness it does not possess but the moral heritage decanted from its own history: an unquenchable thirst for material and spiritual improvement and an unyielding faith in the supremacy of reason and justice as a way and an inspiration for human conduct which now has attained a new far reaching responsibility."

President

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Morocco

"His Majesty King Hassan II and the people of Morocco wish to join the other nations of the world in saluting the courage of the first men to set foot on the Moon in the spirit of peace for all mankind. May this spirit of peace pervade the Earth and the advancement of science enrich the great brotherhood of men."

The Netherlands

"I have great admiration for the skill and perseverance of all those who have contributed to make the first manned flight to the Moon possible. I hope that this achievement will prove of great benefit for the future of mankind."

Juliana R.

Nicaragua

"The arrival of man on the moon will be of great consequence for peace and for the scientific investigation of the origin of the Earth and the Solar System. This extraordinary event and this triumph of man in the application of science inspires us to think of the Creator.

"The People of Nicaragua express their most fervent wishes for the success of the flight of Apollo 11 and show their sincere and profound recognition of the People and government of the United States of America and Astronauts Neil Armstrong, Edwin E. Aldrin, and Michael Collins, who, by their efforts will make possible the conquest of the Moon."

A. Somoza

New Zealand

"By this flight man has finally fulfilled the great ambition of setting foot on another celestial body. As Prime Minister of New Zealand I hope that the realization of this dream -- so long remote -- will inspire all those who set their sights high and thus bring closer the dreams we share of peace and cooperation for all mankind."

Keith J. Holyoake

Norway

"I express my best wishes for the Astronauts carrying out the Apollo 11 mission and for the success of this historic space journey."

Olav R.

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Pakistan

"Greetings and felicitations from Pakistan to the American Astronauts who blazed a new trail for mankind by landing on the Moon. May their high venture and pioneering courage open a new era of peace and progress for the human race."

A. M. Yahya Khan
President

Panama

"All nations of the Earth, small and large, share the wish that the arrival of the first men on the Moon will be a permanent message of peace. Panama is among the first to make this fervent wish of mankind its own."

Colonel Bolivar Urrutia P.
President

Peru

"The Government and the people of Peru join in spirit the astronauts of Apollo 11 in their extraordinary trip to the Moon and express their fervent wish that the immense possibilities of the human spirit which have conquered space may be equally capable of insuring among the Nations of the Earth an era of peace and justice."

General Juan Velasco Alvarado
President

Philippines

"The age-old dream of man to cut his bonds to Planet Earth and reach for the stars has given him not only wings, but also the intellect and the intrepid spirit which had enabled him to overcome formidable barriers and accomplish extraordinary feats in the exploration of the unknown, culminating in this epochal landing on the Moon."

Philippines Con't

"The Filipino people join the world in congratulating the United States of America for putting the first men on the Moon, a triumphant milestone in the conquest of space which augurs greater achievements in the broadening of man's vision and the fulfillment of a larger destiny, within the framework of true human brotherhood and an enduring peace."

Ferdinand Marcos
President

Poland

"Although we are not suggesting any message from the Polish Head of State, please be assured that the achievements of the U.S. astronauts are followed by us with great interest, appreciation and best wishes for the success in their endeavor."

Sincerely,

Jorzy Michalowski
Ambassador

Portugal

"The Portuguese people, discoverers of the unknown Earth in centuries past, know how to admire those who in our days explore outer space bringing mankind in contact with other worlds."

Americo Deus Rodrigues Thomaz
President

Romania

"May the first direct contact of man with the Moon contribute to the fulfillment of the aspirations for progress and peace of all people on Earth."

Nicolae Ceausescu
President

Senegal

"This is a message from black militants. It is a message of human solidarity, a message of peace. In this first visit to the Moon, rather than a victory of technology we salute a victory of human will: research and progress, but also brotherhood."

Leopold Sedar Senghor
President

Sierra Leone

"I send the Apollo 11 astronauts very best wishes for a successful landing on the Moon, one of the greatest achievements and triumphs of man. Their tasks in connection with this great event are extremely complex and difficult. But a successful completion of this assignment will be recorded as a remarkable landmark in the development of mankind and a victory over the forces of nature. We wish them a pleasant and successful journey and a safe return home."

Siaka P. Stevens
Prime Minister

South Africa

"No human being can be unmoved by the prospect unveiled, at this historic moment in time, of man's first landing on the Moon. Thus man reaches out beyond the confines of his own planet, in an enterprise in which the United States of America and its heroic astronauts have opened a new dimension to human experience. I am proud of South Africa's association from the outset with NASA's space program. On behalf of the Government and all the peoples of the Republic of South Africa, I salute this manifestation of human courage and enterprise and express heartfelt wishes and our prayers to the Almighty for the success of this climactic project."

Johannes Jacobus Fouche
President

Swaziland

"Man steps upon the Moon with pride, faith and hope as his inspiration and peace with progress as his objective."

H. M. King Sobhuza II

TURKEY

"I consider the landing of men on the moon as a sign of the beginning of a new era of which we could hardly dream until now.

"Since the start of the space explorations, the Turkish nation has most ardently wished the realization of this thousand-year old dream and followed with great hope and excitement every success in this field.

"I wish to congratulate most heartily the heroic astronauts and the American people, our friends and allies, for they have spared no effort in this field and also those who have contributed to the achievement of this outstanding accomplishment from which, I am sure, mankind and our civilization will benefit for peaceful purposes."

Cevdet Sunay
President

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UNITED KINGDOM

"On behalf of the British people I salute the skill and courage which have brought man to the moon. May this endeavour increase the knowledge and well-being of mankind."

Elizabeth R.

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UPPER VOLTA

"At a time when, transcending the terrestrial sphere and overcoming distances, man is about to dispel the mystery enveloping this world by conquering the Moon, I General Sangoule Lamizana, President of the Republic of Upper Volta, invite men of the entire earth to unite to celebrate this victory which does not belong only to one country or one people but simply to the glory of all mankind.

"We hope with all our heart that this great exploit which we salute with respect and admiration will bring mankind progress and happiness in all areas and that men, feeling the universe become smaller, will strive to make the earth become henceforth a common fatherland where the sons of Adam will live united in brotherhood."

General Sangoule Lamizana
President

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URUGUAY

"The Government and the people of Uruguay have followed with great interest the marvelous and continuing chronicle of the conquest of outer space which will culminate very soon, within a few days, with the arrival on the Moon of a manned American spaceship.

"In order to express my feelings on this matter, I wish to send you, Mr. President, my most cordial congratulations on this heroic feat, which will remain one of the most outstanding achievements of our century, the fruit of courage, tenacity, and the most unshakable desire to excel.

"Future generations will enjoy the positive results of this endeavor, which will benefit the entire universe.
Best regards."

Jorge Pacheco-Areco
President

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VATICAN

"Jahweh our Lord, how great your name throughout the earth, above the heavens is your majesty chanted.

"By the mouths of children, babes in arms, you set your stronghold firm against your foes to subdue enemies and rebels.

"I look up at your heavens, made by your fingers, at the moon and stars you set in place.

"Ah, what is man that you should spare a thought for him? Or the son of man that you should care for him?

"You have made him a little less than an angel, you have crowned him with glory and splendor, and you have made him lord over the work of your hand.

"You set all things under his feet, sheep and oxen all these, yes, wild animals too, birds in the air, fish in the sea travelling the paths of the ocean.

"Jahweh our Lord, how great your name throughout the earth!"

Psalms 8

"To the glory of the name of God who gives such power to men, we ardently pray for this wonderful beginning."

Paul VI, Pope

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VIETNAM

"For many thousand years, the moon has been celebrated by the Vietnamese poets as a beautiful paradise. Today we already know that the face of the moon does not correspond to the imagination of ancient poets. The fact, however, that men of the earth finally set foot on the moon marks the beginning of a most beautiful adventure, because it opens broader vistas on our immense universe, and the perspectives on men's accessibility to other worlds.

"This memorable feat should bring to mankind both a sense of pride and humility: pride, because human beings by their intelligence and perseverance are now able to get beyond this earth to which they seemed to be bound; humility, because the quarrels which divide men on the earth look so petty in the context of our vast universe.

"In this historical event, we prayerfully hope that the ingenuity and intelligence which God endows to men will lead toward increasing progress and brotherhood, and the widening of human horizons. We are, therefore, very happy that the first message deposited by the brave American astronauts of Apollo 11 on the moon is a message of peace for all mankind, and from all mankind, in which the Vietnamese people fully concur."

H.E. Nguyen Van Thieu
President

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YUGOSLAVIA

"May this majestic fulfilment of the ancient dream of the human race - man's setting foot on the distant soil of the moon, the first neighbour of us all - bring closer the realization of the humanity's age-long vision to live in peace, brotherhood and joint endeavour."

Josip Broz Tito
President

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ZAMBIA

"Zambia sends from Earth through Earth's first messengers to land on the moon - the intrepid astronauts Armstrong, Aldrin and Collins - this message of good will among men of all lands and cities: that there be harmony in all the created world."

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APOLLO HISTORICAL SUMMARY

Initial planning for a launch vehicle having a payload capability of the Saturn I began in April 1957. In August 1958, studies concluded that a clustered booster of 1.5 million pounds thrust was feasible and the research and development effort was begun. Initial results proved that the engine clustering technique, using existing hardware, could furnish large amounts of thrust.

Rocketdyne, a division of North American Rockwell Corp., updated the Thor-Jupiter engine, increased its thrust, thus developing the 200,000 pound thrust H-1 engine. Concurrently, from advanced studies, the 1.5 million pound thrust F-1 engine was conceived and subsequently used as the power plant for the even larger boosters.

In October 1958, the Army team moved to develop a high-performance booster for advanced space missions. Tentatively called Juno V and finally designated Saturn, the booster was turned over to NASA in late 1959.

In July 1960, NASA first proposed publicly a post-Mercury program for manned flight and designated it Project Apollo. The Apollo goals envisioned at the time were Earth-orbital and circumlunar flights of a three-man spacecraft.

During 1960, Douglas Aircraft Company, Inc. (now McDonnell Douglas) was selected to build the Saturn I second stage (S-IV) and Rocketdyne was chosen to develop the hydrogen fueled J-2 engine for future upper stages of the Saturn vehicles.

On May 25, 1961, President John F. Kennedy proposed to Congress that the United States accelerate its space program, establishing as a national goal a manned lunar landing and return by the end of this decade. In his report to Congress President Kennedy said:

"Now is the time...for this nation to take a clearly leading role in space achievement, which in many ways may hold the key to our future on Earth.

"...this is not merely a race. Space is open to us now; and our eagerness to share its meaning is not governed by the efforts of others. We go into space because whatever mankind must undertake, free men must fully share.

"No single space project in this period will be more impressive to mankind or more important for the long-range exploration of space...

"Let it be clear...that I am asking the Congress and the Country to accept a firm commitment to a new course of action, a course which will last for many years and carry very heavy costs... If we are to go only halfway, or reduce our sights in the face of difficulty, in my judgment it would be better not to go at all."

With endorsement by Congress, the national objective of manned lunar exploration created an immediate need for a considerably more powerful booster -- later designated the Saturn V. Following another six-month study, NASA announced in January 1962 that the Saturn V, using a cluster of five F-1 engines, would generate 7.5 million pounds of thrust, thus providing the liftoff power for the lunar landing program. After announcing that NASA would undertake the task of developing the Saturn V, contracts were awarded to Boeing Company and North American to build the first two stages of the Saturn V.

The second stage has a cluster of five J-2 engines developing a combined thrust of one million pounds. The third stage (S-IVB) and instrument unit were already under development for the smaller Saturn by Douglas Aircraft and IBM, respectively.

Later in 1962, NASA announced it was developing the Saturn IB which combined the first stage of the Saturn I and the top stage of the Saturn V for Earth orbital tests of the Apollo spacecraft.

On August 9, 1961, MIT was selected to develop the Apollo spacecraft guidance and navigation system. Three and a half months later, NASA selected North American Rockwell Corp. for the Apollo spacecraft command and service module program.

In mid-July 1962, the National Aeronautics and Space Administration selected the lunar orbital rendezvous mode for the lunar mission. This called for development of a two-man lunar module to be used for landing on the Moon and returning to lunar orbit. Grumman Aircraft Engineering Corp. was selected to design and build the lunar module on November 7, 1962.

One year later, the first Apollo command module was flown at White Sands Missile Range in a launch pad abort test. The first high altitude abort was successfully demonstrated on May 13, 1964. Fifteen days later a Saturn I placed the first Apollo command module into orbit from Cape Kennedy.

The first full systems Apollo command module was launched aboard a Saturn IB, and successfully tested the module's reentry heat shield. The February 26, 1966 test was also the first flight of a Saturn IB.

The first phase of the Saturn launch vehicle program was completed in 1965. In ten flights of the Saturn I, ten were successful -- an unprecedented record in rocket development. Much technology was proven in the Saturn I program. The rocket guidance system was developed. The concept of clustered rocket engines was validated and, the program supplied experience in using liquid hydrogen as rocket fuel. Liquid hydrogen provides double the fuel economy of earlier fuels.

The Saturn IB launch vehicle was successfully flown three times in three attempts in 1966. Two of these flights carried spacecraft to space where they satisfactorily completed requirements for Apollo command and service modules in Earth orbital operations.

On January 27, 1967, tragedy struck the nation space effort when a fire erupted inside an Apollo spacecraft during ground testing at Cape Kennedy, resulting in the deaths of Astronauts Virgil Grissom, Edward White II and Roger Chaffee. After two and a half months of investigation, involving 1,500 people, the Board of Inquiry determined that the most likely cause of the fire was electrical arcing from certain spacecraft wiring. After an extensive investigation by an Accident Review Board, the National Aeronautics and Space Administration followed with detailed descriptions of corrective actions, schedule modifications, and cost estimates necessary to move the program toward its objective.

On November 9, 1967, the first flight test of the Apollo/Saturn V space vehicle was successfully accomplished. Designated Apollo 4, the unmanned flight demonstrated performance of the previously unflown first and second Saturn V stages, the restart-in-orbit capability of its third stage, the Apollo spacecraft ability to reenter Earth's atmosphere at lunar mission return speeds, performance of the integrated space vehicle, and the operational readiness of Kennedy Space Center Launch Complex 39. All mission objectives were met following an on-time launching and an 8-hour 37-minute mission. The Saturn V placed a total weight into orbit of over 278,699 pounds after a near perfect countdown. The spacecraft heat shield performed satisfactorily during the 24,800 mile per hour plunge into Earth's atmosphere.

During the January 22-23, 1968 Apollo 5 mission, lunar module systems and structural performance met all objectives, including two firings of both the ascent and descent propulsion systems. The unmanned Lunar Module I was boosted into Earth orbit by a Saturn IB. Post-flight analysis determined the lunar module ready for manned Earth orbital missions.

The April 4, 1968 flight of Apollo 6 was the second unmanned Saturn V mission to demonstrate launch vehicle and spacecraft systems performance. Two problems were experienced with the rocket systems -- vertical oscillations of "POGO" effect in the first stage and rupture of small propellant lines in the upper stages -- in an otherwise, very successful mission.

The precise reentry and splashdown on October 22, 1968 of the 11-day Apollo 7 flight ended what was called a 101 percent successful mission. Manned by Astronauts Walter Schirra, Donn Eisele, and Walt Cunningham, the Apollo 7 performed flawlessly for more than 780 hours in space including eight firings of the spacecraft's primary propulsion system and the first live TV from a manned vehicle.

Apollo 8 lifted off precisely on time, December 21, 1968 from the Kennedy Space Center for history's first flight from Earth to another body in the solar system. Apollo 8 performed flawlessly for 147 hours and over a half million miles of space flight which included ten revolutions around the Moon, lunar and Earth photography, and live television broadcasts.

Apollo 9 splashed down in the Atlantic Ocean, northeast of Puerto Rico, at 12:00:53 EST, March 13, 1969, after a 10-day, 6-million mile Earth orbital mission. All major mission objectives were met in the first five days of flight. Apollo 9 was the first all-up manned flight of the Apollo Saturn V space vehicle, first manned flight of the lunar module, first Apollo EVA, and included rendezvous and docking, live television, photographic surveys of Earth, and observation of Pegasus II satellite and Jupiter. This was the fourth Saturn V on-time launch (11:00 am EST).

Apollo 10 successfully completed man's second lunar orbital flight, passing within 9 miles of the lunar surface in a dress rehearsal for the actual lunar landing mission. Lifting off at 12:49 pm, May 18, Apollo 10 spent nearly 62 hours (31 revolutions) in lunar orbit, sent 19 live color TV transmissions, and splashed down within 7,000 yards of its primary recovery ship in the Pacific Ocean eight days and three hours after launching.

Apollo 11 attained the national goal, set by President Kennedy in 1961, of landing men on the Moon and returning them safely to Earth within the decade of the 1960's. The mission was launched precisely on time from Kennedy Space Center at 9:32 am EDT, July 16, by a Saturn V. The LM touched down in the Moon's Sea of Tranquility at 4:18 pm, July 20, and Commander Neil Armstrong stepped onto the lunar surface at 10:56 that evening followed by LM Pilot Edwin E. Aldrin, Jr. Their activities were viewed live around the world by the largest television audience in history. The returning spacecraft splashed down in the Pacific, southwest of Hawaii, at 12:51 pm EDT, July 24 after a flight of 8 days, 3 hours, 19 minutes. Scientific instruments were left on the Moon and samples of the Moon's soil and rocks were brought back, along with still and motion pictures.

Exactly four months after the Apollo 11 landing, the Apollo 12 repeated this achievement, landing and exploring at the Ocean of Storms, opening a new era in manned scientific exploration. The November 14 launched Apollo 12 mission demonstrated the point landing capability, and implaced the first Apollo Lunar Surface Experiments package on the surface for continued science reporting. Two EVA periods were completed by the astronauts, which included experiments emplacement, field geology investigation, and Surveyor III inspection. The crew for the 10 day 4.5 hour mission was commander, Captain Charles Conrad, Jr.; Command Module Pilot, Captain Richard F. Gordon, Jr.; and Lunar Module Pilot, Captain Alan L. Bean.

Apollo 13 was launched April 11, 1970 to land on the Fra Mauro upland area of the Moon where the crew would retrieve surface samples and emplace geophysical instruments during two EVA periods. A rupture of the service module oxygen tank at 10:11 pm EST, April 13 caused a power failure of the command and service electrical system which prevented the lunar landing. The crew used the lunar module as the command post and living quarters for the remainder of the flight. The lunar module descent engine provided propulsion to make corrections in the flight path which sent the spacecraft around the Moon on a free-return trajectory for re-entry and splashdown in the Pacific Ocean 142 hours, 54 minutes, 41 seconds after liftoff.

The Apollo 13 Review Board announced on June 30 that a short circuit ignited electrical insulation in the spacecraft oxygen tank No. 2, causing failure of the tank. The Board recommended the command and service module systems be modified to eliminate potential combustion hazards in high-pressure oxygen of the type revealed by the accident.

The spacecraft was modified in accordance with the Board's recommendations for Apollo 14 to be launched no earlier than Jan. 31, 1971 to land on the Fra Mauro area of the Moon.

Apollo 14 accomplished the third manned lunar surface exploration mission. The spacecraft was launched at 4:03 p.m., Sunday, Jan. 31, 1971, and the lunar module touched down on the Moon at 4:17 a.m. EST Feb. 5 within 60 feet of the targeted point on the Fra Mauro formation. Landing coordinates were 3 degrees 40 minutes, 27 seconds South latitude: 17 degrees, 27 minutes, 58 seconds West longitude. Mission Commander Alan B. Shepard, Jr. and Lunar Module Pilot Edgar D. Mitchell successfully carried out two periods of extravehicular activity on the lunar surface; the first of 4 hours 50 minutes and the second for 4 hours 35 minutes, totalling 9 hours 25 minutes. They successfully deployed and activated the Apollo Lunar Surface Experiments Package, an array of geophysical instruments which are transmitting data on the Moon's interior and exterior environment to Earth. In addition, they collected 96 pounds of lunar rocks and soil, which included two rocks weighing about 10 pounds each, the largest obtained to date. After spending 33 1/2 hours on the Moon, the lunar module lifted off the surface at 1:47 p.m. Saturday, Feb. 6, 1971. The Earthbound portion of the mission was normal and the spacecraft landed in the South Pacific Ocean at 4:05 p.m. EST Feb. 9, 1971.

The fourth lunar landing mission, Apollo 15, was launched Monday, July 26, 1971 at 9:34 a.m. EDT. Modifications to the spacecraft permitted longer lunar surface staytime and additional scientific instruments in lunar orbit. The 12-day, 7-hour, 12-minute mission was commanded by astronaut David R. Scott, with command module pilot Alfred M. Worden, and lunar module pilot James B. Irwin. On July 30, at 6:16 p.m. EDT Scott and Irwin landed at the Hadley Apennine site, 26 degrees, 6 minutes North latitude and 3 degrees 39 minutes East longitude. During their 66-hour, 55-minute stay on the Moon they explored the lunar surface for a total of 18 hours, 36 minutes, retrieved approximately 170 pounds of surface samples, deployed geophysical instruments and described geological features. Command module pilot Worden conducted extensive scientific experiments while orbiting the Moon which included the operation of two cameras and gamma ray and X-ray sensors mounted in the service module. After 74 lunar revolutions and ejection of a subsatellite, the spacecraft began its Earthbound journey. Astronaut Worden egressed from the command module and retrieved the camera film during the transearth coast. The Pacific Ocean landing was August 7, 1971 at 4:46 p.m. EDT.

Apollo 16, the fifth lunar landing mission, was launched April 16, 1972 at 12:54 p.m. EST. The 11 day, 1 hour, 51 minute mission was commanded by astronaut John W. Young with Thomas K. Mattingly, II as command module pilot and Charles M. Duke, Jr. as lunar module pilot. The spacecraft splashed down in the Pacific at 2:45 p.m. EST April 27. Young and Duke set records for the longest staytime on the lunar surface, 71 hours 12 minutes, and the longest lunar surface EVA time, totaling 20 hours 14 minutes. The three surface EVAs were on April 21, 22 and 23. The lunar module touched down on the Descartes highlands April 20 at 9:23 p.m. EST at a point on the Moon approximately 8 degrees, 54 minutes South latitude and 15 degrees, 30 minutes East longitude. The lunar explorers returned approximately 210 pounds of Moon rocks and soil samples to Earth. Astronaut Mattingly spent 3 days, 9 hours, 39 minutes orbiting the Moon in the command module, while Young and Duke were on the surface. In lunar orbit Mattingly operated a complex array of scientific instruments, two lunar mapping cameras and observed geological features on the surface. A scientific subsatellite was placed in lunar orbit before the trans-Earth maneuver was performed. On the Earthbound trip Mattingly egressed from the spacecraft for 1 hour 24 minutes to retrieve the film canisters from the lunar cameras.

- end -

The sixth and final Moon landing mission in the Apollo Program, Apollo 17, was launched at 12:33 a.m. EST December 7, 1972. The mission was commanded by Astronaut Eugene Cernan, a veteran of Gemini 9 and Apollo 10; Command Module Pilot was Ron Evans who was on his first space flight; and Lunar Module Pilot was Harrison "Jack" Schmitt, the first geologist to visit and work on the Moon. The finale to the Apollo series set many records, among them: longest surface stay time, 74 hours, 58 minutes, 38 seconds; longest single surface extra vehicular activity, 7 hours, 37 minutes, 21 seconds; longest total surface EVA time, 22 hours, 5 minutes, 6 seconds; longest lunar distance traveled with the Lunar Roving Vehicle on one EVA, 12 nautical miles (19 kilometers); and on three EVAs, 22 nautical miles (35 kilometers). It was the longest Apollo mission, 12 days, 14 hours; returned the most lunar samples, 250 pounds (115 kilograms); and spent the longest time in lunar orbit, 147 hours, 48 minutes. The Lunar Module Challenger landed at Taurus Littrow at 1:55 p.m. EST December 11, and lifted off from the Moon at 5:55 p.m. December 14. On the return to Earth segment of the mission Evans performed a 1 hour, 7 minute, 18 second space walk to retrieve film and other experiment data from the Service Module. At 2:24 p.m. EST December 17, the Apollo 17 Command Module "America" landed in the Pacific Ocean. It was 69 years to the day since Wilbur and Orville Wright made the first powered flight in an airplane.

AMERICA'S LUNAR EXPLORERS, WHERE ARE THEY NOW?

Neil A. Armstrong, Apollo 11 mission commander, and Edwin E. Aldrin, lunar module pilot, the first two men from Earth to explore the surface of the Moon, paved the way for 10 additional astronauts to leave their footprints on five other sites on the lunar terrain.

Today, Armstrong is a professor of engineering at the University of Cincinnati, a position he has held since October 1971, after heading NASA's aeronautical research programs in Washington, D.C. for 18 months.

Aldrin, who now resides in California, left the NASA space program in 1971 and was Commander of the Air Force Aerospace Research Pilots School, Edwards, Calif., before he retired from active duty a year later.

Five astronauts who explored the Moon have remained with the corps of space pilots at the Johnson Space Center, Houston. They are: Alan L. Bean, of the Apollo 12 crew who also commanded the second Skylab mission spending 59 days in Earth orbit; Alan B. Shepard, the first American to fly in space in the Mercury capsule in 1961 and commander of Apollo 14; John W. Young, commander of Apollo 16, who also flew two Gemini Earth orbital missions and orbited the Moon as command module pilot of Apollo 10; Charles M. Duke Jr., the Apollo 16 lunar module pilot who accompanied Young during that lunar exploration, and Eugene A. Cernan, commander of Apollo 17, the final mission in the program, who also orbited the Moon as Apollo 10 lunar module pilot.

Five lunar explorers who are no longer active astronauts.

Charles (Pete) Conrad, Apollo 12 commander, became Vice President of American Television and Communications Corp., Denver in February 1974. Edgar D. Mitchell, lunar module pilot on Apollo 14, has resided in California since 1972 and is Chairman of the Institute of Noetic Sciences. David R. Scott, Apollo 15 commander, was appointed Deputy Director of the NASA Flight Research Center, Edwards, Calif. in 1972. James B. Irwin, lunar module pilot of Apollo 15, resigned from the space program in 1972 to enter Christian evangelical work. He resides in Colorado. Dr. Harrison H. Schmitt, a geologist and 12th man to set foot upon the Moon as Apollo 17 lunar module pilot, was appointed Assistant Administrator, Office of Energy Research and Development, at NASA Headquarters, Washington, D.C. in May 1974.

Michael Collins, Apollo 11 command module pilot who orbited the Moon while Armstrong and Aldrin explored the surface, and five other lunar orbiter astronauts have gone to other positions.

Collins is Director of the National Air and Space Museum of the Smithsonian Institution, Washington, D.C.

The Apollo 8 crew, Frank Borman, James A. Lovell, Jr. and William A. Anders, were the first men to orbit the Moon in December 1968. Borman has been senior vice president of Eastern Airlines Operations Group, Miami, since July, 1970.

Lovell, also commander of Apollo 13 which could not land on the Moon because of a service module oxygen tank explosion, became executive vice president of Bay-Houston Towing Co., Houston, in March 1973.

Anders served as Executive Secretary of the National Aeronautics and Space Council, 1969-1973, and is now a member of the Atomic Energy Commission.

Richard F. Gordon, Apollo 12 command module pilot, became executive vice president of the New Orleans Saints professional football team on January 1, 1972.

John L. Swigert, Jr., Apollo 13 command module pilot, was appointed Staff Executive Director, Committee on Science and Astronautics, House of Representatives, in April 1973.

Alfred M. Worden, Jr., command module pilot of Apollo 15, has served as a research engineer and test pilot at the NASA Ames Research Center, Mountain View, Calif., since September 1972.

Stuart A. Roosa, Thomas K. Mattingly II, Ronald E. Evans and Fred W. Haise, Jr., command module pilots of Apollo 14, 16, 17, and 13 respectively, have remained with the astronaut team at the Johnson Space Center.

Thomas P. Stafford, Brig. Gen. USAF, Apollo 10 commander, has been designated commander of the United States Crew of the Apollo Soyuz joint docking mission with the USSR which is scheduled for July 1975.

APOLLO MISSION FACTS

Mission Number	Mission Designation	Mission Type	7	8	9	10	11	12	13	14	15	16	17							
Date	Space Vehicle Number	Launch Vehicle Number	Lunar Module Call Sign	Command & Service Module Call Sign	Launch Complex-Pad (LC-)	Commander (CMB)	Command Module Pilot (CMP)	Earth Orbits	Spacecraft Payload (Pounds)	Lunar Landing Site	Payload to Lunar Surface (Pounds)	Lunar EVA Manhours (Number of EVAs)	Lunar Traverse Distance (KM)	Lunar Samples Returned (Pounds)	Lunar Stay Time	Lunar Orbits	In-Flight EVA Manhours	Mission Duration	Recovery Ship	Landing Coordinates
10/11-22/68	205	205	-	-	34	Schirra	Eisele	163	36,419	-	-	-	-	-	-	-	10days 20hrs	Essex	27°33'N, 84°04'W	
12/21-27/68	503	503	-	-	39A	Borman	Lovell	163	87,382	-	-	-	-	-	-	-	6days 3hrs	Yorktown	16°01'N, 80°8'W	
3/3-13-69	504	504	Splder	Gumdrop	39A	McDivitt	Scott	152	95,231	-	-	-	-	-	-	-	3-2 hrs	Guadalcanal	6°06'N, 23°13'N	
5/18-26/69	505	505	Snoopy	Charlie Brown	39B	Stafford	Young	152	98,273	-	-	-	-	-	-	-	8days 3mins	Princeton	15°08' 165°W	
7/16-24/69	506	506	Eagle	Columbia	39A	Armstrong	Collins	152	100,756	Sea of Tranquility	225	5 hrs (1)	0.25	46	-	-	8days 3.3hrs	Hornet	13°09'N, 169°09.4'W	
11/14-24/69	507	507	Intrepid	Yankee Clipper	39A	Conrad	Gordon	152	101,127	Ocean of Storms	365	15.5 hrs (2)	2	75	-	-	10days 4.6hr	Hornet	15°21'S, 165°10'W	
4/11-17/70	508	508	Aquarius	Odyssey	39A	Lovell	Swigert	152	101,261	Translunar Abort, SMO2 Failure	-	-	-	-	-	-	5days 22.9hr	Iwo Jima	21°38.24'S, 163°21.42'W	
1/31-2/9/71	509	509	Antares	Kitty Hawk	39A	Shepard	Roosa	152	102,084	Fra Mauro	460	18.6 hrs (2)	3.3	94	-	-	9days 3mins	New Orleans	27°11'S, 172°39.90'W	
7/26-8/7/71	510	510	Falcon	Endavour	39A	Scott	Worden	152	107,142	Hadley-Apennine	1210	37.2 hrs (3)	27.9	169	-	-	12days 7.2hr	Oklahoma	26°07'N, 158°08'W	
4/16-27/72	511	511	Orion	Casper	39A	Young	Mattingly	152	107,158	Descartes	1228	40.5 hrs (3)	26.7	210	-	-	1hr 24mins	Ticonderoga	09°43'S, 156°13'W	
12/7-19/72	512	512	Challenger	America	39A	Cernan	Evans	152	107,193	Taurus-Littrow	1242	44.2 hrs (3)	35.0	257	-	-	1hr 7mins	Ticonderoga	17°23'S, 166°07'W	

Mission	Crew	Date	Duration hr:min:sec	Remarks
Mercury-Redstone 3	Shepard	May 5, 1961	00:15:22	Suborbital flight — first American in space. USS Champlain, Atlantic recovery (A). Spacecraft call sign Freedom 7.
Mercury-Redstone 4	Grissom	July 21, 1961	00:15:37	Also suborbital; successful flight but spacecraft sank, astronaut rescued. USS Randolph (A). Liberty Bell 7
Mercury-Atlas 6	Glenn	Feb. 20, 1962	04:55:23	Three-orbit flight; first American in orbit; retropack retained when erroneous signal indicated heat shield possibly loose; capsule landed 40 miles uprange. USS Noa, (A). Friendship 7.
Mercury-Atlas 7	Carpenter	May 24, 1962	04:56:05	Also three-orbit mission; yaw error at manual retrofire caused 250-mile landing overshoot. USS Pierce (A). Aurora 7.
Mercury-Atlas 8	Schirra	Oct. 3, 1962	09:13:11	Six-orbit flight; capsule landed 4-1/2 miles from recovery ship USS Kearsarge, Pacific (P). Sigma 7.
Mercury-Atlas 9	Cooper	May 15 and 16 1963	34:19:49	Twenty-two orbits to evaluate effects on man of 1 day in space; landed 4-1/2 miles from USS Kearsarge (P). Faith 7.
Gemini-Titan III	Grissom, Young	March 23, 1965	04:53:00	Three-orbit demonstration of the spacecraft; maneuver over Texas on first pass changed orbital path of a manned spacecraft for first time; landed about 50 miles uprange. USS Intrepid (A). Molly Brown (only Gemini named).
Gemini-Titan IV	McDivitt, White	June 3 to 7, 1965	97:56:11	Four-day flight with White first American to walk in space in 20-minute extravehicular activity (hatch open 36 minutes); after 62 revolutions of Earth, landed 50 miles uprange from USS Wasp (A).
Gemini-Titan V	Cooper, Conrad	Aug. 21 to 29, 1965	190:55:14	First use of fuel cells for electric power; evaluated guidance and navigation system for future rendezvous missions; incorrect navigation coordinates from ground control resulted in landing 90 miles short; 120 revolutions. USS Lake Champlain (A).
Gemini-Titan VII	Borman, Lovell	Dec. 4 to 18, 1965	330:35:31	Longest-duration Gemini flight; provided rendezvous target for Gemini VI-A; crew flew portions of mission in shirtsleeves for first time; 206 revolutions; landed 6.4 miles from target. USS Wasp (A).
Gemini-Titan VI-A	Schirra, Stafford	Dec. 15 and 16, 1965	25:51:24	Rescheduled to rendezvous with Gemini VII after original target Agena failed to orbit; VI-A launch postponed 3 days when launch vehicle engines automatically shut down 1.2 seconds after ignition; completed first space rendezvous; after 16 revolutions, landed within 7 miles of target to initiate series of pinpoint landings by Gemini spacecraft. USS Wasp (A).
Gemini-Titan VIII	Armstrong, Scott	March 16, 1966	10:41:26	First docking of one space vehicle with another; about 27 minutes after docking, Gemini-Agena combination began to yaw and roll at increasing rates; emergency procedures included undocking, deactivation of malfunctioning spacecraft control system, activation of reentry control system; mission was terminated and, midway through 7th revolution, spacecraft landed 1.1 miles from planned landing point in secondary recovery area in western Pacific; destroyer USS Mason picked up crew 3 hours later.
Gemini-Titan IX-A	Stafford, Cernan	June 3 to 6, 1966	72:21:00	Rescheduled to rendezvous and dock with augmented target docking adapter after original target Agena failed to orbit; ATDA shroud did not completely separate, making docking impossible; three different types of rendezvous were completed; Cernan carried out 2 hours 7 minutes of EVA; 44 revolutions; 0.38 miles from target. USS Wasp (A).

Gemini-Titan X	Young, Collins	July 18 to 21, 1966	70:46:39	First use of Agena target vehicle's propulsion systems; spacecraft also rendezvoused with Gemini VIII target vehicle; Collins had 49 minutes of EVA standing in hatch, 39-minute EVA to retrieve experiment from Agena VIII; 43 revs; 3.4 miles, USS Guadalcanal (A).
Gemini-Titan XI	Conrad, Gordon	Sept. 12 to 15, 1966	71:17:08	Gemini record altitude (739.2 miles) reached using Agena propulsion after first-revolution rendezvous and docking. Gordon fastened Agena-anchored tether to Gemini docking bar, and spacecraft later made two revolutions of Earth in tethered configuration; Gordon 33-minute EVA and 2-hour 5-minute standup EVA; 44 revs; 1.5 miles, USS Guam (A).
Gemini-Titan XII	Lovell, Aldrin	Nov. 11 to 15, 1966	94:34:31	Final Gemini flight; Aldrin logged 2-hour 29-minute standup EVA, 55-minute standup EVA, and 2-hour 6-minute EVA for Gemini record total of 5 hours 30 minutes of extravehicular activity; 59 revs, 2.6 miles, USS Wasp (A).
Apollo-Saturn 7	Schirra, Eisele, Cunningham	Oct. 11 to 22, 1968	260:09:03	First manned flight of Apollo spacecraft command-service module only, 163 revolutions; USS Essex (A) - all Apollo spacecraft splashed down within 10 miles of predicted landing point.
Apollo-Saturn 8	Borman, Lovell, Anders	Dec. 21 to 27, 1968	147:00:42	First flight to the Moon (command-service module only); views of lunar surface televised to Earth; 10 revolutions of the Moon; USS Yorktown (P).
Apollo-Saturn 9	McDivitt, Scott, Schweickart	March 3 to 13, 1969	241:00:54	First manned flight of lunar module; spacecraft call signs for communications identification when undocked: CSM "Gumdrop" and LM "Spider"; Schweickart 37-minute EVA from LM; 151 revs; USS Guadalcanal (A).
Apollo-Saturn 10	Stafford, Young, Cernan	May 18 to 26, 1969	192:03:23	First lunar module orbit of Moon; call signs Charlie Brown and Snoopy; 31 revs of Moon (4 revs by undocked LM); USS Princeton (P).
Apollo-Saturn 11	Armstrong, Collins, Aldrin	July 16 to 24, 1969	195:18:35	First lunar landing; call signs Columbia and Eagle; lunar stay time 21 hours 36 minutes 21 seconds. Armstrong and Aldrin EVA (hatch open to hatch close) 2 hours 31 minutes 40 seconds, lunar surface samples 48.5 pounds; 30 revs; USS Hornet (P).
Apollo-Saturn 12	Conrad, Gordon, Bean	Nov. 14 to 24, 1969	244:36:25	Yankee Clipper and Intrepid; stay time 31 hours 31 minutes, Conrad and Bean EVAs 3 hours 56 minutes and 3 hours 49 minutes, lunar samples 74.7 pounds plus parts from Surveyor 3 unmanned spacecraft; 45 revs; USS Hornet (P).
Apollo-Saturn 13	Lovell, Swigert, Haise	Apr. 11 to 17, 1970	142:54:41	Odyssey and Aquarius; mission aborted after service module oxygen tank ruptured; using lunar module oxygen and power until just before reentry, crew returned safely to Earth; USS Iwo Jima (P).
Apollo-Saturn 14	Shepard, Roosa, Mitchell	Jan 31 to Feb 9, 1971	216:01:57	Kitty Hawk and Antares; stay time 33:31, Shepard and Mitchell EVAs 4:48 and 4:35, samples 96 pounds; 34 revs; USS New Orleans (P).
Apollo-Saturn 15	Scott, Worden Irwin	July 26 to Aug 7, 1971	295:11:53	Endeavour and Falcon; first use of lunar roving vehicle; stay time 66:55; Scott standup EVA 33 minutes, Scott and Irwin EVAs 6:33, 7:12 and 4:50, Worden trans-Earth EVA 38 minutes, samples 170 pounds; 74 revs; USS Okinawa (P).
Apollo-Saturn 16	Young, Mattingly Duke	April 16 to April 27, 1972	265:51:05	Casper and Orion; stay time 71:02; Young and Duke EVAs 7:11, 7:23 and 5:40, Mattingly trans-Earth EVA 1:24, samples 213 pounds; 64 revs; USS Ticonderoga (P).
Apollo-Saturn 17	Cernan, Evans, Schmitt	Dec. 7 to Dec. 19, 1972	301:51:59	America and Challenger; stay time 75:00; Cernan and Schmitt EVAs 7:12, 7:37 and 7:15, Evans trans-Earth EVA 1:06, samples 243 pounds; 75 revs; USS Ticonderoga (P).

Skylab 1st Manned Skylab 2	Conrad Kerwin Weitz	May 25 to June 22, 1973	672:49:49	First U.S. manned orbiting space station mission; crew deployed solar shield, released stuck solar panel. These repair activities permitted manned operations of the Orbital Workshop after meteoroid shield was damaged and torn off during boost. Data obtained on 46 or 55 experiments. Crew performed 3 space walks totaling 5 hours, 41 minutes.
Skylab 3	Bean Garriott Lousma	July 28 to Sept. 25, 1973	1427:09:04	Crew performed systems and operational tests, deployed new solar shield, replaced rate gyros. Crew substantially exceeded pre-mission plans for scientific activities. Performed three space walks totaling 13 hrs., 44 mins.
Skylab 4	Carr Gibson Pogue	Nov. 16, 1973 to Feb. 8, 1974	2017:16:30	Final Skylab manned visit, longest flight of men in space. Crew replenished coolant supplies, repaired antenna, made observations of Comet Kohoutek. Crew performed four space walks totaling 22 hrs., 21 mins. Set record for space walk duration -- 7 hrs., 1 min.

TRANSCRIPTS OF LANDING SEQUENCE

APOLLO 11 MISSION COMMENTARY, 7-20-69, GET 102:43:00, CDT 15:15 307/1

CAPCOM Roger, copy.
PAO Altitude 4200.
CAPCOM Houston. You're go for landing. Over.
EAGLE Roger, understand. Go for landing.
3000 feet.
CAPCOM Copy.
EAGLE 12 alarm. 1201.
EAGLE 1201.
CAPCOM Roger. 1201 alarm.
EAGLE We're go. Hang tight. We're go.
2,000 feet. 2,000 feet into the AGS. 47 degrees.
CAPCOM Roger.
EAGLE 47 degrees.
CAPCOM Eagle looking great. You're go.
PAO Altitude 1600. 1400 feet. Still looking
very good.
CAPCOM Roger. 1202. We copy it.
EAGLE 35 degrees. 35 degrees. 750, coming down
at 23. 700 feet, 21 down. 33 degrees. 600 feet, down at 19.
540 feet, down at 30 - down at 15. 400 feet, down at 9. (garbled)
8 forward. 350, down at 4. 330, 3-1/2 down. We're pegged on
horizontal velocity. 300 feet, down 3-1/2. 47 forward.
(garbled) Down 1 a minute. 1-1/2 down. 70. Got the shadow
out there. 50, down at 2-1/2. 19 forward. Altitude-velocity
lights. 3-1/2 down, 220 feet. 13 forward. 11 forward, coming
down nicely. 200 feet, 4-1/2 down. 5-1/2 down. 160, 6-1/2
down, 5-1/2 down, 9 forward. 5 percent. Quantity light. 75
feet, things looking good. Down a half. 6 forward.
CAPCOM 60 seconds.
EAGLE Lights on. Down 2-1/2. Forward. Forward.
Good. 40 feet, down 2-1/2. Picking up some dust. 30 feet,
2-1/2 down. Faint shadow. 4 forward. 4 forward, drifting to
the right a little. 6 (garbled) down a half.
CAPCOM 30 seconds.
EAGLE (garbled) forward. Drifting right.
(garbled) Contact light. Okay, engine stop. ACA out of
detent. Modes control both auto, descent engine command
override, off. Engine arm, off. 413 is in.
CAPCOM We copy you down, Eagle.
EAGLE (Armstrong) Houston, Tranquility base
here. The Eagle has landed.
CAPCOM Roger, Tranquility, we copy you on
the ground. You've got a bunch of guys about to turn blue.
We're breathing again. Thanks a lot.

APOLLO 11 MISSION COMMENTARY, 7-20-69, GET 102:43:00, CDT 15:15 307/2

TRANQUILITY Thank you.

CAPCOM You're looking good here.

TRANQUILITY I tell you. We're going to be busy
for a minute. Master arm on. Take care of the descent.
(garbled) Very smooth touchdown. Looks like we're venting
the oxidizer now.

CAPCOM Roger, Eagle. And you are stay for
T1. Over. Eagle, you are stay for T1.

END OF TAPE

APOLLO 11 MISSION COMMENTARY, 7/20/69, CDT 15:20, GET 102:48, 308/1

CAPCOM Roger, Eagle, and you're stay. Press
E 1, over. Eagle, you are stay for T1.
EAGLE Roger, and we're stay for T1.
CAPCOM Roger, and we see you getting the OX.
EAGLE Roger.
EAGLE And our circuit breaker.
EAGLE - copy NOUN 60 - NOUN 43, over.
CAPCOM Roger, we have it.
COLUMBIA Houston, do you read Columbia on the
high gain?
CAPCOM Roger, we read you 5 by, Columbia.
He has landed, Tranquility base. Eagle is at Tranquility,
over.
COLUMBIA Yeah, I heard the whole thing.
CAPCOM Rog, good show.
COLUMBIA Fantastic.
CAPCOM (garble)
PAO The next major stay, no stay will be for
a T2 event, that is at 21 minutes 26 seconds after initiation
for power descent.
COLUMBIA Columbia set up telemetry command reset
to reacquire on the high gain.
CAPCOM Copy, out.
PAO We have an unofficial time for that
touchdown of a 102 hours 45 minutes 42 seconds and we will
update that.
CAPCOM Eagle, Houston. You loaded R2 wrong.
We want 10254.
EAGLE Roger.
EAGLE That is V horizontal 5515.2.
CAPCOM That's affirmative.
PAO We are now less than 4 minutes from
our next stay, no stay. The stay will be for 1 complete
revolution of the command module.
EAGLE Mike, AGCS the things align, over?
CAPCOM Say again.
EAGLE Mike, the AGCS the things align, over.
CAPCOM Roger, we are standing by for it.
PAO One of the first things that Armstrong
and Aldrin will do after getting their next stay, no stay will
be to remove their helmet and gloves.
EAGLE Our quantity, (garble).
CAPCOM Eagle, Houston. You are stay for T2,
over.
CAPCOM A correction, your -
EAGLE Have your stay for T2, we thank you.
CAPCOM Roger, sir.
PAO That stay for another 2 minutes plus.
The next stay no stay will be for 1 revolution.

END OF TAPE

APOLLO 11 MISSION COMMENTARY 7/20/69, GET 102:53, CDT 15:25, 309/1

PAO steady for another 2 minutes plus, the next stay no stay, will be for 1 revolution. We don't expect much in the way of a visual description of the landing area from the crew until after we get through these critical stay, no stay periods and have gotten the status to remain on the lunar surface for at least 1 command and service module revolution. All spacecraft systems continue to look good to us here on the ground.

EAGLE Tranquility base, Houston, we recommend you exit P12, over.

EAGLE Houston, that may have seemed like a very long final phase. The auto targeting was taking us right into a football field, football field sized crater, with a large number of big boulders and rocks for about 1 or 2 crater diameters around us, and it required a (garbled) on the 366 and flying manually over the rock field to find a reasonably good area.

CAPCOM Roger, we copy. It was beautiful from here, tranquility, over.

EAGLE We'll get to the details of what's around here, but it looks like a collection of just about every variety of shapes, angularities, granularities, every variety of rock you could find. The colors vary pretty much depending on how you're looking relative to the 0 phase point. There doesn't appear to be too much of a general color at all, however it looks as though some of the rocks and boulders, of which there are quite a few in the near area, it looks as though there going to have some interesting colors to them, over.

CAPCOM Roger, copy. Sounds good to us tranquility. We'll let you press on through the simulated count down, and we'll talk to you later, over.

EAGLE Roger.

EAGLE Okay, this 16G is just like the airplane.

CAPCOM Rog, tranquility, be advised there's lots of smiling faces in this room, and all over the world.

END OF TAPE

APOLLO 11 MISSION COMMENTARY, 7-20-69, CDT 15:30, GET 102:58:00 310/1

EAGLE - yeah, just like an airplane.
CAPCOM Rog, Tranquility - be advised that there is a lot of smiling faces in this room and all over the world, over.
EAGLE There is 2 of them up here.
CAPCOM Rog, that was a beautiful job, you guys.
COLUMBIA And don't forget one in the command module.
CAPCOM Rog.
PAO That last remark from Mike Collins at an altitude of 60 miles. The comments on the landing on the manual take-over came from Neil Armstrong. Buzz Aldrin followed that with a description of the lunar surface and the rocks and boulders that they are able to see out the window of the LM.
CAPCOM Tranquility, Houston. We had you pitch up about 4 and 1/2 degrees, over.
EAGLE That's confirmed by our local observation.
CAPCOM Roger.
COLUMBIA And thanks for putting me on relay, Houston. I was missing all the action.
CAPCOM Roger, we'll enable this in relay.
COLUMBIA I just got it, Larry.
CAPCOM Rog, Columbia. This is Houston. Say something they should be able to hear something, over.
COLUMBIA Roger, Tranquility base. It sure sounded great from up here. You guys did a fantastic job.
EAGLE Thank you. Just keep that orbiting base ready for us up there now. (garble)
COLUMBIA Will do.
PAO That request from Neil Armstrong.
PAO Here in Mission Control, Flight Director Gene Kranz is going around the -
EAGLE We have 10327, AOS 10413, over.
COLUMBIA Thank you.
PAO We have just gotten a report from the TEL COM here in Mission Control that the LM systems looked good after that landing. We're about 26 minutes now from loss of signal from the command module.
CAPCOM Tranquility base, Houston. All of your consumables are solid. You are looking good in every respect. We copy the dips of any. Everything is copacetic over.
EAGLE Thank you, Houston.
EAGLE Houston, the guys had said we wouldn't be able to tell precisely where we are or the winners today -

END OF TAPE

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:20, CDT 21:52 339/1

ARMSTRONG You need more slack, Buzz?
ALDRIN No, hold it just a minute.
ARMSTRONG Okay.
PAO 25 minutes of PLSS time expended
now.
ALDRIN Okay, everything's nice and
sunny in here.
ARMSTRONG Okay, can you pull the door open
a little more?
ALDRIN (garbled)
ALDRIN Did you get the mesa out?
ARMSTRONG I'm going to pull it now.
ARMSTRONG Houston, the mesa came down
alright.
CAPCOM Houston. Roger, we copy, and
we're standing by for your TV.
ARMSTRONG Houston, this is Neil. Radio
check.
CAPCOM Neil, this is Houston. You're
loud and clear. Break, break. Buzz, this is Houston. Radio
check and verify TV circuit breaker in.
ALDRIN Roger, TV circuit breaker's in.
Receive loud and clear.
CAPCOM Man, we're getting a picture
on the TV.
ALDRIN Oh, you got a good picture. Huh?
CAPCOM There's a great deal of contrast
in it, and currently it's upside-down on our monitor, but we
can make out a fair amount of detail.
ALDRIN Okay, will you verify the
position, the opening I ought to have on the camera.
CAPCOM Stand by.
CAPCOM Okay, Neil, we can see you coming
down the ladder now.
ARMSTRONG Okay, I just checked - getting
back up to that first step, Buzz, it's not even collapsed too
far, but it's adequate to get back up.
CAPCOM Roger, we copy.
ARMSTRONG It takes a pretty good little
jump.
CAPCOM Buzz, this is Houston. F 2
1/160th second for shadow photography on the sequence
camera.
ALDRIN Okay.
ARMSTRONG I'm at the foot of the ladder.
The LM foot pads are only depressed in the surface about
1 or 2 inches. Although the surface appears to be very,
very fine grained, as you get close to it. It's almost like
a powder. Now and then, it's very fine.

TRANSCRIPTS OF FIRST STEP AND EVA

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:20, CDT 21:52 339/2

ARMSTRONG I'm going to step off the LM now.

ARMSTRONG That's one small step for a man,

One giant leap for mankind.

ARMSTRONG As the - The surface is fine and powdery. I can - I can pick it up loosely with my toe. It does adhere in fine layers like powdered charcoal to the sole and sides of my boots. I only go in a small fraction of an inch. Maybe an eighth of an inch, but I can see the footprints of my boots and the treads in the fine sandy particles.

CAPCOM Neil, this is Houston. We're copying.

END OF TAPE

APOLLO 11 MISSION COMMENTARY 7/20/69 CDT 21:57 GET 109:25 340/1

ARMSTRONG There seems to be no difficulty in moving around as we suspected. It's even perhaps easier than the simulations at 1/6g that we performed in the simulations on the ground. It's actually no trouble to walk around. The descent engine did not leave a crater of any size. There's about 1 foot clearance on the ground. We're essentially on a very level place here. I can see some evidence of rays emanating from the descent engine, but very insignificant amount. Okay, Buzz, we're ready to bring down the camera.

ALDRIN I'm all ready. I think it's been all squared away and in good shape. Okay? Okay, you'll have to pay out all the LEC. It looks like it's coming out nice and evenly.

ARMSTRONG Okay, it's quite dark here in the shadow and a little hard for me to see if I have good footing. I'll work my way over into the sunlight here without looking directly into the sun.

ALDRIN Okay, it's taut now.

PAO Unofficial time on the first step -
109:24:20.

ALDRIN Yes, I think it's pulling the wrong one.

ARMSTRONG Okay, I'm with you. Pull it down now.
There was still a little bit left in the -

ALDRIN Okay, don't hold it quite so tight.
Okay?

ARMSTRONG Looking up at the LM, I'm standing directly in the shadow now looking up at Buzz in the window. And I can see everything quite clearly. The light is sufficiently bright, backlighted into the front of the LM, that everything is very clearly visible.

ALDRIN Okay, I'm going to be changing this hook hanger.

ARMSTRONG Okay.

PAO The Surgeon says that -

ARMSTRONG Camera installed on the RCU bracket.

PAO The Surgeon says the crew is doing well.

Data is good, crew is doing well.

ARMSTRONG I'm storing the LEC on the secondary strut.

END OF TAPE

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:30, CDT 22:02, 341/1

ARMSTRONG I'll step out and take some of my first pictures here.

CAPCOM Roger, Neil, we're reading you loud and clear. We see you getting some pictures and the contingency sample.

ALDRIN He's getting some pictures and the contingency sample.

PAO 35 and a half minutes of PLSS time expended now.

CAPCOM Neil this is Houston. Did you copy about the contingency sample, over.

ARMSTRONG Rog, I'm going to get to that just as soon as I finish these picture series.

ALDRIN Okay, going to get the contingency sample now, Neil.

ARMSTRONG Right.

ALDRIN Okay, that's good. Okay the contingency sample is down and it's (garbled). Looks like it's a little difficult to dig through -

ARMSTRONG This is very interesting. It's a very soft surface but here and there where I plug with the contingency sample collector, I run into a very hard surface but it appears to be very cohesive material of the same sort. I'll try to get a rock in here. Here's a couple.

END OF TAPE

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:34, CDT 22:06, 342/1

ARMSTRONG A couple.
ALDRIN That looks beautiful from here, Neil.
ARMSTRONG It has a stark beauty all its own. It's like much of the high desert of the United States. It's different but it's very pretty out here. Be advised that a lot of the rock samples out here, the hard rock samples have what appear to be vesicles in the surface. Also I am looking at one now that appears to have some sort of phenocryst.
CAPCOM Houston. Roger, out.
ALDRIN Container handle is off the (cut out) - in about six or eight inches under the surface. I could (cut out)
ARMSTRONG It is. It's - I'm sure I could push it in further, but it's hard for me to bend down further than that.
ALDRIN Now you can -
ARMSTRONG You can really throw things a long way out there. That pocket open, Buzz?
ALDRIN Yes it is, but it's not up against your suit. Hit it back once more. More toward the inside. Okay, that's good.
ARMSTRONG That in the pocket?
ALDRIN Yes, push down. Got it? No, it's not all the way in. Push it. There you go.
ARMSTRONG Contingency sample is in the pocket. I - Oxygen is 81 per cent. I have no flags, and I'm in minimum flow.
CAPCOM This is Houston. Roger and out.
ALDRIN Okay. I have got the cameras on at one frame a second
ARMSTRONG Okay.
ALDRIN And I've got the 80 per cent, no flags.
ARMSTRONG Are you getting a TV picture now, Houston?
CAPCOM Neil, yes we are getting a TV picture.
Neil, this is Houston. We're getting a picture here. It's the first time we can see the bag on the LEC being moved by Buzz, though. Here you come into our field of view.
ARMSTRONG (Garble).
ALDRIN Roger.
ARMSTRONG Hold it a second. First let me move that over the edge for you.
ALDRIN Okay. Are you ready for me to come out?
ARMSTRONG Yes. Just stand by a second. I'll move this over the handrail. Okay?
ALDRIN Alright. That's got it. Are you ready?
ARMSTRONG All set. Okay, you saw what difficulties I was having. I'll try to watch your PLSS from underneath here.
ALDRIN Alright. The backup camera is -

END OF TAPE

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:39, CDT 22:11 343/1

ALDRIN - all right the back up camera's position.
ARMSTRONG Okay. Your PLSS is - looks like it is clearing okay. The shoes are about to come over the sill. Okay, now drop your PLSS down. There you go you're clear and spiderly you're good. About an inch clearance on top of your PLSS.

ALDRIN Okay, you need a little bit of arching of the back to come down. (Garbled) How far are my feet from the -
ARMSTRONG Okay, you're right at the edge of the porch.

ALDRIN Okay. Back in - all little of foot movement - porch. Little arching of the back. Hope it comes up and cleared the bulk head without any trouble at all.

ARMSTRONG Looks good.
PAO 45 minutes PLSS time expended.
CAPCOM Neil, this is Houston. Based on your camera transfer with the LEC do you foresee any difficulties in SRC transfer? Over.
ARMSTRONG Negative.
PAO It's the sample return containers, the rock boxes that CAPCOM -
ALDRIN Now, I want to back up and partially close the hatch. Making sure not to lock it on my way out.
ARMSTRONG A good thought.
ALDRIN That's our home for the next couple of hours and I want to take good care of it. Okay, I'm on the top step and I can look down over the RCU, landing gear pads. That's a very simple matter to hop down from one step to the next.

ARMSTRONG Yes, I found it to be very comfortable and walking is also very comfortable. You've got three more steps and then a long one.
ALDRIN Okay, I'm going to leave that one foot up there and both hands down to about the fourth rung up.
ARMSTRONG There you go.
ALDRIN Okay. Now I think I'll do the same.
ARMSTRONG A little more. About another inch. There you got it. That's a good step. About a three footer.
ALDRIN Beautiful, beautiful.
ARMSTRONG Isn't that something. Magnificent sight down here.
ALDRIN Magnificent definition.
PAO Both PLSS's nominal on consumables.
ALDRIN Looks like the secondary strut has little thermal effects on it right here, Neil.
ARMSTRONG Yeah, I noticed that. That seems to be the worst although similar effects are on - all around.
ALDRIN Both talking at once. - isn't it.

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:39, CDT 22:11 343/2

ARMSTRONG

Isn't it fun.

Aldrin

Right in this area I don't think there's
much of any (cut out) bounce together and it's hard to tell
whether it's a cloud or a rock.

ARMSTRONG

Notice how you can pick it up.

ALDRIN

Yeah it bounces and then

END OF TAPE

APOLLO 11 MISSION COMMENTARY 7/20/69 CDT 22:16 GET 109:44 344/1

ALDRIN Reaching down fairly fast, getting my suit dirty at this stage.

ARMSTRONG The mass of the backpack does have some effect on inertia.

ALDRIN There's a slight tendency I can see now to - backwards - due to the soft, very soft texture.

ARMSTRONG You're standing on a rock, a big rock there now.

ALDRIN This pad sure didn't.

ARMSTRONG No, it didn't.

ALDRIN There's no crater there at all from the engine.

ARMSTRONG No.

ALDRIN I wonder if that right under the engine is where the probe might have hit.

ALDRIN - side like that.

ARMSTRONG Yes, I think that's a good representation of our sideward velocity at touchdown there.

ALDRIN I see that probe over on the minus Y strut. It's broken off and bent back up.

ARMSTRONG (Garbled) bent over.

ALDRIN Can't say too much for the - for the visibility here without the visor up. (Garbled) it looks like there is a (garbled) the surface of it is not bound in rock. And incidently, these rocks - a very powdery surface.

CAPCOM Try again please Buzz, you're cutting out.

ALDRIN I say that the rocks are rather slippery.

CAPCOM Roger.

ALDRIN Very powdery surface when the sun hits. They split up all the very little fine porouses. We will attempt to slide over it rather easily.

CAPCOM Neil Armstrong getting ready to move the TV camera now out to it panorama position.

ARMSTRONG Traction

ALDRIN (garbled)

ALDRIN About to lose my balance in one direction and recovery is a (garbled). And moving arms around Jack doesn't (garbled) the surface. Not quite that light footed.

ARMSTRONG And I have the insulation off the MESA now and MESA seems to be in good shape.

ALDRIN Got to be careful that you are leaning in the direction you want to go otherwise you (garbled). In other words, you have to cross your foot over to stay underneath where your center of mass is. And Neil, didn't I say we might see some purple rocks?

ARMSTRONG Find the purple rocks?

ALDRIN Yes. They are small, sparkly (garbled) are the box.

END OF TAPE

APOLLO 11 MISSION COMMENTARY 7/20/69 CDT 22:21 GET 109:49 345/1

ARMSTRONG - find the purple rocks?
ALDRIN No. Pretty small sparkly (cut out) - fragments (cut out) - on in places (cut out) - I would take a first guess, some sort of biotite. We'll leave that to the Lunar Analysis, but (cut out).
ARMSTRONG Bio compacts underneath (cut out)- completely (cut out) - no, I say you don't sink down more than a quarter of an inch.
PAO Biotite is a brown mica substance.
ARMSTRONG Okay, Houston. I'm going to change lenses on you.
CAPCOM Roger, Neil.
PAO Life Support Consumables still looking good.
ARMSTRONG Okay, Houston. Tell me if you're getting a new picture.
CAPCOM Neil, this is Houston. That's affirmative. We're getting a new picture. You can tell it's a longer focal length lens, and for your information, all LM systems are GO. Over.
ARMSTRONG We appreciate that. Thank you.
ALDRIN Neil is now unveiling the plaque (cut out) -
CAPCOM Roger. We got you fore-sighted but back under one track.
ARMSTRONG For those who haven't read the plaque, we'll read the plaque that's on the front landing gear of this LM. First there's two hemispheres, one showing each of the two hemispheres of the Earth. Underneath it says "Here Man from the planet Earth first set foot upon the Moon, July 1969 A.D. We came in peace for all mankind." It has the crew members' signatures and the signature of the President of the United States. Ready for the camera? I can -
ALDRIN No, you take this (garble)
ARMSTRONG That's the LEC length.
ALDRIN Now I'm afraid these barbed materials are going to (cut out) - The surface material is powdery, but (cut out) - how good your lens is, but if you could (cut out). Very much like a very finely powdered carbon, but it's very pretty looking.
ARMSTRONG Do you want to pull out some of my cable for me, Buzz?

END OF TAPE

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:54 CDT 22:26 346/1

ARMSTRONG - - my cable for me?
ALDRIN Houston. How close are you able to get things in focus?
CAPCOM This is Houston. We can see Buzz's right hand. It is somewhat out of focus. I'd say we're approaching down to probably about 8 inches to a foot behind the position where he is pulling out the cable.
ALDRIN Okay. Let's have the temperature from you.
CAPCOM Temperature of the cabin is showing 0.
ALDRIN I'm a little cool. I think I'll (garbled).
ALDRIN I'm on immediate now Houston, and I show 3.78. 5, 7 - -
CAPCOM Houston. Roger. Out.
ALDRIN And, we'll probably need a little (garbled) back location television camera.
ALDRIN Neil, look at the minus (garbled) The direction you travel at from right to left.
ARMSTRONG Right.
ALDRIN This one over here underneath the ascent engine. It has a broken front tip. (garbled)
ARMSTRONG Have I got plenty of cable?
ALDRIN You've got plenty.
ALDRIN Okay. I think I've got the end of it.
ARMSTRONG Something interesting. In the bottom of this little crater here. It may be - -
ALDRIN Keep going. We've got a lot more.
ARMSTRONG Okay.
ALDRIN Being a little harder to pull out here.
PAO If you stand on the ladder facing forward, the minus Y strap is the landing gear to your left.
ARMSTRONG Afraid I am, Buzz.
ALDRIN 40, 50 feet. Why don't you turn around and let them get a view from there and see what the field of view looks like.
ARMSTRONG Okay.
ALDRIN You're backing into the cable.
ARMSTRONG Okay.
ALDRIN Turn around to your right I think, would be better.
ARMSTRONG I don't want to go into the sun if I can avoid it.
ALDRIN That's right, Neil.

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:54 CDT 22:26 346/2

ARMSTRONG I just (garbled) and walk
around it.

ALDRIN Houston. How's that field
of view going to be except the mesa? All right?

CAPCOM Good.

CAPCOM Neil, this is Houston. The
field of view is okay. We'd like you to aim it a little
more to the right. Over.

ARMSTRONG Okay.

ALDRIN Okay, that's all the cable
we have. We're going out. I'll start working on - -

CAPCOM A little bit too much to the
right. Can you bring it back about 4 or 5 degrees?

CAPCOM Okay. That looks good Neil.

ARMSTRONG Okay, now. Do you think I ought to be
farther away or closer?

ALDRIN Can't get too much further either
way.

ARMSTRONG Let's try it like that for a
while. I'll get a couple of panoramas with it, too.

CAPCOM Roger. You look as far as
distance goes, Neil. And, we'll line you up again when
you finish the panorama. Now, you're going too fast on
the panorama sweep. You're going to have to stop for it.

ARMSTRONG I haven't stopped - I haven't
set it down yet. That's the first picture in the panorama
right there.

CAPCOM Roger.

ARMSTRONG It's taken (garbled) about
north, northeast.

END OF TAPE

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:59, CDT 22:31 347/1

ARMSTRONG - thinking about north or northeast.
Tell me if you've got a picture, Houston.

CAPCOM We've got a beautiful picture, Neil.

ARMSTRONG Okay. I'm going to move it.

CAPCOM Okay, here's another good one. Okay,
we got that one.

ARMSTRONG Okay, now this one is right down front
straight west and I want to know if you can see an angular
rock in the foreground.

CAPCOM Roger, we have a large angular rock in
the foreground and it looks like a much smaller rock a couple
of inches to the left of it. Over.

ARMSTRONG All right and then on beyond it about
10 feet is an even larger rock that's very rounded. That
rock is about - the closest one to you is about sticking
out of the sand about 1 foot and it's about a foot and one-
half long and it's about 6 inches thick but it's standing
on edge.

CAPCOM Roger.

ALDRIN Okay, Neil, I've got the table out and
the pack deployed.

CAPCOM We've got this view now.

ARMSTRONG Straight south.

CAPCOM Roger, and we see the shadow of the LM.

ARMSTRONG Roger, the little hill just beyond the
shadow of the LM is a pair of elongated craters about - that
will be the pair together is 40 feet long and 20 feet across
and they're probably 6 feet deep. We'll probably get some
more work in there later.

CAPCOM Roger. We see Buzz going about his work.

ARMSTRONG How's that for a final.

CAPCOM For a final orientation, we'd like it
to come left about 5 degrees. Over. Now back to the right
about half as much.

ARMSTRONG Okay?

CAPCOM Okay. That looks good there, Neil.

ARMSTRONG Okay.

PAO 1 hour, 7 minutes time expended.

ARMSTRONG Okay, you can make a mark, Houston.

CAPCOM Roger.

ARMSTRONG And incidently you can use the shadow
that the staff makes to (garble).

PAO Buzz is erecting the solar wind experiment
now.

ALDRIN Some of these small depressions (garbled)
3 inches. I could suggest exactly what the surveyor pictures
showed when they pushed away a little bit. You get a force
transmitted through the upper surface of the soil and about
5 or 6 inches of bay breaks loose and moves as if it were

APOLLO 11 MISSION COMMENTARY, 7/20/69, GET 109:59, CDT 22:31 347/2

ALDRIN
really isn't.

ARMSTRONG
foot prints -

caked on the surface when in fact it

I notice in the soft spots where we have

END OF TAPE

APOLLO 11 MISSION COMMENTARY 7/20/69 CDT 22:36 GET 110:04 348/1

ALDRIN -- were taped on the surface when, in fact it really isn't.

ARMSTRONG I noticed in the soft spot where we had foot prints nearly an inch deep that the soil is very cohesive and it will retain a - slope of probably 70 degrees (cut out) foot prints.

PAO All LM systems still looking good.

ARMSTRONG Okay?

ALDRIN Yes. I think that's excellent.

ALDRIN That didn't come out?

ALDRIN (garble)

ARMSTRONG It's up front. Come out here with me. (garble)

ALDRIN You'll have to extend that one.

CAPCOM Columbia. Columbia. This is Houston.

AOS.

COLUMBIA Houston. AOS.

PAO Neil Armstrong has been on the lunar surface now almost 45 minutes.

COLUMBIA Houston. Columbia in high gain.

Over.

CAPCOM Columbia. This is Houston reading you loud and clear. Over.

COLUMBIA Yes. This is History.

Yes. Read you loud and clear. How's it going?

CAPCOM Roger. The EVA is progressing beautifully. I believe they are setting up the flag now.

COLUMBIA Great.

CAPCOM I guess you're about the only person around that doesn't have TV coverage of the scene.

COLUMBIA That's right. That's all right.

I don't mind a bit. How is the quality of the TV?

CAPCOM Oh, it's beautiful, Mike. Really is.

COLUMBIA Oh, gee, that's great. Is the lighting half way decent?

CAPCOM Yes, indeed. They've got the flag up and you can see the stars and stripes on the lunar surface.

COLUMBIA Beautiful. Just beautiful.

ARMSTRONG That's good. See if you can pull that end to pop open. Take that end emblem.

ALDRIN It won't pull out. Okay.

CAPCOM Neil. This is Houston. Radio check.

Over.

ARMSTRONG Roger. Houston. Loud and clear.

CAPCOM Roger. Out.

ALDRIN Loud and clear, Houston.

CAPCOM Roger, Buz.

ALDRIN I'd like to evaluate the various phases that a person can - traveling on the lunar surface. I believe I'm out of your field of view. Is that right, --

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ARMSTRONG - - Tom, Houston?
CAPCOM That's affirmative, Buz.
CAPCOM You are now in our field of view.
ALDRIN You do have to -
CAPCOM You're in our field of view.
ALDRIN Okay. You do have to be rather

careful to keep track of where your center of mass is. Sometimes, it takes about 2 or 3 paces to make sure you've got you're feet underneath you. About 2 to 3 or maybe 4 easy paces can bring you to a nearly smooth stop. Next direction like a football player, you just have to split out to the side and cut a little bit. One called a kangaroo hop does work but it seems that your forward ability is not quite as good.

END OF TAPE

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ARMSTRONG kangaroo hop. It does work, but it seems that your forwardability is not quite as good as it is in the conventional or conventional one foot after another. It's hard to say what a strained pace might be. I think it's one that I'm using now. Could get rather tiring after several hundred - But this may be a function of this suit, as far as lack of gravity forces.

CAPCOM Tranquility Base, this is Houston. Could we get both of you on the camera for a minute, please?

ARMSTRONG Say again, Houston.

CAPCOM Roger. We'd like to get both of you in the field of the view of the camera for a minute.

CAPCOM Neil and Buzz, the President of the United States is in his office now and would like to say a few words to you. Over.

ARMSTRONG That would be an honor.

CAPCOM Go ahead Mr. President, this is Houston. Out.

PRES NIXON Neil and Buzz, I am talking to you by telephone from the Oval Room at the White House. And this certainly has to be the most historic telephone call ever made. I just can't tell you how proud we all are of what you ... for every American, this has to be the proudest day of our lives. And for people all over the world, I am sure they, too, join with Americans, in recognizing what a feat this is. Because of what you have done, the heavens have become a part of man's world. And as you talk to us from the Sea of Tranquility, it inspires us to double our efforts to bring peace and tranquility to earth. For one priceless moment, in the whole history of man, all the people on this earth are truly one. One in their pride in what you have done. And one in our prayers, that you will return safely to earth.

ARMSTRONG Thank you, Mr. President. It's a great honor and privilege for us to be here representing not only the United States but men of peace of all nations. And with interest and a curiosity and a vision for the future. It's an honor for us to be able to participate here today.

PRES NIXON And thank you very much and I look forward - all of us look forward to seeing you on the Hornet on Thursday.

ARMSTRONG Thank you.

ALDRIN I look forward to that very much, sir.