

Enclosure

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"THE LIGHT OF A NEW AGE"

Remarks by
NASA Administrator Daniel S. Goldin
to the Association of Space Explorers
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I want to welcome all of you, particularly those of you from other countries. Welcome to the land of the Wright Brothers and the Right Stuff.

"The bravest are surely those who have the clearest vision of what is before them -- glory and danger alike -- and yet notwithstanding, go out to meet it." Those words of Pericles most surely apply to this fellowship of space voyagers. Your contributions to the human experience are the stuff of world history, and I am honored to speak to you today.

I am expected to speak this morning on why we should go to Mars. So let me begin by going in the opposite direction. What would it mean if we decided today not to go to Mars? Or the Moon. What would it mean?

After all, there are many who say we should not go. A congressman who opposed Space Station Freedom last month said the money should be spent filling potholes and rebuilding our sewers. Sewers are what we need, he said. A former Congressman once said he couldn't justify spending money to find microbes on Mars, when he already knew there were rats in Harlem apartments.

Yes, there are problems on Earth, just as there have been ever since the first human was eaten by a saber-toothed tiger. There were rats and sewage problems back in Genoa when Christopher Columbus was growing up. Their muddy streets probably even had some hellacious potholes.

Columbus' generation also had trouble getting decent health care. Scurvy was a problem; so was the plague. They didn't have CAT scans, or laser surgery, or intensive care units, which got their start -- by the way -- because of the space program.

In this 500th year of Columbus' voyage, we rightly recognize the great admiral's vision and courage, but tend to overlook the historical significance of Queen Isabella. Columbus tried to gain the support for his voyage from the kings of Portugal, England, and France, but they all took a pass.

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Only Isabella was willing to look beyond the many problems on her own shores, and see the potential reward for her investment in the future. The voyages of Columbus set the stage for more Spanish explorers, who turned Spain into a great world power. As a consequence, the language and culture of Spain prevail in most of Latin America to this day.

On the other side of the world, however, in China -- the intended destination of Columbus -- their emperors turned their back on the rest of the world. Sixty years prior to 1492, Chinese explorers had traveled as far as Africa. But a new emperor considered such journeys wasteful extravagances. His successors burned the boats, and banned all Chinese from leaving the country. Those who tried could be executed.

That 15th century decision to not explore still reverberates in China today. For a country with the most people on Earth, China still looks inward -- its culture hardly the dominant force in the world that it could be.

Exploration is one of the hallmarks of a great nation. Turning inward is a sign of a nation in decline. Engaging the world brings in new ideas, new vitality. The waves of immigrants who came to America have always refreshed this country and made it stronger.

Columbus, of course, was not the first to come to America. People were living in the Washington area 10,000 years ago, and the first humans crossed the Bering Strait into Alaska as many as 40,000 years ago. Let's forget about Columbus for a minute and think about why these early explorers left their vast, uncrowded homelands to journey thousands of miles into virgin territory.

Indeed, why did the first homo sapiens leave the warm comfort of Africa and walk to Scandinavia and Siberia? Why didn't those first Americans just stop in Alaska instead of moving through Canada and Mexico down to Chile and Peru? What made the Polynesians brave the mighty Pacific in their tiny canoes to colonize island after island after island?

Exploration is not simply a pastime for the curious; it's a biological imperative -- wired right into our DNA. There is something intrinsic to life itself that says, "To grow is to live; to stop is to die." Exploration is part of what we live for. It's how we grow as intelligent beings.

If we consciously decide not to go to Mars, our generation will truly achieve a first in human history. We will be the first to stop at a frontier. We will be the first to draw a line and say to our children, "This far, and no farther."

To live without a frontier is confining to the mind. Mike Collins wrote in his book Mission to Mars: "I don't want to live with a lid over my head.... Call it genes, character, culture, spirit, ethos: by whatever name, it is within us to look up into the night sky and be curious, [and] within us to commit our bodies to follow our eyes."

Every generation has had its worlds to explore. Human beings have never possessed a technology for travel that they have refused to use. First there was the world beyond the tribal village. Then the continents. Then the oceans. Then the North Pole and South Pole. Then into the air, through the sound barrier, and on to the Moon.

Mars is within our grasp. Sure, it will take hard work, but the challenges do not appear insurmountable. Sure, it will take money. More than some think. Less than some fear.

And so, we must go. Destiny is not what calls us to Mars; our humanity does. If all this heavy philosophy and history can't convince you that we must continue to explore space, then maybe out of the mouths of children comes the truth. The best reason I ever heard for exploring space was written right after the Challenger explosion by an 11-year-old California boy. He said, "If we stop going into space, people everywhere will die a little in their hearts."

Deciding that the human exploration of space is over is simply unthinkable. We have not reached the end, but have barely begun to break the bonds of gravity that have chained us to Earth. Robert Goddard once wrote to H.G. Wells: "There can be no thoughts of finishing, for aiming at the stars, both literally and figuratively, is a problem to occupy generations, so that no matter how much progress one makes, there is always the thrill of just beginning."

To me, the need to explore is intrinsic to life itself. But having said that, let me present four reasons why we should go back to the Moon and go to Mars. Each reason, in and of itself, may be disputed, but taken as a whole, I believe the case is not only compelling, but overwhelming.

The first reason is economic. In the first half of the 1980s, industrial R&D in the U.S. was growing at an average annual rate of 7.5%. In the second half of the 80s, the growth rate was almost zero. The federal government's support for civilian R&D fell off by a similar amount. With the Cold War now over, the next to go will be defense R&D. Budget cutters facing record deficits look at NASA's budget like a barn full of seed corn. The question is, will we plant it, or eat it?

The technology generated from space exploration is one of the highest yielding investments in our future economic growth this country can make. Every dollar spent on the Apollo program generated about seven dollars in economic activity. New products, new industries, and new jobs come through NASA research.

We cannot be like those 15th century Chinese emperors. Those who question the cost of space should question the cost of not investing. Thirty-five years ago, it was hard to see how badly America would need a gigantic interstate highway system costing tens of billions of dollars. Today, we can't imagine life without it.

The Moon has resources that Earth may need some day. Innovative thinkers suggest that helium-3 could be mined from the soil to power as yet uninvented fusion reactors that generate electricity with almost no radioactive byproducts. Whether this would be economical is an open question, but consider this: Americans spend \$175 billion dollars on electricity each year, most of it produced from non-renewable fossil fuels.

We don't know exactly what resources on the Moon or Mars will be most useful, but we do know we should start looking. Columbus went looking for gold and spices, but instead brought back something more valuable: corn and potatoes. More valuable than gold? Yes, because they fueled a population explosion that turned the countries of Europe into global powers.

The Earth's resources, while bountiful, are finite. We owe it to ourselves to at least build the infrastructure needed to access the solar system's resources.

Another reason to go to the Moon and Mars is to increase our scientific knowledge, and apply that knowledge to how our own planet may be changing. The lack of an atmosphere on the Moon means that 4 billion years of the sun's history has been written into the lunar soil. We're not even sure where the Moon came from.

On the Moon, where night-time lasts for 14-days and there's no atmosphere to cloud the view, it's the perfect place for astronomy. The Moon's seismically stable surface will allow us to build telescopes and interferometers that are orders of magnitude beyond what's possible on Earth or in orbit. Building these human-tended observatories on the Moon is perhaps the most economical way to solve the vast mysteries of the universe.

Mars appears to have been a warmer, wetter planet with a dense atmosphere like prehistoric Earth. What happened to the water that once flowed there? What happened to the dense atmosphere? And what can that tell us about the past and future of Earth's own climate?

These are the questions we are smart enough to ask, but there's so much waiting to be discovered, we don't even know what we don't know. But there's one thing I'm absolutely certain we'll find: the unexpected.

We are about to take the first step. In a few days, the Mars Observer mission will be launched to examine the geology of the Red Planet. In two years, the Russians will send their Mars-94 probe. Then NASA's MESUR, the Mars Environmental Survey, will put a series of landers, some with micro-rovers, to study surface features, weather, and seismic activity. These landers will head for some of the more interesting areas of Mars -- such as the polar regions and canyons -- seeking possible human landing sites where the potential for water and signs of life or fossils may be greatest.

And later this year, NASA scientists, with support from the National Science Foundation, will head for Antarctica -- a place almost as cold and dry as Mars -- to begin field testing new technologies. In that isolated and harsh environment, they will test water recycling equipment, self-contained power supplies, and they will remotely control a walking robot down into a live volcano.

Humans on Earth can't remotely control robots on Mars because the communications would take too long. But humans and robots on Mars together would make a potent combination. Imagine an astronaut sitting in a Martian base camp, exploring some ancient river bed with an intelligent robotic rover. Astronauts can use robots to search for the most promising areas for their own visits, and could also use robots to collect samples far beyond the astronaut's own range from camp.

Putting interferometers on the Moon and searching for water on Mars leads us to the next reason to go: the search for possible extra-terrestrial life. For as long as shepherds and suburbanites alike have lain in the grass and gazed into the night-time sky, we've wondered if we're alone in the universe. Despite centuries of wild speculation, it's only during the last 25 years that we've been able to disprove the belief that there are civilizations on the Moon and Mars. But some finding some lower form of life, or fossilized life, on Mars would alter our perception of the universe far beyond anything Copernicus or Columbus ever dreamed.

In the same league would be an interferometer on the Moon capable of seeing planets in other solar systems. Imagine if spectroscopic analysis revealed a blue planet with an oxygen atmosphere just 4 light years away orbiting Alpha Centauri. The demand to build a warp drive would start right away!

Before we envision a United Federation of Planets, however, we must first do more to unite our own planet. The most important reason for missions to the Moon and Mars, I believe, is the political evolution of humankind.

Throughout all of human history, in ever increasing tribes, we have warred with each other. The 20th century has been at once the most advanced and the most savage. During the last four years, we have witnessed the end of imperial communism and erased the threat of global nuclear war. Now we must consolidate those gains.

During the Cold War, there was a popular notion that if the Earth was threatened by space invaders, all of the nations of the world would drop their fear of each other and unite to confront the common enemy. Today we don't face a threat. We face an opportunity.

Instead of building weapons of war, we can pursue projects of peace. What better way to soak up the excess energies of the world's military-industrial complex than to channel that vast expertise and talent into the peaceful exploration of space.

The large scale of international cooperation required for building settlements on the Moon and Mars would inspire the peoples and governments of the entire planet to see what can be accomplished if they lay down their ancient fears and hatreds.

As this tired, old millennium draws to a close, one that began in what is known as the Dark Ages, the nations of the world now have the chance to leave the sad history of warfare behind and head towards the light of a new age. Humanity can finally evolve to a higher order of living, one in which "nation shall not lift sword against nation; neither shall they learn war any more."

Despite all these reasons to extend human presence in the solar system, some will still say, "Not now. It's not worth it. We can't afford it."

This is nothing new. Back in 1848, Daniel Webster stood on the floor of the Senate and declared that New Mexico and California were "not worth a dollar." A few years later, Alaska was denounced as Seward's folly -- a worthless icebox. Five hundred years ago today, Columbus was in the middle of the Atlantic, and I'm sure some of his sailors were saying, "Turn back."

This nation has never been one to shrink from a challenge. The spirit that brought the pilgrims to Plymouth Rock, that wrote a democratic constitution, that tamed the West, and put a man on the Moon must carry forward into space, or America will cease to be recognizable to the world.

The first outpost on this stellar frontier will be Space Station Freedom. That's the place where the studies of the human body will take place that will enable us to live and work in space. Dual use laboratories will give Earth's scientists routine access to microgravity. Debates over its configuration miss the point. The space station is not a destination itself, but a stepping stone on the trail toward the planets.

President Bush has led the space program forward with his call for going back to the Moon and on to Mars. Now it is up to us to make that vision a reality.

When I moved into the Administrator's office five months ago, I found this plaque in a display case -- covered with dust. It is the Apollo 11 patch, and bears the signatures of Neil Armstrong, Buzz Aldrin, and Mike Collins. On the top, it's written, "Carried to the Moon aboard Apollo 11. Presented to the Mars 1 crew."

Ladies and gentlemen, it is time to take this plaque to Mars.

The ultimate legacy of Apollo sits in a special vault in Houston. Under the harsh glare of fluorescent lights, encased in stainless steel and bathed in pure nitrogen sits 800 pounds of another world. But there's something else in that vault: more room.

In the coming years, we can send orbiters to the planets. We have it within our power to bring back samples from the comets, asteroids, moons, and planets of our solar system, and fill up that vault. We can extend human presence in the solar system, breaking the bonds of gravity to spread our species to the Moon, Mars, and beyond.

The science we'll gain from these robotic and human missions to other planets will ultimately support Mission to Planet Earth. For it is by comparing the data of what's happening to Earth right now to what has already happened throughout the solar system that we can hope to fully understand our own planet. This quest for knowledge inspired T.S. Eliot to write, "We shall not cease from exploration and the end of all our exploring will be to arrive where we started and know the place for the first time."

Is there life on Mars? Maybe not now. But there will be.

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