

July 3, 1997

RECOMMENDED PHONE CALL

TO: Dan Goldin at JPL Press Conference

RECOMMENDED BY: Jim Kohlenberger

PURPOSE: To congratulate NASA on the Mars Pathfinder mission, which will land on Mars on July 4. Your conversation will be heard by some 500 reporters gathering at JPL to cover the mission.

BACKGROUND: The July 4 landing is scheduled to take place at 1:00 p.m. local time. Using non-visual data, NASA should be able to confirm whether the landing has occurred safely by about 5:30 p.m. At about 5:45 Dan Goldin and Dr. Ed Stone, JPL Director, will begin a press conference at JPL mission control to talk about the mission. We will patch you into the press conference during the Goldin/Stone portion of the press conference.

The first visual images transmitted by the lander should be available at JPL about three hours later, and released to the public through the Internet shortly thereafter. You should look for an e-mailed version of the first pictures from the Pathfinder at about 8:30pm.

TOPICS OF DISCUSSION: Talking Points Attached.

CONTACT PERSON AND TELEPHONE NUMBER(S): Jim Kohlenberger will call to update you when we know if Pathfinder landed successfully and to give you an ETA on the press conference. You can hold or he can call you back a few minutes before the press conference to patch you in.

DATE OF SUBMISSION: July 3, 1997

## TALKING POINTS

VICE PRESIDENT: Hello, Dan, this is the Vice President. Happy 4th of July. Congratulations on this remarkable achievement. You are making all of America very proud on this special day. As we celebrate our nation's birthday, let us also celebrate American know-how and ingenuity as we continue to press forward to new heights and new frontiers ...both here on Earth and in the heavens above.

GOLDIN: Respond.

VICE PRESIDENT: Please convey my personal congratulations to Dr. Stone and everyone out there at the Jet Propulsion Laboratory who made this day possible. You have captured the world's attention and made us all proud today.

GOLDIN: Respond.

VICE PRESIDENT: I'm looking forward to seeing the images and science results from this mission. I think it's terrific that you will be broadcasting all of this data through the Internet so the American public can participate in our space exploration program.

GOLDIN: Respond.

VICE PRESIDENT: I understand you will be deploying the rover within a few hours of receiving the first images. I've seen a model of it at the White House and actually got to drive around an identical Pathfinder robot when I was there at JPL last year. I think it's amazing how you've been able to pack all those instruments into such a small and sporty vehicle.

GOLDIN: Respond.

VICE PRESIDENT: This mission is really a wonderful example of your new way of doing business at NASA -- faster, better, cheaper. The President and I are both proud of your accomplishments. Keep up the good work.

GOLDIN: Respond.

VICE PRESIDENT: Again, congratulations to all of you and best of luck for the rest of the mission. Happy Independence Day!

## Mission Timeline

All times for events on the spacecraft are given as the time signal would be received on Earth in Pacific Daylight Time (i.e. spacecraft event time plus one-way light time, which is approximately 10 minutes, 40 seconds). All operations events on Earth are in Pacific Daylight Time. Pacific Daylight Time is Universal Time minus 7 hours.

### *June 30:*

12 a.m.: Mars Pathfinder is approximately 1.3 million miles (2 million kilometers) from Mars, traveling at a velocity of about 12,000 miles per hour (19,080 kilometers per hour) with respect to Mars.

### *July 1:*

12 a.m.: Mars Pathfinder is about 982,000 miles (1.6 million kilometers) from Mars, traveling at a velocity of about 12,000 miles per hour (19,080 kilometers per hour) with respect to Mars.

### *July 2:*

12 a.m.: Mars Pathfinder is about 696,000 miles (1.1 million kilometers) from Mars, traveling at a speed of about 12,000 miles per hour (19,080 kilometers per hour) with respect to Mars.

### *July 3:*

12 a.m.: Mars Pathfinder is about 408,000 miles (658,000 kilometers) from Mars, traveling at a speed of about 12,000 miles per hour (19,080 kilometers per hour) with respect to Mars.

### *July 4:*

12 a.m.: Mars Pathfinder is about 121,000 miles (195,000 kilometers) from Mars, traveling at a velocity of about 16,600 miles per hour (26,460 kilometers per hour) with respect to Mars.

9:32 a.m.: Cruise stage separation.

10:02 a.m.: Pathfinder enters the upper atmosphere of Mars at 16,600 miles per hour (26,460 kilometers per hour) and begins the sequence of events that will land the spacecraft on the surface. From this point on, the only likely signal from the spacecraft will be the carrier wave, a single frequency radio wave.

The shifting frequency of the carrier, known as the Doppler shift, will provide an indication of the decelerations occurring during entry and parachute deployment. The spacecraft is also

designed to send back a frequency-keyed signal following certain key events; this signal is called a semaphore. The semaphore is very weak, and is not expected to be received in real time. However, careful analysis after-the-fact of the broad frequency spectrum recording of the radio signal will give the operations team considerable information on how events unfolded during the rapid descent to the surface.

Entry, descent and landing (EDL) takes approximately 4.5 minutes and follows the sequence below:

- Spacecraft rapidly decelerates in the atmosphere using the heatshield
- Parachute deploys
- Heat shield separates
- Lander releases from backshell, descends on bridle
- Radar altimeter returns information on altitude
- Airbags inflate
- Rocket-assisted deceleration (RAD) engines fire
- Bridle cable is cut

10:07 a.m.: Landing on surface of Mars in Ares Vallis. Transmitter turned off shortly after landing to save power.

After touchdown, the following sequence will occur:

- Lander bounces and rolls to a stop
- Airbags deflate and are retracted up against the petals
- Petals open

These events of the entry, descent and landing phase will be complete between 11:32 a.m. and 12:33 p.m. PDT. A semaphore signaling the end of this phase may be received via the lander's low-gain antenna.

12:45 a.m.: Sunrise at the landing site. Operations begin for Sol 1 (a Sol is a Mars day, or 24 hours, 40 minutes).

1:56-3:13 p.m.: Transmitter is turned on, and the spacecraft signals Earth through the low-gain antenna. This communications session will contain telemetry from all engineering subsystems including the rover, and the first science data about the atmosphere taken during descent.

Carrier is received at 1:55 p.m.; following ground processing, actual first information will probably be received by flight controllers at approximately 2:09 p.m.

### **Nominal Mission Scenario**

If all spacecraft systems are normal, the mission will proceed on its "nominal" plan. On this plan, the following events will occur:

3:20 p.m.: The camera on the lander is released and begins searching for the Sun. The high-gain communications antenna is deployed and pointed toward Earth.

4:13-5 p.m.: First high-gain antenna downlink session. First engineering images of lander, airbags and the region around the lander. The very first image frame will be of a small region including part of the lander and an airbag. Assessment of these first images will tell the operations team about the condition of the spacecraft, the airbags and whether the rover ramps can be deployed. First color images of the region around the rover petal will be sent.

### Low-Gain Antenna Communications Scenario

In all likelihood, there will be some condition or conditions of the spacecraft that will be different than the ideal case -- for example, an unusually tilted orientation of the lander due to larger than anticipated rocks, or an airbag draping a solar panel, or some damaged hardware due to a harder than expected landing. At this point the mission team may enter a contingency mode where it uses commands and prepared sequences to further evaluate the health of the lander and improve its ability to continue the mission. Under such circumstances, the highest priority will be to assure the safety of the spacecraft and rover, and to insure enough power for operations and to recharge the battery.

Another possible contingency situation is loss of data due to a spacecraft or ground problem that would require using one of two remaining downlink sessions to retransmit data. Such a situation also will result in replanning the rest of the first day's activities.

Both the lander imager's Sun search and the high-gain antenna deployment must be completed successfully for the images described above to be received. If either activity is not completed fully, the team will intentionally go to a less complex plan of events using the lander's low-gain antenna. The low-gain antenna does not require knowledge of the spacecraft orientation on Mars or active pointing to Earth. This is a contingency scenario that has been well practiced and would proceed on the following timeline (attempts to find the Sun and point the high-gain antenna at Earth would normally resume on Sol 2).

6:06-7:51 p.m.: Low-gain antenna downlink session, including compressed rover ramp deployment images (black-and-white with 80-to-1 compression). Approximately 12 images will be sent. The rover team will evaluate the feasibility of ramp deployment based on these images.

7-8:15 p.m.: During this window, a decision will be made to deploy one or both rover ramps and command the rover to stand up. If more imaging is needed to make this decision, it will be requested at this time.

8:44 p.m.: If the decision is made to deploy either or both ramps, this will occur at this time in the following sequence: activate ramp deploy sequence; release the rover's alpha proton X-ray spectrometer instrument; release the rover from its stowed position; deploy the rover ramps. The rover will then stand up. A semaphore would be transmitted to Earth indicating that the command was received to begin the sequence.

In this low-gain antenna scenario, this is the end of Sol 1 because no more telemetry would be received. The downlink capability ends as the Earth sets to about 30 degrees above the Mars horizon.

### **Nominal Mission Scenario**

If, on the other hand, the high-gain antenna is pointed toward Earth, the following timeline will be followed. It should be remembered that unexpected events can occur at any time which may change this timeline. As always, the highest priority will be to assure the safety of the spacecraft and rover, and to insure enough power for operations and to recharge the battery.

5:40-5:55 p.m.: Command conference to decide whether to deploy the rover ramp.

6 p.m.: Assuming that the rover and project team judge it safe, the ramp deployment sequence will begin at about this time.

6:55-7:57 p.m.: Second high-gain antenna downlink with rover deploy images (black-and-white), showing the ramps deployed. Engineering data, more detailed entry and weather data will be sent. Part of a black-and-white panorama image will be transmitted to Earth.

7:30-8:50 p.m.: Rover and project teams decide whether to deploy rover, based on the position of the ramp(s) on the surface and the expected ability of the rover to safely traverse the area immediately off the end of the ramp(s).

8:58 p.m.: If all conditions are judged acceptable, the rover deploy sequence will be activated and the rover will drive off the lander petal, down a ramp (either forward or backward), and roll out onto the surface of Mars. The alpha proton X-ray spectrometer will be lowered onto the soil to prepare for deployment.

9:24-10:26 p.m.: Third high-gain antenna downlink session. Images should show the rover on the surface of Mars. Based on this imaging, the rover team may decide to deploy the alpha proton X-ray spectrometer. Other images may include a black-and-white 360-degree panorama of the landing site.

10:30 p.m.: Sun sets at landing site, rover goes to sleep. If the alpha proton X-ray spectrometer was deployed, it will be taking measurements of rock and soil composition and storing data all night long.

## ***July 5***

### **Low-Gain Antenna Communications Scenario**

Resuming this scenario in the event that the high-gain antenna is not deployed on the first day:

# Glenn Launch Event

John Glenn Elementary School, Seven Hills, Ohio  
1:45 pm - 3:00 pm, Thursday, October 29, 1998

Meeting requested by Ron Klain  
Briefing prepared by Jim Kohlenberger

## EVENT

You are visiting a school named after John Glenn and joining about 200 area students to watch the historic Glenn launch and leading a discussion on the importance of math and science education. The Glenn Launch window is 2:00 PM -4:00 PM EDT Note: This event is **open press**.

## EXTENDED LOGISTICS: (As of this writing, subject to change)

- **Upon Arrival.** Upon arrival you will be greeted by  
Marcia Harrison, Superintendent, Parma School District;  
Whit Hark, Principal, Lt. Col. John Glenn Elementary School  
Dr. Jules Earle, Deputy Director, Lewis NASA Research Center  
Mary Ellen Webber, astronaut
- **Brokaw Interview.** See separate event memo for Brokaw Interview.
- **When the Event Starts.** When the countdown reaches the 9 minute mark (T minus 9), NASA will stop the countdown for a period of 10 minutes. This is standard launch procedure. This is the point at which you will start the event. That gives you 19 minutes a discussion before the actual launch.
- **Introductions.** Whit Clark, the Principal of the school, introduces a student who actually designed an experiminet that is on this space shuttle. The student then intoduces you accompanied by Astronaut Mary Eilen Weber.
- **Live Images of the Shuttle.** You make brief remarks. During your your event, a large screen will display live images from Florida of the shuttle on the launch pad.
- **The Forum.** After your remarks, you will lead a discussion on the significance of the Glenn launch, the importance of math and science education to achieving important goals like our efforts in space, and the importance of mentoring to science and math education. You will have several space models available on a table in the auditorium available as visual tools to compare Glenn's first launch to his second. See description below.
- **The 30 Second Countdown.** At the 30 second point in the countdown (advance will alert you the 30 second point by holding up a sign), you can engage the students with a verbal countdown.

- **Ascent.** After the launch, it will take 2 minutes before the first side engines are jettisoned and a total of eight minutes until they are in orbit. It is at the end of this ascent period that the worst dangers are over and the crew can unstrap. Mary Ellen Weber can be helpful during this period in describing what Glenn would be experiencing at that time and talking about what its like to fly in space.
- **Closing.** At the conclusion, you can thank everyone and depart.

### YOUR ROLE/CONTRIBUTION

- This will be an opportunity for you to recognize John Glenn as an American hero and talk about the importance of having mentors and role models like John Glenn who encourage more children to get interested in math and science education.

### PROGRAM NOTES

- **Possible Countdown Delays and Contingencies**

Space Shuttle launches can be delayed anywhere from several minutes to several days. At virtually any point in the countdown sequence, the launch may be stopped for technical, safety, or weather-related reasons. Over the past three years, almost 80% of the Space Shuttle missions have been launched on time. Of the past 16 flights, 2 were delayed at least one day for weather and 1 for technical difficulties. For this mission, the launch window is from 2:00 p.m. to 4:30 p.m. NASA reports that 80% of recent launches have gone up within 5 minutes of the targeted launch time.

- **Launch Scrubbed altogether**

If the launch were to be scrubbed altogether, we would probably know in advance of the event. In that case, you and Astronaut Mary Ellen Weber would proceed with the issues forum focussing on the importance of science and math education. Instead of viewing the launch, Mary Ellen Weber will show a video of her own shuttle lift off. As of this writing, NASA indicates that there is little chance for a weather related delay.

- **Launch Delayed During the Event**

Most launches have gone up within 5 minutes of their targeted launch time. In the event that the launch is delayed, it should not be for too much time. Your advance staff will have a line open to the Kennedy Space Center and will have a sense of wether a delay will be short or long.

- **Catastrophic Failure.**

While NASA's number one priority is Space Shuttle safety, there is still risk involved in human spaceflight. NASA estimates the probability of an accident that would result in loss of the Space Shuttle vehicle during ascent is 1 in 438.

Should a launch accident occur, NASA has a well-defined contingency plan which calls for immediate activation of a pre-designated Shuttle Mishap Interagency Investigation Board composed of senior USAF, FAA, NASA and DOT personnel. If such an unlikely incident were to occur, you need to think about consoling the children in the room, expressing your feelings about such an event to the public, and coordinating with the President and Administrator Goldin at Kennedy Space Center.

• **The President and Glenn's Launch**

The President and the First Lady are traveling to Kennedy Space Center today where they will join Annie Glenn (Senator Glenn's wife) and other family members of the STS-95 crew to watch the launch. After the launch, the President will make brief remarks and congratulate the employees. Beforehand he will do an interview with Walter Cronkite.

• **Astronaut Mary Ellen Weber.** Mary Ellen Weber will be participating in the event with you. She was born in Cleveland, Ohio after Glenn made his first flight in space; Bedford Heights a Cleveland suburb, is her hometown. She joined you once before at an event you did in room 450 with Girls Nation unveiling a new Mars Pathfinder photo. On her first space flight in 1995, the five-member crew delivered a NASA communications satellite, the sixth Tracking and Data Relay Satellite. Dr. Weber's primary roles in the mission were in check out and deploy of the satellite, operation of biotechnology experiments, and as contingency spacewalk crew, flight crew, and medical officer. During this nine-day mission, Discovery completed 142 orbits of the Earth (almost 50 times as many orbits as Glenn did on Friendship 7) and traveled 3.7 million miles. Her next flight on the Shuttle is scheduled for August of next year to help assemble the Space Station.

• **Lt. Col. John Glenn Elementary School.** Glenn Elementary school is a K-6 elementary school that serves about 395 students. The principal is Whit Clark. Students in grades K-4 will go to Lewis Center to watch the launch. This event will be simulcast live to the other 21 schools in the district, reaching 13,000 students. The school first opened in 1967. Its symbol is the Voyager. The school focusses strongly on math and science.

• **Payload project.** Ten students from Parma High School, led by two teachers, have developed a science project that will be included in the Discovery's payload of experiments. In the audience this afternoon are Parma Senior High School Biology Teacher Judith Lachvayder and ten of her students who are all involved in an experiment to test the effect of gravity on plants being stimulated with electricity. The experiment is being included on today's shuttle flight and will be conducted tomorrow during the first full day of the shuttle mission. Parma Senior High is one of 12 Ohio high schools participating in the project, which is part of a study on plant growth at Ohio State University.

- **SEMAA students.** There will also be students in attendance who participate in the Science, Engineering, Mathematics and Aerospace Academy. This partnership between NASA's Lewis Research Center and Cuyahoga Community College was established in 1993 to increase the participation of underrepresented and underserved groups in science, engineering, mathematics, and technology careers and to increase success rates of all students interested in science and mathematics. The program served nearly 2,000 students in the 1996-97 school year alone. SEMAA students get the opportunity to learn and develop interests through hands-on/minds-on experiences, field trips, speakers, and mentors.
- **Ohio Astronauts.** Ohio, "The Birthplace of Aviation," is home to more astronauts (23) than any other state. Role models such as John Glenn ("the first all Ohio crew") and Neil Armstrong, the first human to walk upon the Moon during the Apollo project could have contributed to the success of Ohio. It also could be because of Ohio's good schools.

Cleveland, Ohio has a reason to be particularly proud: 8 of Ohio's astronauts were born here. (Cameron, Harbaugh, Lovell, Low, Sega, D. Thomas, Walz, and Weber).

The greatest attention for Ohio's astronauts came with the STS-70 mission in 1995. Four crew members (Nancy Currie, Tom Henricks, Don Thomas, and Mary Ellen Weber) out of a five-member crew have hometowns in Ohio. The fifth crew member, Kevin Kregel, was made an Honorary Ohio citizen by Governor George Voinovich who attended the launch.

- **Visual Props.** In the auditorium on a table you will find 3 props.
  - **Scale Models.** There are 1/100 scale models of both the Friendship 7 and the space shuttle. The capsule of the Friendship 7 can be easily removed from the rocket to more easily and dramatically compare it to the shuttle model of the same scale. Be careful with the shuttle model which comes apart easily. The capsule is smaller than even the nose of the shuttle.
  - **Larger Friendship 7.** There is also a larger model of the friendship 7 capsule cutaway to show John Glenn inside it.

- **Lewis soon to be renamed Glenn Research Center.** Ohio is also home to the Lewis Research Center. In August, you visited the Lewis Research Center where you participated in a Math and Science education event with students from a local high and Senator John Glenn via Satellite from Houston. In the closing days of Congress, legislation was passed to change the name to the "John H. Glenn Center at Lewis Field." Apparently the name change was met with some controversy from the Lewis family for which it was originally named who had not been consulted in the change.

## ATTACHMENTS

- Your remarks
- Suggested Questions
- List of Possible Speakers
- Background on the Glenn Launch
- STS - 95 Background
- Comparison of Mercury 7 to Space Shuttle

## Possible Speakers

Mary Ellen Webber, astronaut

Marsha Harrison, Superintendent, Parma School District

Whit Clark, Principal, Lt. Col. John Glenn Elementary School

students from Glenn Elementary School and other Parma S.D. schools

teachers from Glenn Elementary School and other Parma S.D. schools

parents from Glenn Elementary School and other Parma S.D. schools

## Possible Questions For Participants

The students who just introduced me, from Parma High School, have a very personal connection to this afternoon's shuttle launch. They've been working on a science project that NASA decided to include among their experiments in the shuttle's payload. Could one of you tell us about your project?

Follow-up: What do you hope to learn from your experiment when the shuttle returns from its mission?

Ohio is the home of more astronauts than any other state. In fact, eight astronauts have come from right here in the Cleveland area. We're very lucky to have with one of them with us today, Mary Ellen Weber. Mary Ellen, can you show us on this model of the shuttle where the experiments on the shuttle are located?

**Before or after launch:** The experience John Glenn had when he first went into space was much different than the one he'll have on this mission. Mary Ellen, can you explain some of the differences between the Mercury 7 and the space shuttle Discovery?

**When the launch is imminent:** We're almost to liftoff. Mary Ellen, what's going on in the shuttle and on the pad right now? *Note: Mary Ellen will provide commentary throughout the launch (eight minutes until they're in orbit); you can ask questions of her during this time and encourage the kids to ask questions, too.*

Are there any students here today who'd like to be an astronaut or work for the space program someday?

Follow-up: What do you think you need to do to prepare for being an astronaut?

Mary Ellen, what excited you about math and science when you were in school and why is a background in math and science crucial for astronauts?

Some of the students with us today participate in the SEMAA (see-mah) program with the NASA Lewis Research Center. Can we hear from a student who participates in this program about what you're learning?

Follow-up: Let's hear from another student about a math or science project they recently completed or are working on now.

Lynn Bondurant (BONN-durr-ant) helped start SEMAA. Lynn, tell us why this program works and what you're doing to take it nationwide.

A solid background in math and science education are important for our children to succeed now, and they'll be even more critical in the New Economy of the 21st century. Whit Clark

is the Principal here at Glenn Elementary School. Principal Clark, tell us about what your school is doing to improve math and science education.

We have some teachers with us today. Could we hear from a teacher's perspective about the importance of math and science education and what you do to excite your students about math and science?

## Background on the Glenn Launch

Nearly 37 years ago, on February 20, 1962, John Glenn became the first American to orbit the Earth, completing three orbits in a five-hour flight and successfully achieving the ultimate objective of NASA's Project Mercury. Upon his arrival back home, Glenn became an American hero and a symbol of national pride. President John F. Kennedy voiced the sentiments of nearly all Americans when he congratulated Glenn on a successful mission that was "second to none."

In the years following his historic mission, Glenn did not return to space, although his achievement was widely recognized and commemorated. In honor of the *Friendship 7* mission, Glenn received the NASA Distinguished Service Medal, the highest award bestowed by the Agency. In 1978, President Carter also awarded Glenn, Neil Armstrong, Alan Shepard, Frank Borman, Pete Conrad, and Gus Grissom (posthumously) the Congressional Space Medal.

During this mission, Senator Glenn will be a payload specialist. Scientists hope to monitor Glenn's physiological responses to weightlessness, applying what they learn to similar changes that occur during the aging process. The mission is scheduled to last nine days, returning on November 7. Also on board STS-95 are Commander Curtis Brown, Pilot Steven Lindsey, Mission Specialists Stephen Robinson and Scott Parazynski, and two international astronauts, Dr. Chiaki Mukai of the Japanese Space Agency, NASDA, and Pedro Duque from the European Space Agency. This will be the first time a Spanish national has flown in space. An overview of the STS-95 mission and biographical sketches of each astronaut are attached.

## STS-95 MISSION OVERVIEW

More than thirty six years after he made history as the first American to orbit the Earth, Senator John H. Glenn, Jr. will return to space as part of a multi-national crew with the launch of the Space Shuttle Discovery October 29, 1998. STS-95, will involve more than 80 scientific experiments investigating mysteries that span the realm from the inner universe of the human body to studies of our own Sun and its solar activity.

On February 20, 1962, when Glenn flew in his Friendship 7 Mercury capsule, the largest mystery facing the young NASA space program was whether humans could even survive in the hostile environment of space. In the 121 U.S. space missions since Glenn's flight, more than 200 Americans have flown in space. Glenn, who inspired many current astronauts to pursue space flight as a career, continues to inspire people of all generations as he returns to space.

In addition to Senator Glenn, the STS-95 crew includes a Japanese astronaut, Dr. Chiaki Mukai, making her second flight, and Pedro Duque, who will be the first Spanish national to fly in space.

The wealth of scientific data accumulated during these space flights validate apparent similarities between the effects of space flight and aging. Glenn will be a test subject for specific investigations which mimic the effect of aging, including loss of muscle mass and bone density, disrupted sleep patterns, a depressed immune system, and loss of balance.

Scientific endeavors on the STS-95 mission will also expand our understanding of the Sun and how it affects life on Earth. The Spartan 201 spacecraft will be released by the crew on the fourth day of the mission and will spend two days studying the solar corona, the solar wind, and how the solar wind affects activities in Earth-orbit and on the ground. The Sun drives our weather, and energetic eruptions on the Sun are capable of disrupting satellites and communication and power systems on Earth. After two days of solar observations, Discovery's crew will haul the spacecraft back into the Shuttle's cargo bay and return it to Earth.

Six astronomical instruments comprise the International Extreme Ultraviolet Hitchhiker Experiment (IEH-3) which will be carried in Discovery's payload bay. These instruments support experiments involving studies of stars, remnants of supernovae, and star formation. Discovery will carry a variety of materials and equipment for use during the third Hubble Space Telescope servicing mission, currently scheduled for mid-2000, as well as a Spacehab module. Inside Spacehab, almost 30 smaller experiments ranging from materials science, to plant growth, to developing new techniques for delivering anti-tumor medications, will be conducted by the astronauts. Sponsored by NASA, the Canadian Space Agency, the European Space Agency, and the Japanese Space Agency (NASDA), these studies take the best advantage of the unique environment of space to conduct these diverse studies.

The STS-95 mission is scheduled to last almost 9 days. A launch on October 29 and nominal mission duration would have Discovery landing back at Kennedy Space Center after its 3 1/2 million mile journey on November 7, at about 12 noon Eastern Standard Time. STS-95 will be the 25th flight of the Space Shuttle Discovery and the 92nd mission flown since the start of the Space Shuttle program in April 1981.

## Comparison of Mercury Friendship 7 with Space Shuttle

<b>Mercury Capsule</b>		<b>Discovery Orbiter</b>	
<b>Name:</b>	Friendship 7 (one flight)	<b>Name:</b>	Discovery (23 flights as of 2/98)
<b>Orbits:</b>	3 orbits	<b>Orbits:</b>	Approx. 144 orbits
<b>Duration:</b>	4 hrs, 55 min., 23 sec.	<b>Duration</b>	Approx. 8 days, 20 hrs
<b>Distance Flown:</b>	75,679 statute miles	<b>Distance Flown</b>	Approx. 3,600,000 miles
<b>Maximum G's:</b>	7.7	<b>Maximum G's</b>	3
<b>Payload:</b>	None	<b>Payload:</b>	Spacehab Research Module; Hubble Orbital Systems Test Platform; SPARTAN-201-05 Reflight; International Extreme Ultraviolet Hitchhiker; Getaway Special Canisters
<b>Total individual Spacecraft mileage</b>	75,679 statute miles (one mission)	<b>Total individual Spacecraft mileage</b>	68,837,819 statute miles (23 Discovery missions)
<b>Weight</b>	4256.34 lbs 2657.6 lbs. at reentry	<b>Weight</b>	153,819 lbs. (Orbiter empty but with three Space Shuttle Main Engines)
<b>Lift-off thrust</b>	360,000 lbs. (Atlas Launch Vehicle)	<b>Lift-off thrust</b>	7,000,000 lbs. (Space Shuttle Main Engines and Solid Rocket Boosters)
<b>Crew Size</b>	1	<b>Crew Size</b>	2-7
<b>Volume (habitable)</b>	36 ft <sup>3</sup>	<b>Volume (habitable)</b>	Crew compartment of 2,325 ft <sup>3</sup> (332 ft <sup>3</sup> per crew member)
<b>Interior environment</b>	Glenn was restrained by his couch harness assembly and by the limited space in the interior. Only one stowage compartment was available. Other items were stowed in bags, in pouches, or on specific attachments to the interior.	<b>Interior environment</b>	During ascent and descent the crew members are strapped into seats on either the flight deck or the middeck. The flight deck will hold four persons, while the middeck is usually equipped for three. On orbit, crew members have a free range of movement throughout the crew compartment, as well as the Spacehab in the payload bay.

Talking Points for Vice President Al Gore  
Glenn Launch Forum at the John Glenn Elementary School  
Thursday, October 29, 1998

It is appropriate that we meet today in Cleveland to celebrate John Glenn's historic launch -- because Ohio is the cradle of astronauts. Ohio is the birthplace of 23 astronauts, more than any other state. John Glenn was born a few miles away in Cambridge, Ohio. Eight astronauts were born right here in Cleveland -- including our guest today, Dr. Mary Ellen Weber. Back in 1995, Dr. Weber was launched into space -- on the first of her two trips into space -- aboard the very same Space Shuttle that John Glenn is aboard today. Can anybody tell me the name of that shuttle? [*Discovery*]

Today, your science project will travel where only 391 human beings in history have been -- into space. Hearing you describe your project makes me believe that the next John Glenn or Mary Ellen Weber could very well be sitting in this room today. One of you may one day hit golf balls on Mars. Which one of you will it be?

Every generation of Americans in this century have lived their own memories of historic flights. At the turn of the century, it was the Wright Brothers -- who grew up here in Ohio -- who opened up the clouds to mankind. In the 1920s, the whole world watched as Charles Lindbergh flew across the Atlantic Ocean. For my generation, we will never forget John Glenn.

I was 13 years old when John Glenn made his first trip into space -- and I remember it like it was yesterday. Back then, people talked about the "space race." We were in a race with the Soviet Union to see who could reach space first. For 17 long years, America and the Soviet Union had fought the Cold War. In the late 1950's, the Soviet Union sent a rocket -- called Sputnik -- into space. Then, in 1961, they beat us again, when a Russian cosmonaut named Yuri Gagarin became the first person in space. As a country, we were feeling pretty down about it, and many people wondered if America was up to the task. Then, in 1961, Alan Shepard -- who was trained at the Lewis Research Center right here in Ohio -- became the first U.S. astronaut in space. On February 20, 1962, John Glenn sat in a Mercury space capsule on top of a rocket that nobody was sure would work. On two previous tries, the rocket had failed to work. And nobody was sure the heat shield would protect him upon re-entry. But with courage learned here in Ohio, John Glenn fastened his seatbelt, looked toward the heavens, and became the first astronaut to orbit Earth. I remember it well [*describe what it was like to watch the launch, here the rumble, and pray that he came home safely*]. Can anybody tell me the name of his spacecraft (Friendship 7).

John Glenn made our spirits soar -- and proved to the entire world that America had the right stuff. President John Kennedy called it a "victory of technology and the human spirit."

Today, John Glenn is making our spirits soar again. He will travel the same path -- around the earth in circles -- but in a very different spacecraft [*refer to models of Discovery and Friendship 7*]. Friendship 7 orbited the earth 3 times, Discovery will 144 times. Friendship 7 was in space for five hours, Discovery for nine days. Friendship 7 had a liftoff thrust of 360,000 pounds, Discovery 7 million pounds. Friendship 7 had a crew of one, Discovery has seven. On Friendship 7, John Glenn couldn't move around at all, and there was no payload. On Discovery, not only can the astronauts move around -- your science project will experience zero gravity.

One thing all astronauts have in common: they all have to be good at science and math.

Discovery is the most complicated vehicle ever built, with 800 control switches, 2,600 cargo items, 83 scientific experiments, and a satellite on board. Even at age 77, Senator Glenn had to spend 12 hours a day for the past six months in classrooms and simulators learning the latest science and technology.

Dr. Weber is a good example -- she earned her Bachelor of Science Degree in chemical engineering, and her Ph.D. in physical chemistry.

That's why President Clinton and I have been working so hard to link all of your classrooms and libraries up to the Internet, and make education a priority. Ff

## Phone Call to John Glenn

Mercury Capsule Exhibit, Air and Space Museum  
3:30 - 3:50 pm, Thursday, November 5, 1998

Event requested by Ron Klain

Briefing prepared by Jim Kohlenberger, Eric Anderson, and Jeff Hofgard (OSTP)

### EVENT

You and Scott Carpenter, one of the original Mercury Astronauts, are joining approximately thirty junior high school students for a discussion on the future of space followed by a live, 15-minute conversation -- from 3:40 - 3:55 pm -- with John Glenn and the shuttle Discovery astronauts. This event takes place in front of the actual Friendship 7 capsule that first took Glenn into space.

You will have suggested questions for the students on cards and you will be able see the astronauts on a television monitor (although the astronauts will not be able to see you.) The students, from Jefferson Junior High in the District of Columbia, are space enthusiasts and are affiliated with the Challenger Center for Space Science Education in Alexandria, Virginia, a non-profit organization devoted to the promotion of science literacy. (Senator Glenn has been on the Challenger Center Advisory Board for several years.)

This will be a chance for you to highlight the educational and scientific aspects of the Shuttle mission and explain how this mission is an important precursor for future projects such as the International Space Station. **This event is open press.**

### LOGISTICS

NOTE: Scott Carpenter will drop by your West Wing Office briefly prior to the pre-brief, but he will not take part in the pre-brief. He will also ride in the motorcade to the Air and Space Museum for this event.

- There will be a briefing in your West Wing Office.
- You will proceed to your motorcade to depart en route the Air and Space Museum.
- Upon arrival, you will be met by Captain William Readdy, the current director of the astronaut program at NASA, and the director of the Air and Space Museum.
- You and Scott Carpenter will enter the area in the museum near the Mercury Capsule exhibit at the Air and Space Museum. The students will be already assembled in the area.
- You and Carpenter will have wired lavs attached.

- Scott Carpenter begins the program with brief remarks and introduces you.
- You make brief introductory remarks and commence with the phone call. See attached cards with suggested questions.

**(Advance will indicate when the phone call with Discovery is imminent. WHCA will then announce when Discovery is on the line.)**

- You will have a 15 minute discussion with Glenn and the crew of the Discovery. You will congratulate the crew and ask questions; you can invite Carpenter to ask a question of his fellow Mercury astronaut; then you will invite one of the students to ask a prepared question. Advance will provide you the name of the student and the question ahead of time.
- Following the call, you will wrap up with the students and depart.

### YOUR ROLE/CONTRIBUTION

- This event provide you with the opportunity to accomplish several things. Just as you are bringing Scott Carpenter and John Glenn together, you can show how John Glenn's launch brought the country together and the launch of the International Space Station later this month will help bring the world together.

The event also allows you: 1) to engage the students in a brief discussion of their interests in space and the importance of the discovery mission; 2) to introduce John Glenn and Scott Carpenter to the students -- two American heroes; and 3) to congratulate the crew of Discovery on a successful launch and mission to recognize the importance of John Glenn's return to space.

### PROGRAM NOTES

- **Former Astronaut Scott Carpenter.** Scott Carpenter was selected as one of the original seven U.S. Astronauts along with John Glenn. He served as backup pilot for John Glenn during the preparation for America's first manned orbital flight. It was Scott Carpenter who said, "Godspeed, John Glenn" as Glenn lifted off for both flights. Carpenter flew the second American manned orbital flight on May 24, 1962. He piloted his Aurora 7 spacecraft through three revolutions of the earth, reaching a maximum altitude of 164 miles. Since retirement from the Navy in 1969, Carpenter has made his home in Los Angeles, and continues to apply his knowledge of aerospace and ocean engineering technology to the private sector.
- **Glenn's Mission.** During Glenn's flight, he has been poked and prodded. He has done sleep and other experiments, and he has publicly mused about subjects from the impact of space travel on his religious faith to his experience with "stomach awareness" in weightlessness. Glenn described the awe of seeing hundreds of

lightning flashes over Africa, and of looking down on the Middle East and wondering "why we can't man-solve some of the man-made problems" of that troubled region. His biggest surprise, he has said, is that he had not felt nauseous, as he suspected he would, given that almost half of all astronauts experience such problems as they adjust to weightlessness. And he has been sleeping well, though not as much as he does on the ground. Your conversation with Glenn takes place as he whips around earth every 95 minutes at an altitude of about 340 miles (twice as high as Glenn's first solo flight in a cramped Mercury capsule). As the Washington Post said earlier this week, payload specialist Glenn, at 77 the oldest person to fly in space, is also proving to be one of the most talkative, sometimes verging on a filibuster. They are scheduled to land this Saturday, November 7.

On Wednesday of this week, Glenn spoke with both Walter Cronkite and Jay Leno. He called himself "fat head," poking fun at his swollen face, caused by body fluids shifting in weightlessness. He also said the food was a lot better than on his first flight 36 years ago. He said, "this time I get a lot of choice: I can have my Tang mixed with either Geritol or Metamucil."

- **Challenger Center for Space Science Education.** Approximately 30 students from Jefferson Junior High will be present today; they are affiliated with the Challenger Center, whose mission is to encourage long-term interest in math, science and technology and to motivate students to pursue careers in these fields. These students watched John Glenn's second launch last week.

## ATTACHMENTS

- Opening talking points
- Mission Overview
- Comparison of Friendship 7 and Discovery
- Bio on Scott Carpenter
- Challenger Center Background
- Shuttle Experiment summary from the NY Times

DRAFT 11/4 7:35pm

REMARKS BY VICE PRESIDENT AL GORE  
JOHN GLENN PHONE CALL WITH CHALLENGER CENTER STUDENTS  
Thursday, November 5, 1998

It's great to be here today with all of you, and especially with Scott Carpenter -- the second American ever to orbit the earth. *[Scott and I both know a little bit about being number two...]* When Scott flew on his mission, he flew in a capsule called Aurora, and he said that "Aurora means dawn -- in this case, dawn of a new age." Today we are again celebrating the dawn of a new age. Not only will this mission continue our remarkable path of discovery -- it will also be the last mission before we begin putting up the pieces of the international space station, when the world will come together in common endeavor.

I also want to welcome the students from Jefferson Junior High and the Challenger Center. I know that a lot of you have been on some pretty amazing missions yourselves -- to rendezvous with a comet, or to travel to the moon. *[they participate in simulated missions.]*

Today, we're here to talk about another mission -- the one that John Glenn is on right now. In just a couple of minutes we'll get to talk to Senator Glenn, and ask him a couple of questions about it.

But before we do that, I just want to say a brief word about what this mission means to me. I was 13 years old -- the same age as many of you -- back in 1962, when John Glenn made his first trip into space. Back then, people talked about our "space race" with the Soviet Union, to see who could reach space first.

In the late 1950's, the Soviet Union successfully sent the first rocket -- called Sputnik -- into space. Then, in 1961, they beat us again, when a Russian cosmonaut named Yuri Gagarin became the first person in space. There was a national feeling of defeat, and many people wondered if America was up to the task. Then, in 1961, Alan Shepard became the first U.S. astronaut in space. But on February 20, 1962, the race swung our way for good. John Glenn sat in a Mercury space capsule on top of a rocket that nobody was sure would work. Nobody quite knew what would happen to his body in space. And nobody was sure the heat shield would protect him upon re-entry. But, with uncommon bravery and unwavering patriotism -- John Glenn fastened his seatbelt, looked toward the heavens, and became the first astronaut to orbit Earth.

When he lifted off of that launch pad -- with a plume of smoke and flame beneath him, he lifted the spirits of our nation. He made us believe that we could do it. And the man standing next to me captured the hope and pride of our nation when he uttered those famous words -- "Godspeed, John Glenn."

This mission also shows a new sense of international community. Up there today, we have Pedro Duque *[DOO-kay]* from Spain and Chiaki Mukai *[chee-AH-kee moo-KI]* from

Japan. Space, which was once a high stakes international competition, has now become a forum for international cooperation.

There's another thing that has changed as well. John Glenn's first capsule, Friendship Seven, which is right here behind me, didn't have any room for him to move around at all. As we're going to see in just a minute, compared to Friendship Seven, Space Shuttle Discovery is practically a luxury hotel.

But even as we look at everything that has changed in the last 36 years, there is one thing that remains the same, and that is the bravery of the men and women who have taken us beyond what we thought was possible and toward what we had only dreamed.

As we stand here with Scott Carpenter, and we get ready to talk to John Glenn -- I want each of you to realize that these men -- these heroes -- are just like you. They probably couldn't have imagined what they would grow up to do. But they did the two things that make anything possible. They worked hard, and they dared to dream.

That is how we put a man into space when no one thought it could be done. That is what gave one of our greatest Senators the drive to go back up in space. And that is what builds a brighter future for each and every one of us.

#### **MAKE PHONE CALL:**

Hello, Discovery! I just want to say to the whole crew, congratulations on a wonderful mission so far. You've got a proud nation -- a proud world -- watching you. On behalf of the President, congratulations.

#### **QUESTIONS FOR GLENN:**

John, you've got two former colleagues here -- one from the Senate and one from Project Mercury, and we've got a couple of questions to ask you.

What kind of thoughts have you had as you've looked at the Earth from space this past week -- 36 years after you first had this view?

John, you've been hearing the word hero a lot the last couple of weeks. Who are the heroes in your life?

President John Kennedy called your first mission a "victory of technology and the human spirit." What would you call your second one?

#### **INTRODUCE STUDENT:**

John, we've got a number of students here from Jefferson Junior High who have participated in the Challenger Center programs. And I have with me \_\_\_\_\_, who wants to ask

you a question.

Now I know your friend Scott Carpenter wants to say something to you...

## STS-95 MISSION OVERVIEW

More than thirty six years after he made history as the first American to orbit the Earth, Senator John H. Glenn, Jr. will return to space as part of a multi-national crew with the launch of the Space Shuttle Discovery October 29, 1998. STS-95, will involve more than 80 scientific experiments investigating mysteries that span the realm from the inner universe of the human body to studies of our own Sun and its solar activity.

On February 20, 1962, when Glenn flew in his Friendship 7 Mercury capsule, the largest mystery facing the young NASA space program was whether humans could even survive in the hostile environment of space. In the 121 U.S. space missions since Glenn's flight, more than 200 Americans have flown in space. Glenn, who inspired many current astronauts to pursue space flight as a career, continues to inspire people of all generations as he returns to space.

In addition to Senator Glenn, the STS-95 crew includes a Japanese astronaut, Dr. Chiaki Mukai, making her second flight, and Pedro Duque, who will be the first Spanish national to fly in space.

The wealth of scientific data accumulated during these space flights validate apparent similarities between the effects of space flight and aging. Glenn will be a test subject for specific investigations which mimic the effect of aging, including loss of muscle mass and bone density, disrupted sleep patterns, a depressed immune system, and loss of balance.

Scientific endeavors on the STS-95 mission will also expand our understanding of the Sun and how it affects life on Earth. The Spartan 201 spacecraft will be released by the crew on the fourth day of the mission and will spend two days studying the solar corona, the solar wind, and how the solar wind affects activities in Earth-orbit and on the ground. The Sun drives our weather, and energetic eruptions on the Sun are capable of disrupting satellites and communication and power systems on Earth. After two days of solar observations, Discovery's crew will haul the spacecraft back into the Shuttle's cargo bay and return it to Earth.

Six astronomical instruments comprise the International Extreme Ultraviolet Hitchhiker Experiment (IEH-3) which will be carried in Discovery's payload bay. These instruments support experiments involving studies of stars, remnants of supernovae, and star formation. Discovery will carry a variety of materials and equipment for use during the third Hubble Space Telescope servicing mission, currently scheduled for mid-2000, as well as a Spacehab module. Inside Spacehab, almost 30 smaller experiments ranging from materials science, to plant growth, to developing new techniques for delivering anti-tumor medications, will be conducted by the astronauts. Sponsored by NASA, the Canadian Space Agency, the European Space Agency, and the Japanese Space Agency (NASDA), these studies take the best advantage of the unique environment of space to conduct these diverse studies.

The STS-95 mission is scheduled to last almost 9 days. A launch on October 29 and nominal mission duration would have Discovery landing back at Kennedy Space Center after its 3 1/2 million mile journey on November 7, at about 12 noon Eastern Standard Time. STS-95 will be the 25th flight of the Space Shuttle Discovery and the 92nd mission flown since the start of the Space Shuttle program in April 1981.

## John Glenn: Friendship 7 and Discovery

Friendship 7 orbited the earth three times. Discovery will orbit approximately 144 times.

Glenn was in orbit 4 hours, 55 minutes, 23 seconds in Friendship 7. During the STS-95, he will be in orbit eight days, 20 hours.

Friendship 7 flew a distance of 75,679 statute miles. Discovery will fly 3.6 million miles.

The habitable volume of Friendship 7 was 36 cubic feet. Discovery orbiter crew compartment is 2,325 cubic feet. If each crewmember were allotted 36 cubic feet, Discovery could hold 64 people.

Friendship 7 had 143 cockpit display components. Discovery has 2,312.

Friendship 7 had 56 toggle switches to Discovery's 856.

Friendship 7 had 8 pushbutton switches. Discovery has 219.

Friendship 7 had 19 event indicators to Discovery's 559.

Discovery has 5 general-purpose computers on board. Friendship 7 had none.

Friendship 7 had one window. Discovery has 10.

Glenn was restrained and unable to move during his Mercury flight. During orbit in Discovery, the crew has free range of movement throughout the crew compartment and the Spacehab in the payload bay.

In 1957, Glenn set a transcontinental speed record with the first flight to average supersonic speeds from Los Angeles to New York, making the flight in 3 hours, 23 minutes.

After his Mercury flight, Glenn was asked to fill out a standard psychiatric form during his debriefing. The last question was: "Was there any unusual activity during this period?" "No," Glenn wrote, "just a normal day in space."

Candidates for the first manned space program could be no taller than 5 feet 11 inches. One reason was that the original flight capsule was only 6 feet 10 inches high. Glenn is 5 feet 10½ inches tall.

Friendship 7's highest altitude above earth was 162.2 miles. Discovery will reach 325 miles above earth. Glenn was 40 years old when he took his first space flight.

## SCOTT CARPENTER

Scott Carpenter, a dynamic pioneer of modern exploration, has the unique distinction of being the only human ever to penetrate both inner and outer space, thereby acquiring the dual title, Astronaut/Aquonaut.

He was born in Boulder, Colorado, on May 1, 1925, the son of research chemist Dr. M. Scott Carpenter and Florence Kelso Nixon Carpenter. He attended the University of Colorado from 1945 to 1949 and received a Bachelor of Science degree in Aeronautical Engineering.

Carpenter was commissioned in the U.S. Navy in 1949. He was given flight training at Pensacola, Florida, and Corpus Christi, Texas, and designated Naval Aviator in April 1951. During the Korean War he served with Patrol Squadron Six, flying anti-submarine, ship surveillance, aerial mining, and ferret missions in the Yellow Sea, South China Sea, and the Formosa Straits. He attended the Navy Test Pilot School at Patuxent River, Maryland, in 1954 and was subsequently assigned to the electronics test division of the Naval Air Test Center, also at Patuxent. In that assignment, he flew tests in every type of naval aircraft, including multi- and single-engine jet and propeller-driven fighters, attack planes, patrol bombers, transports, and seaplanes.

From 1957 to 1959 he attended the Navy General Line School and the Navy Air Intelligence School and was then assigned as Air Intelligence Officer to the aircraft carrier *U.S.S. Hornet*.

Carpenter was selected as one of the original seven Mercury Astronauts on April 9, 1959. He underwent intensive training with the National Aeronautics and Space Administration (NASA), specializing in communication and navigation. He served as backup pilot for John Glenn during the preparation for America's first manned orbital space flight in February 1962.

Carpenter flew the second American manned orbital flight on May 24, 1962. He piloted his *Aurora 7* spacecraft through three revolutions of the earth, reaching a maximum altitude of 164 miles. The spacecraft landed in the Atlantic Ocean about 1000 miles southeast of Cape Canaveral after four hours and 54 minutes of flight time.

On leave of absence from NASA, Carpenter participated in the Navy's Man-in-the-Sea Project as a squawab in the SEALAB II program off the coast of La Jolla, California, in the summer of 1965. During the 45-day experiment, Carpenter spent 30 days living and working on the ocean floor. He was team leader for two of the three ten-man teams of Navy and civilian divers who conducted deep-sea diving activities in a seafloor habitat at a depth of 205 feet.

He returned to duties with NASA as executive assistant to the Director of the Manned Spaceflight Center and was active in the design of the Apollo Lunar Landing Module and in underwater extra-vehicular activity (EVA) crew training.

In 1967 Carpenter returned to the Navy's Deep Submergence Systems Project (DSSP) as Director of Aquanaut Operations during the SEALAB III experiment. (The DSSP office was responsible for directing the Navy's Saturation Diving program, which included development of deep-ocean search, rescue, salvage, ocean engineering, and Man-in-the-Sea capabilities.)

Upon retirement from the U.S. Navy in 1969, after twenty-five years of service, Carpenter founded and was chief executive officer of Sea Sciences, Inc., a venture capital corporation active in developing programs aimed at enhanced utilization of ocean resources and improved health of the planet. In pursuit of these and other objectives, he worked closely with French oceanographer J. Y. Cousteau and members of his *Calypso* team. He has dived in most of the world's oceans, including the Arctic under ice.

As consultant to sport and professional diving equipment manufacturers, he has contributed to design improvements in diving instruments, underwater breathing equipment, swimmer propulsion units, small submersibles, and underwater devices.

Additional projects brought to fruition by his innovative guidance have involved biological pest control and the production of energy from agricultural and industrial waste. He has also been instrumental in the design and improvement of several types of waste-handling and -transfer equipment.

Carpenter continues to apply his knowledge of aerospace and ocean engineering as a consultant to industry and the private sector. He lectures frequently in the United States and abroad on the history and future of ocean and space technology, the impact of scientific and technological advance on human affairs, and man's continuing search for excellence. An avid skier, he spends much of his free time on the slopes of Vail, Colorado, his home for the past ten years.

He has appeared as television spokesman for many major corporations, including General Motors (Oldsmobile), Standard Oil of California, Nintendo, and Atari, and has hosted and narrated a number of television documentaries. He has also served as actor/consultant to the film industry in the fields of space flight, oceanography, and the global environment.

He has written two novels. The first was entitled *The Steel Albatross*. The second, a sequel, was called *Deep Flight*. Both were dubbed "underwater techno-thrillers." He is now at work on his memoirs, to be published by Harcourt Brace.

Carpenter's awards include the Navy's Legion of Merit, the Distinguished Flying Cross, the NASA Distinguished Service Medal, U.S. Navy Astronaut Wings, the University of Colorado Recognition Medal, the Collier Trophy, the New York City Gold Medal of Honor, the Elisha Kent Kane Medal, the Ustica Gold Trident, and the Boy Scouts of America Silver Buffalo. He has been awarded six honorary degrees.

## The Challenger Center for Space Science Education

The Challenger Center for Space Science Education is an international, not-for-profit education organization with headquarters in metropolitan Washington, D.C.. Founded in 1986 by the families of the Challenger 51-L crew, the Challenger Center mission is to encourage long-term interest in math, science and technology and to motivate students to pursue careers in these fields.

Using the concept of simulation as an instructional tool, each Challenger Center program creates an exciting, cooperative learning environment that exposes students in grades 5-8 to the challenges of teamwork, problem-solving, communication and decision-making.

Challenger Center programs can be found anywhere - in the classroom, in Challenger Learning Centers, at teacher workshops, in the community, and worldwide on the Internet. Here is a snapshot of the Challenger Center programs that reached over 2 million young people in 1997 alone:

- Through a growing network of 31 Challenger Learning Centers, more than 300,000 students and teachers a year will "fly" missions as part of Challenger Center's educational simulations. Scenarios include Return to the Moon™, Rendezvous with a Comet™, Voyage to Mars™, and the newest scenario developed with a National Science Foundation grant, Encounter Earth™. Pre- and post-flight activities for both teachers and students make this experience an "add-in" to the curriculum, not an "add-on."
- Students and teachers can experience Challenger Center programs in the classroom, too. Using our popular Mars City Alpha™, students are transformed into scientists and engineers launching an international effort to design a settlement on Mars. They can create a prototype for a habitat on Mars and then link with other participating schools to form Marsville: The Cosmic Village®.
- Innovative workshops train teachers to transform any subject, K-12, into a real-world learning environment. EdVentures in Simulation: A Great START to the 21<sup>st</sup> Century™ shows teachers how to incorporate hands-on simulation activities into their everyday curricula. Touching the Future: Linking the Classroom With Space™ uses space science as a catalyst for inter-disciplinary learning. These programs have received critical acclaim from participating teachers and are offered regionally.
- Challenger Center has once again been chosen as the primary educational partner for the Embrace Space initiative and Space Day III on May 6, 1999.
- Window on the Universe and Family Science Night are initiatives that combine the strengths of Challenger Center's educational emphasis with sustainable community-wide, family-oriented space science education activities...making learning fun for the whole family!
- Distance Learning is taking on a new dimension through efforts to link Learning Centers with remote sites. In 1998, Phase II of this collaborative initiative will focus on providing teacher training in using technology as an integral part of the classroom experience.

## ASTRONAUT BIOGRAPHICAL SKETCHES

Lt. Col. Curtis L. Brown, USAF – STS-95 Commander Brown is an Air Force Academy graduate who has logged over 977 hours in space. He was selected as an astronaut candidate in June 1987, and has worked on Shuttle upgrades and operations. This will be Brown's fifth flight on the Shuttle. He is unmarried and has one son, Greg.

Lt. Col. Steve Lindsey, USAF – STS-95 Pilot Lindsey is an Air Force Academy graduate who has logged over 3,300 hours of flying time in 50 different types of aircraft. He became a NASA astronaut in 1996, and has worked on weapons systems for military aircraft and upgrades for the Shuttle. STS-95 will be Lindsey's second space flight. He and his wife Diane have three children: Jessica (11), Jason (8), and Jillian (5).

Dr. Stephen Robinson – STS-95 Mission Specialist Prior to his selection as an astronaut in December 1994, Dr. Robinson was responsible for a number of NASA aerodynamics and engineering research projects. This will be his second space mission. During Dr. Robinson's first STS mission in 1997, he logged over 284 hours in space. Robinson is unmarried.

Dr. Scott Parazynski (para ZIN ski) – STS-95 Mission Specialist A medical doctor by training, Parazynski has conducted extensive research on human adaptation to stressful environments. He has logged over 521 hours in space, including 5 hours of extravehicular activity (EVA). This will be Parazynski's third flight, as the flight engineer. He and his wife, Gail, have one son, Luke (2).

Pedro Duque (doo KAY) – STS-95 Mission Specialist (European Space Agency) Duque joined ESA's astronaut corps in 1992 following several years of orbital determination work in Germany. Duque was trained as a research astronaut (back-up crew) for Soyuz and Mir and supported the joint ESA-Russian EUROMIR 94 and 95 missions. Duque will become the first Spanish national to fly in space. Duque and his wife, Consuelo, have three children: Andres, Irene, and Marc.

Chiaki Mukai (chee AH kee moo KIE) – STS-95 Payload Specialist (NASDA Astronaut) A cardiovascular surgeon, Mukai became the first Japanese female to fly in space on the STS-65 mission in 1984, when she logged over 353 hours in space. This will be her second flight. Mukai and her husband, Makio, have no children.

John H. Glenn – STS-95 Payload Specialist Senator Glenn piloted the Mercury-6 (*Friendship 7*) spacecraft on the first manned orbital mission by the United States. He has logged nearly 9,000 hours of flying time, and 5 hours in space. This will be Glenn's second space flight.

Scott Carpenter – Aurora 7 (Mercury-7 flight)\* Scott Carpenter is a Retired US Navy Commander. One of the original 7 NASA astronauts chosen in 1959, Carpenter became the second American to fly in space in May of 1962, following Glenn's successful Friendship 7 flight. He piloted the Aurora spacecraft through three revolutions of the earth for a total flight duration of 4 hours and 54 minutes.

\* Scott Carpenter will be accompanying the Vice President during the November 5 event.

# Glenn Eclipses a Rich Array of Shuttle Experiments

By WARREN LEARY

HOUSTON, Nov. 2 — Although eclipsed by the attention given John Glenn's return to space, one of the most ambitious and diverse programs of scientific and commercial research yet attempted on a steady mission is being conducted by the crew of the shuttle Discovery.

Along with the aging-related research involving Senator Glenn, the seven-member crew is methodically working through scores of experiments ranging from solar physics and astronomy to the design of new drug delivery systems, studies of artificial bones, and testing of insulation material for the construction industry.

A major event planned for Tuesday is the recovery of the Spartan solar observation spacecraft, which was released from the Discovery on Sunday for two days of studies orbiting on the Sun's hot, outermost layer, the corona. The 3,100-pound Spartan has been trailing the Discovery by about 30 miles. It is to be snared by the shuttle's robot arm and returned to Earth in the orbiter's cargo bay.

Senator Glenn is being poked and prodded during the mission because of similarities between what happens to astronauts in space and bodily changes due to age, like loss of bone and muscle mass, greater sus-

## The Old Man and the Void

Astronauts in micro gravity experience changes in their bodies that resemble some conditions associated with aging. Balance and sleep patterns are affected, bones and muscles weaken and changes occur in the cardio-

vascular system. The crewmembers in the space shuttle, especially 77-year-old John Glenn, will participate in experiments that researchers hope will help them to understand more about the aging process.

**AGE**

Elderly people tend to have problems sleeping. Apnea (a breathing disorder), decreasing levels of melatonin and other sleep-related hormones, changes in the body temperature cycle and less mental and physical stimulation are common causes.

**WEIGHTLESSNESS**

Astronauts have odd sleep patterns due to unusual light cycles. Brain waves of John Glenn and Chakrabarti will be measured during sleep. They will swallow pills that contain a thermometer and will be tested for apnea and sickness. Dr. Mukai's metabolic levels will be monitored.

**HEARING AND VISION**

Chronic balance disturbances affect many old people, and the reasons are largely unknown. Fluid in the middle and inner ear stimulate different nerve fibers as the body changes position and orientation. Eyes, skin pressure receptors and joints also help the body to keep balance.

**BONES AND MUSCLES**

Monitoring temporary, cardio-vascular changes in space might help researchers better understand heart disease and changes in blood pressure. Tests will compare how blood pressure and heart rhythm respond to standing up quickly before and after the flight.

**HEARING AND VISION**

Monitoring temporary, cardio-vascular changes in space might help researchers better understand heart disease and changes in blood pressure. Tests will compare how blood pressure and heart rhythm respond to standing up quickly before and after the flight.

**BONES AND MUSCLES**

Researchers will monitor the bone density and the contraction and break down of muscle proteins in certain astronauts. The changes in Mr. Glenn's muscles, total body mass and spinal bone marrow will be compared with those of the rest of the crew members.

## A needle-poked Glenn can't hide from 'Count Dracula.'

capability in selection and sleeping difficulties. The experiments require him to provide 20 blood samples and 18 urine samples while in space.

Speaking from the shuttle on Sunday, Mr. Glenn said he did not like being stuck with needles and tried to avoid Dr. Scott E. Parasyukh, the crewmate responsible for most of the blood collection, whom the Senator sometimes calls "Igor" or "Count Dracula."

"As much as I like Discovery, there's no place to hide when he comes after me," Mr. Glenn remarked.

The bloodletting is part of a "protein turnover" experiment to study muscle wasting by tracking protein building and breakdown. Data are collected in six three-day sessions held before, during and after the flight. Each session, including two in space, requires five blood samples each taken from the 77-year-old Senator and a fellow crew member, 33-year-old Pedro Duque.

In order to track the formation of new proteins from amino acids, both men take capsules of alanine, an amino acid tagged with a special molecule that can be found in newly built protein.

Simultaneously, the subjects take a very sensitive receiver tagged amino acid, histidine, which measures protein breakdown. Along with blood, urine samples will also be returned to Earth, where the tagged molecules will be measured.

In addition, Mr. Glenn and another crewmate, Dr. Chakrabarti, 46, are doing sleep studies by wearing specially instrumented nose and caps to measure breathing, chest expansion, eye movements and brain waves when they go to bed.

Most of the Discovery's crew members either conduct or take part in long hours of research, with little free time. And these undertakings do not include some experiments that require little or no human attention, like work on an electronic nose for detecting toxic compounds.

The nose is a three-pound box full of chemical sensors connected to a small, palm-top computer. The sensor array, developed by NASA and California Institute of Technology researchers, is designed to detect a variety of gases and gas mixtures by mimicking the way the human nose detects changes in the air.

Because astronauts in the confines of the planned international space station must breathe filtered and recycled air, researchers say they need a monitoring system that detects the accumulation of potentially harmful gases before they become a problem.

Many of the more than 80 experiments aboard the Discovery are housed in a pressurized laboratory in

the cargo bay that is connected to the shuttle's crew quarters by a tunnel. This laboratory, privately owned and operated by Spacehab Inc. of Vienna, Va., contains research like an experiment with aerogel, the lightest solid known.

Aerogel, which has a hairy blue appearance, is a porous material so light and ethereal that it has been nicknamed frozen smoke. Tests show that a single window pane of aerogel has the insulation properties of up to 30 panes of glass and trapped air. If this material can be made transparent, perhaps by modifying under weightless conditions the size or uniformity of pores that compose most of it, aerogel could revolutionize the thermal window industry, scientists at the space agency say.

Spacehab also houses a bioreactor, a device that allows cell cultures to be grown in space in rotating cylinders. Astronauts are running several experiments for growing human cells, including research into making artificial and synthetic material

## A three-pound nose aims to sniff out perils to astronauts.

were acceptable for human implantation by seeding it first with bone cells. This work, researchers said, could lead to synthetic bone to repair limbs damaged by accidents or for dental reconstruction.

Other experiments, like the Hubble Space Telescope Orbital Systems Test, or HOST, developed by NASA's Goddard Space Flight Center in Greenbelt, Md., are in the shuttle's open cargo bay. A platform in the bay contains several instruments and devices tentatively scheduled to be installed on Hubble during its next servicing mission in the year 2000, said Rud V. Moe, payload coordinator at Goddard.

The Discovery is flying as an alti-

tude of about 240 miles, twice the normal shuttle orbit, mainly so the HOST package is exposed in conditions normally found at Hubble's elevation. The instruments include a faster computer with more memory to control the telescope's operations and a solid-state data recorder that will back up a similar device installed two years ago in place of Hubble's original mechanical tape recorder.

HOST is also demonstrating a mechanical refrigeration system that could cool detectors on Hubble's Near Infrared Camera and Multi-Object Spectrometer, a valuable instrument that is no longer working because it has exhausted its supplies of super-cold liquid coolant stored in pressurized bottles.

The instrument requires cool detectors to measure the heat of distant objects. The new system, if shown to work in space, could extend the operation of the infrared instruments for more than five years, Mr. Moe said.

July 13, 1999

## **Apollo 11 30<sup>th</sup> Anniversary Medal Ceremony**

National Air and Space Museum

8:30 am – 9:10 am, Tuesday, July 20<sup>th</sup>, 1999

**Briefing Prepared by: Jim Kohlenberger and Jefferson Hofgard**

### EVENT

You are joining the crew of the Apollo 11 mission, and other invited guests, at the National Air and Space Museum for a commemoration of the historic Apollo 11 Moon landing. You will present the Samuel P. Langley medal, which is the highest honor bestowed by the Smithsonian Board of Regents (yourself among them), to the crew of the Apollo 11, Neil Armstrong, Edwin (Buzz) Aldrin and Michael Collins. Also participating will be Vice Admiral Donald Engen, Director of the museum; Dennis O'Connor, Provost of the Smithsonian; and Daniel Goldin, NASA Administrator. Invited guests include Cabinet Secretaries, Members of Congress, museum trustees and staff, NASA personnel, and aerospace industry representatives. While this event is open press, the Smithsonian has requested that the media treat this event as a ceremony. There is no opportunity built into the program for questions from the audience or press. The ceremony will take place on a stage next to the Apollo 11 Command Module and underneath the 1903 Wright Flyer, the world's first airplane.

**Special Notes:** In presenting the award, you will be acknowledging the great achievement of the first astronauts to land on the Moon, as well as the greater community of Americans whose contributions made the Apollo program a success. This includes the late Charles "Pete" Conrad, the third man to walk on the Moon, who died last Friday in a motorcycle accident. Many of the Apollo astronauts are expected to be in town for Conrad's memorial service on July 19. They are all invited to remain in Washington, DC for another day to attend the medal ceremony. Those in the audience could be recognized and asked to stand up. Also of note, if the Space Shuttle schedule holds, at 12:36 am on the morning of this event, the first woman commander of a Space Shuttle, Eileen Collins, will have blasted off from Cape Canaveral to deploy the Chandra Advanced X-ray Astrophysics Facility.

### LOGISTICS

The medal ceremony begins at 8:30 am in the Milestones of Flight Hall in front of the Apollo 11 Command Module now on display in the museum. (The medal ceremony follows a breakfast reception). Those participating in the presentation of awards will be seated on a dais in front of the invited guests.

- ~~Vice Admiral Donald Engen~~ <sup>Donald Lopez De</sup> Director of NASM will offer brief remarks and introduce Dennis O'Connor, Provost of the Smithsonian Institution.
- Dennis O'Connor, Provost, will make brief remarks and introduce Daniel Goldin.
- Daniel Goldin, NASA Administrator, will make brief remarks.
- Dennis O'Connor, Provost, will take the stage once again and introduce you for the medal presentation.
- You will make brief remarks and conclude by asking the Provost to read the medal citations for Neil Armstrong, Buzz Aldrin and Michael Collins.
- After each citation is read, you will award the medals, which can be handed to the astronauts in their small display cases.

#### PROGRAM NOTES

Facts on the Apollo Program: On May 25, 1961, President Kennedy made a public commitment to land an American on the Moon by the end of the decade. The Apollo 11 mission was launched aboard a Saturn V rocket, from Kennedy Space Center on July 16, 1969. The astronauts reached lunar orbit 4 days later, on July 20, 1969. The 'Eagle' Lunar Module, which carried Neil Armstrong and Buzz Aldrin, separated from the 'Columbia' Command Module and touched down on the Moon, in the 'Sea of Tranquility' on July 20. Michael Collins remained in lunar orbit. Armstrong and Aldrin spent a little over 2 hours outside the Eagle deploying instruments, taking photographs, and collecting rock and soil samples. Their activities were viewed live around the world by approximately 500 million people, one of the largest television audiences in history. The 'Columbia' returned to Earth on July 24 having traveled 488,490 miles in 8 days, 3 hours and 19 minutes.

There were a total of 12 crewed Apollo missions, six of which landed men on the Moon. In all, 12 men have set foot on the lunar surface including: Apollo 11 - Neil Armstrong, Buzz Aldrin; Apollo 12 - Pete Conrad (deceased), Alan Bean; Apollo 14 - Alan Shepard (deceased), Edgar Mitchell; Apollo 15 - David Scott, James Irwin (deceased); Apollo 16 - John Young, Charles Duke; Apollo 17 - Harrison "Jack" Schmitt, Eugene Cernan. Astronaut Eugene Cernan became the last man to walk on the Moon before the program was cancelled in 1972.

The Samuel P. Langley Medal: It was established by the Board of Regents in 1908, at the suggestion of Dr. Alexander Graham Bell. It honors the memory of Samuel Langley, the third secretary of the Smithsonian and a pioneer in early aviation. He was

the inventor of the Langley Aerodrome, an airship that never flew successfully but which provided important information about the use of gasoline-powered engines in airplanes. Some of the more notable recipients include Charles Lindbergh, Robert Goddard, Alan Shepard, Werner von Braun, and the Wright Brothers, who were the first to receive the medal in 1909 (full list is attached).

• **Other activities are planned for July 20<sup>th</sup>:** Following the medal ceremony, there will be a photo opportunity for the Apollo crew in the Oval Office with the President. Lunch will be served at the Newseum, followed by a Newseum-produced interview with the Apollo 11 crew and school students from around the country. At 2:30 pm, the crew will be at NASA Headquarters for a short presentation. In addition, on Friday, July 16<sup>th</sup>, the crew will participate in a ceremony at Kennedy Space Center in Cape Canaveral, Florida. On Thursday, July 22, Neil Armstrong will attend a BBQ at Johnson Space Center in Houston, Texas. Other Apollo astronauts will attend many of the events.

• **Related Space Topics in the News:** If the Space Shuttle schedule holds, at 12:36 am on the morning of this event, the first woman commander of a Space Shuttle, Eileen Collins, will have blasted off from Cape Canaveral to deploy the Chandra Advanced X-ray Astrophysics Facility.

On a sad-note, Pete Conrad, the third man to walk on the Moon, died on July 8. He was injured when his motorcycle went off the road while on a trip with friends in California. Characteristic of Conrad's exuberant personality, when he stepped onto the Moon, he exclaimed, "Whoopie! That may have been a small one for Neil, but that's a long one for me." In addition to commanding the Apollo 12 Moon mission, he also flew on Gemini V, Gemini XI, Apollo 12, and Skylab 2. He achieved more than 1,179 hours of cumulative spaceflight and 14 cumulative hours of extra vehicular activity.

## ATTACHMENTS

- Biographies of Apollo 11 Crew
- Previous Award Recipients of the Samuel P. Langley Medal
- Medal Citations

## **ANNOTATED BIOGRAPHIES OF THE APOLLO 11 CREW**

**Neil Armstrong** currently lives in Cincinnati, Ohio with his second wife, Carol, whom he married in 1994. He served for seventeen years as an engineer, test pilot, astronaut, and administrator for both the National Advisory Committee for Aeronautics (NACA) and its successor, NASA. In preparation for the Apollo 11 mission, Armstrong piloted the Gemini 8 mission and performed the first successful docking of two vehicles in space.

In 1971, he resigned from NASA and accepted its position as Professor of Aerospace.

Engineering at the University of Cincinnati where he remained until 1980. In 1985, he served a 2-year membership on the National Commission on Space. In 1986, he was Vice Chairman of the Presidential Commission on the Space Shuttle Challenger Accident. Since 1989, Armstrong has served on several boards including the Thiokol Corporation (now Cordant Technologies Inc.) which produces the solid fuel rocket boosters for the Space Shuttle. He is currently Chairman of AIL Systems, Inc., an aerospace electronics company in Deer Park, New York. Armstrong has received medals from 17 different countries. He holds honorary doctorates at a number of universities and is the recipient of many other special honors including the Presidential Medal of Freedom and the Congressional Space Medal of Honor.

Buzz Aldrin recently moved to Los Angeles with his wife of 11 years, Lois. He was educated at the U.S. Military Academy at West Point, became an Air Force Officer, and then pursued a doctoral degree in astronautics from MIT. He specialized in manned space maneuvers. The techniques he devised were used on all rendezvous missions, including docking missions with Russian Cosmonauts. In preparation for Apollo 11, Aldrin achieved a new record for extra-vehicular activity in space during the Gemini 12 orbital flight. He has written two books about his experiences in space, *Return to Earth* (1970), and *Men from Earth* (1989). In 1996, his first science fiction novel was published, *Encounter with Tiber*.

He is founder of Starcraft Enterprises, a company that helps finance private sector space endeavors. Currently, in addition to serving as Chairman of the National Space Society, Aldrin is lecturing and traveling throughout the world to pursue and discuss his and others' latest concepts and ideas for exploring the universe. Aldrin received the Presidential Medal of Freedom as well as almost 50 other distinguished awards and medals from countries around the world.

Michael Collins lives in Marco Island, Florida with his wife, Patricia. He graduated from the U.S. Military Academy at West Point with a Bachelor of Science degree. After West Point, he became a fighter pilot and an experimental test pilot at Edwards Air Force Base. Between 1959 and 1963, he logged more than 4,200 hours of flying time. In preparation for Apollo 11, he served as the pilot for the Gemini 10 mission during which he set a world altitude record and became the third man to walk in space. In 1970, Collins retired from NASA. He became Director of the National Air and Space Museum in 1971, a position he held for seven years. This was followed by a position as Undersecretary of the Smithsonian from 1978-1980. Currently he is a trustee of the National Geographic Society and a Director of the AVEMCO Corporation, an aviation insurance company. He continues to be involved in the field as an aerospace consultant and writer. He has authored several books, including *Carrying the Fire*, *Flying to the Moon and Other Strange Places*, and *Liftoff: the Story of America's Adventure in Space*. His last book, *Mission to Mars* was published in 1990. Collins received the Presidential Medal of Freedom and the Collier Trophy and has honorary degrees from six colleges and universities.

## PREVIOUS RECIPIENTS OF THE SAMUEL P. LANGLEY MEDAL

Wilbur and Orville Wright	1909
Glenn H. Curtiss	1913
Gustave Eiffel	1913
Charles A. Lindbergh	1927
Richard Evelyn Byrd	1929
Charles Matthews Manly	1929. (posthumously)
Joseph S. Ames	1935
Jerome Clarke Hunsaker	1955
Robert H. Goddard	1960. (posthumously)
Hugh Latimer Dryden	1962
Alan B. Shepard, Jr.	1964
Wernher von Braun	1967
Samuel Phillips	1971
James E. Webb	1976
Grover Loening	1976
Robert T. Jones	1981
Charles Stark Draper	1981
Jay Cohen	1983
H. Ross Perot, Jr.	1983
Barry Goldwater	1987
Benjamin O. Davis, Jr.	1992

## MEDAL CITATIONS

### For Neil Armstrong:

The Board of Regents of the Smithsonian Institution presents the Samuel P. Langley Medal to Neil A. Armstrong in grateful recognition of his extraordinary contributions to the United States space program. A consummate test pilot of experimental aircraft and an astronaut, he applied his combined expertise to piloting Gemini 8, performing the first docking of two vehicles in space. As Spacecraft Commander for Apollo 11, he commanded the manned mission to the Moon and was the first human being to walk on the Moon's surface. May his outstanding accomplishments in air and space and his legendary role in the Apollo 11 mission be an inspiration to aviators and astronauts for generations to come.

### For Buzz Aldrin:

The Board of Regents of the Smithsonian Institution presents the Samuel P. Langley Medal to Buzz Aldrin in grateful recognition of his extraordinary contributions to the United States space program. With a doctoral degree in astronautics, he brought great technical expertise to the Gemini 12 mission and to the five hours he spent outside the spacecraft during the record setting extravehicular activity that distinguished that effort.

As Lunar Module Pilot on Apollo 11, he participated in the first landing of a manned spacecraft on the Moon and in the first lunar surface excursion. May his outstanding accomplishments in air and space and his legendary role in the Apollo 11 mission be an inspiration to aviators and astronauts for generations to come.

For Michael Collins:

The Board of Regents of the Smithsonian Institution presents the Samuel P. Langley Medal to Michael Collins in grateful recognition of his extraordinary contributions to the United States space program. An exceptional test pilot in the U.S. Air Force, he shared in the record-setting flight of Gemini 10, executing the first rendezvous and docking with a separately launched Agena target vehicle. As Command Module Pilot on Apollo 11, he maneuvered Columbia into position for docking with the Lunar Module Eagle and ensured the success of the crucial lunar orbital rendezvous. May his outstanding accomplishments in air and space and his legendary role in the Apollo 11 mission be an inspiration to aviators and astronauts for generations to come.

REMARKS BY VICE PRESIDENT AL GORE  
APOLLO 11 30<sup>th</sup> ANNIVERSARY CELEBRATION  
Tuesday, July 20, 1999

First, let me say how much we will all miss Director Donald Engen. A hero in World War Two, Donald was no less a hero to this museum.

As one of the Regents of the Smithsonian, I know the first-hand the contribution Donald made. He understood our National Air and Space Museum for what it truly is: a shrine to America's relentless spirit of progress, and a monument to those who led us. He gave new energy to this, the world's most visited museum, and put forth a bold vision for its future. He will be missed.

Let us also remember your fallen colleague Pete Conrad. On the second lunar landing, when Commander Conrad became the third man to walk on the moon, rather than descending the stairs, he jumped from the landing module to the surface -- and with his trademark sense of humor he declared, "That may have been a small one for Neil, but that's a long one for me."

And so it was for Pete -- from his training as an aeronautical engineer, to his service in the Navy, to his time at NASA -- where he became one of the most decorated astronauts ever. Up until his passing, he was working on new commercial ways to open the space frontier. We will remember his humor, his energy, his love of country -- and the unparalleled service he gave to it.

[pause]

Hundreds of years from now, when historians are chronicling the history of the 20<sup>th</sup> Century, I believe they will conclude that one of the most significant decisions we made, as a people, was to send a man to the moon -- to expand the very limits of our horizon, and blaze new paths of discovery.

It was President John F. Kennedy who taught us all to reach for the moon and the stars. And I want to say, on behalf of everyone here today, that our thoughts and prayers are with the Kennedy family at this difficult time. For John Kennedy Jr. wore that mantle of possibility and discovery -- the belief that we can reach a new horizon if we have the courage to try.

One poet has written: "there is no path; we create the path as we walk." [Antonio Machado] That is true of the people we honor today -- who blazed a path further than any we had known, and made President Kennedy's vision a reality.

In hindsight, yours was an audacious journey. Apollo 11's on-board computer had about one-twentieth the storage power of an average floppy disk today and one thousand times less active memory than the average digital organizer today.

With those constraints, you embarked on a mission of half a million miles -- a mission to

a place that was always within our view but never before within our reach. Even Michael Collins would later admit, "There are just too many things that can go wrong." And yet, you succeeded.

For America, yours was also a journey of the human heart. 1969 was a time of growing division in America. We were still reeling from the race riots that followed the assassination of Martin Luther King, Jr., and then the assassination of Robert Kennedy which came so quickly on its heels. The war in Vietnam – a war I was about to see with my own eyes – was cleaving America apart.

But we came together, transfixed by the mission you undertook. As Buzz Aldrin, Neil Armstrong, and Michael Collins sat atop a Saturn V rocket that was taller than the Statue of Liberty, families and communities came together to watch with pride and hope and fear.

We stayed transfixed for the duration of your journey. Later, we would learn just how heroic that mission was. From mission control we heard the words "we're go on that alarm," and only later found out that there had been a computer overload. From you we heard the words "pretty rocky area," and didn't realize that you had to struggle to avoid a field of boulders – and nearly exhausted your fuel in the process. And in the calm language of the test pilot, we heard the words "picking up some dust," but didn't realize that lunar dust had totally obscured your visibility. And then came the graceful words: "Houston, Tranquility Base here. The Eagle has landed."

And with your first step into the sea of tranquility, you brought tranquility to us here at home. In that moment, we became a truly United States, united in pride and gratitude.

Your mission taught us a great deal about the moon. But it taught us even more about ourselves: what we could accomplish as a nation if we set our hearts and minds to it.

So perhaps the greatest thanks we can offer is to continue on the path which you have cleared for us. Thanks to Administrator Goldin, NASA is enabling us to explore the heavens further, faster, and cheaper than before.

And so we must continue to create the path as we walk.

Early this morning, we launched x-ray telescope Chandra -- the third Hubble-class telescope -- to see further and clearer than ever before -- and possibly find other planets orbiting other stars in our solar system.

And in one giant leap for womankind, it was launched on the first Space Shuttle ever to be commanded by a woman – Air Force Colonel Eileen Collins. America is proud of her.

While the Eagle was the size of a Volkswagen Beetle, and space was originally a race between two competing superpowers, today 15 nations have come together to build an international space station that will be the size of two jumbo jets. Already, two of the pieces, have been launched, and next year we will be manning that station.

Last year at this time, we were all captivated by the vivid images that Sojourner was sending back from Mars. We will soon return to Mars, eventually to return a soil sample, and to answer the question of whether microbial life existed there.

And last year, we launched Deep Space One, which will travel so far away that we cannot even communicate with it. It will use artificial intelligence to further advance our process of discovery.

You see, the Apollo 11 was just the beginning of the journey – and it is a journey of curiosity and discovery that must be never-ending.

So today, we present these three men with the Samuel Langley Medal, to stand in equal stead with Wilbur and Orville Wright, Charles Lindbergh, and your colleague Alan Shepard.

As much as any, you have opened up new horizons, and made real what many could not dare to imagine.

Pulitzer Prize winning historian Walter McDougall would later write: "The hope that rode on Apollo was the hope for human adequacy in the face of awful challenges."

You did nothing less than fulfill our greatest hopes, and fuel even grander dreams.

On behalf of a grateful nation, I congratulate you.