

**REMARKS BY  
NASA ADMINISTRATOR DANIEL S. GOLDIN  
SPACE STATION UTILIZATION CONFERENCE  
HUNTSVILLE, ALABAMA  
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First, I want to thank John Bartoe, Jack Lee, Jed Pearson, Arnie Aldrich, and the rest of the NASA team for sponsoring this conference, and all of you for attending, including our international partners from ESA, Canada, and Japan. The more you learn about the possibilities for Space Station Freedom, the more excited you get.

One of the challenges we face as a society — certainly in this period of slow economic growth — is to focus not on the present, but on the future. I believe one of the reasons we're having problems with our economy is that we're not investing in our future to the degree we should.

When I was born in 1940, there were about two billion people on Earth. Today, that's more than doubled to 5.5 billion. And when I'm 100 years old, there'll be almost 10 billion. The people alive during my life have consumed more of the world's resources than all those living in prior generations of human history. We've already used more than we deserve, and now we're stealing from the future to buy the creature comforts of today.

We see it in government, where we have big deficits year after year. We see it in the corporate world, where the focus is on short-term profits, not long-term investment. Last year, the aerospace companies that invested the least in research and development saw their stock prices go up the most. While the rest of the world gears up for the economic competition of the post-Cold War era, America is chowing down on its seed corn to feed its belly today.

NASA scientist Rick Chappell, who works at Marshall, recently had an experience that illustrates this quite clearly. As he was jogging through the wildlife refuge that surrounds the launch pads at Cape Canaveral, he noticed an armadillo by the trail. Later, he looked up and saw an eagle.

He wrote later on, "I was struck by the contrast of their different approaches to life. Where the armadillo never looks up — concentrating only on its next meal, and oblivious to the world around it — the eagle soars quietly and majestically. It is not rooting around on the ground, but is striving for the high ground — seeking a vantage point from where to see the horizon and beyond."

America's first spacecraft that landed on the Moon wasn't called the armadillo; it was the Eagle — the symbol of America. This nation didn't become the greatest in the world by keeping its eyes on the ground. We are about broad visions, about looking over the horizon to see the future, and then blazing the trail for others to follow.

Technology is the fuel in our economic furnace. Technology creates growth. It creates whole new industries and new jobs — high paying, high quality jobs that add value to our economy.

NASA's research and development of advanced technology reaches out into the future to bring back opportunities to the world of today. Between 1979 and 1986, the new products generated from NASA science and engineering created over 350,000 new jobs. And believe me, this is a very conservative estimate, because once NASA invents something and makes it available to industry, we lose track of many byproducts that build on our pioneering work.

NASA has been driving technology forward ever since it was created. Apollo brought us untold bounty — especially in medical technology. Pacemakers, CAT scans, magnetic resonance imaging, intensive care monitoring equipment — all got their start because of research NASA needed to go into space. Mission Control's computer networks and software are the great grandfathers of what runs America's telephone system, banking and credit card networks, and airline computer networks.

But we can't keep living off Apollo's bounty. Currently, the hair of a scientist can turn gray waiting to get their first experiment on the shuttle, let alone the necessary follow-up research. A researcher can't make much progress doing one experiment every few years or so. We can't keep attracting good people to do space science if the research they need for their Ph.D. takes decades to complete.

The House of Representatives took a giant leap in the right direction last week when they voted to continue building Space Station Freedom. As I listened to the debate in the House Chamber and watched the vote tally grow, I was proud that in these difficult economic times, Congress saw the wisdom in investing in our future. It was not just a victory for NASA, but a victory for America and its international partners, who desperately needs the research and technology that will come from a permanent facility in space.

Space Station Freedom will revolutionize our way of life in the 21st century the same way the Apollo program did in the 20th century.

A permanent space station will be the place where we become a true space-faring nation — the place where we learn how to live and work in space. And it will be an example of how nations can unite and work together on projects of peace. All of our plans to build an outpost on the Moon and explore Mars depend on using Space Station Freedom to conduct the necessary life science research to protect astronaut's health from the effects of long duration space travel.

While these studies are going on, the space station will have dual use lab equipment where scientists can systematically study how living organisms and other materials behave without gravity. Essentially, the space station should be thought of as an international research center in orbit. Researchers from universities and the private sector, such as pharmaceutical companies, and our international partners will be able to share facilities on Freedom to facilitate basic research in materials processing biotechnology, and life sciences.

Biotechnology, for instance, is expected to be the big business of the 90s, going from \$4 billion a year currently to \$50 billion by the end of the decade — revolutionizing everything from agriculture to pollution control to health care. The commercial possibilities of biotechnology research in microgravity are mind-boggling. Product improvements developed from this research can fuel the furnace of our economy, creating new jobs and saving lives with new drugs and medical knowledge.

The stunning success of the U.S. Microgravity Lab on the last shuttle flight showed the vast potential of Space Station Freedom. On that flight was Astronaut Larry DeLucas of the University of Alabama at Birmingham, who's an expert in growing protein crystals, which are key to developing new drugs. The protein crystals grown on that flight were some of the largest and best-formed ever. Drug companies and other researchers had attempted to grow some of them on Earth to no avail. One drug company said they accomplished in two weeks an experiment that would have taken two years on the ground.

Yet despite this successful shuttle mission, Dr. DeLucas reached two conclusions: 1) that even a 14-day shuttle flight was not enough time for some of the experiments, and 2) a lab is needed in which scientists can interact and manipulate the experiments on a day-to-day basis.

That's why we need Space Station Freedom. The tidal wave of research that's waiting to be flown in space is what can let us live longer lives, in a cleaner environment, with a higher standard of living.

Clearly investing in the future is worth it, but at what cost? Many people don't realize that NASA receives only 1% of the federal budget — literally two cents a day for every American citizen. When you consider the enormous return on investment a space station will yield, Americans will get far more than their two cents' worth. For that small amount, the dividends we pay are enormous.

Life on Earth is better because of the lives we've sent into space. Thank goodness we have a president that understands how important space is to the strength, and competitiveness, and future economic growth of America. George Bush and Dan Quayle support a robust civil space program because they've seen how science and technology drives this nation forward. Our international partners know this as well, which is exactly why they've joined us.

Every time we have gone to the frontier, we've brought back more than we could ever imagine. Space is no longer just an experiment or a symbol. It's no longer a "luxury," the way automobiles and air travel were once viewed. Space is an essential part of our future in medicine, science, and technology.

We have to get bold again. We have to take risks and make investments so our children will have a better future. By reaching for the stars, we bring inspiration, hope, and opportunity back to Earth.

The "armadillos" of the world cannot defeat those of us who choose to be eagles. By flying higher, and seeing farther, we will use our vision to lead the way for the benefit of all humanity.

Let me leave you with a vision of what the space station could mean. It's early in the next century, and a woman in Montgomery, Alabama goes to her doctor to receive a hormone shot to prevent osteoporosis. That night, she sees on TV that a young astronaut at Kennedy Space Center just received the same shot to prevent bone loss before blasting off on the long journey to Mars.

That young astronaut grew up in Huntsville, where decades before, her father was a builder of Space Station Freedom, on which the life science research for long-term space flight uncovered the hormone that prevents osteoporosis. Her father's work on Space Station Freedom had inspired her to study organic chemistry so that when the time came, she'd be qualified to go search for signs of ancient life on Mars.

Space Station Freedom isn't just a job, or a chance to make money. It's a mission to move the human species into breaking the chains of gravity and becoming a multi-planetary society. Pursuing a mission of this monumental importance will lift civilization on Earth to new heights of health, wealth, and knowledge.

The exploration of space is the most inspirational adventure of all time. Our work offers hope that our children's world will be a better place than our own. Join me as we make this vision a reality.



*SESSION 3:  
LIFE SCIENCES RESEARCH*

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*SPACE STATION FREEDOM UTILIZATION CONFERENCE*

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*AUGUST 5, 1992*

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