of high school hoping to go to college and jumped into a $25,000 program. But that is what we are doing here, trying to identify with pollster politics. We have a real problem on our hands. We are not talking here on the floor of the U.S. Senate about saving the space program, and we should be.

When I see my distinguished colleague who has really gotten into the subject in tremendous detail, the Senator from Arkansas—and nobody here to support him—I feel I must speak by way of conscience, having listened, because we got these hearings before our committee on all the facets of the particular program. When you get the environmental satellites, the aeronautics programs, all those things that will be just practically decimated, and in order to go for a space station, then it is just bad planning—particularly at a time when the United States of America is in a position of having to stop the hemorrhage of tax increases, $1 billion a day. Tell the American public out there. The media are not doing their job. They have no idea. The candidates can run and get elected, saying, ''I am for cutting spending, I am for cutting spending, I am for cutting spending.''

Then they come up here with that silly nonsense of wanting to abolish the Department of Commerce. Who do you think I am on the telephone with now? The National Oceanic and Atmospheric Administration. I am trying to find out whether that hurricane now bearing down on South Carolina is going to hit my house again like Hugo did down in Charleston. What are we going to do with the patent office? We can go down the list of the various endeavors at that department. Our export endeavor was ridiculed. They ridiculed Secretary Brown, who was doing what every Governor worth his salt did. He got offices in London, in Tokyo, talking to industry, and that is what the Secretary should be doing.

That is the effort they want to get rid of, the Department of Commerce, and departments for energy, education, and housing, and then they come around here and put $93.9 billion in a program that is going to really hurt the basic space program, where we are going to have to really cut back on the valued astronauts, the human side, to pay for this hardware. We are just going to make it truly unattractive for them. Their sacrifice is great enough. They practically have to separate themselves from their families and everything else. Their diligence, and time and time again, their discipline and everything else is the hardest work in the world. There is not enough pay. But then they say, like we have at NIH—if you cut the research, the smart graduates see that of all the particular research grants that were presented this year, we were able to actually fund less than 20 percent of those who passed muster competitively. We are not funding. So the smart researchers, scientists, and graduates say, well, there is no future there. I don't want to work my way into trying to get a space station, saying, ''Wait a minute. There is no future there.''

So I have voted to support the basic space program. I have never taken the floor because I did not want to, as chairman of that particular program, indicate opposition to space. I worked with the distinguished Senator from Ohio when President Reagan was in office to save the space program. I will work again to save the space program. Mr. President, that is why I am here this afternoon to save the space program. In this budget climate, we cannot keep both the basic space program and the space station.

I yield the floor.

SPACE STATION FUNDING

Mr. KERRY. Mr. President, I join with the distinguished Senator from Arkansas as a cosponsor of his amendment and urge my colleagues to support this effort to terminate funding for the National Aeronautics and Space Administration Space Station program, which the General Accounting Office estimates will cost American taxpayers $94 billion.

Every day, the working families of Massachusetts have to make tough choices about what they can afford, how to pay the rent, and whether they can send their kids to college.

The Federal budget deficit, while reduced by two-thirds due to President Clinton's leadership and the courage of the Democratic-controlled Congress in 1993, is still too high and must be eliminated. It is a drain on our economy and, increasingly, the debt service we pay is robbing us of the ability to make badly needed investments in our future. I have been working in the U.S. Senate to make the tough choices necessary to balance the budget.

When measured against this imperative, I believe the space station's potential benefits—which I recognize—do not stand the test. I believe we must terminate funding for this program.

We cannot spend nearly $100 billion of the taxpayers money to fund the space station and then say that we do not have enough money to put cops on the beat, clean our environment, and ensure that our children get the best education possible.

The Senator from Arkansas, joined by several others of us, has made a valiant effort to halt this project again and again over the past several years. I am hopeful that this year the time has come when the Senate will exercise fiscal responsibility over our Federal budget, like any family in Massachusetts would over its own family budget, by terminating the space station immediately in order to reduce the deficit.

In 1984, NASA justified the space station based on eight potential uses. Now only one of these assignments remains: the space station will be used as a research laboratory. However, the costs of performing scientific research in space simply outweigh the potential benefits. It will cost over $12,000 to ship 1 pound of payload to the space station.

Many of my colleagues support the space station because it creates jobs. But the project's costs for developing jobs are exorbitant—those jobs will cost approximately $161,000 each. If invested here on terra firma, that amount of money would fund three or four or even more jobs.

As a member of the Senate Commerce Committee, I have fought, along with the distinguished Senator from South Carolina [Mr. HOLLINGS] and other Senators, to secure funding for many important scientific programs. Many of these programs have been shortchanged in order to help pay for the costs associated with the development of the space station. Allowing this extraordinary large science program to receive funding at the expense of these other so-called small science programs—which I believe will produce more products and more valuable products—is unacceptable. These small programs are creating thousands of high wage technology jobs at a fraction of the cost associated with the space station.

In the space program itself, the enormous level of funding consumed by the space station is crowding out much smaller programs for satellites and unmanned space probes, which most experts consider more cost-effective than manned missions.

These activities are aimed at expanding our understanding of the Sun, the solar system, and the universe beyond. The specific programs in this category include the ''new millennium,'' a program to build robotic spacecraft one-tenth the size and cost of satellites; the Cassini mission to Saturn, scheduled for launch in 1997; continuation of the Discovery missions, each of which costs less than $150 million, can be launched within 3 years of the start of its development, and is used by NASA to find ways to develop smaller, cheaper, faster, better planetary spacecraft; and the Mars surveyor program which funds a series of small missions to resume the detailed exploration of Mars after the loss of the Mars Observer mission in 1993.

Funding for projects in this area will be approximately $1.86 billion in fiscal year 1997 which represents a 9-percent reduction from last year. The academic research establishment is concerned that the space station appears to be draining funds from these other space projects.

Also included among the programs placed at risk by the space station is the mission to planet Earth, NASA's satellite program to explore global climate change by means of a series of Earth observing satellites launched over a 15-year period, beginning in 1998—a program endorsed by the National Academy of Sciences.

Given the structure of congressional appropriations bills, the enormous

funding for the space station has come not just at the expense of other space programs but at the expense of environmental research and other important activities that promise to improve the lives of our citizens and enhance our security more completely.

Building the space station has become a joint effort between the United States and Russia. We all want to see continued progress in United States-Russian relations. However, we should be encouraging Russia to house and feed its own people, provide jobs, and above all care for its deteriorating nuclear powerplants and dismantle its nuclear missiles and warheads. Asking Russia to commit its resources to pursue an uncertain and risky space station venture instead of encouraging it to tend to these important matters is unwise.

Some may argue that we have lost our vision if we terminate the space station. But their concern is misplaced. We still have vision. But the vision is to restore the American dream to our citizens, to restore their sense of safety on the streets, to invest in technology that will increase our competitiveness and the quality of jobs, to invest in research that will cure our deadly diseases, and to restore our communities to the condition where children can learn and dream.

It is time to decide. I think the American people are watching impatiently to see whether the U.S. Congress can deliver spending reductions for programs that are politically popular but fiscally unwise.

I commend my distinguished colleague from Arkansas, Senator BUMPERS, for his continuing leadership on this important issue. I urge all my colleagues to vote to terminate the space station.

Mr. PRESSLER. Mr. President, I rise to oppose the Bumpers amendment on space station. As the chairman of the Senate Committee on Commerce, Science, and Transportation, which authorizes and oversees the NASA budget, I believe space station will be the foundation of our space program for many years to come. In just 1 year, we will finally begin the assembly of the largest structure ever constructed in space. Space station also is one of the most ambitious international science exports ever undertaken. Space station will bring together the United States and its foreign partners—Japan, Western Europe, Canada, and its newest partner, Russia—in this great challenge to build an orbiting laboratory to conduct important microgravity and biomedical research requiring the unique environment of outer space. The research of space station is expected to eventually lead to new drugs to fight disease, improve our health, and permit the invention of new advanced materials. These benefits will be enjoyed and experienced by the entire world community.

In addition, we can expect commercial spinoffs and breakthrough technologies just as past NASA programs have spawned such great advances as communications satellites. Many products we take for granted today were the result of work performed on NASA missions. Laser faxes, pacemakers, advanced water filters, hearing aid testers, and Doppler radar systems all were generated from NASA projects. I am confident space station will usher in a new generation of such advances to benefit the world.

Mr. President, after a decade of hard work and planning, NASA is finally prepared to embark on its greatest challenge. Americans in 37 States have contributed their time and talent to brings us to this point. More the $15 billion already has been spent, not including the $6 billion invested by our foreign partners. Next winter, the first element of space station will be launched—a propulsion and navigation system—to begin the assembly of the facility which will conclude in the year 2002. It is in our national interest to move forward, into the future, and begin assembly of the space station.

Let me say my support for the space station is not without some reservations. For instance, I continue to be concerned about the program's heavy reliance on Russian contributions of critical hardware and launch services. Since joining the program 3 years ago, our former cold war rival has gone from being a nonparticipant in the program to an indispensable partner. For example, over half of the 73 space missions to assemble and supply the station are Russian launches, compared with about 27 shuttle launches. Moreover, both the navigation and propulsion system as well as its crew rescue vehicles are to be built and launched by the Russians. While NASA assures Congress and the Nation that the space station could still survive even if the Russians were to withdraw, this may be wishful thinking.

I am also concerned about the cost of the space station project. NASA estimates the total cost of the program at $30 billion through the year 2000. In a report released last month, GAO indicated space station is experiencing troubling cost overruns which, if left unchecked, could ultimately balloon to $400 million.

In addition, there have been recent reports of cost increases which threaten to exhaust much of the reserves budgeted for the project. If this program experiences any significant cost overruns, its huge budget could start to crowd out other worthy space programs like Mission to Planet Earth—which I consider the most important and relevant of all of NASA's activities. Clearly, this result would not be in the public interest.

These concerns were addressed at our July 24 hearing on space station and again at a meeting between the subcommittee chairman, Senator BURNS, and NASA Administrator Dan Goldin. With regard to the Russian issue, Vice President GORE and Administrator Goldin recently traveled to Russia where they negotiated an agreement in principle regarding the respective roles and responsibilities of Russia in the program. The agreement will be the basis for a formal memorandum of understanding to be finalized later this year. Participants in the United States-Russian talks are confident the Russians will make a firm commitment to provide the support to which they have agreed. However, in the event the Russians do not perform, NASA has viable contingency plans to move forward using United States contractors to replace any lost Russian contribution.

As for the space station costs, NASA has assured the Commerce Committee the alarming press accounts are overblown and the program will exceed neither its $2.1 billion annual cap nor its cost estimate of $17.4 billion from October 1993 through assembly completion in the year 2002. NASA is mindful of the potential for cost overruns and the need for better cost control systems. In that connection, the head of the space station program, Wilbur Trafton, testified before our Space Subcommittee that NASA has budgeted $2.9 billion over the program's life to cover unexpected cost overruns. Administrator Goldin is an exceptionally talented administrator so I have great confidence in NASA's assurances the program is on track and within budget.

Accordingly, I support the space station, but as chairman, of the Commerce Committee, I continue to monitor its progress closely through our oversight function. The program has come a long way from the early 1980's when the space station was still a dream of President Reagan and existed only as the blueprints of NASA engineers. Space station is now almost a reality. The plans have been finalized, hardware has been built, and the launches have been scheduled. Next year the space station adventure will finally begin with the launches have been scheduled. Next year, the space station adventure will finally begin with the launch of its first piece of hardware. Now is the time to go forward, not backward, and move the country and our technology into the 21st century. I hope my colleagues will join me in voting for this country's future by opposing the Bumpers amendment. Thank you, Mr. President.

Mr. SHELBY. Mr. President, I rise today to oppose the amendment offered by Senator BUMPERS to terminate the international space station. The distinguished Senator from Arkansas again tells us that America should abandon its commitment as the leader of this historic endeavor. Supporters of this amendment have many reasons why we should desert our international partners just when we are about to launch the first sections of this incredible project into orbit. Mr. President, I reject these arguments for a number of reasons.

First, Mr. President, the opposition talks of cost overruns, and yet, despite

the complexity of this task and the various challenges that will be encountered as the station moves from the drawing board to reality, NASA is committed to remaining within the $17.4 billion projected cost for the redesigned space station. Frankly, Mr. President, we have cut and trimmed the resources available for the space station to the point where NASA has little, if any, flexibility in dealing with the inevitable challenges it will face. Today we debate the very existence of the space station when we should be talking about maximizing NASA's flexibility within the limits that we have already placed upon them.

Second, the opposition tells us that NASA may divert science funds to construction accounts, thereby leaving the station with no scientific capability at all. While NASA may rephase funds intended for developing scientific experiments, this management initiative in no way reflects a reduction in NASA's commitment to research on the space station. Some payload facilities are developing ahead of schedule, and NASA is wisely coordinating these elements to be complete when the station is ready to accept them. This rephasing of funds will allow NASA to augment its program reserve accounts to place them at acceptable levels. This is the type of planning and initiative that we should support, not attack.

Third, we are told that the contractors involved in the station's construction are encountering significant problems with the first two nodes. Mr. President, if all great research and development projects were terminated because they encountered significant problems, we would be without many, if not all, of the greatest discoveries in human history. Yes, the space station is a great challenge, but, the men and women working on the station have yet to encounter an obstacle that they cannot surmount. In fact, node 1 has recently completed a successful pressure test and will now undergo a post-test inspection and final preparation for launch. This is an exciting time for the space station and we should be focusing our attention on its permanent successes and not its temporary setbacks.

Fourth, termination of the international space station will undermine the credibility of the United States with its international partners who have already invested more than one-half of their planned $10 billion contribution. We have taken the lead on this project and given our word that we will see it through. Leadership requires resolve and character. It is not in the American character to break our promises and abandon our friends and partners, especially when the prize we all seek is within our grasp.

Finally, Mr. President, termination of the space station will end any promise of meaningful space-based long-duration research in cell and developmental biology, human physiology, biotechnology, fluid physics, combustion science, materials science, low-temperature physics and the large-scale commercial development of space.

For decades, the space program has driven science and technology development, motivated our children, and inspired a nation and the world. Mr. President, we stand at the threshold of a new millennium. Let it not be said that we squandered one of our first opportunities for greatness in the 21st century.

I urge my colleagues to oppose this amendment. Mr. President, I yield the floor.

Several Senators addressed the Chair.

The PRESIDING OFFICER. The Senator from Missouri is recognized.

Mr. BOND. Mr. President, I rise to propound a unanimous-consent request. We have I believe cleared this on both sides of the aisle.

I ask unanimous consent that the vote occur on or in relation to amendment No. 5178 after 2 hours of debate and that the time be equally divided between Senator BUMPERS and Senator BOND with 15 minutes of the time under my control allocated to Senator HUTCHISON, 10 minutes allocated to Senator MIKULSKI, 20 minutes allocated to Senator GLENN, and that no second-degree amendments or motions to refer be in order prior to the vote in relation to the Bumpers amendment.

The PRESIDING OFFICER. Is there objection? Without objection, it is so ordered.

Mr. SIMON addressed the Chair.

The PRESIDING OFFICER. The Senator from Illinois is recognized.

Mr. SIMON. Mr. President, I have great respect for my colleague.

The PRESIDING OFFICER. Who yields time to the Senator from Illinois?

Mr. SIMON. Will the Senator from Maryland yield 5 minutes to me?

Ms. MIKULSKI. I can only yield Senator BUMPERS' time. Actually in behalf of the opposition to my position, I will graciously yield to one of the great Senators 5 minutes.

Mr. SIMON. I thank the distinguished Senator from Maryland for her graciousness.

I have great respect for the Senator from Ohio. No Member of the Senate has shown more courage. Any of you who have visited the Air and Space Museum and seen that little thing that JOHN GLENN crawled into, I do not know very many human beings who would risk what he did.

So I speak in opposition to his position with great reluctance. But my friends, we simply have to get hold of things.

This morning's New York Times has an op-ed piece by Paul Krugman, a professor of economics at MIT. He says, in referring to the two candidates for President:

> The sad truth about this year's economic debate is that the biggest issue facing the Federal Government—the issue that should be uppermost in our minds—is not being discussed at all. Most of what happens in our economy is beyond the reach of government policy. In particular, the evidence suggests that it is difficult for the Government to have any visible effect on the economy's long-term growth rate.
>
> There is one thing, however, that the Government can and must control: its own budget. And it is heading inexorably toward fiscal disaster, as the baby boomers in the tens of millions march steadily toward the age at which they can claim Social Security and Medicare. True, the crisis is still about 15 years away. But we expect responsible adults to start preparing for their retirement decades in advance; why shouldn't we ask the same of our Government?
>
> Unfortunately, everything that a responsible government should be doing now—raising taxes, raising the retirement age, scaling back benefits for those who can manage without them (that means for the affluent, not the poor)—is political poison.
>
> It may be too much to ask the candidates to preach responsibility to the public, but we can at least ask them not to make things even worse by offering goodies the nation cannot afford.

My friends, this debate is an illustration of why we need the balanced budget constitutional amendment. There are a lot of good things that we would like to do. If we had a $100 billion surplus, I probably would vote for a space station, even though the Aviation Week & Space Technology of August 26 starts off its story—the heading is ''Cost Increases Add to Station Woes''—with the first paragraph:

> NASA is considering ways to scale back early scientific work on the international space station to pay for cost increases that threaten to exhaust reserves for the project.

There are a lot of things that we would like to do that we just cannot do. I think the space station is one of them. I happen to believe that both political parties are being irresponsible right now in asking for a tax cut. Would I like a tax cut? Sure. Would the distinguished Presiding Officer, my friend from Idaho, like a tax cut? Sure. We ought to restrain ourselves and not have tax cuts until we have the surplus. That means that we are going to have to restrain ourselves on some spending that would be nice but is it essential for our Government. And a space station is one of those things. I think we have to use some common sense.

I say to my friend from Arkansas who is here that I am going to be leaving the Senate shortly. You are not going to get an amendment like this passed until we have a constitutional amendment requiring a balanced budget. Until that time, candidates for office are going to continue to promise tax cuts, and we are going to vote for things like this that really do not make sense. I hope that one of these days we will recognize that Thomas Jefferson was right when he said we need fiscal constraint in the Constitution that we do not have.

In the meantime, let us do what is right on this and say, it would be nice, it is not essential, and let us not vote for it. That is what we ought to do.

Let me just add. I want to commend my colleague from Arkansas for year

after year after year pursuing this. I know he feels like he is in the bottom of a well of no one listening. But if we do not push for this kind of restraint we are going to have fiscal chaos in this country. That is the simple reality.

Mr. President, I yield the floor.

The PRESIDING OFFICER. Who yields time?

Mr. BOND. Mr. President, I yield 20 minutes to Senator GLENN.

The PRESIDING OFFICER. The Senator from Ohio is recognized for up to 20 minutes.

Mr. GLENN. I thank the Chair.

Mr. President, I gave a very lengthy statement yesterday on the space program, and the space station in particular, on items that got into considerable detail on the various aspects of the scientific reasoning for it, the corollary between some of the things that happened to astronauts in space and the normal processes of aging here on Earth, and how some of these things are being investigated, or planned to be investigated more in the future than they have been up to now. But I think these are very, very interesting. But for a few minutes, I will not use all of my 20 minutes on this, and I do not want to go back and address all of those things I did yesterday much as I would like to have that time. I know we are under some time constraints. But I want to make sure that we get into the RECORD, or that we put out for our colleagues' consideration, some items that express concerns about the cost growth and schedule slippage on the space station without getting into the scientific background of justification of why we are doing this thing at all because those were put out by my friend from Arkansas, Senator BUMPERS, in a ''Dear Colleague'' letter.

Let me just respond to his comments of a little while ago. I do not have a better friend in the Senate than Senator BUMPERS. We came in here the same day. I would say that our voting records are nearly similar, except once a year we get into opposition on this particular item. I always regret that we have to oppose each other on this because we both feel strongly about this particular issue. So this is not a slam at Senator BUMPERS. But I do want to respond to some of the things that were put out in his ''Dear Colleague'' letter.

In that letter it stated, ''Scheduled delays in cost overruns will add additional billions to the price of the project.''

The bottom line is that as of now the station is over 45 percent complete. The hardware is being cut. This is not some prospective thing off into the future. The hardware is in existence; 45 percent; 122,000 pounds of the space station have already been built and are currently undergoing testing. According to GAO, the $17.4 billion project is about $89 million over cost and about $88 million behind schedule. I repeat. It is a $17.4 billion project, and only $89 million over cost. That is roughly within 1 percent of the planned targets. I think that is better than probably 99 percent of Government projects, or maybe even industrial projects also.

I think very clearly NASA and its contractors need to strive to complete the project on time and on budget, of course. The facts indicate that the program is slightly—I say slightly—over budget; the figures I just gave—and behind schedule. However, NASA managers are taking steps to reverse that trend. A very important tool in NASA's case is its contract with the prime contractor, Boeing, which ties a very substantial portion of Boeing's payment to successful performance of the contract.

Here is another very important management tool for dealing with cost growth. Administrator Goldin set up a program reserve, so included within these planned $17.4 billion program costs are program reserves. Nearly $3 billion of the station's budget fall into this category. These are funds which are to be used for unplanned or unforeseen costs. It is a research program. You cannot define it like buying 22 trucks off the line at GM or Ford or some place where you know the exact costs, and so on. So you do have to plan for unplanned or unforeseen costs. That is a likely occurrence when one is designing and building and testing and operating a very unique research facility, the only one of its kind.

Up until recently, NASA had not had much need to tap into these program reserves. The program was going along well, being well managed, staying within budget. However, the last half of fiscal 1996, 1997, and 1998 are the peak construction and spending years. It is during this time that program managers anticipated they might need to use reserves. The bottom line is that there are adequate reserves to fund all anticipated cost growths that are foreseen right now.

Also, my friend from Arkansas said in that ''Dear Colleague,'' ''NASA is considering making up the shortfall by diverting funds intended for developing scientific experiments on the station. If this happens, NASA could end up with a space station with no scientific capability at all.''

That is a very troubling assertion. But my colleagues know, I believe, that research to be performed on the station will significantly benefit those of us right here on Earth. The research is the reason we have the program. It is not just to let a few people go up and experience the view from up there in space. It is to do the basic, fundamental research in the new laboratory of space, a capability that humankind has never had before through our hundreds of thousands of years of existence here on Earth. For the first time, we can use this new laboratory of space.

So I have asked NASA about this issue and NASA reports the following:

Station managers have taken steps to ensure that the scientific payloads are being developed on a parallel course with the space station vehicle and are synchronized with their planned use aboard the space station. NASA has shifted some funds from the space station science accounts to the program reserve accounts where they may be needed for construction of the vehicle itself during the next year or so. Before these schedule changes were made, some of the scientific payloads were moving ahead of schedule and would have been completed before they would have been used on the station. The rephasing of some of these development activities also has the effect of freeing up funding planned for the next 2 years but that would simply augment the program reserves and place those reserves and figures at a more acceptable level as a percentage of the total budget for those 2 years. So in the end there is no reduction in the commitment to research on the space station. It is a matter of timing, not a reduction in scientific capability.

The overall level of funds for science activity has not been reduced one penny.

Also it has been said, an issue has been made of the problems that have been encountered by NASA and Boeing in building the space station's nodes, the connecting pieces for the space station modules. Earlier this year one of the nodes failed a pressure test. However, this problem has been corrected. Last week, just a week ago, the nodes passed the pressurization test. There have been some costs in schedule penalties when this problem has been addressed. However, the costs can be met through the use of the program reserves I mentioned a moment ago.

Let me say this pressure test takes it up to about 1½ times what the normal pressure will be in that structure while it is in space. They have approximately a sea level pressure, slightly over sea level pressure, which is 14.7 pounds per square inch. I think it is planned that the station will operate at 15.2, and they went up to 1½ times that 15.2, and it passed with no problems. So NASA does not believe that any delays in launching any space station element will occur as a result of this now corrected problem. It was a problem at one time, but that has been overcome.

Finally, the Senator from Arkansas has asserted that the Russians are falling behind on their share of the program and that the United States is bailing out the Russians by renting time on the *Mir* spacecraft. The Russians play a crucial role in the international space station, but their participation will result in the United States ultimately spending less on the program rather than more.

The schedule problems encountered by the Russians have been the subject of high level government-to-government negotiations. In July of this year, 1996, Prime Minister Chernomyrdin and Vice President GORE signed a document detailing key milestones for both sides to meet in order to keep the program on schedule. This meeting resulted in needed funds being freed up

within the Russian bureaucracy so that work on the Russian components could continue. That is just a month and a half ago, a little less than that. The Russian officials have assured NASA that their schedule slippages can be eliminated as long as necessary funding levels are maintained.

In the meantime, the United States and Russia are continuing to cooperate on what I think is an exciting program, a productive joint program on the *Mir* space station. As many of us are certainly aware, U.S. astronaut Shannon Lucid is still up there right now completing a record-setting stay on the *Mir* space station. When she comes back down in another week or so, I believe she will have about 185 days in space. When she comes back down, she will be replaced by another U.S. astronaut, John Blaha, thus continuing what will eventually be 2½ years of continuous U.S. presence on the Russian station. This streak began with Norm Thagard's mission last year.

The goals of this first phase of United States-Russian space cooperation are being met and include, No. 1, experience in long-duration space operation. As discussed above, U.S. astronauts are getting invaluable experience to better understand the requirements of sustained permanent space operations. This experience will enable NASA scientists and engineers to more productively plan for the research that will be conducted on the international space station.

No. 2, science research. U.S. astronauts Norm Thagard and Shannon Lucid have conducted literally hundreds of experiments during their respective stays on *Mir* and hundreds more are being planned over the next 2 years.

So, Mr. President, those are just a few comments in rebuttal to what was put out in the ''Dear Colleague'' letter that was sent around. I will reserve the remainder of my time here to reply to some of the other areas, so I will yield the floor at this time. I reserve the remainder of my time.

How much time do I have remaining, please?

The PRESIDING OFFICER. The Senator has 8 minutes 50 seconds.

Mr. GLENN. I thank the Chair.

Mr. BOND. Mr. President, I would like to have Senator MIKULSKI recognized for her time, and would allocate 10 minutes to her.

The PRESIDING OFFICER. The Senator from Maryland.

Ms. MIKULSKI. Mr. President, I rise again this year in support of America's space program and in opposition to the Bumpers amendment that strikes the funding for the space station. How ironic it is, at this time of great space discoveries like the possibility of life on Mars, that my colleague wants to eliminate one of NASA's greatest programs. Once again, I will come to the defense of the American people who depend on the space station in so many ways.

What do I mean? I am talking about jobs. Killing the space station is about jobs, and jobs in the United States of America. It is about putting people out of work or keeping people on the job, many thousands of men and women who work directly in the program or in factories that work on the space station itself. There are many thousands whose jobs result from the multiplier effect of the station's construction. Most are middle class, blue and white-collar workers who make family level wages, with health security, and we want to be sure that they have paycheck security, health security and can count on this job.

They are the same kind of Americans who are already affected by military base closings. For my colleagues who insist we need a defense conversion strategy to deal with the end of the cold war, the space station is an opportunity to retain our high-tech manufacturing skills for a civilian economy.

My opponent claims that commercialization as a result of the space station is not materializing. The 1993 National Association of Public Administrators committee report stated this:

> Through university-based partnerships with industry and government, and also through traditionally federally sponsored commercial space initiatives conducted at diverse NASA field centers, private investment in commercial space processing ventures has grown.

So I urge my colleagues not to be lulled into thinking that killing the space station will not have a serious negative effect on our economy, the economy of the State of Alabama, and more important, on the lives of thousands of Americans throughout the entire United States, both in Alabama and in Texas.

Also, let us fight for the space station for scientific value. One of the points raised by my opponent is there is little science of any value that will be done aboard the space station. Quite the contrary: The science proposed for the space station cannot be accomplished on Earth. The space station science requires access to very low levels of gravitational force, and it must be sustained. It is technologically impossible to create a low-gravity environment for this type of research without going into space orbit.

The thinking behind the Bumpers amendment is the same kind of thinking that would stifle our understanding of bacteria and germs that cause disease. It is that kind of philosophy that would have stopped Madam Curie from discovering radium, from which the field of radiology developed, or Jonas Salk from finding the cure for polio.

With technology being developed for the space station, scientists are already beginning to understand how cancer cells form in the human body, and they can do so because of a zero-gravity environment which permits them to grow tissues just like they are growing in the human body. What does that mean? We can actually simulate tumors in a way we could never do here on Earth. For those who say, ''Do not give it to NASA, give it to NIH,'' there is a joint agreement between NASA and the National Institutes of Health, just on this exact same kind of life science research.

This type of research has produced important microgravity research findings. This is particularly so in the area of protein crystal growing. No other lab on Earth can simulate that kind of tissue growth. Other labs must contend with the distorting factor of gravity.

What does the absence of gravity mean? It will allow the kind of research that produces new insights into human health and disease treatment, like heart and lung functions, cardiovascular disease, osteoporosis, immune system functionings, and so on.

The other reason we support the space station is because of technological innovation. The space station is not only about science, it is about technology development. By the mere fact of building the station and by the mere fact of doing medical and life science and crystal development, in order to do the research we have to develop new technology. That can be medical equipment technology, mineralization techniques, and a whole series of other things. That has been the history of NASA.

Also, let us be clear, the space station is about the entrepreneurial spirit that has been at the heart of our country's aerospace industry. In the history and development of ideas, there are always the naysayers who say let us stick with the status quo. But we can do better. Through history it has been bold people with entrepreneurial ideas, backed up with resources, that invented new technology that led to new products that led to new jobs that has made the United States of America an economic superpower. We are an economic superpower because of our scientific and technological development. In high-technology innovation, the United States has always led the way. U.S. competitiveness can only be maintained by long-term, cutting-edge, high-risk research and development.

So I will continue to fight for the space station, both for what it represents now and what it represents in the future. I will vote no on Bumpers and yes for America's space program for the 21st century.

I yield back such time as I might yet have.

Mrs. HUTCHISON addressed the Chair.

The PRESIDING OFFICER (Mr. THOMPSON). The Senator from Missouri.

Mr. BOND. Mr. President, I yield the time allocated to the Senator from Texas.

The PRESIDING OFFICER. The Senator from Texas.

Mrs. HUTCHISON. Mr. President, I thank the Senator from Missouri and the Senator from Maryland for the leadership that they are providing in

making sure that we have NASA and the space program, because they know how much this has done for our country. They have been there with me, looking at what the space station will be able to do. We have walked through the modules. We have looked at the experiments and how they are done in space and at the unique attributes they have in that space station which will allow them to do things they cannot do on Earth. They cannot duplicate the microgravity conditions on Earth.

I just wish the Senator from Arkansas would go with me one day and see what a difference it makes for our country that we have this commitment to space and the future, the essence of what we are debating today, when we take up funding for the space station yet again. This is the 14th time that there have been attempts to terminate the funding, but fortunately Congress has been farsighted, and the administration has as well, to make sure we do not walk away from the future.

What we are talking about today is whether we are going to summon the vision to continue this quest in cooperation with other nations. Or would we clip the wings of our civilization and just hunker down here on Earth?

The benefits of NASA research are long proven. Every dollar spent on space results in $2 in direct and indirect economic benefit. Breakthroughs in medical technology that we now take for granted are rooted in NASA technology. For example, NASA has developed a cool suit for Apollo missions which now helps improve the quality of life of multiple sclerosis victims.

NASA technology has provided pacemakers that can be programmed from outside the body. NASA has developed instruments to measure bone mass and bone density without penetrating the skin. These are now widely used to give a test for osteoporosis so that a woman can get a benchmark and then know if she is losing bone loss and needs to add extra calcium to her diet.

NASA research has led to an implant for delivering insulin to diabetics that is only 3 inches across. It provides more precise control of blood sugar levels and frees diabetics from the need for daily insulin injections.

The space shuttle has begun to lift the curtain on the enormous opportunities that lie ahead in a manned microgravity laboratory. The station will allow scientists to modify their experiments in orbit and take advantage of the unanticipated results. This is the kind of flexibility that has historically led to the greatest scientific breakthroughs and will do so again to fight cancer, osteoporosis and diabetes.

Despite these benefits, some critics have said that the scientific returns for more than a decade of experiments in weightless conditions are not really cost-benefit approved. Dr. Michael DeBakey, the chancellor and chairman of the Department of Surgery at Baylor College of Medicine said:

> Present technology on the shuttle allows for stays in space of only about 2 weeks. We do not limit medical researchers to only a few hours in the laboratory and then expect them to find cures for cancer. We need much longer missions in space in months and years to obtain research results that may lead to the development of new knowledge and breakthroughs.

So, Dr. DeBakey is saying we don't need less time, we don't need less emphasis on the space station, we need more. Dr. DeBakey knows what can be done, because he is one of the innovators in this field.

Life and work on the station also generates breakthroughs that improve life on the ground. We expect to develop lighter, stronger, superalloy metals, lower cost heating and cooling systems, longer life power converters, safer chemical storage, air and water purification, waste management, and recycling systems.

As with the Apollo program before, the space station will be the proving ground for advances in communications, computers, and electronics. Research equipment developed for the space station is already paying dividends. Scientists are growing ovarian tumor samples in NASA's new cell culturing device so that tumors can be studied outside the body without harm to the patient. A similar trial is underway for brain tumors.

The question we are asking today is, will we pursue this knowledge? Science alone is not the reason that we are reaching into space. As the world redefines itself in the wake of the cold war, the space station is a catalyst for international cooperation and a symbol of U.S. leadership in a changing world.

We now are drawing on the expertise of 13 nations—the United States, Canada, Italy, Belgium, The Netherlands, Denmark, Norway, France, Spain, Germany, the United Kingdom, Japan, and Russia. Failure to fund the space station would undermine our partnerships with Europe, Japan, and Canada which have expended over half of their $9 billion commitment to the $17 billion space station program. It would cause them to conclude that they can no longer count on the United States as an ally; that our commitment would not be good. Mr. President, we do not want to be bad partners. That is not the legacy that this Congress would want to leave.

I also remind my colleagues that the space station and NASA has not just been out there in a vacuum as we have been trying to cut the rate of growth of spending. They have stepped right up to the line. They have taken their fair share. Dan Goldin has a zero-based review in place that has shaved the cost off NASA and has made it more efficient for the taxpayers of this country.

A 1993 redesign of the program resulted in a space station that is $6 billion more cost efficient. I watched this process closely, and I commend Dan Goldin for this approach. If every agency would do this, we would have a 35-percent budget reduction, saving taxpayers $40 billion more and be able to continue with the mission.

So I do not want us to be the Congress in the last half of the last decade of the 20th century that is remembered for displaying the failure of will. No, Mr. President, we have goodwill in the space agency, in the space station and abandoning it would signify, I think, a myopic view of our country and of the world.

America has been the leader in space, and now we have a chance to cooperate with our friends around the world and continue to do better for mankind. This is not the time to walk away from the gigantic investment we have made. Any scientist will tell you that you cannot predict what the results are going to be when you go into research, but you can make sure that we have the underpinnings that will keep America vibrant and growing so that we can absorb the new people that come into our system, so that we will create the new industries that create the new jobs that will keep our country economically strong.

Our young people must have a place that they know they can go for scientific research and breakthroughs for the future. As we are going into the 21st century, we cannot go back into the 18th century and say, ''Space is out there, but we're not going to explore it.'' Mr. President, that is not the American way.

So I hope my colleagues will join us for the 15th time and make sure that we send the clear signal that we are committed to this research, that it is right for America and that we will do better things for the world because of it.

Mr. President, I yield the rest of my time to my colleague from Texas, Senator GRAMM.

The PRESIDING OFFICER. The Senator from Texas.

Mr. GRAMM. Mr. President, how much time do we have remaining?

The PRESIDING OFFICER. Six minutes.

Mr. GRAMM. Mr. President, let me commend my colleague from Texas for an excellent statement. We have debated this issue with our dear friend from Arkansas on many occasions. I feel confident that the outcome of the vote today will be the same as it has been on the many previous occasions that we have voted on this matter. And since my colleague from Texas has done such a great job of focusing in on the space station, let me take a little bit bigger picture and try to develop that.

In 1965, we spent 5.7 percent of the Federal budget on nondefense research and development. In 1965, we invested 5.7 percent of the Federal budget in new science, new technology, new know-how to plant the seeds to generate jobs in the future.

Today, under the budget submitted by the President, including the funding level that we have for the space station, we are spending 1.9 percent of the

Federal budget on nondefense research and development. From 1965 until today, our investment in science and technology in the future has declined from 5.7 cents out of every dollar we spend in the Federal budget down to 1.9 cents out of every dollar we spend in the Federal budget.

From 1965 to 1997, we have had an explosion in Federal spending, and yet in the midst of this explosion in Federal spending, we have increased spending not as an investment in the future, not as an investment in the next generation, not as an investment in science and technology, but, by and large, we have spent our money on social programs. And in the process, our Government has become the largest consuming institution in our society and one of the smallest investing institutions in our society as a percentage of the budget.

In 1965 we were plowing back 5.7 cents out of every budget dollar into investments in science, technology, the future, investing in the next generation of Americans. We have seen that fall progressively down to the point in this budget where we are investing only 1.9 percent of our Federal budget in science, technology and the future. We are investing increasingly in the next election by spending money on social programs, and we are not investing in the next generation by investing in science and technology and the future.

If you look at the Bumpers amendment, what it says is: Prohibit funding for the space station except for program termination costs. It in no way lowers the annual spending caps. It in no way says these savings have to be applied to deficit reduction. So as we all know, since we are operating under spending caps, every penny that would supposedly be saved, if we kill the space station, would end up being spent in other areas of the Federal budget.

If we did this, if we kill the space station, we would be going further in taking money away from investments in the future, in the science and technology on which jobs in the future will be based and we would basically be converting that money into consumption programs where we would be investing in social programs and investing in the next election and not the next generation. This would be a tragic mistake.

I am confident we are not going to do it today. Our investment in science and technology is already too low. I would like to have a 5-year program to double investment in science and technology instead of cutting it as the Senator from Arkansas proposes.

No nation in history has benefited so much from science and technology as the United States of America. In this century we have been the principal contributor of all nations in the world to science and technology. And we have built a technological base that we have used better than any other country in the world. Our global leadership is threatened because we are not making the investments that we once made in pure science and technology.

No other institution in our society is capable of building the space station. If we do not make this investment, we are again saying we are going to take money out of investment in the future and we are going to invest it in social programs today. That would be a mistake.

I urge my colleagues to reject the Bumpers amendment as we have on 14 previous occasions. We have already cut the space station. We have refocused it. We have broadened the participation. We have taken on the Russians as partners. We have spread the cost of the program. We have made international commitments. We have saved money by paring back on the program. Now is the time to move ahead and build the space station. This is not the time to cut spending for the space station to free up funds to go into social programs. Let us invest in the next generation and not the next election by defeating the Bumpers amendment. I yield back the balance of my time.

Mr. GLENN addressed the Chair.

The PRESIDING OFFICER. The Senator from Ohio.

Mr. GLENN. Mr. President, I wish we had a lot more time because there are many things to be said. I used a lot of time yesterday and will not be able to repeat all that today. Let me talk for a moment about this protein crystal thing because I think there have been some misconceptions put forth on the floor here. This is not something we are just talking about that may be out there some time in the future. It is here now.

Private industry is working with the NASA Center for Macromolecular Crystallography to produce high-quality protein crystals for new development. Let me tell you the companies that are involved with this: Schering-Plough, Eli-Lilly, Upjohn, Bristol-Myers, Squibb, Smith Kline Beecham, Biocryst, DuPont Merck, Eastman Kodak, and Vertex. This is not some time in the future they may do this. They are using them now to research cancer, diabetes, emphysema, and immune system disorders, and including the HIV virus.

There has been such rapid advancements in these particular areas. And this protein structure that can be developed in space promises to revolutionize the pharmaceutical industry. You would not have all these companies directly involved with NASA if that was not true. Researchers seek to define the structure of proteins and design drugs that interact with them.

Penicillin is a well known example of a drug that works by blocking a protein's function. Orbital experiments provide researchers with superior protein crystals for analysis and they also help scientists understand the fundamental concepts about the crystallization process. You cannot do that on Earth. The information could be used to improve crystallization techniques here on earth however.

Rationally designed drugs promise to revolutionize health care. Orbital research will feed this revolution with the crucial protein structure data it needs. NASA researchers have already used—not in the future—but already have used space shuttle missions to produce protein crystals for a variety of clinical conditions, including cancer, diabetes, emphysema, and immune system disorders.

What if we broke through with something on HIV or found out from something from these protein crystal studies that space-grown crystals were in such a way different that we came up with a new approach to HIV or something like that? We would think that was well worth anything that we were looking into on the whole space program.

Mr. President, one other area—without getting into a lot more of those details—there is one other area I wanted to mention here today. You know, we have a lot of things that occur to astronauts when they are up there in space flight. After a few days their bodies start changing. They have a lot of physiologic changes. On the floor here yesterday I had the book that NASA has put out on space medicine, space physiology. If you look at that and then you look over into the Merck Manual on Geriatrics you find some very similar things, you find out that some of the things that occur to astronauts in space in a very short period of time also occur to the elderly in the normal processes of aging.

I wish we could have those 44 million Americans today that are over 60, those 44 million Americans listening to this. I am sure we would have every single one of them supporting the space program when they realize that such things as bone density changes that affect the aging here on Earth also affect astronauts. Orthostatic intolerance, the difference in blood pressure when standing, sitting, and so on, decreases during flight and returns to normal, but it is a symptom associated with aging.

Balance and vestibular problems, dizziness, the inability to maintain their balance upon returning from a flight, sleep disturbances, muscle strength, immunology. The body in space reduces its immunology. Why the immune system? Why, we do not really know. The elderly have the same thing happen. Normally, as people get older, their body's immune system goes down hill. If we could just make some experiments to find out why this occurs and trigger off the body's response, its own immune system against cancer and AIDS and all the other diseases and all the other infections we have here on Earth, that one area alone would be worth everything that we are spending in this area.

Reduced absorption of medicine and nutrients in the stomach and gut evidenced during space flight and also suspected with many elderly. Perhaps

some of the elderly do not get the nutrients, and their drugs are not as effective as they otherwise would be.

Cardiac electrical activity changes, serum glucose tolerance changes, reflexes change, all these things that occur to astronauts in space and also occur to the elderly normally here on Earth.

I know I am rapidly going through these things. I wish I had time to go into these things in more detail. But these are areas of research for the future that I think are extremely, extremely valuable.

Mr. President, one thing we have not mentioned either is the international aspects of this. Isn't it nice that we are cooperating in space rather than fighting each other here on Earth? I think that is an important item. And 13 nations, the United States, Canada, Italy, Belgium, The Netherlands, Denmark, Norway, France, Spain, Germany, the United Kingdom, Japan, and Russia are joining together in the largest scientific cooperative program ever, the biggest single scientific cooperative program ever in the history of this country.

We are drawing on the history of the world. We are drawing on Russian expertise and long duration space flight and existing Russian technology and equipment. And the international space station will help redirect the focus of Russian technology programs to nonmilitary pursuits.

This service is a symbol of the opportunities available through a peaceful international initiative. We will have several laboratories aboard the space station: the United States lab, one other United States facility, the European space agency Columbus Orbital Facility, a Japanese experiment module, and three Russian research modules. Partner nations will contribute $9 billion to the U.S. cooperative effort. And international contributions mean international cooperation bringing together the best scientific minds worldwide to answer fundamental scientific questions in this new laboratory of space.

Mr. President, I have used on the floor before the statement by Daniel Webster when they were contemplating in the Senate of the United States whether to provide money to buy land beyond the Mississippi. And he said as follows:

> What do we want with this vast worthless area, this region of savages and wild beasts, of deserts of shifting sands and whirlwinds of dust and cactus and prairie dogs? To what use could we ever hope to put these great deserts or those endless mountain ranges, impenetrable and covered to their very base with eternal snow? What can we ever hope to do with the western coast, a coast of 3,000 miles, rock-bound, cheerless, uninviting, and not a harbor on it? What use have we for this country? Mr. President, I will never vote 1 cent from the Public Treasury to place the Pacific coast 1 inch nearer to Boston than it is now.

Mr. President, I use that statement again to show how myopic Daniel Webster's vision was, learned though he might have been. Certainly, that Western half of the United States, which we were better able to explore than we are going into space, took more than any 25 or 30 years to develop to where it was useful and bring back all the benefit of all of the money we had spent on it.

People have stood here on Earth and looked up for a hundred years, or several hundred thousand years. We have wanted to travel up there. We wanted to go see what it was like. Now we can use that area of space.

One other area. It is not only international cooperation but it is inspiration for our own youth in this country. I think that is an important byproduct, or important add-on to the space program that we sometimes ignore. It is exciting for our young people to know that we are leading the world in science, technology, and research. It is exciting enough that a lot more are going into science and math because of this. How do we measure those benefits? I don't know. In the future, if we can inspire our young people through the space program and the continuing space station, I think that pays off in benefits for the future beyond anything we can see at the outset. Just like the history of this country has shown, that money spent on basic research, even though we can't quite see the benefits at the outset—if there is one thing we have learned, money spent on basic research seems to have a way of paying off in the future beyond anything we see at the outset. This is one of the biggest research programs that the whole world has ever undertaken, and I think it has the biggest potential payoff.

I ask unanimous consent to have some additional information printed in the RECORD at this time.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

WHY A SPACE STATION?

To create a permanent orbiting science institute in space capable of performing long-duration research in the materials and life sciences in a nearly gravity-free environment.

To conduct medical research in space.

To develop new materials and processes in industry.

To accelerate breakthroughs in technology and engineering that will have immediate, practical applications for life on Earth— and will create jobs and economic opportunities today and in the decades to come.

To maintain U.S. leadership in space and in global competitiveness, and to serve as a driving force for emerging technologies. To forge new partnerships with the nations of the world.

To inspire our children, foster the next generation of scientists, engineers, and entrepreneurs, and satisfy humanity's ancient need to explore and achieve.

To invest for today and tomorrow. (Every dollar spent on space programs returns at least $2 in direct and indirect benefits.)

To sustain and strengthen the United States' strongest export sector-aerospace technology—which in 1995 exceeded $33 billion.

MEDICAL RESEARCH AND THE LIFE SCIENCES

The early space program and experiments conducted on the Space Shuttle have made remarkable contributions to medical research and the study of life on Earth.

The Space Station is the next step: a permanent orbiting laboratory.

The Space Station will provide a unique environment for research on the growth of protein crystals, which aid in determining the structure and function of proteins. Such information will greatly enhance drug design and research in the treatment of diseases. Crystals already grown on the Space Shuttle for research into cancer, diabetes, emphysema, parasitic infections, and immune system disorders are far superior to crystals grown on Earth.

The almost complete absence of gravity on the Space Station will allow new insights into human health and disease prevention and treatment, including heart, lung, and kidney function, cardiovascular disease, osteoporois (bone calcium loss), hormonal disorders, and immune system function.

Space Station research will build on the proven medical research already conducted on the Space Shuttle. The Space Station will enable long-term research with multiple subjects among the six-member crews.

Research equipment developed for the Space Station is already paying dividends on the ground. Scientists are growing ovarian tumor samples in NASA's new cell-culturing device so that tumors can be studied outside the body, without harm to the patient. A similar trial is under way for brain tumors.

Medical equipment technology and miniaturization techniques developed for the early astronauts are still paying off today, 30 years later. For example:

NASA has developed a ''cool suit'' for the Apollo missions, which is now helping to improve the quality of life of multiple sclerosis patients.

NASA technology has produced a pacemaker that can be programmed from outside the body.

NASA has developed instruments to measure bone loss and bone density, without penetrating the skin, that are now being used by hospitals.

NASA research has led to an implant for delivering insulin to diabetics that is only 3 inches across; it provides more precise control of blood sugar levels and frees diabetics from the burden of daily insulin injections.

TECHNOLOGY AND ENGINEERING FOR THE FUTURE

The race to the Moon required great advances in engineering and technology that still fuel our economy today. The Space Station will be a testbed for the technologies of the future, as well as a laboratory for research on new, high-technology industrial materials.

Experimental research in the near absence of gravity produces new insights into industrial processes in materials that cannot be replicated on Earth, including an increased understanding of fluid physics and combustion. Space Shuttle experiments that study metal alloy solidification in space could lead to making lighter, stronger superalloys. A better understanding of the combustion process can lead to energy conservation on Earth. A 2-percent increase in burner efficiency for heaters would save the United States $8 billion per year.

The Space Station will be an industrial research and development laboratory to test lower-cost heating and cooling systems, long-life power converters, safer chemical storage and transfer processes, air and water purification, waste management, and recycling systems.

Telerobotic and robotic systems validated on the Space Station will increase human efficiency in space and result in reliable, low-maintenance robots for industry and commercial purposes on Earth.

Research on large space vehicles will lead to improved computer software for developing new, lightweight structures, such as antennae and solar collectors with precision-pointing accuracy. Such developments will greatly benefit the communications, utility, and transportation industries.

As with the Apollo program before it, the Space Station will be a proving ground for advances in communications, computers, and systems integration. The International Space Station program will use telepresence, telescience, expert systems, and the integration of communications and data on an unparalleled scale.

Space Station facilities with the near absence of gravity will permit researchers to study materials that could not exist and processes that could not take place in full Earth gravity. These materials include polymers for everything from paint to contact lenses, semiconductors for high-speed computers and electronics, and high-temperature superconductors for efficiency in electrical devices.

A NEW ERA OF PEACEFUL COOPERATION

As the world redefines itself in the wake of the Cold War, the Space Station is a catalyst for international cooperation and a powerful symbol of U.S. leadership in a changing world. The Space Station:

Continues the largest scientific cooperative program in history, drawing on the resources and scientific expertise of 13 nations: the United States, Canada, Italy, Belgium, Netherlands, Denmark, Norway, France, Spain, Germany, the United Kingdom, Japan, and Russia.

Will channel the aerospace industry of Russia and other countries into non-military pursuits to reduce the risk of nuclear proliferation and slow the traffic of high-technology weaponry to developing nations.

Will provide international commercial opportunities for U.S. companies.

Uses existing Russian space technology, capability, expertise, and hardware to build a better Space Station more quickly and cost-effectively.

Taps into the Russians' vast experience in long-duration spaceflight to benefit the international partnership.

Serves as a symbol of the power of nations to work together on peaceful initiatives and serves as a test case for building mutual trust and shared goals.

Demonstrates that former adversaries can join forces in a peaceful pursuit at a fraction of the cost of the arms buildup during the Cold War era.

Provides a means to influence policies beyond space cooperation, such as giving Russia and the other countries of the former Soviet Union a greater interest in broader U.S. policy initiatives.

Draws significant financial support from the partner nations, which will collectively add more than $9 billion to the U.S. contribution. The partners from the European Space Agency, Canada, and Japan have already expended more than $5 billion on their development programs.

INSPIRATION AND INVESTMENT IN THE FUTURE

The Space Station will inspire a new generation of Americans to explore and achieve, while pioneering new methods of education to teach and motivate the next generation of scientists, engineers, entrepreneurs, and explorers.

Space science is a catalyst for academic achievement. Enrollment trends of U.S. college students majoring in science and engineering track closely with the funding trends of the U.S. space program.

NASA is a leader in the development of virtual reality and telepresence technologies, giving students the same benefits they would get from actual presence on the Space Station and interaction with real astronauts.

Astronauts and cosmonauts serve as role models, capturing the imagination of future leaders and encouraging more students to study science and engineering.

In addition to lessons from space, students of the future will have experiments on the Space Station and will conduct them from their classrooms on the ground. Students will transmit and receive data, manipulate equipment remotely, and evaluate the experiments through data interpretation.

With the new international focus, students will absorb broad lessons in the value of cooperation as we work with partners in Russia, Europe, Japan, and Canada.

Teachers and communities across the nation are already using Space Station concepts in the classroom. NASA receives unsolicited drawings and models of the Space Station by students of all ages. Communities and states conduct ''Space Week,'' during which students live in a bus outfitted as a Space Station.

DESIGN, MANAGEMENT, AND COST

Independent external review teams have confirmed that the management structure of the International Space Station program has been greatly improved. Now the Space Station will have more laboratory space, more electric power, and a larger crew. It will cost $5 billion less than the cost projected for Space Station Freedom. Greater international participation will be present.

Dr. Charles M. Vest, chair of an independent review committee and President of MIT, stated: ''NASA has performed a remarkable management turnaround.''

Instead of four NASA offices overseeing four prime contractors, the Space Station program is now managed by a single NASA office through a single prime contractor, the Boeing Company, which is known for its innovative management.

This program is affordable. The Space Station constitutes only ½ of 1 percent of the federal budget and less than 15 percent of the total NASA budget. It will cost each American $9 a year—about the same as a night at the movies.

NASA has met all of its external and internal deadlines in redesigning the Space Station.

Fully 75 percent of Space Station Freedom's elements will be used on the International Space Station.

The Space Station program has successfully managed its $2.1 billion average annual expenditure since redesign. The program's budget is $11 billion from the present through completion in 2002, for a total of $17.4 billion.

Our international partners have endorsed the design of the International Space Station and the new management structure. Their commitments will total more than $9 billion on the Space Station, of which more than $5 billion has already been expended or placed on contract.

FACTS ON LIFE AND MICROGRAVITY RESEARCH

Statistics

There were 627 total lead investigators in 1995.

Investigators represent more than 100 institutions of higher learning and more than 40 laboratories and other institutions in 40 states and the District of Columbia.

More than 900 graduate students were supported through NASA research in 1995.

Life and microgravity researchers published more than 1,000 journal articles in 1995.

There were more than 1,000 new research proposals received in 1995.

Background

Life and microgravity science research is solicited through an open, highly competitive, peer-review process to ensure that the most meritorious science gains access to orbit.

Historically, NASA's resources have allowed the agency to accept only about the top fifth of the proposals it receives for life and microgravity research. This level of selectivity is comparable to that of other major U.S. science funding sources, such as the National Institutes of Health and the National Science Foundation. Only 10 to 20 percent of these accepted proposals lead to flight experiments, so selection for flight is even more competitive.

Because of the great demand for limited orbital research opportunities, NASA selects research for flight opportunities only if it cannot be conducted on Earth. Flight research is selected from and supported by a larger research effort on the ground.

NASA is fully committed to its close working relationship with the scientific community and to full access to NASA facilities for the most meritorious scientific research. NASA works with the scientific community through its advisory committees and subcommittees, the National Research Council, and working groups of distinguished scientists.

FACTS ON INSPERATION AND INVESTMENT IN THE FUTURE

Astronauts

Astronauts make thousands of appearances each year all over the world.

Eighteen percent of the active members of the astronaut corps are women.

Col. Guion S. Bluford, USAF, was the first African-American in space (1983).

Dr. Sally K. Ride was the first American woman in space (1983).

Lt. Col. Ellison S. Onizuka, USAF, was the first Asian-American in space (1985).

Dr. Franklin R. Change-Díaz was the first Hispanic-American in space (1986).

Maj. Eileen Collins, USAF, was the first female Space Shuttle pilot (1995).

Education

Traveling aerospace education units

These units visit hundreds of thousands of students each year.

Space science student involvement program

This program provides challenges in science, writing, and art.

This includes elementary, middle, and secondary school students.

The program provides an aerospace internship competition for students in grades 9–12.

Thousands of students participate every year.

Urban Community enrichment program

This program is designed to serve middle school students in urban areas.

It raises an awareness of multicultural contributions to NASA.

The program fosters career awareness in science and mathematics.

Thousands of students and hundreds of teachers participate each year.

NASA educational workshops for teachers

These workshops recognize outstanding teachers.

They provide educational advancement opportunities in science, mathematics, and technology.

Hundreds of elementary and secondary teachers participate each year.

Americans and the Space Program

The National Air and Space Museum has averaged more than 9 million visitors per year.

NASA operates hundreds of traveling exhibits each year, which are attended by millions of people.

Millions of people visit NASA Visitor Centers every year.

FACTS ON INTERNATIONAL SPACE STATION CONFIGURATION

Statistics

End-to-End Width (Wingspan)—356 feet
Length—290 feet
Weight—470 tons (940,000 pounds)
Operating Altitude—220 miles (average)
Inclination—51.6 degrees to the Equator
Atmosphere—14.7 pounds per square inch (same as Earth)
Crew Size—6

Hardware

Canadian Mobile Servicing System—includes a 55-foot robot arm with a 125-ton payload capability. It also includes a mobile transporter, which can be positioned along the truss for robotic assembly and maintenance operations.

Functional Cargo Block (FGB—acronym from the Russian term)—includes the energy block contingency fuel storage, propulsion, and multiple docking points. The 42,600-pound element, built in Russia, but purchased by the United States, will be launched on a Proton vehicle.

Russian Service Module—provides life support and utilities, thrusters, and habitation functions (toilet and hygiene facilities). The 46,300-pound element will also be launched on a Proton vehicle.

Science Power Platform (SPP)—provides power (approximately 25 kilowatts) and heat rejection for the Space Station's science and operations.

Crew Transfer Vehicles (CTVs)—include a modified Russian Soyuz TM capsule and another vehicle yet to be determined. The Soyuz CTV can normally accommodate a crew of three, or a crew of two when considering return of an ill or injured crewmember with room for medical equipment.

Progress Cargo Vehicles—carry reboost propellant (up to 6,600 pounds) to the Space Station about four times per year.

FACTS ON INTERNATIONAL SPACE STATION CONFIGURATION

Seven laboratories

Two U.S.—a laboratory and a Centrifuge Accommodation Module (CAM).

One European Space Agency (ESA) Columbus Orbital Facility (COF).

One Japanese Experiment Module (JEM).

Three Russian Research Modules.

The U.S., European, and Japanese laboratories together provide 33 International Standard Payload Racks; additional science space is available in the three Russian laboratory modules.

The JEM has an exposed platform, or ''back porch,'' attached to it, with 10 mounting spaces for experiments, which require direct contact with the space environment. The JEM also has a small robotic arm for payload operations on the exposed platform.

U.S. Habitation Module—contains the galley, toilet, shower, sleep stations, and medical facilities.

Italian Mini Pressurized Laboratory Module (MPLM)—carries all the pressurized cargo and payloads launched on the Space Shuttle. It is capable of delivering 16 International Standard Payload Racks.

Two U.S. Nodes—Node 1 is for storage space only; Node 2 contains racks of equipment used to convert electrical power for use by the international partners. The nodes are also the structural building blocks that link the pressurized modules together.

Total Pressurized Volume—46,200 cubic feet.

External Sites—four locations on the truss for mounting experiments intended for looking down at Earth and up into space or for direct exposure to space.

Power—110-kilowatt average (46-kilowatt average for research, with the Russian segment producing an additional 14 kilowatts for research). There are four large U.S. photovoltaic modules; each module has two arrays, each 112 feet long by 39 feet wide. Each module generates approximately 23 kilowatts. The arrays rotate to face the Sun, providing maximum power to the Space Station.

FACTS ON INTERNATIONAL SPACE STATION CONFIGURATION

Station schedule

Schedule, Date, and Payload

First U.S. Element Launch, November 1997, FGB
First Russian Element Launch, April 1998, Service Module
Continuous Human Presence, May 1998, Soyuz
U.S. Laboratory Launch, November 1998, U.S. Pressurized Laboratory
Japanese Laboratory Launch, March 2000, JEM Pressurized Laboratory
ESA Laboratory Launch, September 2001, Attached Pressurized Module
Centrifuge Launch, August 2001, Centrifuge Accommodation Module
Habitation Module Launch, February 2002, U.S. Habitation Module
Assembly Complete/Continuous Full Crew, June 2002, CTV, Hab Outfitting

Transportation

Total Space Shuttle flights (1997–2002)	27
Assembly	21
Utilization/Outfitting	6
Total Russian flights	44
Assembly	13
Crew Transport	10
Reboost (propulsion)	21
ESA Assembly Flights (Ariane 5)	1
Launch Vehicle for CTV	1

Cost

	Billion
Preliminary Design (1985–1987)	$0.6
Station-Related Design/Development	0.7
Development	8.9
NASA Estimate for Assembly Complete	17.4
FY 94–96 Development, Utilization, Payloads and Mir Support	6.4
Cost to Go (1997—Assembly Complete in June 2002)	11.0
Development	(4.4)
Operations	(4.1)
Utilization Support	(0.3)
Payloads and Mir Support	(2.2)
Operations (2003–2012)	13.0

Mr. GLENN. Mr. President, I wish we had several more hours to discuss this. I hope my colleagues will take time to look at the more complete statement I had in the RECORD yesterday because it went into a lot of these areas in greater detail.

How much time do I have remaining?

The PRESIDING OFFICER. The Senator's time has expired.

Mr. GLENN. Thank you. I yield the floor.

Mr. BOND. Mr. President, how much time remains on each side?

The PRESIDING OFFICER. The Senator from Arkansas has 55 minutes. The Senator from Missouri has 15 minutes. The Senator from Maryland has 4 minutes.

Mr. BOND. Mr. President, I invite my colleague from Arkansas, since we are about out of time, to utilize what time he wishes.

Mr. BUMPERS. Mr. President, I have listened to the speakers who oppose this amendment. I have listened very carefully. I have not heard anybody make any claims of any beneficial research, mechanical, medical, physical, or any other successful research being accomplished by the Russians and the former Soviet Union after 25 years in space. That is right. The Russians have had a space station orbiting the Earth for 25 years. The only reason in God's world we are putting one up there is because they have one. If you don't like that explanation, there is another one that is probably about as good, which is to figure out how we are going to get to Mars, because it is going to take at least 24 months to get there and back, and we want to know, can man survive that long in space. If you want that to be the justification for the space station, for Pete's sake, be honest about it and let us debate that. Carl Sagan is not rhapsodic about all these arguments about curing cancer, but he is about the exploration of space. Even Daniel Goldin said that we not only need to go to Mars, we need to have an outpost there on a permanent basis. He as much as said that is the reason for the space station. If you want to buy that as a rationale for building a space station, I won't vote for it because we don't have the money. Bear in mind that every dime you put into this space station is borrowed money.

Now, just as soon as we get through with this debate and I lose and we continue inexorably, irreversibly toward spending $94 billion we don't have, the same people will come over and you hear all these pompous speeches about balancing the budget. Senator HUTCHISON, a moment ago, talked about all the magnificent accomplishments so far of the space program. One was a remotely programmable heart pacemaker. And she mentioned other products and inventions. But I say to Senator HUTCHISON, those things could have been accomplished for peanuts right here on Earth. You don't have to go into space to develop a remotely programmable heart pacemaker. I also say that those things were discovered and developed by NASA, not the space station. The space station had absolutely zilch to do with those accomplishments.

If you want to do research in the space program on the shuttle, that's fine. I talked earlier about how many times I had gotten teary-eyed watching the shuttle take off. I want you to know that once I got involved in the space program—and I went on the space committee when I first came here and, believe you me, it was a spacey committee—I quit shedding tears when I found out it cost $400 million to send one of those things up. Think of that—$400 million. My good friend, Senator GLENN, said that I misspoke when I said we had only built

17 percent of the hardware of the space station. He suggested we had done 45 percent. Let me clarify that. We have built 165,000 pounds of the station's total 950,000 pounds of hardware. That is about 17 percent. However, NASA says Boeing has accomplished 45 percent of the prime contract. But of the $17 billion the space station is going to cost in the bill, the prime contract is now only $6 billion of it. It is true, we have done 45 percent of the prime contract, but we have actually only built 17 percent space station's hardware. And we are, according to the General Accounting Office, using up those reserves he talked about at a much faster pace than the program can sustain. I might also point out that Boeing is indeed at least 4 months behind, and the Russians are 6 to 8 months behind, and the press is reporting that the space station is already $500 million over its construction budget—$500 million.

If you ask any Senator how he would like to have $500 million for some of his favorite programs, he will start salivating.

I have not heard one single claim that one single case of influenza has been cured by anything we found in space. I have not heard one single claim anyone plans to commercially grow gallium arsenide crystals in space. They can be made there but nobody argues that you can do it economically. On the contrary, everybody says it is totally uneconomical. It is always what we are going to do. We have been at this business 35 years headed for a $94 billion project, and we are saying look what we are going to do.

Look at this chart. The cost is all broken down for you neat as a pin; $94 billion. I can hardly wait for us to get through with this so we can listen to all of the speeches about balancing the budget again.

Where is the cost going? We have already spent $18 billion since Ronald Reagan made that famous speech about how we are going to build this whole thing for $8 billion. We have spent $18 billion since then—$10 billion more than President Reagan suggested. That is just for building the station. That does not include the $51 billion we are going to spend on shuttle launches to keep the space station supplied with water, food, and whatever else they may need for 10 years, which is supposed to be the life of the space station. So it is all right there—shuttle launches, construction, operations, and $1 billion in additional costs. You still have $76 billion to spend. You can vote ''aye'' on this amendment and save the taxpayers of this country $76 billion. Give it to the National Institutes of Health and you might cure cancer. You might make a greater impact on AIDS, arthritis, and a host of other diseases which make life miserable for so many millions of people. You are not going to accomplish anything by putting it into the space station except maybe a good, warm, fuzzy glow occasionally.

This whole thing, $94 billion, works out to a total cost of $25 million for each day the space station will be in operation. You think of that. This thing is going to cost $25 million a day every 24 hours. What is it worth in gold? Twenty-five times its weight in gold. Isn't that something? You think about something costing 25 times its weight in gold for no tangible benefit.

Jobs—each job on this thing of the 15,000 jobs costs $140,000. I can tell you one thing. If I were from Texas, Alabama, or California, I would probably be on the other side of this issue. If I had 15,000 jobs, or any portion of those 15,000 jobs at $140,000 apiece, I would probably think the space station was the greatest thing since sliced bread.

It is going to cost us $12,880 to transport one pound of water or bread or anything else to the space station. Each astronaut is going to use how many pounds of water a day? They are allocated for all purposes I believe 9.5 liters per day. It all comes to $319,000 a day I believe for each astronaut, just for bottled water. That is $1.9 million in water per day for a crew of six astronauts.

Mr. President, I want to read a portion of a letter which I consider to be extremely important in this debate. The testimony by Prof. Robert L. Park before the Commerce Committee, the Subcommittee on Science, Technology, and Space, which he delivered on July 1, 1993. I am not going to attempt to read the whole letter. But I am going to read the salient parts of it. I hope my colleagues will pay close attention to this.

Dr. Park represents the American Physical Society with 40,000 physicists including astrophysicists. About the only physicists who support the space station are the ones that are on NASA's payroll. Here is what Dr. Park said:

> It is the view of the American Physical Society that scientific justification is lacking for a permanent manned space station in Earth orbit. We are concerned that the potential contribution of a manned space station to the physical sciences has been greatly overstated, and many of the scientific objectives currently planned for the space station could be accomplished more effectively and at a much lower cost on Earth by unmanned robotic platforms, or the Shuttle.

You have two groups of experts on the space station. You have physicists and you have medical science. Here is what the physicists say. He goes on to say:

> The only unique property of a space station environment is microgravity. It is not surprising, therefore, that much has been made of this environment in attempts to sell the space station, but many years of research on shuttle flights and in continuous operation of the Russian space station Mir have produced absolutely no evidence that this environment offers any advantage for processing materials or drugs. Indeed, there are sound reasons for doubting that it could. Gravitational forces are simply too weak to significantly affect most processes.

He goes on:

> A possible exception was thought to be the growth of molecular crystals, specifically protein crystals. In November, however, a team of the Americans that collaborated in protein crystal growth experiments on Mir and on the U.S. space shuttle reporting in Nature magazine that 10 years of work at stupendous cost has produced no significant breakthrough in protein crystal growth. Microgravity has no effect on crystallization of most proteins, they report, and, if it does, crystals are as likely to be worse as better. No protein has been observed to crystallize in microgravity that does not crystallize on Earth.

In short, you can do it on Earth. You do not have to spend $100 billion to go into space.

He goes on to say, in quoting Dr. Blumberg at Harvard, a Nobel laureate and physicist, and he summed it up bluntly in testimony before a Senate committee. Microgravity, he says, is of ''microimportance.''

Then he goes on to the spinoff, what you are going to get out of the spinoff. ''It is both false and demeaning for NASA to claim''—listen to this. He says:

> It is both false and demeaning for NASA to claim that products, from magnetic resonance imaging to synthetic pig teats, are spinoffs of the space program. Any program that spends $15 billion per year is bound to produce something that society can use, but few of NASA's claims stand up. Indeed, an internal NASA study of technology transfer which became public in January acknowledged that NASA's spinoff claims were exaggerated, including such famous examples as Velcro, Tang and Teflon. Contrary to popular belief, the study found NASA created none of these.

I have heard that old Teflon, Velcro, Tang argument for 5 years. NASA had nothing to do with it except publicize it.

Let me just close this segment by saying the opportunities for saving money are very limited around here. This year, the deficit is going to be $116 billion. If Bill Clinton had not acted when he did in 1993, it would be $290 billion this year. I do not care whether you like Bill Clinton or not. A lot of people here do not. But he did something that was very unpopular in 1993—he raised taxes. But he raised taxes on the wealthiest 1.2 percent of the people of this country; 28 million people actually got their taxes lowered. But we are today looking at the most dramatic reduction in the deficit any of us ever dreamed would happen. It is a gratifying thing to see that deficit reduced so dramatically over a 4-year period. But I can tell you, while that was not easy, it is easy compared to how you are going to find that other $116 billion toward a balanced budget. You are not going to balance the budget by spending this $76 billion. You keep spending money like this and all you can do is make those great speeches about balancing the budget but you will never balance it. You may convince the chamber of commerce back home that your heart is in a balanced budget, but you just cannot find it in your heart to vote for the things that bring about a balanced budget.

So I plead with my colleagues to show the kind of spine and spunk that

your constituents have a right to expect of you. Oh, it is an easy vote; 99 percent of the people in this country really do not care whether you vote ''aye'' or ''nay'' on this. That is the reason you cannot win it. That is the reason I have not won it in 5 years; it is too easy to vote ''aye.''

So, as I said, I have no illusions about what the vote is going to be, but I am just like the turtle. A man was riding the turtle across the creek. The turtle got out in the middle of the creek and he went under after he promised he would not. And the man who was on the turtle's back said, ''You promised me you wouldn't do that. Why on Earth did you do it?'' And the old turtle said, ''I guess it is just my nature.'' That is the way it is around here. It is just our nature to vote for big spending projects like this and make speeches about balancing the budget.

I yield the floor, Mr. President.

The PRESIDING OFFICER (Mr. ABRAHAM). The Senator from Missouri.

Mr. BOND. Mr. President, I thank my colleague from Arkansas. I understand that there may not be additional speakers on his side. Is that correct? We have, I believe, under my control only about 15 minutes left. There are five people who have asked for that 15 minutes, including myself, Senator BENNETT, Senator SHELBY, Senator HEFLIN, and Senator BURNS. I urge those who want to share in that largess to come join us very quickly because we may—and I want to put all Senators on notice—be able to go to a vote earlier than 10 minutes of 6.

Mr. BUMPERS. Mr. President, if I may say to the Senator from Missouri, I recognize I have been in that position too many times when Senators want to speak but do not come to the floor. But in the interest of accommodating him, if the Senator would like to put in a quorum call without the time being charged to either side, that would be satisfactory until the speakers get here.

Mr. BOND. Mr. President, unfortunately, as much as we wish to accommodate speakers, we also have to accommodate the leadership, which wants us to move forward on the bill. We do have a Senator who is ready to go, and I am pleased to allocate 3 minutes to the Senator from Utah, Mr. BENNETT.

The PRESIDING OFFICER. The Senator from Utah is recognized.

Mr. BENNETT. I thank the Chair. I thank the Senator.

I will not give all the arguments for the space station. I have given them in times past and Congresses past in debate with my friend from Arkansas. He says it is his nature to bring it up. It is my nature to be for it. I will, however, return to a previous quote that I have used in past debates that I think summarizes why it is we go ahead with it. Samuel Eliot Morison, the great historian, wrote this about this country. He said:

America was discovered accidentally by a great seaman who was looking for something else. When discovered, it was not wanted and most of the exploration for the next 50 years was done in the name of getting through or around it. America was named after a man who discovered no part of it. History is like that, very chancy.

Mr. President, that is why we are going into space. No, we do not know with exactness what we are going to find. We cannot predict it any more than the people who discovered this continent from the European side could predict what would happen, and indeed what we find there may not be wanted just as this country was not wanted for a long period of time. But I will share with the Senate this experience.

Every year, I sponsor in the State of Utah an activity called Space Talk, where we get together and talk about space and what can be done in space and what the prospects of space are. Last year, as part of Space Talk, NASA agreed to allow the shuttle on its way from Cape Canaveral to Edwards Air Force Base to stop in Salt Lake City to refuel and stay overnight. As it turned out, the 747 carrying the shuttle banked in over the Salt Lake Valley just about at the end of the day, just about at sunset it came over. There were approximately 100,000 people who stopped in their cars on the freeway, who came out of their houses and stood in their front yards and who waved and acknowledged that as it made a pass down the valley, then turned, came back in low over the valley and finally landing at the Salt Lake airport. I still have people who will come up to me on the street corner literally with tears in their eyes and say, ''Senator, that was one of the most emotional experiences of my life. How proud I am to be an American,'' demonstrating their support for the space program. America has not lost the sense of exploration that it had all the way back to Columbus' time, and we should not lose it again.

I yield the floor.

The PRESIDING OFFICER. Who yields time?

Mr. BOND. Mr. President, I yield myself 3 minutes and ask that I be notified when that 3 minutes has expired.

I do wish to urge my colleagues who had wanted time to come over, those in support. The time is running out.

I did want to answer the legitimate question asked by the Senator from Arkansas: What do you expect to get out of this? What good is going to come from it?

Just a small sample, Mr. President. The National Depressive and Manic-Depressive Association in a letter of July 27, 1995, to Administrator Goldin, the executive director, expresses ''our support for the human brain and neurological research that is part of NASA's international space station program.''

We have a similar letter from the Multiple Sclerosis Association of America, saying:

We are especially optimistic about a project on the station called Neurolab, dedicated to neurological research. This research could be essential to MS patients. Because MS is a neurological disease, the more we know about the brain, the closer we are to understanding and overcoming this illness.

The American Medical Women's Association has written that:

The space station will provide important research opportunities in the following areas:

Diseases predominantly affecting women, including breast, ovarian and cervical cancers and endometriosis;

Diseases more prevalent in women, such as osteoporosis, diabetes and other autoimmune diseases;

Areas in which women are particularly vulnerable, such as biological rhythms, cyclic hormonal changes and balance disorders . . ..

I ask unanimous consent all these letters be printed in the RECORD.

There being no objection, the letters were ordered to be printed in the RECORD, as follows:

THE PLANETARY SOCIETY,
July 24, 1995.

House of Representatives,
Washington, DC.

DEAR REP. GINGRICH: In the past few weeks you have received mail and calls from some of your constituents who are among the over 100,000 members of The Planetary Society. We are urging you to support the President's proposed budget for NASA. Although that budget calls for significant cuts—about four percent per year for the rest of the decade—it preserves important NASA missions and programs to explore other worlds and to understand our own.

This week, the House will vote on the NASA Appropriation as part of the HUD–VA–Independent Agencies bill. There will an amendment offered to cancel the space station. We oppose that amendment.

The Appropriations bill gives NASA $600 million less in FY 1996 than in the President's proposed budget. We believe that cut, on top of the Administration reductions, is too deep and threatens the vitality of the American enterprise in space.

The recent shuttle-Mir success; the stirring results from the Hubble Space Telescope; and the new cheaper, faster, better missions of Mars Surveyor, Discovery and New Millennium bode well for the future. The great interest in the movie Apollo 13 is a reminder of how much these successes mean to the American public, and how important the NASA ''can-do'' philosophy is to our nation.

The building of the space station is an important global effort. It is the largest and greatest international engineering project in history. Many European nations, Japan, Russia, and Ukraine have investments commensurate with that of the United States. The international space station, like Project Apollo, is serving a greater national interest besides that of space development. Like Apollo, it is playing on a world stage.

Several years ago, Carl Sagan, Bruce Murray, and Louis Freidman—the officers of The Planetary Society—testified to Congress with a statement called ''A Space Station Worth the Cost.'' We opposed the then-space station plan as serving no national purpose, as being unrealistic and counter-productive in its budgeting, and as not contributing to the goals of human exploration beyond Earth orbit.

Those defects have now been remedied. The present plan is working on a fixed budget with meaningful cost-savings from Russia's participation. It is serving national and international interests. And, in perhaps the

biggest difference from the previous plan, it has put Americans back in space, making progress toward understanding the physiological effects of long-duration spaceflight. Norm Thagard just broke the American endurance record in space—five years earlier than anyone would have under the previous space station plan.

For Congress to cancel the space station now would cause huge disruptions in many local and regional economies, and worse yet, it would scar our national psyche. It would end the rationale for America's manned space program, and with it would die some of the spirit of a great nation bold enough to seek great achievements.

We ask your support now for the entire NASA program; Manned Spaceflight, Science, Mission to Planet Earth, Technology and Aeronautics. All have been cut this year as well as in the past several years. There is a delicate balance among them now, important to preserving each enterprise, and important to preserving the whole.

Thank you very much for your consideration.

Sincerely,

CARL SAGAN.
LOUIS FRIEDMAN.

MULTIPLE SCLEROSIS ASSOCIATION OF AMERICA,
June 20, 1995.

Hon. ROBERT S. WALKER,
Chairman, House Subcommittee on Science, House of Representatives, Washington, DC.

DEAR CONGRESSMAN WALKER: I am writing on behalf of the Multiple Sclerosis Association of America (MSAA) to express our support for the International Space Station and the medical research that is an integral part of the project. MSAA is a national organization in its 25th year of service in improving the lives of the 300,000 people diagnosed with multiple sclerosis (MS) in the United States and an additional 200,000 as yet not diagnosed.

The MSAA is hopeful, as new findings continue to emerge from space-based research and the possibilities that the International Space Station holds. We are especially optimistic about a project on the station called Neurolab, dedicated to neurological research. This research could be essential to MS patients. Because MS is a neurological disease, the more we know about the brain, the closer we are to understanding and overcoming this illness.

The MS community has benefited from NASA technology to date by utilizing microclimate cooling systems to control MS patients' exacerbations, which are brought on or worsened by heat. Controlling body temperature is crucial to MS patients' health since overheating can cause painful and debilitating symptoms. The MSAA has signed a Memorandum of Understanding (MOU) with NASA to provide information on liquid cooled garments (''cool suits'') as well as helping to make the present technology widely available to patients and utilizing other spinoff technology.

The MSAA urges Congress to appropriate funding for this important research project. NASA's ''cool suit'' literally has changed the lives of some of those suffering from MS. If space-based research continues, perhaps MS patients will have more options and more information in understanding this elusive and incurable disease.

Sincerely,

JOHN G. HODSON, Sr.,
President and Chairman of the Board.

NATIONAL DEPRESSIVE AND MANIC-DEPRESSIVE ASSOCIATION,
July 27, 1995.

Hon. DANIEL S. GOLDIN,
Administrator, National Aeronautics and Space Administration Washington, DC.

DEAR ADMINISTRATOR GOLDIN: On behalf of the 275 chapters of the National Depressive and Manic-Depressive Association (National DMDA), I want to express to you our support for the human brain and neurological research that is part of NASA's International Space Station program. As an organization representing patients affected with depressive disorders, we are strong advocates for improving treatments for diseases of the brain.

Founded in 1986, by and for patients and their families, National DMDA's mission is to educate patients, families, professionals, and the public about the nature of depressive (unipolar) and manic-depressive (bi-polar) illness as medical disease. As the only illness-specific, patient-run organization in the nation, National DMDA seeks to foster self-help for patients and families, eliminate discrimination and stigma, improve access to care and advocate for research toward the elimination of these illnesses.

We believe the International Space Station will augment and complement ground-based brain research and add to the nation's arsenal of research facilities. NASA's cooperative agreements with the National Institutes of Health's (NIH) National Institute of Mental Health (NIMH) and National Institute of Neurological Disorders and Stoke (NINDS) ensure that human brain research efforts are carefully coordinated and contribute to significant progress in the understanding and treatments of brain and neurological disorders. We are also encouraged by the potential for medical breakthroughs offered by NASA's Neurolab, which involves six Institutes of the NIH and several nations in joint spaceflight research ventures dedicated to research in neurological and behavioral sciences.

The Space Station program and related cooperative agreements with NIH are providing needed medical research into brain disorders that will improve the quality of life for millions of Americans. Therefore, we support full and continued funding of the human brain research programs of NASA's International Space Station.

Sincerely,

SUSAN DIME-MEENAN,
Executive Director.

AMERICAN MEDICAL WOMEN'S ASSOCIATION,
June 12, 1995.

Hon. LINDA SMITH,
House of Representatives, Washington, DC.

DEAR CONGRESSWOMAN SMITH: The American Medical Women's Association (AMWA), a professional organization of 13,000 women physicians, has been committed to improving the state of women's health for 80 years. Of primary concern to AMWA is the need for increased research in women's health. As such, AMWA supports the continuation of funding for NASA's International Space Station because it provides one of the most promising new visions for medical research on diseases that strike women and have unknown causes or cures.

Traditional research approaches have not been sufficient to unravel the complex mechanisms underlying diseases that afflict millions of women. The microgravity environment of space allows researchers to carry out experiments that cannot be performed on earth, potentially loading to medical breakthroughs. The Space Station will provide important research opportunities in the following areas: diseases predominantly affecting women, including breast, ovarian and cervical cancers and endometriosis; diseases more prevalent in women, such as osteoporosis, diabetes and other autoimmune diseases; area in which women are particularly vulnerable, such as biological rhythms, cyclic hormonal changes and balance disorders; diseases with different risk factors or interventions for women, such as cardiovascular disease, blood pressure control, lung cancer and AIDS.

NASA research has already benefitted women's health research. Since 1992, NASA entered into 18 different cooperative agreements with the National Institutes of Health to ensure that NASA biomedical research activities contribute to significant progress in the understanding and treatment of diseases and other medical conditions that affect women.

NASA is also a model for the inclusion of women in medical research, having performed and supported research related to the physiological function of healthy women (25 percent of NASA astronauts are women). This has included research in cardiovascular, neurological, endocrinological and musculoskeletal function; in biological rhythms, in behavior and performance; and in the effects of exercise and inactivities. These studies together represent a valuable and perhaps unique data base on the physiology of healthy women.

AMWA strongly urges Congress to consider the important biological research benefits of longer duration space-based research and maintain full funding of the International Space Station.

Sincerely,

DIANNA L. DELL, M.D.,
President.

Mr. BOND. I just conclude these brief remarks by saying that Carl Sagan who, in the past, along with the Planetary Society, raised great questions about the space station serving no national purpose has, now, written saying that the defects in the space program ''have been remedied'' and it is meaningful. ''We ask your support now for the entire NASA program.''

The PRESIDING OFFICER. The Senator's 3 minutes has expired. Who yields time?

Mr. BOND. Mr. President, I yield 4 minutes to the Senator from Alabama, Senator HEFLIN.

The PRESIDING OFFICER. The Senator from Alabama is recognized.

Mr. HEFLIN. Mr. President, I rise in opposition to the Bumpers amendment. I have supported the space station from the very beginning. In fact, I made a speech and have been told by people at NASA that I was the first Senator to call for the building of the space station, more than 15 years ago.

I think the space station is coming along in an excellent manner. I happen to have had the opportunity to visit Boeing during the recess and saw the progress that is being made on the space station. It is up to schedule and is moving in a manner that will mean it will be launched on time and it will move forward in a proper manner.

The space station has many benefits for mankind. People sometimes question the byproducts that have occurred as a result of the space program. There are many, many byproducts that have

come about as a result of the space program. Many of them were not anticipated, but they developed as you develop the program for the space station. For example, digital watches came out of the space program.

I happen to be sort of a walking example of the various benefits that the space program has provided in the field of medical services. I have a pacemaker. The pacemaker idea came as a result of activities involved in the space station.

I also have what is known as a stent. A stent is sort of a metal pipe that is placed in my coronary artery, that holds open an area that became occluded. Therefore, this program with the idea of having a stent originated out of the space program, in regard to the use of metal and how metal could tie into tissue. So I am sort of a walking example of what the space program has done. There are many other benefits that have occurred as a result of the space program. There are volumes, actually, that have been developed, outlining the various programs.

So, I am fully supportive of the space program and of the space station. I think there are several things that are very important. Senator GLENN has gone into this in detail. But the crystallography, by which you grow crystals in microgravity, has been exceptionally beneficial to working toward finding a cure for disease. There is another program known as the electrophoresis program, which is the ability to separate a cell down to the smallest integral parts. To be able to someday use the ability to grow crystals and to grow cells to a much higher degree than they exist on Earth in microgravity, and then use the process of electrophoresis to separate those cells, into the smallest integral parts, has a great potential relative to finding cures for diseases.

So I am fully supportive of this.

Mr. President, to reiterate, I rise today in firm opposition to the amendment before us which seeks to terminate funding for the international space station. I have been, and will continue to be, a strong and vocal supporter of the international space station. I first rose on this floor over 15 years ago as one of the first proponents of a manned laboratory in space. I share with many in this Nation and this Congress a vision of maintaining and expanding the human experience in space. The space station is an investment in the future, an investment fully consistent with NASA's mission. The first words appearing in the 1958 act which created NASA state that the ''Congress declares it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind.'' This project, more so than many others, is true to that charter.

The space station is the largest international peacetime cooperative effort ever undertaken. It will provide a platform for scientific research which could never be duplicated in any laboratory on the ground. The rhetoric surrounding this celebrated program seems to have taken on a life of its own. Old complaints, long since recognized and addressed, resurfaced with every budget debate. From the moment President Reagan proposed the space station in 1984, however, the project has been engulfed in controversy. Skeptics are not shy about decrying the space station as a flagrant misuse of tax dollars in a time of fiscal restraint. Social critics have argued that the money would be better spent at home, shoring up fractured urban areas and investing in better schools.

Congress has repeatedly voted by substantial bipartisan margins to continue our space exploration projects. But in a time of tight budgets, more attempts to kill sound investments in our future are expected. It seems to me, however, that we cannot back away from a strong investment in public interest and research, any more so than parents can decide not to fund their children's college education just because they might still have a mortgage on their home or a large balance on their credit card accounts. At the same time, we cannot ignore our fiscal dilemma. I have long been in the forefront of efforts to inject responsibility and discipline into the Federal budget process. Any public investment must be cost effective. I believe it is time to review the results of efforts to date and recognize the benefits of the project.

The vision of the Congress was to construct in orbit a permanently-manned space station. The purpose of the project was to exploit and enhance the technological superiority of our scientific, engineering, and aerospace industries. While much of the hard science and technology necessary to construct such a facility did exist, the scope of the project extended into hundreds of areas where the existing technology and knowledge base were not fully developed.

The need to create an environment in space which would support a permanent manned presence led us through years of life sciences experiments which have added to our understanding of the human body and produced countless biomedical breakthroughs which are saving or improving the quality of life for people everywhere. I have personally benefited from one such technology breakthrough when I have experienced heart problems in the recent past. The technique used to treat my condition came from the space station's life sciences developments. Our defense systems have also benefited from space exploration. Composite materials needed to endure the harsh environment of space have enhanced our competitive advantage in the engineering and aerospace industries.

Our international relations were enhanced and our construction and operations costs were reduced when we extended participation in this project to our international partners in Europe, Canada, and Japan. Each makes a contribution to the overall design in return for access to the completed station. And an unprecedented cooperative effort was forged when we extended our hand in friendship to the Russian people to join in this truly international space station.

Over the last few years, an enormous number of technological, organizational, and managerial difficulties have been resolved. A diffused and decentralized program structure suitable to the early design stages has been replaced by a lean, integrated, and responsive management structure where communication and accountability are clear. A single host center and a single prime contractor now coordinate and integrate the hardware which support the program.

Just a few days ago, the first U.S. space station module, node 1, passed a critical pressure test. This module features six docking ports and will serve as a gate-way connecting other station modules. The space station is expected to begin assembly in November 1997 with the launch of the Russian-built core vehicle, the functional cargo block. Node 1 is expected to be launched into space 1 month after this core-vehicle.

Now is not the time to pull the collective rug out from under this effort. We have made commitments to our international partners which we must not breach. We have sought the intellectual and capital investment of countless scientists, engineers, and program managers who have labored long and hard to support our ever elusive vision of this project. We gave these groups the vision of an international space station. We gave them the mission of constructing an orbiting laboratory in space. We have held the reins tight and offered considerable course correction at every turn in the development and design stages. Just as we are about to realize the results of this long labor, there are calls to squander our investment, terminate the work, and redirect the funding.

Such calls are short-sighted and ill-conceived, and should not be supported. This Nation enjoys a technological competitive advantage in aeronautics and space issues because of its tradition in investing in the future. Continued construction and operation of the space station will further our advantage. It will provide a laboratory in microgravity which will enhance our understanding of crystallography. It will give us advancements in biomedical research which will improve our health and welfare. It will provide a platform for environmental study of our fragile planet by allowing us to monitor and measure global changes both above and below the atmosphere.

When I hear some of my colleagues rail against the space station and other projects designed to propel us into the future, I cannot help but wonder what they would have said had they been around in 1492. Certainly had these political pundits been in Spain, the news

headlines would have read: ''Columbus voyage disaster, ship lost, India not found.''

We never know what benefits research and development will ultimately yield. Some of the most important discoveries in medicine and other field have been accidental in nature, just as Columbus' arrival in the New World was 500 years ago. Could any of us argue, with a straight face, that the cost of that long-ago voyage, which at that time was astronomical, has not been outweighed many, many times over by the benefits that were bestowed upon mankind?

As we reflect upon that journey during 1996, it would serve us well to think of and focus on the miraculous technological advances and discoveries—many of which have benefitted the human race immeasurably—that would never have been possible had the naysayers carried the day.

In his inaugural address to the Nation over 30 years ago, President Kennedy told Americans that they stood ''on the edge of a New Frontier.'' In describing the phrase that has become synonymous with his short administration, he inspired an entire generation by saying, ''Let both sides seek to invoke the wonders of science instead of its terrors. Together let us explore the starts, conquer the deserts, eradicate disease, tape the ocean-depths * * *''.

Those words are no less profound today that they were in Kennedy's time, for as long as man is on this Earth, and as long as we are able to move forward with scientific and technological advances, we will always be on the brink of a new frontier.

As this will probably be my last opportunity to champion the international manned space laboratory, I remain fully committed to our vision. I ask my fellow colleagues to join with me today in defeating this unreasonable amendment and signaling our collective resolve to support the continued construction and operation of the international space station.

Mr. BOND. Mr. President, how much time do we have remaining?

The PRESIDING OFFICER. The Senator from Missouri has 3 minutes and 25 seconds.

Mr. BOND. I thank the Chair. Mr. President, does Senator MIKULSKI have additional time remaining?

The PRESIDING OFFICER. She has 4 minutes.

Mr. BOND. There is 4 minutes for Senator MIKULSKI and 3 minutes on this side. I believe other speakers have now indicated they will submit their statements and will not give them directly. At this point I will just wrap up. If Senator MIKULSKI wishes to make any further comments, I will be happy to have her comments. Otherwise, I propose to offer a tabling motion.

The PRESIDING OFFICER. Who yields time?

Mr. BOND. Does the Senator from Arkansas wish further time?

Mr. BUMPERS. I was just going to yield myself 2 or 3 minutes.

The PRESIDING OFFICER. The Senator from Arkansas is recognized.

Mr. BUMPERS. Mr. President, I want to clarify the record on one thing, before Senator HEFLIN leaves the floor. As he knows, he and I talked about it, I also have a stent in my heart. We are getting conflicting information. My doctor told me he was part of the team that developed stents out at the National Institutes of Health. He never did mention the space station or any part of space. So we will have to reconcile that little difference about who developed stents.

In any event, I am grateful to whoever did it.

Mr. HEFLIN. Amen.

Mr. BUMPERS. Mr. President, I want to add one point about the cost of keeping the astronauts supplied with in water in space. As I said before, it will cost $12,880 per pound to ship water to the space station. With each astronaut allocated 9.5 liters of water per day, that comes to $1.9 million per day just to keep a crew of six supplied with water. I've done some more calculations and that comes out to about $700 million per year.

Let me say that again, because I think that is sliding over everybody's head. We are talking about almost three-quarters of a billion dollars a year to send water to six people on the space station. Now, you talk about balancing the budget, that is a great way to do it.

I yield the floor.

The PRESIDING OFFICER. Who yields time?

Mr. BUMPERS. Mr. President, how much of my time remains?

The PRESIDING OFFICER. The Senator from Arkansas has approximately 31 minutes remaining.

Mr. BUMPERS. Is the distinguished manager of the bill short on time? I will be glad to yield some time.

Mr. BOND. Mr. President, I think we have all the time we need on this side. The Senator from Maryland has 4 minutes, if she wants to use it. I can conclude in the little time I have. If the Senator from Arkansas is ready to yield back, I will offer a tabling motion.

Ms. MIKULSKI. Mr. President, I understand I have yet 4 minutes.

The PRESIDING OFFICER. It is the Chair's understanding the Senator from Maryland has 4 minutes remaining.

Ms. MIKULSKI. I claim those 4 minutes.

The PRESIDING OFFICER. The Senator from Maryland is recognized.

Ms. MIKULSKI. Mr. President, I conclude in my opposition to the Bumpers amendment by talking about the impact, what it would mean to both taxpayers' jobs and scientific innovation.

Cost to terminate the station would erode any fiscal 1997 savings gained from cancelling the program. Termination costs are estimated at $700 million. The U.S. Government has invested $6.4 billion in the redesigned station and, for the most part, what the Bumpers amendment would do is essentially lose what we have already put in.

Let's go to mission and employment. Termination of the space station would result in the loss of 15,000 highly skilled engineering and production jobs currently under contract, Mr. President, 15,000 jobs in Texas, in Alabama, and in other parts of our great country. In addition, 1,300 civil service positions directly supporting the space station would become expendable. A conservative multiplier effect in California, Texas, Alabama, and Florida estimates 40,000 jobs.

We could talk about science impact, international impact, and the intangibles. Since its inception, the U.S. space program has driven science and technology. It has also motivated our young people to enter careers in space research, engineering, and has inspired the Nation.

We all went to see ''Apollo 13.'' Apollo 13 was more than a movie. It was the whole Apollo program, the space station program. The Hubble telescope is inspiring young people to move in to study science and engineering, and whether they come or go in the space program, they are going to be fit for duty in the 21st century and inventing products we do not begin to think of.

The long-term cutting edge, high-risk R&D is exactly what the United States of America needs. The investment NASA is making in breakthroughs in science and technology will make long-term economic growth possible. It is exactly this type of activity that we need in the United States of America.

Right now in Desert Strike, we are using smart new weapons of war to bring a dictator under heel. I also want to see in the civilian area these new smart technologies that will generate jobs and keep our economy a 21st century economy. Therefore, we cannot approach it with a 19th century attitude or framework.

Mr. President, that concludes my remarks. I yield the floor.

The PRESIDING OFFICER. Who yields time?

Mr. BOND. Mr. President, does my colleague from Arkansas wish any further time?

Mr. BUMPERS. I do not think so. Is the Senator from Missouri prepared to yield back?

Mr. BOND. I am going to conclude with my 2 minutes.

The PRESIDING OFFICER. One minute thirty seconds for the Senator from Missouri.

Mr. BOND. I ask unanimous consent that the vote be held at 5:30.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. BOND. With the time equally divided.

The PRESIDING OFFICER. Without objection, it is so ordered.

The Senator from Missouri.

Mr. BOND. Mr. President, I claim a minute of that time just to follow up on the comments I made earlier. There were questions raised about what we can learn from the space station. We have not learned anything yet. Well, we have not had the space station up yet.

Here is a letter that I thought particularly compelling. This letter begins:

On Earth, we are prisoners of gravity. Gravity influences all life on Earth . . .

In orbit, there is very little gravity—

Or zero-g.

The microgravity environment of space allows researchers to unmask gravity and to see, in many cases for the first time, deeply into physical, chemical, and biological processes which were previously obscured by gravity. . . . This promises to lead to radical new scientific discoveries about life on Earth.

Fundamental insights from international Space Station research will produce broad-ranging benefits for humanity for generations to come.

The writer says:

I don't have space here to catalog all of the potential contributions that the international Space Station could make to the world's biomedical research efforts. I hope the examples I have provided will serve to illustrate this basic point: NASA technology and Space Station research will support the broader fight against human disease and make tremendous contributions to the quality of life here on Earth.

The letter is signed, from the Baylor College of Medicine, Dr. Michael E. DeBakey.

Mr. President, I ask unanimous consent that this letter be printed in the RECORD.

There being no objection, the letter was ordered to be printed in the RECORD, as follows:

BAYLOR COLLEGE OF MEDICINE,
Houston, TX, July 26, 1995.

Hon. ROBERT WALKER,
Chairman, Committee on Science, House of Representatives, Washington, DC.

DEAR CONGRESSMAN WALKER. On Earth, we are prisoners of gravity. Gravity influences all life on Earth. Gravity influences the behavior of everything—from single-celled organisms to rocks, plants, and ships at sea—on the surface of this small blue planet. When we fall, we fall down. We stay attached to the chairs in our offices because of the constant pull of gravity. In the plant world, roots grow down. Even in our own bodies, our hearts have to work harder when we stand than when we're lying down. Try as hard as I might, I can't even begin to imagine what life would be like on Earth without gravity.

In orbit, there is very little gravity. This radically different environment is sometimes referred to as ''zero-g,'' or, more accurately, microgravity. The microgravity environment of space allows researchers to unmask gravity and to see, in many cases for the first time, deeply into physical, chemical, and biological processes which were previously obscured by gravity. Thus, thanks to our space program, for the first time in the history of humankind, scientists can manipulate gravity by decreasing its force as well as increasing it. This allow us to manipulate a primary force of nature in a way that promises to lead to radical new scientific discoveries about life on Earth.

Fundamental insights from international Space Station research will produce broad-ranging benefits for humanity for generations to come. Indeed, we are already seeing significant benefits from the limited research we can conduct on the Space Shuttle. One example is in the field of telemedicine.

Telemedicine is the practice of medicine through the exchange of information, data, images, and video across distances using telecommunications networks such as telephone lines, satellites, microwaves, and the Internet. Today's telecommunications technology, which provides international accessibility in real-time, greatly enhances the delivery of medical care.

The available technologies can link remote sites to larger medical centers, which can provide an opportunity for specialty consultations that might not otherwise be possible. The application of telemedicine offers advantages of cost-effectiveness as well as improved care to remote areas, disaster sites, and undeserved populations.

NASA has been a pioneer in telemedicine since the early 1960s, when it was faced with the challenge of monitoring the health of astronauts in spacecraft orbiting the Earth. NASA's continued use and development of telemedicine to enhance the delivery of medical care in space for future long-duration platforms, such as a space station, will help to support the rapidly expanding application of this technology to health care here on Earth.

In addition to its contributions to the study of basic human physiology, the international Space Station will support a vigorous program of research in biotechnology. The potential of biotechnology to change human society is at least as great as that of the microelectronics revolution. Everyone knows that NASA technologies have been instrumental in microelectronics, but few realize that NASA supported research and the resulting technologies are also driving whole new endeavors in biotechnology.

These new technologies, such as tissue culturing, allow the growth of human tissues for the possible treatment of diseases, such as arthritis and diabetes, and the growth of cancerous tumors, allowing researches to address the development and treatment of colon, breast, and ovarian cancers. This new NASA technology has broad applications in medical research and in the treatment of diseases.

Millions of Americans suffer tissue or organ loss from diseases and accidents every year; the annual cost of treating these patients exceeds $400 billion. At present, the only treatment for these losses is transplantation of tissues and organs; however, these procedures are severely limited by donor shortages. The shortage of replacement tissue and organs has generated a substantial research effort for the development of alternative sources for transplantations.

A major advance would be the ability to grow functional human tissues like those found in the human body, thereby providing the necessary tissues for transplantations and biomedical research. However, medical researchers have been frustrated in their inability to grow human tissues outside the body. Most present-day tissue growth systems do not provide the conditions needed to form the complex structure of tissue in the human body. However, NASA tissue-growth technologies hold the promise of someday alleviating the suffering caused by tissue and organ loss, a major breakthrough for biomedical research.

NASA technology has played an important role in my own work on the development of a mechanical artificial heart using elements of NASA turbopump technology. The use of these new artificial heart pumps is nearing reality.

I don't have space here to catalog all the potential contributions that the international Space Station could make to the world's biomedical research efforts. I hope the examples I have provided will serve to illustrate this basic point; NASA technology and Space Station research will support the broader fight against human disease and make tremendous contributions to the quality of life here on Earth.

Sincerely,

MICHAEL E. DEBAKEY, M.D.

Mr. BUMPERS addressed the Chair.

The PRESIDING OFFICER. The Senator from Arkansas.

Mr. BUMPERS. Mr. President, I am prepared to yield back the remainder of my time and vote now, if it is agreeable with the managers. The unanimous-consent agreement a moment ago was to vote at 5:30. We can just go ahead and vote now.

Mr. BOND. Mr. President, might I suggest we can handle one or two other matters while we are waiting for that. They are procedural matters. We had set earlier in the day, immediately following the vote on the space station amendment, a vote for an amendment offered by Senator MCCAIN and Senator GRAHAM. We have on both sides worked with them.

Ms. MIKULSKI. I wish to bring to the attention of the Senator from Missouri that Senator MCCAIN has changed the original amendment to actually improve it, I think substantially, and Senator HARKIN of Iowa wishes to be sure it has no negative impact in terms of his State. We cannot agree to the UC until we get a signoff from Senator HARKIN. So we cannot get consent to modify it.

Mr. BOND. Mr. President, then I will not make the unanimous-consent request. We think during the course of this next vote that we can bring everybody together and point out that the modification has moved in the direction that would be very beneficial to the interest that Senator HARKIN has raised.

With that, the time of 5:30 has arrived.

The PRESIDING OFFICER. Not yet, but it is approximately 5:30.

Mr. BOND. Close enough for Government work.

The PRESIDING OFFICER. It is close enough to 5:30 for the Presiding Officer.

Mr. BOND. Under that scenario, I move to table the Bumpers amendment and ask for the yeas and nays.

The PRESIDING OFFICER. Is there a sufficient second?

There is a sufficient second.

The yeas and nays were ordered.

The PRESIDING OFFICER. The question is on agreeing to the motion to lay on the table amendment No. 5178. The yeas and nays have been ordered. The clerk will call the roll.

Mr. NICKLES. I announce that the Senator from Oregon [Mr. HATFIELD], the Senator from Alaska [Mr. MURKOWSKI], and the Senator from Pennsylvania [Mr. SANTORUM] are necessarily absent.

I further announce that, if present and voting, the Senator from Oregon [Mr. HATFIELD] would vote ''yea.''

The PRESIDING OFFICER. Are there any other Senators in the Chamber desiring to vote?

The result was announced—yeas 60, nays 37, as follows:

[Rollcall Vote No. 267 Leg.]

YEAS—60

Akaka	Frahm	Mack
Bennett	Frist	McCain
Biden	Glenn	McConnell
Bingaman	Gorton	Mikulski
Bond	Graham	Moseley-Braun
Boxer	Gramm	Murray
Breaux	Grams	Nickles
Burns	Grassley	Pell
Campbell	Gregg	Pressler
Coats	Hatch	Reid
Cochran	Heflin	Robb
Coverdell	Hutchison	Rockefeller
Craig	Inhofe	Roth
D'Amato	Inouye	Sarbanes
Daschle	Johnston	Shelby
DeWine	Kassebaum	Simpson
Dodd	Kempthorne	Smith
Domenici	Kyl	Stevens
Feinstein	Lieberman	Thompson
Ford	Lott	Thurmond

NAYS—37

Abraham	Faircloth	Lugar
Ashcroft	Feingold	Moynihan
Baucus	Harkin	Nunn
Bradley	Helms	Pryor
Brown	Hollings	Simon
Bryan	Jeffords	Snowe
Bumpers	Kennedy	Specter
Byrd	Kerrey	Thomas
Chafee	Kerry	Warner
Cohen	Kohl	Wellstone
Conrad	Lautenberg	Wyden
Dorgan	Leahy	
Exon	Levin	

NOT VOTING—3

Hatfield	Murkowski	Santorum

The motion to lay on the table the amendment (No. 5178) was agreed to.

Mr. BOND. Mr. President, I move to reconsider the vote by which the motion to lay on the table was agreed to.

Mr. COHEN. I move to lay that motion on the table.

The motion to lay on the table was agreed to.

AMENDMENT NO. 5177, AS MODIFIED

Mr. MCCAIN. Mr. President, I ask unanimous consent to modify my amendment.

The PRESIDING OFFICER. Is there objection? Without objection, it is so ordered.

The amendment (No. 5177), as modified, is as follows:

On page 104, below line 24, add the following:

SEC. 421. (a) PLAN.—The Secretary of Veterans Affairs shall develop a plan for the allocation of health care resources (including personnel and funds) of the Department of Veterans Affairs among the health care Networks of the Department so as to ensure that veterans who have similar economic status and eligibility priority and who are eligible for medical care have similar access to such care regardless of the region of the United States in which such veterans reside.

(2) The plan shall—

(1) reflect, to the maximum extent possible, the Veterans Integrated Service Network developed by the Department to account for forecasts in expected workload and to ensure fairness to facilities that provide cost-efficient health care; and

(2) include—

(A) procedures to identify reasons for variations in operating costs among similar facilities where network allocations are based on similar unit costs for similar services and workload; and

(B) ways to improve the allocation of resources so as to promote efficient use of resources and provision of quality health care.

(C) adjustments to unit costs in subsection (a) to reflect factors which directly influence the cost of health care delivery within each Network and where such factors are not under the control of Network or Department management, and

(D) include forecasts in expected workload and consideration of the demand for VA health care that may not be reflected in current workload projections.

(3) The Secretary shall prepare the plan in consultation with the Under Secretary of Health of the Department of Veterans Affairs.

(b) PLAN ELEMENTS.—The plan under section (a) shall set forth—

(1) milestones for achieving the goal referred to in paragraph (1) of that subsection; and

(2) a means of evaluating the success of the Secretary in meeting the goal.

(c) SUBMITTAL TO CONGRESS.—The Secretary shall submit to Congress the plan developed under subsection (a) not later than 180 days after the date of the enactment of this Act.

(d) IMPLEMENTATION.—The Secretary shall implement the plan developed under subsection (a) not alter than 60 days after submitting the plan to Congress under subsection (c), unless within that time the Secretary notifies Congress that the plan will not be implemented in that time and includes with the notification an explanation why the plan will not be implemented in that time.

Mr. MCCAIN. Mr. President, I thank my colleague from Florida, Senator GRAHAM, for all of his efforts on behalf of this amendment. It has been modified. We have worked with the administration.

Mr. President, since this amendment was accepted in the three previous years and then dropped in conference, the Senator from Florida and I felt that we should have a rollcall vote on this although I think that vote will be nearly unanimous since it is basically the same. It was accepted 3 years before.

So, Mr. President, I ask for the yeas and nays on this amendment.

The PRESIDING OFFICER. Is there a sufficient second? There is a sufficient.

The yeas and nays were ordered.

The PRESIDING OFFICER. The question is on agreeing to the amendment of the Senator from Arizona, as modified. On this question, the yeas and nays have been ordered, and the clerk will call the roll.

The assistant legislative clerk called the roll.

Mr. NICKLES. I announce that the Senator from Oregon [Mr. HATFIELD], the Senator from Alaska [Mr. MURKOWSKI], and the Senator from Pennsylvania [Mr. SANTORUM] are necessarily absent.

I further announce that, if present and voting, the Senator from Oregon [Mr. HATFIELD] would vote ''yea.''

The PRESIDING OFFICER (Mr. GORTON). Are there any other Senators in the Chamber who desire to vote?

The result was announced—yeas 79, nays 18, as follows:

[Rollcall Vote No. 268 Leg.]

YEAS—79

Abraham	Feinstein	Mack
Akaka	Ford	McCain
Ashcroft	Frahm	McConnell
Bennett	Frist	Mikulski
Bingaman	Glenn	Moseley-Braun
Bond	Gorton	Nickles
Boxer	Graham	Nunn
Breaux	Gramm	Pell
Brown	Grams	Pressler
Bryan	Grassley	Pryor
Bumpers	Gregg	Reid
Burns	Hatch	Robb
Campbell	Heflin	Roth
Chafee	Helms	Sarbanes
Coats	Hollings	Shelby
Cochran	Hutchison	Simpson
Cohen	Inhofe	Smith
Conrad	Inouye	Snowe
Coverdell	Jeffords	Specter
Craig	Johnston	Stevens
D'Amato	Kassebaum	Thomas
Daschle	Kempthorne	Thompson
DeWine	Kerrey	Thurmond
Domenici	Kyl	Warner
Dorgan	Levin	Wyden
Exon	Lott	
Faircloth	Lugar	

NAYS—18

Baucus	Harkin	Lieberman
Biden	Kennedy	Moynihan
Bradley	Kerry	Murray
Byrd	Kohl	Rockefeller
Dodd	Lautenberg	Simon
Feingold	Leahy	Wellstone

NOT VOTING—3

Hatfield	Murkowski	Santorum

The amendment (No. 5177), as modified, was agreed to.

Mr. LOTT. Mr. President, I move to reconsider the vote.

The PRESIDING OFFICER. Without objection, a motion to table the motion to reconsider is agreed to.

The majority leader.

UNANIMOUS–CONSENT AGREEMENT—H.R. 3517 and H.R. 3845

Mr. LOTT. Mr. President, I ask unanimous consent that, at 9:30 a.m., on Thursday, September 5, the Senate proceed to the consideration of the conference report to accompany H.R. 3517, the military construction appropriations bill; further that, there be 20 minutes for debate only, equally divided in the usual form, and that following the expiration of debate the conference report be temporarily set aside and the Senate proceed to the conference report to accompany H.R. 3845, the D.C. appropriations bill, there be 10 minutes of debate only equally divided in the usual form, and that following debate the Senate proceed to a vote on the adoption of the military construction conference report, to be followed immediately by a vote on the adoption of the D.C. appropriations conference report.

The PRESIDING OFFICER. Without objection, it is so ordered.

ORDER OF PROCEDURE

Mr. LOTT. So Senators should be aware, this agreement will allow for two consecutive rollcall votes in the morning, Thursday, at 10 a.m. We will